

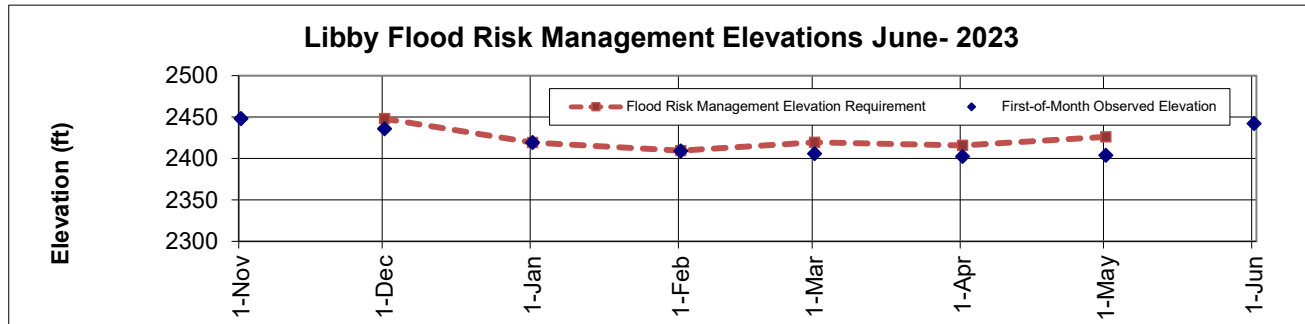
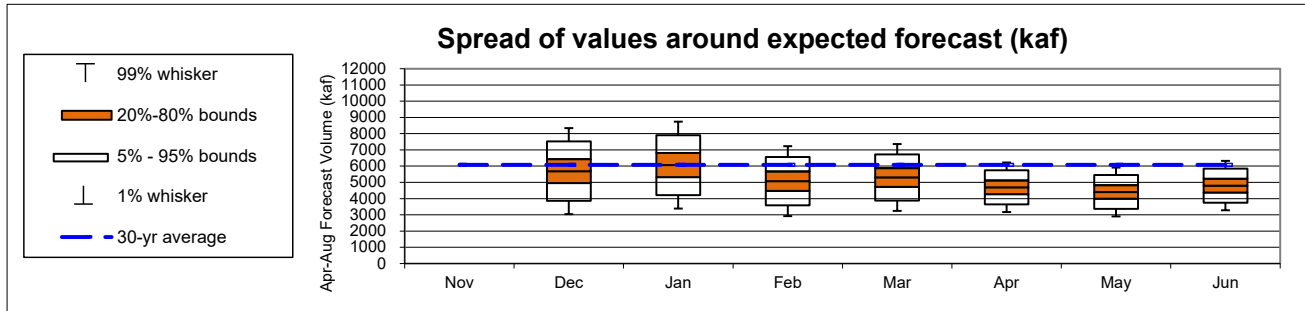
Libby : June Runoff Forecast & Flood Risk Management Calculation

WY 2023

| Runoff Forecast                            | June | 1991-2020 Average | 1991 - 2020 Percent of Average | 1929-2020 Average | 1929 - 2020 Percent of Average |
|--|------|-------------------|--------------------------------|-------------------|--------------------------------|
| Most Probable Runoff Volume: Apr-Aug (kaf) | 4803 | 6080              | 79%                            | 6259              | 77%                            |
| Most Probable Runoff Volume: Apr-Jul (kaf) | 4497 | 5570              | 81%                            | 5708              | 79%                            |
| Most Probable Runoff Volume: May-Jul (kaf) | 4200 | 5014              | 84%                            | 5183              | 81%                            |

| Forecast/Reservoir Data       | Nov    | Dec    | Jan    | Feb    | Mar    | Apr    | May    | Jun    |
|-------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| Apr-Aug Runoff Forecast (kaf) |        | 5692   | 6063   | 5075   | 5302   | 4698   | 4408   | 4803   |
| First-of-Month Elev (ft)      | 2448.0 | 2435.9 | 2419.3 | 2409.0 | 2405.7 | 2402.4 | 2403.8 | 2442.1 |

| Seasonal FRM Requirements            | 30-Nov | 31-Dec | 31-Jan | 28-Feb | 31-Mar | 30-Apr |  |  |
|--------------------------------------|--------|--------|--------|--------|--------|--------|--|--|
| Flood Risk Management Space (kaf)    | 500    | 1689   | 2054   | 1680   | 1823   | 1422   |  |  |
| Flood Risk Management Elevation (ft) | 2448.0 | 2419.3 | 2409.5 | 2419.6 | 2415.8 | 2426.1 |  |  |



Notes:

- The given forecast is the official Corps of Engineers forecast for Libby. If you have any questions please contact Leon Basdekas (208) 353-2564, Jason Chang (206) 764-3528, Lumas Helaire (206) 316-3875, Ethan Cheng (206) 316-3909, or Kevin Shaffer (206) 764-3660.
- 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.
- Nearby Cranbrook A (Auto), BC dataset was used in place of Cranbrook A, BC due to a missing data point in the latter.

**Libby : June Runoff Forecast & Flood Risk Management Calculation**  
**Apr-Aug Runoff Forecast Calculation:**

| Variable                  | Month(s)       | Units       | Observed Value A | Percent of Average (1991-2020) | Regression Coefficient B | Marginal Runoff (KAF) =A*B |
|---------------------------|----------------|-------------|------------------|--------------------------------|--------------------------|----------------------------|
| SOI                       | Σ Jun:Jul      |             |                  |                                |                          |                            |
| Eureka RS, MT             | Σ Oct:May Prcp | inches      | 6.1              | 67%                            | 37.7                     | 228.6                      |
| West Glacier, MT          | Σ Oct:May Prcp | inches      | 14.9             | 66%                            | 22.5                     | 335.4                      |
| Cranbrook A, BC           | Σ Oct:May Prcp | millimeters | 173.8            | 72%                            | 2.0                      | 352.9                      |
| Fernie, BC                | Σ Oct:May Prcp | millimeters | 598.6            | 71%                            | 0.5                      | 300.5                      |
| Hawkins Lake, MT          | 1-Jun SWE      | inches      | 0.0              | 0%                             | 10.1                     | 0.0                        |
| Stahl Peak, MT            | 1-Jun SWE      | inches      | 0.0              | 0%                             | 10.3                     | 0.0                        |
| East Creek, BC            | 1-Jun SWE      | millimeters | 184.0            | 27%                            | 0.4                      | 79.5                       |
| Moyie Mountain, BC        | 1-Jun SWE      | millimeters | 0.0              | 0%                             | 0.8                      | 0.0                        |
| Sunshine Village, AB      | 1-Jun SWE      | millimeters | 0.0              | 0%                             | 0.6                      | 0.0                        |
| Akamina Pass, AB          | 1-Jun SWE      | millimeters | 0.0              | 0%                             | 0.7                      | 0.0                        |
| South Racehorse Creek, AB | 1-Jun SWE      | millimeters | 0.0              | 0%                             | 0.6                      | 0.0                        |
| Intercept                 |                |             | 1                |                                | 978.0                    | 978.0                      |
| Forecast Inflow           | June-August    | kaf         |                  |                                |                          | 2274.8                     |
| Observed Inflow           | April - May    | kaf         | 2528.0           |                                |                          | 2528.0                     |
| May Forecast              | April - August | kaf         |                  |                                |                          | 4802.9                     |

**Data used in Libby Water Supply Forecast**

| Climate Data |  |  |  | Jun-22 | Jul-22 |
|--------------|--|--|--|--------|--------|
| SOI          |  |  |  | 1.7    | 0.8    |

| Precipitation Data      | Oct  | Nov   | Dec   | Jan  | Feb  | Mar  | Apr   | May  |
|-------------------------|------|-------|-------|------|------|------|-------|------|
| Eureka RS, MT (inch)    | 0.4  | 1.1   | 1.6   | 0.2  | 0.5  | 0.1  | 0.2   | 2.0  |
| West Glacier, MT (inch) | 2.0  | 2.8   | 4.5   | 0.8  | 1.8  | 0.4  | 1.0   | 1.7  |
| Cranbrook A, BC (mm)    | 13.0 | 24.5  | 36.6  | 32.8 | 6.0  | 4.1  | 26.2  | 30.6 |
| Fernie, BC (mm)         | 98.8 | 118.0 | 112.3 | 36.1 | 52.1 | 35.1 | 118.9 | 27.4 |

| Snow Water Equiv               | 1-Nov | 1-Dec | 1-Jan | 1-Feb | 1-Mar | 1-Apr | 1-May | 1-Jun |
|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Hawkins Lake, MT (inch)        |       |       |       | 14.1  | 18.5  | 21.8  | 21.3  | 0.0   |
| Stahl Peak, MT (inch)          |       |       | 15.6  | 19.0  | 25.5  | 28.0  | 28.0  | 0.0   |
| East Creek, BC (mm)            |       |       |       | 437.0 | 604.0 | 670.0 | 669.5 | 184.0 |
| Moyie Mountain, BC (mm)        |       |       | 219.0 | 256.0 | 325.0 | 379.0 | 261.0 | 0.0   |
| Sunshine Village, AB (mm)      |       |       | 236.1 | 261.3 | 356.4 | 392.7 | 423.5 | 0.0   |
| Akamina Pass, AB (mm)          |       |       |       | 254.4 | 339.9 | 381.0 | 229.3 | 0.0   |
| South Racehorse Creek, AB (mm) |       |       |       | 242.2 | 326.4 | 371.8 | 279.1 | 0.0   |

| Streamflow                | Nov | Dec | Jan   | Feb   | Mar   | Apr   | May    | Jun |
|---------------------------|-----|-----|-------|-------|-------|-------|--------|-----|
| Libby Inflow Volume (kaf) |     |     | 170.3 | 122.5 | 131.7 | 296.2 | 2231.8 |     |

| Reservoir Elevation   | 1-Nov  | 1-Dec  | 1-Jan  | 1-Feb  | 1-Mar  | 1-Apr  | 1-May  | 1-Jun  |
|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| Libby FOM Elev (feet) | 2448.0 | 2435.9 | 2419.3 | 2409.0 | 2405.7 | 2402.4 | 2403.8 | 2442.1 |

William D. Proctor, P.E.  
 Approving Official  
 Ch., Hydrologic Engineering and Power Branch  
 Northwestern Division

Leon Basdekas, P.E.  
 Upper Columbia Senior Water Manager  
 Seattle District