



Drought Status Update #14

June 12, 2015

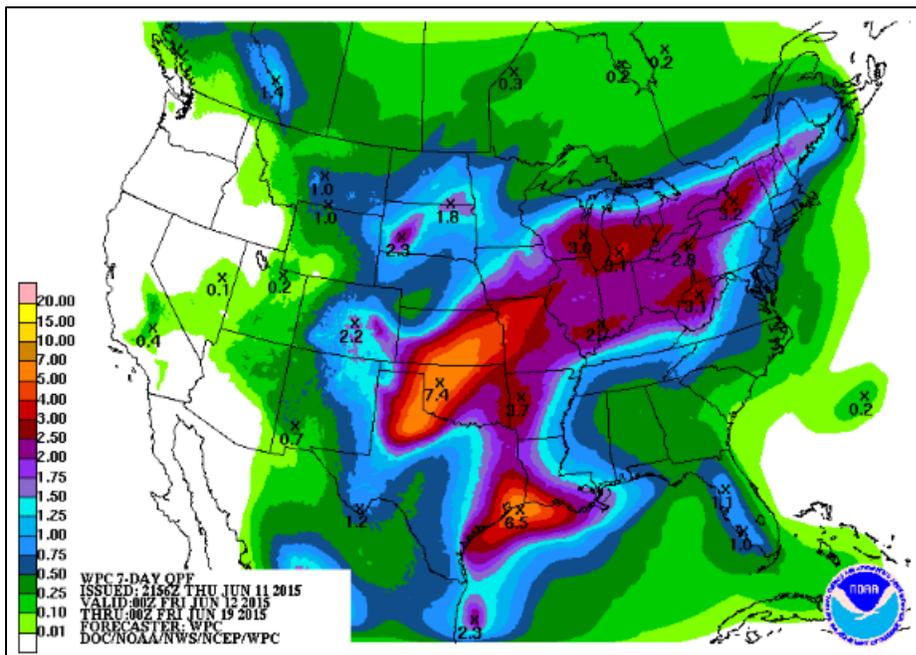
Note: This material is intended for, and contains elements of special interest to, WDFW agency staff. Non-agency readers or anyone having questions about the context, clarity, or content for items in this update should contact the author, WDFW Drought Coordinator Teresa Scott at (360) 902-2713 teresa.scott@dfw.wa.gov

Contrary to expectations for a “snow” drought, groundwater sources are beginning to show reduced levels similar to reduced surface flows across the state. Recall that climate and water supply forecasters predicted that groundwater sources would be fully charged from the normal precipitation levels experienced this winter and spring. Washington State Department of Health is working with municipal water suppliers whose spring- or groundwater-fed systems are beginning to show signs of reduced production or impending failure. Health is preparing water suppliers for the likelihood that 2015 could include “three Augusts” in terms of stressful water supply delivery. Make that “four Septembers” for fish! The question is whether levels have bottomed out early, or whether we will continue to see water levels decline. Ecology will be exploring this question with the Water Supply Availability Committee in its next meeting in early July. It’s inevitable that Drought 2015 will increase people’s awareness and understanding about the linkages between ground and surface water in our state, and will demonstrate the fragility of our over-appropriated water supply.

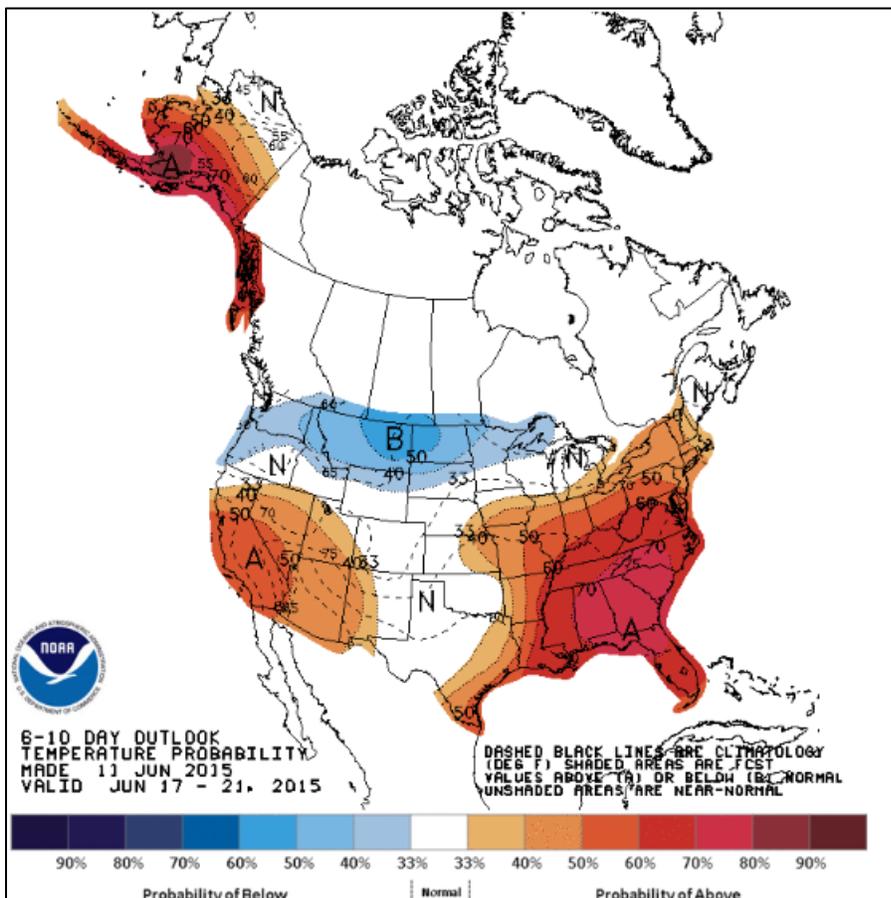
The good news is that as streamflows switch from runoff-fed to groundwater-fed, water temperatures should reduce. At least that’s what the hydrogeologists say.

Temperature and Precipitation Forecasts

For an overview of this week’s (air) temperature and precipitation anomalies and a peek at the extended outlook, check out the [weekly 2015 drought update](#) from the Office of the Washington State Climatologist. I’m going to skip the recaps of last week’s weather and cut right to the forecasts starting this week. There is a little precipitation predicted in northern Washington during the **next** 7 days ([below](#)).

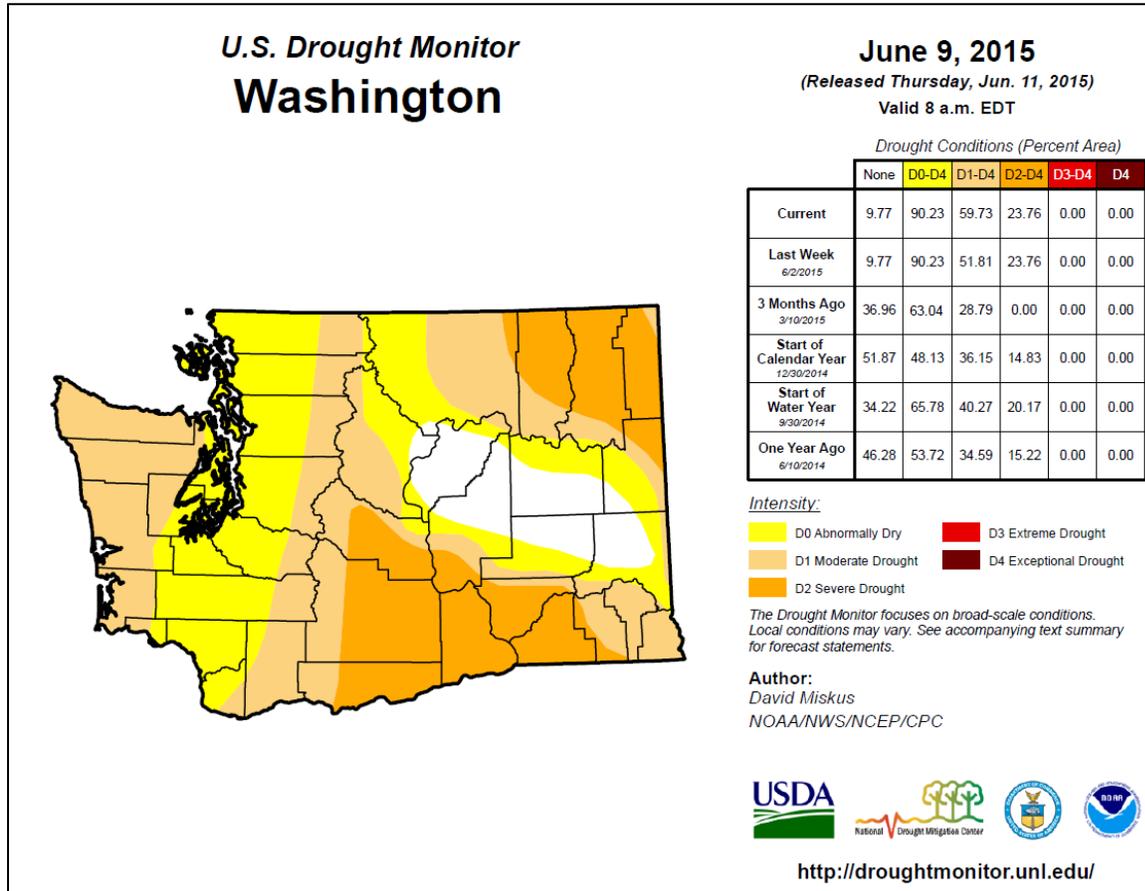


The temperature outlook ([below](#)) is for slightly lower-than-normal temps over most of Washington for the next 10 days.



Federal Drought Status

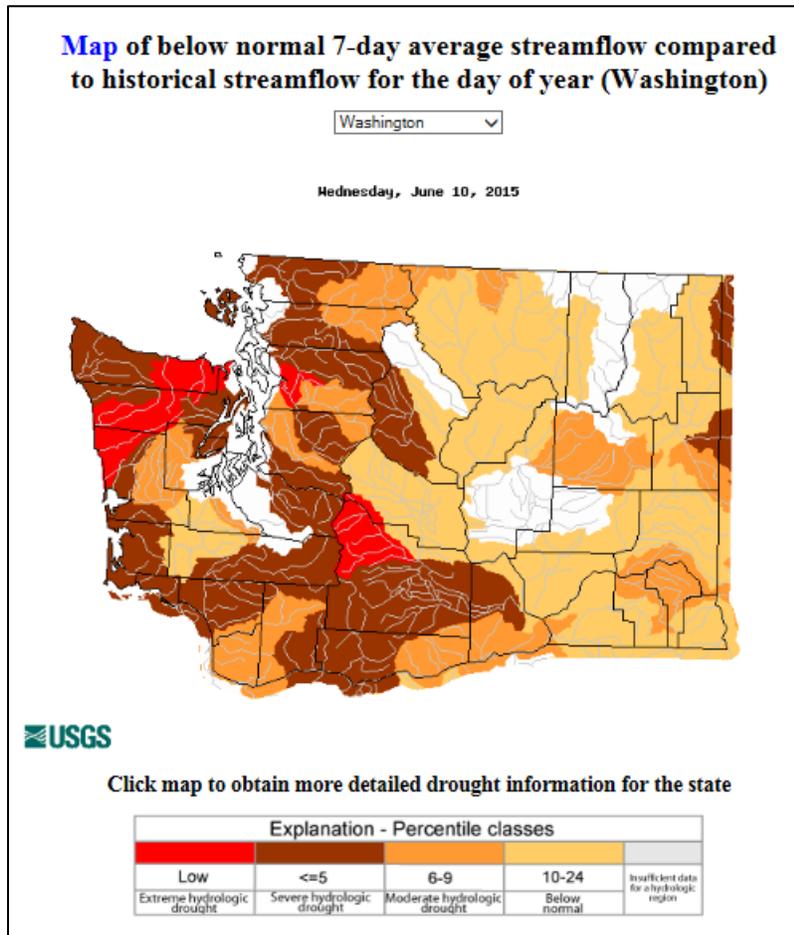
This is week 7 at D2 “Severe Drought” for south central Washington, and week 4 for northeastern Washington. My how time flies! No new areas were added to last week’s drought ratings. ONE more week at D2 will get us a federal drought declaration in south central counties; 4 more weeks in northeast Washington. The [Washington Department of Agriculture drought page](#) provides information distinguishing state-declared and federal drought designations.



Stream Flows

For the state as a whole, the [percentage of stream gauges with below normal streamflow](#) has been roughly the same since Memorial Day weekend with 58% of USGS gauges in the state

below the 10th percentile of flows.



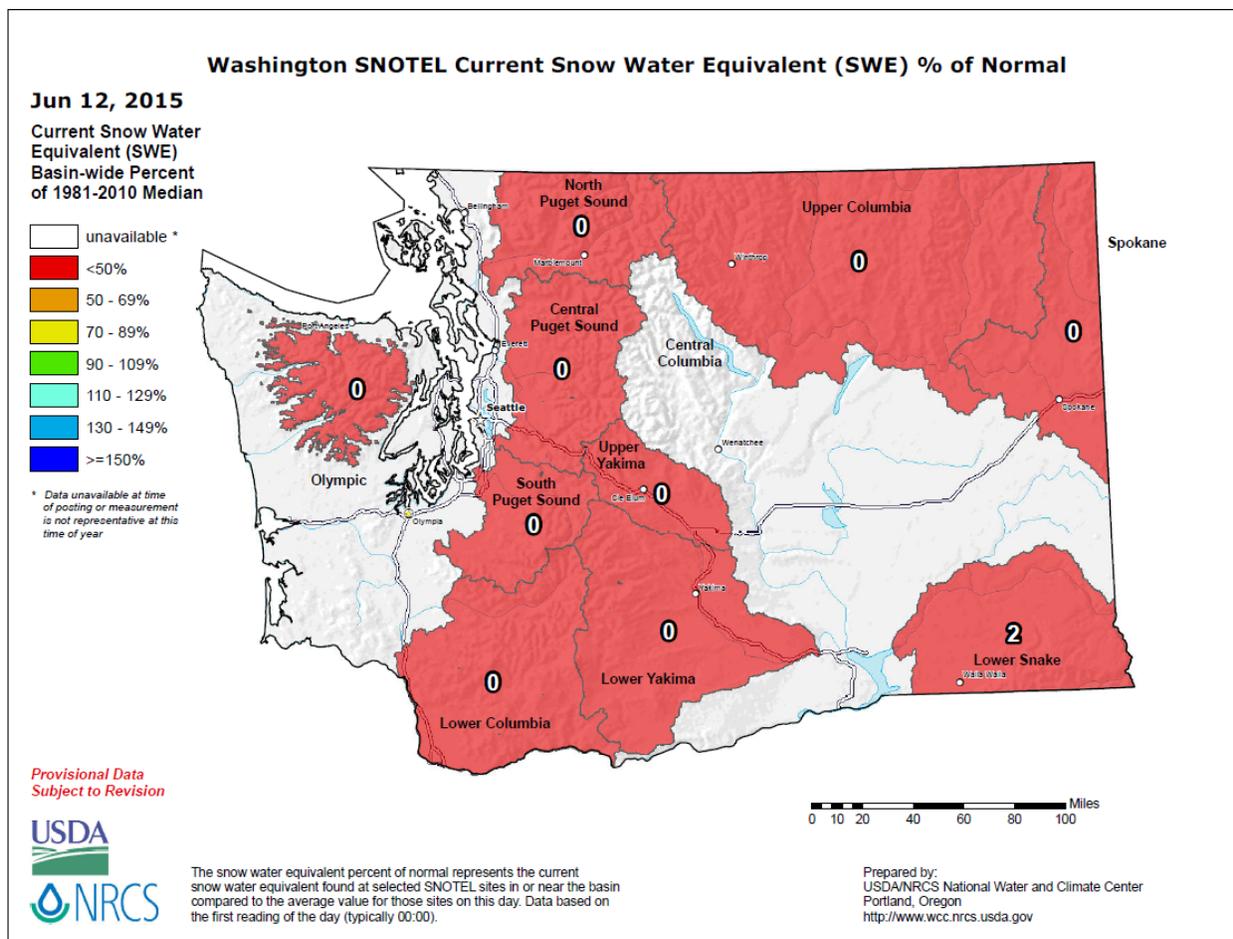
Hydrograph Sampler

The Hydrograph Sampler Charts have been moved to the [end of the document](#).

In general, westside streams are tracking 2 months ahead of normal hydrograph; the Dungeness is 3 months ahead of itself, which is why we are planning now for low flow blockage remediation there. Eastside streams are tracking about a month ahead of normal hydrograph. The Walla Walla is catching up to its normal low status at this time of year after a couple of weeks of increased flows from rain. The Okanogan temperatures are pretty dramatic: temperatures in excess of 20 degrees C have caught up to the downstream gauge. The hydrographs make a lot of sense once you've seen the snowpack status.

Snow Water Equivalents

One last look at snow-water-equivalents (below):



Yes, that’s a ZERO percent of normal – no snowpack left in Washington (except for a little in the Blue Mountains). This just blows me away – don’t know what else to say.

Selected Washington Streamflows Table

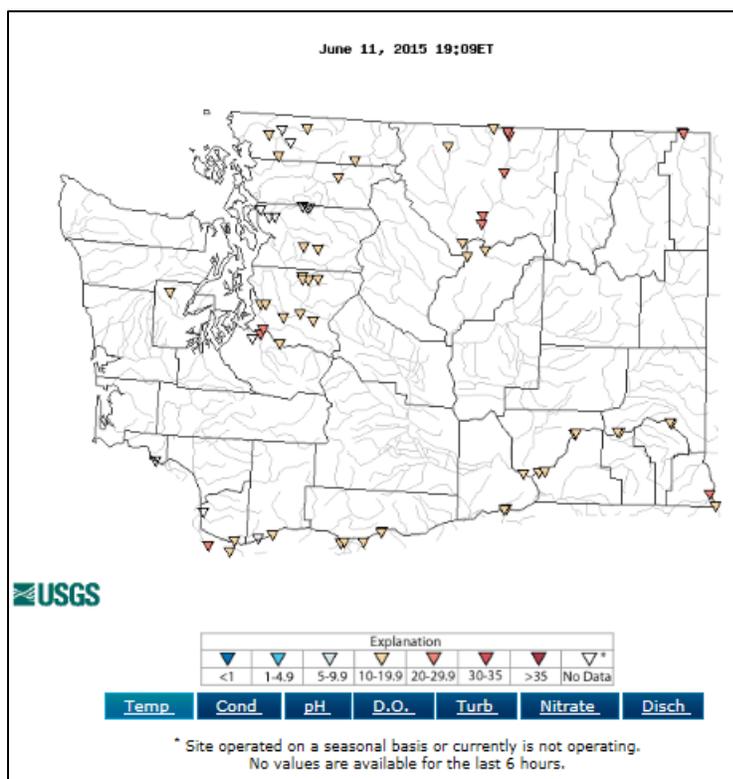
The table gives a quick visual reference for daily flows as a percent of normal for this date in the historic record. A lighter red/orange color is a higher percentage, with none topping 75% of average; anything that’s a bright red is less than 50% of average. The dark red cells in the second column indicate that today’s flows are record low for this date. 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 of our select set of 43 locations set record lows on June 12, 2015. Northwestern Olympic Peninsula streams are all setting records low flows daily as we move into summer. [Statewide streamflows](#) are available from USGS.

June 12, 2015 USGS Stream Gauge	Today's Flow (cfs)	Percent of average for this date in the record	Min Flow (cfs)	Year of Min
MF NOOKSACK RIVER NEAR DEMING, WA	245	36%	232	1992
NOOKSACK RIVER AT FERNDALE, WA	1,930	39%	1,910	1992
SKAGIT RIVER NEAR CONCRETE, WA	11,600	47%	9,890	2005
SAUK RIVER AT DARRINGTON, WA	1,220	36%	1,040	1915
CASCADE RIVER AT MARBLEMOUNT, WA	1,180	60%	1,250	2008
NF STILLAGUAMISH RIVER NEAR ARLINGTON, WA	325	18%	370	1992
SNOQUALMIE RIVER NEAR CARNATION, WA	993	21%	1,030	1992
SKYKOMISH RIVER NEAR GOLD BAR, WA	872	12%	1,670	1992
ISSAQUAH CREEK NEAR MOUTH NEAR ISSAQUAH, WA	58	64%	27	1992
CEDAR RIVER BELOW DIVERSION NEAR LANDSBURG, WA	247	na		
CEDAR RIVER AT RENTON, WA	258	na		
BIG SOOS CREEK ABOVE HATCHERY NEAR AUBURN, WA	37	43%	34	1992
GREEN RIVER NEAR AUBURN, WA	291	26%	293	1973
SOUTH PRAIRIE CREEK AT SOUTH PRAIRIE, WA	54	21%	50	1992
PUYALLUP RIVER AT PUYALLUP, WA	1,960	43%	1,790	1992
NISQUALLY RIVER AT MCKENNA, WA	553	53%	120	1963
DESCHUTES RIVER NEAR RAINIER, WA	51	42%	42	1992
NF SKOKOMISH R BL STAIRCASE RPDS NR HOODSPORT, WA	80	13%	183	1992
DUNGENESS RIVER NEAR SEQUIM, WA	188	26%	270	1926
HOKO RIVER NEAR SEKIU, WA	26	23%	32	1989
CALAWAH RIVER NEAR FORKS, WA	116	27%	135	1995
HOH RIVER AT US HIGHWAY 101 NEAR FORKS, WA	901	43%	1,190	1992
SATSOP RIVER NEAR SATSOP, WA	363	49%	420	1979
CHEHALIS RIVER NEAR GRAND MOUND, WA	348	36%	365	1934
NASELLE RIVER NEAR NASELLE, WA	50	33%	54	1982
COWLITZ RIVER BELOW MAYFIELD DAM, WA	153	na		
COWLITZ RIVER AT PACKWOOD, WA	153	5%	790	1992
LEWIS RIVER AT ARIEL, WA	153	na		
WHITE SALMON RIVER NEAR UNDERWOOD, WA	620	47%	578	1992
KLICKITAT RIVER ABOVE WEST FORK NEAR GLENWOOD, WA	158	21%	171	2005
WALLA WALLA RIVER NEAR TOUCHET, WA	28	7%	9	1992
TUCANNON RIVER NEAR STARBUCK, WA	70	31%	56	1930
GRANDE RONDE RIVER AT TROY, OR	2,960	49%	1,360	1992
YAKIMA RIVER AT KIONA, WA	761	14%	884	1994
AMERICAN RIVER NEAR NILE, WA	92	14%	160	2005
CRAB CREEK AT IRBY, WA	6	16%	4	1992
WENATCHEE RIVER AT PLAIN, WA	2,500	38%	1,440	2005
METHOW RIVER NEAR PATEROS, WA	2,860	46%	1,650	2005
OKANOGAN RIVER AT MALOTT, WA	4,800	44%	2,310	1992

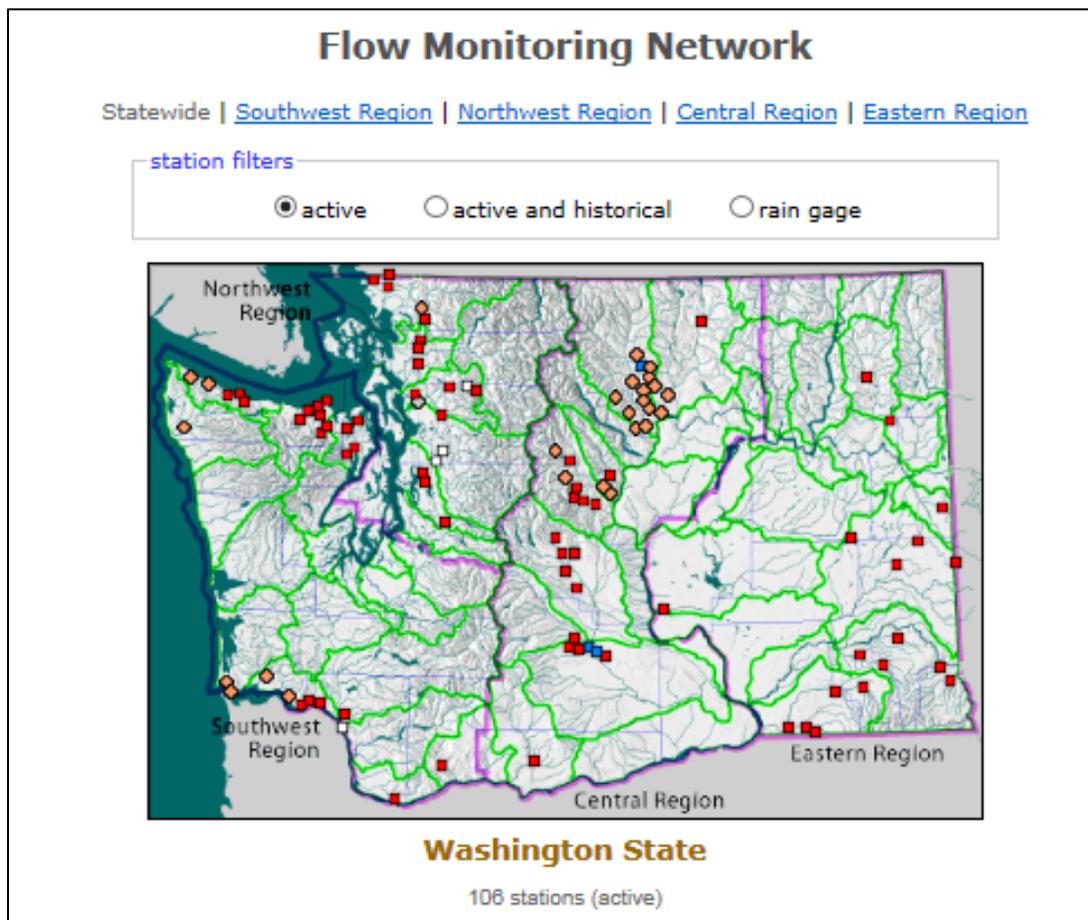
OKANOGAN RIVER AT OROVILLE, WA	1,180	na		
SPOKANE RIVER AT SPOKANE, WA	1,240	10%	2,210	1926
COLVILLE RIVER AT KETTLE FALLS, WA	133	34%	30	1926
PEND OREILLE RIVER BELOW BOX CANYON NEAR IONE, WA	31,200	48%	8,850	1992

Real-Time Water Temperature from USGS and Ecology

Water temperatures are already reaching lethal levels in some areas. [USGS temperature stations in Washington](#) provides water temperature for stations having that feature (below). Temperatures greater than 20 degrees C in the Okanogan River have moved from the U.S./Canada border to south of Malott in the past week. Ecology's gauge on the Stillaguamish River at Oso was reading 19.6 degrees yesterday, June 11, and Touchet River at Bolles was reading 24.7 degrees.



Ecology's [Flow Monitoring Network](#) (below) provides air and water temperature monitoring at several Ecology and Co-op stations. Please note that the color of the dots on this map are not relevant to either flow or temperature.



Data for the Lake Washington Ship Canal can be found [here](#). Ship Canal temperatures at the fish ladder have topped 65 degrees F in the past couple of days.

Drought Impacts to Fish and Wildlife

Dry wetlands impact wildlife

Region 5's David Anderson reports that, while it's a bit early to give a final analysis of the sandhill crane breeding season, at least two sites have been observed where birds have not been successful at nesting due to low water levels. Sandhill cranes in general need anywhere from 6 inches to 20 inches of water for nesting and, due to the drought, we are seeing issues with successful nesting attempts.

There are approximately 30 breeding pairs of sandhill cranes in Washington, and this species was listed in Washington State as endangered in 1981. The breeding population of Washington's sandhill cranes winter primarily in the Sacramento Valley of California. A [state recovery plan](#) was completed in 2002, with the goals of restoring a healthy breeding population of cranes and to maintain the flocks that winter or stop in Washington.



Photo by Joseph V. Higbee

Recovery objectives include a breeding population of more than 65 pairs. Water availability is one of several factors affecting rebuilding of breeding populations in Washington, but, clearly, lowered surface water levels have a pretty severe impact on nesting success.

Sandhill Cranes and Oregon Spotted Frogs are two of the myriad species that depend upon wetlands throughout the spring and summer. Considering this current situation and the potential for dry conditions to become the norm, working with willing private landowners to improve wetland management will be important for all of these species. Wildlife biologists are working with landowners to move beavers into one area on private land to hold more water for sandhill crane nesting. Using beavers as management tools in the proper locations and with landowner cooperation will be a benefit for improving wetland conditions for these species and represents a big step toward resilience to climate change.

Fish in nature:

High water temperatures can block fish migration as effectively as a physical blockage, but there is not much that can be done to reduce temperatures or help fish in the short term. Water temperatures are becoming a concern throughout Washington, as noted in the temperature section above and narrative below.

North Puget Sound

As noted above, water temperatures in the Stillaguamish River are nearing 20 degrees C.

Central Puget Sound

Temperatures at the Lake Washington Ship Canal fish ladder have spiked to 65 degrees F, and temperatures at 8 feet below the surface at the University Bridge are hovering just above 70 degrees F, and at 21 feet are ranging between about 62 to 68 degrees F.

Starting June 10, water stored behind Mud Mountain Dam during Phase 1 of the Cascade Water Alliance/Corps of Engineers barrier structure apron repair project is being released, and fill of the Lake Tapps reservoir has resumed. Lake Tapps elevation has risen from below 530 feet on June 9 to 531.75 and rising on June 12. Lake elevation will increase at a rate of about one-half foot to one foot per day for about a week. On about June 19, water will be held back again for one week as the Corps completes phase 2 of the project. Lake Tapps refill will resume the last week of June and first week of July.

Dungeness

A team of WDFW and tribal biologists is planning to meet June 16 in Blyn to begin planning for remediation of expected low-flow blockages in the Dungeness River basin.

Washington Northwest Coast

Stream flows at almost every measured place on the northwestern Olympic Peninsula are breaking minimum flow records daily.

Southwest Washington

Region 5 biologist Joe Hymer reports that 9,689 sockeye had passed Bonneville Dam through June 10, which is a record. At this time last year, 5,128 sockeye had passed Bonneville. The preseason forecast is 394,000 sockeye. These passage figures are a good start, but aren't an absolute indicator of final run size. Many of these fish are destined for the Okanogan River – see story below.

Yakima

Kittitas Reclamation District (KRD) has turned on bypasses in their canals that provide flows to Manastash Creek and five other upstream Yakima River tributaries. Under a quickly-wrought agreement among KRD and Reclamation, Ecology, Yakama Nation, WDFW, and NOAA Fisheries, extra irrigation water (being released from Reclamation's upper Yakima reservoirs, and intended for downstream irrigators like Roza Irrigation District) is being routed into KRD canals and diverted into these small creeks in order to maintain flow, fish habitat and riparian vegetation during 2015 drought conditions.

This action is part of a drought mitigation strategy developed between Reclamation, Ecology, and Yakama Nation that is intended to maintain stream health during drought periods. The strategy is finally able to be implemented this year because of improvements to KRD irrigation infrastructure (some funded through the Yakima Basin Integrated Plan) that allow water in the canals to be transferred into streams. The bypassed water returns to the Yakima River through these tributaries, and then travels downstream to its intended customers.

It might be possible to maintain this approach into September, depending on water delivery schedules and reservoir outflows. This is a huge flow improvement for Manastash, which had declined to only 3-4 cfs with the creek essentially dry (subsurface) at Cove Road. This swiftly-assembled 2015 agreement among all the Kittitas Valley players is made possible because of the trust relationships that have been built during development and implementation of the Yakima Basin Integrated Plan, says Urban Eberhart of KRD. Urban also wishes to acknowledge the vision of Water Science Team member Paul La Riviere, who encouraged improvement of infrastructure in order to preserve tributary flows in drought years.

This action is just another example of how Washingtonians are using existing infrastructure to implement actions that maintain environmental resilience to climate change.

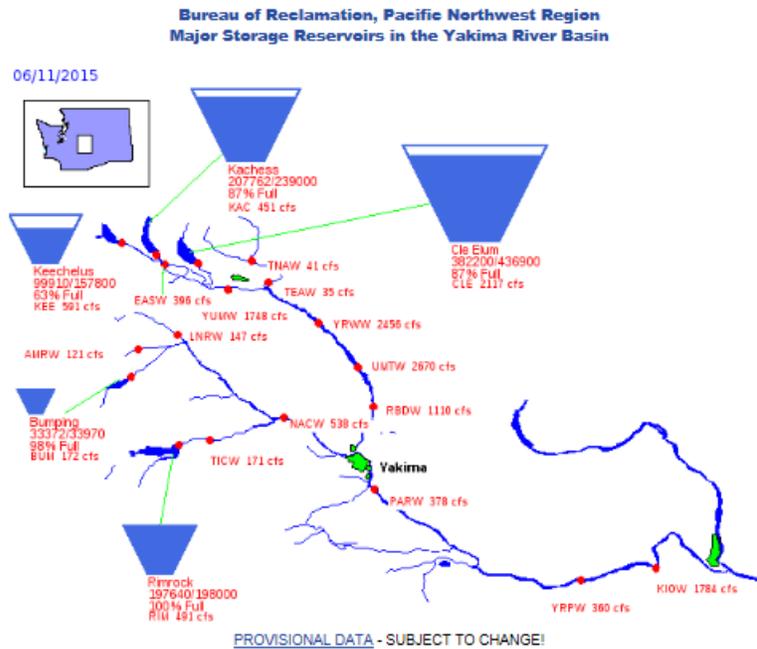
Manastash Creek at Cove Road June 1, 2015 taken by Water Science Team biologist Ryan Steele (right)



7am Thursday June 11 Manastash Creek at Cove Road; photo provided by Urban Eberhart



The [Reclamation Teacup Diagram](#) (below) for Yakima Basin shows Lake Keechelus volume down to 63%, and Kachess and Cle Elum are starting to draw significantly. Junior water right holders are currently receiving a 44% supply; seniors will receive 100% of their needs. Inflow to the five reservoirs is 24% of average, releases are 96% of average, and overall canal diversions are 77% of average for June 11.



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

North Central Washington

High water temperatures have frequently blocked sockeye and chinook migration into the Okanogan River, causing an elevated pre-spawning mortality rate even when flow levels are normal. High temps cause fish to build up in the Columbia River outside the mouth of the Okanogan, creating a fabulous fishing opportunity on these fish when overall fish population

levels can support that fishing. But sockeye need to migrate not just into the Okanogan, but through the lower Okanogan, into Canada, and past lakes filled with warm water in order to reach their spawning streams. The streams themselves are cool, but conditions for the migration can be lethal.

Jeff Korth in Region 2 notes that the most recent heat wave has already resulted in water temperatures in excess of what both sockeye and Chinook will tolerate, and this is before the fish have even arrived. Typically, Okanogan River temperatures are cool enough when the fish arrive that many of them make it upriver before the thermal barrier sets in, but without some cooler temperatures and/or significant rainfall this year, most of the run will likely have to spend the summer in the Columba River before migrating to their spawning grounds further up in the Okanogan Basin. Pre-spawn mortality, already normally high, could far exceed the average if this occurs. In addition, the new sockeye hatchery in Penticton, B.C. not achieve its egg take goal for 2015.

WDFW Drought Response Activity

Fish in Nature:

Low-flow migration blockage intervention: WDFW initiated our Hydraulic Projects Approval application that will cover WDFW staff and partners as we implement projects to remediate low-flow fish migration blockages this summer and fall. The HPA should be completed by mid-July. Staff are working on developing an assessment and approval process for projects intended to be implemented under this standard statewide HPA.

Pat Chapman circulated guidance internally this week about HPA procedures for drought-related projects.

Let 'em Pass Signs: Please let your regional Habitat or Fish program manager or Drought Coordinator Scott know **by June 16** how many signs you can use in your area.

Habitat policy makers are considering conditions under which hydraulic projects would be delayed to reduce impacts to stressed fish.

Please remain vigilant, and report looming, suspected, or real-time blockages to your regional program manager and to Drought Coordinator Teresa Scott at teresa.scott@dfw.wa.gov.

Fish in hatcheries:

Hatchery Division's second weekly call occurred this Wednesday with another great turnout and helpful discussions. Tools being pursued within the division include:

- Water Supply improvements
- Aerators and re-circulation pumps
- Fish transfers
- Pumping costs
- Broodstock collection

Water access:

Implementation of ramp extension projects awaits funding from the legislature. Low-water hazard signs are being printed for distribution and posting at all WDFW water access sites.

News Clips

[Washington climatologist already foresees warm winter](#)

Capital Press - June 09, 2015

[Spring's Not Over, But Westside Rivers At Late-summer Lows](#)

NW Sportsman - June 10, 2015

[B.C. reservoirs will help aid Northwest during drought](#)

The Spokesman-Review - June 11, 2015

[WA drought will not hurt endangered fish](#)

Northwest Cable News - June 10, 2015

[Drought shouldn't impact hydro dams](#)

The Columbian - June 10, 2015

[Farmers need water and taxpayers need accountability](#)

Seattle Times – 9 June 2015

[El Niño Seen Strengthening, Unlikely To Bring Drought Relief](#)

NW Public Radio - June 12, 2015

[Sockeye off to big start up Columbia River](#)

Spokesman Review - June 12, 2015

Links

Ecology's "Washington Drought 2015": <http://www.ecy.wa.gov/drought/index.html>

Office of the State Climatologist now offers a weekly drought update for Washington State:
<http://www.climate.washington.edu/events/2015drought/>

State departments of Health and Agriculture have posted drought web pages:

<http://agr.wa.gov/PestFert/natresources/Drought.aspx>

<http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/HotTopics#2015drought>

Pacific Northwest Drought Portal:

<http://www.drought.gov/drought/regional-programs/pacific/pacific-northwest-home>

NOAA El Nino Portal: <http://www.elnino.noaa.gov/>

Monthly and Seasonal climate outlooks are continuously updated and available at this site:
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.php

Northwest River Forecast Center Water Supply: <http://www.nwrfc.noaa.gov/ws/>

Real time stream data for Washington: <http://waterdata.usgs.gov/wa/nwis/rt>

U.S. Army Corps of Engineers Seattle District Reservoir Control Center <http://www.nwd-wc.usace.army.mil/nws/hh/www/index.html#>

For Further Information:

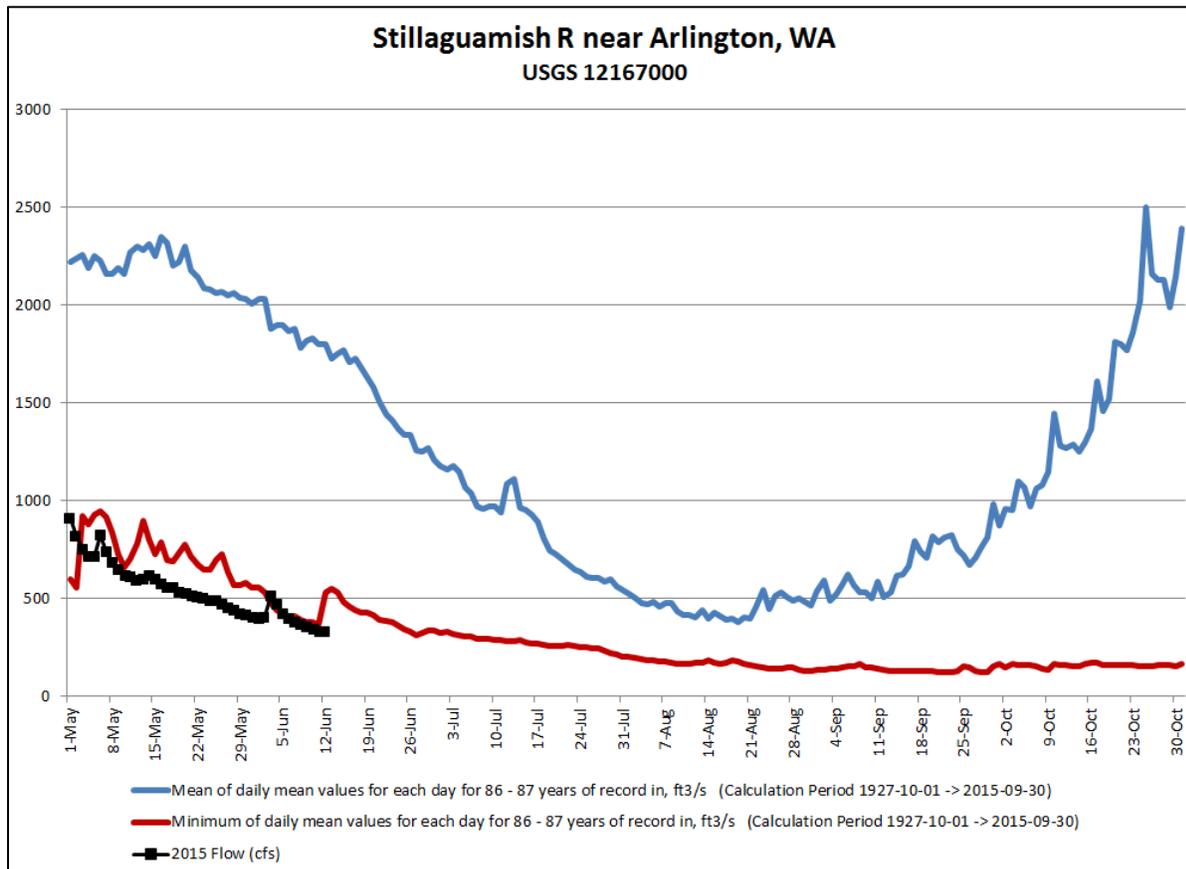
A set of WDFW drought talking points has been posted to the “S” drive for staff to use when asked about drought by the media and citizens.

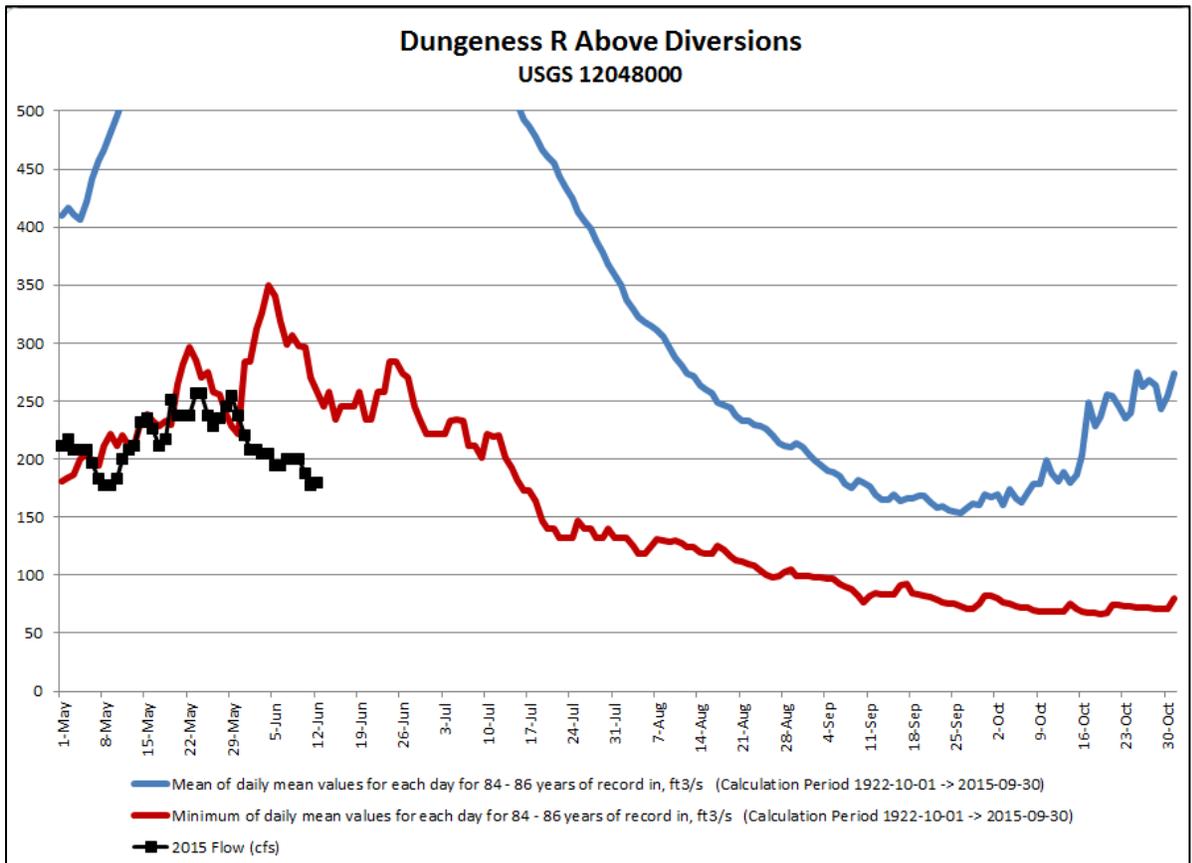
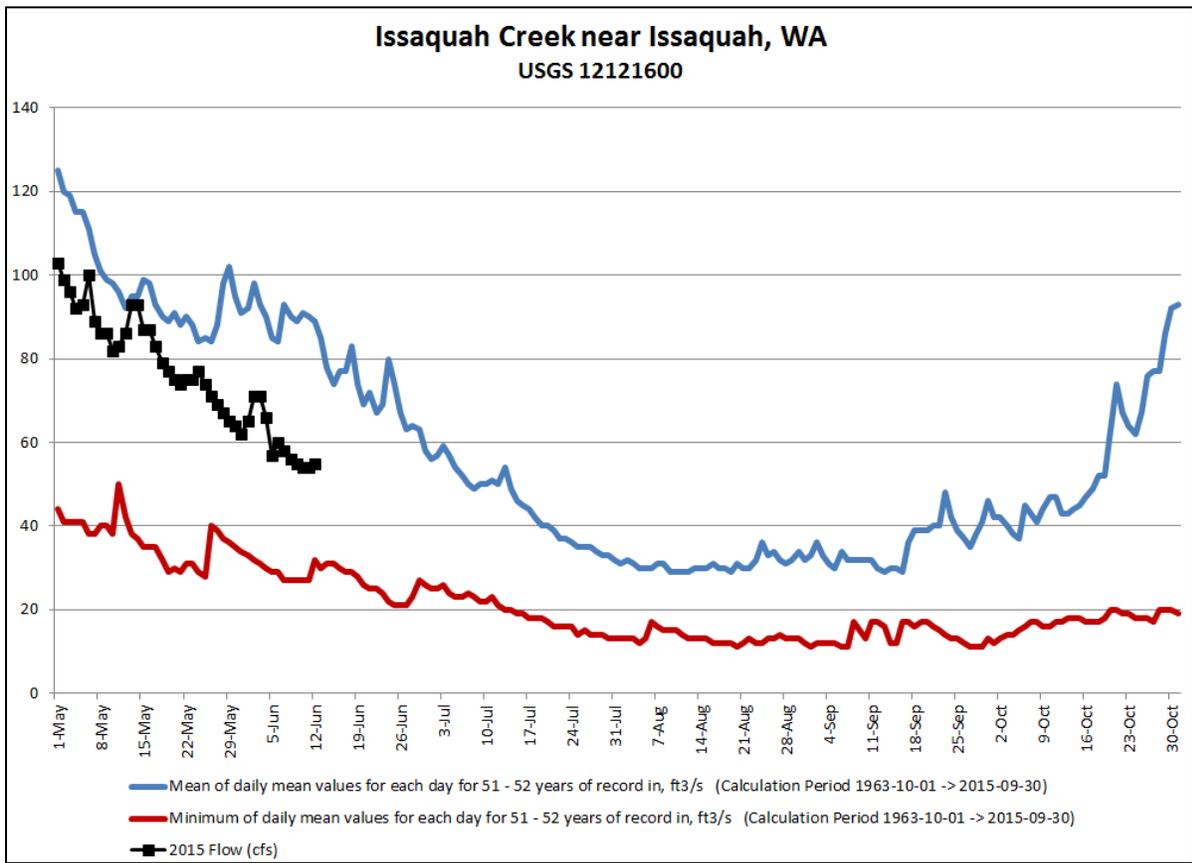
Copies of these status updates and other materials of interest are available on the WDFW common drive at s:\All Agency\Shared Projects\DROUGHT 2015. Presentations and other materials are also posted there.

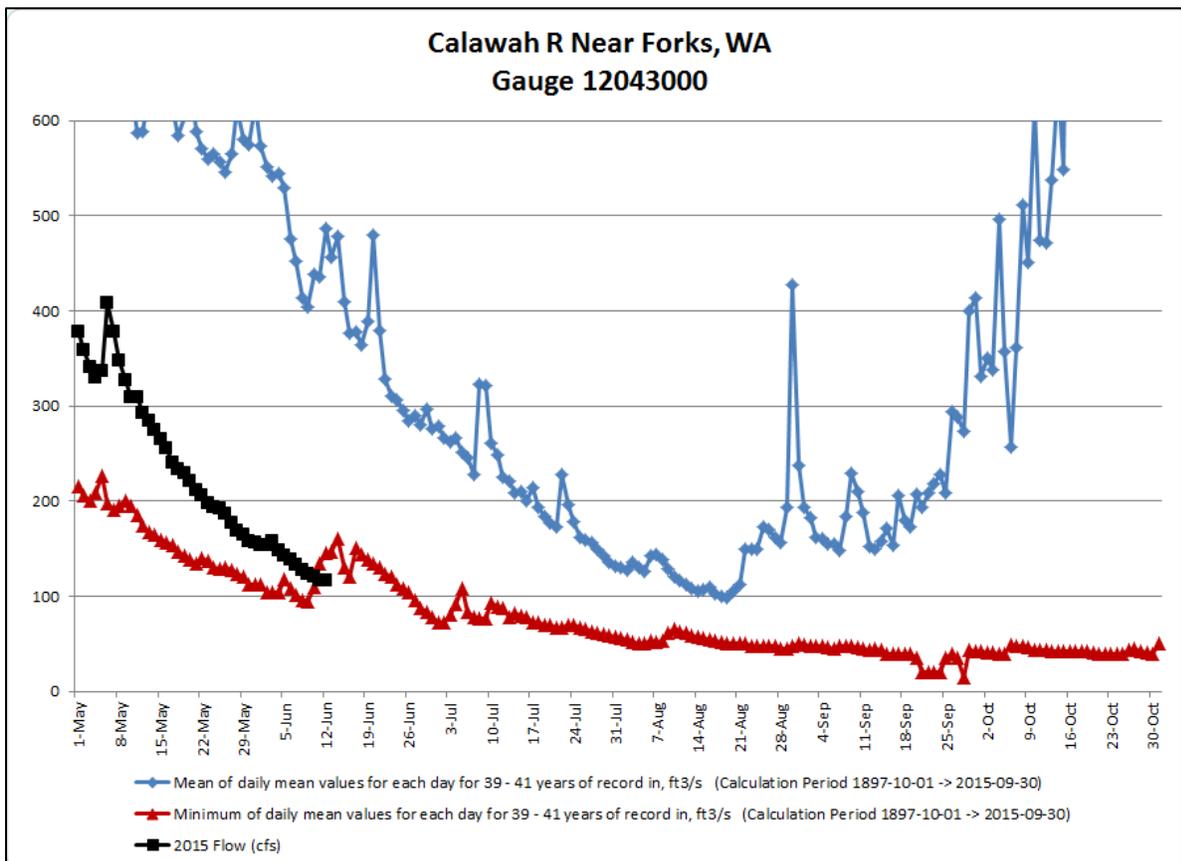
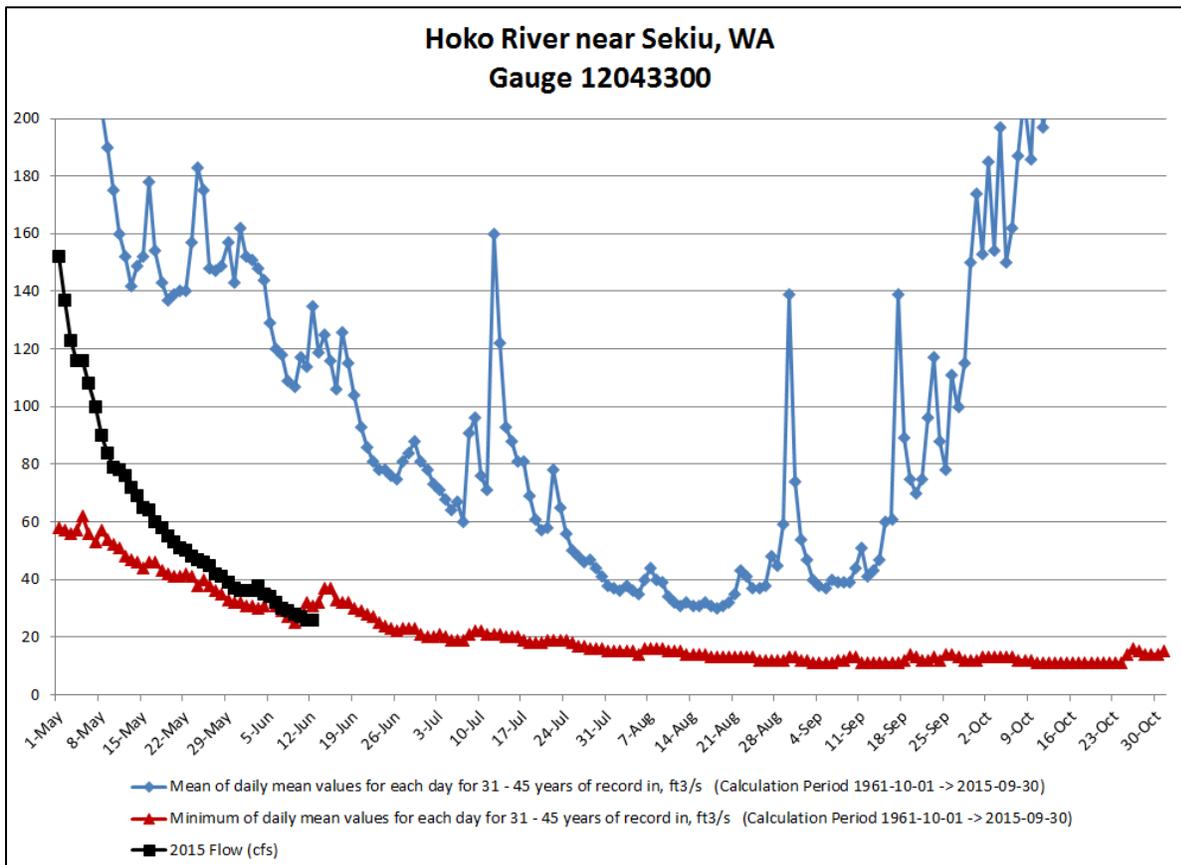
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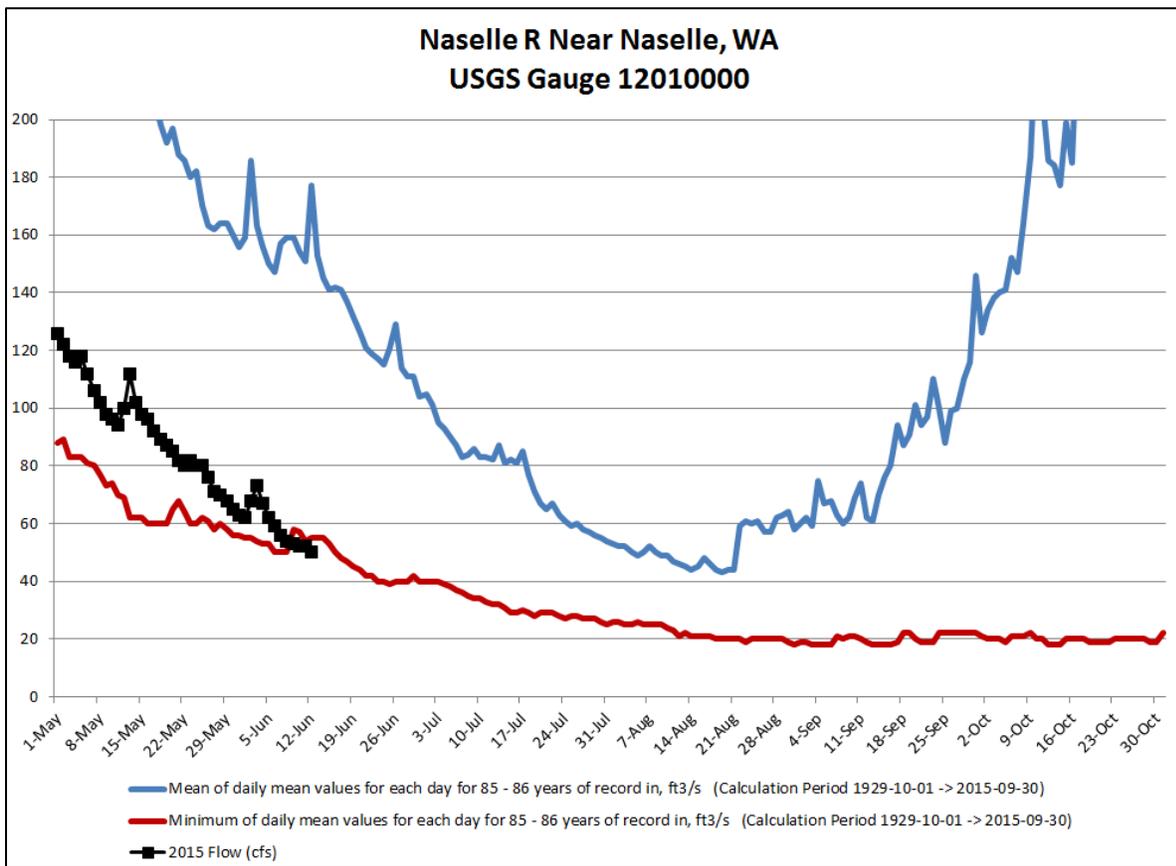
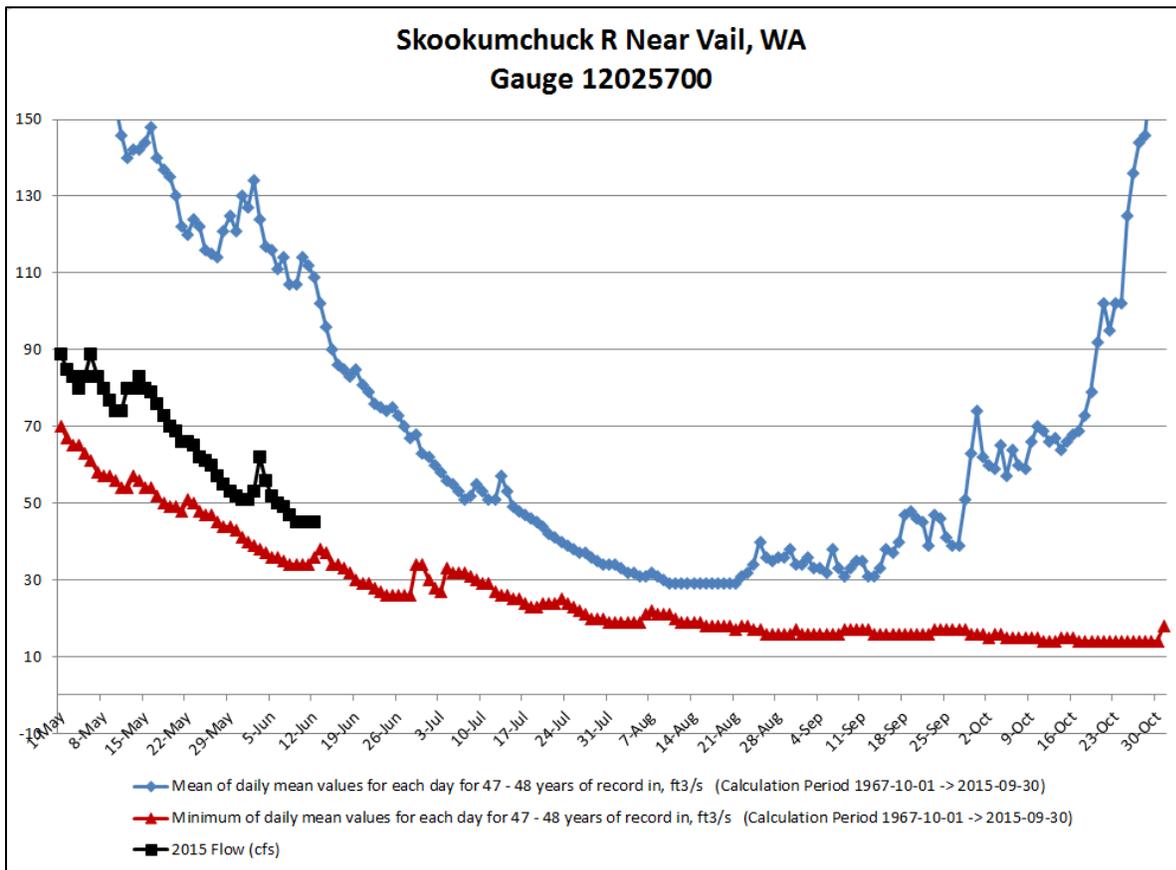
Hydrograph Sampler Charts

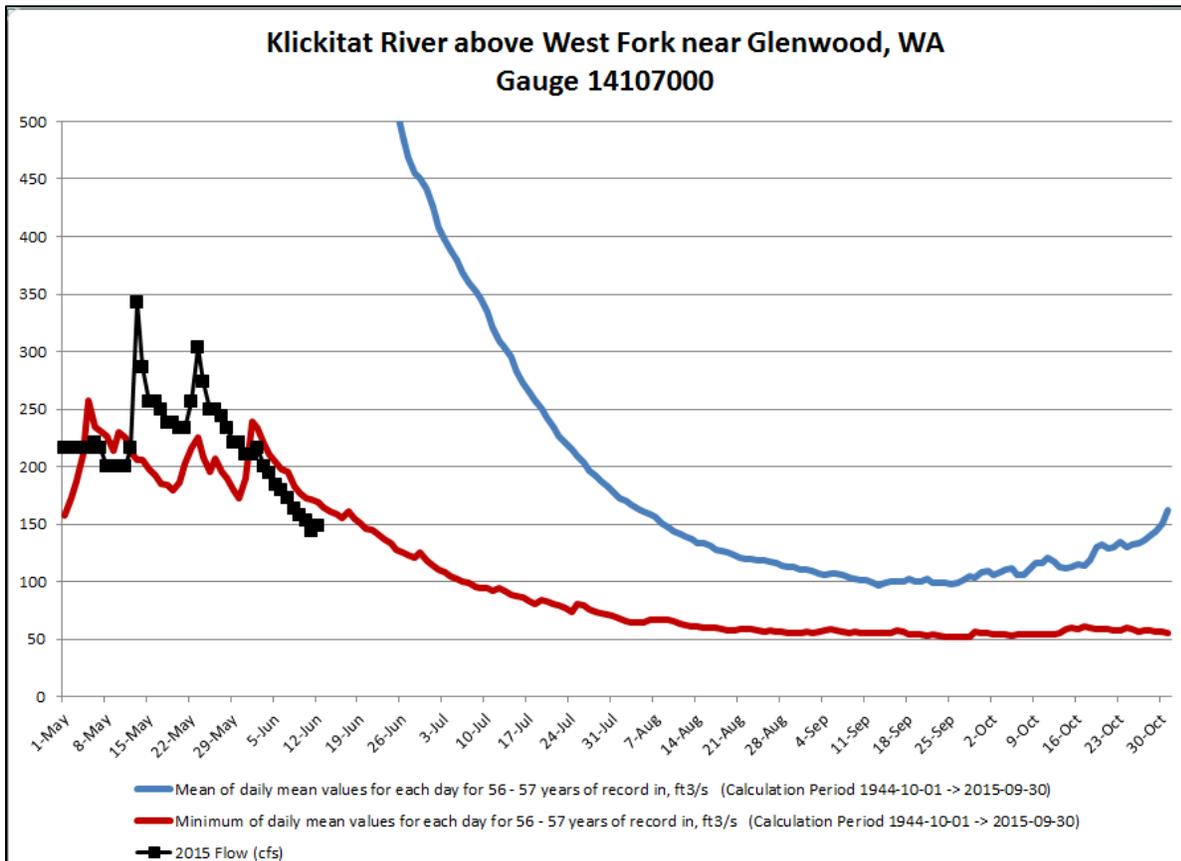
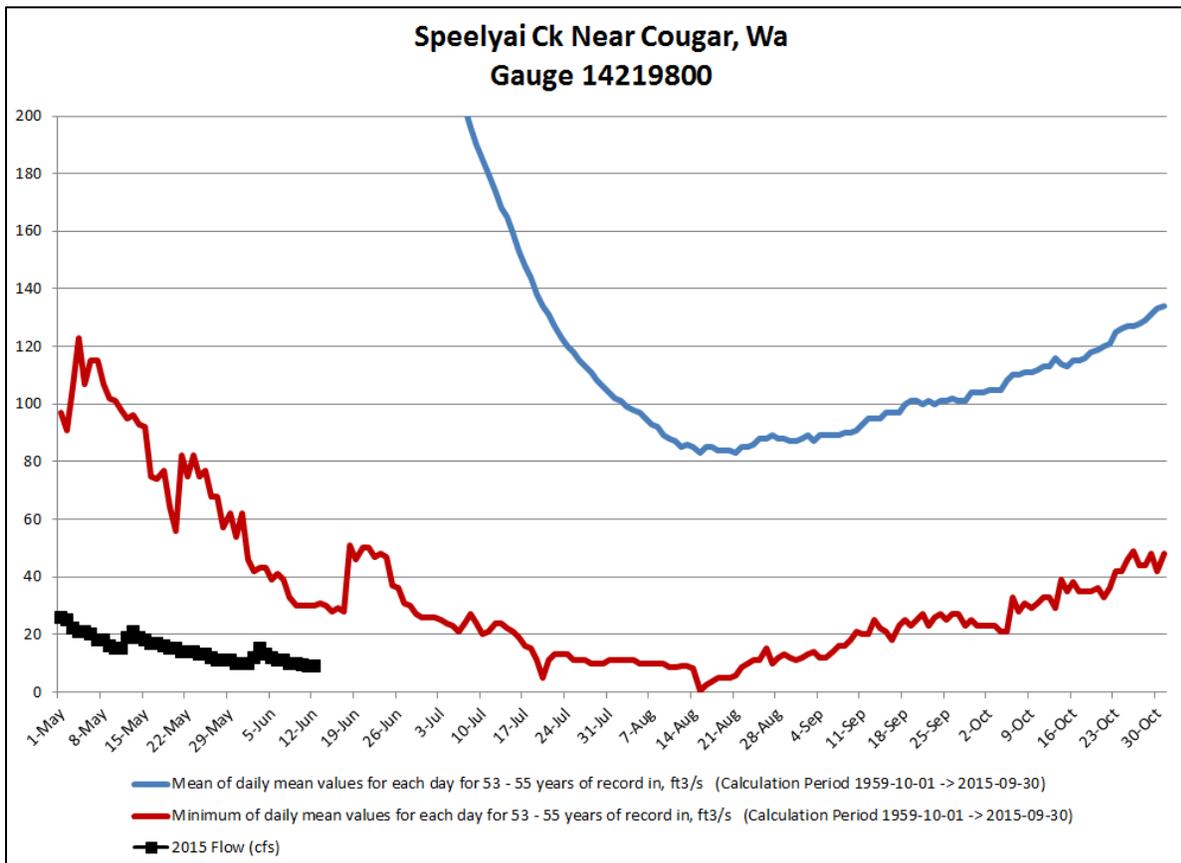
Blue line represents the average daily flows for the period of record; red line shows the minimums of daily flows in the period of record, and the black line depicts 2015 flows. These flows are through mid-day June 12, 2015.

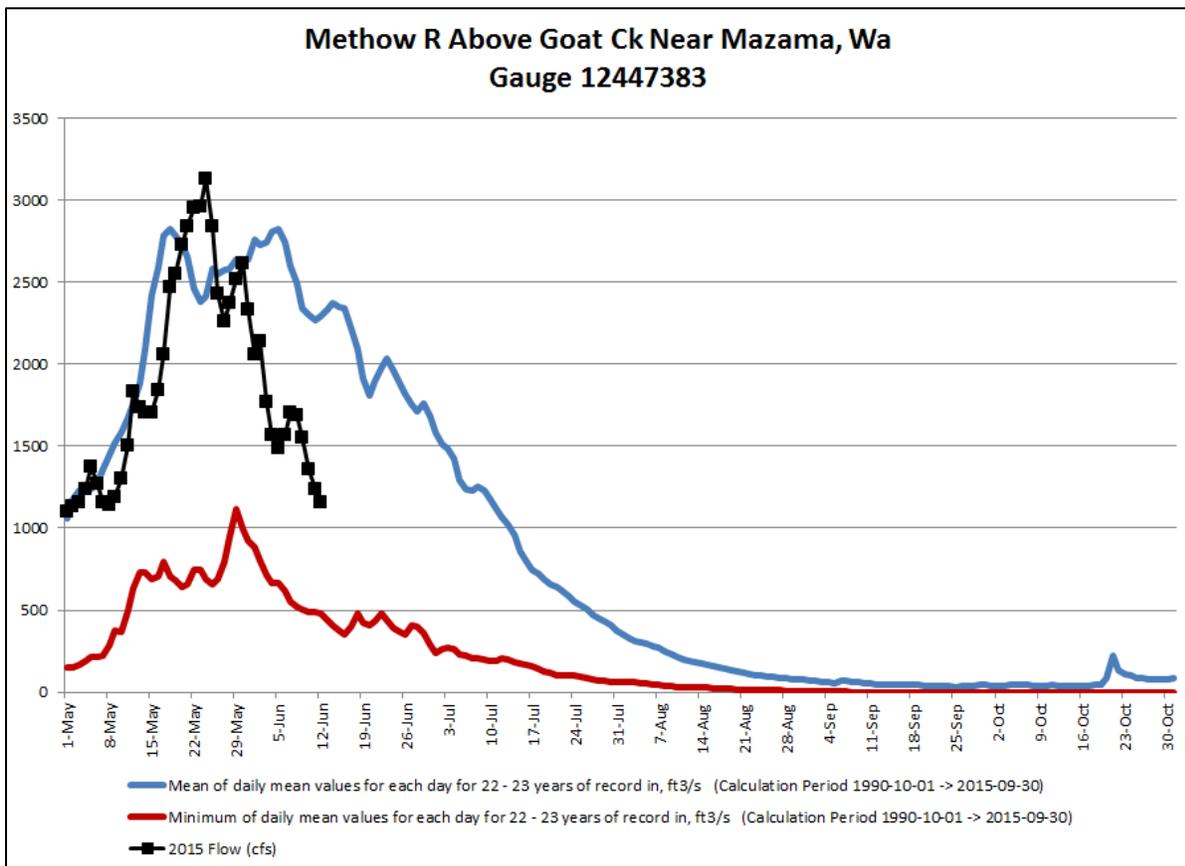
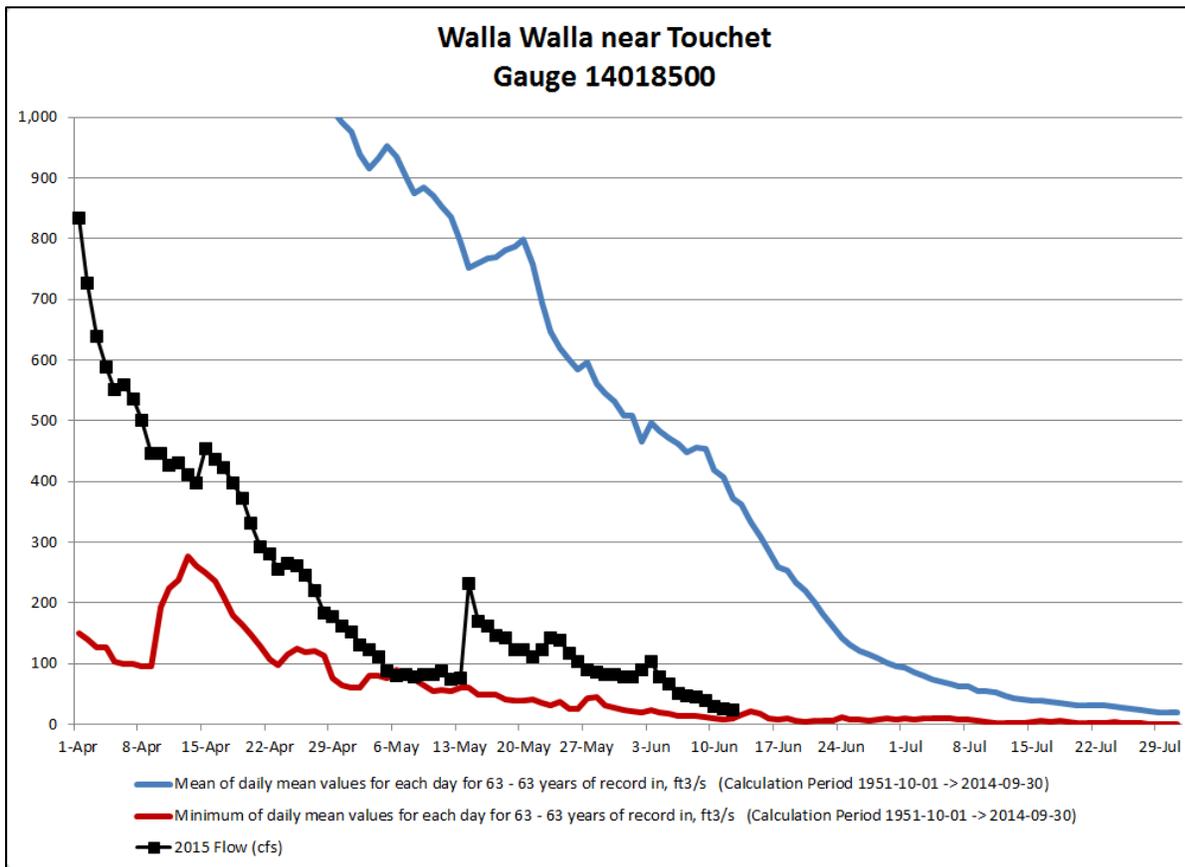


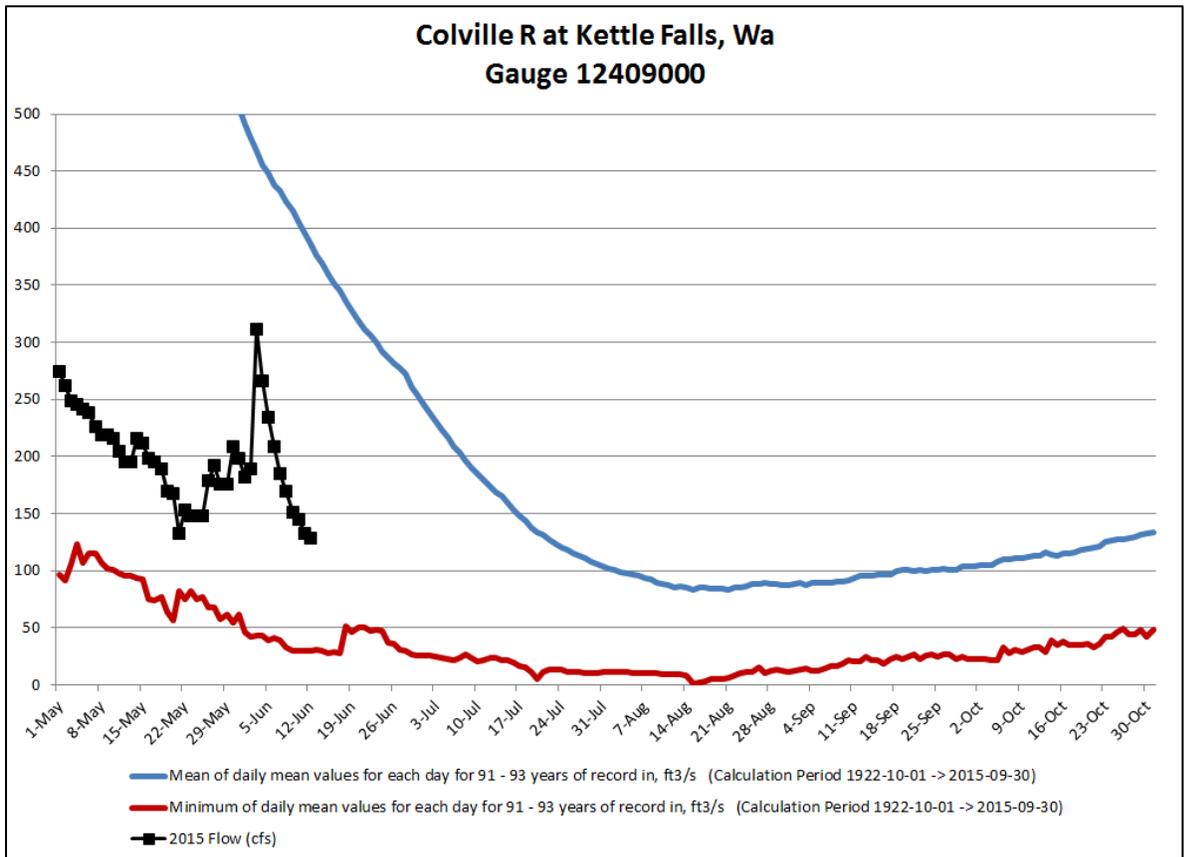
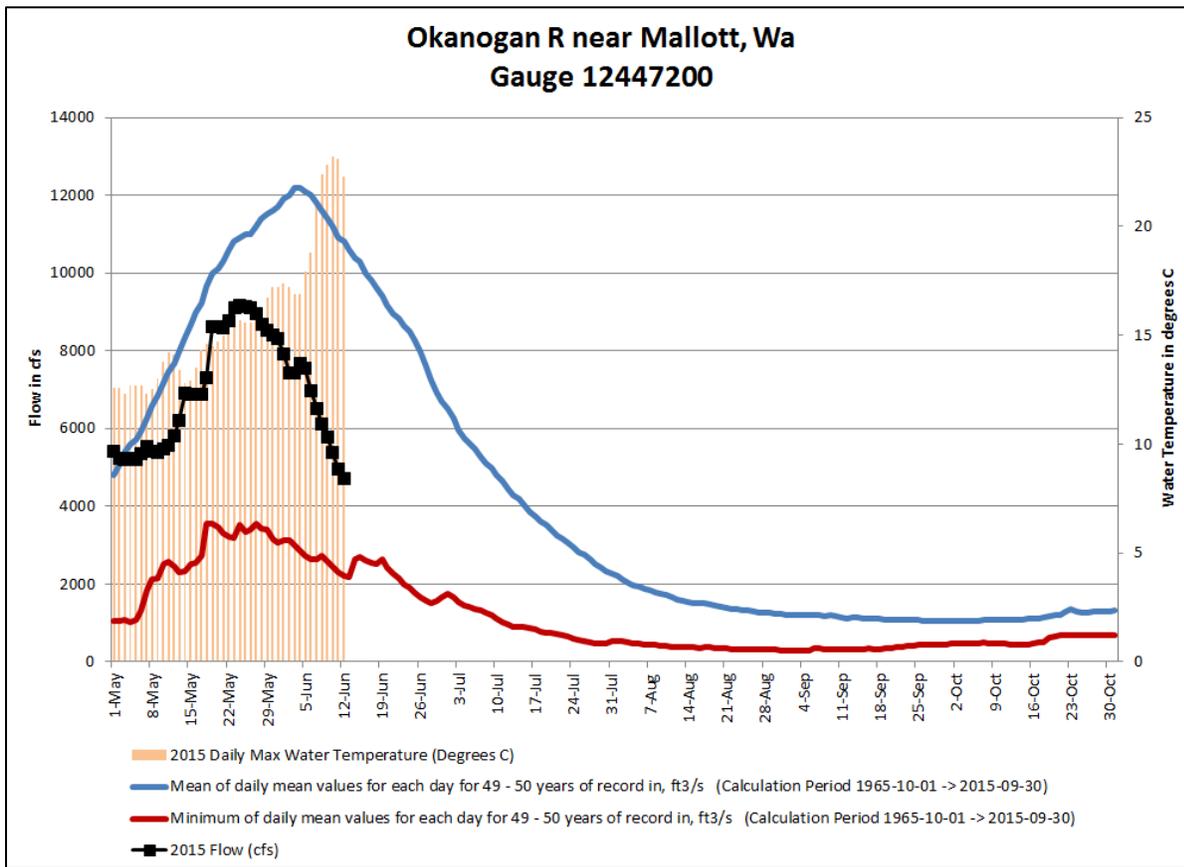












Kettle River Near Ferry, WA USGS Gauge 12401500

