

The Dalles Dam official water supply forecast is computed by RFC on the 5th working day of the month. **The MAY final forecast of April-Aug runoff volume is used to set seasonal reservoir elevations at storage projects.** See the 2013 Water Management Plan (Table 4) for more info.



## Northwest River Forecast Center Water Supply Forecasts

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### (TDAO3) THE DALLES Forecasts for Water Year 2013

#### Official Forecast

10 days of QPF: Ensemble: 2013-05-06 Issued: 2013-05-07

| Forecast Period | Forecasts Are in KAF |       |           |       | 30 Year Average (1981-2010) |
|-----------------|----------------------|-------|-----------|-------|-----------------------------|
|                 | 90 %                 | 50 %  | % Average | 10 %  |                             |
| APR-SEP         | 82906                | 87892 | 95        | 94815 | 92704                       |
| APR-JUL         | 70685                | 74882 | 94        | 81145 | 79855                       |
| APR-AUG         | 78189                | 82436 | 94        | 89097 | 87532                       |
| JAN-JUL         | 88673                | 92870 | 92        | 99133 | 101368                      |

3 days of QPF: Ensemble: 2013-05-06 Issued: 2013-05-07

|         |       |       |    |       |        |
|---------|-------|-------|----|-------|--------|
| APR-SEP | 82751 | 88304 | 95 | 93673 | 92704  |
| APR-JUL | 70193 | 74436 | 93 | 80733 | 79855  |
| APR-AUG | 78070 | 82502 | 94 | 88295 | 87532  |
| JAN-JUL | 88181 | 92424 | 91 | 98721 | 101368 |

0 days of QPF: Ensemble: 2013-05-06 Issued: 2013-05-07

|         |       |       |    |       |        |
|---------|-------|-------|----|-------|--------|
| APR-SEP | 82721 | 88179 | 95 | 94423 | 92704  |
| APR-JUL | 69970 | 74446 | 93 | 81292 | 79855  |
| APR-AUG | 77721 | 82412 | 94 | 89012 | 87532  |
| JAN-JUL | 87958 | 92434 | 91 | 99280 | 101368 |

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

#### Overlay

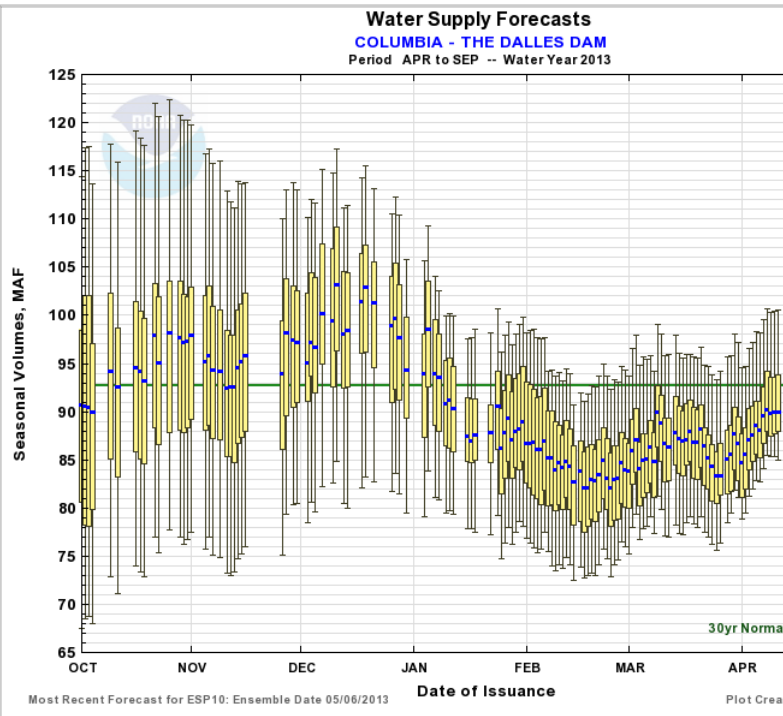
ESP10

ESP3

ESP0

#### Data Files

CSV (ESP10 / APR-SEP)



Max Scale Scale To Data Scale To Last 45 Days

Note: Compatible with the latest browsers (Chrome, Firefox, Safari, and Internet Explorer (ie9+)).

The Lower Granite Dam official water supply forecast is computed by RFC on the 5th working day of the month.

The MAY final forecast is not used for the implementation of any BiOp actions. This forecast is provided for informational purposes only. See the 2013 Water Management Plan (Table 4) for more info.



## Northwest River Forecast Center Water Supply Forecasts

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### (LGDW1) LOWER GRANITE DAM Forecasts for Water Year 2013

#### Official Forecast

10 days of QPF: **Ensemble: 2013-05-06** **Issued: 2013-05-07**

| Forecast Period | Forecasts Are in KAF |       |           |       | 30 Year Average (1981-2010) |
|-----------------|----------------------|-------|-----------|-------|-----------------------------|
|                 | 90 %                 | 50 %  | % Average | 10 %  |                             |
| APR-SEP         | 16060                | 16894 | 76        | 18506 | 22279                       |
| APR-JUL         | 13792                | 14509 | 73        | 16026 | 19848                       |
| APR-AUG         | 14977                | 15700 | 74        | 17339 | 21091                       |
| JAN-JUL         | 18854                | 19571 | 71        | 21088 | 27440                       |

3 days of QPF: **Ensemble: 2013-05-06** **Issued: 2013-05-07**

|         |       |       |    |       |       |
|---------|-------|-------|----|-------|-------|
| APR-SEP | 15835 | 16825 | 76 | 18460 | 22279 |
| APR-JUL | 13593 | 14397 | 73 | 16049 | 19848 |
| APR-AUG | 14762 | 15674 | 74 | 17348 | 21091 |
| JAN-JUL | 18655 | 19459 | 71 | 21111 | 27440 |

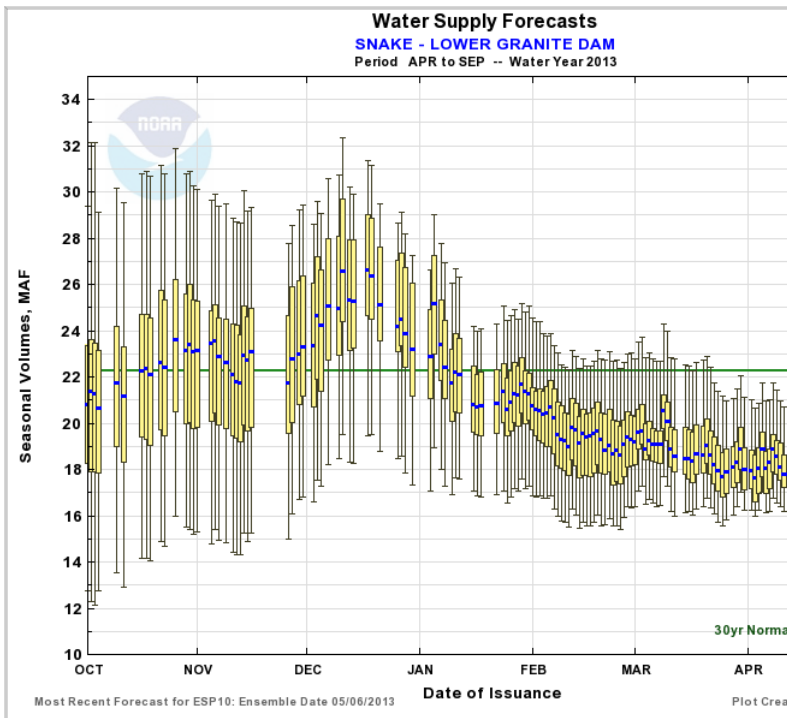
0 days of QPF: **Ensemble: 2013-05-06** **Issued: 2013-05-07**

|         |       |       |    |       |       |
|---------|-------|-------|----|-------|-------|
| APR-SEP | 15686 | 16792 | 75 | 18622 | 22279 |
| APR-JUL | 13465 | 14456 | 73 | 16195 | 19848 |
| APR-AUG | 14613 | 15662 | 74 | 17503 | 21091 |
| JAN-JUL | 18527 | 19518 | 71 | 21257 | 27440 |

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

**Overlay**  
☒ ESP10
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 ☐ ESP0

**Data Files**



Max Scale    Scale To Data    Scale To Last 45 Days

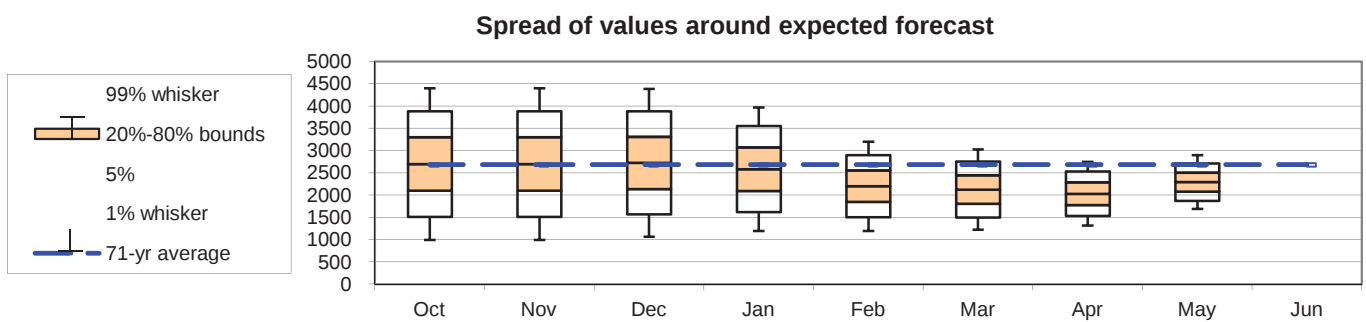
Note: Compatible with the latest browsers (Chrome, Firefox, Safari, and Internet Explorer (ie9+)).

The Dworshak Dam official water supply forecast is computed by Corps Walla Walla District on the 5th working day of the month. The MAY final forecast of April-July runoff volume is used to manage reservoir refill. See 2013 WMP (Table 4) for more info.

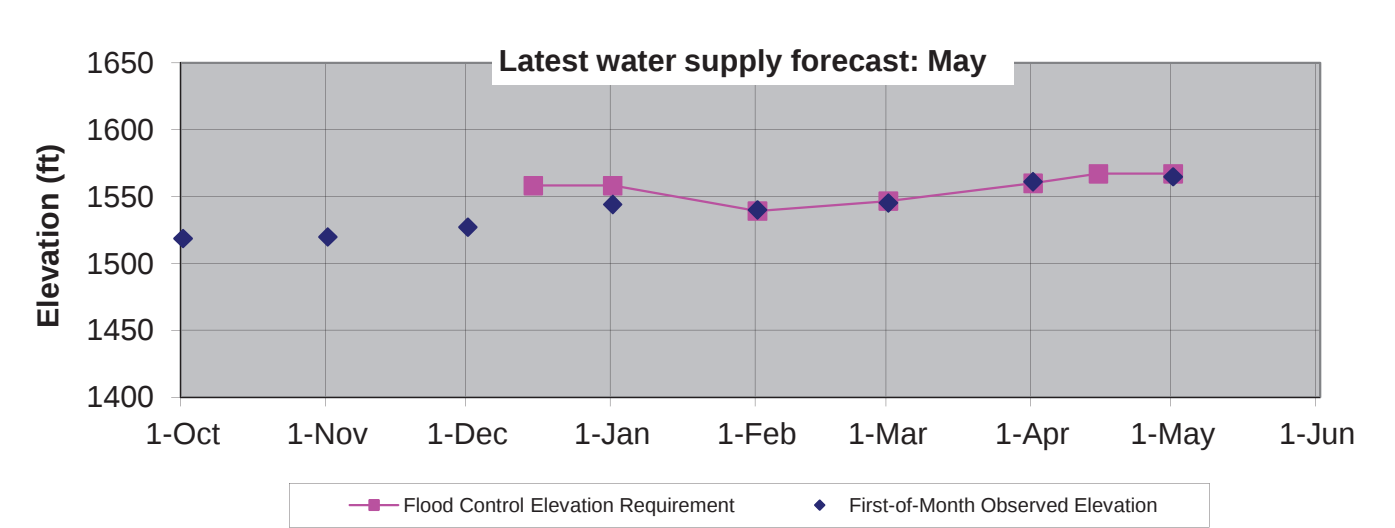
Dworshak : May Runoff Forecast & Flood Control Calculation

WY 2013

| Runoff Forecast and Flood Control                                                |        |         |        |        |        | 1981-2010<br>Average | Percent of<br>Average | 1929-1999<br>Average | Percent of<br>Average |
|----------------------------------------------------------------------------------|--------|---------|--------|--------|--------|----------------------|-----------------------|----------------------|-----------------------|
| Most Probable Runoff Volume                                                      |        | Apr-Jul | 2296   | KAF    |        | 2438                 | 94%                   | 2683                 | 86%                   |
|                                                                                  |        | May-Jul | 1665   | KAF    |        | 1784                 | 93%                   | 1980                 | 84%                   |
|                                                                                  |        |         |        |        |        |                      |                       |                      |                       |
| Seasonal Flood Control (assumes no shift of flood control space to Grand Coulee) |        |         |        |        |        |                      |                       |                      |                       |
| Forecast Date>>                                                                  | Oct    | Nov     | Dec    | Jan    | Feb    | Mar                  | Apr                   | May                  | Jun                   |
| Apr-Jul Runoff Forecast                                                          | 2701   | 2701    | 2727   | 2587   | 2202   | 2128                 | 2036                  | 2296                 |                       |
| First-of-Month Elev                                                              | 1518.8 | 1519.9  | 1527.3 | 1544.2 | 1540.2 | 1545.3               | 1561.2                | 1564.9               |                       |
|                                                                                  |        |         |        |        |        |                      |                       |                      |                       |
| Date >>                                                                          | 15-Dec |         | 31-Dec | 31-Jan | 28-Feb | 31-Mar               | 15-Apr                | 30-Apr               |                       |
| Flood Control Space                                                              | --     | 700     | 700    | 970    | 867    | 675                  | 567                   | 567                  |                       |
| Flood Control Elevation                                                          | --     | 1558.2  | 1558.2 | 1539.2 | 1546.7 | 1560.0               | 1567.1                | 1567.1               |                       |



### Dworshak Flood Control Elevations - 2013



Notes:

- The given forecast is the official Corps of Engineers forecast for Dworshak. If you have any questions please contact Jeremy Giovando (509 527 7053), or Steve Hall (509 527 7550).
- Due to updated values for precipitation, snow or streamflow, subsequent forecasts may be different from the forecast published herein.
- 15-Dec and 31-Dec flood control space is fixed at 700 KAF.
- 30-Apr flood control elevation is based on the 95% confidence Flood Control Refill Curve as computed on 1 April.

## Dworshak : May Runoff Forecast & Flood Control Calculation

| May-Jul Runoff Forecast Calculation: |       |       |         |             |          |
|--------------------------------------|-------|-------|---------|-------------|----------|
| Variable                             | Month | Value | Average | Coefficient | Runoff   |
|                                      |       | A     |         | B           | =A*B     |
| SOI                                  | Sep   | 0.20  |         | 96.46       | 19.3     |
| Elk Butte SWE                        | 1-May | 28.80 | 79%     | 10.48       | 301.8    |
| Hemlock Butte SWE                    | 1-May | 40.10 | 84%     | 9.52        | 381.8    |
| Hoodoo Basin SWE                     | 1-May | 40.60 | 88%     | 9.54        | 387.3    |
| Shanghi Summit SWE                   | 1-May | 9.40  | 51%     | 11.93       | 112.1    |
| Lost Lake SWE                        | 1-May | 47.10 | 78%     | 7.99        | 376.3    |
| Intercept                            |       | 1     |         | 86.63       | 86.6     |
| 1-May Forecast (KAF)                 |       |       |         |             | Σ 1665.3 |

| Data Station                                               | Sept | Nov  | Dec  | 1-Jan | 1-Feb | 1-Mar | 1-Apr | 1-May | 1-Jun |
|------------------------------------------------------------|------|------|------|-------|-------|-------|-------|-------|-------|
| <b>Climate (Stdzd SOI)</b>                                 |      |      |      |       |       |       |       |       |       |
| September SOI                                              | 0.20 |      |      |       |       |       |       |       |       |
| <b>Precipitation (monthly depth, inches)</b>               |      |      |      |       |       |       |       |       |       |
| Headquarters, ID                                           |      | 5.30 | 6.30 |       |       |       |       |       |       |
| <b>Snow Water Equiv (first of month SWE depth, inches)</b> |      |      |      |       |       |       |       |       |       |
| Elk Butte, ID                                              |      |      |      | 12.6  | 21.0  | 25.9  | 29.7  | 28.8  | --    |
| Hemlock Butte, ID                                          |      |      |      | 15.1  | 25.6  | 32.0  | 38.3  | 40.1  | --    |
| Hoodoo Basin, MT                                           |      |      |      | 17.2  | 23.8  | 29.9  | 36.6  | 40.6  | --    |
| Pierce RS, ID                                              |      |      |      | 1.9   | 5.6   | 6.2   |       |       |       |
| Shanghi Summit, ID                                         |      |      |      |       |       |       | 16.3  | 9.4   |       |
| Lost Lake, ID                                              |      |      |      |       |       |       |       | 47.1  | --    |
| <b>Streamflow (monthly volume, KAF)</b>                    |      |      |      | Jan   | Feb   | Mar   | Apr   | May   | Jun   |
| Dworshak Inflow                                            |      |      |      | 158   | 162   | 331   | 630   | --    | --    |

Approval:

HEITSTUMAN.JOHN  
JOSEPH.115940258  
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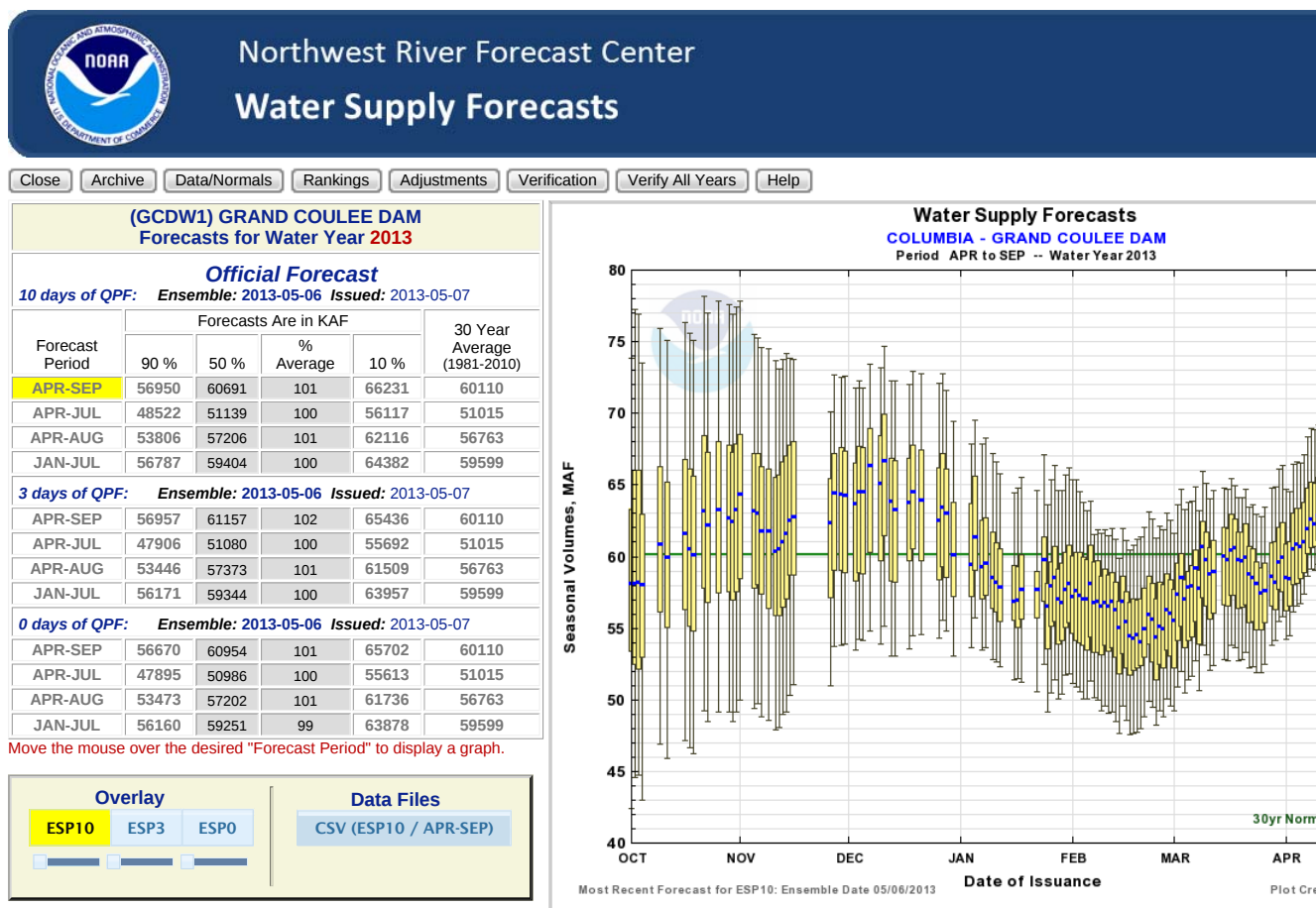
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Peter F. Brooks, P.E., D. WRE  
Ch., Hydrologic Engineering and Power Branch  
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BROOKS.PETER.F.1228519541  
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ou=PKI, ou=USA,  
cn=BROOKS.PETER.F.1228519541  
Date: 2013.05.03 15:32:36 -0700

The Grand Coulee Dam water supply forecast is not used for the implementation of any BiOp actions. This forecast is provided for informational purposes only. See the 2013 Water Management Plan (Table 4) for more info.



The Libby Dam official water supply forecast is computed by Corps Seattle District. **The MAY final forecast of Apr-Aug runoff volume is used to set min. sturgeon volume and min. bull trout flows for post-sturgeon pulse through Sept, and to set VARQ refill flows.**

Libby: May Runoff Forecast & Flood Control Calculation

WY 2013

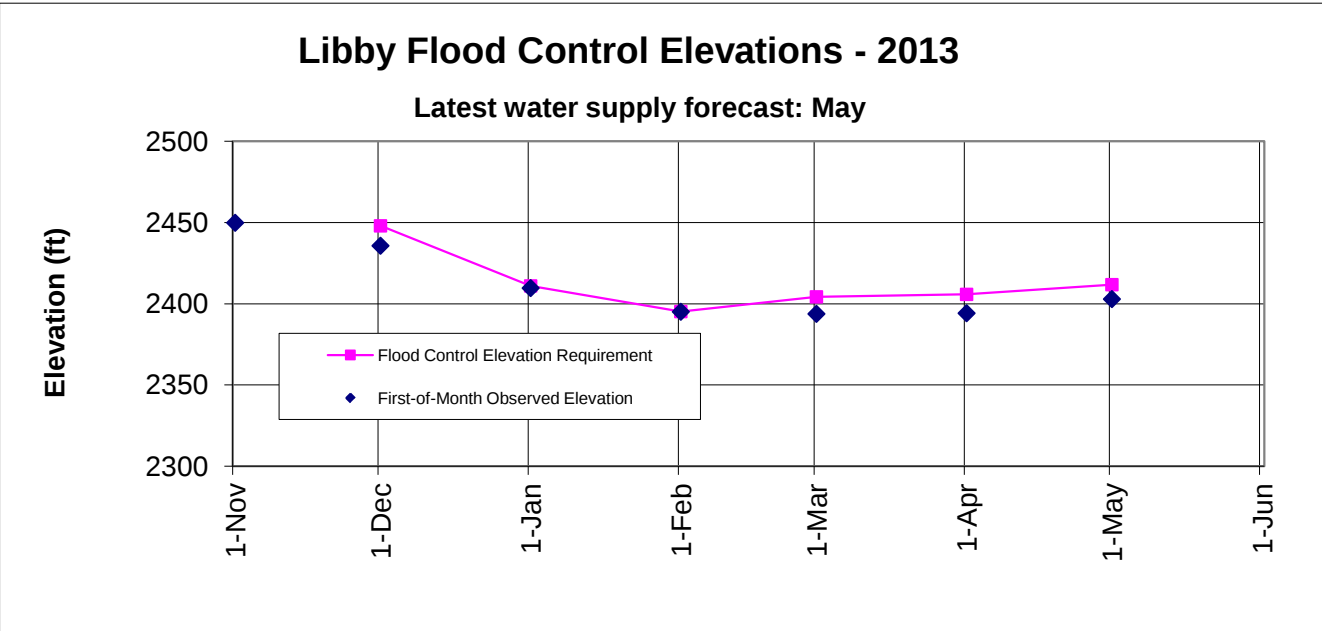
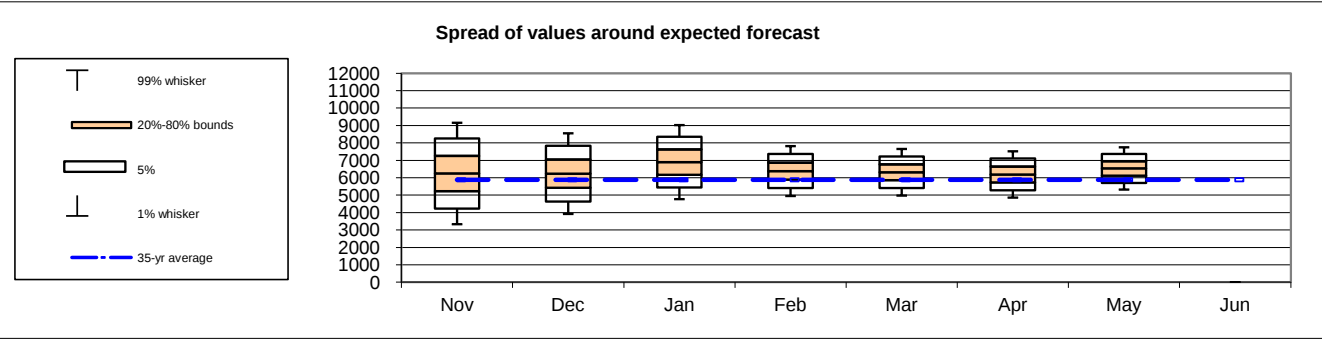
Runoff Forecast and Flood Control

|                              |         |      |     |
|------------------------------|---------|------|-----|
| Most Probable Runoff Volume: | Apr-Aug | 6535 | KAF |
|                              | Apr-Jul | 5928 | KAF |
|                              | May-Jul | 5393 | KAF |

| 1981-2010<br>Average | Percent of<br>Average | 1929-1999<br>Average | Percent of<br>Average |
|----------------------|-----------------------|----------------------|-----------------------|
| 5885                 | 111%                  | 6337                 | 103%                  |
| 5342                 | 111%                  | 5771                 | 103%                  |
| 4821                 | 112%                  | 5247                 | 103%                  |

| Seasonal Flood Control  |        | VARQ Flood Control Implemented |        |        |        |        |        |     |
|-------------------------|--------|--------------------------------|--------|--------|--------|--------|--------|-----|
| Forecast Date >>        | Nov    | Dec                            | Jan    | Feb    | Mar    | Apr    | May    | Jun |
| Apr-Aug Runoff Forecast | 6245   | 6238                           | 6898   | 6384   | 6315   | 6189   | 6535   |     |
| First-of-Month Elev     | 2449.9 | 2435.7                         | 2409.7 | 2395.1 | 2393.8 | 2394.2 | 2402.9 |     |

| Date >>                 | 30-Nov | 31-Dec | 31-Jan | 28-Feb | 31-Mar | 30-Apr |
|-------------------------|--------|--------|--------|--------|--------|--------|
| Flood Control Space     | 500    | 2000   | 2534   | 2238   | 2186   | 1972   |
| Flood Control Elevation | 2448.0 | 2411.0 | 2395.2 | 2404.3 | 2405.8 | 2411.8 |



- Notes:
- The given forecast is the official Corps of Engineers forecast for Libby. If you have any questions please contact Joel Fenolio (206) 764-6683, Kevin Shaffer (206) 764-3660,Adam Price (206) 764-3604, or Kristian Mickelson (206) 764-6927.
  - If a prior month's forecast as published in this document is different than what was originally published in the issue month, then the earlier forecast has been adjusted to reflect updated values for precipitation or streamflow.
  - The Fernie gage reported on 24 of 30 days in April. Other gages in the region had erratic data or showed little correlation with the Fernie station. The observed total at Fernie (65.9 mm ) was scaled up by a factor of 30/24 for input into the forecast model.

## Libby: May Runoff Forecast & Flood Control Calculation

### Apr-Aug Runoff Forecast Calculation:

| Variable                     | Month(s)       | Units  | Observed Value | Percent of Average | Regression Coefficient | Marginal Runoff (KAF) |
|------------------------------|----------------|--------|----------------|--------------------|------------------------|-----------------------|
|                              |                |        | A              |                    | B                      | =A*B                  |
| QBO                          | Σ Jan:Mar      |        | -48.06         |                    | -3.0                   | 144.6                 |
| PNA                          | Σ Oct:Jan      |        | -3.45          |                    | -87.2                  | 300.9                 |
| West Glacier, MT             | Σ Jan:Apr Prcp | inches | 8.54           | 94%                | 83.4                   | 712.4                 |
| Fernie, BC                   | Σ Jan:Apr Prcp | inches | 12.82          | 79%                | 39.2                   | 501.9                 |
| Sunshine Village, AB         | 1-May SWE      | inches | 24.92          | 104%               | 57.8                   | 1440.0                |
| East Creek, BC               | 1-May SWE      | inches | 43.03          | 121%               | 27.7                   | 1189.8                |
| Stahl Peak, MT               | 1-May SWE      | inches | 38.10          | 104%               | 30.2                   | 1148.7                |
| Gardiner Creek, AB           | 1-May SWE      | inches | 30.83          | 128%               | 17.6                   | 543.1                 |
| Intercept                    |                |        | 1              |                    | 18.5                   | 18.5                  |
| 1-May May-Aug Forecast (KAF) |                |        |                |                    |                        | Σ 5999.8              |
| Libby Inflow                 | April          | KAF    | 536            | 103%               |                        |                       |
| 1-May Apr-Aug Forecast (KAF) |                |        |                |                    |                        | 6535.5                |

### Data used in Libby Water Supply Forecast

WY 2013

| Climate Data         | Jan-12 | Feb-12 | Mar-12 | Jun-12 | Jul-12 | Oct-12 | Nov-12 | Dec-12 | Jan-13 |
|----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| SOI                  |        |        |        | -0.40  | 0.00   |        |        |        |        |
| QBO                  | -16.07 | -15.25 | -16.74 |        |        |        |        |        |        |
| PNA                  |        |        |        |        |        | -1.13  | -1.06  | -1.31  | 0.05   |
| Precipitation Data   | Oct    | Nov    | Dec    | Jan    | Feb    | Mar    | Apr    | May    | Units  |
| Eureka, MT           | 1.24   | 0.76   | 1.21   | 0.31   | 0.21   |        |        |        | inch   |
| Libby 1 NE RS, MT    | 1.94   | 2.52   | 4.39   | 0.91   | 0.27   |        |        |        | inch   |
| West Glacier, MT     | 3.06   | 4.59   | 4.51   | 1.92   | 2.04   | 2.71   | 1.87   |        | inch   |
| Fernie, BC           | 136.60 | 153.20 | 186.00 | 54.00  | 45.50  | 143.70 | 82.38  |        | mm     |
| Snow Water Equiv     |        |        | 1-Jan  | 1-Feb  | 1-Mar  | 1-Apr  | 1-May  | 1-Jun  | Units  |
| Floe Lake, BC        |        |        | 429    | 532    | 604    |        |        |        | mm     |
| Sunshine Village, AB |        |        | 319    | 370    | 416    | 556    | 633    |        | mm     |
| East Creek, BC       |        |        | 459    | 533    | 635    | 821    | 1093   |        | mm     |
| Stahl Peak, MT       |        |        | 14     | 20     | 25     | 35     | 38     |        | inch   |
| Gardiner Creek, AB   |        |        | 365    | 479    | 540    | 667    | 783    |        | mm     |
| Three Isle Lake, AB  |        |        | 249    | 294    | 339    | 441    |        |        | mm     |
| Lost Creek South, AB |        |        | 355    | 452    | 547    |        |        |        | mm     |
| Morrissey Ridge, BC  |        |        | 331    | 428    | 514    |        |        |        | mm     |
| Hawkins Lake, MT     |        |        | 14     | 19     | 22     |        |        |        | inch   |
| Streamflow           |        |        | Jan    | Feb    | Mar    | Apr    | May    | Jun    | Units  |
| Libby Inflow Volume  |        |        | 213.0  | 179.9  | 260.0  | 535.7  |        |        | KAF    |
| Reservoir Elevation  | 1-Nov  | 1-Dec  | 1-Jan  | 1-Feb  | 1-Mar  | 1-Apr  | 1-May  | 1-Jun  | Units  |
| Libby FOM Elev       | 2449.9 | 2435.7 | 2409.7 | 2395.1 | 2393.8 | 2394.2 | 2402.9 |        | feet   |

Peter F. Brooks, P.E., D. WRE  
 Approving Official  
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 Northwest Division

Carolyn Fitzgerald, P.E.  
 Branch Chief, Hydraulics and Hydrology  
 Seattle District  
 Upper Columbia Senior Water Manager

The Albeni Falls Dam water supply forecast is not used for the implementation of any BiOp actions. This forecast is provided for informational purposes only. See the 2013 Water Management Plan (Table 4) for more info.



## Northwest River Forecast Center Water Supply Forecasts

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### (ALFW1) ALBENI FALLS DAM Forecasts for Water Year 2013

#### Official Forecast

10 days of QPF: **Ensemble: 2013-05-06** **Issued: 2013-05-07**

| Forecast Period | Forecasts Are in KAF |       |           |       | 30 Year Average (1981-2010) |
|-----------------|----------------------|-------|-----------|-------|-----------------------------|
|                 | 90 %                 | 50 %  | % Average | 10 %  |                             |
| <b>APR-SEP</b>  | 11434                | 11979 | 93        | 13157 | 12815                       |
| APR-JUL         | 10467                | 11020 | 94        | 12069 | 11777                       |
| APR-AUG         | 11013                | 11523 | 93        | 12670 | 12354                       |
| JAN-JUL         | 12701                | 13254 | 93        | 14303 | 14189                       |

3 days of QPF: **Ensemble: 2013-05-06** **Issued: 2013-05-07**

|         |       |       |    |       |       |
|---------|-------|-------|----|-------|-------|
| APR-SEP | 11437 | 12110 | 94 | 13151 | 12815 |
| APR-JUL | 10481 | 11082 | 94 | 12162 | 11777 |
| APR-AUG | 11032 | 11615 | 94 | 12712 | 12354 |
| JAN-JUL | 12715 | 13316 | 94 | 14396 | 14189 |

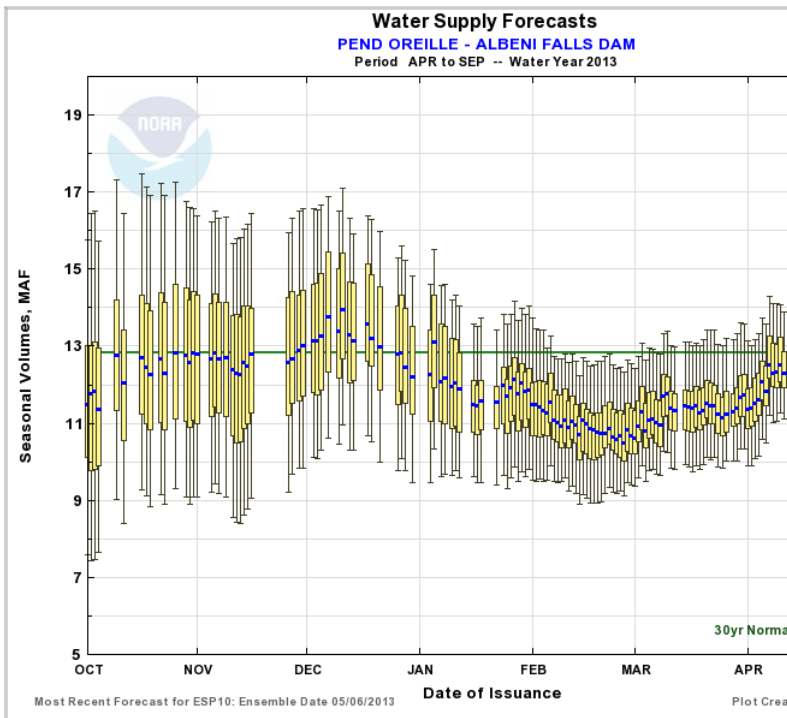
0 days of QPF: **Ensemble: 2013-05-06** **Issued: 2013-05-07**

|         |       |       |    |       |       |
|---------|-------|-------|----|-------|-------|
| APR-SEP | 11444 | 12268 | 96 | 13339 | 12815 |
| APR-JUL | 10467 | 11216 | 95 | 12295 | 11777 |
| APR-AUG | 11035 | 11831 | 96 | 12853 | 12354 |
| JAN-JUL | 12701 | 13450 | 95 | 14529 | 14189 |

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

**Overlay**  
☒ ESP10
 ☐ ESP3
 ☐ ESP0

**Data Files**



Max Scale Scale To Data Scale To Last 45 Days

Note: Compatible with the latest browsers (Chrome, Firefox, Safari, and Internet Explorer (ie9+)).

The official Hungry Horse Dam water supply forecast is computed by the Bureau of Reclamation on the 3rd working day of the month from January-June.

The MAY final forecast of *May-Sep* inflows is used to set VARQ refill flows. See the [2013 Water Management Plan](#) (Table 4) for more info.

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May 3, 2013 - MAY final forecast of volumes (kaf) for Hungry Horse inflow:

May – Jul: 1,665 kaf (106%)

Apr – Aug: 2,054 kaf (106%)

May – Sep: 1,789 kaf (106%)

Jan - Jul: 2,214 kaf (106%)

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John Roache, Civil Engineer  
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PN Regional Office, Boise, ID