Stream Restoration as a Strategy to Address Water Scarcity

Mike Kaputa

Chelan County Natural Resource Department

Water Scarcity:
Wenatchee Instream Flow Reserve Accounting

- **380 gpd fixed rate to September consumptive use**
- **Fixed rate to building permit type allocations (e.g. full use, indoor only)**
- **Tracking new permits under Wenatchee Coordinated Cost Reimbursement**
- **Real-time tracking with annual QA/QC review steps**
- **County QA/QC of past allocation assumptions**

Reserve Accounting System

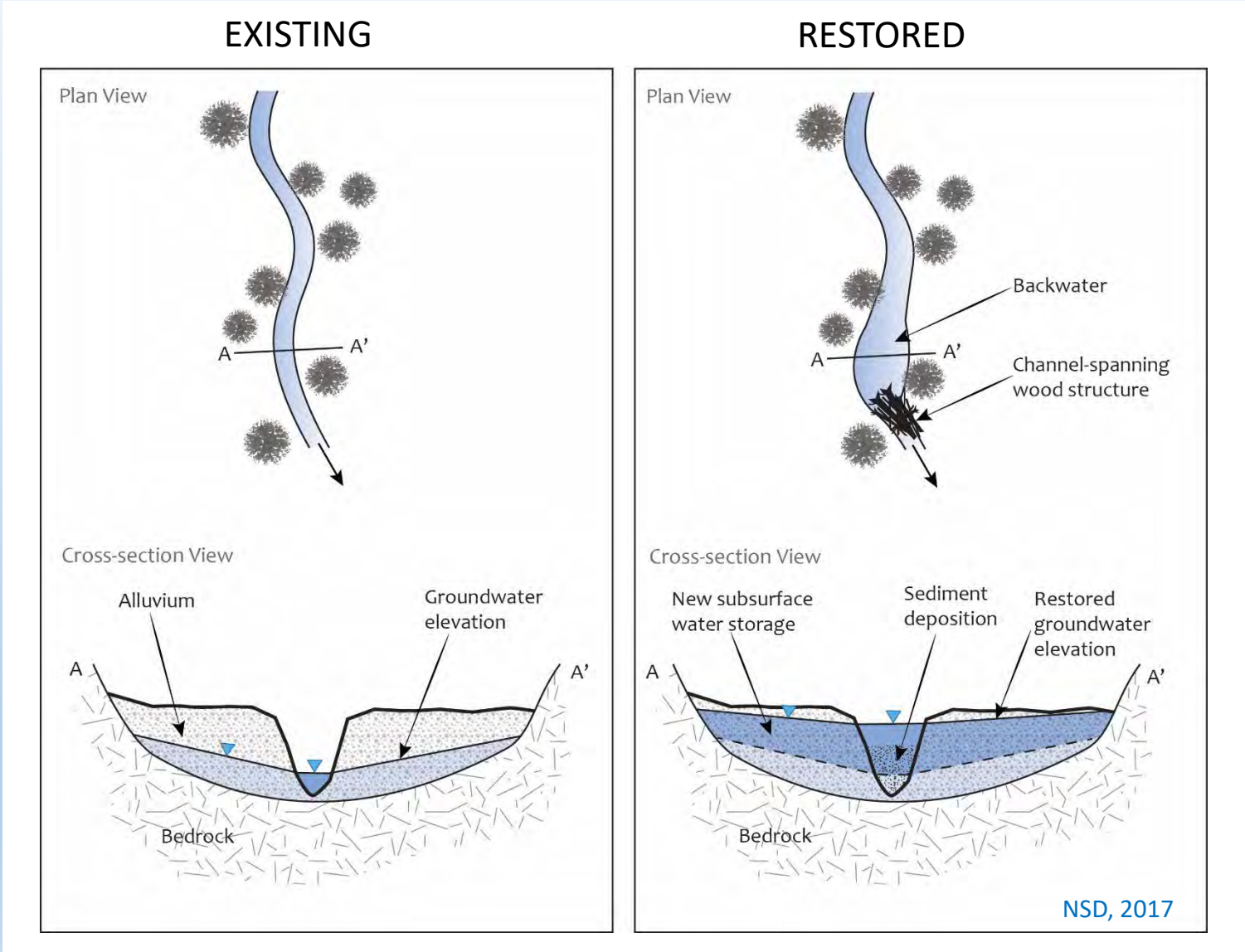
Chelan County Domestic Water Supply - Permit Exempt Well Accounting Summary Table by watershed

		Total Reserve by Subwatershed		Combined Debit		Remaining Reserve	
Watershed	*Sub-watershed*	*Reserve (gbd)*	*Reserve (cfs)*	*Debit (gpd)*	*Debit (cfs)*	*Reserve (gbd)*	*Reserve (cfs)*
WENATCHEE[1]:							
	Lower Wenatchee and its tributaries (below Tumwater):						
	LOWER WENATCHEE	1958630	3.03	35340	0.0547	1923290	2.9753
	ICICLE	64641	0.10	17100	0.0265	47541	0.0735
	CHUMSTICK	27796	0.04	23180	0.0359	4616	0.0071
	PESHASTIN	64641	0.10	7220	0.0112	57421	0.0888
	MISSION	19392	0.03	15200	0.0235	4192	0.0065
	Upper Wenatchee and its tributaries (above Tumwater):						
	UPPER WENATCHEE*	323206	0.50	38000	0.0588	271906	0.4206
	LAKE WENATCHEE	Incl. in Up Wen.	Incl. in Up Wen.	11020	0.0170		Incl. in Up Wen.
	WHITE	Incl. in Up Wen.	Incl. in Up Wen.	2280	0.0035		Incl. in Up Wen
	CHIWAUKUM	Incl. in Up Wen.	Incl. in Up Wen.	0	0.0000		Incl. in Up Wen.
	CHIWAWA	64641	0.10	3040	0.0047	61601	0.0953
	NASON	64641	0.10	12920	0.0200	51721	0.0800
	WENATCHEE TOTAL:	**2587589**	**4.00**	**152000**	**0.2351**	**2422289**	**3.7473**
ENTIAT[2]:							
	ENTIAT		**1.00**	**3650000**	**5.6466**	**-3003588**	**-4.6466**
LAKE CHELAN[3]:							
	LAKE CHELAN		**?**	**700**	**0**		**?**
COLUMBIA RIVER and tributaries[3]:							
	COLUMBIA RIVER		?	0	0		?
	STEMILT		?	0	0		?
	ANTOINE CREEK		?	0	0		?
	SQUILCHUCK		?	0	0		?
	COLOCKUM		?	0	0		?
	COLUMBIA RIVER TOTAL:		?	?			**?**

* All upper wenatchee totals include white river, lake wenatchee, upper wenatchee river, and chiwaukum river

[1]Reserves based on: Chapter 173-545 WAC, Instream Resources Protection Program - Wenatchee River Basin, Water Resources Inventory Area (WRIA) 45. Washington Department of Ecology, 2007. Effective 1/12/2008. Combined debit includes 1/12/2008 - present, 380 gpd/permit exempt well.

Restoring Natural Water Storage



Chelan County: Alluvial Storage Pilots

- **Natural storage has benefits over traditional surface impoundments (environmental footprint) and aquifer storage (cost)**
- **Shifts hydrograph against climate change trend**
- **Water supply benefits capable of meeting rural supply problems**
- **Water quality, temperature benefits**
- **Project in Poison Creek (Mission Creek, Wenatchee basin)**

Mission Creek Alluvial Storage Pilot Project

- **Poison Creek monitoring on-going**
- **East Fork Mission Creek pilot being developed**
- **Master QAPP being considered**
- **Site Specific monitoring plus Master QAPP for administrative ease**
- **Outreach plan to key stakeholders being developed**
- **Commerce grant report**

Poison Creek near Cashmere, WA

- **Piezometers used to monitor shallow groundwater**
- **Streamflow measurements**
- **County code coordination**
- **Ongoing O&M**
- **Improvements over time**
- **About 20 acre-feet of potential storage**

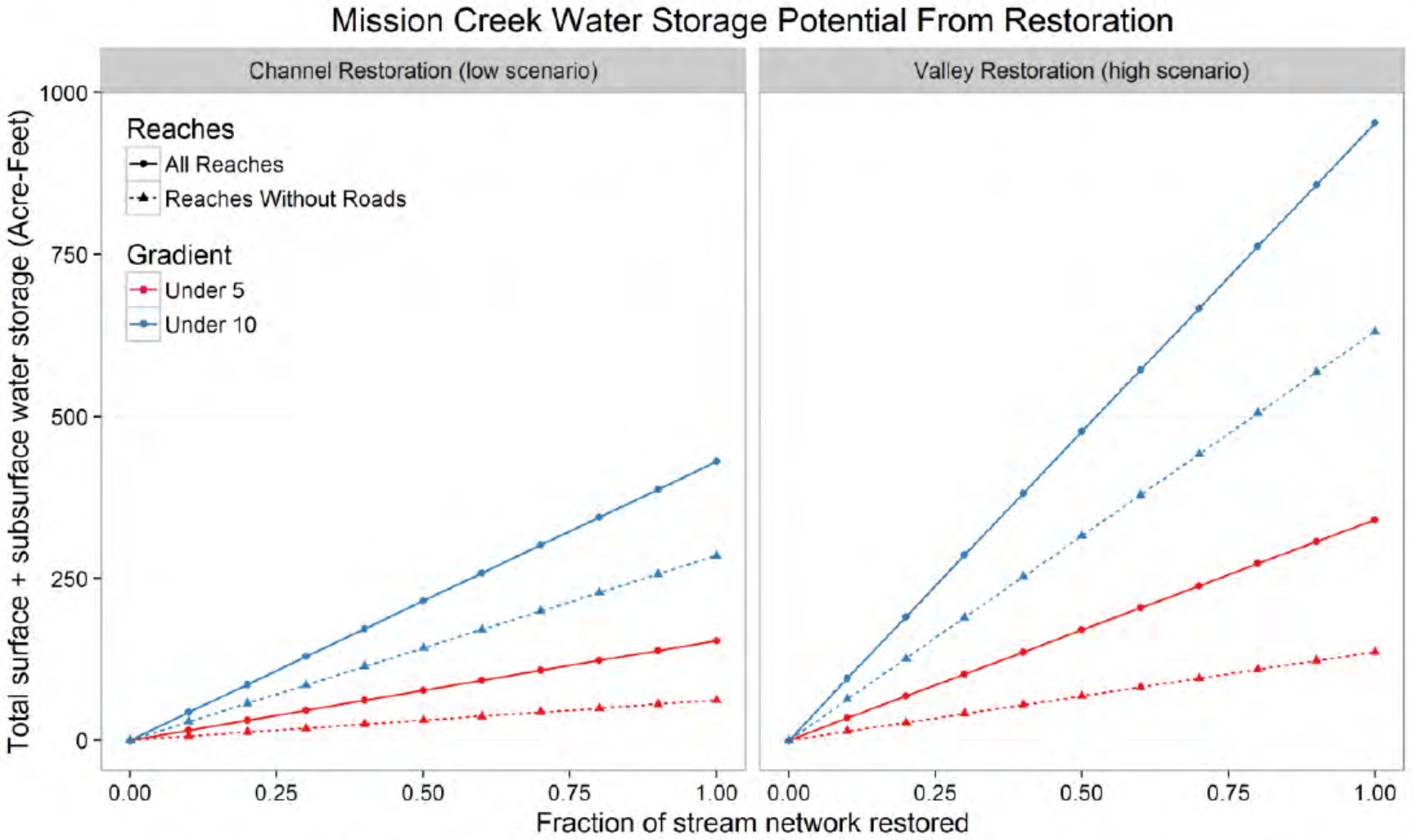


Figure 17. Potential alluvial water storage the low and high restoration scenarios, as a function of the fraction (0 to 1) of the treatable channel network to which restoration actions are applied. Colors indicate the maximum stream gradient of reaches included in the estimate (<5% and <10%), and symbols and line types further indicate the inclusion of all reaches under that gradient threshold, or only reaches that are not adjacent to roads.

Graphics generated by Natural System Design

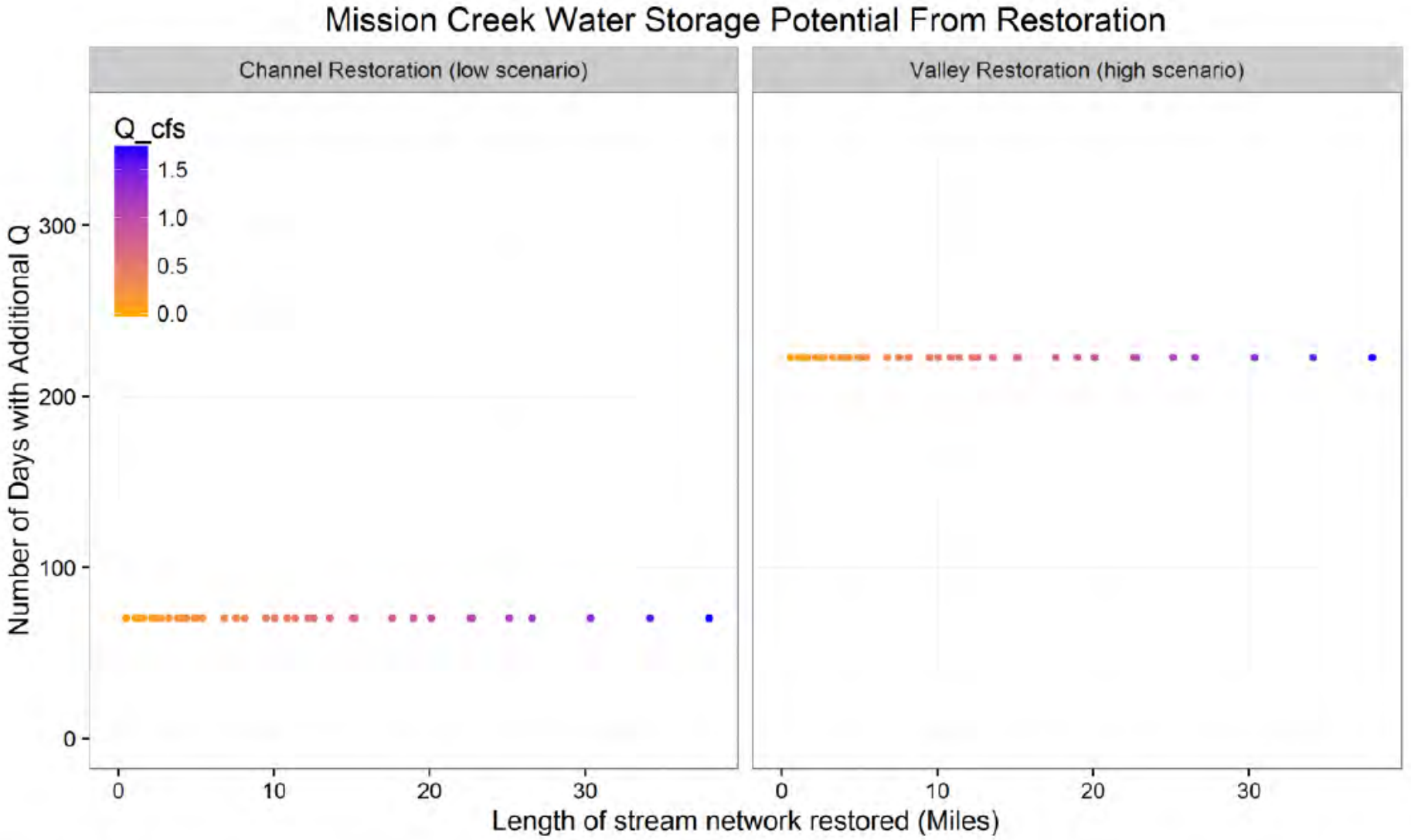


Figure 18. Potential contribution to streamflow (Q, in cfs) from subsurface alluvial water storage in the low (left) and high (right) restoration scenarios. The streamflow contribution (symbolized by color) varies as a function of the length of the stream network restored (x-axis, miles). The number of days (y-axis) of that given streamflow contribution is constant in each scenario because both the additional storage and the additional Q scale linearly with length of the stream network restored.

Graphics generated by Natural System Design