

# FY 2007-2009 F&W Program Project Solicitation

1/6/06

## Section 10. Narrative

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**Project ID:** 200704700

**Title:**

**Washington Hydrography Spatial Data Enhancement Project –  
WDFW & WDNR Operational Data Integration for the Columbia Basin**

### A. Abstract

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Washington States Hydrography federal and state spatial data integration effort will be completed in January 2006. Further work is needed to improve the quality of the 1:24,000 scale spatial and tabular data and to incorporate updated operational data from the WA Dept. of Fish & Wildlife (WDFW) and the WA Dept. of Natural Resources (WDNR) that been collected over the past five years. Access to quality 1:24,000 scale spatial hydrography data is the underpinning to all salmon recovery and basin planning efforts. By synchronizing Washington State's regulatory data improvements with the regions hydrography data is the critical next step in order for us to consistently respond to state and regional scientific and policy questions.

The project will be coordinated and managed through the WA Salmon & Watershed Information Management's Technical Advisory Committee and it's coordinator. With the assistance of WDFW and WDNR, data additions and updates from their stream typing and fish habitat databases with be identified and assessed for inclusion into the existing regional hydrography repository at: [PNW Hydro Clearinghouse](#). All identified additions will be incorporated, routed and attributed, existing stream and water body names will be reviewed for accuracy, and canals will be properly attributed and routed by contracting staff. Updating and loading routines will be created for each state agency to facilitate the continued loading of updated information into the PNW Hydro Clearinghouse.

The project will cover the Columbia Basin and will include Water Resource Inventory Areas (WRIA) 25 though 62, and as each of the watersheds are completed, they will be loaded into the PNW Hydrography Clearinghouse for access and download at: [PNW Clearinghouse Viewer](#). This will have a direct benefit to all who are conducting sub-basin recovery work on any species present in those streams and water-bodies.

### B. Technical and/or scientific background

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#### Problem Statement

Natural resource and environmental management has shifted from an issue specific approach to an integrated landscape and watershed planning approach. This shift has increased the need for agency coordination and data sharing. At the same time, cross-organizational demands for access to surface water information have grown with the growth in watershed-based initiatives. Local watershed planning groups, citizens, tribes, and consultants make frequent data requests to multiple state agencies for separate but similar data. This is driving the need for one contiguous, framework of surface water data that all organizations can tie critical information to it.

## **Project Statement**

The PNW Hydrography Framework Project participants are in the process of building a seamless GIS hydrography layer for all of Washington, Oregon, and northern California to support similar environmental initiatives. This data will be housed on the PNW Hydrography Framework Clearinghouse, which is a dedicated site for the storage and retrieval of the regions hydrography data. Additionally, it also allows appropriate Framework Partners the ability to checkout areas of interest, perform edits to the hydrography data, and then resubmit them back to the Framework thus encouraging the maintenance of one cohesive set of data that's usable by all.

The DNR recently completed the conversion of its legacy HYDRO (Data '96) layer for the state of Washington to this new Framework model and it covers all of western and eastern Washington. The Framework partners have agreed that, in certain watersheds, the converted data will not be posted to the Clearinghouse until it is integrated with hydrography data from the federal partners. The process of integrating these two separate hydrography data sets into one seamless data layer is complex and time consuming and will be completed in January 2006. The last integration step is to add the hydrography data updates (geometry and attributes) that have occurred in the state's operational databases over the past 5 + years into the regions framework hydrography database.

This project will develop the process for and completion of the last integration steps for the Columbia Basin watersheds (WRIA's 25 – 62). All resulting work will be published to the PNW Hydrography Framework Clearinghouse. This will provide multiple users access to coordinated surface water information via an Internet application.

## **Project Objectives**

The primary purpose of this project is to perform the technical data integration, programming, editing, documentation and posting of all affected WRIA's in Washington's Columbia Basin. This means that 36 WRIA's (25 through 62) will need to be edited in order to mesh the two state agencies data into the integrated hydrography data set that existing on the PNW Hydrography Clearinghouse. During the integration process special attention will be spent correcting the canal routing, the stream and water body name attributes, the stream feature type attribute and the addition of all associated framework attribute to all new stream additions. This integration work will be done following the agreed upon pour points established by the USFS/BLM and WDNR and will incorporated all additions and changes downstream from those agreed upon points. The PNW Hydrography Frameworks standards and protocols will be followed during the project.

This is a multi-year project with the first two years focused on the spatial data integration of the WDFW and DNR data with the newly integrated federal and state framework hydrography data.

- Year One: Process, add and update spatial and attribute data for WRIA's 25 pilot and then in production on WRIA's 26 though 40
- Year Two: Process, add and update spatial and attribute data for WRIA's 41 through 62
- Year Three: Final QA/QC and match stream positions along OR & ID border

## **C. Rationale and significance to regional programs**

This will build off the federal and state spatial data integration effort that helped establish agreed upon points for jurisdictional administration and responsibility. It will advance the movement toward a single federal and state regulatory data set that incorporates the spatial geometry from Washington's Forest Practices Stream Typing efforts, Ecology's Impaired Waters of Washington listing (303d) and Fish and Wildlife's Fish Habitat and Population data.

#### **Project Benefits**

- Improve the regional hydrography information base.
- Help avoid duplication of effort by making a single, integrated hydrography layer available to a wide range of users.
- Provide a process for state Framework data integration effort across eastern Washington.
- Help strengthen interagency relationships and decision making in the Columbia Basin
- Provides the base data set needed to hang fish and habitat related attribute in the Columbia Basin

#### **D. Relationships to other projects**

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This is a new project to the F&W Program but it is one that has a long history in the development, construction and sharing of Pacific Northwest hydrography spatial data. Work has been conducted through a regional partnership (OR, WA, BLM, USFS) since 2000.

Recent success has been demonstrated in the last two years in the successful completion on and within budget of the following two projects:

- Western Washington Hydrography Framework Integration - August 2004 to March 2005
- Eastern Washington Hydrography Framework Integration - September 2005 to January 2006

The PNW Hydro Framework was designed so that all agencies and organizations can utilize the core spatial and tabular information directly. It supports the incorporation of data specific to each organization and allows salmon and watershed information to be housed and stewarded within the appropriate agency or organization, yet it can also be shared, analyzed, and displayed within the context of a single set of spatial hydrography data. This project will help support NHD and StreamNet efforts in the region by providing more accurate and updated data from the states regulatory agencies.

#### **E. Project history (for ongoing projects)**

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N/A

#### **F. Proposal biological objectives, work elements, and methods**

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Provides the quality, spatial data needed to tie biological objectives in any stream and/or water-body in the Columbia Basin. Represents the framework for spatial collection, display and analysis of monitoring information in the Columbia basin. This project would directly benefit other projects like status and trend monitoring for habitat and water quality monitoring.

Specific spatial data collection, updating and integration objectives and tasks include the following for this project.

### **Project Tasks, Output Product and Workload**

Specific tasks include:

- Technical coordination between DNR, WDOE, WDFW, USFS & BLM.
- Customize BLM/WA integration tools to meet the needs of Washington Framework state agency's spatial and attribute data additions and updates into the existing integrated data set
- Initial implementation on WRIA 25 pilot project to verify implementation rules and processes on the integration of DNR and WDFW spatial geometry into the Clearinghouse Hydrography Framework data
- Discuss possible efficiencies with participants on improving the process
- Develop agency specific (WDFW, WDNR, ECY) data update routines for loading data into the PNW Hydro Clearinghouse – parallel routines for their existing operational processes
- Document the integration process and finalize documentation
- Develop production schedule for remain watersheds
- Implement production schedule

### **Timelines and Deliverables**

#### Timeline:

Estimated start date: November 1, 2006

Estimated Completion date: September 30, 2009

#### Deliverables:

- 1) 38 fully integrated WRIA's including: watercourse, water bodies, and water shoreline
- 2) Successful posting of integrated data to the PNW Hydrography Framework Clearinghouse
- 3) Documentation detailing the specifics of data integration between state jurisdictions
- 4) Programs and procedures for automating the integration of hydro data

### **Estimated Budget/Resource Impacts:**

#### **Steering Committee Members:**

Resource commitment of about 8 - 12 hours per member/year to cover meetings, reviews and assessment of the project's progress- In-kind services estimated at 60 hrs/year (\$3000) or 180 hours total (\$9000).

Stephen Bernath, Water Quality Program, Ecology

Jim Eby, Information Technology Division, WDFW

Deborah Naslund, Forest Practices Division, WDNR

Joy Paulus, Office of the Interagency Committee (IAC)

#### **State Agency Staff Resources/Services Estimates:**

IAC 1030 hours project management

Ecology 1230 hours technical programming, training and source data comparison and IT programming

WDFW 1340 for source data comparison/integration decision support, QA/QC data review and IT programming

WDNR 1356 hours for source data comparison/integration decision support, Framework hydrography data coordination and IT programming

**Contracted Resources/Services Estimates:**

GIS Technical Specialist:

6544 hrs for spatial data integration, attributing, routing, programming and documentation.

GIS Programming Specialist:

1000 hrs for applications programming for agency update routines to interface with the PNW Hydrography Clearinghouse.

PNW Clearinghouse Infrastructure Support:

The Clearinghouse is used to store hydrography data for Washington, Oregon, and northern California. It is an ArcIMS site dedicated to the storage and retrieval of data and allows partners the ability to checkout areas of interest, perform edits to the data, and then resubmit data back to the Framework. \$25,000/year covers service for:

- Application support;
- ArcSDE administration;
- Support of the transaction environment;
- Oracle database administration;
- Systems administration; and
- Telecommunication services.

**Estimated Costs**

Object		Year 1	Year 2	Year 3
Personnel	GIS Technical Staff	\$87,786	\$50,479	\$28,618
Fringe Benefits	GIS Technical Staff	\$18,435	\$10,601	\$6,010
Overhead	GIS Staff - salaries & benefits	\$42,095	\$24,206	\$13,723
Capital Equipment	3 Servers	\$40,062	\$ 0	\$ 0
Travel	Cross border coordination	\$ 0	\$ 0	\$4,160
Other	GIS Contracting Services	\$393,500	\$367,500	\$184,000
Other	PNW Clearinghouse Infrastructure Services	\$25,000	\$25,000	\$25,000

<b>Itemized Budget Totals</b>	<b>\$606,878</b>	<b>\$477,786</b>	<b>\$261,511</b>
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**FY 2007-FY 2009 Itemized Budget Total \$1,346,175**

**Detailed Tasks and Deliverables:**

**Year 1 Detailed Task Schedule**

	Tasks	Identified Agencies	Hrs/Org.	Start Date	End Date
	<b>INITIAL PHASE – Project Implementation</b>			<b>Nov. 1, 2006</b>	<b>Mar. 30, 2007</b>
<b>1.0</b>	<b>Assessments &amp; Start-up of Columbia Basin Integration Enhancement Project</b>	Project Manager	1 x 220 hrs	Nov 1, 2006 Wk 1	Jan 12, 2007 Wk 10
1.1	Project roles, project time line, commitments and identify agency project participants	Steering Committee	6 x 2 hrs	Wk 2	Wk 4
1.2	Project Steering Committee Kick-off Meeting	Steering Committee	6 x 4 hrs	Wk 5	Wk 5
1.3	Technical Committee Kick-off Meeting	Technical Committee	4 x 4 hrs	Wk 6	Wk 6
1.4	Begin Contract Hiring Process for GIS Professional Services	Project Manager & Member Agencies	1 x 120 hrs	Wk 6	Wk 10
1.5	Produce Status Table for Reporting Progress by WRIA & HUC and Status of Data Delivery and QA/QC	Project Manager & Tech Team	4 x 4 hrs	Wk 7	Wk 7
1.6	Set up meeting schedule for WRIA geometry update integration process sessions with ECY, DNR, & WDFW	Project Manager, DNR	2 x 4 hrs	Wk 8	Wk 10
	<i>1.0 Sub-total</i>		<i>416 hrs</i>		
<b>Product: Project plan and agreement from participants. Hiring completed.</b>					
<b>2.0</b>	<b>Define Integration Decision Rules and Procedures</b>	Project Manager	1 x 60 hrs	Jan. 15, 2007 Wk 13	Mar 16, 2007 Wk 22
2.1	Agencies to review and assess the type of additions, changes and updated that will be handles during this enhancement project	WDFW, WDNR & Ecology	3 x 40 hrs	Wk 15	Wk 19
2.2	Define and document the rules for integrating agency operational data into the existing hydro framework data	WDFW, WDNR, ECY	3 x 8 hrs	Wk 19	Wk 21
2.3	Review and obtain buy-off from the Steering Committee on the integration rules and procedures	Steering Committee	6 x 8 hrs	Wk 22	Wk 22
	<i>2.0 Sub-total</i>		<i>252 hrs</i>		
<b>Product: Procedural documents for data enhancement integration</b>					
<b>3.0</b>	<b>Programming and Procedural Documentation, Training and Integration Test Against WRIA 25 Pilot Project</b>	Project Manager	1 x 30	Mar 18, 2007 Wk 22	Apr 30, 2007 Wk 27
3.1	Modify Ecology's	Ecology &	2 x 80	Wk 22	Wk 23

	WA data enhancement and integration programming	Contractor			
3.2	Procedural Documentation for Data Integration and Enhancement	Ecology & Contractor	2 x 16	Wk 23	Wk 25
3.3	Conduct WRIA geometry update integration session with ECY, DNR, & WDFW on WRIA 25	WDFW, WDNR, ECY, Project Manager, Contractor	5 x 16	Wk 22	Wk 25
3.4	Develop agency specific (WDNR, WDNR, ECY) data update routines for loading data into the PNW Hydro Clearinghouse – parallel routines to existing operational processes	Contractor, ECY, WDNR, WDFW programmer	1 x 800 and 3 x 120	Wk 22	Wk 27
3.5	Test Procedures and programming on WRIA 25 pilot data updates	Contractor w/ Ecology support	2 x 112	Wk 22	Wk 27
3.6	QA resulting data and modify Procedures if necessary	WDFW, DNR & Contractor	3 x 4	Wk 22	Wk 27
3.7	Load pilot data into the PNW Clearinghouse	Contractor	1 x 8	Wk 22	Wk 27
3.8	BLM to Provide User Acceptance and Verification of Data Loading	BLM		Wk 22	Wk 27
	<i>3.0 Sub-total</i>		<i>1630 hrs</i>		
<b><i>Product: Integrated watercourse, water bodies, water shoreline data for WRIA 25 loaded into the PNW Clearinghouse</i></b>					
<b>4.0</b>	<b>Project Team Buy-off on Resulting Data</b>	Project Manager	1 x 16	May 7, 2007 Wk 28	May 14, 2007 Wk 28
4.1	Data review period – 2 weeks. Comments due by March 1, 2008	Technical Team	4 x 40	Wk 28	Wk 28
4.2	Steering Committee & technical team meet to approve results	Steering Committee	10 x 2	Wk 28	Wk 28
	<i>4.0 Sub-total</i>		<i>196 hrs</i>		
<b><i>Product: Accepted procedures and results from Testing Phase</i></b>					
	<b>PRODUCTION PHASE – WRIA 26 - 40</b>			<b>May. 14, 2007</b>	<b>Sept. 30, 2007</b>
<b>5.0</b>	<b>Production Implementation Schedule Set</b>	Project Manager	1 x 40	May 14, 2007 Wk 28	May, 25, 2007 Wk 28
5.1	Adjust schedule and delivery dates, as needed, based on results from WRIA 25	Project Manager	1 x 4	Wk 28	Wk 28

	integration work. Forward results to Steering Committee				
5.2	Technical Committee Kick-off Meeting	Technical Committee	4 x 4	WK 28	Wk 28
	<i>5.0 Sub-total</i>		<i>60 hrs</i>		
<b>Product: Documented cost &amp; implementation schedule for the integration of remaining 15 WRIA</b>					
<b>6.0</b>	<b>Production Integration on 15 Columbia Basin WRIA's 26 - 40</b>	Project Manager	1 x 60	May 28, 2007 Wk 29	Sept. 30, 2007 Wk 48
6.1	Obtain WDFW & DNR Data Sets	Contractor	1 x 12	Wk 29	Wk 38
6.2	Conduct WRIA geometry update integration session with ECY, DNR, & WDFW (16 hrs/WRIA x 15 WRIA's)	Contractor, ECY, WDFW, WDNR	4 x 240	Wk 29	Wk 35
6.3	Following integration procedure documentation begin processing data sets in priority WRIA order	Contractor			
6.4	Integrate DNR & WDFW Watercourse, water body, & shoreline updates and correct canal routes and stream names if necessary (14 days/WRIA)	Contractor	1 x 1680	Wk 29	Wk 38
6.5	Run QA/QC procedures on completed WRIA's and make necessary changes (4 hrs/WRIA)	Contractor	1 x 60	Wk 29	Wk 38
6.6	WDFW and WDNR to verify WRIA for final assurance (stream name, type codes, route integration) 8 hrs/ WRIA	WDNR, WDFW	2 x 120	Wk 29	Wk 38
6.7	Move Completed WRIA to the PNW Clearinghouse (4 hrs/WRIA)	Contractor	1 x 80	Wk 29	Wk 38
6.8	BLM to verify and review loaded data on the Clearinghouse – QA/QC (2 hrs/WRIA)	BLM		Wk 29	Wk 38
6.9	Pull together all technical documentation	Contractor	1 x 120	Wk 32	Wk 38
6.10	<u>Meeting:</u> Steering committee & technical team meet to close out project year	Steering & Technical Team	8 x 2	Wk 38	Wk 38
	<i>6.0 Sub-total</i>		<i>3268 hrs</i>		
<i>Step through Tasks 6.3 through 6.8 until all 1<sup>st</sup> Year Columbia Basin WRIA's are completed</i>					
<b>Product: Fully integrated hydrography framework data posted to the PNW Hydro Clearinghouse of Year 1 WRIA's in the Columbia Basin</b>					

## Year 2 Detailed Task Schedule

	PRODUCTION PHASE	Identified Agencies	Hrs/ Org.	Start Date	End Date
<b>1.0</b>	<b>Production Implementation Schedule Set</b>	Project Manager	1 x 40	<b>Oct. 1, 2007</b>	<b>Oct. 30, 2007</b>
1.1	Adjust schedule and delivery dates, as needed, based on results from WRIA 26 – 40 data integration efforts. Forward results to Steering Committee	Project Manager and contractor	2 x 8	Wk 1	Wk 4
1.2	Project Steering Committee Kick-off Meeting	Steering Committee	6 x 2	Wk 2	Wk 3
1.3	Technical Committee Kick-off Meeting	Technical Committee	4 x 4	Wk 3	Wk 4
	<i>1.0 Sub-total</i>		<i>84 hrs</i>		
<b>Product: Documented cost &amp; implementation schedule for the integration of remaining 20 Year 2 WRIA's in the Columbia Basin</b>					
<b>2.0</b>	<b>Production Integration on 20 Columbia Basin WRIA's 41 – 62</b>	Project Manager	1 x 120	<b>Nov. 1, 2007</b>	<b>Sept. 30, 2008</b>
2.1	Obtain WDFW & DNR Data Sets	Contractor	1 x 12	Wk 5	Wk 20
2.2	Conduct WRIA geometry update integration session with ECY, DNR, & WDFW (16 hrs/WRIA x 20)	Contractor, ECY, WDFW, WDNR	4 x 320	Wk 6	Wk 10
2.3	Following integration procedure documentation being processing data sets in priority WRIA order – data programming support	Contractor	1 x 100		
2.4	Integrate DNR & WDFW Watercourse, water body, & shoreline updates and correct canal routes and stream names if necessary (14 days/WRIA*20)	Contractor	1 x 2240	Wk 11	Wk 45
2.5	Run QA/QC procedures on completed WRIA	Contractor	1 x 60	Wk 11	Wk 45
2.6	WDFW and WDNR to verify WRIA for final assurance (stream name, type codes, route integration – 8 hrs/WRIA)	WDNR, WDFW	2 x 160	Wk 11	Wk 45
2.7	Move Completed WRIA to the PNW Clearinghouse (4 hrs/WRIA)	Contractor	1 x 80	Wk 11	Wk 45
2.8	BLM to verify and review loaded data on the Clearinghouse – QA/QC (2 hrs/WRIA)	BLM		Wk 11	Wk 45
2.9	<u>Meeting:</u> Steering committee & technical team meet to close out project year	Steering & Technical Team	8 x 2	Wk 50	Wk 52
2.10	Pull together all technical documentation	Contractor	1 x 120	Wk 45	Wk 52
	<i>Step through Tasks 2.3 through 2.7 until all WRIA's are complete</i>				
	<i>2.0 Sub-total</i>		<i>4348</i>		

			<i>hrs</i>		
<b>Product: Fully integrated agency hydrography framework data posted to the PNW Hydro Clearinghouse for Year 2 WRIA's In the Columbia Basin</b>					

### Year 3 Detailed Task Schedule

	<b>PRODUCTION PHASE</b>	<b>Identified Agencies</b>	<b>Hrs/ Org.</b>	<b>Start Date</b>	<b>End Date</b>
<b>1.0</b>	<b>Production Implementation Schedule Set</b>	Project Manager	1 x 40	<b>Oct. 1, 2008</b>	<b>Oct. 30, 2008</b>
1.1	Adjust schedule and delivery dates, as needed, based on results from Year 2 data integration efforts. Forward results to Steering Committee	Project Manager and contractor	2 x 8	Wk 1	Wk 4
1.2	Project Steering Committee Kick-off Meeting	Steering Committee	6 x 2	Wk 2	Wk3
1.3	Technical Committee Kick-off Meeting	Technical Committee	4 x 4	Wk 3	Wk 4
1.4	<i>1.0 Sub-total</i>		<i>84 hrs</i>		
<b>Product: Documented cost &amp; implementation schedule for the integration of 13 ID/OR cross-border WRIA's in the Columbia Basin</b>					
	<b>QUALITY ASSURANCE &amp; CROSS BOUNDARY PRODUCTION</b>	<b>Identified Agencies</b>	<b>Hrs/ Org.</b>	<b>Start Date</b>	<b>End Date</b>
<b>2.0</b>	<b>Production Integration on 13 Border WRIA's Bordering ID &amp; OR</b>	Project Manager	1 x 120	<b>Nov. 1, 2008</b>	<b>July. 30, 2009</b>
2.1	Set up meeting schedule for WRIA geometry update integration sessions with ID & OR Framework and GIC Coordinators	Project Manager, DNR	2 x 4	Wk 5	Wk 8
2.2	Obtain ID and OR Data Sets for the affected 13 WRIA's	Project Manager, Contractor	1 x 24	Wk 5	Wk 8
2.3	Establish border match points for all steams and water bodies in each affected WRIA with OR and ID coordinators (16 hrs/WRIA)	DNR, ECY, WDFW, Contractor	4 x 208	Wk 8	Wk 20
2.4	Data programming support for border integration	Contractor	1 x 100		
2.5	Edge match watercourse, water body and shoreline line work to agreed upon match points (7 days/WRIA)	Contractor	1 x 728	Wk 20	Wk 45
2.6	Run final QA/QC procedures on data before submitting to the Framework Clearinghouse (8 hrs/WRIA)	Contractor	1 x 104	Wk 20	Wk 45
2.7	Move Completed Border WRIA's to the PNW Clearinghouse (4 hrs/WRIA)	Contractor	1 x 52	Wk 20	Wk 45
2.8	BLM to verify and review loaded data on the Clearinghouse – QA/QC – 2 hrs/WRIA	BLM		Wk 20	Wk 45

2.9	Pull together all technical documentation	Contractor	1 x 120	Wk 45	Wk 50
	<i>2.0 Sub-total</i>		2088 hrs		
	<i>Step through Tasks 2.3 through 2.7 until all border WRIA's are completed</i>				
<b>Product: Fully integrated cross border hydrography framework data posted to the PNW Hydro Clearinghouse</b>					
<b>3.0</b>	<b>Project Closure &amp; Documentation</b>	Project Manger	1 x 14	<b>Aug, 1, 2009</b> Wk 20	<b>Sept. 30, 2009</b> Wk 52
3.1	Finalize WA Columbia Basin Data Integration and Enhancement Project Documentation	Contractor	1 x 8	Wk 20	Wk 45
3.2	Pull together all technical documentation	Contractor	1 x 120	Wk 20	Wk 45
3.3	<u>Meeting:</u> Steering committee & technical team meet to close out project	Steering & Technical Team	8 x 2	Wk 20	Wk 45
	<i>3.0 Sub-total</i>		158 hrs		
<b>Product: Complete set of project, programming and technical documents for use and acceptance of the final project product</b>					

## **G. Facilities and equipment**

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Existing state agencies facilities, computer hardware and software resources will be used for this project. Contractors will comply with data delivery formats and procedures as outlined at the PNW Hydrography Clearinghouse.

*Examples:*

Software - ArcGIS 9.0, ArcSDE, ArcInfo

RDBMS - SQLServer

Hardware – MS compatible PC's and workstations

Standards – PNW hydrography Framework Clearinghouse Hydrography Data Standards and Procedures

## **H. References**

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PNW Hydrography Framework Clearinghouse Standards and Documentation Site:  
<http://hydro.reo.gov/>

PNW Hydrography Clearinghouse Data Access Site:  
[PNW Clearinghouse Viewer](#)

Eastern Washington Hydrography Federal and State Spatial Data Integration Project Plan:

[Eastern WA Hydro Integration Project](#)

Western Washington Hydrography Federal and State Spatial Data Integration Project Plan:  
[Western WA Hydro Integration Project](#)T

**I. Key personnel**

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**Project Sponsors** – WA Salmon & Watershed Information Management Technical Advisory Committee (SWIMTAC) – Office of the Interagency Committee (IAC)

**Project Manager** – Joy Paulus, Coordinator for SWIMTAC

**Steering Committee** - Stephen Bernath, WA Dept. of Ecology; Jim Eby, WA Dept. of Fish & Wildlife; Deborah Naslund, WA Dept. of Natural Resources; Joy Paulus, IAC

**Steering Committee Support** – Carl Harris, WA Dept. of Natural Resources; Tim Young, WA Dept. of Fish & Wildlife; John Tooley, WA Dept. of Ecology; Dick O’Connor, WA Dept. of Fish & Wildlife

**Technical Team** – Dan Saul, WA Dept. of Ecology; Martin Hudson, WA Dept. of Fish & Wildlife; Carl Harris, WA Dept. of Natural Resources

