



May 2015 Water Supply Briefing

National Weather Service, Northwest River Forecast Center

Telephone Conference: 1-877-501-8577

Pass Code: 71967

Presentation available after brief at:

www.nwrfc.noaa.gov/presentations/presentations.cgi

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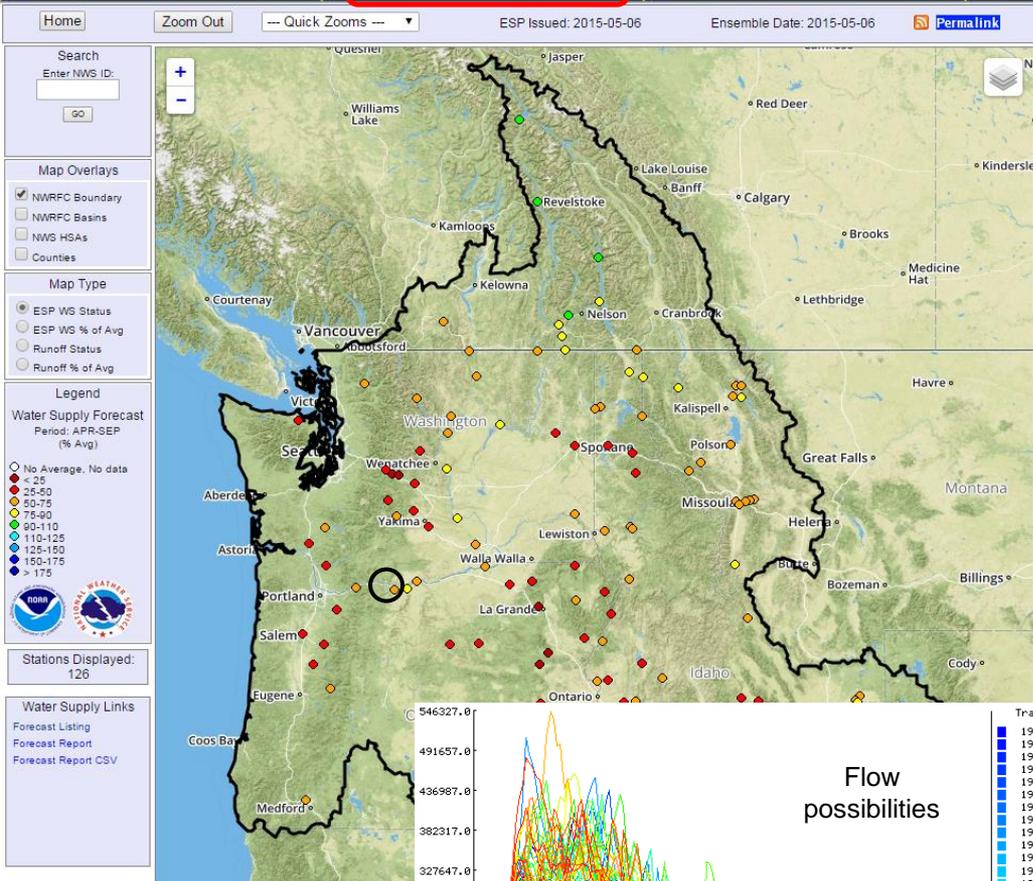
Northwest River Forecast Center

Water Supply Forecasts

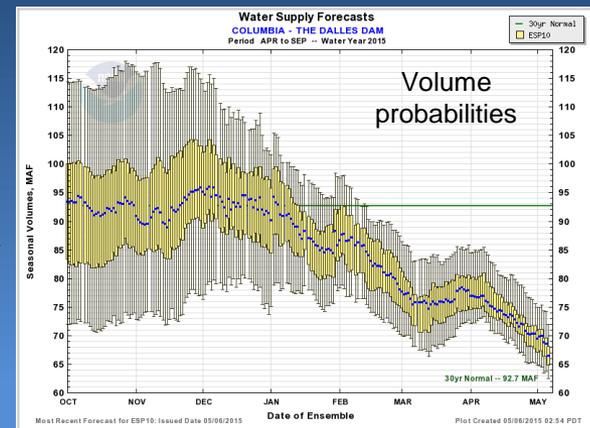
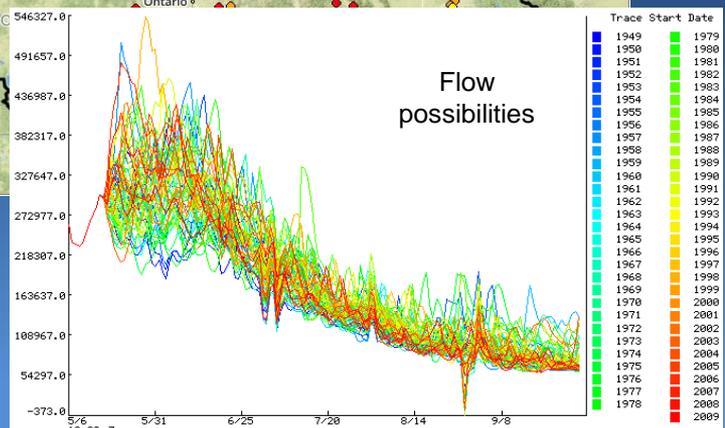
www.nwrfc.noaa.gov/ws/



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



- **ESP: Ensemble Streamflow Prediction**
- Official ESP water supply products include:
 - 10 days of quantitative precipitation forecast (QPF)
 - 10 days of quantitative temperature forecast (QTF)
 - Historical observations (climatology) appended thereafter
- NWRFC also offers 5 and 0 day QPF/QTF products
- Forecasts are updated daily
- Model states and observed runoff updated continuously
- Forecasts are compared to 30 year observed runoff normals (1981-2010)





Water Supply Summary



www.nwrhc.noaa.gov/ws/

Upper Columbia:

- B.C. near to slightly below normal
- W. Montana slightly below normal
- N. Idaho well below normal

Upper Snake:

- Well below to slightly below normal

Middle/Lower Snake:

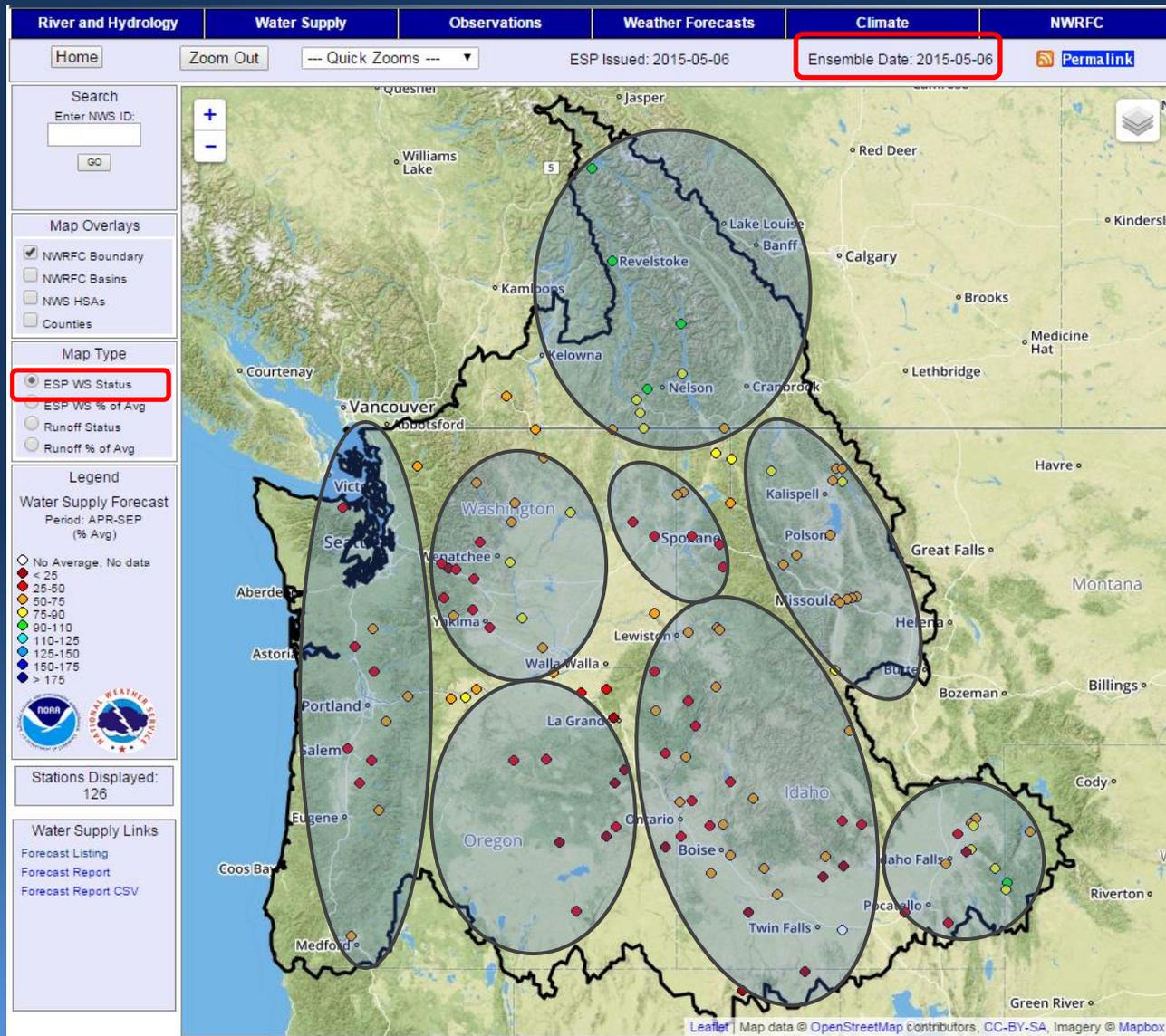
- Well below to below normal

E. Washington/Oregon:

- Well below to below normal

W. Washington/Oregon:

- Well below to below normal





Water Supply Forecast Inputs



■ Observed Conditions:

- Precipitation
- Temperature
- Snowpack
- Runoff

Hydrologic
model states

■ Future Conditions:

- 0, 5, or 10 days of QPF/QTF
- Historical observations appended thereafter



Observed Seasonal Precipitation



www.nwrfc.noaa.gov/water_supply/wy_summary

River and Hydrology | **Water Supply** | **Observed**

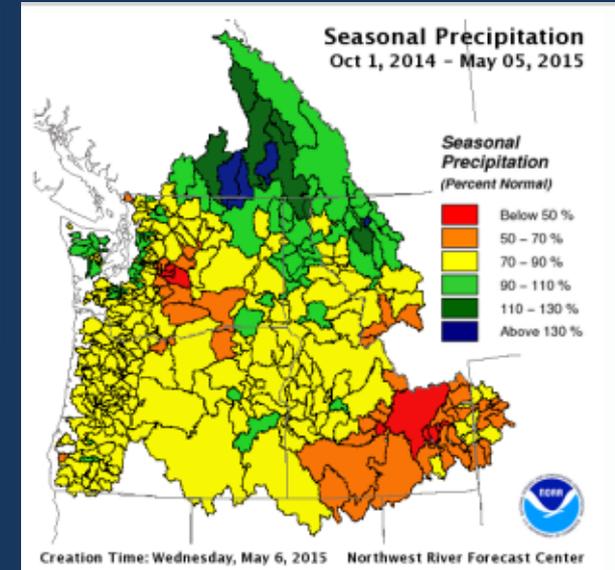
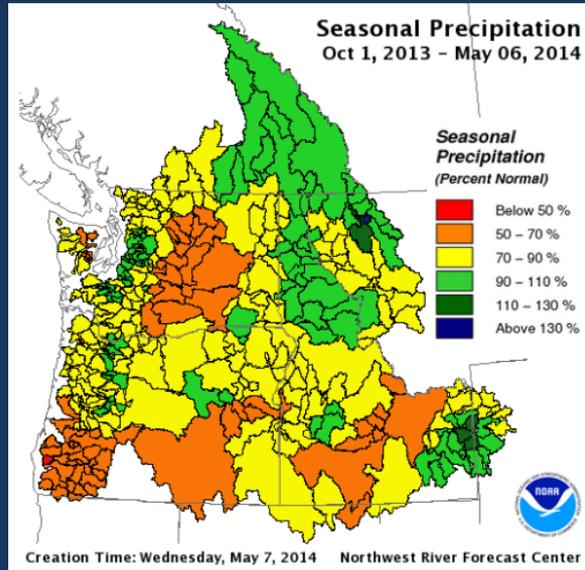
Home | Zc

Search
Enter NWS ID:
GO

Map Overlays
 NWRFC Boundary
 NWRFC Basins
 NWS HSAs
 Counties

Map Type
 ESP WS Status
 ESP WS % of Avg
 Runoff Status

- Forecast Map
- Forecast Listing
- Forecast Report
- Forecast Text Product
- Live Briefing Schedule
- Precipitation/Temperature
- Snow
- Runoff
- Runoff Text Product
- ESP Natural Volumes
- New ESP Natural Forecast **BETA**
- ESP Interactive
- Documentation

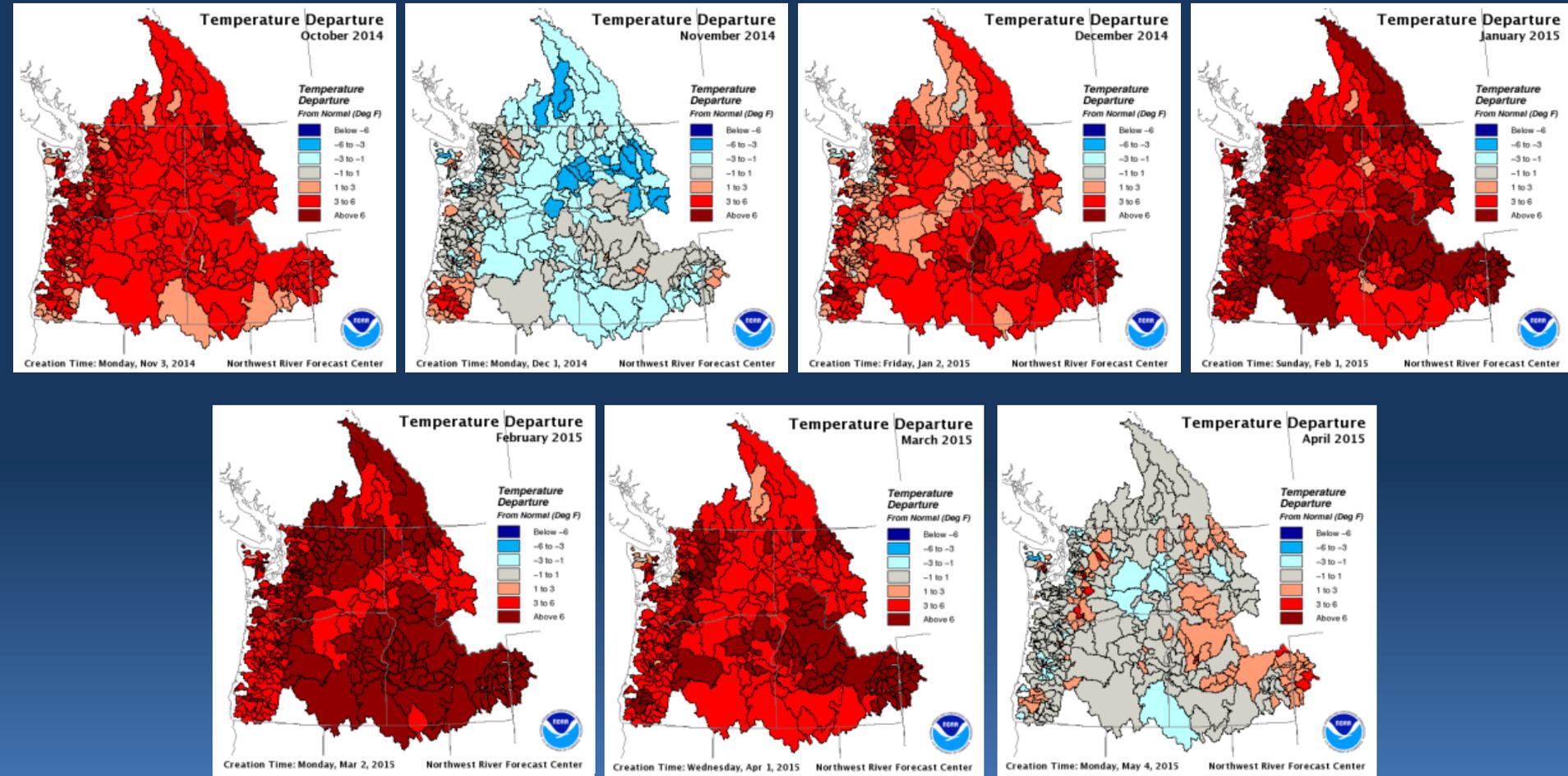


DIVISION NAME	WY 2014 % NORM	WY 2015 % NORM	WY 2015 OBS
Columbia River Basin above Grand Coulee Dam	95	103	27 in
Snake River Basin above Ice Harbor Dam	84	75	12 in
Middle Columbia Lower Tributaries	80	77	14 in
Columbia River Basin above The Dalles Dam	86	86	17 in
*Western Washington	84	84	66 in
*Western Oregon	76	81	47 in

*Average of contributing divisions

Observed Seasonal Temperatures

www.nwrfc.noaa.gov/water_supply/wy_summary

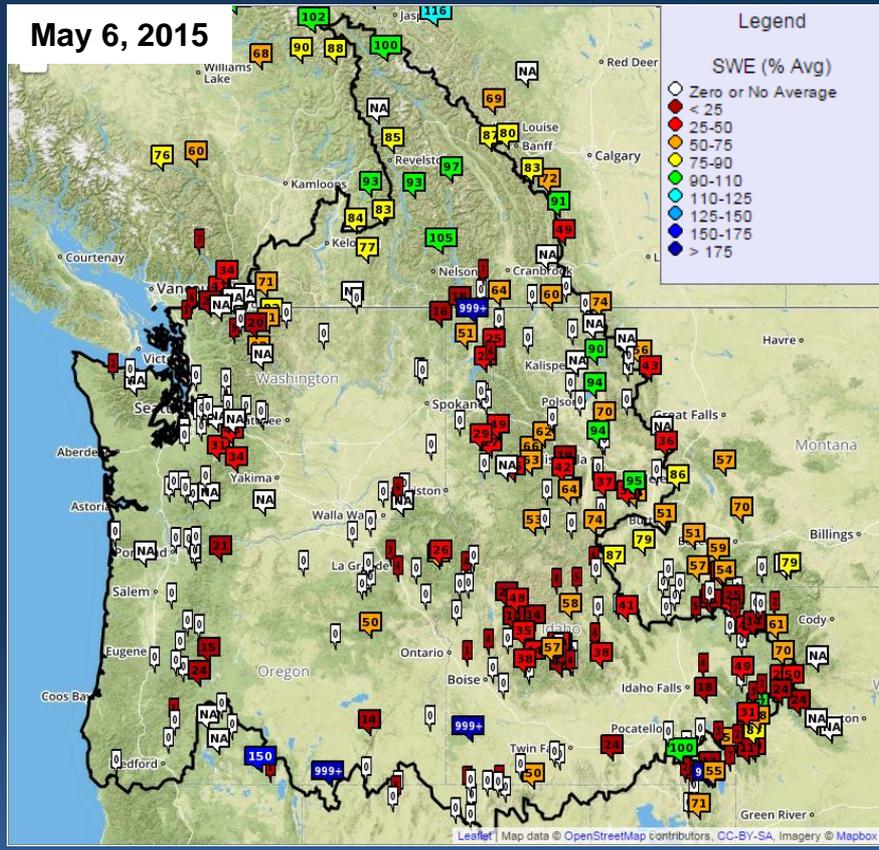
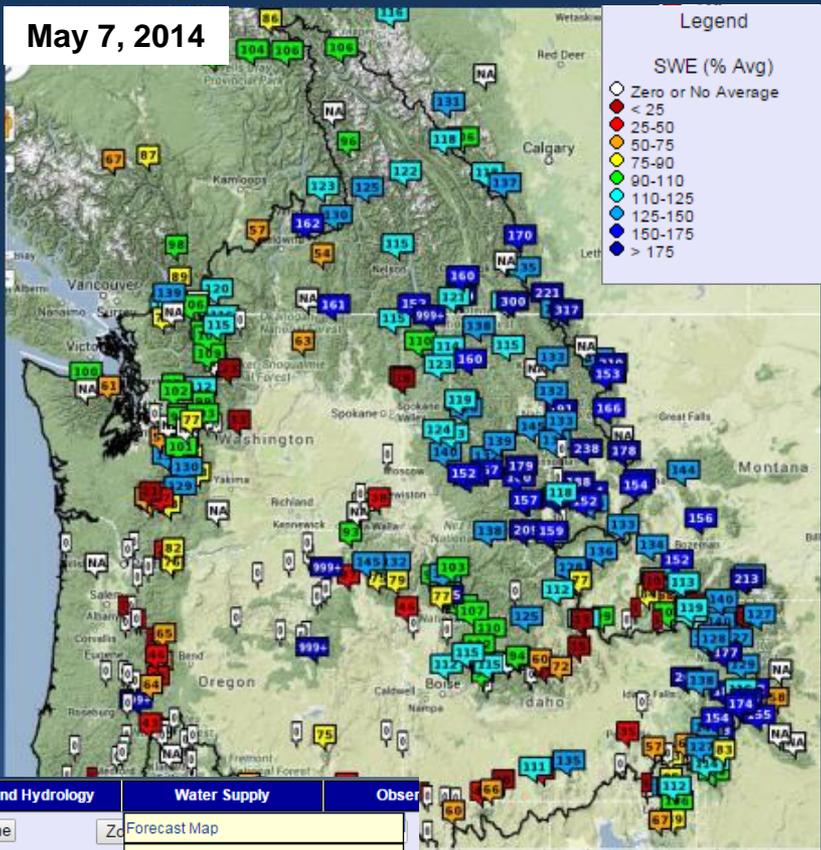


- More rain than snow and/or early snow melt → early runoff



Observed Snowpack Conditions

www.nwrfc.noaa.gov/snow



River and Hydrology | **Water Supply** | **Observed**

Home | Forecast Map | Forecast Listing | Forecast Report | Forecast Text Product | Live Briefing Schedule | Precipitation/Temperature | **Snow** | Runoff | Runoff Text Product | ESP Natural Volumes | New ESP Natural Forecast **BETA** | ESP Interactive | Documentation

Search by NWS ID:

Map Overlays

- NWRFC Boundary
- NWRFC Basins
- NWS HSAs
- Counties

Map Type

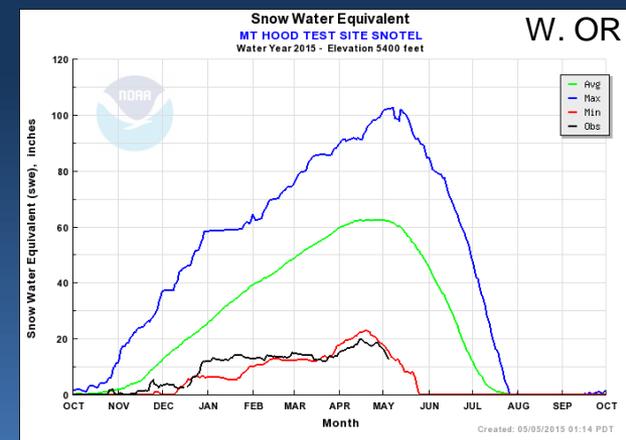
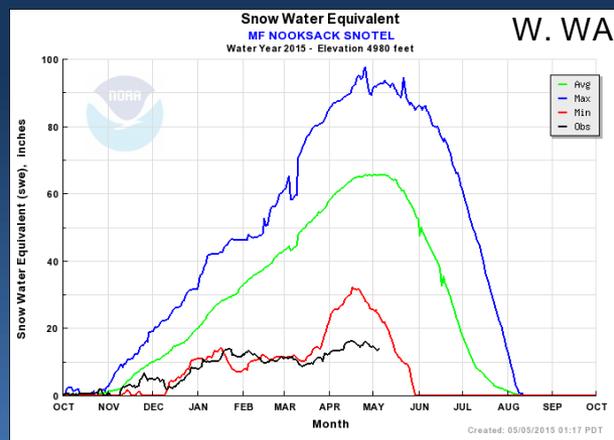
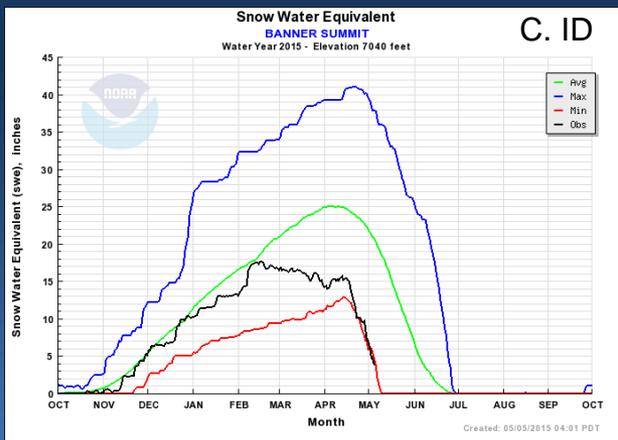
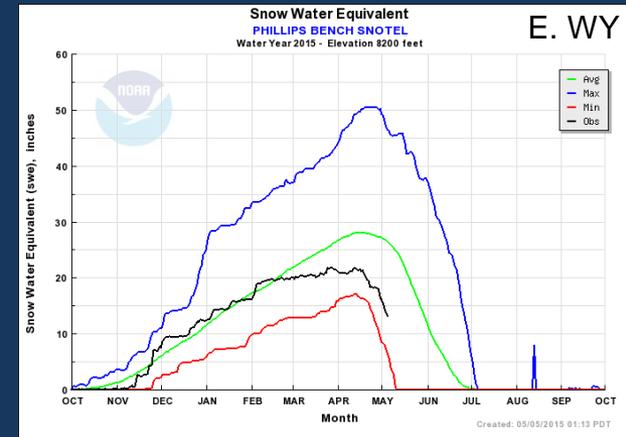
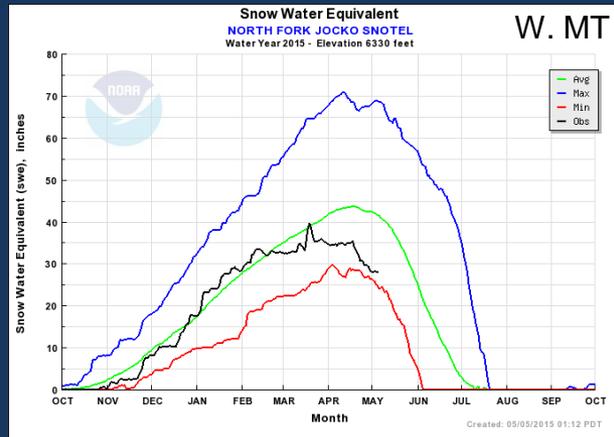
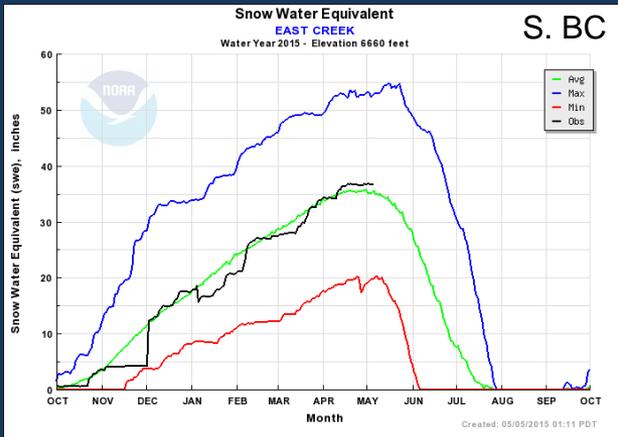
- SWE
- Snow Status
- Snow % of Avg
- Seasonal Peak Status

- Observed snow water equivalent (SWE) values provided by:
 - Natural Resources Conservation Service (NRCS) SNOTEL network
 - Environment Canada (EC) Automated Snow Pillow network



Observed Snowpack Conditions

www.nwrfc.noaa.gov/snow



- Observed snow water equivalent (SWE) values provided by:
 - Natural Resources Conservation Service (NRCS) SNOTEL network
 - Environment Canada (EC) Automated Snow Pillow network



Average Observed Snowpack Conditions

www.nwrfc.noaa.gov/snow



Navigation: Home, Forecast Map, Forecast Listing, Forecast Report, Forecast Text Product, Live Briefing Schedule, Precipitation/Temperature, Snow, Runoff, Runoff Text Product, ESP Natural Volumes, New ESP Natural Forecast: BETA, ESP Interactive, Documentation

Search by NWS ID: [input] [go]

Map Overlays:

- NWRFC Boundary
- NWRFC Basins
- NWS HSAs
- Counties

Map Type:

- SWE
- Snow Status
- Snow % of Avg
- Seasonal Peak Status
- Basin Obs Status
- Basin Sim Status
- Diff

Legend: Basin SWE (% Avg)

- Zero or No Average
- < 25
- 25-50
- 50-75
- 75-90
- 90-110
- 110-125
- 125-150
- 150-175
- > 175

Stations Displayed: 271

Related Links:

- Station Summary List
- Basin Summary List

May 6, 2015

ID	Description	Distance (miles)	Elevation (feet)	Obs Date	Obs	1981-2010 Avg	Percent
GRCM8	GRAVE CREEK SNOTEL	0	4300	05-06	0.0	4.9	0 %
BANM8	BANFIELD MTN SNOTEL	0	5600	05-06	0.0	15.2	0 %
STAM8	STAHL PEAK SNOTEL	0	6030	05-06	22.0	36.7	60 %
MORQ2	MORRISSEY RIDGE	0	6100	05-06	11.0	24.2	45 %
MYMQ2	MOYIE MOUNTAIN	0	6370	05-06	0.7	12.2	6 %
FLKQ2	FLOE LAKE	0	6860	05-06	26.8	26.9	100 %
Basin Average							50 %

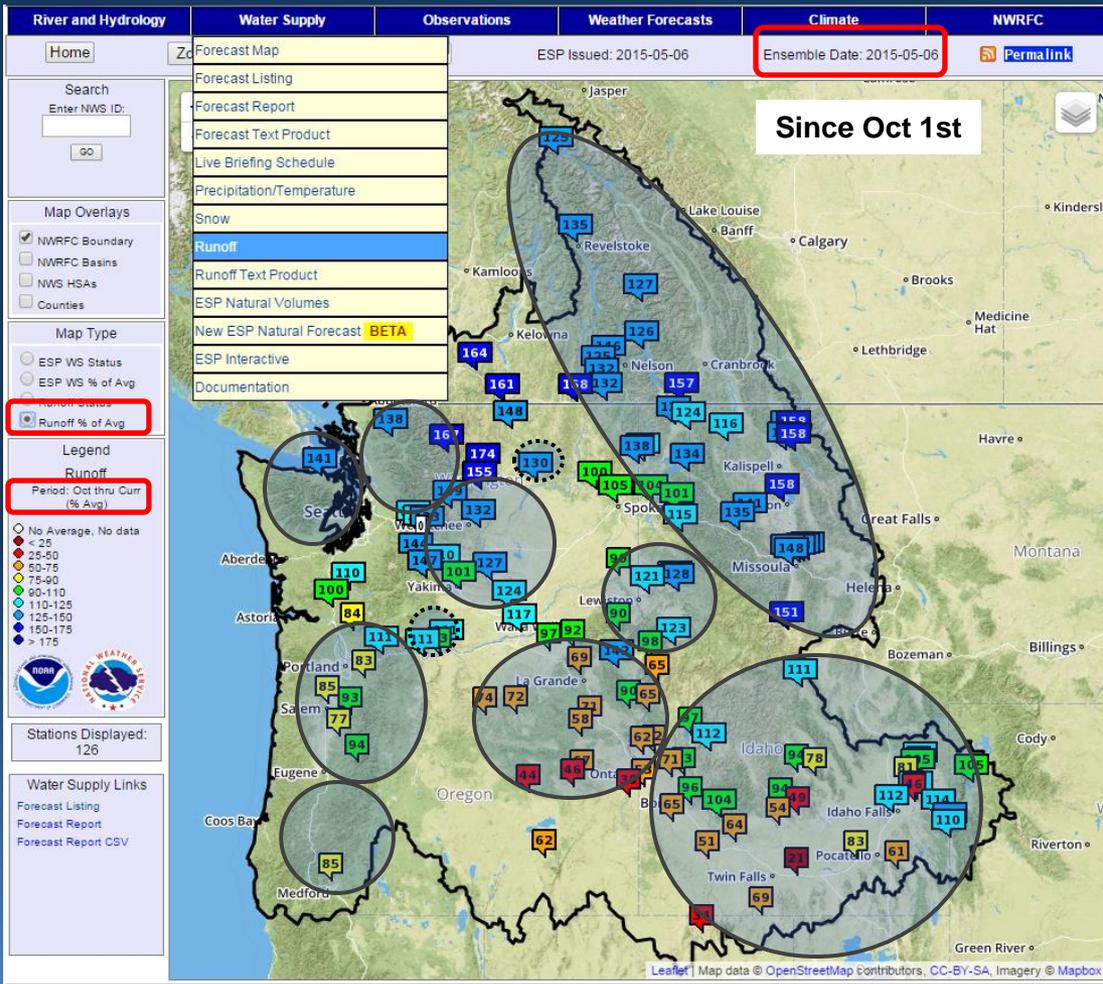
- Estimate of average observed snowpack conditions
 - Averages of stations within and near each watershed
- External guidance for modeled snowpack conditions
 - Assessed weekly



*Observed Runoff Conditions



www.nwrfc.noaa.gov/ws/



LOCATION	OCT 1 – MAY 6 % NORM	APR 1 – MAY 6 % NORM
Columbia River – Grand Coulee Dam	133	86
Clearwater River – Spalding	123	75
Snake River – Hells Canyon Dam	65	33
Yakima River – Parker	102	41
John Day River – Service Creek	75	35
Columbia River – The Dalles Dam	113	77
Skagit River – Concrete	139	82
Dungeness River – Sequim	142	69
Willamette River – Salem	85	56
Rogue River – Raygold	86	52

*Observed runoff adjusted for changes in upstream storage



Water Supply Forecast Inputs



- **Observed Conditions:**

- Precipitation
- Temperature
- Snowpack
- Runoff

Hydrologic
model states

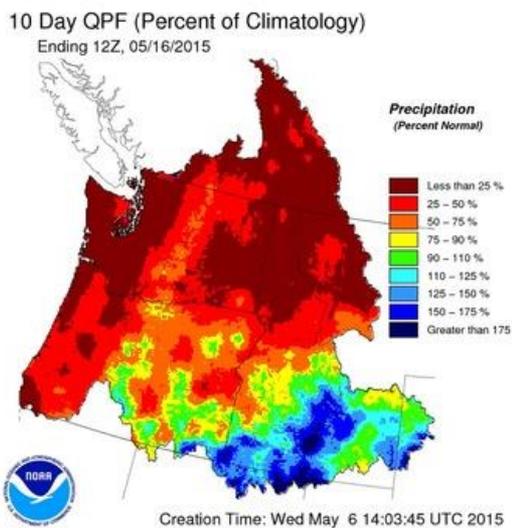
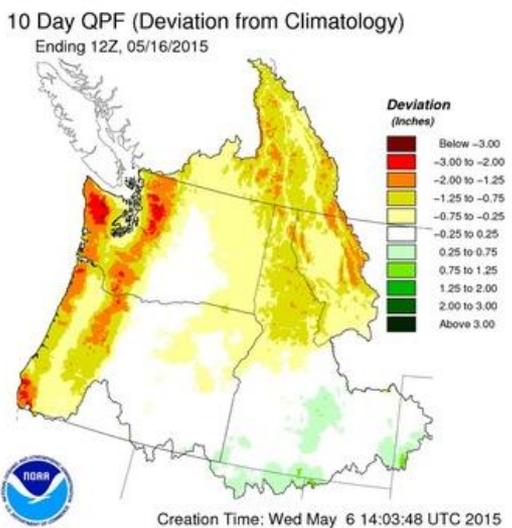
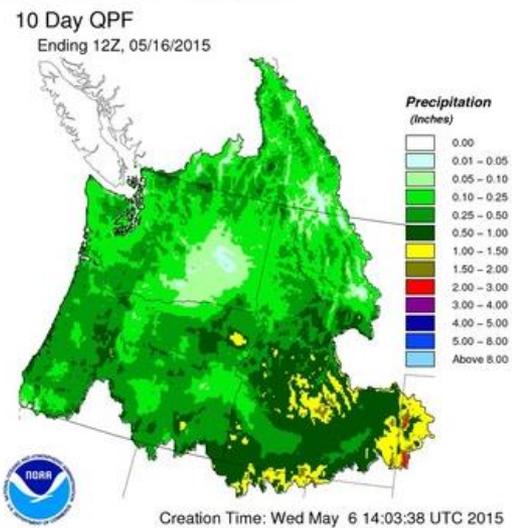
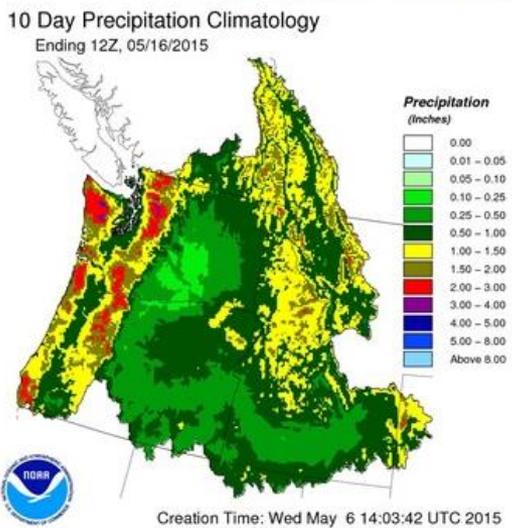
- **Future Conditions:**

- 10, 5, or 0 days of QPF/QTF
- Historical observations appended thereafter

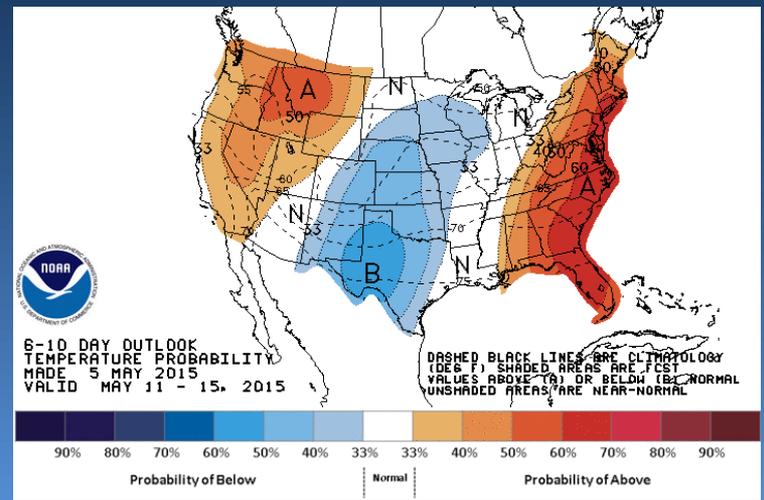
Precipitation & Temperature Forecasts

www.nwrfc.noaa.gov/water_supply/wy_summary

10 Day Forecast Precipitation: Volume Analysis



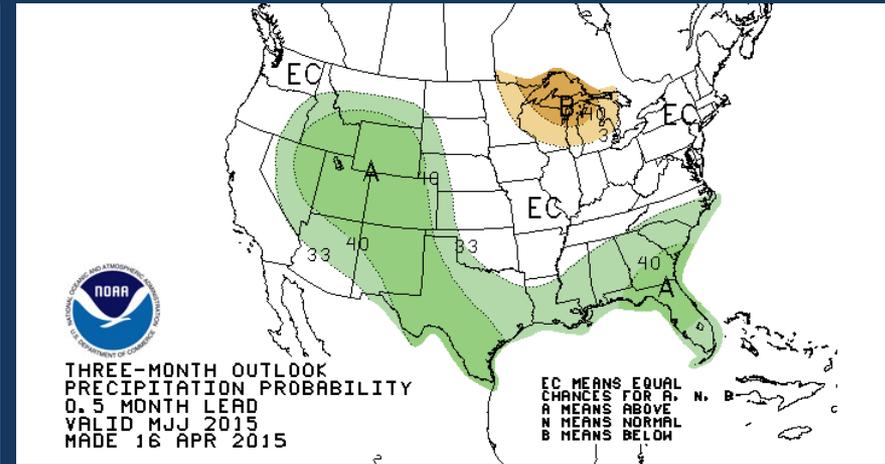
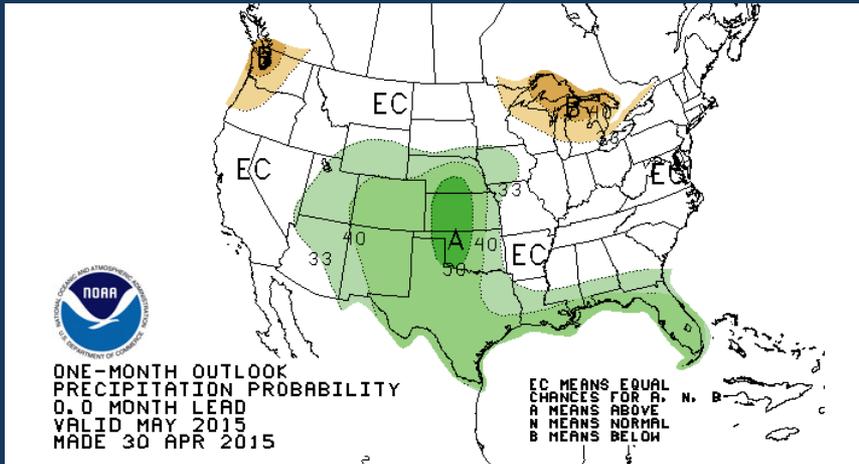
- Relatively dry conditions forecasted to continue across west-side and northern tier
- Southern tier may see some moisture
- Temperatures expected to be warm
- Water supply forecasts are trending lower, or remaining relatively unchanged



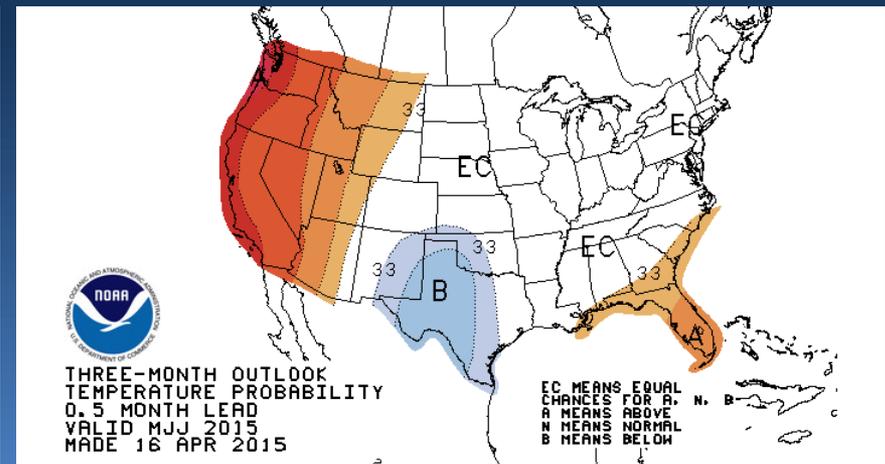
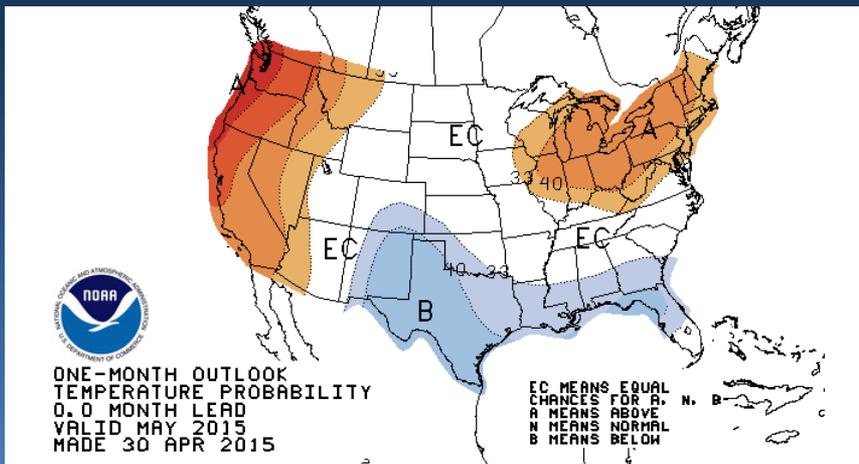
Current Month Outlook

Three Month Outlook

Precipitation



Temperature



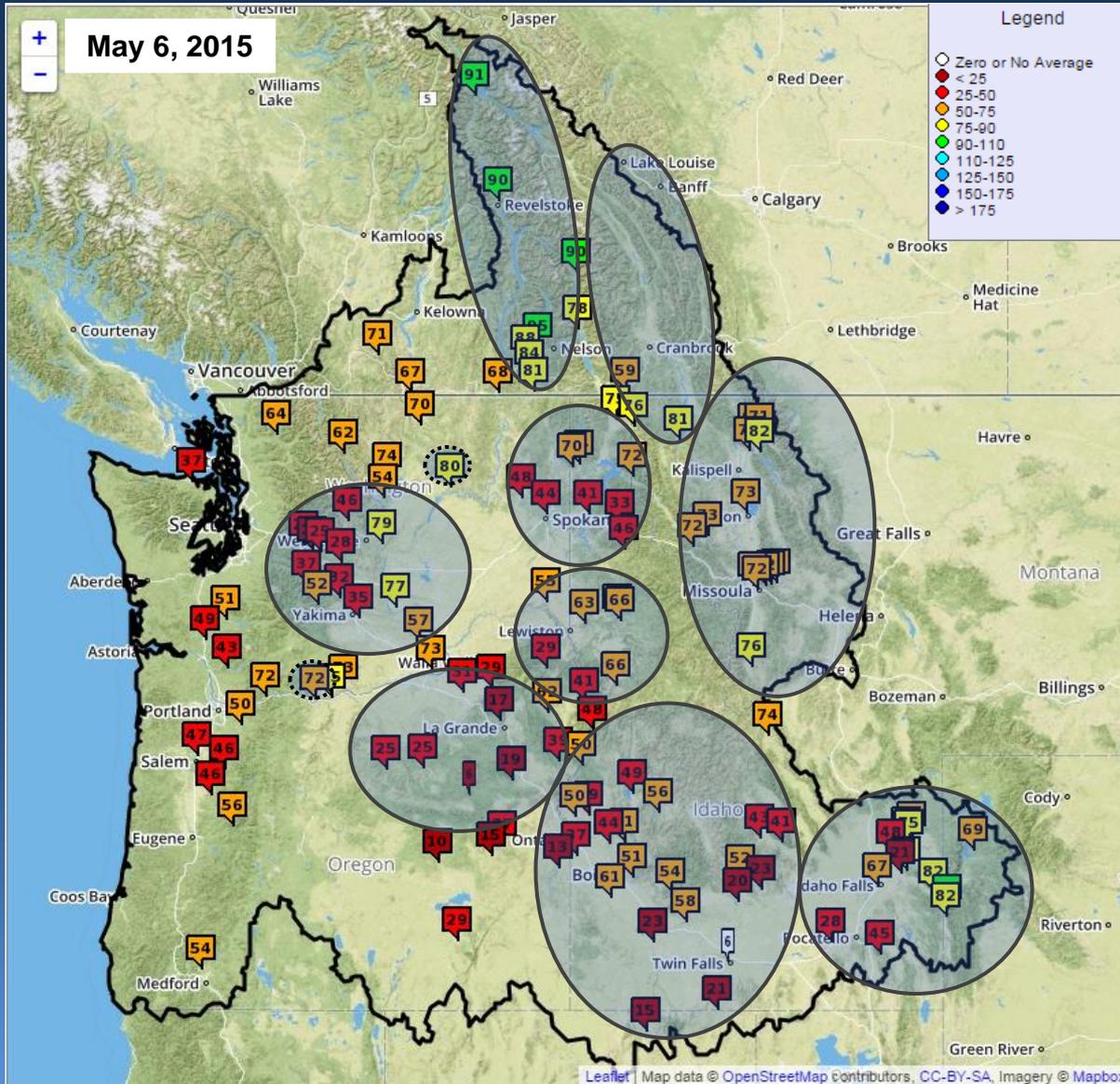
- Warm temperatures likely to persist
- May see some moisture, but unlikely to significantly impact seasonal volumes



Official Water Supply Forecasts



www.nwrfc.noaa.gov/ws/



LOCATION

APR – SEP
% NORM

Columbia River – Arrow Lakes	88
Kootenai River – Libby Dam	81
Clark Fork – Cabinet Gorge Dam	72
Spokane River – Spokane	<u>44</u>
Columbia River – Grand Coulee Dam	80
Snake River – Shelley	67
Snake River – Brownlee Dam	50
Snake River – Lower Granite Dam	55
Yakima River – Parker	<u>35</u>
John Day River – Service Creek	<u>25</u>
Grande Ronde -- Perry	<u>17</u>
Columbia River – The Dalles Dam	72



Columbia River – The Dalles Dam



www.nwrfc.noaa.gov/water_supply/ws_forecasts.php?id=TDAO3

Close Data/Normals Rankings Adjustments Verification Verify All Years Help Archive Beta Monthly Water Supply Forecasts

COLUMBIA - THE DALLES DAM (TDAO3) Forecasts for Water Year 2015

Official Forecast

10 days QPF: **Ensemble: 2015-05-06** Issued: 2015-05-06

Forecasts Are in KAF

Forecast Period	90 %	50 %	% Average	10 %	30 Year Average (1981-2010)
APR-SEP	62769	66787	72	72285	92704
APR-JUL	52001	55218	69	60849	79855
APR-AUG	58357	61850	71	66650	87532
JAN-SEP	93035	97059	85	102577	114216
JAN-JUL	82493	85710	85	91341	101368
OCT-SEP	111537	115562	89	121080	130518

5 days QPF: Ensemble: 2015-05-06 Issued: 2015-05-06

APR-SEP	63378	67891	73	73209	92704
APR-JUL	52384	55745	70	61331	79855
APR-AUG	59247	62544	71	67834	87532
JAN-SEP	93644	98155	86	103492	114216
JAN-JUL	82876	86237	85	91823	101368
OCT-SEP	112147	116658	89	121994	130518

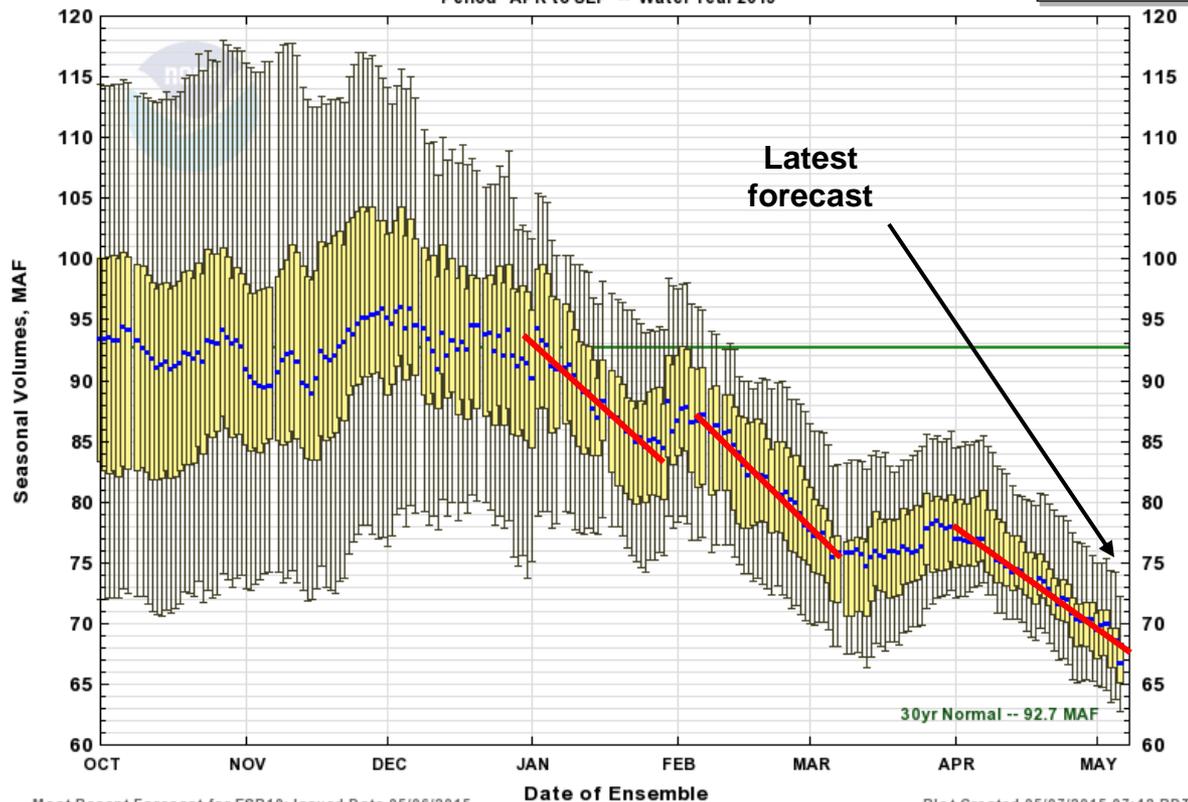
0 days QPF: Ensemble: 2015-05-06 Issued: 2015-05-06

APR-SEP	63946	69184	75	75693	92704
APR-JUL	53243	56846	71	62580	79855
APR-AUG	59571	63670	73	69344	87532
JAN-SEP	94210	99462	87	105977	114216
JAN-JUL	83735	87338	86	93072	101368
OCT-SEP	112713	117964	90	124479	130518

Move the mouse over the desired "Forecast Period" to display a graph.

Water Supply Forecasts

COLUMBIA - THE DALLES DAM
Period APR to SEP -- Water Year 2015



Most Recent Forecast for ESP10: Issued Date 05/06/2015

Plot Created 05/07/2015 07:42 PDT

Max Scale Scale To Data Scale To Last 45 Days

Overlay

Data Files

ESP10 ESP5 ESP0

CSV (ESP10 / APR-SEP)

Forecast Ensemble

90% -> 9 in 10 chance of volume being exceeded (quite likely)
 50% -> 5 in 10 chance of volume being exceeded (most likely)
 10% -> 1 in 10 chance of volume being exceeded (a possibility)



New Water Supply Products

www.nwrfc.noaa.gov/ws/



Close Data/Normals Rankings Adjustments Verification Verify All Years Help Archive

Beta Monthly Water Supply Forecasts

COLUMBIA - GRAND COULEE DAM (GCDW1) Forecasts for Water Year 2015

Official Forecast

10 days QPF: Ensemble: 2015-05-06 Issued: 2015-05-06

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	44560	48026	80	52533	60110
APR-JUL	36890	39378	77	43929	51015
APR-AUG	41598	44676	79	48868	56763
JAN-SEP	60412	63885	93	68337	68694
JAN-JUL	52885	55373	93	59924	59599
OCT-SEP	71068	74541	97	78993	76824

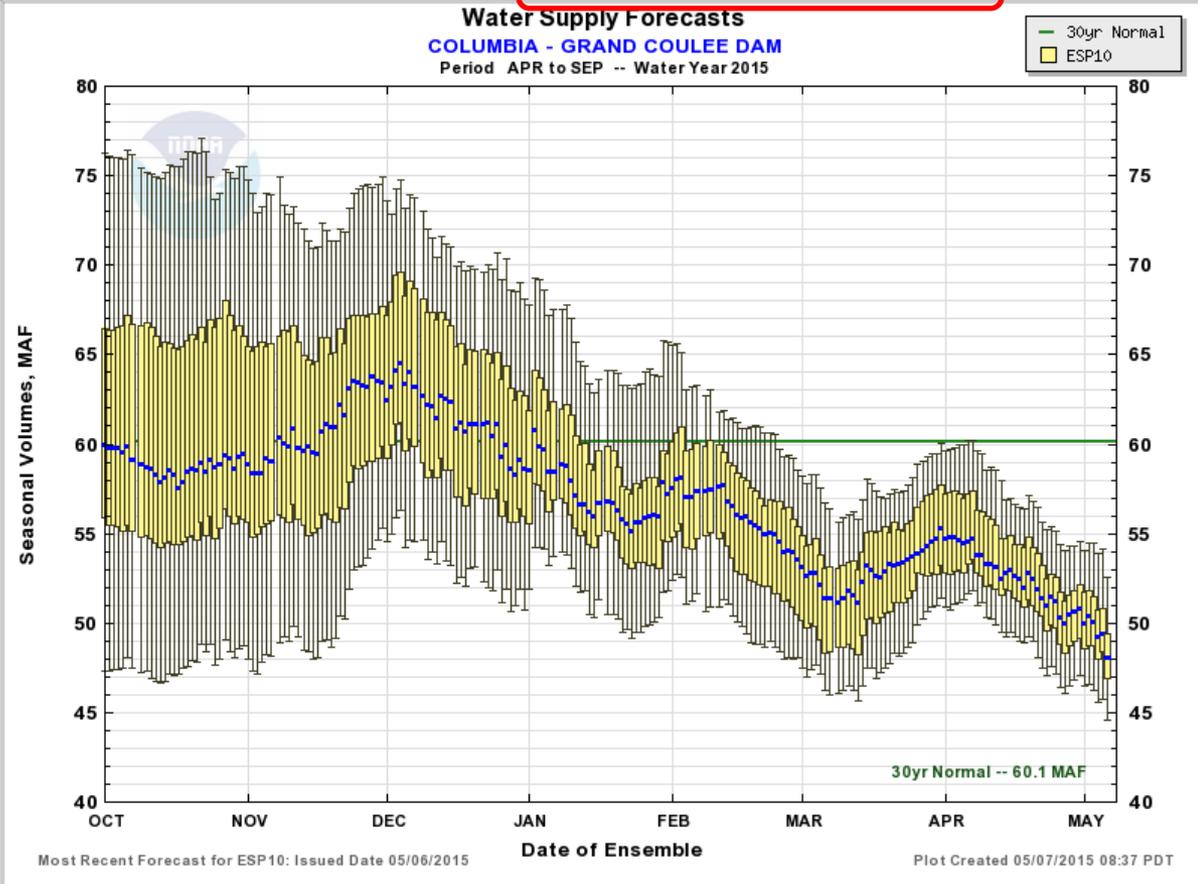
5 days QPF: Ensemble: 2015-05-06 Issued: 2015-05-06

APR-SEP	45278	48896	81	52717	60110
APR-JUL	37263	39967	78	44471	51015
APR-AUG	42323	45533	80	49355	56763
JAN-SEP	61133	64748	94	68599	68694
JAN-JUL	53258	55962	94	60466	59599
OCT-SEP	71790	75404	98	79255	76824

0 days QPF: Ensemble: 2015-05-06 Issued: 2015-05-06

APR-SEP	45732	49552	82	53513	60110
APR-JUL	38124	40856	80	45107	51015
APR-AUG	42858	46135	81	50111	56763
JAN-SEP	61590	65411	95	69377	68694
JAN-JUL	54119	56851	95	61102	59599
OCT-SEP	72246	76067	99	80033	76824

Move the mouse over the desired "Forecast Period" to display a graph.



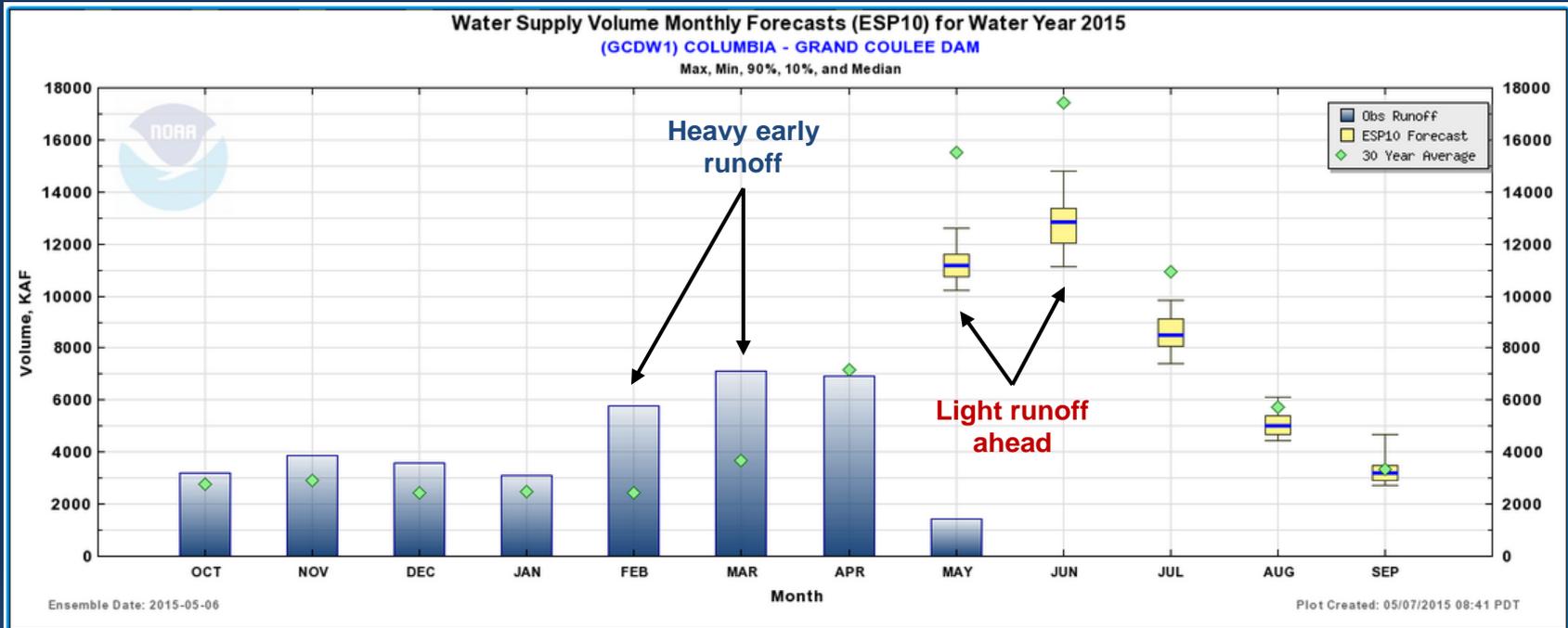
Max Scale Scale To Data Scale To Last 45 Days

- Now offering more volume periods for all water supply forecast points
- Also offering new monthly volume products



New Monthly Water Supply Products

www.nwrfc.noaa.gov/ws/



COLUMBIA - GRAND COULEE DAM Forecasts For Water Year 2015						
ESP Monthly Water Supply Forecast						
10 days QPF: Ensemble: 2015-05-06 Issued: 2015-05-06						
Forecast Period	Forecasts Are in KAF				Obs Runoff (2015-05-06)	30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %		
OCT					3191	2784
NOV					3878	2894
DEC					3578	2452
JAN					3102	2465
FEB					5770	2433
MAR					7123	3686
APR					6923	7143
MAY	10237	11160	72	12583	1409*	15506
JUN	11123	12832	74	14789		17434
JUL	7420	8521	78	9854		10934
AUG	4448	5016	87	6091		5747
SEP	2738	3191	95	4669		3348

Move the mouse over the desired "Forecast Table" to update graph.
* Partial Monthly Total

[CSV Download](#) [ESP10](#) [Forecast Ensemble](#)

COLUMBIA - GRAND COULEE DAM Forecasts For Water Year 2015						
ESP Monthly Water Supply Forecast						
5 days QPF: Ensemble: 2015-05-06 Issued: 2015-05-06						
Forecast Period	Forecasts Are in KAF				Obs Runoff (2015-05-06)	30 Year Average (1981-2010)
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OCT					3191	2784
NOV					3878	2894
DEC					3578	2452
JAN					3102	2465
FEB					5770	2433
MAR					7123	3686
APR					6923	7143
MAY	9663	11331	73	12821	1409*	15506
JUN	11271	13134	75	15180		17434
JUL	7572	8776	80	10020		10934
AUG	4496	5030	88	6196		5747
SEP	2770	3230	96	4631		3348

Move the mouse over the desired "Forecast Table" to update graph.
* Partial Monthly Total

[CSV Download](#) [ESP5](#) [Forecast Ensemble](#)

COLUMBIA - GRAND COULEE DAM Forecasts For Water Year 2015						
ESP Monthly Water Supply Forecast						
0 days QPF: Ensemble: 2015-05-06 Issued: 2015-05-06						
Forecast Period	Forecasts Are in KAF				Obs Runoff (2015-05-06)	30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %		
OCT					3191	2784
NOV					3878	2894
DEC					3578	2452
JAN					3102	2465
FEB					5770	2433
MAR					7123	3686
APR					6923	7143
MAY	10057	11808	76	14042	1409*	15506
JUN	11357	13345	77	15171		17434
JUL	7636	8784	80	9914		10934
AUG	4425	5014	87	6179		5747
SEP	2764	3248	97	4628		3348

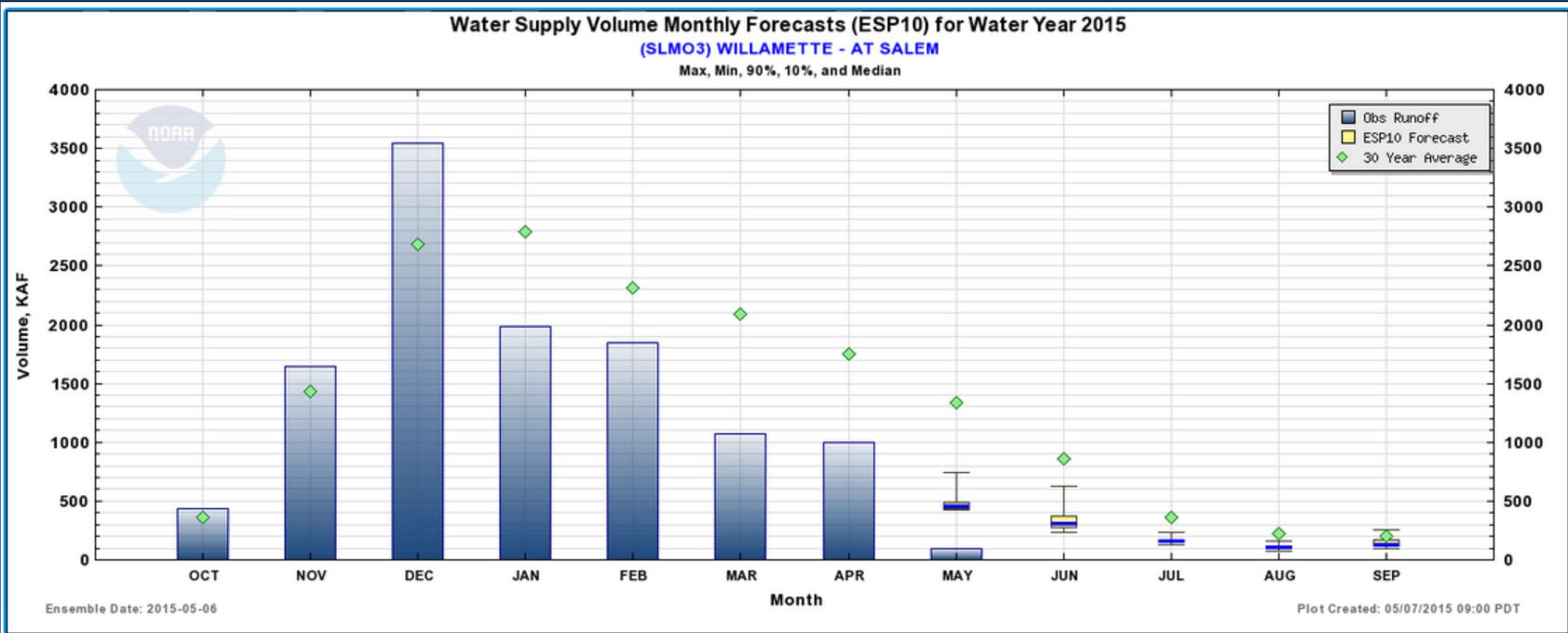
Move the mouse over the desired "Forecast Table" to update graph.
* Partial Monthly Total

[CSV Download](#) [ESP0](#) [Forecast Ensemble](#)



New Monthly Water Supply Products

www.nwrfc.noaa.gov/ws/



WILLAMETTE - AT SALEM
Forecasts For Water Year 2015
ESP Monthly Water Supply Forecast
 10 days QPF: Ensemble: **2015-05-06** Issued: 2015-05-06

Forecast Period	Forecasts Are in KAF				Obs Runoff (2015-05-06)	30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %		
OCT					438	363
NOV					1643	1432
DEC					3542	2680
JAN					1983	2787
FEB					1841	2317
MAR					1070	2086
APR					1001	1750
MAY	429	453	34	742	99*	1337
JUN	237	310	36	628		861
JUL	125	156	44	237		358
AUG	74	104	47	156		219
SEP	93	130	64	254		203

Move the mouse over the desired "Forecast Table" to update graph.
 * Partial Monthly Total

CSV Download **ESP10** Forecast Ensemble

WILLAMETTE - AT SALEM
Forecasts For Water Year 2015
ESP Monthly Water Supply Forecast
 5 days QPF: Ensemble: **2015-05-06** Issued: 2015-05-06

Forecast Period	Forecasts Are in KAF				Obs Runoff (2015-05-06)	30 Year Average (1981-2010)
	90 %	50 %	Average	10 %		
OCT					438	363
NOV					1643	1432
DEC					3542	2680
JAN					1983	2787
FEB					1841	2317
MAR					1070	2086
APR					1001	1750
MAY	425	465	35	753	99*	1337
JUN	236	336	39	639		861
JUL	125	161	45	241		358
AUG	75	104	48	156		219
SEP	93	132	65	257		203

Move the mouse over the desired "Forecast Table" to update graph.
 * Partial Monthly Total

CSV Download **ESP5** Forecast Ensemble

WILLAMETTE - AT SALEM
Forecasts For Water Year 2015
ESP Monthly Water Supply Forecast
 0 days QPF: Ensemble: **2015-05-06** Issued: 2015-05-06

Forecast Period	Forecasts Are in KAF				Obs Runoff (2015-05-06)	30 Year Average (1981-2010)
	90 %	50 %	Average	10 %		
OCT					438	363
NOV					1643	1432
DEC					3542	2680
JAN					1983	2787
FEB					1841	2317
MAR					1070	2086
APR					1001	1750
MAY	435	555	42	778	99*	1337
JUN	240	348	40	679		861
JUL	133	164	46	244		358
AUG	77	107	49	163		219
SEP	97	140	69	260		203

Move the mouse over the desired "Forecast Table" to update graph.
 * Partial Monthly Total

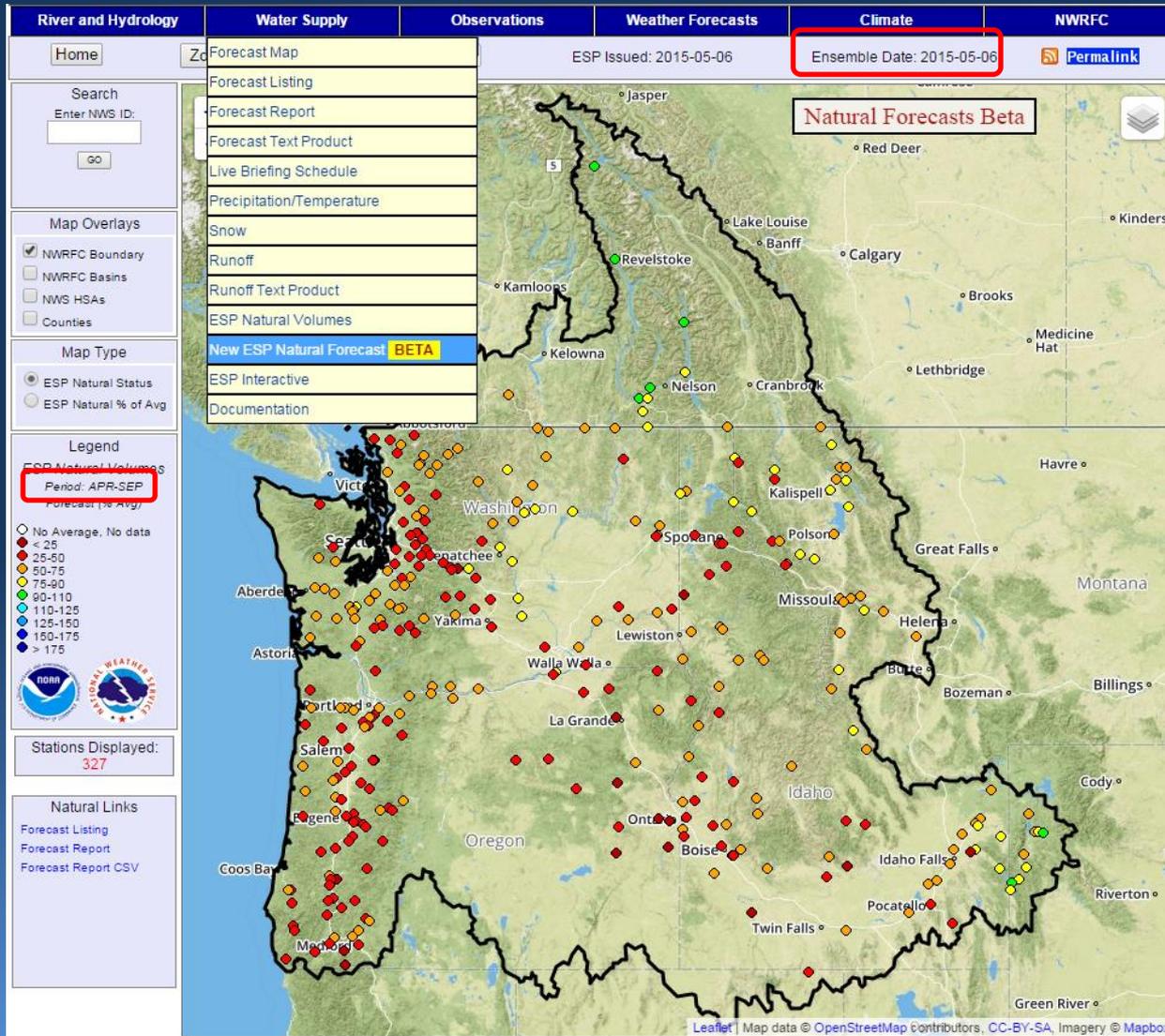
CSV Download **ESP0** Forecast Ensemble



New Natural Volume Forecasts



www.nwrfc.noaa.gov/natural/



- Same look and feel as traditional water supply forecast products
 - Many more locations
- Incorporates new naturalized observed runoff
 - No volume period restrictions
 - Verification now possible
- Adjustments are comprehensive
 - All known man-made impacts accounted for

www.nwrfc.noaa.gov/natural/nat_adjust.php



May 2015 Water Supply Briefing

National Weather Service, Northwest River Forecast Center

Questions?

Presentation available after brief at:
www.nwrfc.noaa.gov/presentations/presentations.cgi

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