

# Water Supply Outlook Spring/Summer 2019

WSAC March 8 , 2019

Brent Bower NWS

# NWS Water Supply Forecasts

- Majority of locations showing projections of near normal water volumes, but varies from well below to well above
- Approximately a third of the state have projections of 80% or below of normal water volumes
- Worst of those have percentiles of 5-10% driest and rank in the top 10 driest
- Areas with the lowest water volume projections are the north east and especially the north central parts of the state
- Outlook is looking less favorable for water supply
  - Warmer than normal likely spring and summer
  - Precipitation greater chances of below normal later spring and summer



# Northwest River Forecast Center

## Water Supply Forecasts



River and Hydrology

Water Supply

Observations

Weather Forecasts

Climate

NWRFC

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[Zoom Out](#)

--- Quick Zooms ---

ESP Issued: 2019-03-07

Ensemble Date: 2019-03-07

[Permalink](#)

Search

Enter NWS ID:

[GO](#)

Map Overlays

- ☒ NWRFC Boundary
- ☐ NWRFC Basins
- ☐ NWS HSAs
- ☐ Counties

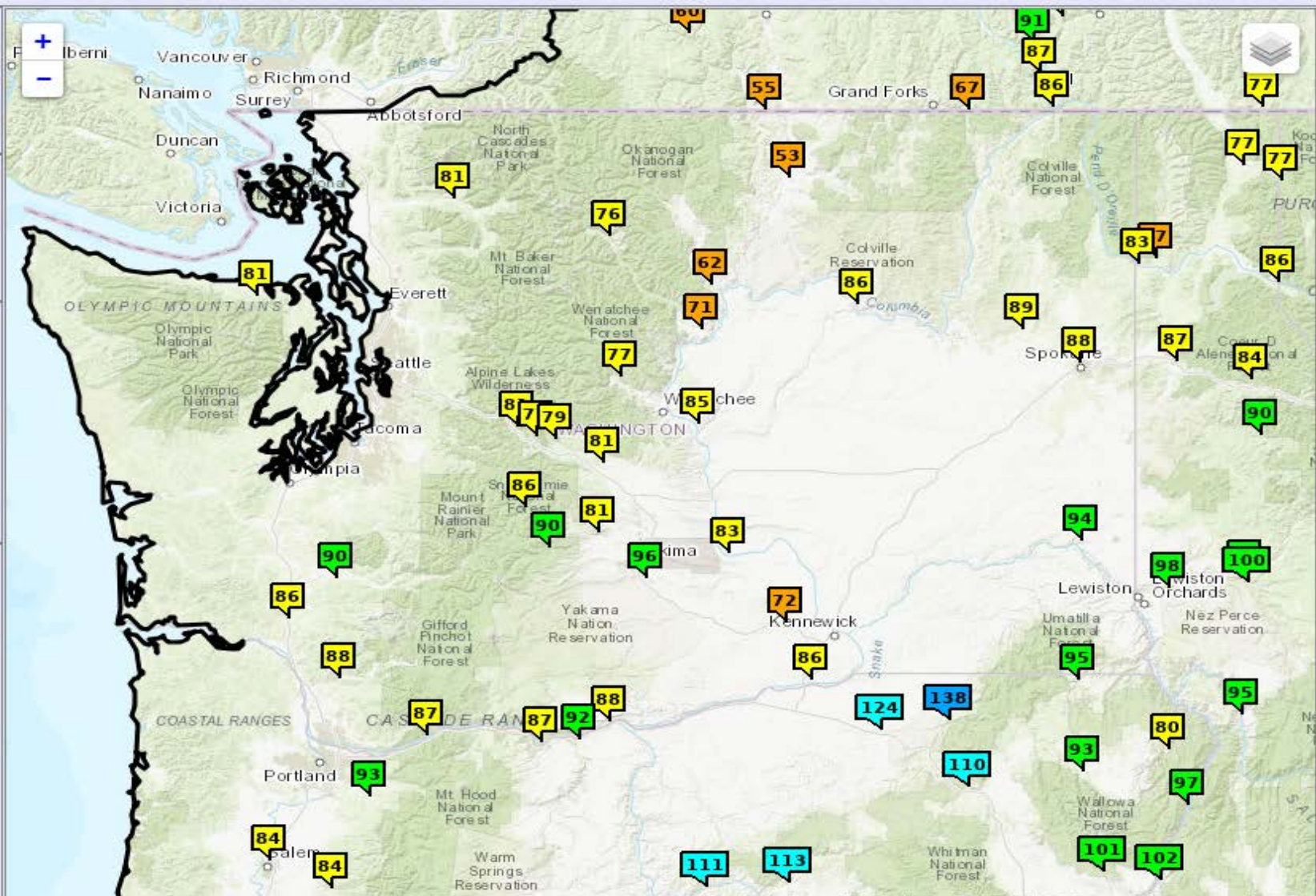
ESP WS Volumes

- ☐ Status
- ☐ Percent of Normal
- ☐ Rank (ASC)
- ☐ Rank (DESC)
- ☐ Exceedance (%)
- ☐ Percentile (%)
- ☐ Runoff Status
- ☐ Runoff % of Normal

Water Supply Forecast

Period: APR-SEP  
(% Normal)

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







# Northwest River Forecast Center ESP Natural Forecast

[River and Hydrology](#)[Water Supply](#)[Observations](#)[Weather Forecasts](#)[Climate](#)[NWRFC](#)[Home](#)[Zoom Out](#)

--- Quick Zooms ---

ESP Issued: 2019-03-07

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Map Overlays

- ☒ NWRFC Boundary
- ☐ NWRFC Basins
- ☐ NWS HSAs
- ☒ Counties

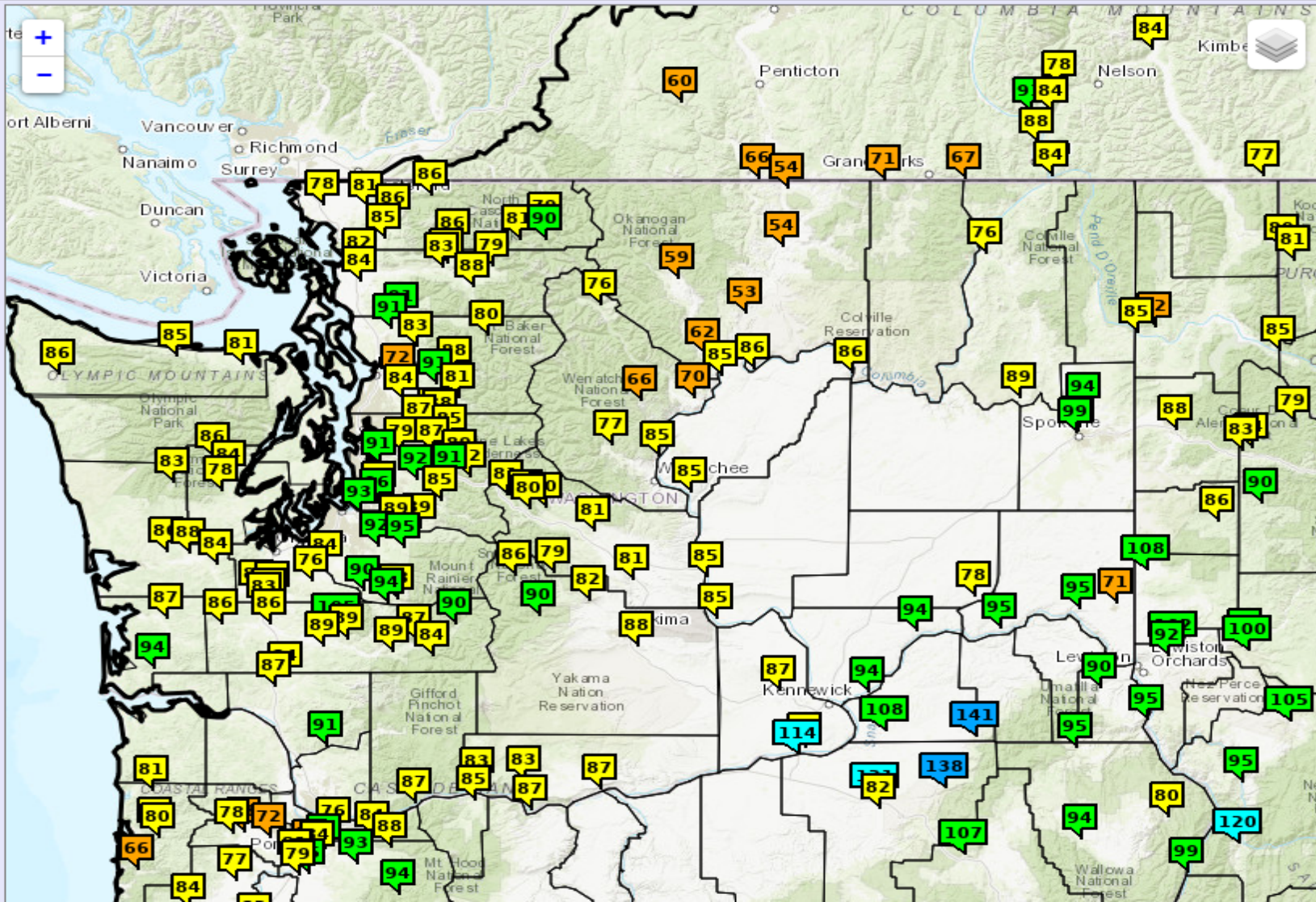
ESP Natural Forecast

- ☐ Status
- ☐ Percent of Normal
- ☐ Rank (ASC)
- ☐ Rank (DESC)
- ☐ Exceedance (%)
- ☐ Percentile (%)
- ☐ Runoff Status
- ☐ Runoff % of Normal

ESP Natural Forecast

Period: APR-SEP  
Forecast (% Normal)

- No Normal, No Data
- < 25
- 25-50
- 50-75
- 75-90
- 90-110
- 110-125
- 125-150
- 150-175
- > 175







# Northwest River Forecast Center

## ESP Natural Forecast

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ESP Issued: 2019-03-07

Ensemble Date: 2019-03-07

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Enter NWS ID:

GO

Map Overlays

- ☒ NWRFC Boundary
- ☐ NWRFC Basins
- ☐ NWS HSAs
- ☐ Counties

ESP Natural Forecast

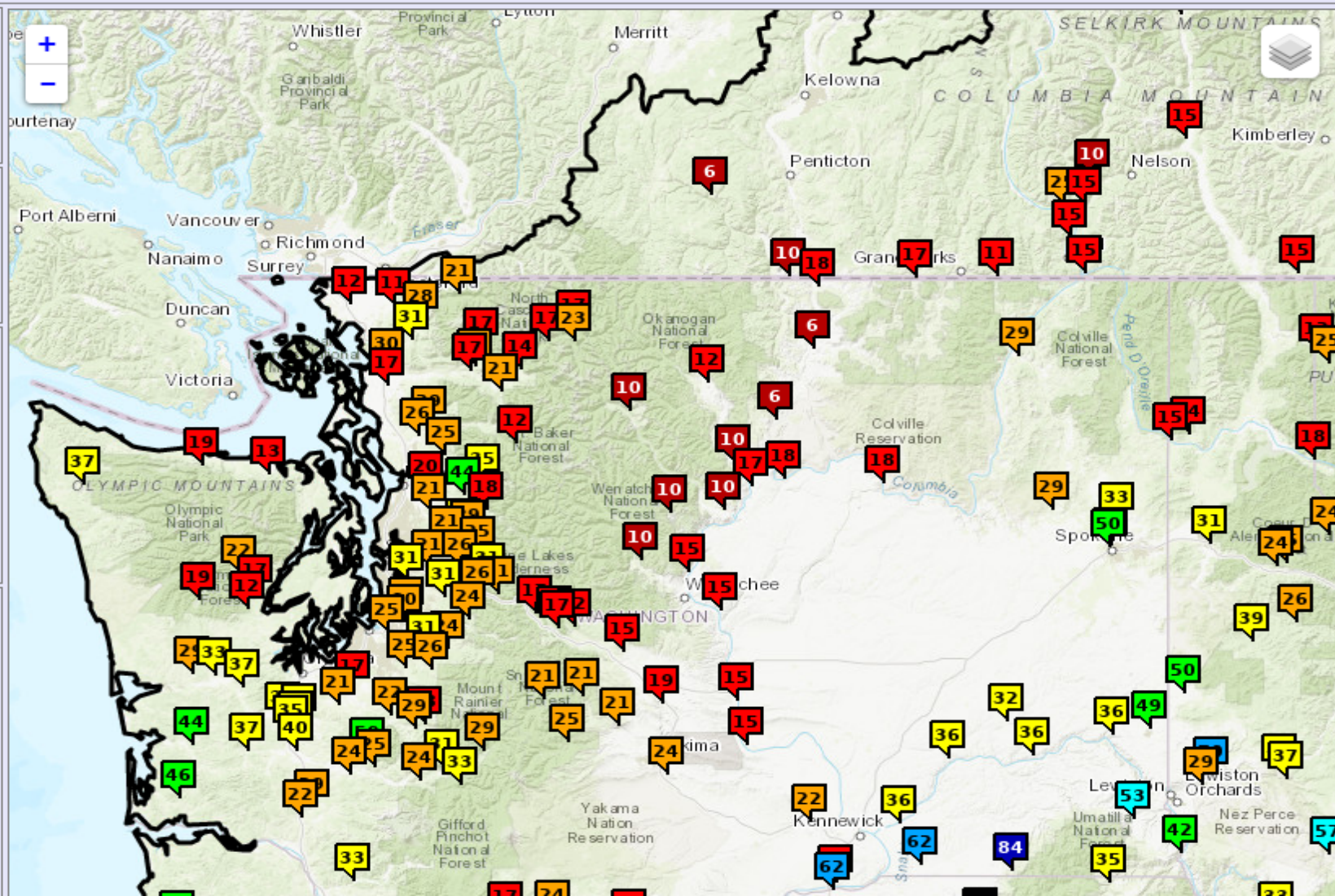
- ☐ Status
- ☐ Percent of Normal
- ☐ Rank (ASC)
- ☐ Rank (DESC)
- ☐ Exceedance (%)
- ☐ Percentile (%)
- ☐ Runoff Status
- ☐ Runoff % of Normal

ESP Natural Forecast

Period: APR-SEP

Percentile Probability(%)

- ☐ No Data
- ☐ 0-10
- ☐ 10-20
- ☐ 20-30
- ☐ 30-40
- ☐ 40-50
- ☐ 50-60
- ☐ 60-70
- ☐ 70-80
- ☐ 80-90
- ☐ 90-100







# Northwest River Forecast Center

## ESP Natural Forecast

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ESP Issued: 2019-03-07

Ensemble Date: 2019-03-07

[Permalink](#)

Search

Enter NWS ID:

[GO](#)

### Map Overlays

- ☒ NWRFC Boundary
- ☐ NWRFC Basins
- ☐ NWS HSAs
- ☐ Counties

### ESP Natural Forecast

- ☐ Status
- ☐ Percent of Normal
- ☐ Rank (ASC)
- ☒ Rank (DESC)
- ☐ Exceedance (%)
- ☐ Percentile (%)
- ☐ Runoff Status
- ☐ Runoff % of Normal

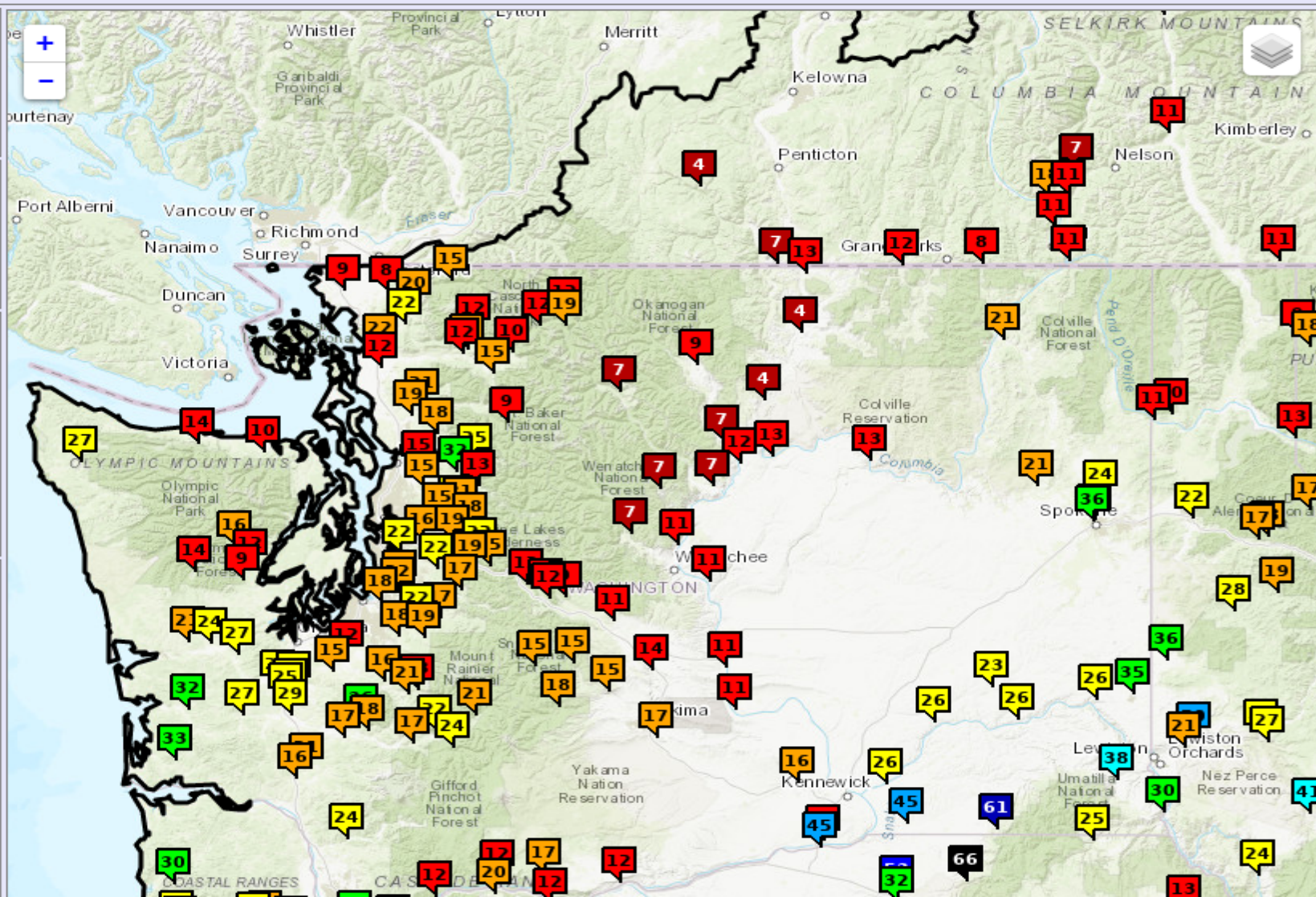
### ESP Natural Forecast

Period: APR-SEP

Rank (Descending)

Marker Color Shows  
Percentile (%)

- ☐ No Data
- ☒ 0-10
- ☐ 10-20
- ☐ 20-30
- ☐ 30-40
- ☐ 40-50
- ☐ 50-60
- ☐ 60-70
- ☐ 70-80
- ☐ 80-90
- ☐ 90-100





# Northwest River Forecast Center

## Water Supply Forecasts

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### METHOW - NEAR PATEROS (PATW1)

#### Forecasts for Water Year 2019

#### Official Forecast

10 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	423	554	62	720	895
APR-JUL	381	506	61	667	833
JAN-SEP	486	617	63	785	985
JAN-JUL	444	571	62	732	923
OCT-SEP	561	692	64	860	1075

5 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

APR-SEP	453	574	64	752	895
APR-JUL	408	525	63	689	833
JAN-SEP	518	646	66	817	985
JAN-JUL	472	599	65	754	923
OCT-SEP	593	721	67	892	1075

0 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

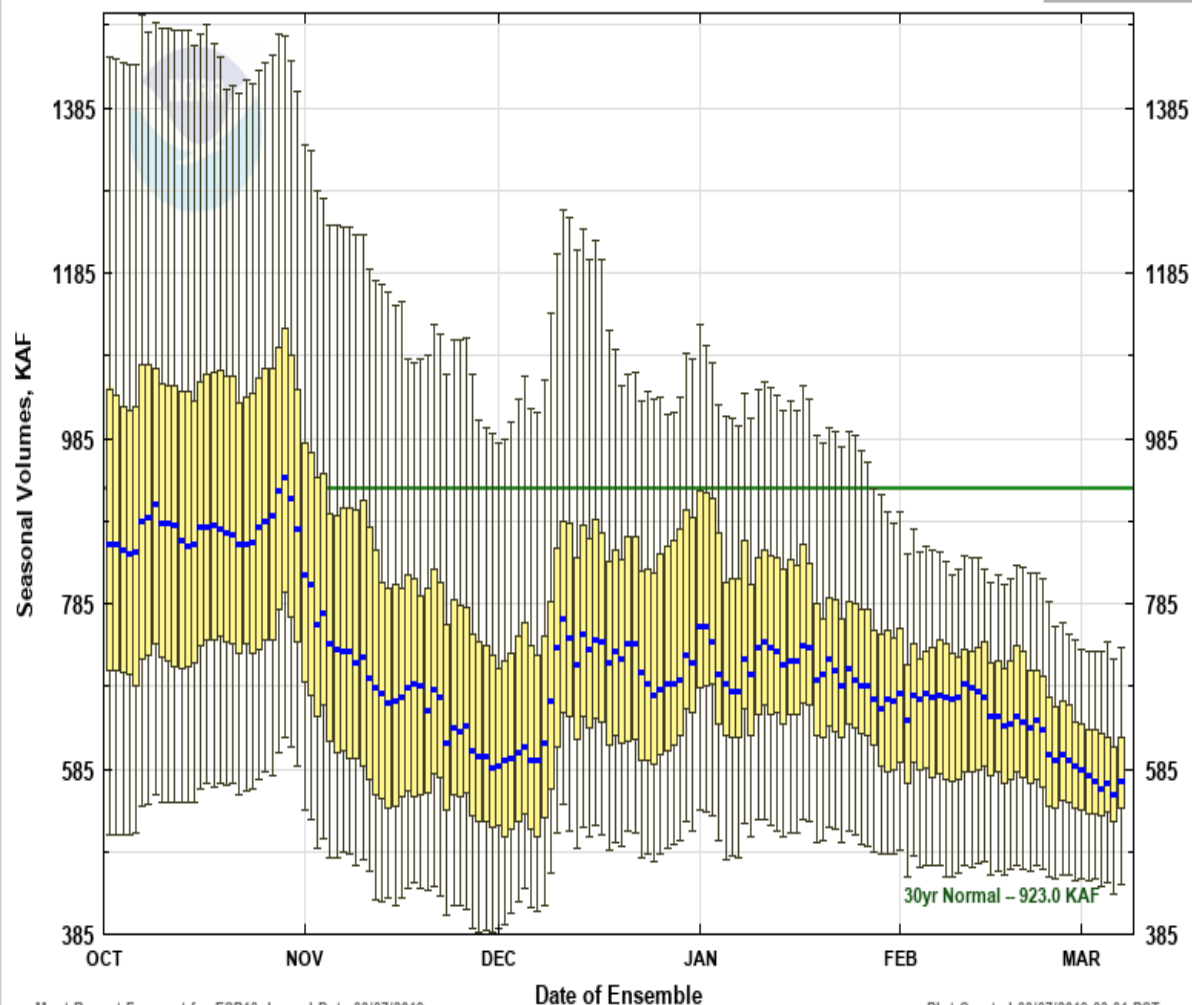
APR-SEP	456	601	67	763	895
APR-JUL	413	549	66	714	833
JAN-SEP	519	669	68	830	985
JAN-JUL	477	618	67	779	923
OCT-SEP	594	744	69	905	1075

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

### Water Supply Forecasts

#### METHOW - NEAR PATEROS

Period JAN to JUL - Water Year 2019





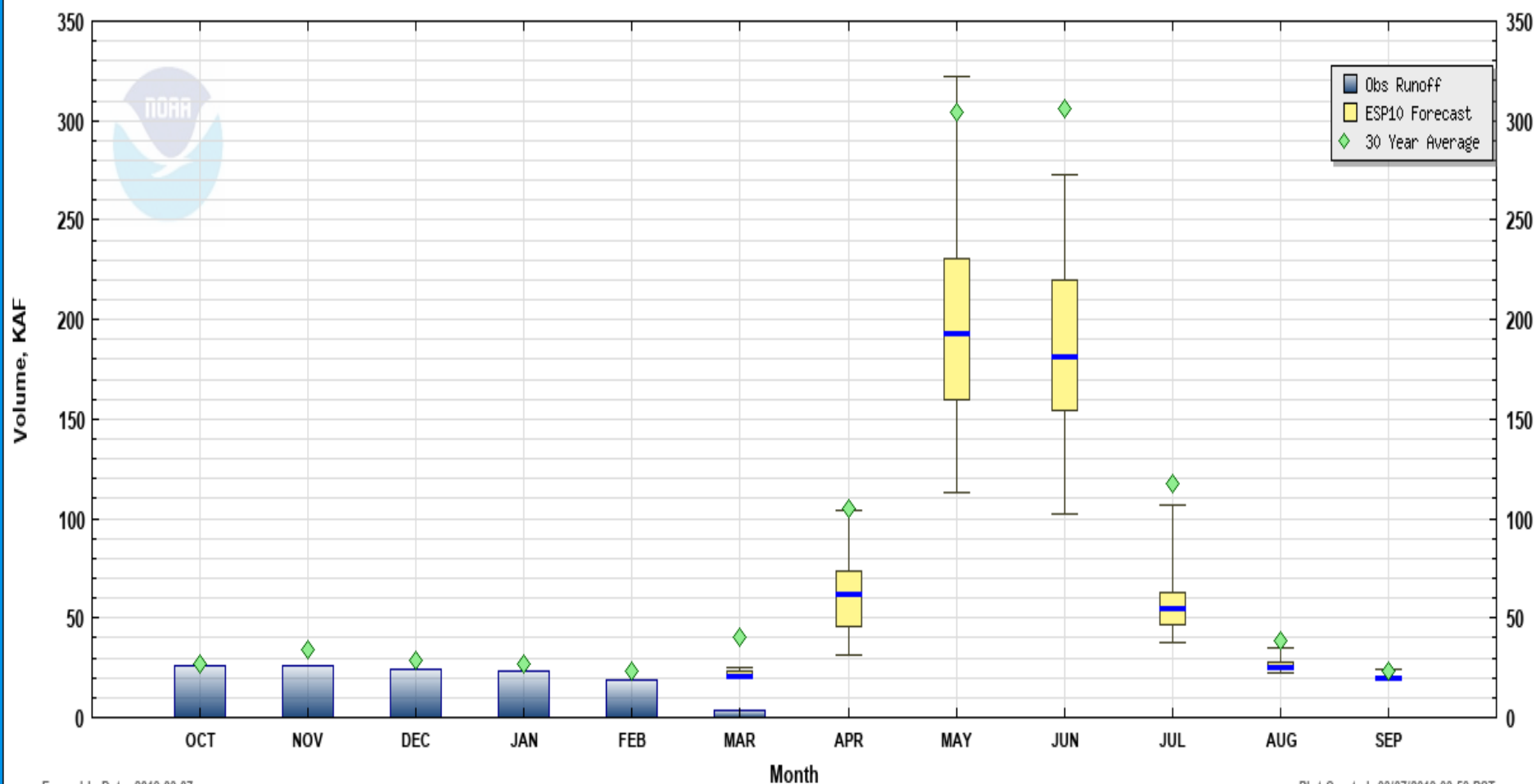
# Northwest River Forecast Center

## ESP Monthly Natural Volumes

[Home](#)[Close](#)[Previous Page](#)[Seasonal Forecasts](#)[Choose Date:](#) [Next Water Year](#)

### Natural Volume Monthly Forecasts (ESP10) for Water Year 2019

(PATW1) METHOW - NEAR PATEROS







# Northwest River Forecast Center

## ESP Natural Forecasts

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### METHOW - NEAR PATEROS (PATW1)

#### Forecasts for Water Year 2019

#### ESP Natural Forecast

10 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	423	554	62	720	895
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0 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

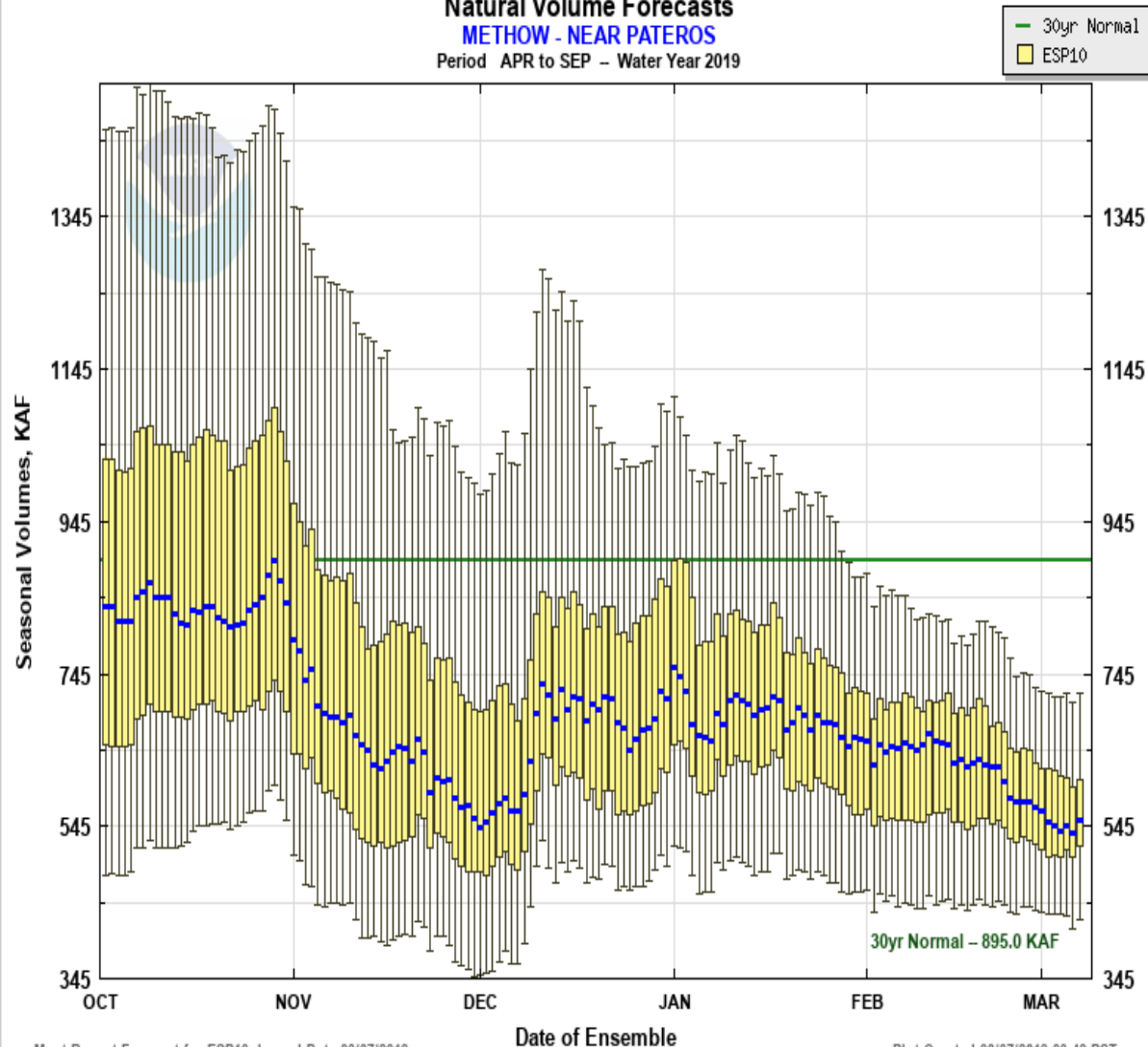
APR-SEP	456	601	67	763	895
APR-JUL	413	549	66	714	833
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JAN-JUL	477	618	67	779	923
OCT-SEP	594	744	69	905	1075

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

### Natural Volume Forecasts

#### METHOW - NEAR PATEROS

Period APR to SEP - Water Year 2019





# Northwest River Forecast Center

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### ENTIAT - NEAR ARDENVOIR (ARDW1) Forecasts for Water Year 2019

#### ESP Natural Forecast

10 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

Forecasts Are in KAF

Forecast Period	90 %	50 %	% Average	10 %	30 Year Average (1981-2010)
APR-SEP	120	145	66	173	218
APR-JUL	105	134	67	159	200
JAN-SEP	131	158	66	185	241
JAN-JUL	117	146	66	172	223
OCT-SEP	147	174	66	201	263

5 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

APR-SEP	122	150	69	181	218
APR-JUL	108	137	68	166	200
JAN-SEP	134	163	68	195	241
JAN-JUL	120	152	68	181	223
OCT-SEP	149	178	68	210	263

0 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

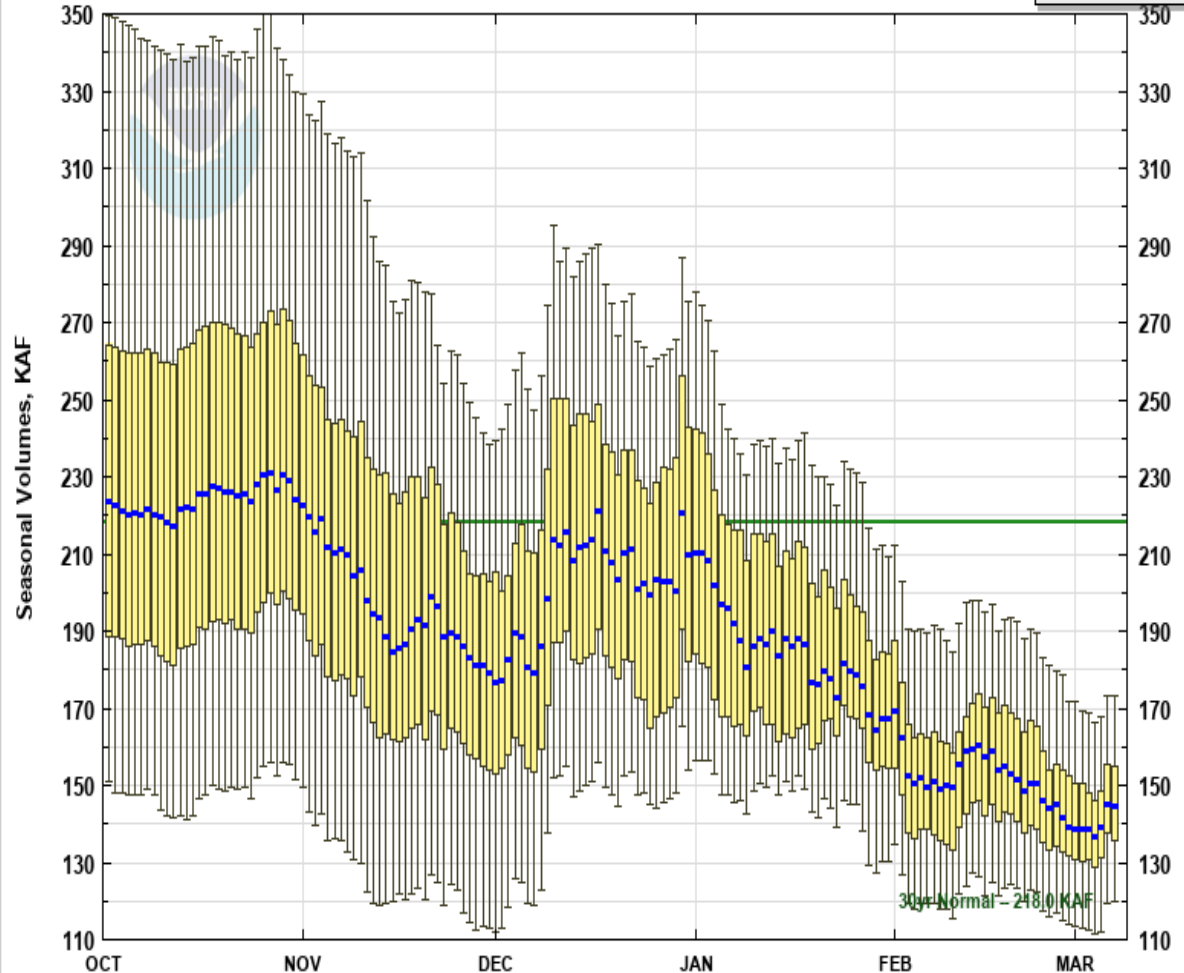
APR-SEP	124	154	71	191	218
APR-JUL	111	140	70	175	200
JAN-SEP	137	167	69	205	241
JAN-JUL	125	153	69	188	223
OCT-SEP	152	182	69	220	263

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

#### Natural Volume Forecasts

ENTIAT - NEAR ARDENVOIR

Period APR to SEP - Water Year 2019



Most Recent Forecast for ESP10: Issued Date 03/07/2019

Plot Created 03/07/2019 03:43 PST





# Northwest River Forecast Center

## ESP Natural Forecasts

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### CHELAN - LAKE CHELAN DAM (CHDW1)

Forecasts for Water Year **2019**

#### ESP Natural Forecast

10 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

Forecasts Are in KAF

Forecast Period	90 %	50 %	% Average	10 %	30 Year Average (1981-2010)
APR-SEP	645	794	70	983	1127
APR-JUL	572	723	72	869	1002
JAN-SEP	733	889	68	1077	1310
JAN-JUL	658	813	69	960	1186
OCT-SEP	878	1034	68	1223	1514

5 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

APR-SEP	658	817	73	995	1127
APR-JUL	598	737	74	890	1002
JAN-SEP	746	915	70	1090	1310
JAN-JUL	683	838	71	999	1186
OCT-SEP	892	1061	70	1236	1514

0 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

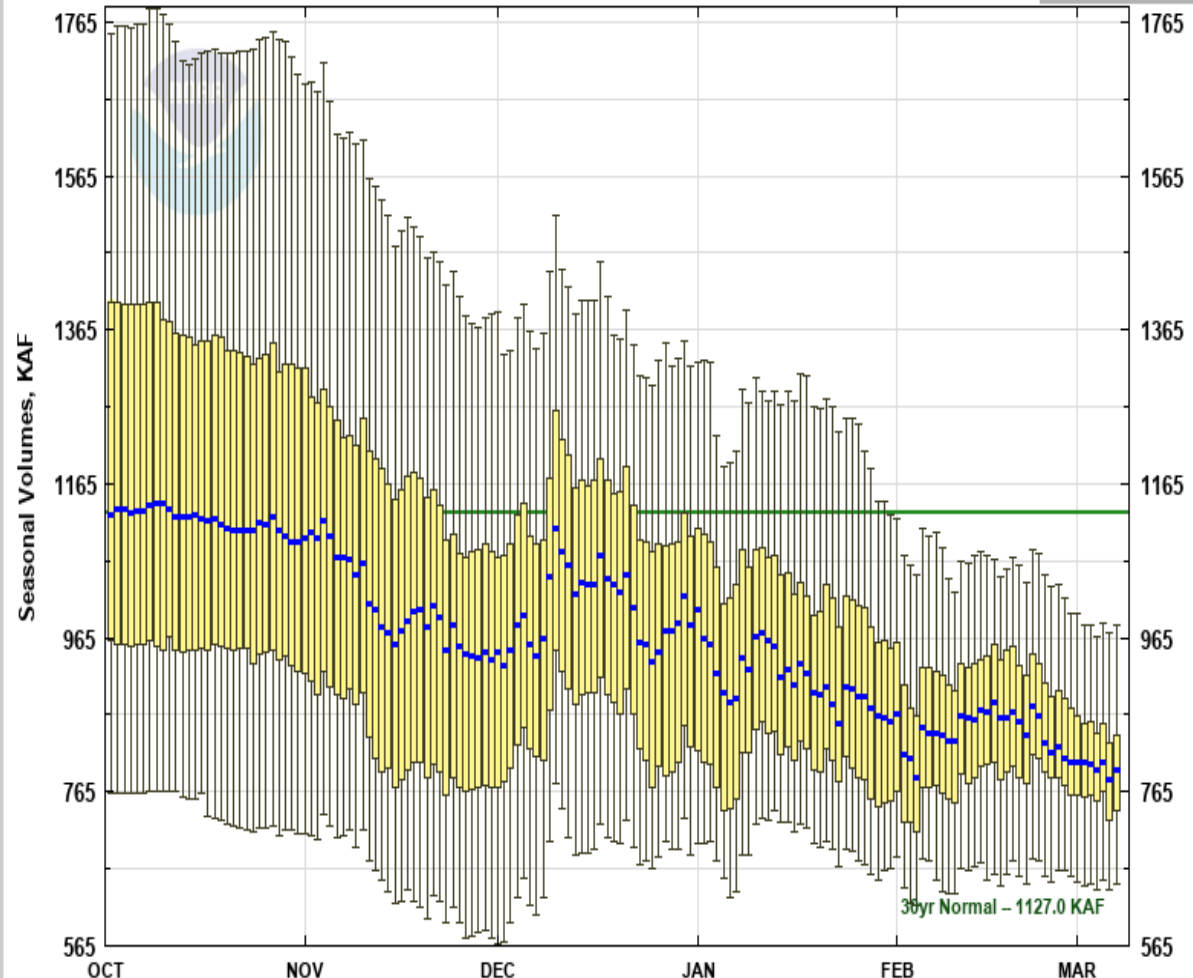
APR-SEP	660	822	73	1036	1127
APR-JUL	593	740	74	943	1002
JAN-SEP	753	932	71	1133	1310
JAN-JUL	681	856	72	1045	1186
OCT-SEP	899	1077	71	1279	1514

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

### Natural Volume Forecasts

CHELAN - LAKE CHELAN DAM

Period APR to SEP - Water Year 2019



Most Recent Forecast for ESP10: Issued Date 03/07/2019

Plot Created 03/07/2019 03:44 PST



# Northwest River Forecast Center

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### KETTLE - AT LAURIER (LAUW1) Forecasts for Water Year 2019

#### ESP Natural Forecast

10 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

##### Forecasts Are in KAF

Forecast Period	90 %	50 %	% Average	10 %	30 Year Average (1981-2010)
APR-SEP	791	1265	67	1775	1876
APR-JUL	749	1194	67	1711	1795
JAN-SEP	882	1359	67	1864	2034
JAN-JUL	842	1286	66	1801	1954
OCT-SEP	994	1470	68	1975	2152

5 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

APR-SEP	850	1329	71	1834	1876
APR-JUL	824	1243	69	1733	1795
JAN-SEP	946	1429	70	1941	2034
JAN-JUL	919	1346	69	1828	1954
OCT-SEP	1058	1540	72	2052	2152

0 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

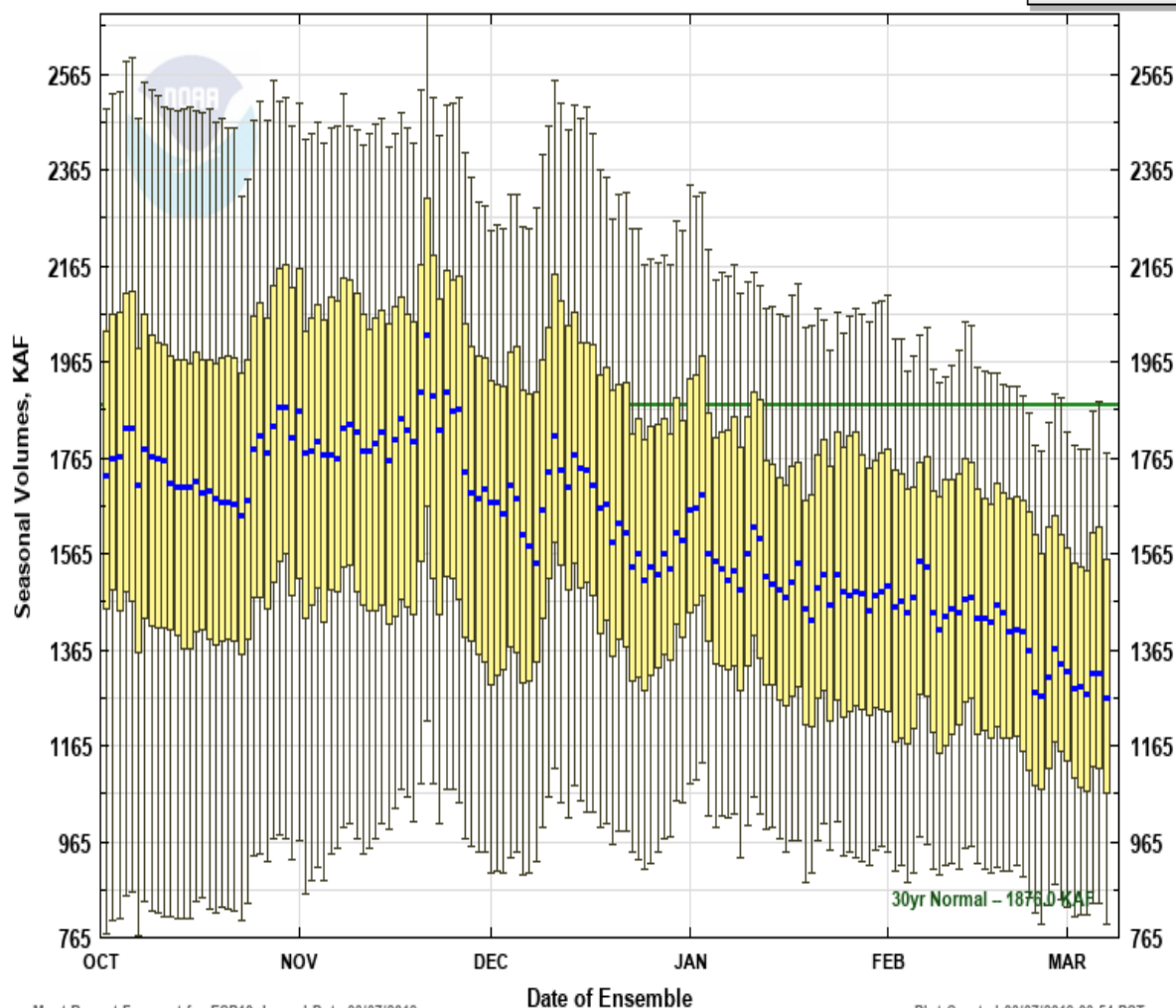
APR-SEP	849	1340	71	1860	1876
APR-JUL	813	1281	71	1730	1795
JAN-SEP	951	1445	71	1966	2034
JAN-JUL	915	1387	71	1832	1954
OCT-SEP	1062	1556	72	2077	2152

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

### Natural Volume Forecasts

#### KETTLE - AT LAURIER

Period APR to SEP - Water Year 2019







# Northwest River Forecast Center

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### SF PALOUSE - AT PULLMAN (PULW1) Forecasts for Water Year 2019

#### ESP Natural Forecast

10 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

Forecasts Are in KAF

Forecast Period	90 %	50 %	% Average	10 %	30 Year Average (1981-2010)
APR-SEP	4	6	71	13	9
APR-JUL	3	6	67	13	9
JAN-SEP	14	18	61	27	30
JAN-JUL	14	18	62	26	29
OCT-SEP	17	21	64	30	33

5 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

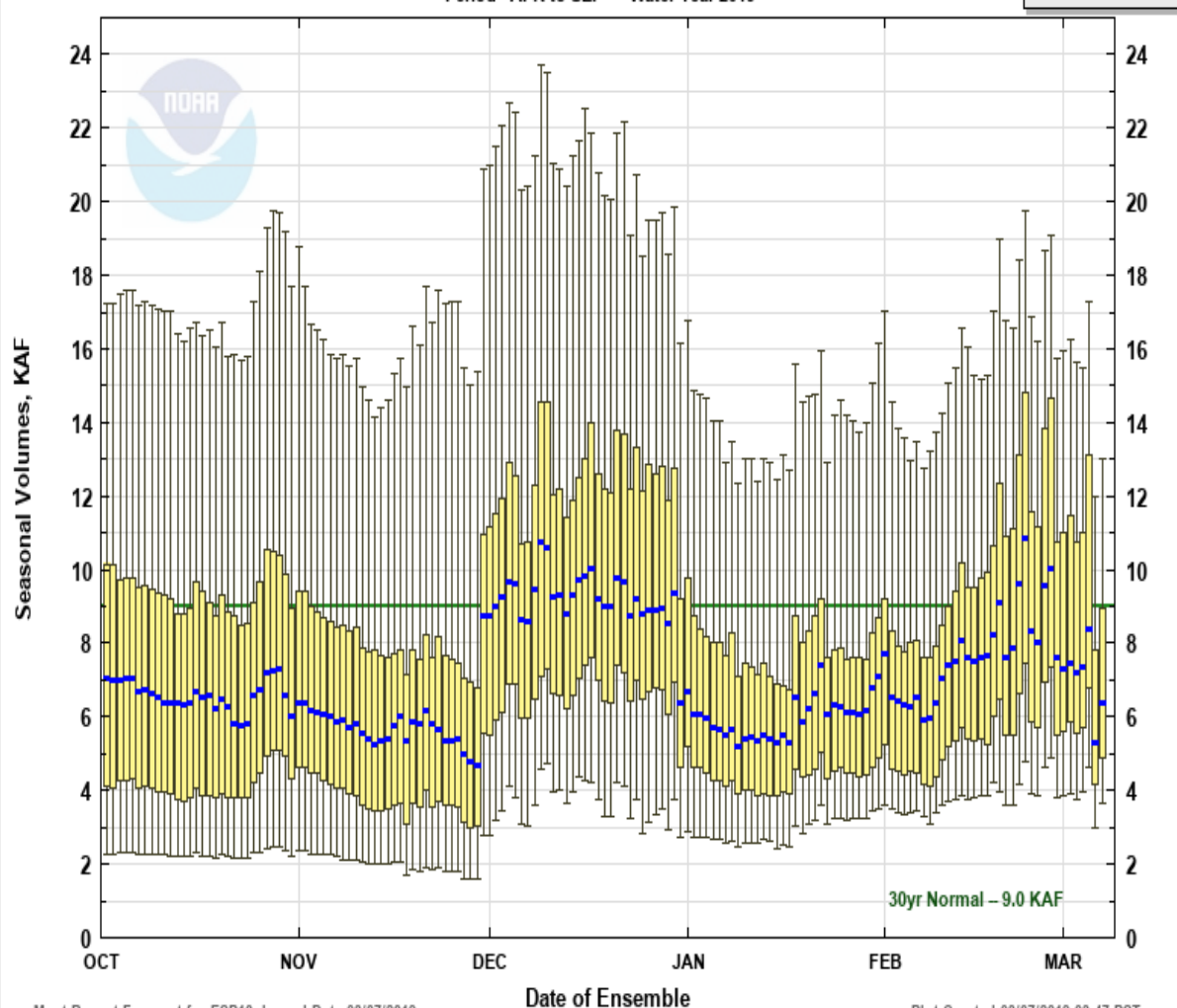
APR-SEP	3	6	62	12	9
APR-JUL	3	5	58	12	9
JAN-SEP	14	19	63	26	30
JAN-JUL	14	18	63	25	29
OCT-SEP	17	22	65	29	33

0 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

APR-SEP	3	6	64	13	9
APR-JUL	3	5	60	12	9
JAN-SEP	15	20	66	30	30
JAN-JUL	14	19	67	29	29
OCT-SEP	18	23	68	33	33

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

### Natural Volume Forecasts SF PALOUSE - AT PULLMAN Period APR to SEP - Water Year 2019





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### COLVILLE - AT KETTLE FALLS (KTFW1)

#### Forecasts for Water Year 2019

#### ESP Natural Forecast

10 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

Forecasts Are in KAF

Forecast Period	90 %	50 %	% Average	10 %	30 Year Average (1981-2010)
APR-SEP	72	100	76	160	131
APR-JUL	65	93	78	148	119
JAN-SEP	106	138	72	201	193
JAN-JUL	100	130	71	187	182
OCT-SEP	140	172	78	235	220

5 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

APR-SEP	75	106	81	171	131
APR-JUL	70	97	82	155	119
JAN-SEP	110	146	76	206	193
JAN-JUL	104	136	75	192	182
OCT-SEP	144	180	82	240	220

0 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

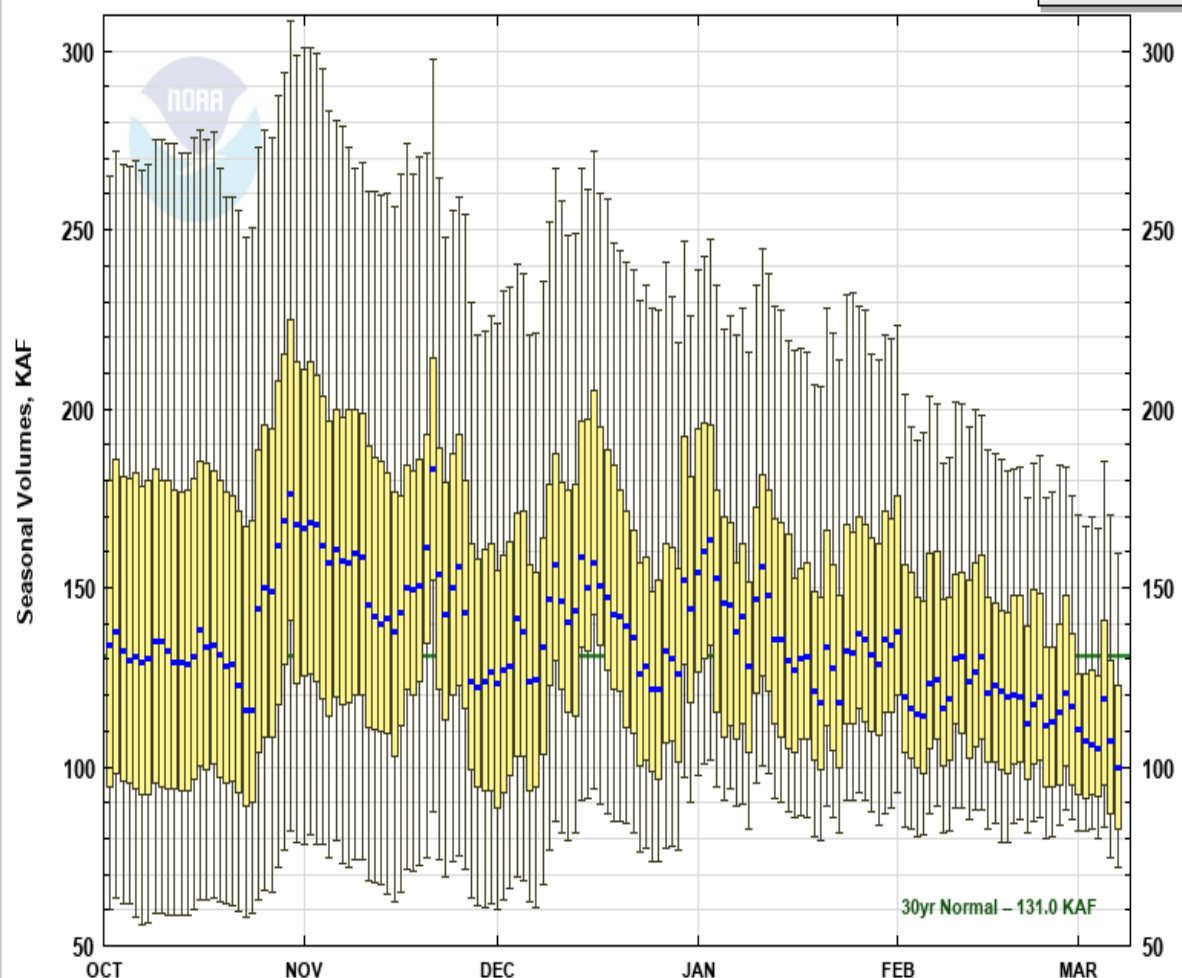
APR-SEP	75	109	83	181	131
APR-JUL	68	99	83	163	119
JAN-SEP	112	152	79	239	193
JAN-JUL	106	143	79	224	182
OCT-SEP	146	186	85	273	220

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

### Natural Volume Forecasts

#### COLVILLE - AT KETTLE FALLS

Period APR to SEP - Water Year 2019



Most Recent Forecast for ESP10: Issued Date 03/07/2019

Plot Created 03/07/2019 03:49 PST





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### DESCHUTES - NEAR RAINIER (DSRW1)

Forecasts for Water Year **2019**

#### ESP Natural Forecast

10 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	22	31	76	46	41
APR-JUL	19	27	75	42	36
JAN-SEP	64	75	60	94	124
JAN-JUL	61	71	60	88	119
OCT-SEP	103	114	63	133	181

5 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

APR-SEP	22	32	78	46	41
APR-JUL	19	28	77	42	36
JAN-SEP	67	79	64	101	124
JAN-JUL	63	74	62	96	119
OCT-SEP	105	118	65	140	181

0 days QPF: Ensemble: 2019-03-07 Issued: 2019-03-07

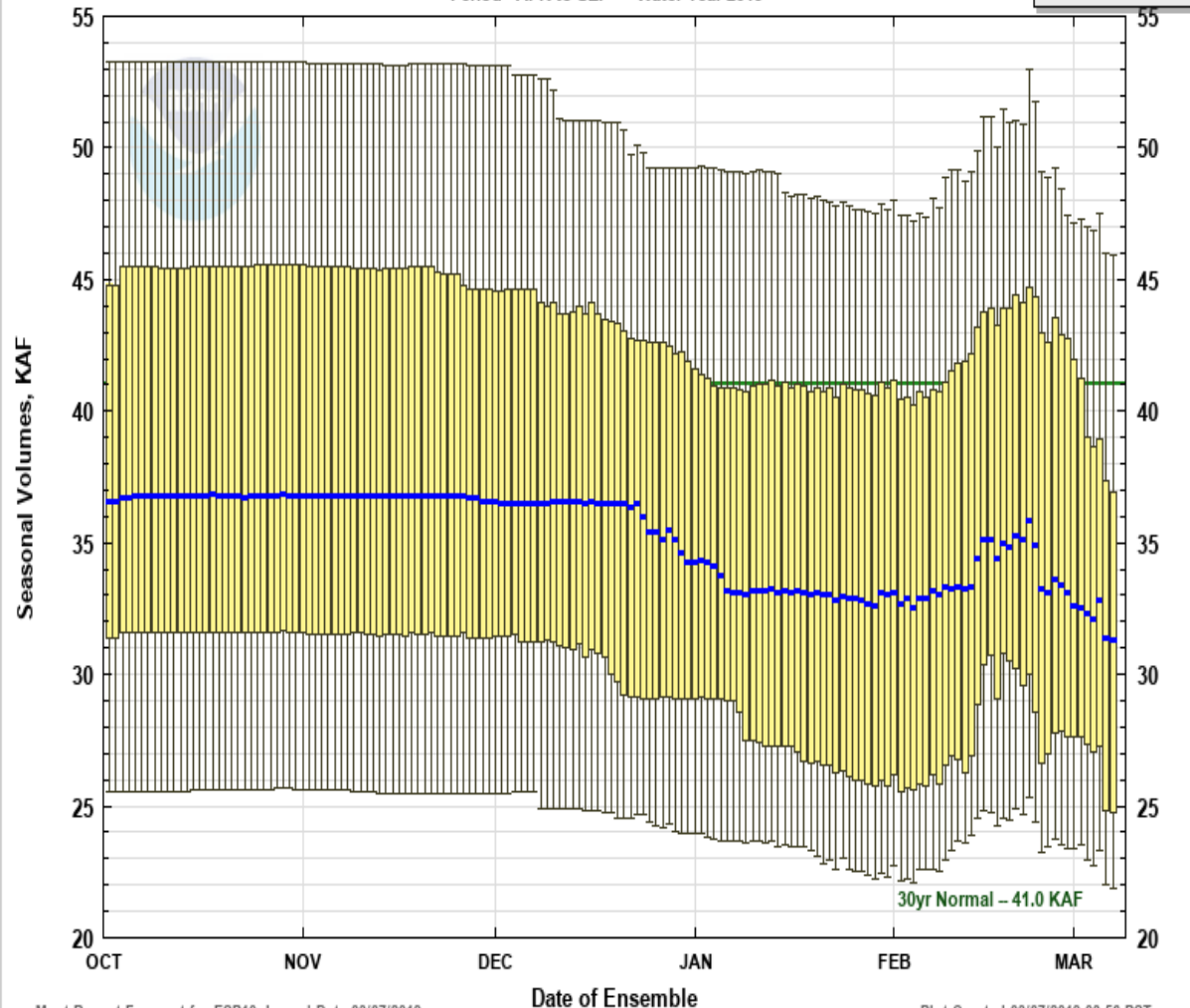
APR-SEP	22	32	79	46	41
APR-JUL	19	27	76	42	36
JAN-SEP	70	81	66	100	124
JAN-JUL	66	77	65	96	119
OCT-SEP	109	120	66	139	181

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

### Natural Volume Forecasts

DESCHUTES - NEAR RAINIER

Period APR to SEP - Water Year 2019



Most Recent Forecast for ESP10: Issued Date 03/07/2019

Plot Created 03/07/2019 03:56 PST

May



THREE-MONTH OUTLOOK  
PRECIPITATION PROBABILITY  
1.5 MONTH LEAD  
VALID AMJ 2019  
MADE 21 FEB 2019

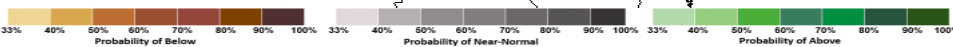


EC MEANS EQUAL  
CHANCES FOR A, N, B  
A MEANS ABOVE  
N MEANS NORMAL  
B MEANS BELOW

Jun



THREE-MONTH OUTLOOK  
PRECIPITATION PROBABILITY  
2.5 MONTH LEAD  
VALID MJJ 2019  
MADE 21 FEB 2019



EC MEANS EQUAL  
CHANCES FOR A, N, B  
A MEANS ABOVE  
N MEANS NORMAL  
B MEANS BELOW

Jul



THREE-MONTH OUTLOOK  
PRECIPITATION PROBABILITY  
3.5 MONTH LEAD  
VALID JJA 2019  
MADE 21 FEB 2019



EC MEANS EQUAL  
CHANCES FOR A, N, B  
A MEANS ABOVE  
N MEANS NORMAL  
B MEANS BELOW

Aug



THREE-MONTH OUTLOOK  
PRECIPITATION PROBABILITY  
4.5 MONTH LEAD  
VALID JAS 2019  
MADE 21 FEB 2019



EC MEANS EQUAL  
CHANCES FOR A, N, B  
A MEANS ABOVE  
N MEANS NORMAL  
B MEANS BELOW



# Water Rights Vs. Climate

- ✓ Percent of Normal is relative to 30-year average
- ✓ Changes through time
- ✓ When were water rights established?
  - ✓ 30 years ago?
  - ✓ 50, 75, or even 100 years ago?
- ✓ How does today's water volume projections, in percent of normal, compare to what was 'normal' at the time of issuing the water rights?
  - ✓ Is the 'normal' amount of water now more or less than 100 years ago?