



Note: This material is intended for, and contains elements of special interest to, WDFW agency staff. Non-agency readers or anyone having questions about the context, clarity, or content for items in this update should contact the author, WDFW Drought Coordinator Teresa Scott at (360) 902-2713 [teresa.scott@dfw.wa.gov](mailto:teresa.scott@dfw.wa.gov)

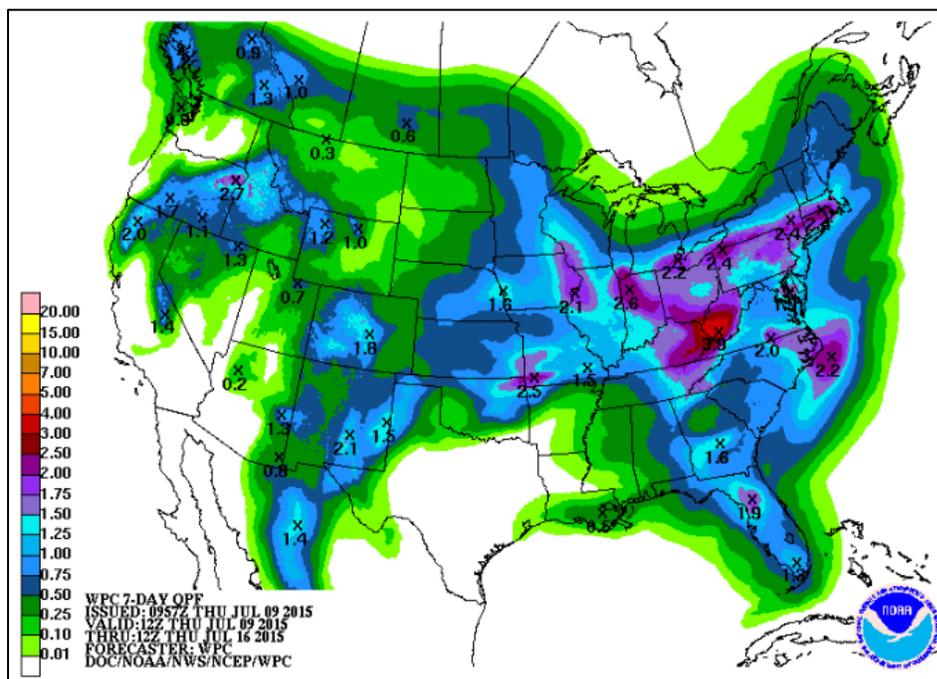
The heat wave that has baked Washington from June into the first part of July 2015 is coming to an end – news that couldn't be more welcome to fish and wildlife devotees. It looks like Washington will return to "normal" temperatures and precipitation through the summer, which might help lower water temperatures. The outlook for fall and beyond is similar to what we experienced this year, with dry-to-normal precipitation and warmer-than-normal temperatures into next spring. The most stunning factoid provided during a July 9<sup>th</sup> briefing by the state climatologist's office is that July 1 soil temperatures in Sunnyside and Prosser were 87 and 86 degrees F, respectively, at a soil depth of 8 inches! Recent-year readings for July 1 range around the mid-70s.

Reports of dead fish and sightings of recreational rock dams have dominated the news coming into Drought Central this past week. Details follow.

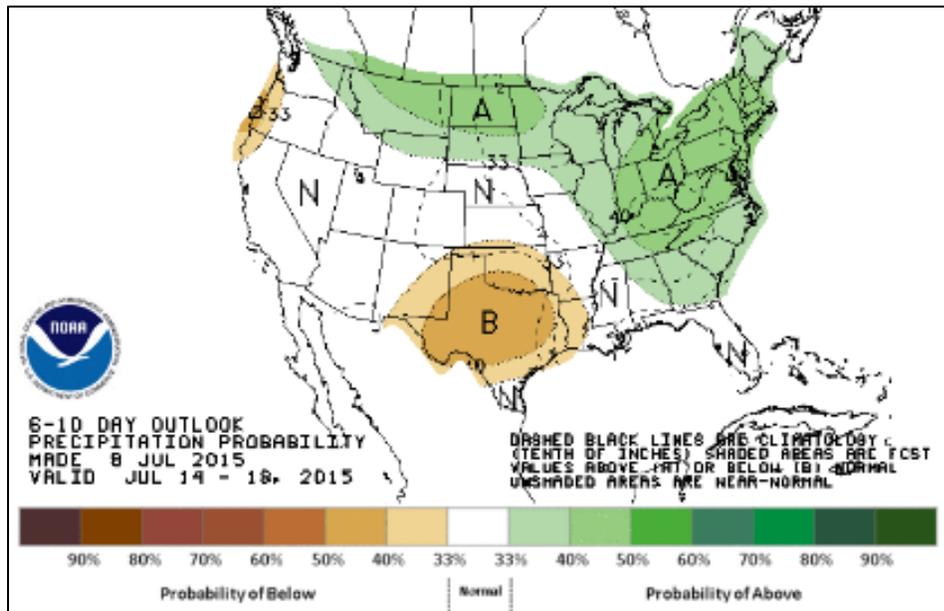
Don't forget to check out the [weekly update by the Office of the State Climatologist](#), which eloquently summarizes conditions and milestones to-date.

### ***Temperature and Precipitation Forecasts***

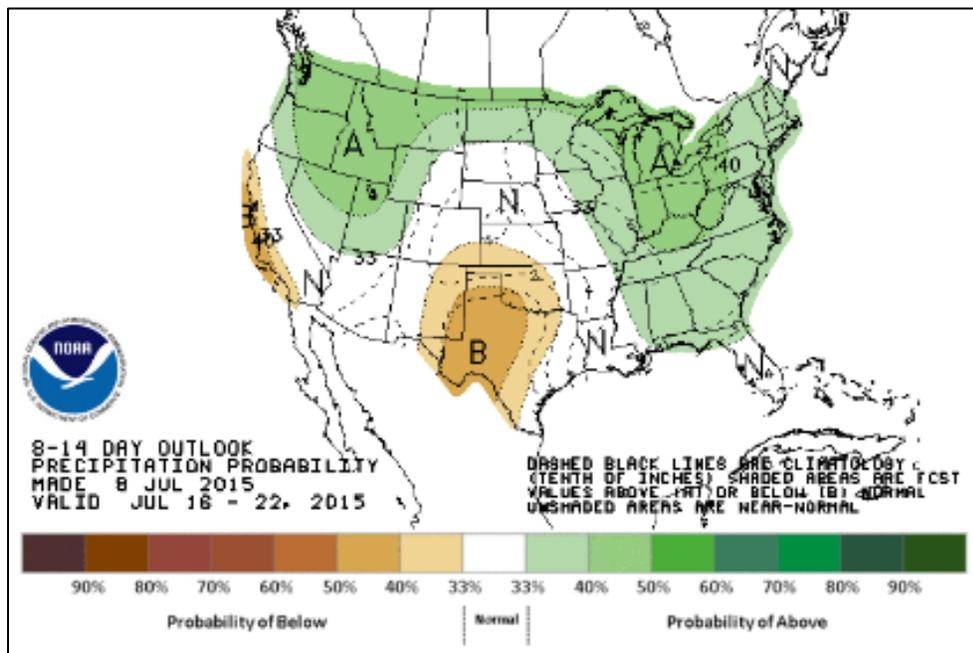
Precipitation in general is expected in Washington during the next seven days ([below](#)).



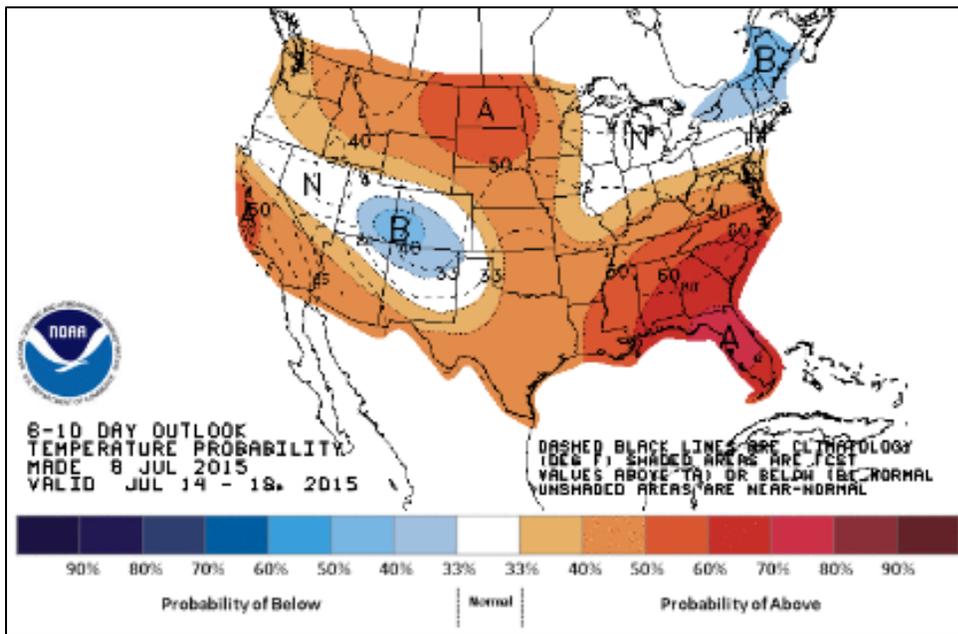
The 6-to-10 day probability of precipitation is greater than normal in north-central to northeast Washington (below)



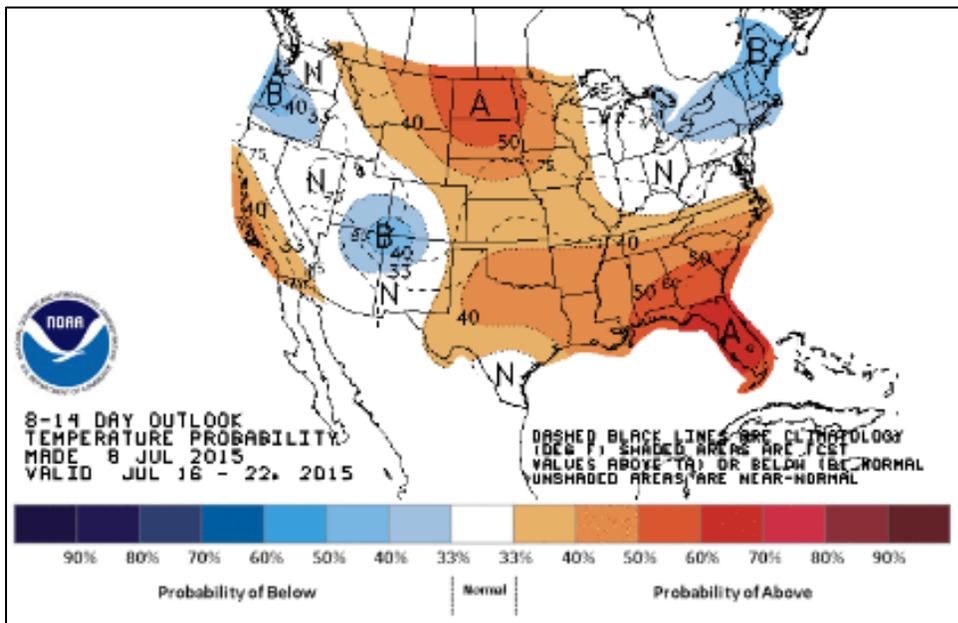
And below is the 8-to-10-day outlook (precipitation probability). To me, this looks like a 30-to-40% probability of above-normal precipitation throughout Washington for this time period. Since this time of July is usually dry (although I recall some very wet Capital Lakefair and Seafair celebrations), this prediction gives me hope for some dust-settling rain in our near future.



What will temperatures look like in the near term? The temperature outlook ([below](#)) is for above-normal temperatures throughout Washington for the next 6-to-10 days.

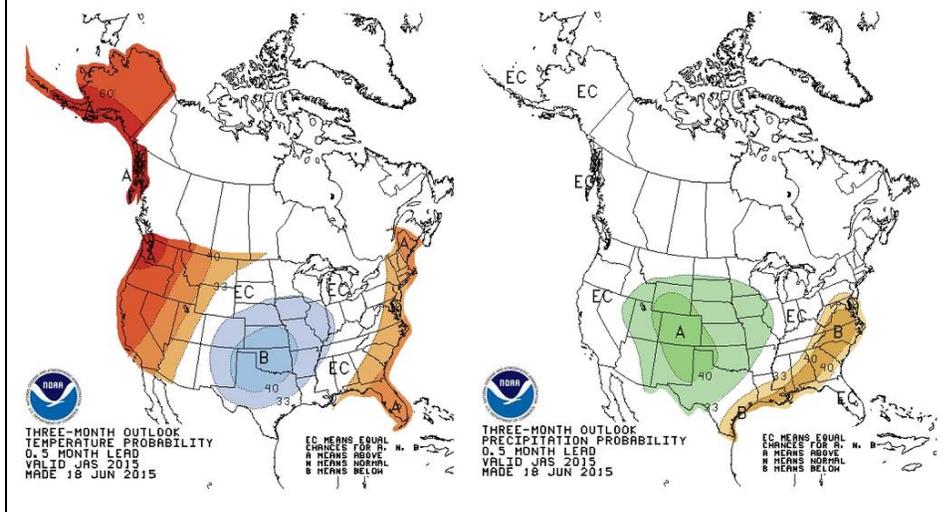


However, temperatures moderate somewhat back to normal levels in the 8-to-14 day period (below), with below-normal temperatures developing in southwest Washington.

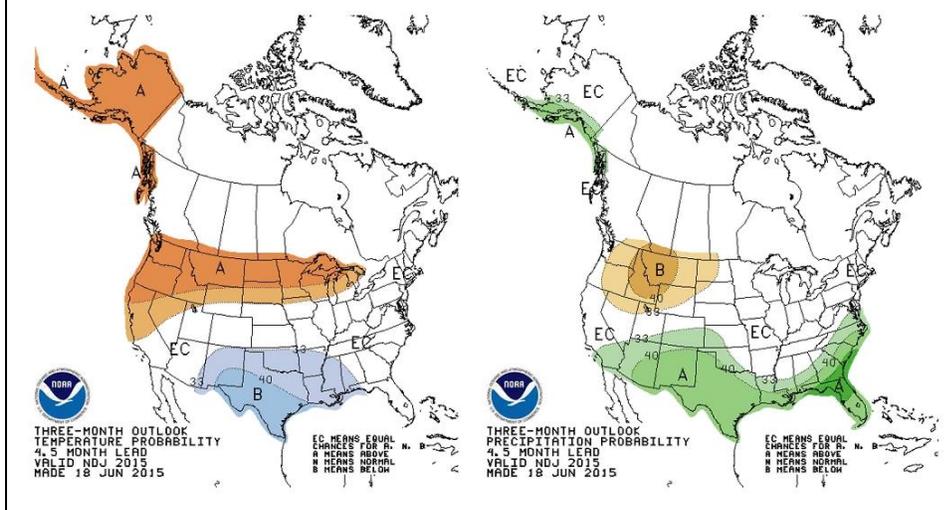


Below is a map showing climate prediction model results for temperature and precipitation for July through September 2015, followed by a map showing predictions for November 2015 through January 2016. These show Washington receiving normal precipitation for the rest of the summer, and dryer-than-normal conditions in fall and early winter. I know you all join me in hoping for normal or above normal precipitation for the remainder of the winter.

### NOAA CPC Predictions of T & P (Jul-Sep)

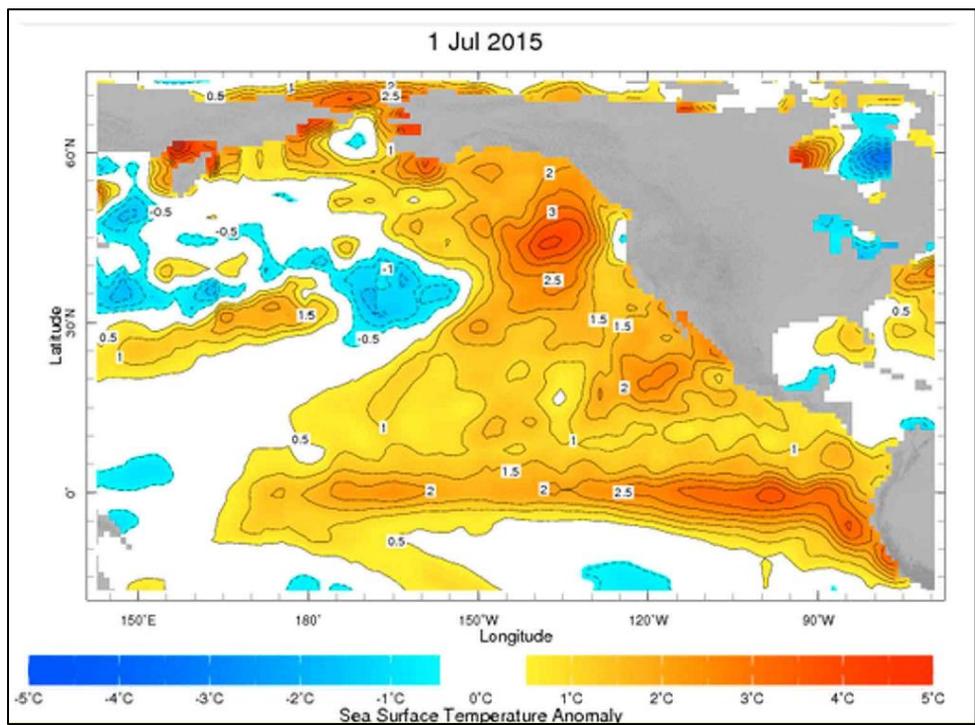


### NOAA CPC Predictions of T & P (Nov-Jan)



## ***El Niño & Longer-term Temperature & Precipitation***

State Climatologist Nick Bond provided this El Niño map (below) for July 1, 2015 showing “The Blob” continuing to hang out off our coast, as it has been for months. Overall, this El Niño will continue to provide warmer-than-normal temperatures into next spring. There is less certainty about precipitation: Precipitation will continue below-normal through the end of this year (after this back-to-normal mid-to-late-summer), but it’s possible that we’ll see normal precipitation after the first of the year. The outlook for next year is for similar or slightly more moderate conditions in comparison to those we’ve experienced this year, which is good news, indeed! Nick’s words were that “there are no indications that conditions will be setting records again next year.”



***Federal Drought Status***

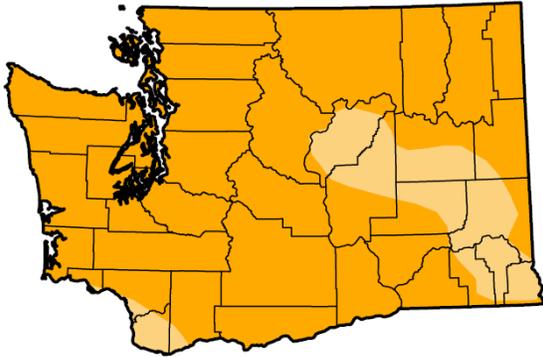
One-hundred percent of the state falls under some sort of federal drought status. The entire western Cascade mountains, Puget Sound and Hood Canal/Admiralty-Inlet “lowland” areas, Island and San Juan counties, and southwest Washington have been downgraded to “D2 – Severe Drought” this week, and areas in the eastern Columbia Basin that were “abnormally dry” last week are now in “D1 – moderate drought” status. While these designations primarily relate to the agriculture industry, the high profile of this situation has captured national attention.

**U.S. Drought Monitor  
Washington**

**July 7, 2015**  
(Released Thursday, Jul. 9, 2015)  
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	86.14	0.00	0.00
Last Week 6/30/2015	0.00	100.00	92.52	45.79	0.00	0.00
3 Months Ago 4/7/2015	34.56	65.44	28.13	0.00	0.00	0.00
Start of Calendar Year 12/31/2014	51.87	48.13	36.15	14.83	0.00	0.00
Start of Water Year 9/30/2014	34.22	65.78	40.27	20.17	0.00	0.00
One Year Ago 7/8/2014	50.82	49.18	33.38	18.27	0.00	0.00



**Intensity:**

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

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National Drought Mitigation Center



<http://droughtmonitor.unl.edu/>

Area	Status	Federal designation
Northwest Olympic Coast	Week 3 at "Severe Drought"	In 5 weeks
South Central	Week 11 at "Severe Drought"	Asotin, Benton, Columbia, Garfield, Klickitat, Walla Walla Counties declared June 24 Chelan, Douglas, Grant, King, Pierce, Whitman, and Yakima counties declared July 1
Northeast	Week 8 at "Severe Drought"	This week?
Columbia Basin to Southeast Washington; southern Clark and Skamania counties	Week 3 at "Moderate Drought"	
Everything else	Week 1 at "Severe Drought"	In 8 weeks

The [U.S. Drought Portal](#) provides the weekly drought status for the nation. Seven new counties were added to the list under federal drought status this week. A federal drought designation is automatic for any county when D2 (severe drought) conditions exist for eight weeks in a row. A Secretarial disaster designation makes farm operators in designated counties eligible to be considered for certain assistance from the Farm Service Agency. Federal designation and all the associated activities are coordinated through [Washington Department of Agriculture](#);

information distinguishing state-declared and federal drought designations, and the effect of federal designations, are available on the Ag web site.

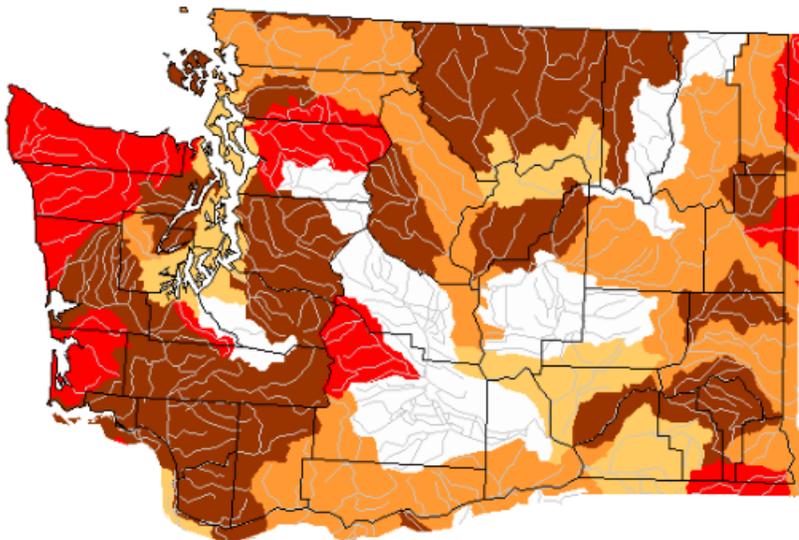
## Stream Flows

For the state as a whole, the figure showing [stream gauges with below normal streamflow](#) for 7 days or more is similar to previous weeks. Most of the state’s stream flows are some level below normal. The white areas are places with insufficient information.

### Map of below normal 7-day average streamflow compared to historical streamflow for the day of year (Washington)

Washington

Wednesday, July 08, 2015



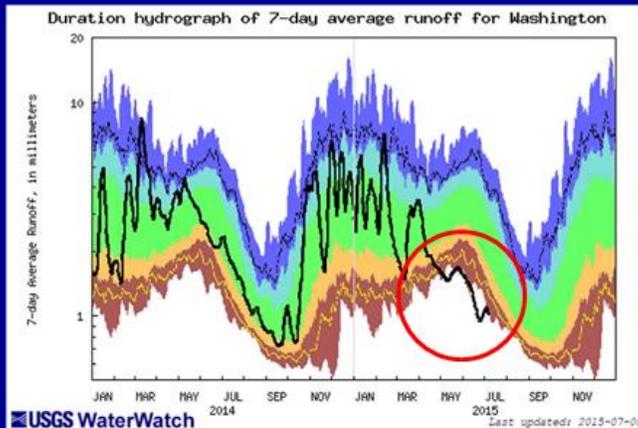
Click map to obtain more detailed drought information for the state

Explanation - Percentile classes				
Low	≤5	6-9	10-24	Insufficient data for a hydrologic region
Extreme hydrologic drought	Severe hydrologic drought	Moderate hydrologic drought	Below normal	

## Hydrograph Sampler

Hydrograph Sampler Charts tell the stories pretty well - see the end of this document for charts and links to our favorite sites. Following is a “Duration Hydrograph” chart showing 2015 Washington average stream flows (black line) in context with historic record.

## Duration Hydrograph, Washington State 7-day Average Streamflow (as of July 8, 2015)



As of July 8, 2015, statewide 7-day average flows are less than the 5th percentile, which is much below normal

Explanation - Percentile classes						
lowest-10th percentile	5	10-24	25-75	76-90	95	90th percentile-highest
Much below Normal	Below normal	Normal	Above normal	Much above normal		Flow

### Selected Washington Streamflows Table

The table gives a quick visual reference for daily flows as a percent of normal for this date in the historic record. The first column shows the gauge location, the second column shows today's stream flow readings, the third column shows today's flows as a percentage of average flows for this date throughout the period of record, column four shows the (previous) minimum flow for this date, and the fifth column shows in what year that minimum occurred.

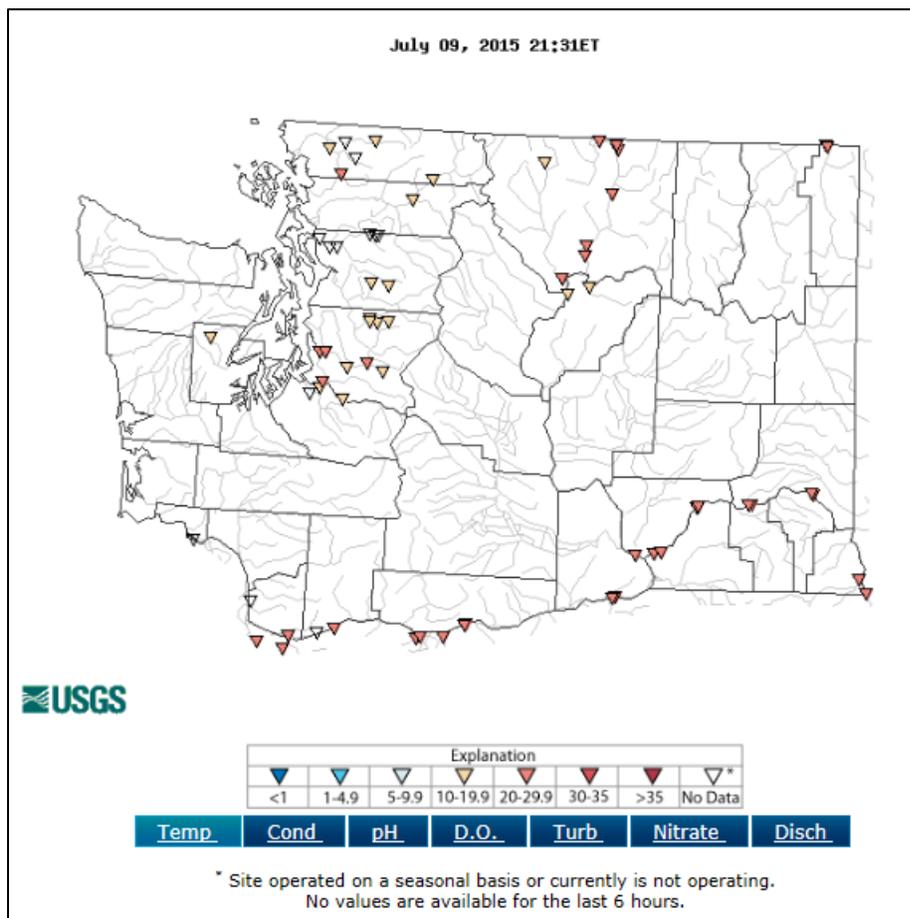
Twenty-three of our select set of 43 locations set record lows on July 10, 2015. Low flow records are occurring less frequently as we move into the traditional low-flow periods for Washington streams. [Statewide streamflows](#) are available from USGS.

Selected Washington Streamflows July 9, 2015	Today's Flow (cfs)	Percent of average for this date in the record	Min Flow (cfs)	Year of min flow
MF NOOKSACK RIVER NEAR DEMING, WA	404	66%	196	1993
NOOKSACK RIVER AT FERNDALE, WA	1,800	48%	1,560	1977
SKAGIT RIVER NEAR CONCRETE, WA	8,140	38%	7,210	1977
SAUK RIVER AT DARRINGTON, WA	680	23%	1,260	1915
CASCADE RIVER AT MARBLEMOUNT, WA	776	33%	1,340	2009
NF STILLAGUAMISH RIVER NEAR ARLINGTON, WA	221	23%	294	1940
SNOQUALMIE RIVER NEAR CARNATION, WA	564	21%	860	1940
SKYKOMISH RIVER NEAR GOLD BAR, WA	425	10%	1,040	1940
ISSAQUAH CREEK NEAR MOUTH NEAR ISSAQUAH, WA	22	45%	23	2004

CEDAR RIVER BELOW DIVERSION NEAR LANDSBURG, WA	175	61%	123	1992
CEDAR RIVER AT RENTON, WA	205	58%	42	1958
BIG SOOS CREEK ABOVE HATCHERY NEAR AUBURN, WA	40	80%	28	2003
GREEN RIVER NEAR AUBURN, WA	270	42%	264	2003
SOUTH PRAIRIE CREEK AT SOUTH PRAIRIE, WA	43	34%	52	2003
PUYALLUP RIVER AT PUYALLUP, WA	2,060	60%	1,580	1977
NISQUALLY RIVER AT MCKENNA, WA	540	85%	35	1962
DESCHUTES RIVER NEAR RAINIER, WA	32	53%	33	2003
NF SKOKOMISH R BL STAIRCASE RPDS	58	14%	103	1926
DUNGENESS RIVER NEAR SEQUIM, WA	157	28%	212	1926
HOKO RIVER NEAR SEKIU, WA	14	15%	21	1972
CALAWAH RIVER NEAR FORKS, WA	70	22%	77	1995
HOH RIVER AT US HIGHWAY 101 NEAR FORKS, WA	947	50%	962	1992
SATSOP RIVER NEAR SATSOP, WA	255	54%	309	1944
CHEHALIS RIVER NEAR GRAND MOUND, WA	180	41%	187	1965
NASELLE RIVER NEAR NASELLE, WA	29	35%	35	1970
COWLITZ RIVER BELOW MAYFIELD DAM, WA	3,030	60%	1,510	1968
COWLITZ RIVER AT PACKWOOD, WA	692	32%	560	1992
LEWIS RIVER AT ARIEL, WA	1,550	66%	83	1931
WHITE SALMON RIVER NEAR UNDERWOOD, WA	578	60%	464	1977
KLICKITAT RIVER NEAR GLENWOOD, WA	90	25%	96	1977
WALLA WALLA RIVER NEAR TOUCHET, WA	7	11%	7	1968
TUCANNON RIVER NEAR STARBUCK, WA	38	39%	24	1930
GRANDE RONDE RIVER AT TROY, OR	504	17%	626	1977
YAKIMA RIVER AT KIONA, WA	1,680	76%	725	1994
AMERICAN RIVER NEAR NILE, WA	42	12%	74	1992
CRAB CREEK AT IRBY, WA	4	20%	2	1990
WENATCHEE RIVER AT PLAIN, WA	881	21%	959	2005
METHOW RIVER NEAR PATEROS, WA	699	25%	560	1977
OKANOGAN RIVER AT MALOTT, WA	1,130	22%	1,270	1977
OKANOGAN RIVER AT OROVILLE, WA	226	25%	93	1987
SPOKANE RIVER AT SPOKANE, WA	863	20%	964	1994
COLVILLE RIVER AT KETTLE FALLS, WA	47	24%	27	1926
PEND OREILLE RIVER BELOW BOX CANYON	11,100	29%	6,940	1977

### ***Real-Time Water Temperature from USGS and Ecology***

Water temperatures are increasing statewide. [USGS temperature stations in Washington](#) provides water temperature for stations having that feature (below). Temperatures above 20 degrees C are occurring at several locations across the state. Columbia and Snake River mainstem forebay temperatures are exceeding 20 degrees C at most sites.



Ecology's [Flow Monitoring Network](#) provides air and water temperature monitoring at several Ecology and co-op stations. There are a number of stations of interest, so follow the link and check it out.

Data for the Lake Washington Ship Canal can be found [here](#).

High water temperatures have contributed to fish die-offs across the region, primarily of small non-salmonids. Confounding public perception is the natural seasonal mortality of stickleback, which most folks can't distinguish from small salmonids. WDFW staff need to be wary of identifying species of fish kills before seeing the specimens first hand.

As an agency, we are working on identifying the correct pathways for reporting die-offs. For now, die-offs with obvious natural (drought-related) causes can be reported through WDFW internal methods. But if there is no obvious natural cause (or the natural cause is obviously not drought-related), we need to be aware of the potential for hazardous material contamination and report such incidents through the Environmental Response Tracking System maintained by Ecology. The correct ERTS reporting mechanisms are identified on the [Ecology ERTS web page](#).

Extremely low flows and increasing water temperatures can reduce survival of Endangered Species Act listed fish that are handled during fisheries. WDFW Fish Program is developing criteria to evaluate when fishery closures might be needed in order to protect fish.

## ***Drought Impacts to Fish and Wildlife***

## North Puget Sound

**Baker River Hydro:** WDFW’s representative on the Baker Aquatic Resources Group reports that Puget Sound Energy is acknowledging a communication issue that led to confusion around a power generation release that was initiated in order to provide flows for a tribal in-river fishery last week. PSE reports that Baker Lake levels are high, and PSE anticipates being able to meet both recreational lake-levels and outflow requirements while providing some small releases this summer.

**Stillaguamish River:** WDFW received and investigated reports of a dead adult steelhead in the Stillaguamish River this week. Temperatures in the Stillaguamish have ranged to 24 degrees C this past week.

**Sultan River:** A citizen reported a recreational rock dam on the Sultan River at Sportsman’s Park on Hwy 2 at the confluence of the Sultan and Skykomish. There is also usually one at what is known as “Big Rock” at the end of the trail in Osprey Park. The citizen learned how to report via a facebook post by WDFW, and shared the WDFW post to the Sultan.Wa Facebook page. The citizen hopes the facebook cross-post will inform residents about the need to remove these dams, but requested that signs or posters might also be effective posted in those parks. Remember to get landowner permission before placing signs. Biologist Kirk Lakey photographed the Sultan River site:



## Central & South Puget Sound

### **Lake Washington Fish Kills:**

There have been numerous fish kill reports for Lake Washington, which is not surprising considering the air (and therefore water) temperatures this past few weeks. On July 7, WDFW Region 4 staff were contacted by City of Kirkland Parks Department about dead fish ashore at a city park (four photos, below).



The majority of the fish are identified as longfin smelt and are abundant in Lake Washington. Biologist Aaron Bosworth indicates there are likely some stickleback in the mix as well. Juvenile sockeye might also be affected (they are all pelagic planktivores, says Aaron), but none were identifiable in this group. This report came through the Region 4 office

Also on July 7, fish (below) were reported washing ashore at Chism Beach Park in Bellevue. This had been occurring since the previous Friday (7/3). Larger perch and bass were starting to wash ashore on the 7<sup>th</sup>. There was no evidence of sheen or hazardous materials. This report came through the WDFW spill team via ERTS.



### **King County Flow and Temperature Conditions**

Correspondent Curtis DeGasperi, who is the Lead Hydrologist at the King County Department of Natural Resources and Parks, presents the following report on King County river and creek flow and temperature summary for week of 6/29-7/5.

#### **STATUS**

- 13 out of 15 rivers with over 15 years of flow data and real-time data delivery had the lowest flows ever recorded for the week.
- 11 out of 21 creeks with over 15 years of flow data and real-time data delivery had the lowest flows ever recorded for the week

- 9 out of 14 rivers/streams with over 15 years of temperature data and real-time data delivery had the highest temperatures ever recorded for the week
- Lake Washington water levels are the lowest for the week since record-keeping began in 1991, and temperatures at the fish ladder at the locks are the highest for the week since record-keeping began in 2004. The U.S. Army Corps of Engineers anticipate Lake Washington’s level will drop below 20 feet this summer, the first time since October 1987, and are taking steps to conserve water during this year’s drought.

**ECOLOGICAL IMPACTS**

- Maximum temperatures in the Cedar River (at Renton) and Laughing Jacobs Creek were between 20 degrees C and 22 degrees C, which can cause thermal stress to salmonids.
- Temperatures in Bear Creek, Little Soos Creek, and the Sammamish River exceeded 23 degrees C, which can have substantial impacts on salmonid health.
- Temperatures at the fish ladder at the locks are approaching a migratory barrier of 21 degrees C for salmon returning through the locks in June through September. Over 150,000 sockeye salmon are forecast for 2015, peaking in early July.

**REGULATORY AND LEGAL CONSIDERATIONS**

- Flow in the Snoqualmie River is lower than the minimum instream flow established by Washington Administrative Code, which allows the state to curtail withdrawals by holders of junior water rights.
- Flows in the Green River are higher than instream flows required during drought years for Tacoma Public Utilities to withdraw water from the Green River using its primary water right, but are below minimum flow requirements for Tacoma Public Utilities to withdraw water from the Green River with its second diversion water right.
- Flows in the Cedar River are higher than the normal minimum flow required to be maintained by Seattle Public Utilities during normal years.

**River Flow Summary**

Status	Regulated Rivers*	Unregulated Rivers
Lowest flow ever for week	Green near Auburn	Skykomish near Gold Bar Tolt (mainstem near Carnation, N Fork, S Fork above reservoir near Index) Snoqualmie (mainstem at Carnation, S Fork, M Fork, N Fork) Raging Cedar above reservoir Sammamish at 116 <sup>th</sup> White above Mud Mountain
Typical flow for week	Cedar at Renton S Fork Tolt below reservoir	

\*Data for White River at Auburn downstream of Mud Mountain Dam only available since 10/1/2007

**Creek Flow Summary\***

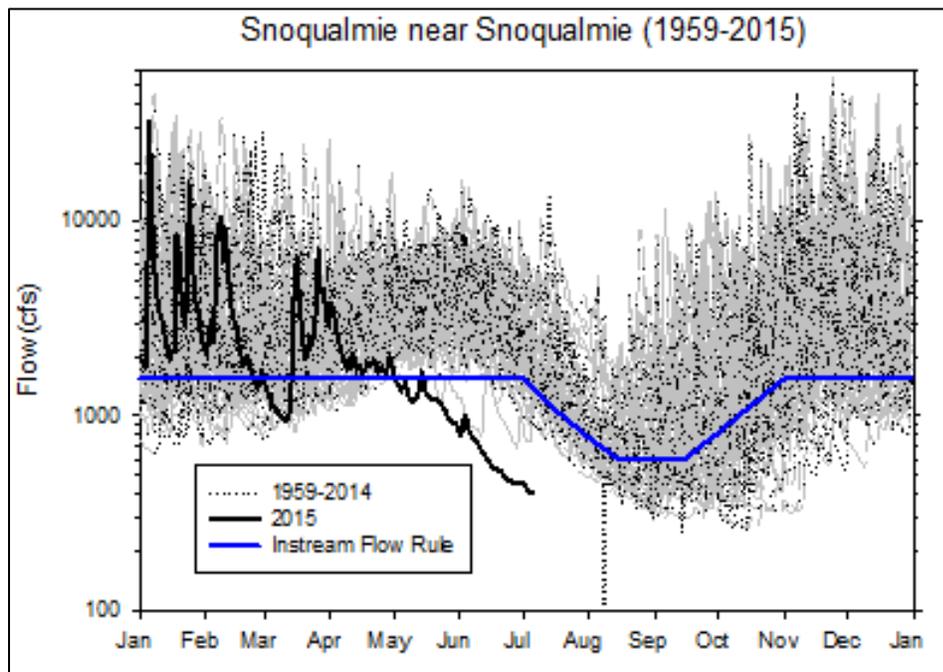
Status	WRIA 8	WRIA 9	WRIA 10

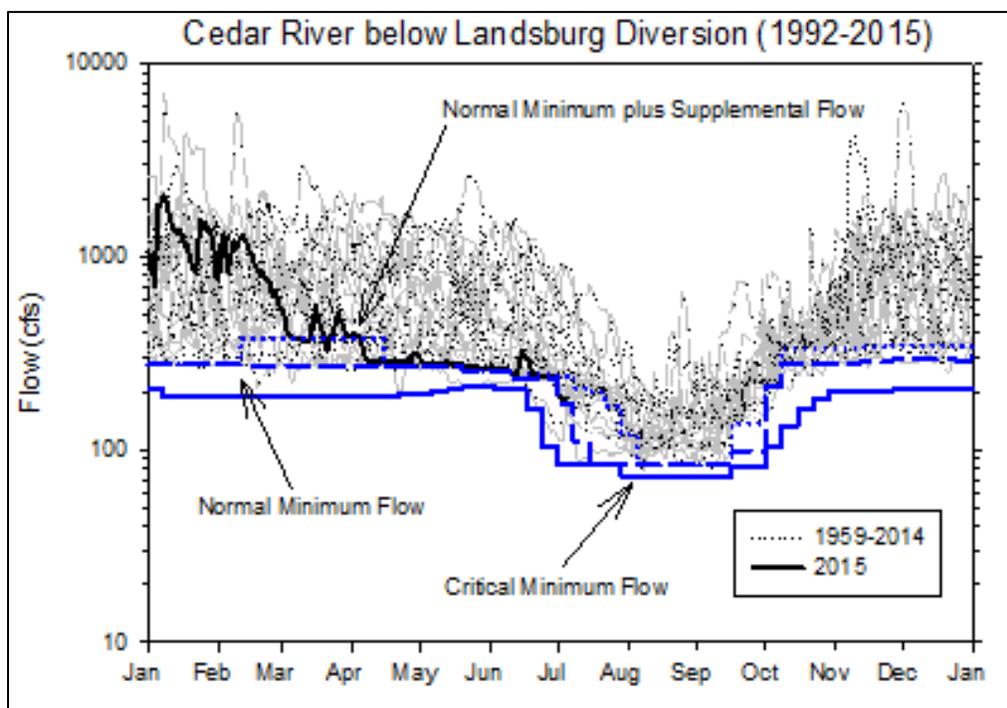
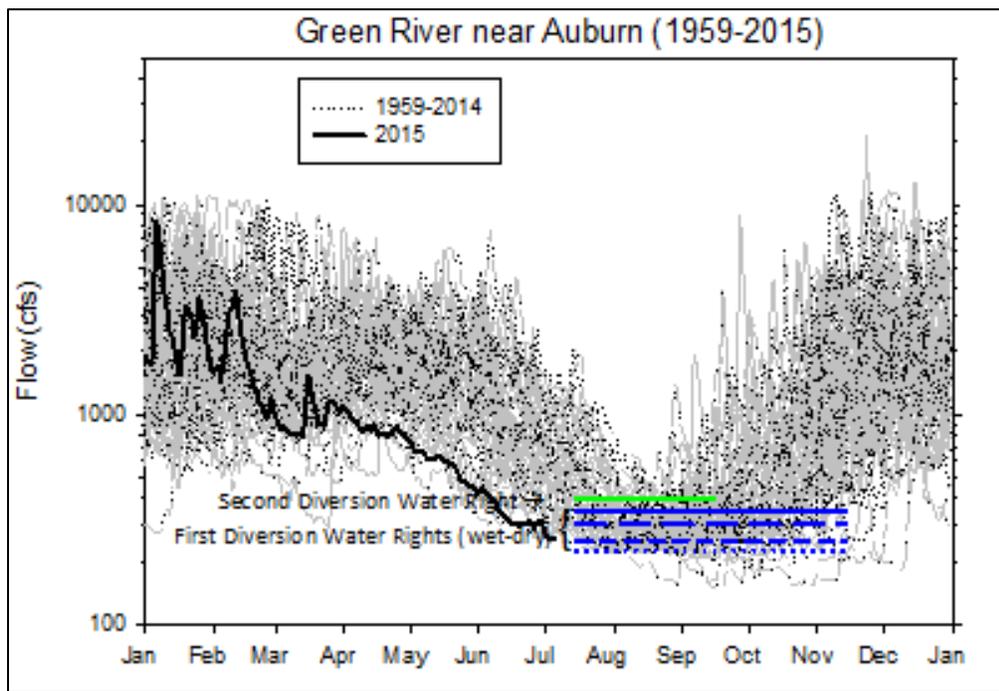
Lowest flow ever for week	Issaquah, Juanita, Rock, Taylor (Selleck), Thornton	Covington, Judd, Little Soos, Soos, Soosette	Boise
Lower flow for week than during 90% of other years		Jenkins	
Below typical flow for week	Bear, Mercer, Lyon	Des Moines	
Typical flow for week	Laughing Jacobs McAleer	Springbrook, Mill (Kent)	
Above typical for week		Crisp	

\*No creeks in WRIA 7 have 15 years of flow data and real-time data delivery

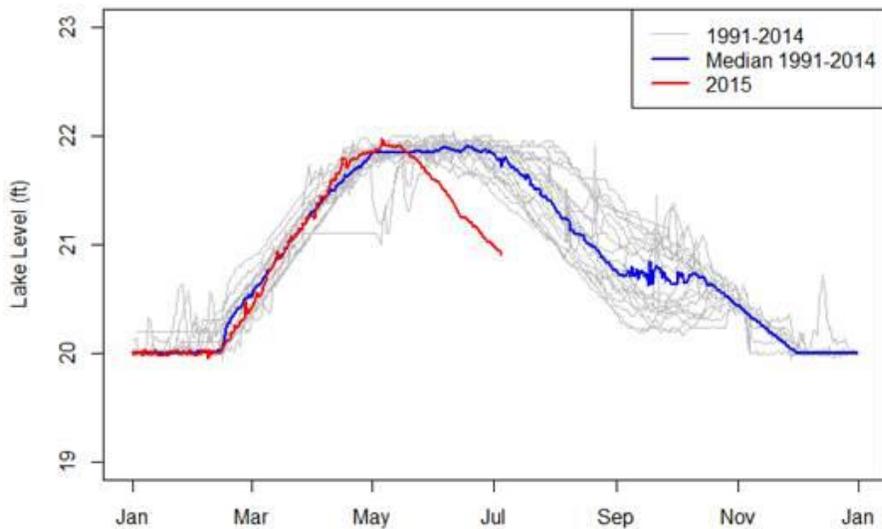
### River and Creek Temperature Summary

Status	River/Creek
Highest temperatures ever for week	S Fork Tolt above reservoir near Index, NF Tolt, Cedar (Cedar Falls and Renton), Sammamish, Bear, Little Soos, Judd, Jenkins
Temperatures for week higher than during 90% of other years	Laughing Jacobs
Higher than typical temperatures for week	S Fork Tolt below reservoir, Soosette, Crisp
Typical temperatures for week	Covington
Lower than typical temperatures for week	None

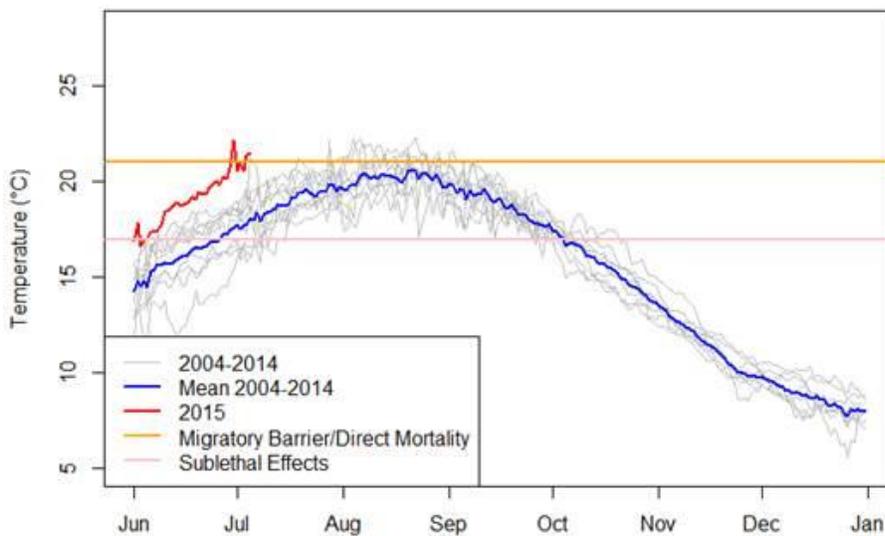




**1991-2015 Lakes Washington & Union Elevation**



**2004-2015 Maximum Daily Temperature Fish Ladder at Locks**



**Seattle water supply:** After the hottest June in recorded history, higher-than-usual water consumption, record-low stream flows into storage reservoirs and the onset of El Niño conditions, Seattle Public Utilities (SPU) changed its water supply outlook from “good” to “fair.” The utility is now making operational changes to maximize water supply, and customers are asked to continue to use water wisely. Seattle is not implementing water use restrictions at this time, but is dusting off its dry-year contingency plan.

**Thurston County:** A citizen report came to WDFW on July 8 via WildComm of a recreational dam on the Black River just upstream of the Black River bridge on 128<sup>th</sup> (photos below).



## Olympic Peninsula

A **Jefferson County Drought Forum** is planned for July 14, 6:00 – 8:00 pm at the Chimacum High School Auditorium. The forum is sponsored by NODC, WSU Jefferson County Extension, Local 20/20, City of Port Townsend, and WA Department of Ecology. WDFW is not scheduled to speak, but staff will be on hand to answer questions and learn about the Port Townsend water supply and potential solutions to anticipated shortfalls this year. The Port Townsend water supply is pumped from the Quilcene River, for which instream flow levels are set by rule.

Clallam County PUD water rights for water taken from **Morse Creek** are under discussion between the PUD and Ecology, with Health and WDFW also providing technical support. The PUD right is interruptible, but supports about 150 homes with no backup water supply available. WDFW has agreed to give the PUD until August 1 to bring on alternative supplies, but impacts to fish will occur in Morse Creek if flows are drawn below the 25cfs instream flow rule.

## Southwest Washington

**Kalama River:** Regional and HQ staff met via conference call to consider how Kalama River mouth conditions could develop later this season, and whether there is potential that adult fish returning to the hatchery will be blocked by low flows. This is one example of a situation that could develop in many streams statewide this fall, so WDFW is carefully considering how to prioritize incident response and prepare for emergency action.

**East Fork Lewis River:** A citizen observed temperatures up to 78 degrees in this stream, and has observed coho juveniles in pools. 352 juvenile fish were salvaged from isolated pools there by the citizen, who was also interviewed for an article by The Columbian.

**City of South Bend** is requesting permission from Ecology to consolidate municipal water sources from two branches of Fliess Creek. The city wants to start diverting their Fliess Creek water at the confluence of the two tributaries where more water is gathered and available. WDFW is providing technical support to Ecology, as is Health and Washington Department of Commerce. Water Science Team staff visited the sites, took stream measurements, and is recommending approval of the downstream move of the Fliess Creek point of



diversion to the confluence of two branches. The City would still need an HPA and to meet screening requirements before constructing a diversion or placing pipes or pumps in the creek.

## South Central Washington & Columbia Basin

### Snake & Columbia Rivers

Columbia River revised forecasts are presented below. Forecasts that appeared pretty good on March 1<sup>st</sup> (around 80%) are now down to 68% at The Dalles and 51% at Lower Granite. “Dry-year protocols” are being implemented relating to Columbia River Treaty and non-treaty storage operations in the U.S. and B.C.

Location	July 5, 2015 5-day QPF ESP	
	% Average (1981–2010)	Runoff Volume (Kaf)
The Dalles (Apr–Aug)	68	59,096
Grand Coulee (Apr–Aug)	75	42,638
Libby Res. Inflow, MT (Apr–Aug)	72 86*	4,219 5,090*
Hungry Horse Res. Inflow, MT (Apr–Aug)	65	1,249
Lower Granite Res. Inflow (Apr–July)	51	10,124
Brownlee Res. Inflow (Apr–July)	44	2,405
Dworshak Res. Inflow (Apr–July)	46 42*	1,101 1,113*

\* Denotes COE June Forecast

Information about the Federal Columbia River Power System (FCRPS) Technical Management Team (TMT), the annual FCRPS Water Management Plan (WMP), and fish operations can be found at the Corps-hosted TMT web site. Check [here](#) under “documents” for the WMP, and browse the rest of the site for other interesting FCRPS information. The Fish Passage Center provides up-to-date information on fish passage figures for the FCRPS.

### Yakima

Following are some photos of conditions in the upper Yakima and Naches basins taken by Cassandra Anderson of the Bull Trout Task Force, and shared through WDFW’s Region 3 office. First is a photo showing a recreational bridge on Indian Creek (left). Note that the creek is already quite narrow, and that material was piled up to support the bridge. On the right is a photo showing Deep Creek flow downstream of the 1808 bridge.

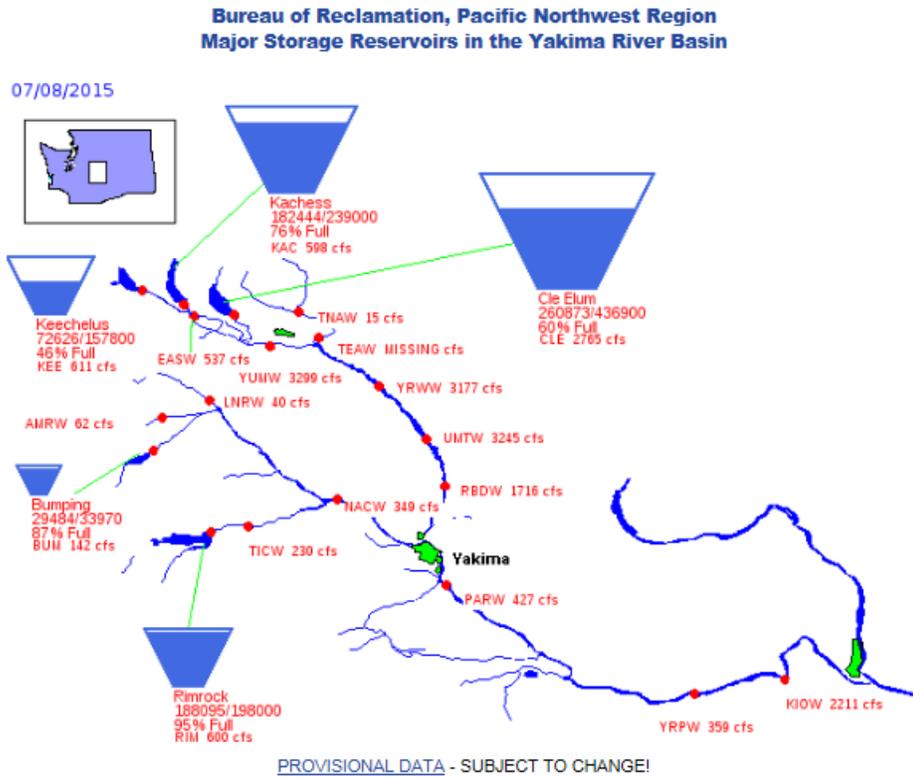


Cassandra also shared the following before/after photo (below) of a recreational rock dam in the south fork of the Ahtanum (left) that was removed by the Bull Trout Task Force (“after” on right). The Task Force has received funding to seek and remove recreational rock dams in the upper reaches of the Yakima/Naches basin. The Task Force/WDFW relationship could provide a good model for working with other external organizations to assist WDFW to do this monitoring and removal work elsewhere in the state. Thanks for the great work, Cassandra and team!



The [Reclamation Teacup Diagram](#) (below) for Yakima Basin shows Lake Keechelus volume down to 46%, Kachess down to 76%, and Cle Elum down to 60%. Bumping is at 87% of full, but Rimrock is still essentially full. Overall storage is 80.5% of average. Inflow to the five reservoirs

is 29% of average, releases from all five reservoirs are 98% of average, and major canal diversions are 80% of average for July 9.



Average daily streamflows indicated in cubic feet per second.  
Reservoir levels current as of midnight on date indicated.

**Teanaway River:** Following are photos of the Teanaway taken July 8<sup>th</sup>.



Teanaway River upstream of Lambert Road 07-08-15 (6.27 cfs).



Teaway River downstream of Red Bridge Road 07-08-15 (8.13 cfs).

River temperatures were 26 and 25 degrees, respectively, quite poor. In the photo downstream from Red Bridge, a series of cross-channel porous weirs can be seen; these were built in order to maintain elevations for the diversion and provide passage for fish. These structures look a little like the fish-blocking recreational dams WDFW is finding and removing. These structures above are porous, however, and provide channel stability and pooling without restricting fish movement.

**Cowiche Creek:** Below is a photo of the south fork of Cowiche Creek from July 7th. Water Science Team staff measured 0.47 cfs at the time the photo was taken (left photo), however the trust water target amount for July at this location is 2.505 cfs. Just downstream of this location is the Ecology Cowiche Creek gauge. At that location (right photo) there should be an additional 2.9 cfs of trust water according to Ecology, however only 1.11 cfs was measured at the gauge. A measurement approximately 7 miles upstream of the mouth of the creek, which is well above any “known” diversions, showed a flow of 2.35 cfs. The total trust amount (5.405 cfs) is clearly not in the creek naturally. Water Science Team staff are contracted by Ecology to measure flows at many eastside locations to determine whether trust water that should be detected in streams is showing up in actual flow readings.



**Wenatchee:** WDFW received a “drought observation” report July 8<sup>th</sup> about a recreational rock dam in the Icicle River within the national forest. The scale of the project (below) means staff need to develop a plan and get assistance to remove this obstacle.



## WDFW Headquarters Drought Response Activity

**Let ‘em Pass Signs:** WDFW staff are enthusiastic about posting these signs around the state, and many signs are destined for locations on WDFW lands. However it is critical to obtain landowner permission prior to any posting on other public or private land. When in doubt, check it out!

**Low Flow Blockage Remediation Program and HPA:** Draft Hydraulic Project Approval provisions are under review for an HPA that would be issued for agency-led drought remediation projects. Version 1 of the remediation program is available in APPS and on the WDFW shared drive. Stay tuned for further announcements about this program.

**Report your observations** - Please remain vigilant, and report looming, suspected, or real-time blockages or stranded fish to your regional program manager AND to Drought Coordinator Teresa Scott at [teresa.scott@dfw.wa.gov](mailto:teresa.scott@dfw.wa.gov) . Stay tuned for a centralized reporting mechanism on the Habitat Program Sharepoint site.

## Drought-related fishery closures

On July 1, the Grande Ronde River became Washington’s second official low-flow/high-temperature fishing closure. On June 17, Sol Duc River near the Sol Duc Hatchery became our first low-flow-related closure of the season. More closures are being considered as water temperatures spike.

WDFW issued a press release Wednesday entitled “*Drought conditions harming fish and wildlife, disrupting some fisheries.*” The release summarizes some of the steps WDFW is taking to reduce drought impacts in fisheries, at hatcheries, and in habitat. The release generated a good amount of interest from the press and citizens, and reports of drought-related observations through the “drought” web page and through WildComm have been dribbling in.

## Fish in hatcheries:

This week's hatchery discussions continued the conversation regarding water temperatures at hatcheries where coho salmon are waiting to be marked. Water temperatures were down somewhat this week, and will likely moderate with the coming cloudiness and rainfall.

Staff shared information about a potential supplemental water source for Issaquah Hatchery.

Region 5 reported the early release of 100,000 rainbow trout from Mossyrock Hatchery into Mineral Lake in Lewis County. In years past these fish have been released much later (August-September), however with flows at the hatchery at 60% of that last 3-year average, the hatchery is working to reduce pond loadings. The flows taken Tuesday at the facility were at 809 gpm. The last three year average for the month of July was at 1,334 gpm and the average from 1983-2000 was 1,531.

1,500 rainbow averaging 1 pound each were released into King County's Morton Lake, which is near Kent. The hatchery, Soos Creek on the Green River, needed to release these fish early to reduce the number of fish in the hatchery facility. The fish are normally released in October.

## News Clips

### [Rich Landers Outdoors Blog](#)

Spokesman Review - ongoing

### [Columbia summer chinook fishing rules change](#)

Tri-City Herald - July 02, 2015

### [Drought leading to fish concerns in Skagit River and creeks](#)

King5.com - July 03, 2015

### [Drought might signal future water use behavioral changes, Port Townsend city manager tells business audience](#)

Peninsula Daily News - July 07, 2015

### [Fishing guide devotes Columbia salmon opener to family as he tunes up for clients](#)

Spokesman Review - July 05, 2015

### [Deep-well irrigation dries up kid-fishing opportunities](#)

Spokesman Review - July 06, 2015

### [New terms required to describe sockeye fishing this good](#)

Spokesman Review – Landers blog – 6 July 2015

### [Below-average runoff triggers dry-year ops for fish protection](#)

Northwest Fishletter 348 – July 6, 2015

### [Drought forces region's hatcheries to release millions of fish early](#)

The Columbian - July 07, 2015

### [Kennewick irrigators express concern about Yakima Basin water plan](#)

Yakima Herald - July 08, 2015

### [State urges anglers to help protect fish stocks stressed by drought](#)

The News Tribune - July 09, 2015

### [Port Angeles considering stricter city water curbs to protect fish; other sources studied](#)

Peninsula Daily News (AP) - July 08, 2015

### [Stress from heat, drought on fish spurs push to reduce kills](#)

Yakima Herald Republic - July 08, 2015

### [Warm water probably caused Deschutes salmon deaths](#)

Statesman Journal - July 08, 2015

[90% chance of another El Nino winter](#)

King 5 - July 10, 2015

[Severe drought conditions spreading rapidly in Washington](#)

Capital Press - July 10, 2015

[Haze From Canadian Wildfires Spreads Across Western US](#)

OPB - July 10, 2015

[Agencies start summer water rescue operation for small, fish-bearing streams](#)

Daily Record - July 10, 2015

[Waterways restoration projects in the works](#)

The Columbian - July 10, 2015

[Protections being taken to save fish from heat](#)

HeraldNet.com - July 10, 2015

[Drought Relief for Farmers Sparks Criticism from Landowners](#) (Skagit)

Skagit Valley Herald – July 8, 2015

[Snow Drought Saps Washington State's Economy](#)

Wall Street Journal – July 1, 2015 (whole story on “S” drive)

## ***Links***

[Ecology's "Washington Drought 2015"](#)

Ecology this week posted a new Dam Safety web page titled [Wildfire Impacts on Dams - What dam owners need to know](#)

Washington State Climatologist [weekly drought update for Washington State](#).

Drought web pages for State departments of [Health](#) and [Agriculture](#)

National Integrated Drought Information System [Pacific Northwest Drought Portal](#)

NOAA [El Nino Portal](#)

[NOAA's Climate Prediction Center](#)

[Northwest River Forecast Center Water Supply](#)

USGS [Real time stream data for Washington](#)

U.S. Army Corps of Engineers [Seattle District Reservoir Control Center](#)

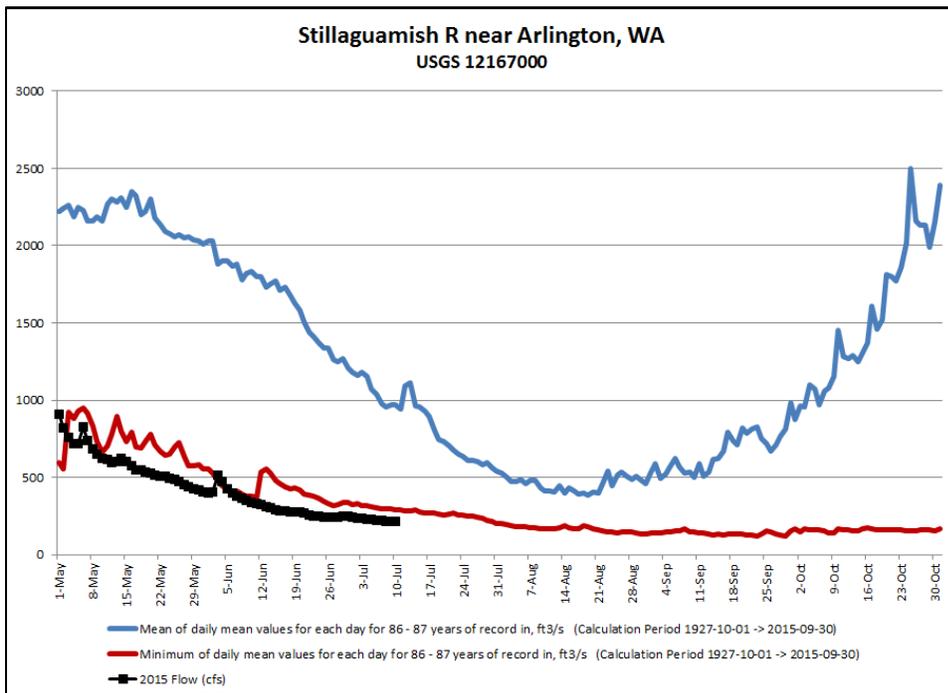
## ***For Further Information:***

Drought talking points, powerpoint presentations, images, and other drought-related resources are available to staff on the “S” drive.

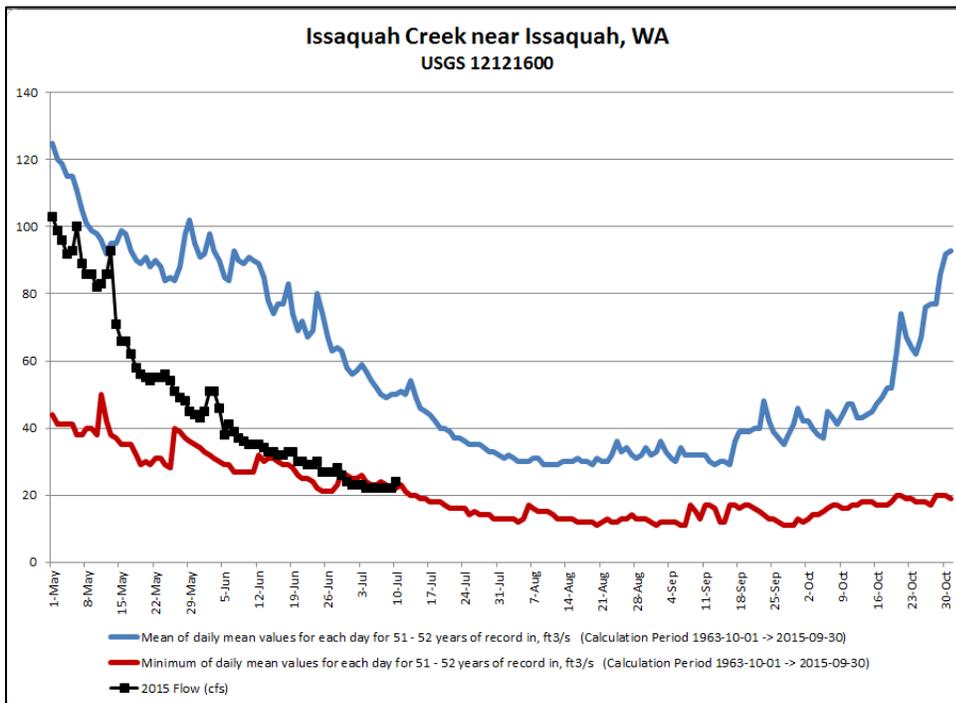
Contact WDFW Drought Coordinator Teresa Scott at [teresa.scott@dfw.wa.gov](mailto:teresa.scott@dfw.wa.gov) or (360) 902-2713 with questions and suggestions.

## ***Hydrograph Sampler Charts - Streamwatch (Real Time Flows USGS)***

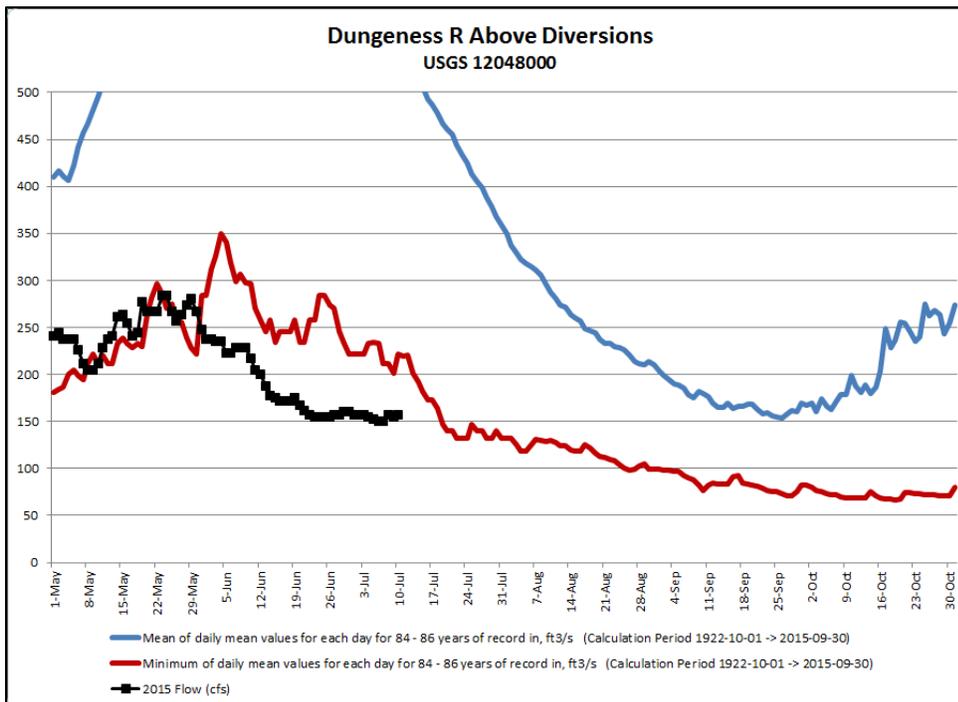
It helps to have a couple of weeks' time lag to gain a good perspective about the information presented in these charts. There are some predictable continued declines, and a few sharp surprises. Many streams have appears to reach base-flow levels; the question is, will flows get even lower?



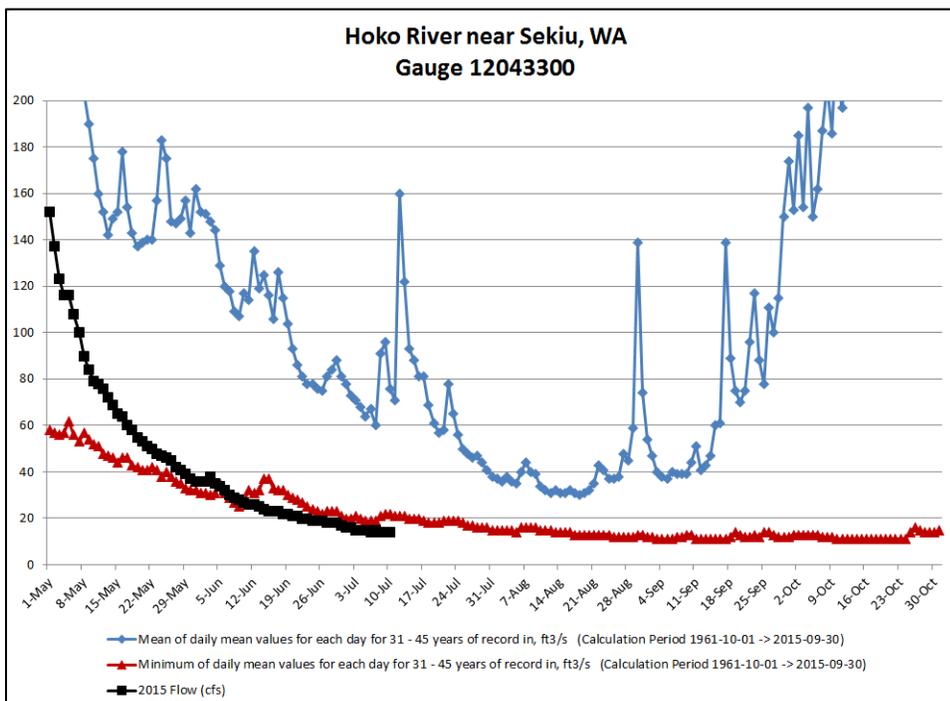
Stillaguamish looks just about as expected for unregulated streams in this neighborhood.

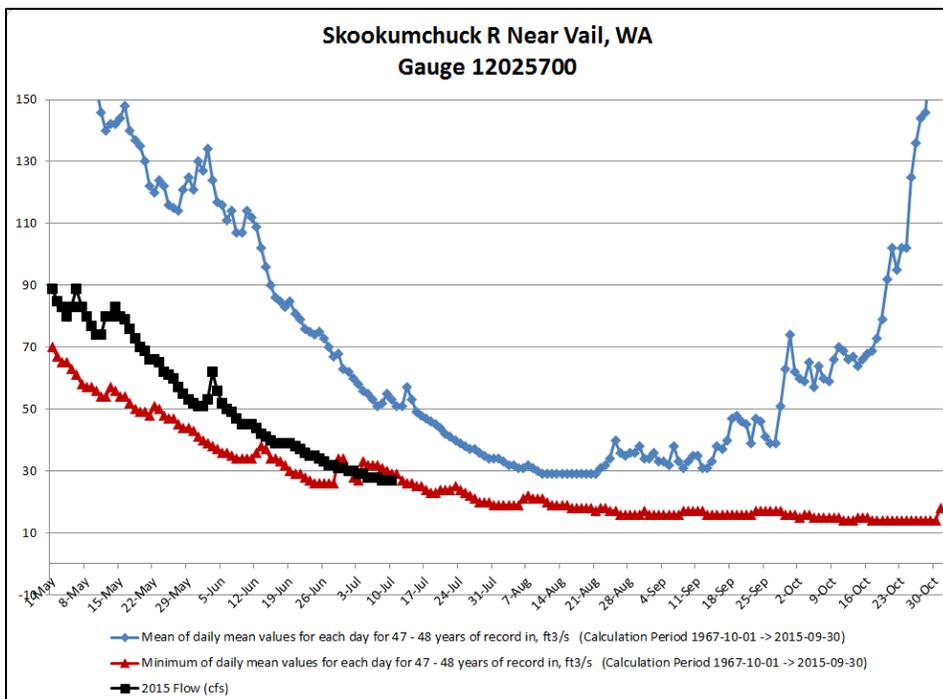
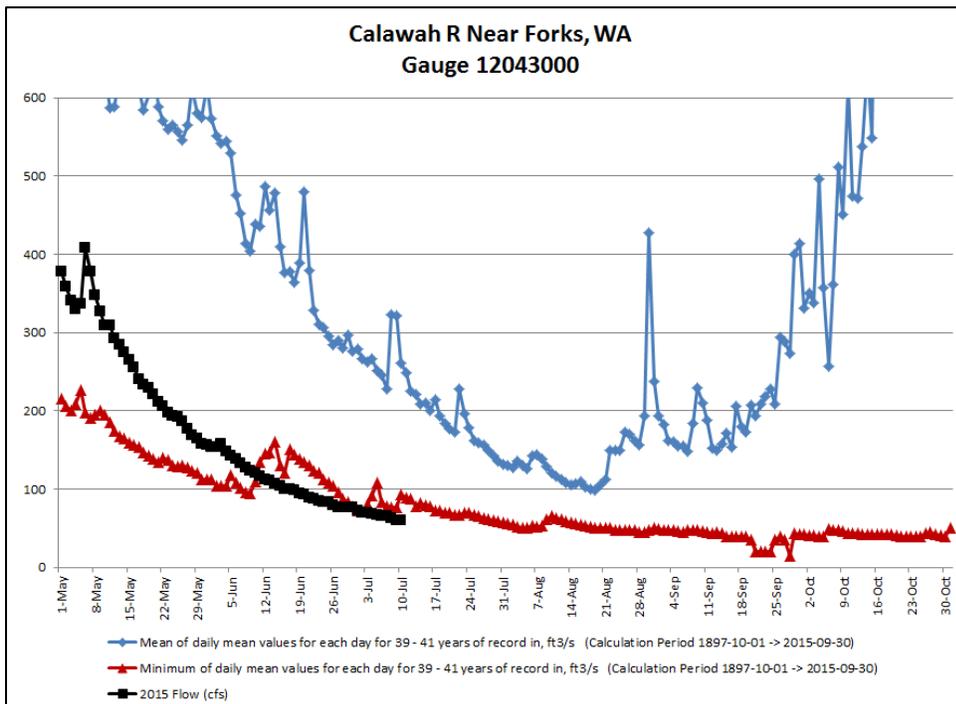


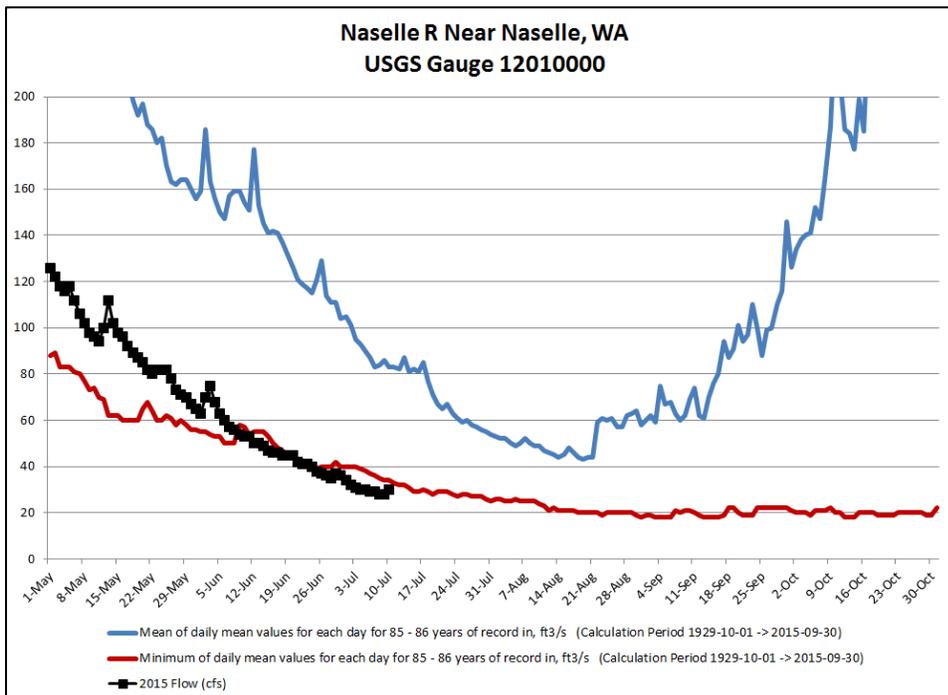
Issaquah: it will be interesting to see whether Issaquah Creek bottoms out soon or continues to decline.



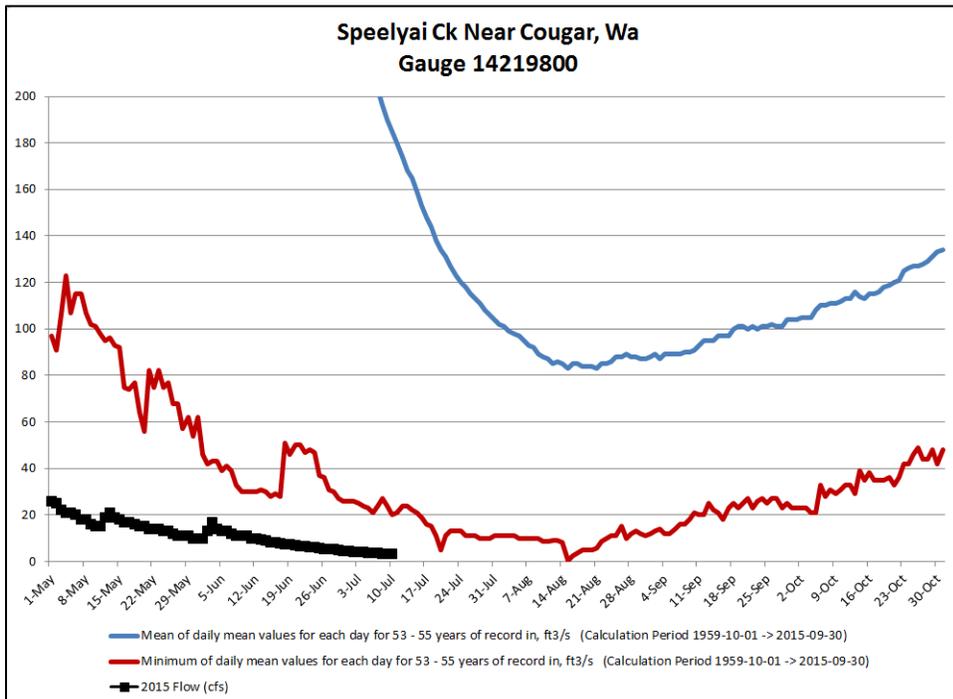
Dungeness: same question – is flow bottoming out or still declining?



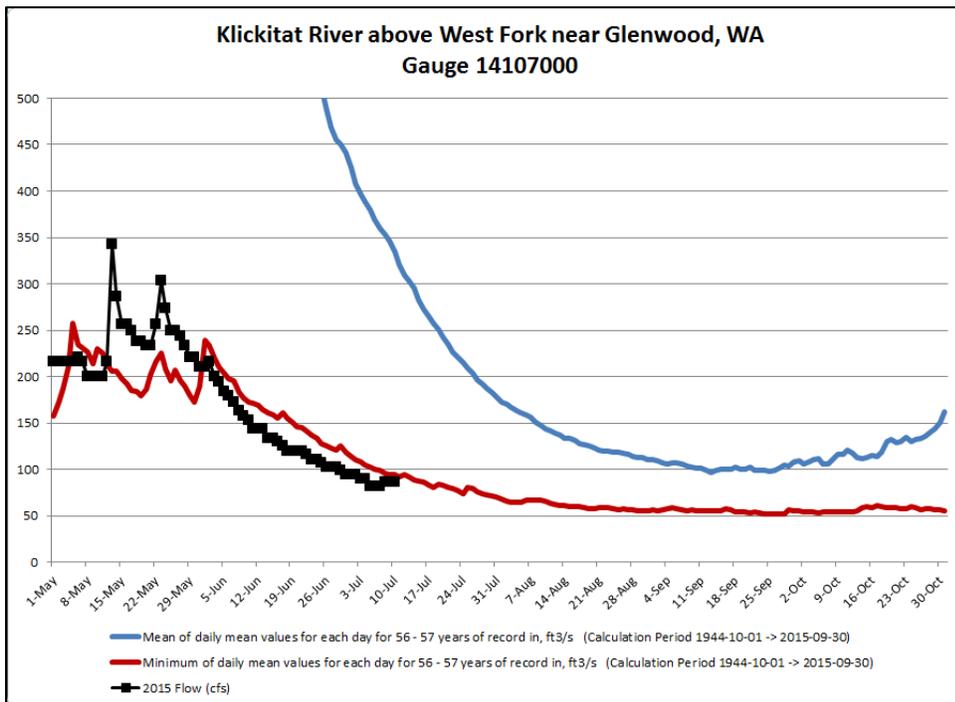




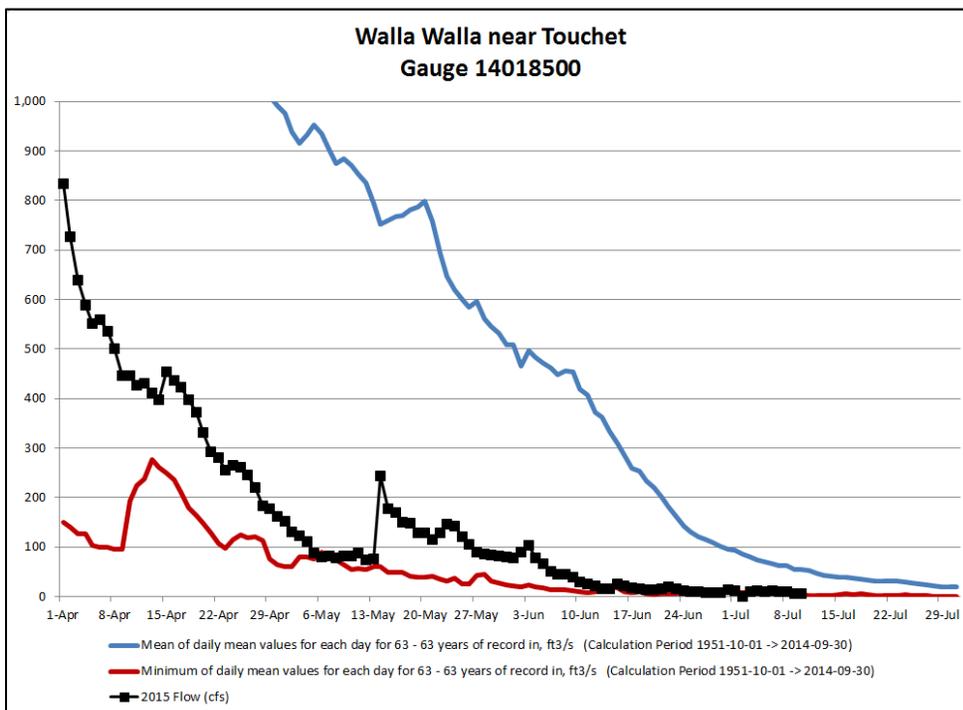
Hoko, Calawah, Hoh, Skookumchuck all looking similar. All these systems appear to continue to decline at slower rates through the end of October – we will see what happens.



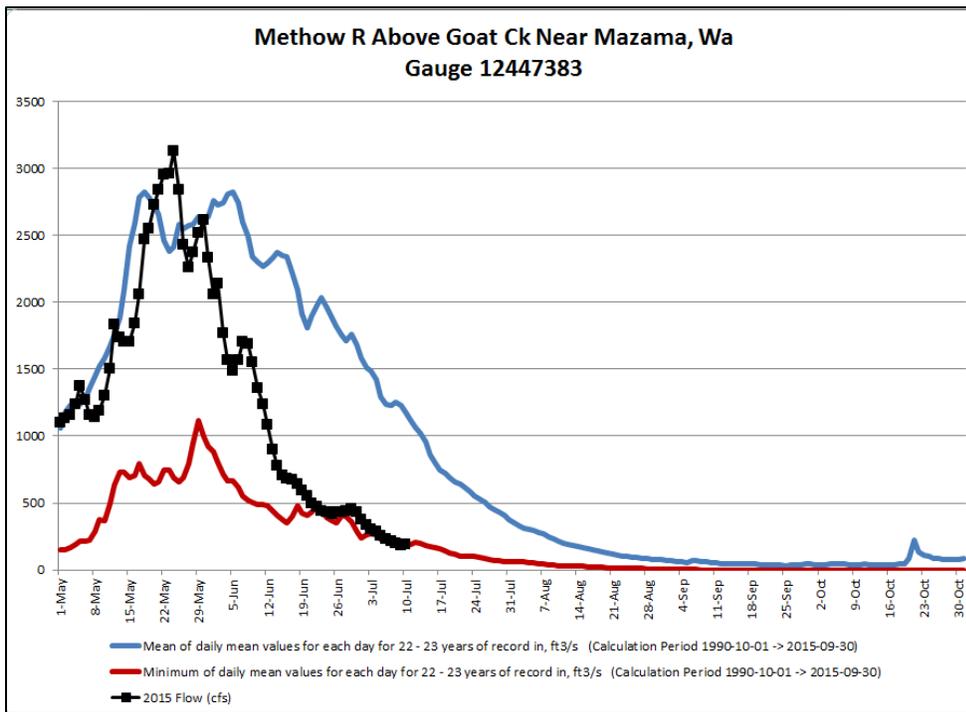
Rate of decline is slowing, but total flow is less than 4 cfs.



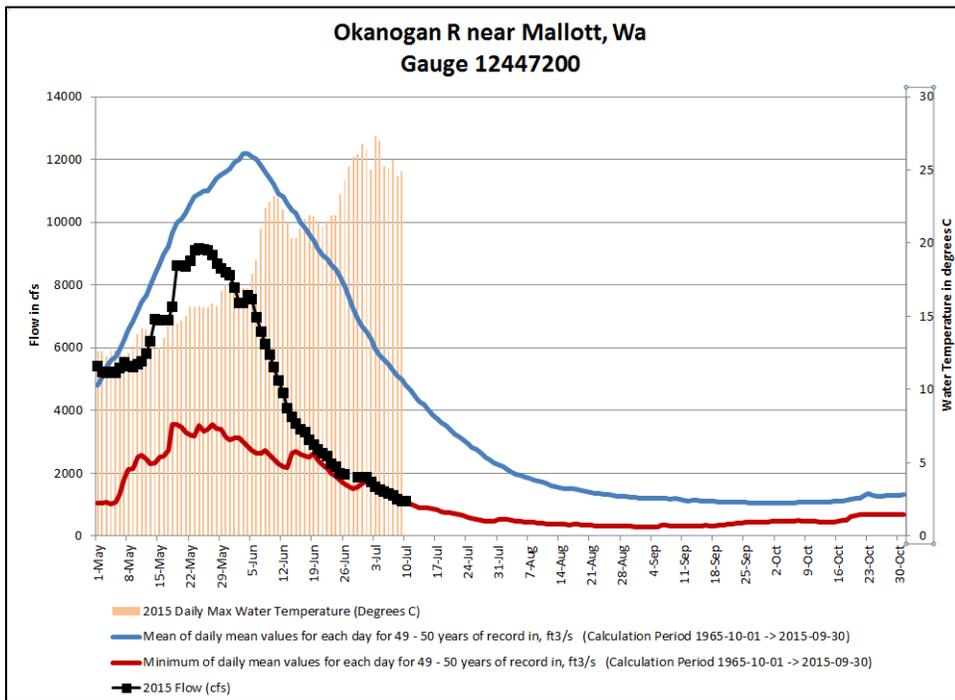
Already bottomed out? Thoughts, anyone?



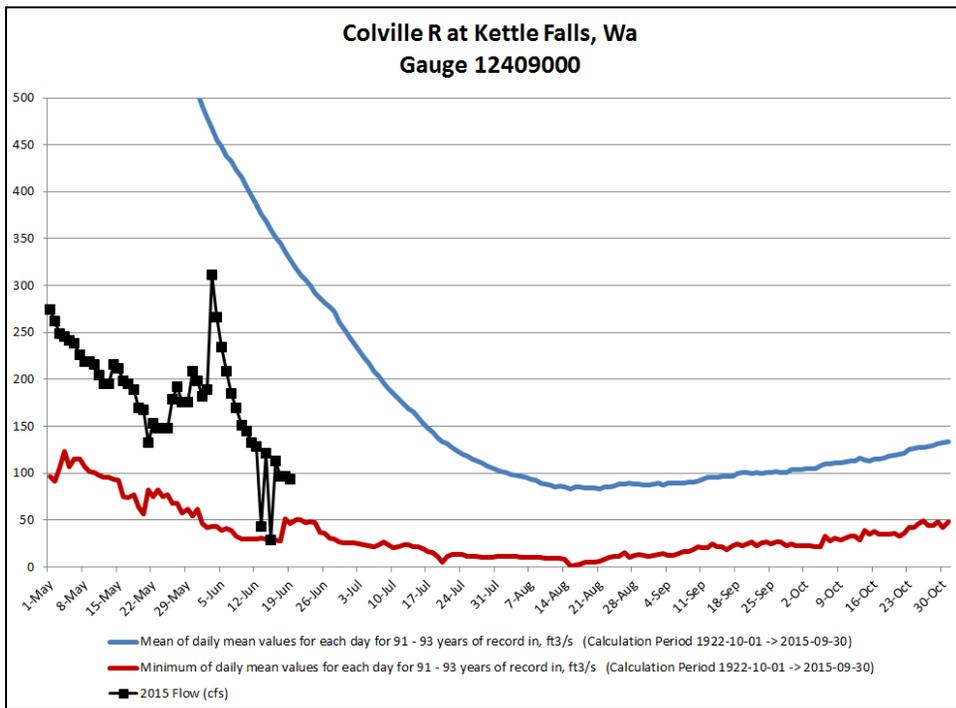
Note that subtle differences in the Walla Walla flows are difficult to see at this scale. However, flows July 8 were 10 cfs, July 9 down to 6 cfs, and today is down to 5 – that’s 50% over 2 days. Water Science Team members Jonathan Kohr and Robert Granger will have a story to tell about chasing trust water that should be instream but is missing. Otherwise this chart shows the drama experienced in May and June pretty well: pulse flow reached this gauge on about 11 May, on the 13<sup>th</sup>-14<sup>th</sup> was the first of a series of thunder showers that show up again on about May 24<sup>th</sup>, June 4<sup>th</sup>, and June 15<sup>th</sup>.



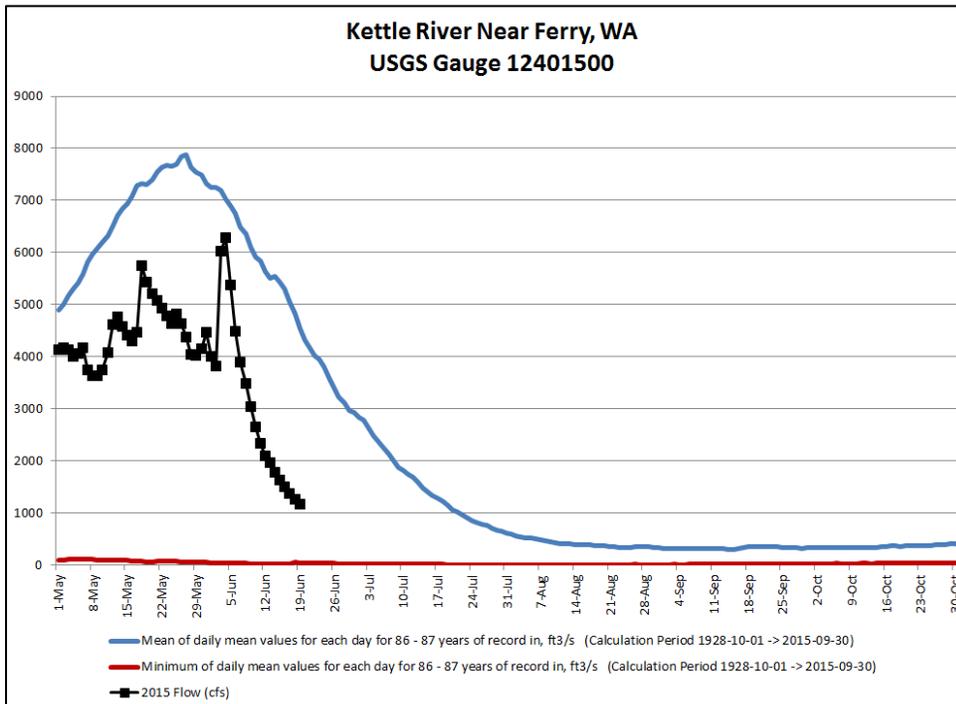
Methow is beginning to show some near-record low flows.



Okanogan gauge is missing some data, which has been reported to USGS for their investigation. The temperature (right) axis needed to be extended to capture temperatures in excess of 25 degrees C. I'm assuming sockeye and chinook fishing in the Columbia off the mouth of the Okanogan is gangbusters? Temperatures in the Columbia River are still below 20 degrees C.



OK, this is a very weird chart for Colville! Spikes would make sense, dips are a bit more difficult. Sandy, any idea what's happening here?



At least Colville and Kettle are telling similar overall stories.

- Stilly [http://waterdata.usgs.gov/wa/nwis/uv?site\\_no=12167000](http://waterdata.usgs.gov/wa/nwis/uv?site_no=12167000)
- Issaquah [http://waterdata.usgs.gov/wa/nwis/uv?site\\_no=12121600](http://waterdata.usgs.gov/wa/nwis/uv?site_no=12121600)
- Dungeness [http://waterdata.usgs.gov/wa/nwis/uv?site\\_no=12048000](http://waterdata.usgs.gov/wa/nwis/uv?site_no=12048000)
- Hoko [http://waterdata.usgs.gov/wa/nwis/uv?site\\_no=12043300](http://waterdata.usgs.gov/wa/nwis/uv?site_no=12043300)
- Calawah [http://waterdata.usgs.gov/wa/nwis/uv?site\\_no=12043000](http://waterdata.usgs.gov/wa/nwis/uv?site_no=12043000)

Skookumchuck	<a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12025700">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12025700</a>
Naselle	<a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12010000">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12010000</a>
Speelyai	<a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=14219800">http://waterdata.usgs.gov/wa/nwis/uv?site_no=14219800</a>
Klickitat	<a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=14107000">http://waterdata.usgs.gov/wa/nwis/uv?site_no=14107000</a>
Walla Walla	<a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=14018500">http://waterdata.usgs.gov/wa/nwis/uv?site_no=14018500</a>
Methow	<a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12447383">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12447383</a>
Okanogan	<a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12447200">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12447200</a>
Colville	<a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12409000">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12409000</a>
Kettle	<a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12401500">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12401500</a>