Washington State Recreation and Conservation Office
Salmon Recovery Funding Board

PROPOSED
Salmon Recovery Funding Board Meeting Agenda

June 4, 2014
Natural Resources Building, Room 172, Olympia, WA

Time: Opening sessions will begin as shown; all other times are approximate.

Order of Presentation: In general, each agenda item will include a presentation, followed by board discussion and then public comment. The board makes decisions following the public comment portion of the agenda item.

Public Comment: If you wish to comment at a meeting, please fill out a comment card and provide it to staff. Please be sure to note on the card if you are speaking about a particular agenda topic. The chair will call you to the front at the appropriate time.

You also may submit written comments to the Board by mailing them to the RCO, attn: Jen Masterson at the address above or at jennifer.masterson@rco.wa.gov.

Special Accommodations:
If you need special accommodations to participate in this meeting, please notify us at 360/725-3943 or TDD 360/902-1996.

June 4, 2014

OPENING AND WELCOME

9:00 a.m.	**Call to Order** • Determine Quorum • Review and Approve Agenda ***(Decision)*** • Approve December Meeting Minutes ***(Decision)***	*Chair*

MANAGEMENT AND PARTNER REPORTS

9:10 a.m.	**1. Management Report**	
	A. Director's Report	*Kaleen Cottingham*
	• Building Safety Evacuation Plan	*Scott Robinson*
	• Legislative and Policy Updates	
	B. Financial Report (written only)	
	C. Performance Update (written only)	
9:25 a.m.	**2. Salmon Recovery Report**	
	A. Salmon Section Report	*Tara Galuska*
	B. GSRO Report	*Brian Abbott*
	C. Projects of Note	*Staff*
10:00 a.m.	**3. Reports from Partners**	
	A. Council of Regions Report	*Jeff Breckel*
	B. Washington Salmon Coalition Report	*Darcy Batura*
	C. Regional Fisheries Enhancement Groups	*Colleen Thompson*
	D. Board Roundtable: Other Agency Updates	*SRFB Agency Representatives*
10:30 a.m.	**General Public Comment:** *Please limit comments to 3 minutes*	

BOARD BUSINESS: BRIEFINGS

10:35 a.m.	**BREAK**	
10:50 a.m.	**4. Presentation by Washington Coast Sustainable Partnership**	*Miles Batchelder*
11:20 a.m.	**5. Overview of RCO's PRISM System** • PRISM Online • E-Billing • Compliance Workbench	*Scott Robinson* *Scott Chapman* *Mark Jarasitis* *Myra Barker*
11:40 a.m.	**6. Communication Plan Update** • Pyramid Communications	*Brian Abbott* *Darcy Batura* *Jeff Breckel*
12:10 p.m.	**LUNCH**	
12:45 p.m.	**7. Habitat Work Schedule and How it's Being Used to Tell the Salmon Recovery Story**	*Jennifer Johnson* *Kiri Kreamer*
1:30 p.m.	**8. Invasive Species** • Invasive Species Council Overview • Threats to Salmon Recovery • Types of Projects the Board Funds	*Wendy Brown* *Tara Galuska*
2:00 p.m.	**9. Preview of the Salmon-Related Budget for 2015-2017** • Region Delisting Monitoring • Lead Entity Capacity • Habitat Work Schedule • Capital Budget	*Brian Abbott*
2:30 p.m.	**BREAK**	

BOARD BUSINESS: DECISIONS

2:45 p.m.	**10. Lead Entity and Regional Organization Allocation of Year Two Capacity Funds**	*Brian Abbott*
3:00 p.m.	**11. Monitoring Funding** A. IMW Contract Extension—Bridge Funding for Remainder of Federal Fiscal Year B. Update to the 2003 Monitoring Evaluation Strategy	*Brian Abbott* *Keith Dublanica*
3:15 p.m.	**12. Adoption of Washington Administrative Code (WAC) Changes**	*Leslie Connelly*
3:30 p.m.	**13. Riparian Buffer Guidelines**	*Leslie Connelly*

BOARD BUSINESS: BRIEFINGS

4:15 p.m.	**14. Department of Fish and Wildlife's 21st Century Salmon**	*WDFW Staff*
5:00 p.m.	**ADJOURN**	

Salmon Recovery Funding Board Briefing Memo

Item **1A**

Meeting Date: June 2014

Title: Director's Report

APPROVED BY RCO DIRECTOR KALEEN COTTINGHAM

Summary

This memo is the director's report on key agency activities, including operations, agency policy issues, and legislation. Information specific to salmon grant management, performance management, and the fiscal report are in separate board memos.

Board Action Requested

This item will be a:

- ☐ Request for Decision
- ☐ Request for Direction
- ☒ Briefing

In this Report

- Agency operations
- Legislative, budget, and policy updates
- Update on sister boards

Agency Operations

RCO Adds a New Grant Program to Protect Marine Shorelines

RCO is accepting applications in a new grant program: The Marine Shoreline Protection Program. This program is supported by funds from the Environmental Protection Agency (EPA). RCO is jointly managing this program with the Washington Departments of Fish and Wildlife and Natural Resources. RCO will accept the applications and manage the grants once awarded. The other agencies will evaluate the grant proposals and award the grants. This grant program aims to protect high-priority, Puget Sound marine shoreline from the impacts of development through land purchases and voluntary land preservation agreements. Preference will be given for projects that protect intact habitat in areas that are rapidly developing. The Marine Shoreline Protection program is part of the larger Puget Sound Marine and Nearshore Grant Program, which funds projects to protect and restore marine shorelines. Applications are due June 2.

RCO Staff on the Move

- **Nona Snell**, RCO's Policy Director/Legislative Liaison, will be leaving at the end of June. She has accepted a position with the Office of Financial Management (OFM) to be the Senior Budget Assistant for the Capital Budget. The positive aspect to this loss is that we will have a Senior Budget Assistant at OFM who is very familiar with all of our programs. We have not yet decided how to replace Nona.
- **Amee Bahr** has joined the Salmon Section as an administrative assistant. She has her degree in environmental science from The Evergreen State College. Amee worked at Sound Native Plants for 10 years. Amee most recently was a secretary for the Department of Ecology in the Nuclear Waste Program.
- **Kiko Freeman** has joined RCO as a new fiscal analyst. Kiko previously worked for the Department of Enterprise Services as a payroll analyst and has many years of experience working in accounts payable with Washington State Patrol and Department of Enterprise Services.
- **Sarah Gage** stepped into the lead entity manager role in the Governor's Salmon Recovery Office replacing **Lloyd Moody** who retired in April. Lloyd has spent the past 5 years guiding the lead entity program in the Governor's Salmon Recovery Office. His knowledge of salmon recovery and the history of Washington's efforts will be missed greatly by all. Sarah is no stranger to lead entities or salmon recovery. She coordinated a very successful Salmon Recovery Conference in 2013 and also was the lead on updating the metrics for more than 1,200 salmon recovery projects.
- **Brent Hedden** has been promoted to the agency's chief accountant. He will supervise two fiscal analysts and lead work with the Department of Enterprise Services in all accounting, payroll, travel, and accounts payable.
- **Wendy Loosle** will join RCO in June as a management analyst. She will have three primary duties: Board liaison, agency records officer, and lead on public disclosure requests. Wendy comes to us from the Washington Department of Early Learning, where she was a professional development coordinator. She is currently is getting a master's degree in environmental studies from The Evergreen State College.
- **Justine Sharp** has been hired as an administrative assistant. Justine is working to scan all old grant documents into digital form for permanent storage in our PRISM database. She has held several administrative positions, most recently at Companion Veterinary Hospital in Lacey.

One of Our Own gets Recognition with Governor Award

Scott Robinson has been selected to receive the Governor's Award for Leadership in Management. High praise for the excellent work he does for us every day. The Governor's award is an annual award that recognizes managers in state government who demonstrate extraordinary leadership through performance results in the previous year. I nominated Scott because he has driven the agency's development of its technology and performance management systems, while ensuring staff remain motivated and customers happy. Scott led RCO in developing technology that transparently showed where the money was going and what it accomplished through new online tools. He managed those same tools to measure staff performance, holding staff accountable for getting money out the door quickly and closing projects timely. Scott recognized that looking forward and positioning our technology for the future is key to remaining open, transparent, accountable, and efficient. Managing through budget cuts, Scott's positive attitude and open communication style ensured that employee morale and customer satisfaction stayed high as measured in statewide surveys. Scott is the kind of independent, self-starting, motivated employee that every manager dreams of having to supervise. His reward, beside our eternal gratitude, is lunch with the Governor.

RCO Teams Up for Salmon Recovery Presentation to Governor

On April 14, RCO teamed up with our partners at the Department of Fish and Wildlife to share data about fish barrier removal with the Governor and his staff. I coordinated a "customer focus" panel to highlight salmon recovery efforts. Participants included David Troutt, chair of the Salmon Recovery Funding Board; Dave Caudill, RCO outdoor grants manager; and Sam Madsen, a participant in the Family Forest Fish Passage Program. See TVW's coverage of the event at www.tvw.org/index.php?option=com_tvwplayer&eventID=2014040047. The salmon discussion starts about 36 minutes into the recording.

50th Anniversary Plan Set

To commemorate RCO's 50th anniversary this year, the agency will be hosting a formal reception for RCO staff, partners, and former employees and board members set for late afternoon on October 29 in the State Capitol Building. Staff committees are meeting to develop the details so more will follow.

RCO and IT Strategy

RCO and the Puget Sound Partnership have an agreement for sharing information technology staff, resources, and support services. We hired a contractor to look at our systems, staffing, hardware, and other things and make recommendations to guide us in developing a strategic plan. With that first phase complete, we are set to hire a contractor to develop the strategic plan, which will guide us for 3-5 years, and a work plan for the next biennium. The process and plans will be centered on:

- Our systems and applications such as PRISM, Habitat Work Schedule, mapping, *State of Salmon in Watersheds* report, and mobile apps.
- Our information and data.
- Web sites, project snapshot, project atlas, report card, project search, and land inventory
- Our hardware, support, storage, etc.

Our goal is to have the plan completed by the end of the year.

Salmon Recovery Monitoring Panel

An assessment of salmon monitoring efforts earlier this winter resulted in a recommendation to create a monitoring panel. RCO recruited for panel members through a Request for Qualifications and Quotations and received eight proposals. Evaluators will be scoring the proposals on the candidate's credentials, expertise, project schedule, and cost. Interviews with most of the candidates are expected in mid-May with contracts developed by early June. The panel is expected to be in place by June. The panel will: Create an adaptive management framework; evaluate the performance of the board's monitoring program and make policy or funding recommendations; and see if there are any lessons in other monitoring efforts could be applied to board programs.

Staff Attending the Salish Sea Ecosystem Conference

Several Salmon Section staff members attended the Salish Sea Ecosystem Conference in Seattle. The conference is the largest, most comprehensive event of its kind in the region. The purpose of the conference is to assemble scientists, First Nations and tribal government representatives, resource managers, community and business leaders, policymakers, educators, and students to present the latest scientific research on the state of the ecosystem, and to guide future actions for protecting and restoring the Salish Sea ecosystem.

Legislative, Budget, and Policy Updates

Budget Update

The Office of Financial Management is expected to complete budget instructions in early July. The instructions will provide direction for the Recreation and Conservation Office's budget requests. See Item 9 for more budget-related information.

Mitigation Matching Project Update

In 2013, The Washington State Legislature provided RCO $100,000 to identify opportunities to optimize salmon habitat restoration and minimize permit delays for transportation mitigation projects. The Governor's Salmon Recovery Office (GSRO) met with the Department of Transportation to explore a partnership between the agencies using our existing data systems to identify mitigation and salmon projects. GSRO hired Eldred and Associates to help develop a search tool that matches transportation projects with salmon projects. This project will show how state-of-the-art technology can streamline permitting by providing easy access to habitat project lists and mapped locations, which can help permitting agencies and applicants implement projects more efficiently. The contract runs through the end of the year.

Update on Sister Boards

Washington Invasive Species Council

The council's invasive species reporting app, 'WA Invasives,' is available now for free download in the iTunes store and Google Play. The council anticipates a full rollout of the app later this spring. At the March 13 meeting, members voted to create an Industry Advisory Panel that would represent the various industry sectors that are impacted by invasive species. The panel would advise on agenda items and other related invasive species current issues. The council also is beginning to develop a decontamination and prevention training video to be used by state and local agencies, and an update to its 2008 statewide strategic plan. Staff also participated in a Washington Department of Fish and Wildlife-led field tour for Congresswoman Jamie Herrera-Buetler's staff to discuss fishery issues and invasive species threats in the Columbia River.

Habitat and Recreation Lands Coordinating Group

The Lands Group held its quarterly meeting and the acquisition forum in March. The group discussed including more information about the use of lands and future costs in reports. The forum was well attended by county commissions, legislators, citizens, and state agencies. State agencies gave presentations about the habitat and recreation lands they anticipate purchasing with appropriations from the 2015-17 Biennial Budget.

The focus of the next quarterly meeting of the Habitat and Recreation Lands Coordinating Group on June 19th will be identification of measurable goals and future costs of land acquisitions and completing the 2014 State Land Acquisition Forecast Report.

Recreation and Conservation Funding Board

The Recreation and Conservation Funding Board met April 16. Assistant Attorney General Brian Faller briefed the board on the potential for board or board member liability, RCO staff gave an update on several high-profile conversion projects, and the board held a public hearing for non-substantial changes to the Washington Administrative Code.

WASHINGTON STATE
RECREATION AND CONSERVATION OFFICE
Salmon Recovery
Funding Board

Salmon Recovery Funding Board Briefing Memo

Item **1B**

Meeting Date: June 2014

Title: Management Status Report: Financial Report

Prepared By: Mark Jarasitis, Chief Financial Officer

APPROVED BY RCO DIRECTOR KALEEN COTTINGHAM

Summary

This financial report reflects Salmon Recovery Funding Board activities as of April 2014.

The available balance (funds to be committed) is $48.4 million, with the majority of these funds to be awarded to projects by the December 2014 board meeting. The amount for the board to allocate is approximately $40.2 million, primarily in new state and federal funds as well as returned funds. The amount for other entities to allocate is $8.2 million.

Board Action Requested

This item will be a:

- ☐ Request for Decision
- ☐ Request for Direction
- ☒ Briefing

Balance Summary

Fund	Balance
Current State Balance	9,544,781
Current Federal Balance – Projects, Hatchery Reform, Monitoring	802,017
Current Federal Balance – Activities	3,462,607
Lead Entities	187,923
Puget Sound Acquisition and Restoration (PSAR) & Puget Sound Restoration (PSR)	29,866,640
Estuary and Salmon Restoration	2,038,318
Family Forest Fish Passage Program (FFFPP)	2,210,269
Puget Sound Critical Stock	296,840

Salmon Recovery Funding Board Budget Summary

For the Period of July 1, 2013 - June 30, 2015, actuals through 2/18/2014 (fiscal month 07).
Percentage of biennium reported: 29.2

	BUDGET new & reapp. 2013-15	COMMITTED Dollars	COMMITTED % of budget	TO BE COMMITTED Dollars	TO BE COMMITTED % of budget	EXPENDITURES Dollars	EXPENDITURES % of completed
GRANT PROGRAMS							
State Funded 03-05	$159,127	$159,127	100%	$0	0%	$159,127	100%
State Funded 05-07	$947,980	$936,749	99%	$11,231	1%	$160,614	17%
State Funded 07-09	$1,892,914	$1,862,914	98%	$30,000	2%	$495,064	27%
State Funded 09-11	$210,888	$205,363	97%	$5,525	3%	$189,426	92%
State Funded 11-13	$7,238,131	$5,950,602	82%	$1,287,529	18%	$2,329,642	39%
State Funded 13-15	$14,382,000	$6,171,504	43%	$8,210,496	57%	$71,731	1%
State Funded Total	24,831,040	15,286,259	62%	$9,544,781	38%	3,405,604	22%
Federal Funded 2009	$4,221,630	$3,928,644	93%	$292,986	7%	$2,096,568	53%
Federal Funded 2010	$12,820,920	$12,657,316	99%	$163,605	1%	$5,224,758	41%
Federal Funded 2011	$12,544,842	$12,544,842	100%	$0	0%	$4,717,583	38%
Federal Funded 2012	$19,224,074	$17,978,056	94%	$1,246,018	6%	$4,867,893	27%
Federal Funded 2013	$18,284,837	$15,722,825	86%	$2,562,012	14%	$1,418,097	9%
Federal Funded Total	67,096,304	62,831,683	94%	$4,264,621	6%	18,324,899	29%
Lead Entities	6,204,166	6,016,244	97%	187,923	3%	1,981,885	33%
Puget Sound Acquisition and Restoration	83,787,108	53,920,468	64%	29,866,640	36%	11,312,576	21%
Estuary and Salmon Restoration	16,749,076	14,710,758	88%	2,038,318	12%	2,937,074	20%
Family Forest Fish Passage Program	11,911,409	9,701,140	81%	2,210,269	19%	3,763,057	39%
Puget Sound Critical Stock	2,395,012	2,098,171	88%	296,840	12%	1,300,718	62%
Subtotal Grant Programs	212,974,114	164,564,724	77%	48,409,390	23%	43,025,813	26%
ADMINISTRATION							
Salmon Recovery Funding Board Admin/Staff	4,265,478	4,265,478	100%	-	0%	1,359,800	32%
Review Panel	684,516	684,516	100%	-	0%	167,503	24%
Subtotal Administration	4,949,994	4,949,994	100%	-	0%	1,527,303	31%
GRANT AND ADMINISTRATION TOTAL	$217,924,108	$169,514,718	78%	$48,409,390	22%	$44,553,116	26%

WASHINGTON STATE RECREATION AND CONSERVATION OFFICE
Salmon Recovery Funding Board

Salmon Recovery Funding Board Briefing Memo

Item **1C**

Meeting Date: June 2014

Title: Performance Report

Prepared by: Jennifer Masterson, Performance Analyst

APPROVED BY RCO DIRECTOR KALEEN COTTINGHAM

Summary

This memo summarizes fiscal year-to-date grant management and project impact performance measures for projects funded by the Salmon Recovery Funding Board.

Board Action Requested

This item will be a:
- ☐ Request for Decision
- ☐ Request for Direction
- ☒ Briefing

In this Report

- Project Impact Performance Measures
- Grant Management Performance Measures

The data included in this memo are specific to projects funded by the Salmon Recovery Funding Board. Data are current as of May 5, 2014.

Project Impact Performance Measures

The following tables provide an overview of fish passage accomplishments funded by the Salmon Recovery Funding Board in fiscal year 2014. Grant sponsors submit these performance measure data for blockages removed, fish passages installed, and stream miles made accessible when a project is completed and in the process of closing.

Twenty-nine salmon blockages have been removed so far this fiscal year (July 1, 2013 to June 30, 2014), with 19 passageways installed (Table 1C-1). These projects have cumulatively opened over 48 miles of streams (Table 1C-2).

Table 1C-1 SRFB-Funded Fish Passage Metrics

Measure	FY 2014 Performance
Blockages Removed	29
Bridges Installed	8
Culverts Installed	5
Fish Ladders Installed	0
Fishway Chutes Installed	6

Table 1C-2 Stream Miles Made Accessible

Project #	Project Name	Primary Sponsor	Stream Miles
07-1676	Historic Skamokawa Creek Restoration	Wahkiakum Conservation Dist	2.2
09-1232	Wickett Flood Plain Connection/Barrier Removal	Chehalis Confederated Tribes	14.15
10-1504	Middle Branch LeClerc Creek Restoration	Kalispel Tribe	0.25
10-1750	Little Bear Creek - 132nd Ave Barrier Removal	Adopt A Stream Foundation	8
10-1776	Midway Creek Fish Barrier Removal Project	South Puget Sound SEG	0.6
10-1794	Camp Creek Culvert Replacement	Pacific Coast Salmon Coalition	3.2
10-1847	Teanaway River - Red Bridge Road Project	Kittitas Co Conservation Dist	2.8
10-1916	Green Creek Weir Removal	Pacific County Anglers	5.89
11-1250	Cedar Creek Road Barrier Culvert Correction	Chehalis Basin FTF	2
11-1285	McDonald Creek Restoration	Chehalis Basin FTF	0.62
11-1340	Christmas Creek Drainage Restoration	Pacific Coast Salmon Coalition	1.04
11-1441	Upper Chumstick Barrier Removal	Chelan Co Natural Resource	0.3
11-1441	Upper Chumstick Barrier Removal	Chelan Co Natural Resource	0.1
11-1441	Upper Chumstick Barrier Removal	Chelan Co Natural Resource	1
11-1441	Upper Chumstick Barrier Removal	Chelan Co Natural Resource	0.5
11-1441	Upper Chumstick Barrier Removal	Chelan Co Natural Resource	1.1
11-1516	Middle Branch LeClerc Creek Restoration Phase II	Kalispel Tribe	3
11-1597	Ellsworth Creek Fish Passage Project	The Nature Conservancy	1
12-1456	Schoolhouse Creek Culvert Replacements	Pierce Co Water Programs Div	0.5
Total Miles			48.25

Grant Management Performance Measures

Table 1C-3 summarizes fiscal year 2014 operational performance measures to date. Recreation and Conservation Office grant managers and fiscal staff continue to meet or exceed performance targets related to timely issuance of project agreements, response to progress reports, and project closure.

Table 1C-3 SRFB-Funded Grants: Management Performance Measures

Measure	FY Target	FY 2014 Performance	Indicator	Notes
Percent of Salmon Projects Issued Agreement within 120 Days of Board Funding	85-95%	**87%**		Staff have mailed a total of 125 agreements so far this fiscal year for SRFB-funded projects. Staff mail agreements on average 59 days after a project is approved.
Percent of Salmon Progress Reports Responded to On Time (15 days or less)	65-75%	**86%**		A total of 367 progress reports have been due so far this fiscal year for SRFB-funded projects. Staff responded to 316 in 15 days or less.
Percent of Salmon Bills Paid within 30 days	100%	**91%**		This fiscal year-to-date, 905 bills have come due for SRFB-funded projects. 828 bills were paid. Bills may not paid on time because of incomplete sponsor paperwork or lack of proper documentation.
Percent of Projects Closed on Time	60-70%	**70%**		A total of 115 SRFB-funded projects were scheduled to close so far this fiscal year. Eighty of these projects closed on time.
Number of Projects in Project Backlog	0	**12**		Twelve SRFB-funded projects are currently in the backlog.
Number of Post-Completion Inspections Done	No target set	**41**	*NA*	

WASHINGTON STATE
RECREATION AND CONSERVATION OFFICE
Salmon Recovery
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Salmon Recovery Funding Board Briefing Memo

Item **2**

Meeting Date: June 2014

Title: Salmon Recovery Management Report

Prepared By: Brian Abbott, Governor's Salmon Recovery Office Executive Coordinator
Tara Galuska, Salmon Recovery Section Manager

APPROVED BY RCO DIRECTOR KALEEN COTTINGHAM

Summary

The following are some highlights of work being done by the staff in the Recreation and Conservation Office and the Governor's Salmon Recovery Office.

Board Action Requested

This item will be a:

- ☐ Request for Decision
- ☐ Request for Direction
- ☒ Briefing

Grant Management

2013 Grant Cycle Update

As of May 15, 2014, there are 28 projects in funded status and grant management staff are working to get agreements signed for these projects. Of those projects funded in 2013, a total of 111 are under agreement and in active status. Our performance measure is to have all 2013 board funded projects in active status by June 4, 2014. Of the active projects, some sponsors are well underway in implementing their projects.

Starting the 2014 Grant Cycle

As of May 1, 2014, 189 applications for the 2014 grant cycle are entered into PRISM, the Recreation and Conservation Office (RCO) project database. Staff are busy reviewing applications and working with project sponsors. Lead entities are coordinating project site visits with the review panel and staff. All project review site visits occur between April and June. Six out of 25 lead entity site visits are completed. The lead entity site visits are an opportunity for staff and the review panel to see the project sites, learn about the projects, and provide feedback to the project sponsor.

There is an early action process to allocate the remaining 2013-2015 Puget Sound Acquisition and Restoration (PSAR) funds. As of May 15, there is $9.2 million remaining to be allocated in the regular PSAR account and two large capital PSAR projects to be funded in the amount of $15 million. Staff anticipate that all of the PSAR funds will be allocated as part of the early action process. Those "early action" projects must have a complete application loaded in PRISM prior to the site visit, and will come before the board for funding at the September meeting in Winthrop, WA. All other projects submit draft applications, with the full application due in PRISM by August 15, 2014.

Family Forest Fish Passage Program Projects Underway

Dave Caudill, RCO outdoor grants manager for the Family Forest Fish Passage Program (FFFPP), presented information on the efficiencies and benefits of the FFFPP to Governor Inslee and his staff. More information on this presentation is included in the Director's Report.

RCO staff are working closely with partner agencies to get the 2014 Family Forest Fish Passage projects underway, including the remainder of the $10 million in funding from 2012 and $2 million in 2013. Staff continue to close out the 42 projects that were constructed during the 2013 summer. There are 52 new projects staff are working with in preparation for construction during the summer 2014. These projects remove fish passage barriers on small, private forestlands. Even with these new projects, there are 458 eligible landowners with 678 crossings on the waiting list.

Estuary and Salmon Restoration Program

Staff are currently placing $12 million in funding under contract for 20 Estuary and Salmon Restoration Program (ESRP) projects funded in 2013. Six additional projects received $2.3 million through the Environmental Protection Agency's National Estuary Program for beach restoration projects.

The Washington Department of Fish and Wildlife (WDFW) hired a new staff person, Jay Krienitz, to replace Betsy Lyons, the former ESRP Program Manager. Betsy moved to a position with Seattle Public Utilities. Jay comes to WDFW from the Minnesota Department of Natural Resources. ESRP staff are preparing for the next grant round in fall of 2014. They are working on the timeline for proposals and will develop and prioritize a project list for the next legislative session.

Viewing Closed Projects

Attachment A lists projects that have closed between February 10, 2014 and May 5, 2014. To view information about a project, click on the blue project number. From that link, you can open and view the project attachments (e.g., designs, photos, maps, and final report).

Amendments Approved by the Director

The table below shows the major amendments approved between February 15, 2014 and May 1, 2014. Staff processed a total of 48 project related amendments during this period, but most were minor revisions related to project scope or time extensions.

Number	Name	Sponsor	Program	Type	Amount/Notes
09-1705	Skamokawa Creek Community Watershed Implementation	Wahkiakum Conservation Dist	Salmon State Projects	Project Type Change	Change from Combination (Acq/Rest) to Restoration only and remove acquisition piece
12-1663	Twisp River-Poorman Creek RM 4.75	Methow Salmon Recovery Found	Salmon Federal Projects	Project Type Change	Change from Acquisition only to Combination Acq/Planning to do feasibility study and design
11-1343	Meadowbrook Creek and Dungeness River Reconnection	North Olympic Salmon Coalition	Puget Sound Acq. & Restoration	Project Type Change	Change from restoration to Combination Res/Planning due to addition of ESRP Planning funds.

Grant Administration

The following table shows projects funded by the board and administered by staff since 1999. The information is current as of May 15, 2014.

- Staff are working with sponsors to place "pending" projects under agreement, following approval at the March 2014 board meeting.
- Active projects are under agreement. Sponsors are working on implementation with RCO support for grant administration and compliance.

	Pending Projects	Active Projects	Completed Projects	Total Funded Projects
Salmon Projects to Date	26	375	1,482	1,883
Percent of Total	1.4%	19.9%	78.7%	

This table does not include projects funded through the Family Forest Fish Passage Program or the Estuary and Salmon Restoration Program. Although RCO staff support these programs through grant administration, the board does not review and approve projects under these programs.

Records Retention Project

RCO's records retention project is a Lean initiative that updates the agency's process for maintaining current project records and handling old records. Lean is a management philosophy that identifies what is valuable to the agency's customers and eliminates unnecessary steps and processes that decrease efficiency. Records are currently stored in multiple places, which is challenging for contract compliance and risk management. Additionally, staff time is spent scanning paper documents that could be received and managed electronically. The records retention project is moving forward in two stages: the first stage will update the retention process for new records, the second will update the process for old records. The first stage is complete and the retention process has been updated, effective May 1, 2014. The second stage is underway and the process should be developed by July 2014.

Governor's Salmon Recovery Office

Lead Entity Program Manager Position

Lloyd Moody of the Governor's Salmon Recovery Office (GSRO) retired April 30, 2014. Lloyd will be missed but luckily Sarah Gage stepped into the full-time role of Lead Entity Manager on May 1, 2014. Sarah is no stranger to lead entities or salmon recovery. She coordinated a very successful Salmon Recovery Conference in 2013 and was also the lead on updating the National Oceanic and Atmospheric Administration (NOAA) metrics for over 1,200 salmon recovery projects. Sarah brings a wealth of knowledge, passion, enthusiasm, and science to the position. She is looking forward to working with the 25 lead entities across the state and the Washington Salmon Coalition.

Communications Plan

GSRO completed a competitive procurement for a consulting firm to develop a communications plan on behalf of regional organizations and recovery partners. Pyramid Communications was selected from a pool of twelve applicants. There have been two meetings of a work group to assist Pyramid with the development of appropriate messaging. A draft communications plan and a summary report of recommendations will be presented at the board's June meeting.

Mitigation Matching Demonstration Project

GSRO solicited contractor proposals in early February for a mitigation matching project that matches transportation projects with habitat restoration and protection projects. Funding for this project was included in the state salmon capital budget in the amount of $100,000. RCO received three proposals and with the help of an evaluation team selected Eldred and Associates.

This project is to develop a system that enables a landscape mitigation approach and evaluates compensatory mitigation in an ecosystem context. Mitigation matching can both minimize permit delays and optimize salmon habitat restoration for compensatory mitigation. This project will show how state-of-the-art technology can streamline permitting by providing easy access to habitat project lists and mapped locations, which can help permitting agencies and permit applicants implement projects more efficiently. Mitigation matching can assist the State of Washington and RCO optimize the benefits of their salmon recovery and habitat protection and restoration planning by identifying proposed projects and actions that align with transportation mitigation obligations.

RCO's salmon restoration project tracking and reporting system, Habitat Work Schedule (HWS), will help make mitigation matching in Washington State possible. HWS tracks nearly 8500 habitat restoration and protection projects, of which 2,000 are proposed or conceptual projects that are either partially or not yet funded. Paired with the sophistication of the State Department of Transportation's planning products and technologies, HWS creates an excellent opportunity to test the benefits of mitigation matching. The contract with Eldred and Associates will run through the end of the year.

Washington Salmon Coalition

The board approved $50,000 of return funds to provide capacity support for the Washington Salmon Coalition (WSC). WSC is a collection of lead entity coordinators across the state that meet regularly. The purpose of WSC is to provide a statewide forum to collectively discuss and address emerging issues in salmon recovery and provide members training and advice for the development of their local salmon recovery program. GSRO prepared request for proposal (RFP) and the contract was awarded to Long Live the Kings. This funding will assist the WSC in implementing their action plan.

Regional Organization Monitoring Budget Request

Regional organizations have consistently expressed a need for additional funding to meet de-listing requirements. Monitoring activities can be funded only through federal funds or state operating funds; state capital (bond) funds cannot be used for monitoring. The GSRO has committed to work with regional organizations to develop a state general fund budget request to submit to the Office of Financial Management for potential inclusion in the Governor's proposed budget for the 2015-2017 biennium. Such budget requests are submitted by a state agency in early September of even-numbered years. To be successful, regional organizations will need to work with RCO staff to:

1. Identify specific monitoring activities that will be necessary to achieve de-listing under the Endangered Species Act, by region and the time period;
2. Describe who will implement the monitoring work within each region;
3. Identify gaps between current state and local monitoring and the monitoring necessary to achieve de-listing;
4. Detail overall monitoring needs for the next 10 years in 2 year (biennial) increments.

The regions had a meeting on May 12, 2014 where they prioritized their budget needs. Memo 9 descibes the budget requests.

Salmon Recovery Funding Board Monitoring Panel

The board approved the creation of a 3-5 member monitoring panel. GSRO/RCO recently released a call for monitoring panel members. Eight responsed to the reguest for qualifications that were due April 30, 2014. The panel is expected to be in place by the end of June and will fill four important roles:

1. Create a functional adaptive management framework with clearly written expectations and a process for timely implementation;
2. Evaluate, by component, the performance of the board's monitoring program and provide guidance and funding recommendations to the board;

3. Review project effectiveness monitoring and Intensively Monitored Watersheds monitoring results to recommend changes in policy or funding criteria;
4. Compare and share monitoring results to see if lessons learned in other monitoring efforts could be applied to board programs.

A small team will be interviewing seven canadates on May 21. Staff will provide an update at the board meeting in June.

State of Salmon Report

The Department of Ecology and WDFW produced data for several State of Salmon indicators. They are publishing their data to data.wa.gov, the state's web-based tool for charting and tracking live data that feeds into the State of Salmon report web site. Our web designer is pulling this data into our development site.

GSRO staff met with the Northwest Indian Fisheries Commission (NWIFC), the Puget Sound Partnership (PSP), and WDFW to increase coordination of data, technologies, and messages for our respective reports: The State of Our Watersheds report (NWIFC), the State of the Sound report (PSP), and our State of Salmon report. All three documents report similar indicators. This coordination will also decrease pressure on our data sources in the long term.

Habitat Work Schedule

GSRO recently held its first HWS Action Committee meeting with lead entity coordinators who will help inform GSRO about what system users need, how metrics can be more clarified and streamlined in the system, and what outside data would be useful to bring into HWS. GSRO staff conducted two trainings with contractor Paladin Data Systems, lead entities, and sponsors. Staff continue to work with lead entities to align HWS and RCO's PRISM grant management data system for historic projects where the data had been out of sync. GSRO and the lead entities are identifying priority HWS metrics to report across the state at various scales, including in the SOS at the state scale. GSRO and lead entities are also working with PSP to report Puget Sound Action Agenda targets using specific PSP metrics that lead entities tracked in HWS.

Salmon Projects Completed and Closed from February 10, 2014-May 15, 2014

Number	Name	Sponsor	Program	Closed On
11-1441	Upper Chumstick Barrier Removal	Chelan Co Natural Resource	Salmon State Projects	2/12/2014
09-1232	Wickett Flood Plain Connection/Barrier Removal	Chehalis Confederated Tribes	Salmon State Projects	2/13/2014
09-1418	Riverview Park Ecosystem Restoration	Kent City of	Puget Sound Acq. & Restoration	2/18/2014
09-1673	Knotweed Survey and Management - Nooksack River	Whatcom County Noxious Weed	Salmon Federal Projects	2/19/2014
09-1461	Tepee Creek Restoration - Phase 2 Construction	Yakama Nation	Salmon Federal Projects	2/21/2014
07-1676	Historic Skamokawa Creek Restoration	Wahkiakum Conservation Dist	Salmon State Projects	2/25/2014
12-1189	Wiens Farm Riparian Acquisition Project	Heernett Environmental Found	Salmon Federal Projects	3/6/2014
11-1553	Willow Creek daylighting	Edmonds City of	Puget Sound Acq. & Restoration	3/7/2014
11-1219	Downey Farmstead Final Design	Kent City of	Puget Sound Acq. & Restoration	3/7/2014
12-1191	Cedar River Belmondo Reach Acquisition	Seattle Public Utilities	Salmon Federal Projects	3/7/2014
08-1948	Upper Wapato Reach Restoration	Yakima County Public Services	Salmon Federal Projects	3/11/2014
10-1794	Camp Creek Culvert Replacement	Pacific Coast Salmon Coalition	Salmon State Projects	3/11/2014
11-1526	Mission Creek Estuary Restoration	Olympia Port of	Salmon Federal Projects	3/12/2014
11-1597	Ellsworth Creek Fish Passage Project	The Nature Conservancy	Salmon State Projects	3/12/2014
09-1524	Barlow Bay Nearshore Ecosystem Restoration	Friends of the San Juans	Puget Sound Acq. & Restoration	3/14/2014
10-1842	Nooksack Forks & Tributaries Riparian Restoration	Nooksack Salmon Enhance Assn	Puget Sound Acq. & Restoration	3/20/2014
10-1496	Dungeness Habitat Protection	Jamestown S'Klallam Tribe	Puget Sound Acq. & Restoration	3/21/2014
11-1335	Elwha River Salmon and Steelhead Weir	Fish & Wildlife Dept of	Puget Sound Acq. & Restoration	3/24/2014
11-1285	McDonald Creek Restoration	Chehalis Basin FTF	Salmon Federal Projects	3/25/2014
09-1390	Lower Quinault Major Tributaries Knotweed Control	Quinault Indian Nation	Salmon Federal Projects	3/27/2014
11-1377	Tree Farm Hole Acquisition	Stillaguamish Tribe of Indians	Salmon Federal Projects	3/31/2014
08-2001	Large Wood Replenishment	Mid-Columbia RFEG	Salmon Federal Projects	3/31/2014
11-1567	WRIA2 Derelict Fishing Gear Removal	NW Straits Marine Cons Found	Salmon State Projects	4/3/2014
10-1365	Stillwater Flooodplain Restoration - Construction	Wild Fish Conservancy	Salmon Federal Projects	4/4/2014
11-1296	Derelict Fishing Net Removal in WRIA6	NW Straits Marine Cons Found	Salmon State Projects	4/4/2014
09-1590	Matson Barrier Removal and Trust Water Project	North Yakima Conserv Dist	Salmon Federal Projects	4/15/2014

Number	Name	Sponsor	Program	Closed On
09-1648	Calistoga Setback Levee - Final Design	Orting City of	Puget Sound Acq. & Restoration	4/15/2014
08-1741	Monahan Creek Restoration	Cowlitz Conservation Dist	Salmon Federal Projects	4/15/2014
13-1103	Royal Arch Reach Protection - Selland	Seattle Public Utilities	Puget Sound Acq. & Restoration	4/17/2014
11-1250	Cedar Creek Road Barrier Culvert Correction	Chehalis Basin FTF	Salmon State Projects	4/17/2014
12-1456	Schoolhouse Creek Culvert Replacements	Pierce Co Water Programs Div	Salmon Federal Projects	4/18/2014
11-1554	Upper Goldsborough Habitat Acquisition Phase 2	Capitol Land Trust	Puget Sound Acq. & Restoration	4/21/2014
11-1450	SF Nooksack Cavanaugh Island Restoration	Lummi Nation	Puget Sound Acq. & Restoration	4/25/2014
10-1481	Canyon Creek Barrier Removal	Whatcom County FCZD	Puget Sound Critical Stock	4/28/2014
10-1859	Middle Boise Creek Restoration	King County DNR & Parks	Salmon Federal Projects	4/30/2014
10-1827	Mill Creek Japanese Knotweed Removal	Walla Walla Co Cons Dist	Salmon Federal Projects	5/6/2014
12-1208	Davis Slough Hydrologic Connectivity Final Design	Skagit Fish Enhancement Group	Salmon Federal Projects	5/6/2014
09-1726	North Powell Complex Riparian Restoration	Nisqually Land Trust	Salmon Federal Projects	5/7/2014
12-1635	NF Touchet R Fish Passage Improvement at Road 650	Umatilla Confederated Tribes	Salmon Federal Projects	5/14/2014

Washington Council of Salmon Recovery Regions
Report to the Salmon Recovery Funding Board
June 2014

The regional directors met in April and May to work on the following topics.

- **Communications and Outreach Strategy**
  In April Pyramid Communications provided an update on their efforts to craft a salmon recovery communications and outreach strategy. Examples of messaging and outreach strategies developed for other organizations were presented. Pyramid explained that the salmon recovery strategy will present a high-level statewide approach in identifying key messaging, audiences, and outreach methods. In May, the nearly final strategy and messaging materials were presented. The directors were pleased with the Pyramid's approach, but recognize that it just the first step in fully developing and implementing an outreach strategy on both the state and regional scales. It was agreed that it was important to maintain the momentum. Each region will now begin to tailor the message for their particular needs.

  In the course of the discussions, the directors expressed a desire to ensure that WDFW programs are in line with regional recovery efforts. The directors asked Brian Abbott to pursue a setting up a meeting with the senior WDFW program managers.

- **2015-17 Monitoring Budget Request**
  The directors are working with GSRO and RCO's policy staff to develop a monitoring budget request for inclusion in RCO's operating budget for the next biennium. This is an important request to fill high priority data gaps that will answer key questions and help in working with NOAA for the next 5-year status review. In developing the budget package the regions agreed that both VSP and habitat status and trends monitoring are priorities. Each region has completed a series of exercises to identify and prioritize their gaps. The final budget request and accompanying narrative will be completed with GSRO with assistance from the regions by the end of June.

- **Potential Washington Coast Sustainable Salmon Partnership Funding Request**
  The Washington Coast Sustainable Salmon Partnership asked the regional directors to endorse their request to the SRFB for $50,000 in regional organization contract return funds to help fund development of an implementation "business plan" for its sustainable salmon plan. The WA Coast Partnership is working with National Fish and Wildlife Foundation to secure funding for this effort. NFWF hopes to provide a 1:1 match to the SRFB funds. They have secured a private donor. The regions are supportive of the Washington Coast Partnership's effort but are unsure of the amount of unused regional organization funds that will available.

- **2015-17 Capacity Coordinated Budget Request**
  WDFW is leading the development of a combined salmon recovery capacity proposal for the next biennium. The regions, lead entities, and regional fish enhancement groups, along with GSRO are working together to complete a capacity needs worksheet template. The parties agree this effort is important and timely, but they have concerns that it may not be possible to garner the level of support needed from each of the numerous groups to prepare a 2015-17 biennial funding proposal. Nevertheless, the directors believe that it is important and will continue to help refine the approach and template details.

WASHINGTON SALMON COALITION

Community-Based Salmon Recovery

May 20, 2014

David Troutt, Chairman
Salmon Recovery Funding Board
WA Recreation and Conservation Office
PO Box 40917
Olympia, WA 98504-0917

Dear Chairman Troutt and Board Members,

2014 Grant Round Update

The statewide grant review is now in full swing! At this point in our process, the Lead Entity coordinators are organizing and facilitating project site visits in a manner that makes the best use of the state review panel's time. The purpose of a site visit is to allow individuals who will be evaluating the project to get a better sense of the problem and the project sponsor's proposed solution. In addition to the two state review panel members, other participants include the Lead Entity Coordinator and an RCO Outdoor Grants Manager. Other individuals who may also be present are board members, staff and/or members of the Technical Advisory Groups and Citizen's Committees.

This is an excellent opportunity for applicants to gather advice from attendees on ways to improve the proposal before the final review, and applicants are encouraged to revise their applications in response to feedback. After the site visits conducted, the review panel team will complete project comment forms with directions on how the applicant can improve the project before the final application deadline. Grant applicants must address review panel comments in their final applications.

Thank you for your Support!

During the March SRFB meeting, you unanimously approved the Washington Salmon Coalition request to use $50k in anticipated unspent lead entity SRFB capacity grant funds to support WSC's statewide efforts as outlined in our Action Plan. Following that decision, we worked with GSRO/RCO to incorporate our scope of work into an RFQQ in order to hire a consultant and put those dollars to work as quickly as possible.

Reponses were reviewed by representatives from GSRC, RCO, and WSC. The contract was awarded to a collaborative approach proposed by Long Live the Kings and Cascadia Consulting. These organizations bring a strong skill set into our group and we are working together to ensure that we hit the ground running. Long Live the Kings and Cascadia Consulting will join WSC for their June in-person meeting to help with meeting logistics and facilitation. We are thrilled to have this support and eager to see how the support will aid WSC in meeting its short and long-term goals and objectives.

WASHINGTON SALMON COALITION

Community-Based Salmon Recovery

Updating WSC Goals and Objectives

You may recall that the WSC completed a significant revision to our Mission, Structure, and Action Plan in 2013. As part of that process, we agreed to revisit both our short and long-term goals annually, during our last meeting of the fiscal year. By doing so, we hope that this guidance document continues to be actively consulted and employed to advance our mission, and is nimble enough to respond to changing needs. Our Communications, Funding, and Habitat Work Schedule committees are working to update their goals and objectives now. Our consultant will update the document to reflect those revisions and we will ask for consensus on the revised document in June.

Statewide Lead Entity News and Updates:

Kennedy/Goldsborough (WRIA 14) project success:

Upper Goldsborough Habitat Acquisition, Phase 2 (11-1554)

Sponsored by Capitol Land Trust and supported by numerous partners including the Squaxin Island Tribe, this project protects 145 pristine acres of Mason County. The property is comprised of wetlands with pockets of forest nearing old-growth conditions, and contains 1 1/3 miles of Goldsborough Creek, which provides high quality habitat for Coho, steelhead and cutthroat.

Goldsborough Creek is a rain-fed system that begins in numerous, depressional lakes and hundreds of acres of floodplain wetlands in the Little Egypt Valley west of Shelton. It increases in gradient and flow downstream as it cuts down through the underlying hydrostratigraphic units to discharge into the Shelton Harbor area. As it flows downstream, summer water temperatures cool from the influx of groundwater. The cooler lower reaches and associated harbor area form critical refugia for numerous resident and migrant fish and wildlife species (including several ESA listed or candidate species like steelhead, orca and coho).

Goldsborough Creek represents an exceptional opportunity for Coho recovery. Returning spawners and out-migrating juvenile populations continue to plummet everywhere around Puget Sound except in Goldsborough Creek. This is the result of removal of a blocking dam at RM 2.2 in 2001 which opened 25 miles of prime fish habitat to spawning and rearing.

Coho benefit tremendously from the fact that the Goldsborough basin is relatively undeveloped. Including the urban growth area, impervious surface is ~8%. Almost all impervious surfaces are located along the lower two miles of stream channel inside the city limits. Much of the basin is managed as industrial timberland which provides extensive forest cover. On the majority of those lands, riparian and instream ecological functions are being restored and protected through a landmark Habitat Conservation Plan/TMDL Technical Report & Implementation Plan.

Yakima Basin (WIRA 37, 38 & 39) Project Success:
Eschbach Park Levee Setback and Restoration Project (10-1765)

Eschbach Park has a long and rich history in the Yakima Basin as a place for rest, refuge, and public open space for recreation and the appreciation of Yakima's natural beauty. Eschbach became a popular park in the 1920s and '30s, thanks to its dance hall, swimming hole and homemade ice cream. For nearly 90 years the park attracted users from around the state for camping, celebrations, or to simply to escape the heat and float on tubes through the lazy side channel.

The park is located in the floodplain of the Naches River and was protected by a large levee. Over the past few decades flood events had weakened the levee and it was clear that the levee as a man-made constriction on the river was contributing to problems downstream, including the loss of private land. Yakima County was also forced to make the hard decision to close Eschbach in 2009 due to challenging budget realities.

In 2010, Yakima County Public Services was awarded a Salmon Recovery Funding Board (SRFB) grant to implement their vision to turn Eschbach Park into a nature preserve. The 50-acre park, located five miles west of Yakima on the Naches River (RM 9.1), features a two-acre pond with a free-flowing stream. The County's vision involved removal of the old levee, allowing the river to recapture some of its historic floodplain, and create fish habitat. This SRFB project ensures that Eschbach will continue to offer public benefits as a place for rest and refuge; however, now the target users are endangered fish and wildlife.

Project partners have worked hard for four years on planning and design, permitting, and looking at cultural resources. Project construction was finally implemented this spring. Project implementation removed the Eschbach Park Levee and reconstructed a new levee 800 to 1100 ft. landward from the original location. The project provides fish access to over 37 acres of high quality, mature riparian habitat in the Naches River and reconnects two side channels that had been cut off by the original levee construction in 1974. Other key benefits include:

- Levee removal – reduction of private property losses.
    - Reduces flood elevations to the City of Yakima Water Treatment Plant (Critical Public Facility) and US 12, both located on the opposite bank from the removed levee.
    - Reduces erosion risk to Kerhsaw Lane and the potential for the channel to move into abandoned gravel pits downstream.
- Irrigation modifications modernized the infrastructure to increase irrigation Efficiencies.

Yakima County takes an innovative approach to implementing projects on its rivers; they consider the river itself to be a key part of the workforce by doing its job of flooding and reshaping the floodplain. Their approach involves a fairly light touch for a project of this size. They provide access by levee removal and create pilot channels directing the river to some of

WASHINGTON SALMON COALITION

Community-Based Salmon Recovery

Continued from page 3:

Eschbach Park Levee Setback and Restoration Project (10-1765)

the historic side channels, then allow the river to do the majority of the work. Over time, they expect the river to reconnect a larger reach (2.1 miles) of the Naches River to its historic floodplain. The construction phase of this project was completed on March 15, 2014. Increasing spring runoff has already allowed the river to begin its work by eroding the levee removal area and directing more water into the side channels. Large woody debris was added to the new overflow channel as it became available during the construction process.

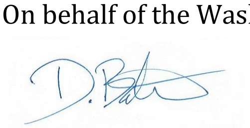
The Yakima Basin Steelhead Recovery Plan recognizes the importance of floodplain habitats to the survival of salmon and the health of the aquatic ecosystem overall. This area is used by ESA-listed (threatened) Mid-Columbia Steelhead and Bull Trout, as well as Coho and spring Chinook. Historic conditions in this reach would have favored spawning and rearing for Steelhead and Summer/spring Chinook, and Coho as documented by recent surveys by the Mid-Columbia Fisheries Enhancement Group. The types of habitat located in and downstream of Eschbach Park are especially important to Chinook and Coho, due to numerous spring-fed channels that exist on the site. As these habitats become reconnected to the river at multiple points and expand spatially, habitat quality and quantity will increase dramatically in the Lower Naches River. All of the floodplain areas affected are already in conservation status, thus the habitat will be protected in perpetuity.

This project is one of the two the RCO selected to forward to NOAA for the PACSRF report to Congress. Please join us in congratulating Yakima County Public Services and their partners RCO, YBFWRB, USFWS, YVCC, and Mike McClung Construction for a great job on implementing a fantastic project!

After Levee Removal - river moving toward Right Bank

Overflow Channel with wood from onsite clearing

On behalf of the Washington Salmon Coalition, I thank you for your continued support,



Darcy Batura
Yakima Basin Lead Entity Coordinator & WSC Chair

WASHINGTON STATE
RECREATION AND CONSERVATION OFFICE
Salmon Recovery
Funding Board

Salmon Recovery Funding Board Briefing Memo

Item **5**

Meeting Date: June 2014

Title: Overview of RCO's PRISM System

Prepared By: Scott Robinson, Deputy Director
Scott Chapman, PRISM System Administrator
Myra Barker, Compliance Specialist
Mark Jarasitis, Chief Financial Officer

APPROVED BY RCO DIRECTOR KALEEN COTTINGHAM

Summary

The Recreation and Conservation Office (RCO) continues to enhance and improve its PRISM data system. In the last three years, staff have focused on developing new system features using web-based technology so sponsors and RCO staff can more readily access the information they need to make informed decisions and better manage projects. RCO calls this system enhancement PRISM Online. In 2012, RCO built the first phase of PRISM Online, the Application Wizard. Since then, staff completed the Compliance Workbench and are in the process of developing a new electronic billing module. These technological improvements help RCO achieve two of its organizing principles -- ensuring for fair and accountable grant management and providing innovative support services. At the June Salmon Recovery Funding Board meeting, staff will present information about the efficiencies created by these new systems.

Board Action Requested

This item will be a:

- ☐ Request for Decision
- ☐ Request for Direction
- ☒ Briefing

PRISM Online – Application Wizard

The Recreation and Conservation Office (RCO) first developed PRISM in 1996 to allow sponsors to submit their applications electronically and as a grant management tool for staff. To use the system, applicants were required to download the PRISM program onto their computer. Users of Macintosh computers could not use PRISM unless they ran a Windows operating system.

Over the years, project applicants have consistently mentioned two areas of concern about PRISM:

- Downloading and installing PRISM can be difficult because of the increased security requirements of many organizations.
- Using PRISM to complete applications is not intuitive and can be frustrating to first-time and infrequent users.

In 2011 RCO started the design process to develop a new grant application system, PRISM Online, that sponsors can easily access and use with any web browser (e.g., Internet Explorer, Firefox, Google, Chrome, Safari, and Opera). Because the application is web-based, users can access PRISM from PCs, Macs, and mobile devices such as iPads and other tablets.

PRISM Online was designed by a team of RCO staff, PRISM users and contracted developers from Rudeen and Associates. Designed as an Application Wizard, the system guides applicants step-by-step through the application process. As they complete each page, applicants are able to check for errors and determine if they have successfully completed that portion of their application. Required application attachments are identified by the system, and a mapping tool allows applicants to map the location of their projects with a point.

Other features of PRISM Online include customized screens to show applicants and sponsors the projects associated with their organizations. Users can also see the location of their projects on a map. These new features help sponsors to fully complete their applications and save RCO staff time previously spent mapping and reviewing applications for completeness.

PRISM Online was implemented in December 2012 and was used for the first time by applicants applying for Salmon Recovery Funding Board grants in 2013.

Compliance Workbench

The Compliance Workbench (workbench) is a new web-based component of PRISM Online that is used by RCO staff to more efficiently conduct project compliance inspections and to track project compliance concerns and conversions.

The workbench has many key features, including:

- Assigning project inspections geographically instead of by individual project.
- Allowing grant managers to fill out compliance forms electronically in the field for multiple projects, which gives project sponsors more timely inspection results.
- Tracking compliance issues until they are resolved by RCO staff.

The workbench was developed partially in response to a National Park Service recommendation that RCO improve the tracking of long-term stewardship issues at funded sites. The workbench was funded with a grant from the Land and Water Conservation Fund and RCO administrative dollars.

The Compliance Workbench was implemented in January 2014. A total of 46 inspections[1] have been completed to date using this new tool.

E-Billing

For more than 10 years, RCO has considered an electronic billing (e-billing) system that allows project sponsors to submit bills online. This reduces the need for paper billing forms and the mailing of documents.

The development of PRISM Online made it cost-effective and feasible for RCO to move forward with e-billing. In order to develop e-billing, RCO assembled a project team made up of staff, grant recipients, and contractors to assist in the scoping, planning, and building of the final product.

The e-billing system is now about 60 percent complete and the first round of testing was a success. More work remains. Further testing will be conducted in September, with a target project completion date of June 2015.

[1] As of May 5, 2014.

GOVERNOR'S SALMON RECOVERY OFFICE & COUNCIL OF REGIONS COMMUNICATIONS PLANNING

COMMUNICATIONS PLAN | MAY 2014

INTRODUCTION

The purpose of this communications plan is to assist Washington State's seven regional salmon recovery organizations to continue to build support for and coordinate the implementation of locally-written, federally approved, scientifically credible recovery and sustainability plans for at-risk salmon and steelhead (six of them for ESA-listed salmonids).

This communications plan with message framework, findings, and recommendations report should be of additional assistance to other members of Washington State's infrastructure for regionally-led salmon recovery: the Governor's Salmon Recovery Office (GSRO) and Recreation and Conservation Office (RCO); the Salmon Recovery Funding Board (SRFB); and the Lead Entities, now organized as the Washington Salmon Coalition (WSC), who work within regions to coordinate and implement on the ground salmon recovery projects.

The plan was developed by Pyramid Communications and based on workshops, meetings, interviews, research, and our own experience with salmon recovery in the state of Washington. Our work was guided by a communications working group assembled by the Governor's Salmon Recovery Office: Brian Abbott (GSRO); Jeff Breckel (Lower Columbia Salmon Recovery Board); Derek Van Marter (Upper Columbia Salmon Recovery Board); Alicia Lawver (Puget Sound Partnership); Darcy Batura (WSC); Susan Zemek (RCO); Nancy Biery (SRFB); and Jennifer Quan (WDFW). Additional assistance was provided by Alex Conley (Yakima Fish and Wildlife Recovery Board); Jeanette Dorner (Puget Sound Partnership Salmon Program Manager); Miles Batchelder (Washington Coast Sustainable Salmon Partnership); Scott Brewer (Hood Canal Coordinating Council); and Steve Martin (Snake River Recovery Board). Sethodology is described in the attached Findings and Recommendations Report.

OVERVIEW

Robust salmon migrating in healthy rivers connect the marine environment and the communities of our coasts to those of our mountains and high deserts. When the decline of multiple species of salmon caused the federal government to list them as threatened and endangered, the citizens of Washington state got to restore salmon and the rivers, forests, shorelines, and other features of the natural world upon which they and we depend.

This collective and local response to federal ESA listings in the late 1990's was unprecedented. Washington State created a new infrastructure of regional salmon recovery organizations to coordinate the efforts of thousands of local professionals and volunteers working in concert with federal, tribal, and state agency scientists and policy makers to create our own regional salmon recovery and sustainability plans.

With the plans completed, the regional organizations have turned their focus to implementation. They review and make recommendations to the Salmon Recovery Funding Board for projects submitted by Lead Entities that will help implement recovery. They have created well-respected processes for public participation. They partner with other organizations to conduct necessary science; they coordinate the efforts of multiple government agencies; and they monitor progress and work with the Governor's Salmon Recovery Office to report biennially to the legislature and public. Funding for the regional organizations is sourced from the federal Pacific Coastal Salmon Recovery Fund. Washington State competes with four other states for this funding. Some regions have begun to diversify their sources of financial support.

The story of this unique approach and new infrastructure was widely reported and well-known in the early years when the ESA listings themselves were received as dramatic news, as was the decision to craft our own recovery plans. But in the fifteen years since, as the regions and local leads have been implementing their plans, reporting on the story has shifted and become more about individual projects or threats, fights among interest groups, or questions about how much is being spent and when we'll be done. There's also a lot of confusion inherent in the salmon recovery story. It's difficult to explain how we can continue to allow harvest on listed species; most people don't realize that there are different species of salmon and within those species, different Ecologically Significant Units that were listed. Very few understand the complications surrounding the use of hatchery fish to supplement fisheries and, in some cases, help rebuild naturally spawning populations. The general public also has limited understanding of the co-manager relationship between the treaty tribes and the state of Washington—another unusual government arrangement.

In part, this is because there was little perceived need on the part of the regions to keep telling this complex story. We'd been successful: the lawsuits and economic upheaval that we feared ESA listings would prompt did not come to pass. Federal funding for implementation was all but assured by our federal congressional delegation who understood the necessity of regional coordination to ensure funds were effectively spent. The regions left the storytelling to the partner organizations and individuals who undertook the salmon recovery projects and to the representative state agencies to make the case for continued federal and state funding.

Fifteen years in, it's time to retell the story. Thousands of people across our state are working together to restore salmon that we might recover and protect a Pacific Northwest in which we want to continue to live. We want to be able to explain to county, legislative, state, federal, congressional, and tribal decision makers and their constituents what the past 15 years have bought us, and what multiple benefits will continue to accrue to all of us now and into the future from an investment in the restoration of salmon and the unique landscapes and waterways they inhabit.

GOAL

To ensure continued support for scientifically credible, regionally-led, locally implemented salmon recovery in Washington State so that we might enjoy abundant and healthy salmon populations, all the multiple additional benefits of functional ecosystems, and a Pacific Northwest we recognize into the future.

OBJECTIVES AND STRATEGIES

The recommended activities in this plan are designed to help regional directors and others in Washington's salmon recovery network work toward the following eight objectives and strategies:

OBJECTIVE #1: COMMUNITY MEMBERS KNOW THE MULTIPLE BENEFITS OF INVESTING IN SALMON RECOVERY.

Strategies:

- Articulate the multiple tangible benefits of investment in salmon recovery, locally
- Stay positive and future-oriented, but be clear about the cost of not acting

OBJECTIVE #2: KEY DECISION MAKERS ADVOCATE FOR AND FUND REGIONALLY LED SALMON RECOVERY.

Strategies:

- Provide clear, consistent, usable updates to elected and agency officials and staff and their influencers, primarily those in the local media
- Invite elected officials to salmon recovery projects to witness multiple benefits
- Help regional stakeholders understand who makes decisions that impact recovery

OBJECTIVE #3: LEAD ENTITY STAFF AND VOLUNTEERS REMAIN ENTHUSIASTIC, COMMITTED, AND RELIABLE.

Strategies:

- Ensure lead entity views are well-incorporated in regional decision-making
- Create opportunities for recognition and celebration
- Provide staff and volunteers clear information and relevant communications tools

OBJECTIVE #4: PRIVATE LANDOWNERS CONTINUE TO EMBRACE AND VOLUNTARILY IMPLEMENT SALMON HABITAT RECOVERY STRATEGIES.

Strategies:

- Provide a platform for landowners who undertake recovery projects to tell their stories
- Foster improved conversation and relationship between landowners and agency staff
- Continue to support NGO partners working with private landowners

OBJECTIVE #5: STATE AGENCY ACTIONS RELATED TO SALMON HEALTH ARE FULLY FUNDED AND MORE CLOSELY INTEGRATED WITH APPROVED REGIONAL RECOVERY PLANS.

Strategies:

- Educate all stakeholders on the need for full funding and implementation of Hatchery Reform principles of All-H integration and program change recommendations
- Continue to encourage better integration at the regional scale of DNR, Ecology, and WDFW activities related to hatchery and harvest management, water quality and quantity, forest health, and other actions impacting salmon recovery.

OBJECTIVE #6: FEDERAL AGENCY OBLIGATIONS TO SALMON RECOVERY ARE BEING IMPLEMENTED AND ARE WELL UNDERSTOOD BY AFFECTED COMMUNITIES.

Strategies:

- Provide forum for federal agency staff to update communities on their plans and responsibilities
- Continue to include participation of federal agency staff in regional collaboration

OBJECTIVE #7: RELATIONSHIPS WITH TRIBES AT REGIONAL SCALE ARE BASED ON MUTUAL TRUST AND SHARED ACCOMPLISHMENT.

Strategies:

- Understand and communicate tribal salmon recovery plans and actions
- Help stakeholders better understand the co-manager relationship
- Work with tribes at regional scale to review recommendations for integrating habitat, hatchery, and harvest decisions for greater recovery benefits

OBJECTIVE #8: PROFESSIONALS TASKED WITH SALMON RECOVERY SPEAK WITH ONE VOICE AND WORK TOWARD COMMONLY UNDERSTOOD OBJECTIVES.

Strategies:

- Coalesce as the network of salmon recovery professionals (RCO, GSRO, Regional Boards, SRFB, Lead Entities) created 15 years ago to identify and pursue shared priorities
- Invest in better mutual understanding of roles and responsibilities and opportunities with WDFW Olympia and regional leaders
- Use the Message Framework: Frame the story of salmon recovery with our shared values, identify the multiple benefits of investments in recovery, and then explain the projects and the financial asks

PRIORITY AUDIENCES

Support from the following audiences is essential to achievement of the key objectives and employment of identified strategies above and the priority actions, that follow.

Tier one audiences are foundational. Once these are updated and on message, they can become effective messengers to influence tier two and tier three audiences.

TIER ONE

- The seven regional salmon recovery organizations (with tribal and county representatives)
- Lead Entities (Washington Salmon Coalition)
- Salmon Recovery Funding Board
- GSRO/RCO
- Washington Department of Fish and Wildlife
- Regional Fisheries Enhancement Groups
- Governor's natural resources policy staff

TIER TWO

- Washington legislative leaders relevant to salmon recovery
- Washington Congressional Delegation
- Current NGO partners
- Local media

TIER THREE

- Private landowners
- Federal Agencies, primarily NOAA, USFS, USFWS, EPA, and Army COE
- Potential partners
- Civic and community groups, eg: Rotary, faith, veterans, school

KEY MESSENGERS & MESSAGES

Regional Salmon Recovery Boards, GSRO/RCO, Lead Entities, and the SRFB will need to identify within their own organizations whom is primarily responsible for sharing the story of salmon recovery in Washington State.

It is recommended that all messengers use the attached message framework to introduce the specific content or points they want to convey—whether they be intended as informational or persuasive.

By framing local and regional or organizational messages in the same way, we can amplify the impact of our story. We want multiple messengers to be understood as representing a movement of many, not just many messengers with many different stories or requests.

PRIORITY ACTIONS

The following four sets of actions are recommended to implement the strategies and achieve the outcomes identified above. Individual actions may help implement multiple strategies.

1. IMPROVE INTERNAL NETWORK COMMUNICATIONS

The Council of Regions and the Washington Salmon Coalition are important new elements for coordination and support, but the network as a whole needs and wants better synchronization and internal communication before it can best tell its story to others.

- Create a biennial system to identify and communicate shared statewide priorities—perhaps in tandem with the biennial State of the Salmon report—which would then lead to identifying target decision makers and empowering key messengers and influencers to carry requests and expectations forward.
- Improve WDFW and other state agencies' understanding of regionally-led salmon recovery and better synchronize with the WDFW regional offices
  - Meet with WDFW to scope a process for regional scale conversations about how habitat recovery investments can work in tandem with hatchery and harvest decisions to recover at-risk salmonids.
  - Help educate legislative and congressional funders and the public about the need for fully funding WDFW salmon recovery programs, as well as regional salmon recovery organizations.
- Train key messengers (RCO, GSRO, SRFB, WSC) in the use of the Message Framework and how to tailor it to their needs.
  - SRFB, GSRO, RCO, and the regions all need to update their communications to make use of unifying language in the message framework.
- Prepare for May 2015 Salmon Recovery Conference.
  - Present message framework and communications plan and conduct message and communications training for interested participants

2. STRENGTHEN CAPACITY FOR REGIONS TO LEAD

Regional organizations are essential as resources and conveners to the community of professionals and volunteers working on recovery, and increasingly are viewed as trusted sources of information and safe places for conversation about natural resource issues of concern to the broader community.

- Regional directors and everyone associated with the organization need to be able to explain the purpose of salmon recovery and its multiple benefits for their communities.
  - Convene lead entities and RFEGs, other partners to synchronize regional priorities.
  - Create regional and local messages using the message framework as the foundation.
  - Convene staff to identify communications expectations for the organization and for individual staff for the coming year, and write them into performance contracts.
- When regional board members—tribal leaders and county commissioners—speak with one voice in Washington D.C. or Olympia, the power of their shared voices is unmatched.
  - Look for areas of agreement on regional recovery boards and create opportunities for them to share that with elected officials and other decision makers.
- Identify the top 20 influencers in your region who need to understand the value of what the regional organizations and their partners are doing. Commit to talk to or spend time with two of them each month.
- Provide forums at appropriate level of formality and scale for tribal leaders or staff to share their salmon recovery project work.
- Convene lead entities and other partners at regional scale to understand status of all-H integration (focus of conference) in each region, and develop questions and recommendations to take to the conference.
- Convene or co-host as advisable forums for discussion of recovery-related issues of particular importance to the community.

3. BUILD RELATIONSHIPS THAT EXTEND YOUR REACH

Salmon recovery is a lifetime commitment and will require all of us to make changes. We need the support of relationships and community with all stakeholders to succeed.

- Participate in local recovery-related events in your communities. Create additional opportunities where possible and strategic.
  - Create a calendar of events that mimics the salmon's life history; organize or join others' celebration of homecoming, spring planting of refugia, hatchery releases and out-migrations, and fishing.
  - Build alliances with local civic, business, veterans, first-responders, or faith-based organizations.
  - Visit a variety of recovery projects—on tribal, private, public lands, at dams and on farms, take partners with you.
  - Create a forum (on-line, via social media platform, earned media or recognition-event) for partners to tell their stories; share those stories with your network.

- Identify with project partners the best way to keep potentially affected citizens informed consistently and proactively as large projects are being designed and before implementation.
  - Use social media, post card mailers, radio talk show interviews, or other means of communicating that will most likely reach potentially affected stakeholders.

4. CREATE AND USE EFFECTIVE MESSAGES AND TOOLS

Creating the necessary tools that effectively reach key audiences is essential. Tools that articulate agreed upon messages in a simple, concise, and visually effective manner will go a long way to engage audiences we have to reach.

- Use attached Message Framework across all mediums (materials, speeches, media, etc.) to introduce consistently the rationale, benefits, and organizational structure of salmon recovery in Washington State.
- Prepare and share necessary informational tools with partners and key messengers for target audiences including:
  - Update diagram that illustrates the relationships between Lead Entities, Regional Recovery Organizations, GSRO and RCO, and the SRFB;
  - Expand Lead Entities Directory to include all members of the network and explain how the network functions;
  - Prepare infographic fact sheets for easy distribution online or in person;
  - Prepare briefing pages on local priorities that can easily be repurposed for use electronically;
  - Prepare simple maps that identify projects within the regions and highlight the migratory routes of at-risk salmon;
  - Post 1-2 minute video clips or links on regional and lead entity, GSRO websites to enable people to see salmon and the excitement they generate up close;
  - Develop on-line regional media packets with up to date, digestible information and contact information for reporters.
- Design, by region, social and earned media strategies tied to key local priorities.
- Consider new logo, font, color palette, design framework to hold and amplify the story and infrastructure of salmon recovery in Washington State.

TIMELINE

Communications efforts designed to achieve specific outcomes from specific events or decisions are most effective. Recognizing that regional recovery organizations have little capacity at present for communications and that most of the responsibility for this will fall to the directors, the following calendar is designed to help distribute the intensity of the effort over the next year.

Each of these milestones is an opportunity to use the message framework and, if developed in time, new visual aids and print and online collateral.

Recommended new communications activities by regions are presented in bolded italics.

2014

May	▪ Information for Governor's biennial State of the Salmon Report compiled ▪ Compile information on monitoring and capacity needs for GSRO ▪ Communications Plan delivered to GSRO and Council of Regions
June/July	▪ ***Regional Recovery Directors meet with staff and identify communications planning targets (audiences, messengers, needed training, events, materials) for their regions*** ▪ ***ID top 20 people you want to relay salmon recovery message to in the coming year; commit to 1-2 conversations per month*** ▪ ***Visit recovery projects with key audiences***
August	▪ Regional boards make recommendations for project funding to SRFB ▪ ***Regional Recovery Boards visit Congressional Delegation in district*** ▪ ***Review communications strategies for potentially affected citizens***
September	▪ ***Visit Salmon Homecoming celebrations with key audiences*** ▪ ***Network meets to determine shared priorities*** ▪ ***Host regional forums as applicable and immediately impactful (issue- focused, built around release of a new federal agency plan, to highlight the work of a particular partner, or education/update purposed)***
October	▪ ***Host open house or brown bag forum with tribal partner to share tribe's salmon recovery strategies/key projects with community of partners***
November	▪ Draft State of the Salmon Report
December	▪ SRFB announces funding decisions ▪ Governor's budget released ▪ ***Regions highlight local projects and partners—holiday/year end recognition of new funding awards and project milestones of note***

2015

January	▪ Governor's Biennial State of the Salmon Report (2014) released ▪ GSRO & RCO organize state requests for 2015 federal funding ▪ State legislative session begins—through April
February	▪ ***Convene working groups by region to review integration of habitat with hatchery and harvest decisions, in anticipation of conference in May: how can we best use this conference to tell our story and get what we need to be successful?***
March	▪ Western Governors and others support of PCSRF delivered to Congress
April	▪ ***Finalize materials, message, presentations for Salmon Recovery Conference***
May	▪ ***Salmon Recovery Conference*** hosted by SRF Board through RCO and GSRO with WDFW and Long Live the Kings: All H Integration is a major theme ▪ ***Regional Recovery Boards visit Congressional Reps and agencies in WDC as able***

RECOMMENDED NEXT STEPS

Several of the recommendations in this Communications Plan may require further communications planning and expertise:

- Training the seven regional salmon recovery organizations and RCO, GSRO, SRFB and WSC to use the message framework;
- Assisting the seven regional organizations with building tailored and more detailed outreach and media plans, audience maps, messages, and implementation calendars;
- Assisting the seven regional organizations and/or the SRFB to develop funding strategies that will require more targeted communications strategies and tools;
- Designing a visual framework for the salmon recovery network that would help convey connectivity, unity, organization, professionalism, and instill confidence in partners, funders, critics, and the public;
- Designing and producing collateral materials and on-line content for all members of the network (FAQs; infographic fact sheets; maps; network diagrams; backgrounders; etc.)

CONCLUSION

The advent of salmon recovery and its multiple benefits for our communities and our state may have been imposed upon us by federal ESA listings, but the thousands of citizens who've come together across the state to restore salmon and the natural systems upon which they and we depend are leading an effort to define our own future. This process has been fortunate to have the right leaders for the right tasks at the right times. Today, with the implementation of locally drafted recovery plans underway and requiring sustained support, it is the directors of the regional salmon recovery organizations who must step forward and coordinate a new telling of the salmon recovery story. Supporting them and the other members of the network of salmon recovery professionals and volunteers across Washington state is the aim of this plan.

ATTACHMENTS

- Message Framework
- Findings and Recommendations Summary

GSRO/COUNCIL OF REGIONS SALMON RECOVERY MESSAGE FRAMEWORK 04.29.14

Values

What the organization values in the world that motivates and inspires its work.

--Clean water and air, a healthy Pacific Northwest we can all enjoy
--Our identity as residents of this unique place
--Our connection to one another
--Our commitment to strong and vibrant communities
--Safe and healthy food (salmon)
--Using our resources sustainably so they persist for the future generations
--The independence that allows us to chart our own future

Tagline & Quick Story

Salmon Connect Us: we're working together to restore wild salmon and retain the Pacific Northwest we love.

Salmon are a symbol of the abundance and vitality of the Pacific Northwest. Saving them means we must respect and restore our natural environment to a condition that can support them—and us. Thousands of people across Washington are working together through regional recovery organizations to restore our rivers, streams, forests, and shorelines. We are building the future we want to live in.

Mission

A one-sentence, overarching description of the organization's purpose, what it does and how. It's the big-picture summary, not a laundry list of activities.

Washington's regional salmon recovery organizations coordinate the work of thousands of volunteers and professionals implementing recovery and sustainability plans to restore salmon to our landscape.

Vision

How the world would be different if the organization achieved its mission.
Our rivers would be cleaner and less likely to flood; our forests would be healthier; we'd have more fish and wildlife, generally, with sustainable harvests of salmon. We could take our grandchildren fishing where we used to fish. Our natural systems would provide protection from the excesses of a changing climate. We could continue to live in a Pacific Northwest we recognize.

Brand Position

Asserts how a brand is unique. This statement is grounded in the following construct: We are the X that does Y for Z.
Regional salmon recovery organizations are the backbone of local salmon recovery. With representatives from cities, counties and tribes, and working with citizens and NGOs, we are uniquely constructed to coordinate recovery efforts by region. This is the scale that scientists tell us is best for decisions regarding salmon; and it allows us to help shape at a local level the future we want for ourselves.

Elevator Statement

The three- to four-sentence statement expanding on the mission to describe what the organization is and does in the time it takes to ride up or down in an elevator.
When Washington's salmon populations were listed as endangered in the late 1990's, we decided to write our own regionally-specific recovery and sustainability plans. Seven regional salmon recovery organizations now coordinate the work of thousands of people working across our state to restore our rivers, streams, forests, and shorelines. What's good for salmon is good for us all. Investing in this work now helps ensure we'll maintain what we love about the Pacific Northwest into the future.

Brand Personality

The human personality traits that define the attitude, tone and style of how the organization's brand is conveyed and delivered (adjectives).
Connected
Local/Regional
Thousands of us
Organized
Working together
Building
Future-focused
Transparent
Accountable
Scientific

Target Audiences

Tier One (ultimately, messengers)
Regional Orgs (Cities, Counties & Tribes)
Lead Entities, SRF Board
GSRO/RCO
WDFW
Governor & natural resources policy staff
Tier Two
Legislature & Congressional delegation
Local media
NGO partners
Federal agencies
Tier Three
Private landowners
Civic and community groups

Key Messages

Salmon bind us to this region and to one another	Restoring salmon eases a stressed Pacific Northwest	Investments in salmon recovery provide multiple benefits	We are shaping our own futures: salmon recovery is locally designed and led.	Restoring salmon is working, but there is much more to do
By their annual migration, salmon connect the ocean to the mountains to the high deserts of WA state. Salmon are a symbol of resilience, strength, and survival in the dramatic and changing landscape we share. Wild salmon are part of a complex web of life that defines the Pacific Northwest. If we remove them, the web collapses, and this place as we know and love it ceases to be. For millennia, the annual return of salmon has been revered and celebrated by Native American tribes. By treaty alone, **we are honor-bound to restore salmon to abundance and support sustainable fisheries. I**n turn, we are helping to ensure a future we all want to live in. Today, thousands of people gather to witness the salmon's homecoming in rivers across our state.	For 100 years we used our land and water resources in ways that put salmon at risk: we blocked fish passage with dams; overdrew water from streams and rivers; let runoff carry pollutants into our shorelines; managed our forests primarily for harvest. We also managed salmon harvest and hatchery production in ways that kept salmon populations depressed. The good news is that by correcting the mistakes and shortsightedness of our past, we can better prepare ourselves for a whole new set of challenges in our future. Waters and forests, shorelines and riverbanks healthy enough to support salmon also help our communities be more resilient in the face of, • Fluctuating temperatures • Shrinking snowpack • Wetter springs and winters • Drier summers and falls • Flood & forest fire risk • Dead zones in our estuaries (low dissolved oxygen) • Acidification of our oceans (absorbing excess carbon from the atmosphere)	Clean and reliably available water is essential for safe drinking, sustaining our farms and gardens, swimming and boating Free flowing rivers provide fish passage and great rafting Reconnecting streams to their flood plains lower flood risk for our communities Healthy forests absorb carbon and improve the air; they provide shade, cooler temperatures, and refuge for wildlife. Healthy forests hold water – essential for areas with shrinking snow pack. They provide economic opportunity for rural communities; and recreation for hikers, packers, hunters, and foragers Unarmored shorelines filter pollution, support shellfish, shelter salmon, and aid all species challenged by rising sea levels Tourism, hospitality, and recreational fishing feed our economy; all are driven by a healthy Pacific Northwest and salmon safe to eat	When salmon got listed, Washington got organized. With the first federal Endangered Species Act listings of salmon in the late 1990s, the state of Washington created an unprecedented approach to recovery: we decided to write and implement our own recovery plans (science-based, federally-approved) at the regional scale. Seven regional recovery and sustainability plans are now being implemented across our state. Whatever one region does to benefit salmon as they travel through our state benefits all regions of our state. Seven regional salmon recovery organizations coordinate the work of hundreds of volunteers and professionals working at the watershed scale as "Lead Entities" or "The Washington Salmon Coalition." The regional salmon recovery organizations ensure projects recommended for funding will help implement their plans; they monitor, evaluate, and report on progress to the Governor and the Legislature. Project funding allocations are decided in public; the process is transparent and accountable.	With the implementation of strong recovery plans, we've lessened the threats to our economy and livelihoods that we feared a federal ESA listing would provoke. Our goal is ambitious: natural systems that can support healthy, sustainably harvestable salmon populations. We've recovered a lot of habitat, and returns have increased, but we're still only at a fraction of what we had 100 years ago. Restoring habitat must be met with equal commitment to protect the best of the rest. Integrating hatchery and harvest reforms with habitat recovery is essential: WDFW funding must be restored. It took a human lifetime to bring salmon to the brink of extinction; it will take at least that long to bring them back. This is a lifetime commitment.

Example of knitting the key messages together in a single narrative:

Salmon are a symbol of what connects us.

Salmon bind together the unique features of our landscape and our communities: the salmon's migration brings the ocean to our mountains and high deserts.

Salmon inspire us: they persist across a dynamic and sometimes cataclysmic geography of landslides, earthquakes, roaring rivers, skyscraper trees; they cross busy ports and highways, heavily populated cities and suburban backyards, and hundreds of miles of farmland.

We need and want our shorelines, rivers, and forests to be as healthy as salmon need them to be.

Our communities are made stronger and our lives enriched by the multiple returns from our investments in salmon recovery: cleaner air and water, less flooding, stronger river banks, fewer forest fires, more refuge from hotter temperatures, healthier shellfish farms, more fishing, better hiking, continued tourism, and salmon safe to eat.

And so we have come together by the thousands across Washington in an unprecedented network of regional recovery organizations coordinating the efforts of volunteers, private landowners, farmers and fishers, scientists and restaurateurs, working with Native American tribes and state and federal agency staff to protect and restore what's good for all of us. It's working because we are committed to making decisions that allow our natural world to function for the greatest number of shared benefits. This is a lifetime commitment. We are changing how we live today so that we will all have the Washington we love in the future.

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GOVERNOR’S SALMON RECOVERY OFFICE & COUNCIL OF REGIONS

MESSAGE FRAMEWORK | APRIL 2014

INTRODUCTION

While the message framework is designed primarily for the regional salmon recovery organizations, all members of the salmon recovery network can use it to introduce their stories or requests, highlight the supporting arguments that best make their case, and fill in with specifics unique to their watersheds or their organizations.

The Framework holds the supporting arguments that best make our case. And it helps ensure that we begin every communication with:

- the values we share
- our identity as Northwesterners
- our fealty to this place and to our communities
- how working together to ensure a future we want to live in connects us
- that this is why we are working to recover salmon

It names the multiple benefits that salmon recovery provides our communities, and it acknowledges that this is a lifetime commitment.

VALUES

What the organization values in the world that motivates and inspires its work.

- Clean water and air, a healthy Pacific Northwest we can all enjoy
- Our identity as residents of this unique place
- Our connection to one another
- Our commitment to strong and vibrant communities
- Safe and healthy food (salmon)
- Using our resources sustainably so they persist for the future generations
- The independence that allows us to chart our own future

VISION

How the world would be different if the organization achieved its mission.

Our rivers would be cleaner and less likely to flood; our forests would be healthier; we'd have more fish and wildlife, generally, with sustainable harvests of salmon. We could take our grandchildren fishing where we used to fish. Our natural systems would provide protection from the excesses of a changing climate. We could continue to live in a Pacific Northwest we recognize.

MISSION

A one-sentence, overarching description of the organization's purpose, what it does, and how. It's the big-picture summary, not a laundry list of activities.

Washington's regional salmon recovery organizations coordinate the work of thousands of volunteers and professionals implementing recovery and sustainability plans to restore salmon to our landscape.

ELEVATOR STATEMENT

An elevator statement is a concise and compelling statement about an organization, initiative, or cause, which you would verbally use as a lead in to a conversation. You can revise this elevator statement to feel comfortable in your own words and reflect your organization's work.

When Washington's salmon populations were listed as endangered in the late 1990s, we decided to write our own regionally-specific recovery and sustainability plans. Seven regional salmon recovery organizations now coordinate the work of thousands of people working across our state to restore our rivers, streams, forests, and shorelines. What's good for salmon is good for us all. Investing in this work now helps ensure we'll maintain what we love about the Pacific Northwest into the future.

KEY MESSAGES

SALMON BIND US TO THIS REGION AND TO ONE ANOTHER

Salmon are a symbol of resilience, strength, and survival in the dramatic and changing landscape we share.

For millennia, the annual return of salmon has been revered and celebrated by Native American tribes.

By treaty alone, we are honor-bound to restore salmon to abundance and support sustainable fisheries. In turn, we are helping to ensure a future we all want to live in.

Today, thousands of people gather to witness the salmon's homecoming in rivers across our state.

RESTORING SALMON EASES A STRESSED PACIFIC NORTHWEST

For 100 years, we put salmon at risk: we blocked fish passage with dams, overdrew water from streams and rivers, let runoff carry pollutants into our shorelines, and managed our forests primarily for harvest.

We also managed salmon harvest and hatchery production in ways that kept salmon populations depressed.

The good news is that by correcting the mistakes of our past, we can better prepare ourselves for a whole new set of challenges in our future. Waters and forests, shorelines and riverbanks healthy enough to support salmon also help our communities be more resilient in the face of,

- Fluctuating temperatures
- Shrinking snowpack
- Wetter springs and winters
- Drier summers and falls

- Flood & forest fire risk
- Dead zones in our estuaries (low dissolved oxygen)
- Acidification of our oceans (absorbing excess carbon from the atmosphere)

INVESTMENTS IN SALMON RECOVERY PROVIDE MULTIPLE BENEFITS

Clean and reliably available water is essential for safe drinking, sustaining our farms and gardens, and swimming and boating.

Free flowing rivers provide fish passage and great rafting.

Reconnecting streams to their flood plains lower flood risk for our communities.

Healthy forests absorb carbon and improve the air; they provide shade, cooler temperatures, and refuge for wildlife. Healthy forests hold water—essential for areas with shrinking snow pack. They provide economic opportunity for rural communities, and recreation for hikers, packers, hunters, and foragers.

Unarmored shorelines filter pollution, support shellfish, shelter salmon, and aid all species challenged by rising sea levels.

Tourism, hospitality, and recreational fishing feed our economy; all are driven by a healthy Pacific Northwest and salmon safe to eat.

WE ARE SHAPING OUR OWN FUTURES:
SALMON RECOVERY IS LOCALLY DESIGNED AND LED

Clean and reliably available water is essential for safe drinking, sustaining our farms and gardens, and swimming and boating.

Free flowing rivers provide fish passage and great rafting.

Reconnecting streams to their flood plains lower flood risk for our communities.

Healthy forests absorb carbon and improve the air; they provide shade, cooler temperatures, and refuge for wildlife. Healthy forests hold water—essential for areas with shrinking snow pack. They provide economic opportunity for rural communities, and recreation for hikers, packers, hunters, and foragers.

Unarmored shorelines filter pollution, support shellfish, shelter salmon, and aid all species challenged by rising sea levels.

Tourism, hospitality, and recreational fishing feed our economy; all are driven by a healthy Pacific Northwest and salmon safe to eat.

RESTORING SALMON IS WORKING, BUT THERE IS MUCH MORE TO DO

With the implementation of strong recovery plans, we've lessened the threats to our economy and livelihoods that we feared a federal ESA listing would provoke.

Our goal is ambitious: natural systems that can support healthy, sustainably harvestable salmon populations.

We've recovered a lot of habitat, and returns have increased, but we're still only at a fraction of what we had 100 years ago.

Restoring habitat must be met with equal commitment to protect the best of the rest.

Integrating hatchery and harvest reforms with habitat recovery is essential: WDFW funding must be restored.

It took a human lifetime to bring salmon to the brink of extinction; it will take at least that long to bring them back.

This is a lifetime commitment.

WHERE DOES MY ORGANIZATION'S MESSAGING FIT IN?

You can tailor the messaging in this booklet to show how the work of your organization relates to the larger statewide salmon recovery effort and to frame up specific messages unique to your region. To demonstrate unity and the size of the network, try to stay true to the primary (bolded) messages and tailor or add to second- and third-level messages. To help you think about how your work and messages connect to the larger effort, you might ask:

- Which of our shared values most guide the thinking of my organization or audience?
- What does my organization contribute uniquely to the salmon recovery network?
- What specific results will my organization's work lead to?
- How are we doing that work?
- What can others do to support it?

PRIORITY AUDIENCES

Priority audiences are those groups or individuals with the authority, responsibility and capacity to make decisions that will directly benefit or hinder progress toward key objectives. Targeting outreach, relationship-building, education, and messaging to these audiences is the most effective use of limited resources. Tier One audiences with time and attention become key messengers.

TIER ONE

- The seven regional salmon recovery organizations (with tribal and county representatives)
- Lead Entities (Washington Salmon Coalition)
- Salmon Recovery Funding Board
- GSRO/RCO
- Washington Department of Fish and Wildlife
- Regional Fisheries Enhancement Groups
- Governor's natural resources policy staff

TIER TWO

- Washington legislative leaders relevant to salmon recovery
- Washington and Congressional delegation
- Current NGO partners
- Local media

TIER THREE

- Private Landowners
- Federal agencies, primarily NOAA, USFS, USFWS, EPA, and Army COE
- Potential partners
- Civic and community groups, e.g., Rotary, faith, veterans, school

EXAMPLE NARRATIVE

Salmon are a symbol of what connects us.

Salmon bind together the unique features of our landscape and our communities: the salmon's migration brings the ocean to our mountains and high deserts.

Salmon inspire us: they persist across a dynamic and sometimes cataclysmic geography of landslides, earthquakes, roaring rivers, skyscraper trees; they cross busy ports and highways, heavily populated cities and suburban backyards, and hundreds of miles of farmland.

We need and want our shorelines, rivers, and forests to be as healthy as salmon need them to be.

Our communities are made stronger and our lives enriched by the multiple returns from our investments in salmon recovery: cleaner air and water, less flooding, stronger river banks, fewer forest fires, more refuge from hotter temperatures, healthier shellfish farms, more fishing, better hiking, continued tourism, and salmon safe to eat.

And so we have come together by the thousands across Washington in an unprecedented network of regional recovery organizations coordinating the efforts of volunteers, private landowners, farmers and fishers, scientists and restaurateurs, working with Native American tribes and state and federal agency staff to protect and restore what's good for all of us.

It's working because we are committed to making decisions that allow our natural world to function for the greatest number of shared benefits.

This is a lifetime commitment. We are changing how we live today so that we will all have the Washington we love in the future.

SALMON CONNECT US: We're working together to restore wild salmon and retain the Pacific Northwest we love.

Salmon are a symbol of the abundance and vitality of the Pacific Northwest. Saving them means we must respect and restore our natural environment to a condition that can support them—and us. Thousands of people across Washington are working together through regional recovery organizations to restore our rivers, streams, forests, and shorelines. We are building the future we want to live in.

Produced by Pyramid Communications

GOVERNOR'S SALMON RECOVERY OFFICE & COUNCIL OF REGIONS COMMUNICATIONS PLANNING

SUMMARY OF FINDINGS AND RECOMMENDATIONS AT A GLANCE | MARCH 2014

TO RECOVER SALMON SPECIES AND THEIR HABITAT, A SUCCESSFUL COMMUNICATIONS PLAN WOULD HELP ENSURE:

- More Washingtonians understand why salmon recovery is a priority
- Elected officials and others continue to fund salmon recovery, as a priority
- Volunteers remain enthusiastic, committed, reliable
- Private landowners embrace and execute salmon habitat recovery, and know full benefits
- Salmon professionals speak with one voice toward commonly understood goals
- Relationships with American Indian tribes would be positive and mutually supporting

WHAT NEEDS TO BE IN PLACE TO ACCOMPLISH THE ABOVE?

- Washingtonians make the link between salmon recovery and our quality of life
- Washingtonians understand the connection between salmon and our Northwest identity
- Washingtonians know their salmon recovery region, watershed, and priorities
- Washingtonians believe it's possible to protect, recover, and restore wild salmon to our waters
- Elected decision makers feel accountable to thousands working toward salmon recovery
- Salmon recovery remains grounded in local and regionally-led efforts by citizens
- County and other local governments consider salmon in growth management and shoreline master plans and elsewhere and know where to get information
- Federal agencies fulfill obligations to manage federal lands and implement federal laws to protect and recover salmon
- State and tribal co-manager decisions on harvest and hatcheries are understood in connection with habitat recovery actions to help recover wild salmon
- State agencies want to integrate their activities with regional salmon recovery organizations
- GSRO has closer working relationship with tribal governments and staff
- Tribal governments and staff continue to work closely with regional organizations, lead entities

WHAT COMMUNICATIONS EFFORTS BY GSRO, RCO, REGIONAL, AND LEAD ENTITIES ARE CURRENTLY IN PLACE?

- Most region messaging is about progress on implementation of ESA recovery plans, is technical, and describes the "what" but not the "why" or the "so-what"; emphasizes stats without baselines or context
- Media and public are confused by lack of context, story (where we are compared to where we've been, where we're going); limited public education or outreach
- Relationship between GSRO, RCO, Council of Regions, and lead entities is hard to discern from multiple websites, "brands," organizational structure; does not convey a network
- GSRO website good clearing house; RCO has made best attempt at sharing logo, look & feel; State of the Salmon website much improved by standardized reporting and user-friendly graphics

- Communications from regions varies; outreach a requirement but ill-defined; varied look and feel
- Capacity to implement external communications/ outreach is low
- Washington Salmon Coalition taking first steps; materials need messaging work; education efforts would benefit from coordination and shared effort from regions, GSRO, WDFW, and perhaps RFEGs and others
- Native American Tribes are seldom mentioned in GSRO, regions, and lead entities messaging or materials
- Legislature and others are hearing dozens of different messages rather than evidence of dozens of supporters of same effort
- No visible attempt to explain or contextualize competing or just siloed salmon-related messages

RECOMMENDATIONS

- Empower regional organizations and lead entities to lead us through this phase of salmon recovery (Washington Way; forum for All-H integration; tribal membership and support)
- Update local partners on regional salmon recovery status
- Connect the dots for people; ID multiple benefits of salmon recovery for our communities
- Remind audiences of how we connect around salmon; how salmon in our streams is essential to our identity as Northwesterners
- Recruit messengers who are not salmon professionals and help them tell their stories
- Identify ways for communities to connect and share positive experiences related to salmon
- Prioritize and speak to need as Council of Regions
- Improve internal and inter-agency/entity communications
- Support lead entities as critical outreach engines
- Maintain, stabilize, and increase federal sources of funding while developing alternatives
- Partner to educate the public on basics of conservation biology
- Develop region-specific messages in context of new shared statewide message framework
- Target collateral materials to specific audiences

PRIORITY AUDIENCES

TIER ONE

- The seven regional salmon recovery organizations (with tribal and county representatives)
- Lead Entities (Washington Salmon Coalition)
- Salmon Recovery Funding Board
- GSRO/RCO
- Washington Department of Fish and Wildlife
- Regional Fisheries Enhancement Groups
- Governor's natural resources policy staff

TIER TWO

- Washington legislative leaders relevant to salmon recovery
- Washington and Congressional delegation
- Current NGO partners
- Local media

TIER THREE

- Private Landowners
- Federal agencies, primarily NOAA, USFS, USFWS, EPA, and Army COE
- Potential partners
- Civic and community groups, e.g., Rotary, faith, veterans, school

GSRO & COUNCIL OF REGIONS COMMUNICATIONS WORKING GROUP

Brian Abbott (GSRO), Darcy Batura (WSC), Nancy Biery (SRF BD), Jeff Breckel (LCSRB), Jeanette Dorner (PSP), Alicia Lawver (PSP), Jennifer Quan (WDFW), Derek Van Marter (UCSRB), Susan Zemek (RCO).

GOVERNOR'S SALMON RECOVERY OFFICE & COUNCIL OF REGIONS COMMUNICATIONS PLANNING

SUMMARY OF FINDINGS AND RECOMMENDATIONS | MARCH 2014

INTRODUCTION

The Governor's Salmon Recovery Office (GSRO), on behalf of the Council of Regions, contracted with Pyramid Communications to develop a communications plan to help the seven regional salmon recovery organizations, as well as other salmon recovery professionals and advocates, tell the story of salmon recovery and why it matters, more effectively. This document is a draft summary of key findings and recommendations toward that end, including:

OVERARCHING GOAL

The state wide recovery and sustainability of salmon species and the habitats upon which they and we depend.

METHODOLOGY

The following summary identifies key findings and recommendations to guide development of a message framework and communications plan for the Council of Regions and Governor's Salmon Recovery Office. This summary is based on information provided to Pyramid Communications by salmon recovery leaders and others through the following:

- Communications workshop with the GSRO & Council of Regions communications working group
- 16 interviews with salmon recovery leaders, funders, and volunteers (see appendix)
- Review of websites, videos, recovery plans, reports, fact sheets, and other existing materials that presently tell the story of regional salmon recovery (see appendix)
- In-house Pyramid Communications expertise

INQUIRY

The inquiry phase of this project was framed by three questions:

1) We sought to clarify the ends toward which a communications plan should be constructed: What would success look like to the regional salmon recovery organization directors, primarily, but also to their partners in salmon recovery?

2) We also wanted to break those goals into more measurable outcomes toward which to target new strategies: How would we know we were making progress?

3) We asked what communications strategies and activities were currently in place: Who needs to know what? Which messages resonate across the regions?

The answers to these questions come primarily from our interviews (see appendix) and a workshop with the communications working group for this project assembled by GSRO, as well as our review of relevant communications collateral.

FINDINGS

Q1: IF THIS COMMUNICATIONS PLAN IS SUCCESSFUL, WHAT WILL IT HAVE HELPED ENABLE YOU TO ACCOMPLISH?

- More Washingtonians would have a shared understanding of why regional salmon recovery is a priority
- Elected officials and others would know the importance of regional salmon recovery and continue to fund it
- Volunteers would remain enthusiastic, committed, and reliable
- Private landowners would continue to embrace and implement voluntary salmon habitat recovery, knowing they were delivering multiple benefits for their property and their community
- Professionals tasked with salmon recovery would speak with one voice and work toward commonly understood objectives
- Relationships between regional organizations, lead entities, and American Indian tribes would be positive and mutually supporting

Q2: WHAT WOULD NEED TO HAPPEN FOR THESE RESULTS TO BE REALIZED?

With this question, we identify some more measurable results toward which to target our communications strategies.

- Washingtonians would make the link between salmon recovery and our quality of life
- We would understand the connection between salmon and our identity as Northwesterners, Washingtonians
- Washingtonians would know in which salmon recovery region and watershed they live, and they'd understand the priority recovery actions for their region and watershed
- Washingtonians would believe it's possible to protect, recover, and restore salmon
- Elected decision makers would feel accountable to thousands of people across the state working toward the same goal: recovering healthy salmon populations and watersheds

- Washington State salmon recovery would remain grounded in local and regionally-led efforts by citizens
- County and other local governments would automatically consider salmon impacts when making decisions related to habitat—from growth management and shoreline master plans to permitting individual activities—and know who to call to get a good assessment of impact
- Federal agencies would be fulfilling their obligations to manage federal lands and implement federal laws in ways that help protect and recover wild salmon
- State agencies (primarily Washington's Departments of Fish and Wildlife, Ecology, and Natural Resources) would want to integrate their activities at the regional scale more closely with regional salmon recovery organizations
- GSRO would have a closer working relationship with tribal governments and staff
- Tribal governments and staff would continue to work closely with regional organizations and lead entities to coordinate and implement priorities for salmon recovery

Q3: WHAT IS THE STATUS OF PRESENT COMMUNICATIONS EFFORTS BY GSRO, RECREATION AND CONSERVATION OFFICE, AND REGIONS?

We wanted to examine how successful current communications efforts by GSRO, the seven regional recovery organizations, and the lead entities were toward achieving the key outcomes the practitioners had identified as necessary for success. The findings below are based on interviews about current communications activities and capacity, Pyramid's review of communications materials, and our twenty-plus years of expertise working on salmon and communications in the Pacific Northwest.

- Most communications about salmon recovery provided by the GSRO and Council of Regions reads as if directed to NOAA for the purpose of demonstrating progress on implementing ESA salmon recovery plans. Messaging tends to:
  - Be technical or written in the language of ESA recovery plans (using phrases like, "limiting factors; riparian areas; ecosystem function" without definition)
  - Generally be limited to a description of the specifics of a particular project (the what, but not the why or the so-what)
  - Emphasize statistics (how many river miles restored) without baselines or context
- The media, and by extension general public, but also most non-professionals involved in salmon recovery find the salmon recovery story complex and confusing. Failure to provide context, connect dots, or frame a narrative lends to this.
  - If 1.6 million Chinook are returning to the Columbia River this year, aren't we done? Why should it matter that they are hatchery Chinook? We need to tell the story of the necessity of wild stocks as brood for hatchery fish as well as critical to functional ecosystems
  - Recreation and Conservation Office (RCO) and GSRO do not generally receive media inquiries about salmon. These are likely going to Washington Department of Fish and Wildlife and individual American Indian tribes
  - General public education provided by GSRO is limited to press releases announcing Salmon Recovery Funding Board grants

- The GSRO video is engaging, high energy, and features lots of different faces intent on salmon recovery but is not yet reinforced by messaging or outreach/engagement activities

- The relationship between GSRO, RCO, and the regional recovery organizations/boards is not lent clarity by the current configuration of websites
  - The RCO has done the most to "brand" salmon recovery by incorporating the titles of GSRO and the Salmon Recovery Funding Board in its logo on some documents related to or used by those organizations
  - The GSRO is housed in the Washington State Recreation and Conservation Office and has a page on the RCO website. The GSRO page serves as a good one-stop-shop for most relevant state-generated reports and policies related to salmon recovery. It provides additional links to:
    - *Region-specific landing pages and to the regions' individual websites*
    - *The separate website established for the Governor's State of the Salmon reports.*
  - A separate website hosts the Governor's State of the Salmon in Watersheds reports, and it offers similar links and information about each of the regions. Recent standardization of reporting is helpful.

- Communications by regional organizations varies
  - The regional organizations each have their own websites. While the websites vary—some regional recovery boards are 501©3 organizations: one is a state agency; others are government entities or public-private partnerships—all appear to be directed primarily toward recovery project implementers and professional salmon managers or volunteers already familiar with this infrastructure of salmon recovery efforts
  - The seven regional salmon recovery organizations are required by the terms of their funding contracts with RCO to engage in communications and outreach activities, but activities are not defined, and they vary widely from region to region

- Capacity to develop and implement communications strategies is low
  - The SRFB is one of many multiple resource-related entities reliant on RCO for communications support; GSRO as an office within RCO is similarly dependent
  - None of the seven regional salmon recovery organizations has a full-time dedicated communications staff person, nor do the lead entities

- The lead entities have come together across regions to self-identify as "The Washington Salmon Coalition" (WSC) and this year have developed limited materials and messaging to enable them to speak as a group of many with a shared language and shared set of measures of success
  - The lead entities feel "The Washington Way" is one of their strongest messages with legislators
  - Language on lead entity printed materials tends to be statistic-heavy and inside-baseball
  - Participation in broader education efforts in Olympia is limited to a small group, including the WSC chair, primarily, though training and support has been offered to entice others

- Native American Tribes' contributions toward salmon recovery receive little mention on the GSRO or regional organization/board websites
  - As co-managers of the salmon resource, the state of Washington might be expected to reference that partnership through all of its agencies' communications
  - Tribes have membership on all of the regional recovery organization/boards; those relationships do not seem to be well understood by the general public

- There has never been a communications plan designed to integrate messaging across the state, among agencies, regional organizations, and lead entities, to generate a shared vocabulary, or to tie messaging and outreach activities to the pursuit and accomplishment of particular outcomes for salmon recovery
  - Because the messaging is so diverse, a legislator hearing from fifty salmon recovery advocates may be less impressed by the size and relative power of that constituency than overwhelmed by having to choose among fifty different requests for assistance
  - This is a relatively new need—we used to have the Chair of the U.S. House of Representatives Committee on Appropriations carrying this for the state at a time when the Congress was making line-item appropriations. We continue to have the leadership support of our senior U.S. Senator, but support is uncoordinated

- Current messages and communications activities among different professionals are not coordinated, consistent, or reinforcing
  - While most Native American tribes in Washington participate in the regional recovery organizations and boards and several are designated as lead entities, their additional communications activities and messaging may complicate these shared endeavors
  - Sport fishing groups are delivering additional sets of messages—from those who self identify as "wild fish advocates" who argue against hatchery fish of any stripe to those who advocate a significant increase in hatchery production and management of hatchery fish for the purpose of increased recreational fishing and its contributions to the economy
  - There is a need to tell the story of how state and tribal co-management of hatchery and harvest improvements is beginning to be integrated with habitat recovery and how it needs to continue

RECOMMENDATIONS

Pyramid offers these draft recommendations as a starting point for conversation. We based them on our understanding of the targets and outcomes our interviewees identified as critical, as well as on our review of communications activities and products currently in use by GSRO and the regional recovery organizations/boards and lead entities. We have also drawn on our collective experience working on communications and salmon recovery in the Pacific Northwest for two decades.

EMPOWER REGIONAL SALMON RECOVERY ORGANIZATIONS/BOARDS AND LEAD ENTITIES TO LEAD US THROUGH THIS PHASE OF SALMON RECOVERY

- While governors, Native American tribal chairs, ambassadors, congressional appropriators, U.S. senators, and county executives were out front and vocal when the task was to get in front of Endangered Species Act listings and develop our own plans for recovery, fifteen years into implementation it will be regional and local leaders who can best tell our shared story and motivate change

- To build a groundswell, educate a new generation, hold local decision-makers accountable for changes necessary to restore our watersheds to levels of health adequate to restore salmon and provide the benefits we expect, we need to support local and regional leaders to communicate the changes that will be made and implemented at the local, municipal, and county scale. They,
  - Embody the Washington Way
  - Provide our best forum for land use negotiations, involving county officials and private landowners
  - Can engage WDFW and Ecology to help them integrate their activities with local habitat recovery efforts for maximum benefit
  - Enjoy tribal membership and support

WE NEED TO UPDATE LOCAL PARTNERS ON REGIONAL SALMON RECOVERY STATUS

- Each region should consider the best way to convene locals and elected officials at that scale to re-frame the story of salmon recovery, share what's been accomplished to date, and be candid about what needs to be done

MESSAGING NEEDS TO CONNECT THE DOTS BETWEEN SALMON RECOVERY AND MULTIPLE BENEFITS TO OUR COMMUNITIES, OURSELVES

- We hike swim, boat, fish, enjoy the views, rely on the clean air and water that healthy rivers and streams, forests, wetlands, estuaries, and shorelines provide us and which are necessary as well for salmon

- River banks planted for salmon strengthen hillsides, allowing plants and trees to grow alongside streams provides more habitat for birds and insects important to farmers and filters pesticides or street pollutants when it rains. Streams reconnected to flood plains provide flood control; streams cooled by vegetation provide refuge from warm temperatures

- Stable streams increase property values, and the healthy rivers and forests necessary for salmons support robust economic contributions by fish and wildlife-dependent industries (fishing, recreation, tourism, hospitality), particularly benefitting rural communities

MESSAGING NEEDS TO REMIND US OF HOW CENTRAL THE FACT AND IMAGE OF HEALTHY SALMON IN OUR WATERSHEDS IS TO OUR IDENTITY AS NORTHWESTERNERS

- This isn't Kansas. We live in a place marked by big geography, dynamic ecological systems, charismatic animals, big mountains and rivers, ocean and rain forest and high desert. We live in rural areas, farming and fishing communities, and in vibrant urban centers. And salmon swim through all of them

- Most of the Pacific Northwest American Indian tribes are salmon tribes. Honoring, celebrating, and harvesting salmon shapes their religion, culture, and art and in turn shapes that of the entire region. Many of the images, colors, and forms we immediately recognize as "Pacific Northwest" come from salmon-dependent cultures

RECRUIT MESSENGERS WHO ARE NOT SALMON PROFESSIONALS AND HELP THEM TELL THEIR STORIES

- Salmon recovery stories can get stale. Fresh voices from landowners who have seen their property values increase as a result of habitat improvements on their lands; veterans groups who've embraced new fish and wildlife recreational opportunities; faith communities who have embraced salmon habitat as an act of stewardship; rotary members who volunteer for salmon, school kids whose salmon reports can be posted on-line—look for new faces and voices to tell the story

LOOK FOR WAYS TO MAKE SALMON RECOVERY A WAY FOR YOUR COMMUNITY TO CONNECT AND SHARE A POSITIVE EXPERIENCE.

- "Salmon fatigue" may be more of an issue for professional salmon managers who've been at this since the beginning (15 years since first listings) than for the general public. Consider:
  - Hundreds of people fill a theater in downtown Tacoma to watch a salmon film series
  - Issaquah Salmon Days is a premiere tourist attraction—thousands of people shut down a city to visit a hatchery and a bit of restored stream to see and celebrate the return of salmon each fall. Find a way for real-life encounters with salmon for more people

REGIONAL LEADERS NEED TO BE ABLE TO SAY AND PRIORITIZE WHAT HAS YET TO BE ACCOMPLISHED—AS A COUNCIL

- Acknowledge what we've done—created this unique extraordinary infrastructure, created our own recovery plans with scientists and community members, government policy staff and private landowners, tribes, and the dozens of different stakeholder groups who see salmon through one particular lens or another. But we're not done. Make a fair statement about hatchery, harvest, pollution, development, and passage issues. Break it out by region—for Puget Sound and parts of southwest Washington, development is a huge pressure. Not so much in Upper Columbia. There, the issues are…On the coast, we…

TO ACHIEVE RECOVERY GOALS, WASHINGTON'S SALMON PROFESSIONALS MUST IMPROVE COMMUNICATIONS INTERNALLY

- Consider a policy summit similar to what the Washington Environmental Council does once a year, where they pull together across the environmental community and identify what their priorities are. Consider a forum that would include Lead Entities, RFEGs, SRF Board, RCO, and GSRO, WDFW

- Coming together around shared objectives and requests for funding will necessitate agreement on priorities and better integrate efforts; it will also provide up-to-date messaging

- The regional recovery organization boards are experiencing turnover—newly elected county commissioners, tribal chairs, etc. New participants bring fresh perspectives and opportunities to refine message

LEAD ENTITIES ARE CRITICAL OUTREACH ENGINES AND NEED SUPPORT

- The lead entities are a potentially significant unified statewide voice. We need lead entities to help regional recovery organizations build relationships across jurisdictions to make tough choices

- Rural areas can feel like they're carrying the burden for urban ones on salmon recovery; less so when they have a lead entity that speaks for them

FEDERAL AND STATE SOURCES OF FUNDING ARE STILL OUR MOST RELIABLE AND GENEROUS SOURCES; WE NEED TO MAINTAIN, STABILIZE, AND INCREASE THEM WHILE DEVELOPING ALTERNATIVES

- We need to better explain the relationship between funding and recovery
  - This is an investment: We're preserving a way of life and building resilience for the future
  - Widespread support across every region of the state and every economic sector

- There's a perception that salmon habitat is well funded, and compared to other species protection, it is; but we are far short of what we need to accomplish what is recommended in our recovery plans
  - Senator Murray leads the fight to secure salmon-related federal funds, but the public doesn't really know about this effort, much less that the money is not guaranteed

- – Every region should have the capacity to tell its story to appropriators and other funders, describe its piece of the statewide effort to safeguard our watersheds, preserve ecosystem function, recover endangered species, and build resilience for our communities in the face of a changing climate

DESPITE ENTHUSIASM FOR THE PACIFIC NORTHWEST AND FOR SALMON, THE GENERAL PUBLIC IS INCONSISTENTLY EDUCATED ON THE BASICS OF CONSERVATION BIOLOGY, THE LINK BETWEEN SALMON AND THE HABITAT THAT SUSTAINS THEM AND US

- A consistent, repetitive approach to ecosystem education and conservation biology is needed; partner where possible with local educators
- Most of the messaging right now focuses on listed species—but even the salmonids not on ESA lists are under threat because all of our watersheds are under threat. We need to know what to manage for as much as what to manage against
- Help people understand: We want to restore fully functioning natural systems that will bring back salmon populations on their own
- We want to change behavior, give people ways to live differently on the land, make different choices—understand the connection between taking a bus to work and lessening the diesel runoff into a shoreline where juvenile salmon go to rest and feed
    - – Consider a state-wide poll to fully assess the public's knowledge and perspectives on salmon recovery, watershed health, ecosystem function, climate change resilience
    - – Look for opportunities to build identity and ownership at the watershed scale: this is my watershed; where I live, where I get water to drink, water my garden, where I work, where I play
    - – A message to the 60% of Washingtonians who have moved here from somewhere else: Washington isn't trashed yet. You left somewhere else to come here; why?
- To live here you need to engage to preserve the quality of life that drew you here and defines this place
- Salmon recovery is an exercise of citizenship

COLLATERAL MATERIALS SHOULD BE VARIED BUT TARGETED TO SPECIFIC AUDIENCES

- People love seeing fish; video is an effective way to demonstrate before and after, connection, change, excitement; short video clips on line are a good investment and many people can now take them with their phones
- Coordinate messaging between print, web, social media, and video productions to reinforce
- Materials don't need to be glossy or expensive; let the story and the examples do the work
- More specific recommendations on this topic will be provided in the Communications Plan

A STATEWIDE CAMPAIGN TO EDUCATE THE GENERAL PUBLIC WOULD BE VERY EXPENSIVE TO LAUNCH AND TO MAINTAIN; TARGET MESSAGING TO KEY DECISION MAKERS AND INFLUENCERS

PRIORITY AUDIENCES

Priority audiences are those groups or individuals with the authority and responsibility and capacity to make decisions that will directly benefit or hinder progress toward key objectives. Targeting outreach, relationship-building, education, and messaging to these audiences is the most effective use of limited resources. Tier One audiences with time and attention become key messengers.

TIER ONE

- The seven regional salmon recovery organizations (with tribal and county representatives)
- Lead Entities (Washington Salmon Coalition)
- Salmon Recovery Funding Board
- GSRO/RCO
- Washington Department of Fish and Wildlife
- Regional Fisheries Enhancement Groups
- Governor's natural resources policy staff

TIER TWO

- Washington legislative leaders relevant to salmon recovery
- Washington and Congressional delegation
- Current NGO partners
- Local media

TIER THREE

- Private Landowners
- Federal agencies, primarily NOAA, USFS, USFWS, EPA, and Army COE
- Potential partners
- Civic and community groups, eg: Rotary, faith, veterans, school

CONCLUSION

This findings and recommendations report will serve as the basis for development of a communications plan and message framework. This suite of documents is designed to assist, primarily, the seven regional salmon recovery organizations. It should also serve the other members of Washington's salmon recovery network, chiefly, the Governor's Salmon Recovery Office, the Washington State Recreation and Conservation Office, the Washington Salmon Coalition (Lead Entities), and the Salmon Recovery Funding Board.

This project is guided by a Communications Working Group assembled by the Governor's Salmon Recovery Office,

- Brian Abbott, *Governor's Salmon Recovery Office*
- Jeff Breckel, *Lower Columbia Salmon Recovery Board*
- Derek Van Marter, *Upper Columbia Salmon Recovery Board*
- Nancy Biery, *Salmon Recovery Funding Board*
- Darcy Batura, *Washington Salmon Coalition*
- Alicia Lawver, *Puget Sound Partnership*
- Susan Zemek, *Washington State Recreation and Conservation Office*
- Jennifer Quan, *Washington Department of Fish and Wildlife*

With assistance from,

- Alex Conley, *Yakima Fish and Wildlife Recovery Board*
- Jeanette Dorner, *Puget Sound Partnership, Salmon Program Manager*
- Miles Batchelder, *Washington Coast Sustainable Salmon Partnership*
- Scott Brewer, *Hood Canal Coordinating Council*
- Steve Martin, *Snake River Recovery Board*

INTERVIEWS

Brian Abbott, Executive Coordinator, Governor's Salmon Recovery Office

Phil Anderson, Director, Washington Department of Fish and Wildlife

Miles Batchelder, Executive Director, Washington Coast Sustainability Partnership

Darcy Batura, Chair, Washington Salmon Coalition

Nancy Biery, member, Salmon Recovery Funding Board

Jeff Breckel, Executive Director, Lower Columbia Salmon Recovery Board

Scott Brewer, Executive Director, Hood Canal Coordinating Council

Alex Conley, Executive Director, Middle Columbia (Yakima Basin) Salmon Recovery Board

Kaleen Cottingham, Director, Washington State Recreation and Conservation Office

Jeanette Dorner, Ecosystem and Salmon Recovery Program Manager, Puget Sound Partnership

Mike Grayum, Executive Director, Northwest Indian Fisheries Commission

Steve Martin, Snake River Salmon Recovery Board

Jennifer Quan, Lands Division Manager, Washington Department of Fish & Wildlife Director,

Derek Van Marter, Executive Director, Upper Columbia Salmon Recovery Board

Jacques White, Executive Director, Long Live the Kings

James White, Program Manager, Upper Columbia Salmon Recovery Board Program

Susan Zemek, Communications Director, Washington State Recreation and Conservation Office

REFERENCE MATERIALS

WEBSITES

- Recreation and Conservation Office (including GSRO and Regional Organization landing pages)
- State of the Salmon Report
- 7 Regional organizations
  - Hood Canal Coordinating Council website <http://hccc.wa.gov
  - Lower Columbia Fish Recovery Board website <http://www.lcfrb.gen.wa.us>
  - Yakima Basin Fish and Wildlife Recovery Board website <http://www.ybfwrb.org>
  - Puget Sound Partnership website <http://www.psp.wa.gov>
  - Snake River Salmon Recovery website<http://snakeriverboard.org/wpi/>
  - Upper Columbia Salmon Recovery Board website <http://www.ucsrb.com>
  - Washington Coast Sustainable Salmon Partners <http://www.wcssp.org>

RECOVERY PLANS:

- Lake Ozette (coast region) Sockeye Recovery Plan
- Lower Columbia River Bull Trout, Chinook, Chum, Coho, and Steelhead Recovery Plan
- Middle Columbia River Bull Trout and Steelhead Recovery Plan
- Upper Columbia River Bull Trout, Chinook, and Steelhead Recovery Plan
- Hood Canal Summer Chum Recovery Plan
- Puget Sound Chinook Recovery Plan
- Snake River Steelhead

OTHER MATERIALS:

- State of Salmon in Watersheds 2012 report
- State of Salmon: Restoring a Washington Icon video
- Millie Judge report to NOAA on Implementation of Puget Sound Chinook Recovery Plan
- Funding for Salmon Recovery in Washington State, Dennis Canty report
- The Washington Way 2006 report
- Extinction is Not an Option 1999 report
- Lead Entity Directory
- Various agency, regional and lead entity briefing documents, fact sheets, hand outs

PREPARED BY PYRAMID COMMUNICATIONS

Salmon Recovery Funding Board Briefing Memo

Meeting Date: June 2014

Title: Communication Plan Update

Prepared By: Brian Abbott, Governor's Salmon Recovery Office Executive Coordinator

APPROVED BY RCO DIRECTOR KALEEN COTTINGHAM

Summary

The communication plan funded by the Salmon Recovery Funding Board was completed in early May. Staff from the Governor's Salmon Recovery Office and Pyramid Communications will present recommendations for salmon recovery communications and potential next steps for the board to consider at the June meeting.

Board Action Requested

This item will be a:

- ☐ Request for Decision
- ☐ Request for Direction
- ☒ Briefing

Background

At the August 2013 Salmon Recovery Funding Board (board) meeting, the Council of Regions (COR) presented a request for the board to fund a communications plan for regional organizations. The board discussed the proposal, generating several ideas about how to engage other parties with the ultimate goal of maintaining or increasing funding for salmon recovery. The board asked the Governor's Salmon Recovery Office (GSRO) to prepare options to consider for the October 2013 meeting.

The GSRO worked with the Washington Department of Fish and Wildlife (WDFW) and the COR to prepare options for the board's consideration. Board Chair David Troutt and member Nancy Biery additionally advised GSRO during this process. One of the main themes of these planning conversations was the concept of "salmon fatigue." As recovery will take years or decades in some watersheds, it is imperative to show progress and tell the salmon recovery story in order to unify stakeholders, decision-makers, and funders invested in long-term recovery work.

Based on planning discussions, GSRO presented three options to the board for its consideration:

1. **Regional Communication Plan Proposed by COR**

   Broad salmon recovery themes, funding, and general support.

2. **Capacity Assessment and Plan 2014-2019**

   Articulate the capacity/non-project strategies, actions, and funding necessary to carry out salmon recovery through 2019.

3. **Board Strategic Funding and Communication Plan**

   Develop a strategy to build support for increasing public and private salmon recovery funding.

Ultimately, the board chose to fund the original COR proposal with the understanding that the other two options would also be researched if time and funds allowed.

The GSRO completed a competitive procurement for a consulting firm to develop a communications plan on behalf of regional organizations and recovery partners. Pyramid Communications was selected from a pool of twelve applicants. A small work group of various representatives met twice and reviewed interim work products. The work group membership is noted below.

Name	Organization
Nancy Biery	Salmon Recovery Funding Board Member
Susan Zemek	RCO Communication Director
Darcy Batura	Washington Salmon Coalition Chair and Yakima Lead Entity Coordinator
Jeff Breckel	Council of Regions Chair and Lower Columbia Fish Recovery Board Executive Director
Derek Van Marter	Upper Columbia Salmon Recovery Board Executive Director
Alicia Lawver	Puget Sound Partnership Public Information Officer
Jennifer Quan	Washington Department of Fish and Wildlife Special Assistant to the Director-Salmon Recovery
Brian Abbott	GSRO Executive Coordinator
Alex Conley*	Yakima Fish and Wildlife Recovery Board, Executive Director
Jeanette Dorner*	Puget Sound Partnership, Salmon Program Manager
Miles Batchelder*	Washington Coast Sustainable Salmon Partnership, Executive Director
Scott Brewer*	Hood Canal Coordinating Council, Executive Director
Steve Martin*	Snake River Recovery Board, Executive Director

*Regional Organization Executive Director; will participate as needed.

The final communications plan was delivered in May. GSRO extended Pyramid's contract and asked them to explore the other communication plan concepts for which the board had earlier expressed interest. Pyramid Communications will summarize proposed next steps at the June board meeting.

Analysis

The board's primary mission is to provide and develop funding programs for salmon recovery. Several times over the last decade, the board has discussed its role and purpose in salmon recovery. The framework developed in the communication plan provides a broad framework for the board, regional organizations, and lead entities to build on. The communications plan was well received by regional organizations and lead entities.

Next Steps

GSRO and Pyramid Communications will present recommendations for salmon recovery communications and potential next steps for the board to consider at the June meeting.

GSRO plans to formally share the communications plan and the board's next steps with partner organizations including WDFW, Northwest Indian Fish Commission, Columbia River Inter-Tribal Fish Commission, Regional Fisheries Enhancement Groups, Conservation Commission, and interested non-governmental organizations.

The communication plan is included as Attachment A. Also attached is a salmon recovery message framework and a summary of findings and recommendations prepared by Pyramid Communications (Attachments B and C).

Attachments

A. Communications Plan

B. Salmon Recovery Message Framework

B. Summary of Findings and Recommendations

WASHINGTON STATE
RECREATION AND CONSERVATION OFFICE
Salmon Recovery
Funding Board

Salmon Recovery Funding Board Briefing Memo

Item 7

Meeting Date: June 2014

Title: Habitat Work Schedule and How it's Being Used to Tell the Salmon Recovery Story

Prepared By: Jennifer Johnson, Governor's Salmon Recovery Office Implementation Coordinator

APPROVED BY RCO DIRECTOR KALEEN COTTINGHAM

Summary

Habitat Work Schedule (HWS) is an online database that stores and displays data related to salmon recovery actions and goals. In collaboration with two lead entities, staff from the Governor's Salmon Recovery Office (GSRO) will brief the board on how HWS can be used to tell the recovery story.

Board Action Requested

This item will be a:

- ☐ Request for Decision
- ☐ Request for Direction
- ☒ Briefing

Background

Habitat Work Schedule

Habitat Work Schedule (HWS) is an online database that stores and displays data related to salmon recovery actions and goals. The 1998 Salmon Recovery Act requires that salmon recovery projects be coordinated and sequenced. Before this legislation, granting agencies and organizations didn't have a system to track salmon recovery activities funded across multiple programs and agencies. Congress asked the U.S. Fish and Wildlife Service to bring transparency, accountability, efficiency, and effectiveness to salmon recovery in Washington State by funding a data system to track recovery actions and coordinate work across hundreds of jurisdictions. As a result, HWS was developed by the Washington State Department of Fish and Wildlife in 2006, co-managed with the Recreation and Conservation Office (RCO) beginning in 2010, and transferred to RCO in 2012. HWS allows salmon recovery stakeholders to show the relationship between projects, prioritize next steps in salmon recovery, and track progress in addressing the problems harming salmon. HWS also stores contact information to improve communication between agencies and organizations. This online tool makes information accessible on more than 8,300 projects statewide and helps the lead entities more efficiently manage public's money for salmon recovery and more effectively communicate about salmon recovery projects.

Habitat Work Schedule Highlight – San Juan Lead Entity

Barbara Rosenkotter, the San Juan Lead Entity Coordinator, expanded the San Juan HWS data site to track and communicate detailed information about the area's species, habitat, and sea level rise to inform salmon recovery project prioritization. The data in the site will also inform the Puget Sound adaptive management process and future recovery plan updates.

Habitat Work Schedule Highlight – Hood Canal Lead Entity

The Hood Canal Coordinating Council expanded their HWS data site and continues to be a leader in data quality. Hood Canal projects are arranged in a three-tier hierarchy by county and watershed, then by project type, then by specific project. The Council works closely with project sponsors to ensure that the data they track are consistent and can be accurately reported. They are standardizing habitat metrics, providing guidance to sponsors, and working to eventually tie the project implementation information with a larger cross-regional implementation assessment effort. In addition, once the region establishes their new habitat goals in the coming year, HWS will help communicate those goals to the public. The accurate implementation data will be used to track progress made towards habitat goals. The Council and its partners are also in the process of inputting additional project metrics for other activity types on previous and current projects for the Hood Canal region.

WASHINGTON STATE
RECREATION AND CONSERVATION OFFICE
Salmon Recovery
Funding Board

Salmon Recovery Funding Board Briefing Memo

Item **8**

Meeting Date: June 2014

Title: Invasive Species

Prepared By: Wendy Brown, Executive Coordinator, Washington Invasive Species Council

APPROVED BY RCO DIRECTOR KALEEN COTTINGHAM

Summary

Staff from the Washington Invasive Species Council (council) will provide information to the Salmon Recovery Funding Board (board) during its June meeting on invasive species issues in Washington and the region, particularly those that threaten salmon recovery. In addition to information sharing, the council is available to serve as a resource for the board on projects that include an invasive species component. The council is also willing to assist the regional organizations and lead entities, if needed, to prioritize invasive species-related projects, as well as the technical review panel in determining the benefit and certainty of a particular project related to invasive species.

Board Action Requested

This item will be a:

- ☐ Request for Decision
- ☐ Request for Direction
- ☒ Briefing

Background

In 2006, the Washington State Legislature created the Washington Invasive Species Council (council). In response to the toll invasive species take on natural resources and cost to local economies, the council was formed to provide statewide strategic direction and greater collaboration among federal, state, tribal, local, and non-governmental partners on invasive species.

The council, housed in the Recreation and Conservation Office, consists of 19 members (Attachment A) that meet on a quarterly basis to discuss emerging hot topics and work on implementing their strategic plan. The plan prioritizes actions that result in greater invasive species prevention and enhanced capacity to respond rapidly when a new detection is made. Over the past eight years, the council has accomplished a lot. Some examples include:

- Programmatic prevention measures included in State Environmental Policy Act, Hydraulic Project Approval permits in known New Zealand mud snail infestation areas, and salmon recovery guidelines in Manual 18 and Bonneville Power Administration's fish and wildlife mitigation contracts.

- Identifying and filling key gaps in statewide legislation on invasive species – including control of invasive marine algae and important new authorities to address invasive animal species.

- Increased federal funding to reduce the spread of invasive species from infested, federally-managed water bodies such as Lake Mead and Lake Havasu.

- Developed a risk analysis tool to identify the top 50 invasive species threats in and around Washington; conducted a baseline assessment in the Puget Sound Basin of species location, methods of spread, and resources at risk for most of those 50 species.

- Collaborated with Oregon and Idaho on several region-wide invasive species outreach campaigns and created a smartphone invasive species reporting app (WA Invasives).

Invasive Species Threats

The spread and proliferation of invasive species harms our national and local economies and the environment in which we live. These species range from weeds and insect pests that reduce crop and timber yields to aquatic species that change the ecology of our lakes and rivers, the health of our fisheries, and capacity of our power-producing and water-delivery systems.

In addition to damages on ecosystems, there are enormous monetary costs caused by invasive species. The annual U.S. cost from invasive species is estimated to be $120 billion – partially including $20 million from Asian gypsy moth impacts and control in western forests, $26 million to eliminate the threat of *Spartina* on the Washington aquaculture industry, and $3.1 billion in long-term costs to the hydropower industry in the Great Lakes region.

For salmon, in particular, the negative impacts of invasive species, both plant and animal, are numerous and well-documented.

- Submerged aquatic plant species, such as **Brazilian elodea** and **Eurasian watermilfoil**, form dense mats in rivers that choke out native aquatic plants. These invasive species markedly reduce dissolved oxygen levels, create shallow areas and increased water temperatures, and block passage of juvenile salmon.

- Riparian invasive species, such as the **invasive knotweed complex**, threaten salmon populations through loss of insects and sediment erosion that can smother salmon eggs. Knotweeds do not out-compete established trees, but dense knotweed inhibits growth of tree seedlings. Over time this leads to fewer trees and less shade in infested riparian areas, and therefore higher water temperatures which impact salmon health. Lack of trees will also eventually mean less large woody debris, which is an important component of healthy salmon habitat, creating pools and cover from predators. Knotweed spreads fast in riparian areas, and current management efforts are not keeping up with the invasion.

- **Zebra** and **quagga mussels** pose a significant threat to salmon populations. These freshwater filter-feeders form huge colonies that have effectively crashed the food web, including fish populations, in the Great Lakes and lower Colorado River ecosystems. In addition to removing productivity in the water column, these invasive mussels are severe biofoulers – encrusting any solid surface in the water in a very short amount of time. For the Pacific Northwest, this will include fish ladders, culverts, screens, and any other man-made structure that salmonids rely on for migration.

- In the March 2009 issue of *BioScience*, Sanderson et al. conclude that the negative impacts of **introduced fish species** (e.g., shad, smallmouth bass, walleye) on salmon could equal or exceed that of habitat alteration, harvest, hatcheries, and hydropower facilities.

- Although their impacts have yet to be quantified, **New Zealand mud snails** are thought to outcompete high-quality food sources such as larval mayflies, stoneflies, and caddisflies.

These and other invasive species that threaten salmon recovery efforts will be discussed in more detail during the June Salmon Recovery Funding Board (board) meeting.

Salmon Recovery Funding Board Funding for Invasive Species Removal

Invasive species removal is eligible in the board's grant program, either as a component of a larger project or as a stand-alone project. The board is an important funding source for the treatment of invasive plant infestations to improve salmon habitat.

Twenty-seven percent of all board-funded project applications have some small portion of the grant dedicated to invasive species removal. The majority of these projects involve the treatment of invasive plants within a restoration project. Less than one percent of all board projects are stand-alone invasive species removal projects, and, of those, the majority are knotweed removal projects.

Detailed information on two invasive species projects will be discussed during the June board meeting.

Attachments

A. Members of the Washington Invasive Species Council

Attachment A: Members of the Washington Invasive Species Council

Washington Invasive Species Council Members include:

Washington State Department of Agriculture
Washington Department of Ecology
Washington Department of Fish and Wildlife
Washington Department of Natural Resources
Washington State Department of Transportation
Washington State Noxious Weed Control Board
Puget Sound Partnership
Washington State Parks and Recreation Commission
U.S Coast Guard
U.S. Customs and Border Protection
U.S. Department of Agriculture
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Forest Service
Chelan County
Stillaguamish Tribe/Squaxin Island Tribe
The Nature Conservancy
Northwest Power and Conservation Council

WASHINGTON STATE
RECREATION AND CONSERVATION OFFICE
Salmon Recovery
Funding Board

Salmon Recovery Funding Board Briefing Memo

Item **9**

Meeting Date: June 2014

Title: Preview of Salmon-Related Budget for 2015-2017

Prepared By: Nona Snell, Policy Director
Brian Abbott, Governor's Salmon Recovery Office Executive Coordinator

APPROVED BY RCO DIRECTOR KALEEN COTTINGHAM

Summary

The Recreation and Conservation Office (RCO) will submit its 2015-17 biennial budget request to the Office of Financial Management in early September. The Salmon Recovery Funding Board (board) will decide on certain aspects of the budget proposal in August. The board will make recommendations on the amount of state funds RCO should include in its operating and capital budget requests related to funds that flow through the board or which match or complement other salmon activities and programs.

Board Action Requested

This item will be a:

☐ Request for Decision
☐ Request for Direction
☒ Briefing

Background

The Recreation and Conservation Office (RCO) will submit its 2015-17 biennial budget request to the Office of Financial Management (OFM) in early September. The Salmon Recovery Funding Board (board) must decide in August on the amount of state funds RCO should include in its operating and capital budget requests related to salmon activities and programs. The Recreation and Conservation Funding Board will also make decisions in August about the funding levels for other RCO administered grant programs, such as the Washington Wildlife and Recreation Program and the Youth Athletic Facilities program.

Washington State enacts budgets on a two-year cycle, beginning on July 1 of each odd-numbered year. The budget approved for the 2015-17 biennium will be effective from July 1, 2015 through June 30, 2017.

RCO must submit the budget requests for the 2015-17 biennium to OFM in early September. OFM staff will analyze the proposals and develop budget recommendations for the Governor, who must propose a budget to the Legislature for the upcoming biennium in December. The Legislature then prepares a final budget sometime in the spring before they adjourn their 2015 session. That budget becomes effective July 1, 2015.

The 2015-17 operating budget outlook is predicted to be challenging because of increased state obligations for maintaining current programs, potential increases in caseload (number of prisoners, students, entitlement recipients, etc.), and to address court rulings on education funding.

In the operating budget related to salmon activities and programs, RCO is exploring requests to fund: 1) monitoring necessary to achieve de-listing of certain salmon populations; 2) lead entity capacity so as to improve our competitiveness for federal funds; and 3) the Habitat Work Schedule data system in the event federal funds should be reduced or eliminated.

The capital budget outlook will likely be stable, barring spikes in interest rates or drastic changes in economic factors. In the capital budget, RCO is exploring requests to strategically increase state funding for salmon recovery and protection grant programs and other salmon programs. This memorandum focuses on the funding for the Salmon Recovery Funding Board grant program. Other salmon grant program funding level requests will be decided based on recommendations from other state agencies who jointly manage those programs (Estuary and Salmon Restoration Program, Puget Sound Acquisition and Restoration Program, Family Forest Fish Passage Program).

Operating Budget Requests

Monitoring to Achieve De-listing of Certain Salmon Populations

The development of federally approved recovery plans brought with it the responsibility of regional organizations and the state of Washington to monitor progress made toward recovery plan goals and the response of listed and at-risk salmon populations. The National Oceanic and Atmospheric Administration (NOAA) determines the status of recovery. Based on NOAA's five-year status review, they may: (1) remove or "de-list" salmon from the endangered species list; (2) change the status from "endangered" to "threatened" status; (3) change the status from "threatened" to "endangered" status; or (4) maintain the current ESA-listing for salmon.

In January 2011, NOAA published *Guidance for Monitoring Recovery of Pacific Northwest Salmon and Steelhead Listed Under the Federal Endangered Species Act*. Regional recovery organizations and partners use this guidance to develop a monitoring framework. NOAA reviews the status of listed salmon every five years with the best scientific and commercial data available. NOAA determines whether a species warrants de-listing based on these reviews. There is currently insufficient monitoring data to meet the NOAA threshold for de-listing.

This proposal for funding has been coordinated with the regional recovery organizations and is specifically tailored to meet de-listing requirements. Of the three types of funding managed by

RCO, monitoring activities can only be funded with federal funds or state operating funds; state capital (bond) funds cannot be used for monitoring.

Regional recovery organizations and the Governor's Salmon Recovery Office have worked together over the last several months to inventory and prioritize monitoring gaps. This effort includes the following components:

1. Identify specific monitoring activities, by region and time period, that will be necessary to achieve de-listing;
2. Describe who is responsible for implementing the monitoring activities within each region;
3. Identify gaps between current monitoring efforts and those necessary to achieve de-listing;
4. Detail overall monitoring needs for the next 10 years in biennial increments.

RCO, on behalf of regional organizations, is considering requesting state operating funds to fill important monitoring gaps for those salmon populations believed to be nearing recovery and thus most likely to be considered for de-listing (Table 1).

Details on the proposed cost estimates will be provided in advance of the August Board meeting once these numbers are more fully reviewed. As of today, the amounts identified by the regions come to approximately $2.8 million for monitoring.

Table 1: Request for State Operating Funds to Fill Monitoring Gaps

Regional Organization	Activity
Hood Canal Coordinating Council	Juvenile Summer Chum nearshore use
Lower Columbia Fish Recovery Board	Adult Abundance Winter/Summer Steelhead Adult abundance Coho
Puget Sound Partnership	NOAA Status and Trends WDFW Land Cover Analysis Steelhead Population Monitoring
Upper Columbia Salmon Recovery Board	Adult Steelhead productivity and smolt abundance
Washington Coast Sustainable Salmon Foundation	Juvenile fish monitoring Willapa Bay Baseline monitoring 5 systems for Coho
Snake River Salmon Recovery Board	Five specific monitoring projects including stream flow, adult abundance and habitat status and trends
Yakima Basin Fish & Wildlife Recovery Board	Steelhead and bull trout red surveys

Lead Entity Capacity

There are 25 lead entities that perform an essential role in salmon recovery in Washington State. The lead entities are integral to the "Washington Way" of empowering local communities' participation in salmon recovery. The lead entities are responsible for recruiting, reviewing, and prioritizing projects funded by the board. They are responsible for making sure local communities are engaged and supportive of these projects. They are also responsible for developing the three year work plans for future projects consistent with the approved regional recovery plans.

Established in law (Revised Code of Washington 77.85), lead entities consist of:

- A lead entity coordinator (staff person)
- A committee of local, technical experts (technical committee)
- A committee of local citizens representing a variety of interests (citizen committee)
- A lead entity grant administrator (the fiscal agent)

One of the board's objectives is to enhance the current capacity for lead entities. However, since the lead entity program was first created in 1999, the board has not been able to significantly increase funding for the program.

Lead entities are funded by a combination of state and federal funds from the board. Originally, when the lead entities were administered by the Department of Fish and Wildlife, they were supported 48% with state funds and 52% with federal PCSRF funds. Beginning in 2009, state funds were reduced and the board agreed to offset that reduction with federal funds. The proportion of state and federal funds has changed over time, with state funding increasingly a smaller piece of the total as Washington weathered the economic downturn. Overall funding for lead entity capacity has not kept pace with inflation and several lead entities struggle to maintain effectiveness.

In 2012, NOAA changed the application requirements and now applicants must separate their request into three priority categories:

1. Projects that address factors limiting the productivity of Pacific salmon listed under the Endangered Species Act or those populations necessary for the exercise of tribal treaty fishing rights or native subsistence fishing.
2. Effectiveness monitoring of habitat restoration actions at a watershed or larger scale for ESA listed salmon, status of monitoring projects that directly contribute to the population viability assessment for ESA-listed salmon, or monitoring necessary for the exercise of tribal-treaty rights or native-subsistence fishing on salmon.
3. Other projects consistent with the Congressional authorization with demonstrated need for PCSRF funding.

Capacity funding falls in the third priority category. Our competitive position with the other five states that compete for these federal funds is at a disadvantage because we use federal funds to support these capacity expenses. The other states load a majority of their PCSRF requests into priority one. RCO's budget proposal is intended to rebalance state and federal funding in order to regain our competitive edge for these federal funds.

The continued downturn in federal funding and pressures on the state budget could have a significant impact on the future capacity of lead entities. At this critical juncture, RCO is proposing to request state funding on behalf of the lead entities in the amount of approximately $1.8 million to regain our competitive edge for federal project funds and to continue the lead entities' important work in community-based salmon restoration.

Habitat Work Schedule

The Habitat Work Schedule (HWS) is a data system administered by RCO. All 25 lead entities and seven salmon recovery regions use HWS to track, sequence, and report their salmon recovery projects. These groups have invested significant time and resources into HWS, as has the state which relies on HWS for monitoring and reporting (e.g. the State of Salmon Report) the progress of salmon recovery efforts. For lead entities, tracking project data using habitat work schedule is a specific deliverable required under their contracts administered by the Governor's Salmon Recovery Office.

HWS is funded exclusively by a grant from the US Fish and Wildlife Service (USFWS). This funding has been reduced from $643,000 in 2012 to $609,000 for 2013. Funds for 2014 have been applied for but not yet received. USFWS funds are distributed based on the federal fiscal year. In recent years, USFWS indicated that this funding was not intended as long-term operational funding and that we should expect it will be eliminated.

Further complicating this is that the HWS system is a proprietary program owned by a private vendor. RCO uses the USFWS grant to pay for the right to use the software (the licensing agreement), maintenance, training, software improvements or enhancements, user support, and data quality assurance.

During a 2011 review, the state's chief information officer noted several areas where we should improve this contractor/vendor arrangement. They questioned the cost of HWS and whether the state was best served by a proprietary system. Others have questioned the platform on which HWS is built and whether it could be better integrated with RCO's PRISM data system for grant management. HWS is not currently a duplication of PRISM, as it tracks more than just RCO-funded projects. It tracks data for projects funded by others, conceptual future projects, data about fish and habitat changes related to projects, and progress towards meeting salmon recovery goals.

Given the uncertainty of future federal funds, it is prudent to further strategize how to address the need for this or a similar database for salmon recovery projects. RCO is currently updating its IT strategic plan (in conjunction with the Puget Sound Partnership; HWS is just one part of the strategic plan update).

RCO is considering requesting up to $1.3 million aimed at preparing for the loss of federal funding for HWS (Table 1). A portion of this funding will be used to assess the potential benefits of moving to a non-proprietary software program in the event that federal funding is eliminated or significantly reduced.

Table 1. Historic Funding Levels for HWS (all figures shown in millions)

Biennium	Amount Requested	Governor's Budget	Appropriation	Federally Funded
09-11	$0	$0	$0	$1.2 (FFY10-11)
11-13	$0	$0	$0	$1.2 (FFY12-13)
13-15	$1.3	$0	$0	$1.2 (FFY14 projected)
15-17	$1.3	-	-	

RCO will be asking the board to support seeking an alternative approach to funding HWS.

Capital Budget Request

RCO administers four salmon grant programs: Salmon Recovery Funding Board grant program (SRFB), Estuary and Salmon Restoration Program (ESRP), Puget Sound Acquisition and Restoration Program (PSAR), and the Family Forest Fish Passage Program (FFFPP). The Salmon Recovery Funding Board has exclusive authority over the SRFB grant program and shares authority over the PSAR Program with the Puget Sound Partnership (PSP). RCO jointly manages the ESRP program with WDFW and PSP and jointly manages FFFPP with DNR and WDFW. This memo will focus on the Salmon Recovery Funding Board grant program. Budget requests for the other grant programs will be set in consultation with the other managing agencies.

Salmon Recovery Funding Board Grant Program

Several factors influence the amount of funding RCO requests for the state portion of the Salmon Recovery Funding Board grant program:

1. The amount needed to match federal Pacific Coastal Recovery Funds (PCSRF);
2. The number of project applications and their requested funding amounts; and
3. The amount of available bond funding.

Federal Pacific Coastal Recovery Funds Match

PCSRF provides a significant portion of the funds necessary for salmon recovery in Washington and requires a minimum 33 percent match from the state. The state bond funds appropriated for the Salmon Recovery Funding Board grant program are used for match, along with a portion of the bonds appropriated for the Puget Sound Acquisition and Restoration and Family Forest Fish Passage programs.

If the PCSRF awards received during the 2015-17 biennium are the same as the current biennium, we would receive $42 million in federal funds, which would require a minimum state match of $13.86 million.

Given the current NOAA guidelines, which have an annual grant maximum of $25 million, the highest PCSRF award would be $50 million, which would require a minimum match of $16.5 million. The historical average biennial federal award to Washington State has been $51.2 million (Table 2). The PCSRF grant amount is announced annually in August.

Table 2. Historic Funding Levels for Salmon Projects (all figures shown in millions)

Biennium	State Request	State Appropriation	Federal Award	State Match Required
03-05	$36.0	$12.0	$53.4	$17.6
05-07	$30.0	$18.0	$47.9	$15.8
07-09	$42.0	$18.0	$46.9	$15.5
09-11	$24.0	$10.0	$56.5	$18.6
11-13	$19.8	$10.0	$45	$14.9
13-15	$40.0	$15.0	Estimate: $45	$14.9

Requests for Grant Funding

The number and amount of grant requests for salmon recovery projects is a factor in determining the amount of money that should be requested in the next biennium.

In total the salmon grant programs only fund about one-third of the salmon recovery habitat projects needed, according to a study commissioned by regional recovery organizations in March 2011. Also, project design and construction costs have risen significantly over the last decade due to inflation and increases in project complexity and size.

Amount of Available Bond Capacity

The projected available bond capacity for the entire 2015-17 capital budget is $1.9 billion. This is an increase from the last biennium. Although an average of approximately 0.75 percent of the total amount of bonds appropriated have been appropriated for the Salmon Recovery Funding Board grant program, the 2015-17 biennium will include new challenges due to the school funding lawsuit. There is the potential for a significant amount of bonds to be appropriated for smaller class sizes and all-day kindergarten. The final decision about this will likely not be known until the end of the 2015 legislative session.

Staff Recommendations-

Staff is still reviewing some of the proposal and will likely recommend submission of the following budget requests to OFM. The staff seeks the board's discussion on three aspects of these proposals: 1) is the topic acceptable; 2) does the amount appear reasonable; 3) what should be the order of priority.

Region De-listing Monitoring: Request up to $2.8 million in operating budget funding to fill important monitoring gaps identified by regional recovery organizations and the Governor's Salmon Recovery Office.

Lead Entity Capacity: Request up to $1.8 million in operating budget funding to support the implementation of salmon recovery projects and to continue the lead entities' important work in community-based salmon restoration.

Habitat Work Schedule: Request up to $1.3 million in operating budget funding to assess the potential benefits of moving the Habitat Work Schedule data system, owned by a private company, to a non-proprietary software program in the event that federal funding is eliminated or significantly reduced.

Salmon Recovery Funding Board Grant Program: Request up to $40 million in capital budget funding for the state portion of the Salmon Recovery Funding Board grant program to protect or restore salmon habitat.

Next Steps

Based on the direction of the board, RCO staff will present draft operating and capital budget requests to the board for a decision at the August meeting. RCO will submit its 2015-17 biennial budget request to OFM in early September.

PROPOSAL
Salmon Recovery Funding Board

Washington Coast Sustainable Salmon Business Plan Initiative
Phase One: Washington Coast Coho Salmon (*Oncorhynchus kisutch*)

Proposal Summary

The Washington Coast Sustainable Salmon Partnership (Partnership) proposes to work with the National Fish and Wildlife Foundation (NFWF) to develop a business plan that would operationalize the implementation of the Washington Coast Sustainable Salmon Plan in order to protect and enhance existing populations of salmon and steelhead. Phase 1 will focus on the Washington Coast coho salmon. The business plan model is a science-based approach that NFWF has employed successfully throughout the country with fish and wildlife conservation initiatives to: 1) articulate shared and achievable conservation outcomes; 2) describe a path for implementation priorities that is measurable and accountable; 3) leverage and focus public and private investments; and 4) benefit the communities economically and socially, as well as with natural resources management. The goal of the business plan will be to demonstrate replicable processes to prioritize and incentivize the conservation of high value habitats sufficient to achieve ecological and economic viability, and to track conservation outcomes using metrics appropriate for site specific results. We propose to develop a business plan process for the Washington coast, with a focus on 3-5 pilot watersheds, in order to build on the current Washington Coast Sustainable Salmon Plan and demonstrate how to further refine the actions and convert the stated objectives into concise and measureable outcomes by working with local communities and private landowners in achieving the goals for Washington Coast coho salmon. Once the pilot watershed business plans are completed, we will then scale up to a broader coast wide business plan that can be used in all watersheds for all species of salmonids in the next decade.

Background

The Partnership was formed in 2008 as a voluntary regional coalition of local, watershed-based salmon recovery groups known in Washington as Lead Entities for Salmon Recovery. Since 15 of the 16 federally recognized species of salmon and steelhead of the Washington coast are not yet listed under ESA, the Partnership formed in order “to prevent additional ESA listings of

Washington Coast salmon populations through sustainability instead of ESA recovery planning."[1]

Even though the salmon and steelhead populations do not warrant ESA listing at this time due to abundance estimates, they have been dramatically reduced from their historic levels. If left unchecked, they will warrant listing if measures are not implemented immediately to prevent further decline. Since the majority of funding in Washington state focuses on recovery of ESA listed species, the Washington coast populations have not been as high of a priority for project funding. The Partnership was formed in order to promote the concept of effective and cost-efficient investment of limited resources to protect and restore habitats for the healthier populations before their levels are reduced and become listed species, when it then becomes more costly to manage their recovery.

To address the challenges and opportunities of this situation, as well as to supplement very limited funding for salmon recovery in general, the Washington Coast Sustainable Salmon Foundation [a 501(c)(3) corporation] was created in 2013 to support the Partnership by providing a vehicle for funding and to mobilize other resources to support the Partnership's mission and the implementation of the recently-completed *Washington Coast Sustainable Salmon Plan* (Plan).

The Plan's Vision states:

All watersheds in the Washington Coast Region contain healthy, diverse and self-sustaining populations of salmon[2], maintained by healthy habitats and ecosystems, which also support the ecological, cultural, social, and economic needs of human communities.

Current Situation and Need:

The Washington Coast Region represents the last best chance for the Pacific Northwest to protect largely intact watersheds. The Partnership motto, "Protect the Best" and "Restore the Rest," effectively summarizes their approach and promotes the concept of *salmon strongholds*, those core centers of abundance and diversity where habitat is still relatively intact and can support multiple species of salmon. Although healthy salmon populations still exist in these places, there are significant areas with degraded habitats that need restoration immediately in order to prevent the further decline of these populations to the point of an eventual ESA listing. Salmon are a key component and indicator of healthy freshwater and estuarine ecosystems. More natural, diverse

[1] *Report on the Consideration of Forming a Coastal Governance Unit for Salmon Sustainability,* Triangle Associates, June 2007.

[2] The general term "salmon" was used throughout the Plan and was defined to include fish of the genus *Oncorhynchus* (salmon, steelhead, and coastal cutthroat) and bull trout.

and productive ecosystems support healthier and more diverse salmon populations; less healthy ecosystems have less capacity to support growth and survival of juvenile salmon.

The *Washington Coast Sustainable Salmon Plan* was conceived and developed as an ecosystem-based Plan to achieve salmon population viability and sustainability. All eight salmon species native to Washington are found in the coastal watersheds; only pink salmon (*Oncorhynchus gorbuscha)* are not known to spawn here. The State of Washington recognizes 118 individual populations, or stocks, of anadromous salmon and steelhead, twelve (12) of coastal cutthroat, and three (3) of bull trout in Coast Region watersheds. The Washington Department of Fish and Wildlife's Salmonid Stock Inventory (SaSI) and the Wild Salmon Center's North American Salmon Stronghold Ratings suggest healthy or strong populations have diminished from 58% to 42%, while depressed or weak stocks have *increased* from 7% to 19% since 1992. The status of nearly 40% of the Region's populations is listed as unknown or needing research.

Supported by twenty-four distinct strategies and more than 200 specific action steps, the Plan's Goals are:

- All of the region's salmon habitats and offshore waters are in a condition that will sustain healthy salmon populations.
- Regional land use decisions are considerate of conserving priority salmon habitats and any habitat degradation resulting from those decisions is effectively mitigated.
- Regional hatchery practices do not impair wild fish populations and, where appropriate, will help to protect them.
- Harvest of salmon – commercial, recreational, subsistence and ceremonial – help to support vibrant economies and communities without negatively impacting the sustainability of salmon populations.

The objective in the Plan speaking directly to salmon populations is:

- By 2040, salmon populations that comprise all or portions of the seven Evolutionarily Significant Units of sockeye, coho, chum and Chinook salmon and two Distinct Populations Segments of steelhead within the Washington Coast Region consistently meet intrinsic habitat potential and exceed sustainable harvest.

The Washington Coast Region's onshore land area is more than 3.75 million acres and contains more than 6,500 miles[3] of fish-bearing rivers and streams. With the attention of federal and state salmon managers and restoration dollars focused on ESA recovery plans, data for the Coast Region's unlisted salmon populations is relatively poor and tracking the impact of Plan

[3] Salmonid stream miles listed by WDFW are widely considered to under-represent the actual number due to the methodology for stream identification relying on 10 meter digital elevation model GIS databases.

implementation on salmon populations will be an ongoing challenge. Under current funding levels, it may be impossible.

The Partnership is actively working to develop an Implementation Strategy for the Plan, including identifying specific metrics and objectives for salmon populations and their habitats with which to track implementation progress and effectiveness of Plan strategies and actions. Methods and means to measure and track the response of salmon populations to plan implementation are urgently needed. With the Plan as a solid foundation, the Partnership and NFWF will examine how to operationalize the implementation of the Plan through NFWF's business planning process which will provide a concise 10 year roadmap to achieve and track measureable outcomes. We propose to start with Washington Coast coho salmon as a focal species.

Why Coho?

Coho can be found in virtually every small coastal stream and large river in the Coast Region. Coast Region Coho are part of two ESUs, Olympic Peninsula Coho and Southwest Washington Coho. The Olympic Peninsula Coho ESU extends beyond the Coast Region to include populations along the Strait of Juan de Fuca west of the Elwha River. Southwest Washington Coho were originally considered part of the larger Lower Columbia/Southwest Washington ESU. When the Lower Columbia portion of the ESU was listed as threatened on June 28, 2005, the Southwest Washington portion was separated from the Lower Columbia populations. However, because the "new" Southwest Washington ESU was never formally evaluated by NOAA Fisheries, its status is listed as "undetermined" and it remains a "candidate" for listing under the Endangered Species Act.

Between the two ESUs, twenty-three (23) separate populations of coho salmon are present in Washington Coast watersheds. Nearly half of these populations have not been evaluated for their stock status, and while the other half are considered "healthy" by the State of Washington, this classification is widely disputed by the Native American tribes and fisheries biologists in the region. A subsequent evaluation conducted by the Wild Salmon Center in 2011 found that 6 of the coho populations were "weak" and 9 needed further research to evaluate status. The remaining populations were considered "strong."

The Partnership and NFWF are proposing to focus the first phase of the business plan process on coho salmon because of their potential as a candidate for listing, however their decline can likely be reversed with targeted habitat conservation. The Washington Coast Sustainable Salmon Business Plan Initiative with a focus on coho salmon would also form an integral component of NFWF's broader Pacific Coast salmon strategy, which includes coho recovery initiatives in the Russian River watershed and the Lower Klamath basin in California. NFWF is also initiating a new Oregon Coast Coho Business Plan Initiative with the Oregon Watershed Enhancement Board, NOAA and other partners. Each business plan NFWF develops with state and regional partners includes involvement of local stakeholders and communities to assure there is buy-in and engagement for effective implementation. A collaborative and integrated Pacific coast program for coho salmon conservation that includes Washington, Oregon and California would be a unique regional effort that focuses on actions to protect strongholds and prevent ESA listing in Washington while restoring habitats with the goals of de-listing coho salmon in California and Oregon.

Methodology

The business plan development process will advance strategies focused on creating models that can be replicated in other coastal watersheds. These include: 1) utilizing the best available science to identify and prioritize habitat protection, enhancement and restoration needs; 2) designing a deadline-specific roadmap to address these needs; and 3) identifying locally supported projects that create and demonstrate social and/or economic incentives for landowner participation. In addition to discussions of ESU status, watershed health, intended conservation outcomes/metrics, and implementation costs, the core of the business plan will describe how local partnerships are advancing these strategies within a few pilot coastal watersheds.

The process will begin with the Partnership and NFWF's selection of the pilot areas. NFWF and the Partnership will work with coastal Lead Entities and tribes to ensure interest and participation in this process. The Lead Entities will summarize project concepts in a Letter of Interest that describes their capacity, with tribal and other partners, to engage in a rigorous prioritization process and to conceptualize projects that advance the triple bottom line approach for coho salmon: social, economic, and environmental objectives.

The Partnership enjoys well established working relationships with the Wild Salmon Center, The Nature Conservancy, state and federal agencies, and coastal Native American Tribes, all of which directly benefited the development of the *Washington Coast Sustainable Salmon Plan.* These relationships will also benefit the preparation of the proposed business plan.

NFWF has extensive experience in preparing conservation business plans with a team of experts and local communities across the U.S. Each business plan is designed to develop specific species outcomes and has a focus on conservation strategies that address key limiting factors, with metrics for monitoring progress over time towards specific goals. The business plans recognize the importance of prioritizing conservation actions and monitoring results. The data are then used to populate a score card which displays the status of strategy implementation and provides accountability for the funding invested and the conservation outcomes achieved in a systematic way. The Hood Canal Coordinating Council recently completed a Hood Canal

Summer Chum Business Plan to operationalize their recovery plans. In addition, NFWF has other examples of business plans such as the Russian River Coho Salmon Business Plan that can be used as a template for the Washington Coast coho salmon business plan development process.

The success of the Washington Coast Sustainable Salmon Business Plan Initiative will be measured by the level of involvement of the local watershed entities, and consensus with the landowners on how best to move forward with a set of priority actions that will achieve measureable ecological goals for habitat protection, enhancement and restoration, while also considering economic and social factors to reach those goals. NFWF's Director for Strategic Planning and Evaluation will be an advisor to assure that the Washington Coast Sustainable Salmon Business Plan will be developed to meet local conditions, while also being consistent with other plans adopted by NFWF's Board of Directors.

Budget Request

NFWF and the Washington Coast Sustainable Salmon Foundation are requesting $50,000 from the Salmon Recovery Funding Board to be matched with up to $100,000 of public and private funds to develop the Phase 1 business plan for coho salmon. These funds will be used to assist the Partnership to engage their local community partners in the business planning process, contract with experts needed to assess the best tools to use (such as NetMap) and the metrics to use to further refine the conservation framework and priority actions needed to reverse the decline of the populations, and utilize a technical writer to clearly communicate the roadmap for a 10 year implementation plan.

NFWF will also utilize our internal science team expertise to provide technical input into the business plan development process. NFWF's Director for Strategic Planning and Evaluation will provide the framework for the business plan. In addition to NFWF's expertise, we will also work with lead coho salmon scientists with local knowledge to review data and provide guidance for the design to assure that the plan is achievable based on the specific Washington coastal habitat conditions. NFWF and the Partnership will also reach out to state and federal agencies, tribes and universities to consult with the best team of scientists to review the business plan.

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WASHINGTON STATE
RECREATION AND CONSERVATION OFFICE
Salmon Recovery
Funding Board

Salmon Recovery Funding Board Briefing Memo

Item **10**

Meeting Date: June 2014

Title: Lead Entity and Regional Organization Allocation of Two Year Capacity Funds

Prepared By: Brian Abbott, Governor's Salmon Recovery Office Executive Coordinator

APPROVED BY RCO DIRECTOR KALEEN COTTINGHAM

Summary

The Salmon Recovery Funding Board annually requests capacity funding from the Pacific Coastal Salmon Recovery Fund to support salmon recovery at the grassroots level. These funds maintain a network of regional organizations and lead entities. Staff requested $1,677,000 for lead entities and $2,828,685 of capacity funding for regional organizations in fiscal year 2015, the second year of biennial funding. This totals $4,505,685 of capacity funding.

Board Action Requested

This item will be a:

- ☒ Request for Decision
- ☐ Request for Direction
- ☐ Briefing

Proposed Motion Language

Move to approve capacity funding of $1,677,000 for lead entities and $2,828,685 for regional organizations in fiscal year 2015, to be allocated as described in briefing memo 10, Attachments A and B.

Background

Each year, the Recreation and Conservation Office (RCO) submits a single Washington State application to the National Oceanic and Atmospheric Administration (NOAA) for Pacific Coastal Salmon Recovery Fund (PCSRF) grant funding. The application is prepared in cooperation with the board, Washington Department of Fish and Wildlife (WDFW), and the Northwest Indian Fisheries Commission.

The Salmon Recovery Funding Board (board) portion of the PCSRF application includes funding for habitat projects, monitoring (required by NOAA), administration, and capacity. Capacity is described as the established organizational foundation that allows for salmon recovery to take place at the grassroots level by maintaining a network of regional organizations and lead entities.

Change to Request Schedule for Capacity Funds

Historically the state budgeted for capacity costs on a biennial basis, beginning on July 1 of each odd-numbered year. The federal budget cycle is annual, beginning on October 1, but due to the grant cycle funds are not available to the state until later in the federal fiscal year. To ensure continuity and predictability for the regions and lead entities, the state has historically requested two years of capacity funding in every other PCSRF application. Habitat projects, monitoring, and administration are requested annually.

Change in NOAA Application Requirements

In 2012 and 2014 NOAA changed the PCSRF application process to require that costs be allocated according to the newly-articulated PCSRF priorities:

1. Projects that address factors limiting the productivity of Endangered Species Act (ESA)-listed Pacific salmonids as detailed in recovery plans. Projects that restore or protect habitat of salmonids that are at-risk of being ESA-listed or are necessary for exercise of tribal treaty rights.
2. Effectiveness monitoring of habitat restoration projects at the watershed or larger scales for listed salmon, or status monitoring projects that directly contribute to population viability assessments for listed salmon.
3. Other projects consistent with the Congressional authorization with demonstrated need for funding.

The state's application must now clearly identify the portion of PCSRF funding that will be allocated to each priority. Within each priority, funding must be further allocated to projects, capacity, and other elements. Previous applications allowed for more general discussions.

Biennial capacity requests and the new application format created a situation that could lessen the state's competitiveness for funding. At its September 2012 meeting, the board decided to allocate capacity funds on an annual basis to improve alignment with the PCSRF grant process.

Spent and Available Funds, 2013-2015

The board funds its grants with state and federal funding it receives for salmon recovery. Most of these funds are allocated to capacity, projects, and monitoring.

Funding is determined annually in light of Washington's annual PCSRF grant award and the state dollars appropriated by the Washington State Legislature each biennium. A summary table of spent and available funds for 2013-2015 is included below (Table 1).

Table 1: Funds for the 2013-15 Biennium

Purpose	Source	State Fiscal Year 2014 Totals	Projected State Fiscal Year 2015
Capacity (Lead Entities and Regional Organizations)			
	State operating budget	$456,614	$456,614
	PCSRF	$3,330,000	Staff estimate $3.3 - $4.1 million (of $20 - $25 million total)
	Return Funds from 2009-2013 PCSRF	$648,571	$548,571
		$4,435,185	**$4.30 - $4.55 million**
Salmon Recovery Funding Board Projects			
	State capital budget	$6,082,000	$8,200,000
	PCSRF	$10,550,000	Staff estimate $10.55 - $12.3 million (of $20 - $25 million total)
	Return Funds from 2009-2013 PCSRF/State Capital	$1,368,000	
		$18,000,000	**$18.75 - $20.50 million**
Available Return Funds			
	Unallocated Return Funds 2009-2014[1]		**$2,540,000**
Returned Funds Reserved for 2014 IMW[2] Projects			
			Up to $2.0 million

General Capacity Funding for Lead Entities and Regional Organizations

The board authorized an $18 million grant round in 2013 and provided the lead entities and regions with similar funding as in previous biennia. In August 2013 the board approved a funding increase of $50,000 each for the Coastal Washington and Lower Columbia regional organizations. In October 2013 the board also increased lead entity support by $133,000 to bring all lead entities up to a minimum baseline of $60,000 annually. The funding totals for

[1] As of May 5, 2014

[2] SRFB decision on March 20, 2014 to use up to $2 million for projects that advance the purposes of three of the Intensively Monitored Watersheds

fiscal year 2014 are included in Table 2 in the staff recommendation section and also summarized in funding tables included as Attachments A and B.

RCO will know the 2014 PCSRF award amount by the end of June or first week of July. Based on current information and not factoring in any additional return funds between May 2014 and December 2014, staff estimates the board will have at least an $18 million grant round. This estimate takes into account reserving $2 million for projects within intensively monitored watersheds.

Capacity Opportunity for Washington Coast Regional Organization

In addition to the annual capacity funded noted above, an opportunity exists to jump start the implementation of the Washington Coast Sustainable Salmon Plan with an additional capacity grant of $50,000 (to be matched by several other partners).

The Washington Coast Regional Organization (the Washington Coast Sustainable Salmon Partnership) recently completed their sustainability plan and is currently developing a three-year work plan. The next logical step for the Washington Coast in the implementation of their sustainability plan is to develop a business plan that builds on the three-year work plan and clearly identifies targets and conservation outcomes.

A 10 to 12-year business plan provides specific and concise conservation information to those (e.g., prospective investors) not familiar with the existing issues, including identifying goals, the management strategy, and financial and other resources necessary to attain those goals. A business plan also provides internal guidance to those who are active in the operation of the organization, allowing all individuals and entities to understand the direction and path of the organization. Finally, a business plan process is an accounting framework to track and evaluate the progress of the initiative in reaching the goals identified through a "scorecard" updated annually.

The National Fish and Wildlife Foundation (NFWF), who partnered with the board for a decade to manage the Community Salmon Fund, has developed a business plan template and applied it to Hood Canal Summer chum and Russian River Coho recovery efforts. They are currently developing a business plan for Oregon coastal Coho, with support from the Oregon Watershed Enhancement Board and the National Oceanic and Atmospheric Administration, and are interested in doing the same for Washington coast watersheds.

An additional $50,000 in capacity funding for the Washington Coast Sustainable Salmon Partnership would match NFWF funds to complete this work. Additionally, NFWF and the Washington Coast Sustainable Salmon Foundation will work together to raise up to $100,000 in the next 18 months from a combination of private and federal funds. The Wild Salmon Center is also a partner on this project and was instrumental in helping the region develop the Washington Coast Sustainability Plan.

If successful, this business plan/implementation approach could be a model for other regional organizations to develop specific implementation strategies, track progress, and pull in additional public and private support for operationalizing salmon recovery plans. The Washington Coast Sustainable Salmon proposal for this business plan is included as Attachment C.

Staff Recommendation

Staff recommend the board fund capacity at a total of $4,505,685, which includes $1,677,000 for lead entities and $2,828,685 for regional organizations in fiscal year 2015. This will retain last year's base funding and incorporate the additional $133,000 in capacity funds the board allocated to lead entities and $50,000 to the coastal region for the business plan in fiscal year 2014. Table 2 summarizes the request; Attachment A details the allocations by regional organization and Attachment B summarizes allocations by lead entity.

Table 2. Proposed Lead Entity and Regional Organization Funding for Fiscal Year 2014

Purpose	Total Funding FY 2014	Proposed Funding FY 2015
Lead Entities	$1,677,000	$1,677,000
Regions	$2,878,685	$2,828,685
Projects	$18,000,000	$18,000,000[3]
Projects in IMWs	$0	Up to $2,000,000

Next Steps

If approved by the board, GSRO staff will amend regional organization and lead entity contracts to add in funding for the second year of the biennium. Amendments will be effective July 1, 2014.

Attachments

A. Funding Table for Regional Organizations
B. Funding Table for Lead Entities
C. Washington Coast Sustainable Salmon Business Plan Proposal

[3] Staff expect the PCSRF grant to come in between $20 million and $25 million. Based on this assumption, the board would have at least an $18 million dollar grant round for fiscal year 2015.

Attachment A: Funding Table for Regional Organizations

Regional Organization	Board Funding Adopted August 2013	Board Funding Added August 2013	Total Funding FY 2014	Proposed Funding FY 2015
Lower Columbia	$406,850	$50,000	$456,850	$406,850
Hood Canal	375,000		375,000	375,000
Puget Sound	689,162		689,162	689,162
Snake	333,588		333,588	333,588
Upper Columbia	435,000		435,000	435,000
Washington Coast	254,085	$50,000	304,085	304,085
Yakima	285,000		285,000	285,000
Total	**$2,778,685**	**$100,000**	**$2,878,685**	**$2,828,685**

Attachment B: Funding Table for Lead Entities

Lead Entity	Board Funding Adopted December 2013	Board Funding Added October 2013	Total Funding FY 2014	Proposed Funding FY 2015
WRIA 1 Salmon Recovery Board Lead Entity	$65,000		$65,000	$65,000
San Juan County Lead Entity	50,000	$10,000	60,000	60,000
Skagit Watershed Council Lead Entity	80,000		80,000	80,000
Stillaguamish Co-Lead Entity (Stillaguamish Tribe)	25,000		25,000	25,000
Stillaguamish Co-Lead Entity (Snohomish County)	37,000		37,000	37,000
Island County Lead Entity	50,000	10,000	60,000	60,000
Snohomish Basin Lead Entity	62,500		62,500	62,500
Lake WA/Cedar/Sammamish Watershed Lead Entity	60,000		60,000	60,000
Green/Duwamish & Central PS Watershed Lead Entity	60,000		60,000	60,000
Pierce County Lead Entity	55,000	5,000	60,000	60,000
Nisqually River Salmon Recovery Lead Entity	62,500		62,500	62,500
Thurston Conservation District Lead Entity	40,000	20,000	60,000	60,000
Mason Conservation District Lead Entity	42,000	18,000	60,000	60,000
West Sound Watersheds Council Lead Entity	50,000	10,000	60,000	60,000
North Olympic Peninsula Lead Entity	80,000		80,000	80,000
North Pacific Coast Lead Entity	45,000	15,000	60,000	60,000
Quinault Indian Nation Lead Entity	45,000	15,000	60,000	60,000
Grays Harbor County Lead Entity	55,000	5,000	60,000	60,000
Pacific County Lead Entity	50,000	10,000	60,000	60,000
Klickitat County Lead Entity	55,000	5,000	60,000	60,000
Pend Oreille Lead Entity	50,000	10,000	60,000	60,000
Upper Columbia Regional Salmon Recovery	135,000		135,000	135,000
Yakima Basin Regional Salmon Recovery	65,000		65,000	65,000
Snake River Regional Salmon Recovery	65,000		65,000	65,000
Lower Columbia Regional Salmon Recovery	80,000		80,000	80,000
Hood Canal Regional Salmon Recovery	80,000		80,000	80,000
Total	**$1,544,000**	**$133,000**	**$1,677,000**	**$1,677,000**

WASHINGTON STATE
RECREATION AND CONSERVATION OFFICE
Salmon Recovery
Funding Board

Salmon Recovery Funding Board Briefing Memo

Item **11A**

Meeting Date: June 2014

Title: Intensively Monitored Watershed Contract Extension and Bridge Funding

Prepared By: Keith Dublanica, Governor's Salmon Recovery Office Science Coordinator

APPROVED BY RCO DIRECTOR KALEEN COTTINGHAM

Summary

Staff request a contract extension and interim funding for Washington Department of Ecology's Intensively Monitored Watersheds (IMW) monitoring. These steps are required to align the IMW program contract with the federal fiscal year, one of a series of recommendations from the Salmon Recovery Funding Board's monitoring subcommittee that were approved at the March board meeting.

Board Action Requested

This item will be a:

- ☒ Request for Decision
- ☐ Request for Direction
- ☐ Briefing

Proposed Motion Language

Move to approve a contract time extension through September 30, 2014 and a cost-change increase of $463,000 from return funds for the board's Intensively Monitored Watershed monitoring program, which is contracted to the Department of Ecology.

Background

At the March Salmon Recovery Funding Board (board) meeting the board approved several recommendations from its monitoring subcommittee and the Stillwater Sciences report titled "Monitoring Investment Strategy for the Salmon Recovery Funding Board." One recommendation was to align all the monitoring contracts (effectiveness monitoring, monitoring status and trends, and Intensively Monitored Watersheds [IMWs]) to coincide with the federal fiscal year, which starts each October 1st.

The board passed an amendment at its March meeting to provide a contract extension and "bridge funding" for the effectiveness monitoring performed by TetraTech. Staff are now requesting a similar contract extension and funding for the IMW monitoring contract with the Department of Ecology.

Analysis

As the federal fiscal year starts October 1, staff request the board pass an amendment to extend the current IMW monitoring contract from June 30, 2014 to September 30, 2014 and add $463,000 of funding (from returned funds). New monitoring contracts for each IMW will be presented to the board for approval in September, with an anticipated effective date of October 1, 2014.

There are four board-funded IMW complexes in Washington State, which receive an annual allotment of $1.4 million. The table below illustrates the activities that will receive "bridge funding" through this contract extension if the requested amendment is approved.

Intensively Monitored Watershed	Activity	Bridge Funding July 1-September 30, 2014
Skagit River Estuary	Habitat monitoring	$38,134
	Fish Monitoring	70,000
	Dept. of Ecology	4,200
Hood Canal	Fish monitoring	47,809
Little Anderson, Seabeck,	Habitat monitoring	38,947
Stavis and Big Beef Creeks	Dept. of Ecology	4,200
Strait of Juan de Fuca	Fish monitoring: trawler	68,000
East and West Twin Rivers	Fish monitoring: beach seines	21,125
and Deep Creek	Habitat monitoring	51,929
	Dept. of Ecology	12,600
Lower Columbia	Fish monitoring	46,163
Germany, Abernathy, Mill	Habitat monitoring	38,947
Creeks	Dept. of Ecology	21,000
Total		**$463,054**

Staff Recommendation

Staff recommends the board move to approve changes to the IMW contract to extend the current Ecology IMW monitoring contract from June 30, 2014 to September 30, 2014 and add $463,000 of funding.

Next Steps

Upon approval by the board, staff will amend the IMW monitoring contract to provide a time extension and bridge funding through September 30, 2014.

The Governor’s Salmon Recovery Office is recruiting the board’s monitoring panel, which staff expect to have in place by early summer. The monitoring panel will make recommendations on new monitoring contracts to take effect October 1, 2014.

WASHINGTON STATE
RECREATION AND CONSERVATION OFFICE
Salmon Recovery
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Salmon Recovery Funding Board Briefing Memo

Item **11B**

Meeting Date: June 2014

Title: Update to the 2003 Monitoring Evaluation Strategy

Prepared By: Keith Dublanica, Governor's Salmon Recovery Office Science Coordinator
Brian Abbott, Governor's Salmon Recovery Office Executive Coordinator

APPROVED BY RCO DIRECTOR KALEEN COTTINGHAM

Summary

The Salmon Recovery Funding Board (board) Monitoring Subcommittee recommended that the board update and finalize the draft monitoring evaluation strategy from 2003 as a high priority. Staff originally proposed having the monitoring panel update this strategy. However, staff now believe hiring a contractor to complete this work will expedite the strategy's review by the monitoring panel and, ultimately, its presentation to the board for approval. It is expected that a contractor can complete this task by October 2014 for a fee not to exceed $10,000. The final draft and updated monitoring evaluation strategy will be reviewed by the monitoring panel and then presented to the board at its September meeting for review and feedback.

Board Action Requested

This item will be a:

- [x] Request for Decision
- [ ] Request for Direction
- [ ] Briefing

Proposed Motion Language

Move to approve up to $10,000 in Pacific Coastal Salmon Recovery Fund unallocated monitoring funds to hire a contractor to update and finalize the board's monitoring and evaluation strategy.

Background

The Salmon Recovery Funding Board (board) Monitoring Subcommittee recommended that the board update and finalize the draft monitoring evaluation strategy from 2003. Updates to the monitoring evaluation strategy will clarify the board's role in monitoring, funding activities, reporting requirements, information exchange, and adaptive management. The subcommittee considered this a high priority recommendation and suggested implementation by October 2014.

Although the 2003 monitoring evaluation strategy is currently in use, it remains in draft form. The draft version provided great utility in the last decade, particularly in the realm of effectiveness monitoring, monitoring status and trends (Fish-in/Fish-out), and the Intensively Monitored Watersheds. Staff desire to modify and formalize the document so a revised draft can be reviewed by the board's monitoring panel and a final draft presented for board approval at the September meeting.

Analysis

Staff believe it may be most efficient to hire a contractor for the high-priority task of updating the monitoring evaluation strategy, as the board's monitoring panel will have many tasks assigned to it when it forms in early summer. Contracting out the update and finalization of the monitoring evaluation strategy will expedite the strategy's review by the monitoring panel and, ultimately, its presentation to the board for approval. It is expected that a contractor can complete this task by October 2014 for a fee not to exceed $10,000.

Staff Recommendation

Staff recommend approving up to $10,000 in Pacific Coastal Salmon Recovery Fund returned monitoring funds to hire a contractor to update and finalize the board's monitoring and evaluation strategy. The document will be reviewed by the monitoring panel before it is presented to the board at its September meeting.

Next Steps

Following approval by the board, staff will enter into a personal services contract with a qualified contractor, who will initiate updates to the board's monitoring evaluation strategy.

Salmon Recovery Funding Board Briefing Memo

Item 12

Meeting Date: June 2014

Title: Adoption of Washington Administrative Code Changes

Prepared By: Leslie Connelly, Natural Resource Policy Specialist

APPROVED BY RCO DIRECTOR KALEEN COTTINGHAM

Summary

This memo presents a staff recommendation for proposed amendments to the administrative rules in Title 420 of the Washington Administrative Code. The amendments change the name of the agency from the Interagency Committee for Outdoor Recreation to the Recreation and Conservation Office and correct statutory references.

Board Action Requested

This item will be a:

- ☒ Request for Decision
- ☐ Request for Direction
- ☐ Briefing

Proposed Motion Language

Move to approve resolution 2014-01 to adopt amendments to Title 420 of the Washington Administrative Code.

Background

Administrative rules are executive branch agency regulations authorized by state law. The Salmon Recovery Funding Board (board) has statutory authority to adopt administrative rules to carry out the purposes of the Salmon Recovery Act.[1] The board first adopted rules for the purposes of the salmon recovery grant program in 2001 and later amended them in 2002.

The board's administrative rules are found in Title 420 of the Washington Administrative Code (WAC). The rules cover general grant program requirements of the board and the

[1] RCW 77.85.120(1)(d)

administration of the grant program by the Recreation and Conservation Office (RCO). The rules are organized into two chapters:

Chapter	Title
420-04	General
420-12	General Grant Assistance

The administrative rules are broad in scope and apply to the board's salmon recovery and Puget Sound Acquisition and Restoration grant programs and RCO's administration.

Agency's Name Changed

In 2007, the name of the agency was changed in state law from the Interagency Committee for Outdoor Recreation to the Recreation and Conservation Office.[2] Although this change was implemented by state law, it was not updated in the WAC.

Rule-making Moratorium

All non-critical rule-making was suspended from October 11, 2011 through December 31, 2012 by Governor's Executive Order 11-03. The agency name change was considered non-critical rule-making; therefore, the board could not update the administrative rules to reflect the name change. Since the order expired at the end of 2012, non-critical rule-making may now be filed with the Office of the Code Reviser.

Two Phases of Planned Rule-Making

Staff propose a phased approach to updating the board's administrative rules.

Phase I: The subject of this memo is the first phase, which is an expedited rule-making to change the agency's name and update statutory references which have changed since 2001.

Phase II: The second phase will consider substantive changes, such as reviewing definitions and amending rules for grant agreements and long-term grant compliance. Staff plan to launch phase II in 2015, with a public hearing scheduled at a regular board meeting.

Analysis

Proposed Amendments for Phase I

The purpose of the proposed phase I amendments to Title 420 WAC is to update the agency's name and correct statutory references. The Recreation and Conservation Office, formerly called the Interagency Committee for Outdoor Recreation, provides administrative support to the

[2] Section 39, Chapter 241, Laws of 2007.

Salmon Recovery Funding Board. The agency's name was changed in 2007. The changes to the WAC will bring the agency's name in alignment with state law and update statutory references which have changed since 2001.

The text of the proposed amendments is included as Attachment A. The amendments are presented in a table format with an explanatory statement for each section. The explanations are meant to be a reference on the types of changes made in the section. In general, there are two types of changes: name change or updated reference.

Expedited Rule-making

The proposed rule-making meets one or more of the criteria for an expedited rule-making process.[3] Agencies may file notice for an expedited adoption of rules if it meets one of the following criteria:

a) The proposed rules related to internal operations only,
b) The proposed rules adopt or incorporate by reference other federal laws or regulations, state laws or rules from other state agencies,
c) The proposed rules correct typographical errors, makes address or name changes, or clarifies language of a rule without changing its effect,
d) The content is explicitly and specifically dictated by statute,
e) The proposed rules have been the subject of negotiated rule-making, pilot rule-making, or other process that involved substantial participation of interested parties, or
f) The proposed rule is being amended after a review of a cost-benefit analysis.

The expedited rule-making process allows the agency to conduct a faster adoption process than a regular rule-making action. The steps for expedited rule-making are:

1. File notice of expedited rule-making in the Washington State Register,
2. Provide the public 45 days to object to the expedited rule-making process,
3. Adopt the rule if there are no public objections received, and
4. File notice of permanent rule-making in the Washington State Register.

Should any member of the public object to the expedited rule-making process, the process starts over and must follow the regular rule-making requirements in the Administrative Procedures Act.[4]

Public Review

Prior to the board meeting, the public was made aware of the expedited rule-making on the following occasions:

- Notice of Expedited Rule-making (CR-105, Attachment B) filed April 1, 2014 and published in issue #14-08-087 of the Washington State Register on April 16, 2014,
- Agenda item at the June 2014 board meeting posted on RCO's Web site,

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[3] RCW 34.05.353

[4] Chapter 34.05 RCW

- Posting of proposed rule-making on RCO's Web site, and
- Email notification sent to interested persons.

As of the writing of this memo, no objections to the expedited rule-making process have been received. The deadline for the public to file an objection is June 3, 2014.

Staff Recommendation

Staff recommend adoption of the expedited rule-making filed April 1, 2014 and published in issue #14-08-087 of the Washington State Register on April 16, 2014.

Decision Requested

Resolution 2014-01 is provided for the board's consideration.

Strategic Plan Link

The proposed WAC changes reflect the board's value for citizen oversight and accountability of the expenditure of public funds and to conduct its work with openness and integrity.

Next Steps

Should the board adopt the expedited rule-making, staff will prepare a Concise Explanatory Statement and file a permanent rule notice for publication in the next available Washington State Register. Adopted rules are effective 31 days after they are filed with the Office of the Code Reviser.

Attachments

A. Proposed Amendments to Title 420 WAC
B. Notice of Expedited Rule-making (CR-105)
C. Concise Explanatory Statement (to be distributed at the board meeting)

Salmon Recovery Funding Board
Resolution #2014-01
2014 Administrative Rule Changes Phase I

WHEREAS, pursuant to RCW 77.85.120(1)(d), the Salmon Recovery Funding Board (board) adopts administrative rules in the Washington Administrative Code (WAC) that govern its salmon recovery grant program which is administered by the Recreation and Conservation Office (RCO); and

WHEREAS, the name of the agency was changed in Section 39, Chapter 241, Laws of 2007, from the Interagency Committee for Outdoor Recreation to the Recreation and Conservation Office, and various state and federal law references have changed since 2001 which need to be updated in the WAC; and

WHEREAS, RCO filed an expedited rule-making with the Office of the Code Reviser on April 1, 2014 and it was published in issue #14-08-087 of the Washington State Register on April 16, 2014; and

WHEREAS, RCO posted notice of the expedited rule-making on its Web site and sent an e-mail notification to interested persons, and

WHEREAS, the public was given an opportunity to object to the expedited rule-making process from April 16 to June 3, 2014 during which time no objections were filed by the public, and

WHEREAS, the rule changes meet the criteria for an expedited rule-making because they are responsive to statutory changes made in 2007 and correct statutory references which has changed since 2001;

NOW, THEREFORE BE IT RESOLVED, that the board does hereby adopt the expedited rule-making as filed with the Office of the Code Reviser on April 1, 2014 and it was published in issue #14-08-087 of the Washington State Register on April 16, 2014; and

BE IT FURTHER RESOLVED that the board directs RCO staff to file a permanent rule adoption with the Office of Code Reviser with an effective date of 31 days after it is filed.

Resolution moved by: ______________________________

Resolution seconded by: ______________________________

Adopted/Defeated/Deferred (underline one)

Date: ______________________________

Attachment A

Proposed Amendments to Title 420 Washington Administrative Code

Amendment Text	Explanatory Statement
WAC 420-04-010 Definitions. For purposes of Title 420 WAC, the definitions in RCW 77.85.010 apply. In addition, unless the context clearly indicates otherwise, the following definitions also apply: "Acquisition" means the gaining of rights of public ownership by purchase, negotiation, or other means, of fee or less than fee interests in real property, and related interests such as water or mineral claims and use rights. "Applicant" means any agency, person or organization that meets qualifying standards, including deadlines, for submission of an application soliciting a grant of funds from the board. Generally, eligible applicants for ((~~SRFB~~)) board funds include a state, local, tribal or special purpose government, a nonprofit organization, a combination of such governments, or a landowner for projects on its land. "Application" means the form(s) developed and implemented for use by applicants in soliciting project funds administered by the board. "Board" means the salmon recovery funding board ((~~(SRFB)~~)) created by chapter 13, Laws of 1999 1st sp. sess. (2E2SSB 5595), now codified as ((~~chapter 77.85~~)) RCW 77.85.110. "Chair" means the chair of the board. "Development" means the construction or alteration of facilities, the placement or removal of materials, or other physical activity to restore or enhance salmon habitat resources.	Name change. Update references.

Amendment Text	Explanatory Statement
"Director" means the director of the ((~~IAC~~)) office or that person's designee, as described in RCW 79A.25.150, responsible for implementation of board activities under chapter ((~~s 79A.25 and~~)) 77.85 RCW. ((~~"IAC" means the interagency committee for outdoor recreation (IAC), an executive state agency established under chapter 79A.25 RCW.~~)) "Lead entity" means the local organization or group designated under RCW 77.85.050. "Manual(s)" means a compilation of state and federal policies, procedures, rules, forms, and instructions that have been assembled in manual form and which have been approved by the ((~~board~~)) office for dissemination by paper, electronic or other formats to all who may wish to participate in the board's grant program(s). "Office" means the recreation and conservation office or the office of recreation and conservation as described in RCW 79A.25.010. "Preliminary expense" means project costs incurred prior to board approval, other than site preparation/development costs, necessary for the preparation of a development project. "Project" means the undertaking which is, or may be, funded in whole or in part with funds administered by the ((~~IAC~~)) office on behalf of the board. "Project agreement" means a project agreement, supplemental agreement, intergovernmental agreement, or project contract between the ((~~IAC~~)) office acting on behalf of the board, and a project sponsor. "Project sponsor" means an applicant under RCW 77.85.010(6) who has been awarded a grant of funds, and has a signed project agreement.	

Amendment Text	Explanatory Statement
WAC 420-04-015 Address. All communications with the board shall be directed to the ((~~IAC offices~~)) recreation and conservation office at the Natural Resources Building, 1111 Washington Street S.E., P.O. Box 40917, Olympia, Washington 98504-0917. Telephone ((~~(360) 902-3000. Web site: www.wa.gov/iac/salmonmain~~)) 360-902-3000.	Name change. Contact information update.
WAC 420-04-020 Organization and operations. The board: (1) Is an unsalaried body of ten members. Five members are citizens appointed by the governor from the public-at-large, with the consent of the senate, for a term of three years each. The other members are the: (a) Commissioner of public lands; (b) Director of the department of fish and wildlife; (c) Director of the state conservation commission; (d) Director of the department of ecology; and (e) Secretary of transportation (or the designees of these individuals). The five citizen members, including the chair, are voting members. The chair of the board is appointed by the governor from among the five citizen members. (2) Is authorized and obligated to administer grant programs for salmon recovery, and related programs and policies. (3) Performs and accomplishes work by a staff under the supervision of the ((~~IAC~~)) director appointed by the governor. (4)(a) Conducts regular meetings, pursuant to RCW 42.30.075, according to a schedule it adopts in an open public meeting. (b) May conduct special meetings at any time, pursuant to RCW 42.30.080, if called by the chair.	Name change.

Amendment Text	Explanatory Statement
(c) Maintains an official record of its meetings in a recorded audio format, unless written minutes are otherwise indicated for logistical reasons. (5) Defines a quorum as three of its voting members, with a preference that at least two of the agency members shall also be present. (6) Adopts parliamentary meeting procedure generally as described in *Robert's Rules of Order*. Only voting members may make motions or formal amendments, but agency members may request the chair for leave to present a proposal for board consideration.	
WAC 420-04-030 Manuals and waivers—Guidance. (1) The board shall adopt one or more manuals that describe its general administrative policies, for use by grant applicants, potential applicants, project sponsors, and others. The board shall inform all applicants in any given grant cycle of the specific project application process and methods of review, including current evaluation tests and instruments, by explaining these items in the manuals or other publicly available formats. Manuals may be adopted for each grant cycle, or for a topical issue, and shall contain a clear statement of the applicability of the policies outlined. The board also instructs the director to use applicable ((~~IAC~~)) office administrative manuals for general guidance in the implementation of ((~~SRFB~~)) board grant contracts. These include ((~~IAC~~)) manuals regarding land acquisition, conservation easements, funded projects, and reimbursement procedures. (2) Board policies, including those referenced in the manuals, shall be considered and approved by the board in an open public meeting. Notice of such considerations will be given by distribution of the agenda for the meeting, press releases, meeting notice in the *Washington State Register*, or other means.	Name change.

Amendment Text	Explanatory Statement
(3) Project applicants, project sponsors, or other interested parties may petition the director for a waiver or waivers of those items within the manuals dealing with general administrative matters and procedures. Determinations on petitions for such waivers made by the director are subject to review by the board at the request of the petitioner. (4) Petitions for waivers of subjects regarding board policy, and those petitions that in the judgment of the director require board review, shall be referred to the board for deliberation. Policy waivers may be granted after consideration by the board at an open public meeting.	
WAC 420-04-060 Delegated authority. Consistent with RCW 79A.25.240 and other applicable laws, the director is delegated the authority and responsibility to carry out policies and administrative functions of the board. This includes, but is not limited to, the authority to: (1) Administer board programs ((~~at the offices of the IAC~~)); (2) Administer all applicable rules, regulations and requirements established by the board or reflected in the laws of the state; (3) Implement board decisions; and (4) Approve certain waiver requests or other administrative matters.	Name change.
WAC 420-04-100 Public records access. (1) The board is committed to public access to its public records. All public records of the board, as defined in RCW ((~~42.17.260~~)) 42.56.070 as now or hereafter amended, are available for public inspection and copying pursuant to this regulation, except as otherwise provided by law, including, but not limited to, RCW ((~~42.17.310 and 42.17.255 (Exemptions)~~)) 42.56.050 and 42.56.210. (2) The board's public records shall be available through the public records officer designated by the director. All records access for board records shall be conducted in the same manner as records access for ((~~IAC~~)) office records,	Name change. Update references.

Amendment Text	Explanatory Statement
including office location, hours, copy fee and request forms. The board adopts by reference the records access procedures of the ((~~IAC~~)) office and charges the director to administer for access purposes the board's records in the same manner as records of the ((~~IAC~~)) office are administered, pursuant to chapter 286-06 WAC. (3) Any person who objects to the denial of a request for a public record of the board may petition the director for review by submitting a written request. The request shall specifically refer to the written statement which constituted or accompanied the denial. (4) After receiving a written request for review of a decision denying inspection of a public record, the director, or designee, will either affirm or reverse the denial by the end of the second business day following receipt according to RCW ((~~42.17.320~~)) 42.56.520. This shall constitute final board action. Whenever possible in such matters, the director or designee shall consult with the board's chair and members.	
WAC 420-12-040 Eligible matching resources. (1) Applicant resources used to match board funds may include: Cash, certain federal funds, the value of privately owned donated real estate, equipment, equipment use, materials, labor, or any combination thereof. The specific eligible matches for any given grant cycle shall be detailed in the published manual. The director shall require documentation of values. (2) Agencies and organizations may match board funds with other state funds, including ((~~IAC~~)) recreation and conservation funding board funds, so long as the other state funds are not administered by the board and if otherwise allowed by state law. For the purposes of this subsection, grants issued by other agencies under the Jobs for Environment program and the Forests & Fish program are not considered to be administered by the board. (3) Private donated real property, or the value of that property, must consist of real property (land and facilities) that would otherwise qualify for board grant funding.	Name change.

Amendment Text	Explanatory Statement
(4) The eligibility of federal funds to be used as a match is governed by federal requirements and thus may vary with individual proposals and grant cycles.	

EXPEDITED RULE MAKING

CR-105 (June 2004)
(Implements RCW 34.05.353)
EXPEDITED RULE MAKING ONLY

Agency: Recreation and Conservation Office on behalf of the Salmon Recovery Funding Board

Title of rule and other identifying information: (Describe Subject):

Updating references and the agency's name in Title 420 WAC, Salmon Recovery.

NOTICE

THIS RULE IS BEING PROPOSED UNDER AN EXPEDITED RULE-MAKING PROCESS THAT WILL ELIMINATE THE NEED FOR THE AGENCY TO HOLD PUBLIC HEARINGS, PREPARE A SMALL BUSINESS ECONOMIC IMPACT STATEMENT, OR PROVIDE RESPONSES TO THE CRITERIA FOR A SIGNIFICANT LEGISLATIVE RULE. IF YOU OBJECT TO THIS USE OF THE EXPEDITED RULE-MAKING PROCESS, YOU MUST EXPRESS YOUR OBJECTIONS IN WRITING AND THEY MUST BE SENT TO

Name: Leslie Connelly
Agency: Recreation and Conservation Office
Address: 1111 Washington St. SE, PO Box 40917, Olympia, WA 98504-0917

AND RECEIVED BY (Date) June 3, 2014

Purpose of the proposal and its anticipated effects, including any changes in existing rules: Makes changes to Title 420 WAC to update the agency's name and statutory references. The Recreation and Conservation Office, formerly called the Interagency Committee for Outdoor Recreation, provides administrative support to the Salmon Recovery Funding Board. The agency's name was changed in 2007. The changes to the WAC will bring the agency's name in alignment with state law and update other statutory references which have changed since 2001.

Reasons supporting proposal: Chapter 241, Section 39, Laws of 2007, changed the agency's name from the Interagency Committee for Outdoor Recreation to the Recreation and Conservation Office.

Statutory authority for adoption: RCW 77.85.120(1)(d)

Statute being implemented: Chapter 77.85 RCW

Is rule necessary because of a:

Federal Law?	☐ Yes	☒ No
Federal Court Decision?	☐ Yes	☒ No
State Court Decision?	☐ Yes	☒ No

If yes, CITATION:

DATE
April 1, 2014

NAME (TYPE OR PRINT)
Leslie Connelly

SIGNATURE Leslie Connelly

TITLE
Rules Coordinator/Natural Resources Policy Specialist

CODE REVISER USE ONLY

OFFICE OF THE CODE REVISER
STATE OF WASHINGTON
FILED

DATE: April 01, 2014
TIME: 2:38 PM

WSR 14-08-087

(COMPLETE REVERSE SIDE)

Name of proponent: (person or organization) Recreation and Conservation Office

- [ ] Private
- [ ] Public
- [x] Governmental

Name of agency personnel responsible for:

	Name	Office Location	Phone
Drafting	Leslie Connelly	1111 Washington St. SE, Olympia, WA 98501-0917	(360)902-3080
Implementation	Kaleen Cottingham	1111 Washington St. SE, Olympia, WA 98501-0917	(360)902-3000
Enforcement	Kaleen Cottingham	1111 Washington St. SE, Olympia, WA 98501-0917	(360)902-3000

Agency comments or recommendations, if any, as to statutory language, implementation, enforcement, and fiscal matters:
None.

WASHINGTON STATE
RECREATION AND CONSERVATION OFFICE
Salmon Recovery
Funding Board

Salmon Recovery Funding Board Briefing Memo

Item **13**

Meeting Date: June 2014

Title: Riparian Guidelines

Prepared By: Leslie Connelly, Natural Resources Policy Specialist

APPROVED BY RCO DIRECTOR KALEEN COTTINGHAM

Summary

As requested by the Salmon Recovery Funding Board during its March meeting, Recreation and Conservation Office staff solicited comments from the public on whether the board should adopt guidelines for riparian restoration projects. This memo describes the analysis of the comments received and presents options for the board's consideration.

Staff recommend the board expand the data collected for riparian restoration projects, maintain its current process for evaluating riparian restoration projects until new or revised guidelines are available, and pursue additional methods to incentivize private landowners to allow salmon recovery projects on their property.

Board Action Requested

This item will be a:

- ☒ Request for Decision
- ☐ Request for Direction
- ☐ Briefing

Proposed Motion Language

Move to adopt option numbers one through five and continue to explore option twelve.

Background

Staff provided a briefing at the December Salmon Recovery Funding Board (board) meeting on recommendations from the National Oceanic and Atmospheric Administration (NOAA) for minimum riparian habitat widths on Puget Sound agricultural lowlands. The briefing also presented how the recommendations were being implemented by the Washington State Department of Ecology (Ecology) as eligibility criteria for its projects in western and eastern Washington in all landscape settings.

Also in December, staff recommended the board solicit comments from the public on whether the board should adopt NOAA's recommendations and Ecology's criteria for projects focused on restoring riparian habitat areas. After significant discussion and comments from the public at the meeting, the board directed staff to research the potential implications of applying riparian habitat widths to past grant cycles to see how many projects would have met them and how many would not.

Staff provided results of this retrospective analysis at the March board meeting. In summary, the majority of the funded projects in fiscal year 2014 did not focus on riparian restoration habitat objectives. For those projects that did have a riparian restoration habitat objective, the majority of projects in western Washington met or exceeded the restoration area widths recommended by NOAA. Of the two projects with a riparian restoration habitat objective in eastern Washington, one met Ecology's criteria.

In March, the board asked staff to collect public comment on whether the board should adopt statewide guidelines for the width of a riparian restoration project. Staff were instructed to ask the public for reasons that would justify a smaller riparian width than those recommended by NOAA, how to improve landowner incentives for participating in riparian restoration projects, and how to incentivize funding projects with larger riparian widths.

Staff prepared four questions, based on the board's direction, for the public's consideration and comment. The complete solicitation announcement is included as Attachment A. The four main questions are listed below.

> *Question 1 - Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide?*
>
> *Question 2 - What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?*
>
> *Question 3 - What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board?*
>
> *Question 4 - Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the board encourage such prioritization at the local, regional or state level?*

Staff posted the public comment notice on RCO's Web site and sent an e-mail notification to over 1,800 individuals. Comments were accepted from April 10-30, 2014.

Summary of Comments Received

In response to the request for comments, 57 individuals and organizations provided feedback on the proposal to adopt guidelines for a minimum riparian width for riparian restoration projects. The table below (Table 1) summarizes the main points of each individual's comment and whether they would support guidelines for a minimum riparian width for riparian restoration projects. The complete set of comments received is included as Attachment B.

In general, there was support for the guidelines from the Northwest Indian Fisheries Commission, U. S. Fish and Wildlife Service, Department of Ecology, and three citizens. The remaining comments expressed a lack of support or had concerns about the guidelines. In general the main reasons for not adopting guidelines were: 1) concerns over landowner participation, 2) the need for flexibility to design and implement riparian restoration projects, and 3) the desire to maintain the current local review process to prioritize applications.

There also appeared to be misperceptions about the proposed guidelines. Some commenters believed the guidelines would make a project ineligible for funding, which was not reflective of the proposals from December or March. Also, there was concern about taking land away from landowners, which is contrary to the voluntary nature of the board's salmon recovery program. Finally, there was confusion with regards to how the guidelines for riparian restoration projects would interact with local and state regulations for critical areas, shoreline master programs, and forest practices. These are requirements that must be met when an entity is conducting site development or forestry. Such site impacts are different than the riparian restoration projects funded in the board's salmon recovery projects.

Finally, there was general support for increasing the types of landowner incentives eligible for board funding, with the concern that doing so would increase project costs and result in funding less projects. There were few comments about how the board could fund projects that provided larger riparian habitat areas than the minimum recommendations.

Table 1: Comments Received on Guidelines for Minimum Riparian Habitat Buffer Widths

Individual or organization	Brief Summary of Comments	Support
State-wide Perspectives and Citizens		
Ben Rau, Water Quality Program, Watershed Planning Unit, WA Department of Ecology	We support the adoption of guidelines for minimum buffer widths.	Yes
Heather Bartlett, Water Quality Program Manager, WA Department of Ecology	We supported the proposed guidelines.	Yes
Curtis D. Tanner, Acting Manager, Environmental Restoration and Assessment Division, U.S. Fish and Wildlife Service	We support the work of the board to establish minimum buffer widths for riparian habitat restoration projects.	Yes
Michael Grayum, Executive Director, Northwest Indian Fisheries Commission	The guidelines provide an essential “bookend” to the recommendations contained in the Aquatic Habitat Guidelines, Stream Habitat Restoration Guidance. Governments at all levels and the public justifiably expect that the board will provide key leadership on what is necessary to recover salmon.	Yes
Thomas Woodruff, Real Estate Acquisition Supervisor, WA Department of Fish and Wildlife	Yes, adopt guidelines for Western WA.	Yes
Jim Hansen, Citizen	I find the new guidelines to be highly reasonable. I like the emphasis on water quality for smaller tribs and ditches.	Yes
Margo DeVries, Citizen	There should be expectations for a reasonable exchange between project funding and project results. Standards should be established in guidelines. These guidelines should be structured to accommodate and accomplish the intended outcome of habitat projects for targeted species across the state.	Yes
Richard Dyrland, Citizen	Updated buffer-width guidelines are needed.	Yes
Ann Stanton, Citizen	Perhaps in support, but not the NOAA Fisheries Interim Riparian Buffer Recommendations. Each project may differ in what buffer width is feasible.	Maybe
Allen Estep, Assistant Division Manager, Forest Resources Division, WA Department of Natural Resources	A specific description of what constitutes a project area and where a minimum buffer should be applied should be articulated.	Neutral – provided technical guidance

Individual or organization	Brief Summary of Comments	Support
Jim Brennan, WA Sea Grant	The definition of riparian only includes freshwater systems. There has been substantial work on marine riparian areas and standards now include the riparian area.	Neutral – provided technical guidance
Larry Zalaznik, Board President, and Colleen Thompson, Managing Director, Regional Fisheries Enhancement Groups Coalition	Given the diversity of projects within each RFEG [Regional Fisheries Enhancement Group] region, our members are responding to the request for comment individually rather than collectively. We appreciate the time and effort you have committed to carefully reviewing the proposal.	Neutral
Phil Anderson, Director, WA Department of Fish and Wildlife	Establishing minimum buffers shifts attention from processed-based stream restoration as set in the Stream Habitat Restoration Guidelines. We would value additional discussion to identity strategies and incentives projects that do more than the minimum.	Concerns
Karen Terwilleger, Senior Director of Forest and Environmental Policy, WA Forest Protection Association (WFPA)	WFPA respectfully requests that if minimum buffer guidelines are established, buffer regimes under Habitat Conservation Plans be incorporated into your minimum guidelines.	Concerns
Mark Indrebo, Citizen	I am concerned that these new guidelines will end up making the perfect become the enemy of the good. I would suggest that the proposed guidelines be revised to allow the review panel to classify smaller-buffer projects as POC's [Projects of Concern] only when there is clear evidence that the project, as a whole, has low habitat value or a low certainty of success.	Concerns
Senator Doug Erickson, 42nd Legislative District Senator Jim Honeyford, 15th Legislative District Senator Kirk Pearson, 39th Legislative District Senator Mark Schoesler, 9th Legislative District	The guidelines should not be adopted for three reasons: riparian buffers on are ditches take away productive farmland, ditches are a low priority for salmon, and projects hinge on site-specific variables.	No
Casey Baldwin, Citizen	I do not believe that minimum buffer widths need to be adopted by the board because it is not possible to pre-determine an effective width.	No
Douglas M. Stienbarger, Citizen	It seems disingenuous to propose the project sponsor justify not using a required buffer width when the minimum buffer width is not tailored to a site to begin with. More significantly, such a policy would likely drastically decrease the number of "willing landowners" interested in riparian projects.	No

Individual or organization	Brief Summary of Comments	Support
Evan Bauder, Citizen	These guidelines will undoubtedly and substantially reduce landowner participation in regards to riparian planting. The ability to stay flexible while developing a riparian restoration plan is what allows practitioners to begin conversations with landowners.	No
George Brady, Citizen	I want to be on record as opposing any setbacks on temporary streams and irrigation ditches.	No
Jerry Barnes, Citizen	I would like to express my opposition to any proposal to inject mandatory buffer widths as a condition of board funded projects.	No
John Richmond, Citizen	Buffer widths are already built-in on riparian property on forested land through DNR [Department of Natural Resources] forest management regulations and through Critical Area ordinances and shoreline management regulations implemented by Ecology.	No
Tom Slocum, Citizen	The guidelines would not improve the benefit and certainty of the majority of individual riparian projects nor the aggregate effectiveness of the program.	No
Dan Wood, Director of Government Affairs, Washington State Dairy Federation	While the size of the proposed buffers may vary, the rigid approach does not. A flexible, site-specific program that empowers positive changes across a wide landscape will be the best approach to make improvements to the environment and, at the same time, help maintain the viability of our farms.	No
Jack Field, Executive Vice President, WA Cattlemen's Association (WCA)	The WCA respectfully requests that the board not adopt any buffer requirements as a condition of receiving funding.	No
John Small, Anchor QEA	Projects should be evaluated only on the impact to salmon recovery. Buffers are one tool to do this, but the lack of a minimum buffer as defined generally does not indicate if a specific project will or will not benefit salmon recovery.	No
Lower Columbia Region		
Darin Houpt, Forest Hydrologist, Cowlitz and Wahkiakum Conservation District	We strongly encourage the board to not adopt the guidelines. The buffer guidelines represent a one-size-fits-all mentality.	No
Eli Asher, Restoration Ecologist, Natural Resources Department, Cowlitz Indian Tribe	I respectfully recommend that the board avoid adopting any policy regarding minimum buffer widths.	No

Individual or organization	Brief Summary of Comments	Support
Jeff Breckel, Executive Director, Lower Columbia Salmon Recovery Board (LCSRB)	The LCFRB recommends that the Salmon Recovery Funding Board table consideration of minimum buffer width guidelines and consider a more thorough and careful evaluation of board-funded riparian buffer restoration efforts to date with the goal of identifying ways to improve the effectiveness of future projects.	No
Pete Ringen, Director, Wahkiakum County Public Works	The proposed policy change is that prescriptive formulas often have unintended consequences, making it more difficult to implement the things we would like to accomplish. Prescriptive formulas can also impact the rightful use of property for those families who gain their livelihood from it.	No
Tony Meyer, Lower Columbia Regional Fisheries Enhancement Group (RFEG)	The Lower Columbia RFEG does not support policy changes of any kind that result in limiting a project sponsor's ability to work with landowners.	No
Mid-Columbia Region		
Deborah Burksfield, LSL Properties	While the minimum buffer widths in Table 1 appear to be reasonable for many riparian improvement projects, minimum buffers should be land use zoning site-specific, in my opinion.	Concerns
Alex Conley, Executive Director, Yakima Basin Fish and Wildlife Recovery Board (YBFWRB)	The YBFWRB does not see a pressing need for riparian buffer requirements in our area. We would recommend that any guidelines adopted by the board use a less ambiguous means other than historic fish use to classify water bodies.	No
Scott Revell, Board Chair, Yakima Basin Joint Board	We do not support the proposed minimum buffer width requirements for salmon recovery grants.	No
Northeast Region		
Eric Berntsen, Habitat Restoration Biologist, Natural Resources Department, Kalispel Tribe	The board should adopt guidelines, and the guidelines should apply statewide.	Yes
Puget Sound and Hood Canal Region		
Bill Blake, Stillaguamish Watershed Council Co-chair	Although we agree that wider buffers provide more function and are preferable from a habitat perspective, the proposed policy does not explicitly acknowledge land use constraints.	Concerns
Jason Mulvihill-Kuntz, Watershed Coordinator, Lake Washington/Cedar/Sammamish Watershed (WRIA 8)	While we agree that larger buffers are preferable from a habitat perspective, the proposed policy as written does not explicitly acknowledge land use constraints preventing large buffers in an urban context.	Concerns
Stephanie Martine, Habitat Division Manager, Makah Tribe Fisheries	The guidelines should allow for local regulations as exceptions.	Concerns

Individual or organization	Brief Summary of Comments	Support
Mark A. Palmer, Engineer, City of Puyallup	Project selection criteria still allows too much room for interpretation, allowing projects to be rejected based on personal bias instead of merit.	Concerns about local process
Bill Pierce, Soaring Swallow Farm	I do not feel minimum guidelines should be adopted. Since each project is different and is the result of balancing many competing goals, I feel it should be left to the discretion of the project lead to determine what buffers are most appropriate.	No
David Swindale, Director, Planning and Development Services, City of University Place	We would not support 100' buffers on [fish-bearing] intermittent or ephemeral waterways.	No
Judy Blanco, Cedar River Restoration Project Manager, Forterra	It is unlikely that our programs would be able to recruit landowners if the minimum planting width requirement is increased to 100'.	No
Mark Isaacson, Director, King County Water and Land Resources Division	We support the science behind NOAA National Marine Fisheries Service's guidance for larger buffer sizes. However, we do not support the board adopting minimum riparian buffer guidelines requiring 100 foot buffers on fish bearing streams because it will result in less acres of habitat being protected and restored.	No
Marlla Mhoon, Councilmember, City of Covington and Bill Peloza, Councilmember, City of Auburn, Co-chairs, Watershed Ecosystem Forum Co-chair	WRIA [Water Resources Inventory Area] 9 does not support the new guidelines and we would like to specifically voice our concern about the board's proposed large riparian minimum buffer widths.	No
Mendy Harlow, Executive Director, Hood Canal Salmon Enhancement Group	If a minimum buffer width for planting projects within a riparian habitat were to be required, it would severely jeopardize overall project progression and ultimately harm salmon habitat restoration efforts in these project areas.	No
Monte Marti, Manager, Snohomish Conservation District	The adoption of the new buffer widths as a required minimum for board projects will negatively impact our ability to not only get trees in the ground, but also to implement in-stream salmon habitat projects.	No
Robert Sendrey, Executive Director and Phil Taylor, Board President, Sounds Salmon Solutions	We are very concerned that adoption of the requirements would be an unrealistic policy and will potentially deter voluntary stewardship actions by private landowners.	No
Terry Williams, Tulalip Tribes, Snohomish Basin Salmon Recovery Forum Chair	The Forum asks that these project-specific decisions be left to the technical experts and board-committee members in the Snohomish Basin.	No

Individual or organization	Brief Summary of Comments	Support
Snake River Region		
Bradley Johnson, Watershed Planning Director, Asotin Public Utility District	How should it be done? There definitely needs to be different standards for the west and eastside of the Cascades for the differing natural conditions.	Concerns
Del Groat, Chairman, Snake River Salmon Recovery Board	We believe that existing intensive local and state project reviews have resulted in sufficient buffer widths that meet project goals.	No
Judith Johnson, Kooskooskie Commons	The new increased buffer requirement of a minimum of 75 feet in width makes it impossible to continue improving water quality and fish passage in the urban streams and spring fed creeks.	No
Larry Hooker, Agricultural Projects Coordinator, Walla Walla Conservation District	If funding hinges upon whether or not a landowner has or will install buffers meeting new guidelines, not only will there be far fewer buffers implemented but it will also result in far fewer salmon recovery projects implemented.	No
Upper Columbia Region		
Derek Van Marter, Executive Director, Upper Columbia Salmon Recovery Board	We recommend delaying implementation of guidelines for riparian improvement projects in Eastern Washington until the criteria can be refined for the geography and needs of populations in the region.	No
Washington Coast Region		
Janet Strong, Chehalis River Basin Land Trust Board Member	I support the minimum guidelines as they appear in the table and think they should be applied statewide, or at a minimum, throughout western Washington.	Yes

Options for Consideration

Based on the comments received, the following options are offered for the board's consideration. See Attachment C for an analysis of the options listed below.

1. Defer adopting any minimum riparian restoration widths pending the Washington Department of Fish and Wildlife (WDFW)'s update to its management recommendations for riparian habitat.
2. Continue to use the 2012 WDFW Stream Habitat Restoration Guidelines as the board's preferred guidelines for all of the board's restoration projects.
3. Collect riparian restoration width information in the application to better understand the scope of the riparian restoration project.
4. Remind lead entity organizations of their critical role in evaluating riparian restoration projects to ensure riparian habitat area widths are appropriate for the site and represent a clear benefit to salmon recovery as articulated in the regional recovery plans.
5. Provide generic guidance to the board's technical review panel that they must evaluate riparian restoration projects for salmon benefit and certainty as appropriate for the site and as articulated in the regional recovery plans.
6. Incorporate the guidelines in the local prioritization process conducted by the regional organizations.
7. Adopt riparian restoration width guidelines for projects on agricultural land in the Puget Sound region only.
8. Adopt riparian restoration width guidelines for projects on any land use type in the Puget Sound region only.
9. Adopt riparian restoration width guidelines for projects in western Washington.
10. Adopt riparian restoration width guidelines for projects statewide.
11. Apply site-specific riparian restoration widths based on soil type and potential vegetation height.
12. Allow funding for additional types of incentives to encourage landowner participation such as temporary construction easements, short-term conservation easements, and leases.

Staff Recommendation

Staff recommend the board adopt options one through five and option twelve, as described in the previous section. This recommendation maintains the practice of using the 2012 WDFW Stream Habitat Restoration Guidelines as the preferred guidelines for all of the board's restoration projects until new or revised best management practices are available. In addition to the riparian restoration area length along a stream, RCO would collect riparian restoration area width as part of the application data to more accurately capture the scope of a project. Lead entities would maintain their responsibilities as the local evaluation teams responsible for ensuring riparian restoration projects clearly provide a net benefit to meeting salmon recovery goals as outlined in the regional recovery plans. The board's technical review panel would be instructed to evaluate each riparian restoration project for benefits to salmon recovery. Finally, to encourage the participation of private landowners in salmon recovery, staff recommend the board pursue option twelve to allow additional types of financial incentives for the use of private land for salmon recovery projects.

Next Steps

Staff will implement the direction provided by the board for new grant applications starting in 2015 and will bring back to the board any additional action items for future discussion and decision.

Attachments

A. Proposed Changes to Salmon Recovery Grant Program
B. Public Comments on Riparian Guidelines (Included as a link)
C. Analysis of Options for Board Consideration

Attachment C

Analysis of Options and Pros and Cons

OPTIONS	PROS	CONS
Option 1: Defer adopting any minimum riparian restoration widths pending the Washington Department of Fish and Wildlife (WDFW)'s update to its management recommendations for riparian habitat.	WDFW's research may provide new information on the riparian habitat area needed to support salmon recovery efforts. Doesn't place additional application requirements on landowners, project sponsors, lead entities or regional organizations. Supports current policy that encourages projects to implement the maximum buffer widths in the 2012 Stream Habitat Restoration Guidelines.	Doesn't implement advice from NOAA on minimum requirements needed to support aquatic functions for salmon recovery. WDFW's research may not specifically address salmon recovery needs as it relates to riparian restoration projects. We may see more applications with smaller buffers, especially if those projects are ineligible for funding in other state or federal programs. We could be perceived as behind the curve as other agencies move ahead with some form of implementation of minimum riparian width guidelines or requirements.
Option 2: Continue to use the 2012 WDFW Stream Habitat Restoration Guidelines as the board's preferred guidelines for all of the board's restoration projects.	Utilizes the most current statewide best management practices for stream restoration projects. Supports current policy that encourages projects to implement the maximum riparian habitat area widths in the 2012 Stream Habitat Restoration Guidelines. Doesn't place additional application requirements on landowners, project sponsors, lead entities or regional organizations.	Doesn't implement advice from NOAA on minimum requirements needed to support aquatic functions for salmon recovery. Guidelines were carried forward from 1997 so they may be outdated and they don't reflect differences in the landscapes across the state (same guidelines apply to eastern and western Washington regardless of site specific conditions). We may see more applications with smaller buffers, especially if those projects are ineligible for funding in other state or federal programs. We could be perceived as behind the curve as other agencies move ahead with some form of implementation of minimum riparian width guidelines

OPTIONS	PROS	CONS
		or requirements.
Option 3: Collect riparian restoration width information in the application to better understand the scope of the riparian restoration project.	Collects valuable information in the application on riparian habitat area widths. Gathers additional information in the grant application to identify any issues that may evolve in the future regarding the riparian habitat areas being restored.	Doesn't implement advice from NOAA on minimum requirements needed to support aquatic functions for salmon recovery. We may see more applications with smaller buffers, especially if those projects are ineligible for funding in other state or federal programs. We could be perceived as behind the curve as other agencies move ahead with some form of implementation of minimum riparian width guidelines or requirements.
Option 4: Remind lead entity organizations of their critical role in evaluating riparian restoration projects to ensure riparian habitat area widths are appropriate for the site and represent a clear benefit to salmon recovery as articulated in the regional recovery plans.	Lead entities remain responsible to evaluate projects for salmon benefit and certainty and meeting recovery plan objectives. Allows for site specific analysis to determine the appropriate width for riparian restoration projects. Provides for flexibility to work with landowners on the amount of riparian area they are willing to contribute to a riparian restoration project.	Doesn't implement advice from NOAA on minimum requirements needed to support aquatic functions for salmon recovery. Lack of guidance or criteria from the state to lead entities on how to evaluate riparian restoration projects for salmon benefit and certainty. We may see more applications with smaller buffers, especially if those projects are ineligible for funding in other state or federal programs. We could be perceived as behind the curve as other agencies move ahead with some form of implementation of minimum riparian width guidelines or requirements.
Option 5: Provide generic guidance to the board's technical review panel that they must evaluate riparian restoration projects for salmon benefit and certainty as appropriate for the site and as articulated in the regional recovery plans..	Provides direction to the technical review panel on the importance of evaluating the benefit and certainty associated with riparian habitat areas. Allows for site specific analysis to determine the	Doesn't implement advice from NOAA on minimum requirements needed to support aquatic functions for salmon recovery. We may see more applications with smaller buffers,

OPTIONS	PROS	CONS
	appropriate width for riparian restoration projects.	especially if those projects are ineligible for funding in other state or federal programs.
Option 6: Incorporate the guidelines in the local prioritization process conducted by the regional organizations.	Implements advice from NOAA on minimum requirements needed to support aquatic functions for salmon recovery. Maintains the evaluation and prioritization of projects with the regional technical and citizen review process. Provides a screen for meeting minimum riparian habitat area widths, with flexibility to allow for smaller buffer widths based on justification in the application. Riparian restoration projects would be more likely to meet the board's evaluation criteria for the technical review panel. Provides consistency with other state and federal voluntary incentive programs.	We may see fewer projects submitted for riparian restoration efforts. Creates the perception that those projects which provide at less than the minimum riparian habitat area would not get done. Project sponsors would need to provide justification for why a minimum riparian restoration area was not achievable.
Option 7: Adopt riparian restoration width guidelines for projects on agricultural land in the Puget Sound region only.	Implements advice from NOAA on minimum requirements needed to support aquatic functions for salmon recovery. Focuses on the specific geography that is the subject of NOAA's recommendations. Implies that smaller riparian areas in other locations are not a problem for salmon recovery. Recognizes that other state and local laws already provide riparian buffer protections on other land use types (e.g., critical areas ordinances, shoreline master programs, and forest practices). Recognizes that some local jurisdictions have not adopted riparian buffer protections for agricultural land uses. Focuses on the specific land use that is the subject of	Creates a disparity on application requirements based on the property's current land use which may or may not be appropriate based upon the land use type. Implies that minimum riparian habitat area widths are not needed for other land use types to support salmon recovery May undercut minimum riparian buffers adopted by local jurisdictions for other land use types if those buffers are larger than the guidelines applied by the board.

OPTIONS	PROS	CONS
	NOAA's recommendations. Implies that smaller riparian habitat areas on other land use types are not a problem for salmon recovery.	
Option 8: Adopt riparian restoration width guidelines for projects on any land use type in the Puget Sound region only.	Implements advice from NOAA on minimum requirements needed to support aquatic functions for salmon recovery. Focuses on the specific geography that is the subject of NOAA's recommendations. Implies that smaller riparian areas in other locations are not a problem for salmon recovery.	NOAA's recommendations were developed with other entities for specific purposes which may not be directly applicable to board projects. Implies that minimum riparian areas widths are not needed in other locations to support salmon recovery. Creates a disparity on application requirements based on the project's location. Applies recommendations for the agricultural landscape to all land use types.
Option 9: Adopt riparian restoration width guidelines for projects in western Washington.	Implements advice from NOAA on minimum requirements needed to support aquatic functions for salmon recovery. Creates consistency in western Washington on minimum buffer widths. Implies that smaller riparian habitat area widths in other locations are not a problem for salmon recovery.	NOAA's recommendations are specifically targeted to the Puget Sound region, so they may not be applicable to other regions. NOAA's recommendations were developed with other entities for specific purposes, which may not be directly applicable to board projects. Implies that minimum riparian areas widths are not needed in other locations to support salmon recovery. Creates disparity on application requirements based on the project's location.
Option 10: Adopt riparian restoration width guidelines for projects statewide.	Applies a minimum riparian habitat area widths statewide while recognizing the different landscapes on the west and east sides. Applies Ecology's width criteria to improve water quality which is also important for salmon recovery.	Ecology's width criteria were developed with other entities for specific purposes which may not be directly applicable to board projects.
Option 11: Apply site-specific riparian restoration widths based on soil type and potential vegetation height.	Applies a minimum riparian habitat area width statewide based on site potential which would support favorable conditions for salmon recovery.	May require the applicant to obtain technical assistance to determine what the minimum riparian habitat area width should be at the project site.

OPTIONS	PROS	CONS
Option 12: Allow funding for additional types of incentives to encourage landowner participation such as temporary construction easements, short-term conservation easements, and leases.	Increases the incentives available to landowners for use of the property. Compensates landowners for participating in salmon recovery efforts. Mimics how other public work projects are typically conducted on private property.	Would likely increase project costs and result in funding fewer projects.

Proposed Changes to the Salmon Recovery Grant Program

Background

The Salmon Recovery Funding Board (board) is considering whether to implement guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat. The board would like input on the proposal before making a decision.

How to Comment

Public comments on the proposed changes are being accepted through Wednesday, April 30, 2014. Send comments to policychanges@rco.wa.gov or to ask questions. Please include in the subject line the following text: ***SRFB riparian guideline comments.***

Definition of Riparian Project

Riparian projects are projects implemented above the ordinary high water mark and within the floodplain of streams that improve the environmental conditions necessary to sustain salmonids throughout their life cycle[1]. The proposed guidelines under consideration would be applied to riparian projects that include riparian planting as a primary habitat objective.

The guidelines would not apply to projects that conduct plantings to mitigate for construction impacts at other projects such as levee setbacks, fish passages or in-stream improvements.

Proposed Changes for Public Comment

The proposal is outlined below in four parts in a question/answer format. Please respond to the questions as directly as possible. Other comments are welcome and should be provided separately from your answer to the questions.

Question 1 - Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide?

The guidelines under consideration are presented in Table 1 below.

[1] Definition of riparian projects for SRFB grants.

Table 1: Proposed Minimum Riparian Buffer Width Guidelines for Riparian Habitat Projects

Category	Functions	Minimum Buffer Width West of Cascades	Minimum Buffer Width East of Cascades
A. Constructed ditches, intermittent streams, and ephemeral streams that are not identified as being accessed and were historically not accessed by anadromous or Endangered Species Act (ESA) listed fish species	Water quality, shade, source control and delivery reduction	35' minimum	35' minimum
B. Perennial waters that are not identified as being accessed and were historically not accessed by anadromous or ESA listed fish species	Water quality, shade, source control, and delivery reduction	50' minimum	50' minimum
C. Perennial, intermittent, and ephemeral waters that are identified as being accessed or were historically accessed by anadromous or ESA listed fish species	Water quality, large wood debris for cover, complexity and shade, and microclimate cooling, source control and delivery reduction	100' minimum	75' minimum
D. Intertidal and estuarine streams and channels that are identified as being accessed or were historically accessed by anadromous or ESA listed fish species	Water quality, habitat complexity	35'-75' minimum, or more as necessary to meet water quality standards	N/A

Table reflects NOAA Fisheries Interim Riparian Buffer Recommendations for Streams in Puget Sound Agricultural Landscapes (December 2013) and Minimum Buffer Requirements for Surface Waters for Grants Awarded through the Washington State Department of Ecology for Nonpoint Source Pollution (October 2013).

Question 2 - What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?

If a proposed riparian project is not designed to meet the minimum buffer widths in the guidelines in Table 1, the applicant would be required to provide a written justification with the grant application as to why the proposal is for a smaller buffer. The written justification would document how the smaller buffer will improve the environmental conditions necessary to sustain salmonids throughout their life cycle and describe the constraints that prohibit achieving the adopted guideline for the stream type where the proposal is located.

Examples of reasonable constraints may include:

- Transportation corridors such as roads or bridges,
- Structures such as homes, barns, or sheds,
- Naturally occurring conditions such as geology and soil types, or

- If the guidelines would lead to declassification of the land as farmland as defined in the state's Open Space Act (RCW 84.34.020).

Review Process
Applications with buffer widths smaller than the guidelines would remain eligible for grant funding. The application, including the written justification for the smaller buffer, would be reviewed by the board's technical review panel in the approved application review process for the grant cycle. If the technical review panel finds a lack of support for the smaller buffer; it may deem the application a project of concern. Applications that are projects of concern remain on the funding list provided to the board. The board would consider whether to fund the application at the funding meeting.

Question 3 - What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board?

The board allows project sponsors to acquire riparian conservation easements in perpetuity to provide compensation to landowners who voluntarily allow their property to be used for salmon recovery projects. Restoration projects are required to be maintained for ten years after the project is complete.

What are conservation incentives[2]?
Conservation incentives are inducements offered by government or private providers to encourage private landowners to undertake voluntary conservation actions on their property. There are six basic categories of incentives:

- Financial assistance: grant, loan, and lease programs that provide cost-share funding for, or reduce expenses of, conservation actions,
- Technical assistance: advice, hand-on help, and training for landowners on conservation tools or techniques,
- Tax relief: tax reductions for landowners undertaking conservation actions,
- Marketing: programs to add market value to products that support conservation on private land,
- Recognition: identification and promotion of landowners undertaking conservation actions, and
- Conservation banking: financial assistance to landowners provided as a condition of permitting for construction projects.

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[2] Adapted from *Conservation Incentive Programs in Washington State: Trends, Gaps, and Opportunities Prepared* for the Washington Biodiversity Council By Evergreen Funding Consultants

Question 4 - Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the board encourage such prioritization at the local, regional or state level?

The board gives preference to funding certain types of projects through its eligibility and evaluation criteria as published in *Manual 18: Salmon Recovery Grants* and as required through statutory direction. Statutory requirements for awarding grants funds are outlined below.

Statutory Criteria[3]
In evaluating, ranking, and awarding funds for projects and activities the board must give preference to projects that:

- Are based upon the limiting factors analysis;
- Provide a greater benefit to salmon recovery based upon the stock status information contained in the Department of Fish and Wildlife's salmonid stock inventory (SASSI), the salmon and steelhead habitat inventory and assessment project (SSHIAP), and any comparable science-based assessment when available;
- Will benefit listed species and other fish species;
- Will preserve high quality salmonid habitat;
- Are included in a regional or watershed-based salmon recovery plan that accords the project, action, or area a high priority for funding;
- Are sponsored by an entity that is a Puget Sound partner; and
- Are projects referenced in the action agenda developed by the Puget Sound Partnership under RCW 90.71.310.

In evaluating, ranking, and awarding funds for projects and activities the board shall also give consideration to projects that:

- Are the most cost-effective;
- Have the greatest matched or in-kind funding;
- Will be implemented by a sponsor with a successful record of project implementation;
- Involve members of the Washington Conservation Corps or the Veterans Conservation Corps established in RCW 43.60A.150; and
- Are part of a region wide list developed by lead entities.

Strategic Plan Link

The proposed changes reflect the opportunity to make policy improvements that support the board's mission to provide funds to achieve overall salmon recovery, including habitat projects and other activities that result in sustainable and measurable benefits for salmon and other fish species.

The proposed changes also reflect the board's goals to:

[3] RCW 77.85.130

- Fund the best possible salmon recovery activities and projects through a fair process that considers science, community values and priorities, and coordination of efforts;
- Be accountable for board investments by promoting public oversight, effective projects, and actions that result in the economical and efficient use of resources; and
- Build understanding, acceptance, and support of salmon recovery efforts.

Next Steps

Comments received will be reviewed and included with a staff report to the board at its public meeting on June 4, 2014 in Olympia. When possible, the proposal will be revised to address the comments received. At that meeting, the board may approve the proposal as presented or direct staff to revise it based upon the comments received.

SALMON RECOVERY FUNDING BOARD SUMMARIZED MEETING AGENDA AND ACTIONS
June 4, 2014

Agenda Items without Formal Action

Item	Follow-up Actions
1. Management Report	No follow-up action requested.
2. Salmon Recovery Management Report	No follow-up action requested.
3. Reports from Partners	No follow-up action requested.
4. Presentation by Washington Coast Sustainable Partnership	No follow-up action requested.
5. Overview of RCO's PRISM System	No follow-up action requested.
6. Communication Plan Update	Provide funding options for aligned communications, marketing, and outreach at the next board meeting, including metrics.
7. Habitat Work Schedule and the Salmon Recovery Story	No follow-up action requested.
8. Invasive Species	No follow-up action requested.
9. Preview of the Salmon-Related Budget for 2015-2017	Budget recommendations from the WSC for August meeting, to include NOAA's perspective on priorities with focus on monitoring and delisting
14. Department of Fish and Wildlife's 21st Century Salmon	Postponed until December 2014 board meeting.

Agenda Items with Formal Action

Item	Formal Action	Follow-up Actions
March 2014 Meeting Summary	Approved meeting summary	No follow-up action requested.
10. Lead Entity and Regional Organization Allocation Year Two Capacity Funds	Delegated authority to Director Cottingham to enter into contract once the 2014 PCSRF notice of awarded funds is received. Added $50,000 to the Lower Columbia lead entity annual allotment, correcting a GSRO error. Added $50,000 in funds for the Washington Coast Regional contract to develop a business plan.	No follow-up action requested.
11. Monitoring & Funding	Approved $10,000 of PCSRF return funds to hire a contractor via personal service contract to update and finalize	

	the monitoring and evaluation strategy. Approved a contract time extension for the IMW contract, and the associated cost increase of $463,000 from return funds to align this contract with the federal fiscal year.	
12. Adoption of Washington Administrative Code (WAC) Changes	Approved a resolution to amend the Washington Administrative Code (WAC) to include the name change of the RCO (from IAC).	No follow-up action requested.
13. Riparian Buffer Guidelines	Approval of options one through five, and a commitment to further exploration of option 12.	Staff will follow up and implement options one through five. Staff to develop options for option 12.

SALMON RECOVERY FUNDING BOARD SUMMARY MINUTES

Date: June 4, 2014
Place: Olympia, WA

Salmon Recovery Funding Board Members Present:

David Troutt, Chair	Olympia	**Megan Duffy**	Department of Natural Resources
Phil Rockefeller	NWPCC	**Bob Cusimano**	Department of Ecology
Nancy Biery	Quilcene	**Jennifer Quan**	Department of Fish and Wildlife
Bob Bugert	Wenatchee	**Susan Cierebiej**	Department of Transportation

It is intended that this summary be used with the materials provided in advance of the meeting. The Recreation and Conservation Office (RCO) retains a recording as the formal record of the meeting.

Opening and Welcome

Chair David Troutt called the meeting to order at 9:03 a.m. and a quorum was determined. Board member Susan Cierebiej arrived late. Board member Sam Mace was excused.

Director Cottingham provided updates regarding staff changes, including:

- **Amee Bahr,** who joined the Salmon Section as an administrative assistant in support of salmon recovery. She has her degree in environmental science from The Evergreen State College. Amee worked at Sound Native Plants for 10 years. Most recently, Amee was a secretary for the Department of Ecology in the Nuclear Waste Program.
- **Wendy Loosle,** who joined RCO in June as the new board liaison and public records officer. Wendy comes to us from the Washington Department of Early Learning, where she served as professional development coordinator supporting policy and implementation of early education systems. She received a Bachelor degree in Spanish from Oregon State University, and she is currently is earning a master's degree in environmental studies from The Evergreen State College.
- **Jen Masterson** has the new role of special projects manager and will continue to work with RCO's performance data.
- **Sarah Gage** stepped into the lead entity manager role in the Governor's Salmon Recovery Office replacing **Lloyd Moody**, who retired in April.

Chair Troutt recognized Billy Frank, Jr. for his contribution to salmon recovery in Washington State.

Agenda adoption
Moved by: Phil Rockefeller
Seconded by: Nancy Biery
Motion: APPROVED

March 2014 Meeting Summary
Moved by: Phil Rockefeller
Seconded by: Nancy Biery
Motion: APPROVED

Management and Partner Reports

Item 1: Management Report

Director's Report: Director Cottingham congratulated Scott Robinson, Deputy Director at RCO, who was selected to receive the Governor's Award for Leadership in Management. The board also congratulated Mr. Robinson for this honor.

Director Cottingham shared that Policy Director Nona Snell will be leaving RCO at the end of June. RCO hopes to fill the Policy Director position by July.

Director Cottingham communicated that RCO is accepting applications in a new grant program: the Marine Shoreline Protection Program (MSPP), a part of the larger Puget Sound Marine and Nearshore Grant Program. MSPP is supported by funds from the Environmental Protection Agency (EPA), and aims to protect high-priority, Puget Sound marine shoreline from the impacts of development through land purchases and voluntary land preservation agreements. In a joint management effort, RCO will accept applications and manage the grants once awarded, and Washington Department of Fish and Wildlife (WDFW) and the Washington Department of Natural Resources (DNR) will evaluate the proposals and award the grants. The criteria to guide application prioritization and selection were developed by Recreation and Conservation Section Manager, Marguerite Austin, in consultation with the Puget Sound Partnership, WDFW, DNR, and others. More information can be found on the RCO website.

Director Cottingham also informed the board that RCO staff is currently working on a web-based Public Lands Inventory that is due to the Legislature on July 1, 2014.

Member Bugert commended Chair Troutt and Director Cottingham on their presentation to Governor Inslee on salmon recovery efforts as part of Results Washington. Member Biery seconded the commendation.

Building Safety Evacuation Plan: Scott Robinson, Deputy Director, RCO informed the board of RCO's recent security updates, put in place to protect staff and visitors in case of an emergency. Information regarding the building safety evacuation plan was provided, and the emergency gathering area was identified for board members and meeting attendees. Board members may voluntarily provide contact information to RCO staff in the event of an emergency.

Item 2: Salmon Recovery Report

Salmon Section Report: Tara Galuska, Salmon Section Manager, shared that all projects from the 2013 grant round except ten are now under agreement. The 2014 grant round is under way with staff busy reviewing applications and conducting site visits. These projects will come to the board in December, and some in September.

There is an early action process in which RCO staff anticipates allocating the remaining 2013-2015 Puget Sound Acquisition and Restoration (PSAR) funds. Those "early action" projects will come before the board for funding at the September meeting in Winthrop, WA. Director Cottingham shared that she will work with Ms. Galuska to ensure that all PSAR funds are allocated and secured by September's meeting, prior to the next budget cycle.

Ms. Galuska updated the board on the Family Forest Fish Passage Program (FFFPP). RCO staff is working closely with partner agencies to get the 2014 FFFPP projects underway, including the remaining $10 million in funding from 2012 and $2 million from 2013. Staff continues to close out the 42 projects that were constructed during the 2013 summer. In preparation for construction during the summer 2014, staff is working with 52 new projects that focus on removal of fish passage barriers on small, private forestlands. Even with these new projects, there are still 458 eligible landowners with 678 crossings on the waiting list.

The Washington Department of Fish and Wildlife (WDFW) hired a new staff person, Jay Krienitz, to replace Betsy Lyons as the new Estuary and Salmon Restoration Program (ESRP) Manager. ESRP staff are preparing for the next grant round in fall of 2014. There are 20 active ESRP projects, with six other projects funded with additional funds received from National Estuary Program.

Ms. Galuska reminded the board how to view closed projects (Attachment A of the memo) and where to find project amendments approved by the director (included with board materials).

Project of Note: Ms. Galuska highlighted the Washington Harbor Bridge Project in Clallam County, sponsored by the Jamestown S'Klallam Tribe and funded by SRFB in partnership with the Hood Canal Recovery Council, and the North Olympic Peninsula Lead Entity through the Puget Sound Partnership. Funding sources include PSAR and ESP. Chair Troutt inquired about projects that have been completed through joint funding efforts, and noted that tracking this information over time would be useful.

The project site is an important location along the migratory path of Chinook and Hood Canal summer chum; however, the surrounding area which includes the Dungeness River supports all salmonid and other listed species. Two culverts were removed from the 37 acre site and replaced it with a causeway. The levee removal increased oxygen and sedimentation encouraging saltmarsh and eelgrass restoration. Due to the project significance, the Jamestown S'Klallam Tribe will allocate resources to carefully monitor the project site. Ms. Galuska also shared a short documentary of the project, produced by the Northwest Indian Fisheries Commission (NWIFC).

Director Cottingham mentioned the benefit of job creation through local projects; every $100,000 invested results in 1.57 jobs.

Governor's Salmon Recovery Office Report: Brian Abbott, Executive Coordinator, Governor's Salmon Recovery Office (GSRO), highlighted the Salmon Recovery Funding Board Monitoring Panel. Eight applicants responded to the Request for Quotes and Qualifications (RFQQ) due April 30, 2014; five were selected with 127 years of combined experience. The panel will fill four important roles:

1. Create a functional adaptive management framework with clearly written expectations and a process for timely implementation;
2. Evaluate, by component, the performance of the board's monitoring program and provide guidance and funding recommendations to the board;
3. Review project effectiveness monitoring and Intensively Monitored Watersheds monitoring results to recommend changes in policy or funding criteria;
4. Compare and share monitoring results to see if lessons learned in other monitoring efforts could be applied to board programs.

Members of the monitoring panel include:
- Dennis Dauble, Environmental Assessment Services
- Jody Lando, Stillwater Sciences
- Micah Wait, Wild Fish Conservancy
- Jim Fisher, Fisher & Associates
- Marnie Tyler, Chair, Ecolution

The first meeting will be held June 6, 2014 to discuss the structure and expectations of the panel. Background on each panel member will be posted to GSRO's website.

Chair Troutt asked if the panel intends to select a chair. Mr. Abbott indicated that the GSRO may select the chair initially, and the panel will assume the responsibility afterwards.

Item 3: Reports from Partners

Council of Regions Report: Jeff Breckel expressed his appreciation for the support of the SRFB in regards to communications and outreach, and is looking forward to statewide expansion efforts. Also, Mr. Breckel commented on the restoration efforts on the Coast, and proposed that returned regional organization funds be used to leverage these projects; the regions are supportive of this effort.

Washington Salmon Coalition (WSC) Report: Darcy Batura, Chair of WSC and Yakima Basin Lead Entity Coordinator, invited Amy Hatch-Winecka, WRIA 13 & 14 Salmon Habitat Recovery Committee Lead Entity Coordinator, to join her for WSC report. Ms. Batura thanked the board for its support of the WSC's action plan through $50,000 of returned funds for further projects. A consultant team has been selected to review and build upon last year's updated mission, structure, and action plan. During the upcoming WSC meeting in Chelan, they intend to approve the new plan and appoint the chair for next year.

Ms. Hatch-Winecka shared a recently completed project on Goldsborough Creek, submitted for PSAR capacity funds by the Squaxin Tribe and the Capitol Land Trust. Goldsborough Creek is the site of a hydroelectric dam removal where the habitat is now responding well and is the only system where Coho members are trending up.

Ms. Batura additionally highlighted the Eschbach Park Levee Setback & Restoration project currently in progress, a site known for its long history of recreation. The project located west of Yakima on Naches River served as a park for 90 years and Yakima County Public Services decided to protect the park. The man-made levee caused flooding problems downstream, so a setback levee was constructed through 2010 grant funds. This 37-acre project will create dynamic river habitat and dramatically reduce flood risk. NOAA featured this project on how PSAR funds are used.

Regional Fisheries Enhancement Groups (RFEG): Coleen Thompson thanked the board for her warm welcome since becoming the new director in March. RFEGs is preparing for the submission of 43 grant applications totaling over 13 million in requested funds, and looking forward to a productive summer. It appears RFEGs will receive some federal funding for fiscal year 2014 to support local restoration and communities. RFEGs continue to work with Sen. Murray and others to highlight achievements, since there is no guarantee for funding.

Chair Troutt thanked the Regional Fisheries Enhancement Groups for implementing 20 percent of the board's total projects. Member Bugert additionally thanked Regional Fisheries Enhancement Groups for their efforts, specifically in volunteer coordination.

Washington State Conservation Commission (WSCC): Carol Smith briefed the board on the Conservation Reserve Enhancement Program (CREP). Although they are not currently authorized to approve projects, the WSCC is developing formalized training and tracking for technical staff and a state certification process. CREP is coordinating nationally to promote local approaches as a means to global impact; this year several Japanese scientists will visit to assist with effectiveness monitoring. CREP will be enhancing their inspection requirements, increasing the current 7-8 year maintenance obligations to 10-15 years.

A data system similar to PRISM was put in place to track implementation monitoring, with updated platform access to support all common internet browsers and use of iPads in the field. Maps are also integrated into the system, including resources from other agencies. The data system will assist staff in tailoring projects as needed by tracking streams and any changes in impaired watered listings.

Chair Troutt inquired about the increased focus on inspection as it relates to compliance. Ms. Smith communicated that the enhanced inspection process will involve trained staff that assesses each site to ensure its trajectory towards functionality. This process is intended to promote consistency which is proving fruitful; thus far only 3 of 200-250 projects have had issues with effectiveness.

Chair Troutt also asked about riparian buffer issues and WSCC discussions regarding buffer widths. The WSCC board expressed concern for salmon recovery progress, wherein they must follow standards set forth by federal funding, and the rules often contradict local decisions that they would like to implement.

Northwest Power and Conservation Council (NWPCC): Phil Rockefeller shared that a draft of their proposed fish and wildlife program has been released and the deadline for comments is July 9. Public hearings are scheduled throughout the region. He shared that NWPCC recently released a report on the state of the Columbia River Basin, and included that impacts of toxins in the Columbia basin are so extensive and ongoing that hydroelectric dams not encouraged where none exist currently.

Department of Natural Resources (DNR): Megan Duffy shared information about the kick-off meeting to develop eelgrass protection and recovery strategies in the Puget Sound. As part of their data collection process recommended by the Blue Ribbon Panel, they will be deploying sensors across the Sound with the intent of monitoring ocean acidification impacts.

Chair Troutt asked if the focus was on native eelgrass or eelgrass species in general. Ms. Duffy affirmed that the goal is to recover native eelgrass.

Department of Fish and Wildlife (WDFW): Jennifer Quan introduced Jay Krienitz, Estuary and Salmon Restoration Program (ESRP) Manager, and described their new online process for Hydraulic Project Approvals (HPA) available at http://wdfw.wa.gov/licensing/hpa/. WDFW has been working to update the HPA rules, and they are anticipating a formal draft to be available by the end of June. Rules currently proposed by WDFW are listed on the Hydraulic Code Rulemaking page. Starting July 16, the public will have 30 days to comment on the proposed rules. The Washington Fish and Wildlife Commission will schedule a public hearing before considering adoption of WDFW's proposals later this year. Ms. Quan anticipates presenting on the HPA rules to the board in September.

Additionally, Ms. Quan shared that the draft Hatchery and Genetic Management Plans (HGMP) are available for viewing and the deadline for public comment is July 4, 2014,

Department of Ecology: Bob Cusimano_emphasized the importance of inter-agency cooperation to make improvements, specifically coordinating how recovery programs match up from agency to agency. He used an example from the Stillaguamish recovery efforts to highlight why an understanding of how programs overlap is key to creating maximum benefit. He suggested that recording in GIS format might be a way to literally see where things are coming together.

Chair Troutt agreed with Member Cusimano, stating that the priority focus is salmon, and this should be the driving force that brings programs together.

General Public Comment

Jean White, Regional Partnerships Unit Supervisor in King County, expressed concerns on behalf of the region they do not agree with the riparian buffer width guidelines. Ms. White respectfully asked that the board not pass the Riparian Buffer guidelines. The region believes the guidelines would results in less protection and fewer buffers instated. Within agricultural areas it's already difficult to work with land owners, and with these guidelines in place the region will likely lose the ability to work with private property owners as effectively. They are concerned that the guidelines appear to apply beyond agricultural areas, and are worried that wider buffers may be a barrier to grantees that are doing this work as analysis showed that current projects under Department of Ecology wouldn't qualify.

Break 10:35 - 10:50 a.m.

Briefings

Item 4: Presentation by Washington Coast Sustainable Salmon Partnership

Miles Batchelder and Dana Deets, Washington Coast Sustainable Salmon Partnership, briefed the board on the WCSSP organization history and salmon recovery efforts in partnership with the Salmon Recovery Funding Board. WCSSP includes the North Pacific Coast, Quinault Indian Nation, Chehalis Basin, and Willapa Basin lead entities, which cover all of Washington's watersheds that drain directly into the Pacific Ocean. He provided an update on the current status of monitored salmon populations. Since 1999, over $12.6 million in PCSRF funds have been invested in the Coast region. More than 440 fish passage barriers have been removed, opening more than 715 miles of salmon habitat. According to Mr. Batchelder, there are 118 identified salmon and steelhead populations in the Coast region.

Mr. Batchelder presented information on The Washington Coast Sustainable Salmon Plan, a comprehensive ecosystem plan which identifies and ranks goals and critical threats to salmon recovery. Specifics on the plan can be found at http://www.wcssp.org/SustainableSalmonPlan.html.

Mr. Batchelder also shared information about the Washington Sustainable Salmon Foundation, a non-profit established to support WSCCP in their efforts, provide fiscal and management services, and to generate funding and resources. The Foundation recently put forth the Washington Coast Restoration Initiative, a collaborative effort by NGOs, tribes, agencies, conservation districts, and counties to seek ongoing legislative funding from the state's capital budget to address high priority habitat restoration projects and bring much-needed jobs to coastal watershed communities.

Mr. Batchelder explained the Habitat Intrinsic Potential Modeling process, and shared several maps of Washington salmon-bearing streams. The IP maps are shared across the region and combined with GIS support to create comprehensive models of anadromous salmonid populations.

Director Cottingham asked if data or maps were available that show successful projects within the region. Mr. Batchelder responded that the timber industry has been very cooperative, investing millions in R-maps, and WCSSP anticipates receiving data in the future. He acknowledged timber companies and their commitment to responsible stewardship. Mr. Batchelder also emphasized the leadership roles that many tribal entities have fulfilled, providing funding and creating strong partnerships.

Chari Troutt inquired about the other ports in the region and their level of participation in salmon recovery efforts. Mr. Batchelder commended the Port of Grays Harbor as a strong partner, but the organization has had difficulty engaging other ports to date.

Member Smith asked a question about WCSSP's review of state and federal level regulatory effectiveness. Mr. Batchelder explained that with regard to forest practices, the WCSSP doesn't have monitoring capacity, but the tribes do; the important task is to be present when conversations regarding habitats and protections occur to ensure that salmon are considered. Supporting the decision-maker in the process is challenging, as they need to uphold the rules and minimize granting exceptions or variances to prevent oversaturation of the intended policy effect. He related that another challenge is that coastal staff is limited due to geographic span that makes tracking and monitoring efforts difficult.

Member Cusimano thanked Mr. Batchelder for his presentation, and asked a question about whether the sustainable framework of IP modeling (which relies on partnerships and shared resources) limits what can be done for recovery efforts, or if the focus is to balance social and economic needs. Mr. Batchelder confirmed that there is a degree of self-limitation, but in order to maintain support of local communities, they (WCSSP) need to support economic well-being and agree to compromise; the overlapping interests are what drive progress in salmon recovery efforts and WCSSP places great focus on creating common ground.

Member Quan asked a question on the business plan and whether it is bringing focus and prioritization assistance to the Coast partnership. Mr. Batchelder responded that he believes the business plan model can be an effective mechanism for communication.

Item 5: Overview of RCO's PRISM System

RCO IT Strategy: Scott Robinson, Deputy Director, provided an overview of RCO's IT strategy. RCO and the Puget Sound Partnership share IT services and resources, and together they are preparing for the next phase of implementation. Next steps involve hiring a contractor to develop the strategic plan which will guide RCO for three to five years, and a work plan for the next biennium. The strategic plan will center on RCO systems and applications, information and data, websites, project snapshots, hardware, support, and storage. RCO anticipates a completed strategic plan by the end of the year.

PRISM Online: Scott Chapman, PRISM Specialist, presented an online demonstration of the new PRISM workbench for sponsors who can now access the system more easily. The new functionality represents a great time savings for RCO staff as it allows sponsors to map their own projects, check for potential submission errors, and attach their own supporting documents.

Director Cottingham commented that this new development is important to identify and prevent delays in RCO processes, and facilitate smooth progress for the board.

E-Billing System: Mark Jarasitis, Chief Financial Officer, demonstrated the new electronic billing system. E-billing will allow online invoice submission and support RCO in transparent management practices. The project team has successfully completed user acceptance testing (UAT) with positive responses. Further testing will be conducted in September, with a target project completion date of June 2015.

Member Bugert inquired about the electronic signature protocol. Mr. Jarasitis explained that the Office of Financial Management (OFM) has approved of the electronic signature process for e-billing as the system requires a secure login and credential authentication. These requirements meet the A-19 processes as well, and are in line with RCO's long-term goal of becoming a paperless agency.

Member Smith asked about changes to the review and approval process and the expected turn-around time for payment. Mr. Jarasitis confirmed that both the fiscal staff and grant managers will conduct a review and approve the invoices; the performance measure for payment is to issue within thirty days of the invoice receipt.

Compliance Workbench: Myra Baker, Compliance Specialist, briefed the board on the new compliance workbench feature in PRISM. The workbench is used by RCO staff to more efficiently conduct project compliance inspections, to track project compliance concerns and conversions, and to provide reports to sponsors quickly. A total of 46 inspections have been completed using the new tool since its implementation in January.

Member Bugert requested to know how many conversions are among the pending compliance issues. Ms. Baker responded that at this time it is difficult to know, but the new system will help staff identify these in the future.

Director Cottingham stated that RCO strives to be ahead of the game in terms of technology and cutting-edge grant management practices in order to streamline processes for sponsors.

Item 6: Communication Plan Update

Brian Abbott, GSRO, and Barbara Cairns, Pyramid Communications, presented recommendations for the board to consider regarding salmon recovery communications and potential next steps. The attached meeting materials include the communication plan (Attachment A), a communication framework specific to salmon recovery (Attachment B), and a summary of findings and recommendations prepared by Pyramid Communications (Attachment C). The board was encouraged to consider building upon the role of a funding entity by strategically planning coordination efforts with other organizations in the salmon recovery family and creating partnerships with one consistent voice.

Pyramid Communications Recommendations: Barbara Cairns and John Hoyt, Pyramid Communications, extended their thanks to Mr. Abbott and Member Biery, in addition to others for their assistance in the process of creating a communications plan. They summarized their strategy, findings and recommendations, and the highlights of the communications plan. They found that previous messaging had a lot about the "what" and not the "why" of salmon recovery. Pyramid is suggesting regional-scale changes to communication. Their summarized recommendations are in the board materials, including a common list of design standards for salmon recovery written materials.

Ms. Cairns shared two goals that were well-received by the board, including the purpose of a communication plan–to amplify the voice of the mission in the absence of funding and target essential decision makers–and to tell a common story visually –make the message immediately apparent and do not assume relevance in the eyes of the general public.

Director Cottingham asked clarifying questions regarding the RCO website and links to other salmon recovery sites. Ms. Cairns explained that users may be getting lost when navigating from one site to another and a common framework would alleviate this issue.

Member Biery asked how much money RCO and the SRFB has allocated to communications (the percentage), and what would be a reasonable amount to dedicate in the future. Director Cottingham explained fiscal restrictions and requirements pertaining to administrative budgets. In general, the board agreed that common messaging through an aligned framework is necessary and requested that recommendations on this subject including specific metrics be presented at the August board meeting.

Lunch 12:55 - 1:15 p.m.

Item 7: Habitat Work Schedule and How it's Being Used to Tell the Salmon Recovery Story

Jennifer Johnson and Kiri Kreamer, GSRO staff, shared the developmental history and a demonstration of the Habitat Work Schedule (HWS), an online database that stores and displays data related to salmon recovery actions and goals. HWS is a planning and prioritization tool that tracks salmon recovery projects from conception to completion, tracks habitat changes, and tracks a variety of funding sources used to support these projects. HWS provides custom reports, mapping tools, and outreach activities which are helpful with monitoring, communication, and tracking goal completion.

Ms. Kreamer highlighted the Hood Canal and San Juan Lead Entities and shared the ways in which each is uniquely using the strengths of the system to support their work. Ms. Kreamer explained how Hood Canal is using the system as a central repository for all data within the region, and then gave an online demonstration to display how San Juan is using the mapping tool to prioritize projects. HWS has the ability to track progress on several scales, allowing the user to view habitat, project, or watershed/county level goals and accomplishments. HWS will inform the Puget Sound adaptive management process and future recovery plan updates by providing long-term project data.

Member Bugert asked if the two case studies were typical examples of HSW users, or if they are ahead of the curve. Ms. Kreamer responded that both are above average in terms of utilizing the system; however, other lead entities are also keeping pace.

Member Smith asked if there will be guidance for lead entities using this tool to promote consistency. Ms. Johnson and Ms. Kreamer both confirmed that streamlined metrics are being defined by a Habitat Work Schedule Action Committee.

Member Bugert inquired about potential efficiencies or economies of scale in using PRISM and HWS together. Ms. Johnson explained that the IT strategic plan described earlier in the agenda will inform this work further. The goal is to improve system alignment.

Member Quan asked if NOAA is using this data for their five year status review, and whether RCO anticipates future collaboration. Ms. Johnson is unsure, but there are reporting structure similarities between NOAA and RCO, and HWS that could inform the status review with project information at various scales.

Member Cusimano asked a question about funders, and Ms. Johnson confirmed that HWS tracks multiple funding sources for each project.

Members Bugert and Biery agreed that HWS should be part of the future communication plan.

Item 8: Invasive Species

Invasive Species Council Overview: Wendy Brown, Executive Coordinator, Washington Invasive Species Council (WISC), described the structure of the council and its role in preventing and responding to invasive species in Washington State. The council provides policy-level direction, planning, and coordination efforts for the state and is implementing a statewide plan of action with a focus on prevention, early detection, and rapid response. Ms. Brown also shared information about the recent release of the "WA Invasives" mobile app, now fully functional and available for download from the Apple Store and iTunes.

Threats to Salmon Recovery: Ms. Brown highlighted the following species as a significant threat to salmon habitat and populations.

- Zebra and quagga mussels (most significant)
- New Zealand mudsnails
- Brazilian elodea and Eurasian watermilfoil
- Invasive knotweed complex
- Introduced non-native fish species

In response to a question about county participation on the council, Ms. Brown explained that the council's enabling legislation outlines that there is to be one westside and one eastside county representative. Over the years, however, it has proven challenging to retain westside county-level participation. She further added that the Washington State Noxious Weed Control Board is another member of the council that represents county-level interests. Member Biery offered to help Ms. Brown find a representative to fill the needed positions.

Member Cierebiej asked about plans for the mobile app and the type of usage statistics that are collected. Ms. Brown indicated that the app allows individuals to report invasive species sightings using their mobile phone. Experts then verify and map the sighting, recording accurate information with easy access for interested parties.

Types of Projects the Board Funds: Tara Galuska, Salmon Section Manager, provided information on the Salmon Recovery Funding Board and invasive species removal. Ms. Galuska stated that invasive species removal is eligible for funding as a component of a larger project or as a stand-alone project, and she provided some statistics on projects that include invasive removal as a project element. Twenty-seven percent of board-funded project applications have some portion of the grant dedicated to the removal of invasive species infestations to improve salmon habitat. Ms. Galuska emphasized that a majority of the projects are knotweed removal projects and that they provide enough information to ensure the projects adequately use the funds.

Alice Rubin, Outdoor Grant Manager, presented a project on knotweed removal from the Quinault Tribe. Ms. Rubin highlighted how the Quinault work with other groups in the region to track, remove, and monitor knotweed populations. To address the knotweed population as early as possible and prevent the spread of the species, the project plan involved starting from the top and progressing down the watershed. Ms. Rubin emphasized the importance of continued funding to control the knotweed through 7-10 years of constant maintenance.

Ms. Brown shared information about the newly formed advisory group that will provide input on WISC actions. The group is comprised of industry leaders from shellfish, public utility, irrigation, boating, and agricultural interests.

Member Rockefeller asked about the chemicals used to control knotweed. Ms. Brown responded that the primary products used, glycophosphate (Roundup) and Imazapyr, are relatively benign. Both products are permitted through the Department of Ecology and require field crews to have a licensed supervisor onsite.

Member Duffy asked about RCO's 529 projects to date and the existing requirements for long-term monitoring or tracking of eradication results, stating that one treatment doesn't seem sufficient. Ms. Galuska responded that a site-monitoring plan for sponsor-owned properties is required, and private lands have an agreement with the sponsor to maintain the site for 10 years.

Member Rockefeller shared the NWPCC's concern that the aggregate impact of invasive species in the Columbia Basin makes it harder to protect healthy salmon populations. He stressed the importance of preventing the spread of invasive species by aggressively and assertively working collectively on removal.

Member Rockefeller expressed his appreciation of Ms. Brown's work, and asked her to review the invasive species components of the NWPCC's draft Fish and Wildlife Program proposal and provide comments.

Item 9: Preview of the Salmon-Related Budget for 2015-2017

Capital Budget: Kaleen Cottingham, Director, Washington Recreation and Conservation Office (RCO), presented information on the 2015-17 biennial budget request that will be submitted to the Office of Financial Management (OFM) in early September. The SRFB will be asked to make decisions in August regarding the amount of state funds related to salmon activities and programs that RCO should include in its operating and capital budget requests.

Director Cottingham described the challenges involved in planning for the 2015-17 budget. Some of the impacts include historically low state revenue levels, mandatory and one-time budget balancing solutions, the McCleary decision on increased education funding, teacher cost-of-living adjustments (COLAs), and constitutional and federal budget obligations. In the next biennium the state is anticipating that the budget will be $1 billion to $3 billion short of expenses. State agencies are required to create budget reduction package based on OFM's initial estimates for maintenance, and identify priorities for added back enhancements. RCO could be required to plan for a 15-25% budget cut, with the largest impact to the vulnerable areas such as GSRO and the lead entities. In the past, the board has made decisions to shift federal funds to support lead entities, reducing other areas in the budget instead of limiting capacity in order to maintain the "Washington way" of bottom-up approaches to salmon recovery.

To support salmon work, three funding sources were identified – state general obligation bonds, the federal Pacific Coastal Salmon Recovery Fund (PCSRF), and the state general fund – each limited in scope as to the priorities for which funds can be used (in limited cases grant money is used to support projects such as the Habitat Work Schedule).

Region Delisting Monitoring, Lead Entity Capacity, and Habitat Work Schedule: Brian Abbott presented a follow-up to Director Cottingham's budget preview, describing RCO's proposals for the operating budget related to salmon activities and programs. RCO is exploring four salmon-related requests to fund: 1) monitoring for regional recovery plans, necessary to achieve delisting requirements of certain salmon populations; 2) lead entity capacity funds, so as to improve our competitiveness for federal funds; 3) the Habitat Work Schedule data system in the event federal funds should be reduced or eliminated; 4) the salmon capital budget request which outlines RCO's match to PCSRF federal funds. Mr. Abbott requested the board provide feedback on the proposals, specifically whether the identified priorities are appropriate, whether they are reasonable, how much funding should be dedicated to each one, and what should be the priority order of the requests.

Mr. Abbott described the first request concerning monitoring and the regional recovery plans. Currently, there is insufficient monitoring data to reach the NOAA thresholds for delisting. Regional organizations are working hard to identify and fill monitoring gaps in order to meet NOAA's requirements. This effort includes identifying responsible parties for implementing regional monitoring activities, identifying the gaps in current monitoring efforts, and detailing overall monitoring needs for the next 10 years in biennial increments. Mr. Abbott encouraged early action with regards to supporting monitoring efforts, as NOAA reviews the history of each request when considering delisting a species. Funds to support this work will be part of the general fund budget request, as monitoring efforts cannot draw from the capital budget or PCSRF funds.

Mr. Abbott described the second request regarding lead entity capacity. With federal funds becoming more competitive and limited state resources, Washington is at a disadvantage for the annual request to support lead entities and capacity. RCO will refer to the RCW establishing the lead entities when drafting the budget request. Currently, the lead entities are supported by about 70% PCSRF funds and about 30% state funds (Mr. Abbott estimated the funding to be around $990,000 for this work). This budget request will focus on centering funding support in a more balanced approach, ideally with 50/50 match funding to be more competitive on a federal level.

Mr. Abbott described the third request regarding the Habitat Work Schedule (HWS), noting a similar request was submitted last biennium. There is uncertainty around RCO continuing to receive USFWS funds to support HWS, which is the basis for this budget request. The high estimate for supporting this work is 1.3 million dollars, and the low estimate is near $25-50,000 for exploring other options, such as data transfers or building a new system. A non-proprietary approach may reduce operating and maintenance costs, but a deeper assessment on the impacts of this proposal is necessary. Part of the budget request will focus on exploring such planning and transitional measures, and the second part will focus on actual implementation of the conversion to in-house system maintenance. Maintaining the software license to operate HWS is about $305,000 annually. A strategic plan for continuing work should include ongoing training and support, enhancements to the system for lead entities and other improvements, and PRISM integration.

Finally, Mr. Abbott described the fourth request for the state salmon match to PCSRF funds. In past years, RCO has not received the full requested amount (receiving 15 million out of the requested 40 million), but has managed to cover established priorities, including the 18 million dollar grant round. Mr. Abbott is proposing a similar request where RCO would submit a 40 million dollar PCSRF match, and anticipate receiving 15 million dollars in general obligation bond funds.

Mr. Abbott opened the discussion for the board to comment on the presented proposals. Director Cottingham explained that RCO has four grant programs affecting salmon recovery; only one is within the purview of the SRFB, and the board will be able to provide feedback on this component at the August meeting.

The board discussed options and recommendations for the draft budget request. Suggestions included aligned efforts across partnering organizations to reduce financial burden, i.e. regional coordination with NOAA, asking NOAA for additional support in general, and the possibility of evaluating the general fund for potential reductions.

Member Bugert expressed his concern regarding lead entity capacity, and identified maintaining current capacity this as the most pressing priority for the board to consider. Considering the budget challenges ahead, it may be beneficial for regions and lead entities to explore efficiencies, economies of scale, mergers between entities, etc. that may strengthen capacity but reduce costs. Mr. Abbott agreed to bring this to the capacity workgroup, and to discuss opportunities for re-organization and distribution of resources while remaining effective.

Chair Troutt shared concerns from tribes on how NOAA uses PCSRF funds, emphasizing that monitoring and delisting should receive federal funds and should not affect state funding. Direct Cottingham indicated that discussions are ongoing, but little is being accomplished in terms of reaching a solution for funding and it is doubtful that NOAA would provide funding for delisting. There are issues with the federal budget that trickle down to local levels, and may impact how decisions are made regarding the state budget.

Member Bugert stated that these budget concerns are high priority along with the outreach strategies discussed earlier in the day. It was determined that more information is needed to provide feedback, and RCO staff committed to preparing recommendations for the board at the August meeting. Presentations from the Washington Salmon Coalition and regional organizations were requested as well, specifically in regards to how the Habitat Work Schedule would be impacted by severe budget reductions. Member Quan requested that options be presented for potential reductions, and what options exist within the limiting restrictions from each funding source.

To summarize the discussion, Director Cottingham briefly confirmed the stated concerns and priorities identified by the board as guidance back to staff: 1) identifying budget priorities and potential reductions; 2) requesting input from NOAA and the regions on monitoring for delisting priorities; 3) identifying where budget cuts will occur and determining which enhancements will move forward. Member Troutt added the state salmon capital budget request as a high priority. He also stated that the lead entity and capacity support should be included first and the last to be cut from the operating budget, and that delisting monitoring should be a federal obligation. Finally, the Habitat Work Schedule needs to move forward without impacting the support to lead entities.

The board agreed to change the August 26 meeting from a conference call to an in-person meeting. RCO staff will provide options in greater detail for the board's consideration.

Break 2:30-2:45 p.m.

Decisions

Item 10: Lead Entity and Regional Organization Allocation of Year Two Capacity Funds

Brian Abbott presented information about RCO's application to NOAA for Pacific Coastal Salmon Recovery Fund (PCSRF) grant funding. Capacity funding is requested and approved annually as of September 2012, and comprised about 32 percent of the application for PCSRF funding for the current biennium. The proposal moving forward is 16 percent for capacity funding to avoid competition pitfalls. He confirmed that funding is available for an 18 million dollar grant round for 2014, as well as RCO's funding commitment for IMWs up to 2 million dollars, and funding capacity for lead entities and regions. RCO will know the 2014 PCSRF award amount by the end of June or early July, and expects at least 20 million dollars to support work in the next year. Pending approval from the board, contract amendments will be prepared and ready on July 1.

Mr. Abbott provided information about two additional considerations for the board. He reminded the board of an additional $100,000 for regional capacity approved last year, with $50,000 going to Coastal Washington and the other half to Lower Columbia. Coastal Washington's addition was a one-time request, though Lower Columbia's request was intended to be a permanent allocation adjustment.

Mr. Abbott shared information about the request from the Washington Coast Sustainable Salmon Partnership for an additional $50,000 to develop a business plan. If approved, this amount would be matched with $100,000 from the National Fish and Wildlife Foundation (NFWF), private donations, and other supplemental funding sources.

Mr. Abbott posed the staff recommendation that the board delegate authority to Director Cottingham to enter in to contracts once RCO has been notified of the 2014 PCSRF funding amount. He also recommended approval for Lower Columbia's request for a permanent $50,000 allocation adjustment, and approval for WCSSP's additional $50,000 for business plan development.

Member Bugert moved to delegate authority Director Cottingham to enter into contract once the 2014 PCSRF notice of awarded funds is received. Member Biery seconded; motion approved.

Member Rockefeller moved to add $50,000 to the Lower Columbia lead entity annual allotment, correcting a GSRO error. Member Biery seconded; motion approved.

Member Bugert moved to add $50,000 in funds for the Washington Coast Regional contract to develop a business plan. Member Biery seconded; motion approved.

Item 11: Monitoring Funding

IMW Contract Extension - Bridge Funding for Remainder of Federal Fiscal Year: Keith Dublanica, Governor's Salmon Recovery Office (GSRO), requested the board pass an amendment to extend the current IMW monitoring contract from June 30, 2014 to September 30, 2014, to align with the 2015 federal fiscal year, and to add $463,000 of funding (from returned funds). Staff will present new monitoring contracts for each IMW to the board for approval in September, with an anticipated effective date of October 1, 2014. Mr. Dublanica reported that the Governor's Salmon Recovery Office is recruiting the board's monitoring panel, which staff expects to have in place by early summer. The monitoring panel will make recommendations on new monitoring contracts to take effect October 1, 2014.

Member Rockefeller moved that the board approve a contract time extension for the IMW contract, and the associated cost increase of $463,000 from return funds to align this contract with the federal fiscal year. Member Biery seconded; motion approved.

Update to the 2003 Monitoring Evaluation Strategy: Keith Dublanica provided an update on the SRFB Monitoring Evaluation Strategy, in draft form since 2003. Updates to the Monitoring Evaluation Strategy will provide clarification on monitoring funding activities, reporting requirements, information exchange, and adaptive management. Mr. Dublanica indicated that updates to draft were originally going to be completed by the monitoring panel, set for their initial meeting this coming Friday, June 6, but several RFQQ respondents have expressed interest in completing this work. Mr. Dublanica stated the subcommittee's intention to present a final draft for board approval at the September meeting.

Mr. Dublanica presented the staff recommendation that the board approve up to $10,000 in PCSRF returned funds to hire an independent contractor to update and finalize the board's monitoring and evaluation strategy. Upon approval, the request also includes delegated authority to enter into a personal services contract with timing consistent with the tasks and timeline of monitoring panel. The panel will then review the draft and provide feedback to the contractor, and the panel chair will present a final draft for approval at the September board meeting.

Member Rockefeller moved to approve the use of $10,000 of PCSRF funds return funds to hire a contractor via personal service contract to update and finalize the monitoring and evaluation strategy. Member Biery seconded; motion approved.

Item 12: Adoption of Washington Administrative Code (WAC) Changes

Leslie Connelly, Policy Specialist, RCO, presented information regarding the official name change of the Recreation and Conservation Office name in the Title 420 WAC. Ms. Connelly reported the suspension of all non-critical rule-making from October 11, 2011 through December 31, 2012 by Governor's Executive Order 11-03. Ms. Connelly indicated the board could not update the administrative rules to reflect the name change because the agency name change was considered non-critical rule-making. Since the order expired at the end of 2012, non-critical rule-making may now be filed with the Office of the Code Reviser. The proposed Title 420 WAC changes reflect the board's value for citizen oversight and accountability of the expenditure of public funds and to conduct its work with openness and integrity.

Ms. Connelly provided information regarding the process RCO used to inform the public of this change. Ms. Connelly stated that prior to the board meeting the public was made aware of the expedited rule-making on the following occasions:

- Notice of Expedited Rule-making (CR-105, Attachment B) filed April 1, 2014 and published in issue #14-08-087 of the Washington State Register on April 16, 2014,
- Agenda item at the June 2014 board meeting posted on RCO's Web site,
- Posting of proposed rule-making on RCO's Web site, and
- Email notification sent to interested persons.

Ms. Connelly stated the deadline for the public to file an objection was June 3, 2014, and no objections to the expedited rule-making process were received. Ms. Connelly stated that staff recommend adoption of the expedited rule-making filed April 1, 2014 and published in issue #14-08-087 of the Washington State Register on April 16, 2014. Ms. Connelly indicated that should the board adopt the expedited rule making, staff will prepare a Concise Explanatory Statement and file a permanent rule notice for publication in the next available Washington State Register. Adopted rules are effective 31 days after they are filed with the Office of the Code Reviser. Ms. Connelly provided resolution 2014-01 for the board's consideration.

Member Biery moved to approve resolution to adopt the name change and to amend Title 420 of the Washington Administrative Code. Member Rockefeller seconded; motion approved.

Item 13: Riparian Buffer Guidelines

Leslie Connelly, Policy Specialist, RCO, updated the board on the recommendations from the National Oceanic and Atmospheric Administration (NOAA) for minimum riparian habitat widths on Puget Sound agricultural lowlands.

At the March meeting, the board asked RCO staff to collect public comment on whether the board should adopt statewide guidelines for the width of a riparian restoration project. To solicit public response staff prepared four questions for the public's consideration and comment:

Question 1 - *Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide?*

Question 2 - *What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?*

Question 3 - *What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board?*

Question 4 - *Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the board encourage such prioritization at the local, regional or state level?*

Ms. Connelly reported that RCO staff posted the public comment notice on RCO's Web site and sent an e-mail notification to over 1,800 individuals. Comments were accepted from April 10-30, 2014.

Ms. Connelly reported that 57 individuals and organizations provided feedback on the proposal to adopt guidelines for a minimum riparian width for riparian restoration projects. The Northwest Indian Fisheries

Commission, U. S. Fish and Wildlife Service, Department of Ecology, and three citizens supported the guidelines. The remaining comments expressed a lack of support or had concerns about the guidelines including concerns over landowner participation, the need for flexibility to design and implement riparian restoration projects, and a desire to maintain the current local review process to prioritize applications.

Ms. Connelly stated that based on the comments received, the board should consider the following options:

1. Defer adopting any minimum riparian restoration widths pending the Washington Department of Fish and Wildlife (WDFW)'s update to its management recommendations for riparian habitat.
2. Continue to use the 2012 WDFW Stream Habitat Restoration Guidelines as the board's preferred guidelines for all of the board's restoration projects.
3. Collect riparian restoration width information in the application to better understand the scope of the riparian restoration project.
4. Remind lead entity organizations of their critical role in evaluating riparian restoration projects to ensure riparian habitat area widths are appropriate for the site and represent a clear benefit to salmon recovery as articulated in the regional recovery plans.
5. Provide generic guidance to the board's technical review panel that they must evaluate riparian restoration projects for salmon benefit and certainty as appropriate for the site and as articulated in the regional recovery plans.
6. Incorporate the guidelines in the local prioritization process conducted by the regional organizations.
7. Adopt riparian restoration width guidelines for projects on agricultural land in the Puget Sound region only.
8. Adopt riparian restoration width guidelines for projects on any land use type in the Puget Sound region only.
9. Adopt riparian restoration width guidelines for projects in western Washington.
10. Adopt riparian restoration width guidelines for projects statewide.
11. Apply site-specific riparian restoration widths based on soil type and potential vegetation height.
12. Allow funding for additional types of incentives to encourage landowner participation such as temporary construction easements, short-term conservation easements, and leases.

Ms. Connelly indicated that after extensive review, staff recommends that the board adopt options one through five and option twelve. Ms. Connelly emphasized that the recommendations maintain the practice of using the 2012 WDFW Stream Habitat Restoration Guidelines as the preferred guidelines for all of the board's restoration projects until new or revised best management practices are available. In addition to the riparian restoration area length along a stream, RCO would collect riparian restoration area width as part of the application data to accurately capture the scope of a project. Lead entities would maintain their responsibilities as the local evaluation teams responsible for ensuring riparian restoration projects clearly provide a net benefit to meeting salmon recovery goals as outlined in the regional recovery plans. The board's technical review panel would be instructed to evaluate each riparian restoration project for benefits to salmon recovery.

Finally, to encourage the participation of private landowners in salmon recovery, staff recommends the board explore option twelve to allow additional types of financial incentives for the use of private land for salmon recovery projects. Staff will implement the direction provided by the board for new grant applications starting in 2015 and will bring back to the board any additional action items for future discussion and decision.

Member Cusimano indicated that the Department of Ecology (DOE) supports the minimum buffer. He brought up the issue of sustainability and balancing all interests with limited available funds, asking how one should recover salmon given the scientific information and riparian needs for integrity. He agreed that RCO staff recommendations to adopt one through five and explore twelve are good, but DOE still supports original proposal.

Member Quan agrees with the recommendation to adopt the limited number of options, but stated that she views option five more as general guidance and less a new requirement. Since the original proposal was only riparian projects and the review panel should use the best available science, she questioned whether it was necessary to provide more guidance on the evaluation process. Ms. Connelly explained that applying the best available science is within the existing duties of the review panel, but the option is meant to highlight and focus on the riparian width as part of the criteria to determine long-term ecosystem benefits. Member Quan stated the need to explore the language in option twelve and refocus on "recovery" efforts.

Member Bugert feels comfortable with the presented options and asked about requirements for incentives, acknowledging that the public involvement process has been conducted well. Ms. Connelly responded that a handful of ideas were presented as incentives, however minimal public feedback was received on the subject.

Member Cierebiej stated that she would support the recommendations and added that buffer width, composition, and context within the watershed are all important and should be under protection.

Member Rockefeller agreed with options one through five; however, option twelve was a concern. He asked whether the incentives would be instituted as a formal practice and documented in Manual 18, stating that salmon recovery projects may only occur if participants are paid. He expressed concern that salmon recovery would go from a volunteer process, to one in which RCO pays for participation. Member Rockefeller asked to adopt the first five and explore option 12. Chair Troutt indicated anything adopted by the board would be added to Manual 18. Member Bugert suggested the board look at the exact language in Manual 18.

Member Bugert moved to adopt recommendations one through five on buffer guidelines and to explore option 12. Member Rockefeller seconded; motion approved.

Item 14: Department of Fish and Wildlife's 21st Century Salmon

This item was postponed until a later meeting due to time limitations.

Closing

Meeting adjourned at 4:33 p.m.

Minutes approved by:

David Troutt, Chair

8/26/14
Date

April 1, 2014

RECEIVED

APR - 4 2014

WA STATE
RECREATION AND CONSERVATION OFFICE

Mr. David Troutt, Chairman
Salmon Recovery Funding Board
P O Box 40917
Olympia, Washington 98504-0917

Dear Mr. Troutt,

My wife and I live at 817 Shorecrest Drive, Oak Harbor, Washington, with our home located in the Dugualla Bay Community on Skagit Bay. This location places us smack dab in the middle of Whatcom Camano Land Trust and your infamous Salmon Recovery Project proposed for our community lagoon.

We are aware that WCLT has insinuated that all Dugualla Bay residents are in favor of said project. This is blatantly untrue! The fact is; all of the residents directly affected are adamantly opposed. It is also my understanding that Ms. Powell has voiced that perhaps, at a later date, she may renegotiate a higher water level for the lagoon. AIN'T GONNA HAPPEN!

My garden area is within three to four feet of the lagoon; consequently, I see a few of the lagoon's fish, mostly bullheads and shiners (smolt, smelt or herring types). The majority of the times they are in the mouths of herons, several different species of mergansers, five or six different types of fish ducks, cormorants, osprey, eagles or king fishers. We also have a resident family of otters, (as many as seven) who also frequent the lagoon. There are also feral cats, raccoons and coyotes. All of these predators in a condensed area?

Why are we opposed to a rise in lagoon water levels? Several years ago, the lagoon's drain pipe became clogged, causing the

lagoon's water level to rise two feet. At the same time, a storm hit our area with gusts up to 60 MPH. There were times during the storm, that the lagoon's water level actually rose approximately four feet, causing damage to several properties. Of greater concern, it may have come very close to compromising our septic systems.

Exposed tide flats have also been mentioned as part of your proposed project. What a stinking mess that would be!

In closing, we say to continue this ill-advised (Tribes?) project is a huge waste of tax payer's money and opens the door to legal recourse.

Sincerely,

Gary Talbert Claudean Davis Talbert

Gary and Claudean (Davis) Talbert
817 Shorecrest
Oak Harbor, WA 98277
Phone 360-679-2067

April 29, 2014

Salmon Recovery Funding Board
David Troutt, Chairman
P.O. Box 40917
Olympia, WA 98504-0917

Re: SRFB riparian guideline proposal

Dear Salmon Recovery Funding Board Members,

The Yakima Basin Fish & Wildlife Recovery Board (YBFWRB) appreciates the opportunity to comment on the proposed guidelines for minimum buffer widths developed by Salmon Recovery Funding Board (SRFB) staff for consideration at the June meeting of the SRFB. In our board-approved letter sent on January 28th, the Yakima Basin Fish & Wildlife Recovery Board stated that "We share the SRFB's desire to insure that SRFB funding is not awarded to projects that propose buffer widths that are insufficient to meet project goals. However, we believe that the existing intensive local and state reviews of SRFB projects will weed out proposals that use buffer widths that are insufficient to meet their goals. Setting new standards accomplishes little not already addressed in the existing project review, yet risks alienating key partners." While the proposed guidelines developed by SRFB staff address some of the concerns raised in our earlier letter (e.g. clarifying that the 'guidelines' only apply to projects whose primary goal is riparian planting), we continue to have concerns. Below you will find both responses from some of our project sponsors, and staff-level comments on specific elements of the guidelines.

A) Project Sponsor Responses

When YBFWRB staff asked our project sponsors for feedback on the proposed guidelines, we received several comments relating to cumulative impact of changes to the SRFB grant review process. For example, one very capable landowner who successfully implemented a highly-ranked SRFB project on his property noted:

For an outsider there is already a mountain of obstacles which makes the SRFB process daunting, if not discouraging. The language, the procedures, the permitting, the process, the Prism software, the tax issues, the reimbursement process, the unknowns -- it can be overwhelming. I'd have given up early (and often) except for some superb help and support which I was fortunate to have received… Yes, the *"wheelbarrow of carrot$" is nice (and even more I greatly appreciated the non-monetary professional assistance I received), but I'd venture to say that the carrots in that wheelbarrow are already almost outweighed by the downsides. Adding yet more presumptive parameters may be well intentioned and science-supported, but it will make the process even more complicated for lay landowners.*

Another frequent project sponsor noted that:

From my viewpoint, the policy manuals are getting thicker and thicker every year, and more and more of the funding is necessarily going towards administration and process and away from on-the-ground results. There is likely a sweet spot that balances the need for flexibility to deal with the unique circumstances of each potential project versus the need to ensure that the funds are effectively spent on projects that meet the purposes the funds were allocated for. The reality here is that most of the low hanging fruit has been picked. The SRFB funding-scale projects that are left are necessarily more complex and more difficult to implement than those projects from the early days, and projects will only get more difficult to implement in the future. If the SRFB process is going to be effective in the future, we need greater flexibility in project review and administration, not less.

While individual proposals to "tighten" the grant process are generally well-intended, if care is not taken, the cumulative effect can be an increasingly complex and inaccessible grant program that erodes the focus on local prioritization and project review that is at the core of the SRFB's program. We urge the SRFB to reserve adding additional requirements for instances where it is clear that the existing program is not working.

B) Staff Comments on SRFB Staff Proposal

Question 1: As noted in our earlier letter, the YBFWRB does not see a pressing need for riparian buffer requirements in our area. If the SRFB still sees a need to adopt them, we would ask that they be limited to Puget Sound and other areas where the Board can demonstrate a clear and defined need.

Table 1 identified classes of water bodies based on historic fish use. This is often unknown, and means that the classification of many water bodies would often be made on a subjective basis. We would recommend that any guidelines used by the SRFB use a less ambiguous means to classify water bodies.

Question 2: The listed examples of constraints focus on physical constraints. At times smaller buffers may be required in order to make an acceptable compromise with landowners who have specific objectives for their properties that are not compatible with larger buffers. These cases should at least be eligible for consideration for an exemption.

In addition, we ask that the state technical review panel be asked to explain specifically why it does not support an exemption request if it is clear that a local lead entity review process has reviewed and supported the proposed exemption. If the review panel does override an exemption request, we would ask that lead entities be given a defined appeal process in which they can bring additional information to the review panel and ask for reconsideration.

Question 3: We would be excited to work with SRFB staff and others to determine how different conservation incentives could be funded via the SRFB. There is clearly a niche for an agreement that is more robust that a 10-year voluntary agreement, but less intimidating to landowners than perpetual easements and fee simple acquisition. Leases and term easements both have the potential to fill this niche, and could be implemented via the SRFB grant program. Tax relief would seem to require action outside of the SRFB's scope, while in our experience, marketing and recognition serve more as rewards for those who have already chosen to participate, and less as incentives for new, sometime skeptical, participants. Mitigation agreements could be an effective funding source for leases and easements, but do not represent an alternate approach independent of leases and easements.

Question 4: Any prioritization that occurs, with the exception of the specific criteria for designation of projects of concern and eligibility criteria, should occur as part of the existing locally-driven processes for developing lead entity and regional ranked project lists. We would recommend that the SRFB refrain from opening the Pandora's Box of having the SRFB or its staff potentially changing the ranking of projects on lists that are submitted to it by lead entities and regions.

Thank you for the opportunity to offer our feedback on the current proposed guidelines.

Sincerely,

Alex Conley
Executive Director

From: ESTEP, ALLEN (DNR)
Sent: Wednesday, April 30, 2014 3:10 PM
To: RCO MI Policy Changes (RCO)
Subject: SRFB riparian guideline comments

I would like to submit some comments on the proposed changes to the salmon recovery grant program.

General Comments:

1. If minimum buffer widths for projects with a specific objective to improve riparian habitat are implemented, then a specific description of what constitutes a project area and where a minimum buffer should be applied should be articulated. For example, is the project area defined by a reach length or only where physical enhancement activities occur (if the project included five 100’ long activities over a 1000’ long reach, are the minimum buffers applied only to the 500’ of activities or over the entire 1000’)?
2. If not already described, it should be stated how long (years) minimum buffer widths must be maintained. Is it the same as the minimum length restoration projects must be maintained or is it linked to the functionality of the project, i.e. longer than 10 years?
3. Regarding the proposed minimum riparian buffer guidelines table, Category A appears to be equivalent to a Type 5 or Ns stream in the forest environment and there is not a required buffer on this type of stream for forest practices activities. A required buffer on these streams will limit a landowner’s interest or support for conducting enhancement projects without conservation incentives on these stream types.

Thank you.
Allen Estep
Assistant Division Manager
HCP & Scientific Consultation Section, Forest Resources Division
Washington State Department of Natural Resources (DNR)
1111 Washington St SE
PO Box 47014
Olympia, WA 98504-7014
360-902-2898 (office)
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allen.estep@dnr.wa.gov
www.dnr.wa.gov

From: Ann Stanton [stanton@SnohomishWA.gov]
Sent: Monday, April 14, 2014 9:41 AM
To: RCO MI Policy Changes (RCO)
Subject: SRFB riparian guideline comments.

Thank you for the opportunity to provide input.

Question 1 - Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide?

Perhaps, but not the NOAA Fisheries Interim Riparian Buffer Recommendations.

Each project may differ in what buffer width is feasible. A stream where a smaller buffer width is achievable may still be a very beneficial project for salmon recovery. It seems arbitrary to award points based on such large buffer widths, especially when sheet flow may not be the key polluting vector.

Question 2 - What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?

1. Beneficial treatment of piped runoff
2. Existing development within buffer area, especially if runoff is addressed through other means
3. Shading is provided through topographic or other means
4. Demonstrated likelihood of net water quality improvement versus arbitrary buffer widths
5. Upstream or downstream conditions that provide additional shading, filtration, etc.

Question 3 - What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board?

1. Types of conservation incentives: (as listed in RCO's "Proposed Changes" document and copied here)

   There are six basic categories of incentives:

   - *Financial assistance: grant, loan, and lease programs that provide cost-share funding for, or reduce expenses of, conservation actions,*
   - *Technical assistance: advice, hand-on help, and training for landowners on conservation tools or techniques,*
   - *Tax relief: tax reductions for landowners undertaking conservation actions,*
   - *Marketing: programs to add market value to products that support conservation on private land,*
   - *Recognition: identification and promotion of landowners undertaking conservation actions, and*
   - *Conservation banking: financial assistance to landowners provided as a condition of permitting for construction projects.*
2. Eligible for SRFB funding: financial and technical assistance as described above.

Question 4 - Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the board encourage such prioritization at the local, regional or state level?

No, due to reasons that include the following concerns:

a. While the fine print in Table 1 reads *"for Streams in Puget Sound* ***Agricultural*** *Landscapes"* these guidelines, if applied broadly, would disadvantagee most urban buffer projects, where the greatest net benefit to water quality is likely to be found.
b. These guidelines do not recognize the potentially greater significance of piped and ditched untreated runoff as an element of water quality.
c. In reality, such large buffer widths will not be feasible to maintain and, when artificially planted in disturbed environments, will become invasive, non-native, self-sustaining

monocultures of Himalayan blackberry or Japanese knotweed. Such stands of non-natives subsequently replicate and increase pressure on remaining native riparian vegetation.

d. Preservation of existing native riparian vegetation is probably more effective than restoration of large new buffers.

e. It may be better to water quality to consider implementing maintainable open space of various planting types (pasture, non-native shrubs, etc.) as buffers rather than solely seeking to recreate native buffers where they have been removed.

f. It may be that these widths are neither necessary nor appropriate to most projects. What science exists to support them?

g. A balanced approach between established human activities and natural systems do not seem to be reflected in these buffer widths.

h. It should be considered whether this approach is a responsible use of limited public funds

Washington State Department of Ecology, Water Quality Program
SRFB Riparian Guideline Comments
April 30, 2014

Question 1 - Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide?

We support the adoption of guidelines for minimum buffer widths. As outlined above, the minimum guidelines are science based, ensure accountability, support funding for the best projects, provide consistency across incentive programs, and provide a meaningful illustration about what is needed to achieve both water quality and salmon recovery goals.

Additionally, we support the adoption of minimum guidelines statewide. Consistent application of the guidance across the state demonstrates that riparian protection is needed for water quality and salmon recovery purposes.

Question 2 - What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?

We recognize that site specific constraints may limit the ability of a grant recipient to implement the minimum guidelines. In limited situations, Ecology has provided conditional exemptions to projects that did not meet the minimum buffer guidelines for the grants that we administer. For example, if a structure impedes a landowner's ability to meet the minimum buffer width, we can provide a conditional exemption. However, it is our experience that exemptions should be narrowly drawn to ensure that only projects with an actual site specific constraint are considered for an exemption, and to avoid recipients seeking exemptions simply based on landowner preferences.

Further, we support providing additional technical review for these projects, and requiring project proponents to provide a written justification describing the constraints and the purported habitat benefits of the project. Conditional exemptions should be limited to situations where there is a significant site specific constraint and a quantifiable habitat benefit. Having both criteria and additional review for projects that may qualify for an exception will promote implementation of the minimum guidance.

Finally, we suggest clarifying the situations where geology, soil types, and declassification of land as farmland would be used as a site specific constraint that would justify an exemption. The current level of detail in the examples is ambiguous. If these examples are retained, we suggest clarifying the types of scenarios where these examples may apply (What types of soils? What geological features? When would declassification occur and when would it be a site specific constraint?). In contrast, the transportation corridors and structures examples are clear site specific constraints that can be identified on the landscape and may constrain the ability to implement the minimum buffer guidance. We support their use as examples of potential constraints that could justify an exemption.

Question 3 - What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board?

We support the use of all types of incentives. We believe that because the habitat goals of riparian projects take decades to fully attain, incentives that promote the long term or permanent protection of these areas should be given priority. Additionally, for this same reason, you may want to consider extending the maintenance time period for Salmon Recovery Grants that include a restoration component.

Question 4 - Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the board encourage such prioritization at the local, regional or state level?

We support prioritizing projects that meet the minimum guidelines.

Conclusion:

Again, thank you for this opportunity to provide comments on the proposed changes to the Salmon Recovery Grant Program. We agree that the use of minimum guidelines for buffers will support the board's goals: (1) Fund the best possible salmon recovery activities and projects through a fair process that considers science, community values and priorities, and coordination of efforts; (2) Be accountable for board investments by promoting public oversight, effective projects, and actions that result in the economical and efficient use of resources; and (3) Build understanding, acceptance, and support of salmon recovery efforts.

In addition, focusing Salmon Recovery Grants funds on projects that will meet both the state's water quality standards and salmon recovery goals will align two important state initiatives.

If you have questions regarding these comments, please contact Ben Rau at (360)-407-6551 or ben.rau@ecy.wa.gov.

Stillaguamish WATERSHED Council

April 28, 2014
Salmon Recovery Funding Board
c/o Washington State Recreation and Conservation Office
P.O. Box 40917
Olympia, WA 98504-0917

RE: Salmon Recovery Funding Board (SRFB) Riparian Guideline Comments

Members of the Board:

The Stillaguamish Watershed Council(SWC) is a 24 member stakeholder group comprised of local governments, citizens, community groups, state and federal agencies, and businesses working together to implement salmon recovery in the Stillaguamish Watershed. The purpose of this letter is to provide comment on the proposal for adopting minimum buffer widths for riparian projects funded by the SRFB. We discussed the proposal at our April 23rd SWC meeting. The group is very concerned that we may start to go backwards in our efforts to prevent livestock access, shade our streams, reduce sediment run-off and restore some level of stream bank stabilization and edge habitat structure. Any deterrent to our voluntary cooperators doing some level of riparian restoration may put us on a losing trend. The basic feeling by many in the basin is we are losing habitat faster than we are restoring it. With this in mind we understand the concern of the Tribes and the creation of the Treaty Rights at risk paper asking the federal government to set and enforce standards.

The Stillaguamish Watershed Chinook Recovery Salmon Recovery Plan (2006) outlines several strategies for recovery of Chinook in the basin including six restoration priorities based on the 1999 Limiting Factors Analysis for the Stillaguamish River Basin. One of the Recovery Plan's focus areas is Riparian Restoration and priority areas have been identified. While we have been meeting our riparian restoration goals, we have a long way to go to improve riparian conditions throughout the basin.

The priority areas for riparian restoration include areas on the North and South Fork of the River as well as many fish bearing tributaries. Although we agree that wider buffers provide more function and are preferable from a habitat perspective, the proposed policy does not explicitly acknowledge land use constraints in some areas including more urbanized and agricultural settings. Buffers provide different functions in different areas and a one size fits all approach restricts the ability to base buffer size on site characteristics and mutually beneficial BMP's occurring on the site. Sometimes, narrower buffers may meet project goals effectively such as eliminating livestock from direct access or achieving shade on a ditch during the summer months. The 100' minimum buffer requirement for all voluntary riparian projects whether they are on a small tributary or on the mainstem of the Stillaguamish River may lead to reduced success in the social advances we have been making towards good stewardship of salmon habitat.

Stillaguamish WATERSHED Council

If we stay the course of an adaptable voluntary program for riparian related projects integrating science and landowners willingness to participate we may continue to advance behavioral change.

The proposed buffer sizes appear to be a negotiated number and are not science based. When the region requires different buffer sizes for SRFB projects, Centennial grant projects, or within the context of land use planning such as GMA, SMP, or NOAA's FEMA BiOp; it dilutes our message as a scientific community and leaves stakeholders wondering whether we know what riparian conditions are really needed to support healthy systems.

The analysis of potential impacts of minimum riparian buffer widths on projects funded by the Board conducted by Recreation and Conservation Office staff, detailed in the briefing memo for the March 2014 SRFB meeting was a good first attempt to evaluate the impacts of this policy change, although the limited scope did not allow for an in depth analysis. The analysis does highlight that new minimum buffer requirements may be addressing a problem that doesn't exist for SRFB funded projects. Out of the 14 projects that were evaluated; all of the projects in the Puget Sound met the minimum buffer requirements.

SRFB projects already undergo an intensive amount of review and scrutiny via the local technical review utilizing detailed scoring criteria, state technical review, and RITT review. Local scoring criteria already utilize all of the *Statutory Criteria* (RCW 77.85.130) and additional review/prioritization based on this would be redundant. Proposals that use buffer widths insufficient to meet restoration objectives are normally weeded out and not prioritized for funding. The Council also agreed that SRFB fund participation alone is a huge commitment and would not see small scale projects due to the type of projects normally submitted through that process.

It is important to consider that many of our projects address several of our watersheds six limiting factors. The project may include elements that address Large Woody Debris, reconnection of a relict side channel, and normally some level of riparian restoration. If not being able to fund the riparian portion prevents us from addressing the additional limiting factors it would be a triple loss in our efforts of moving the chinook Plan forward.

The region should pause prior to implementing this policy, gather more information and develop a policy that makes sense both scientifically, politically, economically and provide a mechanism for improvement of habitat conditions. The Setting of these standards does not seem to address the challenge of increasing landowner participation and should be carefully considered prior to adoption. If the Board adopts a minimum buffer requirement policy, the Board should consider geography and apply the requirements to sites that's meet the criteria for which these buffer widths were derived; Puget Sound Agricultural Landscapes.

Stillaguamish WATERSHED Council

Finally, the Board may want to consider these minimum buffer sizes as guidelines and not requirements that may result in reduced landowner participation. The Stillaguamish Watershed Council has a 24-year history of implementing riparian and other water quality projects. The low hanging fruit was picked long ago. We are now down to the most challenging landowners and need a large tool box to fix the problems.

Sincerely,

Bill Blake
Stillaguamish Watershed Council Co-Chair

Snohomish County Surface Water Management
3000 Rockefeller Avenue, Everett, WA 98201
425-388-3024

Stillaguamish Tribe
PO Box 277, Arlington, WA 98223
(360) 631-0946

From: Bill Pierce [soaringswallowfarm@gmail.com]
Sent: Saturday, April 26, 2014 10:25 AM
To: RCO MI Policy Changes (RCO)
Subject: SRFB riparian guideline comments

Bill Pierce
Soaring Swallow Farm
32324 SR 9 NE
Arlington, WA 98223

Salmon Recovery Funding Board,

Dear SRFB,

I would like to provide public comment on proposed changes to the Salmon Recovery Grant Program as a riparian landowner, farmer and active volunteer on salmon recovery.

Question 1:

While I realize the proposed guidelines are important goals for projects, I do not feel minimum guidelines should be adopted. Since each project is different and is the result of balancing many competing goals, I feel it should be left to the discretion of the project lead to determine what buffers are most appropriate. A 100' buffer may not be significant on a 200 acre farm or forest, but it is very significant on a 7 acre farm.

Question 2:

An omitted constraint would be "the landowner would not accept the project with larger buffers." First and foremost, landowners need to feel in control of the property they own, and are stewards of, or they will not work collaboratively with the State. On our recent riparian project, we would not have accepted larger buffers because they would have been inconsistent with our farm plan.

Question 4:

I think it is reasonable to use buffer size as a prioritization criteria. Let the project lead determine the maximum buffer size they can obtain and then let the project compete for funding with other projects with buffer size as part of the ranking. This way, you're still getting the most benefit without blindly excluding worthy projects.

Thank you for the opportunity to comment.

Sincerely, Bill Pierce, Soaring Swallow Farm

From: Brad Johnson [bjohnson@asotinpud.org]
Sent: Wednesday, April 30, 2014 9:33 AM
To: RCO MI Policy Changes (RCO)
Subject: SRFB Riparian Guideline Comments

Good Morning, I had sent in some questions and hoped to get a response back before the comments were due today. Here are the comments that I have regarding the proposed changes:

Question 1: If the SRFB was to adopt guidelines for minimum buffer widths, how should it be done? There definitely needs to be different standard for the west and eastside of the Cascades for the differing natural conditions. For background material the SRFB should provide the context for the changes, such as:

A. The definition of a riparian project states that it is 'within the floodplain of streams…' Which floodplain is it….50 year, 100 year, or what? This could easily rule out streams with steep v-shaped slopes where plants have not historically existed and would not exist even with heavy artificial watering.

B. A review of past funded SRFB projects to show the range in buffer widths, the results (survival and rate of growth) and what gaps or shortcomings exist that need to be filled by the proposed changes. In other words, what is the overall objective and how many different ways are there for meeting the objective? As proposed here only the width of the buffer is being discussed and maybe that is not the limiting factor.

C. Is the buffer width measured as a horizontal or slope distance? There are huge differences in the surface land area being addressed. The horizontal distance will be far greater than the slope distance in steep terrain such as the Snake River region with shallow dirt and arid environments.

Question 2: The justification for using less than the minimum width or different widths based on natural conditions. There are substantial biogeoclimatic parameters that could make a wide buffer a poor investment and maybe ineffective for salmonids in the Snake River region. Using public funds to sustain plantings in areas unsuitable for such plants could be accomplished for the 10-year period of responsibility stated in the agreement, however, once the artificial support system is removed the plants could easily die. In cases of sub-minimum buffer widths, the applicant's proposal should not be under-rated since the true test should be a function of how well the riparian objectives would be met. This is not always an issue of 'quantity' but rather a function of the 'quality' of the surviving plants in the riparian zone and associated buffer.

Question 3: This is a good subject for all SRFB projects and it seems a little out of place in the discussion of minimum buffer widths since it does not focus on riparian projects. There is not direct discussion of the connection between incentives and minimum buffer widths, more importantly it would be hard to judge one buffer project against another based on sub-teraining flow and or the absence or presence of springs.

Question 4: "How should the SRFB prioritize funding for riparian projects that meet the guidelines?" It is a function of determining the return on investment. The existing statutory criteria seems to be adequate for rating all riparian projects. There is a certain amount of caution that should be exercised here since the SRFB should not be placed in a position of choosing between a riparian project 500 feet long by 75 feet wide versus a 1,000 foot long by 35 feet wide project - both costing the same amount. Valley widths and natural conditions are not similar within watersheds let alone from one side of the state to the other. Yearly rainfall totals cannot be discounted and in low elevation, arid environments that get little if any summer rains…the riparian area is not naturally wide due to narrow valleys that are extremely steep with little soil or natural water in the channel or opportunities for summer rain.

In all honesty I don't believe the SRFB should adopt minimum guidelines since there is local consensus and numerous planning and prioritization documents that have been completed. Additionally the Conservation Reserve Enhancement Program has result in the protection of thousands of miles of streams throughout the state based on a minimum buffer width of 35 feet. Most projects are over 10 years old and changing standards will only confuse and upset landowners.

Thanks for the opportunity to comment.

Bradley Johnson
Watershed Planning Director
PO Box 605
Clarkston, WA 99403-0605
P: 509-758-1010
C: 509-552-9562
F: 509-758-1958

From: Casey Baldwin [Casey.Baldwin@colvilletribes.com]
Sent: Friday, April 11, 2014 8:39 AM
To: RCO MI Policy Changes (RCO)
Cc: Chris Fisher; Keith Kistler
Subject: FW: SRFB riparian guideline comments

RCO,

I appreciate the opportunity to comment on your 'Proposed changes to the salmon recovery grant program'. I have only provided brief comments to questions 1 and 2. Please consider these to be my professional opinion and not an official set of comments on behalf of the Colville Tribes.

Question 1. I do not believe that minimum buffer widths need to be adopted by the SRFB because it is not possible to pre-determine an effective width. Your technical review process should detect any projects that are treating a ‘too narrow’ area. If you do decide the concept of a minimum buffer is needed you should not use the fixed distances in Table 1 nor should you have different standards for Eastern and Western Washington. First of all, I can’t imagine why you would ever want to fund a project that falls into category A of Table 1 (a ditch or intermittent stream with no listed fish presently or historically?). Second, 100 feet may be too narrow to be very effective for a large river with a wide valley width and low gradient. Conversely, a small stream with a high gradient may not ever have had a riparian buffer 100 feet wide. There still could be a great project on a small stream that only needs 50 feet of riparian planting. If you do have minimum buffers they should have different standards for various geomorphic stream classifications, valley width, stream width, gradient, etc. You should also give the local and statewide technical teams some discretion to decide that a lessor buffer is better than nothing.

Question 2. As indicated in Question 1, stream and valley size and gradient would be the primary drivers for natural riparian buffer width. Reasonable anthropogenic constraints in addition to the ones you listed could be agricultural production. In Eastern Washington there are a number of salmon streams with orchard trees or hay fields right up to the river bank. Twenty to 30 feet of riparian would be a lot better than the current conditions as far as shade, allochthonous input, and spray interception.

I think where it is important to forgo narrow strips of riparian planting is in very active channel migration zones. This is where the risk of bank failure might exceed the potential benefits of the planting because the plantings may all end up downstream with the next high flow event.

Sincerely,

Casey Baldwin
Sr. Research Scientist
CCT F&W Dept.
509-421-1799 (Cell)
509-888-0415 (Office)
casey.baldwin@colvilletribes.com

From: Tanner, Curtis [curtis_tanner@fws.gov]
Sent: Tuesday, April 29, 2014 1:25 PM
To: RCO MI Policy Changes (RCO)
Subject: SRFB riparian guideline comments

Chairman Troutt and other Salmon Recovery Funding Board (SRFB) members:

Thank you for the opportunity to provide comments to the proposed riparian guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat funded by the Salmon Recovery Grant Program. These comments are provided as technical assistance from U.S. Fish and Wildlife Service restoration program staff and do not represent official USFWS policy.

To summarize, we support the work of SRFB to establish minimum buffer widths for riparian habitat restoration projects. We appreciate the work that has been done to coordinate with NOAA and Washington Department of Ecology to insure consistency in development of guidelines with other agencies. We agree with your decision that the guidelines would not apply to projects that conduct plantings to mitigate for construction impacts at other projects such as levee setbacks, fish passages or in-stream improvements.

We understand the complexity of defining the necessary widths for all sites, because ideally, the width of a riparian buffer depends on site-specific conditions, including the type of stream channel, the valley setting, the soil, vegetation, hydrology, climate, and other factors. However, as minimum buffer widths, these guidelines are consistent with practices followed in our restoration programs.

Our responses to the four questions raised by SRFB:

Question 1 - Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide?

Yes. The guidelines should be applied statewide.

Question 2 - What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?

We agree with the examples of reasonable constraints mentioned by the proposed guidelines and the review process for those projects that are not designed to meet the minimum buffer widths.

Question 3 - What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board?

We support the use of the first five basic categories of conservation incentives identified by the guidelines to promote voluntary conservation actions. We do not support the use of salmon *recovery funding for conservation banking or other actions required as a condition of permitting for construction projects.*

Question 4 - Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the board encourage such prioritization at the local, regional or state level?

Yes. Prioritize those projects that exceed the minimum buffer widths, at the state level.

Cheers-
CT

Curtis D. Tanner, Acting Manager
Environmental Restoration and Assessment Division
U.S. Fish and Wildlife Service
Washington Fish & Wildlife Office
510 Desmond Dr. SE, Suite 102
Lacey, WA 98503
office: (360) 753-4326
email: curtis_tanner@fws.gov

From: Dan Wood [danwood.wsdf@gmail.com]
Sent: Wednesday, April 30, 2014 5:04 PM
To: RCO MI Policy Changes (RCO)
Cc: DanWood.WSDF@gmail.com
Subject: SRFB riparian guideline comments

RE: SRFB riparian guideline comments

On behalf of the 29 major Washington State agricultural organization represented in the attached letter, I am submitting these comments regarding the proposed mandatory buffers that would be associated with riparian habitat projects.

The proposed minimum width buffer guidelines mirror the approach recently taken by NOAA Fisheries. Please consider our comments in the attached letter as applicable to the SRF Proposal.

While the size of the proposed buffers may vary, the rigid approach does not.

Please keep in mind one of the concepts behinds the Voluntary Stewardship Program: Flexibility to meet the ground conditions and needs of an individual farm will make it more possible and more likely that the farmer will participate in conservation programs.

The rigid, one-size-fits-most approach in the proposed minimum buffers is an idea that was rejected more than a decade ago, because the inflexibility makes it too difficult for many farmers to participate.

Our organizations remained convinced that a flexible-site-specific program that empowers positive changes across a wide landscape will be the best approach to make improvements to the environment and, at the same time, help maintain the viability of our farms.

Dan Wood
Director of Government Affairs
Washington State Dairy Federation
--For Dairy Farmers of Washington--
PO Box 1768
Elma, WA 98541
360-482-3485
DanWood.WSDF@gmail.com

A Joint Plea to the Washington Congressional Delegation from the Major Agricultural Associations in Washington State.

RE: Federal Conservation Programs

June 7, 2013

U.S. Senator Patty Murray
U.S. Senator Maria Cantwell
U.S. Representative Suzan DelBene
U.S. Representative Rick Larsen
U.S. Representative Jaime Hererra Beutler
U.S. Representative Doc Hastings
U.S. Representative Cathy McMorris Rodgers
U.S. Representative Derek Kilmer
U.S. Representative Jim McDermott
U.S. Representative Dave Reichert
U.S. Representative Adam Smith
U.S. Representative Denny Heck

Dear Senators and Representatives:

As representatives of the agricultural community in Washington State, we are concerned about recent conditions being placed on participation in federal conservation programs.

We are concerned that these conditions will make it too costly and harmful for agricultural producers to participate in various conservation programs, leading to less benefit to producers and the environment.

In a letter to USDA Natural Resources Conservation Service and EPA, NOAA Regional Administrator Will Stelle again insisted upon large buffers on agricultural lands that were determined to be economically unacceptable and environmentally unnecessary during the Agriculture, Fish and Water (AFW) process more than 10 years ago.

These proposed buffers could reach widths of two hundred feet or more, depending on water typing. Since these buffers are applied to each side of a stream or river, this would result in a total buffer of more than four hundred feet. At the maximum buffer width on agricultural land, nearly 50 acres of land could be taken out of production per mile.

Whether these restrictions are applied in the Puget Sound region or anywhere in the state, they will be an extreme discouragement to participation in federal conservation programs.

Washington State is second only to California in terms of agricultural diversity. There are more than 300 unique commodities grown in our state. Some operations require thousands of acres to remain economically viable, while others can thrive on just five acres.

Requiring large buffers as a condition of participating in federal programs will result in limiting participation to only those who no longer have an interest in the economic viability of productive farmland.

These large buffers were rejected for both economic and scientific reasons more than 10 years ago. The reasons for rejecting them are as valid today as they were at the time of their proposal.

To make matters worse, federal agencies are beginning to apply these large buffers as a conditioned (or pre-requisite) practice, mandating its implementation as a condition of receiving conservation funding for other needed practices. (This was the case for the NRCS 2013 EQIP Puget Sound salmon recovery initiative, which required use of the NOAA buffer.) Where a producer normally has a choice about implementing a practice, this mandate would remove the producer's choice, other than to decline to participate in the program at all. The expected loss of participation will be a disastrous turn for the Farm Bill conservation title and state and local conservation programs. Farmers will simply refuse to participate with this type of coercion.

The agricultural community has participated in numerous efforts to create flexible conservation and voluntary stewardship programs that will work for agriculture and meet local and state goals to improve the environment.

Recently, our agricultural community worked with tribal, county and environmental interests to create the Voluntary Stewardship Program (VSP).

The VSP is modeled after successful local efforts in the Nisqually, Walla Walla, Snohomish, Upper Columbia, Dungeness and many other areas. In each area, local stakeholders worked together to lay their interests on the table and work together to achieve progress for all of those interests.

Our vision with the VSP is to see productive and viable agriculture and a healthy environment. These are not mutually exclusive outcomes.

Rigidly clinging to old ideas and old demands will leave us in a political and legal system that wastes millions of dollars in the courtrooms instead of spending resources working cooperatively to ensure positive outcomes for agriculture and the environment.

Your leadership is necessary to ensure the viability of important federal conservation programs and maintain their value to the diversity of Washington State agriculture.

We ask you to engage with the agencies to rein in these recent restrictions that will make federal conservation programs less successful.

Sincerely,

Washington State Dairy Federation
Washington State Farm Bureau
Columbia-Snake River Irrigators Association
Washington Cattle Feeders Association
Washington Cattlemen's Association
Washington Friends of Farms & Forests
Washington State Sheep Producers Association
Washington State Grange
Washington Blueberry Commission
Cattle Producers of Washington
Washington Growers Clearing House Association
Washington State Nursery and Landscape Association
Ag., Water & Power Users of Eastern Washington
Washington Asparagus Commission
Hop Growers of Washington
Association of Washington Aerial Applicators
Washington State Horticultural Association
Yakima Valley Growers-Shippers Association
Washington Association of Wheat Growers
Northwest Dairy Association
Wenatchee Valley Traffic Association
Far West Agribusiness Association
Washington Turfgrass Seed Commission
Washington Canola/Rapeseed Commission
Washington State Potato Commission
Western Washington Agricultural Association
Oregon-Washington Pea Growers Association
Northwest Bulb Growers Association
Washington Association of Wine Grape Growers

C: DOE Director Maia Bellon
WSDA Director Bud Hover
Conservation Commission Executive Director Mark Clark
NRCS Washington State Conservationist Roylene Rides at the Door
Bill Ruckelshaus, the Ruckelshaus Center

Cowlitz Conservation District
2125 8th Avenue; Longview, WA 98632; 360-425-1880

Wahkiakum Conservation District
PO Box 67; Cathlamet, WA 98612; 360-795-8240

April 29, 2014

Recreation and Conservation Office
SRFB Riparian Guideline Comments
PO Box 40917
Olympia, WA 98504-0917

To Whom it May Concern:

Cowlitz and Wahkiakum Conservation Districts appreciate the opportunity to comment on proposed riparian habitat changes to the Salmon Recovery Grant Program.

Our conservation districts formed in the 1940's and both have enjoyed 65 years of assisting our local communities with resolution of their natural resource concerns in a voluntary, cooperative manner consistent with the authorities enumerated in RCW 89.08. We have long attempted to engage a wide range of interests in identifying, understanding, and managing our local resource concerns. The nature of resource concerns we are attempting to address with our cooperators has led our districts from a first-come, first-serve, shotgun approach to a landscape approach in the form of "Community Watersheds". We trust you will find that the progress activities and accomplishments presented herein demonstrate effectiveness at addressing the broader scale resource concerns including water quality and salmon recovery and depict the effect of your proposed changes.

Question 1 – Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat?

We strongly encourage the board to not adopt the guidelines.

The buffer guidelines represent a one-size-fits-all mentality. The guidelines meld the myriad of individual riparian function width guidance into an average for aquatic resources. The guidelines fail to take into account the applied side of the science that guided development of all the buffer width curves. The buffer chart loses translation of the vast number of variables that require consideration when designing a riparian buffer. With the exception of the original FEMAT curves, most subsequent curves do not take into account the social and economic considerations that must be a component of buffer design. We have worked hard to educate landowners with respect to variable buffer widths to address site-specific concerns. The proposed guidelines are a step backwards with respect to most buffer design guidelines.

Landowners are asked to provide a share of the project cost in the form of match. They are not credited with the value of allowing the project let alone the value of land that they donate in the interest of the "public" good. All of the Conservation Districts' projects have some grounding in the concept of a win-win scenario. Our cooperators have land management goals and objectives that are very consistent with addressing salmon recovery limiting factors. Over the years of presenting project proposals, we have observed some very questionable technical review comments that begin to erode our ability to generate projects in this context. One year we had to defend how improving stream temperature assisted with Salmon Recovery and lately it has evolved to concerns with a project addressing accelerated (unnatural) rates of streambank erosion.

Imposing the proposed buffer guidelines is essentially another "take" by the State. Collectively the result will be a majority of landowners unwilling to implement a salmon recovery project.

We offer a review of our community watershed projects as a demonstration that a voluntary, collaborative approach to resource management can result in improvements to landscape level resource concerns like water quality and salmon recovery. The focus of the discussion is with respect to riparian buffers. It should be noted that the district attempts to manage resource concerns from a watershed perspective and this effort translates to a total package at the farm level. This management approach takes into account landowner goals, objectives, and capabilities. The following uses the shade function as an example. We fully realize that buffer width effectiveness varies with riparian function with widths greater for some such as wood recruitment and wildlife habitat and less for others such as streambank stability. This letter would easily double in size if we discussed the variables that should be considered surrounding wood recruitment alone.

Arkansas Creek Community Watershed

This watershed was one of the first community watershed projects for the Cowlitz Conservation District funded through the Centennial Clean Water Fund Program. Numerous riparian restoration, fish passage, comprehensive nutrient management plans, forest management plans, and road improvement projects were completed during the period of time in which the Conservation District (District) was funded to plan, design, and implement projects in the watershed. Forest industry, local government, and private non-industrial landowners were equally engaged in the project.

Riparian restoration efforts includes projects that have been implemented or funded that buffer about 3 miles (a 4th mile being planned) of the 6 miles of agriculture land in the Delameter Creek subbasin, 100% of the agriculture land in the Monahan Creek subbasin, and about .2 miles out of 1.5 miles of non-buffered stream in the Arkansas subbasin. Buffer widths range from about 35 feet to 100 feet with an average of about 50 feet. Just one (about 2000 feet) of these buffers would barely meet the proposed guideline. This buffer width was the entire agriculture field, which was not wide enough to meet the buffer width requirement. This is a Conservation Reserve Enhanced Program buffer installed under the USDA Natural Resource Conservation Service Riparian Forest Buffer Standard.This standard provides enough flexibility to fit a buffer to the landscape while meeting landowner goals and objectives. Why would you want to challenge a buffer standard that is getting results on the ground? The remaining buffers do not meet the guideline because landowners' use of "their" property would not support wide buffers.

Abernathy Creek Riparian Restoration Project

This project was a collaborative effort between the District and Cowlitz County to demonstrate that conservation easements could be secured and riparian restoration implemented in agriculture dominated portions of a watershed. About 2.5 miles of the lower Abernathy Creek watershed was involved in the project downstream of a federal research hatchery with decades of fish return data. Forested riparian buffers were established on all of the non-buffered agriculture land use (about 1 mile of stream or 2 miles of stream bank) and riparian buffers improved on forested land use (about 1.5 miles). Created buffers on agriculture land use ranged from 50-100 feet. On average, buffer width was about 70 feet, which does not meet the proposed Buffer Guidelines. This initial riparian restoration effort has subsequently resulted in 3 project locations for in-stream habitat restoration. This project resulted in buffers on all agriculture land that result in an average cumulative effectiveness of about 88% for shading (FEMAT shade curve). The proposed 100 foot buffer is about 95% cumulative effectiveness. Mandating the 100 foot buffer would have equated to no buffers in agriculture land use. Exploring weighted values, it would have taken 9781 feet of stream bank with a 100-foot buffer width to have a comparable shade equivalence of the 10560 feet of buffer at 70 feet width. Two miles of buffer at 88%, effectiveness for shade compared to no buffer at 95% effectiveness is not a difficult concept to wrap ones head around.

Coweeman River Community Watershed Project

The Coweeman Community Watershed Project has resulted in several cost-shared projects with the explicit purpose of addressing water quality (temperature) and salmon recovery in the watershed. The Coweeman River is unique with respect to stream temperature concerns. The legacy of splash damming results in completely different concerns when compared to other watersheds in the area. Efforts to date include correction of 7 fish passage issues providing access to about 10 miles of habitat; implementation of 4 stream restoration projects encompassing about 1.5 miles of mainstem and 1.2 miles of tributary habitat; three projects that create or improve riparian vegetation encompassing about 15 acres of riparian buffer. An invasive weed and riparian restoration project is underway that will treat knotweed on a watershed basis. In areas of dense knotweed riparian vegetation is proposed to reestablish native woody vegetation crowded out by knotweed. Three additional projects are currently funded that will implement instream restoration projects on about 2.5 miles of main stem and .75 mile of tributary habitat including about .75 miles of riparian buffer improvements. Had the proposed guidelines been required none of the riparian buffer projects would have been implemented. Buffer widths ranged from about 40 feet to 110 feet but averaged about 65 feet. In one case, the landowner was simply unwilling to buffer the creek much more than 50 feet in all the other sites there simply was not 100 feet of available ground adjacent to the stream to afforest/reforest. In this case, the proposed guidelines would have resulted in most of these projects never occurring.

Skamokawa Creek Community Watershed

Wahkiakum Conservation District has been working in the Skamokawa Creek Community Watershed since 2004. This includes West Valley, Middle Valley, and East Valley Skamokawa Creeks. We have assisted 24 landowners with projects that include:

- Fish Passage: 2 culverts replaced with bridges
- Livestock exclusion fence: 23,000 feet of fence.
- Livestock Crossings: Three crossing that compliment livestock exclusion fencing
- Alternative livestock watering facility: 3 facilities plus 3000 feet of pipeline
- Instream Restoration projects: 9 projects consisting primarily of large woody debris placement to promote habitat diversity and quantity as the short term objective and establishment of forested riparian buffers as the long term objective encompassing 31298 feet of stream (5.9 miles). Most of these project buffers were designed and implemented through the CREP.
- Forested Riparian Buffer Projects: 3 CREP sites encompassing 15,905 feet (3 miles)
- Dike Modification Project: Historic Skamokawa Creek Project site that includes construction of freshwater intake structure, improved outlet tidegate structure, 2 culvert replacement projects and we are currently working on 12,000 feet of riparian restoration (2.3 miles).

The District has worked with landowners to install forested riparian buffers along 10,252 feet (1.95 miles) of West Valley Skamokawa Creek out of the 29,154 feet of fish bearing stream in agriculture land use (35%). This buffer was installed through the CREP and would meet the proposed guidelines. The landowner in this instance is an absentee landowner that was seeking a means to generate revenue from the property. The CREP offered an opportunity for resource restoration while realizing the farm some revenue.

The District has worked with landowners to install forested riparian buffers along 27,174 feet (5.15 miles) of Middle Valley Skamokawa out of the 39,665 feet of fish bearing stream in agriculture land use (69%). About 5,598 feet of the buffered 29,154 feet or 19% would meet the proposed guidelines. The remaining 81% or 23, 614 feet has an average width of about 75 feet, which provides about 90% of cumulative effectiveness of the riparian buffer at providing for shade according to the FEMAT curves (FEMAT, 1993). Again, the NMFS guidelines of 100 feet provide for about 95% of the cumulative effectiveness for shading according to the FEMAT curves. Twenty-three thousand six hundred and fourteen feet (23,614) at 90% compared to five thousand six hundred feet(5600) at 95% is not difficult math or a difficult concept to understand. Most of the landowners in Middle Valley are still working farms that must remain economically viability. The proposed buffer guidelines would have simply taken away too much of their land base. In these cases, you are not solely looking at loss of riparian buffer, the entire project would not have occurred.

The District has worked with landowners to install forested riparian buffers along 9,777 feet (1.85 miles) of East Valley Skamokawa out of the 29,154 feet of fish bearing stream in agriculture land use (35%). About 2500 feet of the buffered 9,777 feet or 25% would meet the proposed guidelines. The remaining 75% or 7,277 feet has an average width of about 50 feet, which provides about 80% of cumulative effectiveness of the riparian buffer at providing for shade.

Cowlitz and Wahkiakum Conservation Districts sees several fallacies with the notion of the proposed one size fits all buffer guidelines. We believe that our community watershed projects convey the ability to gain landowner confidence and participation in projects that address landscape level resource concerns. We further contend that it takes implementation on a watershed scale to make a difference in resource condition. Recent studies indicate that you must get about 70% of the area restored in a watershed to obtain a measureable change in condition with respect to water quality and salmon recovery. We have professional staff that is working with landowners in a win-win situation in an attempt to resolve resource concerns. When it comes to buffer widths, a prescriptive approach is logically best. This prescription must take into account all variables for it to be effective and realized. One of the first is having a good handle on the resource concern and the processes influencing it within a particular landscape/watershed. It is easy for us to be critical of the argument that we need buffer guidelines. From our perspective buffers need to designed and prescribed for site-specific conditions including all of the physical and natural parameter as well as social and economic considerations. Most of our project sites are working farms that cannot afford to give up a significant portion of their productive land base. If faced with an either or mandate (extortion), forested buffers will not be installed.

The concept of zero buffers versus considerable length of buffers at a lesser cumulative effectiveness should be a simple concept to embrace.

Question 2 – What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?

If you will follow the recommendation in question 1, this question would not be necessary. The applied science behind all of the buffer width curves should be a component of a justification along with social and economic considerations.

Question 3 – What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property.

The operative words in your question are "who allow". Our cooperators have allowed a salmon recovery project on their property, because we have successfully identified a benefit to them for implementing a project. With each grant round we have observed a slow erosion of a win-win scenario. Streambank stabilization has been remarkably interesting to follow, even though it is a priority-limiting factor within the local salmon recovery plan. The proposed guidelines work for some, but as we have illustrated they do not work for about 75%.

In every project we have implemented our cooperating landowners has "given" land to the project. We have long argued that landowners be recognized for their donation to the public benefit. Instead, the proposed buffer guidelines are seeking to "take" more. Consider an incentive that offers fair market value of the land donated to a project as a credit toward match requirements. The greater the buffer width, the greater the incentive. Another incentive that will work for some, but not all, would be a conservation easement. Provide fair market value purchase of land "given" to the project.

Question 4 – Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines?

We strongly encourage you not pursue this avenue. This approach is increasingly being viewed as extortion at the local level. Projects should be evaluated and prioritized based on their merit. As a resource professional, it is often easy to argue that a project with a 50-foot buffer can be effective as or more effective than a project that has a 100-foot buffer. It all goes back to the applied science of prescribing to a site and taking into account all variables. A process is already in place that allow for review and prioritization of projects within the existing grant review process. .

Cowlitz and Wahkiakum Conservation District encourage you to:

- Not adopt the one-size-fits-all buffer guideline
- Allow for existing grant review process to convey the rationale for the proposed buffer width
- Recognize landowners for the "gifts" they are already providing by allowing a salmon recovery project.
- Not attempt to extort more and more
- Not provide preference beyond the weight inherently provided within the existing grant review process.

Respectfully,

Darin B. Houpt
Forest Hydrologist

From: David Swindale [DSwindale@cityofup.com]
Sent: Monday, April 21, 2014 9:44 AM
To: RCO MI Policy Changes (RCO)
Cc: Gary Cooper; Jack Ecklund
Subject: Minimum buffer widths.

We would not support 100' buffers on intermittent or ephemeral waterways. In urbanized areas small streams of this nature have been put into culverts, catch basin and/or run through landscaped back yards. The cost of recreating these as viable salmon habitat would be astronomical. Money is much better spent on perennial streams that have not already been heavely tampered with.

David Swindale
Director, Planning and Development Services
City of University Place, WA 98498
Desk (253) 460-2519
Cell (253) 468-8638
DSwindale@cityofup.com

I, as an unsuccessful (2013) Salmon Recovery Funding grant applicant would like to thank RCO for this opportunity to comment and ask questions.

Question 1 - Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide?

Comment:

1) While the minimum buffer widths in Table 1 appear to be reasonable for many riparian improvement projects, my question is:
   a) Should minimum buffers not be more prudently based upon adjacent and surrounding property land use, i.e. **site specific** rather than simply a generic minimum width? As an example:
      i) Logic tells me, open land and farmland statistically has less potential risk of degrading water quality, thus is a more sustainable project than say a project next to a commercial warehouse property that utilizes chemicals in its processing or adjoining transportation corridors with hazardous materials in transit twenty-four, seven.
   b) Therefore, minimum buffers should be land use zoning **site-specific**, in my opinion.
2) **Any proposed rule or guidelines must be Statewide**, as statewide changes are far more favorable to uniform administration and governing of RCO grant funding and habitat implementation.
   a) To consent to having salmon habitat authority or prioritization in the hands of local government could result in the appearance of RCO preference and or bias, as well as create unnecessary barriers for non-governmental projects that request funding.

Question 2 - What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?

Comment:

1) Just as any constraints that prohibit achieving an adopted guideline for the stream type where the proposal is located, clearly indicates constraints are **site specific** – in my opinion, it is imperative to also consider the best economic potential use of said land, prior to reduction of said buffers or justification of prioritizing salmon restoration projects in general. Examples:
   a) Where a property is currently zoned mining or agricultural (a legally protected natural resource land use or within said permitted land use zone) all other uses of said property, for a proposed riparian habitat grant by RCO should at a minimum consider first and foremost the best economic use of said land, then secondly any constraints prohibiting the proposed property from meeting an adopted guideline with regards to buffer or priority of the project.
   b) Alternatively a property not currently zoned mining or agriculture but as a result of a salmon habitat restoration or riparian habitat grant issued by RCO to a local government benefiting a mining or agricultural operation from or in conjunction with breaching of a dike or other salmon

habitat restoration projects wherein a government, or third party mining or agricultural operation benefits, can or will conceivably realize a revenue, income, benefit, or profit must be disclosed. In this case at minimum a cost/benefit analysis must be conducted for each site, disclosing all properties and their owners, and any operations with potential to benefit from the project prior to any governmental or third party proposal receiving RCO grant funding.

c) Additional Examples of placing more or less stringent buffers and for prioritizing should include:
   i) Existing Land Use Zoning of the property
   ii) Most economic value of a property's permitted land use
   iii) Economic value of project to Fisheries
   iv) Any Social or Economic Government benefit
   v) All Third Party land owner benefit (including a lessee or other economic benefactor)

Question 3 - What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board?

Comment:

Again, this question is **site-specific,** all six basic categories of incentives should be available to land owners who allow salmon recovery projects on their property and also available **to all known land owners whose property value or zoned land uses could be detrimentally effected** by any proposed salmon recovery project, only through full disclosure with at minimum a comprehensive cost/benefit analysis of any salmon recovery action's potential detrimental effect as well as potential benefit to both the surrounding properties or operations of others, provided to all with a reasonable comment period prior to RCO granting any funds will result in an appearance of fairness to all.

Question 4 - Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the board encourage such prioritization at the local, regional or state level?

Comment:

In my opinion the RCO board should only encourage prioritizing and/or fund riparian habitat and salmon recovery projects that meet or exceed at minimum, the full disclosure requirement, i.e. that the whole truth is told before a contract is signed, so that the signers and any land owners of properties effected are fully informed about the consequences of his/her decision to comment, object, approve or reject.

Full disclosure should at minimum include but is not limited to any effects the proposed RCO funded project could have upon the property and surrounding properties, which must be clearly documented by in a cost benefit analysis for said project, stating all parties with potential to benefit or being effected, the economic value thereof, and potential revenue, or profits being provided to all effected property owners, with a fair and equitable opportunity to approve or object, prior to RCO funding said project.

Snake River Salmon Recovery

410 B East Main
Dayton, WA 99328

phone: 509.382.4115

www.snakeriverboard.org

April 22, 2014

Salmon Recovery Funding Board
David Troutt, Chairman
P.O. Box 40917
Olympia, WA 98504-0917

Re: SRFB riparian guideline comments

Dear Chair David Troutt and Salmon Recovery Funding Board Members:

The Snake River Salmon Recovery Board (SRSRB) would like to thank the Salmon Recovery Funding Board (SRFB) for providing an opportunity to comment on the proposed changes to the Salmon Recovery Grant Program and specifically the proposed riparian guidelines.

We believe locally led, voluntary incentive based decision making has proven to be more successful over the last twenty years than the previously attempted, top down decision making model with a one size fits all emphasis.

We understand the complexity and nuances for the SRFB's consideration of adopting guidelines for minimum buffer widths and we share your desire to insure that SRFB funding is not awarded to projects that propose insufficient buffer widths. However, we believe that existing intensive local and state project reviews have resulted in sufficient buffer widths that meet project goals.

The momentum and effectiveness of salmon recovery and habitat project implementation in the State has largely been successful due to the fact that these efforts are locally based and locally driven where private landowners may participate voluntarily. We support the Washington Way, utilizing a local voluntary incentive based approach to buffer widths and not the conditioned top down required buffer widths. Forcing regulation will cripple our ability to work on private land and will damage the trust and successful working relationships that have been built over time where we've worked together. We support site specific considerations with scientific support for buffer widths rather than an arbitrary standard width as the best method to achieve maximum effective restoration for salmonid habitat.

Additionally, we offer the following in response to the specific questions proposed:

> *Question 1 - Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide?*

No. In our Region the existing intensive local and state project review process has resulted in sufficient buffer widths that meet project goals and satisfy scientific rational, or in the few instances where sufficient buffer widths cannot be met, satisfactory justification was provided. Given this, we do not feel that the SRFB should adopt specific guidance for minimum buffer widths; adopting guidelines could hinder the ability of project sponsors to work on private land and could damage successful working relationships that have been developed resulting in less rather than more habitat improvement.

Particular care should be made in utilizing the guidelines to help streamline the grant round process and should adhere to sound science and practices. Again we feel that the SRFB review and grant process at the local and state level have produced strong projects with sufficient riparian buffers and that a review of previously funded projects would show that riparian buffer widths are not a large issue.

Question 2 - What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?

Guidelines by definition are not site specific and tend to result in a one size fits all regulation. Every site specific program would have to justify any deviation from a guideline that is not appropriate for the proposed project.

We agree with the examples provided as reasonable justification for smaller riparian habitat buffers – transportation corridors such as roads or bridges, structures such as homes, barns, or sheds, naturally occurring conditions such as geology, vegetation and soil types, or if the project requirements would lead to declassification of the land as farmland as defined in the
state's Open Space Act (RCW 84.34.020).

It would be worthwhile for the SRFB Review Panel to confer with the Lead Entity and local Technical Team before making a determination on whether a smaller riparian habitat buffer is justified or not and before flagging a project as a project of concern. We recognize that any project can be flagged as a project of concern and riparian projects shouldn't be exempt, however a project shouldn't be flagged automatically if it doesn't meet the guidelines if they are established – by definition guidelines are not mandatory, binding, or enforceable.

Question 3 - What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board?

We support that the full range of conservation incentives should be eligible for salmon recovery funding through the SRFB; a private landowner should be able to use whatever options are available to them. Working with private landowners requires compromise and a give-and-take whereby a salmon recovery project provides value or compensation to the landowner in addition to providing value for salmon habitat. Having multiple tools available to use in the wide variety of scenarios and situations that may come about could be advantageous.

As described these potential tools are: 1. financial assistance: grant, loan, and lease programs that provide cost-share funding for, or reduce expenses of, conservation actions, 2. technical assistance: advice, hand-on help, and training for landowners on conservation tools or techniques, 3. tax relief: tax reductions for landowners undertaking conservation actions, 4. marketing: programs to add market value to products that support conservation on private land, 5. recognition: identification and promotion of landowners undertaking conservation actions, and 6. Conservation banking: financial assistance to landowners provided as a condition of permitting for construction projects.

> *Question 4 - Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the board encourage such prioritization at the local, regional or state level?*

No. Prioritization should remain a local Lead Entity process for success. We don't believe the SRFB should add additional emphasis on prioritizing funding for riparian habitat projects that meet any guidelines. The SRFB already gives preference to funding certain types of projects through its eligibility and evaluation criteria as published in Manual 18: Salmon Recovery Grants and as required through statutory direction. The existing criteria already encompasses anything additional that would be added with the riparian buffer guidance.

Thank you for the opportunity to comment on this proposed guideline change.

Del Groat 4/23/14

Del Groat, Chairman
Snake River Salmon Recovery Board

April 30, 2014

Salmon Recovery Funding Board
Chairman David Trout
P.O. Box 40917
Olympia, WA 98504-09127

Dear Chairman Trout:

I thank the Salmon Recovery Funding Board for the opportunity to comment on the proposed minimum buffer width guidelines for projects with a specific objective to improve riparian habitat. The Upper Columbia Salmon Recovery Board (UCSRB) has for fifteen years worked to find lasting solutions that work for the species and the people living in the region. As I understand the proposal, the intent is to identify minimum guidelines the SRFB would require as a condition of funding riparian improvement projects. As you know, the full benefit of riparian modifications takes years to manifest. Furthermore, there are so many different stream types across the State of Washington that identifying a single set of guidelines is a monumental challenge. Nonetheless, there may be an opportunity to ensure that riparian projects the SRFB invests in will indeed result in anticipated benefits in the long-term.

Below are responses to the four questions posed in the request for public comments.

Question 1 - *Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide?*

We understand and are supportive of the SRFB's need to establish criteria for projects that it funds. We are receptive to the Recreation and Conservation Office staff recommendation for individual regions to work with NOAA and the Governor's Salmon Recovery Office to develop reasonable guidelines for their respective regions as outlined in the March 20, 2014 SRFB Meeting materials. We do not have an opinion about implementation of the proposed criteria in Puget Sound or Western Washington.

As indicated in the March 20, 2014 SRFB Meeting materials, the criteria as proposed for Eastern Washington are not ready for implementation. We recommend delaying implementation of guidelines for riparian improvement projects in Eastern Washington until the criteria can be refined for the geography and needs of populations in the region. We are constantly balancing the cultural, economic and ecological interests of the region in developing our responses to the listings. Minimum buffer widths as a condition of funding may shut the door on our partners to future opportunities to improve currently degraded riparian areas.

In refining criteria for Eastern Washington, the following are important considerations with regard to the Upper Columbia region:

- Stand-alone riparian improvement projects are relatively rare.
- Guidelines should take into account the wide variation in stream sizes and types, and the reasons for implementing riparian improvements (e.g. temperature, sediment, future large wood recruitment) in Eastern Washington. This could be done in a number of different ways, such as variable buffer widths tied to stream bank-full width and gradient.
- Final guidelines should be clear, flexible and fair without adding unnecessary obstacles to implementation.

Question 2 - What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?

As mentioned above, there are a variety of stream types and sizes, and motivations for riparian improvement. Guidelines that take these factors into account should reduce the necessity for justifying variations. However, additional constraints such as availability of water, availability of funding, and landowner willingness could also influence projects in such a way as to result in reduced buffer widths and still result in viable actions. The scope of the project may be another justification. The majority of riparian planting projects in the Upper Columbia are single components of larger projects. It is important to include flexibility in the implementation of guidelines so that there are opportunities to explain why those guidelines are not appropriate in a given situation.

Question 3 - What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board?

In general, projects across Washington are moving away from the low-hanging fruit to more complex and complicated ones. This is definitely the case in the Upper Columbia. While many projects in the early days provided a direct benefit to the landowner (e.g. improved irrigation system, flood attenuation), modern projects may not necessarily provide an obvious and direct benefit to the landowner (e.g. large wood installations). I think it is very productive for the SRFB to be discussing the six categories of incentives, and to work with other state and local agencies on the opportunities to implement each. Direct financial assistance (e.g. construction easements) and tax incentives are generally good tools to encourage voluntary participation in our grass-roots approach.

Question 4 - Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the board encourage such prioritization at the local, regional or state level?

Again, all of the regions have unique needs for implementation, and are adaptively managing those needs as we learn how our current implementation strategies are working. While modern projects are more complicated, we all have priority areas for implementation that could technically include a variety of strategies to address the existing threats. As previously mentioned, standalone riparian projects are rare in the Upper Columbia. Prioritizing funding for standalone riparian projects in our region does not help us address the existing and documented threats in each of our priority areas. Additionally, riparian projects are typically employed as a surrogate for an existing threat (i.e. temperature, sediment), but again those benefits materialize many generations later, if at all. Arguably, deferring to the prioritization in the regional recovery plans is the soundest scientific and political decision. It appears this already occurs through the statutory criterion that preference is given to projects that “are included in a regional or watershed-based salmon recovery plan that accords the project, action, or area a high priority for funding,” (RCW 77.85.130).

I applaud the SRFB for considering the importance of buffer widths. I also want to caution the SRFB against setting standards without considering the impacts that decision will have on effective implementation of the recovery plans that the regional organizations manage.

Please feel free to contact me at (509) 670-1462 if you have any questions.

Respectfully,

Derek Van Marter
Executive Director

From: Doug [stienbad@tds.net]
Sent: Thursday, April 24, 2014 6:28 PM
To: RCO MI Policy Changes (RCO)
Subject: SRFB riparian guideline comments

Regarding the establishment of minimum buffer widths for SRFB funded projects. While science indicates buffers between 30′-100′ can be quite effective, these also vary considerably, dependent upon slope, soil, vegetation, and land use outside the buffer. It seems disingenuous to propose the landowner / project sponsor justify not using a required buffer width when the minimum buffer width is not tailored to a site to begin with.

More significantly, while simple, "one size fits all" minimum buffer widths certainly makes for regulatory simplicity, such a policy would likely drastically decrease the number of "willing landowners" interested in riparian projects, serving as a disincentive to many landowners. In my 23 years working with landowners in Western Washington (as a former conservation district conservation planner, a current board member of another conservation district; and as a WSU faculty/educator in natural resources), rigid and expansive buffer widths remain one of the most contentious issues among private landowners, even for more environmentally inclined landowners.

It is especially problematic for those using their land for economic purposes, such as agriculturalists. It would seem in proposing an "ideal" buffer standard, SRFB risks trading something for nothing. While we currently get something (smaller buffers than we might like), this policy risks getting nothing (or very little) if it dissuades landowners from participating at all. As a member of the Technical Advisory Committee for the Lower Columbia Fish Recovery Board for the last 12 years, I can say that buffers and protection for riparian restoration already figure into my calculation of value and certainty for success on grant proposals.

Perhaps one alternative would be to use the incentives SRFB proposes as incentives for landowners who **voluntarily** agree to the minimum buffers proposed, without otherwise penalizing those who opt for smaller buffers. As a practical matter, I hope the SRFB retains flexibility in the size of buffer widths.

Sincerely,
Douglas M. Stienbarger
Woodland, WA

Cowlitz Indian Tribe
Natural Resources Department

Salmon Recovery Funding Board (via email)
policychanges@rco.wa.gov

April 30, 2014

RE: SRFB riparian guideline comments

Members of the Salmon Recovery Funding Board:

Thank you for the opportunity to comment on the Board's decision(s) regarding the establishment of riparian restoration guidelines for salmon recovery grants. I am concerned that establishing minimum buffer widths will adversely affect salmon recovery efforts in the state. I have based my comments on a decade of proposing, managing, and reviewing hundreds of habitat restoration projects throughout Washington and Oregon.

Question 1: Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide?

I respectfully recommend that the board avoid adopting any policy regarding minimum buffer widths. I have three primary concerns with the proposed policy: first, the policy ignores natural site processes; second, the policy alienates willing landowners; and third, the policy promotes perfection at the expense of the good.

This policy ignores natural site processes.
I understand that guidelines must be general. These guidelines, however, emphasize one metric—buffer width—while ignoring arguably more important factors. Most natural resource management agencies employ complex methods to establish meaningful buffer widths that relate to site potential tree heights, adjacent slope and aspect, stream type, and stream size. The application of a one-size-fits-all buffer ignores important physical geography of the site.

Buffer width is only one part of an effective riparian restoration project. Plant selection, stem density, and maintenance can be more important than buffer width in establishing a functional riparian corridor. Setting a policy establishing buffer widths ignores the complexity of effective riparian restoration.

This policy alienates willing landowners.
The absurdity of an all-or-nothing approach will not be lost on landowners. Under current laws, agricultural lands are generally exempt from riparian buffer requirements.

Willing private landowners are therefore basis for enacting salmon recovery actions throughout the state on agricultural lands. Project sponsors work for years to develop relationships with landowners, often resulting in incrementally increasing project scopes as landowners become more comfortable with salmon recovery efforts. If the board adopts this policy, it will send the message that willing landowners must bear the sole responsibility for restoring salmon habitat while their neighbors continue to cultivate up to the stream bank. Minimum standards belong in regulations—not voluntary programs.

This policy promotes perfection at the expense of the good.
My understanding is that NOAA and Ecology have identified these buffer widths as the minimum to meet habitat goals for salmonids with regard to water quality and in-stream wood contributions. In many cases, however, salmon recovery efforts are unable to achieve full habitat benefits on a site. The board has funded countless projects over the last decade that have acknowledged the necessary coexistence of salmonids and humans—levees are set back, not removed entirely; Puget Sound shorelines are soft-armored rather than completely disarmed; and undersized culverts are replaced with bridges or culverts adequately sized to pass fish, gravel, floods, and wood. In each of these cases, the board tacitly agrees that ideal habitat restoration would remove the levee, disarm the shoreline, and remove the entire road, but acknowledges the infeasibility of sacrificing human use of the landscape for the sole benefit of salmonid populations.

Riparian restoration projects are no different in that regard. As a project proponent working with a private landowner, my preference is to enroll the landowner in a program that fully buffers the homeowner's stream frontage. In many areas of the state, however, this would completely preclude the landowner's use of the property. Thirty-five foot buffers on agricultural ditches would effectively render many parcels worthless as agricultural ground. One-hundred-foot buffers would require abandonment of family homes, barns, and sheds. Under current guidance, larger buffers are preferred, but project proponents take what they can get—ten feet is better than nothing, and fifty feet is better than ten. Project proponents currently have no incentive to minimize buffer widths, but this policy implies that a buffer of less than ideal width is not worthwhile.

Question 2: What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?

By establishing minimum standards and requiring sponsors to justify actions, this policy will have a chilling effect on project proposals. The board is unlikely to collect an exhaustive list of instances where decreased buffer widths are justifiable, but if such a list existed, it would simply act to make an already long and complex process more arduous for potential project sponsors. The technical review panel already has the ability to deem proposals projects of concern without the additional layers of bureaucracy created by this policy. Please let them exercise that discretion.
Question 4: Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the board encourage such prioritization at the local, regional or state level?

Regional and lead entity organizations currently prioritize projects under the general categories of benefits to fish, certainty of success, and cost. In practice, projects prioritized at the lead entity and state level are rarely re-ordered or re-prioritized by the board. This preserves local priorities and allows local and regional experts to decide what actions are most appropriate at the project site. Technical review panel members provide the board with a third-party check on the technical merit on a project-by-project basis. In essence, the local and regional processes are already working—this policy is a solution without a problem.

Respectfully,

Eli Asher
Restoration Ecologist

Cowlitz Indian Tribe Natural Resources Dept.
1055 9th Avenue ~ P.O. Box 2547 ~ Longview, WA 98632 ~ 360-353-9425
www.cowlitz.org

From: Eric Berntsen [EBerntsen@kalispeltribe.com]
Sent: Wednesday, April 30, 2014 4:25 PM
To: RCO MI Policy Changes (RCO)
Subject: SRFB riparian guideline comments

Hello and thanks for the opportunity to provide comments on whether the Salmon Recovery Funding Board should implement guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat.

My comments on the four proposed changes are as follows:

Question 1 - Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide?

The board should adopt guidelines, and the guidelines should apply statewide. In developing statewide guidelines, I think it's important to build upon previous efforts, including but not limited to, Ecology's guidance on delineating channel migration zones (http://www.ecy.wa.gov/programs/sea/sma/cma/index.html) and DNRs forest practices watershed analysis methodology (http://www.dnr.wa.gov/researchscience/topics/watershedanalysis/pages/fp_watershed_analysis.aspx)

Question 2 - What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?

The process and the example constraints seem reasonable, as long as a requirement to protect and maintain buffers in perpetuity exists.

Question 3 - What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board?

All the conservation incentives listed should be available for participating landowners. I would suggest providing funding to conservation districts and other local partners to provide technical assistance and outreach.

Question 4 - Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the board encourage such prioritization at the local, regional or state level?

The board should encourage prioritizing funding for projects, especially those projects identified as high priority in a regional or watershed-based salmon recovery plan and/or a region wide list developed by lead entities.

Thanks again for providing the opportunity to comment and your continued efforts towards salmon recovery!

Eric Berntsen, PH, CFM
Habitat Restoration Biologist
Kalispel Natural Resources Department
P.O. Box 39
Usk, Washington 99180
Desk: (509) 447-7185
Fax: (509) 445-5302
Mobile: (509) 671-6466
Email: eberntsen@kalispeltribe.com

From: Evan Bauder [evan@masoncd.org]
Sent: Wednesday, April 30, 2014 1:34 PM
To: RCO MI Policy Changes (RCO)
Subject: Proposed Minimum Riparian Buffer Width Guidelines

To Whom it May Concern,

I have been participating in riparian restoration for more than 5 years and have been managing riparian restoration for the past 3 years. Over the past 5 years i have helped to implement well over 300 acres of riparian planting. I am writing to voice my concerns about the proposed minimum buffer width guidelines. These guidelines will undoubtedly and substantially reduce landowner participation in regards to riparian planting. I see this a an effort to obtain perfection that will result in a comprehensive benefit that is much less than what we are currently experiencing. The ability to stay flexible while developing a riparian restoration plan is what allows practitioners to begin conversations with landowners. All riparian restoration practitioners are aiming for the greatest amount of benefit and associated acres restored as possible. I find that in almost all cases landowners will agree to a plan that has an average buffer width very close to the recomended minimums (and in many cases greater than the proposed minimums). Allowing for flexibility throughout the negotiation process is what makes landowners feel comfortable working with us. If we had to tell them in the begining that they will be held to a minimum buffer width of 100 feet many would immediately ask us to leave their property before the conversation had any chance to develop into a good project.

I believe that riparian restoration is one of the most important actions taking place in the name of salmon recovery, and i fear that this new policy will halt progress toward restoring natural riparian function. Thank you for your consideration.

Sincerely,

Evan Bauder

From: Webmail cascadeb [cascadeb@televar.com]
Sent: Monday, April 14, 2014 12:09 PM
To: RCO MI Policy Changes (RCO)
Subject: proposed changes to rules

I want to be on record as opposing any setbacks on temporary streams and irrigation ditches. These changes make no sense.

George Brady
Pateros, WA 98846

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

April 30, 2014

Leslie Connelly
Natural Resource Policy Specialist
policychanges@rco.wa.gov
(Sent Electronically)

Re: SRFB Riparian Guideline Comments

Dear Ms. Connelly:

Thank you for this opportunity to provide comments on the proposed changes to the Salmon Recovery Grant Program. We are encouraged by the leadership the Salmon Recovery Funding Board is showing in increasing protection and accountability for riparian projects. While the state has made progress on improving water quality and salmon habitat, significant challenges remain. Increased riparian protection and restoration is needed to achieve water quality and salmon recovery goals. Therefore, we support the adoption of the proposed minimum riparian buffer width guidelines for riparian habitat projects found in the *Proposed Changes to Salmon Recovery Grants (April 2014*) document. This past year, the Washington State Department of Ecology (Ecology) adopted the same minimum guidelines pursuant to Environmental Protection Agency (EPA) and National Oceanic and Atmospheric Administration (NOAA) direction. We are encouraged by your engagement of this issue and see an opportunity for our two efforts to become more aligned. This is especially true as we address more complex and controversial issues.

Incentive programs are often the first tool the state uses to encourage on-the-ground environmental improvements. With limited resources, we think it is important to spend public money on projects that promote compliance with Washington's water quality standards, and protect salmon and their habitat. Science based minimum guidelines, as embodied in the NOAA guidance, promote accountability and ensure that the most effective projects are implemented with Salmon Recovery grants. Without minimum standards, we risk investing in projects that do not support attainment of water quality standards and adequate protection of salmon. Clear standards ensure protective projects receive funding. As the agency responsible for regulating water quality and implementing water quality standards to support salmon protection and recovery, we believe grant programs designed to meet the science and water quality standards provide the best investment of public funds.

Further, guidelines are a significant educational tool to inform the public on what is needed to achieve desired results. Projects that meet minimum guidelines serve as models of what is needed to achieve water quality and salmon recovery goals. Funding projects that meet science based minimums align water quality standards with salmon recovery and demonstrate what is needed to fully protect and restore salmon.

Finally, there are significant benefits to better aligning incentive programs. While recognizing that each funding program will have its own specific eligibility requirements, the proposed minimum guidelines would ensure consistency between the Salmon Recovery Grant Program and the grant programs administered by Ecology. In addition to having a consistent message about what is needed to achieve salmon recovery and water quality goals, aligned funding will support a better integration of salmon recovery efforts and the state's nonpoint program and plan.

Sincerely,

Heather R. Bartlett

Heather R. Bartlett
Water Quality Program Manger

Washington Cattlemen's Association
P.O. Box 96 ♦ 1301 N. Dolarway ♦ Ellensburg, WA 98926-0096
509/925-9871 ♦ FAX 509/925-3004
wacattle@kvalley.com ♦ www.washingtoncattlemen.org

To: Salmon Recovery Funding Board (SRFB)

From: Washington Cattlemen's Association

April 25, 2014

Subject: SRFB riparian guideline comments

The Washington Cattlemen's Association (WCA) would like to express its concerns and opposition to the Salmon Recovery Funding Board's (SRFB) potential adoption of guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat. The WCA believes if the SRFB adopts a standard that mandates a buffer of any size as a condition of receiving funding it will be a huge step backwards in the process of incentivizing voluntary stewardship activities that benefit salmon and habitat.

The WCA strongly supports incentives as a means of engaging landowners in habitat projects. Landowners view buffers of any size as a taking, and as a result they (landowners) will not participate in activities that include buffer mandates of any size.

The WCA respectfully requests that the SRFB not adopt any buffer requirements as a condition of receiving funding. Recently, the National Resource Conservation Service (NRCS) experimented with tying a buffer mandate to a conservation program in the Puget Sound. The result of the buffer requirement on the program was that zero landowners utilized that specific program. The SRFB has successfully implemented numerous projects throughout the state without a buffer mandate. Please do not jeopardize the future of habitat conservation in Washington State with a buffer.

Sincerely,

Jack Field
Executive Vice President
Washington Cattlemen's Association

From: Janet Strong [janet.strong4@gmail.com]
Sent: Tuesday, April 29, 2014 11:18 AM
To: RCO MI Policy Changes (RCO)
Subject: SRFB Riparian Guideline comments

I support the minimum guidelines as they appear in the table and think they should be applied statewide, or at a minimum, throughout western Washington. I have seen a glaring example of an inadequate riparian buffer applied, to the point as it being meaningless, and yet the landowner received a state-of-the-art bridge to his field. True a fish-blocking culvert was removed, but the streambank is barely being protected from grazing animals. Riparian buffers are critical to stream health; they are integral parts of the stream ecosystem. Stream functions are greatly limited when buffers are either absent or inadequate. The buffers in the table will assist greatly in protecting all or most of the functions of the stream ecosystem.

Thank you for the opportunity to provide comments.

Janet Strong, biologist, board member Chehalis River Basin Land Trust

Lake Washington/Cedar/Sammamish (WRIA 8) Watershed
201 S. Jackson Street, Suite 600
Seattle, WA 98104-3855

April 30, 2014

Salmon Recovery Funding Board
c/o Washington State Recreation and Conservation Office
P.O. Box 40917
Olympia, WA 98504-0917

RE: Salmon Recovery Funding Board (SRFB) Riparian Guideline Comments

Members of the Board:

The Lake Washington/Cedar/Sammamish Watershed (WRIA 8) is a partnership between 27 local governments, citizens, community groups, state and federal agencies, and businesses working together to implement salmon recovery in the watershed through the *WRIA 8 Chinook Salmon Conservation Plan* (WRIA 8 Plan). The purpose of this letter is to provide comment on the proposal for adopting minimum buffer widths for riparian habitat projects funded by the Salmon Recovery Funding Board (Board).

Our watershed is the most populous watershed in Washington and is home to two genetically distinct populations of threatened Chinook salmon. The WRIA 8 Plan—one of the watershed-specific chapters of the *Puget Sound Salmon Recovery Plan*—outlines numerous habitat restoration projects for recovering Chinook salmon, many of which have a riparian restoration component. While we agree that larger buffers are preferable from a habitat perspective, the proposed policy as written does not explicitly acknowledge land use constraints preventing large buffers in an urban context. The list of "reasonable constraints" identified in Question #2 addresses some of the constraints found in urban areas, yet other limitations exist that are similarly constraining and important to recognize. Examples include utilities, commercial and industrial land uses, and recreational facilities (e.g., park amenities, regional trail systems, etc.).

Urbanized areas in WRIA 8, as well as in other Puget Sound watersheds, provide irreplaceable migratory habitat for adult salmon returning to their spawning grounds and rearing habitat for outmigrating juveniles. In our watershed, small creek mouths along our lakeshores and in the marine nearshore provide crucial rearing habitat for juvenile salmon. In many cases these small creeks flow through areas constrained by urban development, thus limiting the potential for large riparian buffers. We know these areas are important for salmon recovery, and even small-scale riparian enhancements on small stream systems provide habitat function that otherwise would not exist.

Without sufficient flexibility in the language and application of this proposed policy, the unintended outcome may be an inability to fund and implement critical riparian enhancements in areas confined by urban development. Should the Board elect to adopt minimum riparian buffer widths, we urge you to acknowledge the urban context and similar constraints explicitly in the policy guidance and recognize that urban land uses may be reasonable justification for smaller buffers. Our watershed is continuing to develop restoration projects in urban environments that will significantly enhance habitat conditions for salmon, and successful implementation of these projects could be hindered by minimum buffer width requirements if urban land uses are not considered a reasonable exception.

Another potential unintended consequence of this policy could be a decrease in the willingness of private landowners to participate in grant-funded restoration projects. Even with the incentives described in Question #3, private property owners may find the minimum buffer width requirement—even with exceptions and incentives—to be a deterrent to participating in voluntary restoration. Should this occur, watersheds will find it increasingly difficult to implement priority actions in salmon recovery plans.

Lastly, we appreciate the analysis of potential implications of minimum riparian buffer widths on projects funded by the Board conducted by Recreation and Conservation Office staff, which is detailed in a briefing memo for the March 2014 Board meeting. However, by looking at fiscal year 2014 projects only, the analysis is limited in scope and potentially understates the effect of this policy on Board-funded projects. We encourage the Board to consider a broader analysis of Board funded projects to more fully understand the potential impact of the proposed minimum buffer policy.

Please contact me if you have any questions: jason.mulvihill-kuntz@kingcounty.gov or 206-477-4780.

Sincerely,

Jason Mulvihill-Kuntz
Watershed Coordinator
Lake Washington/Cedar/Sammamish Watershed (WRIA 8)

cc: Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Salmon Recovery Council members

LOWER COLUMBIA FISH RECOVERY BOARD

April 30, 2014

Chairman David Troutt
WA Salmon Recovery Funding Board
Via email: policychanges@rco.wa.go

Re: SRFB riparian guideline comments

We are writing in response to the Salmon Recovery Funding Board (SRFB) request for comments on minimum riparian buffer widths. The Lower Columbia Fish Recovery Board (LCFRB) recognizes that adequate riparian buffers play an important role in creating and sustaining habitat for salmon and steelhead. The Board is concerned, however, that the adoption of minimum riparian buffer widths for SRFB funded restoration projects could significantly hamper riparian restoration efforts. WE offer the following comments for your consideration.

Stream size and watershed conditions vary considerably from broad alluvial plains with wide meandering rivers to narrow valleys with confined high gradient streams. Establishing a minimum buffer width, which would be 100 feet for nearly all western Washington streams, ignores this diversity. Moreover, it implies that buffers of less than 100 feet have little or no value. The LCFRB encourages its project sponsors to seek a riparian buffer width of 150 feet and gives wider buffer widths higher priority; however, it recognizes that buffers less than 150 feet can have significant habitat value.

The effectiveness of a riparian buffer depends on a number of factors, only one of which is buffer width. These factors are laid out in Washington's Stream Habitat Restoration Guidelines (SHRG, 2012) and include stream size, gradient, channel type, hydrology, valley width, slopes, soils, site aspect, existing and proposed plant types, planting densities, landownership, and adjacent or contiguous land uses. The LCFRB Technical Advisory Committee (TAC) considers these factors in evaluating and scoring riparian projects. No riparian project will be given full credit if it has a width of less than 150 feet. We assume that the SRFB Technical Review Panel also takes similar factors into consideration. Given the existing technical guidance and review processes that riparian projects currently undergo, we question the need for the proposed buffer width guidance.

The proposed policy recognizes that there may be physical constraints that would justify a buffer width less than the minimum. Again, given current review processes, we question the value of requiring sponsors to provide a written justification for buffers less than the minimum. Riparian projects should be reviewed based on all factors that can affect their effectiveness. Placing emphasis on buffer width diminishes the potential importance and relevance of other key factors. Under the current SRFB grant application requirements, project sponsors should already be providing justification for the adequacy of their riparian restoration designs.

2127 8th Avenue Longview Washington 98632 • 360 425-1555

The proposed policy recognizes the value of providing incentives to induce landowners to allow broader buffers. Incentives such as technical assistance and landowner recognition are already being used by project sponsors in the Lower Columbia and financial incentive programs, such as the Conservation Commission's Conservation Reserve Enhancement Program, have proven to be effective in securing riparian buffers. Regardless of whether minimum riparian buffer guidelines are adopted, the SRFB may wish to consider financial incentives such as lease programs for riparian buffers. In doing so, it should carefully consider whether the cost of such incentives would result in riparian buffers of commensurate value. Unless properly constructed an incentive program could increase the cost of riparian buffer projects.

Perhaps most importantly, the proposed policy does not adequately provide for the consideration of landowner interests as a factor in determining an effective buffer width. It is not included in the proposed constraints listed as being the possible justification for a buffer less than the prescribed minimum.

The success of SRFB habitat grant program is totally dependent on the cooperation of willing landowners. Lead entities and project sponsors strive to build effective working relationships with landowners. Doing so requires the flexibility to address the interests and concerns of a landowner along with other factors and constraints in designing and implementing a habitat project. In setting land aside for a riparian buffer, a landowner is voluntarily forgoing other uses of the land and potentially income, as is the case for agricultural uses. Incentives can assist in offsetting economic impacts, but may not be sufficient in addressing other landowner values and concerns, particularly for smaller residential and agricultural parcels. While a landowner may be willing to set some land aside for a riparian buffer, the landowner may to be unwilling to voluntarily commit to 100 foot buffer. In such cases, a minimum buffer width requirement or guideline could result in the loss of a narrower, but nevertheless beneficial buffer. If roads, structures, and physical features are constraints that would be reasonable justification for a buffer smaller than the guideline, then landowner willingness should be as well. While we believe that efforts to secure wider buffer widths should be a priority, in the end proposed riparian restoration projects should be evaluated based on the benefits they would provide and their cost.

Finally, the SRFB asks if it should encourage prioritizing funding for riparian habitat projects that meet the proposed guidelines. In the Lower Columbia, all other factors being equal riparian restoration projects with wide buffer widths are already given a higher funding priority. Overall, however, project priorities in the Lower Columbia are driven by the recovery plan and supporting habitat strategy. Similar to the SRFB, our goal is to maximize benefits to fish in a manner that makes the most effective and efficient use of resources. Funding criteria that would encourage wider riparian buffers may not maximize fish benefits or provide for the best use resources. We believe funding priorities should continue to focus on benefits to fish and not on maximizing a particular project attribute.

In summary:

- The LCFRB believes that efforts to secure riparian buffers that will maximize habitat benefits are and should be a priority. We are interested new approaches to achieve greater riparian restoration benefits.

- We are concerned that establishing minimum buffer width guidance could hinder rather than further those efforts and question the need for a buffer width policy. There is no compelling evidence to suggest that the current riparian buffer guidelines and project review processes have resulted in projects that do not provide substantial value at a reasonable cost.

- The SRFB habitat program is dependent on willing landowners. Landowner values and concerns are legitimate reasons for considering a buffer width less that the guideline. We are concerned that the buffer width policy would discourage landowner participation, reducing the overall effectiveness of riparian restoration efforts.

- The effectiveness of riparian buffers depends on many factors, buffer width is only one. Setting guidelines for buffer width may give too much weight to a single factor.

- Incentives could help encourage some additional landowners to commit to a wider buffer, but will not address all landowner values and concerns and unless carefully constructed could increase the effective cost of riparian restoration.

- A minimum buffer “all or nothing” approach without consideration of landowner values and interests would be contrary to the SRFB goal of funding “the best possible salmon recovery activities and projects through a fair process that considers science, community values and priorities, and coordination of efforts.”

- The LCFRB recommends that the SRFB table consideration of minimum buffer width guidelines and consider a more thorough and careful evaluation of SRFB funded riparian buffer restoration efforts to date with the goal identifying ways to improve the effectiveness of future projects. The LCFRB would support and participate in such an evaluation should the SRFB chose to undertake it.

Thank you for taking the opportunity to comment on the proposal.

Sincerely,

Jeff Breckel
Executive Director

From: Jerry Barnes [barjrb@gmail.com]
Sent: Tuesday, April 29, 2014 10:16 AM
To: RCO MI Policy Changes (RCO)
Subject: SRFB riparian guidelines comments

Salmon Recovery Funding Board

I would like to express my opposition to any proposal to inject mandatory buffer widths as a condition of SRFB funding projects. It is unacceptable that "one size fits all" buffers be applied to any and all projects as per the chart attached to the proposal. From a land owner perspective that is a taking, or more bluntly said, extortion to get the desired project funded.

If a landowner is willing to take part in a habitat project benefiting salmon, let's not get too greedy in taking additional land from their operation. This seems symptomatic of the disconnect between landowners and the agencies that serve them. As a representative of agriculture on the Citizen Advisory Board, I would have a difficult supporting any proposal that imposed mandatory buffers on any landowner.

A great deal of salmon habitat improvement has been accomplished, let's not kill the program with the addition of mandatory buffers. Thanking for your consideration,

Jerry Barnes

From: James S. Brennan <jbren@u.washington.edu>
Date: Thursday, May 1, 2014
Subject: SRFB riparian guideline comments
Alicia Olivas <aolivas@hccc.wa.gov>

I haven't had time to review the full riparian guidelines, but did notice that your definition of riparian only includes freshwater systems. Yet, the report mentions estuaries. There has been substantial work on marine riparian areas, including functions and values, and most marine restoration and protection projects and standards (e.g., SMP) now include the riparian area. So, it seems that the definition (and the entire guidelines) should include marine shorelines. In 2009, I coauthored a guidance document for the State, which may serve as one reference. I have also published several other papers on the topic, which may be useful (see attached). I hope they are helpful in making your determination.

Please let me know if there may be an extension on the comment period. Otherwise, please accept these comments.

Sincerely,
Jim Brennan
206-855-8670

PROTECTION OF MARINE RIPARIAN FUNCTIONS IN PUGET SOUND, WASHINGTON

Prepared for:
Washington Department of Fish and Wildlife
(WDFW Agreement 08-1185)

Prepared by:
Washington Sea Grant
3716 Brooklyn Avenue NE
Seattle, WA 98105
(UW Contract: A39268)

Jim Brennan, Project Manager, Washington Sea Grant
Hilary Culverwell, Starrfish Consulting
Rachel Gregg, Washington Sea Grant
Pete Granger, P.I., Washington Sea Grant

June 15, 2009

Table of Contents

Section I. Introduction

Purpose of this document

This document was developed to provide shoreline planners and managers with a summary of current science and management recommendations to inform protection of ecological functions of marine riparian areas (defined in Section III). Washington Administrative Code (WAC 173-26-186(8)) directs that Shoreline Master Programs (SMPs) "include policies and regulations designed to achieve no net loss of those ecological functions." The Washington State Department of Ecology has produced guidelines to help achieve this standard on marine shorelines of Washington (http://www.ecy.wa.gov/programs/sea/sma/guidelines/index.html). In addition, the state's Aquatic Habitat Guidelines (AHG) program developed recommendations for protecting marine riparian functions: Protecting Nearshore Habitat and Function in Puget Sound: An interim Guide (2007) (http://wdfw.wa.gov/hab/nearshore_guidelines/). The AHG program is a partnership of state agencies dedicated to providing science guidance for protection of marine, freshwater, and riparian ecosystems. The AHG program develops guidance documents that can aid local governments updating Shoreline Master Programs (SMP) and Critical Areas Ordinances (CAO).

This information contained in this report will help inform local decisions regarding what is needed to protect ecological functions of marine riparian areas. Specifically, we summarize the range of marine riparian buffer widths (Appendix G) needed to meet particular levels of ecosystem function based on a literature review and input from an expert panel workshop.

Protection of marine riparian areas

Puget Sound's marine shorelines and riparian areas have been altered over the last 160 years by human activities including agriculture, forestry and development. Nearly all of the merchantable timber along the marine shorelines of Puget Sound was harvested or burned by 1884 (Chasan, 1981). Although natural regeneration of riparian vegetation occurred in the years that followed, human manipulation of vegetation continues to influence marine shorelines today.

During the past three decades, an extensive body of research has emerged documenting the importance of riparian areas in providing ecological functions. These functions include:

- Water quality maintenance
- Fine sediment control
- Large woody debris (LWD) delivery and retention
- Microclimate moderation
- Nutrient delivery and retention

- Fish and wildlife habitat creation and maintenance
- Hydrology/slope stability

Most riparian research has focused on stream and riverine ecosystems. Attention to marine riparian processes and functions has only emerged in the literature during the past decade, and research in this area is increasing. Nevertheless, riparian areas provide ecological functions regardless of whether they are adjacent to freshwater or marine water bodies (Desbonnet et al. 1994, 1995; NRC 1996; NRC 2002; Brennan and Culverwell 2004**).**

Organization of document

In addition to the Introduction above, this document contains the following sections:

- Methodology used to compile information.
- Overview of marine riparian areas.
- Description of the seven most ecologically important riparian functions and recommendations for protecting (sustaining?) these functions.
- Impacts to riparian functions from activities associated with development, agriculture and forest practices.
- Recommendations to protect and sustain marine riparian functions.

Section II. Approach/Methods

This document summarizes our literature review and synthesis of scientific and technical information on riparian areas and presents recommendations to help protect marine riparian functions from common human activities. The following seven riparian functions are the focus of this document:

- Water quality
- Fine sediment control
- Shade/microclimate
- Large woody debris (LWD)
- Detritus and nutrients
- Fish and wildlife habitat
- Hydrology and slope stability

We addressed the following questions regarding the seven riparian functions listed above:

- What are the mechanisms or processes by which riparian areas perform each of the seven functions?
- How do human activities (i.e., agriculture, forestry, and development) affect riparian area function?
- What management approaches are most likely to protect each function?
- What data gaps and uncertainties exist relative to each function?

We paid particular attention to buffer-effectiveness research; that is, research focused specifically on the performance of buffers of varying widths at protecting riparian function for both freshwater and marine settings within and outside the Puget Sound region. We examined seven riparian buffer review documents to help determine the buffer widths that have been recommended to protect the seven riparian functions. These seven documents were selected because we identified them as being among the most thorough, frequently cited, and scientifically sound sources available (Appendix B). They were also selected because of their relevance to Washington State (Castelle et al. 1992; FEMAT 1993; Knutson and Naef 1997), the Puget Sound lowlands (Castelle et al. 1992; May 2000), and coastal systems (Desbonnet et al. 1994, 1995). Because some of the review documents did not consider wildlife, we added some pre 2000 references dealing with buffer recommendation for protection of wildlife that we encountered during the literature review.

We reviewed books, journals, online gray literature from government sites (USGS, US EPA, USDA, Washington State Departments of Ecology, Natural Resources, and Fish and Wildlife); online databases [Web of Science, CAB Abstracts, ProQuest, ScienceDirect, Agricola], and bibliographies [most notably one written by David Correll for the Smithsonian Institution, Correll 1999]. A summary of this information is contained in Appendix C, Tables 1-7.

In Appendix G, we summarized buffer width recommendations from Appendix C to achieve 80-100% effectiveness. We did this in three ways. First we report the smallest and largest buffer widths recommended in the literature that achieved a minimum of 80% effectiveness for that function. For example, the buffer width recommendation for the water quality function ranges from 5-600 m (16 -1920 ft) across all water quality studies.

Secondly, we present average values, which are based on the arithmetic mean of all buffer widths recommendations from the literature cited in Appendix C that achieve a minimum effectiveness of 80%. For example, the mean width to achieve a minimum of 80% effectiveness among 11 studies in appendix C for water quality function was 109 m (608 ft). For single studies that offer a range of buffer widths to achieve a minimum of 80% effectiveness, we took the average of that range before including it with data from other studies. For example, for the water quality function, Mayer et al (2006) offer a buffer range of 6-70 m (19 -224 ft) to achieve 91-99% effectiveness for subsurface flows for a grass forest buffer. We used a value of 38 m (122 ft, i.e., the average of 6 and 70 m; 19-224 ft) to represent this study.

Finally we provide buffer width recommendations to meet 80% effectiveness based solely on FEMAT curves. The FEMAT curves plot the relationship between the effectiveness of a mature forests buffer at providing an ecosystem function at various buffer widths. For example, the FEMAT curve for LWD indicates that an approximately 40 m (131 ft) buffer width achieves 80% effectiveness of the LWD function. In some cases, the FEMAT function curves illustrate several parameters e.g., the water quality FEMAT curve shows total suspended solids (TSS), sediment, nitrogen and phosphorus. In this case, a range of widths is reflected in the recommendations, to address each parameter of concern. FEMAT curves did not address hydrology/slope or wildlife functions. FEMAT (1993) uses site potential tree height (SPTH) as a proxy for buffer width where one SPTH = 61 meters (200 ft). FEMAT defines site potential tree as “a tree that has attained the average maximum height possible given site conditions where it occurs” (FEMAT 1993). Like other characteristics of Puget Sound marine shorelines, site conditions and thus site potential tree heights will vary across Puget Sound region.

We found no effectiveness studies for litter fall or hydrology/slope stability and thus do not report on this function in terms of buffer width effectiveness. For all other function, we report on the buffer widths that achieve 80% effectiveness as opposed to other values of effectiveness simply because most of the studies could be summarized at this level. The description of effectiveness at the 80% level does not imply a recommendation for adopting that level of effectiveness.

Because much of the literature was related to freshwater riparian systems, we assembled an interdisciplinary science panel to inform the process of adapting fresh water studies to marine nearshore environments (Marine Riparian Workshop Proceedings 2008; Appendix H). We used FEMAT (1993) curves as a tool to communicate with the science panel. First developed in 1993 for freshwater environments, FEMAT curves depict the relationship between ecological functions and the width of mature riparian forests along a generalized shoreline. Relationships between ecological function and width of riparian zones for specific shorelines may differ from this generalized model due to site-specific factors such as slope, soil, geomorphology, plant community type, disturbances, anthropogenic alterations, etc. A riparian function curve for wildlife was not developed due to the complexity of life history requirements for the wide variety of wildlife found in marine riparian areas, as well as the lack of scientific information on this topic.

The decision to adapt FEMAT-style curves for the marine environment was based on the assumption that studies used as the basis for developing these curves can be generally applied to the marine environment. The rationale for this application relates to the similarities of riparian functions between marine and fresh water systems and the support for this application from a number of publications (e.g., Desbonnet et al. 1994, 1995; NRC 2002; Brennan and Culverwell 2004) and the science panel.

The summary of literature reviews, buffer recommendations and adapted FEMAT curves were provided to the science panel at a workshop to solicit their opinion as to the applicability of the riparian function curves to the marine environment. The workshop was held on November 19, 2008 at the University of Washington. It included 14 scientists representing multiple disciplines relevant to riparian function and processes. A proceedings document entitled *Draft Marine Riparian Review Technical Workshop Proceedings* was produced as a result of this workshop and contains the names, affiliations and expertise of science panel members (Appendix H). The consensus of the science panel is that freshwater riparian buffer research as generally depicted in the FEMAT curves is applicable to the marine environment. Exceptions are noted in the workshop proceeding. The recommendations contained in this guidance document are the result of these efforts.

Section III. Overview: Riparian Areas and Riparian Buffers

Riparian areas

As defined by the National Research Council (NRC 2002):

> Riparian areas are transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes and biota. They are areas through which surface and subsurface hydrology connect water bodies with their adjacent uplands. They include those portions of terrestrial ecosystems that influence exchanges of energy and matter with aquatic ecosystems (i.e., zone of influence). Riparian areas are adjacent to perennial, intermittent, and ephemeral streams, lakes, and estuarine–marine shorelines.

Riparian buffers

Riparian buffers are generally recognized as a "separation zone" between a water body and a land use activity (e.g., timber harvest, commercial or residential development) for the purposes of protecting ecological processes, structures, functions) and/or mitigating the threat of a coastal hazard on human infrastructures (National Wildlife Federation 2007). As used here, buffers are defined as separation zones (as above) that are relatively undisturbed by humans and thus represent mature vegetation consistent with the potential of the site.

Why are marine riparian areas important?

Based in large measure on our understanding of fresh water riparian ecosystems marine riparian areas likely play a central role in maintaining the health and integrity of aquatic and terrestrial ecosystems (Desbonnet et al 1994; NRC 2002; Brennan and Culverwell 2004). Many of the functions of freshwater riparian areas are similar to marine riparian areas, although marine riparian areas also provide functions that are unique to nearshore ecosystems due to differences in biogeochemical processes, ocean influences and differences in the biota between fresh and marine environments. Marine riparian areas provide a broad suite of functions, seven of which are the focus of this document. These include water quality (filtration and processing of contaminants); fine sediment control; inputs of large woody debris (LWD); shade/microclimate; litter fall/organic matter input; hydrology and slope stability; and fish and wildlife habitat (see Section IV). There are a number of other functions provided by marine riparian areas which were not reviewed nor discussed here e.g., recreation, cultural and aesthetic resources, carbon sequestration, and providing protection from threats of coastal hazards.

Section IV. Riparian Functions

1. Water quality

a. Technical overview: riparian influence on water quality function

Of the seven riparian functions addressed in this document, water quality is perhaps best understood. Riparian areas provide water quality benefits through a variety of mechanisms including:

- Infiltration and corresponding reduction of surface runoff rates/volumes;
- Intercepting nutrients, fine sediments and associated pollutants from surface water runoff;
- Binding dissolved pollutants with clay and humus particles in the soil;
- Conversion of excessive nutrients, pollution, and bacteria from surface and shallow groundwater into less harmful forms by riparian vegetation; and
- Regulating water temperature.

The water quality function of riparian areas is facilitated by vegetation and soils, which slow the flow of surface and subsurface water and increases retention or "treatment" time. Vegetation, geology, landform, and soil characteristics can affect the manner and rate at which water flows over and through the riparian area and the extent to which groundwater remains in contact with plant roots and soil particles (Klapproth and Johnson 2000). Microorganisms found in riparian soils and sediments, including bacteria, fungi, and other biota, are capable of metabolizing pesticides and transforming nutrients and other chemicals into less toxic forms (Ettema et al. 1999; Klapproth and Johnson 2000). They can also perform chemical reduction reactions such as denitrification (Adamus et al. 1991; Schoonover and Williard 2003; Rich and Myrold 2004). In addition to reducing the pollutant load to receiving waters, microorganisms cycle nutrients including carbon, nitrogen, and phosphorus. Soils high in very fine materials (e.g., clay) tend to be less permeable and may facilitate greater runoff, while sand-dominated soils can facilitate rapid draining and therefore limited sediment retention (Hawes and Smith 2005). Fine mineral soils or soils with high levels of aluminum or iron may be more likely to perform the nutrient removal/transformation function than other soil types (Adamus et al. 1991).

Trees, shrubs and herbaceous plants can trap and retain pollutants from the atmosphere, sediments, surface runoff and groundwater (Correll 1997). Plants also help lengthen the residence time of water by decreasing flow and velocity, which can increase filtration and soil retention potential (Evans et al. 1996; Klapproth and Johnson 2000; Ducros and Joyce 2003). Vegetation can help mediate nutrient and pollutant input into receiving waters by stabilizing banks to reduce erosion, storing runoff, trapping sediment, and transforming nutrients (Omernik et al. 1981; Smith 1992; Osborne and Kovacic 1993; Arthington et al. 1997).

b. Key findings from buffer literature and science panel on water quality

Numerous studies have investigated the role of riparian buffers composed of vegetation such as grass and forest in controlling the transport of sediment, nutrients, pesticides, metals, microorganisms, and other contaminants to receiving waters (NRC 2002). Most research focuses on nonpoint source pollution, particularly nutrients (phosphates/phosphorus, nitrates/nitrogen), TSS, and sediments. To a lesser degree, research has also addressed bacteria and other pathogens along with oils, pesticides, and herbicides. Appendix C, Table 1 provides a summary of water quality buffer recommendations reviewed for this document.

Our review suggests that:

- The range of buffer widths that met a minimum 80% effectiveness for this function was 5 – 600 m (16-1920 ft; Appendix G). This wide range relates to the breadth of water quality issues. See Appendix C to get more specific widths related to specific water quality parameters.
- Minimum buffer widths to achieve 80% effectiveness for different elements of water quality functions can be extrapolated from the literature and are listed in Appendix G.
- Site characteristics and the amount and nature of the contaminant in the water influence the buffer's capacity to ameliorate those contaminants.

A riparian function curve for water quality was developed for review by the science panel to determine its application to the marine environment. Summary data from Desbonnet et al. (1995) (Table 1) were used to generate a series of curves for four commonly studied contaminants including sediment, TSS, nitrogen and phosphorus (Figure 1). These curves, which are similar to those developed by FEMAT (1993), demonstrate function (in terms of % removal of contaminant) based on a number of studies at different locations and under different site conditions. Note that curves are contaminant-specific despite similarity of shape.

Panelists generally agreed that the function curves are conceptually valid for water quality issues originating in marine riparian areas. However the panel distinguished marine riparian from freshwater riparian function on the basis of drainage area and relative contribution to Puget Sound water contamination. Relative to the dynamics affecting water quality in Puget Sound at the watershed and landscape scales, undisturbed marine riparian area's contribution to maintaining water quality is limited to the area that drains directly into Puget Sound. Anthropogenic activities in marine riparian areas include the generation and routing (via water) of pathogens, nutrients, toxics, heat, and fine sediment (above normal background levels) that can affect water quality. However, the marine riparian area is limited in spatial extent; that is, it constitutes a small fraction of the Puget Sound drainage basin. Most contaminants reach Puget Sound via streams or drainage networks discharging into the Puget Sound Basin, or pathways that concentrate rainfall and snowmelt from impervious surfaces associated with human residential and commercial development and transportation infrastructure. Washington State Department of Ecology, United States Environmental Protection Agency, Puget Sound Partnership Publication Number 07-10-079 (http://www.ecy.wa.gov/pubs/0710079.pdf); and waste water entering Puget Sound from municipal and industrial facilities. The panel did not address nutrient or pathogens from agricultural sources or residential septic systems.

Table 1. Summary data adapted from Desbonnet et al. (1994, 1995) used to generate generalized curve for removal effectiveness of various pollutants at different buffer widths. This data is identical to Desbonnet et al (1995) with the exception of the zero point which we added for illustrative purposes.

% Removal	**Buffer Width in Meters (ft)**			
	Sediment	TSS	Nitrogen	Phosphorus
0	0	0	0	0
50	0.5 (1.6)	2 (6.6)	3.5 (11)	5 (16)
60	2 (6.6)	6 (20)	9 (30)	12 (39)
70	7 (23)	20 (66)	23 (75)	35 (115)
80	25 (82)	60 (197)	60 (197)	85 (279)
90	90 (296)	200 (656)	150 (492)	250 (820)
99	300 (984)	700 (2297)	350 (1148)	550 (1804

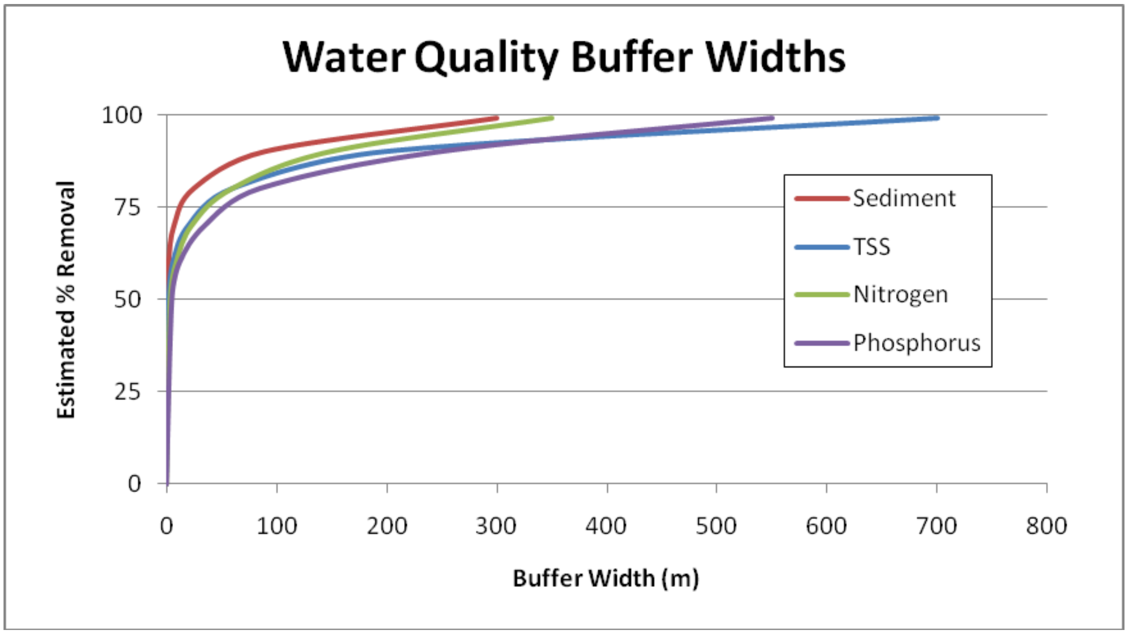

Figure 1. Contaminant removal effectiveness of four water quality parameters at various buffer widths (adapted from Desbonnet et al. 1995).

c. Conclusions and Recommendations for water quality

The literature review (see Appendix C) shows removal effectiveness as a function of buffer widths. In general, the larger the buffer, the greater its effectiveness in performing a water quality function. Long-term studies suggest that contaminant loading can increase over time (depending on the site conditions and type of contaminant), thereby reducing the overall effectiveness of the buffer.

This document focused on four major water quality contaminants that have received the most attention from researchers: nitrogen, phosphorous, total suspended solids and fine sediment. Soil characteristics, slope and vegetation cover type are the most important determinants of buffer effectiveness to protect water quality. To maximize the buffer's effectiveness to remove contaminants, the following actions are recommended in order of priority:

- Retain, restore, or enhance vegetation, particularly native vegetation.
- Manage drainage to ensure that water is moving evenly through the buffer to maximize retention time and infiltration, rather than flowing through pipes, culverts, rills, or other conveyance mechanisms. Avoid routing drainage to adjacent streams that may transect marine riparian areas.
- Avoid the use of pollutants (petroleum, toxics, pesticides, etc) in or near riparian areas.
- Avoid construction of impervious surfaces and septic tank drain fields in riparian areas.

- Manage agricultural and pasture lands to minimally disturb buffers.
- Limit or prohibit the application of pesticides and herbicides in or near riparian areas.
- Avoid disturbance (e.g., grading, compaction, removal) of native soils.

2. Fine Sediment Control

a. Technical overview: riparian influence on fine sediment control function

Riparian areas can play an important role in controlling fine sediment transport into local water bodies (fine sediments include fine-grained particles such as silt, clay, sand, and mud particles). As described previously, fine sediment plays an important role in ameliorating the effect of toxic chemicals and excessive nutrients in water quality. Fine sediment also is important in maintaining soil characteristics necessary for the growth and maintenance of riparian vegetation. However, maintaining natural erosion and sediment transport processes is critical to maintaining Puget Sound beaches and much of the sediment nourishing these beaches originates in marine riparian areas. The delivery of sediment to marine beaches is facilitated by natural driving forces (wind and wave action, bluff saturation, leading to slope failures) and it is very important to maintain these natural sediment inputs. Thus, there is a need to distinguish between "normative" sedimentation rates in marine riparian areas as opposed to human-induced changes to sediment inputs.

Fine sediments originate from a number of terrestrial sources, both natural and anthropogenic, however, the focus of this section is fine sediments originating from development, forestry, and agriculture, which can increase fine sediment delivery beyond normative rates. As used here, normative rate refers to the rate of sediment delivery in riparian areas undisturbed by human activity. Fine sediments become exposed and subject to erosion as a result of vegetation removal, excavation and compaction of soils. Once sediments are suspended in surface water, they can be delivered through run-off to adjacent waterways unless they settle out or become trapped. Undisturbed soils and vegetation in riparian areas act in concert to reduce erosion and slow the transport of fine sediment by the following mechanisms (adapted from Greenway 1987; Gray and Leiser 1992; and Gray and Sotir 1996):

- Riparian vegetation intercepts rainfall energy, helping prevent soil compaction;
- Roots and soils help bind and restrain soil particles and increase sheer strength of the soil;
- Vegetation slows surface runoff allowing for increased localized sediment deposition and decreasing off-site transport;
- Porous and permeable soils improve water absorption reducing surface flow; and
- Transpiring vegetation helps moderate soil moisture levels, which increases infiltration and decreases saturation that leads to increased surface water run-off.

Riparian vegetation can play an even more significant role in sediment and erosion control in steep areas through mechanical reinforcement of sediment via roots and stems and by modifying hydrology through soil moisture extraction (Gray and Sotir 1996). Mature plant communities can be more effective in maintaining slope stability than immature communities. Benefits of vegetation increase in areas with several layers of vegetative cover such as herbaceous growth, shrubs, and trees (Menashe 2001).

b. Key findings from buffer literature and science panel

Most studies include fine sediment control as a component of the water quality function because many contaminants adhere to sediments and increasing inputs of sediments to water bodies can be considered a water quality problem. Appendix C, Table 1 provides a summary of fine sediment control buffer recommendations reviewed for this document.

Our review suggests that:

- The range of buffer widths that met a minimum 80% effectiveness for this function was 25-91 meters (Appendix G).
- Wider buffers are needed in areas with steep slopes.
- Site specific conditions should be considered when determining buffer width (e.g. soils, vegetation type and density, upland/adjacent land uses, and loading).

Two riparian function curves (one for sediment and one for TSS) were developed for review by the science panel (Figure 2) using summary data from Desbonnet et al. (1995) (Table 2). Note that these curves were included in the water quality section. The data were selected because Desbonnet et al’s (1995) work was one of the few sources of summary data for fine sediment control at various buffer widths, and represents a number of studies at different locations and site conditions. The data show that roughly 90 percent of sediment can be effectively removed by 30-60 meters (100-200 foot) buffers and roughly 90 percent of TSS can be effectively removed by 200 meter (650 foot) buffers.

There was general consensus by panelists that function curves for sediment control are conceptually valid. Panelists ranked the importance of this function relative to other marine riparian functions as low, largely because of the differences in effects of increased sediment inputs between freshwater and marine systems. Panelists noted that maintaining natural erosion and sediment transport processes is critical to maintaining Puget Sound beaches and much of the sediment nourishing these beaches originates in marine riparian areas. Further, they noted that delivery of this sediment is facilitated by natural driving forces (wind and wave action, bluff saturation, leading to slope failures) and it is very important to maintain these natural sediment inputs. Perhaps the biggest current threat to marine riparian systems from human activity is the reduction of sediment inputs by armoring shorelines and disrupting natural erosion of bluffs.

This is in contrast to freshwater systems, where riparian areas and roads are managed to minimize human-induced fine sediment inputs which can impact habitat and water quality of freshwater streams. Thus, the panel recognized the need to distinguish between "normative" sedimentation rates in marine riparian areas as opposed to human-induced changes to sediment inputs. Further, the panel recognized marine riparian areas should provide for "normative" sediment processes while reducing potentially harmful levels of fine sediments from anthropogenic activities.

Table 2. Summary data adapted from Desbonnet et al. (1994, 1995) used to generate generalized curve for removal effectiveness of various pollutants at different buffer widths. This data is identical to Desbonnet et al (1995) with the exception of the zero point which we added for illustrative purposes. Note that this table is identical to Table 1.

% Removal	**Buffer Width in Meters (ft)**			
	Sediment	TSS	Nitrogen	Phosphorus
0	0	0	0	0
50	0.5 (1.6)	2 (6.6)	3.5 (11)	5 (16)
60	2 (6.6)	6 (20)	9 (30)	12 (39)
70	7 (23)	20 (66)	23 (75)	35 (115)
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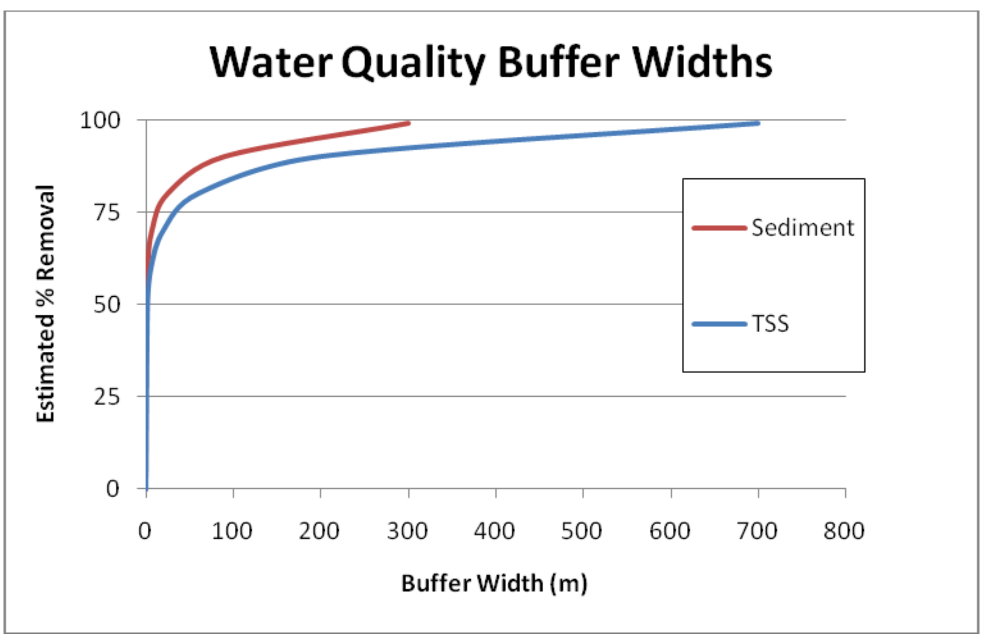

Figure 2. Sediment and total suspended sediment (TSS) removal effectiveness of two water quality parameters at various buffer widths (adapted from Desbonnet et al. 1995).

c. Conclusions and Recommendations for sediment

The literature reviewed for this document (see Appendix C) indicates a range of buffer width recommendations. In addition to buffer width, sediment transport through riparian areas is highly dependent on slope, land use, rainfall, and vegetation and soil type (Hawes and Smith 2005).

Based on the FEMAT-style figure presented in this section, to achieve 100% effectiveness of the buffer to control total suspended solids (TSS) requires a nearly 700 meter (2300 ft) buffer width, but will vary depending upon site specific conditions and fine sediment loading.

To maximize the buffer's effectiveness to control sediment transport, the following actions are recommended:

- Maintain native vegetation cover.
- Minimize soil disturbance including compaction, plowing, grading and soil removal activities.
- Manage drainage and hydrologic conditions as described for other water quality functions.

3. Shade/Microclimate

a. Technical overview: riparian vegetation influence on shade function

Riparian areas can have microclimates that differ from upland areas and which influence physical and biological conditions at a local scale. Marine riparian areas are strongly influenced by marine water temperatures during both summer and winter months (warmer in the winter and cooler in the summer than upland areas). Living riparian (overstory trees, understory shrubs, and ground) vegetation, in turn, can intercept solar inputs and affect microclimate conditions such as soil and ambient air temperature, soil moisture, wind speeds, and humidity (FEMAT 1993; Knutson and Naef 1997; May 2003; Parkyn 2004). Terrestrial and aquatic microclimates are influenced by shade, and temperature fluctuations that can negatively impact both aquatic and terrestrial organisms, particularly those that can only survive within a relatively narrow range of temperature and moisture conditions.

Solar radiation has long been considered an important limiting factor for organisms in the upper intertidal zone of marine environments. Solar radiation affects distribution, abundance, and species composition (e.g., Ricketts and Calvin 1968; Connell 1972). Although research is limited, studies have quantified the influence of shade on marine organisms such as surf smelt (eggs) and talitrids (amphipods) on Puget Sound beaches. In their literature review of causes of spatial and temporal patterns in intertidal communities, Foster et al. (1986) found that desiccation is the most commonly reported factor responsible for setting the upper elevational limits of survival for intertidal animals. More recent studies (Pentilla 2001; Rice 2006) showed that a lack of shade on surf smelt spawning beaches results in higher temperatures, drier conditions, and increased egg mortality.

b. Key findings from buffer literature and science panel

Recommended buffer widths for the shade function in forested riparian areas include a range of values. Appendix C, Table 3 provides a summary of shade buffer recommendations that were derived from seven review documents and other literature.

Our review suggests that the range of buffer widths that met a minimum 80% effectiveness for this function was 17-38 meters (56 – 125 ft; Appendix G).

The FEMAT curve was selected to represent the shade function because it was the only data that depicted shade effectiveness as a continuous function of forested riparian buffer width. The values in Table 3 generally agree with values provided by other riparian review and synthesis reports. One method for comparing different recommendations among authors is to describe the buffer width at a given effectiveness level, such as 80 %. For example, the FEMAT curve suggests approximately 80 percent effectiveness at about 37 meters. Other recommendations for achieving 80 percent effectiveness include Wenger (1999) (10-30 meters); Castelle et al. (1992): (30 meter minimum); May (2000): (30 meter minimum); and Knutson and Naef (1997) (11-46 meters to achieve 50-80 percent (Table 3).

Science panelists agreed that shade is an important function for a number of organisms in the upper intertidal areas during low tide (when exposed upper intertidal areas are subject to heating; see above). On the other hand shade in marine environments is potentially less important in moderating water temperature than shade in freshwater systems. Puget Sound water temperatures as a whole are unlikely to be affected much by shade cast by riparian vegetation, given the mass of water and the exchange rates with water from the Pacific Ocean, primarily through tidal actions. Further, shade from riparian areas is likely to cover only a small fraction of the upper intertidal area given the shallow gradients on many beaches and mudflats. Panelists noted that while increases in solar radiation due to loss of riparian shade could warm shallow intertidal waters, particularly pocket estuaries, the amount of warming and effects on biota have not been quantified.

Table 3. Data used to create generalized curve in Figure 3 indicating percent of riparian shade function occurring within varying distances from the edge of a forest stand (adapted from FEMAT 1993).

Effectiveness (%)	Buffer Width (SPTH)	Buffer Width SPTH m (ft)
0	0.00	0 (0)
10	0.07	4 (14)
20	0.15	9 (30)
30	0.22	13 (44)
40	0.29	18 (58)
50	0.36	22 (72)
60	0.42	26 (84)
70	0.50	31 (100)
80	0.60	37 (122)
90	0.73	45 (146)
93	0.80	49 (160)
95	1.00	61 (200)

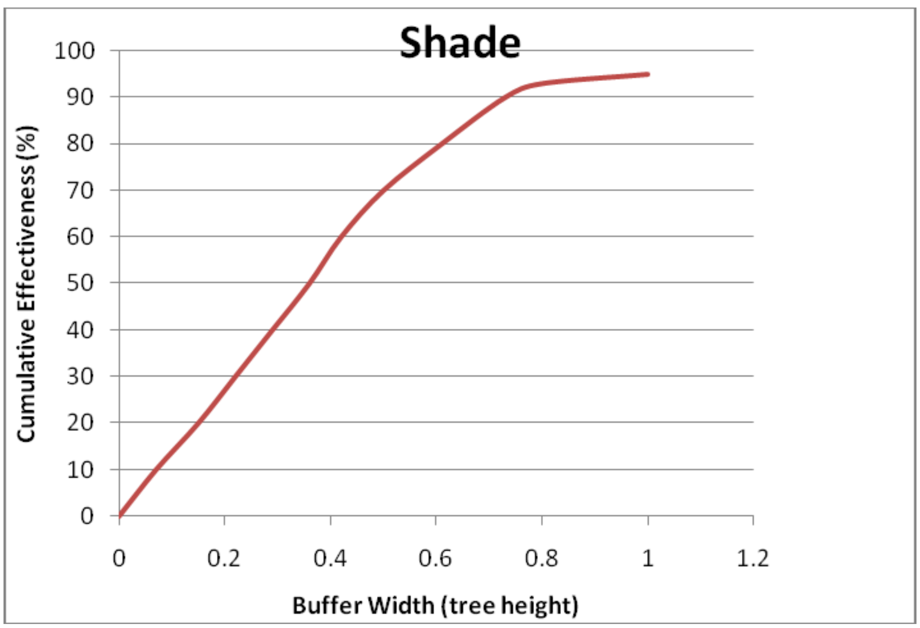

Figure 3. Generalized curve indicating percent effectiveness of riparian shade occurring within varying distances from the edge of a forest stand. Tree height (SPTH) is used to indicate buffer width where one SPTH = 61 meters (200 ft) (adapted from FEMAT 1993).

c. Conclusions and Recommendations

The literature review (see Appendix C) indicates a range of buffer width recommendations for protecting the shade function. Based on the FEMAT curve reported in this section of the report, approximately 1 SPTH (estimated at 61 meters or 200 ft) will provide nearly 100 percent effectiveness of the buffer to protect the intertidal from desiccation, elevated temperatures, and other shade-related functions. Of course, in nonforested community types (e.g., prairie and grasslands) the shade function from overstory trees may be unattainable.

To maximize the buffer's effectiveness to provide the shade function, the following actions are recommended:

- Avoid disturbance to native vegetation in riparian areas, especially nearer the water's edge.
- Retain, restore, and enhance mature trees and a multi-layered canopy and understory of native vegetation at sites that support these types of plant communities.
- Ensure that riparian areas can be maintained in mature, native vegetation through time.
- Prevent modifications to banks and bluffs (e.g., armoring) that could disrupt natural processes (such as soil creep, development of backshore and overhanging vegetation, recruitment of wood and other organic matter to riparian area including beaches and banks.)
- Prohibit cutting and topping of trees and avoid "limbing" (selective branch cutting to enhance views) of trees for view corridors and other purposes within buffers.

4. Large Woody Debris

a. Technical overview: riparian influence on large woody debris function

Forested riparian areas are a significant source of large woody debris (LWD) in freshwater systems (Harmon et al. 1986; Sedell et al. 1988; Bilby and Bisson 1998; Hyatt and Naiman 2001). In marine environments, LWD (also known as 'driftwood') originates from both freshwater and marine riparian sources. Marine riparian areas contribute LWD to shorelines through natural recruitment processes, including windstorms, fires, wave action, and landslides (NRC 1996). Most of Puget Sound's bluffs are naturally unstable and landslides are a common occurrence throughout the region (Johannessen and MacLennan 2007).

Large woody debris provides numerous benefits to shorelines and riparian areas including:

- Moderation of local water temperature and soil moisture;
- Accumulation of detritus serving as a food source and habitat for invertebrates;
- Support of terrestrial vegetation (such as nurse logs);
- Structural complexity that provides habitat for fish and wildlife;
- Sediment trapping and bank erosion control.

Recent research in the Puget Sound region has shown that marine LWD serves similar functions including provision of structural complexity; moderation of local water and soil temperatures; and habitat creation. An overview of the marine research by topic area follows.

LWD and Substrate Temperature: Several studies conducted in Puget Sound have shown that LWD has a significant effect on substrate temperatures (Higgens et al. 2005; Rice 2006; Tonnes

2008). For example, in a study conducted in north Puget Sound, Tonnes (2008) found that mean sediment surface temperatures under LWD on accretionary beaches were 7.7° C cooler than beach sediments lacking LWD. Mean surface temperatures under driftwood on bluff-backed beaches were 2.4° C cooler than nearby sediment. LWD influences sediment temperatures below the surface. Mean temperatures were cooler at depths of 5 centimeters and 15 centimeters under LWD on both accretionary and bluff-backed beaches (Tonnes 2008).

Detritus: Driftwood accumulates detritus from both marine and upland sources, which is consumed by invertebrates, birds and other organisms (Polis and Hurd 1996; Pank 1997; Dugan et al. 2003; Rodil et al 2008).

Invertebrate biomass: Detritus entrained in driftwood has been linked with increased invertebrate biomass which, in turn, supports higher level prey for species such as shorebirds. Amphipods (Talitridae) are the most abundant macroinvertebrate on Puget Sound beaches. In a study of north Puget Sound beaches, Tonnes (2008) found that amphipods represent the predominant biomass of invertebrates within the supratidal zone (e.g. within driftwood). Amphipods are strongly associated with driftwood, where they find refuge from predators, favorable temperature and moisture conditions, and organic matter for consumption. Higher densities of amphipods have been found associated with wood than bare sediment.

Structural support: Marine LWD also provides structural support for vegetation similar to nurse logs in upland settings. In a survey of >1 meter (3.28 ft) diameter wood along 3.9 kilometers (2.3 miles) of Puget Sound beaches, Tonnes (2008) found that 71 percent supported at least one species of terrestrial vegetation. In addition, large wood supported a mean of 2.4 species of vegetation with up to 11 species on a single log. Backshore areas can be relatively dry, exposed and nutrient deficient, and driftwood may play an important role in providing structural stability, moisture and nutrients for establishment of other plant species.

Habitat: Increased vegetation provided by driftwood also increases primary productivity and increases structural complexity for fish and wildlife. May et al. (1997) found wood to be one of the most important factor in determining habitat for salmonids in fresh water systems. Driftwood embedded in beach berms and/or at the toe of banks helps dissipate wave energy and retain sediments that, collectively, act to buffer the effects of storm waves and longshore currents by moderating or reducing bank erosion. It also provides potential roosting, nesting, refuge and foraging opportunities for wildlife; foraging, refuge and spawning substrate for fish; and foraging refuge, spawning attachment substrate for aquatic invertebrates and algae.

b. Key findings from buffer literature and science panel

Numerous studies have investigated the role of riparian areas in providing LWD to adjacent water bodies. Appendix C, Table 4 provides a summary of LWD buffer recommendations that were derived from seven review documents and other research. Most studies find that LWD originates from within one site potential tree height of the riparian area, although steeper slopes may provide LWD from greater distances. Establishing appropriate buffers to maintain the LWD function must therefore account for processes affecting the potential for the land-water interface to change through time such as sea level rise.

A number of studies and reviews of riparian buffers note that, in addition to considering the benefits of LWD in adjacent water bodies, it is important to consider LWD benefits within the terrestrial environment, specifically for its contribution of ecological functions e.g., nurse logs, habitat, nutrient recycling, and helping maintain soil moisture. Appendix C, Table 1 provides a summary of fine sediment control buffer recommendations reviewed for this document.

Our review suggests that:

- The range of buffer widths that met a minimum 80% effectiveness for this function was 17-38 meters (Appendix G).
- Buffer width effectiveness is strongly influenced by site conditions (such as slope) and potential height of mature trees.

The curve adapted from FEMAT (1993) (Appendix D) generally agree with values provided by other riparian review and synthesis reports. The FEMAT curve reveals approximately 80% effectiveness at about 40 meters; the science panel generally agreed that the curve is conceptually valid.

Table 4. Approximated data used to create generalized curve (Figure 4) indicating percent of LWD recruitment function occurring within varying distances from the edge of a forest stand (adapted from FEMAT 1993).

Effectiveness (%)	Buffer Width (SPTH)	Buffer Width m (ft)
0	0.00	0 (0)
10	0.07	4 (14)
20	0.15	9 (30)
30	0.22	13 (44)
40	0.29	18 (58)
50	0.36	22 (72)
60	0.42	26 (84)
70	0.50	31 (100)
80	0.61	37 (122)
90	0.73	45 (146)
93	0.80	49 (160)
95	1.00	61 (200)

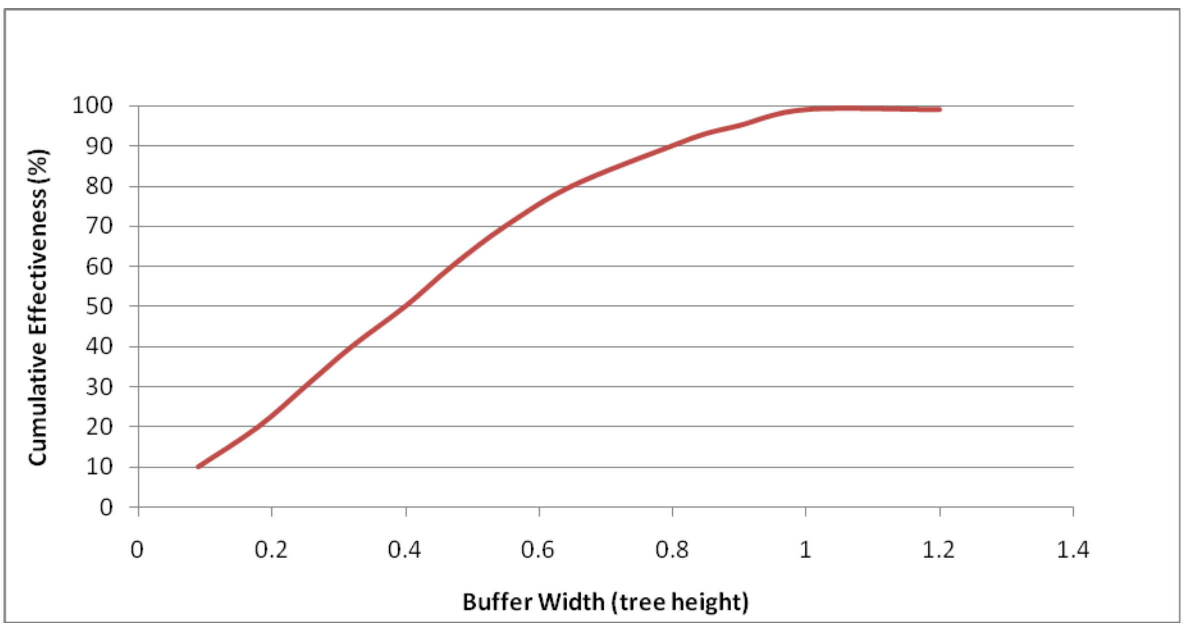

Figure 4. Generalized curve indicating percent effectiveness of LWD recruitment from riparian areas occurring within varying distances from the edge of a forest stand. Tree height (SPTH) is used to indicate buffer width. One SPTH = 61 meters (200 ft) (adapted from FEMAT 1993).

c. Conclusion and Recommendations

The literature reviewed for this document (see Appendix C) indicates a range of buffer width recommendations for protecting the LWD function. Buffer width effectiveness is strongly influenced by site conditions (such as slope, vegetation type and age structure, and natural disturbance regimes).

There are a range of buffer widths for achieving high levels of effectiveness based on the literature in Appendix C ranging from 10 to 130 m (33 – 427 ft). The FEMAT (1993) riparian function curve indicates 100 percent effectiveness of the LWD function at approximately 60 meters (200 ft).

To maximize the buffer's effectiveness to provide the LWD function, the following actions are recommended:

- Avoid human disturbance in riparian areas.
- Allow for the accrual of drift wood and other upland sources of LWD on beaches and shorelines.
- Protect, restore, and enhance marine riparian trees to help ensure a long-term source of LWD.
- Provide buffers that allow for long-term source and recruitment of trees (LWD) as shorelines retreat, or as a result of soil creep and landslides, and increasing sea levels.

5. Litter Fall/Organic Matter

a. Technical overview, riparian influence on litter fall/input of organic matter

Riparian vegetation provides litter that serves as habitat and food for fishes and aquatic invertebrates (Adamus et al. 1991; Levings and Jamieson 2001; Vigil 2003; Lavelle et al. 2005) and influences the amount and type of terrestrial invertebrates that fall into aquatic systems. Terrestrial invertebrates serve as a major food source for fishes (including salmon) birds, mammals, reptiles, and amphibians. Terrestrial insects have recently been shown to be a large component of the diet of juvenile salmonids residing in nearshore waters of Puget Sound. In addition, some fish and invertebrates feed directly on vegetative detritus (McClain et al. 1998; King County DNR 2001; NRC 2002; Vigil 2003; Brennan et al 2004; Lavelle et al. 2005; Fresh 2007; Duffy et al *in review*). Nutrient exchange occurs in two directions from the terrestrial to aquatic systems and vice versa. Examples of nutrient-energy exchange (marine to terrestrial and terrestrial to marine) include:

1. Atmospheric input via wet or dry deposition, which can occur through fires, intensive farming and agricultural activities, and wind erosion (Lavelle et al. 2005).
2. Lateral transfers of nutrients through tidal and wave action, including microalgae and macroalgae washed ashore (Adamus et al. 1991).

3. Decomposing secondary consumers, such as juvenile Pacific herring, Pacific sand lance, longfin smelt, surf smelt, sole, salmon, seabirds, and marine mammals, which also contribute nutrients. For example, Pacific salmon nutrients are deposited by predators and scavengers in excreta, or as carcasses and skeletons (Cederholm et al. 1999; Naiman et al. 2002; Drake et al. 2006).
4. Secondary consumers can transport nutrients to upland areas, facilitating nutrient and energy exchange between terrestrial and aquatic food webs (Ballinger and Lake 2006). For example, Elliott et al. (2003) examined the relationship between bald eagles and Plainfish Midshipman, a demersal fish and intertidal spawner. Between May and June of 2001, the authors found that eagles consumed about 22,700 ± 3,400 midshipman, representing large transfers of nitrogen into upland areas, and the potential to enhance community productivity along the shoreline.

b. Key findings from buffer literature and science panel

A number of references identify the contributions of organic matter (e.g., forest litter, terrestrial insects, woody debris) and food web linkages between freshwater and marine riparian areas and adjacent water bodies (Appendix C, Table 5). Most studies conclude that the delivery of leaf and other organic matter declines at greater distances away from the water's edge, and that most contributions are made within 30-60 meters (100-200 ft) of the shoreline. Appendix C, Table 5 provides a summary of litter fall buffer recommendations that were derived from seven review documents and other research.

Our review suggests that:

- The range of buffer widths that met a minimum 80% effectiveness for this function was 17-38 meters (Appendix G).
- Most litter contributions are made within 30-60 meters (100-200 ft) of the shoreline.
- As in fresh water riparian systems, the delivery of leaf and other organic matter delivered to the marine intertidal areas declines with distance away from the water's edge.

A riparian function curve for litter fall was adapted from the original FEMAT curve (Appendix D). The FEMAT curve reveals approximately 80 percent effectiveness at about 25 meters. The science panel generally accepted that the litter fall curve is a valid representation of marine riparian environments. Panelists also generally agreed that riparian areas are likely to produce insects that fall into the adjacent waters

Table 5. Approximated values for cumulative effectiveness of buffer width for litter fall/organic matter inputs used to create Figure 5, based on the original FEMAT curve.

Effectiveness (%)	Buffer Width (SPTH)	Buffer Width m (ft)
0	0	0
10	0.04	2.4 (8)
20	0.08	4.9 (16)
30	0.12	7.3 (24)
40	0.17	10.3 (34)
50	0.22	13.4 (44)
60	0.27	16.5 (54)
70	0.33	20.0 (66)
80	0.40	24.4 (80)
90	0.50	30.5 (100)
95	0.65	40.0 (130)
98	0.90	55.0 (180)

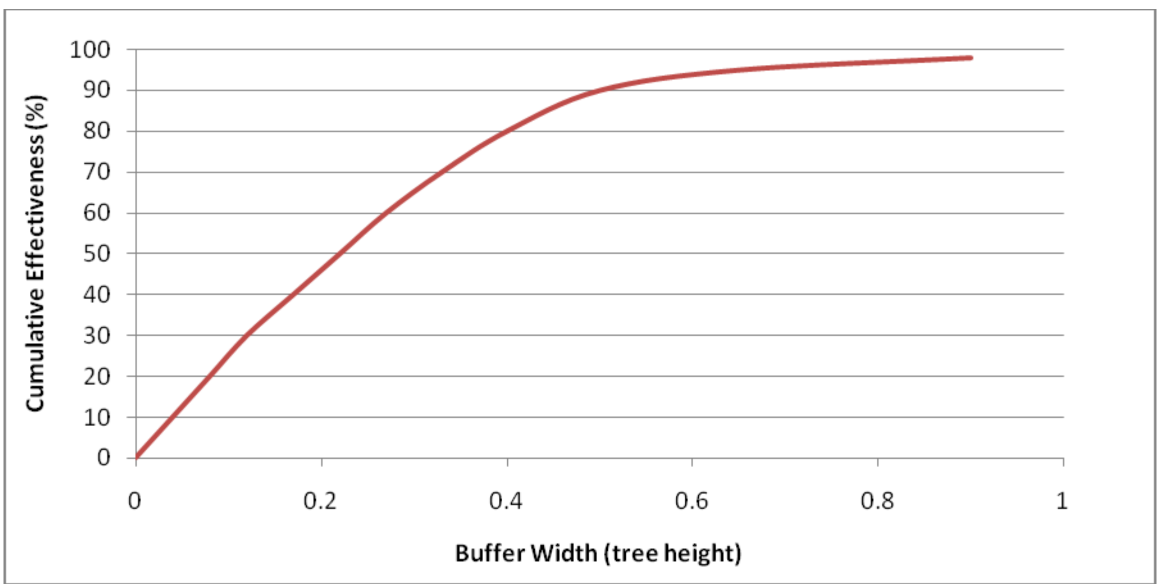

Figure 5. Effectiveness of riparian litter fall/organic matter input as a function of distances from the water's edge (adapted from FEMAT 1993) where one site potential tree height is approximately 60 meters or 200 ft.

c. Conclusion and Recommendations for litter fall/organic matter inputs

The literature reviewed for this document (see Appendix C) indicates a range of buffer widths to achieve this function. In addition, the function curve derived from FEMAT indicates that approximately 100 percent of the litter fall function is achieved at 60 meter (200 ft).

To maximize the riparian function for litter fall/organic matter inputs the following actions are recommended:

- Maintain native riparian vegetation in the riparian area.
- Avoid human disturbance to vegetation.
- Allow for natural succession of plant communities and maintain sources and accumulations of organic matter within riparian areas and on beaches.

6. Hydrology/Slope Stability

a. Technical overview: riparian influence on hydrology/slope stability function

The role of vegetation in protecting hydrologic processes and slope stability is well documented. The information generally falls into two areas: research focusing on the impacts of sediment inputs to streams and wetlands; and research focused on protecting human infrastructure from anthropogenic disturbances such as logging, agriculture and development.

Sidle et al. (1985) found that tree and shrub root strength contributes to slope stability, and loss of root strength following tree death or removal may lead to increased incidence of erosion and slides. Vegetation also helps lengthen the residence time of soil moisture by decreasing runoff volume and velocity. This in turn can increase filtration and soil retention potential (Evans et al. 1996; Klapproth and Johnson 2000; Ducros and Joyce 2003) and slope stability (Williams and Thom 2001).

Vegetation plays an important role in affecting hydrologic processes and slope stability in the following ways (adapted from Gray and Leiser 1982):

Interception: Foliage and plant litter absorb the energy of precipitation, reducing direct impacts on soil.

Restraint: Root systems bind soil particles and blocks of soils, and filter sediment out of runoff.

Retardation: Plants and litter increase surface roughness, and reduce runoff volume and velocity, thereby reducing channelization.

Infiltration: Roots and plant litter help maintain soil porosity and permeability.

Transpiration: Plants absorb moisture, delaying the onset of soil saturation and surface runoff.

Root Reinforcement: Roots mechanically reinforce soil by transferring shear stresses in the soil to tensile resistance in the roots.

Soil Moisture Depletion: Interception of raindrops by foliage and evapotranspiration limit buildup of soil moisture.

Buttressing and Arching: Tree trunks can act as buttress piles or arch abutments in a slope, counteracting shear stresses.

Surcharge: The weight of vegetation on a slope may exert a destabilizing down slope stress and a stress component perpendicular to the slope that increases resistance to sliding.

Root wedging: Roots invade cracks and fissures in soil or rock that could add restraint stability or cause local instability by wedging action.

Wind throw: Strong winds cause trees to blow down that can disturb slope soils

Soil saturation strongly influences erosion potential on a slope. The more water that can be intercepted, absorbed, or otherwise controlled by vegetation, the greater the slope stability. Soil composition and slope geometry (slope height and angle) are also major factors determining slope stability. Studies have shown that decreasing vegetation cover results in increased soil saturation and slope failure during rainfall events. Some slope failures are unrelated to vegetation cover, usually as a result of unusually high precipitation, undercutting, strong winds, or other factors. However, in studies of slope failures in urbanized areas such as Seattle, over 80 percent of slope failures were attributed to human influence such as vegetation removal and poor drainage management (Tubbs 1975; Laprade et al. 2000).

b. Key findings from buffer literature and science panel

None of the buffer research reviewed for this paper provided buffer recommendations for maintaining slope stability and natural hydrologic processes see Appendix C, Table 6). However, two documents include some analysis that could be helpful in determining buffer widths to protect hydrologic functions. Knutson and Naef (1997) include relevant discussion regarding erosion control. Additionally, FEMAT (1993) identified the relationship of tree root strength to slope stability and provides a generalized effectiveness curve for root strength.

Since a riparian function curve for hydrology and slope stability was not found in the literature, data from Griggs et al 1992 as cited in Macdonald and Witek (1994) were used to describe setbacks on bluffs or other unstable slopes to protect against property loss. The minimum setbacks for different bluff heights and various levels of stability are illustrated in Table 6 and Figure 6. These setbacks do not account for ecological functions but rather focus solely on protection against property loss. The FEMAT curve developed for this function is estimated based on extent of root systems adjacent to a slide scar margin, or “soil stabilizing zone of influence” (equal to slide scar width plus half a tree crown diameter). Such information is not easily interpreted into a buffer width or under the variable site conditions existing on marine shorelines. It appears that neither FEMAT (1993) nor other literature makes buffer recommendations. Much of the shoreline in Puget Sound is composed of bluff-backed beaches, which are naturally eroding. Buffers should be based on site-specific slope conditions, with steeper slopes having wider buffers. This approach is similar to establishing stream buffers from the outside edge of the 100-year floodplain. However, the variability and multitude of factors that need to be considered in determining slope stability in the marine shoreline make it difficult to develop specific buffer width recommendations for this function. We offer information from Griggs et al 1992 as a way of conceptualizing the idea of maintaining riparian function on unstable slopes.

All science panel members agreed that the hydrology/slope stability curve developed with data from Griggs et al. 1992 as cited in Macdonald and Witek (1994) is applicable in the marine environment. Panelists discussed the importance of hydrology, geomorphology, soil type, and vegetation type in supporting slope stability functions in Puget Sound, in addition to the human safety concerns about slope stability in the region.

Geomorphology

- Landforms and geology can be more important here than buffer width. For example, in the San Juan Islands, there can be a 45° slope on basalt form that can be very stable.
- Geomorphic shore form is an important consideration – geologic legacy, landscape position, density, slope, etc. Use of Shipman (2008) geomorphic classification system may be useful (Appendix F).

Soil and Vegetation

- Riparian areas can increase slope stability (through root structure) and increase water interception and absorption. Protecting natural rates of sediment delivery and protecting processes and functions of nearshore ecosystems may be achieved by establishing and maintaining adequate riparian buffers.
- Upslope alterations can be contributing factors to slope instability.
- It is important to consider flow paths; for example, slope stability may be associated more with altered upland drainage patterns or precipitation patterns. Buffer width versus landform may be the most important factor. For example, steeper slopes, particularly those with underlying geologic instability, require wider buffers.

Table 6. Setback distances (in ft) from Griggs et al 1992 as cited in Macdonald and Witek (1994) for different bluff heights at various levels of stability where geologic stability for 50-years cannot be demonstrated.

Bluff Height (ft)	**Stable (1:1)(45^0)**	**Moderately Stable (2:1)(30^0)**	**Unstable (1:1)(45^0)+ (2:1)(30^0)**
20	20	40	60
40	40	80	120
60	60	120	180
80	80	160	240
100	100	200	300
120	120	240	360
140	140	280	420
160	160	320	480
180	180	360	540
200	200	400	600

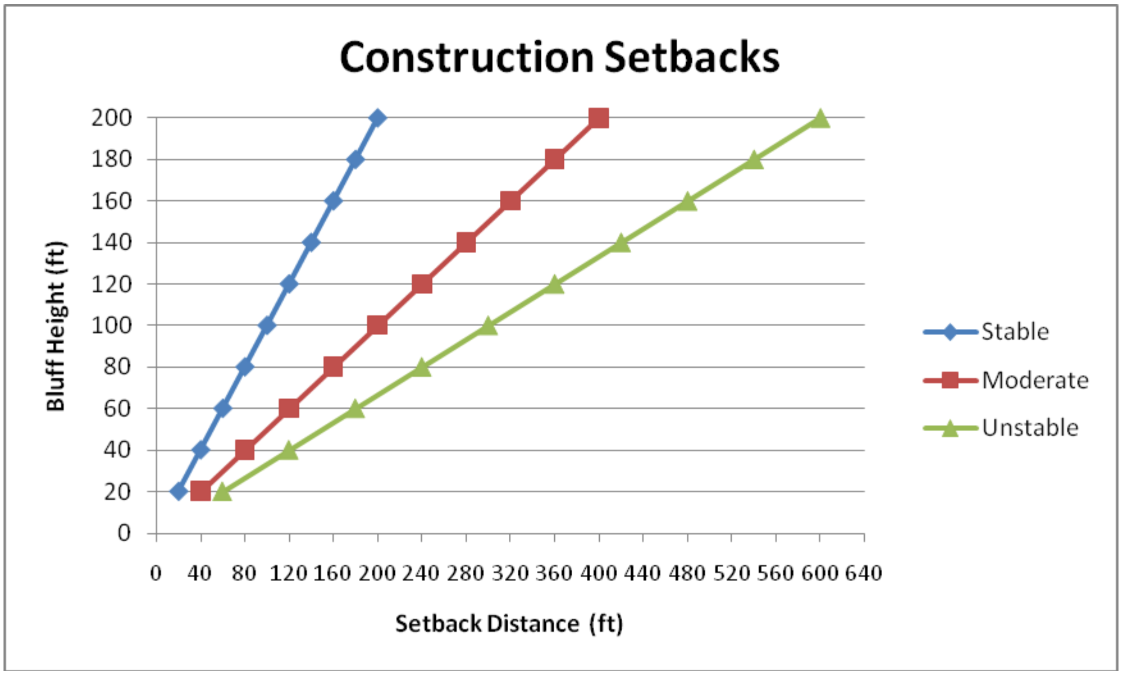

Figure 6. Construction setbacks for different bluff heights at various levels of stability, where geologic stability for 50-years cannot be demonstrated (after Griggs et al 1992 as cited in Macdonald and Witek 1994).

c. Conclusion and Recommendations

No riparian function curve was developed for this section, due to the high variability of site specific conditions that may be encountered and the lack of summary data that could be generally applied.

To maximize the buffer's effectiveness to maintain hydrologic functions and slope stability, the following actions are recommended:

- Avoid development near naturally eroding bluffs.
- Avoid engineering approaches that encroach on buffers to create more stable slope conditions.
- Avoid impervious surfaces and compacted soils.
- Maintain riparian vegetation especially on steep slopes to prevent excessive erosion and allow for evapotranspiration.
- Avoid 'loading' of bluffs whereby excessive moisture (from irrigation, septic fields, impervious surfaces, and other sources of water) can exacerbate the instability and erosion potential of the site.

7. Fish and Wildlife Habitat

a. Technical overview, riparian influence on wildlife function

Provision of wildlife habitat has been well documented for freshwater riparian systems (e.g., Knutson and Naef 1997; Cederholm et al 2000; NRC 2002, Buchanan et al. 2001). Riparian areas provide the resources and structure to meet important life history requirements such as feeding, roosting, breeding, refuge, migration corridors and clean water for a variety of wildlife species. Knutson and Naef (1997) report that riparian areas contribute to the high productivity and species diversity in aquatic and upland areas.

The wildlife function of marine riparian areas is not well documented, although Buchanan et al. (2001) Brennan and Culverwell (2004) described a wide variety of fish and wildlife associations for marine riparian areas of Puget Sound. Wildlife species have adapted to the natural processes, structure, and functions of marine riparian areas and have also played an important role in shaping the structure and character of riparian areas. For example, many birds and mammals that breed and rear in upland areas forage in intertidal areas. Thus, these species provide marine derived nutrients to uplands in the form of feces and carcasses. These marine derived nutrients play an important role in forest ecosystem health (Cederholm et al 2000).

b. Key findings from buffer literature and science panel

A number of studies have examined the role of riparian buffers in supporting wildlife. All studies reviewed for this document report that marine riparian areas function as important wildlife habitat. Appendix C, Table 7 provides a summary of wildlife buffer recommendations that were derived from seven review documents and other research.

Our review suggests that buffer requirements for fish and wildlife depend on different species' individual habitat requirements and may be influenced by season, upland habitat quality and connectivity with other habitat areas.

The science panel generally agreed that marine riparian areas provide habitat for many wildlife species. Some participants pointed out that without buffers, numerous species would not utilize marine nearshore areas or cross onto beaches from upland areas. Perhaps more importantly, riparian buffers and other nearby relatively undisturbed areas provide habitat for riparian obligates (i.e., those that require habitat in close proximity to water bodies such as great blue heron). All panel members agreed that marine riparian areas provide a suite of important services for wildlife. Pertinent information from that discussion follows.

> ***Obligate/Optimal Use Species:*** The science panel was uncertain if obligate species in Puget Sound's marine riparian areas had been identified (but see Buchanan et al. 2001). They suggested that most wildlife in marine riparian areas are probably generalists in their habitat use, and the marine riparian environment supports a number of important functions and processes that create and maintain wildlife habitat. Larger buffers would increase the number of wildlife species using the area and benefit animals with larger home ranges.
>
> ***Invasive species*** within riparian areas may reduce buffer effectiveness. Buffers can harbor nuisance wildlife species which is a cause for concern with respect to local wildlife and human populations.

c. Conclusion and Recommendations

The literature (see Appendix C) provides a range of buffer width recommendations, although few report 100 percent effectiveness. Relative to the other riparian functions discussed in this guidance document, wildlife needs are widely variable.

The ability to recommend a buffer width that would provide 100 percent effectiveness for wildlife is limited at this time because inventories of marine riparian wildlife species and their habitat requirements are lacking. Based on the literature surveyed for this guidance document, a buffer width greater than 200 meters (660 ft) will protect some wildlife habitat functions. Buffer requirements for fish and wildlife depend on the species' individual requirements and these may change or be influenced by season, upland habitat quality and connectivity with other habitat areas. To maximize the buffer's effectiveness to support wildlife, the following actions are recommended:

- Ensure that wildlife habitat connectivity is maximized though maintenance of riparian corridors.
- Ensure native vegetation diversity is maintained (both species composition and age structure) along buffers to offer maximum habitat opportunities to the broadest range of species.
- Allow for natural disturbances such as floods, wind throw and landslides to provide snags, LWD and other complex habitat structural features in the buffer.
- Understand which local species use marine riparian areas by consulting with WDFW Priority Habitat and Species lists or other sources so that buffers can be designed with those species' habitat needs in mind.

Section V. Impacts to Marine Riparian Functions

1. Introduction

Riparian and aquatic ecosystems are currently being altered, impacted, or destroyed at a greater rate than at any time in history (Good et al. 1998). Although no comprehensive study has been conducted to document the rate and extent of marine riparian loss across the Puget Sound basin over time, three studies conducted between 1980 and 2006 provide some perspective on the region's riparian losses. Bortelson et al. (1980 *in* Levings and Thom 1994) studied eleven major river deltas in Washington and documented a 76 percent loss in tidal marshes and riparian habitat during the preceding century. The major losses were within highly developed estuaries including the Puyallup and Duwamish River deltas (Bortelson et al. 1980 *in* Levings and Thom 1994). In 1995, scientists with the Puget Sound Assessment and Monitoring Program (PSAMP) found that approximately 33 percent (or 800 miles) of Puget Sound shoreline had been physically altered by bulkheads, docks, or other structures. These structures typically impact riparian areas through vegetation removal, soil removal and compaction. MacLennan and Johannessen (2008) conducted geographically-focused research in the San Juan Islands and found an average 25% loss of marine riparian forest cover on San Juan, Orcas, Lopez and Stuart islands between 1977 and 2006.

Impacts to riparian function from activities associated with development, agriculture and forestry are well documented in the literature and are summarized in Appendix E, Tables 1-2. As described in Section IV, the level of disturbance to riparian soils and vegetation are key factors determining riparian function. A more detailed description of each of these activities and its impact on riparian function is included in the next three sections.

2. Development

Modern development along marine shorelines usually involves the removal of native vegetation, topsoil and organic matter and the compaction of soils which result from clearing and grading, construction of buildings, pavement, and roads. Additional impacts include the introduction of nonnative plant species associated with landscaping. Loss of natural vegetation in riparian and stream habitats in developed areas is usually permanent, (Booth 1991 *in* Knutson and Naef 1997) and activities associated with development impact all riparian functions (See Appendix E, Tables 1-2). Thus riparian areas are more highly altered in developed landscapes than in agricultural and forested landscapes on a per acre basis (Booth 1991 *in* Everest and Reeves 2006) although agriculture and forestry typically occur over a larger proportion of the landscape than develop areas do. Below we provide a summary of literature addressing development activities and their impacts on riparian function.

a. Water quality

Development activities within riparian areas can affect water quality. Alteration within the riparian areas causes “changes in loading of nutrients, organic matter, and sediments (Valiela et al. 1992; Wahl et al. 1997; Jones et al. 2000; Jordan et al. 2003); increased loading of contaminants and pathogens (Siewicki 1997; Inglis and Kross 2000; Mallin et al. 2000); and changes in water flow (Hopkinson and Vallino 1995; Jones et al. 2000)” (*in* Hale et al. 2004). The shoreline and upland development of residential, business, and industrial facilities and utilities can result in altered topography, removal of vegetation, soil compaction and grading, and rerouting of surface and groundwater flows (Knutson and Naef 1997; NRC 2002; Ekness and Randhir 2007; Schiff and Benoit 2007). In general, habitat alteration and development creates impervious surfaces, which prevents water from infiltrating into the ground and thus the ability of soil to intercept toxic substances; increases the volume of surface water; increases the magnitude of local flooding (Montgomery et al. 2000 *in* Johannessen and MacLennan 2007); and increases flooding potential (Glasoe and Christy 2005).

b. Fine sediment control

Development impacts to the fine sediment/erosion control function of riparian areas are well documented. Concentration/ channelization of surface runoff can lead to increased soil erosion along and downslope of the path of concentrated flow. Clearing of land for development produces the largest amount of sediment to aquatic resources (U.S. EPA 1993 *in* Stanley et al. 2005), and developed areas can produce 50-100 times more sediment than agricultural areas (Jones and Gordon 2000 *in* Stanley et al. 2005) on a per acre basis. Direct alteration of soils and vegetation within riparian areas can change nutrient loading rates, amounts and types of organic matter, and sediment dynamics (Valiela et al. 1992; Wahl et al. 1997; Jones et al. 2000; Jordan et al. 2003 *in* Hale et al. 2004). In sloped areas, these activities can also result in higher frequencies of slope failure, a relationship demonstrated through many field and laboratory studies (Gray and Sotir 1996; OSB 2007). Permanent loss of vegetative cover increases soil saturation and surface water runoff, causing increased loading of fine sediments. While undisturbed mature native vegetation on slopes provides erosion control and slope stabilization benefits, disturbed or degraded sites can undergo continual erosion, which may hinder the development of effective vegetation cover. Competition by invasive, exotic plants, such as Himalayan blackberry, can also retard or preclude natural establishment of “effective” vegetation (Menashe 2001).

c. Shade/microclimate

The shade function of riparian areas is affected by many activities in the riparian area, particularly those occurring near the water’s edge. Vegetation removal can decrease shade (Macdonald et al. 1994; Thom et al. 1994; Macdonald 1995; Penttila 1996; Williams and Thom 2001) and increase water and beach substrate temperatures (Beschta et al. 1987; Williams and Thom 2001; Bereitschaft 2007). Rice (2006) and Sobocinski et al. (2003) demonstrated that shoreline modifications (such as boat ramps, bulkheads, roads, and parking lots) that involve vegetation removal close to the water’s edge not only reduce shade but also lower species diversity and abundance. Maintaining native vegetation in the form of mature trees in riparian areas can provide more shade than low-lying shrubs and grasses. Decreased shade, via removal of trees can result in increased egg mortality of beach-spawning forage fishes (Pentilla 2001; Rice 2006) and reductions in diversity and abundance of invertebrate species, as well as loss of habitat structure that supports climate sensitive species (Sobocinski et al. 2003; Brennan and Culverwell 2004; Tonnes 2008).

d. Large Woody Debris (LWD)

The reduced supply of LWD to nearshore ecosystems from marine riparian areas is largely the result of historic activities; however, impacts from ongoing development activities also affect this riparian function. Activities linked to development that affect marine LWD provision include tree removal for development within riparian areas (including shoreline armoring); wood removal (e.g., for fire fuel, landscaping, artwork, furniture); controlled and uncontrolled beach fires; salvage logging; drift log removal from open water; and vegetation removal.

Shoreline armoring can reduce or eliminate the upper intertidal and supratidal zones. This is turn may mobilize LWD and prevent it from settling on the shore. Low levels of LWD have been found on armored beaches compared to unaltered beaches (Sobocinski et al. 2003; Higgins et al. 2005; Dugan and Hubbard 2006; Defeo et al. 2009). Changes in wood abundance and elevated beach temperatures have been documented in several studies around Puget Sound (Higgins et al. 2005; Rice 2006; Tonnes 2008).

e. Litter fall/organic matter inputs

Alteration of riparian habitats can cause changes in nutrient loading, organic matter, and sediments (Valiela et al. 1992; Wahl et al. 1997; Jones et al. 2000; Jordan et al. 2003 *in* Hale et al. 2004). In freshwater systems, dams and other water control structures have caused changes in nutrient cycling (Knutson and Naef 1997) through vegetation removal and soil compaction. Studies in marine systems show lower levels of terrestrially derived organic litter on armored versus unarmored beaches (Sobocinski et al. 2003; Higgins et al 2005; Dugan and Hubbard 2006; Defeo et al. 2009).

f. Wildlife

Shoreline modifications can have direct and indirect impacts on wildlife including interfering with species behavior, lowering survival, and decreasing habitat quality and quantity.

Habitat Loss/Quality

Shoreline modifications result in habitat loss, reduction, and or alteration (Paulson 1992; Levings and Thom 1994; Williams and Thom 2001; Toft et al. 2004), lower bird biodiversity (Donnelley and Marzluff 2004), altered food webs and benthic community composition (Dauer et al. 2000; Lerberg et al. 2000 *in* Hale et al. 2004), creation of passage barriers for salmon and other aquatic species (Williams and Thom 2001), and fragmented habitat (Williams and Thom 2001). The installation of shoreline armoring structures reduces beach width (decreases habitat), and can impede wildlife migration through shoreline corridors (NRC 2002). A reduction in habitat can lower diversity and abundance of wildlife, especially in upper intertidal areas. This can in turn cause change trophic relationships (Sobocinski et al. 2003; Defeo et al. 2009); for example, changes in the nearshore habitat can reduce potential spawning grounds for surf smelt and sand lance, which are a main component of the Pacific salmon diet (Johannessen and MacLennan 2007), and a primary food source for marine bird and marine mammals.

e. Hydrology/Slope Stability

Impacts to the hydrology/slope stability function of marine riparian areas have been widely documented in Puget Sound. Urbanization often causes compaction or removal of top soil, reducing infiltration and soil storage and increasing runoff. Erosion may increase downslope of concentrated flow outlet (e.g., pipe outfalls, impervious surface runoff) and may increase slope failure when this flow discharges to the top of the slope. Vegetation is a critical component in maintaining stable slopes (Morgan and Rickson 1995 *in* Parker and Hamilton 1999; Menashe 1993), and trees above the top of the slope contribute significantly to the geotectonic stability of the slope below (Parker and Hamilton 1999). Tree roots often anchor thin layers of soil to the bedrock or provide lateral stability through intertwined roots (Sidle et al. 1985 and Chatwin et al. 1994 *in* Stanley et al. 2005). In addition, changes to hydrology from the installation of onshore and offshore modifications affects sediment conditions.

3. Agriculture

Agriculture practices like other land use activities can result in the removal of riparian vegetation, addition of pesticides, soil disturbance and thus altered riparian functions. Many riparian areas became disconnected from the aquatic environment when tidelands and wetlands/salt marshes were diked and filled to create farmland. In addition, agricultural sources of bacterial contamination, fertilizers and pesticides can threaten local water quality.

a. Water Quality

Water quality problems associated with agricultural activities include fecal coliform pollution, higher water temperatures, and nutrient and pesticide loading from surface and groundwater flows (Hashim and Bresler 2005). In some cases, excessive fertilizer use has led to increased nutrient levels in aquatic environments, causing algal blooms and eutrophication (Caffrey et al. 2007). Studies in the Puget Sound region show that agricultural activities can increase phosphorus levels in soils and surface runoff (Carpenter et al. 1998 *in* Stanley et al. 2005) and contribute 40 times the amount of nitrogen than forested areas and twice the nitrogen levels of developed areas (Ebbert et al. 2000 *in* Stanley et al. 2005). Agricultural activities that occur within, or drain to, riparian areas can negatively impact riparian soils and sediments by causing soil loss and erosion (Hashim and Bresler 2005), reductions in native vegetation (Spence et al. 1996), and altered flow paths leading to increased sediment, nutrient, pathogen, and pesticide loading (Sedell and Froggatt 1984). In addition, studies have shown that the conversion of riparian areas to cropland has decreased the infiltration potential of riparian soils (NRC 2002).

b. Fine sediment control

Agricultural activities can negatively affect the soil and sediment stability of marine riparian areas. Agricultural activities along Puget Sound shorelines typically result in a loss of native vegetation close to the water's edge because the land is valued for crop production. This loss of vegetative cover and root structure can increase erosion rates into receiving waters (Seddell and Froggatt 1984).

c. Shade/Microclimate

Removal of trees within marine riparian areas reduces the amount of shade available (Hashim and Bresler 2005). Shade and temperature influence photosynthesis rates of plants and metabolic rates of animals. Fluctuations in temperature can alter fish community structure and composition (Baltz et al. 1987; Dambacher 1991; Hillman 1991; Reeves et al. 1987). High water temperatures can cause behavioral changes in fish by affecting migration timing and patterns (Spence et al. 1996).

d. Large Woody Debris

Agricultural activities within riparian areas have resulted in a loss of native vegetation and large woody debris, bank instability, and loss of flood-plain function (Spence et al. 1996).

e. Litter fall/organic matter inputs

Agricultural practices have impaired nutrient regulation in riparian areas. For example, the conversion of riparian areas to cropland has decreased the infiltration potential of riparian soils (NRC 2002), and agricultural activities often require vegetation removal (Everest and Reeves 2006). Excessive fertilizer use has led to increased nutrient levels in aquatic environments, causing algal blooms and eutrophication (Caffrey et al. 2007).

f. Hydrology/slope stability

Land clearing, tillage, wetland drainage, irrigation and grazing can lead to increased surface runoff and greater sediment delivery. Changes in hydrology as a result of agricultural activities can result in altered flow regimes, increased sedimentation, and modified and consolidated stream channels (Sedell and Froggatt 1984), as well as bank instability (Spence et al. 1996).

Permanent loss of vegetation cover, or replacement by monocrops or other non-native vegetation increases soil saturation and surface water runoff. While undisturbed mature native vegetation on slopes provides erosion control and slope stabilization benefits, disturbed sites (such as tilled or over-grazed land) can undergo continual erosion, and may not establish an effective cover. Competition by invasive, exotic plants such as Himalayan blackberry can also retard or preclude natural establishment of effective riparian vegetation (Menashe 2001).

g. Wildlife

Agricultural activities within riparian zones have simplified aquatic and riparian habitats (Spence et al. 1996) and may result in lower biodiversity within these areas.
Grazing practices in riparian areas can damage aquatic habitat through shoreline erosion, disturbance (when large animals disrupt stream channels and pools), and deposition of excess nutrients and fecal coliform.

4. Forest Practices

Coniferous forests are the dominant forest type throughout the Puget Sound basin, with the exception of areas with relatively frequent natural disturbance (e.g., landslides, wind stress), or soils that would not support conifers (e.g., rocky headlands, shallow soils). The age structure, density, diversity, and connectivity of existing riparian forests are important characteristics that determine the types and level of functions provided.

a. Water Quality

Industrial forest practices, including the use of fertilizers and pesticides, timber harvesting, and road construction and maintenance, can degrade water quality and cause changes in hydrology and riparian vegetation (Jones et al. 2000). Forestry activities within riparian areas negatively affect that area’s ability to perform its water quality functions in much the same way that agricultural practices do. Specifically, the removal of riparian vegetation may limit the ability of riparian areas to decrease flows and filter, break down, and slow the flow of pollutants. Pesticides can be transported to riparian areas via surface and groundwater flows.

b. Shade/Microclimate

The removal of canopy through logging and thinning practices opens the understory and ground to increased light and air flow. The resulting microclimate changes can change the character of the plant species, expose soils and beach sediment to desiccation, and/or alter the temperature of water bodies below through the removal of shade-inducing foliage. Timber harvesting within riparian areas reduces shade and can increase water temperatures (Hashim and Bresler 2005).

c. Large Woody Debris

Large old-growth trees within marine riparian areas were historically among the first harvested in the region because of their close proximity to water and low transport costs (Prasse 2006; Brennan 2007; Chiang and Reese undated). Along Puget Sound shorelines and rivers, the number, size and species composition of trees has changed dramatically since the mid 1800s due to tree harvest, levee construction, development and invasive species colonization (Spence et al. 1996; Collins et al. 2002; Brennan 2007). As a result, the composition and volume of LWD on beaches has changed, with larger, mature logs occurring with less frequency. In a survey of 3.9 kilometers of beaches in north Puget Sound, fewer than 5 percent of large logs documented were considered ‘new’ recruits to the beach. The remaining 95 percent were severely weathered, and carbon dating revealed that many were delivered to the aquatic environment between 1700 and 1920 (Tonnes 2008).

The amount of new wood, especially large logs, delivered to beaches appears to be declining (Gonor et al. 1988; Maser and Sedell 1994; MacLennan 2005; Tonnes 2008), Old growth logs are decomposing and gradually disappearing from beaches. In addition, much of the wood currently being recruited to beaches consists of end-cut logs, which are more mobile (due to their smaller size and lack of a root wad and branches) and therefore provide somewhat different functions over shorter temporal and spatial scales (Tonnes 2008).

e. Fine sediment control

Road construction in forested areas increases sedimentation and reduces bank stability (Everest and Reeves 2006). Construction and maintenance activities can increase fine sediment loads and mass wasting processes (e.g., debris avalanches, debris flow, and debris torrents), which in turn can cause erosion and changes in stream channel (or beach) morphology (Hashim and Bresler 2005; Everest and Reeves 2006). Logging and burning can destabilize soils, increase the frequency and magnitude of erosion, and cause sedimentation (Knutson and Naef 1997).

f. Wildlife

Forest composition, structure and age class strongly influence type of wildlife habitat available and the diversity of wildlife that utilize the habitat. Old-growth rain forests of the Olympic Peninsula are among the most productive ecosystems in the world (Franklin and Dryness 1973), while younger second and third-growth forests provide fewer habitats and harbor a fewer numbers of species (Ruggiero et al 1991). Removal of forest cover and associated structure (such as snags and downed logs) can lower the habitat quality in riparian areas, reduce the input of nutrients into waterways (an essential food source for aquatic invertebrates) and eliminate important wildlife migration corridors.

Forestry practices can cause changes in the abundance and diversity of wildlife in riparian areas. This occurs through the loss of LWD, canopy and shrub cover, interior forest habitat within and adjacent to the riparian zone, sedimentation of the aquatic habitat, and habitat fragmentation (Knutson and Naef 1997).

g. Hydrology/Slope stability

Intact coniferous forests provide a perennial canopy and extensive root structure, which intercepts substantial amounts of precipitation, moderates surface and subsurface flows, and reduces erosion potential. Removal of forest cover and structure changes the character of the surface flow, particularly on steeper slopes where surface run-off accelerates and erosion and flash-flooding of small streams can occur.

5. Other Impacts of Concern

Development, agriculture and forest practices are only three of numerous potential impacts to riparian ecosystems. Additional impacts that were outside the scope of this guidance document include:

- Atmospheric deposition of pollutants.
- Harmful Algal Blooms (HABs) and other marine-borne pathogens and diseases.
- Non-native/nuisance Species.
- Recreation (harvest/collection of organism, trampling, wildlife disturbance).
- Climate change (changes in air/ocean temperature, sea level rise, changes in hydrology. and erosion from increased wave action, shoreline retreat, inundation, flooding).
- Oil and fuel spills from commercial shipping and tanker traffic.

Section VI. General Conclusions and Management Recommendations for Protecting Marine Riparian Function

This section is divided into three categories: (1) general conclusions adapted solely from the NRC (2002); (2) overarching recommendation; s; and (3) impact-specific recommendations adapted from the literature review with input by the science panel as described above. These recommendations are intended to offer guidelines and approaches for protecting marine riparian functions addressed in this guidance document.

1. General Conclusions Adapted Solely from the NRC (2002)

- Riparian areas perform important hydrologic, geomorphic, and biological functions. These areas encompass complex above- and below-ground habitats created by the convergence of biophysical processes in the transition zone between aquatic and terrestrial ecosystems.
- Riparian areas cannot be thought of in isolation from associated water bodies. The characteristic geomorphology, plant communities, and associated aquatic and wildlife species of riparian and marine systems are intrinsically linked.
- Natural riparian systems have adapted to specific disturbance regimes. Managing riparian areas without regard to their dynamic patterns and influences of adjacent water bodies ignores a fundamental aspect of how these systems function.
- Riparian areas, in proportion to their area within a watershed, perform more biologically productive functions than do uplands. Riparian areas provide a wide range of functions, such as microclimate modification and shade, bank stabilization and modification of sediment processes, contributions of organic matter and large wood to aquatic systems, nutrient retention and cycling, wildlife habitat, and general food web support for a wide range of aquatic and terrestrial organisms.
- Riparian areas are effective in filtering and transforming materials (such as dissolved and particulate nonpoint source pollutants) from hill slope runoff.
- Because riparian areas are located at the convergence of terrestrial and aquatic ecosystems, they are regional hot spots of biodiversity and often exhibit high rates of biological productivity in marked contrast to the larger landscape.
- During the last decade, a patchwork of federal, state, and local laws and programs has come to acknowledge the importance of riparian areas and to require or encourage special management to restore or protect their essential functions, although the degree of protection, the focus, and the spatial coverage of these laws and programs are highly variable among federal, state, and local levels.

2. Overarching Recommendations

This section contains general management recommendations that broadly address riparian areas.

- Protect marine riparian soils and vegetation – prevent damage to native riparian soils and vegetation, including clearing and grading, compaction, covering (paving) and removal.
- Restore damaged marine riparian habitat – restore vegetation, soil characteristics.

- Account for scale issues (temporal and spatial) when evaluating riparian condition, current functions and potential for future functions, and cumulative effects of alterations. The dynamic nature and connectivity of riparian areas and linkages between riparian and aquatic systems operate at multiple scales.
- Exclude all major sources of contamination from the riparian buffer, including construction, impervious surfaces, mining, septic system drain fields, agricultural activity, clear cutting and application of pesticides and herbicides.
- Manage riparian areas for the long-term. For many sites, substantial time, on the order of years to decades, will be required for vegetation to become fully functional (NRC 2002).
- Require additional structural setbacks (10-30 ft) landward of buffers will allow routine maintenance of structures without compromising buffer function integrity.

3. Recommendations to Avoid or Minimize Specific Impacts

The following recommendations are directed at protecting riparian functions from activities associated with development:

- Avoid vegetation removal on shorelines and bluffs. If vegetation must be removed, minimize the area and amount removed and locate the disturbed area as far from the water as possible. Minimize ground disturbance, removal of mature trees, and introduction of nonnative vegetation, especially invasive species such as English Ivy.
- Avoid locating impervious surfaces in riparian buffers. If impervious surfaces must be located in riparian areas, minimize footprint, and mitigate impacts through techniques including pervious surfaces such as pervious pavers and concrete; bioretention facilities such as rain gardens; green roofs, cisterns, etc. Promote infiltration and implement approved methods/designs for controlling rates of surface runoff and pollutant loading. Caution should be taken when designing and installing bioretention and other facilities that infiltrate water along slopes and bluffs so as to not increase the likelihood of mass failures or erosion.
- Avoid shoreline modification**;** maintain existing native vegetation, particularly at and near the land-water interface. If shoreline alterations must occur they should be done in a way that minimizes potential negative impacts to natural functions and should use the least intrusive methods including bioengineering or relocating structures where feasible and practicable. All adverse impacts should receive full compensatory mitigation to ensure no net loss of ecological functions.
- Remove invasive plant species from marine riparian areas; Purple Loosestrife, Himalayan blackberry, English Ivy and other invasive plants compete with native species, particularly in disturbed sites along marine bluffs and shorelines.
- Restore and replant marine riparian areas with native vegetation to improve the connectivity of upland and marine riparian habitat, and to restore functions that benefit the nearshore and beach ecosystems. Ensure that replanted marine riparian areas are properly maintained to improve plant survival.

- Avoid building in the riparian buffers. If building must occur, then minimize footprint, site disturbance and locate structures far enough back from the water's edge to ensure maintenance of functional riparian areas.
- Avoid locating septic and waste water systems in the riparian area. If they must be located in the riparian area, then they should be designed, maintained, and operated in such a way that that human waste and nutrients are prevented from leaching into local water bodies.
- Avoid disturbance to native vegetation in the riparian area, especially near the water's edge, with the goal of maintaining vegetation communities that are resilient to disturbance from surrounding land uses and able to regenerate with minimal human intervention; and to help ensure that nutrients, pathogens, toxics, and fine sediments associated with land-use practices are prevented from entering water bodies.
- Avoid land use practices in riparian areas that involve the use or generation of nutrients, pathogens, and toxics. Avoid salvage or removal of downed trees, LWD or snags in riparian areas and on beaches. Maintain complex, multi-aged riparian forest cover and wide buffers to allow natural recruitment of LWD over long time frames.

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APPENDIX A. Researchers who conducted technical and scientific literature review on riparian buffers and functions

Section	Name	Affiliation
Slope stability/erosion control Hydrology	Jessi Kershner	UW School of Marine Affairs
Water quality Litter fall/organic matter inputs	Rachel M. Gregg	UW; Washington Sea Grant
Large Woody Debris	Dan Tonnes	UW School of Marine Affairs, NOAA-NMFS
All Functions	Jim Brennan	UW; Washington Sea Grant

APPENDIX B. Brief descriptions of seven buffer review documents

FEMAT 1993
The Forest Ecosystem Management Assessment Team (FEMAT) was formed in 1993 with a directive to assess management options for managing federal lands within the range of the Northern Spotted Owl along the west coast of the United States. The forest plan presents buffer effectiveness curves that were created to represent the relationship between buffer width and ecosystem function.

Castelle et al. 1992
This report focuses on the role of wetland buffers and their effectiveness in protecting ecosystem functions, and was developed for Washington State agencies to consult when creating policies for wetland protection. The report contains a literature review, an agency survey of buffer requirements of areas throughout the United States, and a field study of buffers in King and Snohomish counties.

Knutson and Naef 1997
This review of fish and wildlife habitat requirements was written for the Washington Department of Fish and Wildlife. The authors review freshwater riparian habitat functions (e.g., vegetation, litter fall, large woody debris, water quality) and assess the vulnerabilities of riparian habitats to human activities. The report provides recommendations using riparian habitat area (RHA) widths.

May 2000
This report covers buffers as means of protection for riparian habitat functions for stream systems in Kitsap County. The author summarizes buffer-related research and pays special attention to the preservation of salmonid habitat, including riparian wetlands, and instream spawning and rearing areas.

Desbonnet et al. 1994, 1995
Both papers focus on the role of vegetated buffers in coastal areas and provide recommendations. These papers review the benefits of vegetated buffers, their effectiveness in protecting ecosystem functions, and the variables that affect buffer effectiveness, including possible impacts from human activities and land use.

Wenger 1999
The authors reviewed about 140 articles and books for guidelines on riparian buffers with regards to their width, extent, and composition. This review was created to provide guidelines for local officials and natural resource managers in Georgia.

APPENDIX C. Literature cited for seven buffer functions

Study	Year	Study type	Review or original research	Pollutant of focus	Buffer Composition	Buffer range	Minimum Width Recommendation[1]	Key findings and comments
City of Boulder PDS and Biohabitats, Inc.	2007	Wetlands and streams	Review of science and regulatory approaches to buffers	Phosphorus	Not specified	Not specified	30 m (100 ft) for steep slope, 50 ft for shallow slope	Base minimum recommendations on CWP/EPA 2005. Buffer composition not specified, but recommends grass and trees (best for sediment- bound nutrients, pesticides, and pathogens).
				Nitrogen			30 m (100 ft)	
				Biocontaminants, pesticides			15 m (50 ft)	
Goates	2006	Freshwater streams	Review of adequacy of standard 30m buffers in protecting wildlife	Not specified	Not specified	15-40 m (49 – 131 ft) (Phillips 1989)	Not specified	
				Soluble nitrogen	Forest	30m (98 ft) to remove 97-100% (Doyle et al. 1975; Pinay and Decamps 1988)		
				Nitrogen and phosphorous	Not specified	36 m (118 ft) to reduce nutrients (Young et al. 1980)		
Mayer et al.	2006	Freshwater and wetlands	Summary of 14 regional reviews of riparian buffer literature	Nitrogen	Grass	4.6 – 27m (15 – 89 ft)– surface flow, -27-76% effective 10 – 100 m (33 – 328 ft) subsurface flow, 60-100% effective	>30 m (>98 ft) for effective reduction	Soil type, hydrology (flow paths), and subsurface biogeochemistry (e.g., organic carbon supply, high nitrate inputs) influence nitrogen removal in subsurface flows. Surface flows primarily remove nitrogen effectively when buffers are wide enough and sufficiently vegetated to control erosion and filter particulate nitrogen forms. Vegetation type (e.g. grass, trees, etc.) influences interception potential; for example, grass buffers are better at trapping sediment, filtering sediment-borne nutrients, and reducing sheet flow.
					Grass forest	7.5 – 15 m (25 – 49 ft) – surface flow, 28-41% effective 6 – 70 m (20 – 230 ft) – subsurface flow, 91-99%		
					Forest	30 – 70 m (98 – 230 ft) – surface flow, 78-79% 10 – 220 m (33 – 722 ft) subsurface flow, 58-100%		
					Forest wetland	5.8 – 38 m (19 – 125 ft) – subsurface flow, 59-100%		
					Wetland	20 m (66 ft) – surface flow, 12-74% 1 – 200 m (3.28 – 656 ft) – subsurface flow, 52-100%		
Hawes and Smith	2005	Freshwater streams		Nitrogen and phosphorus Pesticides		4.9 – 50 m (16-164 ft) 15 – 100 m (49-328 ft)	5-30 m (16 – 98 ft) of dense grassy or herbaceous buffers on gradual slopes	Wider buffers will be able to provide longer-term storage. Nitrogen is more effectively removed than phosphorous. Greater widths necessary for steeper slopes

Parkyn	2004	Freshwater and wetlands	Summary review of published research on efficiency and management of riparian buffer zones	Solids, phosphorus, and nitrogen	Vegetated filter strips, usually consisting of rank paddock grasses	4.6 - 9.1 m (15 – 30 ft) for removal of 74-84% of solids, 61-79% of phosphorus, 54-73% of nitrogen (Dillaha et al. 1989)	Not specified	
May	2003	PNW streams	Review and summary of stream buffer literature and evaluation of Puget Sound lowland streams.	Sediment and erosion control	Not specified	8 – 183 m (26 – 600 ft)	Not specified	
				Pollutant removal		4 – 262 m (13 – 860 ft)		

Summary of water quality buffer recommendations from selected review documents.

Study	Year	Study type	Review or original research	Pollutant of focus	Buffer Composition	Buffer range	Minimum Width Recommendation[1]	Key findings and comments
Schoonover and Williard	2003	Stream buffer	Original	Nitrate	Not specified	0 – 10 m (0 – 33 ft) (at 3.3 m (11 ft), 61-90% nitrate reduction)	Not specified	Limited samples in original research along cane and forested buffers.
			Review of groundwater nitrate removal by forest riparian buffer zones	Nitrate	Deciduous forest	19 m – 55 m (62 – 181 ft) for 90 – 94% removal		In 10 m(33 ft) cane buffer, about 40% of observed 99% nitrate reduction may be related to dilution by upwelling groundwater. Denitrification and plant assimilation – most likely reasons for reduction. Results varied based on Nitrate-N input (mg/L) and water table depth.
					Forest	16 m – 90 m (53 – 296 ft) for >90% removal		
					Pine forest	5 m (16 ft) for 98% removal		
					Alder forest	50 m (164 ft) for 98% removal		
					Pine/deciduous forest	8 m – 15 m (26 – 49 ft) for 21-93% removal		
GEI Consultants Inc.	2002	Freshwater	Review of riparian buffers on WA agricultural lands	Fecal coliform	Not specified	Not specified	3.8 m (12.5 ft) (Doyle et al. 1975 and Oskendahl 1997)	
Borin and Bigon	2002	Stream buffers	Original	Nitrate	Grass and trees	6 m (1.8 ft) for 47-74% reduction	6 m (1.8 ft)	Subsurface flow 5m grass strip and 1m wide row of trees
Kuusemets et al.	2001	Stream buffers	Original	Nitrate	Meadow/Alder forest	31 – 51 m (102 – 167 ft)	31 m (102 ft) for 40% removal 51 m (167 ft) for 85% removal	
				Phosphorus			31 m (102 ft) for 78% removal 51 m (167 ft) for 84% removal	
Christensen	2000	Freshwater streams and rivers	Literature review of studies on freshwater buffers	Nitrogen	Vegetated	7-60 m (23 – 197 ft) range for removal	30 m (100 ft) most recommended minimum width to reduce inputs	Wide range of effectiveness due to slope, vegetation composition, and time of year
				Phosphorus		5-50 m (16 – 164 ft) range for removal/reduction		
USDA	2000		Review of studies evaluating buffer effectiveness for pesticides	Not specified	Not specified	4.6 – 9 m (15-30 ft), up to 50 m (164 ft) for multipurpose buffers 4.8 – 18 m (16-59 ft) to filter chemicals 5-262 m (16 – 860 ft) (soluble)	Not specified	
Wenger	1999	Stream buffers	Review and summary of the primary buffer literature and evaluation of several models for evaluating riparian function	Sediment	Not specified	15 – 30 m (49 – 98 ft)	*3 options:* 30.5 m (100 ft) + 0.61 m (2 ft) per 1% slope 15.2 m (50 ft) + per 1% slope 30.5 m (100 ft) fixed buffer width (recommended for governments that find it difficult to implement variable width buffers)	Slopes > 25% does not count toward buffer width. Long-term studies suggest the need for wider buffers. All major sources of contamination should be excluded from the buffer, including construction, impervious surfaces, mining activities, septic tank drain fields, agricultural fields, waste disposal, livestock, clear cutting, application of pesticides and herbicides. Buffer effectiveness declines over time, primarily due to loading. Must control sources of contaminants.
				Nitrate		15 – 30 m (49 – 98 ft)		
				Phosphorus		15 – 30 m (49 – 98 ft)		
				Other contaminants		9+ – 15+ m (30+ – 49+ ft)		

Knutson and Naef	1997	Freshwater systems	Review and summary of riparian and buffer literature	Sediment filtration	Not specified	8 – 91m (26 – 300 ft)	42m (138 ft) for sediment filtration	
				Other pollutant removal		4 – 184m (13 – 600 ft)	24 m (78 ft) for pollutant removal	
Desbonnet et al.	1994, 1995	Coastal vegetated buffers	Review and summary of functions and buffer studies conducted at different locations and under different conditions	Sediment TSS Nitrogen Phosphorus	Not specified	25 – 700m (82 – 2300 ft) for all contaminants	60 m (197 ft) buffer width for 80% contaminant removal (ultimately recommend variable widths to accommodate small coastal lots)	Authors provide gradient of effective sediment and pollutant removal by m/ft and percentage: 5 m (16 ft) 50% or > 10 – 15 m (32-49 ft) 60% or > 20 – 30 m (66-98 ft) >70% 50m (164 ft) 75% or > 75 – 100 m (246-328 ft) 80% or > 200 m (656 ft) 90% or > 600 m (1968 ft) 99% or >
FEMAT	1993	Streams and rivers	Based recommendation primarily on literature review by Castelle et al (1992)		Not specified	3.7 – 262m (12 – 860 ft)	61 m (200 ft) (logging operations) 91 m (300 ft) slope distance for fish bearing streams	Widths vary as a function of geomorphic characteristics such as slope and soil type and by vegetative structure and cover
Castelle et al.	1992	Wetland buffers	Review and summary of literature, agency survey, and a field study on wetland buffer use and effectiveness		Not specified	3.7 – 262m (12 – 860 ft) 19 – 88m (62 – 288 ft) to achieve 50-92% pollutant removal effectiveness	30.5 m (100 ft) or greater	Buffer effectiveness increases with buffer width. Slope and vegetation cover are most important factors for reducing water quality impacts (<15% slope and dense vegetative cover are most effective). Buffers less than 15m (50 ft) are generally ineffective in protecting wetlands.

[1]Unlike some other authors, Knutson and Naef (1997) does not offer minimum buffer width recommendations based on individual functions, but instead recommend Riparian Habitat Area (RHA) widths based on stream type. Authors note that WDFW does not identify minimum (RHA) widths because minimal conditions do not offer adequate habitat to support healthy fish and wildlife in the long run.

Summary of fine sediment control buffer recommendations from selected review documents.

Study	Year	Study type	Review or original research	Buffer Composition	Buffer Range	Minimum Buffer Width Recommendation[1]	Key findings and comments
City of Boulder PDS and Biohabitats, Inc.	2007	Wetlands and streams	Review of science and regulatory approaches to buffers	Not specified		3 m (100 ft) for steep slope (5-15%) 15 m (50 ft) for shallow slope (<5%)	Base recommendations on CWP/EPA 2005
Hawes and Smith	2005	Freshwater streams		Not specified	10 – 45 m (33-148 ft) (Army Corps 1991) 9 – 61 m (30-200 ft) (Fisher and Fischenich 2000) 15 – 65 m (49-213 ft) (Broadmeadow and Nisbet 2004)		Depends on soil type, slope, land use, rainfall, the rate at which water can be absorbed into the soil, type of vegetation in the buffer, the amount of impervious surfaces, and other characteristics specific to the site. Mixed buffers of trees, shrubs, and grasses are more effective than single buffer vegetation type.
May	2003	PNW streams	Review and summary of stream buffer literature and evaluation of Puget Sound lowland streams	Not specified	8 – 183 m (26 – 600 ft) for sediment removal/erosion control	30m (98 ft)	
Pentec Environmental	2001	Freshwater in City of Everett	Review	Not specified	15 – 91 m (50-300 ft)	15 m (50 ft) for 60% removal 30 m (98 ft) for 70% removal 91 m (300 ft) for 80%+ removal	
Bavins et al.	2000	Fish habitat (freshwater and marine)	Summary of buffer recommendations for fish habitat	Not specified	9-90 m (30 – 295 ft)	30-90 m (98 – 295 ft)	Ability of buffers to remove sediment varies depending on vegetation type and density, type of soil, slope and placement of the filter. Grass more effective at removing coarse sediments. Non-linear relationship between buffer width and % sediment removal.
USDA	2000		Review of studies evaluating effectiveness of buffers to trap pesticides entering water	Not specified	4.6 – 15 m (15-50 ft)	4.6 – 9 m (15-30 ft) cited as adequate, but for sedimentation and erosion, wider buffers are recommended	

Study	Year	Study type	Review or original research	Buffer Composition	Buffer Range	Minimum Buffer Width Recommendation[1]	Key findings and comments
Christensen	2000	Freshwater streams and rivers	Literature review of studies on freshwater buffers	Not specified	3 – 122 m (10-400 ft)	31 m (100 ft)	
Wenger	1999	Stream buffers	Review and summary of the primary buffer literature and evaluation of several models for evaluating riparian function	Not specified	18-30 m (49-98 ft)	15 – 30m (49 – 98 ft)	Ability to trap suspended solids is negatively correlated with slope. Significant evidence from long-term analysis that wider buffers are necessary to maintain sediment control. Buffers are less effective in stopping sediment transported by concentrated or channelized flow.
Knutson and Naef	1997	Freshwater systems	Review and summary of riparian and buffer literature	Not specified	8 – 91m (26 – 300 ft) for sediment filtration 31 – 38 m (100-125 ft) erosion control	42 m (138 ft)	
Desbonnet et al.	1994, 1995	Coastal vegetated buffers	Review and summary of riparian functions and buffer studies conducted at different locations and under different conditions (composite of data).	Not specified	0.6 – 304 m (1.98 – 997 ft) for 4 – 99% removal of TSS and sediment	25m (82 ft) for 80% removal efficiency	For TSS removal, an approximate increase in buffer width by a factor of 3.0 provides a 10% increase in removal efficiency; buffer width must increase by a factor of 3.5 to achieve a 10% increase in sediment removal. TSS and sediment removal values high in forested buffers. Application of vegetated buffers for residential and other developing lands has not been adequately addressed in existing implementation efforts. Much of the coast is developed (or developing) to the water's edge, providing little means for long-term protection of coastal water quality, shoreline and aquatic habitat, and visual appeal. Mechanisms that apply to inland riparian buffers should similarly apply to coastal buffers.
FEMAT	1993	Streams and rivers		Not specified	3.7 – 262 m (12 – 860 ft)	None offered specific to sediment removal/ water quality, other than the following: 61 m (200 ft.) (one site potential tree height to control sediment from logging operations) two site potential	

Study	Year	Study type	Review or original research	Buffer Composition	Buffer Range	Minimum Buffer Width Recommendation[1]	Key findings and comments
						trees, or 91 m (300 ft) slope distance for fish bearing streams (for maintaining general riparian functions)	
Castelle et al.	1992	Wetland buffers	Review and summary of literature review, agency survey, and a field study on wetland buffer use and effectiveness Sediment/soil erosion control recommendation is part of general water quality buffer recommendation	Not specified	3.7 – 262 m (12 – 860 ft) 19 – 88m (62 – 288 ft) to achieve 50-92% pollutant removal effectiveness	30.5 m (100 ft) or greater	Buffers are essential for wetlands protection. Buffer effectiveness increases with buffer width. Slope and vegetation cover are most important factors for reducing water quality impacts (<15% slope and dense vegetative cover are most effective). Buffers less than 15 m (50 ft) are generally ineffective in protecting wetlands. Buffer widths effective in preventing significant water quality impacts to wetlands are generally 30.5 m (100 ft) or greater.

Summary of shade buffer recommendations from selected review documents.

Study	Year	Study focus	Review or original research	Buffer Composition	Buffer Range	Minimum Buffer Width Recommendation[1]	Key findings and Comments
Hawes and Smith	2005	Freshwater streams		Not specified	9 – 70 m (30 ft – 230 ft)	9 m (30 ft) – adequate, may need 70 m (230 ft) to completely control temperature	"The amount of shade required is related to the size of the channel. The type of vegetation in the buffer regulates the amount of sunlight reaching the stream channel. Generally, a buffer that maintains 50% of direct sunlight and the rest in dapple shade is considered preferable."
Parkyn	2004	Freshwater and wetlands	Summary review of published research on efficiency and management of riparian buffer zones	Vegetated filter strips, usually consisting of rank paddock grasses	5 – 30 m (16- 98 ft) (for reduced air temperatures – Meleason and Quinn 2004) >10 m (33 ft) (for water temperature moderation – Davies and Nelson 1994) 45 m (148 ft) or > (to maintain natural microclimate following timber harvest – Brosofske et al. 1997)	5 m (16 ft) reduced air temp by 3.25ºC 30 m (98 ft) reduced air temp by 3.42ºC 10 m (33 ft) or greater 45 m + (148+ ft)	Narrow buffers can maintain cool air temperatures
May	2003	Freshwater streams	Literature review of freshwater riparian buffers	Not specified	11 – 43 m (36 – 141 ft) for water temperature moderation 45 – 200 m (148 – 656 ft) for microclimate	30 m (98 ft) 100 m (328 ft)	Buffer width recommendations should be qualified with vegetation type and SPTH of trees. "For example, 30 m (98 ft) of mature forest may provide a natural level of shade, but the same width of deciduous trees (willow, alder, etc.) or shrubs may not. With respect to shade and temperature control, a buffer composed of grasses, shrubs, and/or small trees is not equivalent to a natural riparian forest of mixed, mature coniferous and deciduous trees. Buffer quality is as important as buffer quantity."
Eastern Canada Soil and Water Conservation Centre	2002	Freshwater streams and rivers	Literature review of buffer strips	Not specified	17 – 24 m (56 – 79 ft)	24 m (79 ft) with dense trees will maximize shading and 17 m (56 ft) will supply 90% of shade (Belt et al. 1992)	Loss of vegetation may increase water temperature by 2 to 100C(Belt et al. 1992). Recommend large dense trees and bushes (based on Carlson et al. 1992). The amount of shade is more dependent on the height and density of the buffer than actual width.
Christensen	2000	Freshwater streams and rivers	Literature review of studies on freshwater buffers	Not specified	11 – 43 m (36 – 141 ft)	30 – 43 m (98 – 141 ft) for 50-100% temperature moderation 11 – 24 m (36 – 79 ft) and 15 – 30 m (49 – 98 ft) (36 – 141 ft) for 60-	11 – 43 m (36 – 141 ft): ranges represent between 60 and 100% of shading that is similar to levels of light below the canopy of old-growth riparian trees 22 – 46 m (72-150 ft) range of effective buffers, 31 m (100 ft) min buffer width. "provide shade equivalent to mature forest

Study	Year	Study focus	Review or original research	Buffer Composition	Buffer Range	Minimum Buffer Width Recommendation[1]	Key findings and Comments
						80% temperature moderation 23 – 38 m for 80% temperature moderation	conditions, and maintian background water temperatures”
Bavins et al.	2000	Fish habitat (freshwater and marine)	Summary of buffer recommendations for fish habitat	Not specified	15 – 30 m (49 – 98 ft) (for water temperature moderation)	15 m (49 ft)	Not specific, but use Dosskey et al. (1997) to recommend shrub and trees to yield high level of effectiveness for temperature moderation. Grass ranks low.
Wenger	1999	Stream buffers	Review and summary of the primary buffer literature.	Not specified	10 – 30 m (33 – 98 ft)	10 m (33 ft) (based primarily on review by Osborne and Kovacic 1993)	Must be forested and continuous along all stream channels Forested buffers of native vegetation are vital to the health of stream biota
Knutson and Naef	1997	Fish and wildlife associated with freshwater systems	Review and synthesis of riparian and buffer literature.	Not specified	Temperature Control: 11-46 m (35-151 ft) for 50-80% shading Microclimate Maintenance: 61 - 160 m (200 – 525 ft)	Temperature 27 m (90 ft) Microclimate: 126 m (412 ft)	Perpendicular distance from stream NOTE: Authors (WDFW) do not identify minimum Riparian Habitat Area (RHA) widths because minimal conditions do not offer adequate habitat to support healthy fish and wildlife in the long run.
FEMAT	1993	Streams and rivers	Based recommendation primarily on Beschta et al. 1987; Steinblums 1977; Chen 1991.	Not specified	3.7 – 262 m (12-860 ft)	None offered specific to shade/microclimate, other than the following: - 100 ft.+ to provide as much shade as undisturbed late successional forest (Steinblums 1977) -	Buffer width correlates well with degree of shade (citing Beschta et al. 1987). Temperature and microclimate characteristics are influenced by season, time of day, aspect and extent of tree removal. Few reported field observations of microclimate in riparian zones, but Chen (1991) documented change in soil and air temperature, soil moisture, relative humidity, wind speed, and radiation as a function of distance from clear-cut edge into upslope forest.
Castelle et al.	1992	Wetland buffers	Review and summary of literature, agency survey, and a field study on wetland buffer use and effectiveness.	Not specified	15 – 30 m (50-98 ft) (Broderson 1973; Lynch et al. 1985 and Brazier and Brown 1973)	30.5 m (100 ft) or greater for multiple functions; no recommendation specific to shade	Buffers are essential for wetlands protection Buffer effectiveness increases with buffer width Slope, exposure, and canopy cover are considerations for establishing buffers on a case-by-case basis.

Summary of large woody debris (LWD) buffer recommendations from selected review documents.

Study	Year	Study type	Basis for Buffer Recommendation	Buffer Composition	Buffer Range	Minimum Buffer Width Recommendation[1]	Key comments and findings
May	2003	Freshwater streams	Review and summary of stream buffer literature and evaluation of Puget Sound lowland streams	Not specified	10 – 100 m (33 – 328 ft) 20-30 m (Murphy and Koski 1989) 15-46 m (McDade et al. 1990) 45 m (148 ft) (Harmon et al. 1986) 46 m (151 ft) (Robison and Beschta 1990) 50m (Van Sickle and Gregory 1990; Collier et al. 1995) 55m (Thomas et al. 1993) 200 m (656 ft) Hennings 2001 (required to minimize non-native veg. intrusion)	50 m (164 ft)	Approximates one site tree height and is based on long-term, natural levels of LWD
Bavins et al.	2000	Fish habitat (freshwater and marine)	Summary of buffer recommendations for fish habitat	Not specified	5-100 m (16 – 328 ft)		
Christensen	2000	Freshwater streams and rivers	Literature review of studies on freshwater buffers	Not specified	10 – 100 m (33 – 328 ft) provides approximately 80-90% LWD 30 m (98 ft) (Murphy and Koski 1989) 31 m (102 ft) (Bottom et al. 1983) 30-46 m (98 – 151 ft) (Mc Dade et al. 1990) 45 m (148 ft) (Harmon et al. 1986) 50 m (164 ft) (Collier et al. 1995; Robison and Beschta 1990; Van Sickle and Gregory 1990)	46 m (150 ft)	
Wenger	1999	Stream buffers	Review and summary of the primary buffer literature	Not specified	15 – 130 m (49 – 427 ft) (Murphy et al 1986) 1 SPTH for LWD input – 3 SPTH for stability (allow for wind throw) (Collier et al 1995)	No specific recommendation	LWD is the most important factor in determining habitat for salmonids and related fish (May et al. 1997) Of all the ecological functions of riparian areas, the process of woody debris loading requires the longest time for recovery after harvest (Gregory and Ashkenas 1990)
Knutson and Naef	1997	Freshwater systems	Review and synthesis of riparian and buffer literature. Used average of reported widths	Not specified	30.5 – 61 m (100 – 200 ft)	45m (147 ft)	Perpendicular distance from stream

Study	Year	Study type	Basis for Buffer Recommendation	Buffer Composition	Buffer Range	Minimum Buffer Width Recommendation[1]	Key comments and findings
FEMAT	1993	Streams and rivers	Based recommendation on the probability that a falling tree will enter the stream is a function of slope distance from the channel in relation to tree height (citing multiple authors). Note: does not account for steep and unstable slopes that would increase the likelihood of delivery from greater distances.	Not specified	No range provided	None offered specific to LWD, other than the following: Estimation of values provided in generalized curves indicates approximately 70% cumulative effectiveness for LWD at 0.5 SPTH (30.5 m; 100 ft) Delivery of wood is low at distances greater than approximately one tree height away from stream channel	

Summary buffer recommendations for input of litter fall/organic matter from selected review documents.

Study	Year	Study type	Basis for Buffer Recommendation	Buffer Composition	Buffer Range	Minimum Buffer Width Recommendation[1]	Key comments and findings
Hawes and Smith	2005	Freshwater streams	Review of buffer recommendations	Not specified	3 – 100 m (10-328 ft) Majority of studies reviewed fall within 15 – 31 m (50-100ft)	3-10 m (10 – 33 ft)	Use general rec widths of Jontos 2004 (modified from Fisher and Fischenich 2000)
Bavins et al.	2000	Fish habitat (freshwater and marine)	Summary of buffer recommendations for fish habitat	Not specified	5-100 m (16 – 328 ft)		
Wenger	1999	Stream buffers	Citing primary literature, specifically Davies and Nelson (1994)	Not specified	15 – 130 m (49 – 427 ft) (Murphy et al. 1986) as part of combined discussion of litter and LWD	30m (98 ft)	Removal of riparian forests has a profoundly negative effect on stream biota. Results in significant decrease in macroinvertebrate and fish abundance Forested buffers of native vegetation are vital to the health of stream biota.
Knutson and Naef	1995	Freshwater systems	Review and synthesis of riparian and buffer literature Discussed as "contributions to the food web" and in relation to LWD Used average of reported widths	Not specified	30 – 61 m (100 – 200 ft) (same as LWD)	45m (147 ft) – none offered specific to this function, but discussed along with LWD/Structural Diversity	Riparian areas are the dominant contributor to the aquatic food web (approximately half dissolved compounds, half particulate matter)
Desbonnet et al.	1994, 1995	Coastal vegetated buffers		Not specified	This function not reviewed by these authors	Not specified	
FEMAT	1993	Streams and rivers	Based recommendation primarily on Erman et al. (1977) and "best professional judgment." Erman et al. reported that composition of benthic invertebrate communities in streams with riparian buffers greater than 30.5m (100 ft.) were indistinguishable from streams flowing through unlogged watersheds.	Not specified	No range offered, but produced effectiveness curve consistent with Erman et al (1977) and "best professional judgment"	30.5 m (100 ft) or more (one-half site potential tree height, or more) to maintain biotic community structure in stream	Distance from which litter originates depends on site-specific conditions Delivery of leaf and other particulate organic matter declines at distances greater than approximately one-half tree height from stream channel Riparian forests of widths equal or greater than 30.5 m (100 ft) retained sufficient litter inputs to maintain biotic community structures in the stream.
Castelle et al	1992	Wetland buffers	Review and summary of literature review, agency	Not specified	This function not reviewed by these authors	30.5 m (100 ft) or greater for multiple functions; no	Vegetation provides a food source through leaf litter and insect drop and provides cover

Study	Year	Study type	Basis for Buffer Recommendation	Buffer Composition	Buffer Range	Minimum Buffer Width Recommendation[1]	Key comments and findings
			survey, and a field study on wetland buffer use and effectiveness			recommendation specific to inputs of organic matter	through deposition of large organic debris. Buffer effectiveness increases with buffer width. Slope, exposure, and canopy cover are considerations for establishing buffers on a case-by-case basis. Cite Erman et al. (1977) and Newbold (1980), who found that a 30 m (98 ft) buffer was successful in maintaining background levels of benthic invertebrates in streams adjacent to logging activity

Summary of hydrology/slope stability buffer recommendations from selected review documents.

Study	Year	Study type	Review or original research	Buffer Composition	Buffer Range	Minimum Buffer Width Recommendation[1]	Key findings and comments
City of Boulder PDS and Biohabitats, Inc.	2007	Wetland and stream	Review of science and regulatory approaches to buffers	Not specified	Not specified	Not specified	Best vegetation type: shrubs and trees
Hawes and Smith	2005	Freshwater	Review	Not specified	9 – 30 m (30-98 ft)	10-20 m (based on Jontos 2004)	
May	2003	PNW streams	Review and summary of stream buffer literature	Not specified	Not specifically reviewed by this author. Some information may be derived from summary of sediment removal and streambank erosion control: 8-183 m (26-600 ft) for sediment control	30 m (98 ft)	
Bavins et al.	2000	Fish habitat (freshwater and marine)	Summary of buffer recommendations for fish habitat	Not specified	5-125 m (16-410 ft) for stabilization of bank erosion	5 m (16 ft) (of vegetated buffer required to protect riverbank stability)	"The *Guidelines for Queensland Streambank Stabilisation with Riparian Vegetation* recommend a naturally diverse and dense vegetation community within a buffer zone width determined by the minimum width of 5 m (16 ft) (the *basic allowance*) plus the *height allowance* and the *establishment allowance*. An example of a 'decision tree' is provided in the guidelines to assist the determination of riparian zone widths. It should also be acknowledged that erosion processes are natural and even healthy vegetated streambanks are not static, and should not be expected to remain unchanged by erosive forces over time."
Christensen	2000	Freshwater	Review	Not specified	Not specified	31 m (100 ft)	
Wenger	1999	Stream buffers	Review and summary of the primary buffer literature and evaluation of several models for evaluating	Not specified	Author did not review these functions specifically. However, the review of sediment and	30 m (98 ft) (general buffer recommendation)	Buffer effectiveness increases with buffer width Long-term studies have suggested that much wider buffers (than those recommended) are necessary for sediment control. Efficiency of buffers can be expected to vary based on

Study	Year	Study type	Review or original research	Buffer Composition	Buffer Range	Minimum Buffer Width Recommendation[1]	Key findings and comments
			riparian function		surface runoff is relevant to these topics.		slope, soil infiltration rate, and other factors. Width may be extended to account for steep slopes and land uses that yield excessive erosion. One of the most important roles of protected riparian buffers is to stabilize banks.
Knutson and Naef	1997	Freshwater systems	Review and summary of riparian and buffer literature.	Not specified	Authors provide some relevant review, but no recommendations specific to these topics. However, discussion and recommendations for erosion control are relevant. 30 – 38 m (98-125 ft) for erosion control	34 m (12 ft) NOTE: Authors (WDFW) do not identify minimum Riparian Habitat Area (RHA) widths because minimal conditions do not offer adequate habitat to support healthy fish and wildlife in the long run.	Riparian areas assist in regulating stream flow by intercepting rainfall, contributing to water infiltration, and using water via evapotranspiration – vegetation helps to trap water flowing on the surface, storing it in the soil and later releasing it to streams, moderating peak stream flows. Used average of reported widths. Note that larger buffer in range is for controlling mass wasting.
Desbonnet et al	1994, 1995	Coastal vegetated buffers		Not specified	These functions not reviewed by these authors	Not specified	
FEMAT	1993	Streams and rivers		Not specified	No range offered, but produced effectiveness curve for slope stability based on an estimate of tree root strength.	Not specified	Based recommendation on the width of a slide scar plus half a tree crown diameter, which is an estimate of the extent to which root systems of trees adjacent to the slide scar margin affect soil stability. Steep hill slope areas are common initiation sites of debris slides and debris flows (Dietrich and Dunne 1978). Root strength provided by trees and shrubs contribute to slope stability; and loss of root strength following tree death by harvest or other causes may lead to increased incidence of slides (Sidle et al. 1985)
Castelle et al.	1992	Wetland buffers	Summary of literature review, agency survey, and a field study on wetland buffer use and effectiveness	Not specified	This function not specifically reviewed by these authors	30.5 m (100 ft) or greater for multiple functions; no recommendation specific to hydrology and slope stability.	Buffers play a role in moderating water level fluctuations…vegetation impedes the flow of runoff and allows it to percolate into the ground. The soil then yields this water to the wetland over an extended period of time, resulting in stable, natural ecosystems. Buffer effectiveness increases with buffer width Slope, exposure, and canopy cover are considerations for establishing buffers on a case-by-case basis. The best functioning buffers were the most stable, and buffer stability was in turn enhanced by high percentage vegetative cover and dense stands of trees,

Study	Year	Study type	Review or original research	Buffer Composition	Buffer Range	Minimum Buffer Width Recommendation[1]	Key findings and comments
							rather than by sparse vegetation or individual trees protruding above an understory (citing Darling et al 1982).

[1]Unlike some other authors, Knutson and Naef (1997) do not offer minimum buffer width recommendations based on individual functions, but instead recommend Riparian Habitat Area (RHA) widths based on stream type. Authors do not identify minimum (RHA) widths because minimal conditions do not offer adequate habitat to support healthy fish and wildlife in the long run.

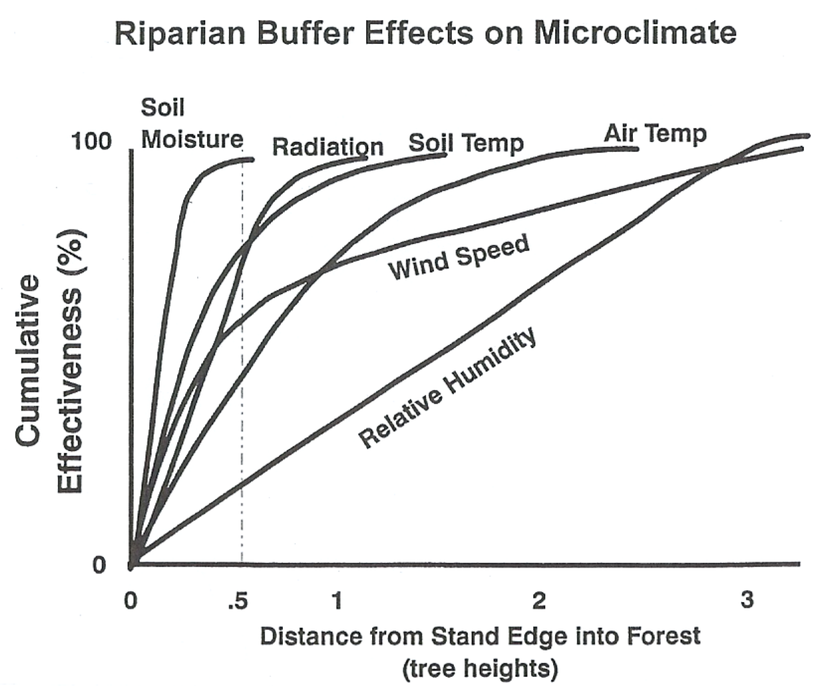
Summary of wildlife buffer recommendations from selected review documents. Buffer composition was not specified.

Study	Year	Study type	Review or original research	Review of Multiple Wildlife Types	Buffer Range	Minimum Buffer Recommendation	Key comments and findings
City of Boulder PDS and Biohabitats, Inc.	2007	Wetland and streams	Review of science and regulatory approaches to buffers			31 m (100 ft) for unthreatened species 61 – 91 m (200-300 ft) for rare, threatened and endangered 15 m (50 ft) for species diversity in rural areas; 31 m (100 ft) for species diversity in developed areas	Base recommendations on CWP/EPA 2005
Goates	2006	Freshwater streams	Review of adequacy of standard 30m buffers in protecting wildlife		30.5 m (only 44% of nests and hibernation burrows of turtles in South Carolina (Burke and Gibbons 1995) 30 m (98 ft) buffer inadequate to maintain bird species in logged areas of western WA (Pearson and Manuwal 2001)	73 m (240 ft) required to protect 90% of hibernation and nesting; 275 m (902 ft) to protect 100% (Burke and Gibbons 1995) 45 m (148 ft) buffer required to maintain bird community (Pearson and Manuwal 2001)	30m minimum protect from timber harvests (Castelle et al. 1994; Semlitsch and Bodie 2003; Lee et al. 2004) Recommend that managers consider temporal constraints, long-term analyses, sex, and location.
Hawes and Smith	2005	Freshwater	Review		10 – 50 m (33-164 ft)		
Parkyn	2004	Freshwater and wetlands	Summary review of published research on efficiency and management of riparian buffer zones		3-107 m (10 ft - 351 ft) (depending on particular resource needs of invidiual species – Castelle et al. 1994)		Will differ depending on needs of species
May	2003	PNW streams		Yes	15-100 m (49 – 328 ft)	100 m (328 ft)	Compiled different recommendations from authors, including: 30m for macroinvertebrates, Chinook salmon, Cutthroat trout >30m for macroinvertebrates and salmonids 30-70 m (98 – 230 ft) for salmonids 30-70 m (98 – 230 ft) and 67-93 m (220 – 305 ft) for small mammals 100 m (328 ft) min for migration corridor for large mammals and for interior habitat and migration corridor 50-125 m (164 – 410 ft) for nesting, migrating, and feeding habitat for birds

Study	Year	Study type	Review or original research	Review of Multiple Wildlife Types	Buffer Range	Minimum Buffer Recommendation	Key comments and findings
							200 m (656 ft) for eagle nest and heron rookery, deer and elk habitat
Bavins et al.	2000	Fish habitat (freshwater and marine)	Summary of buffer recommendations for fish habitat	Yes, but primarily limited to fish	5-106 m (16 – 348 ft) for species diversity and distribution (e.g., connectivity between marine and freshwater environments; continuous lines of vegetation; migration pathways) 15-45 m (49 – 148 ft) for provision of other wildlife habitat (wildlife corridors) 5-100 m (16 – 328 ft) for provision of remnant vegetation 30 m (98 ft) or > for salmonid eggs to develop normally	Not specified, but recommend vegetated buffers	
Wenger	1999	Stream buffers		Yes	Ranges reported for different wildlife types Generally: 15-100+m (49 – 328+ ft)	100m (328 ft)	While not practical on all streams, there should be some with 90-300m riparian corridors, along with large blocks of upland forest targeted for preservation.
Knutson and Naef	1997	Freshwater systems		Yes	8-300 m (26 – 984 ft)	88m (average of reported widths)	“Buffers” described as “Riparian Habitat Area” widths
Desbonnet et al	1994, 1995	Coastal vegetated buffers		Yes	15-200 m (49 – 656 ft)	No single buffer recommendation offered	Reported buffer widths were intended as minimum values to meet desired objective 5 m (16 ft) poor habitat value; useful for temporary use by wildlife 10 m (33 ft) minimal protection for stream habitat, useful for temporary use by wildlife 15 m (49 ft) minimal wildlife and avian value 20 m (66 ft) minimal value for habitat, some for avian habitat 30 m (98 ft) maybe useful as travel corridor for wildlife and avian habitat 50 m (164 ft) minimal habitat value 75 m (246 ft) fair to good wildlife and avian habitat value 100 m (328 ft) good wildlife habitat, may even protect significant wildlife habitat 200 m (656 ft) excellent wildlife value, likely to support a diverse community 600 m (1968 ft) excellent wildlife habitat value, supports diverse community, protects significant species
Castelle et al.	1994	Wetland buffers		Yes	2-110 m (7-361 ft) wildlife		
Johnson and Ryba	1992	Stream buffers		Yes	10-200 m (33-656 ft)		Birds require larger buffers than other wildlife groups. Salmonids require ~30 m (100 ft) buffer.

Study	Year	Study type	Review or original research	Review of Multiple Wildlife Types	Buffer Range	Minimum Buffer Recommendation	Key comments and findings
Castelle et al	1992	Wetland buffers		Yes	Ranges varied by wildlife type	33-98 m (108 – 321 ft)	Draws conclusion from WA Dept. of Wildlife (1992) Buffer needs of wetland wildlife.
Groffman et al	1990			Yes	32-100 m (105 – 328 ft) (or more)	No single buffer recommendation offered. 32-100 m (or more in case of threatened or endangered species)	Buffer model is offered, based on 4 factors: 1) habitat suitability; 2) wildlife spatial requirements; 3) access to upland and/or transitional habitats; 4) noise impacts on feeding, breeding, and other life functions.

APPENDIX D. Original FEMAT curves.



APPENDIX E: Literature summary documenting the impacts of development, agriculture and forest practices on riparian functions

Land use impacts on riparian function (Development, Agriculture and Forestry)

Land use	Riparian function impaired: Water Quality	Shade/Microclimate	LWD	Litter fall	Fine sediment control	Wildlife	Hydrology/slope stability	Specific activities associated with land use category	Impact findings on function	Literature cited
Development	X	X	X	X	X	X	X	Clearing and grading/vegetation removal Construction of homes, buildings, roads/Impervious surfaces Shoreline armoring (docks, bulkheads, etc.) Landscaping (non-native plants) Recreational activities (hiking, biking, beachcombing, etc.)	Riparian areas are more highly altered in developed landscapes than in agricultural and forested landscapes	Booth 1991 *(in* Everest and Reeves 2006)
									Direct alteration within the riparian area (vegetation removal/reduction, soil compaction, grading) causes changes in loading of nutrients, organic matter and sediments; reduces capacity of riparian area to filter/absorb pollutants; increases sediment loading	Valiela et al 1992; Wahl et al. 1997; Jones et al. 2000; Jordan et al. 2003 (*in* Hale et al. 2004)
									Creation of impervious surfaces (e.g., parking lots, paved streets, sidewalks, roads), vegetation removal, and soil compaction cause surface water to increase in volume and magnitude. Increased runoff decreases the ability of soils and vegetation to infiltrate and intercept pollutants , increases flooding potential.	Knutson and Naef 1997; Montgomery et al. 2000 (*in* Johannessen and MacLennan 2007); Glasoe and Christy 2005; Hashim and Bresler 2005; Ekness and Randhir 2007; Schiff and Benoit 2007
									Construction of boat landings, docks, and piers creates increased slopes, causing increased and concentrated water flows; construction of domestic, residential and industrial facilities and utilities in and near riparian areas can result in altered topography, removal of vegetation, and rerouting of surface and groundwater flows	Knutson and Naef 1997; NRC 2002; Ekness and Randhir 2007; Schiff and Benoit 2007
									Construction close to the water's edge (bulkheads, docks, etc.) reduce shade as well as species diversity and abundance	Sobocinski et al. 2003; Rice 2006
									Areas with high levels of impervious surface coverage (>50%) correlated with low macrobenthic diversity and abundances	Lerbert et al. 2000
									Vegetation removal causes decreased shade and increased temperatures	Beschta et al. 1987; Macdonald et al. 1994; 1995; Thom et al. 1994; Penttila 1996; Williams and Thom 2001; Bereitschaft 2007
									Removal of vegetation cover also reduces LWD and canopy cover, which serve to dissipate flow energy and control temperature by shading	Booth et al. 2006
									Increases of light levels in the upper intertidal zone results in higher levels of mortality and dessication of insects, invertebrates, and the eggs of intertidal spawning fish like Pacific sand lance and surf smelt.	Pentilla 1996, 2000; Rice 2006
									Low levels of organic litter and LWD have been found on armored beaches	Sobocinski et al. 2003; Dugan and Hubbard 2006; Defeo et al. 2009
									Increased surface runoff of toxins Toxins can affect wildlife through physiological and behavior changes,	Klapproth and Johnson 2000; Krebs and Bums 1977; Krebs and Valiela 1978; Moore et al. 1979

									reduced density and species richness	(*in* Adamus et al. 1991); Firehock and Doherty 1995 (*in* Klapproth and Johnson 2000); Hashim and Bresler 2005; PSAT 2007
									Vegetation is a critical component in maintaining stable slopes . Roots anchor thin layers of soil to the bedrock or provide lateral stability through intertwined roots.	Morgan and Rickson 1995 (*in* Parker and Hamilton DATE); Sidle et al. 1985 and Chatwin et al. 1994 (*in* Stanley et al. 2005).
									Decreased wood abundance and elevated beach temperatures have been documented in several studies around Puget Sound.	Higgens et al. 2005; Rice 2006; Tonnes 2008
									Low levels of LWD and organic litter have been found on armored beaches as compared with unaltered beaches	Sobocinski et al. 2003; Dugan and Hubbard 2006; Defeo et al. 2009
									Dams and other water control structures have caused changes in nutrient cycling	Knutson and Naef 1997
									Offshore structures (e.g., breakwaters, jetties) can cause increased deposition of beachwrack .	Martin et al. 2005 *in* Defeo et al. 2009
									Shoreline modifications result in 1. wildlife habitat loss, reduction, and or alteration 2. lowered bird biodiversity 3. altered food webs and benthic community composition 4. creation of passage barriers for salmon and fragmented habitat connectivity 5. lowered abundance of wildlife which can cause harm to upper trophic levels, like Pacific salmon	1. Paulson 1992; Levings and Thom 1994; Williams and Thom 2001; Toft et al. 2004; Griggs 2005 2. Donnelley and Marzluff 2004 3. (Dauer et al. 2000; Lerberg et al. 2000 *in* Hale et al. 2004), 4. Williams and Thom 2001). 5. Sobocinski et al. 2003; Johannessen and MacLennan 2007; Defeo et al. 2009
									Habitat alteration can cause increased loading of contaminants and pathogens	Siewicki 1997; Inglis and Kross 2000; Mallin et al. 2000 (*in* Hale et al. 2004)
									Habitat alteration can cause changes in water flow	Hopkinson and Vallino 1995; Jones et al. 2000 (*in* Hale et al. 2004)
									Clearing of land for development produces the largest amount of sediment to aquatic resources; developed areas can produce 50-100 times more sediment than agricultural areas	U.S. EPA 1993 (*in* Stanley et al. 2005); Jones and Gordon 2000 (*in* Stanley et al. 2005
Agriculture	**X**		**X**		**X**	**X**	**X**	Clearing and grading/vegetation removal Application of pesticides/fertilizers Tillage/irrigation practices	Loss of native vegetation and LWD, bank instability and loss of floodplain function	Spence et al. 1996 *(in* Everest and Reeves 2006)
									Increased phosphorus and nitrogen levels in soils and surface runoff; 40 times the amount of nitrogen in agricultural land than forested areas and two times the nitrogen levels of urban areas in Puget Sound	Carpenter et al. 1998 (*in* Stanley et al. 2005); Ebbert et al. 2000 (*in* Stanley et al. 2005
									Excessive fertilizer use has led to increased nutrient levels in aquatic environments, causing algal blooms and eutrophication	Caffrey et al. 2007
									Activities can cause soil loss and erosion	Hashim and Bresler 2005
									Loss of vegetation cover, changes in hydrology cause altered flow regimes; increased sedimentation	Seddell and Froggatt 1984 *(in* Everest and Reeves 2006)
									Activities within riparian areas have simplified aquatic and riparian habitats	Spence et al. 1996 *(in* Everest and Reeves 2006)

									Direct alteration can cause increased loading of contaminants and pathogens	Inglis and Kross 2000 *(in* Hale et al. 2004)
									Conversion of riparian areas to cropland can decrease the infiltration potential of riparian soils	NRC 2002
Forestry	**X**	**X**			**X**	**X**	**X**	Introduction of pesticides and fertilizers Impervious surfaces (roads etc) Vegetation removal (timber harvesting)	Timber harvesting within riparian areas reduces shade	Hashim and Bresler 2005
									Timber harvesting within riparian areas increases sedimentation	Everest and Reeves 2006
									Timber harvesting within riparian areas reduces bank stability	Everest and Reeves 2006
									Road construction and maintenance activities can increase fine sediment loads and mass wasting processes, and can reduce bank stability	Hashim and Bresler 2005; Everest and Reeves 2006
									Forestry practices can cause changes in the abundance and diversity of wildlife in riparian areas. This occurs through the loss of LWD, canopy and shrub cover, interior forest habitat within and adjacent to the riparian zone, sedimentation of the aquatic habitat, and habitat fragmentation.	Knutson and Naef 1997
									Removal of trees within marine riparian reduces available shade (thereby increasing water temperatures); temperature changes affect water quality and changes in fish/wildlife behavior, structure, and composition.	Hashim and Bresler 2005 Vigil 2003; Everest and Reeves 2006
									Forestry practices, including use of fertilizers and pesticides, timber harvesting, and road construction and maintenance, degrade water quality and can cause extensive changes in hydrology and riparian vegetation	Jones et al. 2000

Impact of specific activities on riparian function

Specific activities	Typically associated with land use	Riparian function impaired							Finding	Literature cited
		Water quality	Shade/Microclimate	LWD	Litter fall	Fine sediment control	Wildlife	Hydrology/slope stability		
Clearing and grading/ vegetation removal (including timber harvesting)	Development Agriculture Forestry	X	X	X		X	X	X	Can lead to an increase in contaminated runoff	Ekness and Randhir 2007
									Common development practices can result in conditions that produce unhealthy plants that require excessive fertilizers and pesticides	WDOE 2007
									The reduction or removal of slope vegetation can result in either increased rates of soil erosion or higher frequencies of slope failure.	OSB 2007
									Permanent loss of vegetation cover or replacement by ineffective vegetation increases soil saturation and surface water runoff. Disturbed or degraded sites undergo continual erosion and may not establish an effective cover.	Menashe 2001
									Vegetation removal decreases shade, leading to increased temperatures that can impact wildlife survival	Macdonald et al. 1994; Thom et al. 1994; Macdonald 1995; Penttila 1996, 2000; Williams and Thom 2001; Rice 2006; Bereitschaft 2007
									Can cause extensive changes in hydrology and riparian vegetation.	Jones et al. 2000
									Timber harvesting within riparian areas reduces shade; agricultural activities can degrade water quality by increasing fecal coliform levels, temperatures and nutrient/pesticide loading.	Hashim and Bresler 2005
									Timber harvesting within riparian areas reduces bank stability	Everest and Reeves 2006
									Agricultural activities within riparian zones have resulted in a loss of native vegetation and LWD, bank instability, and loss of floodplain function.	Spence et al. 1996 (*in* Everest and Reeves 2006)
									Agricultural activities within riparian areas have simplified aquatic and riparian habitats	Spence et al. 1996 (*in* Everest and Reeves 2006)
Construction and maintenance of impervious surfaces (e.g. roads, homes and buildings)	Development Agriculture Forestry	X				X	X	X	Can lead to an increase in contaminated runoff	Ekness and Randhir 2007
									Can degrade water quality (including increased temperatures) and cause extensive changes in hydrology	Jones et al. 2000
									Direct alteration can cause increased loading of contaminants and pathogens	Mallin et al. 2000 (*in* Hale et al 2004)
									Can increase fine sediment loads and mass wasting processes, which can cause erosion.	Hashim and Bresler 2005
									Direct alteration within the riparian area causes changes in loading of nutrients, organic matter and sediments	Valiela et al 1992; Wahl et al. 1997; Jones et al. 2000; Jordan et al. 2003 (*in* Hale et al. 2004)
									Areas with high levels of impervious surface coverage (>50%) correlated with low macrobenthic diversity and abundances.	Lerbert et al. 2000

									Impervious surfaces cause increased volume and magnitude of surface water runoff, decreasing the ability of soil and vegetation to absorb/intercept pollutants	Montgomery et al. 2000 (*in* Johannessen and MacLennan 2007)
									Impervious surfaces increase flooding potential	Glasoe and Christy 2005
									Increased sedimentation has also been shown to affect juvenile and filter-feeding fish.	Williams and Thom 2001
Shoreline armoring (e.g. docks, bulkheads, etc)	Development	X					X		The construction of boat landings, docks, and piers often creates increased slopes, which causes increased and concentrated water flows. Shoreline armoring structures, such as rip-rap, concrete, and bulkheads, can require the removal of vegetation and can also impede the movement of wildlife that utilize the shoreline as migration corridors.	NRC 2002
									The installation of shoreline armoring structures reduces beach width, resulting in the loss of wildlife habitat (in upper intertidal areas)	Griggs 2005
									Associated with low levels of organic litter and LWD	Sobocinski et al. 2003; Dugan and Hubbard 2006; Defeo et al. 2009
									Alters hydrologic processes, which affects sand transport rates, erosion and beach accretion processes	Defeo et al. 2009
									Shoreline modifications result in habitat loss, reduction, and or alteration* lowered bird biodiversity** (altered food webs and benthic community composition*** creation of passage barriers for salmon and fragmented habitat connectivity****	*Paulson 1992; Levings and Thom 1994; Williams and Thom 2001; Toft et al. 2004 ** Donnelley and Marzluff 2004 ***Dauer et al. 2000; Lerberg et al. 2000 *in* Hale et al. 2004 ****Williams and Thom 2001
Construction and maintenance of impervious surfaces (e.g. roads, homes and buildings)	Development Agriculture Forestry	X				X	X	X	Can lead to an increase in contaminated runoff	Ekness and Randhir 2007
									Can degrade water quality (including increased temperatures) and cause extensive changes in hydrology	Jones et al. 2000
									Direct alteration can cause increased loading of contaminants and pathogens	Mallin et al. 2000 (*in* Hale et al 2004)
									Can increase fine sediment loads and mass wasting processes, which can cause erosion.	Hashim and Bresler 2005
									Direct alteration within the riparian area causes changes in loading of nutrients, organic matter and sediments	Valiela et al 1992; Wahl et al. 1997; Jones et al. 2000; Jordan et al. 2003 (*in* Hale et al. 2004)
									Areas with high levels of impervious surface coverage (>50%) correlated with low macrobenthic diversity and abundances.	Lerbert et al. 2000
									Impervious surfaces cause increased volume and magnitude of surface water runoff, decreasing the ability of soil and vegetation to absorb/intercept pollutants	Montgomery et al. 2000 (*in* Johannessen and MacLennan 2007)
									Impervious surfaces increase flooding potential	Glasoe and Christy 2005
									Increased sedimentation has also been shown to affect juvenile and filter-feeding fish.	Williams and Thom 2001
Shoreline armoring (e.g. docks, bulkheads, etc)	Development	X					X		The construction of boat landings, docks, and piers often creates increased slopes, which causes increased and concentrated water flows. Shoreline armoring structures, such as rip-rap, concrete, and bulkheads, can require the removal of vegetation and can also impede the movement of wildlife that utilize the shoreline as migration corridors.	NRC 2002

									The installation of shoreline armoring structures reduces beach width, resulting in the loss of wildlife habitat (in upper intertidal areas)	Griggs 2005
									Associated with low levels of organic litter and LWD	Sobocinski et al. 2003; Dugan and Hubbard 2006; Defeo et al. 2009
									Alters hydrologic processes, which affects sand transport rates, erosion and beach accretion processes	Defeo et al. 2009
									Shoreline modifications result in habitat loss, reduction, and or alteration* lowered bird biodiversity** (altered food webs and benthic community composition*** creation of passage barriers for salmon and fragmented habitat connectivity****	*Paulson 1992; Levings and Thom 1994; Williams and Thom 2001; Toft et al. 2004 ** Donnelley and Marzluff 2004 ***Dauer et al. 2000; Lerberg et al. 2000 *in* Hale et al. 2004 ****Williams and Thom 2001
Tillage and irrigation practices	Agriculture	X							Can result in soil loss and erosion as well as the transport of pesticides and fertilizers to surface and groundwater	Hashim and Bresler 2005
Introduction of pesticides and fertilizers	Development Agriculture Forestry	X							Can degrade water quality and cause extensive changes in hydrology and riparian vegetation	Jones et al. 2000
									Agricultural activities result in fecal coliform pollution, and nutrient and pesticide loading	Hashim and Bresler 2005
Recreational activities (trails, etc)	Development							X	Trampling of riparian soils leads to compaction, erosion and the destruction of soil microbial communities	NRC 2002

APPENDIX F. Puget Sound Shore Form Tables (adapted from Shipman 2008)

Shoreline Type	Landforms	Characteristic Regional Location(s)	Characteristic Human Modifications
Rocky Coasts (resistant bedrock with limited upland erosion)	Plunging (rocky shores within minimal erosion/deposition and no erosional bench or platform)	San Juan Islands Strait of Juan de Fuca	Intertidal fill Armoring of pocket beaches
	Platform (wave-eroded platform/ramp, but no beach)		
	Pocket Beaches (isolated beaches contained by rocky headlands)		
Beaches (shorelines consisting of loose sediment and influenced by wave action)	Bluffs (formed by landward retreat of the shoreline)	Main Basin, most of Puget Sound Whidbey Basin Northern Straits South Sound San Juan Islands	Armoring Intertidal and backshore fills Groins and jetties Overwater structures Slope stabilization Fill at base of bluff Upland hydrologic changes Inlet stabilization
	Barriers (formed where sediment accumulates seaward of earlier shoreline)		
Embayments (protected from wave action by small size and sheltered configuration)	Open coastal inlets (small inlets protected from wave action by their small size or shape, but not extensively enclosed by a barrier beach)	Northern Straits Main Basin South Sound Kitsap bays and inlets Hood Canal Includes Port Madison, Discovery Bay, Eld Inlet, Kala Point, Point Monroe, Foulweather Bluff, Beckett Point	Watershed modifications: hydrology, sediment loading Fill Bank armoring Inlet modifications: relocation, stabilization, closure, dredging Wetland and intertidal fill Barrier modification
	Barrier estuaries (tidal inlet largely isolated by a barrier beach and with a considerable input of freshwater from a stream or upland drainage)		
	Barrier lagoons (tidal inlet largely isolated by a barrier beach and with no significant input of freshwater)		
	Closed lagoons and marshes (back-barrier wetlands with no surface connection to the Sound)		
Large Deltas (long-term deposition of fluvial sediment at river mouths)	River-dominated (extensive alluvial valleys with multiple distributaries and significant upstream tidal influence)	Strait of Juan de Fuca Stilliguamish River Elwha River Dosewallips River Hood Canal (South of Foulweather Bluff)	Diking Draining Cultivation Watershed changes Dredging

	Wave-dominated (deltas heavily influenced by wave action, typically with barrier beaches defining their shoreline)		
	Tide-dominated (deltas at heads of bays where tidal influence is much more significant than fluvial factors, typically with wedge-shaped estuary)		
	Fan deltas (steep, often coarse-grained deltas with limited upstream tidal influence)		

APPENDIX G. A summary of buffer width recommendations from Appendix C.

See Section II for a description of how this table was created.

Function	Buffer width recommendation to achieve ≥ 80% effectiveness	Literature cited	Average of all literature (to achieve ≥ 80% effectiveness)	Minimum buffer width (approximate) based on FEMAT curve to achieve ≥ 80% effectiveness
Water quality	5-600 m (16 – 1,968 ft) (Appendix C contains specific buffer widths for different water quality parameters)	5 m (16 ft): Schooner and Williard (2003) for 98% removal of nitrate in a pine forest buffer 600 m (1969 ft): Desbonnet et al (1994/1995) for 99% removal	109 m (358 ft)	25 m (82 ft) sediment 60 m (197 ft) TSS 60 m (197 ft) nitrogen 85 m (279 ft) phosphorus
Fine sediment control	25-91 m (92 – 299 ft)	25 m (82 ft): Desbonnet et al (1994/1995) for 80% removal 91 m (299 ft): Pentec Environmental (2001) for 80% removal	58 m (190 ft)	25 m (82 ft) (sediment) 60 m (197 ft) (TSS)
Shade	17-38 m (56 – 125 ft)	17 m (56 ft): Belt et al 1992 *IN* Eastern Canada Soil and Water Conservation Centre (2002) for 90% 38 m (125 ft): Christensen (2000) for 80% temperature moderation	24 m (79 ft)	37 m (121 ft) (.6 SPTH*)
LWD	10-100 m (33 – 328 ft)	10 m (33 ft): Christensen (2000) for 80-90% effectiveness 100 m (328 ft): Christensen (2000)	55 m (180 ft)	40 m (131 ft) (.65 SPTH*)

		for 80-90% effectiveness		
Litter fall	No studies found	N/A	N/A	24 m (79 ft) (.4 SPTH*)
Hydrology/slope stability	No studies found	N/A	N/A	N/A
Wildlife	73-275 m (240 – 902 ft)	73 m (240 ft): Goates (2006) for 90% of hibernation and nesting	174 m (571 ft)	N/A
		275 m (902 ft): Burke and Gibbons 1995 *IN* Goates 2006 for 100% of hibernation and nesting		

* Tree height (SPTH) is used to indicate buffer width where one SPTH = 61 meters or 200 ft (adapted from FEMAT 1993)

APPENDIX H. Marine Riparian Technical Review Workshop Proceedings

November 19, 2008

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SECTION I: Introduction/Background

The Marine Riparian Technical Review Workshop (riparian workshop) was held on November 19, 2008 at the University of Washington's School of Aquatic and Fishery Sciences. The goal of the workshop was to solicit expert scientific opinion to help the state's Aquatic Habitat Group (AHG) develop management guidelines to protect marine riparian functions. The AHG is a multi-agency panel assembled to provide guidance for local governments updating Shoreline Master Programs and Critical Areas Ordinances to better protect ecological functions, including marine riparian functions. The riparian workshop included a panel of 14 scientists (including three members of the AHG) with expertise in riparian functions and processes. Panelists were asked to help determine how best to apply knowledge about *freshwater* riparian functions to protect *marine* riparian functions and processes. Seven specific riparian functions were addressed during the workshop, including:

A. Water Quality
B. Shade/Microclimate
C. Large Woody Debris (LWD) recruitment
D. Litter Fall/Provision of allochthonous[*] inputs
E. Fine Sediment Control
F. Wildlife
G. Hydrology/Slope Stability

The names, affiliations, and expertise of panelists (including the three members of the AHG who also served as panelists) are included in Appendix A.

The riparian workshop was the second of a three-phase project. Phase I involved a literature review and the development of draft riparian guidance document; <u>Phase II (the riparian workshop) is the focus of these proceedings</u>. Phase III will involve finalizing the guidance document based in part on expert input solicited during Phase II. *Although shoreline managers utilize a variety of tools to protect aquatic and riparian ecosystems, this project is focused on providing guidance on establishing appropriate buffers for protection of marine riparian area functions.*

In preparation for the workshop, the AHG modified the functional effectiveness curves (also known as riparian function curves) designed and used by FEMAT (1993) to characterize the relationship between buffer width and riparian functions in freshwater environments of the Pacific Northwest (see original curves at end of Appendix A). These regenerated riparian function curves are based on the results of function studies conducted primarily in freshwater systems and are presented as analogs for

[*] Allochthonous inputs are organic matter brought in from outside a system.

marine riparian areas. The relevance of freshwater riparian functions to marine riparian functions has been recognized and supported in a number of publications (e.g., Adamus et al. 1991; Desbonnet et al. 1994, 1995; NRC 2002; Brennan and Culverwell 2004; Lavelle et al. 2005). The curves plot the relationship between buffer width (X axis) and its relative effectiveness (Y axis) in maintaining or providing a particular function (e.g., pollution abatement/water quality, LWD recruitment, wildlife habitat). These curves are particularly well suited to define tradeoffs between buffer width or size and function loss based on the following assumptions:

1. By virtue of their location, riparian areas mediate important ecological processes and functions that benefit adjacent water bodies (and vice versa).
2. The functional effectiveness of buffers at various widths illustrated by the riparian function curves reflects a generic or typical setting (i.e., a prototypical morphology and physical setting of a relatively undisturbed vegetation community growing adjacent to a water body).

Most studies focus on receiving waters to measure and observe how riparian functions are manifested in the ecosystem, yet many of these ecological functions occur within the riparian area as well. For example, the curve describing LWD recruitment is measured from the middle or edge of the stream, not within the riparian area. For some functions, site potential tree height (SPTH) was used as a proxy for buffer width, whereas other buffer width determinations are provided as simple linear measurements. More details about how the riparian function curves were used to solicit expert opinion during the riparian workshop is included in the following section. *Input gathered from panelists during the workshop on the applicability of riparian research to protect marine riparian functions is intended to meet the state's best available science criteria.*

SECTION II: Workshop Objectives and Approach

The four key objectives for the workshop were to:

1. Solicit expert opinion on the <u>applicability (or fit)</u> of using freshwater riparian function curves to protect marine riparian functions.
2. Solicit expert opinion on the <u>uncertainties associated with the application of buffers</u> in different physical or ecological settings (e.g., geomorphology, vegetation type and cover, exposure, etc.).
3. <u>Identify literature</u> that could help inform the development of buffers for marine riparian areas.
4. <u>Identify data gaps, uncertainties, and research needs</u> associated with marine riparian areas.

To achieve these objectives, the workshop was divided into three facilitated sessions as described below.

<u>Session I:</u> Background/context

Panelists were provided with background information on marine riparian protection efforts in the Puget Sound region. This was followed by an overview and summary of scientific information for each of the seven riparian functions addressed in the workshop. Riparian function curves for six of the seven riparian functions (wildlife was not included, see details in section III d) were presented along with underlying science used to generate the curves, providing a context for how applicable the function curves could be for marine settings.

***Session II*: Riparian function curve review**

Panelists were asked to review the riparian function curve generated for each riparian function and to respond to three questions:

1. Does the riparian function curve "fit" (e.g., is it applicable) in marine settings? The applicability of a particular function curve refers to how well the curve describes the functions of marine riparian areas in a prototypical shoreform/beach type in Puget Sound.

2. How important is this riparian function in marine settings? Panelists were asked to provide their opinion on the capacity of undisturbed marine riparian areas to provide each function or process on a scale of 1 (lowest) to 10 (highest). For example, for the hydrology/slope stability function, participants were asked to assign points based on their understanding of marine riparian areas' ability to protect hydrology and slope stability functions derived from riparian vegetation. This information was used to generate discussion and help the workshop organizers better understand where and why opinion differed among panel members.

3. How should the curve be modified to better characterize the marine riparian environment? If the panelists thought a function curve did not accurately describe a relationship, they were asked how the curve should be modified to better describe it. Panelists were asked to provide supporting information for suggested modifications.

***Session III*: Additional information (caveats, controlling factors, missing literature, and data gaps):**

For each of the seven functions, panelists were asked:

1. Which controlling factors (e.g., shore form, slope, disturbance, vegetation type, aspect, soils, etc) are most important in determining the specific relationship between buffer width and this function?

2. What additional literature would be informative?

3. What data gaps exist?

SECTION III: Overview of Riparian Functions and Key Findings of Science Panel

A. Water Quality

Overview

The water quality function of riparian areas is well understood and widely documented, although much of the literature is focused on freshwater systems. Riparian vegetation and soils bordering both freshwater and marine systems act in concert to intercept and absorb water; absorb and process nutrients, sediments, and pollutants; store and transmit water; and retain or decompose pollutants (Correll 1997; Wenger 1999; Vigil 2003; Brennan and Culverwell 2004; Hawes and Smith 2005). Vegetation and soils decrease surface and subsurface water velocity and flow, thereby increasing the potential for retention, filtration, and/or transformation of sediments and other contaminants. A number of factors have a strong influence on buffer effectiveness for water quality, including vegetation type and density, topography and slope (i.e., geomorphology), contaminant load, amount of impervious surface, ability to provide sheet flow (as opposed to channelized flow), infiltration/absorption capacity, organic and moisture content of soils, and soil texture (permeability).

Riparian function curve for water quality

The data (Table 1) and graph (Figure 1) below were adapted from Desbonnet et al. (1995) to provide a generalized representation of buffer width recommendations for water quality. It is considered a good synopsis of the findings of several buffer review and synthesis papers, and was one of the few sources of summary data for water quality effectiveness at various buffer widths.

Table 1. Summary data used to produce a generalized curve for effectiveness of vegetated buffers to remove various pollutants at different widths (adapted from Desbonnet et al. 1995). TSS = total suspended sediment. We found no information available on composition of vegetation within the buffer.

% Removal	Buffer Width (m)			
	Sediment	*TSS*	*Nitrogen*	*Phosphorus*
50	0.5	2	3.5	5
60	2	6	9	12
70	7	20	23	35
80	25	60	60	85
90	90	200	150	250
99	300	700	350	550

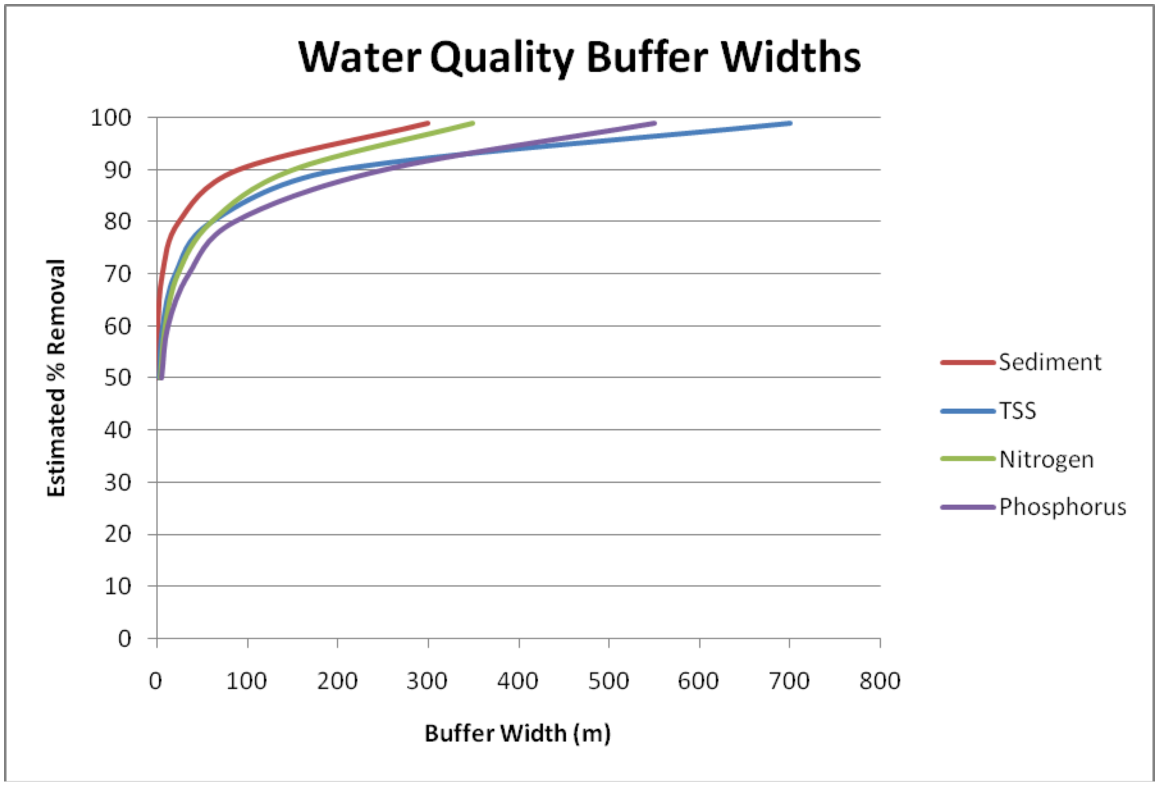


Figure 1. Contaminant removal effectiveness of four water quality constituents at various buffer widths (adapted from Desbonnet et al. 1995).

Key science panel findings

Water quality is an important function of marine riparian areas, but relative to the dynamics affecting water quality in Puget Sound at the watershed and landscape scales, many panelists concluded that an undisturbed marine riparian area's contribution to maintaining water quality is proportional to the upland area. Anthropogenic activities in marine riparian areas undoubtedly include the generation and routing (via water) of pathogens, nutrients, toxics, heat, and fine sediment (above normal background levels) that can affect water quality. However, the marine riparian area is limited in spatial extent; that is, it constitutes a small fraction of the Puget Sound drainage basin. Most contaminants reach Puget Sound via:

1) Streams or drainage networks discharging into the Puget Sound Basin, or pathways that concentrate rainfall and snowmelt from impervious surfaces associated with human residential and commercial development and transportation infrastructure; and

2) Waste water entering Puget Sound from municipal and industrial facilities (i.e. municipal sewage treatment plants and direct discharge from industrial facilities).

Thus, while minimizing impervious surfaces and controlling harmful inputs into surface and groundwater is as important in marine riparian areas on an acre for acre basis as it is across the entire Puget Sound basin, many panelists believed that relative to the larger watersheds that deliver pollutants to Puget Sound, marine riparian areas contribute a small fraction of the ecological function in mitigating water quality impacts at a landscape scale. However, given their proximity to nearshore development and their role in influencing shoreline habitats and species, the panel generally agreed that marine riparian areas do play a role in protecting water quality (i.e., site specific, along marine shorelines) and contribute to the cumulative watershed influences. One aspect of residential development in marine riparian areas not addressed during the workshop included pollution from failing septic systems including bacteria and nutrients.

Panelists generally agreed that the curve in Figure 1 is conceptually valid for water quality issues originating in marine riparian areas.

B. Shade/Microclimate

Overview

Marine riparian areas have unique natural climate control mechanisms that differ from upland areas and which influence both physical and biological conditions at a local scale. Riparian vegetation can intercept solar inputs and help create microclimate conditions (soil and ambient air temperature, moisture, solar radiation, wind, humidity) in both terrestrial and aquatic environments (FEMAT 1993;

Knutson and Naef 1997; May 2003; Parkyn 2004). Forested buffers have an insulating effect, helping to moderate ambient air, soil, and water temperatures, keeping them warmer in the winter and cooler in the summer (Castelle et al. 1992; FEMAT 1993; Osborne and Kovacic 1993; Knutson and Naef 1997; Chen et al. 1999; Wenger 1999; Bavins et al. 2000; Rice 2006; Tonnes 2008).

Riparian function curve for shade

In order to develop a graphic representation of shade effectiveness (Figure 2), the generalized curve from FEMAT (1993) (Appendix D) was used to generate the data needed (Table 2) to create a plot of buffer width effectiveness at varying distances from the edge of a forest stand.

Table 2. Approximated data used to create a generalized curve (Figure 3) indicating percent of riparian shade function occurring within varying distances from the edge of a forest stand (adapted from FEMAT 1993) (SPTH = site potential tree height).

Cumulative Effectiveness (%)	Buffer Width (SPTH)	SPTH m(ft)
0	0.00	0(0)
10	0.07	4(14)
20	0.15	9(30)
30	0.22	13(44)
40	0.29	18((58)
50	0.36	22(72)
60	0.42	26(84)
70	0.50	31(100)
80	0.61	37(122)
90	0.73	45(146)
93	0.80	49(160)
95	1.00	61(200)

Figure 2. Generalized curves representing cumulative effectiveness of microclimate attributes as a function of distances of the edge of a forest stand (after Chen 1991). One tree height equals 200ft (61m) (from FEMAT 1993).

Key science panel findings

Panelists unanimously agreed that shade/microclimate is an important marine riparian function. In contrast to freshwater environments, where shade can help moderate stream water temperatures, shade in marine environments was considered less important in moderating water temperature than in moderating temperatures of beach substrates in the supratidal zone and in intertidal zones during low tides, especially during summer months. Panelists noted that while increases in solar radiation due to loss of riparian shade could warm shallow intertidal waters, the effects of this warming have not been quantified. They pointed to studies indicating that riparian vegetation plays an important role in the survival of forage fish spawn (Penttila 2001; Rice 2006) by reducing either heat or desiccation stress. They also noted that solar radiation is an important limiting factor for most rocky intertidal organisms (Ricketts and Calvin 1968; Connell 1972), and that shade may be particularly important for climate-sensitive species. Panelists also noted that ultraviolet radiation is an important consideration because it will persist, even on cloudy days.

Additional panel comments include:

- Overall, vegetation community type is an important consideration for assessing the shade function as some shorelines, even in an undisturbed state, do not support forest community types.

- Important factors that influence marine riparian shade include aspect, SPTH, bank morphology, and other site characteristics that affect plant growth.
- Loss of overstory trees can increase solar radiation to the patch and to the upper beach – an effect that may persist for decades or even longer.
- The continuity of the vegetated community structure over time is an important component of the shade characteristics it provides (as well as other functions) and is influenced by natural processes and disturbances. In the Puget Sound marine environment, where slumping cliffs and erosion are common shoreline characteristics, the shade function depends on a recruitment process. For example, the setback distance of a tree that is 50 feet from the shoreline today will shrink over time as a result of bank erosion, or surface soil creep. This differs from the shade function in freshwater environments, which may be relatively more stable, but is somewhat analogous to a relocation of the stream channel in a floodplain, albeit with somewhat greater predictability because the shoreline only migrates in one direction.

Data gaps

- Limited knowledge exists on survival thresholds for climate-sensitive species, especially in the marine environment.
- Microclimate data are typically derived from upland research. Applying upland climatic data to the marine environment where many buffers are simply one-sided is a large data gap.
- Research is needed on the influence of shade to groundwater (some of which is discharged to beaches via surface flows) on shorelines.

C. Large Woody Debris (LWD) Recruitment and other functions of wood

Overview

The contribution of large woody debris (LWD) into marine environments is considered an important function of marine riparian areas, although the relative proportion of wood delivered from the marine setting compared to river systems is not well documented (Brennan and Culverwell 2004; Tonnes 2008). The role of upland riparian areas in providing LWD in freshwater environments, however, has been very well studied. It is generally believed that LWD provides similar functions in both freshwater and marine systems (Harmon et al. 1986; Sedell et al. 1988; Bilby and Bisson 1998; Hyatt and Naiman 2001; Latterell and Naiman 2007) including:

- Accumulation of organic matter and sediments.
- Habitat structure for periphyton (Coe et al. 2009), invertebrates, fish, and wildlife.
- Bank stability and erosion control.
- Substrate (such as “nurse logs”) for recruitment of plant species.
- Moderation of local benthic temperatures and moisture regimes on beaches.

The source of LWD in streams and rivers is riparian forest growth both adjacent to and upland from the stream channel. Similarly, the natural source of marine LWD (also known as "driftwood") comes from adjacent marine riparian areas, or is delivered from rivers, streams, and other shoreline areas via marine currents. In recent decades, the volume and quality (wood variety and dimensions) of LWD from natural sources appear to have been reduced due to historic and current logging practices, the conversion of shoreline areas for agriculture and flood control levees, and urbanization (Tonnes 2008). Persistence and residency time of LWD are controlled by decomposition rates of different wood types, size and dimensions of the wood, their ability to become trapped or anchored, and the exposure to hydraulic forces (e.g., river flows, tides, waves, currents).

Riparian function curve for LWD

For the LWD riparian function curve (Figure 3), cumulative effectiveness of LWD recruitment data (Table 3) was plotted as a function of potential tree height (based on the FEMAT 1993).

Table 3. Approximated data used to create generalized curve (Figure 3) indicating percent of LWD recruitment function occurring within varying distances from the edge of a forest stand (adapted from FEMAT 1993). Note that one SPTH equals 200 feet (61 meters).

Cumulative Effectiveness (%)	Buffer Width (SPTH)	SPTH m(ft)
0	0	0
10	0.09	6(18)
20	0.18	11(36)
30	0.25	15(50)
40	0.32	20(64)
50	0.4	24(80)
60	0.47	29(94)
70	0.55	34(110)
80	0.65	40(130)
90	0.8	49(160)
93	0.85	52(170)
95	0.9	55(180)
99	1	61(200)
99	1.2	73(240)

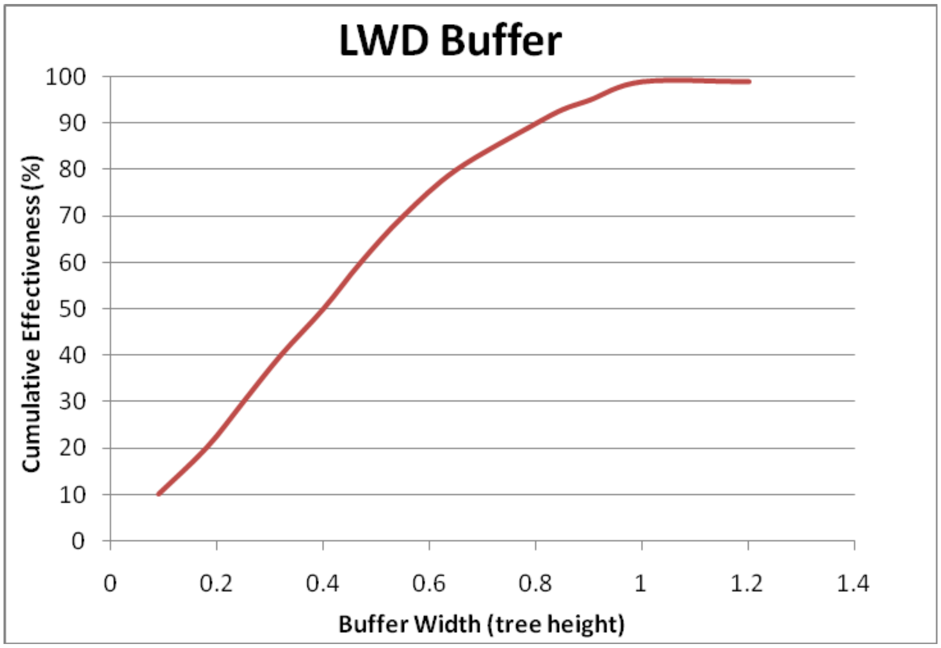


Figure 3. Generalized curve indicating percent effectiveness of LWD recruitment from riparian areas occurring within varying distances from the edge of a forest stand. Tree height (SPTH) is used to indicate buffer width. One SPTH is equal to 200ft (61m) (FEMAT 1993).

Key science panel findings

In general, the science panel agreed that the LWD effectiveness curve is conceptually valid although the proportion of marine LWD entering via shorelines versus river systems is largely unknown. The panel recognized that the quantity and availability of marine LWD is likely to be lower now than historically, particularly in the largest diameter classes, as a result of historic harvest, urbanization, salvage logging, and efforts by the U.S. Army Corps of Engineers to remove floating logs that pose navigation hazards. Wood entering beaches from coastal shorelines may be more stable since this LWD often includes root balls, or may be anchored in the bank, which could reduce its mobility during high tide and storm events. Dan Tonnes discussed his thesis research in Whidbey Basin, where he found that 1.4 percent of the LWD on sediment bluff beaches originated from adjacent unstable bluffs. Additional points raised by the panel included:

- LWD is important for many nearshore organisms that use wood as food and habitat.
- LWD helps stabilize beaches and reduce wave-cut erosion of bluffs.
- The shape of the function curve is primarily based on downhill delivery, within a distance of a single tree height and for more stable and less steep. The shape of the curve would be different under steeper and less stable slope conditions.

D. Litter Fall/Provision of Allochthonous Inputs

Overview

Riparian areas contribute significantly to material creation, cycling, and movement between terrestrial and aquatic systems (Lavelle et al. 2005; Ballinger and Lake 2006). Although the exchange of energy and nutrients between aquatic and terrestrial systems is identified as an important ecological process for maintaining productivity, most studies of these interactions focus on the influence of allochthonous inputs of organic material on stream systems. The contribution of these inputs to marine systems and influence on productivity and other ecological functions is not well understood.

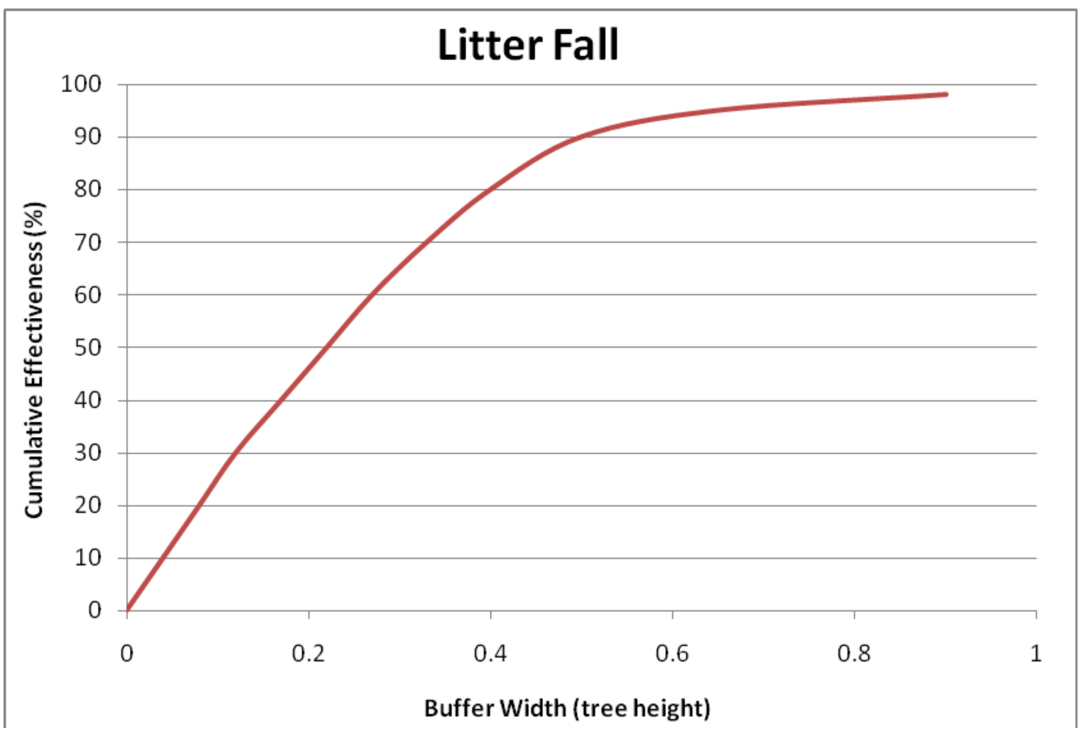
Riparian vegetation provides organic litter that serves as habitat and food for fishes and aquatic invertebrates (Adamus et al. 1991; Vigil 2003; Lavelle et al. 2005;; Ballinger and Lake 2006). Aquatic invertebrates are important components of stream systems and are often used as indicators of stream health (Wenger 1999). Riparian vegetation influences the amount and type of terrestrial invertebrates that fall into aquatic systems which in turn serve as a major food source for freshwater fishes birds, mammals, reptiles, and amphibians (Romanuk and Levings 2003; Sobocinski 2003). Terrestrial insects are an important food source for many salmonids in streams, and have recently been shown to be a large component of the diet in juvenile salmonids while residing in marine nearshore waters of Puget Sound (Sobocinski 2003; Brennan et al. 2004; Duffy et al. 2005; Fresh et al. 2006; Fresh 2007). In addition, some fish and invertebrates feed directly on vegetative detritus (McClain et al.1998; King County DNR 2001; Vigil 2003; Lavelle et al. 2005).

Riparian function curve for allochthonous inputs

The FEMAT (1993) “litter fall” buffer effectiveness curve was used to recreate a generalized graphic representation of allochthonous inputs because data required to generate a graph were not available from other sources.

Table 4. Approximated* data used to create generalized curve (Figure 5) indicating percent of riparian allochthonous input function occurring within varying distances from the edge of a forest stand (adapted from FEMAT 1993).

Cumulative Effectiveness (%)	Buffer Width (SPTH)	SPTH m(ft)
0	0	0
10	0.04	2.4(8)
20	0.08	4.9(16)
30	0.12	7.3(24)
40	0.17	10.3(34)
50	0.22	13.4(44)
60	0.27	16.5(54)
70	0.33	20(66)
80	0.4	24.4(80)
90	0.5	30.5(100)
95	0.65	40(130)
98	0.9	55(180)



* An estimate of values from FEMAT 1993 plotted on an X and a Y axis, or extrapolating from FEMAT graphs to come up with specific numbers to plot on a new graph. See guidance document for more detail.

Figure 4. Generalized curve indicating percent effectiveness of riparian allochthonous input and litter fall occurring within varying distances from the edge of a forest stand. One site potential tree height is equal to 200ft (61m) (adapted from FEMAT 1993).

Key science panel findings

Overall there was a general acceptance that organic nutrient exchange is a relevant function of marine riparian areas and that the conceptual curve is a valid representation of marine allochthonous input functions. In addition, there was a consensus on the following:

- Energy and nutrient exchange is a multi-dimensional characteristic across the aquatic and terrestrial interface. For example, litter fall/allochthonous input is not limited to leaves, but includes other matter such as plant stems, insects, and other organic matter.
- Riparian areas are likely an important area of emergence for insects, and some flying insects may be introduced to marine waters via wind and stream inputs. Panelists noted that some of the insects found on beaches and in the diet of juvenile salmonids do not fly and are not as likely to become airborne and transported via wind.
- Nutrient exchange is not simply unidirectional, but bi-directional. Marine derived nutrients are also transported into the terrestrial environment via multiple pathways including:
    - Atmospheric input via wet or dry deposition, which can occur through fires, intensive farming and agricultural activities, and wind erosion (Lavelle et al. 2005).
    - Lateral transfers of nutrients through water flows, including microalgae and macroalgae washed ashore (Adamus et al. 1991; McLachlan and Brown 2006).
    - Decomposing secondary consumers, such as juvenile Pacific herring, Pacific sand lance, longfin smelt, surf smelt, sole, salmon, seabirds, and marine mammals, also contribute nutrients. For example, in freshwater systems, Pacific salmon nutrients are deposited by predators and scavengers in excreta, or as carcasses and skeletons (Cederholm et al. 1999; Naiman et al. 2002; Drake et al. 2006).
    - Secondary consumers can transport nutrients to upland areas, facilitating nutrient and energy exchange between terrestrial and aquatic food webs (Ballinger and Lake 2006). For example, Elliott et al. (2003) examined the relationship between bald eagles and Plainfish Midshipman, a demersal fish and intertidal spawner. Between May and June of 2001, the authors found that eagles consumed about 22,700 ± 3,400 midshipman, representing large transfers of nitrogen into trees, and the potential to enhance community productivity along the shoreline.

The overall relevance of this function curve was ranked in the middle, likely because many panelists did not feel knowledgeable enough to make an informed ranking due to a lack of empirical studies in marine riparian systems.

E. Fine Sediment Control

Overview

One of most studied functions of riparian areas is fine sediment control. Fine sediments enter waterways from a number of terrestrial sources, both natural and anthropogenic. The human-derived fine sediments originate primarily from construction sites, suburban and urban developed areas, forestry and agricultural practices, and unpaved roads that drain into waterways. Sediments become exposed and subject to erosion as a result of vegetation removal, excavation, road wash from unpaved roads, and compaction of soils. Once sediments are suspended in and moved by surface water runoff, they can be delivered to waterways unless they settle out or become trapped.

Excess amounts of sediment, particularly fine sediments, can have numerous deleterious effects on water quality and aquatic biota. The following list briefly summarizes several major effects from anthropogenically-produced sediment (adapted from Wenger 1999):

- Sediment deposited in rivers and streams can reduce habitat for fish and invertebrates.
- Suspended sediment reduces light transmittance, which decreases primary productivity.
- High concentrations of fine suspended sediments cause direct mortality, or impairment (such as suffocation and/or reductions in food supply) for many fish and invertebrates.
- Excess suspended sediments can interfere with filter feeders' apparatus thus reducing the abundance and diversity of filter-feeding organisms, including mollusks and some arthropods.
- Sediments absorb chemical compounds, serving as a delivery mechanism for contaminants to water bodies.

Riparian buffers composed of dense vegetation can act as a "line of defense" for reducing or eliminating anthropogenic sedimentation of waterways in a number of ways by (adapted from Wenger 1999):

- Displacing sediment-producing activities away from a water body;
- Trapping terrestrial sediments in surface runoff;
- Reducing the velocity of sediment-bearing storm flows, allowing sediments to settle out of water and be deposited on land;
- Creating sheet flow of surface waters, reducing channelization (which can increase conveyance and erosion);
- Stabilizing banks and bluffs, preventing landslides and other erosion;
- Intercepting and absorbing precipitation in the canopy, understory, and ground cover, thereby reducing the amount of water that can displace sediments; and/or

- Contributing LWD, which helps to trap sediments, support vegetation, and reduce erosion from stream flows and waves.

Research on buffer effectiveness has examined both forested buffers (composed of native vegetation) and grass buffers, although results are mixed as to which is most effective at controlling fine sediments. Riparian buffers composed of dense vegetation can reduce the velocity of sediment bearing storm flows, help reduce channelization, and intercept precipitation in the canopy thereby reducing the amount and energy of water that can displace sediments. In addition, composition and density of riparian vegetation (both standing and as LWD) are important elements for controlling surface flows, trapping sediments, and reducing erosion. Riparian soils also play an important role in absorbing water and trapping sediments.

An important factor in determining the sediment removal capabilities of riparian areas is slope. Riparian areas with steeper slopes require wider buffers to provide the same level of sediment removal (similarly with contaminant removal). Capacity is also an important consideration. High levels of sediments can exceed the capacity of riparian areas to trap sediments. If overloaded, riparian effectiveness can be reduced to a point where this function is essentially lost.

Riparian function curve for fine sediment control

To illustrate fine sediment control in generalized curves for riparian buffer effectiveness at various widths, the summary data from Desbonnet et al. (1995) (Table 5) were used to generate a scatter plot (Figure 5) and associated curves, similar to the riparian buffer curves developed by FEMAT (1993).

Table 5. Summary data used to generate generalized curves for sediment control effectiveness at different buffer widths (adapted from Desbonnet et al. 1995).

% Removal	Buffer Width(m)	
	Sediment	*TSS*
50	0.5	2
60	2	6
70	7	20
80	25	60
90	90	200
99	300	700

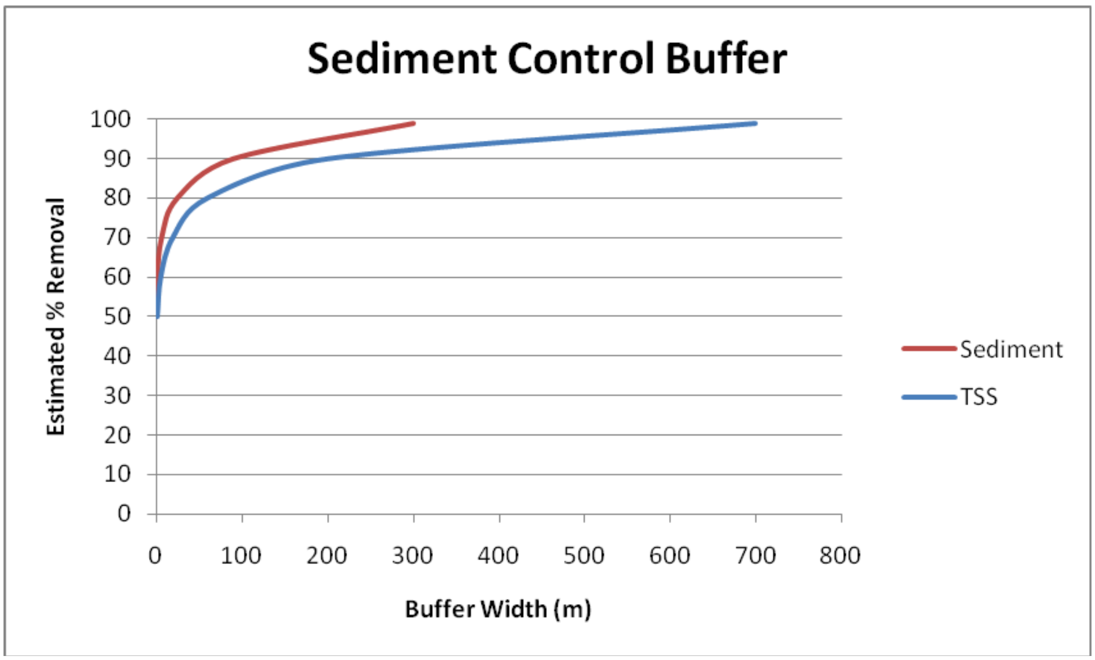


Figure 5. Generalized curve illustrating sediment removal effectiveness at various buffer widths (adapted from Desbonnet et al. 1995).

Key science panel findings

There was general consensus by panelists that the riparian function curve for sediment control is conceptually valid. The panelists discussed the relationship between sediment delivery and land use, the role of sediment, the definition of sediment (e.g., size, class), and the source and function of natural versus unnatural causes of sedimentation. Panelists ranked the relevancy of this function as it relates to other marine riparian functions as low, largely because there is a strong contrast in natural and anthropogenic sediment issues in freshwater and marine systems. Panelists noted that maintaining natural erosion and sediment transport processes are critical to maintaining beaches in Puget Sound.

They also noted that much of the sediment nourishing Puget Sound beaches originates in marine riparian areas, facilitated by natural driving forces (wind and wave action, bluff saturation, leading to slope failures). The panelists felt strongly that it was very important to maintain natural sediment inputs from marine riparian areas into Puget Sound – that perhaps the biggest threat to marine systems from human activity is the reduction of sediment inputs by armoring shorelines and disrupting natural erosion of bluffs. This is in sharp contrast to freshwater systems, where riparian areas are managed to minimize human-induced fine sediment inputs which substantially impact habitat and water quality of freshwater streams. Thus, the panel recognized the need to distinguish between “normative” sedimentation rates in marine riparian areas as opposed to human-induced changes to sediment inputs. Further, while the risks of human induced inputs of fine sediments into marine shorelines have not been as well studied as freshwater systems, the panel recognized marine riparian areas as important for ensuring “normative” sediment processes and reductions of potentially harmful levels of fine sediments from anthropogenic activities.

Additional key comments and questions raised by the science panel are provided under the following topics:

Definition of Sediment

- Most reviews of the water quality functions in riparian areas incorporate a discussion of sediment control as part of the discussion of other contaminants. Associating sediment control functions with other water quality functions may help reduce the confusion concerning natural sediment delivery and transport processes versus excessive fine sediment inputs from anthropogenic sources.
- How sediment is defined (e.g., size, class) can change the role and function within the ecosystem as a whole. Perhaps identifying “anthropogenically-derived fines” would help clarify this.
- Sediment delivery is critical to sustaining Puget Sound beaches and is part of the natural watershed process that shapes the shoreline.

Land Use

- Land use practices influence the characteristics, timing, and magnitude of sediment input, and can increase annual sediment loads reaching streams by several factors.

Role of Sediment

- The role of sediment in nearshore processes of Puget Sound needs to be acknowledged and not confused with controlling fine sediment (and associated contaminant) delivery to marine waters. The compounds that bind to sediment (such as phosphorus) are delivered to the nearshore aquatic environment (where they may play an important ecological role), thus natural levels of sediment delivery should be an important component of riparian management.

F. Wildlife

Overview

In a review of eight separate reports synthesizing much of the literature on riparian functions and buffers, all include a discussion of the importance of riparian areas to wildlife and offer either a range of reported buffer widths, and/or specific buffer recommendations for protection of wildlife habitat. The provision of wildlife habitat is commonly identified as one of the most important functions of riparian areas by meeting important life history requirements such as feeding, breeding, refuge, and migration corridors.

Riparian function curve for wildlife
FEMAT (1993) did not generate a riparian function curve for wildlife. Although a number of other publications describe the importance of riparian areas for supporting wildlife, functional effectiveness data are specific to individual species life history requirements, so it was not possible to generate a function curve. Some researchers have attempted to use physical criteria (plant community, microclimates) as a surrogate for identifying unique riparian habitat attributes for wildlife.

Key science panel findings

Although no riparian function curve for wildlife was available for panel review, there was general consensus that marine riparian areas provide a suite of functions for wildlife as habitat buffers and migration corridors. Some participants pointed out that there are a number of species that would not utilize marine nearshore areas, or cross onto beaches, if a buffer did not exist, which led to a discussion of obligate versus facultative uses. All panel members agreed that marine riparian areas provide a suite of important services for wildlife and this function was rated high across the panel. Discussion on the wildlife function included:

Obligate/Optimal Use Species

- There are few known marine riparian obligate species and it was unclear if the process of identifying obligate species in marine riparian areas had been carried out. It is believed that most wildlife in these areas are generalized in their use and preference, although few studies have focused on this set of questions for marine riparian areas. The unique aspect about the marine riparian environment is that it supports a number of important functions and processes that create and maintain wildlife habitat. Diversity was mentioned frequently with regard to riparian areas; many wildlife species are generalists in their use of ecotones, so increased local species diversity may or may not lead to high regional diversity. Heightened local diversity occurs because structural diversity and vegetation are linked closely with the aquatic system. Larger buffers would benefit bigger animals with wider ranges, and are important for wildlife sensitive to human disturbances. See Marzluff (2005), Sax and Gaines (2003), and Scott and Helfman (2001).

- Invasive species within riparian areas need to be considered as they may reduce buffer effectiveness. Buffers can harbor nuisance species and any pathogens that are transported along with their introduction, which is a cause for concern with respect to local wildlife and human populations.

Additional Key Comments:

- It may be helpful to provide more information on the functions of ecotones in the guidance document (e.g., define and provide information on multiple functions of ecotones).
- Need to consider obligate versus facultative use species in the buffer. For example, some shorebird species may be obligate users of the marine riparian zone during migration periods.
- Address seasonal variability as it relates to wildlife usage;
- Need to consider supralittoral (i.e. the splash/spray zone above spring high tide line, not submerged by water) use by plovers, seals, otters, deer, and other animals.
- Buffer areas could disrupt or enhance migratory pathways, depending on the species life history requirements and habits.
- Functional connectivity between habitats does not always have to be continuous; some animals can leap-frog areas.
- Some structural elements may need to be considered for specific wildlife needs (may vary with beach and/or buffer type).
- Wildlife may have important roles, through selective feedings and deposition of nutrients, in shaping the structure and productivity of marine riparian areas (Naiman and Rogers 1997).

G. Hydrology/Slope Stability

Overview

Substantial literature exists on the role of vegetation in controlling hydraulic processes and increasing slope stability. Much of this literature addresses the impacts (such as sedimentation, siltation, and excessive flow volumes) of logging, agriculture, urbanization, and other practices to streams and wetlands. A significant portion of the literature on impacts has little to do with maintaining or protecting ecological functions of riparian or aquatic systems, but rather focuses on how these impacts affect human infrastructure. Regardless of the system (freshwater or marine), or the focus of the research and assessment reports (ecological or social implications), the general consensus is that vegetation can play an important role in controlling hydrologic processes and slope stability in the following ways (adapted from Griggs et al. 1992: IN Macdonald and Witek 1994):

- *Interception*: Foliage and plant litter absorb the energy of precipitation, reducing direct impacts on soil.
- *Restraint*: Root systems bind soil particles and blocks of soils, and filter sediment out of runoff.
- *Retardation*: Plants and litter increase surface roughness, and reduce runoff volume and velocity, reducing channelization.
- *Infiltration*: roots and plant litter help maintain soil porosity and permeability.
- *Transpiration*: plants absorb moisture, delaying the onset of soil saturation and surface runoff.

In addition, the influences of woody plants on mass movement may include:

- *Root Reinforcement* – Roots mechanically reinforce soil by transferring shear stresses in the soil to tensile resistance in the roots.
- *Soil Moisture Depletion* – Interception of raindrops by foliage as well as evapotranspiration limit buildup of soil moisture.
- *Buttressing and Arching* – Tree trunks can act as buttress piles or arch abutments in a slope, counteracting shear stresses.
- *Surcharge* – The weight of vegetation on a slope may exert a destabilizing down slope stress and a stress component perpendicular to the slope that increases resistance to sliding.
- *Root wedging* – Roots invade cracks and fissures in soil or rock that could add restraint stability or cause local instability by wedging action.
- *Wind throw* – Strong winds exert an overturning movement on trees causing blow down (usually of aged, diseased, or undermined trees) that disturb slope soils.

Riparian function curve for hydrology and slope stability

No data could be found plotting the functional effectiveness of the hydrology/slope stability function, so data were generated following the model provided by Griggs et al. (1992) (IN Macdonald and Witek 1994) were used to create Table 6 and Figure 6. This study addresses setbacks on bluffs and other unstable slopes to protect against property loss.

Table 6. Setback distances (ft.) for different bluff heights at various levels of stability where geologic stability for 50 years cannot be demonstrated (after Griggs et al. 1992).

Bluff Height (ft)	**Stable (1:1)(45^0)**	**Moderately Stable (2:1)(30^0)**	**Unstable (1:1)(45^0)+ (2:1)(30^0)**
20	20	40	60
40	40	80	120
60	60	120	180
80	80	160	240
100	100	200	300
120	120	240	360
140	140	280	420
160	160	320	480
180	180	360	540
200	200	400	600

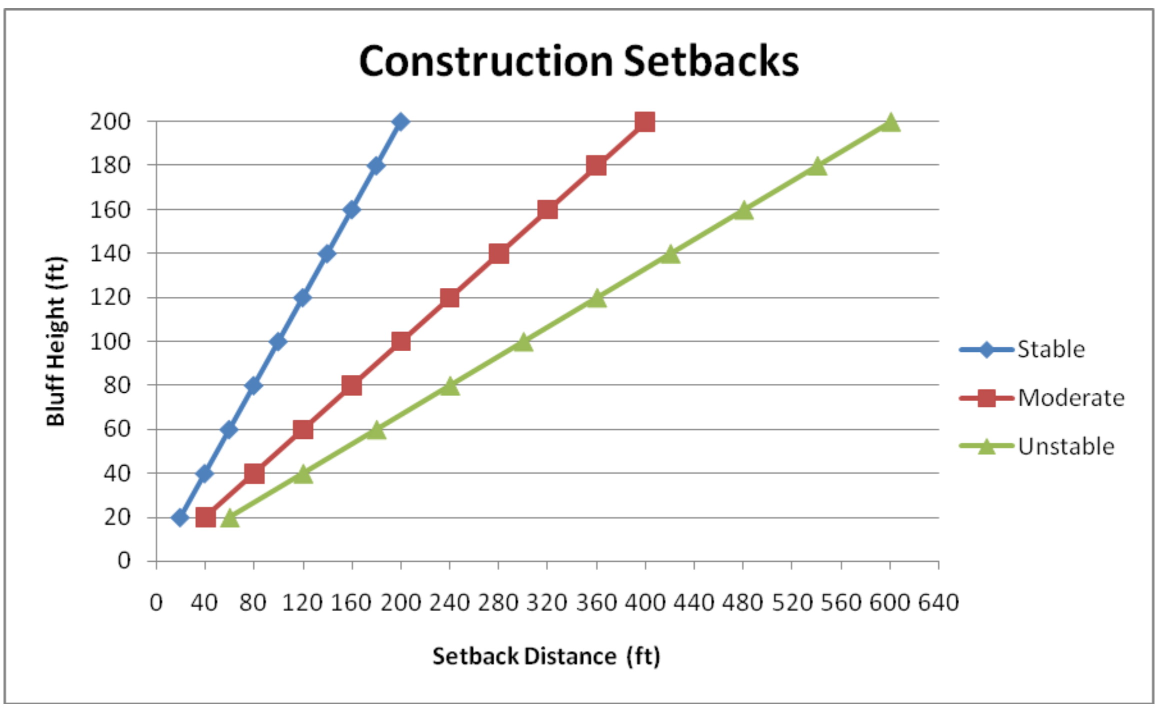


Figure 6. Construction setbacks for different bluff heights at various levels of stability, where geologic stability for 50 years cannot be demonstrated (after Griggs et al. 1992).

Key science panel findings

All participants agreed that the hydrology/slope stability graphic is applicable in the marine environment. Panelists discussed the importance of hydrology, geomorphology, soil type, and vegetation type in supporting slope stability functions in Puget Sound, in addition to the human safety concerns about slope stability in the region.

Geomorphology

- Landforms and geology can be more important here than buffer width. For example, in the San Juan Islands, there can be a 45° slope on basalt form that can be very stable.
- Consider geomorphic shore form (e.g., geologic legacy, landscape position, density, slope, etc.). Use of Shipman (2008) geomorphic classification system may be useful.

Soil and Vegetation

- Soils and vegetation play important roles in slope stability and hydrology.
- The relationship of riparian vegetation and slope stability is very specific to hydrologic and geologic conditions. It is important to consider flow paths; for example, stability may be associated more with altered upland drainage patterns or precipitation patterns. Therefore, this relationship may be site-specific.
- Need to consider the role of vegetation on the slope itself versus above the slope, which would yield different functions. The relative importance of vegetation at each location, given site-specific conditions and methods of protection need to be determined. Similar to the discussion of "sediment" above, management should allow for normative rates of LWD recruitment and erosion to provide sediments and wood to beaches.
- Buffer width versus landform may be the most important factor. For example, steeper slopes, particularly those with underlying geologic instability, require wider buffers.
- Need to maintain normative rates of sediment delivery by using setbacks and buffers – should avoid interfering with natural processes.
- Upslope alterations are large contributing factors to slope instability.
- Home protection and public hazard considerations are likely to garner public support for buffers.
- Riparian areas can increase slope stability (through root structure) and increase water interception and absorption. Protecting natural rates of sediment delivery and protecting processes and functions of nearshore ecosystems may be achieved by establishing and maintaining adequate riparian buffers.

SECTION IV: Summary and Conclusions

The purpose of this workshop was to solicit expert opinion on how best to apply riparian science to protect marine riparian functions and processes with a particular emphasis on buffers. The science panel included fourteen scientists with expertise related to riparian ecosystems. Panelists were asked for input on a variety of questions related to seven specific riparian functions and/or processes.

In general, panelists agreed that findings from studies of freshwater riparian areas are transferable to marine riparian areas, although some processes and functions are unique to marine riparian areas.

A summary of panelist responses to the key questions follows (note: questions were asked for each of seven riparian functions).

1. **Is there general agreement that this function applies in the marine environment? On a scale of 1-10 (low to high), what is the relative importance of this particular function in the marine environment?**

General consensus was reached that each of the seven functions reviewed during the workshop applies in both freshwater and marine riparian environments, although their relative importance varied. For example, three functions (LWD, litter fall, and hydrology) emerged as having higher relative importance to marine environments, based on a subjective ranking process. Many panelists noted that marine riparian science would be greatly improved with additional research. It was also generally agreed these areas should be viewed and managed holistically to address multiple processes and functions at small and large spatial and temporal scales

Water Quality – The panel agreed that while water quality is an important function of marine riparian areas overall, the relative contribution of these areas is minor at a larger scale compared to the freshwater inputs from the Puget Sound drainage basin as a whole. However, water quality functions provided by marine riparian areas may be very important, especially at a site specific level, depending upon land use practices and the integrity of the riparian area.

Shade/Microclimate – According to the panel, shade is of medium relative importance to marine riparian areas in Puget Sound relative to water temperatures in the marine environment, which was judged to be less sensitive to solar inputs than waters in freshwater systems. However, shade has been shown to play a role in survival of upper intertidal organisms in Puget Sound. Additional research is needed to fully understand its role. Erosion and tree removal within and outside the riparian buffer can disrupt the shade function in the marine environment. In addition, the limited knowledge on the survival thresholds for climate-sensitive species in the marine nearshore environment is a major data gap.

LWD Recruitment – LWD in the marine nearshore provides important functions but it was unclear how much of that wood comes from marine riparian areas versus rivers. LWD is known to supply nutrients, stabilize beaches and banks, reduce wave erosion, enhance establishment and growth of vegetation, and provide refuge, nesting and foraging habitat for a variety of species. There is an overall general lack of information specific to the marine environment, but sources of LWD to beaches include freshwater riparian material, logging activity, and marine riparian areas. Recruitment of marine LWD requires buffers that allow for natural erosion and recruitment over extended time periods as banks and bluffs recede.

Litter Fall/Provision of Allochthonous Inputs – These inputs are relevant to both marine and freshwater environments. Terrestrial source nutrients have been shown to be important to the nearshore ecosystem, and some studies have determined that riparian areas serve as emergence habitat for fish prey and support a number of trophic levels in the nearshore food web. Nutrient and energy exchange is not unidirectional and marine derived nutrients find their way to terrestrial environments. Some panelists noted that the contribution of allochthonous inputs to and their influence on productivity in marine systems is a data gap.

Fine Sediment Control/Delivery – This process is important in both marine and freshwater systems. Sediment delivery to the Puget Sound via river systems and eroding marine bluffs (convergence zones) is critical to beach forming processes. Fine sediments originating from anthropogenic sources need to be distinguished from natural sources and background levels. Riparian areas can help control harmful levels of fine sediment and associated contaminant delivery to the aquatic environment while allowing natural processes to continue.

Wildlife – Marine riparian areas provide a suite of habitat functions for wildlife including feeding, breeding, and migration corridors. Some panelists pointed out that there are a number of species that would not cross into the nearshore area if a marine riparian buffer did not exist. Few studies have focused on wildlife utilization of marine riparian areas, but much of what has been studied about the life history requirements in other areas would apply to those species that occur in these areas. Some species may be highly adapted to marine riparian areas and could be considered obligate species, although survey data are lacking.

Hydrology and Slope Stability – Vegetation can play an important role in controlling runoff, maintaining slope stability, and maintaining normative rates of erosion. From this perspective, one function of a riparian area is protecting people from landslides. The safety factors provided by buffers may resonate with people more directly if the argument is framed in terms of the need for normative rates of erosion and sediment delivery to beaches along with protection of human structures.

2. **Does the FEMAT-style curve adapted for this function "fit" for the marine environment? (Yes or No)**

Nearly every panelist agreed that all six of the FEMAT-style curves adapted for riparian processes and functions (a wildlife functional effectiveness graph was not provided) were a reasonable "fit" or conceptually valid for the marine environment, notwithstanding site and scale controlling factors. Several exceptions and caveats were included, such as the LWD function (every panelist felt that the curve's "fit" would vary at a site specific scale); and the shade function (participants pointed to many factors that needed to be considered, including aspect and temporal/spatial variability.

3. **Which controlling factors are most important in determining the specific relationship between buffer width and function (e.g., shore form, slope, vegetation type, aspect, soils)?**

Responses to this question are summarized in Table 7 below. The discussion of these topics was very limited due to time constraints.

Table 7. Controlling factors for riparian buffer functions.

Process/Function	Controlling Factors
Water Quality	▪ anthropogenic activities ▪ flow concentration ▪ slope (highly relevant to flow concentration) ▪ vegetation type and density
LWD	▪ condition of vegetation – species, size, presence, age, structure ▪ landslides ▪ climatic events, wind action, precipitation, ice storms ▪ anthropogenic disturbances: forestry/logging ▪ trigger trees (cause others to fall) ▪ soils ▪ geology ▪ groundwater/hydrology ▪ condition of wood (insects, root rot, disease) ▪ fire (consideration of fine scale disturbances versus catastrophes) ▪ invasive species
Litter	▪ vegetation species, type, age,

Fall/Allochthonous Inputs	structure ▪ vertical diversity (big trees versus understory, ground cover) ▪ climatic events, wind action ▪ slope (degree) ▪ shoreform type ▪ anthropogenic disturbances
Hydrology/Slope Stability	▪ soils ▪ geology ▪ erosion rates ▪ presence of vegetation ▪ groundwater/hydrology ▪ anthropogenic disturbances and upland activities ▪ topography ▪ climatic events, wind and wave exposure, storm severity (climate impacts/change)

Parking Lot Ideas

Throughout the workshop, panelists brought up ideas, issues, concerns, and questions. A number of these topics and considerations were outside the scope of the workshop but were noted as "Parking Lot" issues. They fell into two main topic areas: buffer management and research gaps and needs, and have been grouped by these two categories below.

Guidance on Buffer Management

- Many uncertainties exist in managing marine riparian areas. Using a precautionary approach and adaptively managing these areas is important.
- Management of marine riparian areas must consider a time element. Like many other ecological elements, the processes and functions of marine riparian areas evolve over extended time periods, which need to be considered for developing appropriate management actions. For example, since plants and plant communities (extent, age since last disturbance, composition) are important determinants of riparian functions, managers need to consider the time it takes for large trees to grow and plant communities to become established and maintained through time. Similarly, the time it takes to reestablish following a disturbance event (natural or anthropogenic) should be incorporated into the management strategy (e.g., for protection, enhancement, restoration, recreation).
- Management of marine riparian areas must consider multiple spatial scales. Connectivity is an important characteristic of riparian areas for maintaining ecological functions. Fragmentation and narrowing of buffers can have larger-scale effects. Because shoreline development and permitting typically occur on a site-by-site basis, current management does not account for cumulative and large-scale impacts. In addition, bluffs may continue to erode over time, sea levels will rise and existing buffers will likely become narrower as a result of human or natural disturbance, thereby providing reduced functions. This should be a management consideration for creating sustainable processes and functions.
- In addition to ecological functions, riparian areas have important social, cultural, economic, and recreational values and these should be important management consideration.
- Riparian buffers need to be recognized as being important for human safety in addition to their ecological importance. A large portion of Puget Sound shorelines is naturally eroding, which potentially threatens human infrastructure and safety. The effects of climate change are likely to increase erosion rates and threaten existing infrastructure.
- Sediment (including mass wasting) is important for maintaining beaches in Puget Sound and should not be confused with fine "anthropogenic" sediments that could have adverse environmental effects. One of the key functions of riparian areas is pollution abatement (e.g., trapping fine sediments, treatment of contaminants associated with fine sediments, absorption and treatment of water-borne contaminants). Natural sedimentation and transport processes should be maintained, at normative rates, while also ensuring that riparian functions are protected.

- The term “large wood” has not been precisely defined within the nearshore setting. “Small wood” (i.e. under 1 m long) has been found to moderate beach temperatures and support richer communities of macroinvertebrates.
- Invasive and nuisance species can have a profound effect on riparian functions . Many invasive and nuisance species are well-adapted to disturbance and once established, may alter natural processes and functions, and/or may prevent native species from reestablishing.
- Marine riparian buffers should not be the sole mechanism by which the marine nearshore ecosystems are protected.
- Resiliency of vegetation in marine riparian areas is a function of patch size. As vegetation patches become smaller (thinner) and more isolated by human development, they are more likely to experience disturbances that can change structure and function of that plant community. Isolated patches of relatively undisturbed vegetation may be more susceptible to wind-throw, or invasion of nonnative species, such as English ivy. Further, these patches may become isolated to the point where they suffer from a lack of recruitment of new propagules. They can also be eliminated altogether as a consequence of bluff retreat.

Research Needs and Data Gaps

- Link riparian processes and functions to a geomorphic classification for Puget Sound. A geomorphic classification (e.g., Shipman 2008) may be helpful in developing a riparian classification scheme and may also be informative for identifying important marine riparian functions and processes
- Determine a standard for describing buffer widths. Some investigators have used site potential tree height (SPTH) for determining buffer widths.
- The influence of groundwater on trees and vegetation in the riparian zone.
- Relative contribution of litter fall/allochthonous inputs from the riparian zone versus rivers and other outside areas.
- Value of litter fall/allochthonous inputs and relative food web energetic contribution to the riparian system.
- Identification of priority pollutants in the Puget Sound nearshore system. The panelists noted the need to understand the role of septic systems as likely primary pollutant sources in marine riparian areas; in freshwater systems, septic pollution has been shown to affect fish community structure (Moore et al. 2003).
- Identification of optimal use and obligate species in marine riparian areas
- Classification of the intensity, frequency, and conditions that could give rise to massive slope stability failures in Puget Sound.
- Vegetation dynamics and the effects on riparian function in areas surrounded by human developed lands.

- Riparian condition related to volumes/timing and types of terrestrial insects delivered to nearshore settings.
- The geomorphic functions of driftwood along various Puget Sound shoreline types.

Appendix A. List of Participants

Name	Affiliation	Expertise
Jim Agee	UW	Forest Ecology
Derek Booth	UW, Stillwater Sciences	Geohydrology
Jim Brennan	UW Sea Grant	Marine/Nearshore Ecology
Randy Carman*	WDFW	Marine/Nearshore Ecology
John Marzluff	UW	Wildlife
David McDonald	SPU	Soils Sciences
Bob Naiman	UW	Riparian Ecology
Michael Pollock	NMFS	Riparian Ecology
Tim Quinn*	WDFW	Wildlife
Steve Ralph	Stillwater Sciences, Inc.	Aquatic Ecology
Si Simenstad	UW	Marine/Nearshore Ecology
Kathy Taylor*	WDOE	Marine Ecology /Forest Ecology
Dan	NMFS	Biology

Tonnes		
Steve Toth	Independent Consultant	Geomorphology

* Member of Aquatic Habitat Group

Appendix B. Agenda

TIME	TOPIC	PRESENTER/ FACILITATOR
8:00-8:20	**Welcome, introductions, agenda review**	Hilary
8:20-8:45	**Background, goals, objectives, terminology**	Hilary
8:45-9:45	**Summary of riparian functions and applicability to marine shorelines**	Jim
9:45-10:00	**Break**	
10:00-Noon	**Detailed discussion of functions** ***Key questions for each function*:** • Does the FEMAT-style buffer curve derived from the freshwater science for this function "fit" for the marine environment? • Why or why not? • How is the relationship between buffer width and this function likely to be different in marine compared with freshwater systems? • What data exists to support each of the differences identified in answer to question the question above?	Hilary/Panel
Noon-1:00	**Lunch**	
1:00-3:00	**Detailed discussion of functions** ***Key questions for each function:*** • Does the FEMAT-style buffer curve derived from the freshwater science for this function "fit" in the marine environment? • Why or why not?	Hilary/Panel

	• How is the relationship between buffer width and this function likely to be different in marine compared with freshwater systems? • What data exists to support each of the differences identified in answer to question the question above?	
3:00-3:15	**Break**	
3:15-4:45	**Controlling factors discussion for functions** • Which controlling factors are most important in determining the specific relationship between buffer width and this function? (e.g., shore form, slope, vegetation type, aspect, soils) • What are the most important data gaps and uncertainties associated with the relationship between buffer width and this function? • How certain are we of the relationship presented?	Hilary
4:45-5:00	**Wrap-up, next steps** • Summarize key thoughts/recommendations • Summarize next steps	

Appendix C. List of Reference Materials

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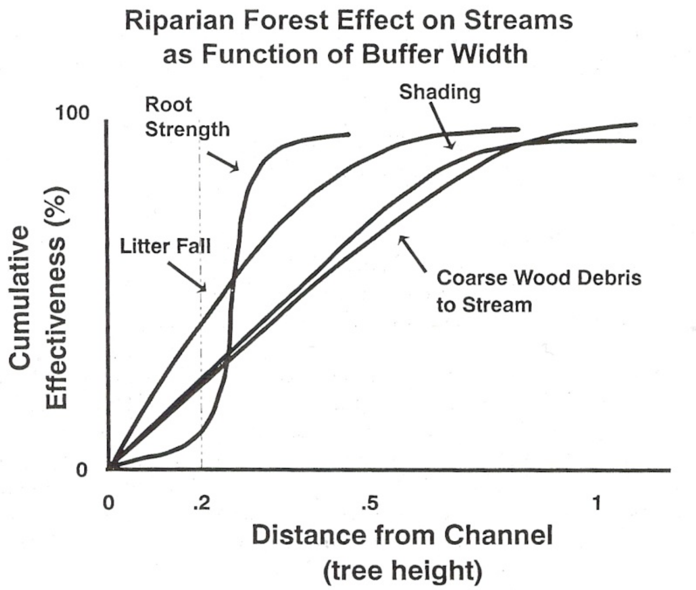
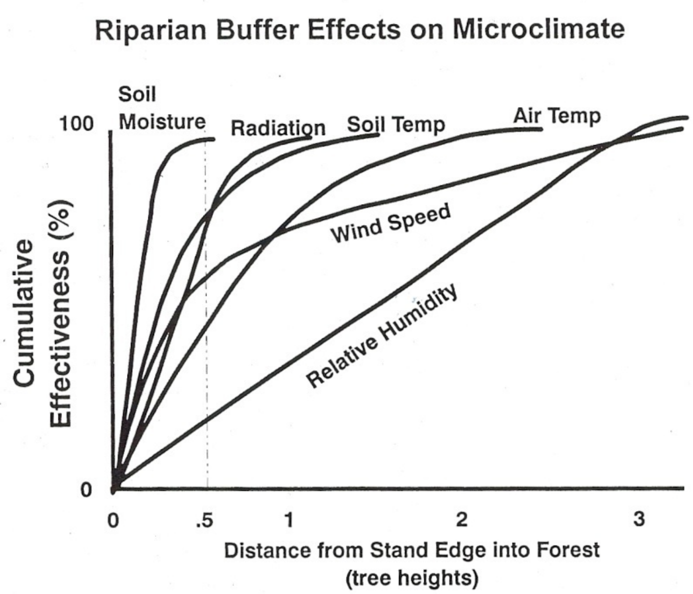
Appendix D. Original FEMAT curves (FEMAT 1993)





Technical Report 2007-02

Marine Riparian Vegetation Communities of Puget Sound

Prepared in support of the Puget Sound Nearshore Partnership

James S. Brennan
Washington Sea Grant

Valued Ecosystem Components Report Series

PUGET SOUND NEARSHORE PARTNERSHIP

RESTORING OUR ECOSYSTEM HEALTH

The Puget Sound Nearshore Partnership (PSNP) has developed a list of valued ecosystem components (VECs). The list of VECs is meant to represent a cross-section of organisms and physical structures that occupy and interact with the physical processes found in the nearshore. The VECs will help PSNP frame the symptoms of declining Puget Sound nearshore ecosystem integrity, explain how ecosystem processes are linked to ecosystem outputs, and describe the potential benefits of proposed actions in terms that make sense to the broader community. A series of "white papers" was developed that describes each of the VECs. Following is the list of published papers in the series. All papers are available at *www.pugetsoundnearshore.org.*

Brennan, J.S. 2007. Marine Riparian Vegetation Communities of Puget Sound. Puget Sound Nearshore Partnership Report No. 2007-02. Published by Seattle District, U.S. Army Corps of Engineers, Seattle, Washington.

Buchanan, J.B. 2006. Nearshore Birds in Puget Sound. Puget Sound Nearshore Partnership Report No. 2006-05. Published by Seattle District, U.S. Army Corps of Engineers, Seattle, Washington.

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Mumford, T.F. 2007. Kelp and Eelgrass in Puget Sound. Puget Sound Nearshore Partnership Report No. 2007-05. Published by Seattle District, U.S. Army Corps of Engineers, Seattle, Washington.

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Front and back cover photos courtesy of Washington Sea Grant.

Contents

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The Puget Sound Nearshore Partnership Steering Committee initiated the concept of this paper and the others in this series. The Nearshore Partnership Project Management Team (PMT) — Tim Smith, Bernie Hargrave, Curtis Tanner and Fred Goetz — oversaw production of the papers. The Nearshore Science Team (NST) played a number of roles: they helped develop conceptual models for each valued ecosystem component (VEC), in collaboration with the authors; individual members were reviewers for selected papers; and members were also authors, including Megan Dethier, Tom Mumford, Tom Leschine and Kurt Fresh. Other NST members involved were Si Simenstad, Hugh Shipman, Doug Myers, Miles Logsdon, Randy Shuman, Curtis Tanner and Fred Goetz.

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To download PDF files of this and other reports in the series, visit our Web site at *www.pugetsoundnearshore.org*.

Executive Summary

Riparian vegetation along marine shorelines serves a variety of critical ecological and social functions. Coastal trees and other vegetation on backshore areas, banks, and bluffs help stabilize the soil, control pollution entering marine waters, provide fish and wildlife habitat, and modify stressful physical conditions along shorelines. Riparian areas are transitional, providing connections between and affecting both adjacent aquatic and terrestrial systems.

Geological history, soils, climatic conditions, and various types and degrees of disturbance affect riparian vegetation along the shores of Puget Sound. Although quantitative historical data on vegetation types and locations are mostly lacking, riparian areas have been heavily disturbed through timber harvest, urban development, roads, railroads, and other infrastructure and activities. The historical climax communities in marine riparian areas were likely forests of western hemlock and Douglas fir, intermixed with western red cedar and a variety of associated understory species. In areas of frequent disturbance, early successional trees, such as red alder and maple, dominated coastal forests. Douglas fir is currently the most common conifer in relatively undisturbed sites. Today's shorelines are often dominated by maple, alder, and non-native species, which colonize rapidly after many types of disturbance, including logging, fire, soil erosion and other anthropogenic impacts. Madrone forests are found on dry, sunny sites with relatively nutrient-poor soils. Other, more specialized riparian communities include prairies, dune-grass associations, salt marshes, and tidal or surge-plain communities; losses of most of these habitats have been extensive in Puget Sound.

Prior to European colonization, marine coastal vegetation in Puget Sound was probably a mosaic, with natural disturbances such as fire, wind, and landslides removing the climax community in patches and "resetting" succession. Variation in physical conditions, such as soil moisture and local rainfall, also would have caused different plant communities in different parts of the sound, but the data suggest that dense, coniferous forests covered most of the lowlands. Today, natural disturbances, such as fire, are suppressed, while anthropogenic ones, such as logging and urbanization, act in a different fashion. The introduction of invasive plant species means that natural succession is disrupted when disturbances do occur.

Restoring native riparian vegetation will be a slow task because of the time required to establish and grow mature forests, although early successional trees, shrubs, backshore, and salt marsh vegetation could be regenerated fairly quickly. Protecting remnants of existing native coastal vegetation is the most cost-effective and rapid management option for regaining some of the lost functions of these habitats. Removing non-native plants and physical obstructions (such as shoreline armoring), and allowing natural succession to occur, can take place on a larger scale but will be very slow in achieving results. Restoration (e.g., by actively planting native forest species) will be difficult but could ultimately provide the greatest benefits.

Preface

Riparian vegetation along marine shorelines provides ecological, economic, social and cultural functions and benefits. The recognition of these values has prompted managers to incorporate riparian vegetation into ecosystem management practices, providing increased shoreline protection. Riparian areas are part of the transition zone between aquatic and terrestrial systems. They affect exchanges of matter and energy between these systems and provide climatic differences from inland areas, important wildlife habitats and improvements in water quality. The importance of marine riparian areas typically falls into two categories: ecological functions and social values. Ecological functions include pollution control, fish and wildlife habitat, soil stability, sediment control, microclimate, shade, and inputs of nutrients and large woody debris. Societal values include human health and safety, as well as cultural and aesthetic qualities. These values overlap. For example, if good water quality were not valued by society, it would likely not be considered an important function. Similarly, soil stability functions provided by riparian vegetation become a human safety issue if development occurs on or near unstable slopes. A summary of each of these functions and values is provided below. Additional discussion may be found in Brennan and Culverwell (2004) and in the references provided at the end of this manuscript.

Pollution/Sediment Control

Vegetated riparian areas are efficient and cost-effective tools for pollution control. Many contaminants from urban and rural areas bind to sediments that, when washed into waterways, constitute large masses of pollutant loadings. These contaminants include most forms of nitrogen and phosphorus, hydrocarbons, PCBs, most metals, and pesticides. In addition, fine sediments themselves can adversely affect aquatic organisms by clogging the gills of fishes and invertebrates, smothering eggs and larvae, altering substrates, and burying benthic organisms. Riparian vegetation can slow the rate of runoff, retain sediments, absorb nutrients, and remove or break down many pollutants, preventing them from contaminating waterways. Effectiveness depends on vegetation composition, depth, density and continuity.

Fish and Wildlife Habitat

Riparian areas tend to promote higher fish and wildlife species diversity, owing to their complexity and adjacency to water. Resident and transitory wildlife species use these areas for rearing, feeding, reproduction, refuge and migration. Riparian vegetation also influences the health of adjacent water bodies and thus the fish and wildlife that live there. The alteration or removal of historical vegetative structure has undoubtedly resulted in the loss or fragmentation of riparian wildlife habitat and the consequent loss of wildlife species. In addition to living vegetation, large woody debris (LWD), often derived from riparian forests, is an important part of estuarine and oceanic habitats. Structurally, LWD in the marine environment provides potential roosting, nesting, refuge and foraging opportunities for wildlife; foraging, refuge and spawning substrate for fishes and aquatic invertebrates; and attachment substrate for algae. Logs high in the intertidal zone may become imbedded and form beach berms, which may influence sediment and wrack deposition patterns and establishment of beach vegetation. As trees are removed from riparian areas for development and view corridors, their potential recruitment to the beach is eliminated, or they are replaced with smaller and shorter-lasting deciduous trees.

Soil Stability

Intact riparian communities act as natural sponges. They intercept precipitation with their canopy, build absorbent soils with their litter, bind soils with their root structure, and retain moisture. Thus, riparian vegetation, once established, provides self-perpetuating and increasingly effective erosion control. For all shorelines (particularly those in areas with steep bluffs), native vegetation is usually the best tool for keeping the bluff intact.

Microclimate

Riparian vegetation creates small-scale microclimates upon which plants, fish, and wildlife depend, especially climate-sensitive species such as amphibians and upper intertidal invertebrates. Removing vegetation in upland and riparian areas increases exposure of the land and water to sun and wind. This increases desiccation rates, reduces organic matter, alters soil conditions, increases runoff and creates a stressful environment for organisms that are dependent upon cool, moist or shaded conditions. Cleared areas become more homogeneous and are often colonized by invasive plants that do not provide the same structure and ecological functions as native vegetation.

Shade

Solar radiation leads to increased temperatures and desiccation and plays an important role in determining the distribution, abundance, and species composition of intertidal organisms. Along Puget Sound shorelines, distinct differences in substrate moisture, air and substrate temperature exist between shaded and unshaded beaches. For example, Penttila (2001) and Rice (2006) have determined that significantly higher mortality of smelt (forage fish) eggs occurs on unshaded beaches, apparently because of reduced substrate moisture and direct solar radiation.

Nutrient Inputs

Riparian vegetation may support substantial populations of insects, which are important in the diet of marine fishes such as juvenile salmonids. In areas with healthy riparian communities, terrestrial insects in marine waters are diverse and abundant. Some marine invertebrates, such as mysids and amphipods, are also connected to riparian vegetation by detritus-based food webs. As riparian vegetation is eliminated, the food supply and carrying capacity of the nearshore ecosystem are likely to be reduced.

Introduction

Northwest Washington state is one of the most ecologically diverse areas in the nation and contains some of the most productive forests in the world. The Puget Sound region is a centerpiece of that diversity and productivity. The mosaic of forests and vegetation communities in this region are the product of thousands of years of evolution; their composition, structure, and functions are influenced by multiple factors, including geology, climate, topography and disturbance. These influences have resulted in patterns of forest types and vegetation communities segregated into distinct zones and community associations, which vary with regard to management issues and ecological and economic values. The Puget Sound Area Zone is one of the most distinctive and important because of its glacial history, ecological linkages to the marine waters of the region, and management challenges resulting from post-European settlement and modification of the natural landscape. The areas adjacent to the marine waters of Puget Sound are distinguished as riparian areas: transitional areas between the aquatic and terrestrial systems, or ecotones, where the interactions and influences between these two environments create gradients in the biophysical conditions and distinctive ecological processes and biota. Vegetation is one of the primary features used to distinguish riparian areas and evaluate ecological functions and values, although some riparian areas support limited vegetation owing to natural disturbances. The riparian vegetation communities that have evolved around the shores of Puget Sound are very diverse, and they play an important role in the ecological health of the terrestrial and aquatic ecosystems, and as terrestrial aquatic ecosystems are recognized as some of the most valuable and indicative ecosystems in the world, (NRC 2002, NRC 2004, MEA 2005). Yet little information exists on the species composition, distribution, associations, or alterations of marine riparian vegetation communities. This paper is an attempt to assemble the available information on marine riparian vegetation communities and summarize some of the ecological conditions necessary for their existence and role in the nearshore ecosystem.

As with any study of the living landscape, vegetation zones and community types may be distinguished at various spatial or temporal scales, or both. Forest zones and their associated vegetation community types are diverse. For example, Franklin and Dyrness (1973) list more than 350 plant community types or subtypes for Oregon and Washington. Within the Puget Sound Area, there are more than 50 types or subtypes. At the larger scale (e.g., from sea level to the mountain tops), forest types are broken into zones, represented by the dominant canopy (tree) species, or climax community, with various subtypes distinguished by subdominant tree and shrub associations. As distance from the shore and elevation increase, changes in soil, moisture, temperature, precipitation, and other factors combine to create conditions that are suitable for different plants. For northwest Washington, there are five major forest zones identified by Franklin and Dyrness (1973): the Sitka Spruce, Western Hemlock, Puget Sound Area, Pacific Silver Fir, and Mountain Hemlock zones (Figure 1). The Puget Sound Area Zone is embedded in the Western Hemlock Zone, but is distinctive in its plant associations because of differences in climate and soils. In the coastal areas of northwest Washington, there are three dominant forest types (Box 1). The Pacific Silver Fir and Mountain Hemlock zones are found at higher elevations along the western slopes and crest of the Cascade Range and in the Olympic Mountains, and they are not characteristic of coastal forests. The Pacific Silver Fir Zone lies between the Western Hemlock Zone of the lowlands and the subalpine Mountain Hemlock Zone.

Within each zone, there is also vertical stratification of vegetation types, including dominant canopy tree species, understory trees and shrubs, and groundcover. Different vegetation community types evolve over time, depending upon climate, soils, local disturbances and other conditions. Plants that are better adapted to one set of conditions are typically less tolerant of other conditions and will therefore be less abundant as conditions change. The diverse set of environmental conditions, including the ways in which different plants interact (e.g., understory vegetation with canopy species), sets the stage for the development of different vegetation associations, or community types. For a more complete description of forest zones and community types, refer to Franklin and Dyrness (1973) and Chappell (2005).

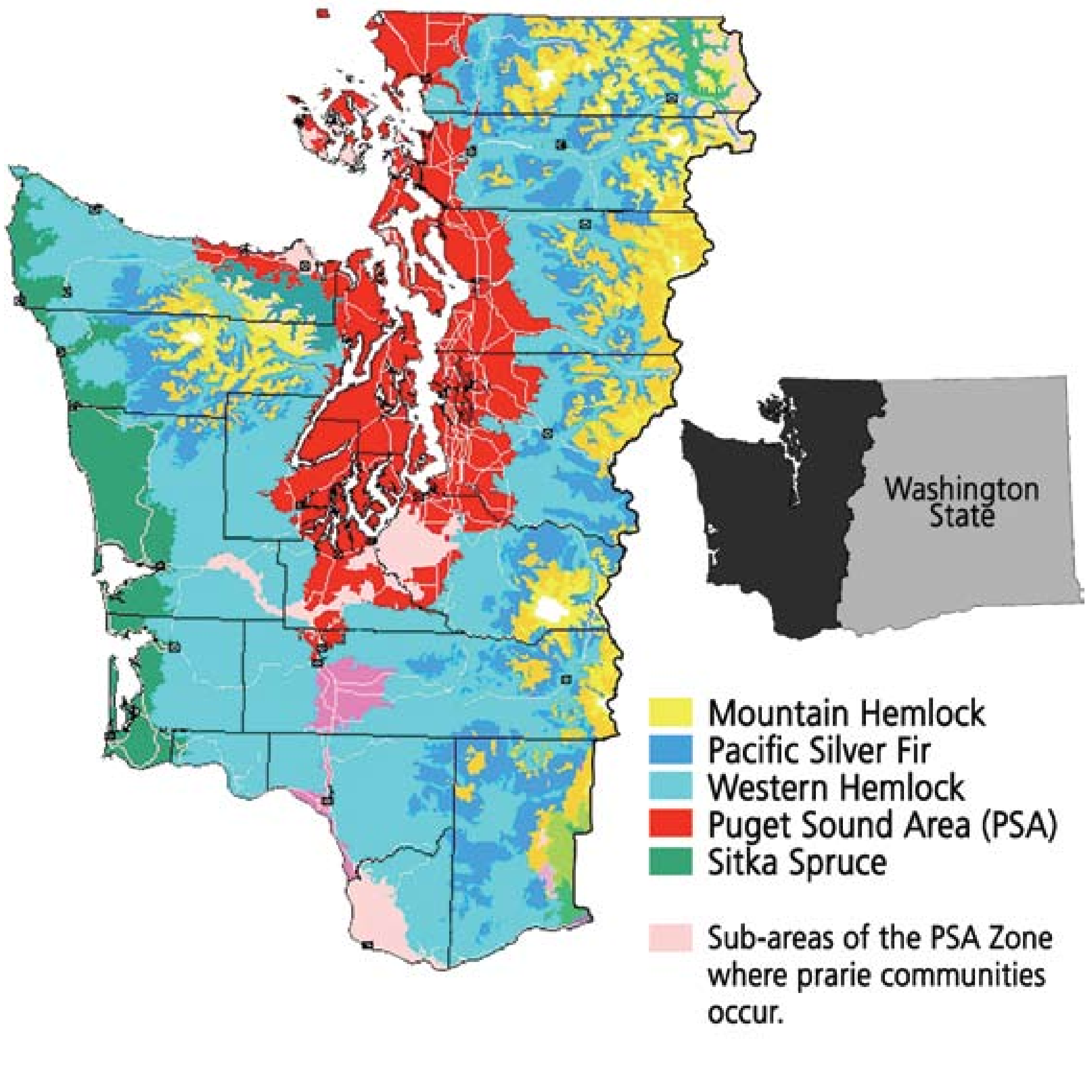

Figure 1. Major forest zones in northwestern Washington. Adapted from image acquired from the University of Washington (*http://depts.washington.edu/natmap/images/modimage/www_zone.jpg*).

Distinguishing forest zones and ecological communities serves multiple purposes, including the identification, quantification and management of harvestable forest products, fish and wildlife, and conservation efforts. Numerous state and federal agencies, such as the U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Geological Survey, and the Washington departments of Natural Resources and Fish and Wildlife, have mapped and studied various aspects of forest zones, community types, fish and wildlife interactions, harvest impacts, recreation, and management strategies. Similarly, private forest landowners and conservation groups (e.g., The Nature Conservancy) have expended substantial time and financial resources to study forests and develop management strategies for harvesting commercial products and conserving ecological communities. These efforts have become particularly important in recent decades, following many decades of poor development and forestry practices that have resulted in the loss or fragmentation of important ecological communities, individual species, and associated ecological goods and services.

Marine riparian vegetation communities are particularly important because they exhibit greater biodiversity than inland vegetation communities, influence the health and integrity of marine habitats and species, and are an integral part of nearshore ecosystems. Riparian areas maintain local biodiversity, and their ecological functions provide the basis for many valued fisheries, in addition to bird and other wildlife habitat (National Research Council 2002). Unfortunately, riparian systems have historically been heavily disturbed through timber harvest, urban development, and other anthropogenic activities, which have reduced their ability to provide "ecological goods and services." The extent of modification and loss of coastal forests and riparian areas serves as a strong indicator of reduced forest and nearshore ecosystem health. Their demise has also led to reduced air and water quality; a loss of commercial, cultural, recreational and aesthetic resources; and a disruption of ecological processes needed to maintain nearshore ecosystems.

The recognition of marine riparian areas as an integral part of marine nearshore ecosystems, and the importance of their ecological and social benefits, is a fairly recent occurrence. As a result, we lack directed studies to develop a more thorough understanding of these systems and regulatory or nonregulatory standards to protect them. Although regional forests and plant communities, defined as aggregations of species (Kruckeberg 1991), have been classified and mapped at various spatial scales by different entities (e.g., U.S. Forest Service, U.S. Geological Survey, Washington Department of Natural Resources [WDNR]), marine riparian vegetation communities of the Puget Sound region have not. General information on forest classifications, plant biology, plant associations and their life-history requirements and ecology are available from multiple sources (e.g., Franklin and Dyrness 1973, Kruckeberg 1991, Grossman et al. 1998, Jennings et al. 2004, NatureServe 2004, Chappell 2005), and limited mapping information is also available. However, historical data, which would help in determining the extent of change, are lacking, and current vegetation community types are not well mapped at the smaller scale. Nonetheless, available information is adequate to determine that riparian vegetation communities are significantly changed from historical conditions, primarily owing to settlement patterns in the region, timber harvest and subsequent development practices. Protecting, enhancing or restoring riparian forests will require large-scale and long-term strategies and commitments and an ecosystem-based approach to managing nearshore systems and coastal communities of Puget Sound.

Box 1. The three dominant coastal forest types and their characteristics.

Examples of Western Washington Coastal Forest Zone Communities

(Adapted from Franklin and Dyrness 1973)

Sitka Spruce (*Picea sitchensis*) Zone

The Sitka Spruce Zone extends from northern California, coastal Oregon and along the outer Washington coast into the Strait of Juan de Fuca to approximately Port Angeles. It is generally found below elevations of 150 meters, but goes to 600 meters where mountain masses are immediately adjacent to the coast. This zone's climate is considered uniformly wet and mild because of its proximity to the ocean. Annual precipitation averages 2,000–3,000 mm, but frequent fog and low clouds during the summer ensure minimal moisture stress. Wind is a primary disturbance factor along the coast. Average annual temperatures range from 10.3° to 11.3° C. Soils are typically acidic (pH 5.0–5.5) and high in organic matter. Coniferous forest stands in this zone are typically dense, tall, and highly productive. Constituent tree species are Sitka spruce, western hemlock, western red cedar, Douglas fir, grand fir, and Pacific silver fir (the first three are the most common). Mature forests have lush understories with dense growths of shrubs and ferns. One distinctive variant in this zone in northwest Washington is the Olympic rainforest.

Western Hemlock (*Tsuga heterophylla*) Zone

The Western Hemlock Zone is the most extensive vegetation zone in western Washington and Oregon and the most important in terms of timber production. It extends from British Columbia through the Olympic Peninsula, Coast Ranges, Puget Sound, and both Cascade physiographic provinces in western Washington. This zone has a wet, mild, maritime climate. Precipitation averages 1,500–3,000 mm per year. Average annual temperatures in this zone range from -3.7° to 29.4° C, with a mean of 8–9° C. There is a great deal of climatic variation throughout this zone, associated with latitude and elevation. Soils are also variable and influenced by forest cover type, underlying geology and slope. Constituent tree species are Douglas fir, western hemlock, and western red cedar. Grand fir, Sitka spruce, and western white pine occur sporadically. Both western white pine and shore pine occur on glacial drift in the Puget Sound area. Hardwoods, such as red alder and big leaf maple, are not common, except in disturbed sites or specialized habitats (e.g., riparian areas). Madrone and Oregon white oak may be found on drier, lower elevation sites. Western red cedar is associated with wet sites on lower slopes and stream terraces. Although this is called the Western Hemlock Zone, based upon potential climax species, large areas are dominated by forests of Douglas fir (particularly drier sites). Much of the zone has been logged or burned, or both, during the last 150 years, and Douglas fir is usually dominant (often sole dominant) in the seral stands that have developed. There are many variations of the community pattern throughout this zone, generally in response to moisture, soils and disturbance.

Puget Sound Area (PSA) Zone

The Puget Sound Area Zone falls within the greater Western Hemlock Zone but is noteworthy because it has characteristics and its own variations that distinguish it as a separate vegetative zone. The PSA extends from approximately Port Angeles, in the Strait of Juan de Fuca, around the lower eastern side of the Olympic range and throughout the Puget Sound lowlands, up into British Columbia. A portion of the area lies in the rain shadow of the Olympic Mountains. Annual precipitation averages 800–900 mm in the Puget lowlands, but drops as low as 460 mm on the northeastern side of the Olympic Peninsula and in the San Juan Islands. Average annual temperatures in the lowlands range from approximately 3.3° to 19° C (temperatures are lower in higher elevations). The fact that the terrestrial environment is adjacent to large bodies of water has a great influence on climate. Similarly, because this area is glaciated, the glacial outwash and terrain influence the diverse array of vegetative communities. Plant communities are generally typical of the Western Hemlock Zone, but major constituents include Douglas fir and grand fir. There are also pine forests, oak groves, prairies, swamp and bog communities, and deciduous forests in areas where disturbance occurs with some regularity.

Vegetation Characteristics And Conditions

The forests and other vegetation communities that line the shores of Puget Sound evolved in a manner similar to all other life forms following the end of the last glacial period, some 13,000 years ago. On the terrestrial side, the process of succession from grasses and shrubs to mixed conifer and deciduous forests continues today, where the vegetation characteristics (e.g., type, age structure, extent) continue to be influenced by the forces of both nature and man. In general, the major natural forces that control what types of vegetation become established in a particular location are the interacting influences of atmosphere (air), lithosphere (soils), and hydrosphere (moisture). Even though the greater Puget Sound basin is considered to be one ecoregion, local variations in soils, exposure to sun and wind, precipitation, topography, soil stability, tidal inundation, and microclimate cause small-scale variations in vegetation community types.

Puget Sound lowland vegetation is generally classified in the Western Hemlock, or Western Hemlock/Sword Fern Zone, recognizing the climax tree canopy species (western hemlock) and the associated, dominating presence of the sword fern on the forest floor (Franklin and Dyrness 1973, Kruckeberg 1991). Kruckeberg (1991), recognizing the historical climax community, classifies the dense conifer forests in the Puget Sound lowland as the Western Hemlock/Western Red Cedar Forest Zone, indicating dominance of hemlock–cedar in late successional phase. This large-scale view overlooks marked local variations in the plant and animal communities. For example, Douglas fir often dominates the present lowland forests that would nevertheless be included in the Western Hemlock Zone (Kruckeberg 1991), and its current dominance indicates the lack of climax forest communities. In fact, some authors (e.g., Kricher and Morrison 1993, Chappell 2005) identify this northwest forest zone as being dominated by Douglas fir, which is now true, particularly in drier, more exposed and well drained areas, but this does not recognize the climax species. Although fire was historically pervasive across the region and reset the ecological clock in terms of seral communities, present-day forests and vegetation communities differ significantly in their composition and succession patterns because of anthropogenic influences that now serve as the major controlling factors.

Other species are common cohabitants with western hemlock and sword fern, including Douglas fir, western red cedar, and understory shrubs such as red huckleberry, Oregon grape, trailing blackberry, and salal (Kruckeberg 1991). Other common trees in this zone include big leaf maple, vine maple, red alder, black cottonwood and madrone. A list of the most common plants of the Western Hemlock Zone, along with information on their relative abundance and habitats, may be found in Kruckeberg (1991). A more extensive species list may be found in Franklin and Dyrness (1973). A list of the more common native trees, understory, and salt-tolerant vegetation found in marine riparian areas was compiled for this paper (Table 1).

Within the Puget Sound Area, a number of smaller-scale plant associations illustrate the diversity and complexity within this ecoregion. A classification for plant associations in the Puget Sound Area has been developed by the Natural Heritage Program (Chappell 2005) and provides details on distribution, status, environmental characteristics, disturbance/succession and terrestrial plant species associations.

Table 1. Vegetation species list (common and standard names) for some of the more common species found in marine riparian areas.[1]

Western hemlock	*Tsuga heterophylla*
Douglas fir	*Pseudotsuga menziesii*
Western red cedar	*Thuja plicata*
Pacific madrone	*Arbutus menziesii*
Bigleaf maple	*Acer macrophyllum*
Vine maple	*Acer circinatum*
Red alder	*Alnus rubra*
Salal	*Gaultheria shallon*
Oceanspray	*Holodiscus discolor*
Oregon grape	*Mahonia spp.*
Indian plum	*Oemleria cerasiformis*
Salmonberry	*Rubus spectabilis*
Snowberry	*Symphoricarpos spp.*
Sword fern	*Polystichum munitum*
Huckleberry	*Vaccinium spp.*
Nootka rose	*Rosa nutkana*
Gumweed	*Grindellia integrifolia*[2]
Saltweed	*Atriplex patula*[2]
Saltgrass	*Distichlis spicata*[2]
Pickleweed	*Salicornia virginica*[2]
Fleshy jaumea	*Jaumea carnosa*[2]
Seaside arrowgrass	*Triglochin maritimum*[2]
Seaside plantain	*Plantago maritima*[2]
Dune wildrye	*Elymus mollis*[2]

[1]*Please refer to Franklin and Dyrness (1973) for a more complete plant species list, and Chappell (2005) for plant species associations.*

[2]*Salt tolerant, typically associated with salt marsh, beach strand, or other wetlands.*

Each of these plant associations is characterized by the dominant types of vegetation (primarily dominant trees), and then by associated vegetation (other trees and understory vegetation). The western hemlock and Douglas fir associations are the most common and widespread, with approximately 33 association subtypes. The Natural Heritage Program surveys (Chappell 2005) have determined that some of these associations are widespread, some are rare and only found in specific areas within the Puget Sound Area, and others may be found in patches. The details (maps and descriptions) of these associations may be found in Chappell (2005), but it is important to keep in mind that these are terrestrial plant associations, and no attempt has been made to map or characterize vegetation on shorelines.

No surveys or characterizations exist for forest or other vegetation associations and community types found specifically on Puget Sound shorelines. However, vegetation communities found in the Puget Sound Area that are less likely to occur on shorelines include oak woodlands and lodgepole and ponderosa pine forests, which are often associated with savannas or plains and occur as early- to mid-seral stage forests in areas disturbed by fires (Chappell 2005). Fire suppression has greatly influenced these communities' distribution and abundance. Although these tree species may occur along shorelines in association with others, they are not considered the dominant or characteristic species. There are, however, unique and uncommon patches of uncharacteristic tree species in some locations around the region — such as oak woodlands (Oak Bay, Jefferson County), aspen (Sucia Island, San Juan Island, San Juan County) (Paula Mackrow, North Olympic Salmon Coalition, pers. comm., Jim Agee, University of Washington, pers. comm.) and Douglas maple (Tom Mumford, WDNR, pers. comm.) — but they have not been mapped or formally described.

Available characterization information for the various community types, and some knowledge of local conditions, indicates that some community types are more likely than others to occur along shorelines—for example, Douglas fir, western hemlock and deciduous (maple, alder) associations. Less common, but worth mentioning, are the madrone associations. Madrone typically occurs on dry, sunny sites with relatively nutrient-poor soils. They are also relatively fire and drought resistant, which has allowed them to persist under natural fire disturbance regimes (e.g., they resprout well after fire). Fire suppression, timber harvest/clearing, and other development activities have resulted in the fragmentation of madrone forest communities, an increase in disease and a decline in historical abundance (Chappell 2005).

Douglas fir forests are likely the most common forest communities found along Puget Sound shorelines today. Shrubs and deciduous trees would dominate where these fir stands have been disturbed by natural or anthropogenic influences. Douglas fir forests are the most diverse of the local forest types, with varying distribution patterns and associations. With some exceptions, and in the absence of natural or anthropogenic disturbance, most fir forests in moist areas would likely become dominated by hemlock and red cedar if left undisturbed for hundreds of years, because they are considered mid-late seral-stage forests. Although the varieties of this community type are well described by Chappell (2005), surveys of shoreline distribution and abundance, continuity/fragmentation, density, age structure, and other characteristics are not available. Clearly, however, very few if any of these forests look and function as they did before European settlement, when these undisturbed forests likely were dominated by western hemlock and Douglas fir. Where natural disturbance occurred and along open edges, Douglas fir dominance would follow the early seral communities of shrubs and deciduous trees. Localized conditions, influenced by soils, moisture, aspect, types and frequency of disturbance and other factors, would ultimately result in a plant community adapted to these conditions. Intense and more frequent physical disturbances, such as fire or soil movement, would result in disturbance-adapted vegetation communities, such as alder, maple, black cottonwood and madrone.

Alder and maple (vine and big leaf) forest communities are a common occurrence along the shores of Puget Sound. Naturally, they occur in a limited habitat, located on steep slopes (Chappell 2005). Alder colonizes a disturbed area rapidly and is prolific but short-lived (about 80–100 years). Maples are also strongly associated with soil movements and appear capable of surviving small or slow mass movements, sprouting vigorously after major damage to a mature stem, unlike conifers and alder (Chappell 2005). They are characteristically adapted for early succession (e.g., reduced shade canopy) and physical disturbance. Because most of the bluffs around Puget Sound experience soil movement at intervals shorter than those needed for the development of a climax forest, these "fringe" forests often have a higher composition of disturbance-adapted vegetation. In addition to soil movement, disturbances such as wind, salt spray, timber harvest, development, and other anthropogenic activities have resulted in the conversion of conifer forests to vegetation communities dominated by alder, maple, and non-native species, making these forest communities much more common and widespread today than they were historically.

Specialized Communities

A variety of other specialized community types are also found along the shores of Puget Sound: the forest and prairie communities of Sequim and the San Juan Islands; "ocean-front" communities (Franklin and Dyrness 1973) such as sand dune, strand or salt marsh communities; and communities associated with flood or tidal surge plain areas (i.e., tidal estuaries). These vegetation communities are included in this discussion because they are a distinct part of the transition between marine and terrestrial systems, have unique characteristics and adaptations, and play an important ecological role in the nearshore ecosystems. These beach and salt marsh communities add to the diversity of habitats and vegetation community types in the region and are highly susceptible to disturbance from anthropogenic activities along the shoreline. Additional specialized communities may be found along the shores of Puget Sound, but like those being described here, none have been well studied or mapped; also, these three community types were simply selected to serve as examples of the diversity and specialization exhibited by some of these plant communities.

Sequim and the San Juan Islands are situated in the rain shadow of the Olympic Mountains and, as a result, include some of the driest sites encountered in western Washington (Franklin and Dyrness 1973). The exposed, south-facing slopes of Whidbey and the San Juan Islands are occupied by grassland vegetation and open woodlands, composed of Douglas fir and madrone. Other tree species include white oak, shore pine, and juniper. More sheltered areas support more dense forests of Douglas fir, mixed with grand fir and western red cedar. This illustrates the diversity of community types that may be found in close proximity to each other and the strong influence of aspect, wind exposure and moisture. The drier climate, free-draining soils and exposure also support unique prairie communities, such as those found in Sequim and on the southwest side of San Juan Island. Unlike most other shorelines in Puget Sound, trees are a minor component, and those that do occur exhibit stunted growth and stress from wind exposure (and likely salt spray).

Beach and salt marsh plant communities contain highly specialized plant species that are tolerant of salt, relatively dry and free-draining soils or soils of high organic content, and disturbance from wave action, tidal inundation and shifting substrate. Most of what is known about beach vegetation communities comes from studies of outer-coastal dune areas; in Puget Sound they occur at a much smaller scale than the broad and continuous dunes of the outer coast. "Strand" communities inhabit the backshore, or beach berm, with its accumulation of sediments, relatively narrow band of stranded logs and salt-tolerant vegetation. Larger accumulations of logs and vegetation typically occur in sediment accretion areas, such as points, spits and estuaries, which are capable of supporting large and more diverse vegetation communities. Salt marsh communities may also occur in the strand, but typically occur in larger patches, on broad flats, or within stream and river estuaries and embayments that are regularly inundated by tides; these communities are more easily recognized and classified as a wetland "type" (see Cowardin et al. 1979, Dethier 1990). Regardless of the size and dimensions, many of the same vegetation types exist along shorelines, and all are technically wetlands, providing similar ecological functions and influenced by many of the same processes.

Some of the more common plant species in these areas include dune grass (dune wildrye), sedges, rushes, seaside arrowgrass, seaside plantain, saltgrass, pickleweed, gumweed, saltweed (fat hen), fleshy jaumea, beach pea, tufted hairgrass and shore lupine. Their ability to tolerate wind, waves, saltwater inundation and shifting sediments enables them to survive in such harsh environments. They are an important part of the nearshore food web, provide habitats for fishes and wildlife, and they help to stabilize beaches, reducing erosion of fine sediment and contributing to the development of beach berms.

The vegetation communities that occur in tidal or surge plain areas (i.e., river-mouth estuaries) are often substantially different from the typical open shoreline of Puget Sound, primarily due to the reduced energy, freshwater and sediment input within these areas. As river flows come up against tidal forces over time, sediments and organic matter carried downriver or on incoming tides settle out, creating broad deltaic and mudflat formations. These become colonized by vegetation communities adapted to varying levels of salt and inundation from tidal and river flows. The vegetation itself becomes a trap for additional sediments and provides organic matter that builds the marsh and contributes to many of its important ecological functions. Salt marsh communities become a dominant feature in lower areas with saltwater inundation, giving way to less salt-tolerant species as elevation and freshwater input increases. The vegetation types within these tidal wetlands have been described generally as emergent marsh or scrub/shrub, but precise surveys of plant species composition are lacking. In addition, early settlers began converting much of this marshland for agriculture, ports and industrial or residential uses. These conversions have continued, and little is known about what has been lost. Several studies have determined that the loss of tidal marsh and riparian habitat is extensive (Bortelson et al. 1980, Thom and Hallum 1991, Levings and Thom 1994), and an historical reconstruction of tidal marshes (Collins and Sheikh 2005) indicates that tidal wetlands now amount to about 17-19 percent of their historical extent. Unfortunately, none of these assessments was able to identify specific vegetation community types, because the original data (e.g., General Land Office surveys) lacked such detail. So even though we can estimate the spatial extent of loss, we know little about plant species composition. However, some available data on tree species in the historical estuarine streamside forest, tidal-freshwater streamside forest, and freshwater streamside forest do quantify major tree species frequency and basal area (Collins and Sheikh 2005). For example, "spruce forests" have been described along the lower reaches of some estuarine streamside forests. Spruce is not considered a dominant tree species in this region. This likely indicates specialized community types and adaptation to historical conditions along lower river/estuarine areas. The documented tree species composition offers a good picture of historical conditions, and it is likely that some of the gaps in knowledge of other vegetation and community types could be filled in with further analysis.

Factors Controlling Riparian Vegetation Communities

Elevation, climate, precipitation, soils, disturbance and hydrology are among the factors that control forest zones, vegetation communities and successional patterns. Available seed source, aspect, wildlife interactions, competition, and other natural or anthropogenic influences also play a role in the evolution of community types. The details and complexity of these influences are beyond the scope of this paper, but a brief description of some of these factors is provided below to help in understanding how riparian vegetation community types evolve.

Succession

The classification of the Western Hemlock Zone, in recognition of the climax species, provides a broad, generalized picture of the dominant tree and associated vegetation community that would occur within this zone over a time scale of hundreds of years. Within this timeframe, one would find earlier seral plant communities and different dominants, depending upon local environmental conditions, disturbances and available seed source. In a mature forest, for example, when the tree canopy is removed due to age, disease, fire, logging, or other natural or anthropogenic influences, an opportunity exists for other plants, which may not be shade tolerant, to thrive. Over time, the early settlers (e.g., grasses and shrubs) give way to deciduous trees and conifers, and the understory ultimately consists only of shade-tolerant vegetation. On dry, well-drained sites, hemlock may be absent or rare, with the dominant conifer being Douglas fir. On heavily disturbed sites, such as erosional areas, the vegetation types may be dominated by early-to-mid seral communities, characterized by species such as maple, alder and salal, or nonnatives, such as Himalayan blackberry and Scotch (Scot's) broom.

Information on successional patterns for western hemlock forests comes primarily from studies of commercial forests, following traditional clearcut, slash and burn methods. Note that successional patterns under all circumstances have not been well studied, and the type of disturbance to a site or area may result in different successional patterns. General information on western Washington and Oregon forests, with some limited details, may be acquired from the WDNR Natural Heritage Program (Chappell 2005), Franklin and Dyrness (1973), Kruckeberg (1991), and Proctor et al. (1980). However, as noted earlier in this paper, some distinct plant community types do exist in the Puget Sound Area and have their own successional patterns based on various controlling factors. For example, the "prairie" communities that occur in the south sound are more typical of open grasslands with invasions of Douglas fir and oaks and are quite dissimilar from the successional patterns seen in the typical hemlock community. Similarly, early- to mid-successional communities become established along very actively eroding bluffs and those composed of well-drained soils and a southern exposure, excluding or reducing the abundance of many of the characteristic hemlock seral communities due to limitations in stress tolerances for drier, more disturbed sites.

Climate

Climatic conditions in the Puget Sound region greatly influence vegetation types, patterns of distribution and ecological processes, structure and functions. In general, climate is defined by temperature, precipitation and humidity, which are all affected by the geomorphology (local terrain) of the region, the Pacific Ocean, cloud cover and other atmospheric conditions. The cool marine waters and air that flow into Puget Sound from the Pacific Ocean act as the region's thermostat and generator of moisture-laden air. The mountain ranges and other topographic features influence precipitation and cloud cover patterns throughout the region, causing variations in weather within short distances. For example, Sequim, in the rain shadow of the Olympic range, receives an average of only 432 mm of rain per year, whereas Olympia receives more than 1,270 mm yearly (Kruckeberg 1991).

Land that lies close to marine waters experiences temperatures that are cooler in the summer and warmer in the winter than uplands. At lower elevations, precipitation comes mainly as rain; in Puget Sound, more than 75 percent of it falls between the beginning of October and the end of March (Kruckeberg 1991). Humidity follows the temperature and precipitation patterns. The variable and combined effects of temperature, moisture, and humidity result in conditions that are suitable for the types of vegetation communities found throughout the region. At the regional scale, coniferous forests are dominant, but the high degree of variability that exists in the smaller-scale patterns of coastal forests and vegetation communities results from variations in more localized climatic conditions. For example, a tree canopy may be dominated by madrone or deciduous trees on some drier sites, and the associated understory shrubs would likely be dominated by salal rather than swordfern, which require more shaded, moist conditions. Trees and other vegetation in close proximity to marine waters are also likely to be more exposed to wind, salt, and fog.

Soils

The geologic history of the Puget Sound region is particularly important for understanding soils and topography, which are important determinants of plant associations and successional patterns. The soils of the northern Puget Trough Province are generally well described by Franklin and Dyrness (1973) and have been mapped in the Coastal Zone Atlas by the Washington Department of Ecology (WDOE 1977–1980). The glacial legacies (geology, soils, and topography) of the region are described by Downing (1983), Franklin and Dyrness (1973), Burns (1990), and

Kruckeberg (1991). Aside from plate tectonic influences, in general, the geology and topography of the Puget Sound basin resulted from a lobe of the cordilleran icecap, which pushed into the area from the north during the Pleistocene epoch (the Vashon glaciation being the most recent). The deposits left by glacial advance and retreat range from very porous gravels and sands to a hard, cemented till in which substantial clay and silt are mixed with coarser particles (Franklin and Dyrness 1973) or are in stratified layers, varying in sediment composition. Over time, organic contributions from decomposing vegetation have also created a layer of humus-enriched topsoil in many areas. Soil organisms, such as mycorhizae-forming fungi, also play an important role in soil condition and nutrient acquisition by plants.

These variations in soil types have a strong influence on vegetation. For example, soils with low permeability may become quickly saturated or create standing water, which promotes growth of tree species like hemlock and red cedar that are more tolerant of wetter conditions. In contrast, free-draining soils in more exposed areas would support Douglas fir and madrone. Many shoreline areas retain water or have springs and seeps that often provide localized conditions for plants that are tolerant of, or thrive in, wet soils, while excluding plants that have a low tolerance for wetter soils or are capable of surviving in drier soils (e.g., madrone). The close proximity of vegetation to the water also creates more moist conditions due to the cooling effect of Puget Sound, fog and condensation on riparian plants and soils.

Areas with soils high in organic material support vegetation associations that thrive in nutrient-rich soils (e.g., Douglas fir–western hemlock/Oregon grape/sword fern association [Chappell 2005]). Such vegetation would be absent or less common in areas where soils are nutrient poor (e.g., Douglas fir–western red cedar/Pacific rhododendron association [Chappell 2005]). Higher organic composition in the topsoil also sets the stage for greater microbial activity, a process that is strongly linked to nutrient availability and plant health. Many of the controlling factors for the various vegetation associations may be found in Chappell (2005). The major controlling factors for the major tree species have been summarized in this paper (Table 2).

Topography

For the purposes of this report, topography refers to both elevation and relief (i.e., slope height and angle). As mentioned earlier, changes in temperature and other weather conditions at different elevations are a strong influence on forest zones. For coastal forests within the Puget Sound lowland, however, atmospheric conditions and proximity to marine waters are the primary controllers of the local climate, and minor elevation changes have little influence.

The variability in topographic relief and stability of steep slopes greatly influence vegetation community types and add to the diversity and complexity of forest/vegetation communities within the region. The complex of hills, valleys, plains, ravines, steep bluffs, and low- to no-bank shorelines exhibits various community types. Shorelines with steep slopes and unconsolidated soils that experience soil movement at relatively frequent intervals are dominated by deciduous trees and associated vegetation communities. On more stable slopes, particularly those with lower relief, there is less exposure to wind and less soil movement over greater periods of time, allowing for dominance of slower-growing and longer-lived conifers.

Table 2. Physical characteristics and tolerances for six of the more common marine riparian trees.[1]

PHYSICAL CHARACTERISTICS	**Western Hemlock**	**Douglas Fir**	**Western Red Cedar**	**Pacific Madrone**	**Bigleaf Maple**	**Red Alder**
Age (yrs)	400+	750+	1,000+	N/A	300+	100
Diameter (cm)	90-120	150-220	150-300	35	50	55-75
Height (meters)	50-60	70-80	60+	30	15	30
TOLERANCES						
Soil Moisture	High	Low	High	Low	Medium	Medium-High
Shade	Very High	Low	High	Low	Medium	Low
Rocky/Sandy Soil	Medium	Medium	Low	High	Medium	Medium-High
Physical Damage/ Disturbance	Low	Medium	High	High	Very High	Medium[2]

[1]Developed from several sources, including Franklin and Dyrness (1973), Hanley and Baumgartner (2002), Chappell (2005).

[2]Physical damage to tree low, but generally tolerant and quickly recolonizes disturbed areas.

Disturbance

Disturbance is a natural process in riparian ecosystems that usually occurs in episodic events over large time scales. Forest fires, disease, insect blight, windstorms, volcanic eruptions, seismic events, landslides and storm surge can have large-scale effects on a forest. Any major disturbance of the plant community would normally be followed by a regular succession of plant communities until a steady state is again established, in the form of the climax community (Figure 2). Anthropogenic disturbances also have a significant impact on forest ecosystems, but forests are often converted and controlled to a point that few undergo natural succession.

Fires can devastate hundreds of acres of forest that take centuries to regenerate into a climax community. Intentional clearing and burning for timber harvest and the development of agricultural and urban lands have also removed thousands of acres of forest and caused major shifts in vegetation communities. Consequently, much of these forests is prevented from regenerating, or is replanted with monocultural stands of Douglas fir for future harvest. Native people deliberately burned forest areas to maintain openings in the forested landscape. These areas were an important source of specialized plants for food and technology (e.g., building and clothing materials) and also provided good forage for game animals (Jefferson County Historical Society 1992, Kruckeberg 1991). Today, natural, episodic fire events are suppressed, disrupting natural selective and successional processes in Puget Sound forests. A reduction of fire-resistant species, increased invasions of nonnative plants, and a change in abundance and dominance patterns from historical forest conditions are all attributed to current fire suppression practices (along with other modifications of natural disturbances) (Brown and Smith 2000, Smith 2000).

Anthropogenic disturbances are the greatest threat to riparian areas today. Starting with historical logging practices and early urbanization and continuing through modern times, riparian vegetation communities have not only been altered, but vast areas have been and continue to be permanently converted to urban and agricultural lands. Intensive logging over the past 150 years has significantly reduced the volume of timber that existed prior to European settlement. For example, the 1840 estimate of timber for all of Washington was 578 billion board-feet, reduced to an estimated 60 billion board-feet of old growth and 100 billion board-feet of second growth in 1973 (Kruckeberg 1991) (note: no data exist for riparian forests). Clearcutting, slash and burn, and replanting with monocultural tree species have significantly changed the landscape and ecological functions of forests. Commercial and residential development along the shores of Puget Sound begins with vegetation removal, or thinning, and tree removal to improve views, often followed by replacement with impervious surfaces, artificial landscaping, fill, armoring, and other modifications of the soils and vegetation. These disruptions and conversions interfere with natural riparian processes, structure and functions, setting the stage for invasions of nonnative species, losses of natural habitats and native species, reductions in water and air quality, and an increase in other risks to human health and safety. The literature is replete with evaluations and warnings of the potential and known consequences of these modifications (e.g., Puget Sound Water Quality Authority 1990; WADOE 1994, 1995; Williams et al. 2001; Brennan and Culverwell 2004). Considering the linkages between healthy riparian areas and the health of fishes and wildlife that depend upon them, the recent listings of numerous habitats and species under various state and federal regulations, including the Endangered Species Act listings of salmon and orca, are strong indicators of an ecosystem out of balance owing to anthropogenic influences.

Figure 2. Photos depicting natural erosion (left) and vegetation patterns (right) on a steep bluff.

Aspect, Wind, Saltwater Inundation and Spray

A number of other factors also influence riparian vegetation communities and, similar to many of the other controlling factors, are not well studied or documented for marine riparian areas in Puget Sound. However, observation alone reveals patterns in vegetation that are likely controlled by aspect, wind, and saltwater inundation and spray. Aspect (compass direction and exposure) plays an important role in the amount of solar radiation and wind exposure riparian vegetation receives. Trees and understory plants that thrive in dry, exposed conditions (e.g., Douglas fir, madrone, oak) will compete better on shorelines with a southern exposure. However, where wind is a major influence (e.g., highly exposed points, south/southwest sides of San Juan and Whidbey Islands), trees become less of a component of the vegetation community, and growth may be stunted or distorted (e.g., broken or twisted trunks and limbs) (Figure 3). Although sun exposure provides increased opportunity for photosynthesis, wind has a desiccating effect on plants and soils. Terrestrial plants not well adapted to saltwater inundation and spray exhibit signs of salt "burn" (drying, desiccation and death of stems and leaves) if they are in close proximity to the water's edge. These effects have been well studied on outer-coastal forests and dune communities, but have not been studied in Puget Sound.

Links to Other VECs

There are a number of direct and indirect linkages between riparian vegetation and other valued ecosystem components. Most of these are in the form of "functional benefits." For example, in pollution abatement, riparian vegetation retains, filters, or processes contaminants that run off the land and can contaminate marine organisms via uptake through physical contact (i.e., water or sediments) or through the food web, where contaminants accumulate in prey and are passed along to the consumer. Riparian vegetation also provides structural benefits that influence many physical and biological processes, such as bluff erosion, sediment distribution, and providing habitat structure for fish and wildlife feeding, refuge and reproduction. Riparian areas are a major source of primary and secondary production, providing organic material for the detritus-based food web and insects that serve as prey for salmon and terrestrial wildlife. Some of the easily identifiable linkages to the other VECs have been summarized in Table 3.

Figure 3. Shoreline prairie community on San Juan Island (left) and wind-stressed trees (right).

Table 3. Linkages between marine riparian vegetation and other VECs in terms of a stronger, more direct linkage (yes), an indirect or weaker linkage (maybe), or no apparent link (no) between the linkages (listed across the top row) and the VECs (listed down the first column)..

	Slope stability	Food web	Water quality	Habitat structure	Fine sediment reduction	Sediment control (metering/deposition)
Beaches and bluffs	**Yes** (root structure, drainage control)	**Yes** (soil health, structure, biomass, biological productivity)	**Yes** (contaminant & sediment trapping, filtration)	**Yes** (standing and down wood/vegetation)	**Yes** (biological activity/ productivity)	**Yes** (rates of erosion, deposition)
Shellfish	**Maybe**	**Yes** (detrital/organic inputs)	**Yes** (contaminant trapping, filtration)	**Maybe**	**Yes** (burial, respiration)	**Yes** (sediment volume, type)
Salmon	**Maybe**	**Yes** (prey production)	**Yes** (contaminant trapping, filtration)	**Yes** (LWD, sediment, and living vegetation) (feeding, refuge, migration)	**Yes** (respiration, water clarity)	**Yes** (sediment volume, type)
Forage fishes	**Maybe**	**Yes** (prey production)	**Yes** (contaminant trapping, filtration)	**Yes** (LWD, sediment, and living vegetation) (feeding, refuge, migration)	**Yes** (respiration, water clarity)	**Yes** (sediment volume, type)
Great Blue Heron	**Maybe**	**Yes** (prey production, primary and secondary	**Yes** (contaminant trapping, filtration)	**Yes** (Trees, sediment, and living vegetation) (feeding, refuge, roosting, reproduction)	**No**	**No**
Marine birds	**Maybe**	**Yes** (prey production)	**Yes** (contaminant trapping, filtration)	**Yes** (LWD, sediment, and living vegetation) (feeding, refuge, roosting/resting, reproduction)	**Maybe**	**Maybe**
Orca		**Yes** (prey production, secondary)	**Yes** (contaminant trapping, filtration)	**No**	**Maybe**	**No**
Kelp and eelgrass	**Maybe**	**No**	**Yes** (contaminant trapping, filtration)	**Yes** (waterlogged logs - potential attachment substrate)	**Yes** (burial, photosynthesis)	**Maybe** (sediment volume, type)

Status and Trends

Available literature has shown that as little as 150 years ago the Puget Sound lowland was covered with dense coniferous forests. Kruckeberg (1991) describes the experience of early explorers to the region as having "encountered on our shores an evergreen forest of majestic and awesome dimensions." Most forests likely were climax communities of the western hemlock/western red cedar/Douglas fir associations. Accurate historical data on the vegetation along shorelines is very limited, but some information can be gleaned from early survey maps and written records (e.g., General Land Office and U.S. Coast & Geodetic Survey topographic sheets [T-Sheets]). These data could be used to develop a historical reconstruction similar to that in tidal estuaries by Collins and Sheikh (2005). Such an analysis may provide a basis for quantifying changes in riparian communities since European settlement and evaluating how changes in riparian forests have affected the health and integrity of riparian and nearshore ecosystems.

A number of recent marine nearshore assessments have evaluated the types and extent of modifications to the nearshore ecosystem. Although riparian forest composition is likely the most modified component of the Puget Sound nearshore environment, this has not been quantified. Anthropogenic disturbances, such as filling, diking, armoring, overwater structures, upland structures, roads, ports, and other activities along shorelines have resulted in the fragmentation and loss of the diversity and abundance of shoreline plant communities (Figure 4). Several assessments give indications of the amount of change. For example, estimates based upon evaluation of 11 major deltas in Puget Sound indicate at least a 76 percent loss in tidal marshes and riparian habitat (Levings and Thom 1994). Coastal urban areas have lost 90-98 percent of their estuarine wetlands, and water quality is in good condition in only 35 percent of Washington's estuaries (WDNR 1998). The WDNR's ShoreZone inventory (WDNR 1999) indicates that riparian vegetation overhanging the intertidal zone is relatively rare in Puget Sound, occurring at only 440 of the nearly 2,500 shoreline miles of Puget Sound (Redman et al. 2005). Riparian forests were the first areas to be extensively logged, because they were easily accessed, and logs could be rafted and floated to mills around the region. Since mature hemlock/Douglas fir forests take hundreds of years to develop, it is likely that where these forests occurred naturally, there are few, if any, nearshore riparian forests remaining in pristine condition, with the possible exception of areas where natural disturbance was frequent and persistent enough to maintain early seral communities. Therefore, it is logical to assume that altering the vegetation structure and disrupting natural processes has resulted in a shift in or loss of riparian vegetation, community types, and ecological functions.

Figure 4. Examples of anthropogenic disturbances that result in changes (left) or elimination (right) of natural vegetation on shorelines.

Ecosystem Processes

The primary purposes of focusing on an individual component of the nearshore ecosystem include providing an improved understanding of how the system and each component works and what can be done to improve conditions or prevent further degradation. Conceptual models are often used to better explain the linkages between various management actions and potential outcomes for ecological improvement. The PSNERP has developed a conceptual model for the nearshore ecosystem to determine the suite of actions that, combined, will preserve or restore the full ecosystem. But the finer detail of each component of the ecosystem is needed to identify problems and develop management actions at that scale. The conceptual model developed for marine riparian vegetation (Figure 5) is designed to meet this need. It identifies some of the important linkages between management actions and expected outcomes. It can be plugged into the larger-scale model, which illustrates the linkages in a simplified diagram, to enhance understanding and management of the nearshore ecosystem. This model does not identify all management measures, restored processes, structural changes or functional responses, but simply attempts to identify some of the more important actions and expected outcomes. Using this model will assist scientists, resource managers and policy makers in deciding which actions would be the most effective, beneficial and important for preserving, protecting, enhancing or restoring the nearshore ecosystem. For example, by protecting existing riparian vegetation, or establishing undisturbed vegetation buffers that require separation between upland development and the water, we would expect that many of the natural processes (e.g., hydrology, sediment transport/deposition, plant growth and succession) would not be impaired. Further, these processes would then allow for the development of the natural structure (forests, wetlands/salt marsh/strand communities, beaches), and functions (pollution abatement, feeding, breeding, migration, refuge) of the nearshore ecosystem.

Conditions Required to Maintain, Enhance, or Restore Healthy Marine Riparian Vegetation

Given that coastal forests in the Puget Sound nearshore environment have been significantly modified throughout the brief 150-year post-European settlement of the region, there are three management actions that should be implemented, in concert, to improve forest conditions and realize the benefits of associated ecological functions.

First, existing shoreline forests must be protected to allow them to mature into the types of stable climax communities found historically. This is the most important and cost-effective management action, but it will require an inventory and assessment of current forest conditions, prioritization of areas to be protected, and restrictions on development activities that would modify or degrade shoreline vegetation communities. Buffers are one of the most effective management tools available for protecting shoreline vegetation. Although marine shoreline buffers are not well studied in the Puget Sound region, the results of studies in other marine and freshwater systems are transferable and can be used until studies on buffer effectiveness for multiple functions are established for Puget Sound shorelines.

Second, for areas that are already modified as a result of urbanization, enhancement and rehabilitation are the most logical approaches for reestablishing some ecological functions. Removing nonnative plants and physical obstructions (e.g., armoring, impervious surfaces, nonessential structures) and replanting with native species would improve existing conditions if done at large-enough temporal and spatial scales. Results likely will not be realized quickly because plant growth, functional responses, and the natural succession of native plant communities occur over decades and centuries. However, this understanding of their biology should be part of the management strategy and a focus of public education and outreach. Removal or relocation of some roads, railroads, bulkheads, overwater structures, dikes and other obstructions wherever possible would also help in reestablishing the linkages between riparian areas and the aquatic environment.

The third action—restoration of coastal forests and riparian areas—is likely to be the most difficult, costly, and time-consuming management action, but could provide some of the greatest benefits, depending on the scale of restoration and commitment to long-term goals. Much could be learned in the restoration process if efforts were monitored and the results made available to coastal managers. Many restoration efforts likely would occur piecemeal, at the site scale, and should therefore be a part of a larger restoration strategy. Similarly, efforts to protect, enhance or restore any nearshore habitats should take a more holistic approach and consider riparian conditions and influences as a part of their project evaluation and implementation.

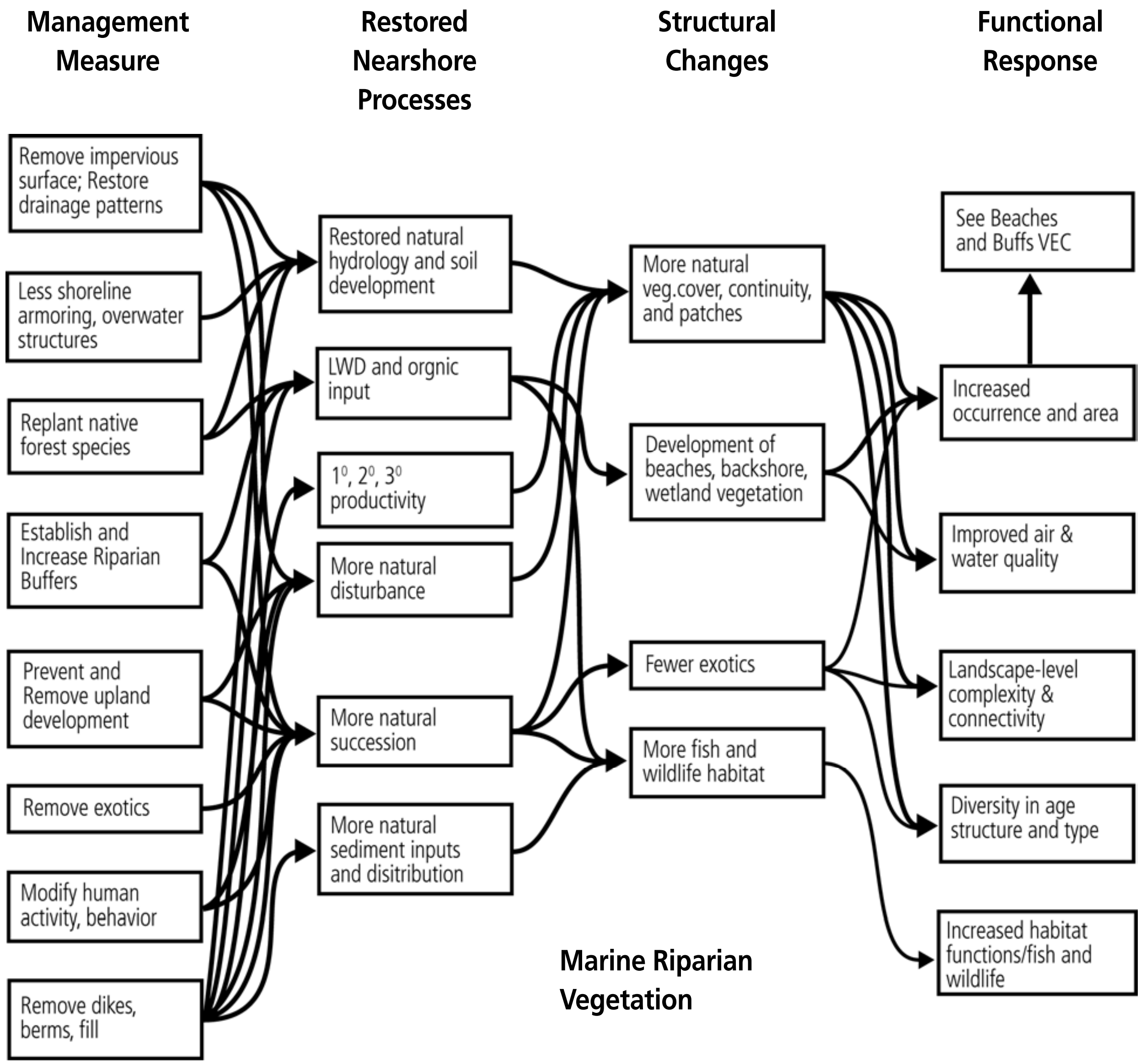

Figure 5. Conceptual model of the marine riparian vegetation VEC, illustrating the linkages between management measures, restored processes, structural changes, and functional responses.

Major Gaps/Critical Uncertainties

- Studies/data on marine riparian functions for the Puget Sound region are very limited.
- Inventories (types, locations, size) of shoreline vegetation and community types or associations are lacking, and there is no monitoring or assessment of modification and loss.
- Protection, enhancement, and restoration standards for marine riparian vegetation are limited.
- Fish and wildlife inventories and dependencies on marine riparian areas are not well documented.
- Appropriate buffer widths and setbacks for protecting marine riparian and marine aquatic systems are poorly understood and inconsistently applied (if applied at all).
- An improved understanding of the exchanges (e.g., energy, matter) across and within these riparian transition areas is needed.
- Food web data are limited.
- Study of the potential effects of climate change and sea-level rise on marine riparian systems is lacking.

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PSNERP and the Nearshore Partnership

The Puget Sound Nearshore Ecosystem Restoration Project (PSNERP) was formally initiated as a General Investigation (GI) Feasibility Study in September 2001 through a cost-share agreement between the U.S. Army Corps of Engineers and the State of Washington, represented by the Washington Department of Fish and Wildlife. This agreement describes our joint interests and responsibilities to complete a feasibility study to

"…*evaluate significant ecosystem degradation in the Puget Sound Basin; to formulate, evaluate, and screen potential solutions to these problems; and to recommend a series of actions and projects that have a federal interest and are supported by a local entity willing to provide the necessary items of local cooperation.*"

The current Work Plan describing our approach to completing this study can be found at:

http://pugetsoundnearshore.org/documents/StrategicWorkPlanfinal.pdf

Since that time, PSNERP has attracted considerable attention and support from a diverse group of individuals and organizations interested and involved in improving the health of Puget Sound nearshore ecosystems and the biological, cultural, and economic resources they support. The **Puget Sound Nearshore Partnership** is the name we have chosen to describe this growing and diverse group, and the work we will collectively undertake that ultimately supports the goals of PSNERP, but is beyond the scope of the GI Study. Collaborating with the Puget Sound Action Team, the Nearshore Partnership seeks to implement portions of their Work Plan pertaining to nearshore habitat restoration issues. We understand that the mission of PSNERP remains at the core of our partnership. However, restoration projects, information transfer, scientific studies, and other activities can and should occur to advance our understanding and, ultimately, the health of the Puget Sound nearshore beyond the original focus and scope of the ongoing GI Study.

As of the date of publication for this Technical Report, our partnership includes participation by the following entities:

- King Conservation District
- King County
- National Wildlife Federation
- NOAA Fisheries
- NOAA Restoration Center
- Northwest Indian Fisheries Commission
- Northwest Straits Commission
- People for Puget Sound
- Pierce County
- Puget Sound Partnership
- Recreation and Conservation Office
- Salmon Recovery Funding Board
- Taylor Shellfish Company
- The Nature Conservancy
- U.S. Army Corps of Engineers
- U.S. Department of Energy
- U.S. Environmental Protection Agency
- U.S. Geological Survey
- U.S. Fish and Wildlife Service
- U.S. Navy
- University of Washington
- Washington Department of Ecology
- Washington Department of Fish and Wildlife
- Washington Department of Natural Resources
- Washington Public Ports Association
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Puget Sound
Nearshore
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RESTORING OUR
ECOSYSTEM HEALTH

Puget Sound Nearshore Partnership/
Puget Sound Nearshore Ecosystem Restoration Project

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Marine Riparian:
An Assessment of Riparian Functions in Marine Ecosystems

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Marine Riparian:
An Assessment of Riparian Functions
In Marine Ecosystems

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Executive Summary

Marine Riparian: An Assessment Of Riparian Functions in Marine Ecosystems

Authors: J.S. Brennan and H. Culverwell

While marine nearshore environments are some of the most resource-rich and economically important ecosystems in the world, the structure, functions, and processes that form and maintain habitats in these systems are complex and poorly understood. Of the many habitats constituting the nearshore, perhaps the least understood and most unappreciated, in terms of critical functions, are riparian areas. Riparian areas have been studied intensely in recent years because of their critical functional relationships to stream and freshwater wetland ecosystems. Marine riparian areas, on the other hand, have received little attention. Although marine riparian systems have not been subject to the same level of scientific investigation, a growing body of evidence suggests that riparian systems serve similar functions regardless of the salinity of the water bodies they border. While riparian areas and shoreline vegetation have been identified as integral and important parts of the marine nearshore ecosystem, their functions and benefits have not been adequately evaluated and integrated into shoreline management strategies. Recognizing this gap in our knowledge and the apparent links between shoreline vegetation and the nearshore ecosystem based on personal observations, we began an investigation with a preliminary review of the scientific literature and interviews with other marine scientists. Our working hypothesis is that marine riparian systems provide functions similar to those described for freshwater riparian systems and are likely to provide additional functions unique to marine nearshore ecosystems. Following this preliminary assessment, we conducted a more extensive literature review and assessment of riparian functions relative to marine systems.

In this paper, we review riparian functions and associated benefits (i.e., ecological or social values) as they relate to the marine environment, using the most commonly reviewed freshwater riparian function topics as a template. The functions reviewed for this paper include water quality, soil stability, sediment control, wildlife habitat, microclimate, nutrient input, fish prey production, shade, and habitat structure with an emphasis on large woody debris (LWD). We also briefly review and discuss social values such as human health and safety, and aesthetics. In addition, we assess the relationship between current regulatory and management strategies and their effectiveness in protecting riparian and marine resources and the ecosystem as a whole. In addition to presenting the above-stated reviews and assessments, we provide a foundation to enhance discussions of shoreline management and improve resource protection through an increased understanding of nearshore and marine riparian ecosystems.

Marine Riparian Functions

Water Quality: Degradation of urban waterways is directly linked to urbanization and has been exacerbated by the lack of adequate storage, treatment, and filtration mechanisms for runoff. Water collected in stormwater systems, sewage, and discharges from industrial sources may or may not be treated and contains varying levels of silt, waste, and chemical constituents that could otherwise be absorbed or removed by allowing for infiltration, detention, and absorption by soils and vegetation. The use of riparian areas for pollution abatement is well documented and vegetated buffers are known to be efficient and cost effective. However, determining appropriate buffer widths to provide pollution abatement functions will require some basic knowledge of environmental conditions.

Soil Stability: Vegetation affects both the surficial and mass stability of slopes in significant and important ways, ranging from mechanical reinforcement and restraint by the roots and stems to modification of slope hydrology as a result of soil moisture extraction via evapotranspiration. Vegetation, once established, provides a self-perpetuating and increasingly effective permanent erosion control. Soils, slope height and angle, drainage, and other factors are also very important in determining susceptibility to erosion. For shorelines, and particularly those in areas with steep and eroding bluffs, native vegetation is usually the best tool for keeping the bluff intact and for minimizing erosion. Removal of the vegetation that helps to stabilize the face, or excavation along the face, increases the chance of slumping, which results in imperiled structures, lost land, a disruption to the ecological edge-zone, and increased sedimentation to the aquatic environment.

Sediment Control: The control of sediments entering waterways is one of the most commonly identified functions of riparian areas in freshwater and coastal riparian studies. Most discussions of sediment control are addressed in the context of functional mechanisms of pollution abatement and soil stability provided by riparian buffers. In addition to the various pollutants associated with sediments, fine sediments can have a dramatic physical effect on aquatic organisms. Siltation can clog the breathing apparatus (i.e., gills) of fishes and invertebrates, inhibit proper respiratory function in eggs and larvae (suffocation), alter substrates, and bury benthic organisms. The inherent qualities of riparian vegetation to slow runoff, stabilize soils, take up nutrients and other contaminants, and reduce siltation are common knowledge and serve even greater functions in protecting water bodies from contamination.

Wildlife Habitat: Healthy (i.e., intact and functional) riparian systems along marine shorelines support abundant and diverse assemblages of wildlife. Of the 331 wildlife species known to inhabit all of King County, Washington, we identified 263 wildlife species (9 amphibians, 5 reptiles, 192 birds, 57 mammals) known or expected to be associated with marine riparian habitat. This represents 79.5% of all wildlife species found in King County. Many wildlife species are dependent upon riparian areas for their entire life cycle, with requirements for feeding, breeding, refuge, cover, movement, migration, and climate that are intricately interwoven into the ecological balance of riparian structure, functions, and processes. Other wildlife may only depend on riparian areas during a specific life stage, for limited periods during seasonal migrations, or simply as a migration corridor. Regardless of the timing, the availability

and condition of riparian habitat can determine their survival, and many wildlife species have been extirpated due to the dramatic alteration and loss of marine riparian habitat.

Microclimate: Riparian plant and animal communities are greatly influenced by marine waters—especially those communities immediately adjacent to marine waters—through temperature and moisture regulation, tidal inundation, wind exposure, and salt spray. Marine littoral communities are, in turn, influenced by riparian conditions. The greatest influence of marine waters on riparian communities is temperature; marine waters keep lowland areas cooler in the summer and warmer in the winter. Temperature and moisture are also regulated by the amount of vegetative cover on the land. Together, these factors contribute to microclimates upon which fish and wildlife depend. Removing vegetation in upland and riparian areas increases exposure of the land and water to sun and decreases organic matter, resulting in elevated runoff and increased temperatures for water entering marine systems, desiccation of soils, and increased stress for animals dependent upon cool, moist conditions.

Shade: Solar radiation (which leads to increased temperatures and desiccation) has long been recognized as one of the classic limiting factors for upper intertidal organisms and plays an important role in determining distribution, abundance, and species composition. Although the influence and importance of shade derived from shoreline vegetation in the Puget Sound nearshore ecosystem is not well understood, it is recognized as a limiting factor to be considered and has prompted investigations to determine direct linkages between riparian vegetation and marine organisms. One such link is the relationship between shade and surf smelt (*Hypomesus pretiosus*), a common nearshore forage fish found throughout the Puget Sound basin. On the basis of a comparison of adjacent shaded and unshaded spawning sites sampled in northern Puget Sound, Penttila (2001) found significantly higher egg mortality on the unshaded (sun-exposed) beaches. Considering the influences of temperature, moisture, and exposure on the diversity, distribution, and abundance of organisms that use upper intertidal zones, additional benefits of natural shading likely will be discovered as we investigate further.

Nutrient Inputs: One of the characteristics that makes marine nearshore areas so productive is that they act as sinks for nutrients derived from upland and marine sources. The primary source of nutrients in the system is derived from primary producers (i.e., aquatic and terrestrial vegetation, phytoplankton), although terrestrial-derived organic contributions have not been well studied. Alterations of intertidal and subtidal areas by dredging, filling, diking, overwater structures, and shoreline armoring have dramatically affected marine wetland and other aquatic vegetation (i.e., eelgrass, algae). Similarly, upland development has greatly reduced the amount of vegetation and nutrients available to the marine system. Such modifications have resulted in decreased abundance and taxa richness in both benthic and infaunal invertebrate and insect assemblages.

Fish Prey Production: Of the dietary studies of marine fishes that were reviewed for this study, it appears that salmon benefit most from riparian vegetation. For those species of salmonids (i.e., cutthroat trout, chinook and chum salmon) known to be most dependent upon shallow, nearshore waters, insects derived from the terrestrial environment appear to play an important role in their diets. Because of limited sampling and dietary analysis of juvenile salmonids and other fishes in the nearshore environment, we need additional studies to understand the contribution of riparian vegetation to nearshore food webs and the impacts of vegetation loss along marine shorelines. However, as vegetation is eliminated, the food supply, and thus the carrying capacity of the coastal ecosystem, is likely to be reduced.

Habitat Structure/LWD: Riparian vegetation and large woody debris (LWD) provide a multitude of functions in aquatic ecosystems and riparian forests. One primary role of vegetation and LWD is habitat structure. The role and importance of LWD in freshwater lotic systems has been well documented and has led to increasing efforts to use LWD for bank stabilization and habitat restoration. Course woody debris is also an important part of estuarine and oceanic habitats, from upper tidewater of coastal rivers to the open ocean surface and the deep sea floor. The ecological functions of riparian vegetation and LWD in the estuarine environment are much the same as those in freshwater systems, but many of the wildlife species, and most of the fish species that have direct and indirect dependency upon riparian functions are different. Structurally, LWD provides potential roosting, nesting, refuge, and foraging opportunities for wildlife; foraging, refuge, and spawning substrate for fishes; and foraging, refuge, spawning, and attachment substrate for aquatic invertebrates and algae in the marine/estuarine environment. As the source of this material has diminished, so have the many functions provided to fish and wildlife.

Human Health and Safety: At least three riparian functions—water quality, soil stability, and the ability to act as a separation zone (i.e., absorb the impacts of storm surges and other natural, physical assaults on shorelines)—apparently serve direct benefits to humans, especially in areas like the Puget Sound region. In addition to heavy metals, petroleum, and other chemical constituents, pathogenic bacteria and viruses pose a serious health risk to humans. Shoreline erosion, landslides, and tidal inundation also pose threats to development along shorelines. Prohibiting buildings in slide-prone areas, establishing proper buffers and setbacks, controlling drainage, and maintaining native vegetation would greatly reduce hazards to humans and maintain ecosystem integrity.

Aesthetics: Aesthetic qualities are not physical or biological functions of riparian areas, but they are societal values. Aesthetic qualities of riparian areas enhance livability and add to the quality of life for residents and visitors and are of economic value for ecological functions and outdoor activities (e.g., wildlife viewing, boating, hiking).

Findings

This study focuses on riparian functions and marine ecosystem issues in the Puget Sound region. The lack of directed marine riparian studies in this region required a review and assessment of the national and international literature to determine whether studies performed in other coastal regions may be helpful in understanding the importance of individual riparian functions for Puget Sound. Our findings indicate that both freshwater and marine riparian systems serve almost identical purposes, and that marine riparian systems provide additional functions important for supporting marine biota and the integrity of nearshore ecosystems. Unfortunately, the lack of directed studies for defining the full suite of marine riparian functions and values in this region (and elsewhere) leaves much uncertainty and has resulted in a lack of standards and practices to protect riparian systems and other coastal resources.

The Puget Sound region has realized some of the most rapid coastal population growth in recent years and is expected to support continued growth in the coming decades. This will inevitably result in an increasing demand for shoreline development. Living right next to the water is highly valued in our society, but usually results in the clearing of native vegetation for view corridors, buildings, landscaping, and appurtenant structures such as bulkheads and docks. Unfortunately, shoreline development activities have significantly altered the natural structure, functions, processes, and beauty of our shorelines. Much of the historical destruction occurred without regard for the long-term consequences. Furthermore, science and public education have certainly not kept up with the level of development. However, despite the fact that current scientific knowledge and public sentiment support protection of natural resources for a variety of reasons, including aesthetics, existing environmental protection programs have proven to be woefully inadequate and ineffective at stopping the losses.

While research and empirical data to quantify functional characteristics of marine riparian systems in Puget Sound are substantially lacking, this review and assessment indicates that marine riparian functions play an important role in marine nearshore ecosystems. Our assessment also indicates that the lack of attention to marine riparian areas and poor protective standards have resulted in substantial loss and degradation of marine riparian and nearshore ecosystem components, which are of value to fishes, wildlife, and human health and safety. There is a critical need to develop and implement a research program and protective standards to learn more about marine riparian systems and prevent further degradation and loss of riparian functions and benefits.

Recommendations

The following recommendations should be considered as a part of any coastal management strategy and development of shoreline regulations.

Use the Precautionary Principle: "Do No Further Harm"
Preventing additional losses is both critical and cost effective. Once riparian functions are lost, they are difficult and expensive to restore, if restoration is possible at all.

Fill Data Gaps
The lack of empirical data for northwest coastal ecosystems and limited recognition of riparian functions has led to poor management practices and protection standards for coastal resources. Research and documentation are critical for establishing a scientific foundation for creating adequate policies and practices for protection and restoration.

Establish Appropriate Buffers and Setbacks
Buffers and setbacks are essential, functional and cost effective tools for preserving important processes and functions, preventing environmental degradation and protecting valuable coastal resources.

Maintain and/or Restore Riparian Vegetation for Human Health and Safety
Flooding, storm and erosion hazards are a common problem in coastal areas and become a greater threat when shoreline development does not consider the functions and values of maintaining riparian vegetation buffers (see Beatley et al. 1994; NRC 2002).

Identify, Evaluate and Incorporate Multiple Functions Into A Management Strategy
Any management strategy should be based upon maintaining all natural processes and functions, determined by an evaluation of the specific requirements for maintaining individual and collective functions over space and time (e.g., LWD recruitment; life history requirements of multiple species of fishes and wildlife).

Use a Multidisciplinary Approach in Developing Riparian Management Zones
Experts in a wide range of natural sciences should collaborate on an integrated and multidisciplinary assessment.

Maintain and/or Restore Riparian Vegetation for Pollution Abatement and Soil Stability
Vegetative buffers would likely be of benefit by reducing contaminants in runoff and reduce costly reactionary measures to clean up waterways.

Maintain and/or Restore Riparian Vegetation for Fish and Wildlife
It is clear that as vegetation is eliminated, the food supply, and thus the carrying capacity of the coastal ecosystem, is reduced.

Protect Marine Riparian Areas From Loss and Degradation
Riparian areas provide a wide range of functions, which are beneficial to humans, fish and wildlife. Every effort should be made to preserve remaining marine riparian areas from further degradation, fragmentation and loss.

Increase Public Education and Outreach
It is critical that decision-makers and the general public be educated about the outcomes of their actions, especially those that have the greatest influence on outcomes (i.e., those that live, work and play along our shorelines).

Develop and Implement Conservation Programs
Use ecological principles to guide actions and incorporate multiple functions and processes in developing goals and objectives for conservation actions.

Develop Incentives for Conservation Programs
Land acquisition, tax incentives, regulatory incentives and other measures have been used and should be considered in the development of conservation programs.

Introduction

While marine nearshore environments are some of the most resource-rich and economically important ecosystems in the world, the structure, functions, and processes that form and maintain habitat in these systems are complex and poorly understood. Of the many habitats constituting the nearshore, perhaps the least understood and most unappreciated, in terms of critical functions, are riparian areas. Riparian areas have been studied intensely in recent years because of their critical functional relationships to stream and wetland ecosystems. Marine riparian areas, on the other hand, have received little attention. As a result, most definitions of riparian systems are oriented to freshwater. In defining riparian systems, most authors omit any reference to tidal waters, which seems to be more of a reflection of the study area than a definition of the functional relationship (e.g., Gregory et al. 1991, Naiman et al. 1993). However, riparian areas are generally understood to be the interface between terrestrial and aquatic ecosystems. Therefore, early in the development of this manuscript (which began in 2001) we merged language used by Swanson et al. (1982) and Hall (1987) for a simplified definition that captures all aquatic systems. In order to be more inclusive, we initially defined riparian systems for this paper as follows: *Riparian systems are located in those areas that are on or by land bordering a wetland, stream, lake, tidewater, or other body of water, and which constitute the interface between terrestrial and aquatic ecosystems*. Subsequently, the National Research Council (NRC 2002) developed the following definition, which is largely in line with our original definition by recognizing marine riparian areas and we recommend using this definition:

> Riparian areas are transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes and biota. They are areas through which surface and subsurface hydrology connect waterbodies with their adjacent uplands. They include those portions of terrestrial ecosystems that significantly influence exchanges of energy and matter with aquatic ecosystems (i.e., zone of influence). Riparian areas are adjacent to perennial, intermittent, and ephemeral streams, lakes, and estuarine–marine shorelines (NRC 2002).

The interface of these two systems results in mutual influences and unique characteristics. In general, healthy riparian systems are defined by characteristics that may include some or all of the following:

- long linear shapes
- high edge-to-area ratios
- microclimates distinct from those of adjacent uplands
- standing or flowing water present all or much of the year, or a capacity to convey or retain water
- periodic flooding, which results in greater natural diversity
- composition of native vegetation differing somewhat from upland (inland) systems (e.g., different species abundance, diversity, and structure)
- support systems for terrestrial and aquatic biota

These characteristics create a unique environment (i.e., ecotone) that is complex, provides distinct functions not found in other ecotones, and typically supports higher species diversity and richness than non-riparian areas. While nested within and connected to other ecosystems within the landscape, riparian systems are themselves distinct ecosystems. Adjacent to marine waters, marine riparian systems are directly linked to, and are a part of, marine nearshore ecosystems owing to the mutual influences and dependencies upon similar processes and functional relationships.

Marine nearshore environments, particularly estuarine systems, are some of the most biologically productive and economically important systems in the world. As such, they are also among the most popular places for human habitation. In the United States, over half of the human population lives in coastal watersheds, and more than 37 million people and 19 million homes have been added to coastal areas during the last three decades (EPA 2004). Peoples' decisions to live near the water and use its resources for residential, commercial, industrial, and recreational purposes has resulted in significant modifications to shorelines (i.e., dredging, filling, armoring, clearing and grading, overwater structures, shipping and wastewater disposal). This has in turn negatively impacted the quality of nearshore habitats and the numerous estuarine-dependent species that rely on them. In Puget Sound, Washington, the nation's second largest estuary, seven salmon stocks are already extinct, and estuarine-dependent chinook (*Oncorhynchus tshawytscha*) and summer chum (*Oncorhynchus keta*) salmon have been listed as threatened under the federal Endangered Species Act (ESA). Bull trout (*Salvelinus confluentus*), which are thought to use the nearshore for feeding and migration, are also listed as threatened under the ESA. Coho salmon (*Oncorhynchus kisutch*) are being considered for ESA listing and 19 additional marine fishes, all of which are associated with nearshore habitat, were petitioned for listing because of critical population declines. Furthermore, the system's top-predator, the orca whale (*Orcinus orca*), whose prime food source includes salmon, has been petitioned for listing. While many factors have contributed to population declines, habitat loss and degradation resulting from human development has been identified as a major contributing factor.

In many U.S. estuaries, resource managers are studying various management tools to better protect these fragile and valuable ecosystems. One such tool being investigated (and in some cases used) is protective riparian "buffers" or "setbacks" along estuarine shorelines, which is similar to the more common establishment of buffers and setbacks along freshwater streams and rivers. A *buffer* is defined as a horizontal distance separating a coastal feature or resource from human activities and within which activities are typically regulated or controlled (i.e., limited) to protect the resource or minimize the risk of creating a coastal hazard. Buffer widths are typically based upon the desire to maintain a healthy "separation zone" and are determined by functions. A *setback* is defined as a distance landward of some coastal feature (e.g., the ordinary high-water mark) within which certain types of structures or activities are prohibited (National Oceanic and Atmospheric Administration [NOAA] 1998). Unlike buffers, setbacks seldom account for riparian or other coastal functions.

The use of riparian buffers and setbacks as tools to protect water quality, prevent erosion, and protect habitat structure and other functions in streams and rivers is well established; it is largely the result of an extensive body of literature documenting these functions and their associated socio-economic and biophysical benefits. Although marine riparian systems have not been subject to the same level of scientific investigation, a growing body of evidence suggests that riparian systems serve similar functions regardless of the salinity of the water bodies they border (see Desbonnet et al. 1994, Levings and Jamieson 2001). Desbonnet et al. (1994) conclude that the functional mechanisms that apply to inland riparian areas should be similarly applied to coastal areas. They point out that marine and freshwater riparian zones serve almost identical purposes, including pollutant removal, soil stability, wildlife and fish habitat, and stormwater control. Their conclusions support our hypothesis: Marine riparian systems provide functions similar to those described for freshwater riparian systems and are likely to provide additional functions unique to marine nearshore ecosystems.

The recent salmon crisis in the Pacific Northwest (PNW) is of particular interest in this study because it illustrates how narrowly we have focused our attention as resource managers. Most of what we know about salmonids comes from extensive studies of the freshwater phases of their life history. The information derived from decades of study has taught us much about the importance of water quality, sediments, flows, and the influence and importance of healthy riparian areas in freshwater systems. Yet, relatively little is known about salmon as they move from freshwater to marine conditions—for example, early life-history requirements and how these fish use the nearshore environment—even though these are critical stages in their life cycle. Similarly, we know relatively little about their life at sea. These marine phases of their life are critical to sustaining healthy salmonid populations in addition to providing critical links in our understanding of PNW ecosystems. The interdependency between upland and aquatic systems is illustrated in recent publications by Gresh et al. (2000) and Cederholm et al. (2000), who discuss the importance of marine-derived nutrients (i.e., returning salmon) in PNW forest and stream ecosystems. Their studies suggest that we not only need to preserve salmon in the system, but we need to look beyond salmon and maintain important estuarine and marine functions that will support healthy salmon populations. Without a doubt, this holds true for a multitude of other species as well.

While riparian areas and shoreline vegetation have been identified as integral and important parts of the marine nearshore ecosystem, their functions and benefits have not been adequately evaluated and integrated into shoreline management strategies. Recognizing this gap in our knowledge and the apparent links between shoreline vegetation and the nearshore ecosystem based on personal observations, we began an investigation with a preliminary review of the scientific literature and interviews with other marine scientists. Following this preliminary assessment, we conducted a more extensive literature review and assessment of riparian functions relative to marine systems. In this paper, we review riparian functions and associated benefits (i.e., ecological or social values) as they relate to the marine environment, using the most commonly reviewed freshwater riparian function topics as a template. The functions reviewed for this paper include water quality, soil stability, sediment control, wildlife habitat, microclimate, nutrient input, fish prey production, shade, and habitat structure with an emphasis on large woody debris (LWD). We also briefly review and discuss social values such as human health and safety, and aesthetics. In addition, we assess the relationship between current regulatory and management strategies and their effectiveness in protecting riparian and marine resources and the ecosystem as a whole. This paper is not intended to provide an exhaustive review of the literature, but rather a review of the scientific, planning, and resource management studies, concepts, and tools that have been used to identify and protect functions and values of riparian systems and their relationship to marine ecosystems. In addition to presenting the above-stated reviews and assessments, we provide a foundation to enhance discussions of shoreline management and improve resource protection through an increased understanding of nearshore and marine riparian ecosystems.

The terms “marine” and “estuarine” are used interchangeably in this report to cover the diverse and complex array of shorelines with saltwater influence found in Washington State. We also use the term “nearshore” to describe the area that tends to have the highest productivity, is the part of the marine ecosystem that includes and is most likely influenced by riparian interactions, and is also affected the most by anthropogenic disturbances/modifications. For this review, the nearshore is defined as the outer limit of the photic zone (approximately -20 m below MLLW) extending landward to include coastal landforms such as the backshore, sandspits, coastal bluffs, coastal wetlands, and riparian areas on or adjacent to any of these areas. In addition, the nearshore environment includes subestuaries such as the tidally influenced portions of river and stream mouths. Puget Sound is the focus of our attention in this report for a number of reasons, including the following:

1. It is the second largest estuary in the United States, exhibiting a wide range of both marine and estuarine characteristics.
2. It supports the richest and most complex fish and wildlife habitat and species diversity found in Washington State.
3. It supports the greatest urban density and growth of any region in the state.
4. It has a history of substantial habitat modification, loss, and degradation; species extinction and extirpation; and fish and wildlife population reductions.
5. Resource managers are currently charged with finding recovery solutions for several Puget Sound salmonid species listed under the Endangered Species Act.
6. A significant portion of Puget Sound’s shorelines has already been modified by development and the remainder is increasingly threatened.

Marine Riparian Functions

Ecological Functions

Hydrological, geological, biological, oceanographic, and meteorological processes form and maintain marine habitat structure and functions. The interactions of these processes determine the natural physical, chemical, and biological elements of the ecosystem. Water delivered to the Puget Sound basin in the form of rain and snow percolates through the soils and off the land. The water entering Puget Sound in streams, springs, and seeps delivers sediments, nutrients, and organic matter. It may also deliver harmful levels of silt and contaminants. The rate and mechanism of delivery greatly influences the quality of the water and its influence on associated biotic communities. Therefore, the character of the land adjacent to marine shorelines and the transport mechanisms have a significant influence on the health and integrity of the nearshore ecosystem. The processes, structure, and functions of marine nearshore systems are complex and not well understood. However, with the limited information that we do have for the nearshore environment, along with an understanding of other aquatic ecosystems and the application of basic ecological principles, we are able to identify factors that result in habitat degradation and potentially limit species survival.

One element of the nearshore ecosystem that has received very little attention is the contribution of riparian functions. Our review of the literature has revealed many marine–riparian ecosystem linkages that have previously received little attention or discussion. It has also enabled us to better understand the importance of marine riparian systems and the environmental impacts associated with altered or lost riparian functions. For example, Shreffler et al. (1994) conclude that altering the physical conditions of the shoreline can cause changes in the biological structure and functioning of shoreline habitats and can also alter use of these habitats by fish, shellfish, birds, and other organisms. Furthermore, removal of shoreline vegetation reduces shade and large woody debris (LWD), which affects the supply of terrestrial insects (that salmon feed on), epibenthic prey resources, and the spawning habitat of baitfish, which are prey resources of larger juvenile and resident salmon (Simenstad 1998). Marine riparian areas provide a variety of ecological functions integral to the marine ecosystem. They also provide a number of social benefits as well. These functions and benefits include the following:

Ecological functions:

1. soil and slope stability
2. sediment control
3. wildlife habitat
4. microclimate
5. water quality
6. nutrient input
7. fish prey production
8. habitat structure (e.g., large woody debris)
9. shade

Social values:

1. human health and safety
2. aesthetics

The following sections provide a review of each of these ecological functions and social values. Cultural and commercial values (e.g., marketable fish and shellfish), among other social values, are also important, but were not reviewed for this manuscript.

Soil and Slope Stability

> *The effects of natural or geological (surface) erosion are everywhere to be seen, but this natural erosion works slowly.… Because it works so slowly, the effects of this type of erosion are hardly felt and present no serious problem. The real problem today is not natural erosion, but the intensification of this action, known as accelerated erosion. Unlike natural erosion, accelerated erosion is the result of human activities. (Wood 1938)*

Vegetation affects both the surficial and mass stability of slopes in significant and important ways, ranging from mechanical reinforcement and restraint by the roots and stems to modification of slope hydrology as a result of soil moisture extraction via evapotranspiration. In a mature forest, approximately one-third of rainfall may be absorbed and evaporated back prior to reaching the ground. The remaining water is absorbed by forest duff and roots with a small percentage left to infiltrate into the ground. One dramatic example of this process is that a mature conifer can absorb up to 100 gallons of water per day (Dunne and Leopold 1978). The end result is that only a small fraction of the total rainfall actually infiltrates into the ground, or runs off of the land through this extensive, natural filtration system.

Considering the relatively high level of annual rainfall in the Pacific Northwest (relative to many other marine regions), water that is not intercepted by the tree canopy, understory, or shrubs will infiltrate into the ground, or run off the surface. This can lead to significant surficial erosion of soils that results in lost topsoil, siltation, burial of aquatic environs, and the introduction of contaminants into waterways. In addition, rainfall not intercepted or absorbed by vegetation also increases soil saturation, increasing the potential for landslides. Landslides appear to be much more frequent in areas where vegetation has been removed by development than in undisturbed areas of Puget Sound.

Vegetation, once established, provides a self-perpetuating and increasingly effective permanent erosion control (Kittredge 1948, Menashe 1993). Soils, slope height and angle, drainage, and other factors are also very important in determining susceptibility to erosion. However, for all shorelines, and particularly those in areas with steep and eroding bluffs, native vegetation is usually the best tool for keeping the bluff intact and for minimizing erosion (Broadhurst 1998). The loss or removal of slope vegetation can result in increased rates of erosion and higher frequencies of slope failure. This cause-and-effect relationship can be demonstrated convincingly by the many field and laboratory studies reported in the technical literature. Disturbing the face or toe of a bluff or bank may cause destabilization, slides, and cave-ins (Clark et al. 1980).

Removal of the vegetation that helps to stabilize the face, or excavation along the face, increases the chance of slumping, which results in imperiled structures, lost land, a disruption to the ecological edge-zone, and increased sedimentation to the aquatic environment (Clark et al. 1980).

Often, it is not simply the removal of native vegetation and forest duff that contributes to decreased soil stability. As shoreline properties are developed, the increase in impervious surfaces (e.g., roads, driveways, foundations, etc.) concentrates and increases runoff. This exacerbates erosional problems by increasing the volume of water and energy of flows that cut away and destabilize the land. Despite attempts to use detention, infiltration, and other forms of stormwater control, erosion and destabilization problems are often realized in other areas "downstream" or result in direct discharge to waterways, producing another set of problems (e.g., water quality, hydrology, siltation, habitat loss, and degradation). The relationship of these problems to riparian and aquatic ecosystems is clearly one of lost functions, reductions in fish and wildlife, and an increased threat to human health and safety.

Sediment Control

The control of sediments entering waterways is one of the most commonly identified functions of riparian areas in freshwater and coastal riparian studies. Most discussions of sediment control are addressed in the context of functional mechanisms of pollution abatement and soil stability provided by riparian buffers. Since most pollutants associated with stormwater are adsorbed to sediments (Karr and Schlosser 1978), trapping sediments also removes a certain percentage of the pollutant load carried in surface runoff (Desbonnet et al. 1995). Desbonnet et al. (1995) also state: "Pollutants that adsorb to sediments, and therefore can be effectively treated by riparian vegetation, include most forms of nitrogen and phosphorus, hydrocarbons, PCBs, most metals, and pesticides. Bacterial and viral pathogens are additional contaminants of concern (Thom et al. 1988, PSWQA 1995, Desbonnet et al. 1995) that may also be attenuated by riparian vegetation. While sediments are the most easily removed pollutant (Desbonnet et al. 1995), total suspended solids (TSS) and other pollutants, such as nitrogen and phosphorus, require wider buffers for filtration and uptake by vegetation. Desbonnet et al. (1994) determined that a 25-m riparian buffer would remove approximately 80% of the sediment load, whereas removing approximately 80% of nitrogen and TSS required 60 m. Removing approximately 80% of phosphorus required an 85-m buffer. But while sheet and subsurface flows through a buffer make use of the soils and vegetation, conveying stormwater through a buffer via a ditch or pipe will provide little filtration and defeat the purpose of the buffer in providing protection to the aquatic system.

In addition to the various pollutants associated with sediments, fine sediments can have a dramatic physical effect on aquatic organisms. Siltation can clog the breathing apparatus (i.e., gills) of fishes and invertebrates, inhibit proper respiratory function in eggs and larvae (suffocation), alter substrates, and bury benthic organisms. Siltation and erosion controls have long been recognized as best management practices for development projects regardless of their proximity to a water body. Yet, many control practices have proven to be inadequate, especially for projects conducted during winter in the Pacific Northwest. The most common recommendations for silt and erosion control in the technical literature are to minimize vegetation removal in the area being cleared, maintain vegetated buffers, detain runoff on site, and provide water-quality treatment.

The inherent qualities of riparian vegetation to slow runoff, stabilize soils, take up nutrients and other contaminants, and reduce siltation are common knowledge and serve even greater functions in protecting water bodies from contamination. However, the functional ability of riparian areas to handle sediment loading depends greatly upon vegetation structure (i.e., type, age, density), steepness of slope, width of buffer, and level of disturbance and volume of contaminants being introduced from above the riparian area. Maintaining riparian vegetation can be a relatively simple, long-term, and cost-effective method of pollution abatement. Re-establishing riparian vegetation may be costly, but the long-term benefits are likely to greatly outweigh such costs.

Wildlife Habitat

Healthy (i.e., intact and functional) riparian systems along marine shorelines support abundant and diverse assemblages of wildlife. Of the 331 wildlife species known to inhabit all of King County, Washington (King County 1987; Kate Stenberg, King County Department of Natural Resources, Seattle, pers. comm.) we identified 263 wildlife species (9 amphibians, 5 reptiles, 192 birds, 57 mammals) known or expected to be associated with marine riparian habitat. This represents 79.5% of all wildlife species found in King County (Table 1**)**. The Table 1 listing represents only those species suspected of having a dependence on, or association with marine riparian zones (e.g., utilization for feeding, migration, reproduction, prey/nutrient production) and does not reflect species such as marine mammals, other birds and fishes that may have less well-defined associations with marine riparian functions. This would potentially include hundreds of additional species.

Many wildlife species are dependent upon riparian areas for their entire life cycle, with requirements for feeding, breeding, refuge, cover, movement, migration, and climate that are intricately interwoven into the ecological balance of riparian structure, functions, and processes. Other wildlife may only depend on riparian areas during a specific life stage, for limited periods during seasonal migrations, or simply as a migration corridor. Regardless of the timing, the availability and condition of riparian habitat can determine their survival, and many wildlife species have been extirpated due to the dramatic alteration and loss of marine riparian habitat.

Vegetation and other characteristics of riparian areas in Puget Sound are diverse and greatly influenced by myriad physical processes such as exposure, tidal inundation, waves, hydrology, littoral drift, and erosion potential. However, excluding subestuaries (stream and river mouths), most riparian areas immediately adjacent to the waters of Puget Sound comprise mixed conifer and deciduous forests. In terms of habitat type and species com-

Table 1

AMPHIBIANS
☒ Northwestern Salamander
☒ Long-Toed Salamander
☐ Pacific Giant Salamander
☐ Van Dyke's Salamander
☒ Ensatina
☒ Western Red-Backed Salamander
☒ Rough-skinned Newt
☒ Tailed Frog
☒ Western Toad
☒ Pacific Treefrog
☒ Red-legged Frog
☐ Cascades Frog
☐ Spotted Frog
☐ Bullfrog (I)
TOTAL AMPHIBIANS: 14

REPTILES
☒ Northern Alligator Lizard
☒ Western Fence Lizard
☐ Rubber Boa
☒ Common Garter Snake
☒ Western Garter Snake
☒ Northwestern Garter Snake
☐ Painted Turtle
☐ Western Pond Turtle
☐ Snapping Turtle (I)
☐ Slider (I)
TOTAL REPTILES: 10

MAMMALS	MAMMALS (cont'd)	MAMMALS (cont'd)
☒ Virginia Opposum (I)	☒ Raccoon	☒ Beaver
☒ Cinerous Shrew	☒ Marten	☒ Deer Mouse
☒ Trowbridge Shrew	☐ Fisher	☒ Northwestern Deer Mouse
☒ Vagrant Shrew	☐ Short-tailed Weasel	☒ Bushytailed Woodrat
☒ Montane Shrew	☒ Long-tailed Weasel	☒ Black Rat(I)
☒ Water Shrew	☒ Mink	☒ Norway Rat (I)
☒ Marsh Shrew	☐ Wolverine	☒ House Mouse(1)
☒ Townsend's Mole	☒ River Otter	☒ Southern Red-backed Vole
☒ Coast Mole	☐ Spotted Skunk	☐ Heather Vole
☒ Shrew Mole	☒ Striped Skunk	☐ Long-tailed Vole
☒ Little Brown Bat	☒ Mountain Lion (Cougar)	☐ Townsend's Vole
☐ Keen's Myotis	☒ Bobcat	☐ Creeping Vole
☒ Yuma Myotis	☒ Elk	☒ Water Vole
☐ Long-eared Myotis	☒ White-Tailed Deer	☒ Muskrat
☐ Long-legged Myotis	☒ Mule Deer	☒ Pacific Jumping Mouse
☐ California Myotis	☐ Mountain Goat	☐ Porcupine
☐ Silver-haired Bat	☒ Mountain Beaver	☒ Nutria (Coypu) (I)
☒ Big Brown Bat	☒ Townsend's Chipmunk	☐ Pika
☐ Hoary Bat	☐ Yellow Pine Chipmunk	☐ Snowshoe Hare
☐ Townsend's Big-eared Bat	☐ Hoary Marmot	☒ Eastern Cottontail (I)
☒ Coyote	☐ Cascade Golden-mantled Ground Squirrel	
☐ Gray Wolf	☒ Eastern Gray Squirrel (I)	
☒ Red Fox	☒ Douglas' Squirrel	
☒ Black Bear	☒ Northern Flying Squirrel	
☐ Grizzly Bear		**TOTAL MAMMALS: 69**

Table 1. King County wildlife species list (excluding marine mammals). Species checked are those that are known or expected to have a dependence, or association with marine riparian areas (i.e., utilization for feeding, breeding, refuge, migration, prey/nutrient production, etc).
NOTE: Checklist is based upon documented occurrence and/or professional opinion of reviewers. Additional research is needed to verify ecological linkages and utilization of marine riparian areas by wildlife.

BIRDS	BIRDS (cont'd)	BIRDS (cont'd)	BIRDS (cont'd)	BIRDS (cont'd)
☒ Red-throated Loon	☒ Red-breasted Merganser	☒ Parsitic Jaeger	☒ Hammond's Flycatcher	☒ Cedar Waxwing
☒ Pacific Loon	☒ Ruddy Duck	☒ Franklin's Gull	☒ Dusky Flycatcher	☒ European Starling (I)
☒ Common Loon	☒ Osprey	☒ Bonaparte's Gull	☒ Pacific-slope Flycatcher	☒ Orange-crowned Warbler
☒ Pied Billed Grebe	☒ Bald Eagle	☒ Heermann's Gull	☐ Say's Phoebe	☐ Nashville Warbler
☒ Horned Grebe	☒ Northern Harrier	☒ Mew Gull	☐ Western Kingbird	☐ Yellow Warbler
☒ Red-necked Grebe	☒ Sharp-shinned Hawk	☒ Ring-billed Gull	☐ Eastern Kingbird	☒ Yellow-rumped Warbler
☒ Eared Grebe	☒ Cooper's Hawk	☒ California Gull	☒ Northern Shrike	☒ Black-throated Gray Warbler
☒ Clark's Grebe	☐ Northern Goshawk	☒ Herring Gull	☒ Cassin's Vireo (Solitary)	☒ Townsend's Warbler
☒ Western Grebe	☒ Red-tailed Hawk	☒ Thayer's Gull	☒ Hutton's Vireo	☐ Hermit Warbler
☒ Double-crested Cormorant	☐ Rough-legged Hawk	☒ Western Gull	☒ Warbling Vireo	☒ MacGillivray's Warbler
☒ Brandt's Cormorant	☐ Golden Eagle	☒ Glaucous-winged Gull	☐ Red-eyed Vireo	☒ Common Yellowthroat
☒ Pelagic Cormorant	☐ American Kestrel	☒ Caspian Tern	☐ Gray Jay	☒ Wilson's Warbler
☒ American Bittern	☒ Merlin	☒ Common Tern	☒ Western Scrub Jay	☒ Western Tanager
☒ Great Blue Heron	☒ Peregrine Falcon	☒ Black Tern	☒ Steller's Jay	☒ Spotted Towhee
☒ Green Heron	☒ Gyrfalcon	☒ Common Murre	☐ Blue Jay	☐ Chipping Sparrow
☒ Black-crowned Night Heron	☒ Ring-necked Pheasant (I)	☒ Pigeon Guillemot	☒ American/Northwestern Crow	☐ Vesper Sparrow
☒ Turkey Vulture	☐ Spruce Grouse	☒ Marbled Murrelet	☒ Common Raven	☒ Savannah Sparrow
☒ Tundra Swan	☐ Blue Grouse	☒ Ancient Murrelet	☐ Horned Lark	☒ Fox Sparrow
☒ Trumpeter Swan	☐ White-tailed Ptarmigan	☒ Rhinoceros Auklet	☒ Purple Martin	☒ Song Sparrow
☒ Greater White-Fronted Goose	☐ Ruffed Grouse	☒ Rock Dove (I)	☒ Tree Swallow	☒ Lincoln's Sparrow
☒ Snow Goose	☐ California Quail	☒ Band-tailed Pigeon	☒ Violet-green Swallow	☒ White-throated Sparrow
☒ Ross's Goose	☒ Virginia Rail	☒ Mourning Dove	☒ Northern Rough-winged Swallow	☒ Golden-crowned Sparrow
☒ Brant	☒ Sora	☒ Barn Owl	☐ Bank Swallow	☒ White-crowned Sparrow
☒ Canada Goose	☒ American Coot	☒ Western Screech Owl	☒ Cliff Swallow	☐ Harris's Sparrow
☒ Wood Duck	☐ Sandhill Crane	☒ Great Horned Owl	☒ Barn Swallow	☒ Snow Bunting
☒ Green-winged Teal	☒ Pacific Golden Plover	☒ Snowy Owl	☒ Black-capped Chickadee	☒ Dark-eyed Junco
☒ Mallard	☒ Black-bellied Plover	☒ Northern Pygmy Owl	☐ Mountain Chickadee	☒ Lapland Longspur
☒ Northern Pintail	☒ Semipalmated Plover	☐ Spotted Owl	☒ Chestnut-backed Chickadee	☐ Black-headed Grosbeak
☒ Blue-winged Teal	☒ Killdeer	☒ Barred Owl	☒ Bushtit	☐ Lazuli Bunting
☒ Cinnamon Teal	☒ Greater Yellowlegs	☐ Long-eared Owl	☒ Red-breasted Nuthatch	☒ Red-winged Blackbird
☒ Northern Shoveler	☒ Lesser Yellowlegs	☒ Short-eared Owl	☒ Brown Creeper	☐ Western Meadowlark
☒ Gadwall	☒ Solitary Sandpiper	☐ Northern Saw-whet Owl	☒ Bewick's Wren	☐ Yellow-headed Blackbird
☒ Eurasian Widgeon	☒ Spotted Sandpiper	☒ Common Nighthawk	☐ House Wren	☐ Brewer's Blackbird
☒ American Widgeon	☒ Whimbrel	☐ Black Swift	☒ Winter Wren	☒ Brown-headed Cowbird
☒ Canvas Back	☒ Ruddy Turnstone	☒ Vaux's Swift	☒ Marsh Wren	☒ Bullock's Oriole
☒ Red Head	☒ Surfbird	☒ Anna's Hummingbird	☐ American Dipper	☐ Gray-crowned Rosy Finch
☒ Ring-necked Duck	☒ Sanderling	☒ Rufous Hummingbird	☒ Golden-crowned Kinglet	☐ Pine Grosbeak
☒ Greater Scaup	☒ Semipalmated Sandpiper	☒ Belted Kingfisher	☒ Ruby-crowned Kinglet	☒ Purple Finch
☒ Lesser Scaup	☒ Western Sandpiper	☐ Lewis's Woodpecker	☐ Western Bluebird	☒ House Finch
☒ Harlequin Duck	☒ Least Sandpiper	☒ Red-breasted Sapsucker	☐ Mountain Bluebird	☒ Red Crossbill
☒ Black Scoter	☒ Baird's Sandpiper	☒ Downy Woodpecker	☒ Townsend's Solitaire	☐ White-winged Crossbill
☒ Surf Scoter	☒ Pectoral Sandpiper	☒ Hairy Woodpecker	☒ Swainson's Thrush	☐ Common Redpoll
☒ White-winged Scoter	☒ Dunlin	☐ Three-toed Woodpecker	☒ Hermit Thrush	☒ Pine Siskin
☒ Common Goldeneye	☒ Short-billed Dowitcher	☒ Northern Flicker	☒ American Robin	☒ American Goldfinch
☒ Barrow's Goldeneye	☒ Long-billed Dowitcher	☒ Pileated Woodpecker	☒ Varied Thrush	☒ Evening Grosbeak
☒ Bufflehead	☒ Common Snipe	☒ Olive-sided Flycatcher	☐ Northern Mockingbird	☒ House Sparrow(I)
☒ Hooded Merganser	☒ Wilson's Phalarope	☒ Western Wood-Pewee	☒ American Pipit	
☒ Common Merganser	☒ Red-necked Phalarope	☒ Willow Flycatcher	☒ Bohemian Waxwing	**TOTAL BIRDS: 238**

position, these riparian areas are similar to those found along Puget Sound lowland streams and other riparian areas in western Washington State. Therefore, a similar value assessment of riparian wildlife habitat is warranted. Wildlife habitat requirements in riparian systems are complex and have received much review and analysis. For example, Knutson and Naef (1997), Desbonnet et al. (1994), and Wenger (1999) have performed extensive literature reviews to determine buffer widths required to maintain riparian functions for wildlife. For Washington State, Knutson and Naef (1997) determined that the average width reported to retain the riparian function for wildlife habitat was 88 m. In their literature review of wildlife habitat protection, Desbonnet et al. (1994) recommend 60-100 m for general wildlife habitat, 92 m for protecting important wildlife habitat, and 600 m for protecting critical species. Unfortunately, little discussion and even less effort has been focused on preserving marine riparian areas for wildlife species in Puget Sound or elsewhere. This has resulted in a dramatic loss and fragmentation of riparian habitat and associated wildlife. Buffer requirements for freshwater systems may be substantially less than for some marine and estuarine systems because of the influences of wind, salt spray, desiccation, and general microclimatic effects on vegetation and associated wildlife (Klaus Richter, King County, Department of Natural Resources and Parks, Seattle, pers. comm.).

One of the greatest impacts of urbanization on wildlife comes from habitat fragmentation (Stenberg et al. 1997, Knutson and Naef 1997). The isolation of remnant habitat parcels makes utilization and recolonization by wildlife difficult or impossible (Knutson and Naef 1997). This is of particular concern for species with low mobility such as amphibians (Richter 1995, Knutson and Naef 1997). Because many wildlife species depend upon wide, continuous corridors, and separation from the disturbance of urbanization, fragmented and discontinuous riparian habitat provides limited value to a wide range of species and will ultimately support greatly reduced species diversity and abundance. This is not to say that small tracts of remaining riparian habitat are of no value. Rather, it suggests that species diversity and abundance, along with other wildlife benefits and riparian functions, may be improved with efforts to reconnect and expand remaining riparian (and upland) areas.

Washington State claims to have nearly 2.5 million wildlife watchers over the age of 16, with expenditures of $980 million for wildlife watching activities in 2001 (U.S. Fish and Wildlife Service [USFWS] 2001). Much of this wildlife viewing occurs along marine shorelines, from the land and from the water. Considering the species diversity and abundance of wildlife supported by riparian areas, there appears to be both economic and biological arguments for their maintenance and protection.

Microclimate

Riparian plant and animal communities are greatly influenced by marine waters—especially those communities immediately adjacent to marine waters—temperature and moisture regulation, tidal inundation, wind exposure, and salt spray. Marine littoral communities are, in turn, influenced by riparian condition. The interaction of these two systems creates an ecotone, a unique transition zone from a marine system to an upland ecosystem that supports a diverse assemblage of plants and wildlife.

The greatest influence of marine waters on riparian communities is temperature; marine waters keep lowland areas cooler in the summer and warmer in the winter. Temperature and moisture are also regulated by the amount of vegetative cover on the land. Together, these factors contribute to microclimates upon which fish and wildlife depend, especially climate-sensitive species such as amphibians. Even the quality of the soil (biological, chemical, and physical properties) is influenced by climate, thereby affecting conditions for plants and animals.

Removing vegetation in upland and riparian areas increases exposure of the land and water to sun and decreases organic matter, resulting in elevated runoff and increased temperatures for water entering marine systems, desiccation of soils, and increased stress for animals dependent upon cool, moist conditions. Cleared areas become hotter in the summer and colder in the winter, have increased evaporation due to wind and sun exposure, have reduced humidity, and may experience increased soil instability.

Microclimates contribute to higher species diversity and abundance along marine shorelines compared with nonriparian areas. As marine shorelines have become urbanized, large volumes of riparian vegetation have been displaced by concrete, asphalt, structures, and landscaping, which changes habitat structure and results in temperature and moisture changes. Changes in microclimate and habitat structure also result in concurrent changes in species composition.

Water Quality

Degradation of urban waterways is directly linked to urbanization and has been exacerbated by the lack of adequate storage, treatment, and filtration mechanisms for runoff. The major pollutants found in runoff from urban areas include sediment, nutrients, oxygen-demanding substances (e.g., organic compounds), road salts, heavy metals, petroleum hydrocarbons, pathogenic bacteria, and viruses (U.S. Environmental Protection Agency [USEPA] 1993). Many contaminants bind to sediments, which, when suspended, constitute the largest mass of pollutant loadings to receiving waters from urban areas (USEPA 1993). Clearing, grading, and other construction practices are the major source of sediment erosion. In addition to the damages caused by chemical constituents, excessive sedimentation results in burial and siltation, which can have severe, adverse effects on aquatic biota.

Typically, clearing and grading is followed by the installation of impervious surfaces such as roads, buildings, sidewalks, and parking lots. Furthermore, landscaping practices and the compaction of soils that occurs with development results in vast areas of relatively impermeable soil. Rainfall and other runoff is not retained and gathers in volume, velocity, and contaminants as it flows over the now-converted landscape toward its ultimate destination—a waterway such as Puget Sound. Water collected in stormwater systems, sewage, and discharges from industrial sources may or may not be treated and contains varying levels of silt, waste, and chemical constituents that could otherwise be absorbed or removed by allowing for infiltration, detention, and absorption by soils and vegetation.

Pesticide, herbicide, and fertilizer application can have dramatic impacts on fish and wildlife through direct and indirect contact. Improper application, excessive concentrations, and overuse of pesticides and fertilizers are common practices in urban shoreline areas where artificial landscapes are desired by landowners. Harmful chemical constituents are transported to marine and estuarine waters through a number of transport mechanisms (i.e., sediments, surface runoff, springs, seeps, streams) and are taken up by aquatic organisms in the water through prey organisms and other food sources. Contaminants also accumulate in sediments that can affect benthic and epibenthic organisms through physical contact. Direct effects include mortality to adults, juveniles, or embryos; reduced reproductive success; birth defects; anorexia and loss of body-weight; retarded growth; and changes in species composition. Indirectly, treatments with pesticides (particularly insecticides and herbicides) can reduce plant and insect food sources for wildlife species (Knutson and Naef 1997) and fishes. Reduced and contaminated food sources can cause stress, reduced growth and survival, relocation, and higher susceptibility to predation.

Fertilizers and other urban and agricultural runoff contribute to additional indirect impacts by introducing high levels of organic nutrients, petroleum byproducts, and other contaminants into the aquatic system. The increase in nutrients can cause plankton blooms, which may consume oxygen as the plankton die. This process is known as eutrophication. Eutrophication in the nearshore has been identified as a concern by resource managers and scientists (Broadhurst 1998). It is often the result of poorly functioning septic systems and other unfiltered runoff. Eutrophication is particularly acute in water bodies with poor tidal flushing or extended residence times like Hood Canal, Whidbey basin and South Puget Sound. It can also occur in embayments, particularly in heavily urbanized areas.

Contamination has also had a direct economic effect on the region's shellfish industry. Washington is the second largest producer of oysters and clams in the nation and the leading producer of farmed oysters and clams. Clean water is critical for the industry and the public who enjoy harvesting shellfish (Washington Department of Health/Puget Sound Action Team [WDOH/PSAT] press release, June 2003). In 1992, 32% of classified commercial shellfish-growing areas in Puget Sound and Juan de Fuca Strait were either restricted or prohibited for harvesting owing to water-quality issues (Levings and Thom 1994). In 2003, the WDOH identified 20 threatened shellfish areas in a record number of counties (12) according to their Early Warning System (WDOH/PSAT 2003). In most urban and urbanizing areas of Puget Sound, sport harvest of clams is restricted because of contaminants derived from urban runoff, failing septic systems, and other nonpoint pollution sources. Despite efforts to upgrade and expand wastewater treatment facilities, increasing urbanization and destruction of riparian zones will continue to contribute to degraded water quality and will likely result in increased harvest restrictions.

The effects of these contaminants become most apparent through analysis of higher-order predators such as marine mammals. In his review of contaminants found in Puget Sound marine mammals, Calambokidis (1995) found that concentrations of PCBs in harbor seals (*Phoca vitulina*) in the 1970s were among the highest reported worldwide. He also reported that these contaminants have been linked to a variety of disorders in marine mammals, including premature births, reproductive failure, and immunosuppression. More recently, high levels of PCBs have been found in orca whale tissues, which is suspected as a possible cause of population decline. This concern has led to the listing of orcas as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and a petition for listing orcas under the Endangered Species Act in the United States.

According to state water-quality assessments, the leading nonpoint pollution contributors to estuarine waters are urban runoff (including construction and development activities and onsite disposal systems) and agriculture (USEPA 1993). Other significant nonpoint contributors in some coastal watersheds include silviculture, marinas, and hydromodification. Furthermore, the loss and degradation of wetlands and riparian areas has adversely impacted coastal water quality (USEPA 1993).

The use of riparian areas for pollution abatement is well documented (e.g., Phillips 1989, Groffman et al. 1990, Desbonnet et al. 1994, Knutson and Naef 1997, Lorance et al. 1997a,b, Rein 1999, Wenger 1999). In addition, vegetated buffers are known to be efficient and cost effective. Our review of the literature regarding the use of riparian buffers for pollution control in estuaries indicates that the level of effectiveness depends upon a number of factors including the following:

- soils
- geomorphology
- hydrology
- biological processes (e.g., microbial activity)
- vegetation type
- steepness of slopes
- annual rainfall
- level of pollution
- type of pollutants
- surrounding land uses
- buffer width

In an analysis of multiple soil types found in several states along the Atlantic coast, Phillips (1989) found that a 91-m vegetated buffer area would provide sufficient filtration for nonpoint pollution concerns around estuaries. Clark et al. (1980) recommended 24-m minimum buffers for slopes of 20% with slight erosion, and 46-m minimum buffers for 30% slopes with severe erosion for controlling agricultural runoff. Lee and Olsen (1985) found that the majority of nitrogen loading in estuarine lagoons (70-90%) and resultant algal blooms and eutrophication resulted from upland residential development and application of herbicides and pesticides. In addition, a number of studies link declines in seagrasses (i.e., *Zostera* spp.) and changes in species composition to degraded water quality associated with shoreline development (Short and Burdick 1996, Pennings et al. 2002). Resolving these problems entailed recommendations that included maintaining and replacing septic systems, reducing further development, and a requirement for natural vegetation buffers. Rein (1999) not only recommended vegetated buffer strips to reduce siltation and pollutants from agriculture, but quantified the economic benefits to the grower and society that result from using vegetation for erosion control and filtration of contaminants. Similarly, in a study of the cost of nutrient control in Chesapeake Bay, Butt and Brown (2000) conclude that the past decade of nutrient control experience has proven that pollution prevention would have been a much cheaper alternative in the long run. Knowing that vegetative buffers can provide significant reductions in pollutants, it can be inferred that requiring such buffers would be of great benefit and reduce costly reactionary measures to clean up waterways. However, determining appropriate buffer widths to provide pollution abatement functions will require some basic knowledge of environmental conditions (i.e., factors listed above).

Nutrient Input

One of the characteristics that makes estuaries so productive is that they act as sinks for nutrients derived from upland and marine sources. Estuarine ecosystems have a functional dependency on capturing and processing organic matter to support detritus-based food webs. Furthermore, this function depends upon the right kinds and appropriate levels of organic nutrient input.

The primary source of nutrients in the system is derived from primary producers (i.e., aquatic and terrestrial vegetation, phytoplankton). Alterations of intertidal and subtidal areas by dredging, filling, diking, overwater structures, and shoreline armoring have dramatically affected marine wetland and other aquatic vegetation (i.e., eelgrass, algae). Similarly, upland development has greatly reduced the amount of vegetation and nutrients available to the marine system.

Organic detritus is the principal energy source for food webs in estuarine and shallow, marine benthic portions of the ecosystem; the principle source of this detrital carbon is debris from macrophytes in the system (Gonor et al. 1988). For large woody debris, isopods (*Limnoria*), mollusks (*Bankia*, *Teredo*), fungi, and bacteria play important roles as agents of wood conversion and dispersion in the carbon and energy cycles of estuaries. For example, the wood-boring isopods, *Limnoria* (gribbles), transfer fine wood particles to the carbon pool of the benthic sediment system by enormously increasing the surface area of wood and effectively converting trees directly into nonbuoyant wood powder. The breakdown of this material and its contribution to carbon cycling in detrital systems is not well understood, but it may provide an important source of carbon where LWD (and other upland vegetative material) is available. Thus, reductions of LWD in the nearshore likely result in reduced detrital carbon.

Beach wrack (organic/plant material deposited on beaches that is derived from marine and upland sources) provides habitat for several taxa that, in turn, process the material for introduction into the detritus-based food web and serve as prey for higher trophic levels (i.e., fish and wildlife). Beach wrack is also processed by the mechanical action of waves and the grinding action of the sand and gravel on the beach. The structural benefits of wrack include cover and refuge from desiccation and predators. While beach wrack tends to attract both terrestrial insects and marine invertebrates, it appears that the most abundant taxonomic group is crustaceans. For example, in a survey of beach wrack infauna at North Beach, near the West Point Wastewater facility in Seattle, Washington, the numbers of crustaceans found in some beach wrack samples exceeded 10,000 per square meter (Shimek 1993). While some shorebirds are known feed on these crustaceans, little is known about links to higher trophic levels.

While food webs and trophic interactions in the nearshore are generally understood, there remain significant data gaps in our understanding of specific linkages and pathways between inputs and trophic levels. Most studies of trophic interactions are species-specific, linked to specific projects in space and time, or lack the design and goals for a larger-scale understanding of the ecosystem. Studies are typically performed by different agencies, for different purposes, and often, using different methodologies. Also, the designs of independent studies often do not lend themselves to comparing and interpreting data. For example, it is well known that fishes in the marine environment prey on a suite of organisms from various trophic levels supported by detritus. Although the importance of detritus in maintaining a prey base is well accepted, the contribution of riparian vegetation to the detritus base of the marine food web has received little attention.

In their assessment of shoreline armoring effects on selected biological resources in Puget Sound, Shreffler et al. (1994) note that increased beach erosion caused by shoreline armoring can convert the beach from a system that shows net accumulation of organic matter to one that shows net loss of organic matter on an annual or seasonal basis. Organic matter is essentially stripped from the beach or no longer accumulates as a result of the increased energy, resulting in lowering of the beach profile and loss of intertidal area due to the placement of armoring. The assessment by Shreffler et al. (1994) also illustrates that armoring results in a direct loss of riparian vegetation, alterations of sediment input, deposition and retention, nutrient flux, species assemblage shifts and ultimately, negative effects on aquatic organisms such as forage fishes, salmonids, clams, crabs, and other invertebrates. The losses due to shoreline armoring have been identified in numerous studies and reports (see Kozloff, 1974, Macdonald et al. 1994, and Broadhurst 1998 for summaries and references). Yet, little attention and fewer studies have been focused on quantifying the cumulative impacts of such losses. However, a recent study by Sobocinski (2003) clearly identifies and quantifies biological impacts associated with armored shorelines. Natural beach sites had larger amounts of beach wrack (organic debris) and significantly higher species diversity and abundance of insects and invertebrates when compared with armored/altered sites, which illustrated that shoreline armoring decreases abundance and taxa richness in both benthic and infaunal invertebrate and insect assemblages.

Fish Prey Production

Numerous studies have identified functional linkages between riparian areas and marine aquatic systems. However, few have established direct linkages between specific prey resources derived from riparian vegetation and marine fishes. Of the dietary studies of marine fishes that were reviewed for this study, it appears that salmon benefit most from riparian vegetation. The direct input of insect prey (fallout) from riparian vegetation for salmonids in freshwater systems has been well documented. However, the importance of insect fallout from riparian vegetation in juvenile salmon (and juvenile and adult cutthroat trout, *Salmo clarki*) diets in the marine environment is just being realized, and this resource may play an important role in early marine survival.

The success of salmon feeding in shallow estuarine and marine areas may have an important influence on the early marine growth and survival of the fish utilizing these areas for rearing (Pearse et al. 1982). Successful feeding and growth depends upon the availability of preferred prey in the right space and time. In the nearshore environment, sporadic dietary studies of juvenile salmonids have shown interspecific differences in prey selectivity, and intraspecific differences in space and time. However, for those species of salmonids (i.e., cutthroat trout, chinook and chum salmon) known to be most dependent upon shallow, nearshore waters, insects derived from the terrestrial environment appear to play an important role in their diets.

Several studies have shown that chum salmon prey on terrestrially derived insects in Pacific Northwest estuaries. Simenstad (1998) found that summer chum collected in Hood Canal preyed upon insects. In the central Puget Sound Basin, Cordell et al. (1998; 1999a, b) found that insects were a dominant prey item in chum stomachs and consisted of chironomid fly larvae, pupae/emergent adults, dipteran flies, and spiders. The predominance of insects, especially chironomids, found in these studies is similar to results of chum salmon diets from other estuarine sites (Congleton 1978, Northcote et al. 1979, Shreffler et al. 1992, Cordell et al. 1997, Fresh et al. 1979).

Juvenile chinook salmon have also been shown to prey upon insects in the Puget Sound nearshore and other estuaries in Washington State. Insects were identified as a significant dietary component of juvenile chinook collected off Bainbridge and Anderson islands by Fresh et al. (1981). Miller and Simenstad (1997) found that insects (chironomids and aphids) were the most important prey items for juvenile chinook at created and natural channels in the Chehalis River estuary. Studies by Cordell et al. (1997; 1998; 1999a,b) have shown similar results in juvenile chinook salmon diet studies but have also shown prey species variability among years and seasons studied in the Duwamish and Snohomish river estuaries. The importance of insects in juvenile chinook diets is also supported by studies in the Frasier River estuary (Levings et al. 1991, Levings et al. 1995), the Nisqually estuary (Pearce et al. 1982), the Puyallup River estuary (Shreffler et al. 1992), the Nanaimo estuary (Healey 1980), the Nisqually Reach area of Puget Sound (Fresh et al. 1979), and central Puget Sound (Sobocinski 2003). More recently, juvenile chinook salmon stomach contents analyzed from beach seine samples collected throughout King County shorelines in central Puget Sound show a predominance of terrestrial insects in their diet (Brennan et al 2004) (**Figure 1**). This suggests that riparian vegetation on open marine shorelines may play an important role in producing prey for juvenile salmon.

The results of these studies provide direct evidence of the importance of salt marsh and upland riparian vegetation as vital ecosystem components for providing detritus and habitat for salmonid food organisms. For example, Levings et al. (1980) found that of the 10 prey species used by chinook, chironomid larvae, pupae, and adults were most abundant in the vegetated zones, and therefore, their density might be used as an index of fish food abundance directly related to vegetation presence or coverage. Other invertebrates, such as mysids and amphipods, are connected to vegetation via detritus-based food webs as shown on the Fraser

Figure 1. Stomach contents of a 143 mm juvenile chinook salmon captured off of Maury Island (Puget Sound shoreline) on September 14, 2001. Note that contents are comprised entirely of terrestrial insects. Although juvenile salmonids feed on both marine and terrestrial organisms, this illustrates that they do have some dependency on prey derived from the adjacent uplands.

estuary (Healey 1982) and in studies of other areas (e.g., Simenstad and Wissmar 1985, Levings et al. 1991). A current food-web analysis by the University of Washington (Cordell et al., School of Aquatic & Fishery Sciences, Seattle, unpubl. data) has identified important habitats and food-web connections for chinook salmon in Puget Sound, including:

- Intertidal and shallow subtidal areas that produce amphipods and other epibenthic crustaceans. As has been established for juvenile chum salmon, these probably include intertidal flats as well as vegetation and areas of high detritus buildup.
- Nearshore vegetated terrestrial habitats that are the source of terrestrial insects in the diets.
- Feeding on planktonic grazers such as euphausiids, shrimp, and crab larvae, planktonic amphipods, and copepods.
- Feeding on other secondary pelagic consumers such as herring and other fish.

Because of limited sampling and dietary analysis of juvenile salmonids and other fishes in the nearshore environment, we need additional studies to understand the contribution of riparian vegetation to nearshore food webs and the impacts of vegetation loss along marine shorelines. However, as vegetation is eliminated, the food supply, and thus the carrying capacity of the coastal ecosystem, is likely to be reduced (cf. Levings and Jamieson 2001 for review of riparian vegetation/food web linkages).

Habitat Structure/Large Woody Debris (LWD)

Riparian vegetation and large woody debris (LWD) provide a multitude of functions in aquatic ecosystems and riparian forests. One primary role of vegetation and LWD is as habitat structure. The role and importance of LWD in freshwater lotic systems has been well documented and has led to increasing efforts to use LWD for bank stabilization and habitat restoration (e.g., Cramer et al. 2003, Johnson and Stypula 1993). Course woody debris is also an important part of estuarine and oceanic habitats, from upper tidewater of coastal rivers to the open ocean surface and the deep sea floor (Gonor et al. 1988). Yet, long before we understood or were concerned about freshwater or marine riparian systems, vast amounts of trees were cut along rivers and Puget Sound shorelines for timber and land development. Shoreline riparian forests likely were some of the earliest wood harvested owing to the ease of access and transport (logs could be floated down rivers, or rafted up the estuary for delivery to a mill site). This assumption is at least partially supported by Sedell and Duval (1985). Maser and Sedell (1994) provide a historical review of reported wood accumulations on estuarine and coastal beaches, and a number of past activities (and continuing operations) that help to understand the fate of LWD, including the following:

- West coast survey reports in the 1850s recorded that many of the drift trees in the lower Columbia River were as large a 150 feet long by 13 to 18 feet in circumference; the largest was 267 feet long (Secretary of the Treasury 1859).
- Swan (1857) reported drift trees as large as 250 feet long by 8 feet at the base, with a root span of some 20 feet, on the beach near the mouth of the Quillayute River in the Washington territory.
- The lower river and estuary banks (riparian corridor) probably were the most common sources of the largest driftwood in the bays. In the 1860s, the banks of the upper half of the Coquille estuary were lined with mature hardwoods that made travel on the Coquille like walking "dim aisles in ancient cathedrals" (Dodge 1898).
- The U.S. Army Corps of Engineers (USACE) reported that Pacific Northwest estuarine shorelines and river-mouth beaches had often been covered with driftwood in the 1870s.
- The USACE's responsibility to improve and maintain navigability led to removing significant amounts of driftwood (snags) and cutting trees along riparian corridors: "In the Tillamook River system in 1904, the U.S. Army Corps of Engineers cut down all overhanging trees along the banks of the estuary in an attempt to alleviate the woody debris problem" (Report of the Secretary of War 1904-5).
- Fishermen were also troubled by the snags and formed cooperatives to clear the rivers and estuaries of snags.
- Many sources of large wood for estuaries and beaches along the Pacific Northwest coast were exhausted by 1920.

Although similar historical data for Puget Sound were not available, the fate of LWD likely is similar to that found elsewhere in the Pacific Northwest. For example, in Puget Sound, the USACE continues to remove drift logs to reduce navigation hazards, and others snag logs for firewood, furniture, artwork and other uses.

The ecological functions of riparian vegetation and LWD in the estuarine environment are much the same as those in freshwater systems, but many of the wildlife species, and most of the fish species that have direct and indirect dependency upon riparian functions are different. Structurally, LWD provides potential roosting, nesting, refuge, and foraging opportunities for wildlife; foraging, refuge, and spawning substrate for fishes; and foraging, refuge, spawning, and attachment substrate for aquatic invertebrates and algae in the marine/estuarine environment. As the source of this material has diminished, so have the many functions provided to fish and wildlife.

Bald eagles, kingfishers, and other birds use logs on beaches, tideflats, and estuarine channels as perches, which provide visibility for foraging, resting areas, and to reduce flight times (energy conservation) between foraging areas and nesting sites. Herons and egrets will use drifted trees that are partially out of the water, as well as floating logs and log rafts, for foraging and resting. Cormorants, pelicans, small shorebirds, and some waterfowl also require perches and platforms for rest between periods of foraging to spread their wings to dry their feathers and for preening themselves. Purple martins and other cavity-nesting birds will use rotting snags on beaches for nesting. This has become more common because rotting trees on land near the water have become scarce (Gonor et al. 1988). Richter (King County, DNRP, unpubl. data) has found that gulls (western, glaucous-winged, and hybrids) along the Pacific coast prefer log beaches and estuarine meadows to logless beaches and other areas for breeding. Nests are built adjacent to logs that perform many functions, including visual isolation from adjacent nesters, thermoregulatory benefits for egg development (prevents addling), and cover for newly hatched chicks. Logs enable gulls to spend less time protecting the nest and more time foraging. Hence, fewer eggs and chicks die and the remaining ones grow larger in less time. LWD is suspected to serve similar functions for other ground nesting wildlife.

The importance of LWD to aquatic organisms varies and depends highly upon LWD location. Logs high in the intertidal may become embedded and alter deposition patterns of organic litter—or beach wrack (vegetation derived from both aquatic and upland sources)—and sediments that support diverse assemblages of terrestrial and aquatic invertebrates. Although the species assemblages that use woody debris and other beach wrack are not well described, personal observations have found diverse taxonomic groups, including flying insects, spiders, mites, worms, beetles, isopods, amphipods, and many other unidentified insects and larvae. The role of beach wrack has not been well studied in the PNW. However, similar to the importance of gribbles, many of these insects may play an important role in the breakdown of organic material and contribute to carbon cycling in the nearshore ecosystem. They may also play an important role as prey for higher trophic levels in the nearshore food web, such as shorebirds and fishes.

Logs may also become waterlogged and provide substrate in intertidal zones. In estuaries where the intertidal areas comprise predominantly shifting sands and gravels, or silty substrates, solid surfaces are limited. As logs become immobilized, numerous organisms will colonize this habitat for feeding, refuge, and reproduction. Mobile invertebrates supported by this habitat (i.e., crabs, snails, limpets, nudibranchs) will find feeding opportunities, refuge, and spawning substrate. Sessile species (i.e., mussels, oysters, barnacles, and tube worms) use the space for attachment, as will algal species (e.g., *Fucus* spp.). As the logs become colonized, the surface area and habitat complexity increases. Other species will move into the area in search of prey that have colonized, or are associated with, the log while others, such as herring and other fishes, may use the attached algae or protected crevices as spawning substrate.

Vegetation and woody debris also provide refuge for fishes. While most studies have described the importance of vegetation in estuarine marshes, similar functions likely would be afforded by overhanging shoreline vegetation and woody debris on the beaches around Puget Sound. Gregory and Levings (1996) showed that, under laboratory conditions, predation by cutthroat trout on juvenile salmonids was significantly reduced in the presence of vegetation (Aitkin 1998). Considering that juvenile salmonid predators come from aquatic and terrestrial environments, the added habitat complexity and cover provided by vegetation may be a critical element of survival.

Trapping and stabilizing sediments in salt marshes and on beaches is another important structural function of vegetation and LWD in the marine environment. Gonor et al. (1988) defines salt marshes as densely vegetated, low coastal wetlands at elevations within the annual vertical range of regular tidal fluctuations that contain plants capable of growing in saturated estuarine sediments and withstanding stresses from salinity and tidal inundation. Salt marshes are important parts of estuarine systems in the PNW because of their high annual plant production rates. These marshes provide numerous functions including the following: (1) They export a significant fraction of their plant matter to the rest of the estuarine ecosystem as detritus; (2) they function as hydraulic buffers to flood and storm surges because of their extensive area; and (3) they provide important habitat to migratory waterfowl and juvenile fishes, especially salmonids, who use tidal channels (Gonor et al. 1988). Logs play important roles in forming and maintaining tidal channels by trapping sediments, which in turn become colonized by salt-marsh vegetation, further stabilizing sediments and creating complex habitat and flow patterns.

Similarly, LWD dropped onto beaches from adjacent riparian areas, or deposited during high tides, influences sediment transport and deposition. Some logs are transient while others may become embedded and serve as effective traps for sand and gravel. As sediments accumulate, back beaches, berms, and spits may be created, which are typically colonized by dune grass, beach rocket, and other plants tolerant of the conditions found in this zone (i.e., halophytes). The logs retain moisture that becomes available to dune plants and play an important role in these plants' establishment and survival. The plant stems, leaves, and complex root structure provide additional stability to the sediments. The evolution of these beach types generates new habitat for wildlife, contributes moisture and nutrients for the establishment of vegetation, adds detrital carbon to the marine system, and can greatly reduce the rate of wave-induced shoreline erosion.

Shade

For freshwater systems, shade plays an important role in regulating water temperature, which influences the survival of aquatic organisms (Beschta et al. 1987). Unlike the influence on small streams and rivers, a shaded fringe along coastal or estuarine waters is not likely to have much influence on marine water temperatures. However, solar radiation (which leads to increased temperatures and desiccation) has long been recognized as one of the classic limiting factors for upper intertidal organisms and plays an important role in determining distribution, abundance, and species composition (e.g., Ricketts and Calvin 1968, Connell 1972,). Foster et al. (1986), in their literature review of causes of spatial and temporal patterns in intertidal communities, found that the most commonly reported factor responsible for setting the upper limits of intertidal animals is desiccation. Along Puget Sound shorelines, distinct differences have been noted for substrate moisture and air and substrate temperature between shaded and unshaded beaches (personal observations). Although the influence and importance of shade derived from shoreline vegetation in the Puget Sound nearshore ecosystem is not well understood, it is recognized as a limiting factor to be considered and has prompted investigations to determine direct linkages between riparian vegetation and marine organisms.

One such link is the relationship between shade and surf smelt (*Hypomesus pretiosus*), a common nearshore forage fish found throughout the Puget Sound basin. According to Penttila (2001), surf smelt (and sand lance, *Ammodytes hexapterus*) are unique among local marine fishes in their requirement for mixed sand and gravel beaches in the upper intertidal zone as "critical habitat" for depositing and incubating eggs. Both species are considered to be important trophic links in the nearshore food web. Surf smelt also supports a fishery for human consumption. On the basis of a comparison of adjacent, shaded and unshaded spawning sites sampled in northern Puget Sound, Penttila (2001) found significantly higher egg mortality on the unshaded (sun-exposed) beaches. The study also suggests that reduced substrate moisture (increasing the potential for desiccation) in addition to direct solar radiation (direct sun exposure and elevated temperatures) may have an important influence on egg viability. However, in addition to other factors such as groundwater seeps, shading would contribute to reduction in direct exposure, temperature moderation, and higher substrate moisture. Considering the influences of temperature, moisture, and exposure on the diversity, distribution, and abundance of organisms that use upper intertidal zones, additional benefits of natural shading likely will be discovered as we investigate further.

Social Values

Human Health and Safety

Human health and safety are rarely identified in the scientific literature as one of the primary functions of riparian areas. However, at least three riparian functions—water quality, soil stability, and the ability to act as a separation zone (i.e., absorb the impacts of storm surges and other natural, physical assaults on shorelines)—apparently serve direct benefits to humans, especially in areas like the Puget Sound region. In urban areas, most people get their drinking water from a municipal water supply that comes from surface waters stored in reservoirs. These water supplies would be of much lower quality if it were not for the cleansing action of riparian forests and restrictions on forestry and development practices adjacent to these water supplies. In rural areas, many people depend upon surface and groundwater, the quality of which depends upon adequate recharge and the cleansing action of the forest and soils that act as filters. In both cases, vegetation provides stability to soils, further reducing the potential for landslides and siltation (contamination of a water supply). However, as vegetation is cleared for development and impervious surfaces displace vegetation, negative results are realized including the following:

1. The loss of filtration for surface water flowing into drinking and recreation water supplies
2. Reduced filtration for groundwater supplies
3. Reduced water volume for recharging groundwater supplies
4. Increased collection and concentration of runoff (with associated siltation and contaminants feeding into receiving waters)
5. Contamination of fish (finfishes and shellfish), game, and algal species harvested for human consumption
6. Destabilization of soils, leading to increased slide activity and threats to property and life
7. The loss of a protective "separation zone"

In addition to heavy metals, petroleum, and other chemical constituents, pathogenic bacteria and viruses pose a serious health risk to humans. Most shoreline residential properties around Puget Sound were developed using on-site septic systems. Frequently, these systems were placed between the residential structure and the water, with minimal setbacks and allowance for adequate infiltration. The drainage from these systems often infiltrates to a shallow, impermeable layer, then out through the bank and into Puget Sound. This, in conjunction with stormwater outfalls, surficial runoff, and industrial and municipal discharges, reduces water quality that has a direct link to potential human health risks. Thom et al. (1988) and others have documented eutrophication problems in Puget Sound and have expressed a concern about the likely effects on human health and biological resources. In addition, they expressed concern about predicted increases in nutrient input (thereby increasing eutrophication) as a result of increasing population.

The addition of water from a septic system, rainfall, and other runoff contributes to the likelihood of destabilized soils where the benefits of vegetation have been reduced or eliminated. Surface erosion, shallow soil creep, and deeper sliding activity is exacerbated by changes in hydrology that result from shoreline development. Shoreline erosion and sliding is a natural phenomenon on Puget Sound shorelines, where approximately half of the shorelines are classified as geologically hazardous. The overall rates of shoreline retreat are usually minor, maybe an inch or two a year, but in some areas may average as much as a half a foot per year (Macdonald et al. 1994). However, changes in hydrology, vegetation removal, and increasing impervious surfaces have had a dramatic influence on slope stability and rates of erosion.

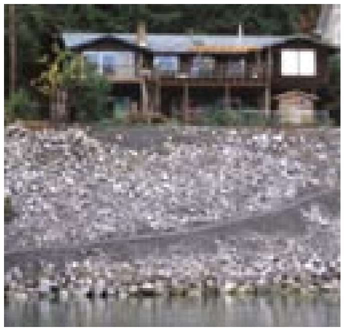
Shoreline erosion has become a critical issue to shoreline property owners, resource managers, and policy makers. The literature is replete with discussions of causes and recommendations for avoiding and controlling bluff or bank erosion. While much of the literature focuses on engineering designs for controlling erosion, the most common recommendations are simply to avoid development in geologically hazardous areas, establish development setbacks, and maintain vegetation that helps to stabilize the bank or bluff via moisture extraction, interception, and root structure. In our review of the literature of coastal slides and erosion, the earliest reference we could find in addressing erosion concerns was found in a publication prepared by The Conservation Foundation (Clark et al. 1980):

Coastal slides and erosion have long been recognized as problems in siting buildings. For example, in the 1790's George Washington reportedly studied the erosion of the Long Island coast. He ordered that the Montauk Point lighthouse at the eastern tip be built at least 200 feet back from the edge of the cliff so the lighthouse would last 200 years. At the present rate of erosion, it will last just about that long.

Many coastal structures in Washington state are often built dangerously close to the shoreline, where natural erosion can threaten property (Canning and Shipman 1994). This fact has been demonstrated many times in recent years around Puget Sound where development on or near steep shoreline slopes has caused losses of structures, property damage, high repair and replacement costs, and loss of human lives (Figure 2a,b,c). Many, if not most, of these disasters could have been avoided if we used the wisdom and will of George Washington. Prohibiting buildings in slide-prone areas, establishing proper buffers and setbacks, controlling drainage, and maintaining native vegetation would greatly reduce hazards to humans and maintain ecosystem integrity.

In addition to avoiding erosional areas and maintaining vegetation, prior recommendations (e.g., Terich 1987, Lynn 1998, Williams et al. 2001) for Puget Sound shorelines have included avoiding placing bulkheads on the beach at the expense of wetlands or productive shallow-water habitat and relocating endangered structures rather than cutting off the supply of sand to the beach. The construction of bulkheads is a common response to real or perceived erosion problems. Yet, bulkheads are not a panacea. Their installation often exacerbates bluff erosion and does not address a number of concerns, including (1) individual and cumulative environmental impacts, (2) limitations in stabilizing slopes and providing protection from wave-induced erosion, (3) loss of sediments that feed beaches, (4) loss of riparian vegetation and associated functions, (5) beach erosion and associated loss of habitat caused by bulkhead installation, and (6) other factors such as geology, hydrology, and drainage that may be the primary cause of erosion. Additional review of shoreline erosion discussion and recommendations may be found in the Coastal Erosion Management Studies prepared for the Washington Department of Ecology (WDOE 1994), Terich (1987), Manashe (1993), Myers et al. (1995), Broadhurst (1998), and Williams et al. (2001).

a. Perkins Lane, Seattle, WA.



b. Manzanita Bay, Bainbridge Island, WA.

c. Rolling Bay, Bainbridge Island, WA

Figure 2. Examples of modified (developed) steep shoreline areas, which have resulted in losses of structures (a;c), high costs of repair and environmental damage (b), and loss of human lives (c). [Photos courtesy of Washington Department of Ecology (www.ecy.wa.gov/programs/sea/landslides/)]

In summary, it appears that human health and safety would benefit greatly by maintaining appropriate setbacks from shorelines, reducing impervious areas, controlling drainage, and maintaining well-vegetated marine riparian zones.

Aesthetics

Aesthetics is not commonly recognized as a function of riparian areas, but rather as a societal value and appreciation for the visual pleasures derived from viewing natural shoreline features. Although aesthetics is not a physical or biological function of riparian areas, they do provide a function to mankind. Aesthetic qualities of riparian areas are difficult to quantify, but when preserved or restored, they enhance livability and add to the quality of life for residents and visitors (Knutson and Naef 1997). A discussion of aesthetics is difficult because it involves how people perceive their environment and where their values are rooted. One of the reasons people and businesses are attracted to the Puget Sound region is because of the aesthetic qualities and access to shorelines. Most environmental policies and regulations are founded on societal values and seek to preserve and protect them for future generations (e.g., Shoreline Management Act, RCW 75.20). Many Pacific Northwesterners view themselves as having an appreciation for their natural environment. Puget Sound is considered by some as "the boating capitol of the world," with watercraft ranging from kayaks to large sailboats and motor vessels being used to enjoy the area's aquatic resources and natural shoreline beauty. Living on and having access to shorelines is also highly valued. Businesses often choose to locate in the Puget Sound region based on "livability" criteria. Fishing, wildlife viewing, hiking, cycling, and other outdoor activities are very popular, support the regional economy, and are the very reasons people get outside to enjoy the water, trees, wildlife, and incredible views available to us.

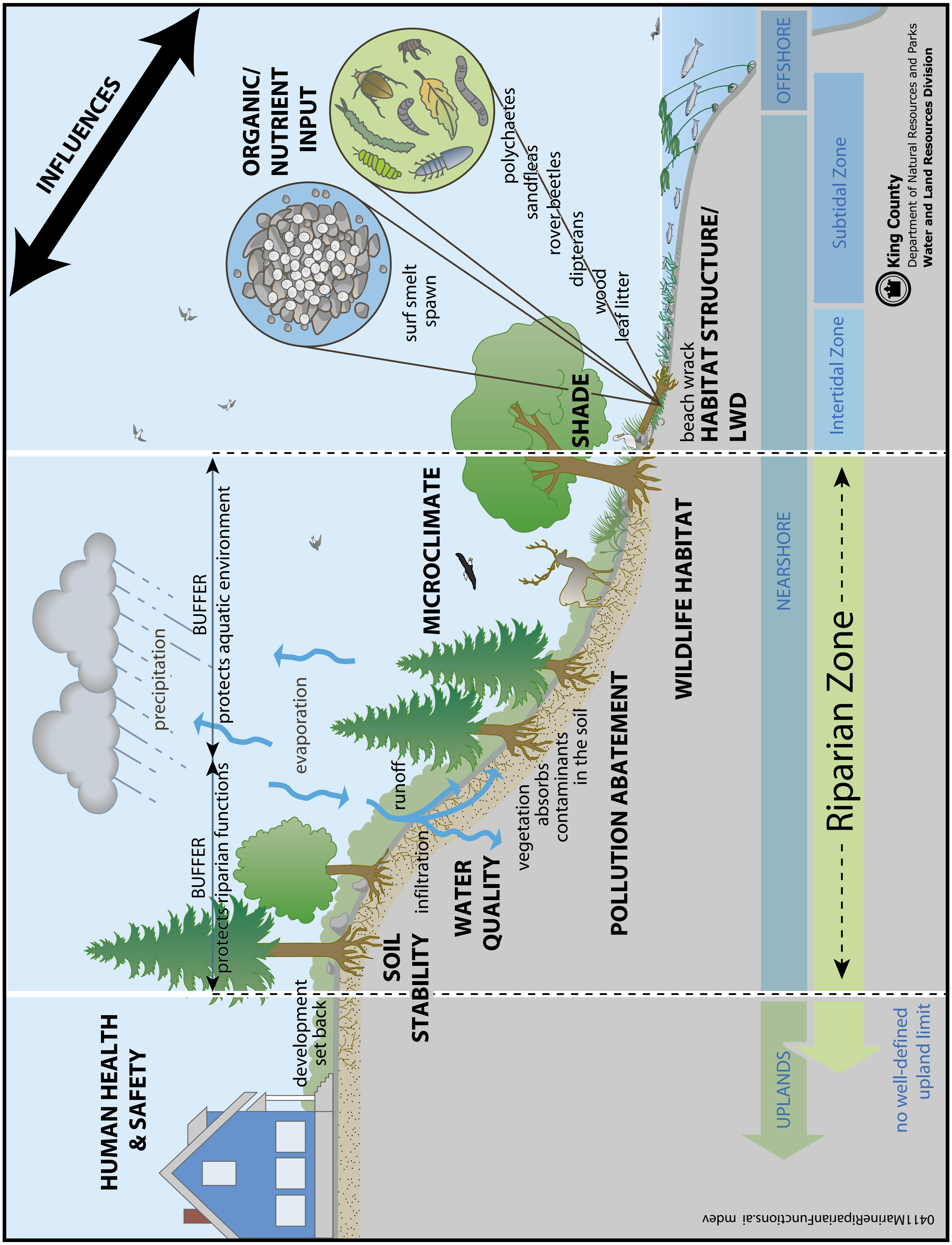
A Conceptual Model

Future progress in riparian management and marine ecosystem conservation not only requires additional empirical data, but a conceptual foundation for establishing linkages and stating assumptions. On the basis of our literature review and understanding of the Puget Sound nearshore ecosystem, there appears to be sufficient evidence of direct and indirect riparian–aquatic linkages that enable us to display known or assumed functions in a conceptual model (**Figure 3**). This conceptual model provides a foundation for illustrating how we think the system works and for formulating hypotheses that can be tested to improve our understanding. The assumptions and supporting evidence from which we derived this model are provided in the preceding sections of this report and this graphic is simply a means of illustrating many of the important functions and benefits that may be provided by the marine riparian system. This generalized conceptual model is not weighted by any individual function and does not represent the diverse array of marine shorelines found in Puget Sound (e.g., high bluffs, low bank, river mouth estuary). However, it does represent the suite of ecological functions reviewed for this report. It also identifies the need for buffers (i.e., separation zones) that serve to prevent modification of important processes and limit external influences that may impair functions.

Two buffers are identified in our conceptual model: (1) a separation from the water and maintenance of native vegetation to allow for certain functions (e.g., LWD and organic input, pollution abatement), and (2) a separation from the initial buffer to assure that functions are not impaired and will persist for some time. The need for this secondary buffer is identified repeatedly in the scientific literature as an essential component for preserving and maintaining riparian functions. For example, if development (i.e., vegetation clearing, soil compaction, installation of impervious surfaces, introduction of contaminants) occurs up to the edge of the initial buffer, functions may be impaired by overloading the primary buffer (e.g., with sediments, contaminants, noise). This exemplifies the need to recognize both latitudinal and longitudinal connectivity and the establishment of buffers at the appropriate temporal and spatial scales.

Figure 3

Conceptual Model of Marine Riparian Functions



Management Considerations

The current dogma in resource management encourages the incorporation of a watershed perspective in programs dealing with habitat, resource productivity, and conflicts in resource use. Although progressive, the watershed, or catchment basin perspective remains inadequate when considering, for example, how marine and anadromous fishes and wildlife life-history requirements span linkages across terrestrial landscapes and marine/oceanic ecosystems. Therefore, while we attempt to improve our understanding of watershed-scale processes and functions, it is critical that we be mindful of the openness and connections to larger- and smaller-scale ecosystems, levels within ecosystems, and elements that constitute ecosystems. The number and complexity of elements involved in the form and functions of ecosystems can be difficult to understand and often require us to work at a scale that helps us to understand individual elements or ecosystems that are embedded within larger scale systems. In order to do this, we need to identify the pieces to this complex puzzle and determine how they fit. Marine riparian ecosystems are one such piece. Recognizing and developing an improved understanding of marine riparian systems enhances our ability to properly manage natural resources at multiple scales (i.e., local, watershed, landscape) by incorporating previously neglected elements.

This study focuses on riparian functions and marine ecosystem issues in the Puget Sound region. The lack of directed marine riparian studies in this region required a review and assessment of the national and international literature to determine whether studies performed in other coastal regions may be helpful in understanding the importance of individual riparian functions for Puget Sound. Our findings indicate that both freshwater and marine riparian systems serve almost identical purposes, and that marine riparian systems provide additional functions important for supporting marine biota and the integrity of nearshore ecosystems. Unfortunately, the lack of directed studies for defining the full suite of marine riparian functions and values in this region (and elsewhere) leaves much uncertainty and has resulted in a lack of standards and practices to protect riparian systems and other coastal resources.

The recognition of declining coastal resources has never been more apparent and is now acknowledged as a high priority for management by regional, national, and international organizations. We have summarized a representation of these perspectives in the following sections to illustrate the severe reduction in coastal ecosystem services and importance of improved coastal management strategies, which should include recognizing and protecting marine riparian processes, structure, and functions. In addition to perspectives on the status and management of coastal systems, we discuss and summarize the role riparian functions serve, identify data gaps, provide recommendations, and offer some likely outcomes for inadequate consideration of riparian functions in developing coastal management strategies.

Regional Perspective

From a regional perspective, it is clear that substantial losses of marshes and riparian habitat have occurred over the past century in Puget Sound. Estimates based upon evaluation of 11 major deltas in Puget Sound indicate at least a 76% (556 km^2) loss in tidal marshes and riparian habitat (Levings and Thom 1994). Coastal urban areas have lost 90–98% of their estuarine wetlands and water quality is in good condition in only 35% of Washington's estuaries (Washington Department of Natural Resources [WDNR] 1998). Riparian areas within urbanized shoreline areas, such as King County, are approximately 100% altered and are rapidly being further modified or lost as a result of upland development. This is not to say there are not remnants of undeveloped shorelines. Instead, we are referring to the loss of proper functioning conditions from a larger-scale (i.e., landscape) perspective. For example, the fact that a 200-foot stretch of shoreline is not armored and contains native vegetation does not necessarily mean that it is functioning to its fullest capacity. Remnant patches are dramatically influenced by adjacent land use and development practices, which may result in reduced functions at locations that appear to be relatively "pristine."

The difficulty in evaluating the extent of loss, quality of riparian habitat, or level of function stems from the lack of empirical data. Few empirical studies have been conducted because of the lack of recognition, funding, and evaluation of individual or cumulative adverse project impacts. However, recent studies do indicate that the composition of vegetation (i.e., volume, type, age, continuity) and associated functions have been greatly diminished. For example, a survey conducted by Washington Department of Natural Resources (WDNR) in Watershed Resource Inventory Areas 8 and 9 (King County) determined that overhanging shoreline vegetation remained in only 1% and 11%, respectively, along marine shorelines in these areas (WDNR 1999). Additional lessons may be learned from studies of similar ecoregions. For example, May et al. (1997) developed quality indices for lowland streams in Puget Sound as a measure of urbanization impacts on salmon. As the level of basin development increased above 5% of total impervious area (%TIA), results indicated a precipitous initial decline in biological integrity as well as the physical habitat conditions (quality and quantity) necessary to support natural biological diversity and complexity. A wide (>30 m) and near-continuous (<2 breaks/km) riparian zone appears to be necessary although not a wholly sufficient condition for a natural level of stream quality and biotic integrity. Similar inferences can be made when evaluating riparian condition for wildlife needs (see Knutson and Naef 1997). Considering that Puget Sound marine shorelines occur in the same ecoregion as lowland streams (similar geologic history, soils, land-form, vegetation succession, and land-use patterns), we suggest that riparian functions are similar and that the loss of marine riparian vegetation and concurrent increase in impervious area are likely to result in environmental degradation similar to that for lowland streams. Understanding the linkages between landscape or watershed level processes, physical habitat structure, and the organisms that inhabit aquatic ecosystems is a key to successfully managing these resources.

While population growth and development are rapidly diminishing the ability of these urban riparian and estuarine systems to assimilate cumulative human impacts, managing urban estuaries in Puget Sound is constrained by the lack of a scientific foundation for decisions about intervention to improve these degraded systems (Shreffler and Thom 1995). Furthermore, despite growing support from the scientific community, the concept of estuary-wide conservation and restoration planning is constrained by a regulatory process that fosters a fragmented, permit-by-permit approach to ecosystem management. In some cases, activities that result in modifications of shorelines require no environmental review or permits at all. For example, based on the Shoreline Management Act, single family residential (SFR) developments are exempt from shoreline substantial development permits and compensatory mitigation is generally not required for construction projects, such as bulkheads and docks at SFR's (Broadhurst 1998). Single family residential development usually results in significant clearing and grading of shoreline riparian areas for placement of buildings, view corridors, walkways and driveways, landscaping, shoreline armoring, and often, bank stabilization structures (Broadhurst 1998). Residential development along shorelines seldom accounts for natural erosion and often exacerbates erosion potential. In response, bulkheads are frequently constructed, which further disrupts physical and biological processes. While little quantifiable data exist, many researchers and resource managers have observed the linkages between the changes in physical processes and potential impacts to marine biota, such as changes in hardshell clam growth and distribution (Elliffrit et al. 1973), shifts in biotic communities (Antrim et al. 1993, Thom and Shreffler 1994), and loss of feeding habitat for benthic feeding fishes and spawning habitat for forage fishes (Macdonald et al. 1994).

Commercial and industrial development have had similar impacts (see Bortelson et al. 1980, Blomberg et al. 1988). However, as the regional population continues to grow, so will transportation needs and commercial, residential, and industrial development. Despite the fact that larger-scale transportation, commercial, and industrial projects receive a higher level of scrutiny and environmental review, mitigation for impacts is usually incomplete and inadequate. The lack of adequate compensatory mitigation and continued degradation stems from a poor understanding of nearshore ecosystems, a lack of monitoring, a lack of individual or cumulative impact assessment, and the lack of oversight and enforcement of environmental regulations by resource managers (see Kunz et al. 1988, Broadhurst 1998, Lynn 1998).

The protection, restoration, and enhancement of marine riparian areas are of particular importance in the Puget Sound region owing to the fairly recent listings of chinook and chum salmon and bull trout. In February 2000, the National Marine Fisheries Service (NMFS) designated "Critical Habitat" for ESA listed species (chinook and chum salmon). "Critical habitat consists of the water, substrate, and adjacent *riparian zone* of estuarine and riverine reaches....". Critical habitat is designated to include all marine, estuarine, and river reaches accessible to listed salmon in Puget Sound (NMFS 2000). These areas are considered "essential to the conservation of the species" and "may require special management considerations or protection." In consideration of this and other salmon conservation and management guidance (e.g., Spence et al. 1996, NMFS 1996), it is clear that marine riparian areas serve important functions toward the conservation and recovery of salmon stocks in Puget Sound. While we are not suggesting that marine riparian areas be protected solely for the sake of salmon, this designation and definition of critical habitat lends recognition (and possibly credibility) to our argument for recognizing and protecting marine riparian vegetation and associated functions. The National Research Council (2002) has also recognized the importance of riparian systems on marine shorelines and includes these areas in their definition of "riparian."

National and International Perspectives

Marine systems, especially nearshore ecosystems, contain some of the most expansive and productive ecosystems worldwide. Estuaries in particular are the most biologically productive and economically valuable systems in the marine environment. Estuaries are bodies of water that are semi-enclosed by land but have open, partly obstructed, or sporadic access to the ocean, and in which seawater is at least occasionally diluted by freshwater runoff from the land (Dethier 1990). The unique "mixing zone" of freshwater and saltwater within estuaries derives nutrients from both the land and the sea, forming nutrient-rich, shallow-water habitat that supports abundant fish and wildlife. About 80% of all fish and shellfish worldwide use estuaries as primary habitat or as spawning and nursery grounds. Many species are dependent upon estuaries for their entire life cycle, while others depend upon the protected, nutrient-rich environment for reproduction and early rearing, refuge, and feeding of young. Reproduction success and early survival is critical to the maintenance of valuable fisheries and regional economies. The ecological wealth of estuaries has contributed substantially to the economic wealth of a number of the world's coastal countries. In the United States, home to 28 federally listed "estuaries of national significance," natural resources derived from estuaries contribute approximately $111 billion per year to the nation's economy. As one of the 28 estuaries in the National Estuary Program (NEP), Puget Sound is governed by a comprehensive coastal management plan. The Puget Sound Action Team, a state agency in the Governor's office, oversees the NEP for Puget Sound.

The United Nations Environmental Programme, Chapter 17 of Agenda 21 (as adopted by the Plenary in Rio de Janeiro; United Nations Environmental Programme [UNEP] 1992) states that the marine environment—including the oceans and all seas and adjacent coastal areas —forms an integrated whole that is an essential component of the global life support system. Klaus Toepfer, UNEP Director, noted that the value of marine and coastal ecosystems is equivalent to half of the annual global gross national product, yet we continue to treat coasts and oceans as if they were not an important economic resource. Degradation of the marine environment results from a wide range of sources. Land-based sources contribute nearly 80% of marine pollution, and result from human settlements, land use, construction practices, agriculture, forestry, urban development, tourism, and industry. Many polluting substances originating from land-based sources are of particular concern with regard to the marine environment since they exhibit at the same time toxicity, persistence, and bioaccumulation in the food chain.

A number of federal agencies in the United States (e.g., EPA, NMFS, USFWS, USACOE) have jurisdiction and regulations (e.g., Clean Water Act, Magnuson Fisheries Conservation Act) that recognize and guide management of coastal resources. However, the Coastal Zone Management Act probably provides the most broad-based set of guidelines for protecting coastal resources through land-use practices. The following is from NOAA (1998):

Section 303 of the Coastal Zone Management Act declares that it is the national policy to encourage states to develop and implement management programs to achieve wise use of the land and water resources of the coastal zone. Coastal wetlands (both tidal and nontidal) are among the most productive areas on earth. They are essential habitat for spawning, feeding, and growth of a majority of the nation's living marine resources (Chambers 1991). At the same time, they are among the most stressed natural ecosystems. Since 1780, nearly half of all coastal wetlands, excluding those in Alaska, have disappeared through draining, diking, filling, excavating and other alterations for agriculture, port and urban expansion, and recreational uses such as marinas (Dahl 1990). Stresses on the remaining coastal wetlands are the result of pollutants from nonpoint sources such as farms, forest harvest activities, construction sites and urban areas. Today, coastal zones are most at risk from development pressures brought about by rapid coastal population growth and the demands for housing, transportation, and commercial and recreational facilities (Good et al. 1997).

The coast is home to over half of the nation's population (Culliton 1998), is a popular vacation destination, provides key transportation avenues for over 90% of US international trade (NOAA 1995), and supports over $56 billion in commercial and recreational fishing activity each year (NOAA 1994). The coastal human population is expected to increase by an average of 3,600 per day, reaching 165 million by the year 2015 (Culliton 1998, NOAA 1998). Therefore, finding ways to protect sensitive and valuable coastal resources is imperative.

Bringing this review of issues back to our study area, the Puget Sound region has realized some of the most rapid coastal population growth in recent years and is expected to support continued growth in the coming decades. This will inevitably result in an increasing demand for shoreline development. Living right next to the water is highly valued in our society, but usually results in the clearing of native vegetation for view corridors, buildings, landscaping, and appurtenant structures such as bulkheads and docks. Unfortunately, shoreline development activities have significantly altered the natural structure, functions, processes, and beauty of our shorelines. Much of the historical destruction occurred without regard for the long-term consequences. Furthermore, science and public education have certainly not kept up with the level of development. However, despite the fact that current scientific knowledge and public sentiment support protection of natural resources for a variety of reasons, including aesthetics, existing environmental protection programs have proven to be woefully inadequate and ineffective at stopping the losses.

These perspectives illustrate common themes, including the following:

- Coastal areas are of great economic value due to the productivity and value of natural resources.
- Coastal areas are among the most stressed of natural ecosystems owing to land-use and development practices.
- The health, integrity, and viability of biological resources depends upon the protection and maintenance of natural ecosystem processes, structure, and functions.
- There is a distinct need to provide protection and improve management practices in coastal areas because of the increasing pressures of human habitation and use.
- The recognition of marine riparian functions and benefits, research to better understand marine riparian systems, and the implementation and enforcement of regulations to protect or restore riparian systems are severely lacking.

Conclusions

On the basis of our review of the literature and the application of ecological principles, we conclude that riparian systems perform similar functions regardless of whether the adjacent water body is freshwater or saltwater. Desbonnet et al. (1994) argue that the functional mechanisms that apply to freshwater riparian areas should be similarly applied to marine systems. They point out that marine and freshwater riparian areas serve almost identical purposes, including pollutant removal, soil stabilization, stormwater control, and provision of wildlife and fish habitat. Furthermore, we concur with National Research Council (2002), which states that no justifiable reason exists to exclude shorelines of estuaries and marine coasts in defining riparian areas. It is true that most riparian studies have focused on freshwater (i.e., riverine and wetland) systems. However, studies that have focused on marine shorelines not only support findings similar to those found in freshwater riparian studies, but indicate that additional functions may be linked to marine biota. For example, recent studies in the Puget Sound nearshore ecosystem are finding riparian linkages to salmonid prey production (Penttila 2001, Sobocinski 2003, Brennan et al 2004).

While research and empirical data to quantify functional characteristics of marine riparian systems in Puget Sound are substantially lacking, this review and assessment indicates that marine riparian functions play an important role in marine nearshore ecosystems. Our assessment also indicates that the lack of attention to marine riparian areas and poor protective standards have resulted in substantial loss and degradation of marine riparian and nearshore ecosystem components, which are of value to fishes, wildlife, and human health and safety. There is a critical need to develop and implement a research program and protective standards to learn more about marine riparian systems and prevent further degradation and loss of riparian functions and benefits. This requires identifying data gaps, developing appropriate research questions, dedicating adequate funding and manpower resources, public education and outreach, and the political will to develop, implement, and enforce regulations that are designed to preserve, protect, enhance, and restore riparian functions and benefits. Following this section, a set of recommendations is offered to begin this process.

In conclusion the preceding review provides evidence that indicated the following:

1. A number of riparian functions have critical values and are important for sustaining healthy marine and riparian ecosystems.
2. Marine riparian systems provide a number of ecosystem services that are beneficial to humans, fish, and wildlife.
3. The importance of marine riparian vegetation and associated functions has been recognized at regional, national, and international levels.
4. Increasing human population and development in coastal areas are resulting in the loss of riparian vegetation and adverse effects to the health of marine ecosystems, coastal economies, and human health and safety.
5. The specific requirements for maintaining individual and collective riparian functions and benefits are poorly studied in most areas.
6. Management of coastal areas has been inadequate in protecting natural resources and maintaining ecosystem functions. The shorelines of Puget Sound have experienced significant modifications and continue to be modified.

Recommendations

The science, planning, and policy literature reviewed for this report indicate that much work needs to be done to advance our knowledge and improve management of coastal areas to better protect and restore riparian functions and their inherent values. Human population growth and poorly designed or unregulated development practices have taken a serious toll on marine nearshore resources. Despite recent advancements in science and the development of new educational and management tools, coastal areas, and marine riparian systems in particular, lack adequate protection standards and continue to be degraded. Although Washington State has recognized the ecological importance and social values of shoreline areas (i.e., Shoreline Management Act), marine riparian vegetation and associated functions are not specifically recognized or protected. The following recommendations should be considered as a part of any coastal management strategy and development of shoreline regulations.

Use the Precautionary Principle: "Do No Further Harm"

Two of the most important actions to be taken in natural resource management are to preserve and protect for resource sustainability, values, and services. Until we learn more about the full suite of marine riparian functions, we should rely on existing information and address uncertainty by taking a precautionary approach, providing buffers that protect marine shorelines in Puget Sound from additional degradation. Preserving important riparian areas and preventing additional losses is both critical and cost-effective. Once riparian functions are lost, they are difficult and expensive to restore, if restoration is possible at all.

Fill Data Gaps

Early in the process of identifying and evaluating marine riparian functions, we noticed that empirical data were lacking, particularly for Pacific Northwest coastal ecosystems. This lack of data and limited recognition of riparian functions has led to poor management practices and protection standards for coastal resources. The functions and benefits of marine riparian systems need to be studied and documented in the scientific literature to provide a better understanding of riparian processes and functions relative to nearshore ecosystem integrity. Research and documentation is also critical for establishing a scientific foundation for creating adequate policies and practices for protection and restoration. The following is a list of data needs that would improve our understanding and management of marine riparian systems (adapted from Williams et al. 2001):

1. Determine the role of marine riparian vegetation (MRV) in upland and marine food webs and in energy transfer (i.e., contribution of organic carbon, insects, etc).
2. Determine the role of marine riparian vegetation in providing water quality functions, especially nonpoint source pollution. This will require multidisciplinary investigations of vegetation (type, density, continuity, age structure, etc.), soils, hydrology, and other factors.
3. Identify levels of impervious surfaces (type and extent) in coastal areas and their influence on vegetation, water quality, hydrology, and other riparian processes and functions.
4. Map MRV, including extent (length, width, continuity), type, density, composition, and age structure.
5. Quantify the role of MRV in providing microclimate functions.
6. Quantify the linkages between MRV and important habitat functions for fishes and wildlife that use coastal areas.
7. Conduct additional quantification of the importance of shade and habitat structure to aquatic and terrestrial biota.
8. Quantify the role of MRV and large woody debris (LWD) in increasing slope and beach stability.
9. Determine the cumulative impacts of shoreline armoring and other shoreline development and land-use practices on MRV and MRV functions.

Establish Appropriate Buffers and Setbacks

Buffers and setbacks are essential, functional, and cost-effective tools for preserving important processes and functions, preventing environmental degradation, and protecting valuable coastal resources. Delineating riparian areas and establishing appropriate buffers should be based upon maintaining or reestablishing natural processes and functions in addition to providing for human health and safety and other ecosystem services. This will require scientific investigations that may use freshwater riparian studies as a model for determining functions and benefits. The development of a buffer model would be an important and useful tool for developing buffers.

The scientific support on riparian buffer functions is clear and abundant. There are literally hundreds of articles and dozens of books written on the subject of riparian buffer zones (Wenger 1999). Establishment and maintenance of riparian buffers have long been used to protect wetlands, lakes and streams, but oddly, such buffers are only beginning to be recognized as important marine ecosystem management tools (i.e., within the last decade or so). Although many approaches have been taken in establishing riparian management zones, most set a minimum width with additional setback requirements for steep slopes. Buffer-width considerations should include amount of remaining, intact riparian area along specified reaches of shoreline; impervious surface limitations; and connectivity within and between reaches. As a part of the Tri-County Salmon Recovery Response, a technical workgroup has developed a riparian management zone proposal that might be helpful in developing a management strategy for the State. This proposal recommends both standard and flexible buffers, depending upon the level of urbanization and ability or practicality of buffer implementation.

In Puget Sound, where shoreline retreat is expected (and may occur at an increased rate with sea level rise), wide buffers are needed to allow for wildlife habitat, LWD recruitment, and other functions over time. As in freshwater systems, the functions and benefits provided by the marine riparian zone will vary and be determined by a number of factors (e.g., soils, slope, vegetation type and density). Therefore, determining functional characteristics and associated benefits through empirical studies is critical to establishing appropriate buffer widths. Until we have more empirical data to support marine buffer width determinations, we must rely on models or examples in freshwater systems and take a precautionary approach when developing along marine shorelines to prevent further, irreparable damage.

Maintain or Restore Riparian Vegetation for Human Health and Safety

The discussion of soil stability issues and recommendations for prevention and remediation can be found throughout the technical and non-technical literature (e.g., USEPA 1993, Menashe 1993, Myers et al. 1995; WDOE 1994). From our review of the current literature, it is apparent that maintaining and using native vegetation is a common theme for addressing soil stability concerns. This is particularly true in developing coastal management strategies. Flooding, storm, and erosion hazards are a common problem in coastal areas and become a greater threat when shoreline development does not consider the functions and values of maintaining riparian vegetation buffers (see NRC 2002).

Identify, Evaluate and Incorporate Multiple Functions Into A Management Strategy

Riparian functions and benefits should be evaluated as a whole to define the ecosystem. Management should not be piecemeal and should not be selective for individual functions (i.e., fish prey production, pollution abatement) that may only benefit a select few organisms in the system while ignoring other important ecosystem services (e.g., LWD recruitment, wildlife habitat). Any management strategy should strive to maintain all natural processes and functions, developed through an evaluation of the specific requirements for maintaining individual and collective functions over space and time (e.g., LWD recruitment, life history requirements of multiple species of fishes and wildlife). For marine riparian systems, this will require the use of models, collection of empirical data, and an assessment equivalent to those conducted in freshwater systems.

Use a Multidisciplinary Approach in Developing Riparian Management Zones

The complexity of marine riparian systems and diversity of functions performed by these systems warrant an integrated and multidisciplinary assessment. An appropriate level of analysis will require collaborative efforts from those that specialize in vastly different specialties because riparian systems include terrestrial and aquatic characteristics. Disciplines that should be incorporated include geology, forestry/botany, wildlife and fisheries biology, marine biology, oceanography, soils sciences, chemistry, and hydrology.

Maintain or Restore Riparian Vegetation for Pollution Abatement and Soil Stability

A principle objective of the Clean Water Act (CWA) is to “restore and maintain the chemical, physical and biological integrity of the Nation’s waters.” Riparian areas serve to meet the goals and objectives of the CWA. Despite efforts to upgrade and expand wastewater treatment facilities, increasing urbanization and destruction of riparian zones will continue to contribute to degraded water quality and are likely to result in increased harvest restrictions and adverse effects to aquatic and terrestrial biota. Knowing that vegetative buffers can provide significant reductions in pollutants, it can be inferred that requiring such buffers would be beneficial by reducing contaminants in runoff and reducing costly reactionary measures to clean up waterways. However, determining appropriate buffer widths to provide pollution abatement functions will require some basic knowledge of environmental conditions (e.g., physiochemical and biological). Maintaining riparian vegetation can be a relatively simple, long-term, and cost-effective method of pollution abatement. Reestablishing riparian vegetation has a cost associated with it, but the long-term benefits are likely to greatly outweigh such costs.

Maintain or Restore Riparian Vegetation for Fish and Wildlife

Because surveys, sampling, and dietary analyses of wildlife, juvenile salmonids, and other fishes in the nearshore environment are limited, additional studies are needed to understand the contribution of riparian vegetation to nearshore food webs, and the impacts of vegetation loss along marine shorelines. Understanding energetic constraints on habitat suitability for fish and wildlife in any system requires a framework capable of determining how nutrient inputs, prey availability, capture success, and other factors interact to produce spatial and temporal variation in growth conditions. Such understanding is sorely lacking for Puget Sound nearshore ecosystems. Therefore, spatially explicit bioenergetics models—which incorporate the spatial distribution of fish and wildlife, their prey, prey production, and the physical conditions that affect foraging and growth—are needed for investigating and understanding the underlying basis for seasonal and spatial differences in habitat suitability (Nislow et al. 2000), habitat selection, and habitat quality. Overall, it is clear that as vegetation is eliminated, the food supply, and thus the carrying capacity of the coastal ecosystem, is reduced.

Protect Marine Riparian Areas from Loss and Degradation

Riparian areas provide a wide range of functions, which are beneficial to humans, fish, and wildlife. These areas provide many ecosystem services to man in the form of pollution abatement, soil stability, improved air quality, recreational and aesthetic benefits, and a wide range of goods and social and cultural values. The health and integrity of the nearshore marine ecosystem depends upon riparian areas because of their location, uniqueness, and functions. Riparian areas are regional hot spots of biodiversity and often exhibit high rates of biological productivity in marked contrast to the larger landscape (NRC 2002). Every effort should be made to preserve remaining marine riparian areas from further degradation, fragmentation, and loss.

Increase Public Education and Outreach

Resource management and protection depends greatly on public perception and participation. As we learn more about marine and riparian systems, it is imperative that the information is translated and transferred to the public. One of the biggest challenges to advancing resource management is changing human behaviors in a manner that will provide protection and reduce degradation and loss of valuable natural resources. Humans will not have an appreciation of and, therefore, will not demand protection for what they do not understand. Consequently, it is critical that decision makers and the general public be educated about the outcomes of their actions, especially those who have the greatest influence on outcomes (i.e., people who live, work, and play along our shorelines).

Develop and Implement Conservation Programs

The development and implementation of conservation programs will be essential for protecting and improving riparian processes and functions in marine ecosystems. Conservation programs may include efforts to preserve, restore, rehabilitate, or enhance existing or lost functions and may also include strategies or actions such as land acquisition, regulatory measures (i.e., setback and buffer requirements), revegetation, and removal of impediments (structures and other modifications of riparian areas). In developing conservation measures, every effort should be made to consider multiple functions and linkages within and between ecosystems. In other words, use ecological principles to guide actions and incorporate multiple functions and processes in developing goals and objectives for conservation actions.

Develop Incentives for Conservation Programs

Conservation programs will only be successful if they take action at the appropriate scales (temporal and spatial) and if they provide incentives for participants. Considering that the majority of Puget Sound shoreline property is in private ownership, state, local, tribal, and federal governments need to create incentives for landowners to change behaviors, or take actions that will protect, restore, or enhance riparian functions. For example, conservation easements are a way to protect riparian areas while allowing the landowner to continue to use their property outside (landward) of the protected riparian area. Land acquisition, tax incentives (i.e., reducing property taxes for not building in the riparian area), providing native vegetation to shoreline property owners for replanting, requiring buffers and setbacks (regulatory incentives), and other measures have also been used and are available for consideration in developing conservation programs. The positive and negative aspects of the various incentives must be considered, but should not exclude them from being used in any shoreline management program.

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From: JIM HANSEN [jh_mk1234@msn.com]
Sent: Thursday, April 17, 2014 12:19 PM
To: RCO MI Policy Changes (RCO)
Subject: Riparian Buffer Widths

Reviewed proposed revised guidelines. From my perspective of 15 years as a habitat restoration professional with the Lummi Nation, I find the new guidelines to be highly reasonable. I like the emphasis on water quality for smaller tribs and ditches.

One concern is that any leeway to buffer size associated with homes or other structures be more specific than just the judgment of reviewers when there is compensation associated with the project.

Jim Hansen
2418 Keesling St
Bellingham, Wa

SRFB riparian guideline comments

I am submitting replies to this subject as follows:

Question 1 - Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington ***only, or statewide?***

Answer: **No.** Buffer widths are already built-in on riparian property on forested land through DNR forest management regulations and through Critical Area ordinances and shoreline management regulations implemented by the Department of Ecology.

Any additional designation only adds to the complexity of land ownership management.

The proposal does not speak to the linear extent along the stream for treatment, it could be reasoned that many miles might be involved and beyond budget capacity and prioritization capacity.

Further: Limited funds for Salmon Restoration to reduce riparian erosion of already identified projects precludes expenditures for estimates of secondary benefit projects.

An owner of 0.5 miles of river frontage and 0.8 miles of perennial, intermittent and ephemeral waters along grazing or timbered areas, if the river encroaches a hayfield, would not want to repeatedly, relinquish another 100' for riparian plantings. It is better to identify and fund the stream segment for soft armoring placement and planting the disturbed areas.

Question 2 - What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?

Answer: In the context of not having to "Prove a Negative," it is more reasonable to justify only the necessary width and length of a proposed buffer, not to impose a blanket width to have to justify a reduction of width or length.

Further: The buffer width, length, area or existence, should not be a project selection evaluation criteria.

Question 3 - What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board?

Answer: In the initial construction, there must be a distinct benefit to the landowner, such as:

Physical protection against erosion, sedimentation or avulsion, or regeneration of marketable resources such as timber or livestock access to water;

No increase in public access;

Financial assistance to landowners provided as a condition of permitting for construction projects, or maintenance of them;

Tax relief: tax reductions for landowners undertaking conservation actions;

Perpetual cash payment for perpetual easement.

Question 4 - Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the board encourage such prioritization at the local, regional or state level?

Answer: Project sponsorship should **not** require being a Puget Sound Partnership affiliate.
The remaining Statutory Criteria, shown on page 4 of the proposed changes to the Salmon Recovery Grant Program, are without comment.

Evaluation, ranking, are re-listed in order of preference:

1.) Are part of a region wide list developed by lead entities;
2.) Are the most cost-effective;
3.) Will be implemented by a sponsor with a successful record of project implementation;
4.) Involve members of the Washington Conservation Corps or the Veterans Conservation Corps established in RCW 43.60A.150; and
5.) Have the greatest matched or in-kind funding. (This criteria should only be evaluated on a "Meets Minimum" criteria.

Strategic Plan Link: Reduce harvest levels of anadromous fish, by all means, at a rate of 10% per year, for 7 years. If recovery of runs re-establishes, then increase harvest to a sustainable level.

Quoting a fisheries habitat specialist of a well-known conservancy, "Hatchery fish returns become wild fish after two generations."

People Who Live On the Land Care For the Land.

Respectfully Submitted,

John Richmond

Forks, WA,

2:00PM, April 30, 2014

From: John Small [jsmall@anchorqea.com]
Sent: Thursday, April 10, 2014 2:38 PM
To: RCO MI Policy Changes (RCO)
Subject: Proposed Changes to the Salmon Recovery Grant Program

Question 1: NO!, projects should be evaluated only on the impact to salmon recovery. Buffers are one tool to do this, but the lack of a minimum buffer as defined generally does not indicate if a specific project will or will not benefit salmon recovery.

Question 2: Reasonable Justification should always be case by case. It is impossible to determine what is reasonable for every project.

Question 3: all six.

John W. Small ASLA

ANCHOR QEA, LLC
JSmall@AnchorQEA.com
Office 206.903.3308
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April 30, 2014

policychanges@rco.wa.gov

Transmitted Electronically

To: Salmon Recovery Funding Board

Subject: Riparian buffer width requirements for state and federal riparian restoration funding on Walla Walla Urban Creeks

The federal and state funding for riparian restoration tied to the new increased buffer requirement of a minimum of 75 feet in width makes it impossible to continue improving water quality and fish passage in the urban streams and spring fed creeks in Walla Walla and College Place, Washington. Increased buffer width requirements are impossible meet given historic infrastructure of homes, schools and churches within 75 feet of urban streams. Funding from a decade of restoration work for water quality improvement on these streams has come primarily through the Washington State Department of Ecology and the National Fish and Wildlife Foundation. Both of these agencies have adopted the EPA's criteria of increased buffer widths to allow funding, thus making it impossible for our successful programs to continue to improve water quality and fish passage in these urban streams.

We are requesting that an exemption be made for the increased buffer widths within the urban growth boundaries of Walla Walla and College Place.

Because **all** the water that flows from the Blue Mountains into Mill Creek, its tributaries and the multiple spring creeks flow through the urban area, these creeks are critical to the recovery of migratory fish in the Mill Creek Watershed. Yellowhawk Creek provides the **only** passage for ESA Listed migratory Mid Columbia River Steelhead and Columbia River Bull Trout, as well as, reintroduced spring Chinook from the Walla Walla River to upper Mill Creek spawning areas. Garrison Creek is an historic steelhead stream, though screened at its confluence with Mill Creek contains western brook lamprey, fresh water mussels, bull trout and cold water at its confluence with the Walla Walla River. The myriad of spring creeks that arise within the city boundaries provide significant flows of cold water to Yellowhawk, Garrison and Mill Creek during hot summer months.

In 2009 we prepared, in partnership with the Walla Walla Basin Watershed Council, a report describing the flows of the Spring Creeks in Walla Walla (See attached WWBWC Final Spring Creeks Report). The Basin Watershed Council is currently completing a report, which provides data proving the contribution of cold water from these creeks, which significantly reduces water temperatures in the larger creeks into which they flow.

Over the past decade, my organization, Kooskooskie Commons, in partnership with the Tri-State Steelheaders, Creating Urban Buffers Program, has conducted riparian restoration on all of these creeks (See the attached map depicting restoration through for 2011 and 2012). In 2013, twenty-six additional projects were completed (See attached copy of WRIA 32 TMDL). We have pulled tons of garbage from the creeks, dug out miles of reed canary grass, and planted thousands of native plants on seventy-five private and public properties, including three city parks, three public schools and two church properties. We have created buffers as wide as possible on each of these properties, aiming for 35 ft minimum and increasing the width where possible with the understanding that any buffer is better than no buffer. In addition public education on the proper care of these creeks is integral to our work involving thousands of student volunteers and requiring each property owner to sign a contract to maintain the buffers for a minimum of ten years. We have many requests from property owners to restore flows and buffers on their properties and are frankly heartbroken that we are unable to continue this work because of lack of funding. Thus we are appealing to you for support for and exemption to the increased buffer width requirements.

We appreciate your consideration of our request.

Sincerely,

Judith S. Johnson

Program Coordinator, Kooskooskie Commons
209 N. Clinton St. Walla Walla, WA 99362
509-529-8009 cell 509-301-2973
jsj@bmi.net

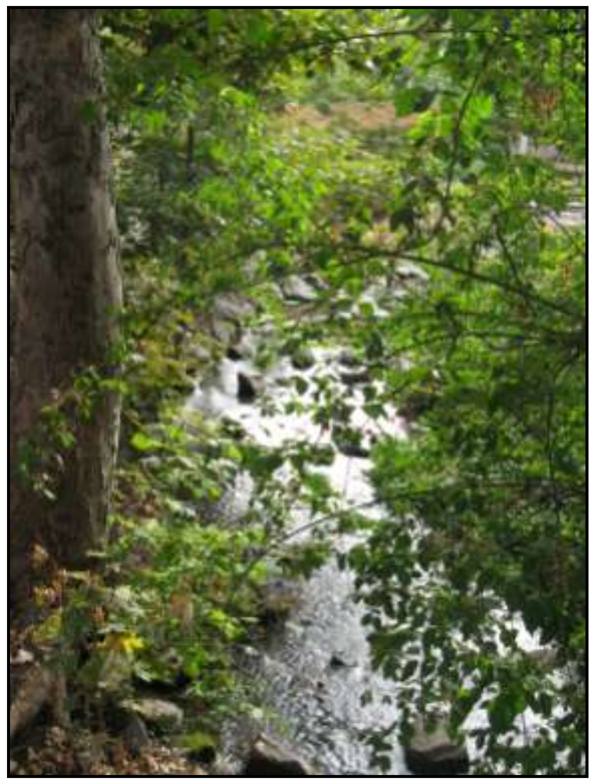
www.wwbwc.org
Walla Walla Basin Watershed Council
541-938-2170 or 7086 P.O.Box 68, Milton-Freewater, OR 97862

Watershed Management Initiative Monitoring Program Phase II:

Final Report

Small Order Stream and Spring Monitoring Network 2009 Report
Historic Springs Report

(WMI Tasks 4.1b)



11/30/2009

Judith S. Johnson

STATE OF OREGON WATER RESOURCES DEPARTMENT WRD

OWEB Oregon Watershed Enhancement Board

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Table of Contents

Project Background

Historic surface water monitoring efforts in the Walla Walla basin have mainly focused on the Walla Walla River and its main tributaries. Starting in 2001, the WWBWC utilized funding from both the Oregon and Washington states to monitor surface flow in the spring branches that depend on the shallow aquifer for their source water. These springs provide cold, clean water for both irrigation and wildlife habitat and are a part of the historical hydrologic function of the valley. In the city of Walla Walla these springs also add to the character and culture of the community by enhancing property values and adding to the livability. Currently the WWBWC is funded to collect the flow and temperature on a select number of these spring-creeks systems. This collected information related to the historic context and background on these spring-creeks to incorporate into the project reporting and outreach in order to help raise the public's interest and awareness. This information will be incorporated into the Watershed Management Initiative Monitoring program Surface Monitoring Project (WMI Task 4.1) as subtask 4.1b.

Project Objectives

Historic information was collected on the Mill Creek Subbasin spring-creeks in and around the Cites of Walla Walla and College Place, including Bryant, Butcher, Caldwell, Doan, Lasiter, McEvoy, Stone and Titus Creeks.

Historic narrative questions that were addressed.

- Is there a Historical Map of the springs and streams of the Mill-Yellowhawk system?
- What is the history of the stream's name?
- Are there historical photos of the stream?
- What interesting habitat or salmon related information is pertinent to the stream?
- What is the current condition of stream (e.g. piped versus open, natural meander vs. straightened.)
- What historical data is available for the stream?
- What current restoration programs, projects and groups are affiliated with the stream?
- What role has the stream played in the quality of life, habitat and wildlife issues in Walla Walla and College Place.
- How may the stream be taken for granted but still play an important role in the character and quality of life in Walla Walla and College Place.

This information was also organized by stream for posting to www.wwbwc.org.

Project Process

Information was incorporated into a narrative report with appendices and bibliography through the following tasks.

Task 1: Utilization of libraries, county and city records and other historic data sources to compile information for spring-creeks in the Mill Creek Subbasin

Task 2: Collection of citations (e.g. reports names, publications and/or dates and author information for Bibliography).

Task 3: Focused first on streams-springs where WWBWC is collecting data. Secondary were non-WWBWC monitored.

Task 4: Organized information by stream (e.g. photos and information) to be easily transferred to website link.

Common Elements of Historic Spring Creeks

All the spring creeks in this project provide flows to other streams. Bryant, Stone, McEvoy, Lasater, Doan/Cold Creeks flow directly into other streams. Bryant Creek through Garrison, Stone and McEvoy Creeks flow into the Walla Walla River very near to each other close to the Burlingame Diversion. Caldwell and Lasater flow into Yellowhawk Creek. Yellowhawk, for whom the creek is named, was a Cayuse Chief who signed the 1855 Treaty and had his camp at old Braden School on the old Milton Hiway near Lasiter Spring Creek. Doan/Cold Creeks flow into Mill Creek near the Whitman Mission. These creeks have the potential to add cold water to the larger fish bearing streams. All the other spring creeks Butcher, College and Titus are diverted into pipes or storm drains (including Lincoln Creek) that dump into the Mill Creek flood control channel so that the potential for adding cold water is "limited."

All the spring fed creeks maintain a flow (except portions of McEvoy Creek) through the summer with average flows higher from November through May with spikes in flows at times. The average flows at their source springs range in Cubic Feet/Second from Butcher Creek at 0.18 , Caldwell 0.39, McEvoy 0.67 Lasater 0.71, Bryant Spring 0.94, College 1.0, Stone Creek 1.03. All the creeks have water rights associated with them and are used for irrigation of lawns or agricultural crops or both. Stone Creek, as an example, contains 119 water rights extending from 1863 totaling 8.31 cfs to irrigate a total of 626 acres. Many of those original water rights have been divided multiple times for individual homes that pump water from the creek for their lawns. The water rights to Doan Creek total 7.0 cfs for 494 acres stretching back to 1871.

Some of the creeks have had restoration work done on them. These creeks are Caldwell, College, Lasater, Stone, McEvoy and Titus. Two urban stream restoration efforts are coordinated with each other, Creating Urban Riparian Buffers is a project of the Walla Walla County Conservation District (WWCCD), managed by Tri-State Steelheaders and partnering with Kooskooskie Commons, which also manages the Walla Walla Backyard Stream Team's work. Rural Conservation Reserve Enhancement buffers are conducted by the WWCCD and Tri-State Steelheaders often in cooperation with Washington Department of Fish and Wildlife. All together about 2 miles of riparian restoration has been installed along the spring creeks listed, but each would benefit from considerably more restoration and landowner changes in management practices to improve water quality and quantity.

Summary of Specific Characteristics of Historic Spring Creeks

1. Preservation and restoration through Park management in Walla Walla and Creeks—**Bryant (Garrison)**

   Walla Walla Parks and Recreation manages and maintains the source of **Bryant Spring Creek** and Lincoln Spring Creek in Pioneer Park and the final stretch of Bryant Creek in Jefferson Park (formerly Dreamland) where it flows into the Children's Fishing Pond which then empties into Garrison Creek. Parks and Recreation has sponsored four grants from Washington Department of Ecology, Terry Husseman Coastal Protection awards in partnership with Kooskooskie Commons and the Walla Walla Backyard Stream Team for restoration of Garrison Creek in Jefferson Park and Ft. Walla Walla Park, including the associated Garrison wetland restoration totaling over a half mile of stream.

2. Piping redirecting—**Butcher Creek** is one of the most fragmented creeks arising from three spring sources north of Isaacs Avenue flowing together above Memorial Pool and shortly thereafter diverted into a pipe crossing under and then back again under Hiway 12 and at 13th into the Mill Creek Channel. For most of the creek's length it is redirected, or in a confined channel or pipe that at times are too narrow and thus overflows causing flooding.

3. Private property owner's restoration initiative with a little help from their friends. Beginning in 2005 Jon and Mary Campbell initiated restoration on **Caldwell and Yellowhawk Creeks** that border their property. They were assisted by the Tri-State Steelheaders and numerous volunteers.

4. Prominent presentation of art along a spring creek on a campus—**College (Isaacs) Creek** runs most of its length through the Whitman College campus and includes a duck pond and is well shaded with many old trees and some new native plantings. The creek is respected as an esthetic feature of the campus emphasized with several sculptures.

5. Positive restoration from historic aerial photos for cold water and reestablishing steelhead—**Doan Creek/Cold Creek.** Through a partnership between the Walla Walla County Conservation District, Whitman Mission and Tri-State Steelheaders the section of Doan Creek that connects with Mill Creek has been restored to its original channel from an irrigation ditch constructed decades ago. Steelhead have already been observed spawning at the mouth of the creek and a moose family has inhabited the newly planted willows.

6. Water quality issues from livestock, lawn grass and urban development—**Lasater Spring Creek** rises in a pond just east of Braden Road and is immediately tiled under an agricultural field. The creek emerges in the next property and runs a mile to Yellowhawk Creek through mostly agricultural land composed of horse paddocks and cow pastures where the livestock is fenced into the creek. Additional impacts to the creek include urban development with large lawns with herbicide and pesticide run-off that border and are irrigated from the creek.

7. Preservation and restoration of spring creek flows through aquifer recharge and riparian plantings—**McEvoy Spring Creek** has lost most of its summer and early fall flows due to upstream changes in management. A pilot winter aquifer recharge project upstream in Oregon increased summer flows.

8. Proliferation of irrigation rights, divisions and development—**Stone Creek** has some of the oldest water rights of any of the spring creeks commencing in 1863. Many of the former farmland rights that are now urban housing have been divided multiple times, making monitoring difficult. Those rights are largely exercised to water lawns with downstream water rights, near the mouth, that continue to be used for agricultural irrigation.

9. Policy benefits for water conservation through trust agreements—**Titus Creek** is essentially a four mile long braid of Mill Creek divided into three reaches that sustain different management and conditions. The lowest portion of the braid is sustained by springs on the Walla Walla Community College Campus where stream restoration and water conservation measures are being applied to retain more surface flow.

10.

Summary of Spring Creek Water Rights

Creek	# Files	Date	Qi	CFS	Acres
Bryant	17	1853	0.39	CFS	44.08
Butcher	64	1869	1.78	CFS	87.5
Caldwell	14	1859	1.91	CFS	77.65
College	1	1870	0.40	CFS	20.00
Cold	39	1900	14.05	CFS	713.57
Doan	19	1871	7.02	CFS	493.50
Lasater	13	1865	2.708	CFS	80.40
McEvoy	6	1908	2.656	CFS	132.80
Stone	119	1863	8.3078	CFS	625.63
Titus	29	1861	11.348	CFS	575.50
Unnamed Source	9	1901	0.72	CFS	81.10
Total	**330**		**51.29**		**2931.73**

Figure 1. Information source-Washington Department of Ecology-Water Resources.

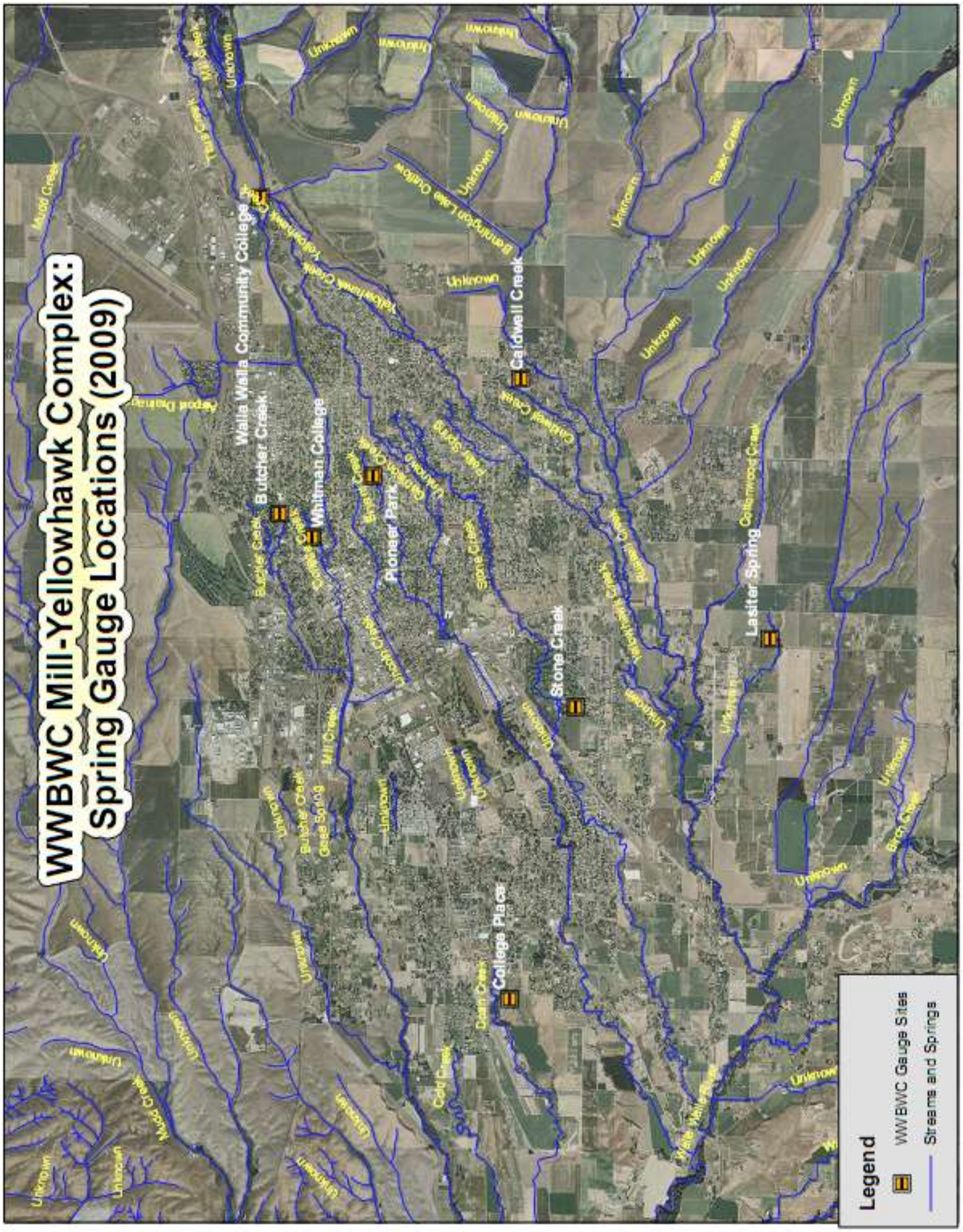


Figure 2. Map of Springs around Walla Walla, Washington.

Bryant Creek - From Pioneer to Dreamland

Average Stream Flow	Water rights total	Acres Irrigated total	Date First Right	Number of Records
0.94 cfs	**0.39**	**44.08**	**1853**	**17**

Bryant Creek, formerly Bush Springs arises in Pioneer Park and forms two ponds just to the west of the Pioneer Middle School sports field. Lincoln Creek also rises out of a spring fed pond just near Division Street in Pioneer Park. These two creeks take very different routes through Walla Walla. Bryant Creek flows out of the large pond in Pioneer Park through what was a fish hatchery that is now the small ponds in the aviary and from there south and west through the block bounded by Howard and Pleasant, crossing Catherine street, then down Thorne on the south side, swinging north by west in a large bend. Then it turns back south, ending in Garrison Creek a short distance below where it forms the fish pond in Jefferson Park, once known as Dreamland. A second branch of Bryant Creek is piped under McCullough St. parallel with Chestnut St. between 4th and 5t.h. The pipe continues west under Chestnut Street angling southwest under 9th Street and then west under and alongside the railroad tracks and then sees daylight again through the Veterans Hospital reservation. Though Bryant Creek is confined to culverts and channelized through most of its route, the creek sees daylight. Lincoln Creek, formerly Roberts Creek, runs west along Lincoln and Newell Streets, across Palouse, Catherine, First and then along Birch to Second where it is confined to a pipe under the grounds of St. Mary's hospital under Poplar to and north under Ninth until it finally drains into the south side of the Mill Creek channel a short distance below where Butcher Creek drains into the channel from the north side the channel.

The City Parks of Walla Walla contain a significant portion of Bryant Creek in Pioneer Park and Jefferson Park. Garrison Creek also flows through Jefferson Park and Ft. Walla Walla Park. These creeks are enjoyed by diverse publics. July 4th has been celebrated in Pioneer Park since the park was formed around the spring fed ponds. Jefferson Park where Bryant Creek flows into the youth fish pond contains the senior center, children's wading pool and the wellness center. Bryant Creek flows out of the pond at Jefferson Park into Garrison Creek that then flows through Ft. Walla Walla Park, which also draws people to the dog park, the skate park and a large disc golf course. A half mile of riparian restoration has been sponsored by the parks department in Jefferson Park and Ft. Walla Walla Park. Kooskooskie Commons coordinates the restoration with volunteers through the Walla Walla Backyard Stream Team. All the city parks are in the process of qualifying as Salmon Safe, a certification that testifies to management that is environmentally friendly to salmon.

Figure 1 and 2. Bryant Creek originates from a spring creating this pond in Pioneer Park and then is confined in a concrete structure as it flows through the park.

Figure 3 and 4. Bryant Creek flows into Jefferson Park after flowing through hundreds of backyards and into Dreamland Pond a popular youth fishing pond. From the pond the creek flows into Garrison Creek.

Butcher Creek –Butchered Creek

Average flow	Water rights total	Acres irrigated	Date First Right	Number of Records
0.18 cfs	**1.78**	**87.5**	**1869**	**64**

Butcher Creek-Starts behind the old General Hospital(now Whitman Dorm) and is joined by Owen Creek that arises behind the Sigma Kai on Isaacs but has been dry recently and by Barber Creek that arises from springs above Melrose. A 1938 Walla Walla Union Bulletin article describes this area, "That section of the city to the north of Isaacs avenue which includes Alvarado terrace is one of the most moist portions of the city. In the early days it is reported city officials had much difficulty in filling in streets through that marshy territory. A few years ago when the water department installed a secondary sewer along the south side of Alvarado so heavy was the ground seepage that an auxiliary pump had to be installed to handle the flow and permit the installation of the pipe.

From there the creek sources converge and flow through Walla Walla City public housing where Whitman College students conducted a stream restoration project in 2004. The Nov. 6th, 1938 Union Bulletin article describes the creek as "running through the lower Stadium property, (now a city park) down through the Northern Pacific Buildings, (recently torn down), across Fourth and south to Moore and on out to Bowman where it eventually winds up, as do virtually all the streams, in being used for irrigation supplies.

Butcher Creek's name is associated with the meat and cold storage with pens and slaughter house formerly at 4th and Rees. The Union Pacific Railroad ran beside the slaughterhouse where ice was made and the signal for the railroad operators (Tom Page's brother was one) was to place their hands over their ears when directing the conductor to the slaughter house to indicate the cold. There were pig pens at Butcher Creek in the 1960's. The stock yard was near the present K-Mart. A spring fed creek of cold clean water that runs year round, like other creeks in Walla Walla. This creek has been highly impacted. It has been straightened, piped and severed. At present the creek disappears underground into pipes near Dell Avenue, traveling under Hiway 12. The pipe then crosses back under Route #12 and the creek empties into the Mill Creek Channel near the Farmer's Coop. The original creek reemerges as springs below Gose Street and serves as surface irrigation water to Gene Thom who farms garden crops.

Figure 1. and 2. Butcher Creek originates in from two springs, one behind a private home on Figeroa Street and the second to form this small pond behind the Old General Hospital.

Figure 3 and 4. Butcher Creek flows through Memorial Park and into a pipe for several miles and finally is piped into the Mill Creek Channel downstream from 11th Street

Caldwell Creek Narrative-Private Landowner Initiative

Average flow	Water rights total	Irrigated acres	Date First Water Right	Number of Records
0.39 cfs	**1.91**	**77.65**	**1859**	**14**

Caldwell Creek emerges from springs in the area of south Wilbur Street in Walla Walla and flows west southwest for about a mile eventually flowing into Yellowhawk Creek.

Jon and Mary Campbell's property is bordered on the north by Yellowhawk Creek and on the south by Caldwell Creek. Before restoration was begun, Yellowhawk Creek was characterized by a single line of black locust trees with an understory largely composed of Himalayan blackberries and reed canary grass in a narrow strip. Caldwell Creek lacked the locust over story but streamside and in stream vegetation was like Yellowhawk largely invasive non-native species. The Campbell's stretch of both Yellowhawk and Caldwell Creeks were characteristic of their status throughout the system.

The Campbells began restoration in November of 2005 by tearing out the blackberry bushes on both Caldwell Creek and Yellowhawk Creek. The buffers were planted in the early spring of 2006, including 1700 shrubs and trees. In the subsequent three years the Campbells planted 1300 more plants/trees, approximately two acres total. The total stream frontage, which includes both sides of Yellowhawk Creek and the north side of Caldwell Creek that has been restored, is about 2,470 feet. (This number actually includes 50 feet on the south side of Caldwell Creek that belongs to a neighbor, restored with his approval.)

Shortly after restoration began a wind storm blew down over twenty of the black locust trees that lined Yellowhawk Creek essentially removing the over story shade. Weed control in the areas not covered by mulch cloth (that eventually decomposes) has been a constant battle to keep the blackberries from re emerging and consuming the new plantings. The Campbells found most effective method for discouraging reproduction of blackberries is to employ people to hand clip emerging spring blackberry shoots and apply a root killing compound. Tarping to keep out sunlight has also been effective for both reed canary grass and blackberries. In the spring of 2010 the Campbells will experiment with the effects of removing the tarp in some areas and seeding with native grasses.

Jon and Mary have observed increases in native and migratory water birds, hawks and passerines in the thriving native vegetation. They enjoy the beauty of the blossoms of wild roses, mock orange and other native shrubs in the spring and the production of red rose hips and waxy white snowberries attract deer and other wildlife in the fall.

Figure 1. 2005-Before blackberry removal

Figure 2. 2009- After planting (3 years if growth)

Figure 3. 2005-Before blackberry removal

Figure 4. 2009 after planting (3 years of growth)

College Creek -Preservation-Whitman College Celebrates a Creek

Average flow	Water rights total	Irrigated acres	Date of First Water Right	Number of Records
1.0 cfs	**0.40**	**20**	**1870**	**1**

College Creek is the only spring fed creek on which water rights holders do not use some of the water for irrigation or other purposes.

Isaacs Creek, as College Creek was originally named, arises on the Isaacs property, one of the oldest homesteads in Walla Walla, adjacent to Whitman College campus through which the remainder of the creek flows. Crossing under Stanton Street the creek circumscribes an amphitheater used for outdoor celebrations, including weddings. For a short distance the creek flows through an unaltered area where native trees and shrubs line the banks. Then the creek flows through a wooded and landscaped area that is sited with a totem pole and other sculptures. The creek then creates Lakum Duckum, an open water small pond that attracts mallards, American widgeon at times, and wood ducks. It is a favorite place to relax on campus. From Lakum Duckum the creek crosses under Boyer Street, flows past Prentiss residence hall and several other sculptures including Jim Dine's *Venus.* It flows behind Hunter Auditorium under Park Street emerging as a natural stream bordered by water birch, red osier dogwood, golden currant and other planted native trees and shrubs through an open area between Reid Campus Center and the Art Building. Students lobbied to have this area be planted in native plants when construction plans were made. This area also supports a wide lawn with outdoor chairs viewed from Reid Campus Center outdoor dining area before the creek meanders behind a pre-school and alumni house from where it is piped and falls into the confined concrete Mill Creek flood control channel in just east of the Spokane Street Bridge.

An ignominious ending for a lovely little stream.

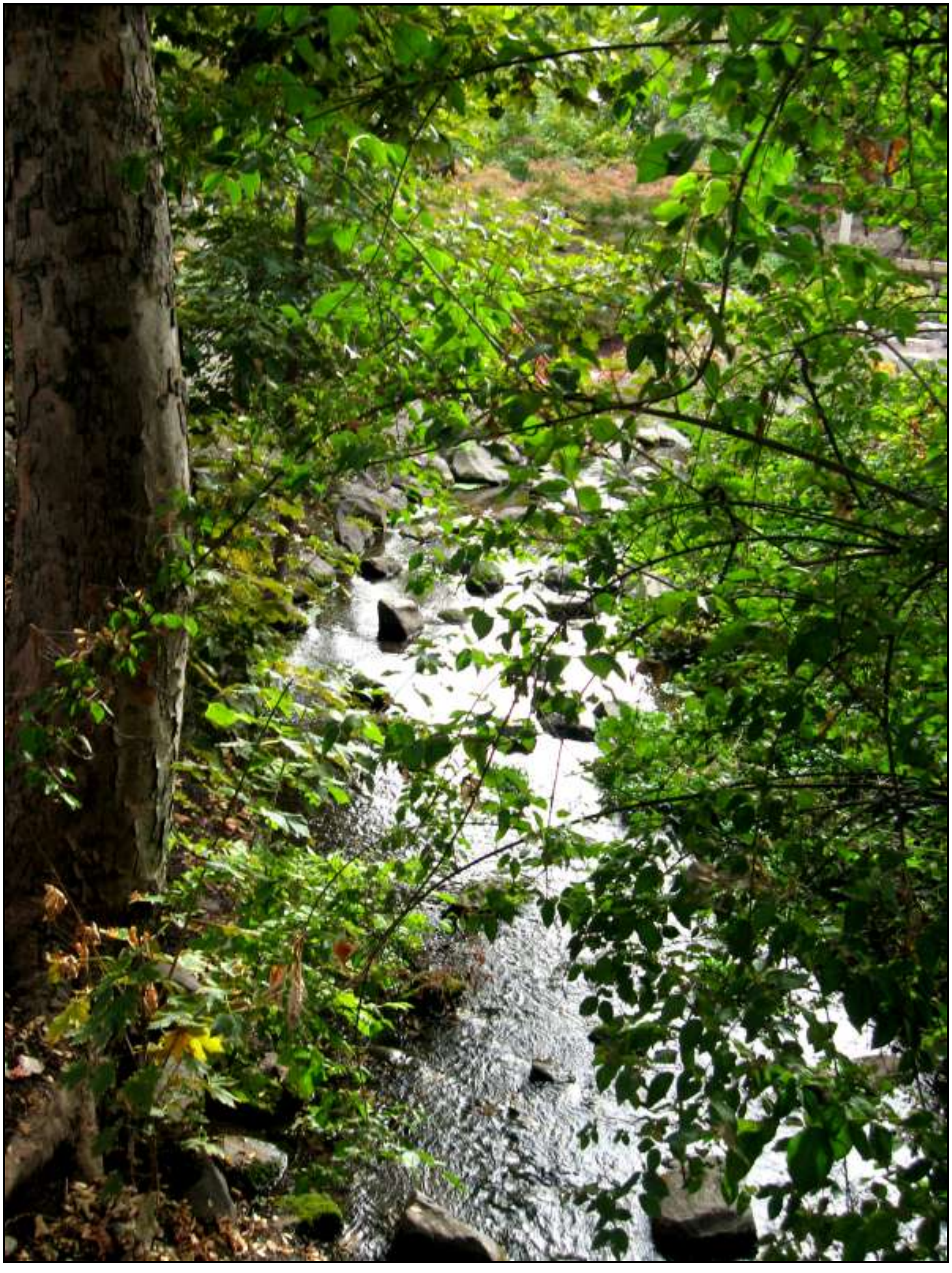


Figure 1. Unaltered section of College Creek with residual native vegetation

Figure 2 and 3 Landscaped riparian border and Lakum Duckum

Doan Creek/Cold Creek-Restoration from historic photos

Average flow	Water rights total	Irrigated acres	Date of First Water Right	Number of Records
(1-2)	**7.0 cfs**	**493.5 total acres**	**1871**	**19**

A 1939 aerial photo map has been used for restoration of Doan Creek, listed as Garfield Creek on other maps. The map includes portions of Cold Creek that historically joined Doan Creek near the Whitman Mission on a 1906 map located in the archives in the Whitman College library. The 1939 map shows a meandering stream with riparian vegetation and an extensive wetland near what is now Last Chance Road on the Maxon family land on, which riparian restoration was conducted about 15 years ago to create pheasant habitat that supplied a pay to hunt income. Members of the Hanebut family recount stories of a deep pool in the area near Last Chance Road that was enjoyed as a swimming hole. Mr. Hanabit, now deceased, also recalled several fish species that were present in the creek. *Mike Denny, Walla Walla County Conservation District and Jon Cole, Professor Emeritus, Walla Walla University*

Doan Creek arises on the Rodgers School ground in College Place from springs that are tiled through the swale on the playground. The disruption of the source springs by construction prevented accurate measurement of flows. Adjacent property has been developed into housing where the creek was also redirected. The creek then flows through other private properties including onion farms where other springs arise and from which purified water that is effluent from the Walla Walla wastewater treatment plant is donated to Doan Creek. The creek then flows through Walla Walla University property where it is partially tiled and where open has been straightened and lacks riparian vegetation. Using the 1939 photo as their guide, Walla Walla University staff and students in cooperation with the Walla Walla County Conservation District have completed designs and acquired funding to free the creek from the tile and excavate the old creek bed with care creating meanders into which the creek will be restored.

Doan Creek ends at the Whitman Mission, flowing into Mill Creek. Farms adjacent to and at the Mission have been irrigated from Doan Creek since the mid 1800's. In the 1940's Tom Page remembers his uncle raising asparagus on his farm along Cold Creek using a horse pulled cart to carry the asparagus through the fields. His uncle had modified the creek with a concrete structure about 15 feet high that created a dome from which irrigation water was drawn.

Using 1939 aerial photos as a guide, Mike Denny with the Walla Walla County Conservation District and funding and aid from the Tri-State Steelheaders partnered with the National Park Service at Whitman Mission to restore Doan Creek. The photos showed a shaded meandering creek that was a migration and spawning stream for steelhead, other Salmonids and native trout that require cold clear water. The creek was an alternate migratory pathway to the upper Mill Creek spawning gravels. Sometime after 1939 the creek's water was diverted from its natural course into a straight irrigation ditch against a hillside in order to allow the farmers to cultivate the creek bed. Yet, even the irrigation ditch attracted steelhead despite the invasion of non native reed canary grass that choked the creek's water.

After design work was completed in 2003 a "new" channel was excavated. Meanders that were as close as possible to the original stream bed were completed in the fall of 2004. Pools, gravel riffles, and woody debris jams were constructed in 2005 to create in-stream habitat for fish. A fabric mulch was installed along the stream banks to prevent the recurrence of reed canary grass and other non native vegetation. In 2007 the site was planted to native shrubs and trees that will eventually provide shade, bank stability, food, large wood debris and habitat for birds, invertebrates and other wildlife.

In 2009 threatened steelhead were photographed spawning in the creek, attracted by the cold clear water. And, the willows along the creek have attracted a moose family that has recently migrated to the basin following Mill Creek down to the Walla Walla River.

Figure1. 1939 Aerial Photo of Cold Creek and Doan Creek from which the channel was restored.

Figure 2. and 3. Restoration of original channel of Doan Creek and the reemergence of willows. Photo by Mike Denny Walla Walla County Conservation District

Figure 4. Steelhead spawning in the restored channel of Doan Creek near Whitman Mission. Photo by Larry Hooker, Walla Walla County Conservation District.

Figure 5. Female moose and calves near Doan Creek. Photo compliments of the

Lasater Spring Creek-Livestock Water Quality Pollution Solutions

Average flow	Water rights total	Irrigated acres total	Date First Water Right	Number of Records
0.71 cfs	**2.708**	**80.40**	**1865**	**13**

Lasater Spring Branch bubbles up out of a wheat field on private property at what is known as "the old Braden Place" close to the former Braden School. This was the area in which Chief Yellowhawk had his camp during the Treaty of 1855 of which he was one of the signers. Lasater flows for about one mile through agricultural small acreages and residences into Yellowhawk Creek. The creek maintains a steady flow throughout the summer at its origin despite pumping for crops and cattle pasture and multi-acre lawns.

From the old Braden Place the creek flows under the road and is joined by another spring branch and then flows for about a quarter mile along 2 Acre Lane and across pasture land until it reaches spring branch road. There the creek is confined to a ditch alongside the road at the base of large lawns with not buffer so that herbicides and pesticides escape into the creek. It then continues as a ditch through cattle pens and horse pens with no vegetation and no containment away from manure and other pollutants. Near Yellowhawk Cellars the creek flows through a culvert under the road through a series of pastures with cows and no large shrubs nor trees providing shade to the creek. After the pastures, the creek again flows through a culvert below a vineyard into a pond that is shaded by large willows and shrubs. From there the creek flows through another culvert under the Old Milton Hiway through a restored creek bed and wetland area to join Yellowhawk Creek.

Local and state policies that govern in stream flows and water quality include riparian buffers through the Walla Walla County Critical Areas Ordinance that assures better water quality as the buffers filter out pollutants from migrating to the stream. The Clean Water Act is a federal law that guides the Washington State Department of Ecology's Water Quality laws. The 2007 In-Stream flow rule requires limited water use for new housing in rural areas for outside water use and requires that all new domestic wells are metered. New shallow aquifer agricultural wells have been banned for several decades in Washington. The Walla Walla Basin In-Stream Flow Rule also limits stock watering.

Two riparian restoration projects were completed in 2008 with Phase IV Watershed/WADOE funding and National Fish and Wildlife Foundation Funding by Kooskooskie Commons and the Walla Walla Backyard Stream Team.

Figure 2. Lasater Spring Creek near its origin demonstrating typical flows and reed canary grass infestation that slows flows and deposits sediments disrupting in stream habitat.

Figure 3. Lasater Creek straightened adjacent to the road subject to road runoff and contamination from lawn chemicals.

Figure 4. Lasater Creek fenced into cow pasture risking contamination from fecal coliform and abuse of riparian habitat.

Figure 5 Lasater Spring Creek near confluence with Yellowhawk Creek. Weed barrier cloth stapled down to discourage re-growth of reed canary grass and to conserve moisture for native plant growth.

Figure 6. Planting native plants along Lasater Spring Creek restores shade and habitat.

McEvoy Spring Creek-Aquifer Recharge to Restore Flows

McEvoy Spring Creek rises to the west of Beet road just south of Stateline Road and runs parallel to Beet Road for about a half mile, crossing under the road, continuing through agricultural fields and empties into the Walla Walla River in about another half mile.

Jo Winn remembers her childhood in the 1930's on McEvoy Spring Creek at the original spring, which formed a deep swimming hole. Jo's family owned and operated the JO-SO Dairy for which the water source was an artesian well that in winter was used to flood a field to create a skating rink. Jo recalls a favorite trick that she used to show her friends, which was to ride her pony at a fast pace toward the creek, coming to a dramatic halt on the creek bank and sliding over the pony's head into the swimming hole.

At intervals throughout to length of the creek small springs contribute to the flow. Tom Page grew up on McEvoy Creek in the 1950's where the creek flows into the Walla Walla River. Tom also describes the swimming hole where he learned to swim-an area that is now dry most of the year.

McEvoy Spring Creek is one of several creeks in the area that have experienced greatly reduced flows since 2000. The reason for reduced flows are multiple including changes in irrigation practices upstream designed to protect salmon, increased ground water pumping up stream and in areas adjacent to the spring creeks. Degradation of the streams for almost a decade has encouraged the reduction of native vegetation and proliferation of reed canary grass resulting in silt choked streams that further reduces flows. Historically, in summer these small spring-fed streams provided cold water to the main stem Walla Walla River.

Yancey Reser, who also grew up in the area describes the historic condition of the West Little Walla Walla River and Walsh Creek, known as Lewis Creek before it crosses the state line from Oregon. *"Not long ago the project area was a year round stream, home to trout and steelhead, beaver, otter, mink and muskrat. Its waters, and shores providing nesting places for mallards, and teal, its trees for wood ducks and other birds, its swamps for turtles and snipe. Handicapped persons could have the excitement of catching a fish from a small flowing stream. A kid could learn to swim in its cold water. Warren Webb would tell you about catching a twenty-four inch trout in the stream. My Father could tell you about the salmon runs when he was a kid."*

Observations made by professionals who were part of the United States Exploring Expedition reported to the US Government about the area surrounding the Whitman Mission in 1841. This was a time when it was not known whether this ground would be British or American. The quoted excerpt is from Volume IV, Chapter XI, Walla Walla, at page

394, of the Narrative of the United States Exploring Expedition. *"The soil, in the vicinity of the small streams, is a rich black loam, and very deep. The land fit for cultivation along these streams does not, however, amount to more than ten thousand acres. This quantity is susceptible of irrigation, and in consequence can be made to yield most luxuriant crops. In many parts of it, a natural irrigation seems to take place, owing to the numerous bends of the small streams, which almost convert portions of land into islands. These streams take their rise in the Blue Mountains about forty miles east of Wallawalla (sic), are known to never fail. The climate is very dry, as it seldom rains for seven or eight months in the year. During the greater part of this time, the country forty miles north and south of this strip, has an arid appearance. There are large herds of horses owned by the Indians that find excellent pasturage in the natural hay on its surface. There is a vast quantity and profusion of edible berries on the banks of the streams above spoken of, consisting of the service-berry, two kinds of currants, whortleberry, and wild gooseberries: these the Indians gather in large quantities, for their winter supplies."*

McEvoy Spring Creek has served a unique role in recent years as a pilot project for winter aquifer recharge to determine if that technique would increase and lengthen summer flows. Recharge of an area upstream on the East Little Walla Walla River in Oregon was demonstrated to increase summer flows in McEvoy Spring Creek.

Due largely to the efforts of Tom Page through the Land Owner Incentive Program of Washington Department of Fish and Wildlife about 2/3 of the length of McEvoy Spring Creek has been replanted with native trees and shrubs

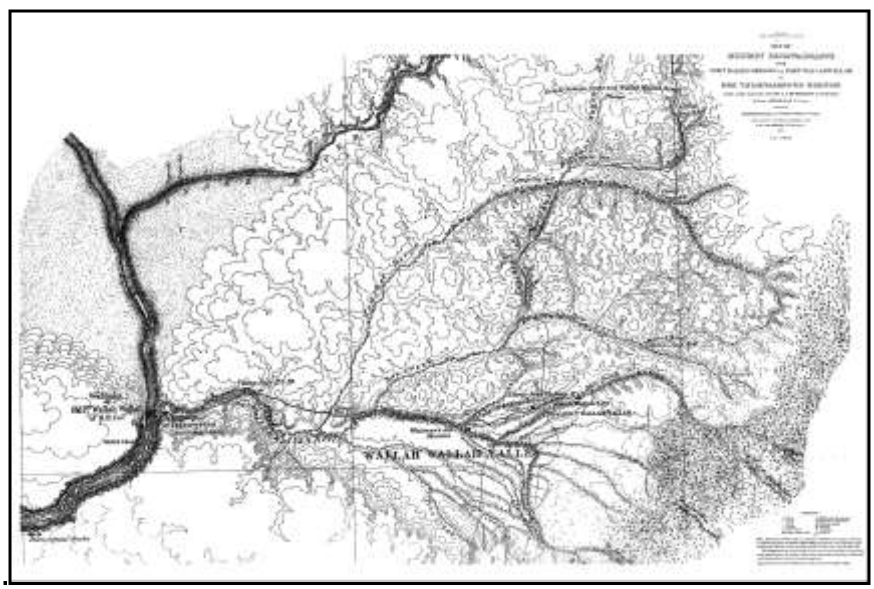


Figure 7. Mullen Map from 1859 of the Walla Walla River system showing the natural braiding distributaries of the Little Walla Walla Rivers and Spring Creeks

Figure 8. Native Sumac in late November 2009 sunlight through which the original barn from the JO-SO Dairy is visible. The well next to the barn was artesian in the 1930’s.

Figure 9. Riparian restoration of McEvoy Spring Creek near where Jo-Winn enjoyed swimming in the 1930's

Figure 10. McEvoy Spring Creek staff gauge in late November 2009-flows just returning after loss of summer

Stone Creek –Water rights Multiplicity

Average flow	Water rights total	Irrigated acres total	Date of First Water Right	Number of Records
1.03 cfs	**8.3078 cfs**	**625.63**	**1863**	**119**

Stone Creek rises from several springs at the eastern end of Chestnut Street in Walla Walla as well as behind the Blackberry Inn. The creek contains some of the oldest water rights in the area beginning in 1863 and is still used throughout the town for watering of lawns. The origin of the name of the creek is unknown but was associated with the first water rights, although it is possible it was named after Henrietta Stone who claimed a right to water 47.1 acres in 1875. More likely, the stream was named for stony physical features of the creek at the time of Euro-American settlement. The original water rights have been transferred to subsequent owners who have subdivided the land to the extent that there are hundreds of small water rights. Although all diversions are required to be screened and metered the multiplicity of rights makes monitoring difficult.

Stone Creek flows through Walla Walla to the southwest and empties into the Walla Walla River just above the Burlingame Diversion. Throughout town much of the creek is armored and confined to a narrow channel with lawns to the creek's edge where pesticides and herbicides enter the creek by landowner application to their lawns.

Beginning in 2008 the Walla Walla County Conservation District received a grant from the Washington State Department of Ecology to improve water quality. The District has developed the Creating Urban Buffers (CURB) program that prioritized Stone Creek for outreach and restoration. Five properties at the headwaters of the Stone Creek and several other properties where the creek runs close to Tietan Way and through the Stone Creek Homes property have received riparian restoration. These projects are all completed in partnership with the homeowner who provides assistance in site preparation and planting and is responsible through a contract for maintaining the native plants for ten years until they are established. The homeowner is a participant in the selection of plants from an extensive list that includes trees, shrubs, grasses and wildflowers. To date over 1000 linear feet of Stone Creek have been restored with native plants.

Historically Stone Creek sustained larger flows than at present, with losses due largely to housing and industrial development in both Walla Walla and College Place. Testimonies of long time property owners along the creek describe 3 to 3.5 feet long trout and two pound rainbow trout through the 1960's. Other fish included brook lamprey, shiners, cut lip chub and squaw fish. Fresh water mussels are particular species of interest of the Confederated Tribes of the Umatilla Indian Reservation as an indicator of healthy streams.

Although holding some of the oldest agricultural water rights and housing development along its route through Walla Walla, Stone Creek has experienced changes in flow as a result of several property changes in the past decade. The creek traverses the Walla Walla Country Golf Course where the route of the creek has been modified from its original channel breaking through the lens at the bottom of the creek reducing surface flows. Also, the creek has been narrowed and armored and riparian vegetation is at a minimum. From the Country Club Stone Creek for many years was a water source for orchards that are slated for housing development. Leaving the orchards, the creek flows parallel to the Hiway between Walla Walla and Milton-Freewater creating a wetland area that has gradually been drained and developed, first for a mobile home park where the creek was straightened and piped and then through a Mall and Wal-Mart development site where the creek was ultimately planted with native vegetation. The area is maintained by Wal-Mart but is adjacent to a huge parking lot from which trash accumulates in the creek. Downstream of Wal-Mart housing continues to be developed. From there the stream traverses several farms where the water is impounded in ponds creating fish passage problems. As the creek nears its confluence with the Walla Walla River near the Burlingame Diversion across from Beet Road, several farm with the assistance and funding through the Walla Walla County Conservation District have installed Conservation Reserve Enhancement Projects that after a decade has resulted in native trees and shrubs thirty feet high, which provide a healthy riparian area at the lowest end of the creek. The creek would benefit greatly if other farms would participate in riparian restoration.

Figure 11. Near spring at one source of Stone Creek. This area on both sides of the creek has been restored with removal of blackberries and reed canary grass and planting of native plants by the WA/DOE funded CURB program

Figure 12. Stone Creek flows for about ½ mile through the Walla Walla Country Club Golf Course where it is channelized and devoid of riparian vegetation and subject to run off from lawn chemicals.

Figure 13. When Wal-Mart was constructed in College Place, Stone Creek was altered in the area. As compensation the company planted native plants, fenced the creek and have achieved a functioning riparian buffer.

Figure 14. At the lower end of Stone Creek irrigated agriculture is the prominent use of water. Though the meanders are maintained on this property the creek is devoid of native riparian habitat and thus chemicals applied to crops are not filtered from the stream.

Titus Creek-Policy Restoration Opportunities

Average Flow	Water Rights Total	Acres Irrigated Total	Date of First Water Right	Number of Records
(1-2cfs)	**11.348**	**575.5**	**1861**	**29**

"Titus Creek is a small stream in Walla Walla watershed, located on the east edge of Walla Walla. It is a four mile long braid of Mill Creek. Titus Creek diverges downstream of Five Mile Bridge near the Tracy grain elevators. The creek flows west, paralleling Mill Creek. Just upstream of Five Mile Road it divides into a bypass channel that flows back into Mill Creek and a smaller channel that continues flowing west under Five Mile Road under the entrance to Rooks park and reconnecting with Mill Creek just downstream of Yellowhawk divisions works after it flows through the campus of the Walla Walla Community College.

In the area after Titus Creek diverges upstream of Mill Creek flood control, stream flows are dynamic as rain fall and snow pack melt determined by 7 to 10 pulses each year from October to May. Stream flows vary from hundreds to thousands of cubic feet per second. Typically about 10 % of the water from Mill creek flows into Titus creek. By July the snow pack has been released and Mill Creek stream flows fall to 20 to 40 cfs. During summer months about 30% of the flow of Mill Creek (about 10 cfs) is diverted into Titus creek.

The divergence from Mill Creek changes every year with the shifting of the gravel bar. At irrigation season, Kirk Klicker under a permit, modifies gravels diverts water into Titus creek. During other times of the year there is no control at this point.

Titus Creek is healthiest in the reach from the divergence to the bypass above Five Mile Road . Cold spring discharges and mature black cottonwood shade work in concert to keep stream temperatures low. The riparian forest naturally deposits large woody debris to create pools and cover where fish can find refuge as well as shallower riffles that incorporate water into the river. Natural pulsing of stream flow prevents fine sediments from covering the stony stream bed. Stone flies and other insects provide food for trout and salmon.

Near Five Mile Road behind the Abeja Winery an informal structure controls the flow of water through a by-pass back to Mill Creek or on downstream to Titus Creek. During peak flows water is diverted back to Mill Creek to keep from flooding Titus Creek downstream of Five Mile Road. During irrigation season the bypass flow is sealed to keep water in Titus Creek. Downstream of the flow control structure the small stream is changed where there are fewer over story trees, meanders and pools. Stream flows diminish due to seepage and irrigation diversions. There is an increase in grasses and other plants growing in the stream channel. This makes the water warmer and reduces dissolved oxygen decreasing the quality of habitat for fish and other aquatic organisms. Open sunlight falling on the banks of the stream encourages the growth of these plants. Once these plants get established conditions tend to worsen. The plants filter and trap sediment and accumulate soil in the stream bed which in turn improves condition for these plants to grow. Plants choking the stream channel are not just a problem for fish but a problem for irrigators at it reduces the flow for downstream senior right water owners.

As Titus Creek nears the community college ground water springs restore flow and enable Titus Creek to flow year round with cold clear water. A portion of the creek flows through industrial shops and parking areas. The channel is choked with over story grasses due to a lack of over story shading. The close proximity of parking lot and vehicles creates a point of entry to the stream of pollutants during storm water runoff.

Downstream of this area a portion of Titus Creek is routed through a pond that is a primary feature of the community college landscape. In summer this broad shallow pond creates warming of the stream flow.

Downstream of the pond Titus Creek flows through a wetland featuring cottonwood trees and beaver ponds before rejoining Mill Creek through a pipe. When the flow of Mill Creek falls below the level of the culvert connecting Titus Creek to Mill Creek, the gap presents a passage barrier to juvenile fish trying to escape the warm pools of Mill Creek for the cooler spring fed refuge of Titus Creek.

Restoring Titus Creek

Despite its short length, Titus Creek is a relatively complex system involving a number of landowners and a variety of complex issues. It is helpful to think of Titus Creek in three distinct reaches. The upstream reach extends from the division from Mill Creek upstream of the bypass channel at Five Mile Road. The middle reach of Titus Creek begins at the flow control structure upstream of Five Mile Road and extends to the springs near the downstream end of the Klicker property. The downstream reach of Titus Creek extends from the ground water springs on the Klicker property through the Walla Walla Community College campus to the confluence with Mill Creek.

The upstream reach of Titus Creek currently performs a full range of functions. It conveys peak stream flows flowing down Mill Creek. It provides habitat for fish and other wildlife. It provides a source of water for irrigation and livestock and it provides a recreational and esthetic amenity for people living in the area.

Four key issues to focus on in the upstream reach-

1. Flow control structure at downstream area near Five Mile Road presents a fish passage barrier during irrigation season. Needs modification.

2. How should water flow from Mill Creek into Titus Creek?

3. Need to sustain healthy plant systems in and around the stream. Managing livestock and fallen trees.

4. Minimize irrigation diversions and insure screening to prevent damage to fish and wildlife.

Middle Reach- poses the greatest restoration and stewardship challenges. This reach delivers irrigation for crops and livestock. Provides recreation and esthetic amenity and supports fish and wildlife to a limited degree.

Issues to address to make this reach healthy for fish.

1. Define fish habitat and flows criteria.

2. Establish and appropriate channel shape and structure including meanders, appropriate width and depth and pools.

3. Remove and prevent barriers to water and fish from flowing freely throughout the reach.

4. Need to create and sustain healthy plant systems in and around the streams. Removing invasive plants and planting native plants that provide shade.

5. Establish practices for managing livestock and fallen trees.

6. Minimize irrigation diversions and insure that all water diversions are properly screened to prevent harm to fish and wildlife.

An alternative is to exclude fish from this reach, which would reduce complications from the Endangered Species Act. However, this alternative would not reduce the need to address the recommended stream channel morphology and invasive plant and management issues.

Downstream reach is currently managed as an irrigation water source and recreational and esthetic amenity. It also supports fish and wildlife to some degree.

Restoration and stewardship issues:

1. Improve fish passage between Mill Creek and the mouth of Titus Creek. Either by replacing or modifying the culvert at this location.

2. Need to establish a channel shape and structure for the entrance reach near the community college including meanders appropriate width and depth, riffles and pools.

3. Need to create and sustain healthy plant systems in and around the stream with an emphasis on eradicating and replacing invasive plants with native trees and shrubs.

4. Need to minimize diversions of stream flow for irrigation and consider alternative sources of irrigation water.

5. Consider eliminating the community college pond.

6. Evaluate whether beaver dams are having a negative effect on fish.

Restoration will require information, organization, money and time through a collaborative effort by many people. A good plan is key to gaining support to sustain economic viability as well as complying with the Endangered Species Act and the Clean Water Act in partnership with other agencies.

1. Inventory

2. Early actions

3. Assess long term actions

4. Develop implementation plan

5. Prioritize actions and gain funding.

6. Implementation

Figure 15. Titus Creek before restoration began at Walla Walla Community College Campus

Figure 16. Titus Creek channel reconfiguration at Walla Walla Community College Campus

Figure 17. Titus Creek pump station for Walla Walla Community College turf irrigation

Figure 18. Titus Creek outflow from wetland area into Mill Creek at Walla Walla Community College

Figure 19. Buster Simpson's " Poetic License" along Mill Creek near Titus Creek culvert outflow.

REFERENCES

Personal Communications

1. Jon Cole- Professor Emeritus Walla Walla University-restoration design and surveys with students
2. Jo-Winn-Lived on McEvoy Spring Creek as a child at the JO-SO Dairy
3. Mary and Jon Campbell-restored riparian habitat on Yellowhawk and Caldwell Creeks
4. Mike Denny-Walla Walla County Conservation District-coordinated restoration projects on Stone and Doan Creeks
5. Tom Page, Native Creek Society, Long time resident and farmer at home property on McEvoy Spring Creek and at Lasiter Spring Creek
6. Yancey Reser, Native Creek Society-Long time resident on multi-generational farm on Walsh Spring Creek and West Little Walla Walla River.

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2. Darnell, Richard, Washington State Department of Ecology, *Walla Walla Spring Creeks Water rights map overlaid on 1939 base maps.*
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4. Kohley, Robby and Shanna Bailey, Environmental Science Senior Project Presentation, *A Plan for Renovation of Doan Creek through the Walla Walla College Farm, 2009*
5. Hunn, Eugene H.,with James Selam and Family, 1990, Nchi'i-Wana, "The Big River", Mid-Columbia Indians and Their Land
6. Johnson, Judith S., Kooskooskie Commons-Walla Walla Backyard Stream Team, *2002-2009 photographs of spring creeks*

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14. Walla Walla Union Bulletin, *The Land of Many Waters is Aptly Named, "Seven Streams Rise or Flow Through City of Walla Walla," reprinted from the Nov.6, 1938, Walla Walla Union-Bulletin*

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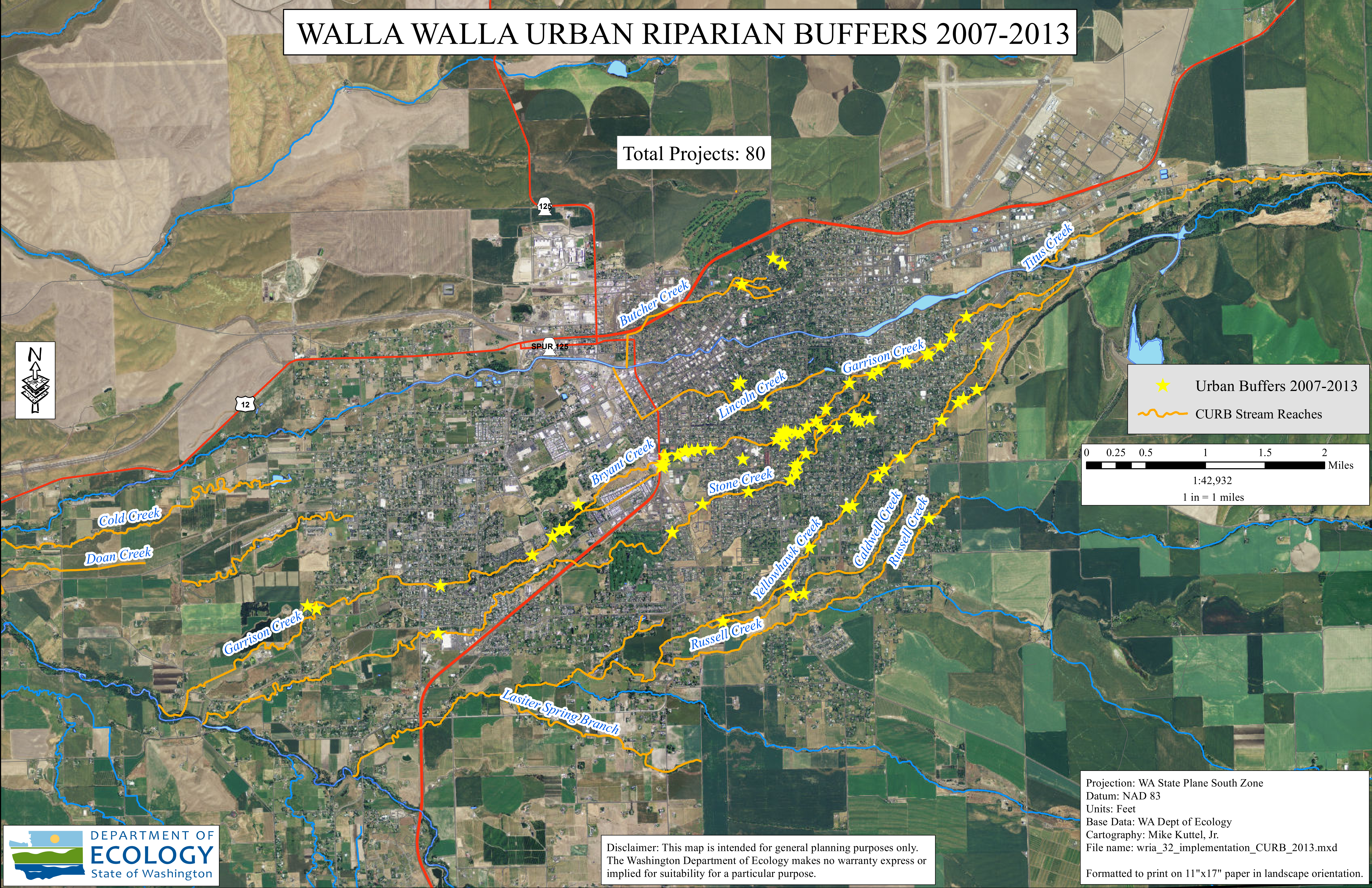
WALLA WALLA URBAN RIPARIAN BUFFERS 2007-2013
Total Projects: 80
Urban Buffers 2007-2013
CURB Stream Reaches
0 0.25 0.5 1 1.5 2
Miles
1:42,932
1 in = 1 miles
N
125
SPUR 125
12
Butcher Creek
Titus Creek
Garrison Creek
Lincoln Creek
Bryant Creek
Stone Creek
Cold Creek
Doan Creek
Yellowhawk Creek
Caldwell Creek
Russell Creek
Garrison Creek
Russell Creek
Lasiter Spring Branch
DEPARTMENT OF ECOLOGY State of Washington
Disclaimer: This map is intended for general planning purposes only. The Washington Department of Ecology makes no warranty express or implied for suitability for a particular purpose.
Projection: WA State Plane South Zone
Datum: NAD 83
Units: Feet
Base Data: WA Dept of Ecology
Cartography: Mike Kuttel, Jr.
File name: wria_32_implementation_CURB_2013.mxd
Formatted to print on 11"x17" paper in landscape orientation.

WRIA 32 TMDL Implementation Tracking

Note: = prior to WQIP; (#) = information source

Describe extent of implementation

Columbia Conservation District, NRCS, & FSA

Action	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Install riparian buffers	256.2 acres of CREP (3)		Broughton LC CREP (4)	6.9 acres CREP (1)	10.3 acres CREP (2)								
Apply direct seeding					Spring 1466 Acres	Spring 933 A. Fall 941 A.							
Open conveyeance ditch converted to pipeline		6290' pipeline 20 user diversion points installed				8480' pipeline 43 user diversion points, 238.7 acres							
Install fencing							14,992 ft						
Develop off-site water systems				Spring Development, pipe line and trough installed			troughs, pipeline installed (3)						

Confederated Tribes of the Umatilla Indian Reservation

Action	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018

Kooskooskie Commons

Action	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Walla Walla backyard stream team	3.14 acres riparian buffers			1.58 acres riparian buffers			0.86 acres riparian buffers						
Yellowhawk Streamkeepers - urban backyard riparian restoration			0.41 acres riparian buffers		0.80 acres riparian buffers		0.69 acres riparian buffers						
Restoration education and outreach													

Priority Projects Group*

Action	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
3-5 acres wetland restoration						Brewer wetland (4.25 acres)							
3-5 acres upland steppe restoration						See above							

* Priority Projects Group consists of: Walla Walla County Conservation District, Tri-State Steelheaders, Washington State Department of Fish and Wildlife, Confederated Tribes of the Umatilla Indian Reservation, and Blue Mountain Land Trust

Tri-State Steelheaders

Action	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Walla Walla River woody bank armor, riparian planting & conservation easement													
Touchet River large woody debris & riparian planting					Completed (5)								
NF Coppei Creek conservation easement													
Mill Creek conservation easement													
Russell Creek riparian planting, pasture fence setback				400 ft fencing, 0.4 acres riparian planting									
Yellowhawk & Caldwell creek pasture fence setback, riparian planting				980 ft fencing, 0.7 acres riparian planting									
Walla Walla River riparian planting, livestock setback/exclusion													
Reser Creek basin restoration 3-acre wetland with a 14 acre native plant buffer					Completed (1,5)								
New - Mud Creek livestock exclusion fencing and riparian planting						1,775 ft of fencing, 1.2 acres riparian planting							

Creating Urban Riparian Buffers (CURB)						33 projects on 8,873 ft of streams	5 riparian buffer projects completed along 1450 linear ft of stream; sent outreach letters to 500 streamside residences; Water quality eduction for 300 5th graders	22 riparian projects along 6945 linear ft of stream; Water quality education to 18 elementary, 2 high school and 3 colleges classes					

U.S. Army Corps of Engineers - Walla Walla District

Action	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Nursery St. Bridge riparian planting													
Walla Walla basin feasibility study													

City of Walla Walla

Action	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Install 1,000 placards at storm drains				Ongoing	Ongoing	Ongoing	Ongoing						
Sweep arterials every week and residential streets every 2 months				Ongoing	Ongoing	Ongoing	Ongoing						
Maintain BMPs required by stormwater permit				Ongoing	Ongoing	Ongoing	Ongoing						
Yearly composting collection city wide				Ongoing	Ongoing	Ongoing	Ongoing						
Yearly household hazardous waste collection				Ongoing	Ongoing	Ongoing	Ongoing						
Publish 4 articles, bill inserts and/or TV spots about water quality				Ongoing	Ongoing	Ongoing	Ongoing						
New - illicit discharge report number posted on their website						Viewed 10/18/11							

Walla Walla Community College's Water & Environmental Center

Action	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Education and outreach workshops				Return to the River	Return to the River	Return to the River	Return to the River						

Walla Walla Community College

Action	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Titus Creek restoration						800 ft of stream restored and 0.5 acres of riparian planting							

Walla Walla County Conservation District, NRCS & FSA

Action	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Install 810 acres of riparian buffers						174 miles (3,300 acres) of CREP buffers as of 9/2011 (1)	200+ miles (3,400 acres) of riparian forest buffers as of 12/2012						
Conservation Reserve Program (CRP)						150,000 acres	142,420 acres						
Continuous Conservation Reserve Program (CCRP)							3,177 acres						
Highly erodible lands BMPs						2,819 acres	22,980 acres						

Walla Walla County Conservation District

Action	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Install 9 to 15 urban buffers						See CURB under Tri-State Steelheaders	See CURB under Tri-State Steelheaders						
Install 6 miles of piping in Eastside Irrigation District				Eastside-Westside complex piping: 13.7 miles (1)									
Install piping in irrigation canals at Old Lowden				Started 2009 targeted finish date 2/2013 (1)			Installation commenced late 2012; completion scheduled for 3/2013						
Install piping for Bergevin-Williams irrigation canals				Started 2009 targeted finish date 2/2013 (1)			Installation commenced late 2012; completion scheduled for 3/2013						

Install piping in Gardena Irrigation District					South Lateral 5.5 miles of ditch replaced with 4.25 miles of pipe (1)		Completed 2,800 ft. project on GFID main canal (above Pine Creek Siphon); commenced installation of North Lateral w/3-2012 targeted completion date						
Install piping in Lowden irrigation canals													
Restore Doan Creek east of Last Chance Road													
Implement Smith Sediment Retention Demonstration							Installed inlet structure & 1,150 feet of conveyance pipeline and graveled 2,200 feet of access road						
Implement Stiller Pond Shallow Aquifer Recharge Project							Phase 1 completed						

Walla Walla County Public Works Department													
Action	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Develop stormwater management plan & use BMPs during road construction						Reser Rd improvements: widened road, replaced bridge, removed direct outfall to Yellowhawk Cr., installed infiltration BMPs							
Use stormwater BMPs & riparian restoration at bridge construction sites				ongoing	ongoing	ongoing	ongoing						
Develop stormwater management plan & use BMPs during rock crushing activities				ongoing	n/a	n/a	n/a						
Develop stormwater management plan & use BMPs at county facilities				ongoing	ongoing	ongoing	ongoing						
Develop stormwater management plan & use BMPs during road construction of housing developments				ongoing	ongoing	ongoing	ongoing						
Develop stormwater management plan & use BMPs during road construction for industrial & commercial buildings				ongoing	ongoing	ongoing	ongoing						
Evaluate direct discharge of stormwater into streams				ongoing	ongoing	ongoing	ongoing						
Apply herbicides per regulations				ongoing	ongoing	ongoing	ongoing						
Use non-toxic de-icing solutions				ongoing	ongoing	ongoing	ongoing						

Washington State Department of Ecology													
Action	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Award grants and Loans				Ongoing: CURB, irrigation ditch piping	Ongoing CURB	(2) riparian restoration proposals being considered for FY 2013 nonpoint funding	Funded CREP ($499k) (200-400 acres Ag riparian and/or wetland restorations) and CURB 2 ($216k) (25 urban riparian buffers on 2,000 ft of streams)						
Provide technical assistance (TA)						Referred (2) landowners on Walla Walla River @ Lowden to Walla Walla CD and other groups for TA	Referred 2 landowners to Walla Walla CD and other groups for TA: 1 Big Spring Branch, 1 Cottonwood Creek						
Provide education & outreach						10/4/11 presentation to Walla Walla Watershed Management Partnership	2/7/12 Implementation update presentation to WWWMP, funded CURB 2 which includes education & outreach	3/5/13 Implementation update presentation to WWWMP, funded CURB 2 which includes education & outreach					

Monitor water quality	Ongoing Ambient Monitoring	Ongoing Ambient Monitoring	Ongoing Ambient Monitoring	Ongoing Ambient Monitoring	Ongoing Ambient Monitoring	Ongoing Ambient Monitoring	Ongoing Ambient Monitoring	Proposed TMDL effectiveness monitoring					
Inspect facilities				Ongoing w/ permit managers	Ongoing w/ permit managers	Ongoing w/ permit managers	Ongoing w/ permit managers	Ongoing w/ permit managers					
Follow up on complaints, referrals & enforcement				Ongoing	Ongoing	Ongoing	Ongoing	Ongoing					

Washington State Department of Transportation													
Action	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Increase infiltration along Highway 12 plus additional 5 acres						8 miles completed + offsite wetland mitigation							

Sources:

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3. Columbia Conservation District Annual Report 2006
4. Broughton Land Company Environmental Assessment and Native Fish Habitat Conservation Plan. 4/2008
5. Tri-State Steelheaders' website viewed 12/7/2011

Organization Name:												Important - please provide quantities		
Project Number	*Project Name/ID*	*Stream/Watershed*	*Install dates*	*Project Life Expectancy*	*Estimated Benefit (e.g. reduced erosion 10,000 tons)*	*Total Project Cost*	*Partners*	*Funding Source 1 (Name)*	*Funding Source 2 (Name)*	*Funding Source 3 (Name)*	*Funding Source 4 (Name)*	*Description of Work (e.g. X acres riparian planting, Y feet of fencing, etc.)*	*Longitude - Decimal Degrees (5 decimal places if possible)*	*Latitude - Decimal Degrees (5 decimal places if possible)*
1	CURB	Butcher	09-Feb-13	10 years		$688.42	WWCCD/ Kooskooskie Commons	DOE				1440 square feet of riparian planting	-118.33083	46.07552
2	CURB	Garrison	15-Jun-13	10 years		$718.69	WWCCD/ Kooskooskie Commons	DOE				3000 square feet of riparian planting	-118.312547	46.063107
3	CURB	Stone	10-May-13	10 years		$1,257.60	WWCCD/ Kooskooskie Commons	DOE				8100 square feet of riparian planting	-118.322316	46.052266
4	CURB	Caldwell	09-Feb-13	10 years		$1,187.97	WWCCD/ Kooskooskie Commons	DOE				4025 square feet of riparian planting	-118.323371	46.037520
5	CURB	Yellowhawk	22-Mar-13	10 years		$22,487.50	WWCCD/ Kooskooskie Commons	DOE				70000 square feet of riparian planting	-118.320309	46.043312
6	CURB	Garrison	27-Mar-13	10 years		$15,234.74	WWCCD/ Kooskooskie Commons	DOE				26250 square feet of riparian planting	-118.302834	46.065423
7	CURB	Garrison	15-May-13	10 years		$2,418.72	WWCCD/ Kooskooskie Commons	DOE				2900 square feet of riparian planting	-118.302391	46.065506
8	CURB	Bryant	31-Oct-13	10 years		$2,396.67	WWCCD/ Kooskooskie Commons	DOE				8750 square feet of riparian planting	-118.327342	46.060864
9	CURB	Russell	22-Nov-13	10 years		$944.93	WWCCD/ Kooskooskie Commons	DOE				1750 square feet of riparian planting	-118.299312	46.046395
10	CURB	Garrison	19-Oct-13	10 years		$422.17	WWCCD/ Kooskooskie Commons	DOE				900 square feet of riparian planting	-118.324338	46.057331
11	CURB	Garrison	25-Nov-13	10 years		$4,766.30	WWCCD/ Kooskooskie Commons	DOE				19250 square feet of riparian planting	-118.362583	46.0464
12	CURB	Caldwell	25-Oct-13	10 years		$1,255.03	WWCCD/ Kooskooskie Commons	DOE				24000 square feet of riparian planting	-118.321554	46.037694
13	CURB	Garrison	23-Oct-13	10 years		$1,155.11	WWCCD/ Kooskooskie Commons	DOE				3400 square feet of riparian planting	-118.324278	46.057537
14	CURB	Garrison	12-Sep-13	10 years		$965.15	WWCCD/ Kooskooskie Commons	DOE				1680 square feet of riparian planting	-118.298883	46.06645
15	CURB	Garrison	06-Sep-13	10 years		$3,267.25	WWCCD/ Kooskooskie Commons	DOE				4375 square feet of riparian planting	-118.298534	46.066264
16	CURB	Lincoln	15-Nov-13	10 years		$2,163.24	WWCCD/ Kooskooskie Commons	DOE				6000 square feet of riparian planting	-118.331532	46.063621
17	CURB	Garrison	07-Jun-13	10 years		$3,210.24	WWCCD/ Kooskooskie Commons	DOE				1050 square feet of riparian planting	-118.32429	46.055891
18	CURB	Lincoln	14-Oct-13	10 years		$800.69	WWCCD/ Kooskooskie Commons	DOE				1125 square feet of riparian planting	-118.332137	46.063295
19	CURB	Garrison	02-May-13	10 years		$1,722.08	WWCCD/ Kooskooskie Commons	DOE				10150 square feet of riparian planting	-118.337145	46.055613
20	CURB	Russell	18-Oct-13	10 years		$3,940.03	WWCCD/ Kooskooskie Commons	DOE				11550 square feet of riparian planting	-118.304905	46.042006
21	CURB	Stone	09-Feb-13	10 years		$644.33	WWCCD/ Kooskooskie Commons	DOE				3000 square feet of riparian planting	-118.32248	46.05317
22	CURB	Garrison	18-Feb-13	10 years		$510.52	WWCCD/ Kooskooskie Commons	DOE				950 square feet of riparian planting	-118.38492	46.03988
23														
24														
25														
26														
27														
28														
29														
30														

From: Judy Blanco [jblanco@forterra.org]
Sent: Wednesday, April 30, 2014 5:35 PM
To: RCO MI Policy Changes (RCO)
Cc: Hayes Swinney; Timothy J Farrell; Holtz, Cyndy
Subject: SRFB riparian guideline comments

Attn: Salmon Recovery Funding Board

Please find Forterra's response to the minimum buffer width guidelines being considered for the Salmon Recovery Grant Program in the requested question/answer format below.

Thank you for the opportunity to offer comments on how these changes may affect our riparian restoration projects. We'll look forward to the results of the board's decision on this matter after the public meeting on June 4th.

Question 1 - Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide?

No. Forterra plays a key role in a collaborative riparian restoration effort on the Cedar River in King County called Stewardship-in-Action. SiA partners include Seattle Public Utilities, Forterra, King County Noxious Weed Control Program, and Friends of the Cedar River Watershed. SiA has been restoring riparian habitat on the Cedar River since 2007. SiA's focus is eradication of knotweed and other invasive, non-native plants in the riparian zone, and re-establishment of riparian native plant communities. Since 2007 SiA has reduced the area of knotweed infestation on the Cedar River to 20% of its 2007 footprint. SiA works with private landowners to systematically control knotweed and remove other pervasive, invasive plant species. We then restore their river shorelines with native plants, working one-on-one with each family to address their concerns about aesthetics, views, plant species and maintenance, while providing much needed riparian habitat and species benefit. The SiA approach with individual landowners hinges on the ability to have flexibility in terms of riparian buffer widths and restoration design.

The proposed riparian buffer guidelines may require a minimum buffer width of 100' for these private property plantings. Of the many projects planted on private property thus far, none has been as wide as 100', and in many cases, entire property depths do not reach 100'. It is unlikely that our programs would be able to recruit landowners if the minimum planting width requirement is increased to 100'.

Question 2 - What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?

As outlined in Question 1, the minimum buffer widths may not be feasible on the majority of private properties on which we work, as well as along most urban and suburban rivers and streams in the region. On the Cedar River, we work with up to 380 private landowners on a system that is a mix of private and public ownership along 16 river miles. Our programs use an upstream-to-downstream approach so that invasive plants such as knotweed are controlled in a systematic, contiguous pattern. Our planting projects follow a similar logic; that contiguous riparian buffers of varying widths have a bigger impact on natural stream dynamics and habitat than isolated forested parcels of a standardized width would.

In addition, SiA currently fills programmatic gaps in salmon recovery restoration actions by addressing degraded habitat conditions on private property. A 2011 King County WRIA 8 Land Cover Change Analysis finds that despite comprehensive planning and regulations, including Critical Areas Ordinances and Shoreline Master Programs, key areas continue to decline in both area and function (Vanderhoof et al. 2011). The analysis finds that forest cover loss and increased impervious surfaces are the result of small actions by private landowners in sensitive ecological areas. The study suggests targeted stewardship of stream areas on private properties as part of a larger strategy to protect riparian areas. SiA's riparian restoration program has been providing such targeted outreach and focused collaboration with landowners since 2009. This model is needed on additional degraded rivers and streams where continuous buffer widths of 100 feet are not feasible.

SiA relies wholly on grant funding. As a guideline, minimum riparian buffer widths may make all of our planting projects ineligible for funding; it might make us less competitive for funding; or it may put an undue burden on the partnership to gain exceptions for each planting project. Given the success of the program on the Cedar River, this change would represent a significant lost opportunity to improve salmon habitat along our region's rivers and streams.

We concur that wider riparian buffers where possible provides greater habitat function, however, the proposed guidelines may undermine restoration projects that can have a significant impact on degraded riparian habitat in areas where minimal buffer widths are not available due to development, particularly for fish-bearing streams and rivers in urban and suburban areas. On the Cedar River these smaller buffer projects are the pieces that connect the large, publically held natural areas. The contiguity of riparian cover overall is a priority of the SiA partnership.

Question 3 - What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board?

SiA is successful in enrolling private property owners in riparian stewardship projects because we offer a voluntary, non-regulatory program with a flexible, collaborative approach. Forterra staff works closely with landowners to generate a restoration plan that engages them in the stewardship process and that provides benefit to the resource. In addition, Forterra becomes a trusted technical advisor for landowners on the continued stewardship of their riverfront properties. These non-monetary incentives work because Forterra can professionally control knotweed and other invasive plants and install native plants without imposing on property rights or privacy. In return, the project is accomplished efficiently and effectively, and maintained over the long term. Continuing to fund projects in buffers of less than 100-foot width, when combined with Forterra's approach, is in itself a significant incentive for landowners.

Question 4 - Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the board encourage such prioritization at the local, regional or state level?

No. Since large-scale floodplain reconnection projects and other publically-owned natural area restoration sites already include comprehensive reforestation components, the proposed guidelines would only affect projects that restore riparian zones with built-in buffer constraints, such as those properties adjacent to roads or adjacent to structures on private property. As grant funding opportunities for riparian habitat projects become more competitive, successful programs such as ours would lose ground were the board to encourage prioritizing projects that meet the guidelines.

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Leslie Connelly
Natural Resource Policy Specialist
WA Recreation and Conservation Office
1111 Washington St SE
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Olympia, WA 98504-0917

Subject: Comments on Proposed Changes to the SRFB Riparian Guidelines

Dear Ms. Connelly:

The Washington Forest Protection Association (WFPA) appreciates the opportunity to comment on the Salmon Recovery Funding Board's (Board) proposed changes to the Salmon Recovery Grant Program. WFPA is a forestry trade association representing large and small forest landowners and managers of nearly 4 million acres of productive working timberland located in the coastal and inland regions of the state. Our members support rural and urban communities through the sustainable growth and harvest of timber and other forest products for U. S. and international markets. Several WFPA members participate in your grant programs. For more information about WFPA, please visit our website at http://www.wfpa.org/.

As outlined below, WFPA respectfully requests that if minimum buffer guidelines are established as outlined in your April 2014 proposal, that buffer regimes under Habitat Conservation Plans (HCPs) be incorporated into your minimum guidelines and accordingly considered for priority funding.

The Board is considering whether to implement guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat. This proposal reflects the NOAA Fisheries Interim Riparian Buffer Recommendations for Streams in Puget Sound Agricultural Landscapes (December 2013). The Board has also asked for feedback on appropriate deviations from the guidelines and whether projects with minimum buffers should be elevated for priority funding. The Board's public notice for comment explains: "Riparian projects are projects implemented above the ordinary high water mark and within the floodplain of streams that improve the environmental conditions necessary to sustain salmonids throughout their life cycle. The proposed guidelines under consideration would be applied to riparian projects that include riparian planting as a primary habitat objective. The guidelines would not apply to projects that conduct plantings to mitigate for construction impacts at other projects such as levee setbacks, fish passages or in-stream improvements."

While we appreciate the desire for buffer standardization, the proposed NOAA guidelines were developed for agricultural land uses; agricultural land uses are regulated under a very different system than forest land. Although the proposed minimum buffers are guidelines, the Board may choose to give higher priority to projects which utilize these buffers, effectively rendering them as baseline requirements for projects. Due to the limited funding for salmon recovery projects, projects that don't meet these guidelines may not receive appropriate consideration.

Washington State landowners have a long history of developing collaborative, science-based programs leading to HCPs approved under the federal Endangered Species Act. Major components of these HCPs deal with riparian functions and buffering requirements. Our major concern with the Board's proposal is that it does not recognize the considerable effort, investment, and success of the buffering systems embedded in HCPs developed by public and private landowners. Nor does it recognize the reality that NOAA Fisheries and the US Fish & Wildlife Services have already approved these HCP riparian buffering systems. If the Board adopts minimum buffer guidelines, WFPA believes that the guidelines should incorporate the riparian buffer systems developed in federally-approved HCPs.

For example, the 1999 Washington Forests & Fish Law was developed in collaboration with federal, state, tribal, and county governments and private forest landowners. In 2001, the Washington Forest Practices Board adopted new permanent forest practice rules to address impacts to aquatic species on all private forest lands not covered under an existing HCP and Washington Department of Natural Resources lands east of the Cascade Crest. Representatives from each collaborating partner worked together for 18 months to make changes to the forest practices rules to protect clean water and riparian habitat on non-federal forestland in Washington State. Regulatory changes were made to improve forest roads and culverts, enlarge buffer zones along stream banks, and identify and protect unstable slopes. An Adaptive Management monitoring program has also been put into place to review the effectiveness of the new rules. As one of the most comprehensive pieces of state environmental legislation in the U.S., the Forests & Fish Law and accompanying regulations are designed to fully comply with both the federal Endangered Species Act (ESA) and the Clean Water Act (CWA) to protect Washington's native fish and aquatic species and assure clean water compliance. In 2006, the Forests & Fish Law was endorsed by the federal government through a statewide Forest Practices Habitat Conservation Plan.

Similarly, other private and state forest landowners have made considerable investments in HCPs to protect riparian functions. Among these landowners are: the Green Diamond Resources Company, the West Fork Timber Company, the Plum Creek Timber Company, Port Blakely Tree Farms, and the Washington State Department of Natural Resources.

Requiring a new and different set of buffer requirements for forest-based salmon recovery projects may create a disincentive for forest landowners to participate with Tribes, non-profit groups and other partners in applying for Salmon Recovery Board grants for riparian habitat restoration. The track record of Washington's forest landowners in recovering and restoring habitat is truly impressive. State and private landowners have opened up 3288 stream miles of habitat, repaired 5142 barriers and abandoned/restored over 5000 miles of roads. In fact, the Board's own grant program currently recognizes the contribution of the Forest Practices HCP by explicitly identifying the conditions under which forest landowners can receive funding for road maintenance and abandonment plans.

Allowing forest landowners to participate in projects using existing, federally-approved buffer regimes enhances salmon recovery efforts and incentivizes the use of HCPs to protect salmon. An

more

explicit recognition of the protections afforded by these plans may encourage other landowners to invest in HCP conservation programs.

Acknowledgement of these HCPs also supports key elements of the Board's Strategic Plan:

- Assured funding of the best possible salmon recovery activities and projects which integrate science, community values and priorities, and coordination of efforts.
- Forest land projects are accountable, effective projects which result in the economical and efficient use of state and private resources.
- Forest land collaboration helps to build public understanding, acceptance, and support of all of our salmon recovery efforts.

Our request could be achieved by limiting the proposed table to projects located on non-forested streams, or specifically referencing the buffer requirements in federally-approved HCP's as the minimum buffer requirement for affected forest lands.

In summary, the benefits of allowing forest landowners to use current buffers included in HCPs support collaborative, scientifically-based salmon recovery and strong community partnerships. Again, thank you for the opportunity to comment. Please let me know if you have any questions.

Sincerely,

Karen Terwilleger
Senior Director of Forest and Environmental Policy

From: Larry Hooker [lhooker@my180.net]
Sent: Thursday, April 24, 2014 1:20 PM
To: RCO MI Policy Changes (RCO)
Cc: RickJ; SteveM; Jeff Klundt
Subject: SRFB Riparian Guideline Comments

As one of the Co-Leads of the Snake River Salmon Recovery Board, the Walla Walla County Conservation District is well aware of, and supportive of the Snake River Salmon Recovery Board's position regarding proposed riparian guideline changes. In our opinion, the current buffer program as it now exists in Eastern WA is working very well, thank you. It has always been locally led and voluntary with great support from all our conservation partners. The riparian forest buffer program has been referred to as the "cornerstone" of fish habitat restoration efforts in our region. It is incentive based and extremely successful. This is illustrated by the fact that Walla Walla County has almost 25% of the riparian forest buffers in the State of Washington.

We have a very real fear that making buffer guidelines more restrictive will essentially kill this highly successful program. Further, if federal and/or state funding hinges upon whether or not a landowner has or will install buffers meeting new guidelines, not only will there be far fewer buffers implemented but we believe it will also result in far fewer salmon recovery projects implemented as well. Most landowners want to do the "right thing" with their land bordering streams. However, they do not implement conservation practices out of the goodness of their hearts. Most of our rural landowners make a living off these "working lands" and have a right to expect some benefits from the practices they implement. These may be monetary, environmental or (in some cases) aesthetic. Current programs provide these benefits at various levels and have the flexibility built into them that allow projects to meet landowner objectives and respect their property rights.

Falling back to a top down driven "one size fits all" mentality that is regulation based is a step backwards to policies have that failed miserably time and again.

Larry L. Hooker

Agricultural Projects Coordinator
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Regional Fisheries Enhancement Groups Coalition

Supporting and advocating for the RFEGs missions to protect, restore and enhance the salmonid resources of Washington State

April 30, 2014

To: The Salmon Recovery Funding Board

Re: SRFB riparian guideline comments

Thank you for the opportunity to submit comments regarding the proposal to implement guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat.

The Regional Fisheries Enhancement Group Coalition (RFEGC) has been closely following the process. Given the diversity of projects within each RFEG region, our members are responding to the request for comment individually rather than collectively.

As key stakeholders and recipients of SRFB grant funding, we appreciate the time and effort you have committed to carefully reviewing the proposal. Please do not hesitate to contact us if you have questions or if we may offer our assistance in any way.

Sincerely,

Larry Zalaznik

Larry Zalaznik
Board President
lzalaznik@charter.net

Colleen Thompson
Managing Director
Colleen.thompson278@gmail.com

April 30, 2014

SRFB riparian guideline comments

<u>Question 1 - Response</u>

There should be expectations for a reasonable exchange between project funding and project results. Standards should be established, in guidelines, which create an understanding between and among parties-to these 'agreements', and these guidelines should be structured to accommodate and accomplish the intended outcome of habitat projects for targeted species across the State.

The proposed minimum riparian buffer width guidelines, for riparian habitat projects presented, are presumed to be established, by input from those trained-in and experienced-with understanding what minimum standards are required for the success of projects and targeted species related to this particular intention.

Regarding the interpretation of particular wording used in Table 1, as may be compared to practical use: a named, local stream, currently and historically supporting anadromous species, which, overtime, were reduced to one species, not currently "listed". This creek is otherwise referred to as "a drainage", which may seem to reduce this stream's status, except to those wild salmon surviving because of its existence. The need for intermittently dependable water should not be underestimated. Thank you for those considerations on this Table.

<u>Question 2 - Response</u>

Projects are presumed to be designed to accommodate the improvement of habitat for the lives of salmonids. If a smaller riparian habitat buffer is required, due to unchangeable obstructions, in an area currently valuable to salmon, or certain to be valuable to salmon in the reality of "current", then it should be considered by the technical review panel, with recommendation to the board, for additional consideration. However, the strength of guidelines should not be diminished by what may become a myriad of exceptions to proven standards.

The examples of "constraints" identified in the "Proposed Changes" seem reasonable and others may also be included. However, it would seem that if there is a decision of "project of concern" by the technical review panel, it would include the knowledge of prior "projects of concern" related to their outcome for salmon and habitat use with smaller buffers, and whether those were successful.

<u>Question 3 - Response</u>

Are there examples, of other funding, identifying which of these conservation incentives have proven to be most effective? If they are all presumed equally effective, then the conservation incentive types identified should be offered, as they are applicable, to landowners, who allow salmon recovery projects on their property; and be eligible for salmon recovery funding through the SRFB. "Recognition" should be a consideration for each property owner willing to share in such important salmon recovery efforts, unless they otherwise request not to be acknowledged. Are there examples of unintended 'misuse' of funding opportunities, such as; uncompleted or unfeasible projects? When are these incentives offered, or come-to-fruition, during the project grant program?

__Question 4 - Response__

If the question is asking to prioritize riparian habitat projects above all other habitat project types, does that apply to acquisition and restoration equally for determination by the Statutory Criteria? And even so; if the question is limited to a riparian project priority; then it seems, that act, limits the prospect of all other habitat projects, which may be of equal value, as determined by the statutory criteria. Are there project types now, anywhere, being prioritized above all other project types, where there are more than one applicable type, in guidelines or otherwise? Have those types been proven to be more successful to the restoration of habitat and salmon across all regions? This prioritization may seem too prejudiced, in favor of certain sponsorship or certain regional areas. Perhaps, this change is an attempt to offer areas with only riparian habitat projects, an equal chance for project funding; but that, should not be done in this way. The effort within the funding process is great enough, for projects to continue year after year, hoping to surface for funding, without additional obstacles. Establishing this prioritization may tend to eliminate subsequent project phases, and set trends for the 'choice' of riparian habitat projects, by sponsors. Perhaps, this would become an unintended limiting factor to the desired outcome for salmon and habitat.

__Strategic Plan Link__

Is this a blanket statement for all considerations of the board, or has it been crafted for this subject alone? It seems the policy statement: "changes reflect the opportunity to make policy improvements" implies that there are no "no" answers to these questions. I hope, that I have stayed within responses, as directly related to the questions, as I can attempt to achieve.

Thank you, for this opportunity to comment, on these important issues.

Respectfully,
Margo DeVries

From: Mark Indrebo [mindrebo@gmail.com]
Sent: Wednesday, April 30, 2014 10:52 AM
To: RCO MI Policy Changes (RCO)
Cc: Kevin Lee
Subject: General comments on proposed changes to buffer widths

As the former program manager for an RFEG, I appreciate RCO's efforts to encourage greater buffer widths for streams. Buffers are extremely valuable for habitat, and encouraging buffers that capture the maximum habitat benefit should always be encouraged.

However, I am concerned that these new guidelines will end up making the perfect become the enemy of the good. In agricultural areas, where many of the potential restoration projects are, it is likely that most projects will be unable to achieve the buffer widths outlined in the new guidelines. There are simply too many barriers to achieving full buffer widths, whether it be the landowner's economic needs and reluctance to set aside that much land for habitat, or deed restrictions that require land to remain in production, or local regulations aimed at preserving farmland. The new guidelines, while well-intentioned, will end up putting most restoration projects into a category where they will face higher scrutiny, creating more work for the project sponsor and increasing the potential for a project to fail to be implemented. There are already too many hindrances to project implementation, which is why most salmon recovery plans are behind schedule on their restoration goals. These new guidelines would simply add another obstacle to habitat restoration.

Under the new guidelines, a project with less-than-ideal buffers will automatically be classified as a Project Of Concern unless the project proponent can convince the Review Panel that it should not be. According to Manual 18, a Project of Concern is one that provides low habitat value or low certainty of success. Having a smaller-than-ideal buffer does not mean that a project has a low habitat value or a low certainty of success. Indeed, I suspect that most successful SRFB-funded projects to date have included buffers smaller than those set in the new guidelines. A 50 to 75 foot buffer is better than no buffer at all, and, especially on smaller streams can be extremely valuable.

As I understand it, the Salmon Recovery Funding Board was created to enable local organizations to restore salmon habitat in a way that works in their community, rather than having a centralized State or Federal organization impose recovery actions. These new guidelines will erode the ability to develop local solutions. Local organizations spend dozens or even hundreds of hours over a period of one to several years negotiating, bargaining, and pleading with landowners, local governments, diking districts, farm boards, conservation commissions, or any number of local stakeholders to find ways to create a stream buffer that everyone can support. They work hard at understanding the community needs, building trusting relationships with the stakeholders, and finding consensus on the proposed project and its buffers.

By comparison, the Review Panel has very little communication with the local community. They will review a short summary, and maybe one or two members will visit a site for 20 minutes. There is simply no way they can make a truly informed decision without having been party to those preceding negotiations, discussions, and relationship-building. The Review Panel either needs to be more involved in the local process, or they need to trust that the local groups who have participated in all the discussions have done all that they can do to maximize buffer widths.

I would suggest that the proposed guidelines be revised to allow the review panel to classify smaller-buffer projects as POC's only when there is clear evidence that the project, as a whole, has low habitat value or a low certainty of success. The size of the buffer should only be one factor in the determination, and should not, in itself, be sufficient grounds to classify a project as a POC. I would also suggest that if the Review Panel classifies a project as a POC based on buffer width, they should be prepared to meet with the sponsor and the stakeholders involved with the project in order to get a better understanding of why the buffer being proposed is smaller than ideal. This would help bridge the gap between the local community and the Review Panel, and help ensure that the recovery process is focused on local communities, as intended.

Sincerely,

Mark Indrebo

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April 30, 2014

David Troutt, Chair
Salmon Recovery Funding Board
C/O WA Recreation and Conservation Office
1111 Washington St SE
PO Box 40917
Olympia, WA 98504-0917

RE: Salmon Recovery Funding Board Riparian Guidelines Comments

Dear Mr. Troutt:

Thank you for the opportunity to comment on the Salmon Recovery Funding Board's (SRFB) proposal to adopt minimum riparian buffer guidelines. King County's Water and Land Resources (WLR) Division has worked tirelessly to protect and restore watershed conditions towards the goal of recovering thriving populations of salmon. Since 1999, the WLR Division has received over 60 SRFB grants totaling over $20 million. These grants, combined with other matching funding, have resulted in over 1,000 acres of habitat protected and over 200 acres of habitat restored within King County. Together we are making progress, although much work remains to be done.

We support the science behind NOAA National Marine Fisheries Service's guidance for larger buffer sizes. Large forested buffers are necessary for the floodplain processes to occur that allow instream and riparian salmon habitat to form naturally. We also recognize the importance of tribal concerns regarding habitat protection and tribal treaty rights.

However, we do not support the Board adopting minimum riparian buffer guidelines requiring 100 foot buffers on fish bearing streams because it will result in less acres of habitat being protected and restored. Our experience is that requiring larger buffer widths will mean that fewer private property owners will partner on habitat projects. If adopted, these guidelines will have the unintended consequence of reducing the amount of riparian buffers being planted, particularly in agricultural areas. Please see the analysis done by WLR Division on the implications of the federal buffer guidelines being applied to the Department of Ecology's grant programs. Many of the findings from this analysis apply to the current proposal being considered by the SRFB.

Many private landowners are not willing or able to plant 100-foot buffers on fish bearing streams due to the loss of property for other uses. Our experience working with landowners in agricultural areas over the last ten years is that they are willing to plant at most 35-50 foot buffers. Even with the incentives described in Question #3, the riparian guidelines as proposed will reduce the number of private property owners willing to partner on salmon restoration projects on their property. As the Recreation and Conservation Office (RCO) staff analysis shows, in many cases, SRFB projects include riparian buffers as secondary elements to other restoration projects such as fish barrier removals or levee setbacks, so these new guidelines could threaten other very beneficial habitat projects by reducing private property owner's willingness to partner on SRFB projects.

If the proposed SRFB buffer guidelines are applied to all land uses in Puget Sound, there are big implications for the more urbanized parts of Puget Sound as well. Large buffers will be very difficult to achieve in the urban and suburban portions of King County's watersheds which provide critical migratory and rearing areas for salmon. We recommend that any buffer guidance for SRFB projects provide the flexibility to consider site conditions, the purpose of the buffer, the landowner's objectives, and other local government mandates under the Growth Management Act, such as protecting agricultural production areas and concentrating growth in urban areas.

The RCO staff recommended option gives project sponsors the chance to argue their case that a project with smaller buffers still meets salmon recovery goals and to describe the constraints that prevent the application of larger buffers. We appreciate the attempt to provide flexibility in the proposed guidelines, but without clear criteria for how this flexibility would be applied, the uncertainty for project sponsors would result in significantly fewer applications. The existing local and state SRFB review process is very thorough and sufficient to ensure that only habitat projects that meet their salmon recovery objectives will be funded through the SRFB.

The Board requested analysis of the potential implications of minimum riparian buffer widths on projects funded by the SRFB. However, by only looking at fiscal year 2014 projects, the analysis is too limited in its scope and potentially understates the effect of this policy on SRFB-funded projects. King County encourages the Board to consider a broader analysis of SRFB-funded projects to more fully understand the potential impacts of the proposed buffer policy before considering any changes to its policy on buffers.

Thank you for the Board's excellent work for salmon recovery in Washington State. We appreciate our on-going partnership with the SRFB to get good habitat projects on the ground. If you have any questions regarding these comments, please contact me at (206) 477-4601 or Jean White at (206) 477-4846.

Sincerely,

Mark Isaacson
Director, King County Water and Land Resources Division

cc: Kaleen Cottingham, Director, RCO
Leslie Ryan-Connelly, RCO
Jean White, King County WLR

Impacts of new buffer requirements

New buffer requirements imposed by the EPA and NOAA will set back important habitat restoration work in King County. The large buffer requirements of 100 feet (or greater) imposed by the Department of Ecology on Centennial Clean Water and Section 319 grants will significantly reduce King County's ability to work with property owners on voluntary restoration projects. King County has evaluated the impact assuming that over the last ten years, 26 property owners would not have participated in habitat projects; over 50 acres of restored habitat along over 20 miles of rivers and streams that have an average of 30-35 foot buffers would not have been built. The new requirement if imposed on past projects are assumed to have not happened because of the significant loss of agricultural lands. The following table summarizes the projects that were completed.

Restoration Entity	Ecology Funding	Match	Total Funding	Number of Landowners	Typical Buffer Size	Riparian Acres Planted
Sound Salmon Solutions	$109,000	$36,437	$145,437	1	35 ft.	6
Stewardship Partners	$249,999	$83,333	$333,332	10	35 ft.	18.8
King County	$650,000	$359,000	$1,009,000	15	30 ft.	26.5
Totals	**$1,008,999**	**$478,770**	**$1,487,769**	**26**	**30-35 ft.**	**51.3**

Over the last decade, most of King County's Water and Land Resources (WLR) Division work with private property owners on riparian buffers has been focused on the lower Snoqualmie River basin and Newaukum in the Green River basin. These areas are primarily agricultural areas where the streams and the mainstem often lack adequate shade and suffer from higher temperatures, low dissolved oxygen and elevated fecal counts. Water bodies in both basins are listed as impaired under the 303d for temperature, dissolved oxygen and fecal coliform. With the help of Ecology grants, the WLR Division has been successful in partnering with landowners and nonprofit organizations (NGOs) to repair riparian buffers to improve water quality and habitat.

Property owners in agricultural areas are generally willing to consider buffers ranging from 20-35 feet on streams and 40-60 feet on a mainstem river, but not more. None of the work done to date by the WLR Division and its partners through Ecology funded grants would qualify for funding under the new guidelines due to the smaller size of these voluntary buffers.

On the lower Snoqualmie floodplain over the last decade, King County has partnered with NGOs. The attached "Farmers Acting for Fish Map" is an overview of cooperative efforts to improve riparian buffers in the Snoqualmie Valley in partnership with Stewardship Partners, Sound Salmon Solutions and others to work with landowners to voluntarily plant riparian areas (attachment one). This work resulted in over 15 miles of river and streams planted with buffers ranging from 20-35 feet on streams and 40-60 feet on the mainstem river. It is important to note that an additional 3.5 miles of plantings on three properties in the Snoqualmie basin have included larger buffers (150-180 feet) cost-shared through the Conservation Reserve and Enhancement Program (CREP). CREP offers substantial funding for the plantings and provides participating property owners with rental income for ten years for the land encumbered by the buffers. Nevertheless, to date only three landowners have enrolled in CREP with the larger buffers in the Snoqualmie Valley.

Over the last eight years, the WLR Division partnered with 20 property owners on Newaukum Creek planting buffers ranging from 25-35 feet for an estimated 5.56 miles planted. The attached "Newaukum Creek Revegetation map" depicts private landowners voluntarily restoring habitat and improving water quality in purple (attachment two). These buffers can grow quickly providing shade, reducing stream temperatures and other water quality benefits. The attached Newaukum Creek planting photos depict the quality of voluntary buffers that are achievable to restore waterways (attachment three).

Impact on Agriculture

The potential impact of 100 to 150 foot buffers could remove farming as an economic activity in the County. It would severely restrict agricultural viability due to the relatively small size of the parcels, configuration, and the number of streams and modified ditches that exist in the agricultural areas. One hundred foot buffers on fish bearing streams and waterways would take approximately 1,830 acres (13%) of currently farmed land in the Snoqualmie Agricultural Production District out of production. One hundred and fifty foot buffers could encumber another 1,000 acres in agricultural production, for a total of 20% of the Snoqualmie Agricultural Production District.

King County has a long history of protecting agricultural resource lands through both the zoning designation of Agricultural Production Districts and through its Farm Land Preservation Program (FPP) where it purchases restrictive covenants. More recently King County has expanded the Transfer of Development Rights Program to include agricultural lands. A strong agriculture in King County helps protect rural lands from development pressure and helps address the impending impacts from climate change. Sustainable agricultural practices such as what we see practiced extensively in the Snoqualmie Valley sequester carbon and will help this region have some food security as climate impacts become more pronounced. The county Executive has just announced a new food policy initiative aimed at helping to restore and strengthen our agriculture economy. If implemented, these buffer requirements run contrary to a strong agricultural sector with reasonable habitat enhancements.

Washington DFW Approved Agricultural Drainage Program

To sustain agricultural productivity, many waterways that cross farmlands in King County require periodic maintenance such as sediment removal and beaver dam modification, which can impact salmon and their habitat. The WLR Division worked with regulatory agencies to standardize requirements and best management practices (BMPs) that minimize harm to salmon and habitat while allowing maintenance of agricultural waterways.

The goal for the Agricultural Drainage Assistance Program (ADAP) is to protect water quality and fish habitat while streamlining regulatory requirements, reducing county costs, and adequately draining fields for farming. Maintenance projects may include removal of accumulated sediment and noxious or invasive vegetation that encroaches into and chokes waterways or field drain tiles, and may also include culvert replacement or beaver dam removal.

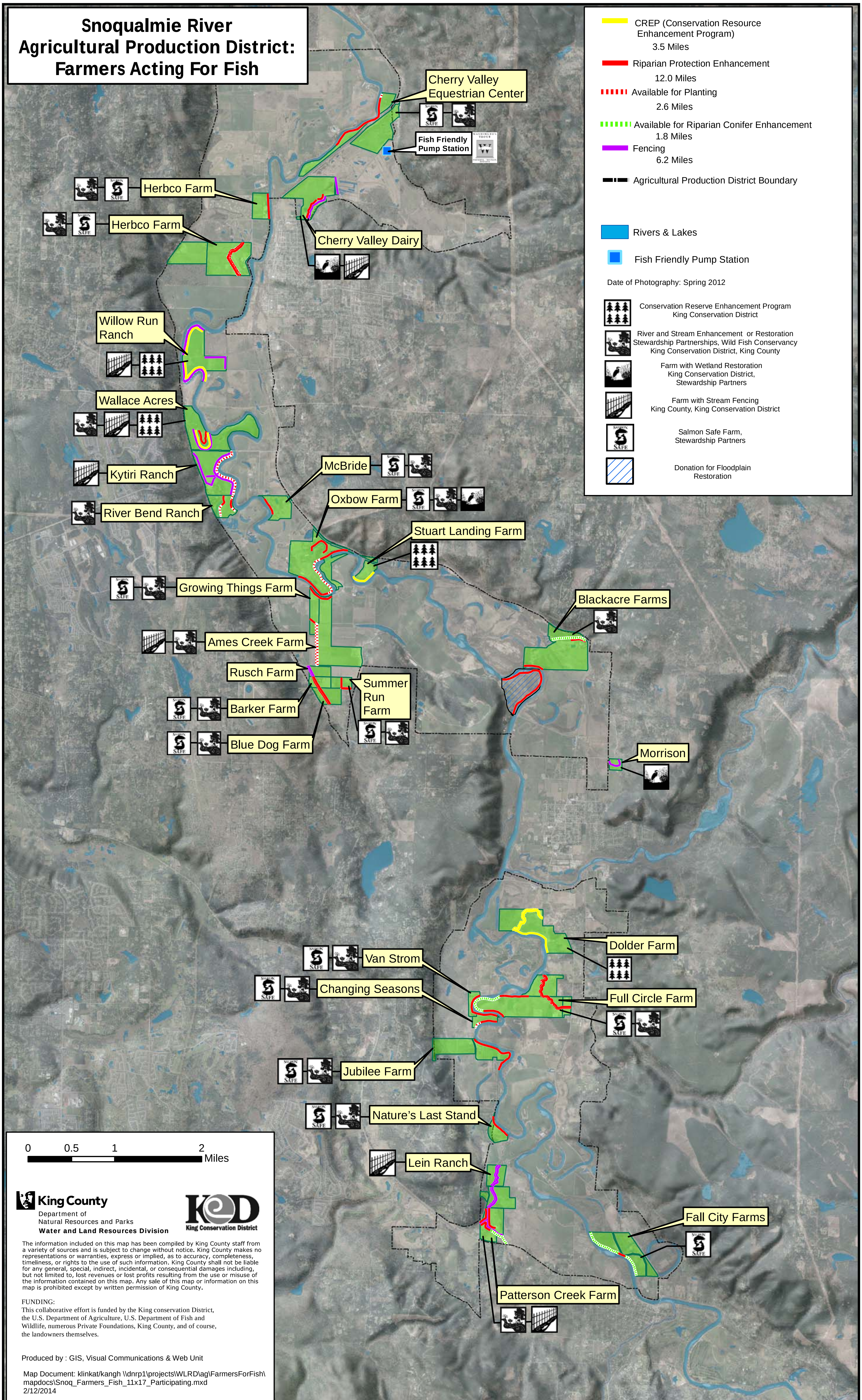
To determine appropriate BMPs to maintain agricultural drainage, the WLR Division developed a waterway classification system that uses the state's hydraulic code channel designations (natural, modified, and artificial) as well as known or expected presence of salmon (high, moderate, low) based on our best available scientific information. BMPs cover the time of year for the project, sediment and erosion control, fish relocation out of the construction area, and planting requirements in buffers ranging from three to ten feet.

The ADAP can be used in modified streams and artificial ditches. (Natural streams, which have not been straightened and have had minimal alterations, are outside the scope of ADAP and require an individual permit review.) The expected presence of salmonids during construction is based on a variety of information including the known presence or absence of salmonids, known fish passage barriers, the quantity of water known or expected to be present during construction, documented temperature measurements of the water present during construction, the size of the upstream contributing drainage basin, and the geologic characteristics of the waterway. The classification system was developed for the typical agricultural maintenance time period, July through September, and does not attempt to classify winter use of these waterways.

ADAP requirements and BMPs were reviewed by regulatory agencies and the public through the State Environmental Policy Act process. The Washington Department of Fish and Wildlife (WDFW) signed a letter of agreement with King County on the ADAP requirements and BMPs. The Washington Department of Ecology, WDFW, the King County Department of Permitting and Environmental Review all participated in the regulatory negotiations, field investigations, and provided input into the waterways classification system and BMPs. We presented the waterway classification system in detail to US Army Corps of Engineers; National Marine Fisheries Service; and Muckleshoot, Tulalip, Puyallup, and Snoqualmie tribal staffs. We did not receive requested changes from anyone not directly involved in negotiations.

Finally, ADAP was included in the King County Programmatic Assessment and Compliance for flood plain management. FEMA determined that the ADAP program met or exceeded the performance standards of the Biological Opinion on the National Flood Insurance Program.

Snoqualmie River Agricultural Production District: Farmers Acting For Fish



King County
Department of
Natural Resources and Parks
Water and Land Resources Division

King Conservation District

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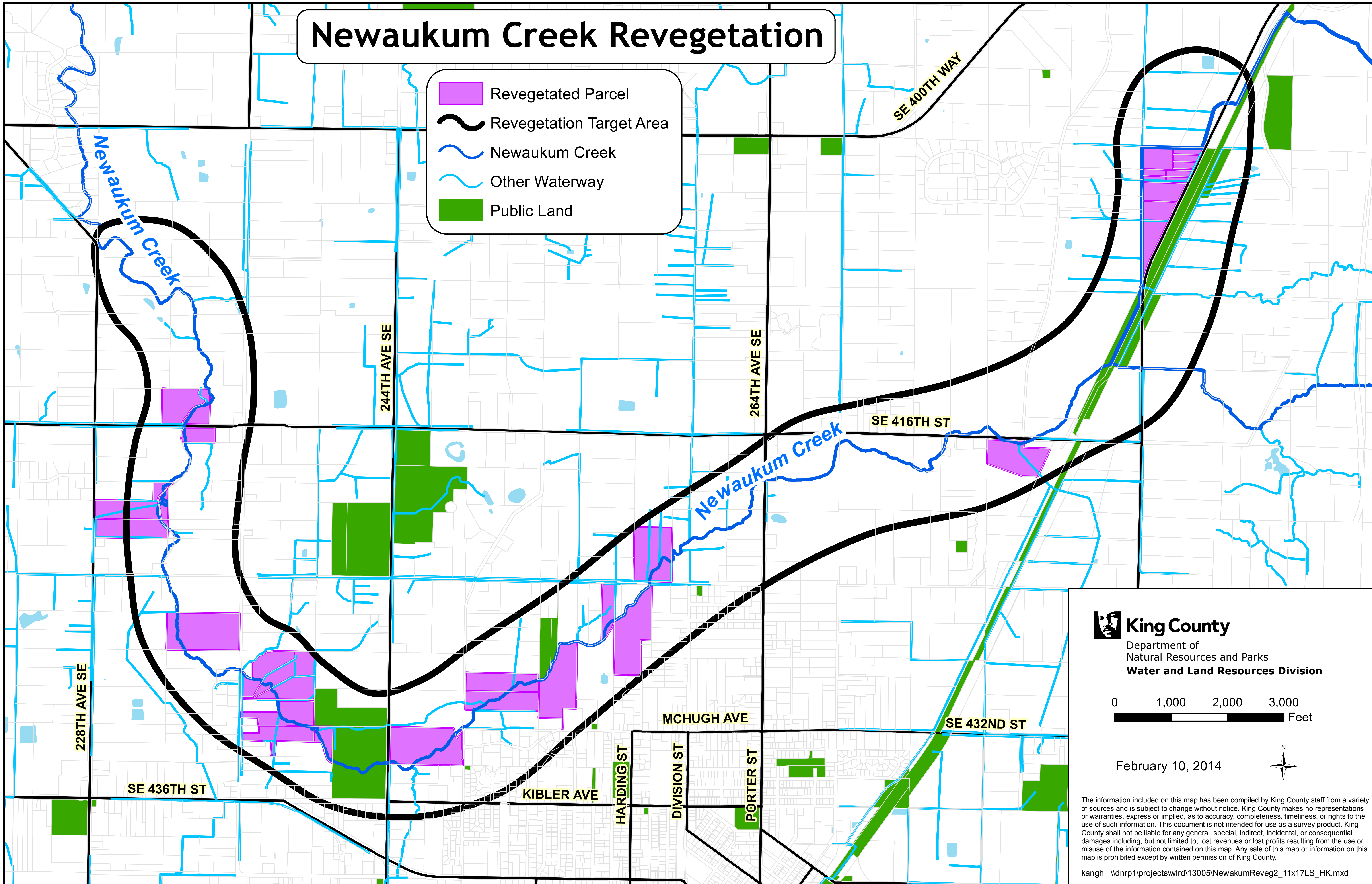
FUNDING:
This collaborative effort is funded by the King conservation District, the U.S. Department of Agriculture, U.S. Department of Fish and Wildlife, numerous Private Foundations, King County, and of course, the landowners themselves.

Produced by : GIS, Visual Communications & Web Unit

Map Document: klinkat/kangh \\dnrp1\projects\WLRD\ag\FarmersForFish\mapdocs\Snoq_Farmers_Fish_11x17_Participating.mxd
2/12/2014



Newaukum Creek Revegetation
Revegetated Parcel
Revegetation Target Area
Newaukum Creek
Other Waterway
Public Land
SE 400TH WAY
Newaukum Creek
244TH AVE SE
264TH AVE SE
SE 416TH ST
Newaukum Creek
MCHUGH AVE
SE 432ND ST
228TH AVE SE
SE 436TH ST
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HARDING ST
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Department of
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Water and Land Resources Division
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February 10, 2014
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NEWAUKUM CREEK RESTORATION PROJECT PHOTOS

The following photos depict various stages of previously implemented revegetation projects along Newaukum Creek, demonstrating the significance of riparian vegetation establishment on narrow buffers (less than 35-foot in width). After 10 years, projects provide 100% shade and overhanging cover completely over the entire channel width. This occurs regardless of whether a buffer was planted on one or both sides of the stream.

1) *Pre-planting stage*

2) Planting of willow cuttings along Newaukum Creek

3) Two years after planting (~30 feet on both sides of creek)

4) Four years after planting (overhanging cover forming)

5) Six years after planting

6) Eight years after planting

7) Ten years after planting (25-foot buffer planting on one side of Newaukum Creek)

From: Mark Palmer [MPalmer@ci.puyallup.wa.us]
Sent: Thursday, April 10, 2014 2:58 PM
To: RCO MI Policy Changes (RCO)
Subject: SRFB riparian guideline comments

Project selection criteria still allows too much room for interpretation, allowing projects to be rejected based on personal bias instead of merit. Other than not being listed specifically in the PSP plan, I don't see any other reasons why Meeker Creek Channel Restoration project should have been rejected.

Mark A. Palmer, P.E., LEED AP
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April 28, 2014

Salmon Recovery Funding Board
c/o Leslie Connelly
Natural Resource Policy Specialist
WA Recreation and Conservation Office
PO Box 40917
Olympia, WA 98504-0917

Dear Members of the Salmon Recovery Funding Board,

Thank you for the opportunity to comment on the proposed new rule for riparian projects seeking funding from the Salmon Recovery Funding Board (SRFB) in the document dated April 10, 2014. On behalf of WRIA 9, we would like to respond to Question 1: **Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide?**

No, WRIA 9 does not support the new guidelines and we would like to specifically voice our concern about the SRFB's proposed large riparian minimum buffer widths. We all agree that larger buffers are better for salmon habitat than smaller buffers, but we also have seen that smaller width buffers plantings are better than not planting at all. Adopting large minimum riparian guidelines is shortsighted because it will greatly reduce the number of restoration opportunities to improve riparian conditions. These guidelines will require that the land be either in public ownership, or if private, the landowner will need to be compensated for their land lost to the larger buffers. The vast majority of the riparian restoration projects that have occurred within WRIA 9 have been 30 to 50 feet in width. Most landowners have not been willing to donate more than that to restoration projects and many landowners would not be willing to sell easements for the larger buffers required in the proposed new guidelines.

We believe in big buffers—as seen in many of our jurisdiction's CAO buffer requirements--we strongly encourage you keep the guidelines as they currently exist. Thank you for your time and consideration.

Sincerely,

WRIA 9 Watershed Ecosystem Forum Co-Chairs:

Marlla Mhoon
Co-chair, Watershed Ecosystem Forum
Councilmember, City of Covington

Bill Peloza
Co-chair, Watershed Ecosystem Forum
Councilmember, City of Auburn

Hood Canal Salmon Enhancement Group

PO Box 2169 Belfair, WA 98528
mendy@hcseg.org
fax 360-275-0648
phone 360-275-9722

April 30, 2014

Dear Salmon Recovery Funding Board,

Re: SRFB riparian guideline comments

The Hood Canal Salmon Enhancement Group (HCSEG) requests to provide comment for the purpose of the Salmon Recovery Funding Board upcoming consideration for implementing guidelines for minimum buffer width for projects with a specific objective to improve riparian habitat.

The HCSEG conducts habitat restoration projects along 6 rivers (with ESA listed salmon species) throughout the Hood Canal watershed. These restoration activities, including projects where riparian native plantings are the objective, are mainly conducted on private properties. On riparian native planting projects, HCSEG works with hundreds of landowners, communicating benefits of native plants for salmon, wildlife and property values. HCSEG can negotiate and alleviate most landowners concerns relating to planting buffer width incorporating native plantings where they had not existed previously. Most plantings occur using a minimum 35 foot buffer and in some cases up to 100 feet depending on landowner's criteria and property logistics.

If a minimum buffer width for planting projects within a riparian habitat were to be required, it would severely jeopardize HCSEG's overall project progression and ultimately harm salmon habitat restoration efforts in these project areas. The proposed 100 foot buffer minimum requirement, as defined, by NOAA and Department of Ecology, for grants awarded, would decline productivity by turning away once willing landowners who would have allowed for plantings under no buffer requirements. Likewise, many properties along these rivers could not hold increased native plant buffers due to the property size and existing structures. If a buffer width were to be required, landowners may become apprehensive and not approve *any* plantings. This will pose serious consequences with a great potential loss of restoration activities.

HCSEG's mission is to enhance salmon species throughout the Hood Canal watershed and considers salmon habitat a large component to salmon success. The proposed change to require a buffer width, in this case, may increase salmon habitat but would ultimately not benefit salmon if planting projects are severely restricted by buffer width requirements. The HCSEG strongly urges the Salmon Recovery Funding Board to NOT approve and implements guidelines for minimum buffer widths for grant funding.

Thank you for your consideration.

Sincerely,

Mendy K. Harlow

Mendy Harlow
Executive Director
Hood Canal Salmon Enhancement Group

From: Mike Grayum [mgrayum@nwifc.org]
Sent: Wednesday, April 30, 2014 4:07 PM
To: RCO MI Policy Changes (RCO)
Cc: jwweber@nwifc.org; Todd Bolster; Fran Wilshusen; Jim Peters
Subject: SRFB riparian guideline comments

Thank you for this opportunity to provide comments on the Salmon Recovery Funding Board's proposal to adopt guidelines for minimum buffer widths for projects intended to improve riparian habitat. As you are aware, in July 2011, the Northwest Indian Fisheries Commission and its member Tribes adopted their Treaty Rights at Risk initiative to try to reverse the ongoing process of habitat degradation and erosion of their rights to take fish. Treaty Rights at Risk focuses on 3 broad areas: aligning federal authorities to support salmon recovery and shellfish protection, halting the disparate treatment of treaty rights, and getting more steady federal leadership on meeting treaty rights. As a result, much attention has been focused on aligning federal authorities to support salmon recovery (and applicable water quality standards). Voluntary grant programs have been a significant focus because they are so fundamental. It is difficult to see how salmon will recover if federal, state, and local governments are unable to develop and implement voluntary programs that are designed to meet the habitat requirements of salmon.

The proposed guidelines for minimum riparian buffer widths are a direct outgrowth of requests made by the Commission and the Swinomish Indian Tribal Community. The proposed guidelines are not perfect, but they provide an essential "bookend" to the recommendations contained in the Aquatic Habitat Guidelines, Stream Habitat Restoration Guidance that the SRFB has already adopted as guidance. There needs to be a clear message about what is needed to support salmon recovery. Governments at all levels and the public justifiably expect that the Salmon Recovery Funding Board will provide key leadership on what is necessary to recover salmon.

Adoption of the minimum buffer widths would also serve to meet the statutory requirements of the SRFB to "develop appropriate outcome-focused performance measures" and to coordinate those measures with other agencies. See RCW 77.85.135. The minimum buffer widths translate directly to on-the-ground expectations, and are consistent with multiple agencies including NOAA-Fisheries, US EPA, and the Department of Ecology.

Along with providing leadership on what salmon need, it is important that the SRFB assure that salmon recovery funds be used to purchase the conditions that are necessary to support salmon recovery and treaty rights. In so doing, the SRFB would be leading by example. This would also provide important leverage and corroborating guidance to enhancement implementers who face the sometimes challenging job of talking reluctant landowners into a different way of looking at riparian areas. As we all know, some enhancement projects are implemented without regard for salmon habitat requirements. Such projects set a bad example and make it tougher for enhancement implementers to convince landowners about the land management changes needed to protect salmon habitat. The SRFB's proposed minimum buffer recommendations will set an important, positive example.

Question 1 - Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide?

Answer 1: Yes, the board should adopt guidelines for minimum buffer widths for projects that are intended to improve riparian habitat. With respect to the geographic scope of the SRFB's proposed guidelines, at a minimum, they should be applied throughout the Boldt case area. Arguably, a good example is always valuable and should thus be applied state-wide, but the Commission's member tribes' treaty reserved interests are in western Washington. In setting a good example, it is important that the SRFB minimum buffer recommendations not undercut any decisions by local governments that seek to assure greater protection for salmon habitat. For example, the Suquamish Tribe and others worked hard to get the Kitsap County Critical Areas Ordinance to adopt 200 foot buffer requirements for segments of Big Beef, Chico, Curley, Burley, and Blackjack creeks along with segments of the Tahuya and Union rivers. The Kitsap CAO also calls for 150 foot riparian buffers along Type F streams. The concern is that the SRFB's adoption of a minimum buffer guideline should not be allowed to provide a justification to reduce CAO requirements adopted to protect salmon. Accordingly, we recommend that the SRFB's minimum buffer guidance should reflect either the buffers called for by the applicable CAO (or other applicable law) or the recommended minimum buffer guidelines, whichever are larger.

Question 2 - What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines? **Examples of reasonable constraints may include:**

- **Transportation corridors such as roads or bridges,**
- **Structures such as homes, barns, or sheds,**
- **Naturally occurring conditions such as geology and soil types, or**
- **If the guidelines would lead to declassification of the land as farmland as defined in the state's - Open Space Act (RCW 84.34.020).**

Answer 2: Obviously, in most situations, it makes sense to allow for reasonable accommodation of transportation corridors and structures. To the extent that the SRFB wants to provide an exception for naturally occurring conditions such as geology and soil types, then it needs to provide additional guidance on what is intended. It is noteworthy that several soil types in western Washington would support site potential tree heights significantly greater than the largest buffer (100 feet) recommended in the proposed minimum buffer guidelines. Proposals to shrink riparian buffers below the levels recommended should be accompanied by a detailed site-specific justification based on data. This should then be subject to technical review to assure that the end product will result in conditions adequate to support salmon habitat, which – after all – is the purpose of these riparian enhancement projects. Projects that seek SRFB funding to provide buffers that are below the recommended minimums should be accorded lower priority than projects that meet or exceed the recommended minimums.

As for the proposed exception based upon the potential for declassification of land as farmland under state law, we are unaware of any situation where this problem has arisen. We think it unnecessary to create an exception for a problem that has never occurred. Also, the purpose of these riparian buffers is to prevent the impacts of activities on farm land from harming water quality and fish habitat. As such, the buffers can be considered as much a part of agricultural infrastructure as, for example, manure lagoons. Finally, we do not believe it is appropriate to give greater priority to the vagaries of state tax laws over the mandates of federal law, including protecting habitat for treaty-reserved salmon and shellfish.

Project Review Process – The SRFB proposal allows projects that propose buffer widths smaller than the recommended minimums to remain eligible for grant funding. Such projects would be subject to technical review by the SRFB's technical review panel and could be flagged as projects of concern and subject to additional SRFB scrutiny. We think it is a good idea to provide some flexibility for the occasional project that is able to provide a well-documented justification as to why the needs of salmon will still be met even if the proposed buffers do not meet the recommended minimums. However, we think it is important that the SRFB send the clear message that it continues to encourage riparian buffer projects to be consistent with the guidance provided in the Streamside Habitat Restoration Guidelines and, at least, the proposed recommended minimums.

Question 3 - What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board? The SRFB identifies the following six kinds of incentives:

1. **Financial assistance: grant, loan, and lease programs that provide cost-share funding for, or reduce expenses of, conservation actions;**
2. **Technical assistance: advice, hand-on help, and training for landowners on conservation tools or techniques,**
3. **Tax relief: tax reductions for landowners undertaking conservation actions,**
4. **Marketing: programs to add market value to products that support conservation on private land,**
5. **Recognition: identification and promotion of landowners undertaking conservation actions, and**
6. **Conservation banking: financial assistance to landowners provided as a condition of permitting for construction projects.**

Answer 3: We believe that it is reasonable to offer conservation incentives to landowners who allow salmon recovery projects on their property. However, the SRFB needs to give more thought and explanation to the incentives that it's proposing, as its proposals are very vague.
Financial assistance can be appropriate. The kind of financial assistance, and the SRFB's basis for its choice(s) should be identified. The successes and failures of previous programs should inform the SRFB's approach. Also, it is probably not appropriate to fund acquisition of lands for buffers where there is already an obligation to provide buffers. Similarly, it would be inappropriate to fund installation of buffers on lands where there is already a requirement to install buffers.

Technical assistance may also be helpful, so long as it results in land and water conditions that support salmon recovery. It is our understanding that technical assistance tends to vary based on who is giving it. More work needs to be done to assure that technical assistance is both designed and provided to result in habitat conditions that actually support salmon recovery.

Tax reductions may also be a useful tool to incentivize conservation. Again, assuring that the approach selected builds upon the lessons learned from other programs is vital.

As for marketing, it is not clear what the SRFB is proposing. With respect to recognition, developing programs recognizing landowners for undertaking recommended actions, such as implementing the Streamside Habitat Restoration Guidelines on their property, is a good idea. Like technical assistance, making sure that the recognition program encourages the right land management is critical.

Finally, the SRFB proposes conservation banking as a form of financial assistance as a condition of permitting for construction projects. This category does not seem like a salmon habitat restoration incentive. Instead, it appears to confuse project mitigation with salmon enhancement. At a minimum, more explanation is necessary. For example one interpretation of what the SRFB is proposing could be to pay developers to mitigate for salmon impacts even though the developers already have a mitigation obligation under federal, state, and/or local law. Why should the public subsidize developers who are already obligated to pay to avoid impacts? Another interpretation could be that the SRFB is proposing to use funds collected from one landowner, who wants a permit that will result in salmon impacts, and pay those funds to another landowner who will preserve or enhance his/her land. At best, this results in maintaining current habitat conditions, not salmon recovery. Again, further explanation is necessary in order to allow for meaningful comment.

Question 4 - Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the board encourage such prioritization at the local, regional or state level?

Answer 4: RCW 77.85.130 makes clear that projects funded by the SRFB are intended to protect and restore salmon habitat. Perhaps the most reasonable way of assuring these results would be to accord highest priority to those projects that are consistent with the Streamside Habitat Restoration Guidelines. Projects that exceed the minimum recommended buffer sizes should be next in priority. Projects that just barely meet the minimum recommendations should be next and those that do not meet the minimums should be lowest priority and subject to close technical and policy scrutiny to assure that they do not undermine habitat protection.

In conclusion, thank you for this opportunity to provide comments. The Commission appreciates the efforts of the SRFB to provide greater clarity regarding riparian buffer design that is consistent with its objective to protect and restore salmon habitat.

Michael Grayum
Executive Director
Northwest Indian Fisheries Commission

SNOHOMISH CONSERVATION DISTRICT

CELEBRATING 70 YEARS SNOHOMISH CONSERVATION DISTRICT

SCD 528 91st Ave NE, Ste A, Lake Stevens, WA 98258-2538
Phone 425-335-5634, ext 116 FAX 425-335-5024 Website: www.snohomishcd.org

April 30, 2014

Re: SRFB Riparian Guideline Comments

Dear Salmon Recovery Funding Board;

The Snohomish Conservation District (SCD) board and staff sincerely appreciate the opportunity to comment on the proposed changes to your guidelines and, in particular, your willingness to consider the impact these changes could have on your partners in salmon recovery.

SCD has been building relationships with landowners across Snohomish County for the past 70 years with the goal of improving and protecting our natural resources. One of the reasons our organization has been so successful in implementing best management practices on private lands is our recognition that while we may disagree on the "how", we generally agree on the "why", which is protecting our soils, water, and fisheries for future generations. We have become a powerful partner in the salmon recovery community in our County, planting 48 acres of riparian forest these past two years in addition to completing numerous other habitat and water quality improvement projects.

The adoption of the new buffer widths as a required minimum for SRFB projects will negatively impact our ability to not only get trees in the ground, but also to implement in-stream salmon habitat projects. We submitted two projects this year for SRFB rounds in WRIA's 6 and 7. Both are high priority projects identified in the salmon plans and neither one would be eligible if the buffer guidelines were mandatory. We do, however, recognize that wider buffers have greater ecological impacts and agree that projects with a higher impact should receive priority of funding.

If the buffer guidelines become mandatory for all projects, we expect to see the following impacts:

- Reduction in the number of willing landowners.
- Reduction in the total acreage of riparian forest we are able to plant.
- Reduction in the number of stream miles we are able to plant with limited available funding.

The Snohomish Conservation District shares the SRFB's goal of improving salmon habitat and prioritizing our habitat dollars to get the greatest ecological lift. We feel we can work together with partners to do this in creative ways by increasing incentives available to landowners. Please see our responses to your questions below, including our specific program ideas:

Question 1 – Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, Western Washington only, or statewide?

We encourage the board not to adopt minimum buffer widths for projects, but rather to adopt recommendations that local scoring committees can use as guidelines. We share the opinions presented by the Stillaguamish Watershed Council and the Snohomish River Forum that scoring of projects be left to the technical experts on the lead entity and SRFB review committees. These local committees can better assess how the proposed projects benefit salmon habitat and contribute to the goals set forth in their watershed's salmon plan.

Question 2 – What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guideline?

As mentioned above, SCD is not in favor of adopting mandatory buffer widths. If, however, SRFB adopts recommendations based on the buffer table, the following should be considered when scoring projects with buffers that do not meet the new guidelines:

- Ecological impact desired – Narrow buffers can provide shade to cool water, a source of large wood, filtration of nutrients and pollutants, erosion protection, control of invasive weeds, and cover for juveniles. These benefits need to be weighed against the impact of NOT installing the project.
- Benefits of Total Project – The benefit of in-stream projects such as fish passage barriers, wood placement, side channel reconnections, etc. should be weighed even if buffer widths are narrower than the guidelines.
- Land use – If land is being used for agricultural production, a wider buffer may not be economically feasible for the landowner.
- Size of property – Landowners on smaller parcels will be less willing to plant a wider buffer if it takes up a large proportion of their total acreage.

Question 3 – What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board?

SCD recently completed a series of workshops with American Farmland Trust, NOAA and Forterra that resulted in survey data being collected from over 50 landowners in target Chinook areas where agriculture is the primary land-use. Preliminary results of this study indicate the following:

- 41% said they would consider planting a riparian buffer (and another 18% said maybe).
- Of these 21 landowners, only ten said they would consider planting a 100' buffer.
- Of these same 21 landowners, only ten said the current CREP payment would incentivize them to plant a 35' buffer and only 5 said the payment would incentivize them to plant a 100' buffer.
- 82% of respondents said they would rather retain ownership if a portion of their land was restored, rather than sell it.

Based on this data, SCD recommends the following programs be funded by SRFB:

<u>Enhanced CREP Program</u> – In several areas throughout the Country, local entities have chosen to supplement the Conservation Reserve Enhancement Program payments to agricultural landowners by

increasing the one-time signing bonus. We propose increasing this bonus from $100/acre up to $5,000/acre in high priority subbasins. Another option would be to provide a sliding scale signing bonus based on width of riparian buffer.

<u>Multi-Benefit/Working Buffers</u> – SCD, the Tulalip Tribes, and Forterra recently applied to DOE for NEP funds to complete a feasibility study of the multi-benefit or working buffer concept. Landowners would be incentivized to plant a larger buffer if they could re-coup the revenue lost to traditional agricultural production by harvesting a commodity from the buffer while retaining the buffer's ecological function. DOE chose to fund only a portion of our proposal, and did not fund this feasibility study.

<u>Riparian Easements</u> – Purchasing easements for riparian buffers enables landowners to retain ownership of their land, while financially incentivizing them to take land out of production for riparian enhancement.

Question 4 – Should the board encourage prioritizing funding for riparian habitat projects that meet the guideline? If so, how could the board encourage such prioritization at the local, regional or state level?

Projects for most funding programs are already scored based on whether or not the projects meet the ecological objectives of the funding program. For SRFB, projects are scored locally and at the state-level using criteria for how effectively a project is likely to meet its salmon recovery objectives. Project sponsors such as the Snohomish Conservation District understand that in most if not all cases, a larger buffer will provide a great habitat benefit in the long-term. As such, when developing salmon restoration projects, the District works with landowners to develop restoration plans that maximize the riparian buffer width. For this reason, the District does not feel it is necessary to add any additional criteria or guidelines to encourage prioritization of funding since this is already done effectively. To better enable grant reviewers to score the ecological function of proposals, grant applications could include a request for a justification/description of how the buffer width was determined and the types of benefits it's expected to provide.

Thank you for considering our response. The Snohomish Conservation District greatly appreciates all the SRFB has done to improve salmon habitat by supporting local projects. We would be more than willing to continue to work with SRFB to discuss the ideas presented above or to gather landowner feedback on any new ideas that are proposed by others.

Sincerely,

Monte Marti
Manager, Snohomish Conservation District

From: Pete Ringen [ringenp@co.wahkiakum.wa.us]
Sent: Tuesday, April 15, 2014 9:19 AM
To: RCO MI Policy Changes (RCO)
Cc: Jeff Breckel (jbreckel@lcfrb.gen.wa.us)
Subject: SRFB riparian guideline comments

Thank you for the opportunity to provide input to the proposed policy changes regarding riparian buffers.

While I'm sure most would agree about the sensitivity of riparian zones, and their importance to protection of a variety of species we care deeply about, my initial concern with the proposed policy change is that prescriptive formulas often have unintended consequences, making it more difficult to implement the things we would like to accomplish. Prescriptive formulas can also impact the rightful use of property for those families who gain their livelihood from it.

Question 1 –Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide?

Buffer widths sound nice in theory, but in the field, topography may have more of a role in the streamside character than vegetation. Of particular interest is the proposed riparian width for constructed ditches. Sometimes these ditches have been functioning for several decades, and the implication of a riparian zone overlay is that maintenance of the ditch may afterward be limited. I have seen firsthand the negative impact on use of and value of property when functioning drainage ditches are no longer maintained. Although the board phrases this buffer width as a guideline, the teeth in the guideline is the outcome that a particular project would not be funded as a project of concern if it does not meet the guideline. This makes it more of a rule, than a guideline.

While it is desirable to provide shade to perennial waters that did not historically have fish, the Board should not lose sight of the fact that trees consume large amounts of water, and lose this water in the summer through transpiration. The shade and cooling of these waters is certainly desirable, however the water quantity could actually go down in areas that need to keep their volumes as high as possible in summer. It is also possible that landowner resistance to participation under this guideline may make project implementation more difficult.

For perennial and ephemeral waters, flexibility would help with individual sites, as the needs and situations vary by surroundings and complexities of design constraints. There may be features in the built environment that are next to these streams that are cost prohibitive to remove, and it would add another layer of explanation and variance to what is already a very labor intensive grant application process.

In summary, these guidelines could be added, but they should be true guidelines, there should be no outcome as a project of concern if the guideline is not met by an individual project. The project should proceed or not proceed on its overall merit. I have no rationale to offer for whether they should be Puget Sound only, or state wide, except that I believe they may be more readily accepted in the Puget Sound region.

Question 2- What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?

The constraints listed as examples are appropriate ones.

- Transportation corridors such as roads, bridges, ……also drainages structures and utilities
- Functioning dikes or levees that require maintenance for public safety
- Structures such as homes, barns, sheds, ………..or commercial buildings
- Naturally occurring conditions such as geology, and soil types,…………… also topography, such as steep slopes
- Existing uses that will result in economic hardship if buffers are implemented as indicated in the guidelines
- Problems with control and management of invasive species or noxious weeds

Question 3- What types of conversation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board.

These incentives could dovetail with any existing conservation land incentives offered by individual Counties. The initial grant easement or acquisition should spell out the terms of any initial benefit to the property owner for participation.

Projects could be show-cased with media involvement if the landowner is interested in that.

Question 4- Should the Board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the Board encourage such prioritization at the local, regional, or state level?

With the large number of under-funded fish passage projects in the State, riparian habitat, while important, may not rise to the same level of urgency.

best regards

Pete Ringen, P.E.
Director/County Engineer
Wahkiakum County Public Works
360-795-3301

State of Washington
DEPARTMENT OF FISH AND WILDLIFE
Mailing Address: 600 Capitol Way N, Olympia, WA 98501-1091 • (360) 902-2200 • TDD (360) 902-2207
Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia, WA

April 25, 2014

David Trout
Chair, Salmon Recovery Funding Board
Post Office Box 40917
Olympia, WA 98504-0917

Dear Chairman ~~Trout~~ David:

The Salmon Recovery Funding Board (SRFB) and the Washington Department of Fish and Wildlife (WDFW) share a common goal to restore and perpetuate our state's salmon resources. Riparian areas are extremely important in this pursuit and we appreciate your desire to ensure riparian projects are effective. We are concerned, however, that a focus on establishing minimum buffers for these projects is not the best way to address these goals.

The SRFB's goal is salmon recovery, and SRFB projects have a history of exceeding minimum expectations for riparian protection. The current SRFB manual cites the *Stream Habitat Restoration Guidelines* (2012) co-published by WDFW, the Recreation and Conservation Office (RCO), the Departments of Ecology, Natural Resources, and Transportation, the Puget Sound Partnership, and the U.S. Fish and Wildlife Service, which set a high bar for process-based stream restoration that restores riparian ecosystems. Establishing minimum buffers shifts attention from this restoration objective to protecting existing riparian areas.

Instead, we would value additional discussions with the SRFB and RCO staff to identify strategies that incentivize projects that do more than the minimum. Such an approach builds on the restoration community's history of doing more, and we believe this will produce more measurable progress toward our shared restoration goals.

We remain committed to our shared restoration and recovery goals, and we appreciate the opportunity to think with you about how best to advance them.

Sincerely,

Philip Anderson
Director

cc: Kaleen Cottingham, Lisa Veneroso, Jennifer Quan, Margen Carlson

4-30-2014 RS

Richard Dyrland

From: Richard Dyrland <toppacific2@msn.com>
To: RCO Policy (policychanges@rco.wa.gov)
Subject: SRFB Riparian Guideline Comments

RECEIVED
MAY - 5 2014
WA STATE
RECREATION AND CONSERVATION OFFICE

Dear RCO,

Thank you for the opportunity to respond to the proposed Riparian Guideline Comments. Here is my response:

Question 1-A. Yes, up-dated buffer-width guidelines are needed.

1-B. Apply "statewide" but there may be some rational for differentiation between west sided and east side of Cascades.

Table 1. I agree with "A"
I agree with "B"
On "C" I would change the 100 ft. minimum to 75 ft. west of the Cascades & 50 ft. east of the Cascades.
I agree with "D"

Question 2. I agree with Q-2 as written.

Question 3. Riparian plantings by themselves seldom provide adequate habitat restoration results for a stream. In most cases they need to be accompanied by additional stream bank and channel work that will reduce width to depth ratios, build deep pools to further reduce summer stream flow temperatures, that in combination will allow a reach of stream and/or the stream to return to "balanced" functioning.

USGS studies on the west side of the Cascades (Sidell Paper) showed that the loss of deep pools ranged from 40% to 60% and the width of many channels had increased substantially largely due to anthropogenic disturbances. Radiation and temperature budgets done by the US Forest Service in developing the Spotted Owl alternatives indicated that without narrow channels and deep pools, riparian buffers were only partly effective and that some of the wider buffers proposed were not justified ecologically in terms of stream habitat benefits.

In general, I support "Conservation Incentives" prefaced by my remarks above, but unless it is an unusual situation, they should be accompanied by stream bank and channel treatment technology that deals with the whole problem of that reach of stream.

Question 4. I agree with the goals. I also suggest that all "strategic recovery plans" not only focus on habitat but also integrate recent population trends for the various species in order to improve the quality and effectiveness of Existing or new "strategic Plans"

Respectfully,

Richard Dyrland
Supervisory Hydrologist, Watersheds & Steams

RECEIVED

APR 16 2014

WA STATE
RECREATION AND CONSERVATION OFFICE

Working to ensure the future of salmon in the Stillaguamish, Snohomish and Island County watersheds

April 10, 2014

Kaleen Cottingham
Recreation and Conservation Office
P.O. Box 40917
Olympia, WA 98504-0917

RE: New Riparian Buffer Guidance for Federal Grant Programs

Dear Ms. Cottingham:

Our organization is one of 14 nonprofit, community-based, salmon enhancement groups that receive federal grant funding from a number of sources for riparian buffer restoration projects. We recently learned of the National Oceanic and Atmospheric Administration's riparian buffer guidance for grant programs utilizing federal funding when the Department of Ecology adopted NOAA's guidance requiring a 100' minimum buffer on fish bearing streams and rivers for its current round of grant making. While we support and appreciate the critical conservation funding your agency provides, we are very concerned that adoption of the same requirements by the Salmon Recovery Funding Board would be an unrealistic policy and will potentially deter voluntary stewardship actions by private landowners.

In our region parcel size and width, existing infrastructure, agricultural production, farmland preservation and salmon recovery efforts in the form of riparian vegetation restoration and enhancement must all be factored into a successful approach to salmon recovery. In our experience flexibility has been a key attribute to engaging private landowners to undertake volunteer riparian planting projects. We strongly encourage you to review the implications of the new requirements to our salmon recovery efforts.

At the March SRFB meeting a riparian buffer policy update was delivered. We hope that any policy under consideration will include development of a riparian buffer exemption process. As a small nonprofit with limited organizational capacity and funding for project development, only a clearly defined process and list of qualifying conditions that will nearly guarantee certainty of an exemption will allow us to continue pursuing successful cooperative agreements with private landowners. Until such an exemption process is approved, we ask that you consider delaying implementation of a new minimum riparian buffer size policy in SRFB's grant rules.

Sincerely,

Robert Sendrey

Robert Sendrey
Executive Director

Phil Taylor
Board President

1911 Vernon Road, Lake Stevens, WA 98258
Phone: 425-252-6686 – Email: info@soundsalmonsolutions.org

YAKIMA BASIN JOINT BOARD

A Partnership of Public Entities Promoting the Multiple Uses of the Yakima Valley's Water Supply

IRRIGATION ENTITIES
KENNEWICK IRRIGATION DISTRICT
KITTITAS RECLAMATION DISTRICT
ROZA IRRIGATION DISTRICT
SUNNYSIDE DIVISION
YAKIMA-TIETON IRRIGATION DISTRICT

MUNICIPALITIES
CITY OF YAKIMA

April 30th, 2014

Salmon Recovery Funding Board
RE: SRFB riparian guideline comments.
policychanges@rco.wa.gov

The Yakima Basin Joint Board represents various irrigation and domestic use entities dependent on water from the reservoirs and rivers in the Yakima River Basin. As such, our operations are linked with the survival of Yakima Basin salmonids. Therefore, we are very interested in supporting measures that will increase the survival and ensure the conservation of those resources. We are writing in relation to the Salmon Recovery Funding Board's proposed riparian guidelines for grants. We do not support the proposed minimum buffer width requirements for salmon recovery grants.

In reviewing the proposed mandatory buffer widths we are particularly opposed to "Category A" buffers on man-made irrigation conveyance facilities. Man-made irrigation facilities are part of the irrigation distribution system constructed by the United States Bureau of Reclamation, private irrigation entities, and by water users on farm. These facilities require continued maintenance, repair, and in some cases, re-location or replacement which mandatory buffers will interfere with. Additionally, these facilities are not part of the natural system, were never intended to function as part of the natural system and, therefore, require no "protection" by buffers.

Project sponsors often work with landowners on an individual basis to propose best management practices that help in salmon, and steelhead restoration activities on private lands. In some cases, project sponsors negotiate riparian buffer widths in consideration of landowner's needs as part of the project. Imposing the proposed mandatory riparian buffer width requirements on landowners will not allow project sponsors the flexibility needed to get good restoration projects on the ground. Additionally, many landowners will not participate because of the mandatory buffer widths. We worry that many projects will go unfunded on streams that need as much riparian restoration as possible, when considering current land uses.

By funding riparian restoration projects, as have been proposed in the past, and without imposing mandatory riparian buffer width requirements, we believe our resident and anadromous fish resources will benefit, while still meeting the irrigation and municipal water needs of the Yakima River Basin. The farms and ranches of our area are working landscapes.

The purposed riparian buffer widths themselves appear to be arbitrary. The mandatory riparian buffer requirements are misguided, and will create a strong disincentive to participate in salmon recovery efforts.

Please contact me if you have any questions.

Sincerely,

Scott Revell

Scott Revell, Board Chair

Washington State Senate

Olympia Address:
PO Box 40442
Olympia, WA 98504-0442

Senator Doug Ericksen
42nd Legislative District

(360) 786-7682
FAX: (360) 786-1323
E-mail: Doug.Ericksen@leg.wa.gov

April 16, 2014

Recreation and Conservation Office
Salmon Recovery Funding Board
P.O. Box 40917
Olympia, WA 98504-0917

Re: Proposed Changes to the Salmon Recovery Grant Program

Dear Salmon Recovery Funding Board:

I would appreciate your consideration of my comments on the proposed minimum buffer guidelines for riparian habitat improvement projects. I understand that improving riparian habitat is believed to enhance salmon populations, but such projects also hold the potential to inhibit farming and cost jobs in Washington. I don't believe salmon recovery should come at the cost of Washington's agricultural strength.

My comments focus on the proposed minimum buffers for the waterways labeled Category A and Category B in Table 1. Category A includes constructed ditches, intermittent streams, and ephemeral streams that have never been accessed by salmon. A minimum buffer width of 35 feet is proposed for Category A. Similarly, the Board proposes a 50-foot minimum buffer width for waters in Category B, which includes perennial waters that salmon have never accessed. In my opinion, the new buffer guidelines should not be adopted as proposed for three reasons.

1. Many waterways described in Categories A and B are used for irrigation, or intersect working farms. As you are aware, Washington agriculturalists irrigate about 1.8 million acres. Much of the water used for irrigation originates as surface water and is diverted through canals and ditches. Your new proposed guidelines for 35-foot buffers at those waterways could place large swaths of adjacent farmland within habitat buffers, thereby rendering those lands unusable for agriculture. Additionally, requiring minimum buffers for habitat projects on farmland may create a disincentive for key landowner participation in salmon recovery efforts.

2. The waterways described in Categories A and B are low priority relative to other waters where salmon occur or are known to have occurred in the past. The Board's proposed buffers run the risk of making farming more difficult in order to improve riparian habitat in areas where salmon have never thrived. This means that a "successful" restoration project has only a tenuous connection to salmon recovery. Buffers should not be proposed for areas where habitat projects will not yield the desired result for fish.

3. Minimum buffer guidelines could be of limited value, because the success of riparian habitat improvement projects hinges on consideration of many site-specific variables. The Board's grant application process already recognizes this reality, as demonstrated by the requirement that each application must undergo review by the technical review panel before receiving funding. This includes site visits, consideration of regional priorities depending on location, and review of project-specific factors that make the project suitable or unsuitable for funding. Because differing circumstances must be accounted for in the case of each project, it is not clear that predetermined guidelines for minimum buffers could ever be applied effectively.

I appreciate your work on this issue. I urge your strong attention to these comments.

Sincerely,

Doug Ericksen

Senator Doug Ericksen, Chair
Senate Energy, Environment
and Telecommunications Committee

Olympia Office:
107 Irv Newhouse Building
PO Box 40415
Olympia, WA 98504-0415
Phone: (360) 786-7684
FAX: (360) 786-7173
e-mail: Jim.Honeyford@leg.wa.gov

Washington State Senate

Senator Jim Honeyford
15th Legislative District

Eastern Yakima County
Including the towns of:
Buena Gleed Grandview
Granger Mabton Moxee
Selah Sunnyside Toppenish
Union Gap Wapato
Yakima and Zillah

April 16, 2014

Recreation and Conservation Office
Salmon Recovery Funding Board
P.O. Box 40917
Olympia, WA 98504-0917
policychanges@rco.wa.gov

Re: Proposed Changes to the Salmon Recovery Grant Program

Dear Salmon Recovery Funding Board:

Thank you for considering these comments on the proposed minimum buffer guidelines for riparian habitat improvement projects. While improving riparian habitat is believed to enhance salmon populations, such projects also hold the potential to inhibit farming in Washington. This is true throughout the state but is especially troubling for areas east of the Cascades, where many farmers and orchardists rely on irrigation to sustain their operations and provide jobs. Salmon recovery should not come at the cost of Washington's agricultural strength.

My comments focus on the proposed minimum buffers for the waterways labeled Category A and Category B in Table 1. Category A includes constructed ditches, intermittent streams, and ephemeral streams that have never been accessed by salmon. A minimum buffer width of 35 feet is proposed for Category A. Similarly, the Board proposes a 50-foot minimum buffer width for waters in Category B, which includes perennial waters that salmon have never accessed.

<u>The new buffer guidelines should not be adopted as proposed for three reasons.</u>

(1) Many waterways described in Categories A and B are used for irrigation, or intersect working farms. As you are aware, Washington agriculturalists irrigate about 1.8 million acres. Much of the water used for irrigation originates as surface water and is diverted through canals and ditches. Your new proposed guidelines for 35-foot buffers at those waterways could place large swaths of adjacent farmland within habitat buffers, thereby rendering those lands unusable for agriculture. Additionally, requiring minimum buffers for habitat projects on farmland may create a disincentive for key landowner participation in salmon recovery efforts.

(2) The waterways described in Categories A and B are low priority relative to other waters where salmon occur or are known to have occurred in the past. The Board's proposed buffers run the risk of making farming more difficult in order to improve riparian habitat in areas where salmon have never thrived. This means that a "successful" restoration project has only a tenuous connection to salmon recovery. Buffers should not be proposed for areas where habitat projects will not yield the desired result for fish.

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Thank you for your work on this issue. I appreciate your attention to these comments.

Sincerely,

Senator Jim Honeyford
15th Legislative District

Washington State Senate

Olympia Address:
115 Irv Newhouse Building
PO Box 40439
Olympia, WA 98504-0439

Senator Kirk Pearson
39th Legislative District

Contact Information:
Phone: (360) 786-7676
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E-mail: Kirk.Pearson@leg.wa.gov

RECEIVED
APR 18 2014
WA STATE
RECREATION AND CONSERVATION OFFICE

April 16, 2014

Recreation and Conservation Office
Salmon Recovery Funding Board
P.O. Box 40917
Olympia, WA 98504

Re: Proposed Changes to the Salmon Recovery Grant Program

Dear Salmon Recovery Funding Board:

Thank you for considering these comments on the proposed minimum buffer guidelines for riparian habitat improvement projects. While improving riparian habitat is believed to enhance salmon populations, such projects also hold the potential to inhibit farming in Washington. Salmon recovery should not come at the cost of Washington's agricultural strength.

My comments focus on the proposed minimum buffers for the waterways labeled Category A and Category B in Table 1. Category A includes constructed ditches, intermittent streams, and ephemeral streams that have never been accessed by salmon. A minimum buffer width of 35 feet is proposed for Category A. Similarly, the Board proposes a 50-foot minimum buffer width for waters in Category B, which includes perennial waters that salmon have never accessed.

The new buffer guidelines should not be adopted as proposed for three reasons.

(1) Many waterways described in Categories A and B are used for irrigation, or intersect working farms. As you are aware, Washington agriculturalists irrigate about 1.8 million acres. Much of the water used for irrigation originates as surface water and is diverted through canals and ditches. Your new proposed guidelines for 35-foot buffers at those waterways could place large swaths of adjacent farmland within habitat buffers, thereby rendering those lands unusable for agriculture. Additionally, requiring minimum buffers for habitat projects on farmland may create a disincentive for key landowner participation in salmon recovery efforts.

(2) The waterways described in Categories A and B are low priority relative to other waters where salmon occur or are known to have occurred in the past. The Board's proposed buffers run the risk of making farming more difficult in order to improve riparian habitat in areas where

salmon have never thrived. This means that a "successful" restoration project has only a tenuous connection to salmon recovery. Buffers should not be proposed for areas where habitat projects will not yield the desired result for fish.

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I appreciate your attention to these comments.

Sincerely,

Kirk Pearson

Olympia Address:
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Olympia, WA 98504-0409
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Washington State Senate

Senator Mark Schoesler
Republican Leader
9th Legislative District

Residence:
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Recreation and Conservation Office
Salmon Recovery Funding Board
P.O. Box 40917
Olympia, WA 98504-0917
policychanges@rco.wa.gov

April 17, 2014

RECEIVED
APR 23 2014
WA STATE
RECREATION AND CONSERVATION OFFICE

Re: Proposed Changes to the Salmon Recovery Grant Program

Dear Salmon Recovery Funding Board:

Thank you for considering these comments on the proposed minimum buffer guidelines for riparian habitat improvement projects. While improving riparian habitat is believed to enhance salmon populations, such projects also hold the potential to inhibit farming in Washington. This is true throughout the state but is especially troubling for areas east of the Cascades, where many farmers and orchardists rely on irrigation to sustain their operations and provide jobs. Salmon recovery should not come at the cost of Washington's agricultural strength.

My comments focus on the proposed minimum buffers for the waterways labeled Category A and Category B in Table 1. Category A includes constructed ditches, intermittent streams, and ephemeral streams that have never been accessed by salmon. A minimum buffer width of 35 feet is proposed for Category A. Similarly, the Board proposes a 50-foot minimum buffer width for waters in Category B, which includes perennial waters that salmon have never accessed.

The new buffer guidelines should not be adopted as proposed for three reasons.

(1) Many waterways described in Categories A and B are used for irrigation, or intersect working farms. As you are aware, Washington agriculturalists irrigate about 1.8 million acres. Much of the water used for irrigation originates as surface water and is diverted through canals and ditches. Your new proposed guidelines for 35-foot buffers at those waterways could place large swaths of adjacent farmland within habitat buffers, thereby rendering those lands unusable for agriculture. Additionally, requiring minimum buffers for habitat projects on farmland may create a disincentive for key landowner participation in salmon recovery efforts.

(2) The waterways described in Categories A and B are low priority relative to other waters where salmon occur or are known to have occurred in the past. The Board's proposed buffers run the risk of making farming more difficult in order to improve riparian habitat in areas where salmon have never thrived. This means that a "successful" restoration project has only a tenuous connection to salmon recovery. Buffers should not be proposed for areas where habitat projects will not yield the desired result for fish.

(3) Minimum buffer guidelines could be of limited value, because the success of riparian habitat improvement projects hinges on consideration of many site-specific variables. The Board's grant application process already recognizes this reality, as demonstrated by the requirement that each application must undergo review by the technical review panel before receiving funding. This includes site visits, consideration of regional priorities depending on location, and review of project-specific factors that make the project suitable or unsuitable for funding. Because differing circumstances must be accounted for in the case of each project, it is not clear that predetermined guidelines for minimum buffers could ever be applied effectively.

Thank you for your work on this issue. I appreciate your attention to these comments.

Respectfully,

Mark S. Schoesler

Senator Mark Schoesler

RECEIVED
APR 23 2014
WA STATE
RECREATION AND CONSERVATION OFFICE

From: Stephanie Martin [stephanie.martin@makah.com]
Sent: Thursday, April 10, 2014 4:56 PM
To: RCO MI Policy Changes (RCO)
Subject: SRFB riparian guideline comments

I believe there should be broad language in ***Question 2 - What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines?*** That allows for local regulations, such as counties or tribal, to also have exceptions. Frequently there are laws and regulations that are associated with lands located reservations and those laws are different for every tribe, and so some form of broad language that allows for that discussion to be had is important.
Also, what is that buffer extends onto the property of somebody else that is not a party to the project?

Thank you,

____

Stephanie Martin
Habitat Division Manager/Ecologist
Makah Tribe Fisheries Management
P.O. Box 115
150 Resort Drive
Neah Bay, WA 98357
Phone: (360) 645-3173
Cell: (360) 640-1181
Fax: (360) 645-2323
stephanie.martin@makah.com

Snohomish Basin Salmon Recovery Forum

May 1, 2014

RE: SRFB Riparian Guideline Comment

Dear Salmon Recovery Funding Board Members;

The Snohomish Basin Salmon Recovery Forum (Forum) would like to thank you for your work and commitment to support the recovery of Puget Sound Chinook salmon. We appreciate the support you have given to Snohomish projects in the past and recognize the essential funding role you play in advancing the recovery goals in each watershed.

The Forum was formed in 1998 to coordinate the effective implementation of salmon recovery efforts in the Snohomish Basin, and develop the Snohomish River Basin Salmon Conservation Plan in 2005. The Forum has 41 members including high level decision-making representatives from the 14 municipalities within the watershed, King and Snohomish Counties, the Tulalip Tribes, seven special purpose districts, 11 special interest groups including four farmers and three citizens as well as representatives from federal and state agencies.

A critical component of the work supported by this group is habitat restoration actions consistent with the Puget Sound Salmon Recovery Plan. The success that the Snohomish Basin has had in achieving progress towards habitat benchmarks is largely due to the strong cross-sector partnerships that result in on-the-ground projects. However, the Snohomish Basin remains behind schedule on implementation of our recovery actions. We believe the recent SRFB proposal to implement guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat may result in the Snohomish Basin further falling behind in implementation targets.

The Forum recognizes the importance and intent of buffer widths that protect critical ecological functions, including shade and groundwater filtration. The Forum is working with partners to develop creative solutions in order to achieve these ecological functions and maintain support all Forum partner goals. <u>The Forum asks that these project-specific decisions be left to the technical experts and SRFB-committee members in the Snohomish Basin.</u>

A recent project proposal by watershed partners submitted to the NEP Watershed Grant program in the French Creek Basin worked to address creative ways to achieve the ecological function while retaining agricultural production goals. This project partnership, grown out of the Snohomish Sustainable Lands Strategy, consists of the Snohomish Conservation District, Tulalip Tribes, Forterra, and local farmers. The partners were disappointed to hear that despite receiving funding for most components of the proposal, the groundbreaking and carefully crafted solutions for riparian buffers was excluded for funding due to similar riparian buffers policies adopted by Department of Ecology. This is an example of where months of work resulted in fewer gains in an area that has historically been extremely difficult to make any progress towards salmon recovery goals.

The Snohomish Forum appreciates the Board's consideration of these comments.

Sincerely,

Terry Williams, Tulalip Tribes
Snohomish Basin Salmon Recovery Forum Chair

cc:
Forum Members and Interested Parties

From: Woodruff, Thomas L (DFW)
Sent: Friday, April 11, 2014 8:28 AM
To: RCO MI Policy Changes (RCO)
Cc: Budd, Dan (DFW); Skye, June L (DFW); Kane, Elyse A (DFW)
Subject: SRFB Riparian Guideline Comments

Answer to question 1: Yes, adopt "guidelines". Guidelines should only apply to Western WA.

Answer to question 2: Constraints should also include "topography" (not to be confused with geology).

Answer to question 3: No comment.

Answer to question 4: NO! These are guidelines and not criteria. The project should stand on its own merit. It should not be "penalized" for not meeting guidelines.

Thomas L. Woodruff
Real Estate Acquisition Supervisor
Washington Dept. of Fish and Wildlife
600 Capitol Way North
Olympia, WA 98501-1091
(360) 902-8145
thom.woodruff@dfw.wa.gov
fax (360) 902-8140

From: tomslocum@q.com [tomslocum@q.com]
Sent: Tuesday, April 22, 2014 8:23 PM
To: RCO MI Policy Changes (RCO)
Subject: SRFB riparian guideline comments

To whom it may concern:

I would like to comment on the proposed minimum buffer width requirements for SRFB-funded riparian projects, specifically to Question No. 1.

Since 2000 I have worked in several roles helping to implement RCO's salmon recovery program. Based on this experience, I think that the proposed minimum buffer width guideline would not improve the benefit and certainty of the majority of individual riparian projects that are funded from year to year, nor the aggregate effectiveness of the program in general. Each individual project design responds to site-specific conditions and the particular limiting factors identified in each lead entity's local recovery plan. Mandatory buffer width guidelines would limit the independent judgment of project designers to balance all the relevant factors that must be considered in optimizing the benefit and certainty of a project design. The trend in the CREP program in Washington over the past decade has been to continually refine its buffer width rules to allow for more flexibility to respond to site specific circumstances; the RCO's proposed rule moves towards greater rigidity, running counter to the trend in the CREP program.

Second, the proposed rule will set a precedent within the SRFB program of mandating specific, numeric project objectives. At one board meeting several years ago I raised the issue of setting quasi-numeric guidelines for helping to define the "benefit to fish" criterion. The board chairman responded that this would tend to generate a false sense of accuracy to predict benefit in a very complex ecological situation. Similarly, I think that mandating numeric buffer width guidelines would tend to generate an unwarranted sense of accuracy of project benefit.

In summary, in the interest of preserving maximum flexibility to design projects that respond to site-specific conditions, and to avoid a precedent of RCO setting numeric technical standards that generate a false sense of accuracy, I feel that RCO should not adopt the proposed riparian buffer width guidelines. If this proposed change is being mandated by NMFS as a condition of receiving PCSRF funding, then it should be restricted to only those projects that receive federal funding, but not as a general requirement for all SRFB funding. Thank you for this chance to provide comments on this important issue.

Sincerely,

Tom Slocum

4-25-2014

To Whom It Concerns:

The Lower Columbia RFEG does NOT support policy changes of any kind that result in limiting a project sponsors ability to work with landowners to achieve salmon recovery goals. SRFB already possesses the ability to determine benefits to salmon via its technical review panel process regardless of project type. In our opinion, the **quality** of riparian planting projects is far more important than buffer width, especially along smaller streams. The proposed buffer widths should be viewed as the ideal, not as a minimum threshold. The proposed “all or nothing” policy is too simplistic and does not account for the realities project sponsors face when negotiating with landowners on behalf of salmon.

As currently proposed, East side buffers will be 75% of the buffer widths proposed for the West side of the Cascades. This doesn’t make sense considering that East side streams rely heavily (exclusively in many cases) on ground water flows whereas west side streams are often supplemented with rain fall in addition to ground water flow. Also, the average size of a parcel on the East side is much larger than a west side parcel making it “easier” for the east side landowner to donate their land as riparian habitat. In either event the geographical disparity in the proposed buffer widths does not make sense nor do we believe it to be science based.

We are concerned that implementing the proposed minimum buffer requirements will drive riparian restoration activities farther down in the watershed to larger parcels which are often in public ownership which can more easily accommodate the larger buffers being proposed. This works well for cities and counties as they are more and more often the owner of these areas. Unfortunately, as we know, it’s much better to work higher in the watershed where the derived benefits of riparian restoration (lower temperatures, reduced turbidity and detrital inputs) have the ability to “flow” downstream and benefit much larger parts of the watershed rather than just its bottom end.

For example, while re-vegetating the floodplain in the lower river areas may help with floodplain function, detrital inputs and infiltration, it can do next to nothing in terms of lowering stream temperatures as larger streams are typically very wide, slow moving and can’t be shaded regardless of buffer width. Given that salmon can’t survive warm water conditions found in most lower river reaches it doesn’t make sense to focus on setting a minimum buffer width if it means driving project sponsors to locations where land availability trumps measurable fish benefits.

In addition, research is starting to indicate that our restoration dollars are better spent in smaller tributaries rather than the main stems of larger watersheds. We know that the problems impacting the main stems are many times products of the impacts from what’s happening in its tributaries. “Fixing” the larger main stem issues without addressing the core problems in its tributaries will cost significantly more if the smaller, more easily fixed issues in the tributaries are not addressed first.

Requiring a 200’ (100’ each side) buffer on a 5’ wide stream on a 2 acre parcel is tough to sell to the landowner as the buffer will take up their whole property whereas vegetating 50 foot buffers on each side of this same small stream is much more plausible and would still play a significant role in sustaining salmon populations on that stream by simply lowering water temperature and reducing sediment input. By requiring larger buffer widths of these small landowners we may be excluding the most cost effective means of improving salmon runs in the larger watershed context.

As for the RCO analysis of looking at prior years projects to assess the potential impact in getting landowners signed up under the new increased buffer requirements; we are somewhat suspect of that as well. Over the past few years the average size of the projects worked on in the Salmon Creek watershed has gone from 15+ acres down to around 1 or 2 acres and it’s getting smaller and smaller all the time.

Simply put, 15 years of restoration in Salmon Creek watershed coupled with ongoing development has resulted in less vacant land available to implement larger projects which has shrunk the average project size to next to nothing as compared to the recent past. Again, smaller sized projects typically translate into less ground landowners are capable or willing to give up. We are also seeing many more landowners decline as they have developers telling them not to do anything as they could get paid to have mitigation completed on their property. This latter issue also applies to governmental entities i.e. county's and city's.

In closing, we urge SRFB to do nothing in this instance and let the project sponsors work with their land owners to develop projects that best fit the needs of the salmon resource and the needs of the land owners whom we must all defer to in order to gain permission to implement salmon recovery projects.

Sincerely,

Tony Meyer
Lower Columbia RFEG
360-882-6671

Question 1 - Should the board adopt guidelines for minimum buffer widths for projects with a specific objective to improve riparian habitat? If yes, should the guidelines apply to Puget Sound only, western Washington only, or statewide? No, the board should use its paid technical consultants (Review Panel) to determine a projects benefits to fish. If the RP determines the buffer widths are insufficient they should notify the local TAC/ LE and articulate their concerns so they can score the project appropriately. If SRFB is going to use prescriptive protocols to determine a projects benefits to fish then there is no need for paid consultants. If SRFB feels the need to implement the proposed buffers we recommend they do so for Puget Sound only as that is where the issue appears to be most relevant to the Tribes.

As stated in our cover letter (above), we feel implementing the proposed buffers will result in unintended consequences as project sponsors shift their attention away from projects that benefit fish to projects that meet the minimum buffer standards. This would be very unfortunate given that water temperature is the most common limiting factor and can be addressed with much narrower buffers than those proposed, especially on small streams less than 100' wide and certainly those less than 5' wide!

Question 2 - What constraints would be reasonable justification for smaller riparian habitat buffers that are less than the guidelines? Ultimately the land owner will determine what the buffer width will be on their property so it is up to the technical folks to determine whether or not the buffer width proposed by the project sponsor warrants the expenditure of salmon recovery funds. *With that in mind,* **any reasonable justification articulated by the landowner is sufficient reason to reduce the buffer widths assuming concurrence by the Technical Review Panels.**

Question 3 - What types of conservation incentives should be offered to landowners who allow salmon recovery projects on their property? Which types of incentives should be eligible for salmon recovery funding through the Salmon Recovery Funding Board? We question whether or not incentives should be funded by SRFB at all but at minimum whatever incentive(s) offered to a landowner should come with a **permanent** agreement that protects the investment of taxpayer dollars.

Question 4 - Should the board encourage prioritizing funding for riparian habitat projects that meet the guidelines? If so, how could the board encourage such prioritization at the local, regional or state level? Yes, we would support increasing prioritization of riparian projects that maximize riparian buffers over riparian projects that don't, assuming the projects are comparable. We don't support prioritizing a riparian project over other restoration project types simply because the riparian buffer is maximized.