

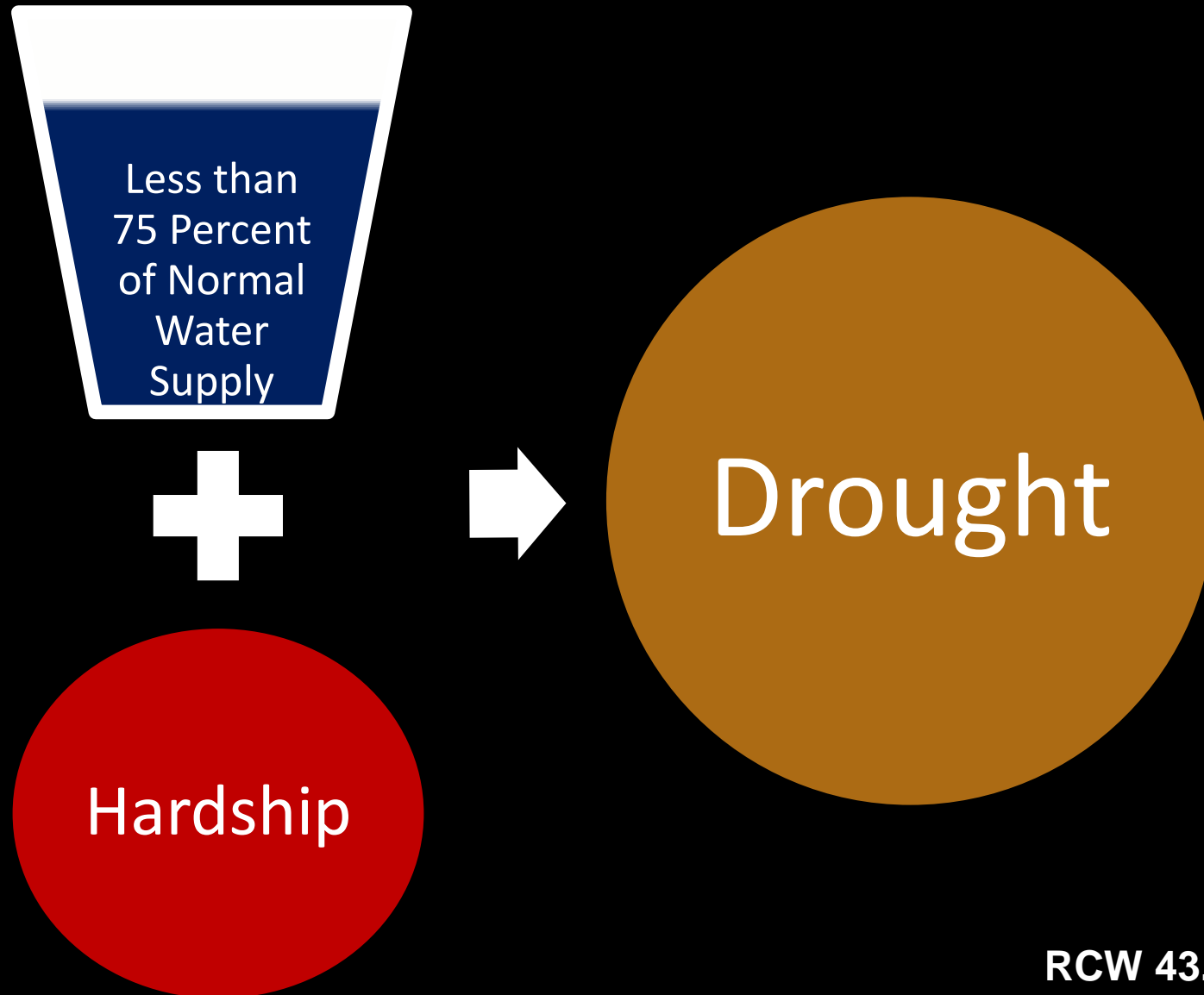
# Washington State Drought Response

- **How is drought defined in Washington State?**
- **What factors does the State consider?**
- **What is the process behind a drought declaration?**
- **What does a drought declaration accomplish?**

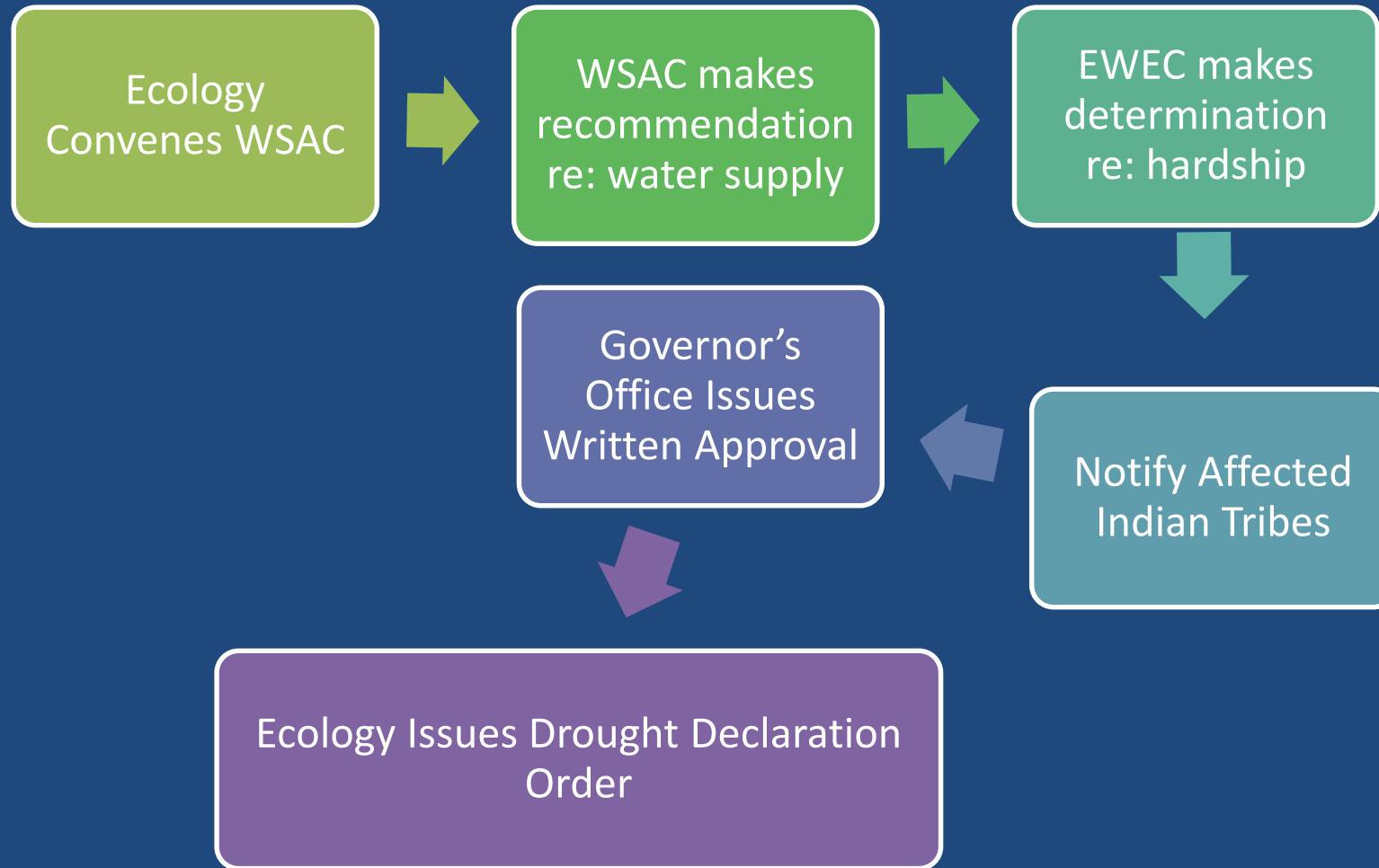
# Recognition of Drought in Statute and Regulations

- **Emergency Water Withdrawal Facilities: Revised Code of Washington 43.83b**
- **Emergency Drought Relief: Washington Administrative Code 173-166**
- **Emergency Drought Funding: Washington Administrative Code 173-167 (expired Oct 2015)**

# Washington State's Drought Trigger



RCW 43.83B.400



WSAC = Water Supply Availability Committee (Technical)  
EWEC = Executive Water Emergency Committee (Policy)

**Drought conditions** are *water supply conditions* where:

1. a geographical area or a significant part of a geographical area is receiving, *or is projected to receive*, less than seventy-five percent of normal water supply as the result of natural conditions.

**AND**

2. the deficiency causes, *or is expected to cause*, undue hardship to water users within that area.

# When does an *impact* become a **hardship**?



# Normal Water Supply



“...the average amount of water available to a geographical area on an annual basis, based upon evaluation of precipitation, streamflow, snowpack and other hydrological and meteorological factors”

forecasts are in KAF

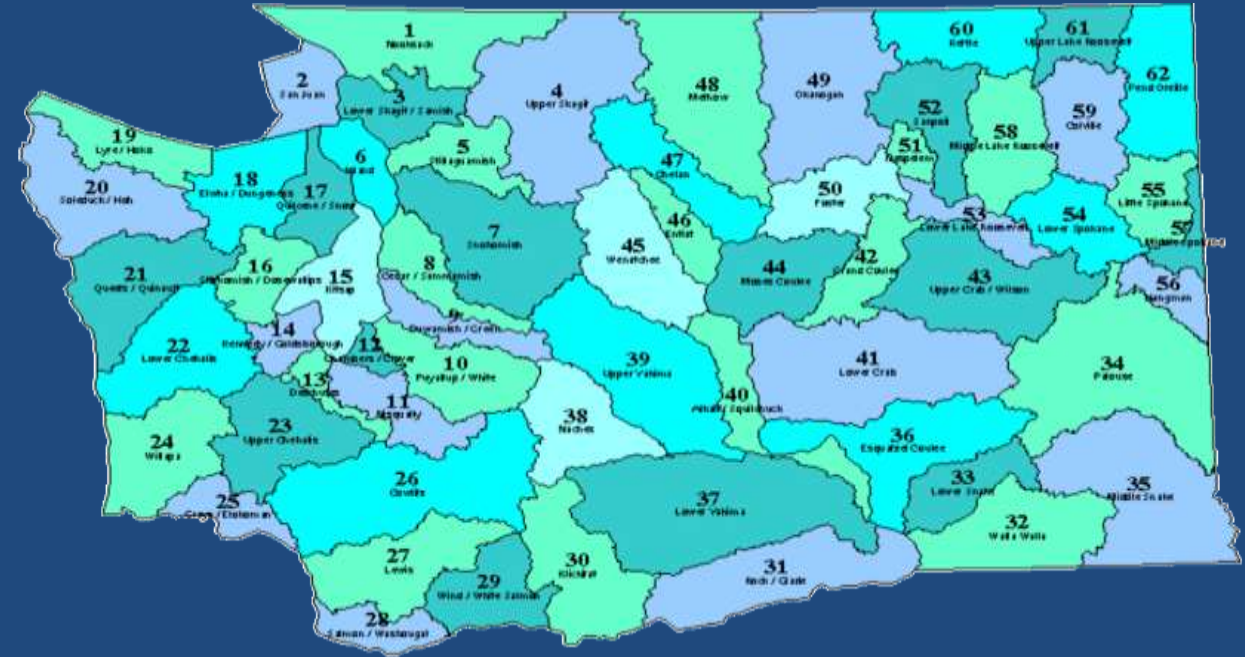
	90 %	50 %	% Average	10 %	(198
SEP	62122	62629	68	63933	9271
R-JUL	53285	53318	67	53358	7985
AUG	58186	58585	67	58956	8753
SEP	92483	92993	81	94329	111
	83777	83810	83	83850	
	111496		85	1120	

The determination of drought conditions will be based upon the updated seasonal forecast...

# "Geographical area" can be natural or political



County, State, City



Watershed, Partial-Watershed, Aquifer



# River Stations Where Volume of Runoff Was Below 75 Percent of Normal

Oct – Sept (full water year)

Apr -- Sept (spring/summer)

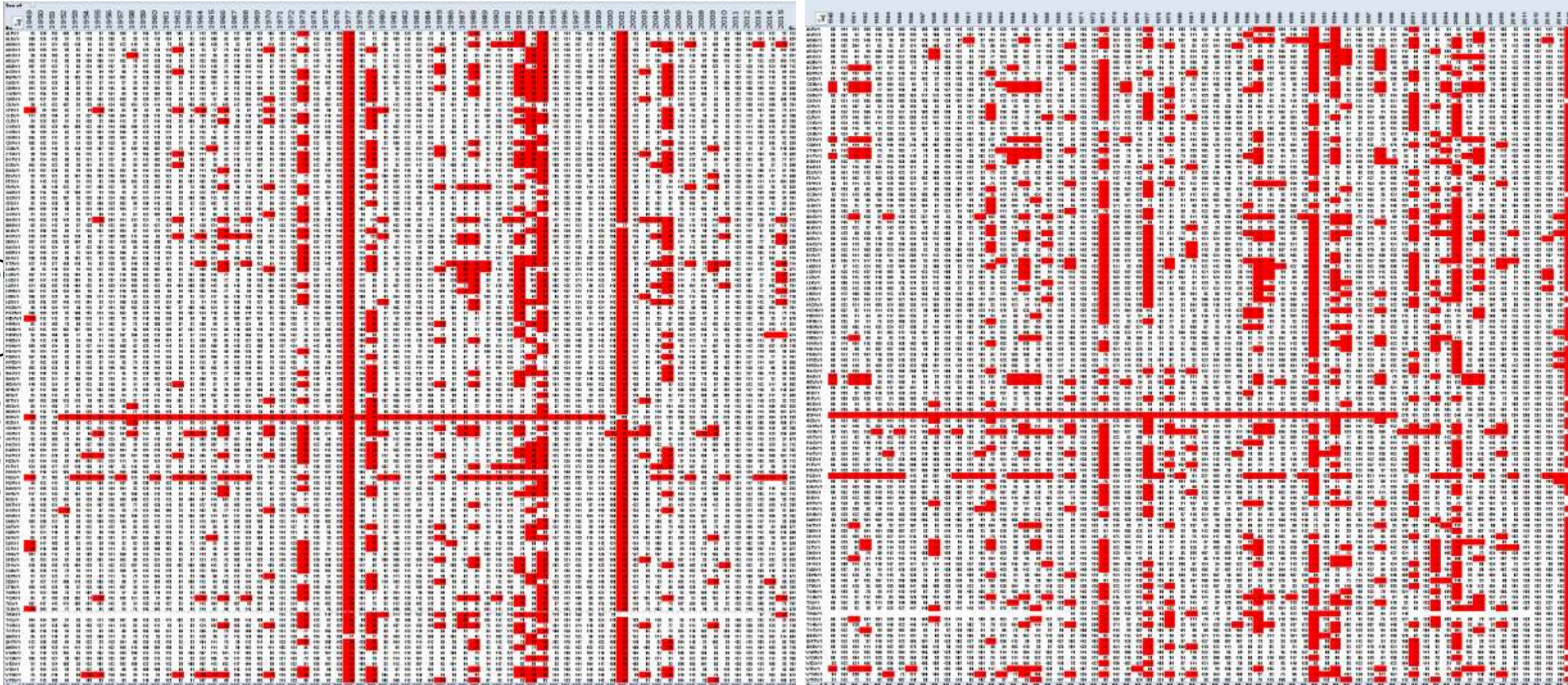
1949 ←

→ 2015

1949 ←

→ 2015

River Stations (n= 119)



73 77

92 94 01 05

15

73 77

92 94 01 05

15



# Northwest River Forecast Center ESP Natural Volumes



- River and Hydrology
- Water Supply
- Observations
- Weather Forecasts
- Climate
- NWRFC

[Home](#)   
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 ESP Issued: 2015-05-11   
 Ensemble Date: 2015-05-11   
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Search

Enter NWS ID:

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- Map Overlays
- NWRFC Boundary
  - NWRFC Basins
  - NWS HSAs
  - Counties

- Map Type
- ESP Natural Status
  - ESP Natural % of Avg



Legend

ESP Natural Volumes

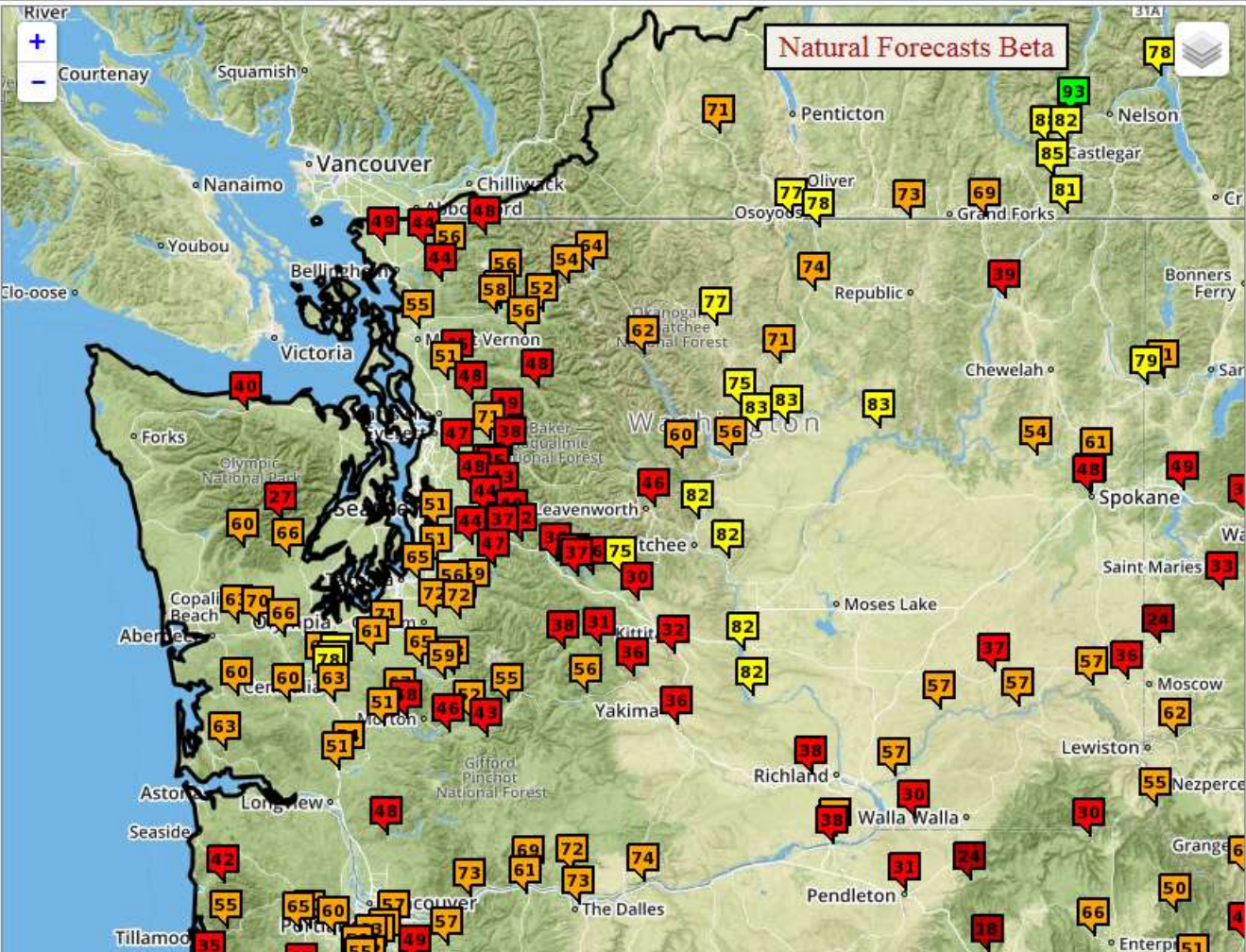
Period: APR-SEP

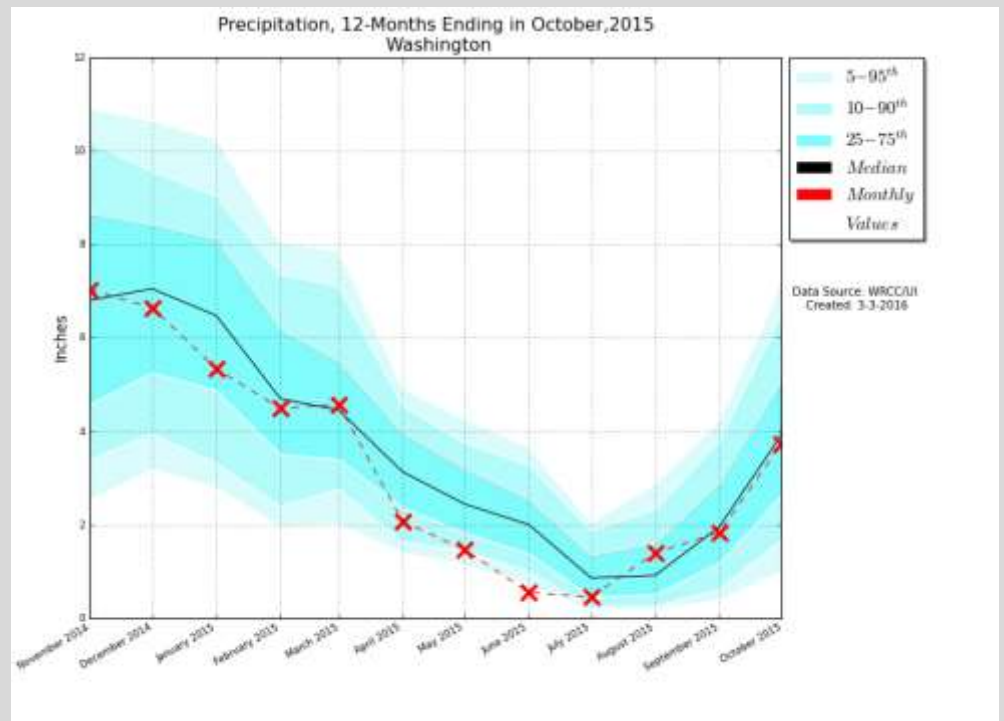
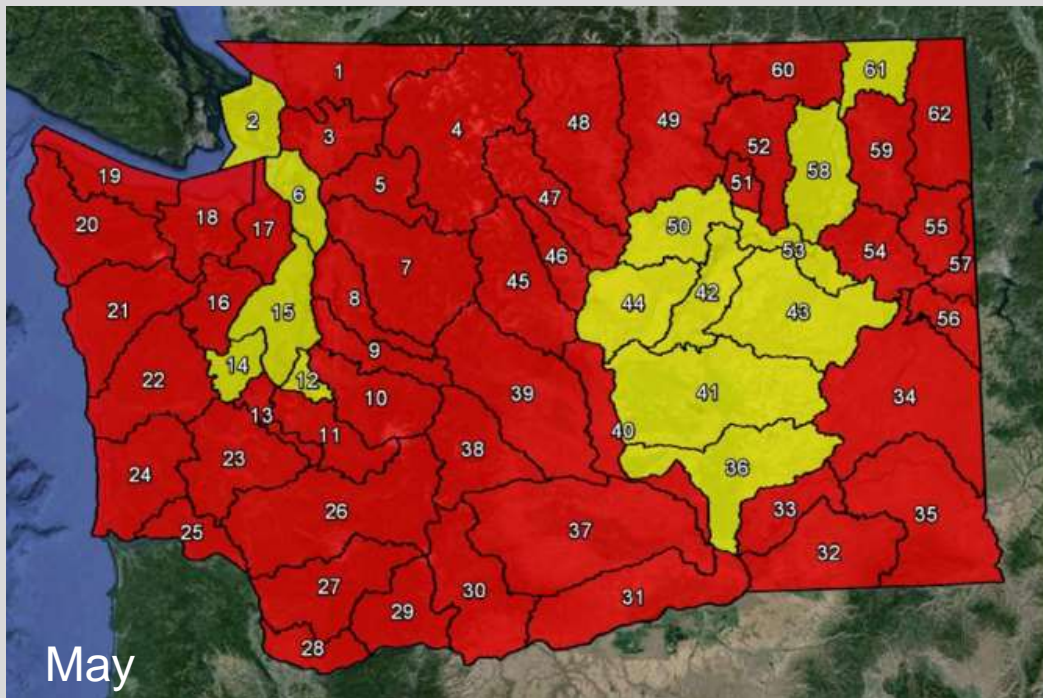
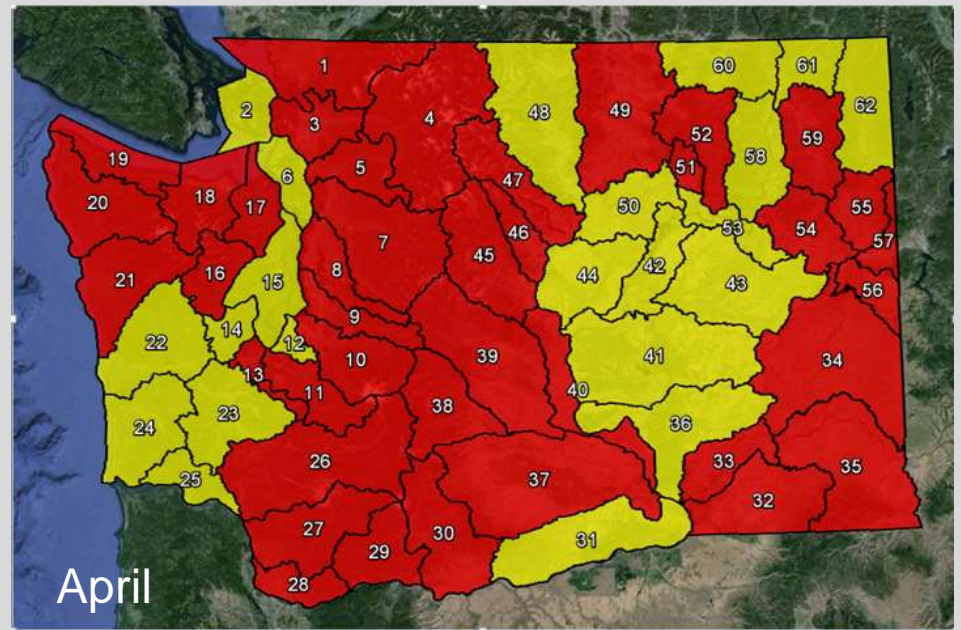
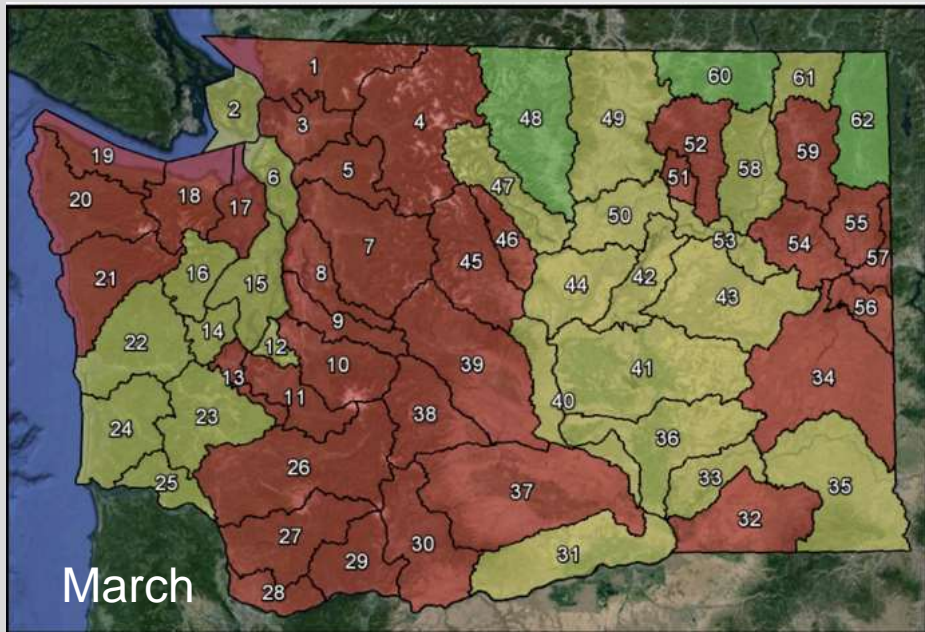
Forecast (% Avg)

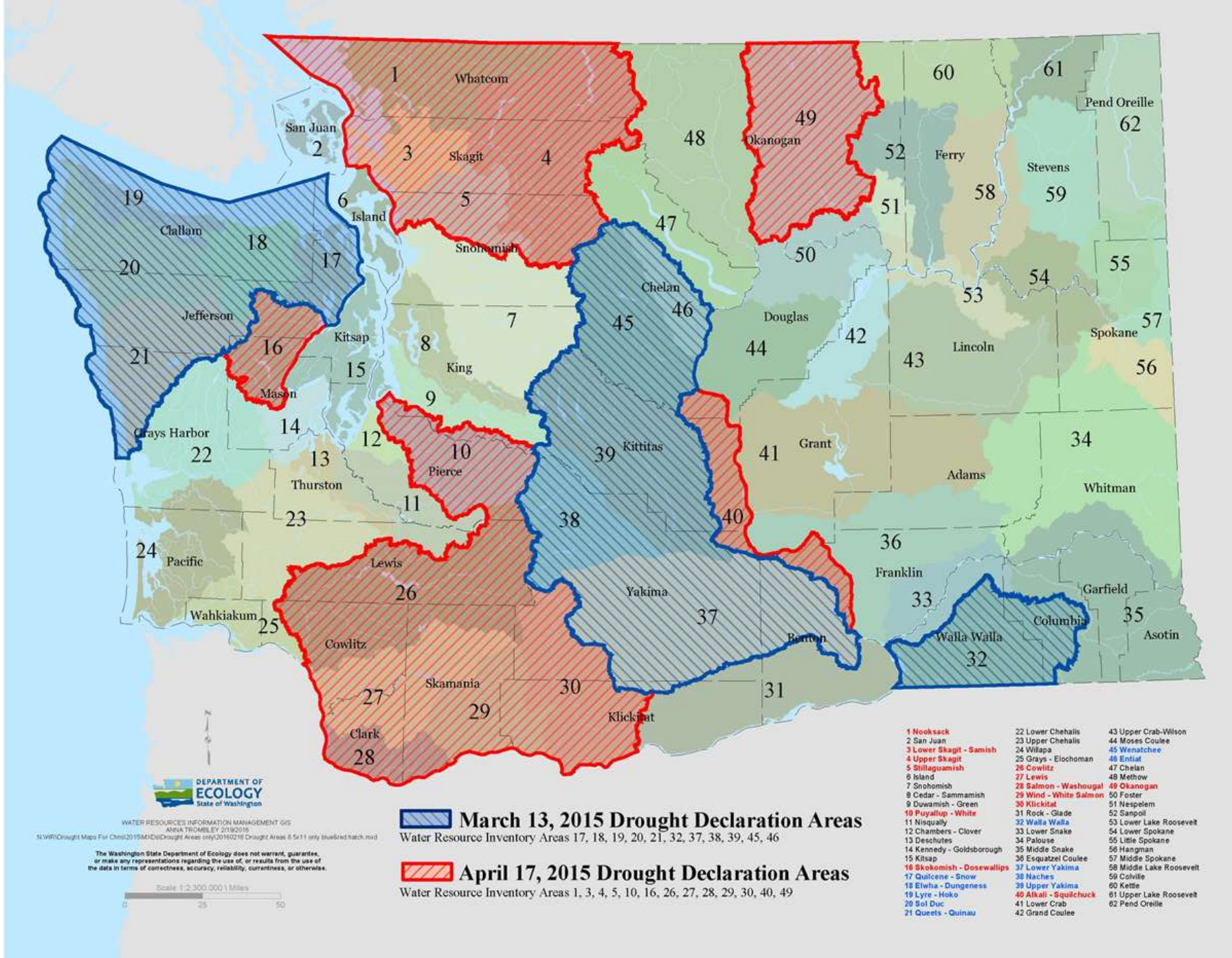
- No Average, No data
- < 25
- 25-50
- 50-75
- 75-90
- 90-110
- 110-125
- 125-150
- 150-175
- > 175

Stations Displayed:  
**195**







# Ecology Drought Actions

**Leasing of Water Rights** in Yakima and Dungeness Basins to boost stream flows

**Funding Emergency Fish Passage** and Hatchery Projects

**Authorization of Emergency Wells** in Yakima Basin

**Approving Emergency Water Right Transfers**  
(e.g., Skagit Basin, Yakima Basin)

**Emergency Drought Funding** (grant and non-grant) to irrigation districts, cities and Tribes

**Curtailment Orders** issued for almost 900 water rights statewide to protect senior water rights

# Emergency Drought Funding Preventive vs Urgent Care Model

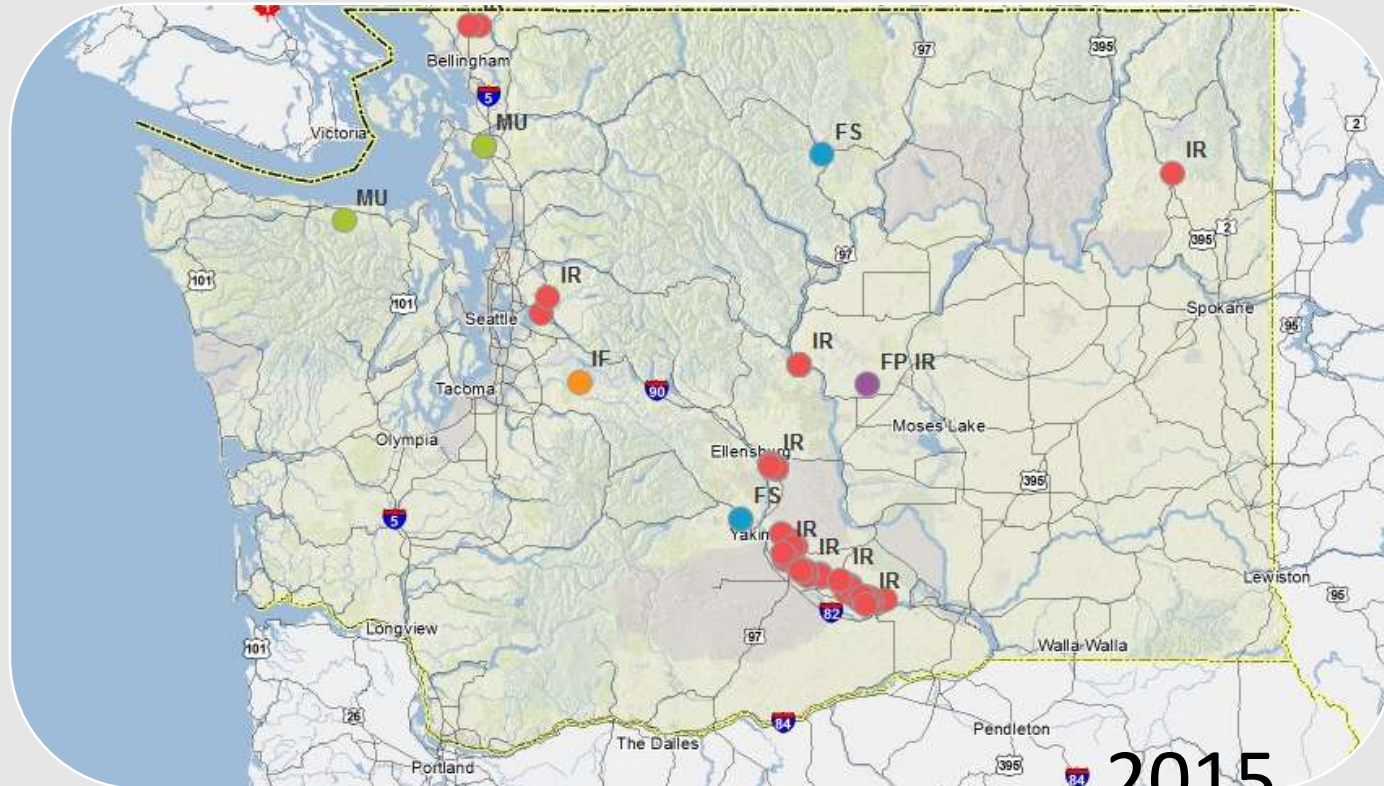


Applicant	Project	Grant Request
Clallam County PUD 1	Booster pump system to move water from lower to higher reservoir	\$258,190
Icicle Irrigation District	Hand dig channels to access stored water in 8 mile and Colchuck lakes	\$12,500
Jamestown S'Klallam Tribe	Buy/use diversion dams along the Dungeness River to aid fish passage	\$74,430
Jones LID 1&2	Construct 2 emergency wells for agricultural irrigation	\$291,700
Kennewick Irrigation District	Residential irrigation conservation program	\$28,872
Kennewick Irrigation District	Pump rental to capture return flow	\$45,304
Lower Stemilt Irrigation District	Transfer diversion from Stemilt Creek to the Columbia River	\$297,348
Moxee, City of	Upgrade two city wells	\$133,000
Sequim, City of	Flow augmentation to Bell Creek at 2 locations	\$21,783
Skagit County PUD	Construct 2 fill stations	\$57,750
Startup Water District*	Rehabilitate Well #2	\$19,451
Stemilt Irrigation District	Replace 3,000 feet of pipe to increase capacity	\$41,500
Stevens PUD	Riverside Well Replacement	\$47,000
Whitworth Water District #2	Move existing water station to new location with easier/safer access	\$56,500

2001



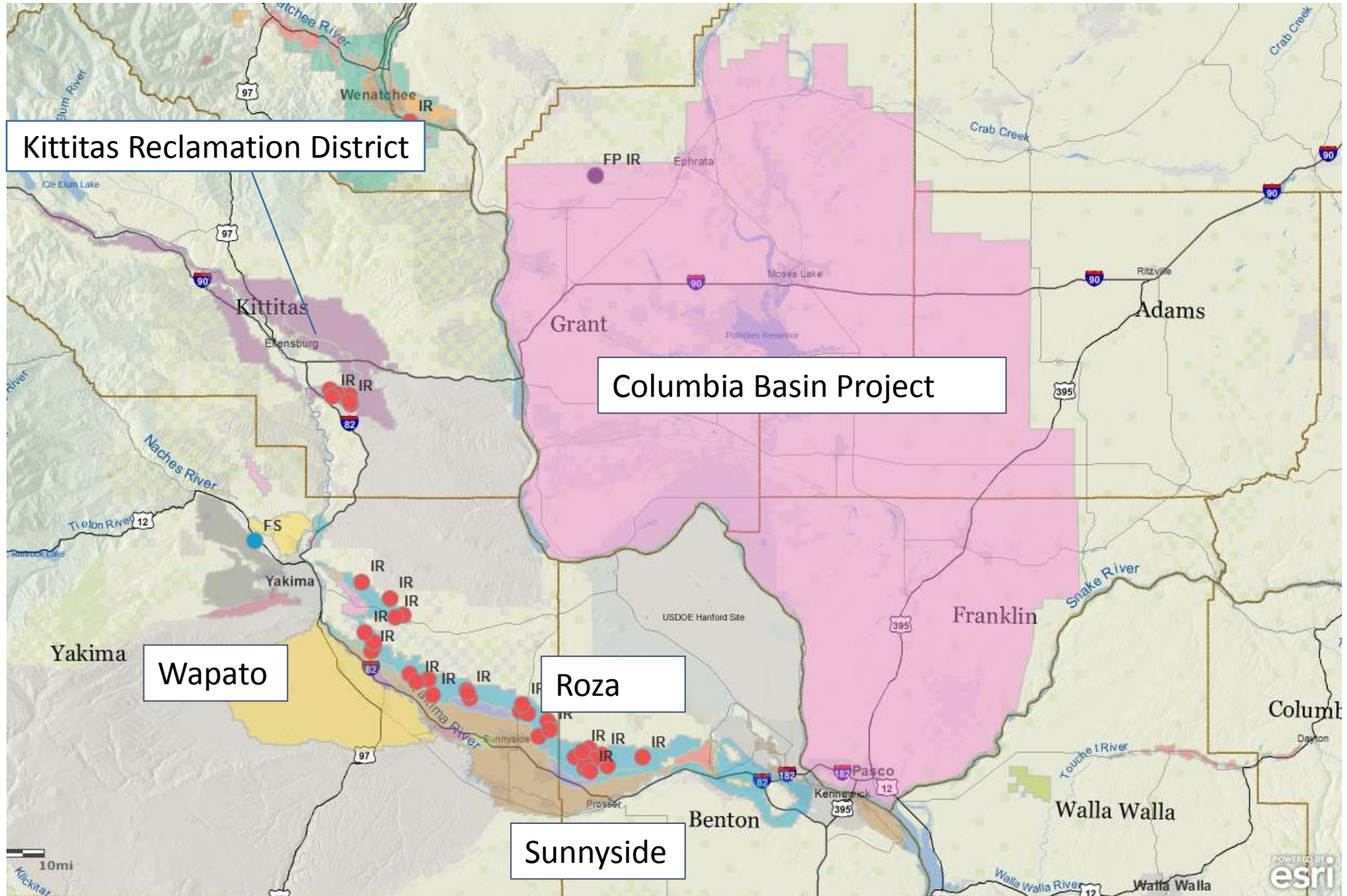
2005



2015



# Drought Permit Authorizations Central Washington





**Dungeness River, Olympic Peninsula**



Jeff Marti  
Washington Department of Ecology  
Water Resources Program  
jeff.marti@ecy.wa.gov  
360 407 6627



07/08/2015 13:19

Reserve slides follow  
DO NOT PRINT

Walla Walla River Pulse Flow May 11, 2015

Looking upstream at diversion pre-pulse





Walla Walla River  
Pulse Flow  
May 11, 2015

Looking downstream from  
diversion

May 5; pre-pulse

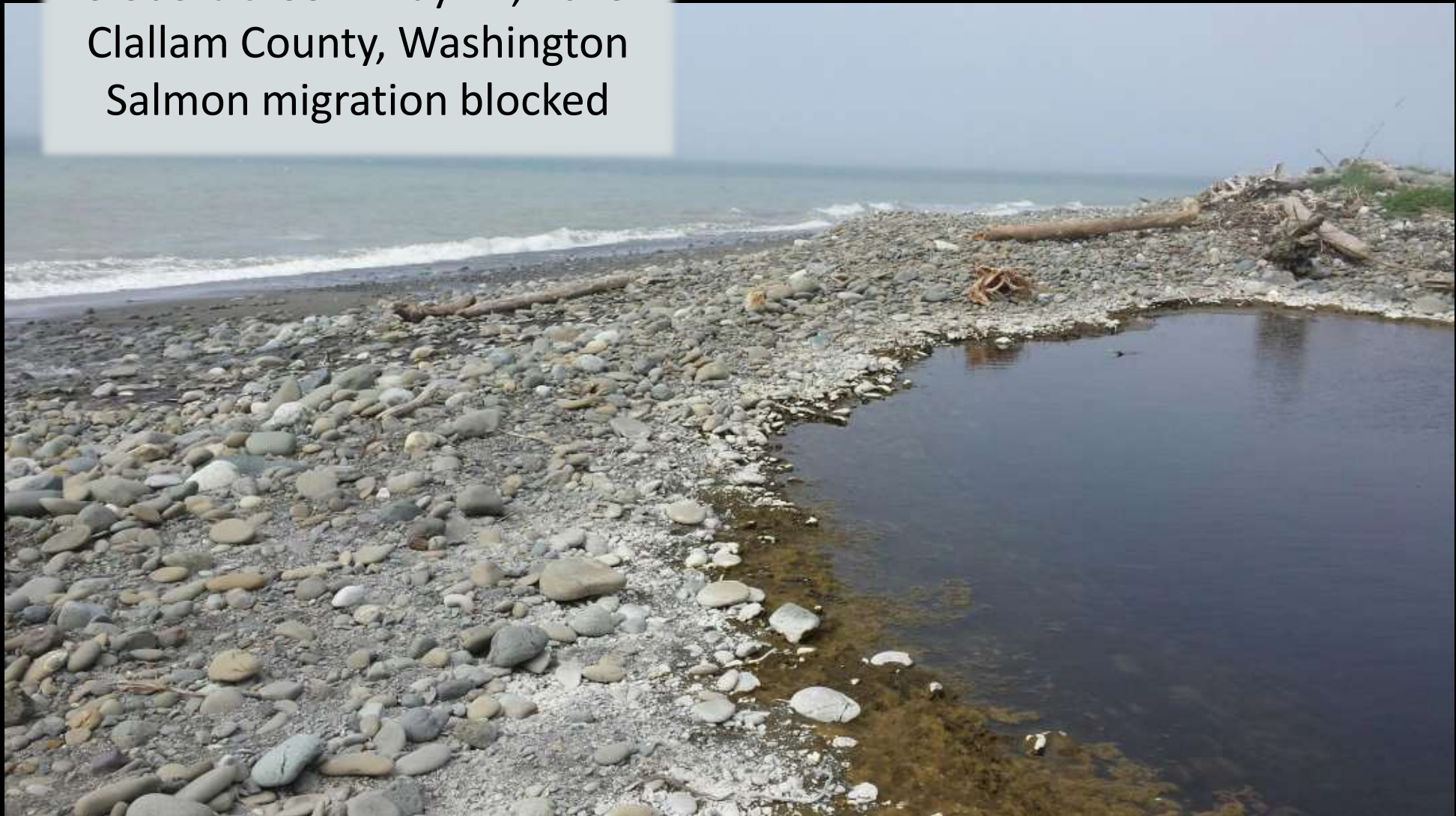
05/05/2015 12:15



May 11; during pulse

05/11/2015 11:48

Siebert Creek May 27, 2015  
Clallam County, Washington  
Salmon migration blocked



Trenching to connect channel



Siebert Ck  
May 28, 2015

Channel

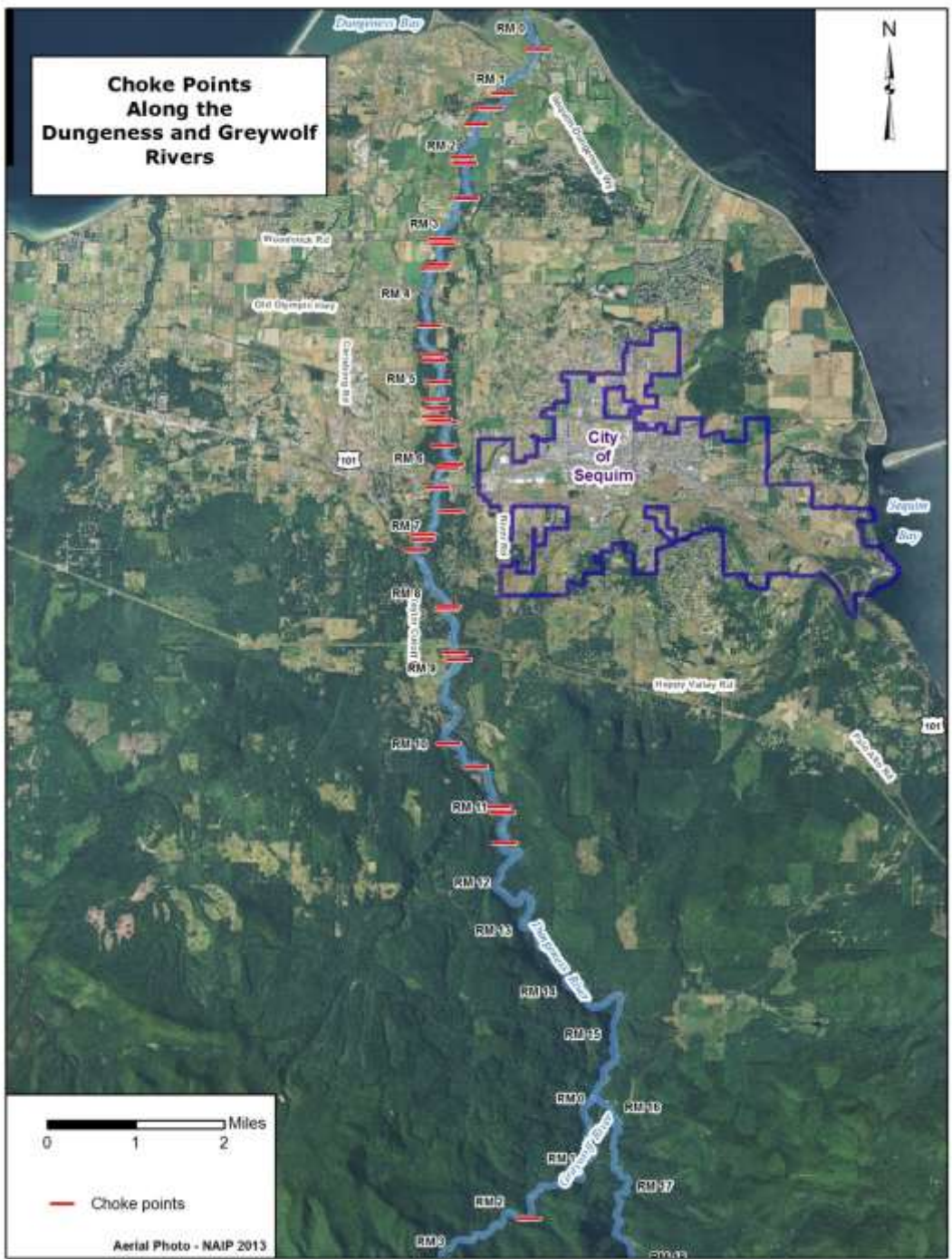
Reconnected  
Coho smolts moved  
out, adult steelhead  
moved into creek



Many thanks to fisheries staff of  
Jamestown s'Klallam Tribe



**Choke Points  
Along the  
Dungeness and Greywolf  
Rivers**



0 1 2 Miles

— Choke points

Aerial Photo - NAIP 2013

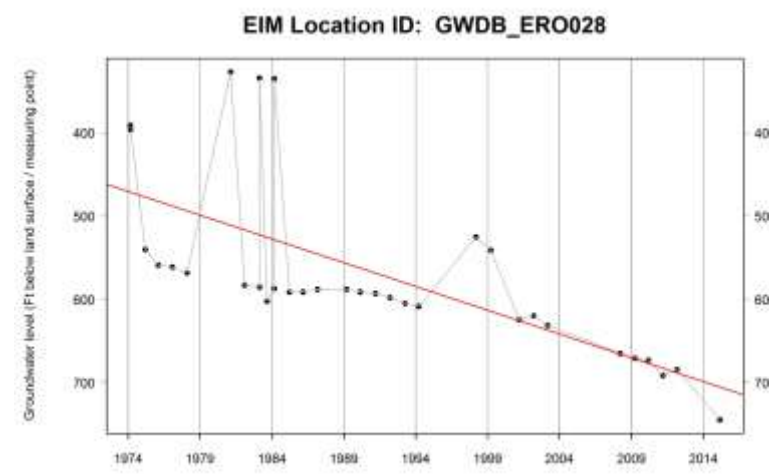
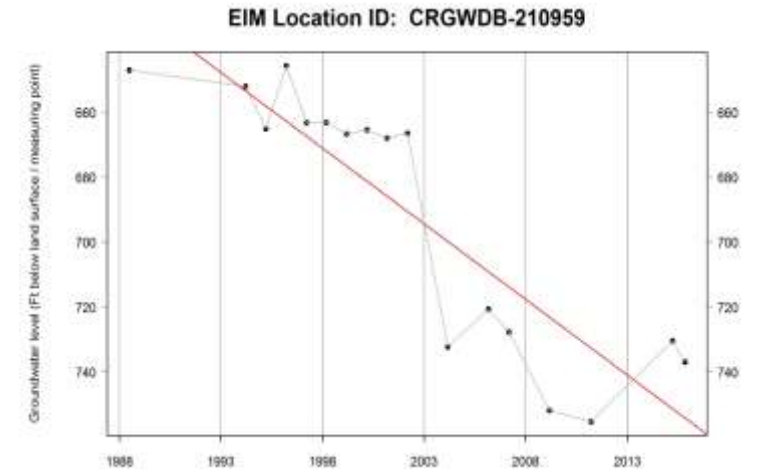
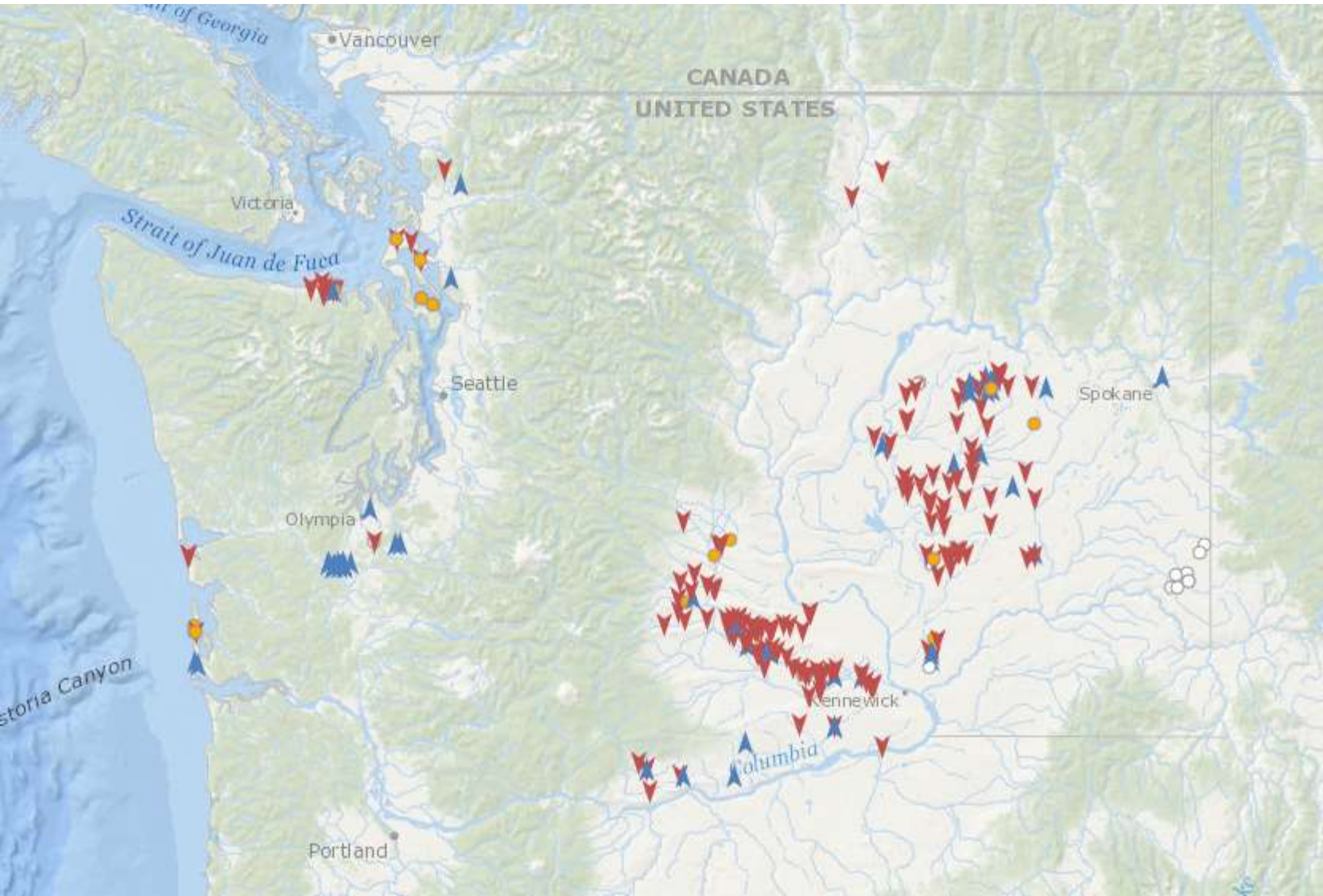
# Low Flow Remediation Dungeness River August 11-12, 2015



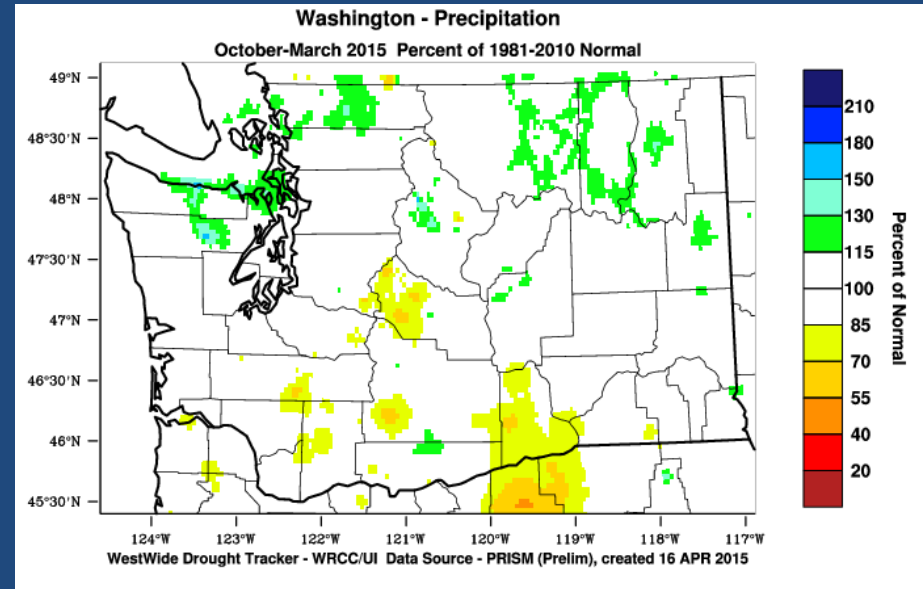
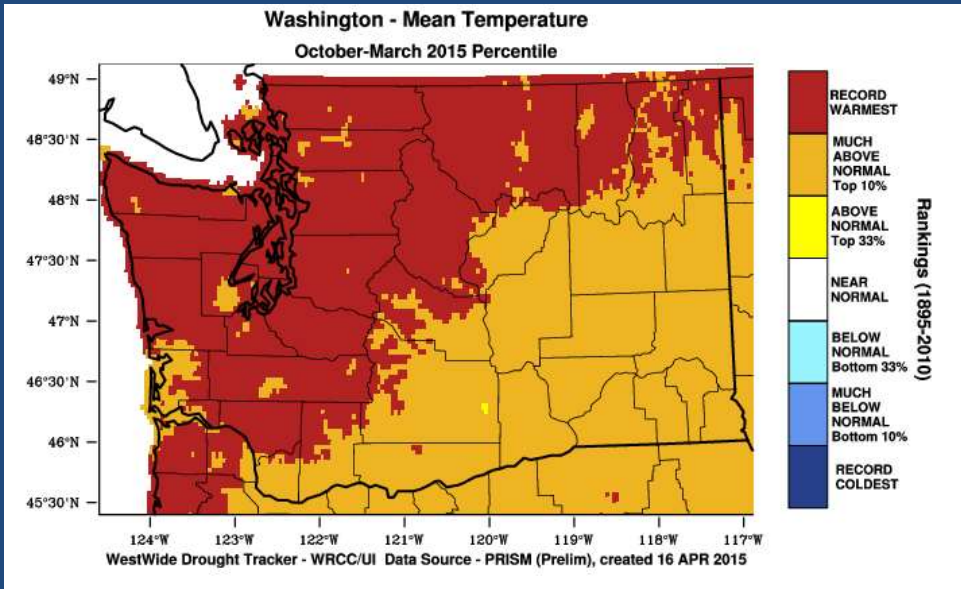
June 24, 2015  
Quileute tribal fish  
biologists salvage  
salmon fingerlings  
in Elk Ck



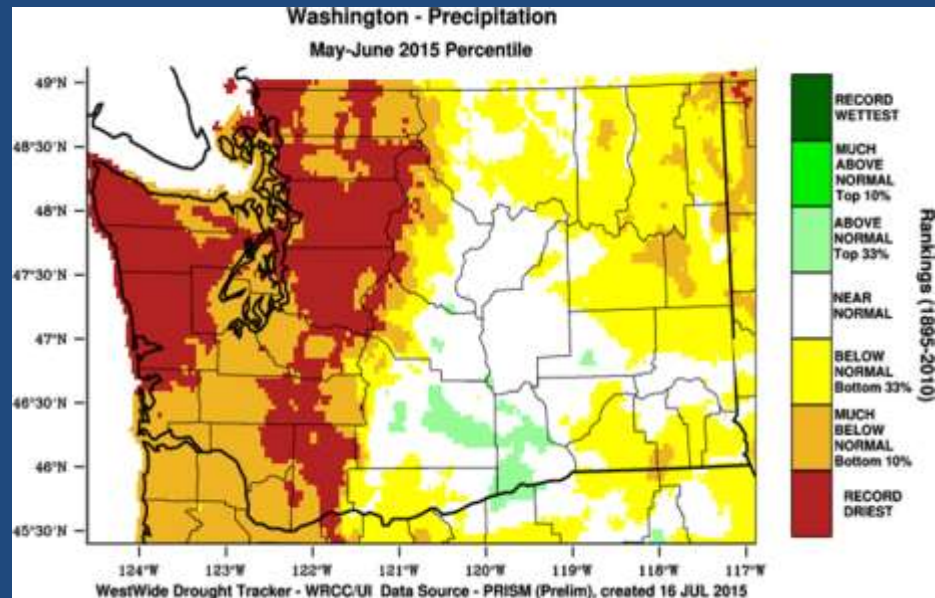
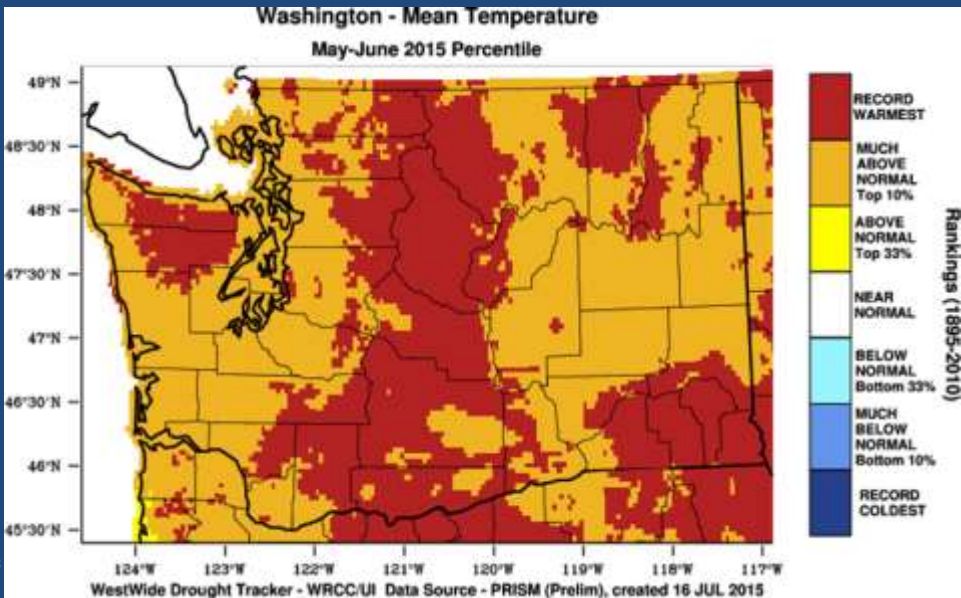
# Long-Term Groundwater Level Trends



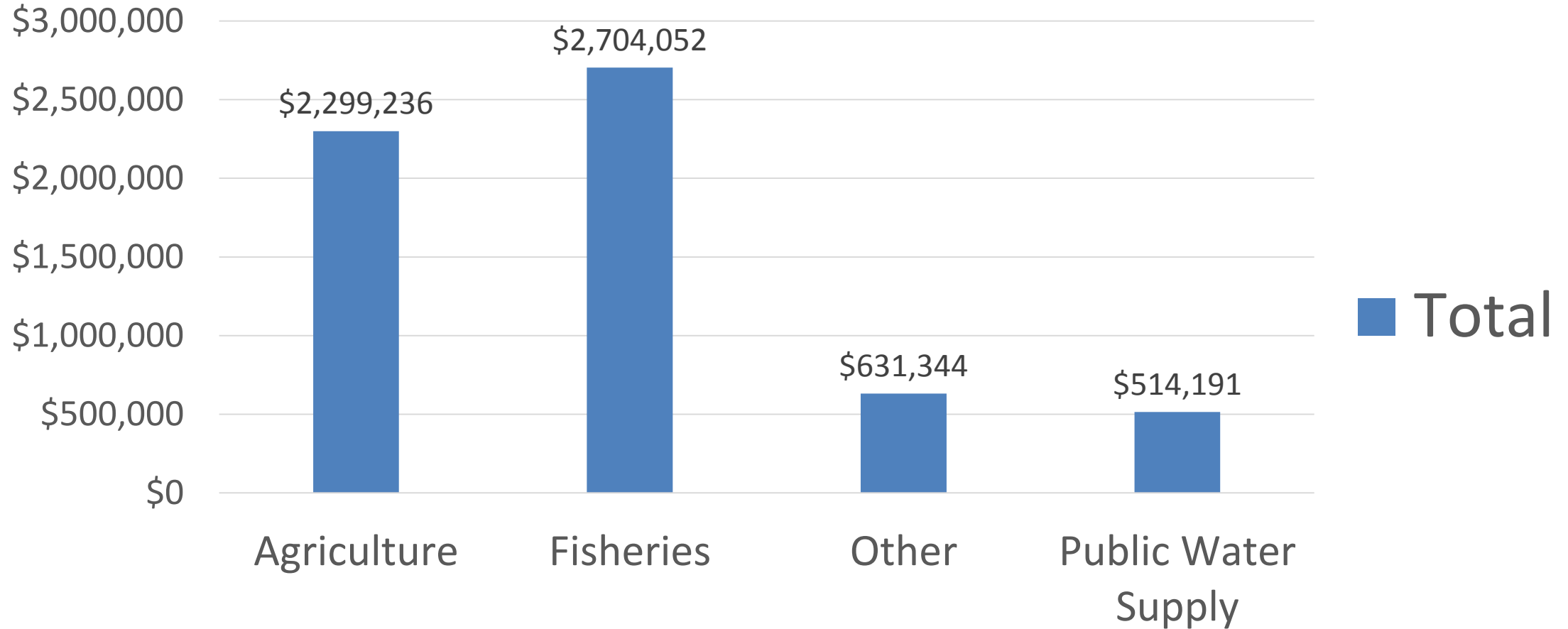
# October thru March 2015



# May thru June 2015



# Drought Spending by Category



# Bogachiel Peak, Olympic Mountains



← June 5, 2014

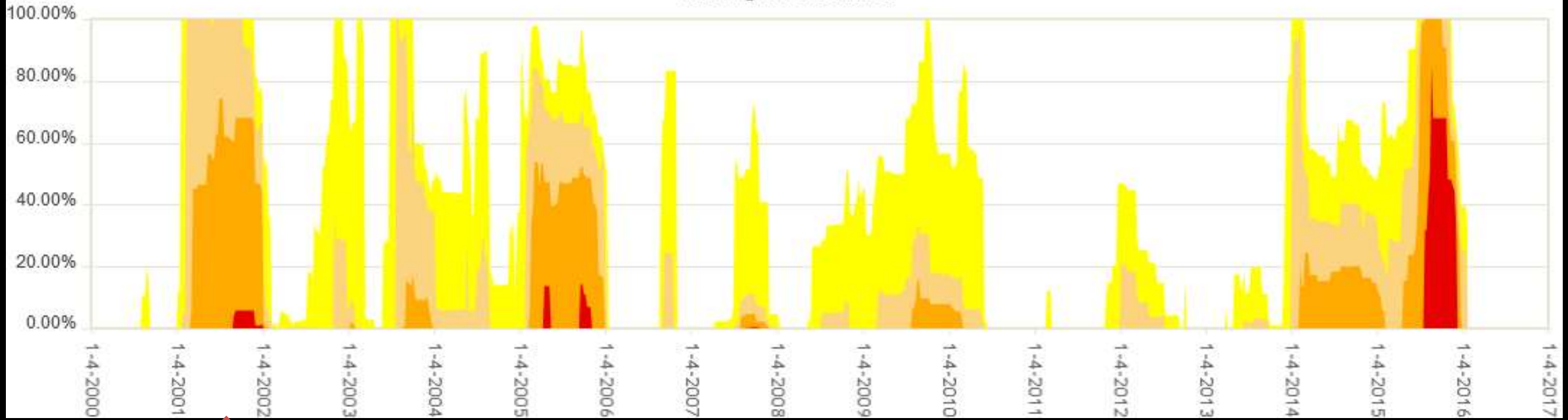


June 6, 2015 →



DEPARTMENT OF  
**ECOLOGY**  
State of Washington

Washington Percent Area



2  
0  
0  
1

2  
0  
0  
5

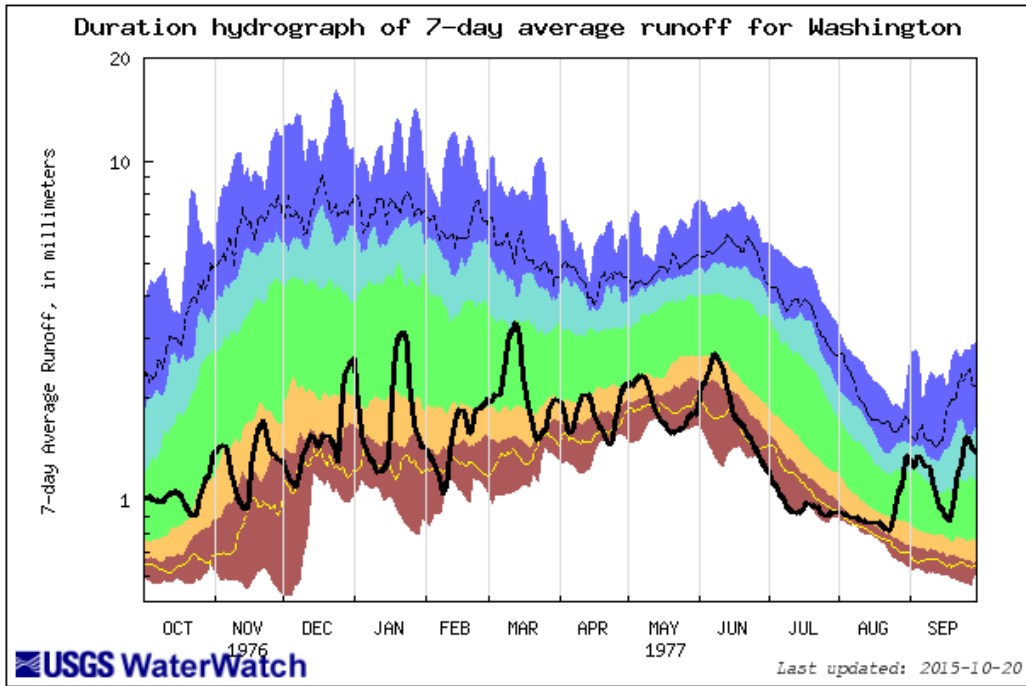
2  
0  
1  
5

U.S. Drought Monitor Legend

**Drought Severity**

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

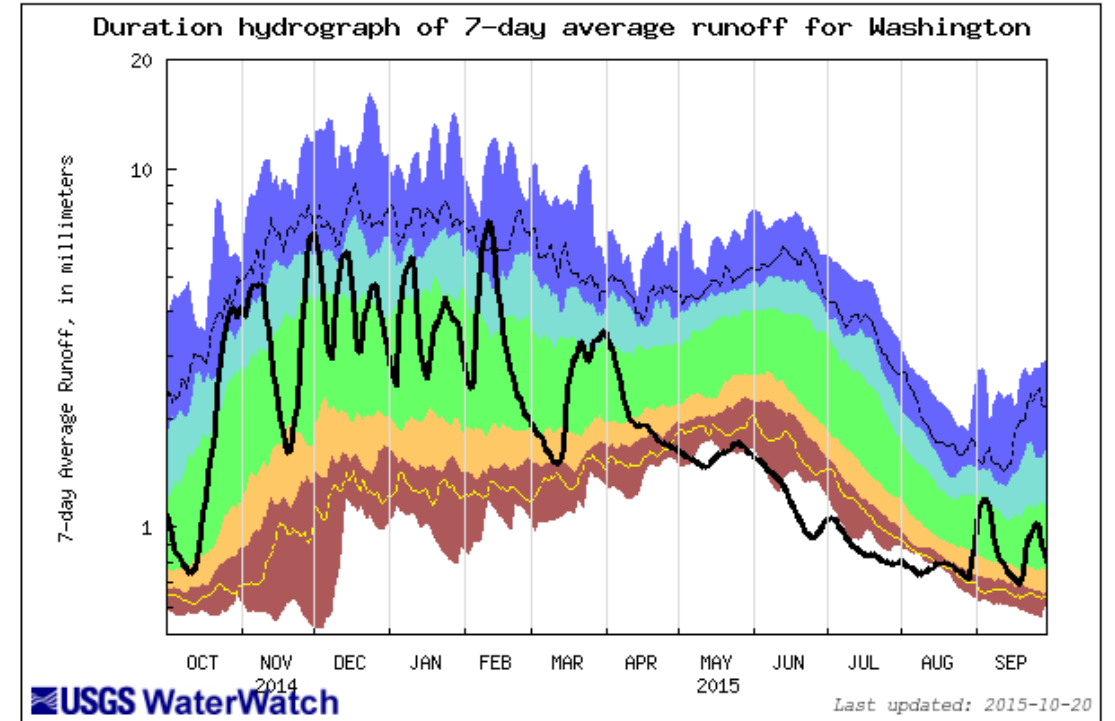




← 1977: Driest on Record,  
Normal Temperature October thru March

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

2015: Warmest on Record, Normal  
Precipitation October thru March →



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

# Drought Affects *Physical* and Legal Water Availability: Yakima Example

- First in time, first in right
- Federal Government 1905 withdrawal



**Senior  
Water Rights**

Pre-1905 priority date:  
receives full water right



**Proratable  
Water Rights**

1905 priority date:  
receives ~ 1/3 to full water  
right depending on supply



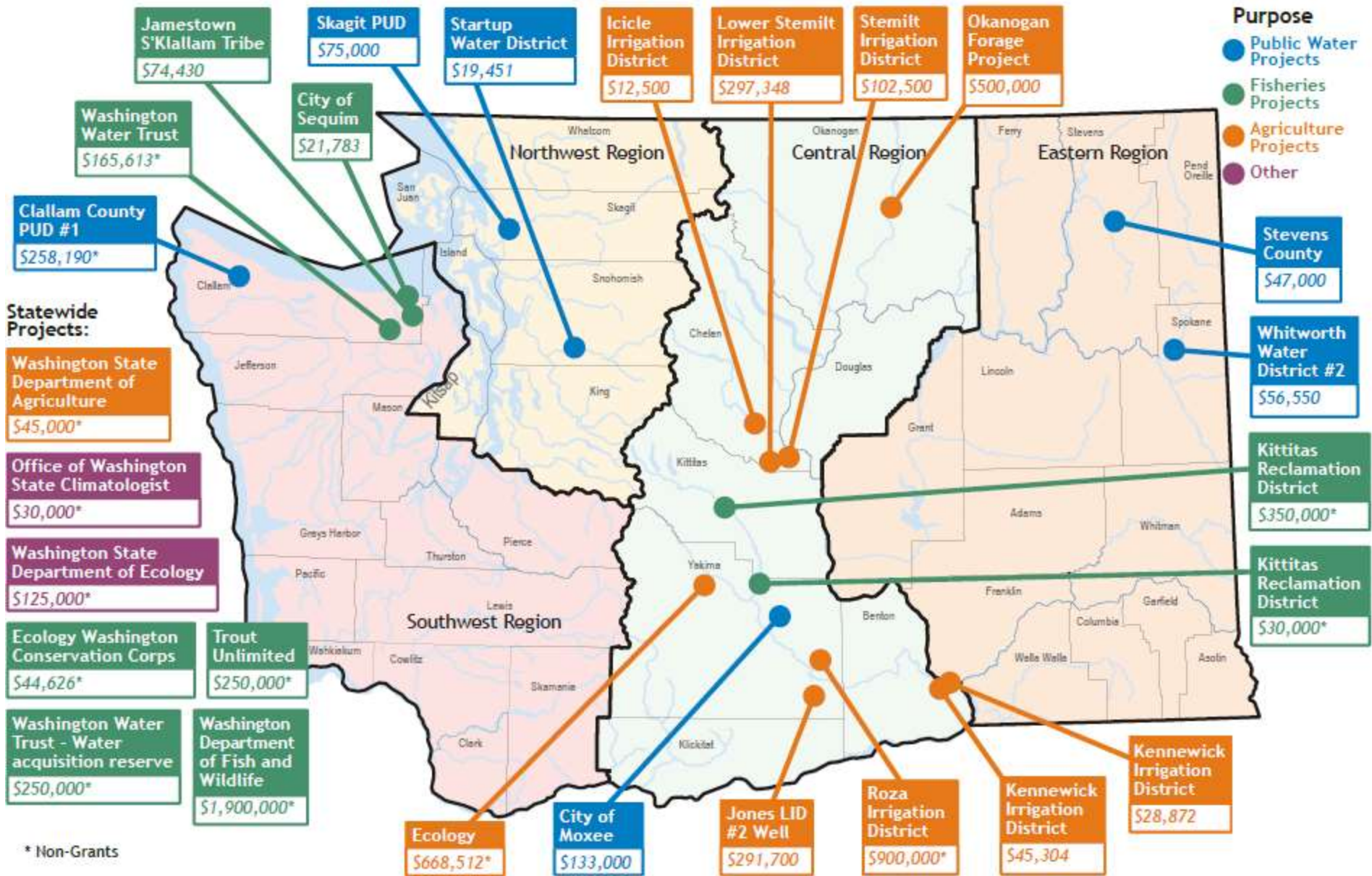
**Junior  
Water Rights**

Post-1905 priority date:  
receives no water once  
rationing occurs



**No  
Water Rights**

Surface water use  
without a water right  
is unlawful



\* Non-Grants



7 millions boxes lost;  
\$86M



22% below 5 yr. avg.; \$212M



26% crop loss; \$13.9M



4 million pound  
loss; \$12M



An OK year. Early  
harvest, little damage,  
smaller than normal.



No impacts reported (pears are  
harvested before ripening)

# Public Water Systems

---

Forks, Port Townsend and Port Angeles implemented watering restrictions

---

Large Westside municipalities at Stage 2 (Voluntary) Conservation, greater reliance on backup wells

---

Wells ran dry for Startup, Moxee and Riverside (north of Spokane)

---

Reports of individual well users with wells running dry sporadically around state



# Fisheries

- Columbia River: More than 200,000 missing sockeye...but record returns of Chinook
- Okanogan Sockeye spawners: 3-4.5% of forecast
- Columbia River: 182 sturgeon carcasses (88 percent > 55 in. length)
- Yakima River: 320 returning sockeye (2,500 in previous year)
- Hatcheries: 1,647,000 dead salmon, steelhead and trout
- Returning Coho: 73% Reduction in expected returns
- Elsewhere: stranding, migration blockages from low flows, recreational rock dams

