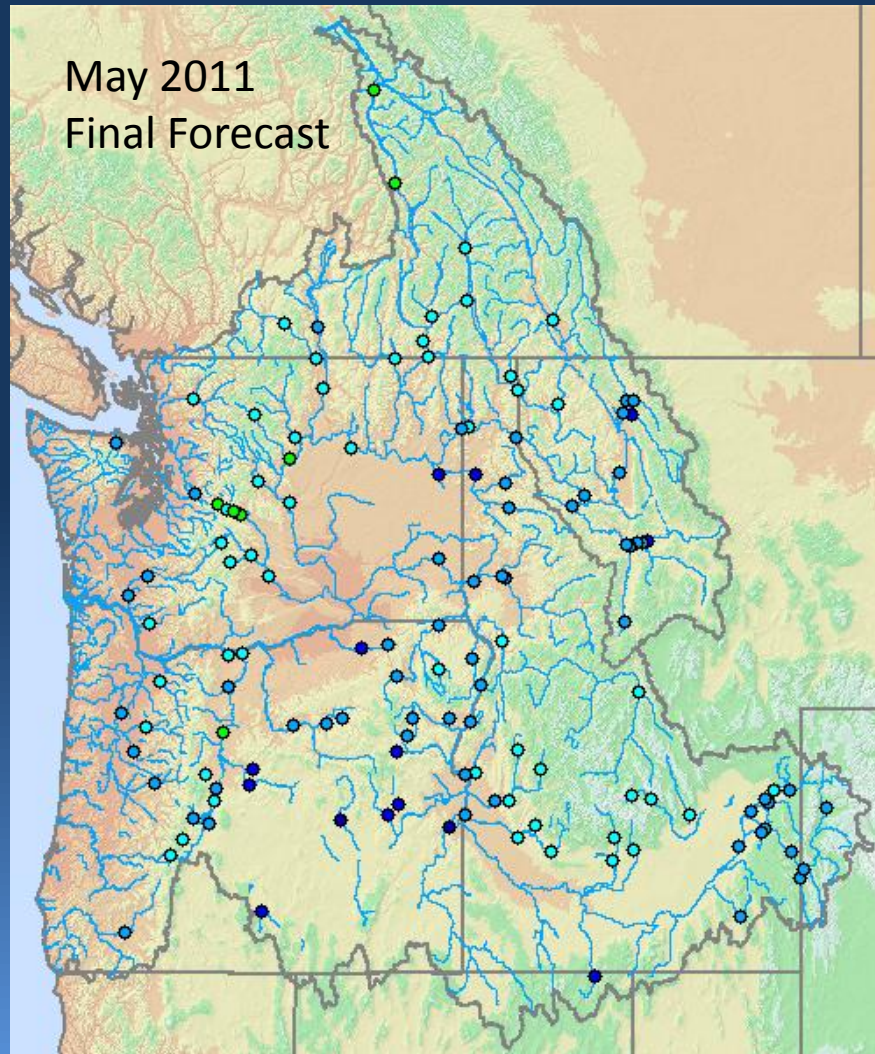




Northwest River Forecast Center Water Supply Briefing



Water Supply Forecast (% Avg)

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

May "Final" Forecast (5/6/11)
Legacy Regression Technique

Ensemble Streamflow Procedure (ESP)
(5/3/11)

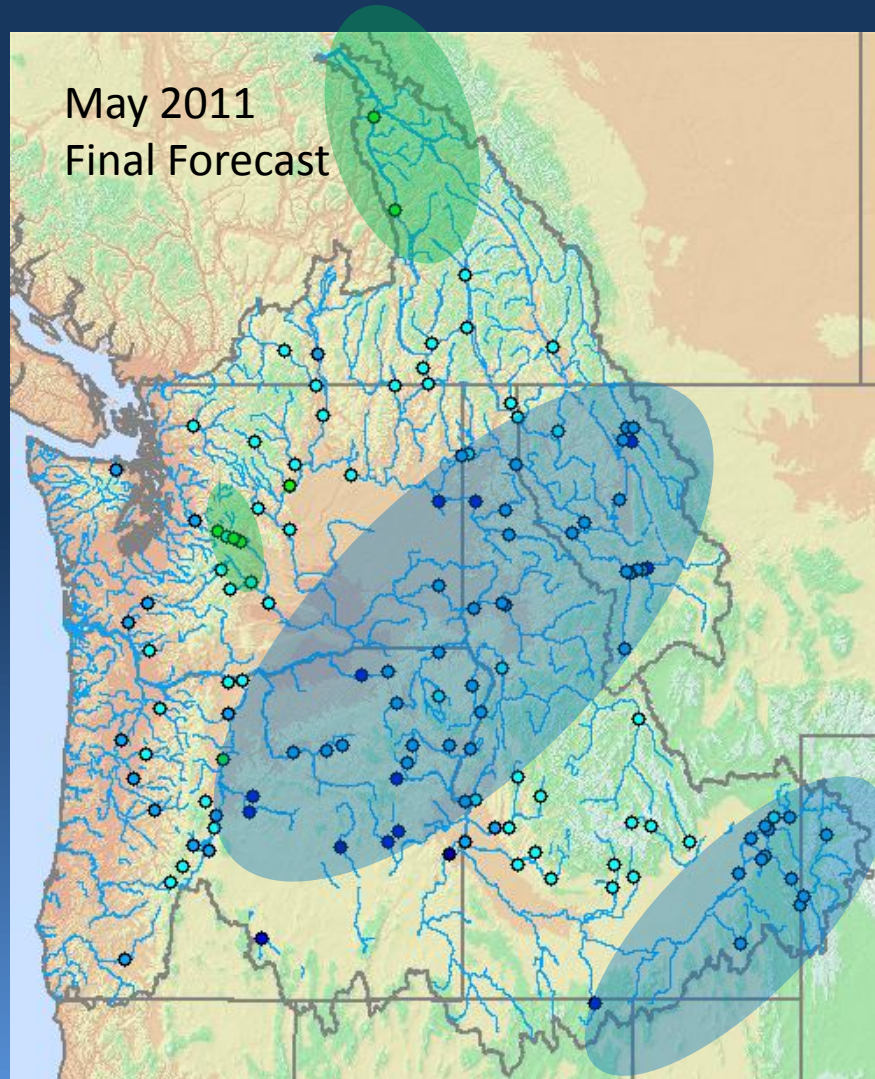
Precipitation Forecast:
100% of Normal for May

Agency Coordinated

BC Hydro input for Canadian Forecasts



Northwest River Forecast Center Water Supply Briefing



Water Supply Forecast (% Avg)

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

General Outlook:

(Well) Above Normal Forecasts

Western Montana

Idaho Panhandle

Upper Snake

Eastern OR/WA

Southern Idaho

Near Normal Forecasts

Far Upper Columbia

Yakima



Observed Conditions



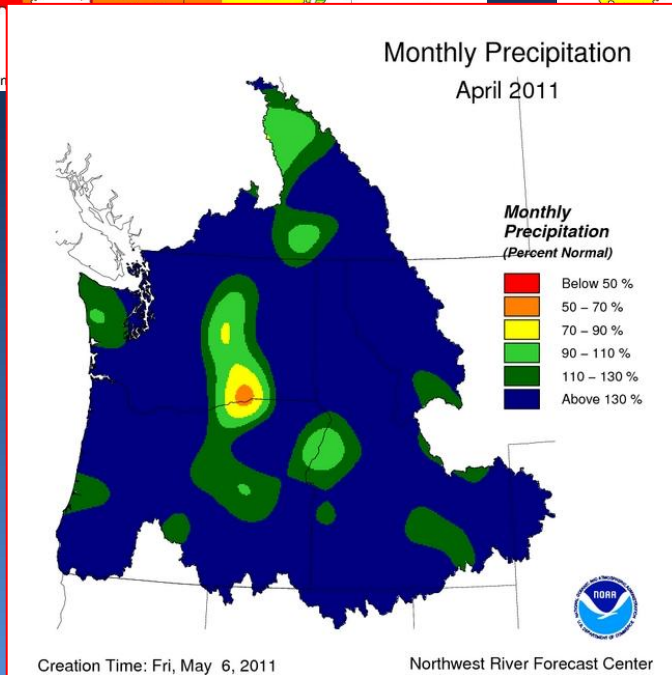
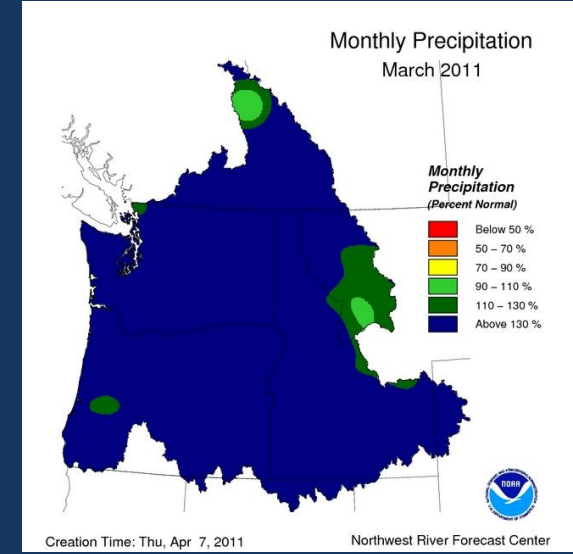
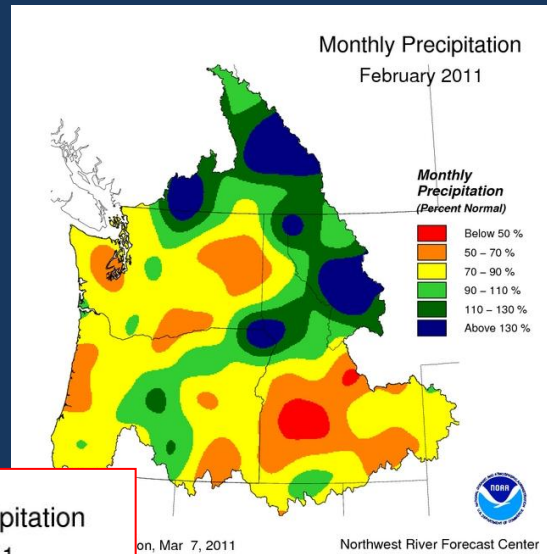
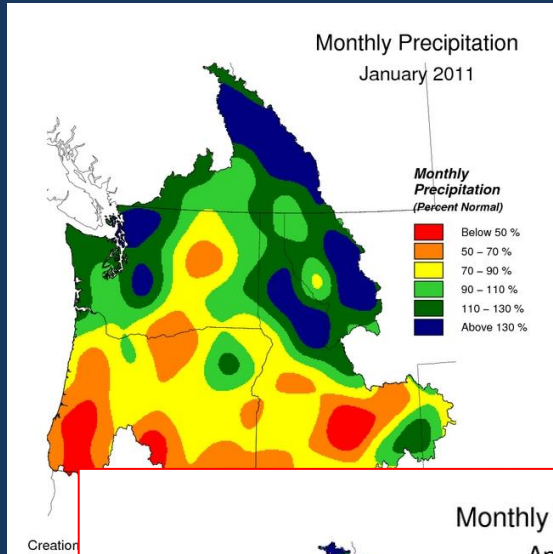
Precipitation

Snowpack

Runoff



Observed Monthly Precipitation



Observed April precipitation
above Grand Coulee = 151%
above Ice Harbor = 160%
above The Dalles = 159%

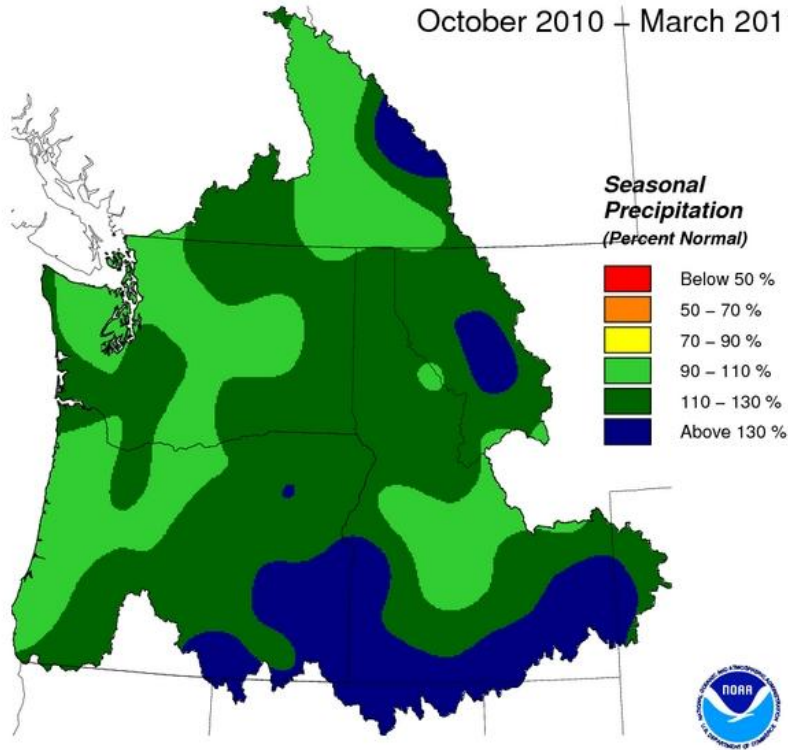
April 'Final' Forecast precipitation assumption
= 110% of Normal



Observed Seasonal Precipitation



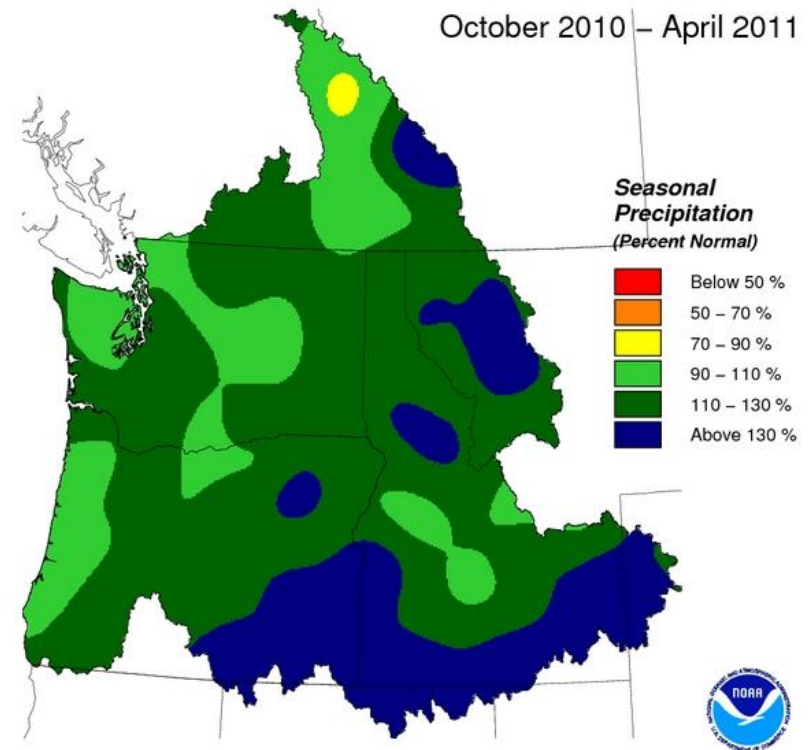
Seasonal Precipitation
October 2010 – March 2011



Creation Time: Thu, Apr 7, 2011

Northwest River Forecast Center

Seasonal Precipitation
October 2010 – April 2011



Creation Time: Fri, May 6, 2011

Northwest River Forecast Center

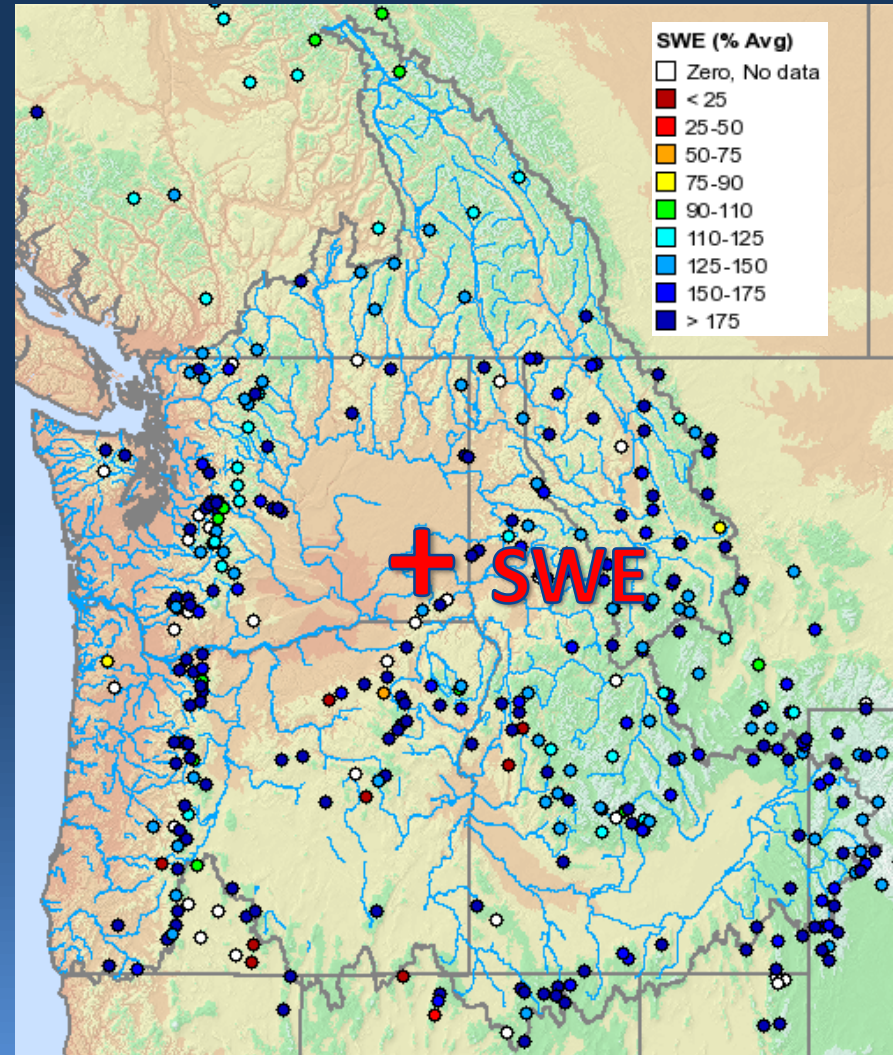
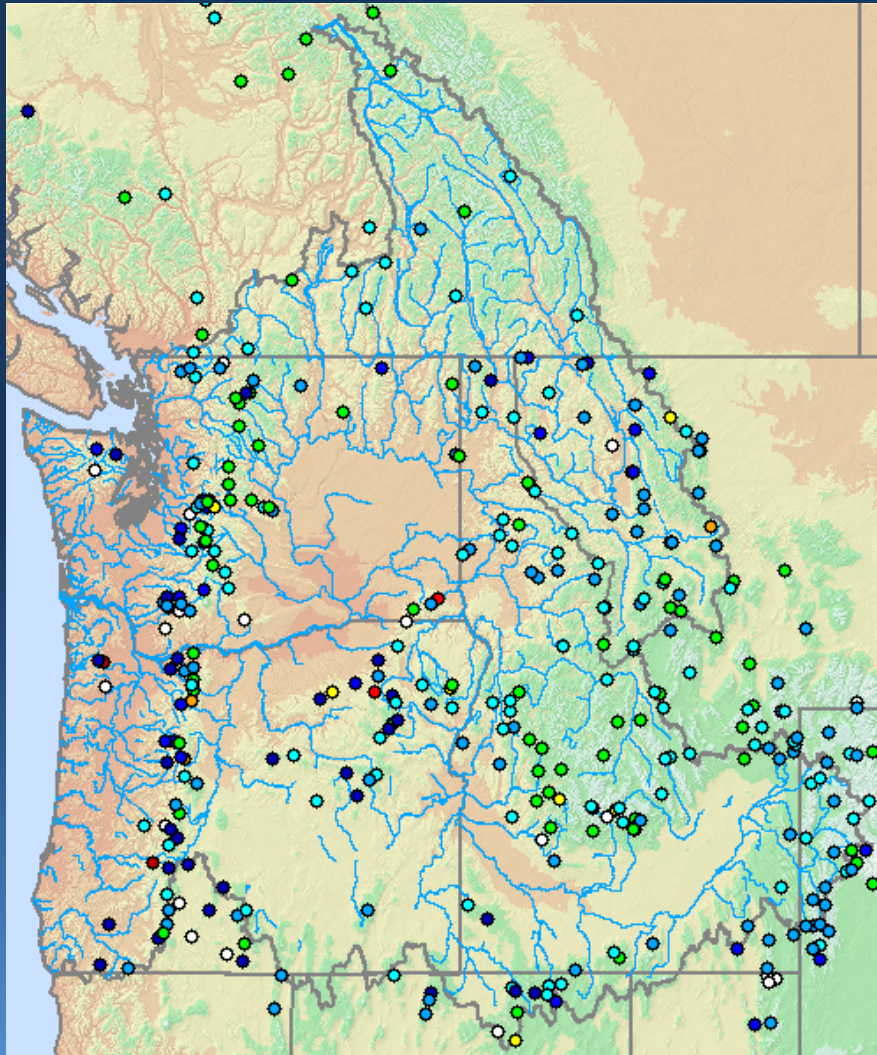


Current Snow Conditions



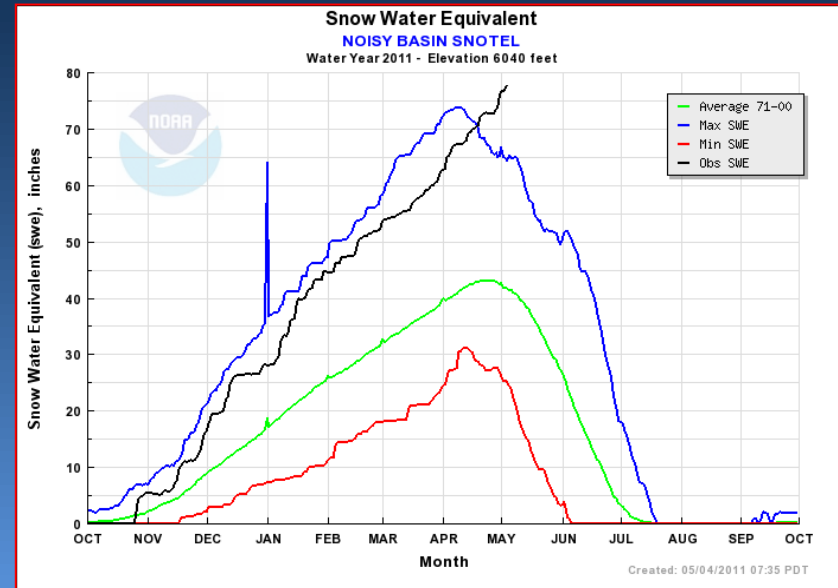
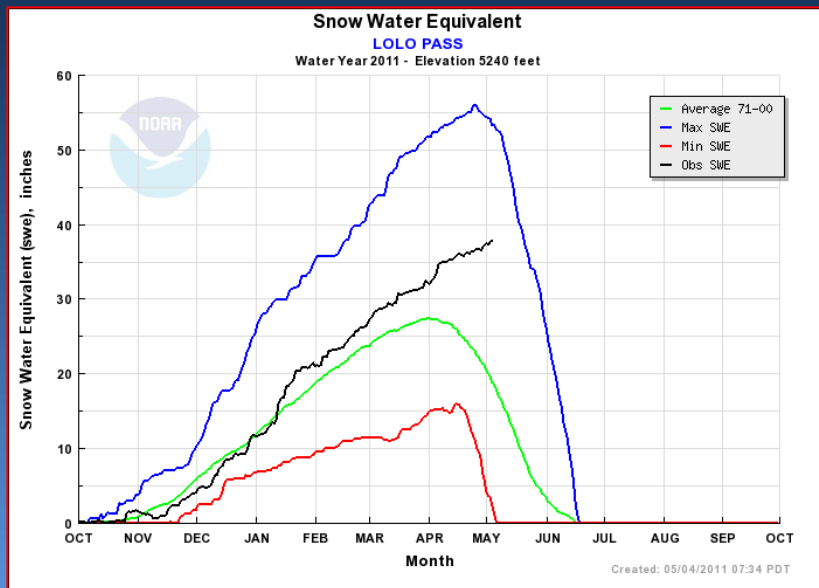
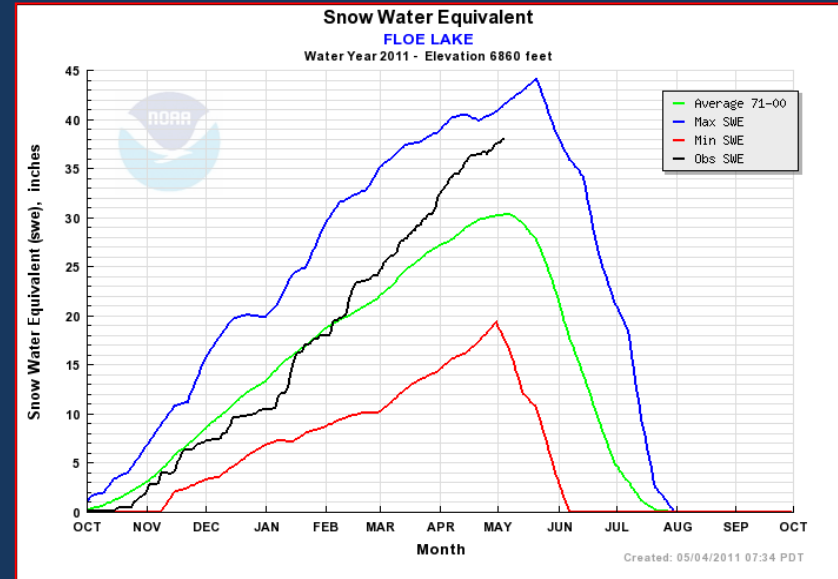
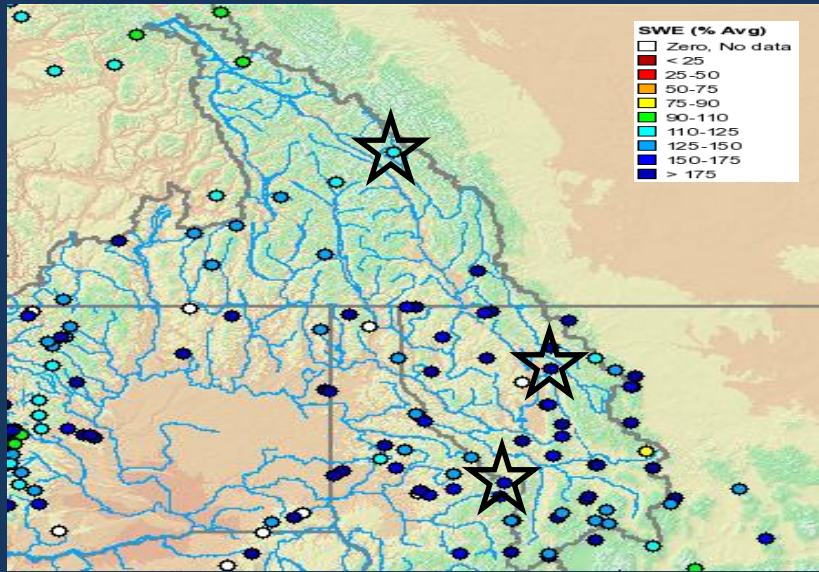
April 7, 2011

May 4, 2011



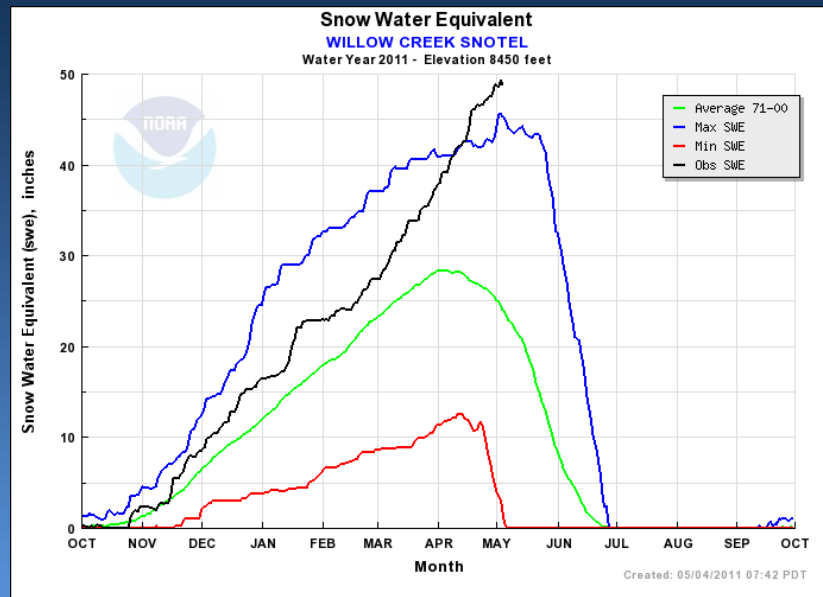
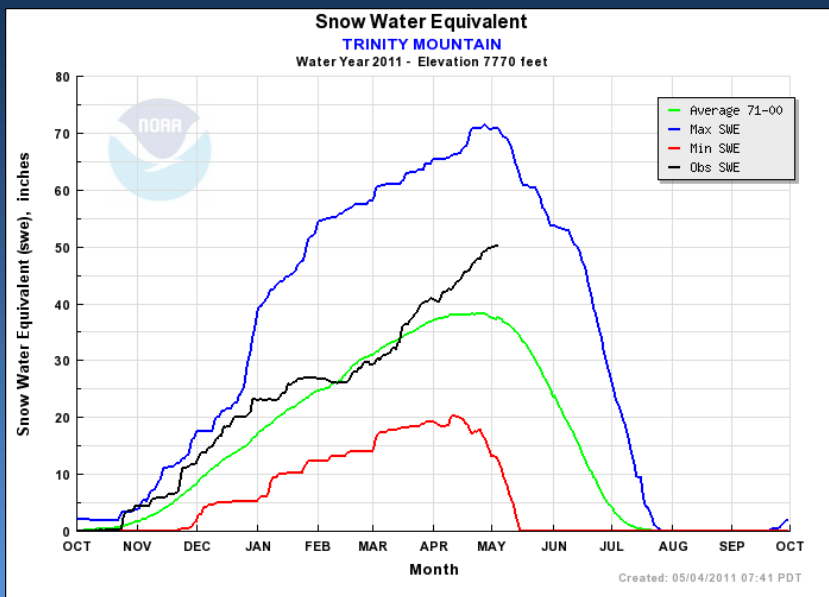
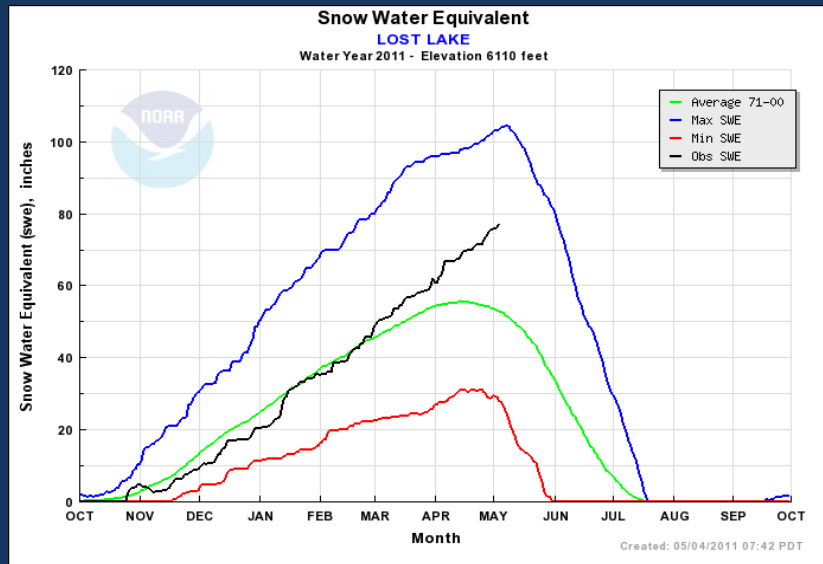
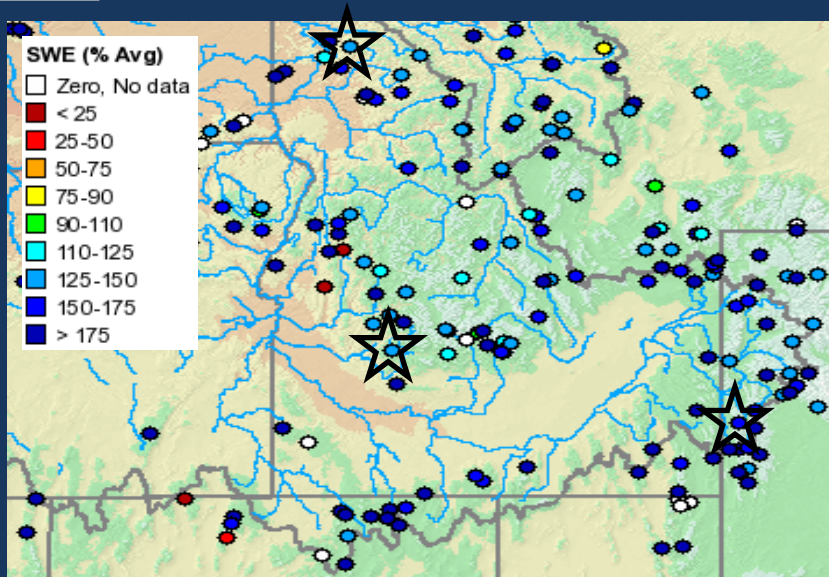


Upper Columbia Snow Conditions

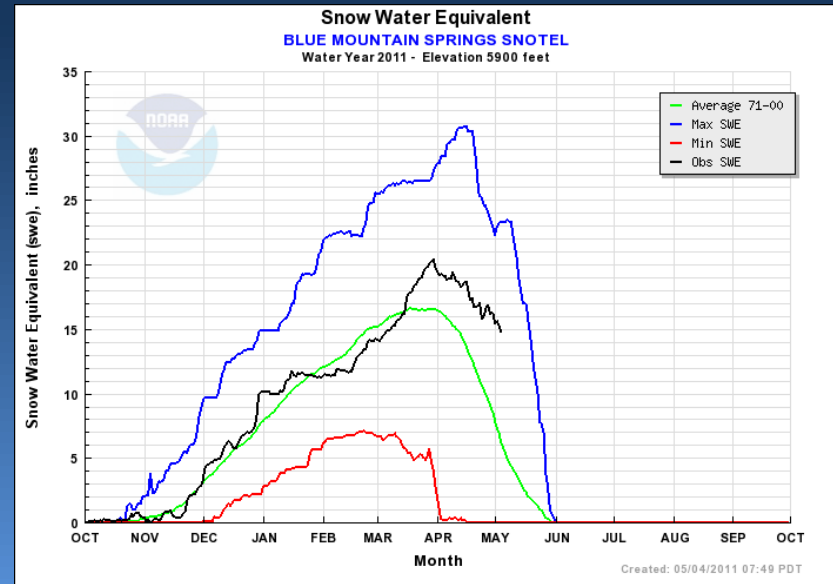
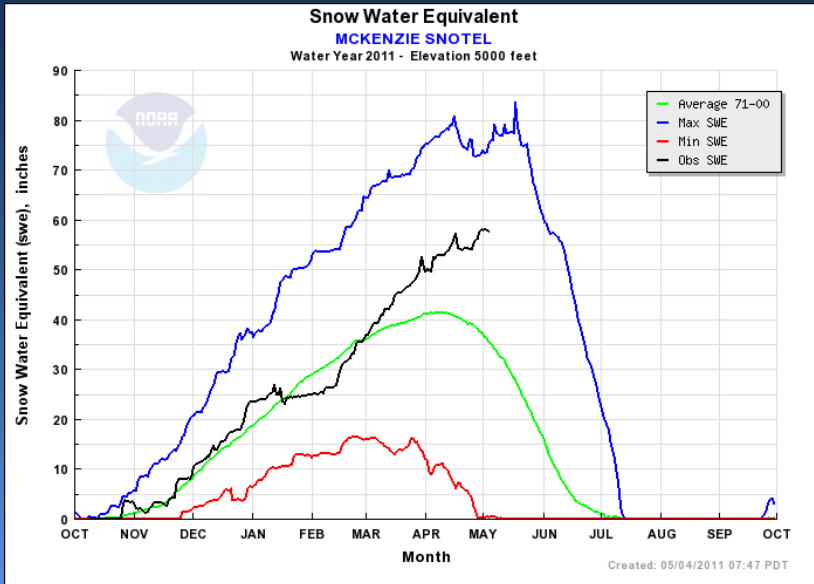
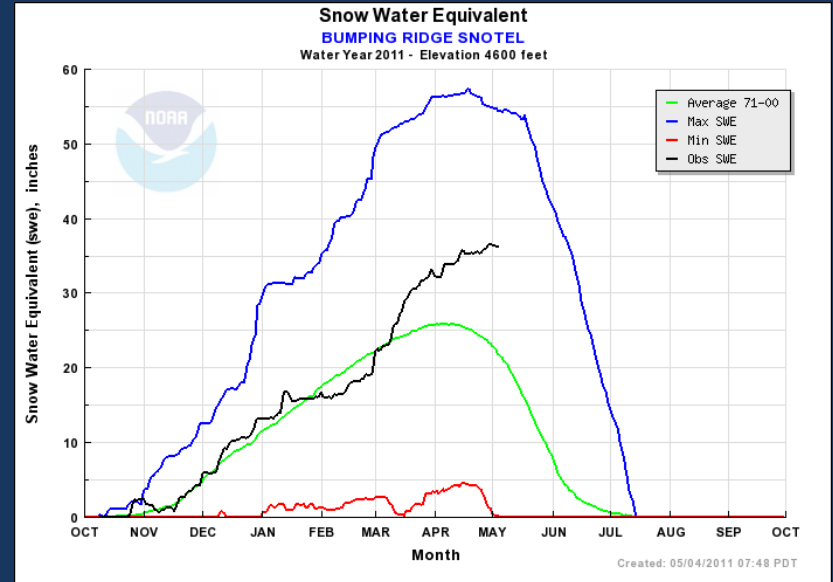
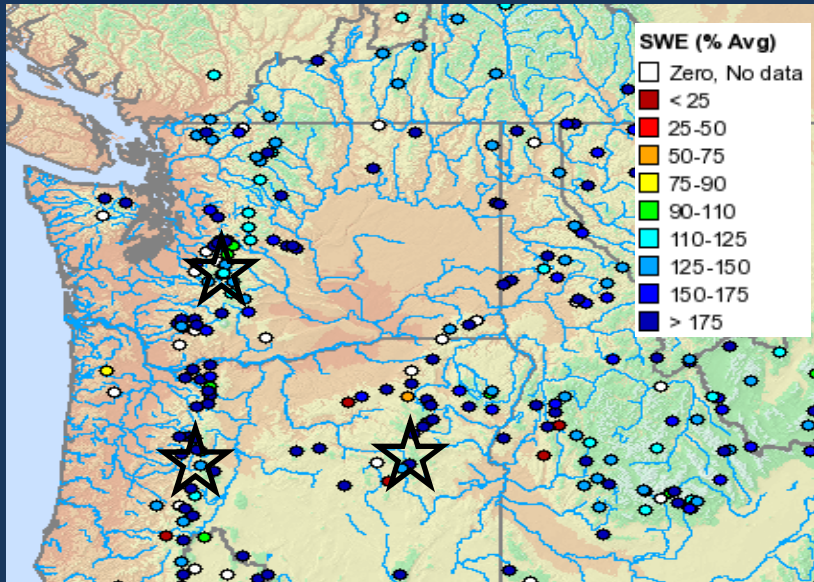




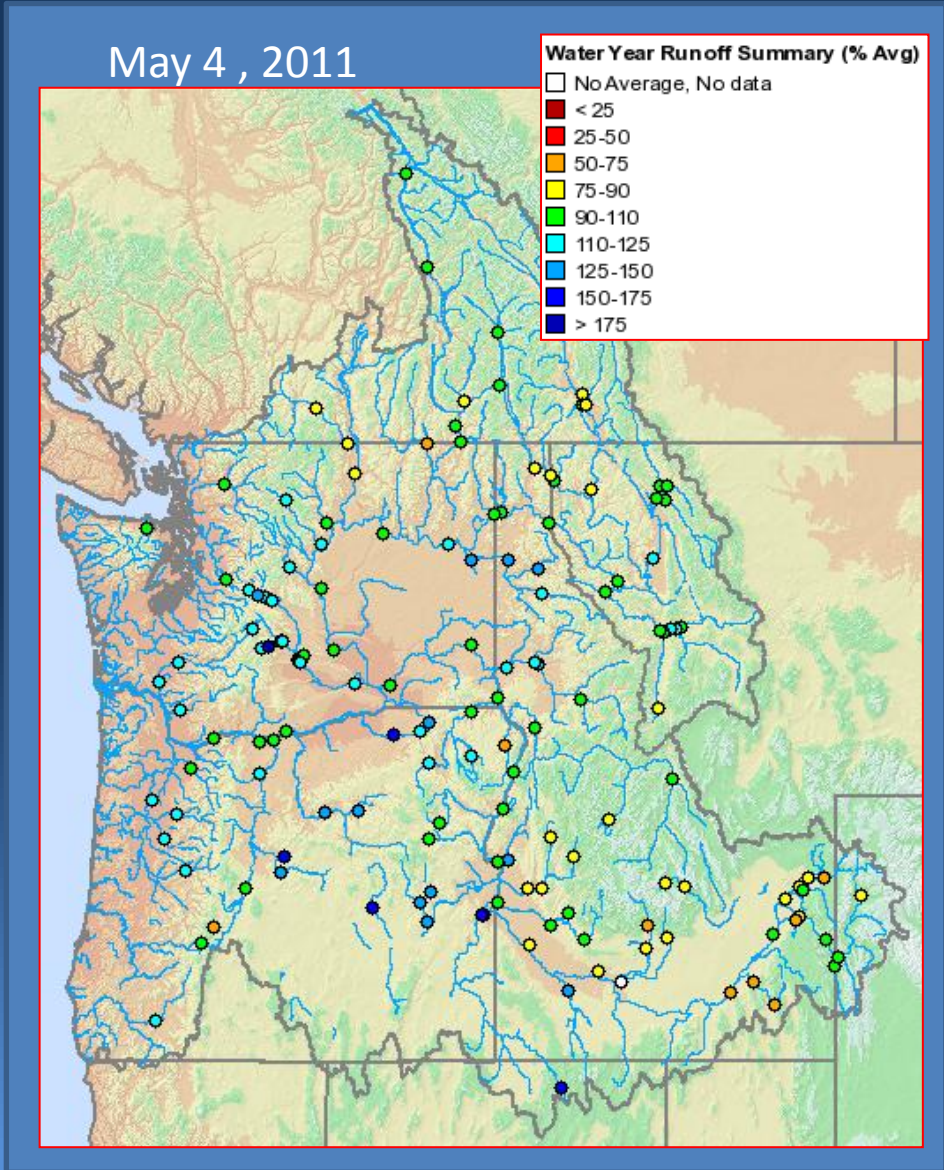
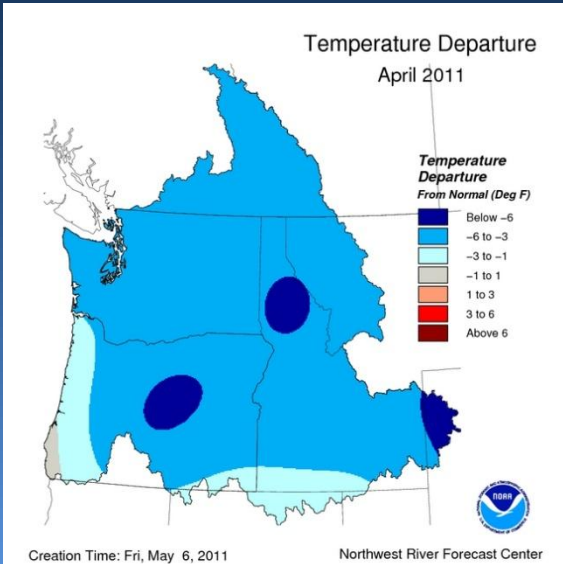
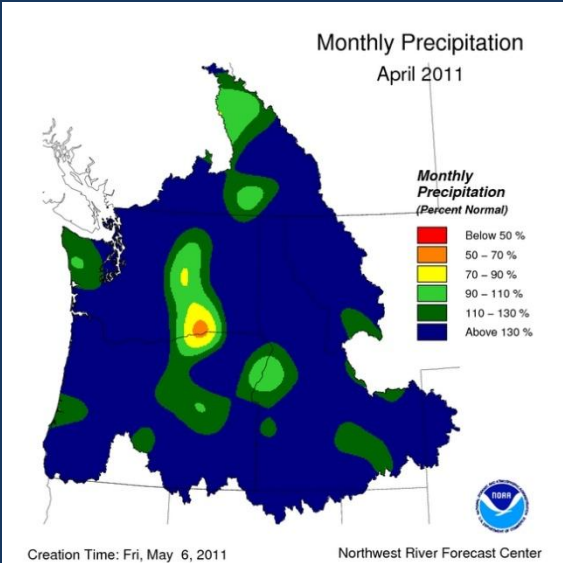
Snake River Snow Conditions



Lower Columbia Snow Conditions



Current Runoff Conditions





Future Conditions



Climate Outlooks

Precipitation Assumptions

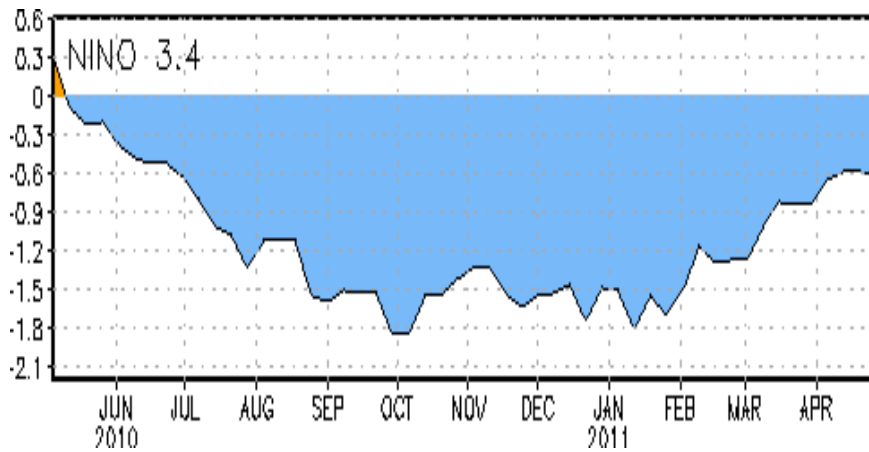
Water Supply Forecasts



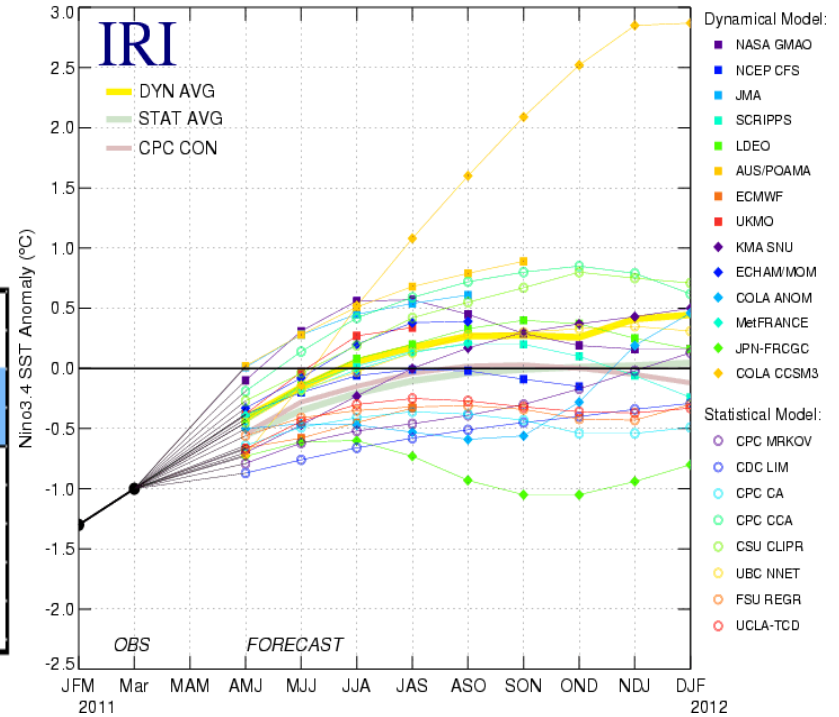
Enso: Observed and Forecast SST Anomaly (Deg C)



Observed: SST 3.4 ~ -0.6 Deg C



Model Predictions of ENSO from Apr 2011



CPC Synopsis: La Niña is present, but continues to weaken (neutral by June '11).

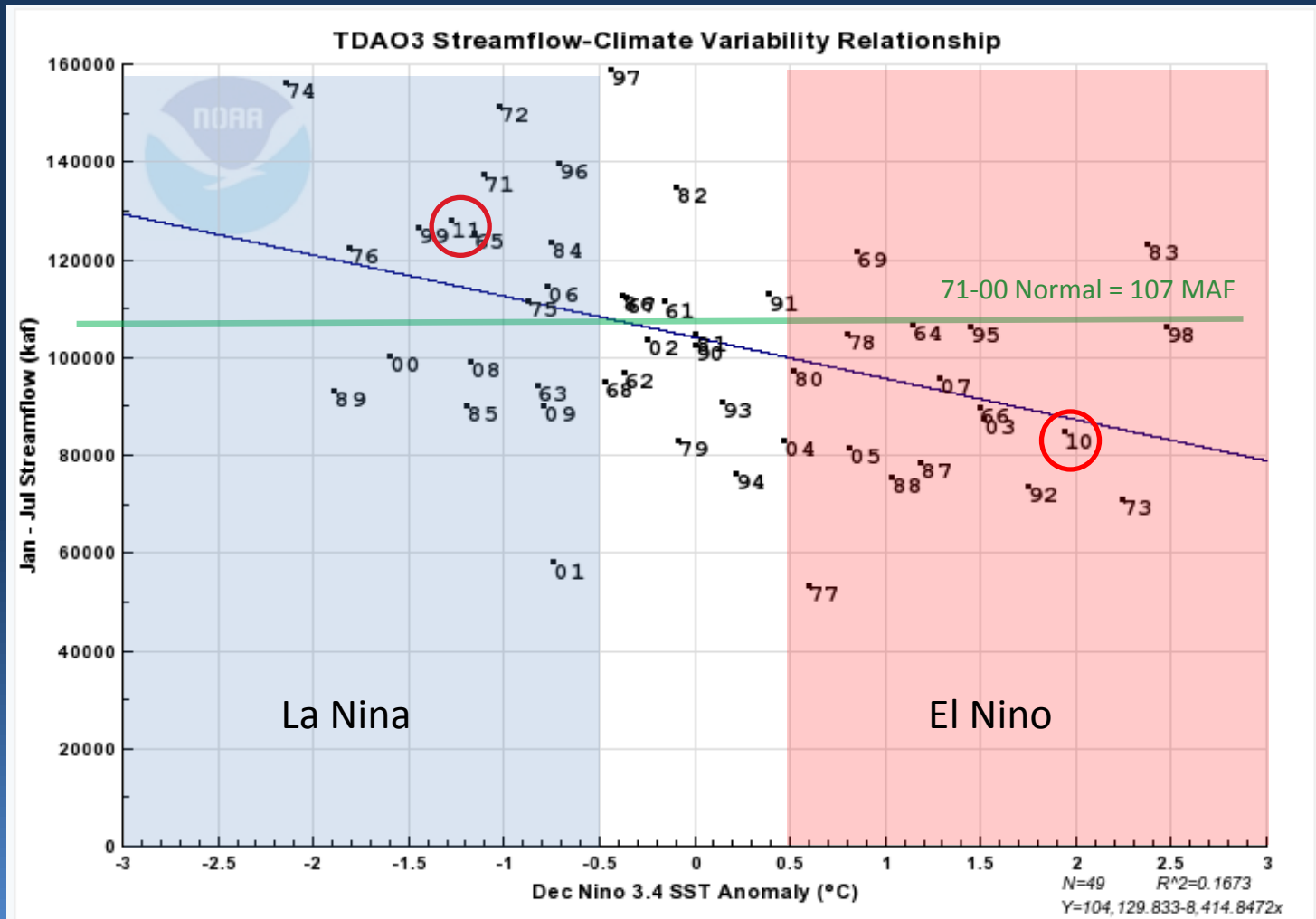
Source: Climate Prediction Center Weekly ENSO Update

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf



SST Anomaly vs Streamflow

Columbia River near The Dalles

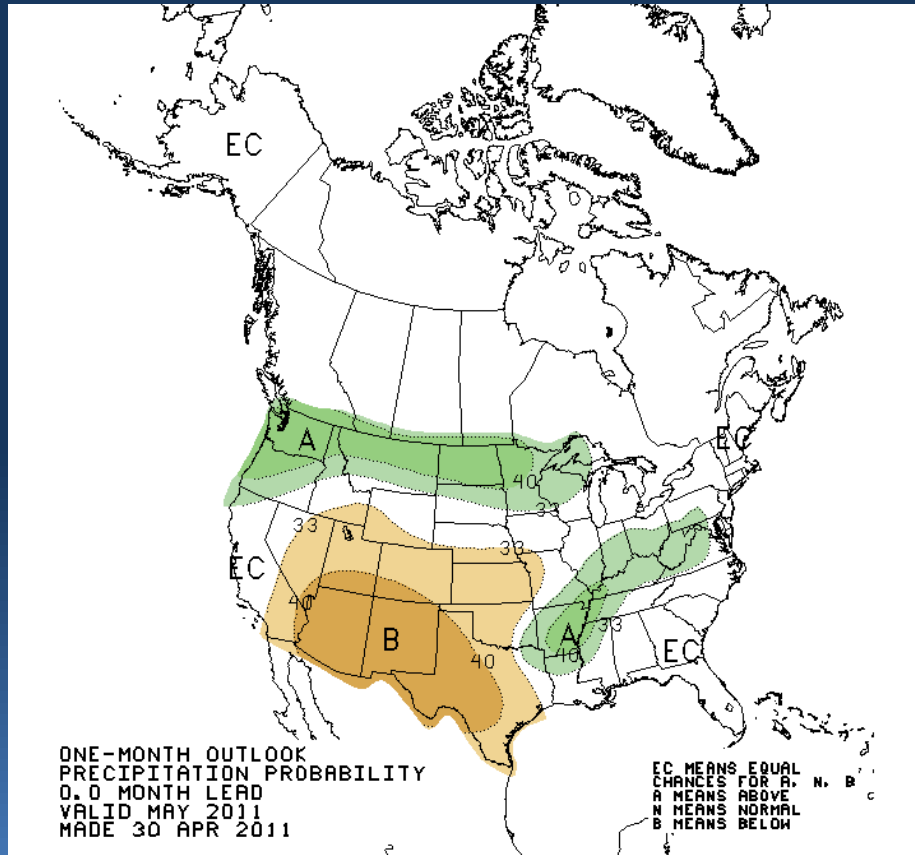




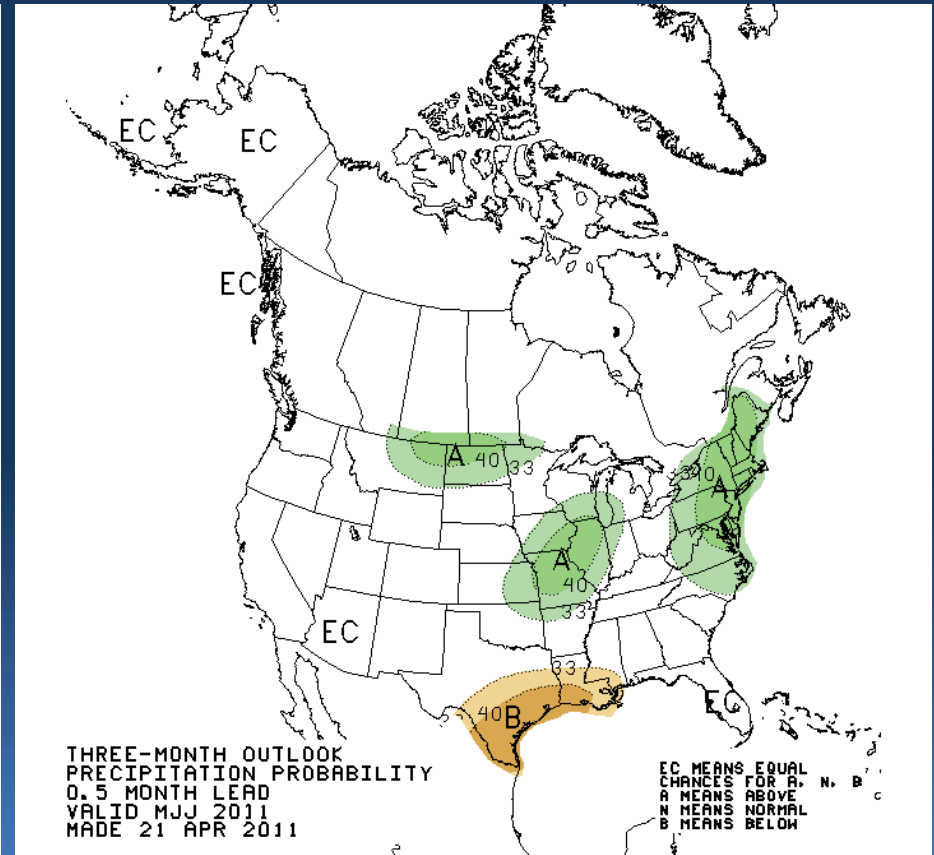
Climate Outlook: Precipitation



Current Month Outlook



Three Month Outlook

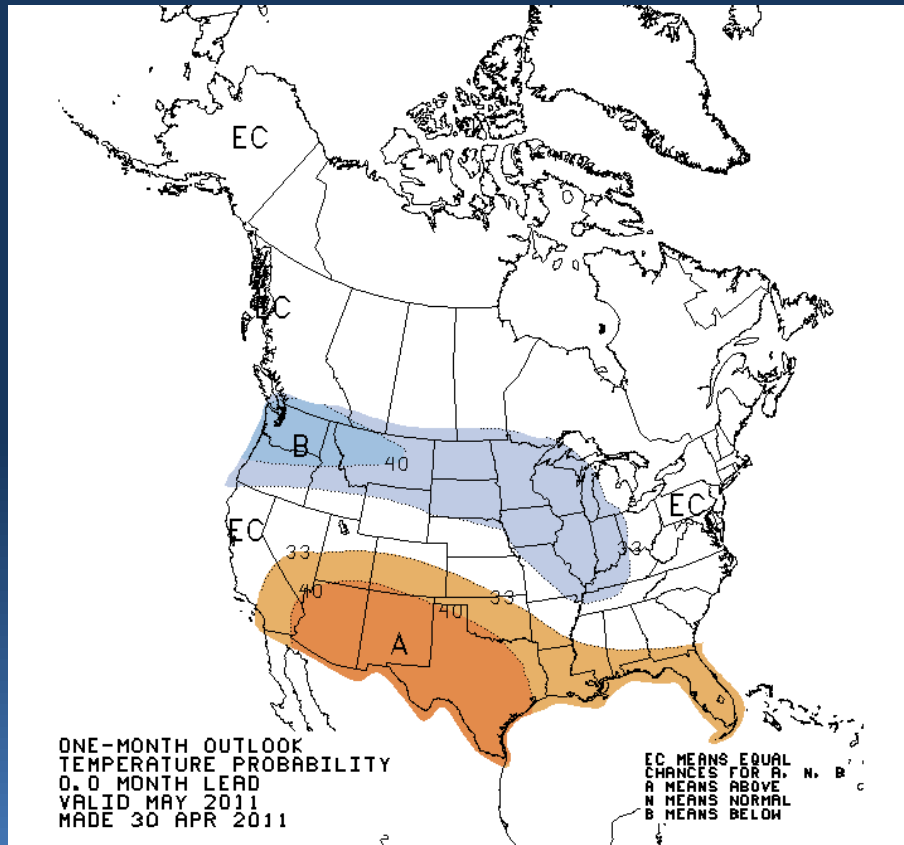




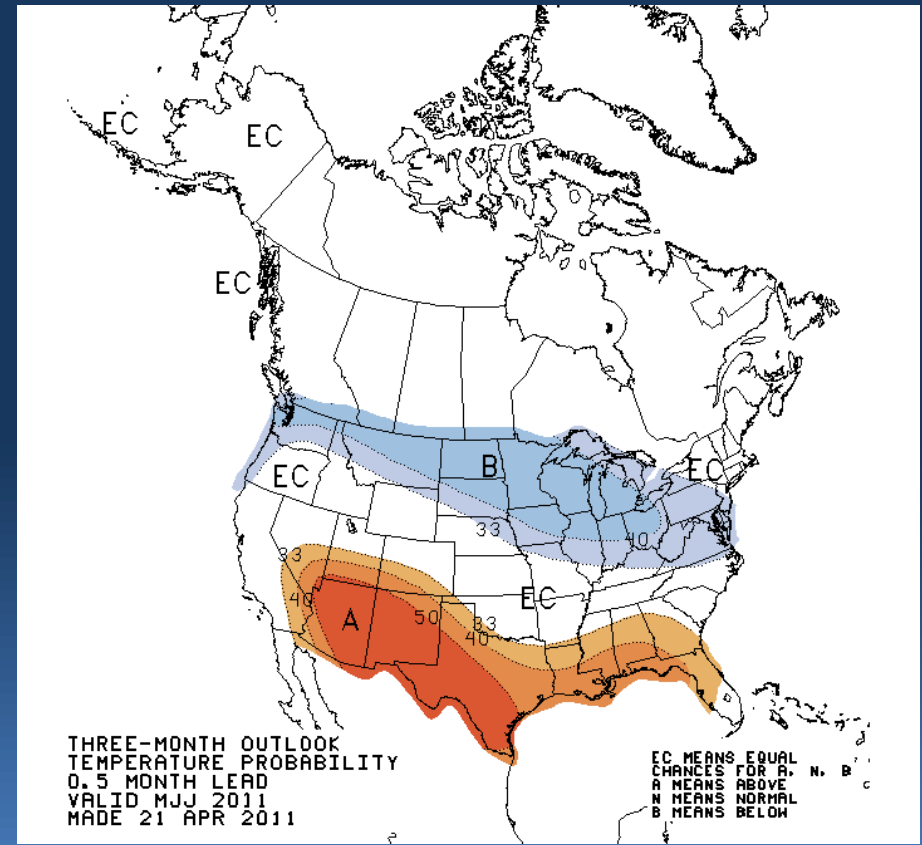
Climate Outlook: Temperature



Current Month Outlook

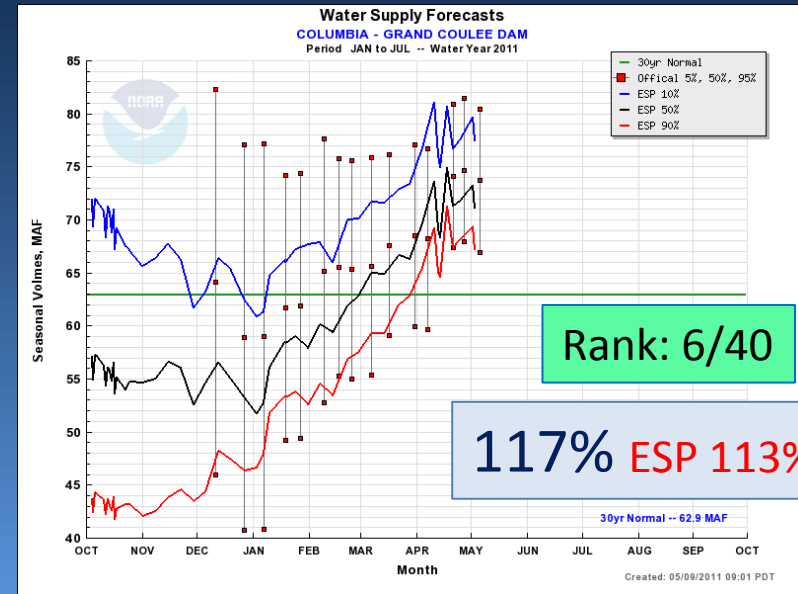
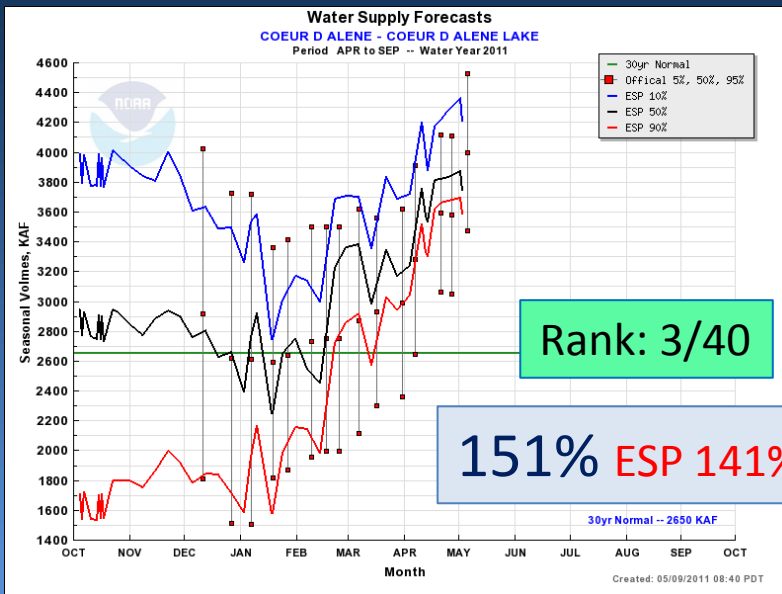
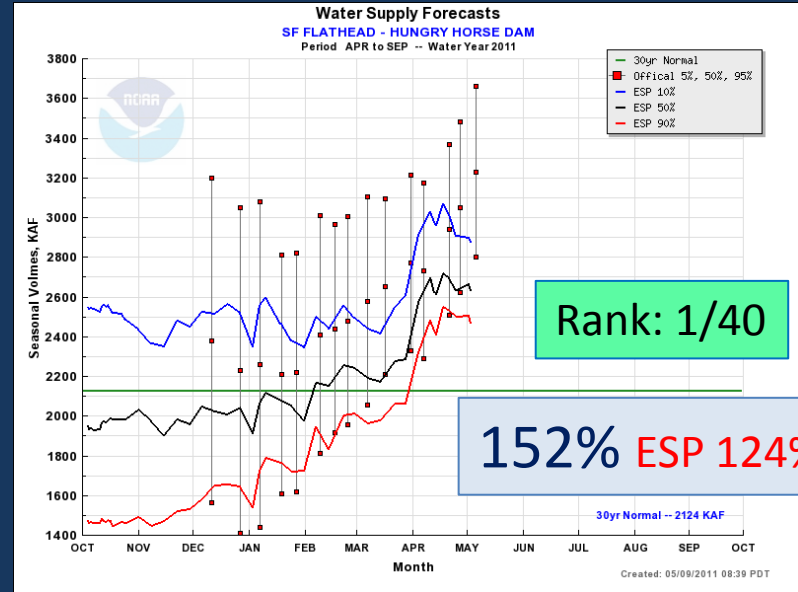
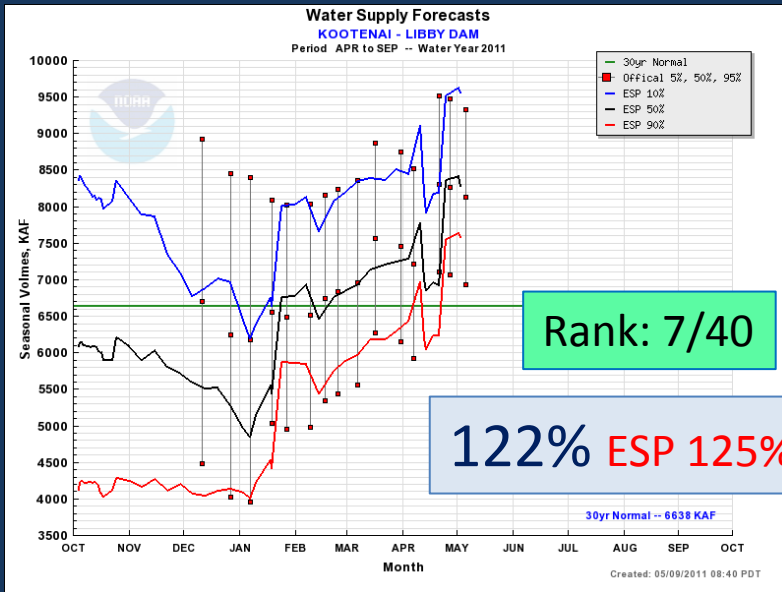


Three Month Outlook



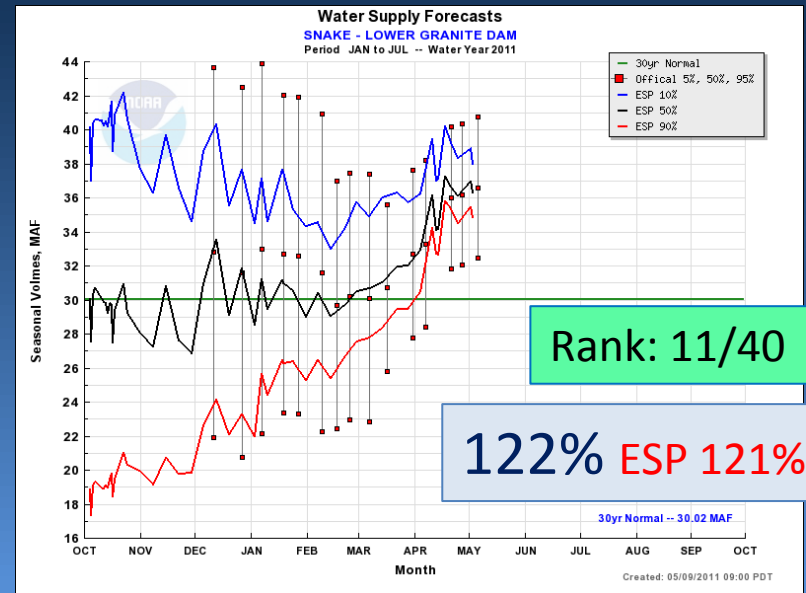
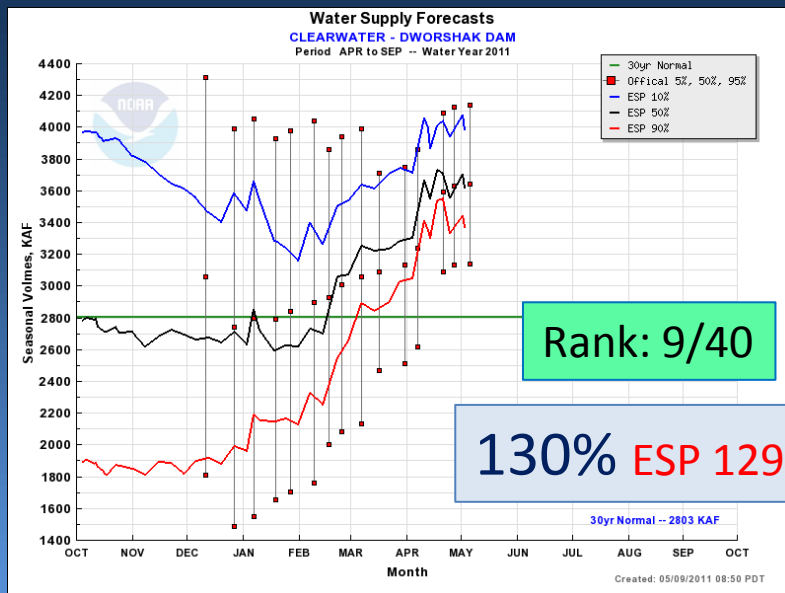
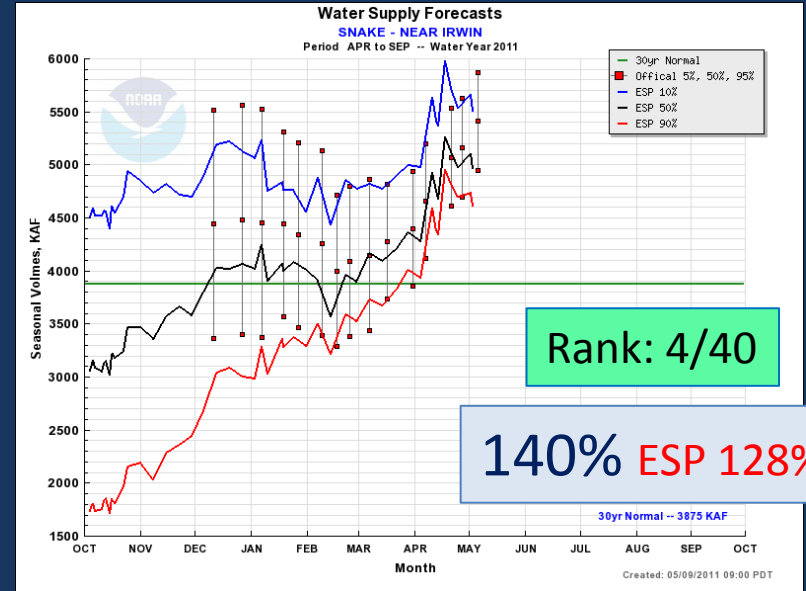
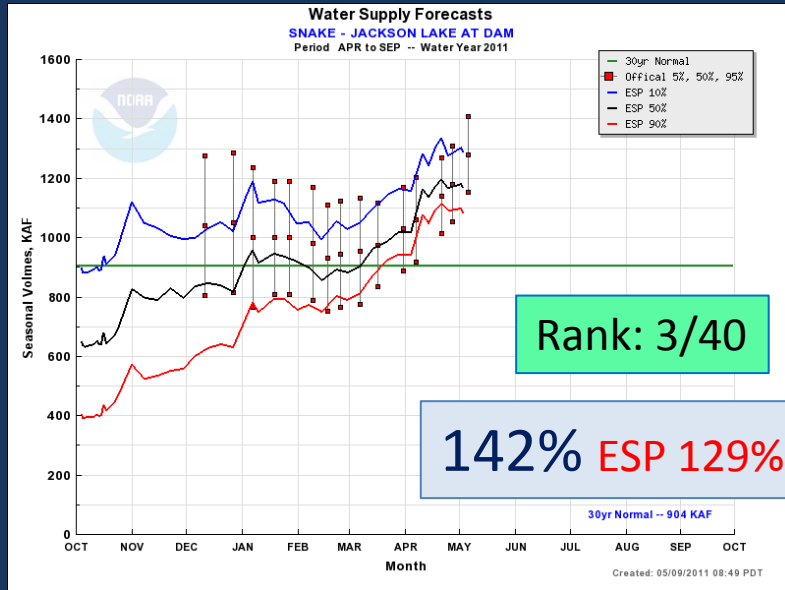


Water Supply Forecast: Upper Columbia



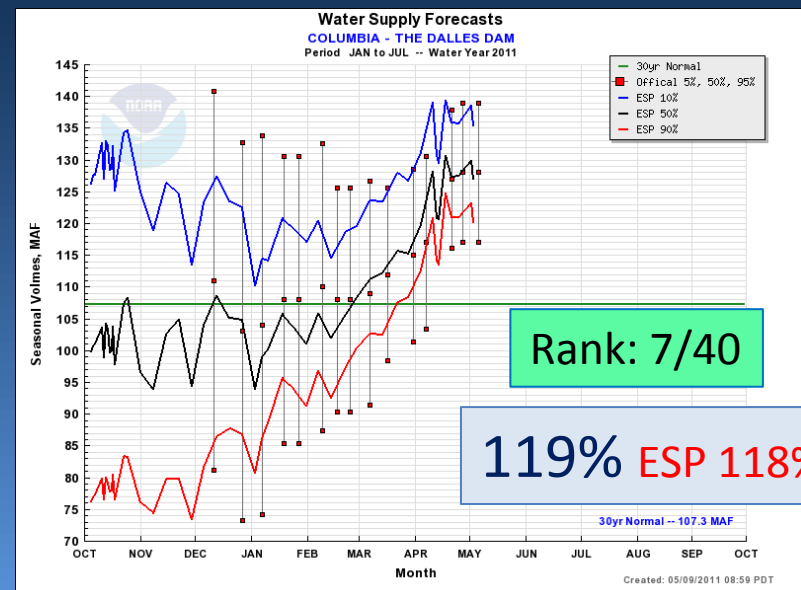
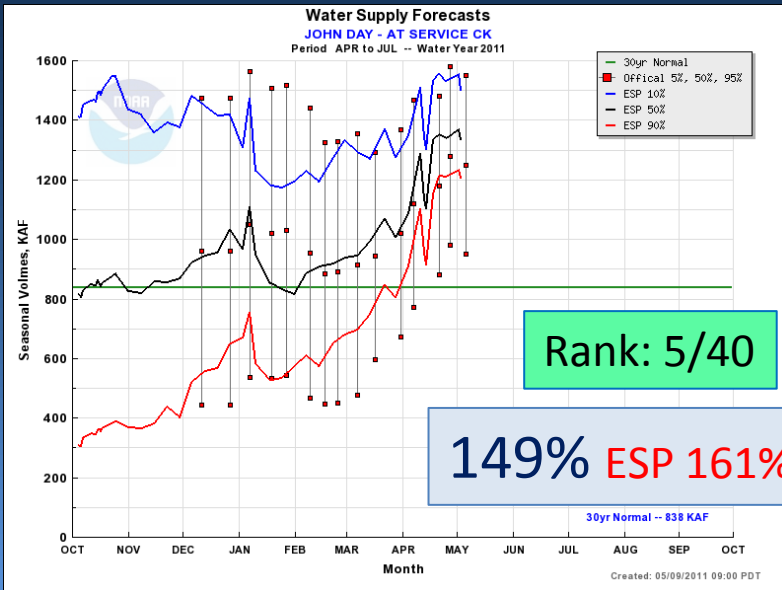
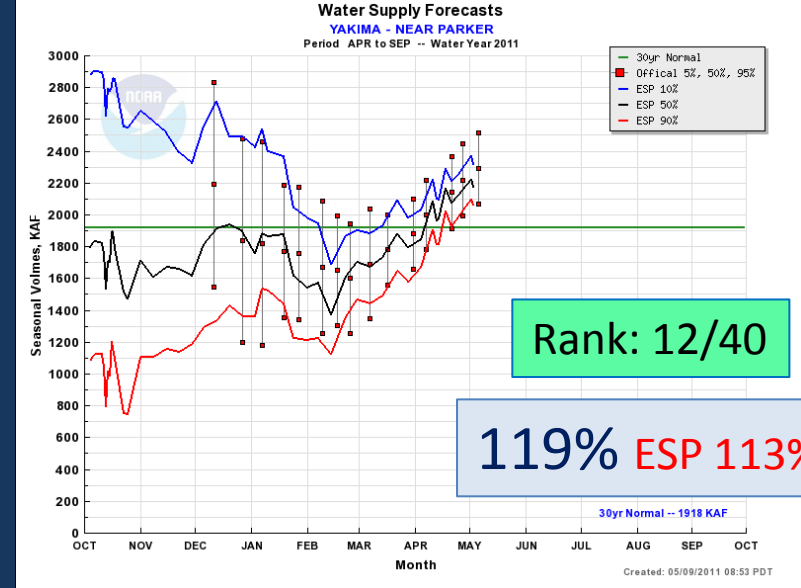
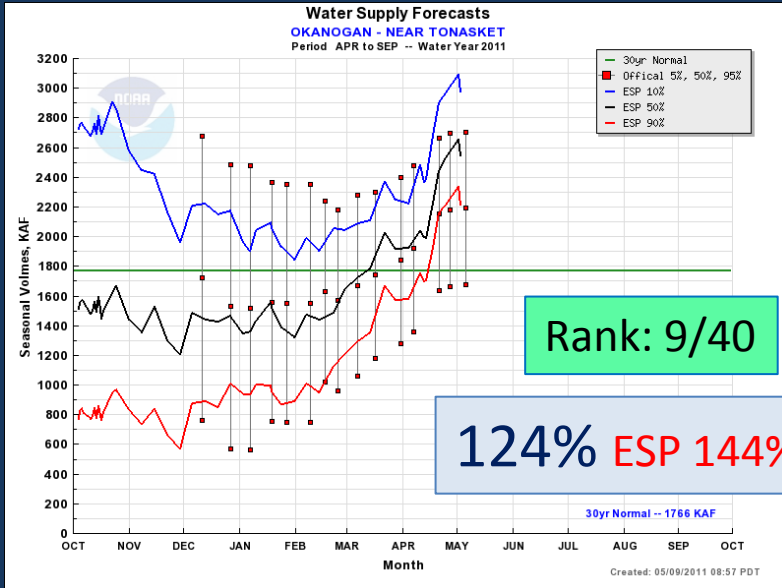


Water Supply Forecast: Snake





Water Supply Forecast: Lower Columbia





Water Supply Forecast: ESP Comparison



| COLUMBIA - GRAND COULEE DAM (GCDW1) Forecasts for Water Year 2011 | | | | | | | | | |
|--|----------------------|-------|----------|-------|---|-------|----------|-------|----------------|
| Official Water Supply Forecast <i>Issued: 2011-05-06</i> | | | | | ESP Water Supply Forecast <i>Issued: 2011-05-03</i> | | | | |
| Forecast Period | Forecasts Are in KAF | | | | Forecasts Are in KAF | | | | 30 Year Normal |
| | 95 % | 50 % | % Normal | 05 % | 90 % | 50 % | % Normal | 10 % | |
| APR-SEP | 68345 | 75100 | 117 | 81855 | 68808 | 73942 | 116 | 79990 | 63990 |
| APR-JUL | 56445 | 63200 | 117 | 69955 | 56689 | 60622 | 113 | 66931 | 53850 |
| APR-AUG | 64045 | 70800 | 117 | 77555 | 64573 | 68976 | 114 | 75058 | 60290 |
| JAN-JUL | 66945 | 73700 | 117 | 80455 | 67182 | 71115 | 113 | 77424 | 62900 |

| SNAKE - LOWER GRANITE DAM (LGDW1) Forecasts for Water Year 2011 | | | | | | | | | |
|--|----------------------|-------|----------|-------|---|-------|----------|-------|----------------|
| Official Water Supply Forecast <i>Issued: 2011-05-06</i> | | | | | ESP Water Supply Forecast <i>Issued: 2011-05-03</i> | | | | |
| Forecast Period | Forecasts Are in KAF | | | | Forecasts Are in KAF | | | | 30 Year Normal |
| | 95 % | 50 % | % Normal | 05 % | 90 % | 50 % | % Normal | 10 % | |
| APR-SEP | 27349 | 31500 | 130 | 35651 | 29576 | 31218 | 129 | 32960 | 24140 |
| APR-JUL | 24249 | 28400 | 132 | 32551 | 26586 | 28022 | 130 | 29695 | 21550 |
| APR-AUG | 25649 | 29800 | 130 | 33951 | 28220 | 29828 | 130 | 31577 | 22870 |
| JAN-JUL | 32449 | 38600 | 122 | 40751 | 34855 | 36291 | 121 | 37964 | 30020 |

| COLUMBIA - THE DALLES DAM (TDA03) Forecasts for Water Year 2011 | | | | | | | | | |
|--|----------------------|--------|----------|--------|---|--------|----------|--------|----------------|
| Official Water Supply Forecast <i>Issued: 2011-05-06</i> | | | | | ESP Water Supply Forecast <i>Issued: 2011-05-03</i> | | | | |
| Forecast Period | Forecasts Are in KAF | | | | Forecasts Are in KAF | | | | 30 Year Normal |
| | 95 % | 50 % | % Normal | 05 % | 90 % | 50 % | % Normal | 10 % | |
| APR-SEP | 109112 | 120000 | 122 | 130888 | 112687 | 120047 | 122 | 127938 | 98650 |
| APR-JUL | 92112 | 103000 | 122 | 113888 | 94894 | 101691 | 120 | 110060 | 84650 |
| APR-AUG | 102112 | 113000 | 121 | 123888 | 106379 | 112680 | 121 | 121226 | 93090 |
| JAN-JUL | 117112 | 128000 | 119 | 138888 | 120146 | 126943 | 118 | 135312 | 107300 |



NWRFC Water Supply Webpage

www.nwrfc.noaa.gov



Water Supply Forecast Release Schedule for 2011 WY

| Type of Forecast | Month | | | | | | | |
|-------------------------------------|-------|-----|-----|-----|-----|-----|------|-----|
| | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul |
| <i>Early Bird (Prelim Forecast)</i> | 30 | 27 | 24 | 31 | 28 | | 2,30 | |
| <i>Official Forecast (Final)</i> | | 7 | 7 | 7 | 7 | 6 | 7 | 8 |
| <i>Peak Flow Forecast</i> | | 10 | 8 | 8 | 8 | 9 | 8 | 11 |
| <i>Mid-month Update</i> | 16 | 20 | 17 | 17 | 21 | 19 | 16 | |
| <i>Live Call</i> | | 10 | 8 | 8 | 8 | 9 | | |

ESP updates issued weekly through end of season