

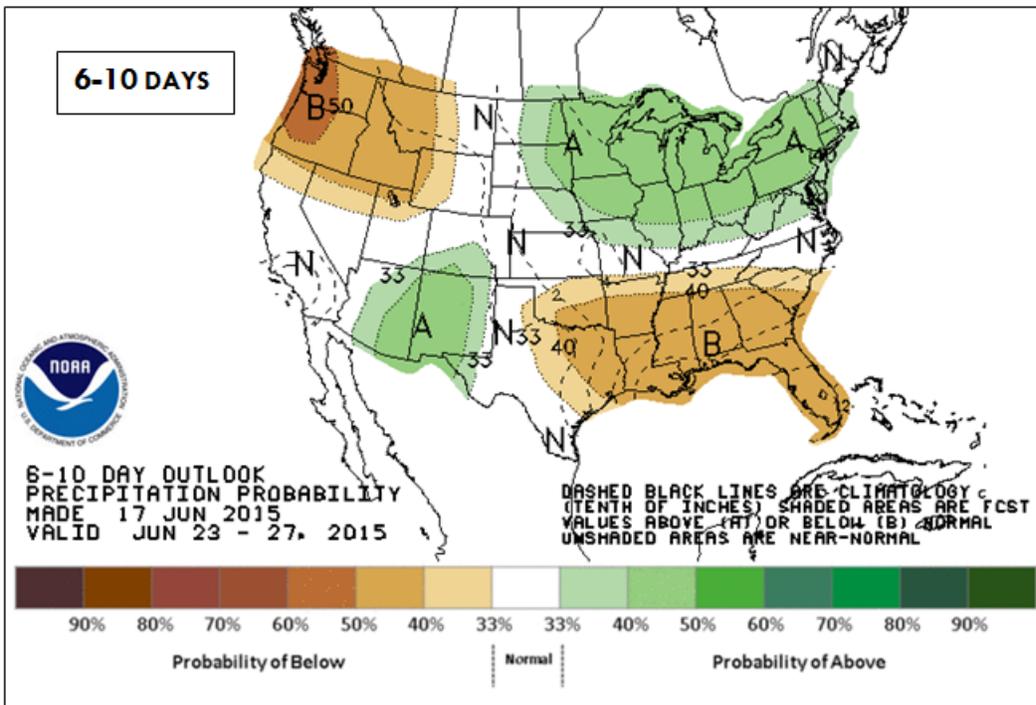


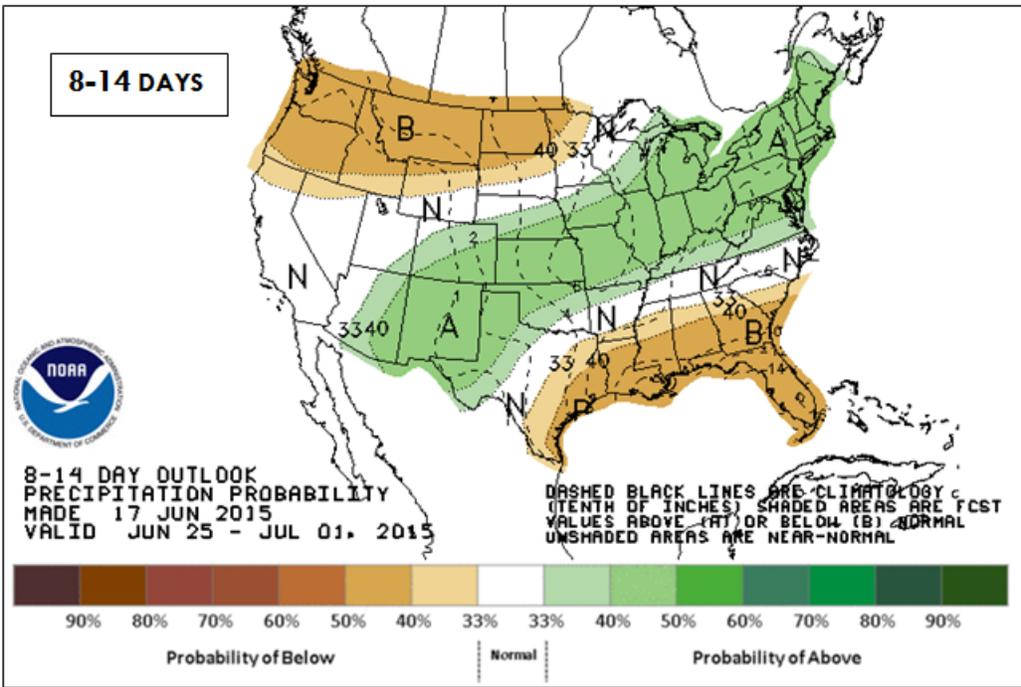
Note: This material is intended for, and contains elements of special interest to, WDFW agency staff. Non-agency readers or anyone having questions about the context, clarity, or content for items in this update should contact the author, WDFW Drought Coordinator Teresa Scott at (360) 902-2713 [teresa.scott@dfw.wa.gov](mailto:teresa.scott@dfw.wa.gov)

WDFW, Ecology, Health, and Ag are all actively responding to emerging drought impacts this week. Stream flows are one, two, in some places three months ahead of the normal snow-melt-completion timing, which makes sense in light of the fact we had no snow to melt. Fish migration is already being delayed due to low flows (Sol Duc) or high water temperatures (Okanogan). Department of Health reports numerous contacts from community water systems in western Washington (San Juans, Olympic Peninsula, Southwest Washington) who are concerned about declining supplies. Some of these systems will run out of water this summer-fall. Department of Agriculture is gearing up to support federal drought disaster assistance. Ecology is working on emergency water supply issues in the Skagit and northern Olympic Peninsula to add to their eastside drought caseload.

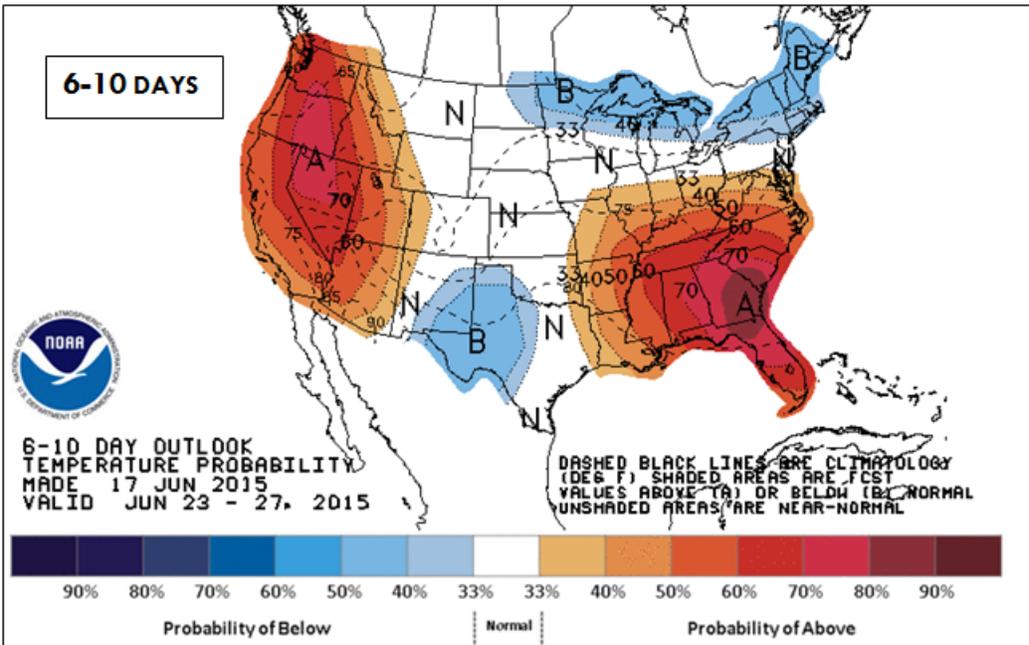
### Temperature and Precipitation Forecasts

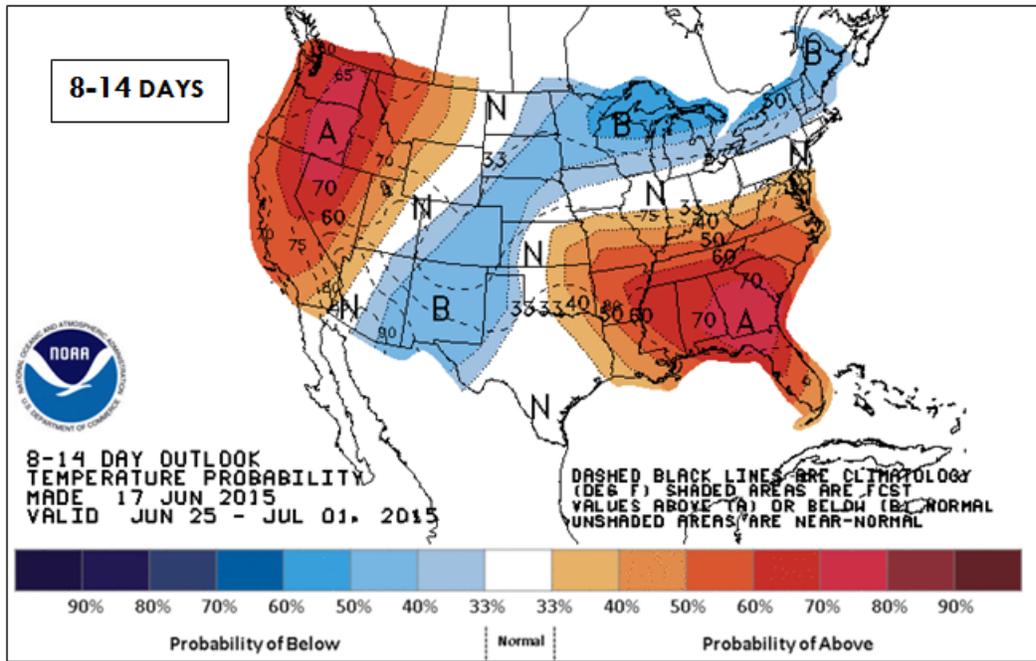
For an overview of this week's (air) temperature and precipitation anomalies and a peek at the extended outlook, check out the [weekly 2015 drought update](#) from the Office of the Washington State Climatologist. Precipitation is predicted to be below-to-far-below normal in the next 6-to-10 days and 8-to-14 days ([below](#)).





The temperature outlook ([below](#)) is for above-normal temps over most of Washington for the next 6-to-10 and 8-to-14 days.





## ***Federal Drought Status***

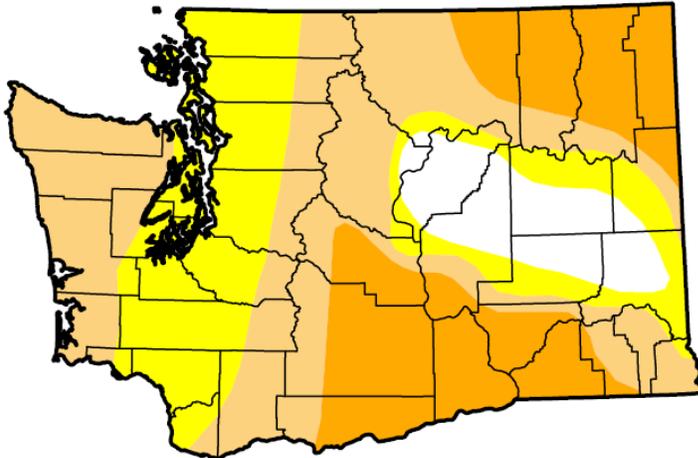
This is the start of week 8 at D2 “Severe Drought” for south central Washington, and federal Farm Security Administration officials will likely descend on the state to provide federal, crop-specific drought relief. Our first federal designation was Klickitat County last week due its proximity with Oregon county designations. This is week 5 for northeastern Washington – only 3 more weeks before the federal designation spreads to this corner of the state. No new areas were added to or removed from last week’s drought ratings. 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.

# U.S. Drought Monitor Washington

**June 16, 2015**  
(Released Thursday, Jun. 18, 2015)  
Valid 8 a.m. EDT

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	9.77	90.23	63.42	25.78	0.00	0.00
Last Week 6/9/2015	9.77	90.23	59.73	23.76	0.00	0.00
3 Months Ago 3/17/2015	38.73	61.27	28.13	0.00	0.00	0.00
Start of Calendar Year 12/30/2014	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 6/17/2014	46.28	53.72	34.59	15.22	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.*

**Author:**  
Richard Tinker  
CPC/NOAA/NWS/NCEP



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

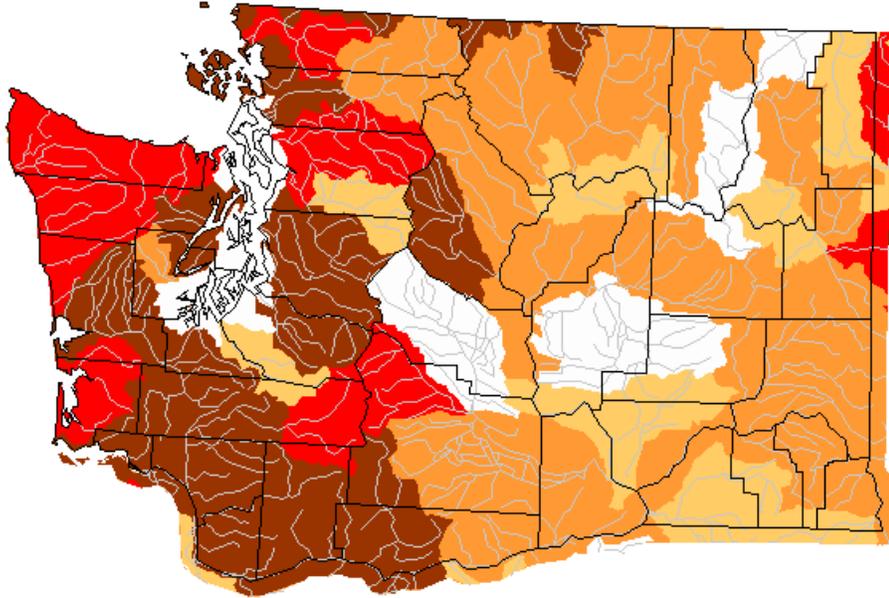
## Stream Flows

For the state as a whole, the figure showing [stream gauges with below normal streamflow](#) for 7 days or more is pretty dramatic, with most of the state running stream flows that are some level below normal (“average”). Note that watersheds with “normal” stream flows are watersheds in highly-regulated systems: Upper Yakima receives Reclamation project flows from upper reservoirs, the mid-Columbia Basin area is influenced by Columbia Basin Reclamation Project flows, and watersheds encompassing the upper Columbia/Lake Roosevelt areas are controlled by flows coming out of Canada.

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

Washington ▼

Wednesday, June 17, 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

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 Okanogan temperatures are climbing: daytime high temperatures are well above 20 degrees C.

## 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.

A lighter red/orange, yellow, or green color in the third column represents values that are a higher percentage of historic average, 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.

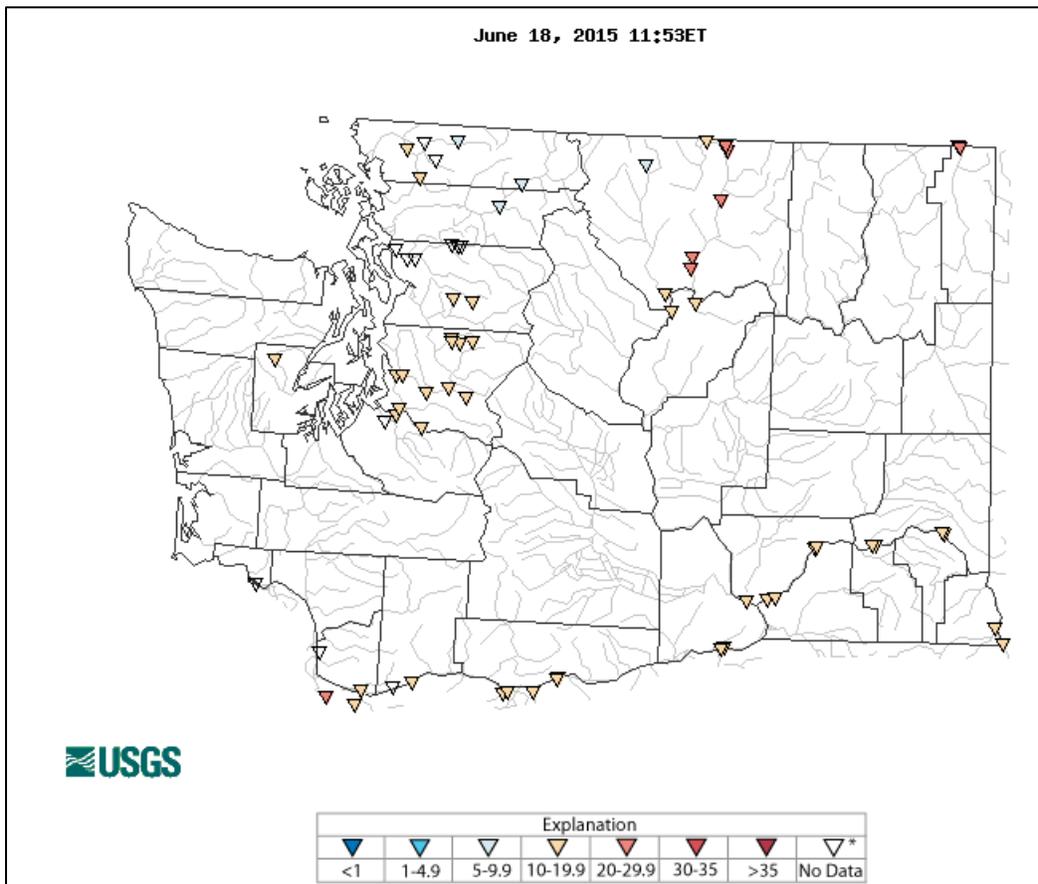
Twenty-one of our select set of 43 locations set record lows on June 18, 2015. Northwestern Olympic Peninsula and north Puget Sound streams are almost all setting records low flows daily as we move into summer. [Statewide streamflows](#) are available from USGS.

<b>Selected Washington Streamflows</b>	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	257	36%	242	1992
NOOKSACK RIVER AT FERNDALE, WA	1,620	33%	2,020	1992
SKAGIT RIVER NEAR CONCRETE, WA	10,200	40%	10,600	2001
SAUK RIVER AT DARRINGTON, WA	940	24%	1,180	1915
CASCADE RIVER AT MARBLEMOUNT, WA	879	35%	1,700	2010
NF STILLAGUAMISH RIVER NEAR ARLINGTON, WA	281	16%	439	1940
SNOQUALMIE RIVER NEAR CARNATION, WA	818	18%	1,310	1934
SKYKOMISH RIVER NEAR GOLD BAR, WA	650	9%	1,620	1941
ISSAQUAH CREEK NEAR MOUTH NEAR ISSAQUAH, WA	55	71%	29	2003
CEDAR RIVER BELOW DIVERSION NEAR LANDSBURG, WA	292	57%	218	1992
CEDAR RIVER AT RENTON, WA	315	50%	136	1963
BIG SOOS CREEK ABOVE HATCHERY NEAR AUBURN, WA	39	53%	34	1992
GREEN RIVER NEAR AUBURN, WA	262	25%	296	1979
SOUTH PRAIRIE CREEK AT SOUTH PRAIRIE, WA	45	21%	61	1992
PUYALLUP RIVER AT PUYALLUP, WA	1,710	37%	1,580	1992
NISQUALLY RIVER AT MCKENNA, WA	549	60%	51	1961
DESCHUTES RIVER NEAR RAINIER, WA	45	47%	43	1992
NF SKOKOMISH R BELOW STAIRCASE RPDS	72	12%	155	1992
DUNGENESS RIVER NEAR SEQUIM, WA	175	25%	245	1926
HOKO RIVER NEAR SEKIU, WA	23	18%	32	1989
CALAWAH RIVER NEAR FORKS, WA	98	26%	151	1989
HOH RIVER AT US HIGHWAY 101 NEAR FORKS, WA	738	35%	997	1992
SATSOP RIVER NEAR SATSOP, WA	334	47%	388	1958
CHEHALIS RIVER NEAR GRAND MOUND, WA	273	34%	324	1934
NASELLE RIVER NEAR NASELLE, WA	43	30%	48	1982
COWLITZ RIVER BELOW MAYFIELD DAM, WA	3,050	n/a		
COWLITZ RIVER AT PACKWOOD, WA	692	23%	730	1992

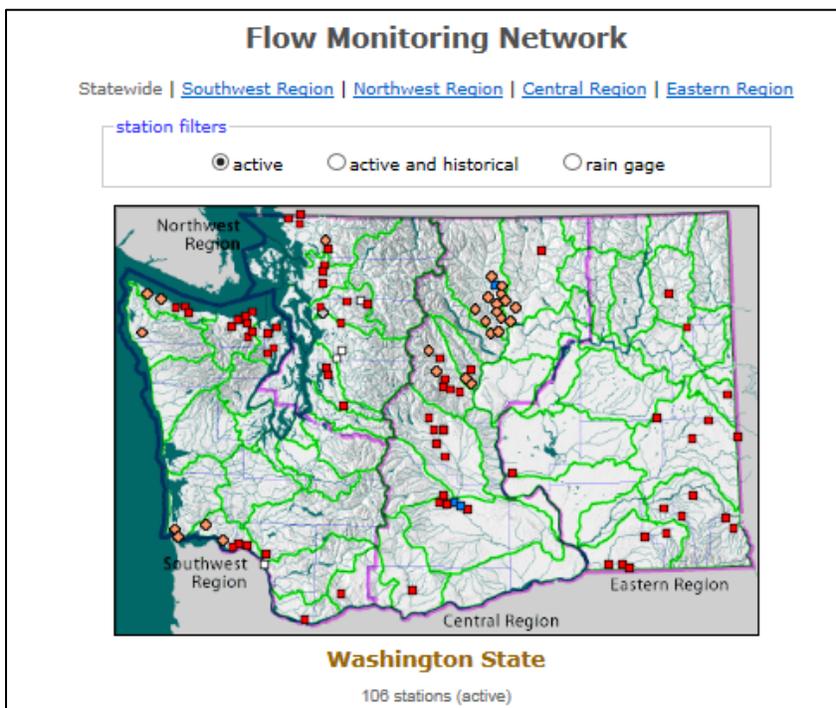
LEWIS RIVER AT ARIEL, WA	2,340	n/a		
WHITE SALMON RIVER NEAR UNDERWOOD, WA	608	48%	587	1977
KLICKITAT RIVER NEAR GLENWOOD, WA	130	19%	161	1992
WALLA WALLA RIVER NEAR TOUCHET, WA	21	8%	9	1963
TUCANNON RIVER NEAR STARBUCK, WA	59	29%	34	1930
GRANDE RONDE RIVER AT TROY, OR	1,750	31%	1,590	2001
YAKIMA RIVER AT KIONA, WA	920	19%	669	1994
AMERICAN RIVER NEAR NILE, WA	71	11%	161	2005
CRAB CREEK AT IRBY, WA	4	11%	3	1992
WENATCHEE RIVER AT PLAIN, WA	1,590	25%	1,230	2005
METHOW RIVER NEAR PATEROS, WA	1,780	30%	1,310	2001
OKANOGAN RIVER AT MALOTT, WA	3,260	33%	2,550	2005
OKANOGAN RIVER AT OROVILLE, WA	797	n/a		
SPOKANE RIVER AT SPOKANE, WA	1,110	11%	1,900	1945
COLVILLE RIVER AT KETTLE FALLS, WA	101	29%	28	1926
PEND OREILLE RIVER BELOW BOX CANYON	23,400	39%	15,700	1973

### ***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 in Okanogan River, Pend Oreille Boundary Reservoir, Touchet River at Bolles, Stillaguamish at Oso, Sammamish River, and the mouth of the Willamette River are greater than 20 degrees C during the day. Duwamish R near the Tukwila golf course is nearing 20 degrees C (19.2 degrees at 9am 6/18). Ecology's gauge on the Stillaguamish River at Oso has been ranging from 12.5 degrees at night to above 20 degrees for a daytime high over the last 6 days. Touchet River at Bolles has a mean temp of 20.2 degrees so far in June, with an instantaneous maximum of 26.7 degrees. Tucannon River near Marengo is ranging as low as 13 degrees during nighttime, with daytime highs in the high teens and low 20's so far this week. I don't usually follow water temperatures, so I don't really know how different these temps are from a normal year, or what information is useful to field staff, so let me know how to improve this section!



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 are approaching 67 degrees F in the past couple of days. Temperatures in the ship canal below University bridge are pretty much over 70 degrees F down to 20 feet or so. Yes, I do remember swimming off Gasworks Park about a lifetime ago.

## Drought Impacts to Fish and Wildlife

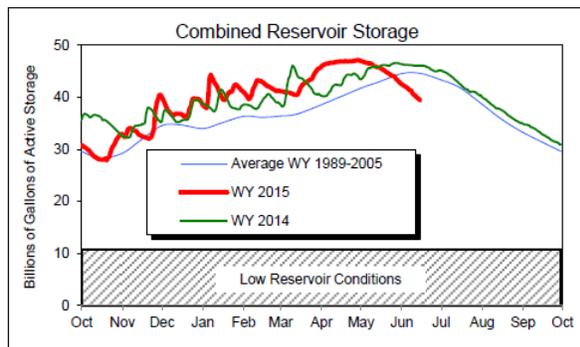
### North Puget Sound

As noted above, water temperatures in the Stillaguamish River are nearing 20 degrees C. Stillaguamish Tribal staff have developed a plan to rescue/salvage chinook in the Stillaguamish in coordination with Region 4 staff.

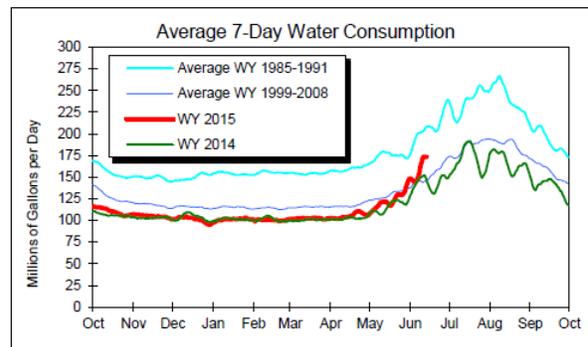
### Central Puget Sound

#### Cedar/Tolt

Following is a report from Seattle Public Utilities about the [status of their water supply system](#) as of June 15.



The combined reservoir storage of Chester Morse Lake, Masonry Pool, Lake Youngs and South Fork Tolt Reservoir is below the long term average for this time of the year.



Water use over the past week averaged about 174 million gallons per day (mgd), which is more than the 146 mgd used during the same period over the years 1999-2008.

All data is provisional and subject to revision.

### Lake Washington Ship Canal

See **Lake Washington Ship Canal** temperatures, [above](#). Aaron Bosworth reports that high water temperatures in the Ship Canal are an issue annually. Most of the mortality of adult fish returning to Lake Washington systems is probably delayed – fish make it through the ship canal but disappear while in Lake Washington. Steward Reinbold reports that migrating fish pick up pathogens in the warm water that kill the fish after they enter streams but before they are able to spawn. These warm water effects represent an increasing proportion of chinook and sockeye production loss. An independent panel provided the Army Corps of Engineers in 2012 with recommendations for how to improve fish passage conditions – no action yet toward funding and implementation.

The Corps of Engineers has indicated that the elevation of Lake Washington is down to 21.25 ft; their objective is to keep the lake elevation at 20 to 22 feet or higher in order to minimize saltwater intrusion. The Corps will likely be reducing lockages to the minimum possible. Mariners can expect up to 1-hour waits at this point.

## **White River/Lake Tapps**

According to the Army Corps of Engineers, phase 2 of the interim repairs to the Cascade Water Alliance barrier dam on the White River is scheduled to begin Monday June 22. The Corps will be monitoring turbidity and conducting fish rescue efforts. Ramp down will begin no later than Friday June 19. Fish rescue efforts are scheduled to begin on Monday June 22 at dawn. This phase of repairs is expected to take 4 possibly 5 days.

This requires White River flow to be about 350 cfs so that the contractor can safely move the upstream cofferdam, construct the downstream cofferdam and install the culvert to the Muckleshoot tribal hatchery and move river flow to the left bank. This work will take place until June 26.

Starting June 26, release of stored water from behind Mud Mountain Dam is anticipated to proceed in a manner similar to the current release. All flow arriving at the Buckley site will be directed to the left bank and go to the Lake Tapps flow line, USACE fish trap, and over the newly repaired apron section to the Reservation Reach.

Phase 2 work is scheduled to be complete about August 7, when White River flow would again need to be controlled to about 350 cfs for removal of cofferdam materials and restoration of upstream and downstream channels. This work would be completed no later than August 14. Again, water stored behind Mud Mountain Dam would be released until Mud Mountain Lake is empty.

The Corps is looking for volunteers to help with fish salvage, and has set up a doodle poll to help in organizing this effort: <http://doodle.com/p3c7b4i49i4ur9ps>

## **Olympic Peninsula**

### **Dungeness**

A team of WDFW and tribal biologists met June 16 to plan for remediation of expected low-flow blockages in the Dungeness River basin. The team is planning to implement projects beginning the week of July 13 to observe how the river responds. One tool planned for use is a water-filled bladder that will constrict flow at an exceptionally wide and shallow reach near the mouth. Logistics for this project are providing opportunities to test our response capabilities, to learn where equipment and supplies are located, and to refresh understanding about permitting for these emergency fish protection projects.

### **Washington Northwest Coast**

Stream flows are still breaking records on coastal streams, and the first drought-related fishing closure occurred on the Sol Duc this week. Sol Duc Hatchery is working to bring their backup water supply on-line.

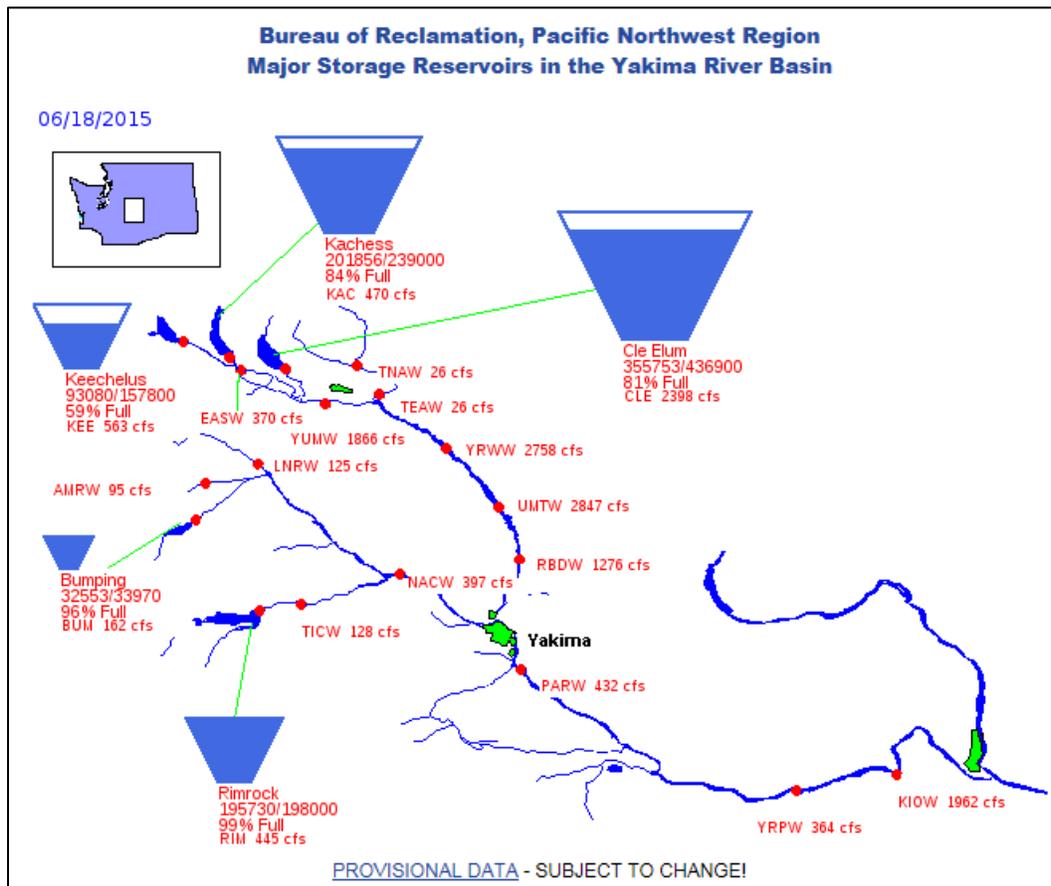
## **Southwest Washington**

Reporters from The Columbian contacted staff this week to learn stories about how the drought is impacting fish and wildlife.

## South Central Washington

### Yakima

The [Reclamation Teacup Diagram](#) (below) for Yakima Basin shows Lake Keechelus volume down to 59%, and Kachess and Cle Elum are starting to draw significantly (84% and 81% full, respectively). Junior water right holders are currently receiving a 44% supply; seniors will receive 100% of their needs. Inflow to the five reservoirs is 19% of average, releases are 93% of average, and overall canal diversions are 75% of average for June 19.



## North Central Washington

Correspondent Tom Kahler from Douglas County PUD reports that water temperatures upstream from Wells Dam already exceed 20 degrees. Tom reports that getting a broad representation of run timing in the spawning escapement has been difficult. Last year, most of the fish from the bulk of the run distribution would have been lost had it not been for three anomalous rain events that cooled both Osoyoos Lake and the Okanogan for short periods (long enough for lots of fish to make the run for the border). Even with those breaks in the heat, the actual escapement to Osoyoos, Skaha, and Okanogan lakes in 2014 totaled less than 40% of the sockeye passing Wells Dam. Kahler is concerned that as warming continues, only the earliest and latest running sockeye (and chinook) will survive the migration. For now, enough sockeye and chinook survive these high-temperature, low-flow years to maintain diverse populations and support fisheries in the Columbia.

## ***WDFW Headquarters Drought Response Activity***

### **Fish in Nature:**

**Low-flow migration blockage intervention:** See Dungeness and Stillaguamish, above. Staff contacted NOAA/NMFS and USFWS this week regarding ESA coverage for intervention projects. Staff are using the last of Habitat Program's vacancy savings to order drought project equipment and supplies.

**Let 'em Pass Signs:** Let 'em Pass signs will be shipped to regional offices and selected other locations as soon as they are received. An order for 800 signs was submitted earlier this week. Signs will be cardboard with heavy lamination and sized 11 by 17 inches. They will be light enough to staple and heavy enough to last through the fall.

Contact has been made with State Parks to provide copies of the sign for posting at state parks. Signs will be distributed to the parks regions, and individual park managers will determine where/whether to post at their park. Contact with DNR is pending.

Habitat senior managers are considering conditions (e.g. water temperature) 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](mailto:teresa.scott@dfw.wa.gov).

### **Drought-related fishery closures**

Sol Duc River is our first low-flow-related closure of the season:

**[OUTDOORS: Low water levels close short stretch of Sol Duc River at hatchery](#)**

**Peninsula Daily News (AP) - June 17, 2015**

### **Fish in hatcheries:**

Hatchery Division is meeting weekly via conference call to coordinate hatchery facility maintenance projects relating to drought, and discuss emerging problems and potential solutions. Tools being implemented at hatchery facilities include water Supply improvements, water quality monitoring equipment, aerators and re-circulation pumps, fish transfers, and 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 vulnerable WDFW water access sites.

### ***News Clips***

**[Feds To Make \\$110M Available To States Coping With Drought](#)**

**Earthfix - June 15, 2015**

**[Low flow means big trouble for salmon](#)**

**Chinook Observer - June 17, 2015**

**[Fishing On Sol Duc At Hatchery Closing To Protect Wild Chinook](#)**

Northwest Sportsman - June 16, 2015

[OUTDOORS: Low water levels close short stretch of Sol Duc River at hatchery](#)

Peninsula Daily News (AP) - June 17, 2015

[Fears For Fish Now And In The Future Rise As Westside River Levels Sink To New, And Warmer Lows](#)

NW Sportsman - June 19, 2015

[Warm water blamed for pre-spawn Chinook salmon deaths](#)

Statesman Journal - June 18, 2015

[Lake Tapps to reopen Saturday for some recreational activities](#)

KOMO News - June 18, 2015

[Skagit River sockeye fishery starts off poorly due to low water conditions](#)

The Seattle Times - June 18, 2015

[Critical Water Shortage Endangers Crops](#)

La Conner Weekly News June 17, 2015

[Port Susan estuary takes a hit from warming, low Stillaguamish River flow](#)

Everett Herald June 9, 2015

[Gig Harbor Urges Water Conservation During Drought](#)

Q13 Fox June 16, 2015

[State park burn ban issued for Eastern Washington](#)

Tri-City Herald June 16, 2015

[Saving crops in Skagit County](#)

ECO Connect June 18, 2015

[Port Angeles ratchets up water alert to stage 2](#)

Peninsula Daily News June 17, 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](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>

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

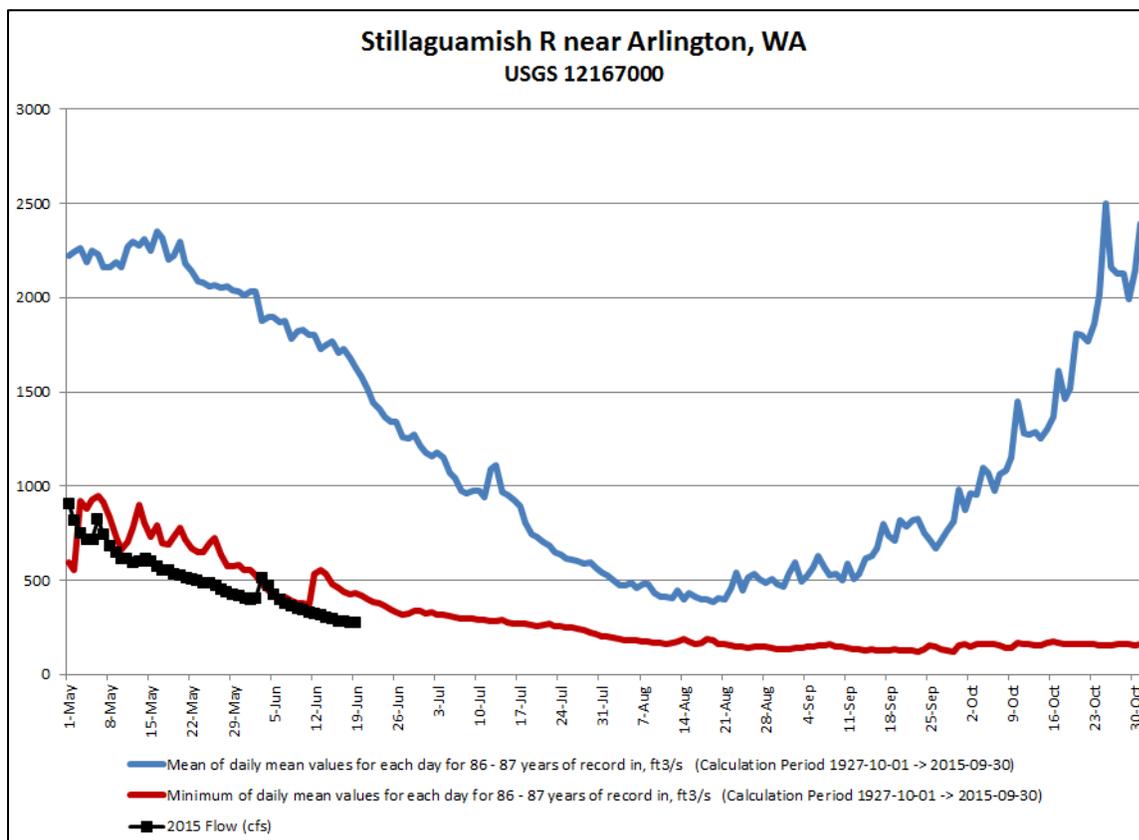
A set of WDFW drought talking points has been posted to the “S” drive for staff to use when asked about drought by the media and citizens.

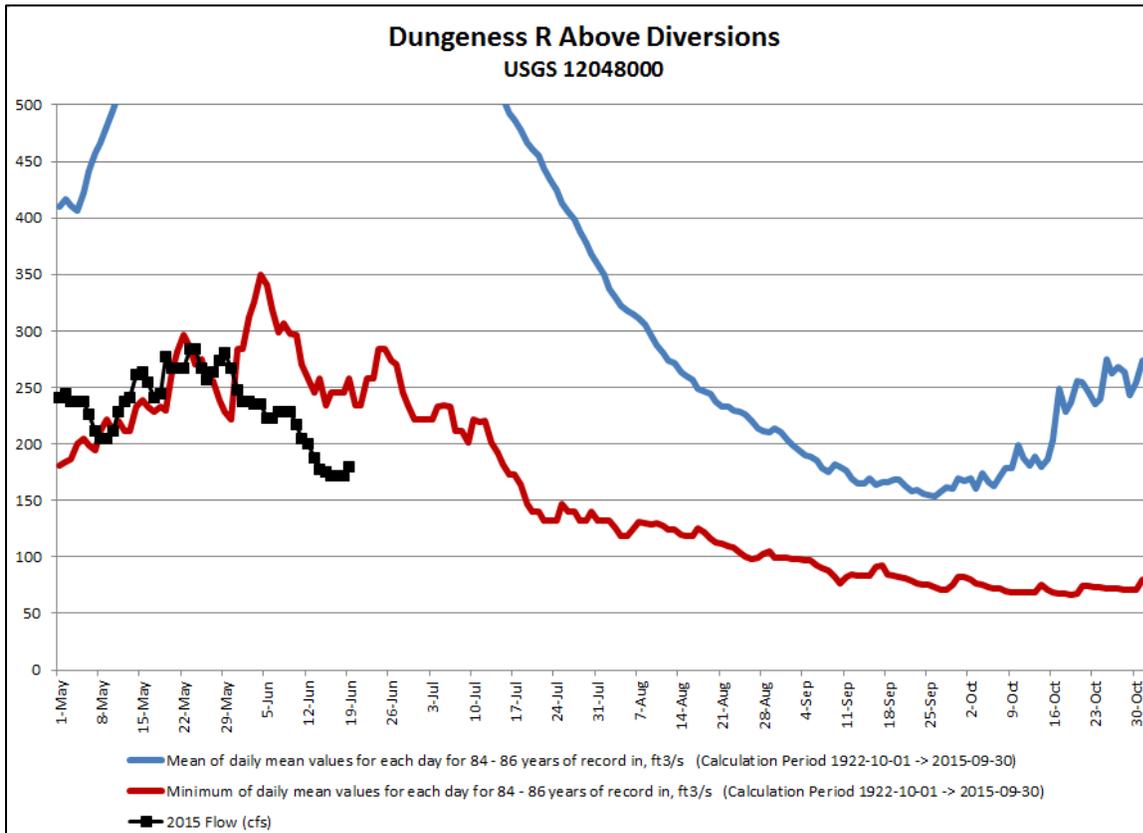
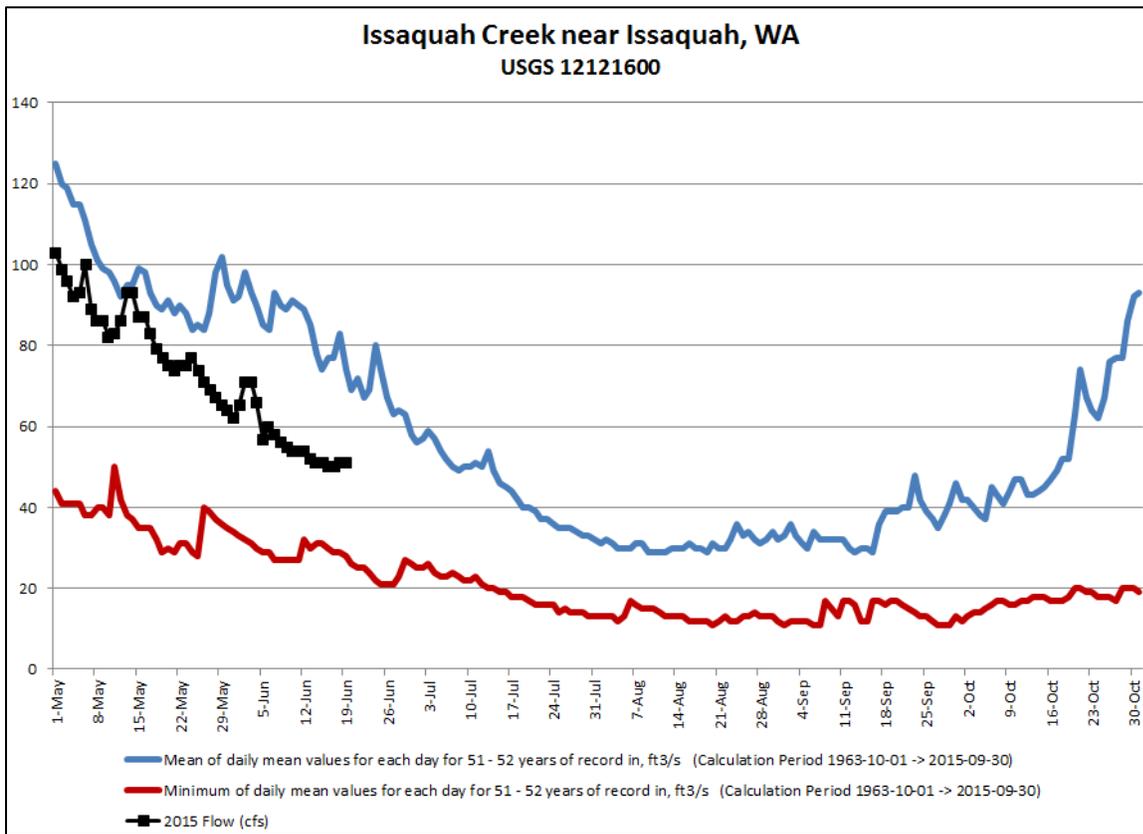
Copies of these status updates and other materials of interest are available on the WDFW common drive at s:\All Agency\Shared Projects\DROUGHT 2015. Presentations and other materials are also posted there.

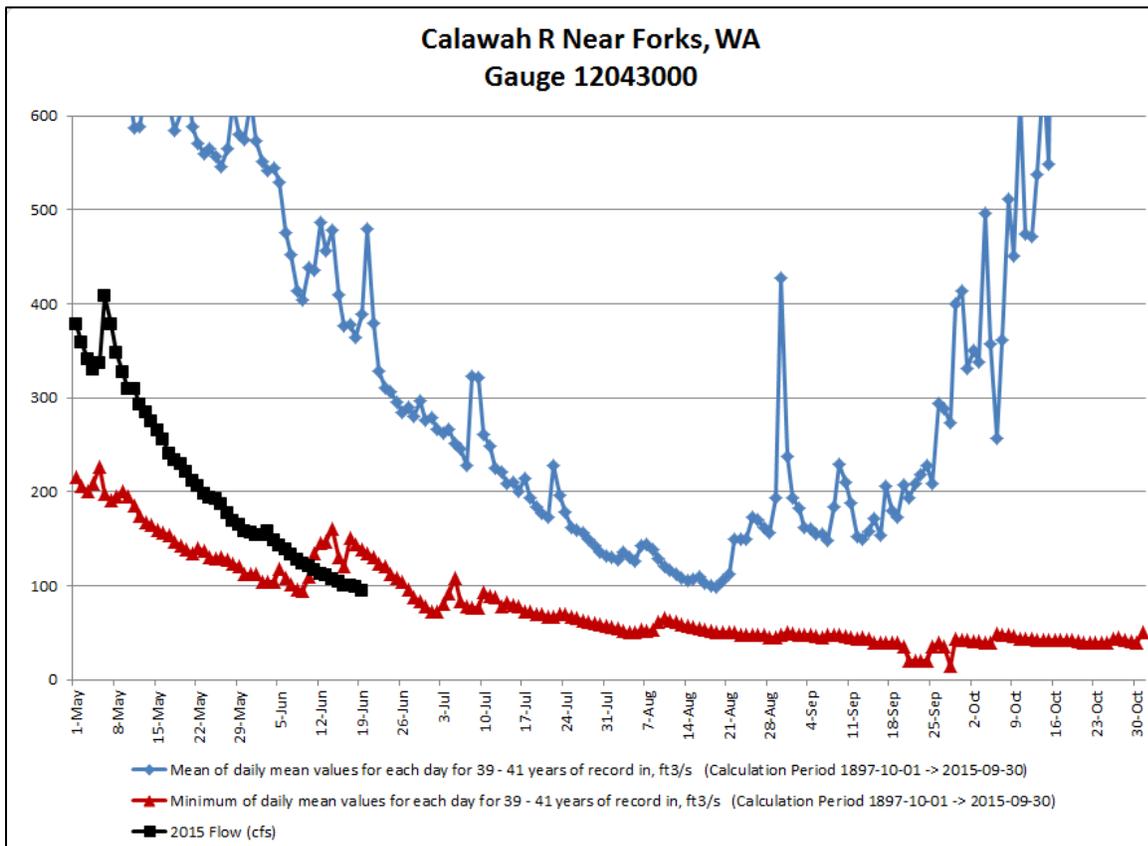
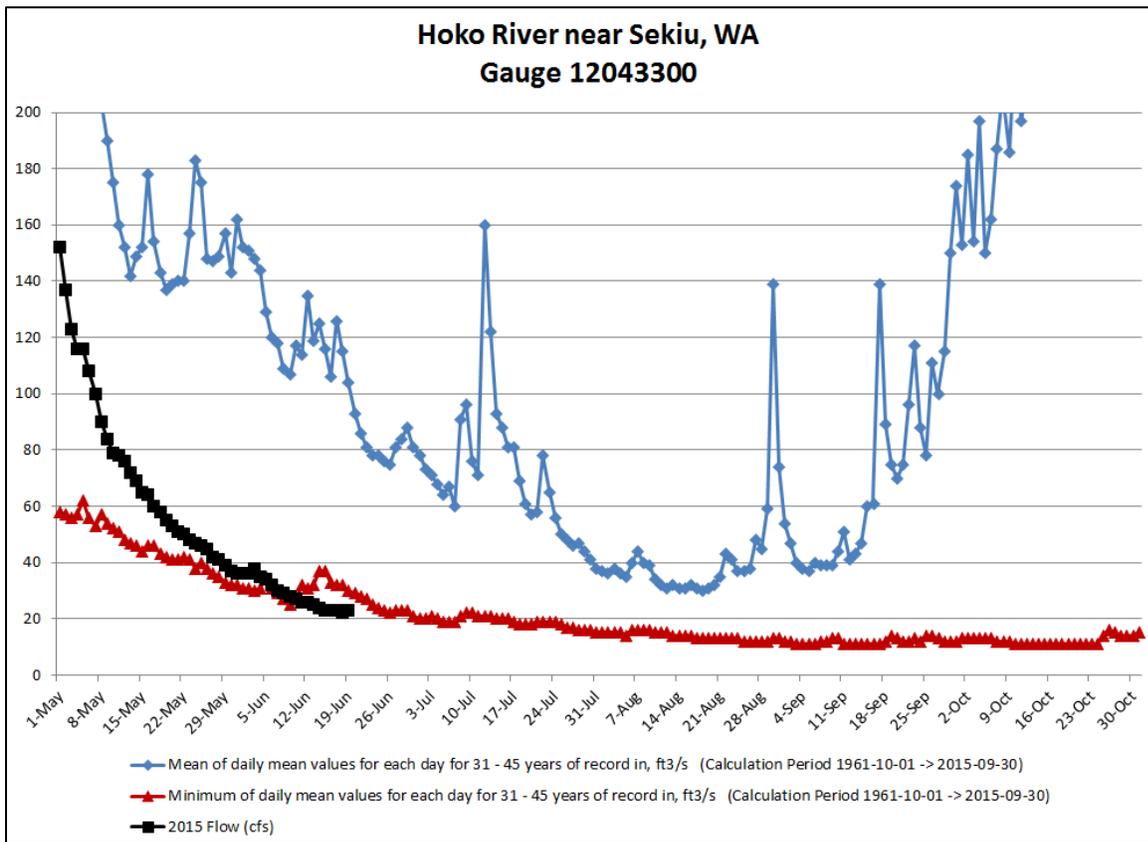
Contact WDFW Drought Coordinator Teresa Scott at [teresa.scott@dfw.wa.gov](mailto:teresa.scott@dfw.wa.gov) or (360) 902-2713 with questions and suggestions.

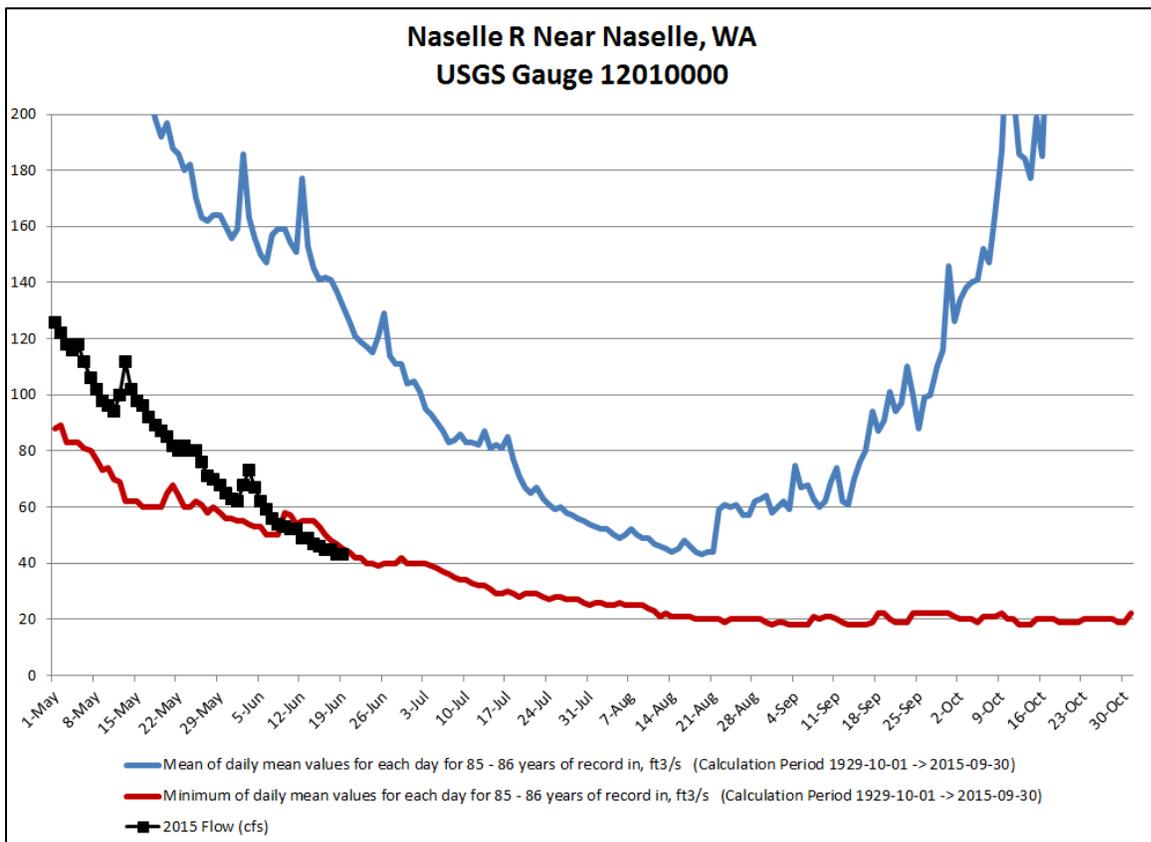
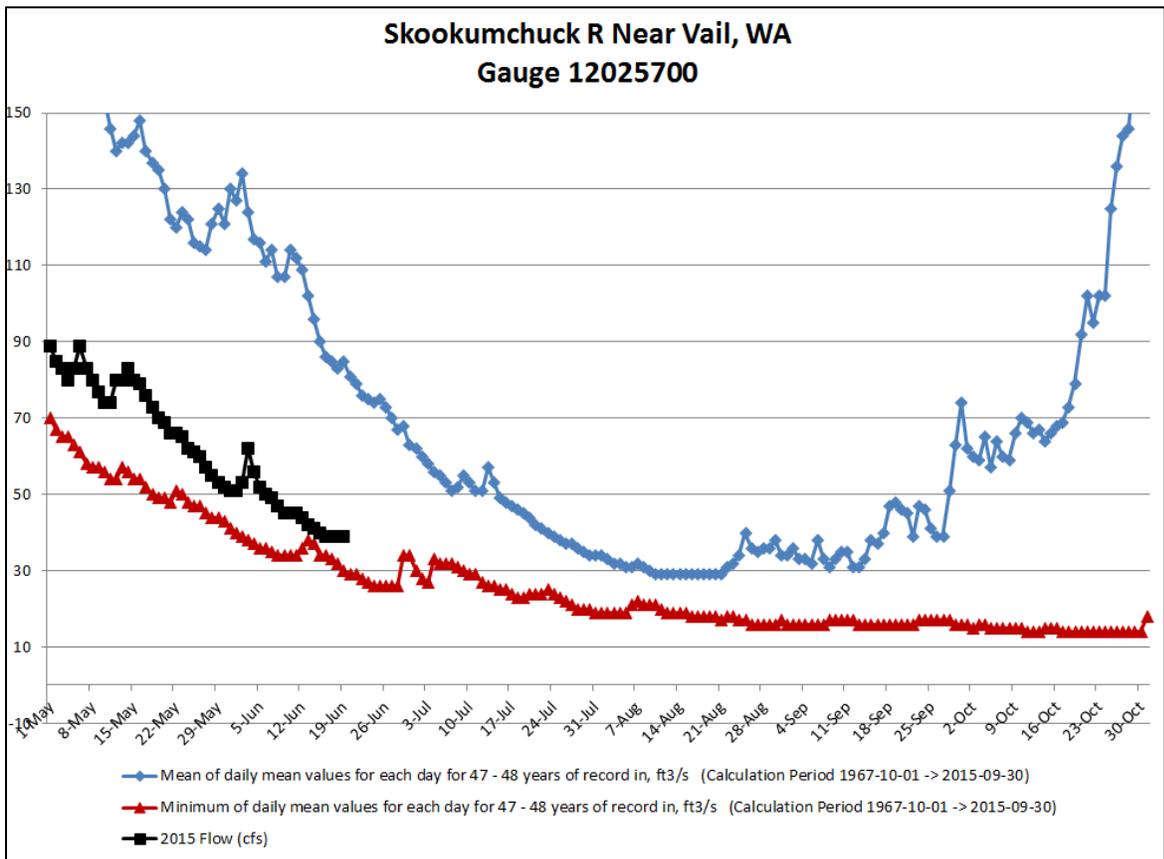
### ***Hydrograph Sampler Charts***

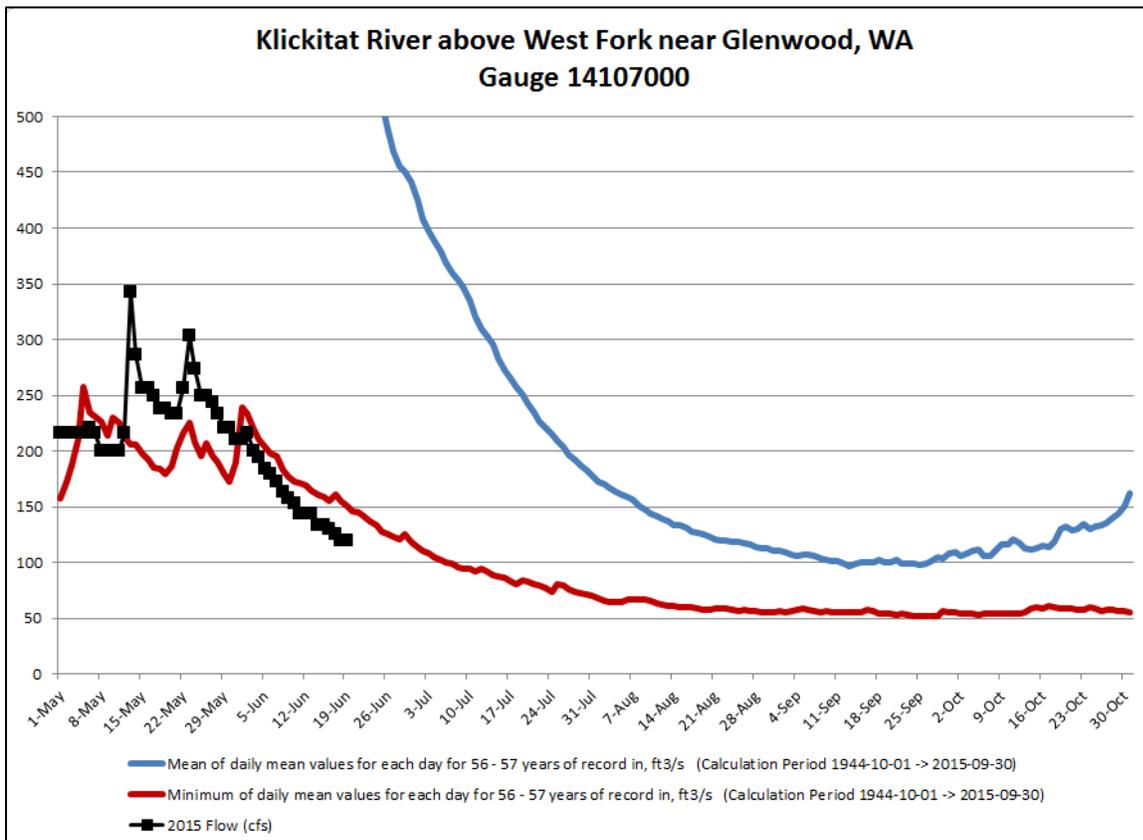
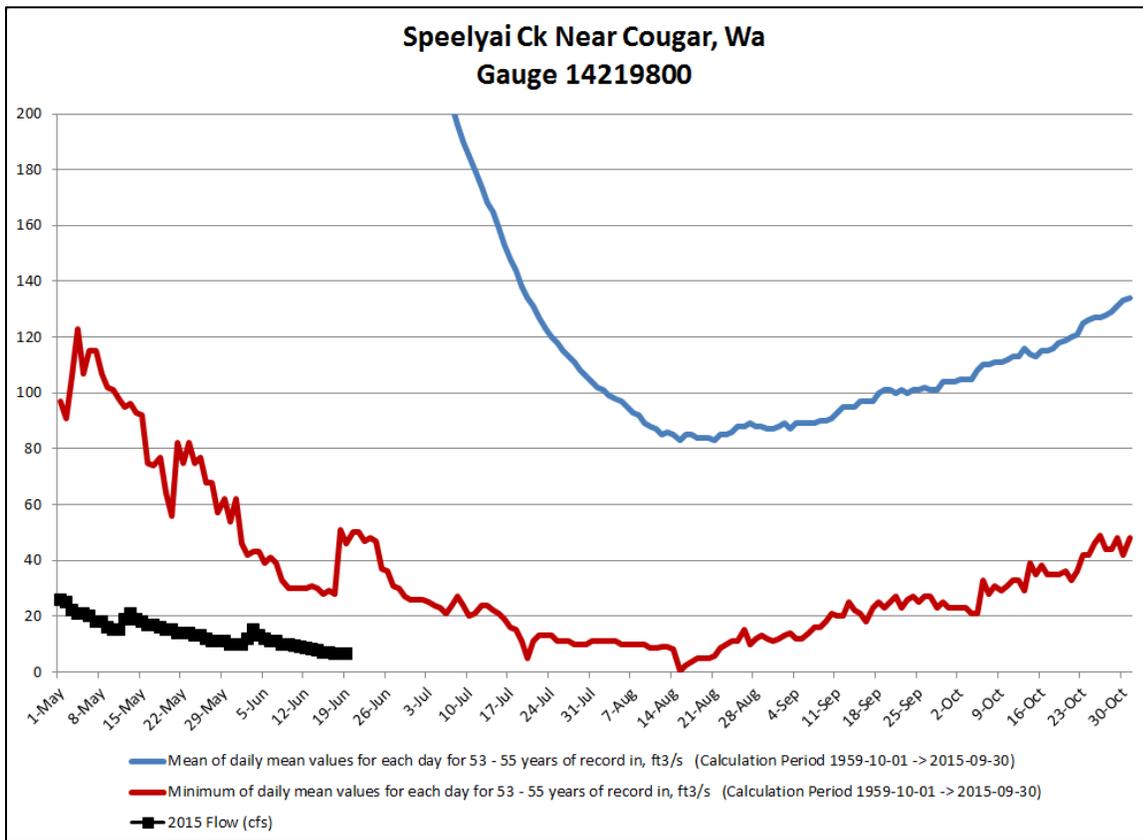
Blue line represents the average daily flows for the period of record; red line shows the minimums of daily flows in the period of record, and the black line depicts 2015 flows. These flows are through mid-day June 19, 2015.

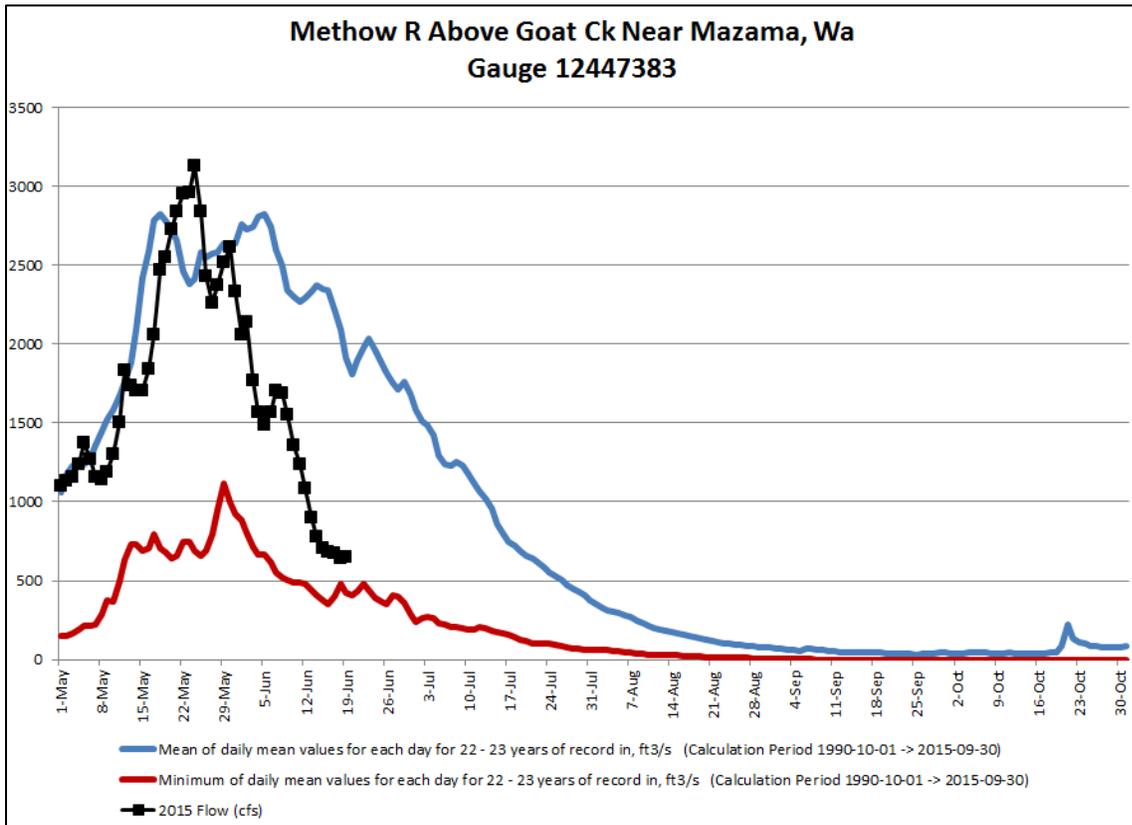
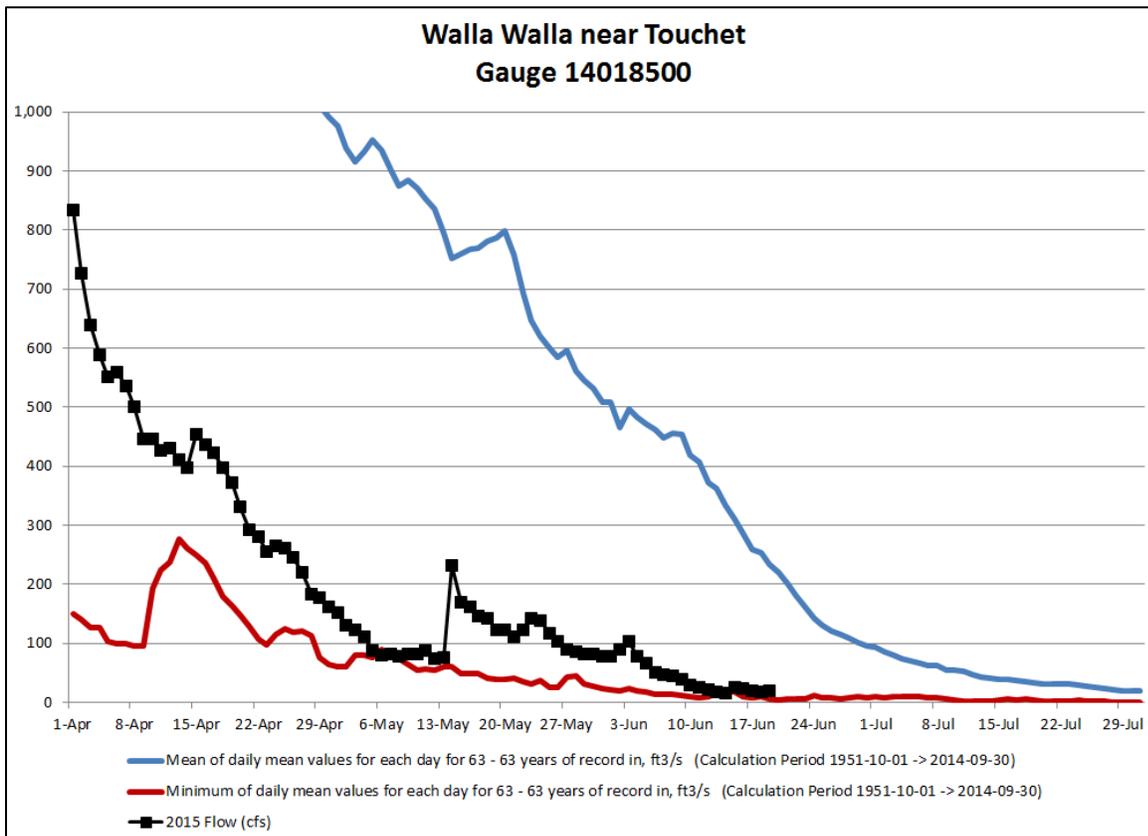


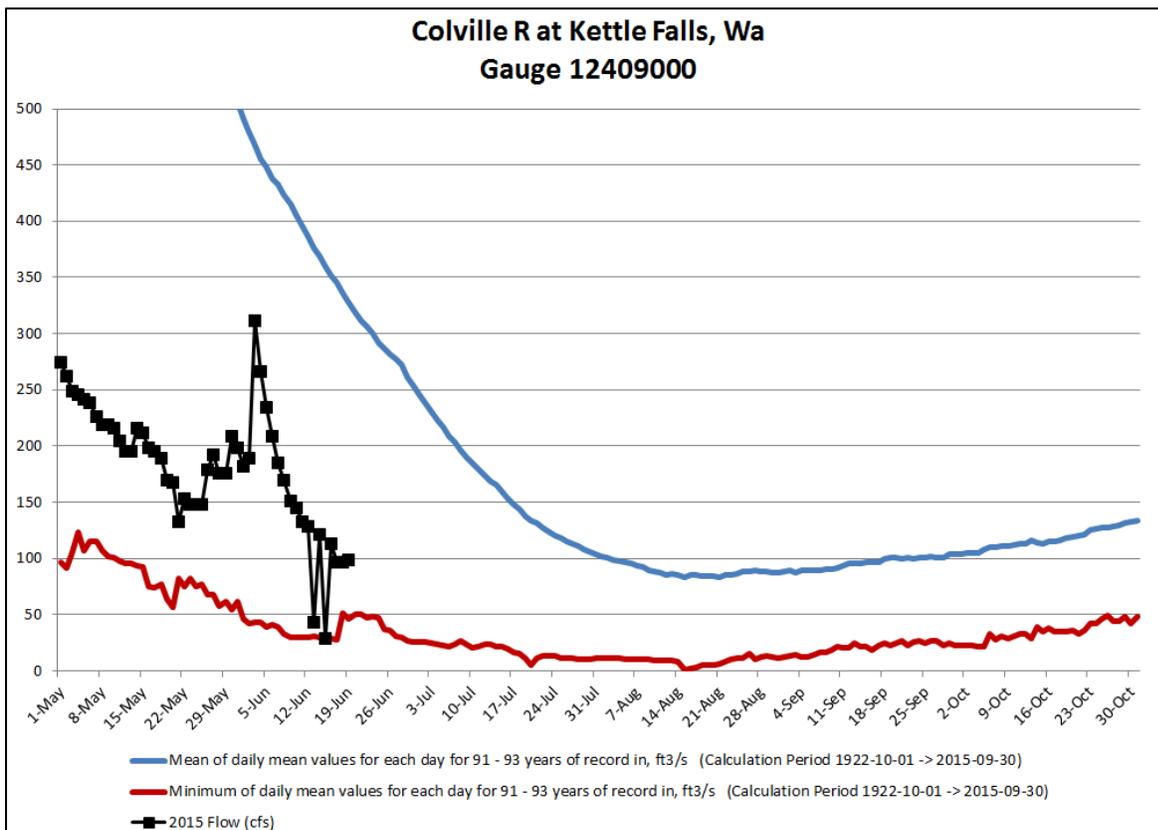
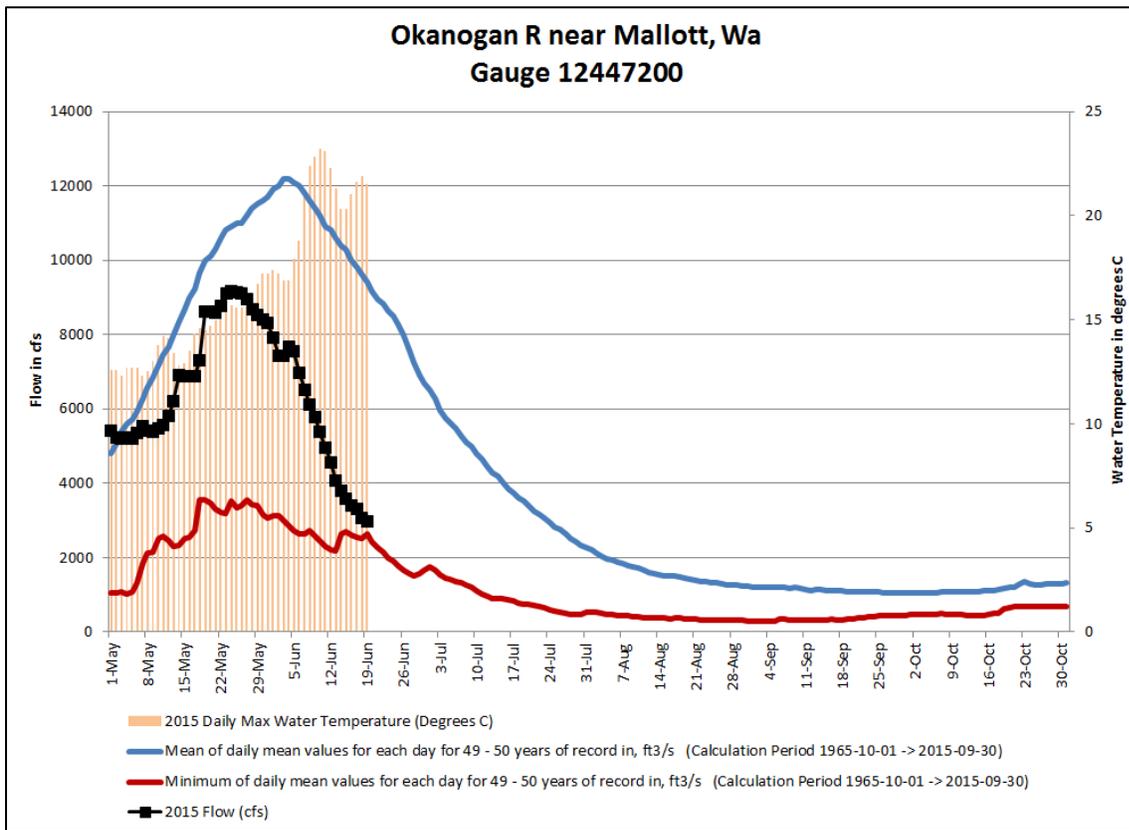












### Kettle River Near Ferry, WA USGS Gauge 12401500

