MARCH SHIFT ESTIMATES AND REFILL INFORMATION

06Mar2025

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MARCH TIMELINE

- ETA on FRM input data afternoon of Thursday 6 Mar
- FRM data calculations, processing, QA that afternoon
- FRM data due Friday 7 Mar

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SHIFT CALCULATION

- The amount of storage that can be shifted is limited by a max allowable shift depending on WSF.
- FRM returns to the unshifted 30 Apr FRM (barring early refill, in which case the reservoirs transition to refill FRM).
- Shift is not allowable over a threshold WSF
  - 3 Maf at DWR Apr-Jul
  - 5.8 Maf at BRN Apr-Jul

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EARLYBIRD FRM – NOT FINAL FORECASTS

75% Dworshak shift only

	units	31-Jan	28-Feb	31-Mar	10-Apr	15-Apr	30-Apr
Grand Coulee	ft	1290	1290	1282.6	1281.7	1280.9	1282.4
Brownlee	ft	2077	2044.5	2052.3		2059.9	2067.9
Dworshak	ft	1550.1	1546.2	1558.3		1566.9	1554.3

50% Dworshak shift only

	units	31-Jan	28-Feb	31-Mar	10-Apr	15-Apr	30-Apr
Grand Coulee	ft	1290	1290	1282.9	1282	1281.7	1282.4
Brownlee	ft	2077	2044.5	2052.3		2059.9	2067.9
Dworshak	ft	1550.1	1546.2	1557		1562.8	1554.3

Without shift

	units	31-Jan	28-Feb	31-Mar	10-Apr	15-Apr	30-Apr
Grand Coulee	ft	1290	1290	1283.3	1283.3	1283.3	1282.4
Brownlee	ft	2077	2044.5	2052.3		2059.9	2067.9
Dworshak	ft	1550.1	1546.2	1554.4		1554.3	1554.3

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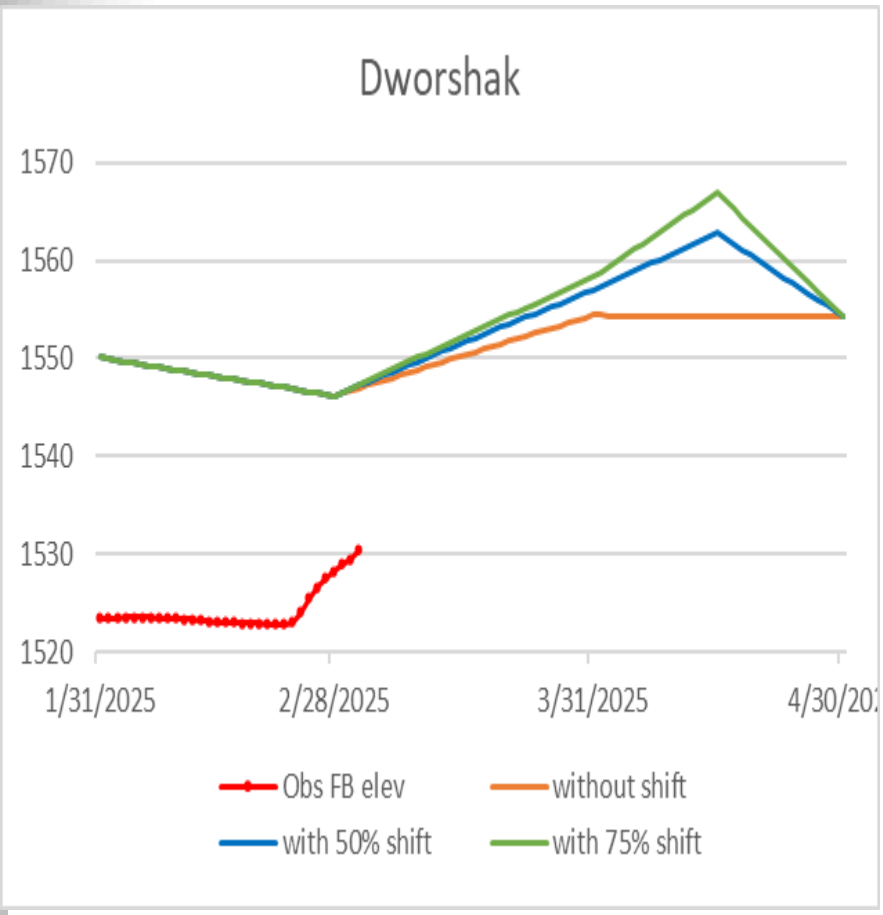
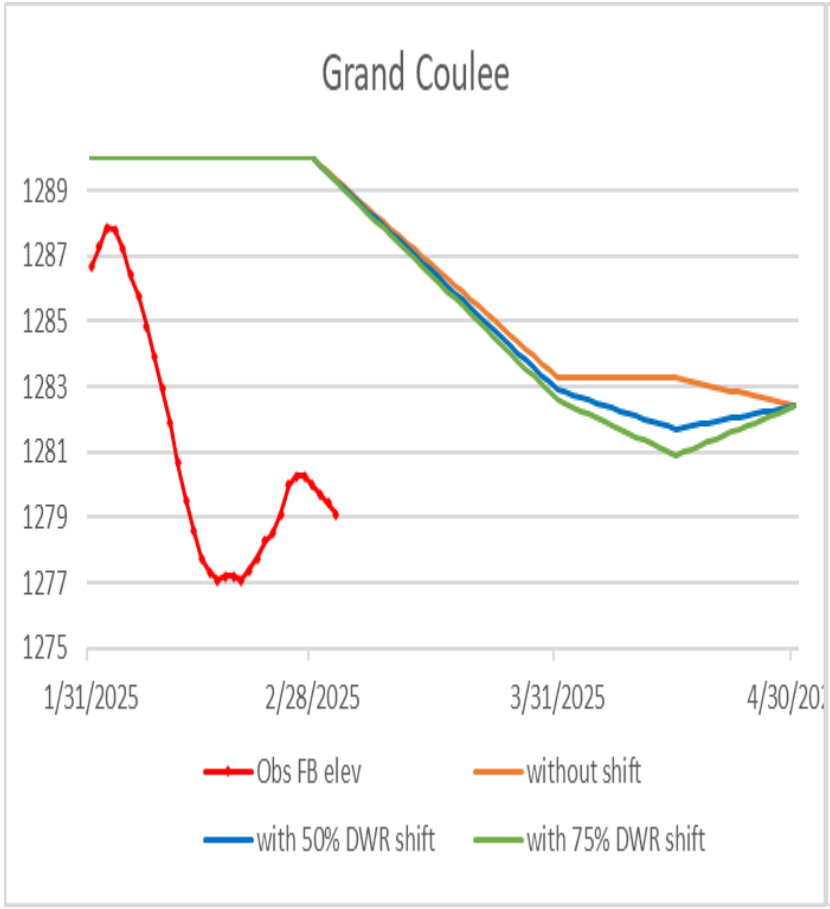
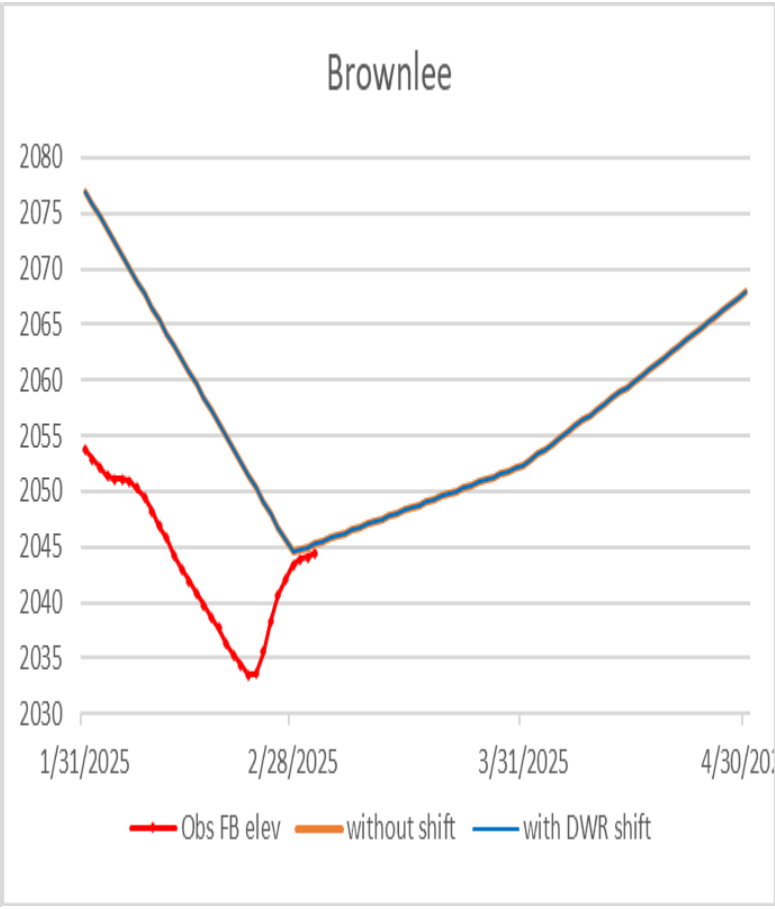
EARLYBIRD SHIFT PLOTS







DECLARING START OF REFILL

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DECLARATION OF REFILL CONCEPT

- Refill in this context refers to the date at which reservoirs can exceed the Upper Rule Curve for FRM.
- The FRM refill date may not actually be the day that reservoirs begin filling if the reservoir is already far below FRM.
- The FRM refill date isn't usually the same for each reservoir. Refill can be triggered by:
  - A concept called the Initial Control Flow (ICF) Date
  - Typical days before ICF
  - Rules in the Water Control Manual
  - Low flow criteria
  - FCRC

https://www.nwd-wc.usace.army.mil/report/flood_risk/

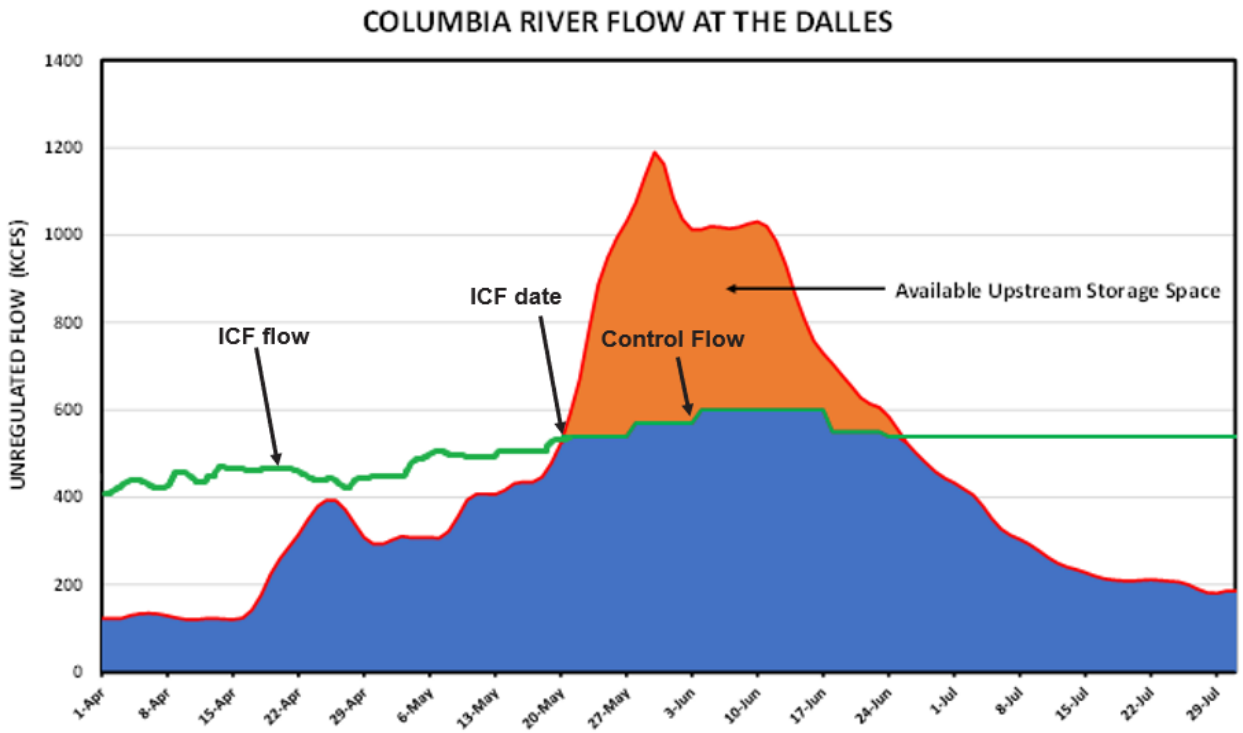
C. Flood Risk Management Requirements

These requirements have been prepared using the most recent official seasonal volume forecasts. The April-August volume forecast at The Dalles Dam based on the February 2025 official forecast is 75,228 kaf. All other forecasts can be found in Table 2 or at: http://www.nwd-wc.usace.army.mil/report/colsum/

Table 1 shows the flood risk management elevations, draft and flow limits for the evacuation, holding and refill periods. The Initial Controlled Flow (ICF) based on the February forecast is 276 kcfs.

INITIAL CONTROLLED FLOW (ICF) CONCEPTS

- ICF is the first estimate of The Dalles (TDA) regulated flow that can be controlled to throughout the refill season
- ICF Date is the date at which the TDA unregulated flow first exceeds the ICF
  - System project refill is initiated based on ICF Date
- ICF is calculated daily if needed (more frequent close to refill)



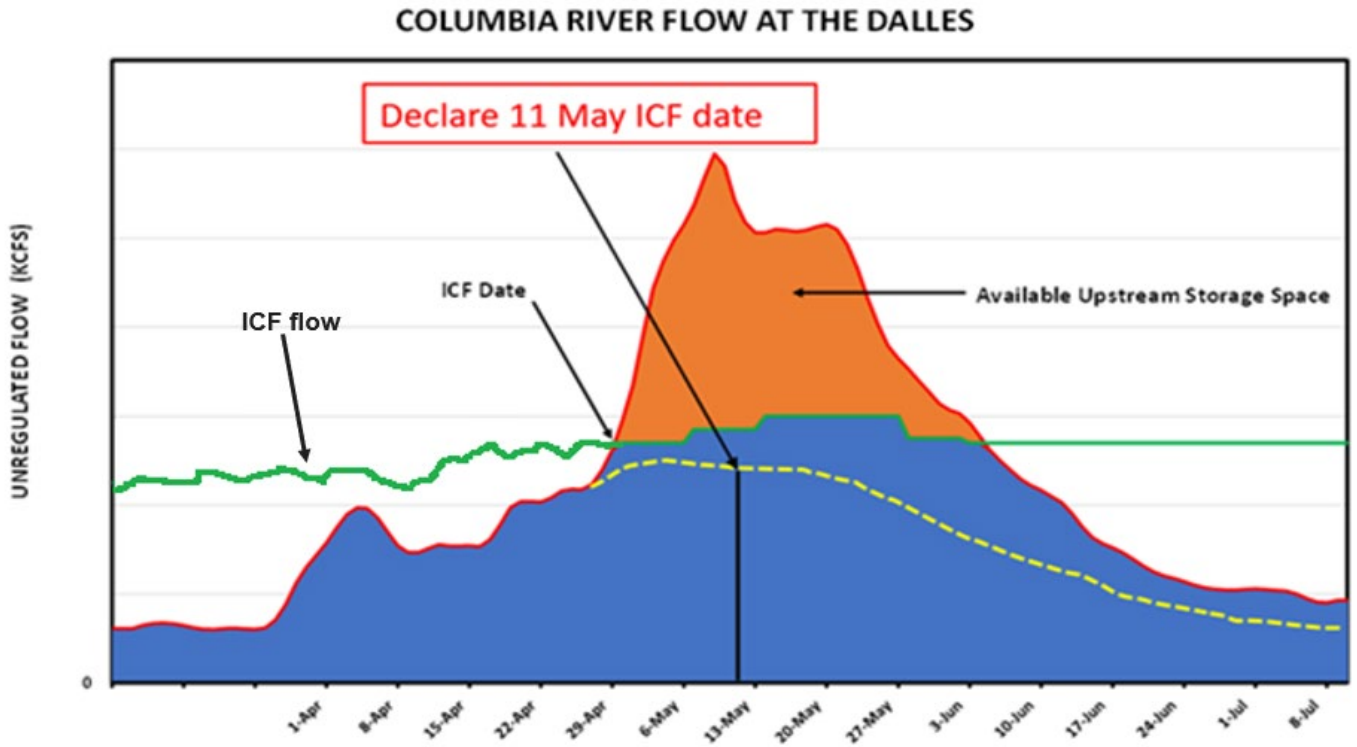
DETERMINE THE ICF DATE

The ICF date is the day on which the ICF flow crosses the unregulated flow hydrograph in the next 7-10 day window and appears to remain at that flow threshold for at least 7 days.

Project	Number of days prior to Initiation of FRM Fill that refill may begin
Mica	2[1]
Arrow	2[1]
Duncan	2[1]
Libby	3[2]
Hungry Horse	4[3]
Dworshak	1[4]
Brownlee	1
Grand Coulee	1[5]

LOW FLOW CRITERIA FOR ICF DATE

- The low-flow criteria sets a a fail-safe ICF date of 11 May
- This prevents a low water year scenario in which unregulated flows never reach the ICF Flow and we would either declare refill too late or never declare refill.
- Threshold for low flow is 82 maf Apr-Aug at TDA

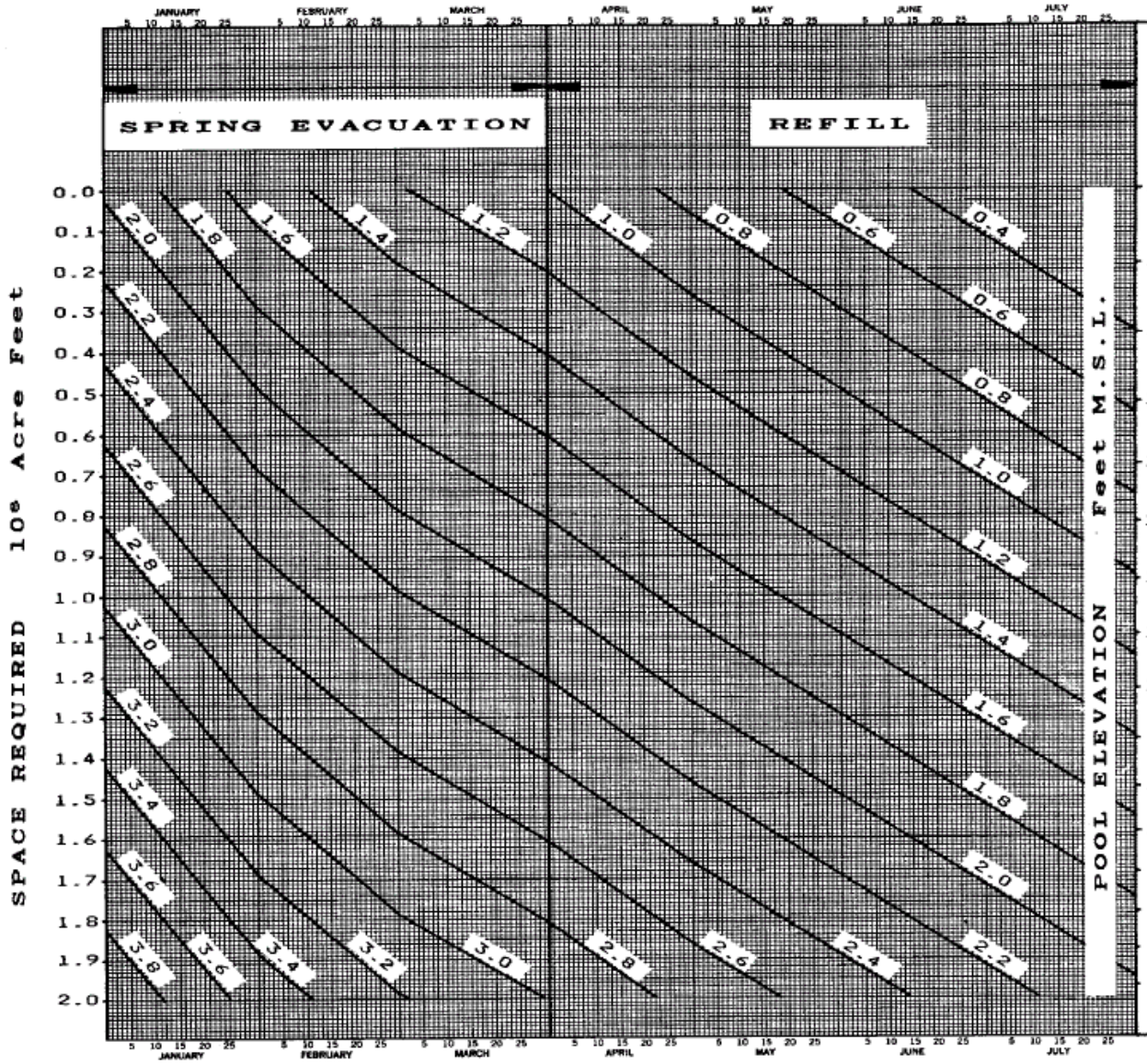


FCRC REFILL

- Flood Control Refill Curve
- Tries to ensure refill with a 95% confidence
- Comes from the Water Control Manual

- Given: the volume the project has to fill, the volume we think is going to run off (with a forecast error applied) and what volume the project needs to evacuate (min flow)
- Solve for: what elevation the project needs to be at to ensure refill
- The date at which this elevation crosses the URC is the refill date for the project

FCRC REFILL



NOTES

1. The variable refill curves (VRC) have the following corrections built in to assure 95% refill and provide a mean daily release of 2,000 cfs from forecast date through 31 July.

Forecast correction applied to most probable forecast = 1.645 x standard error for period of forecast:

1 Jan Fcst	1 Feb Fcst	1 Mar Fcst
1,129,100 AF	797,700 AF	609,500 AF
1 Apr Fcst	**1 May Fcst**	**1 Jun Fcst**
511,100 AF	374,200 AF	265,200 AF

The forecast correction is applied to the most probable forecast when computing the VRC.

The volume correction required for a 2,000 cfs mean daily release from forecast date through 31 July is as follows:

1 Jan Fcst	1 Feb Fcst	1 Mar Fcst
841,000 AF	718,000 AF	606,900 AF
1 Apr Fcst	**1 May Fcst**	**1 Jun Fcst**
484,000 AF	365,000 AF	242,000 AF

2. The VRC curves are used as follows: Enter on the date of the forecast and follow the date line to its intersection with the VRC equal to the most probable volume from date to 31 July. Then read the space required from the vertical scale on the left margin. This is the space that has a 95% probability of refill with a mean daily release of 2,000 cfs.

DWORSHAK DAM AND RESERVOIR
North Fork Clearwater River, Idaho

VARIABLE REFILL CURVES
BASED ON NPW FORECASTS

U.S. Army Engineer District, Walla Walla
Hydrology Branch January, 1986

WATER CONTROL MANUAL PLATE 7-2

SUMMARY AND NEXT STEPS

Shift and FRM – will be posted COB Friday

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