

2023 Hydrology and Hydro Project Operations

Cowlitz Annual Program Review
and Science Conference

September 4, 2024

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Overview

- Physical setting
- Review Water Year 2023 & 5-year* context
 - Inflows: Rain and runoff
 - Reservoir elevations
 - Instream flow at Mayfield
- Looking to 2024

*October 2022 – September 2023, 2019-2023



Stewardship of the Cowlitz River

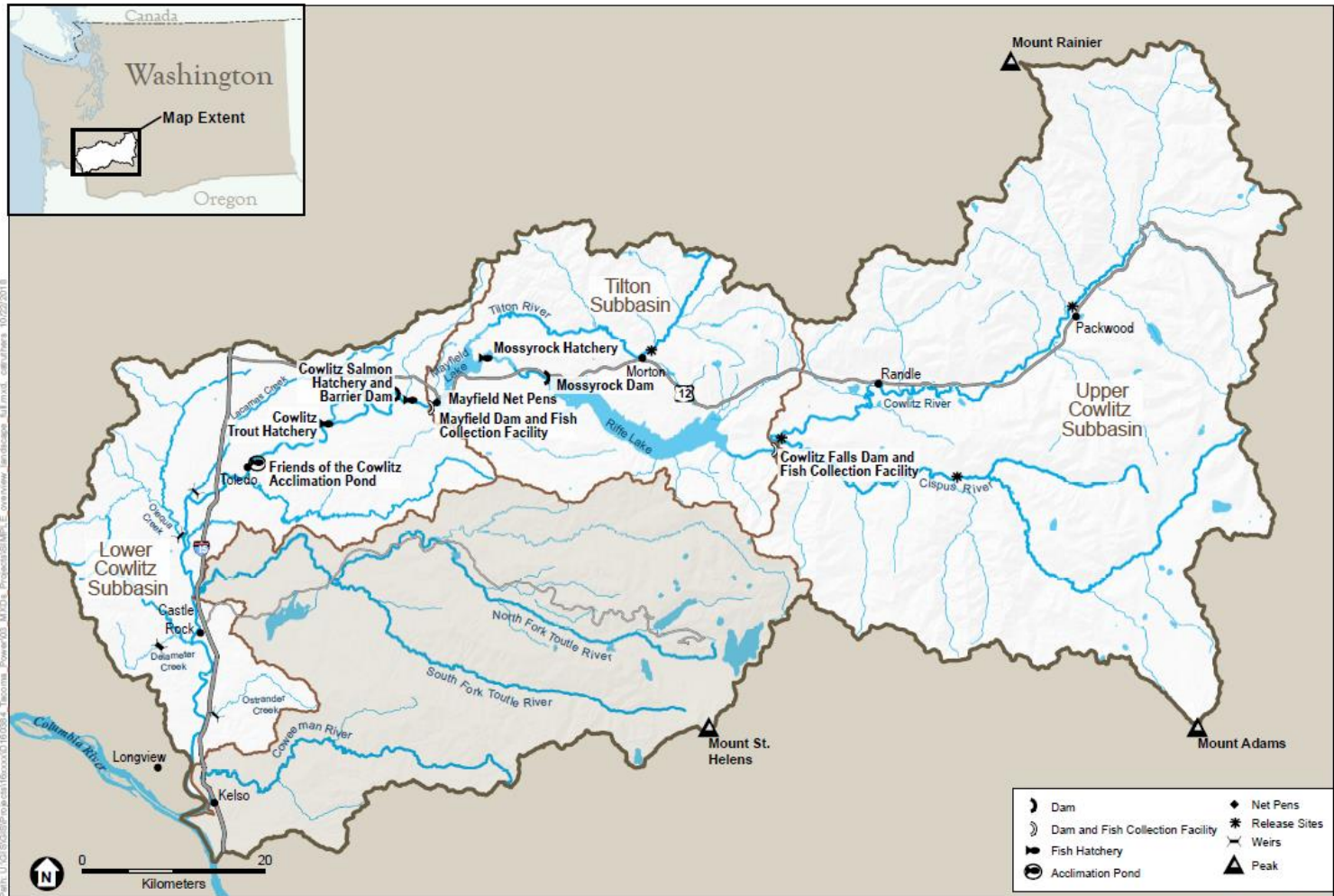


Stewardship of the Cowlitz River



Modified operations at Riffe Lake

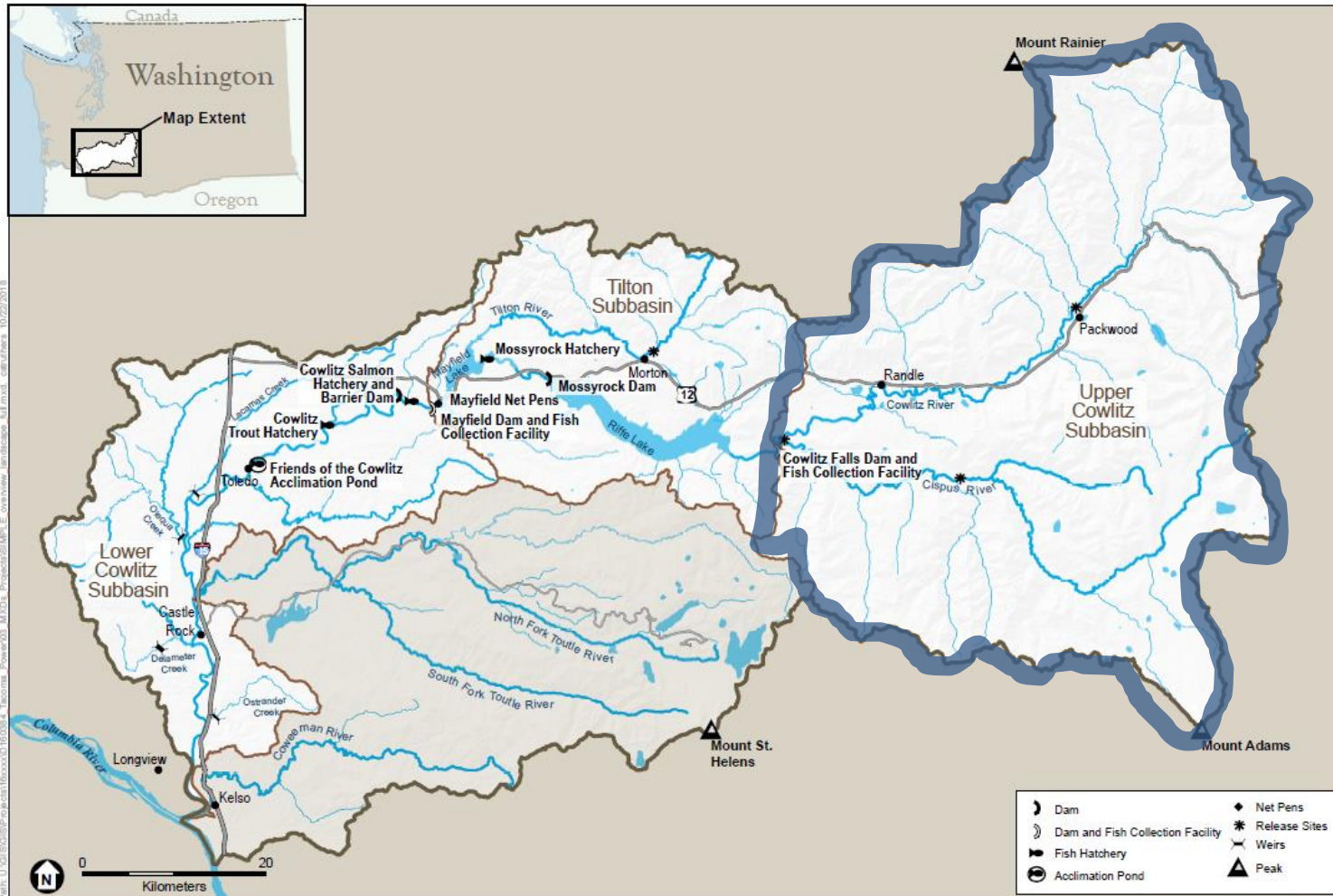
Watershed and Subbasins



SOURCE: SWIFD, 2014; WDNR, 2017

Tacoma Power
Figure 1
 Cowlitz River Subbasins

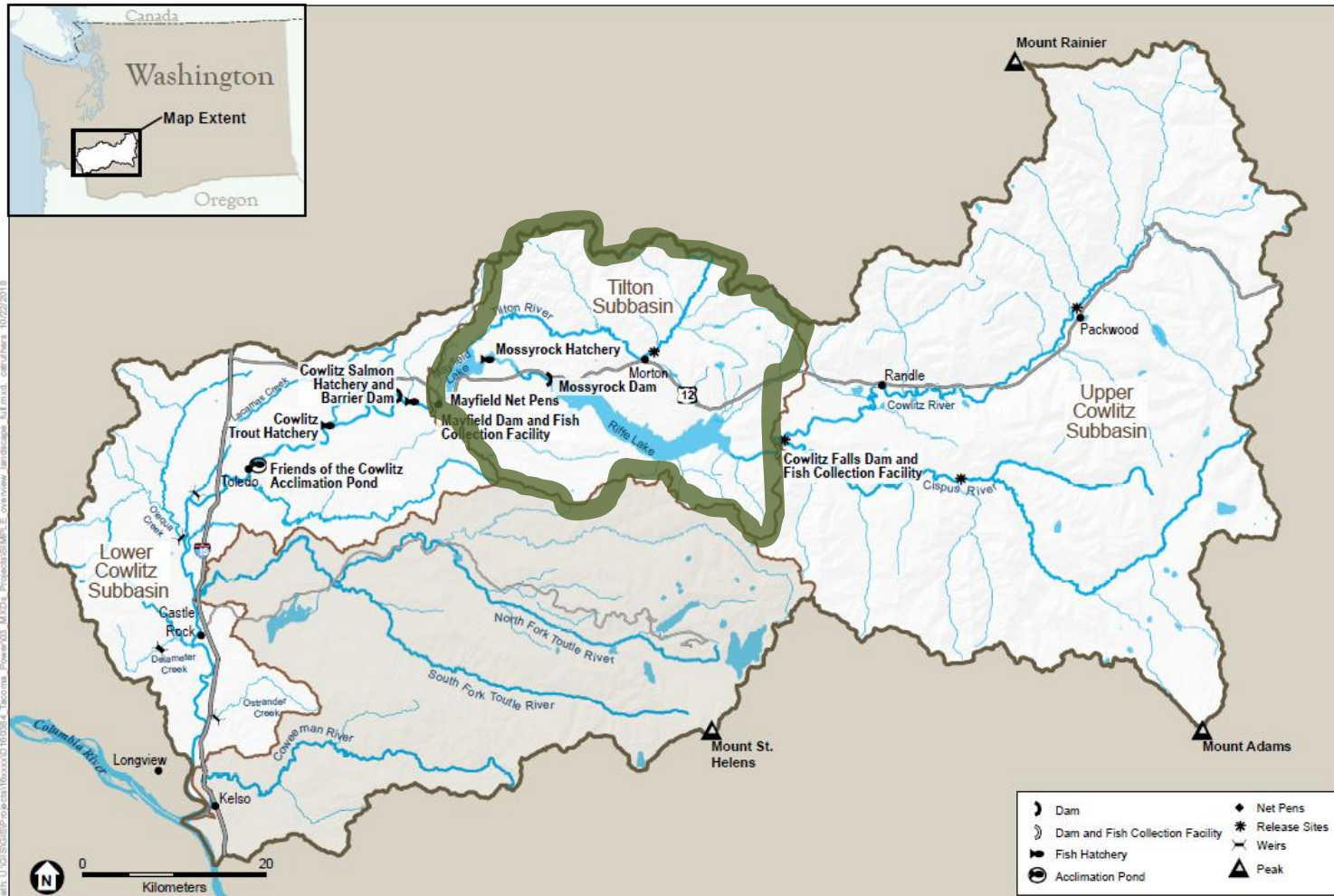
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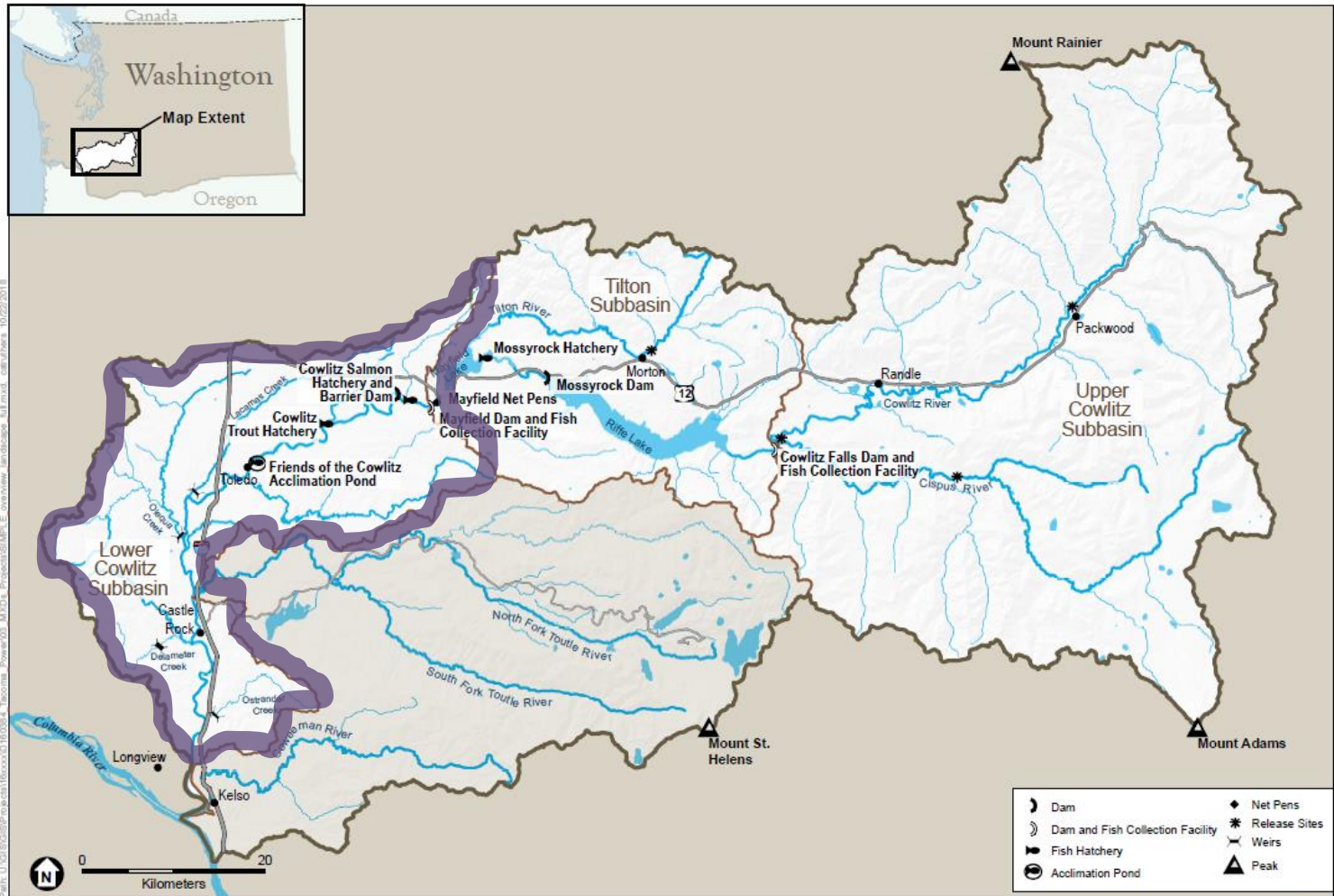
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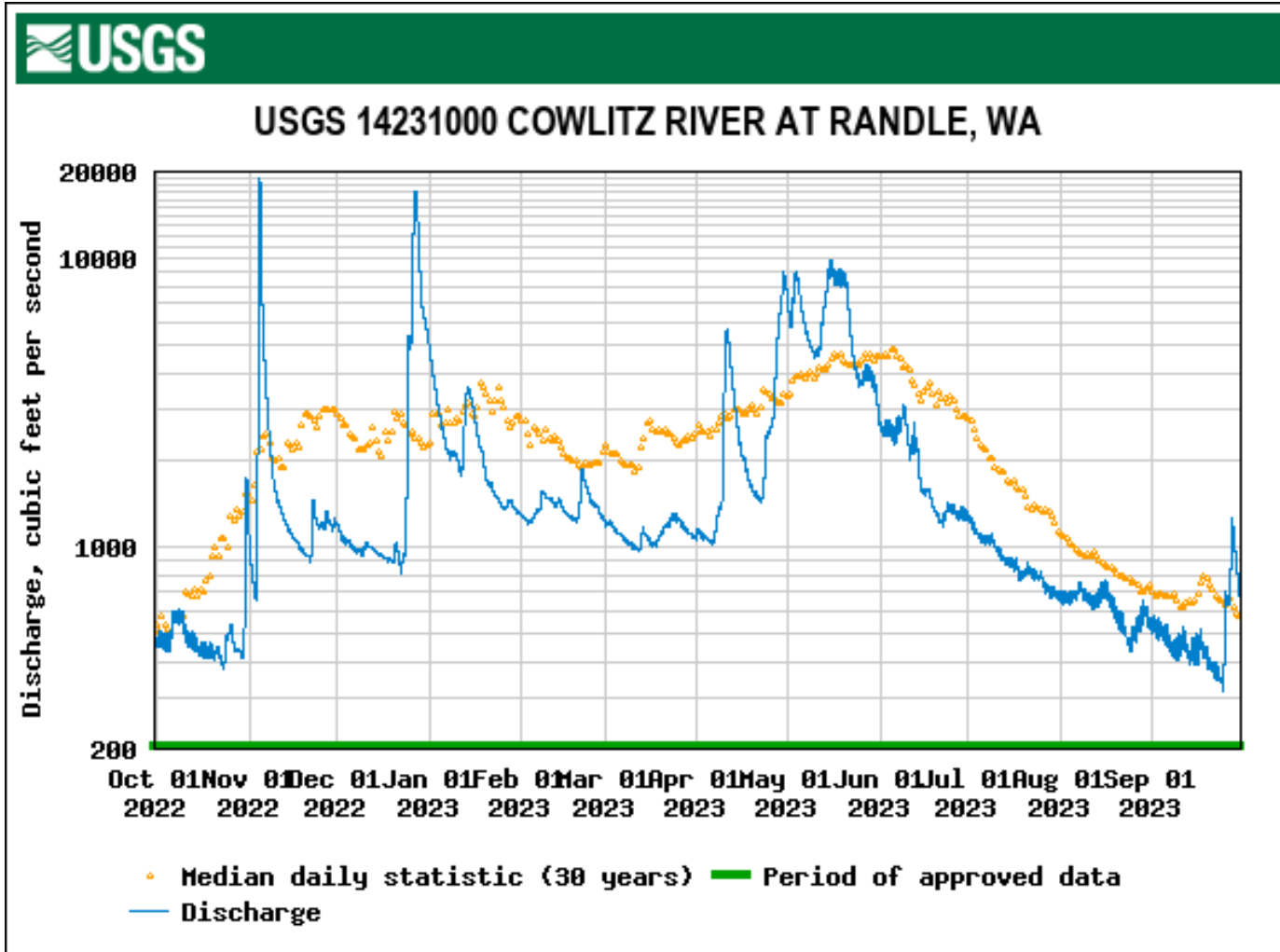
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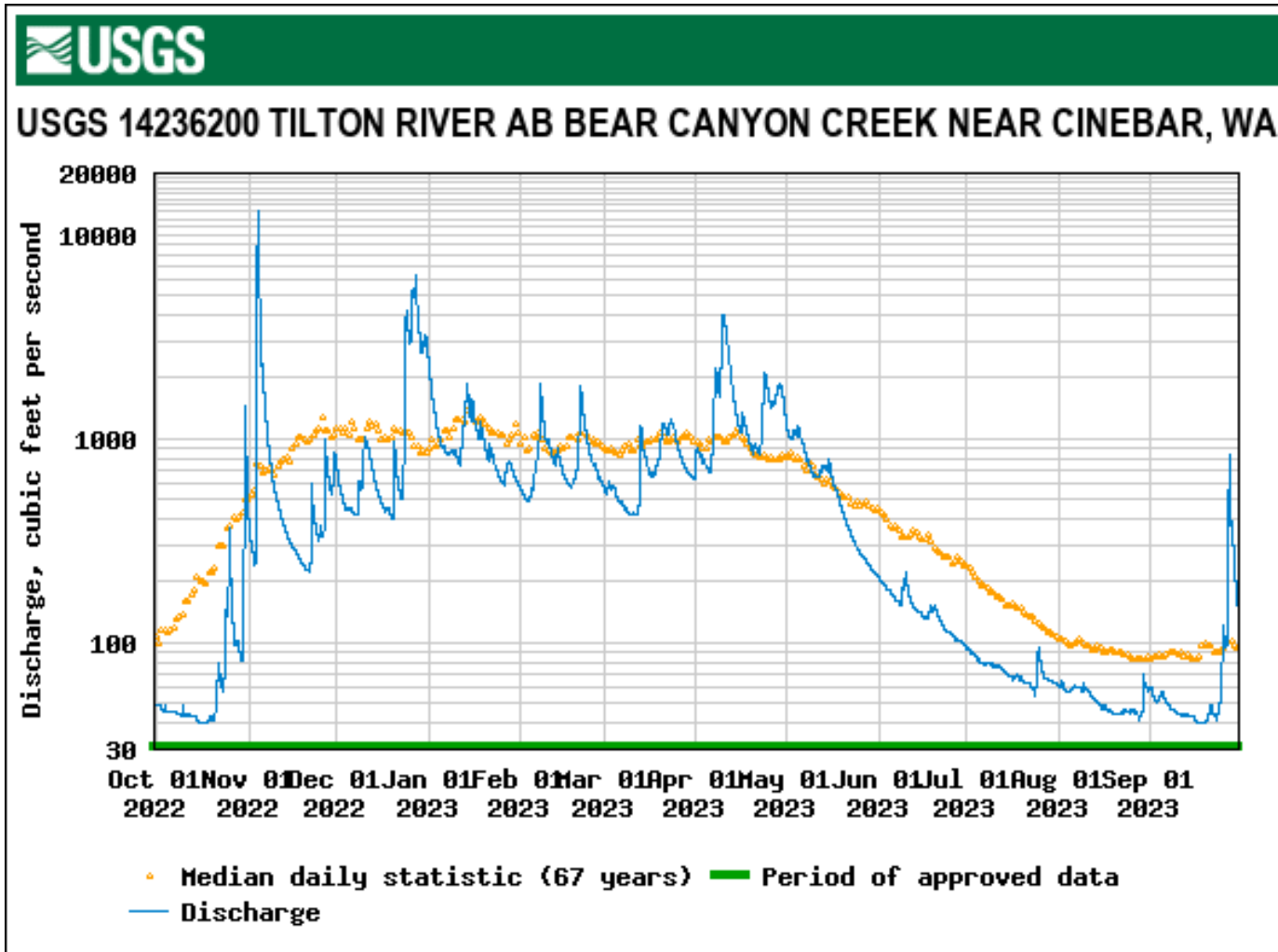
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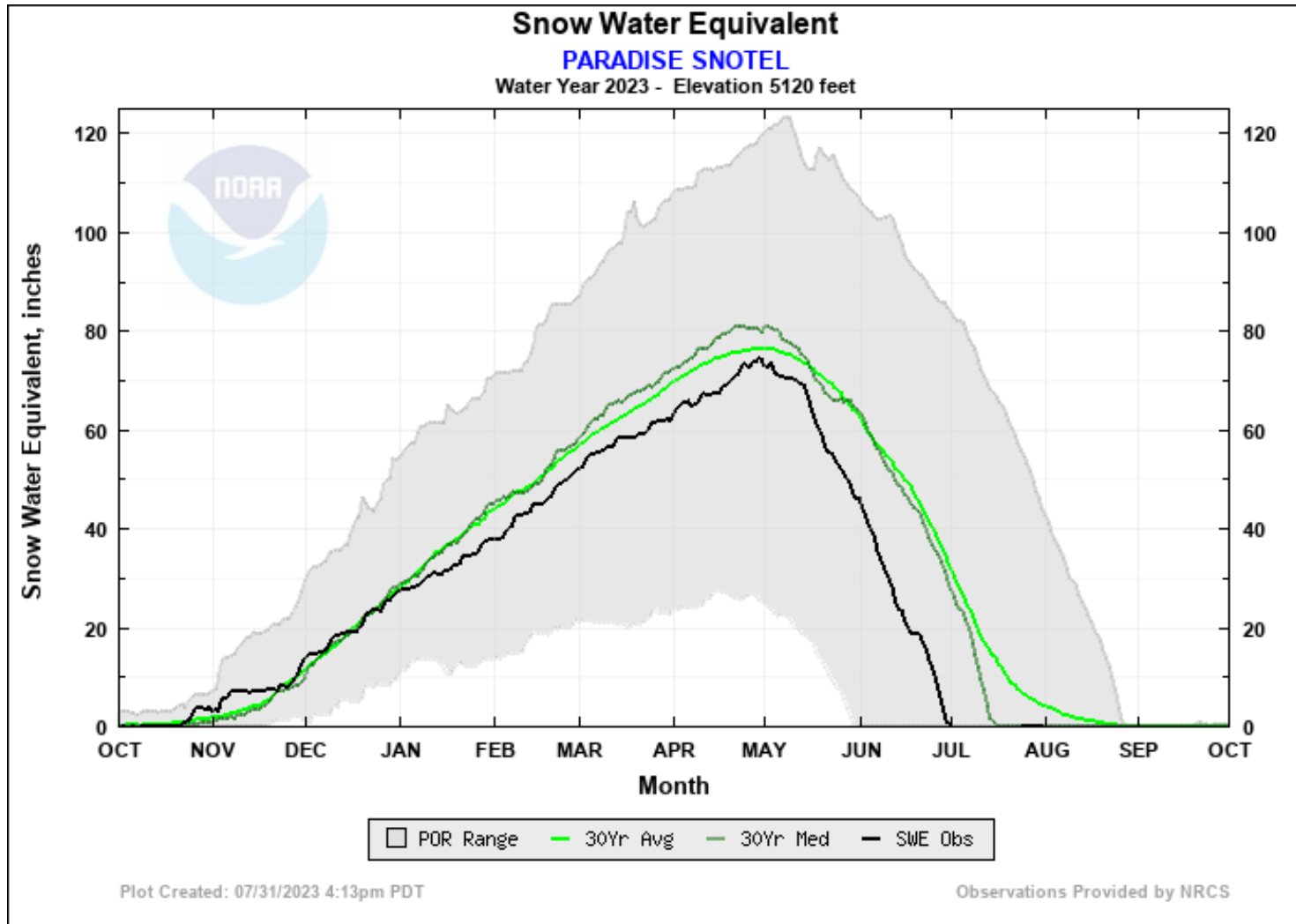
2023 Inflows: Rain and Runoff



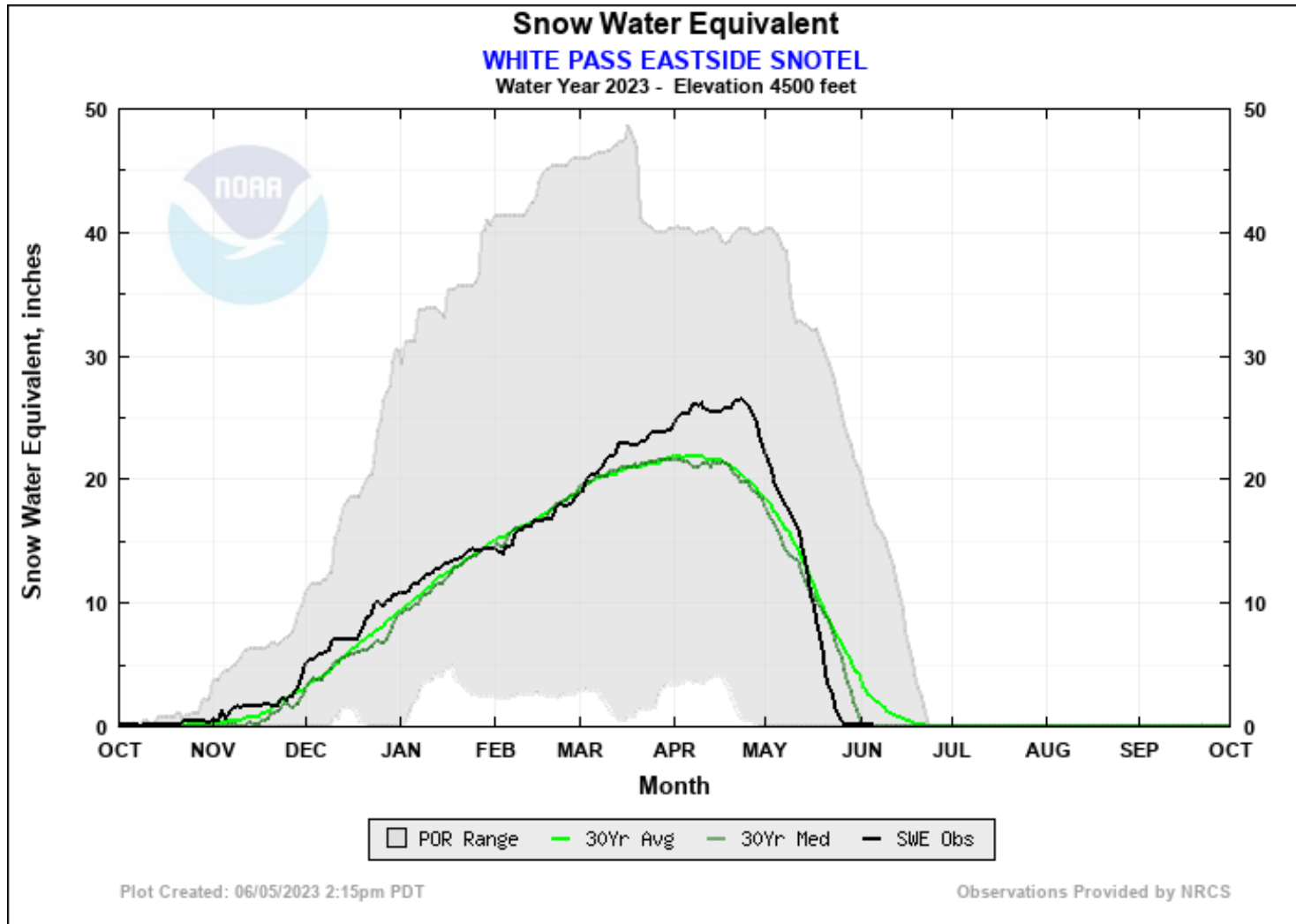
2023 Inflows: Rain and Runoff



2023 Inflows: Snowpack

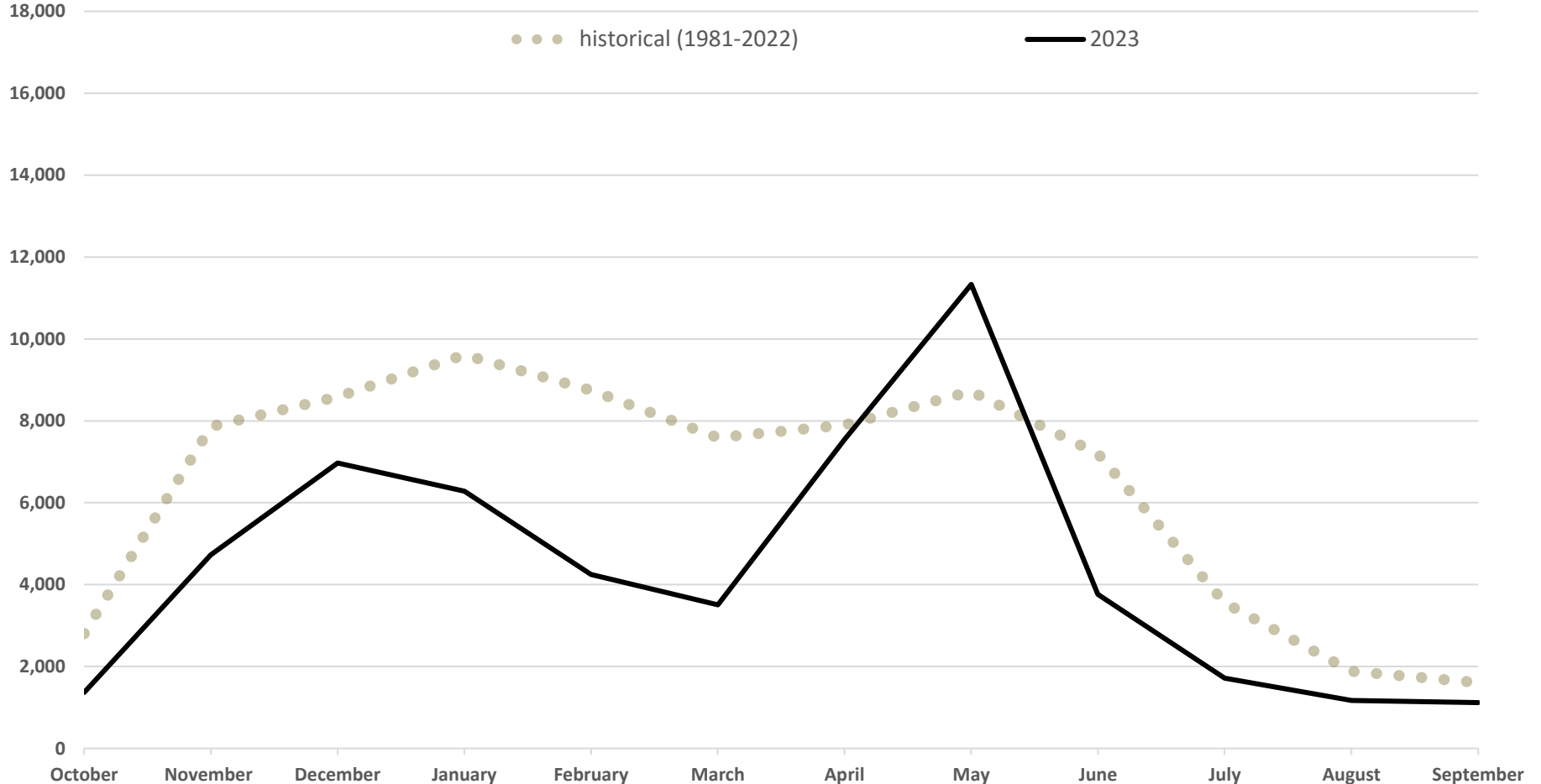


2023 Inflows: Snowpack



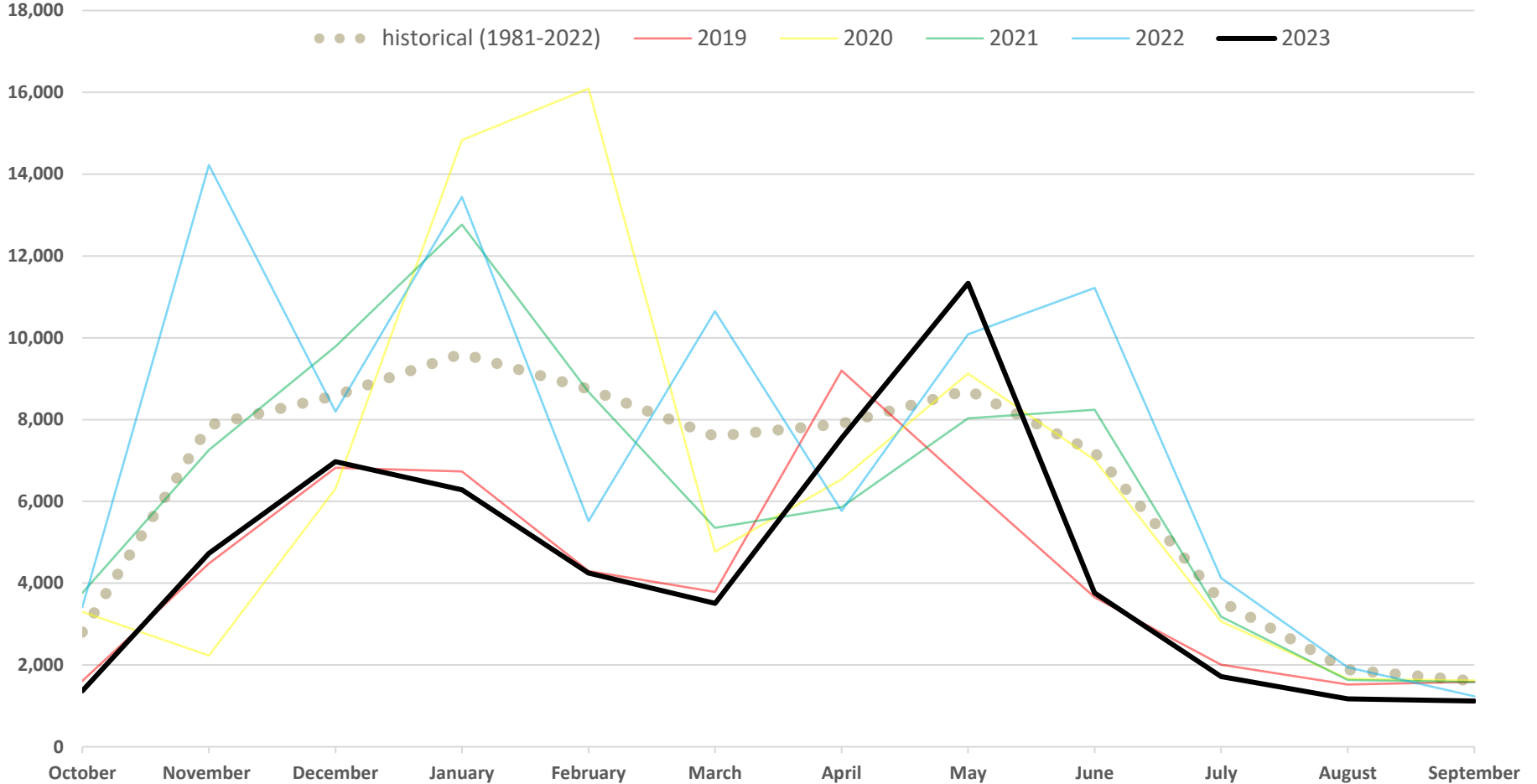
2023 Inflows: By Month

Natural Inflows to Cowlitz Project (Tacoma Power): Daily Average by Month (cfs)



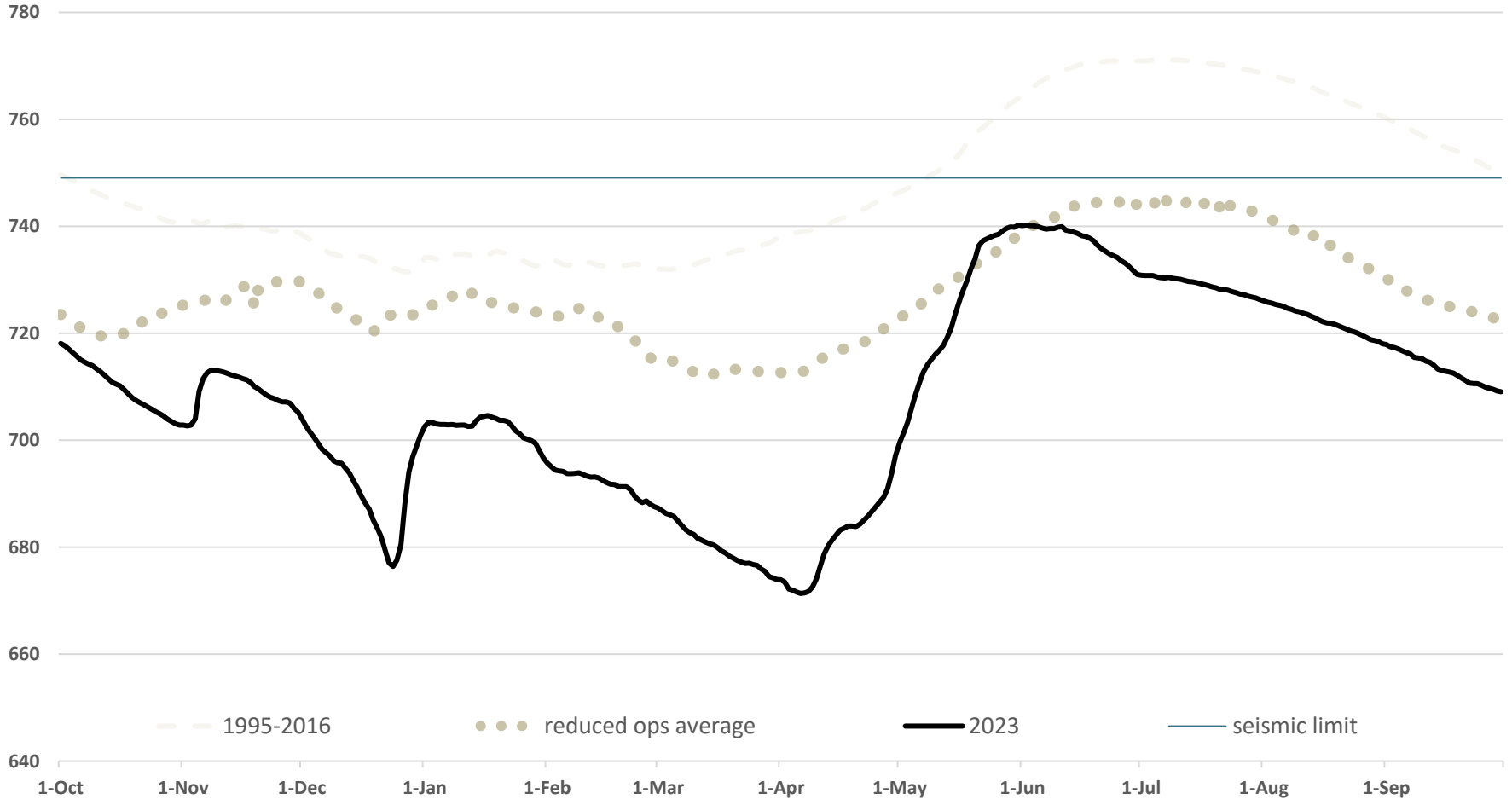
2023 Inflows: 5-Year Context

Natural Inflows to Cowlitz Project (Tacoma Power): Daily Average by Month (cfs)



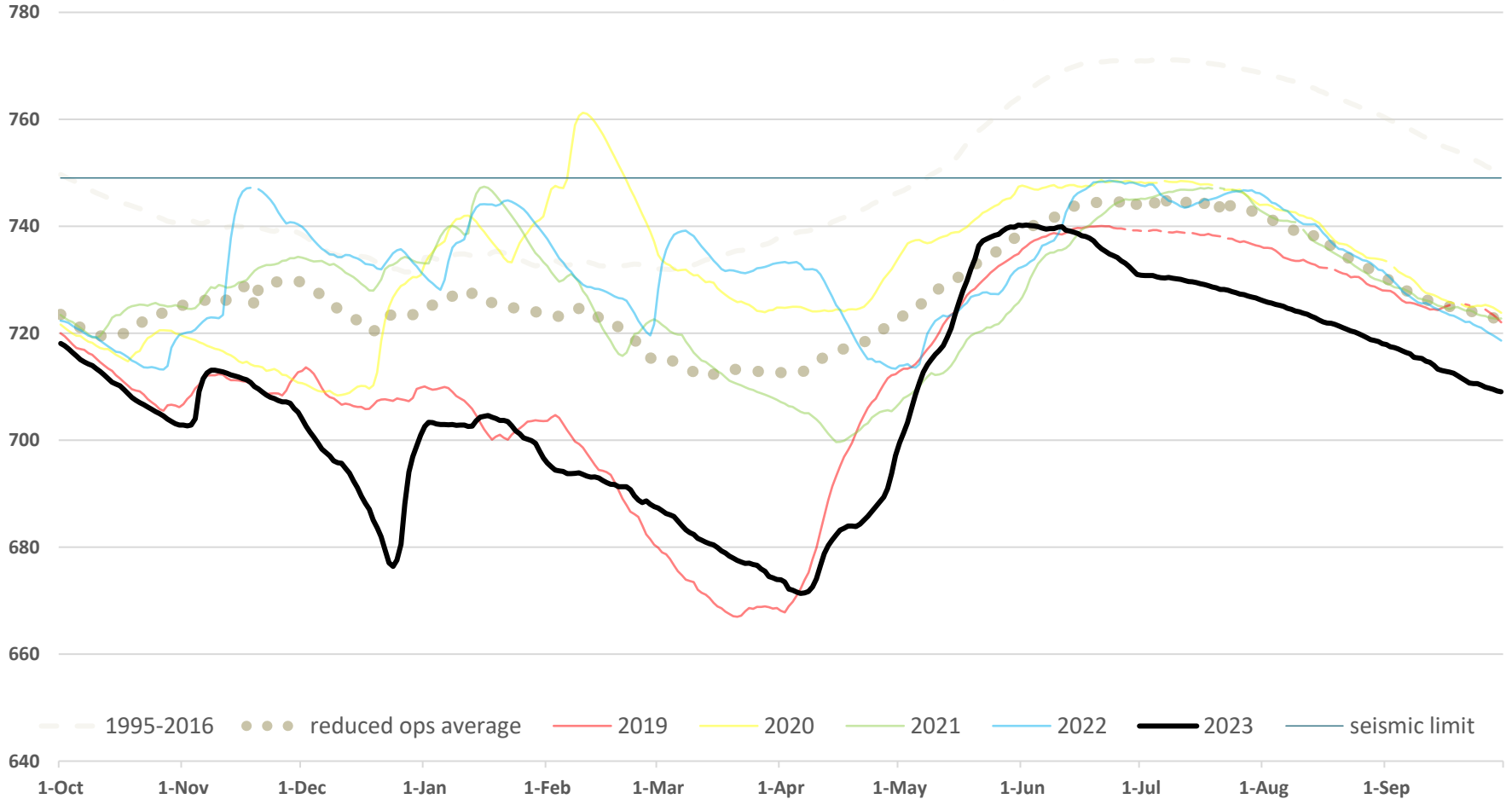
2023 Reservoir Elevations

Riffe Lake Elevations (Tacoma Power): Daily (ft)

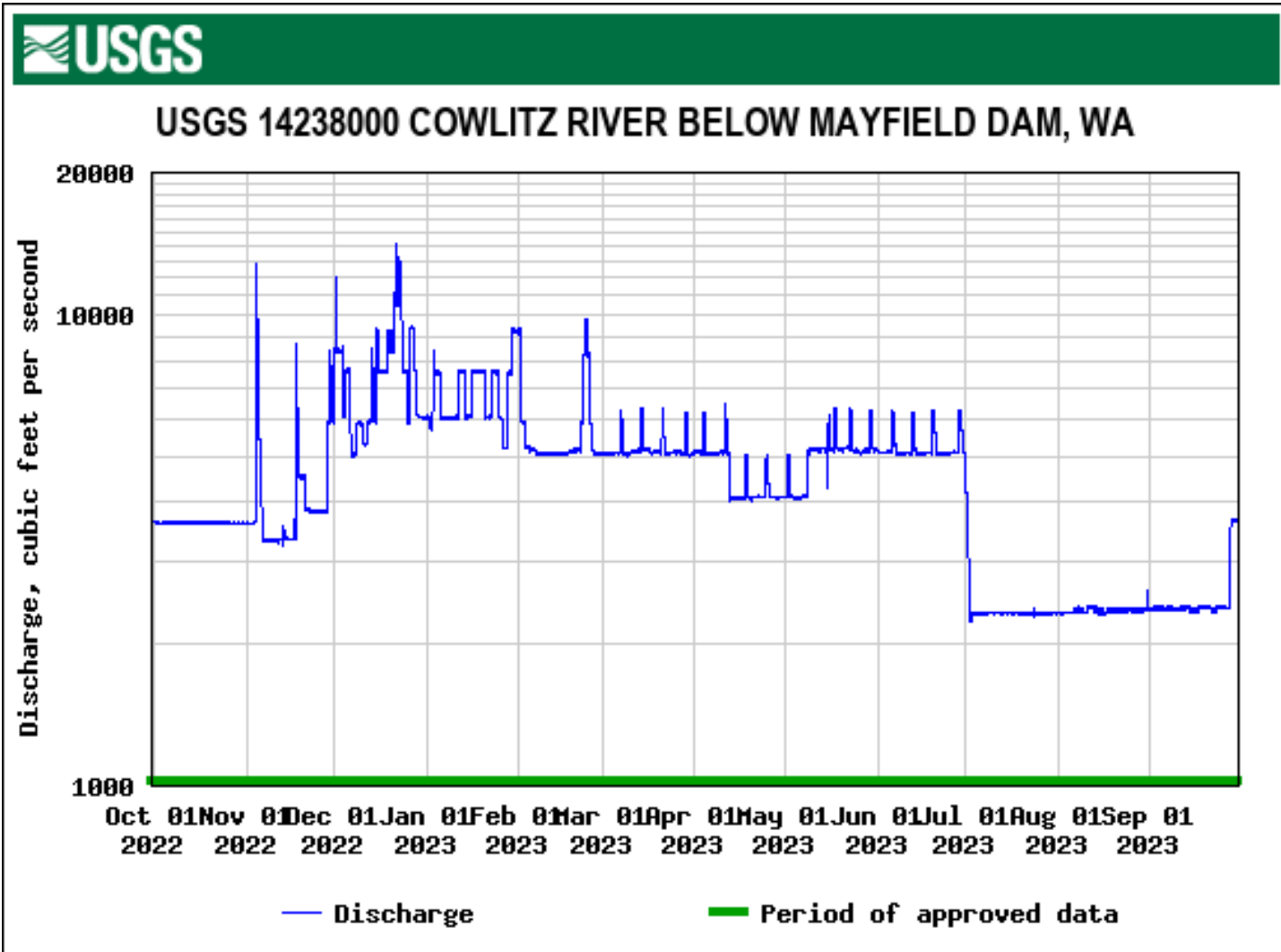


2023 Reservoir Elevations

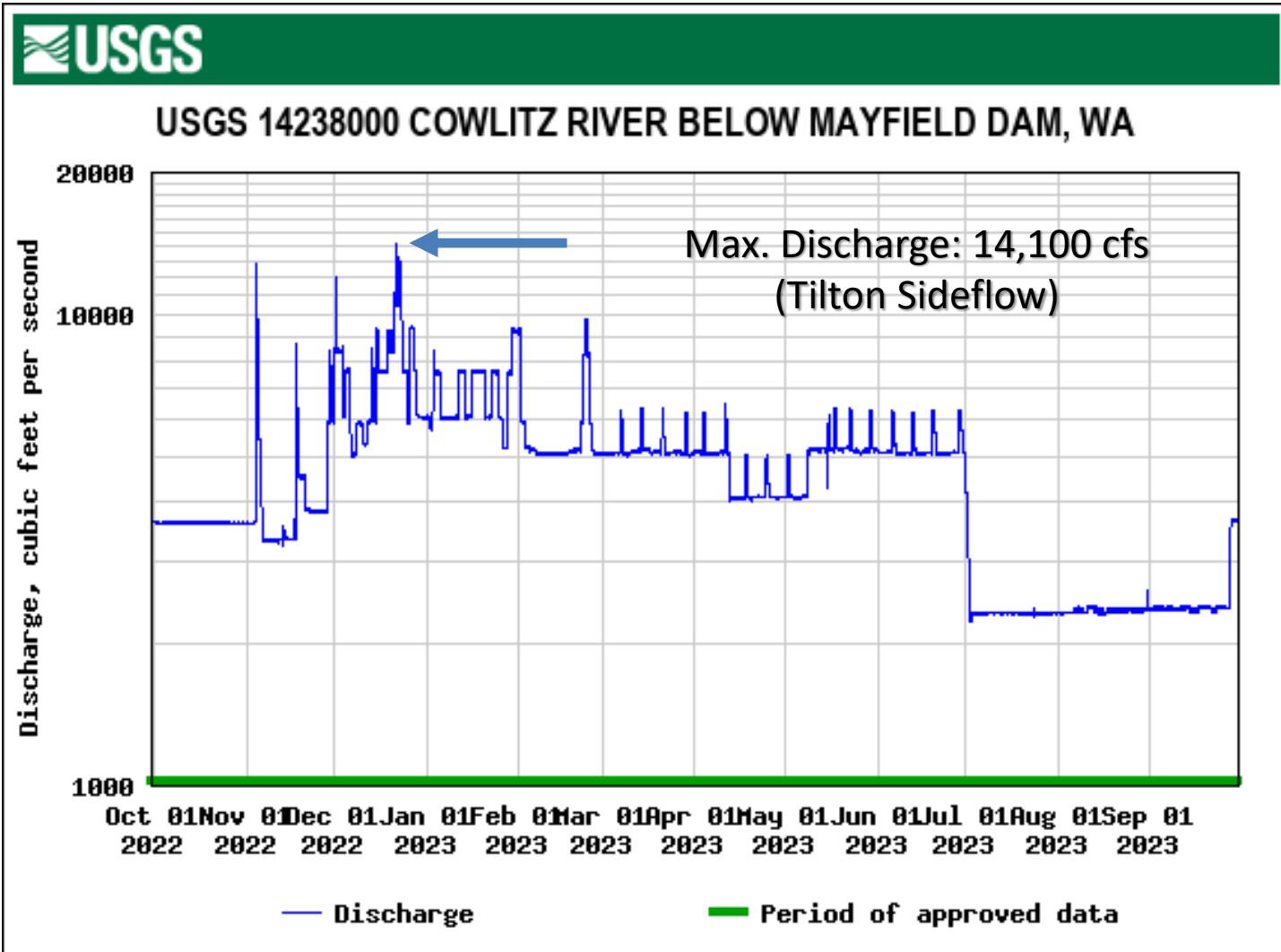
Riffe Lake Elevations (Tacoma Power): Daily (ft)



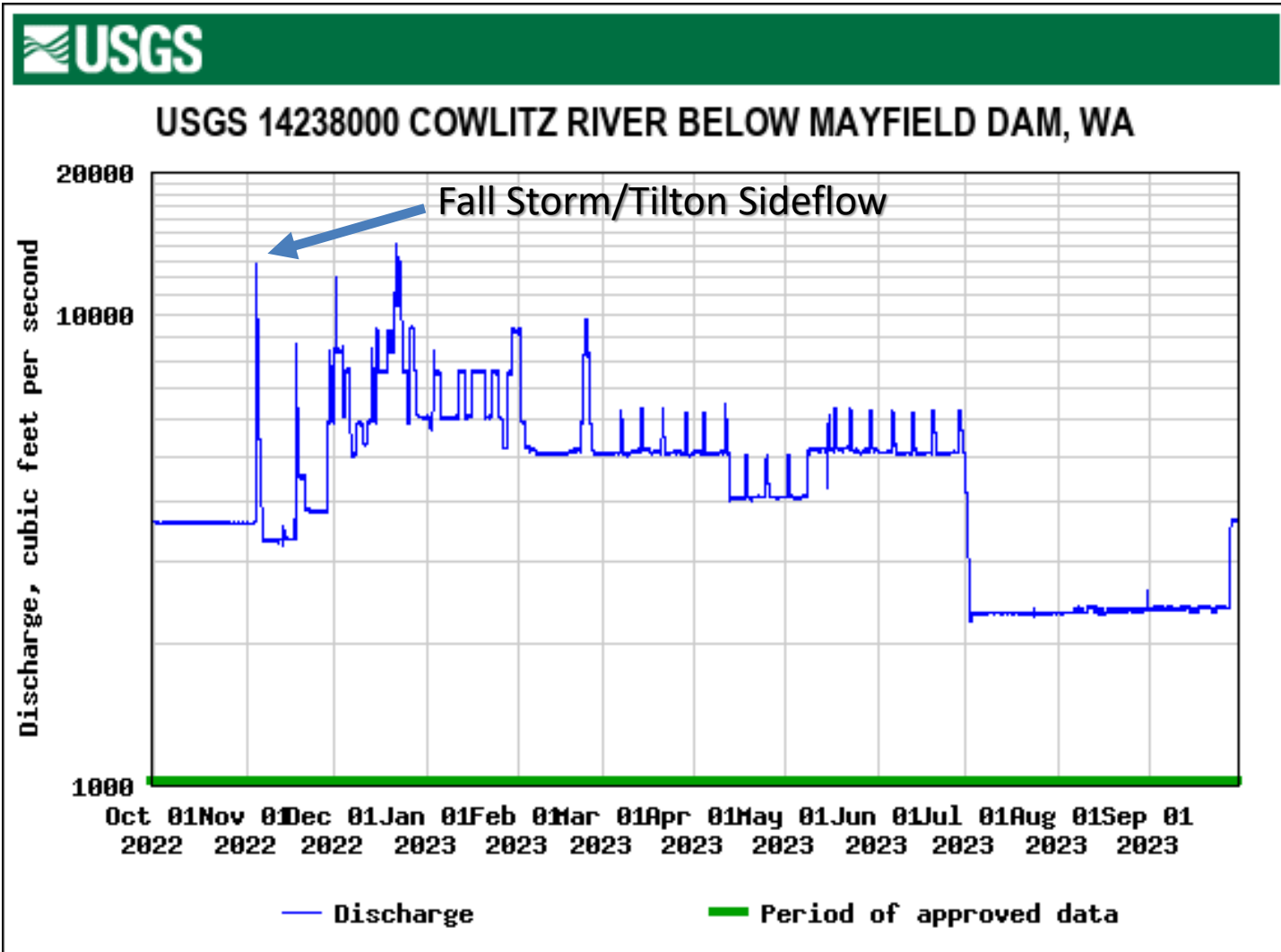
2023 Outflows



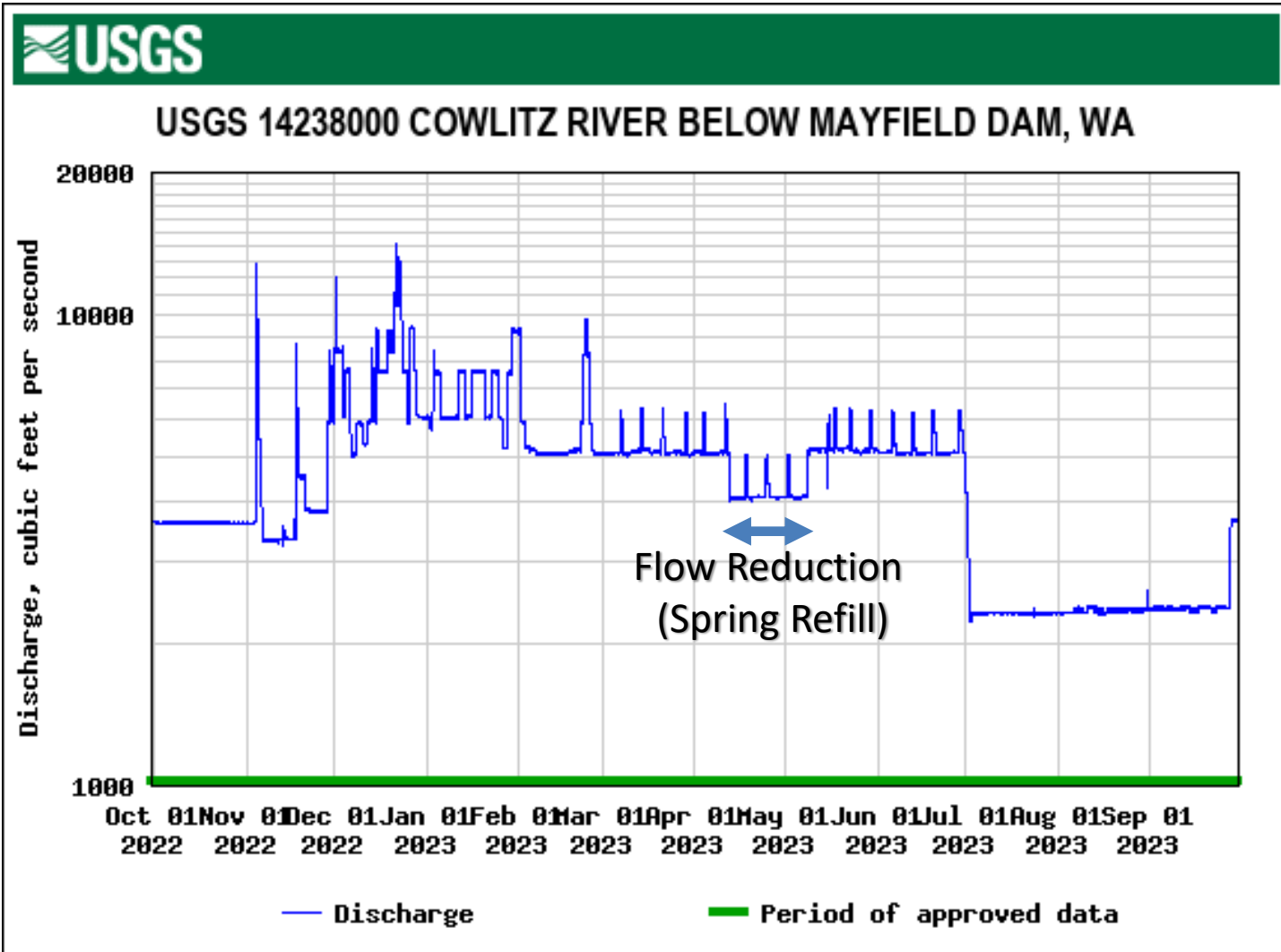
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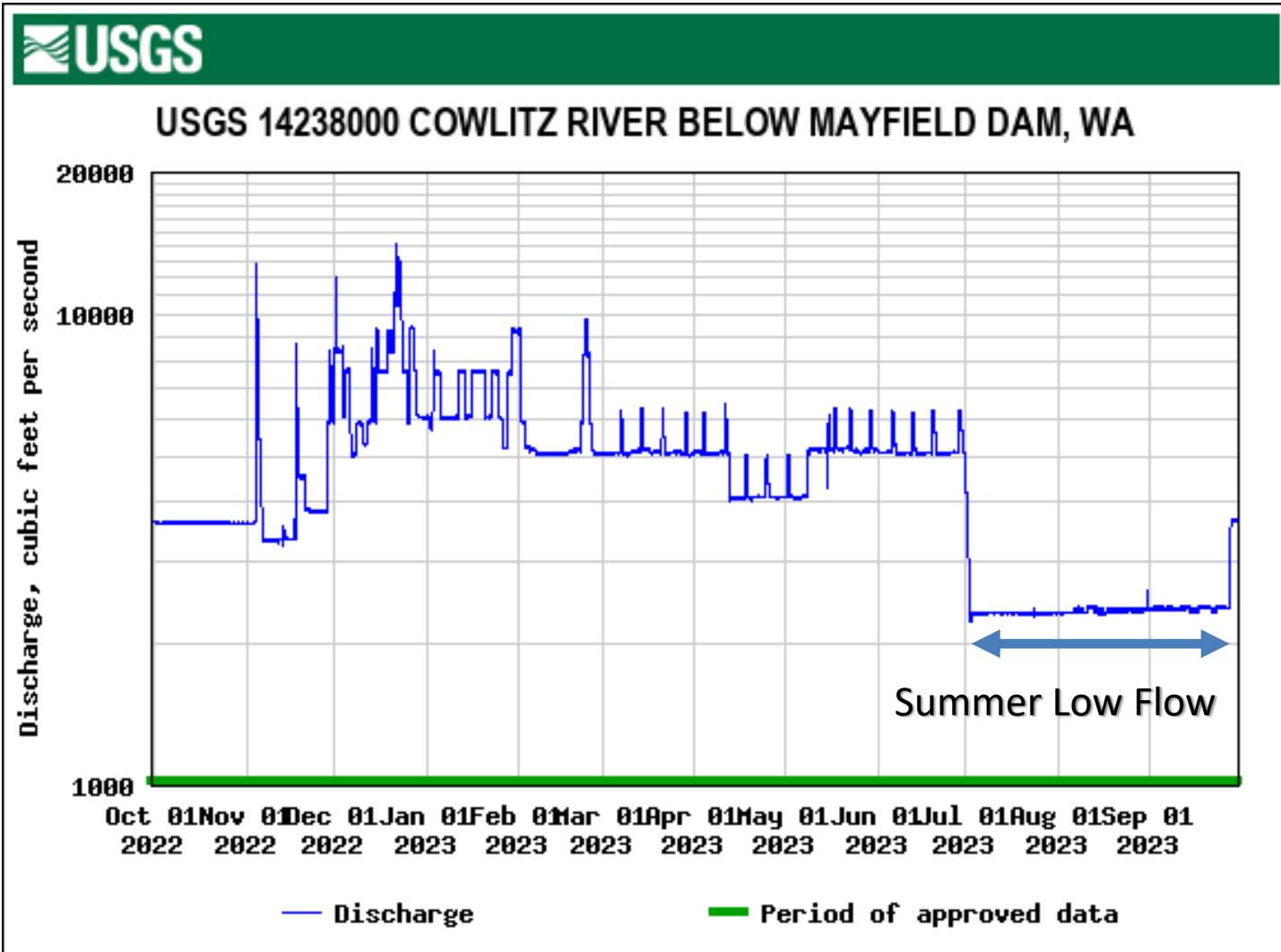
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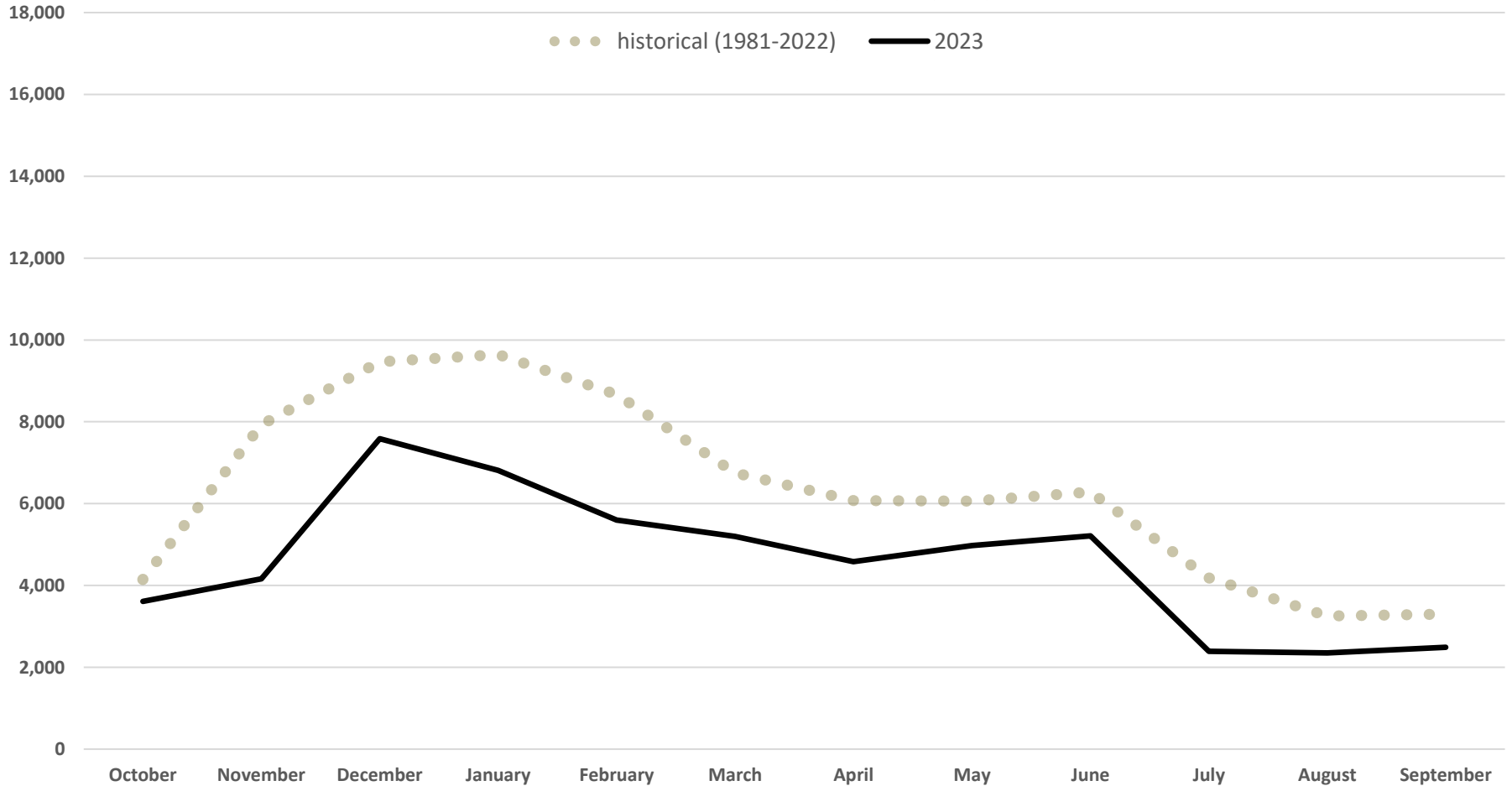


2023 Outflows



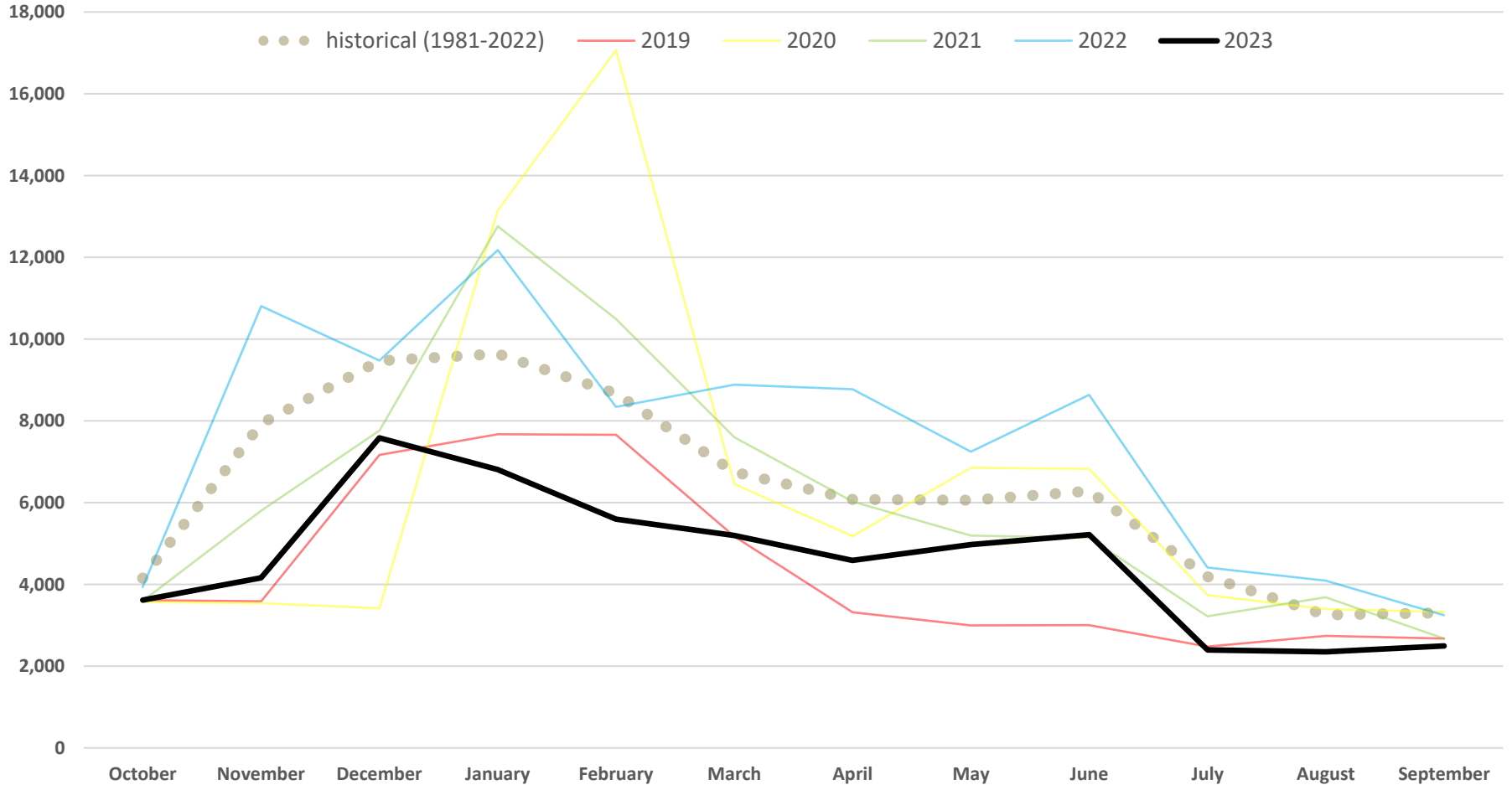
2023 Outflows by Month

Outflows from Cowlitz Project: Daily Average by Month (cfs)



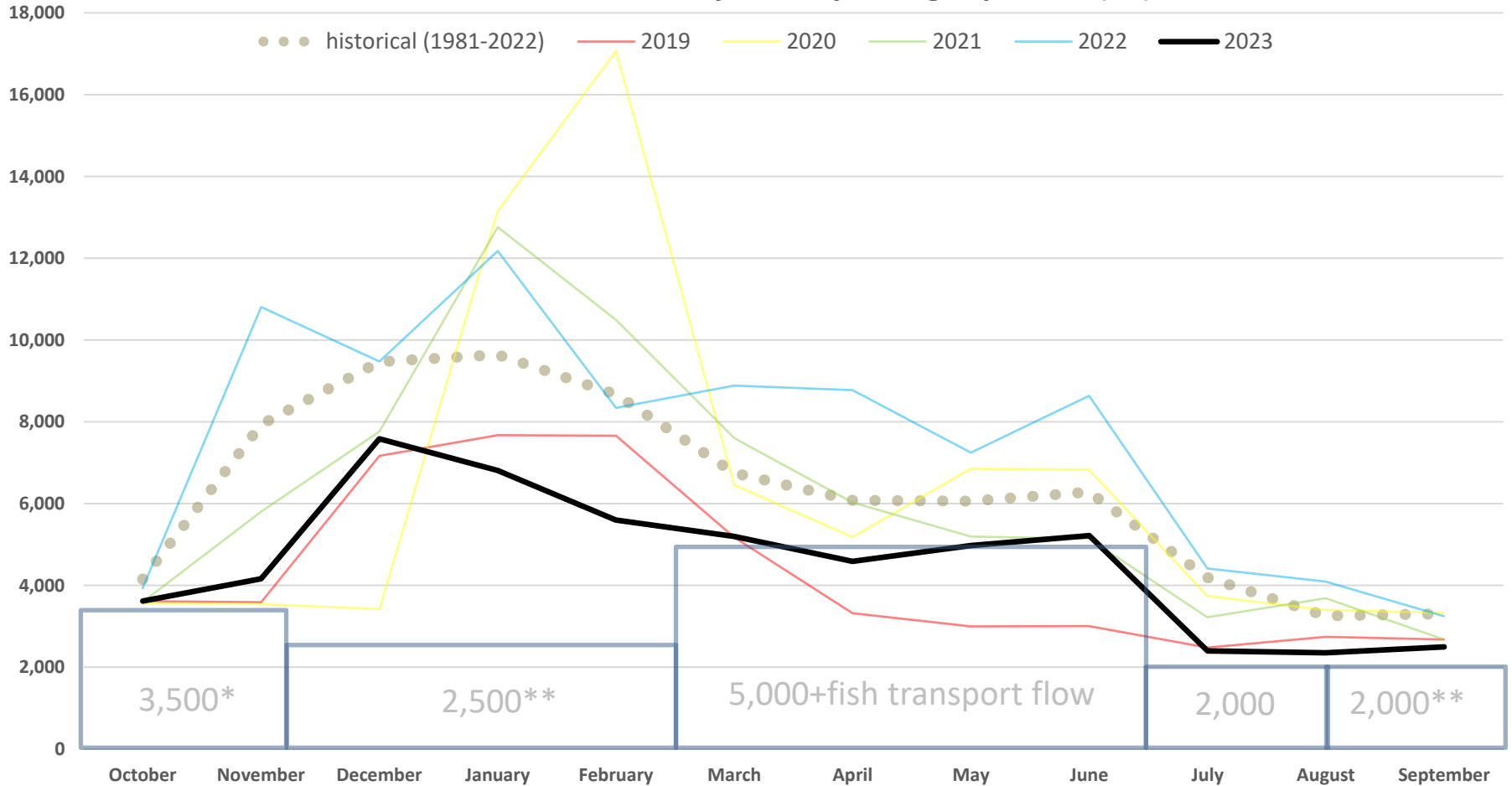
2023 Outflows: 5-Year Context

Outflows from Cowlitz Project: Daily Average by Month (cfs)



2023 Outflows: 5-Year Context

Outflows from Cowlitz Project: Daily Average by Month (cfs)



* Absolute minimum if no 5-day consecutive average >3,500 cfs during 8/15-9/30

** Minimum can adjust up to 5,000 cfs based on consecutive 5-day averages

Key Points, 2023 Highlights

- Except for April/May, inflows were low all year (low precipitation and/or cold temperatures)
- No prolonged spill
- Snowpack was near normal, but ran off early
- Short springtime flow reduction (~4,000 cfs)
- Reservoir did not refill, drafted through June and then into the fall (lowest since 1995)
- Operated near minimum flows from mid-February through most of September

Key Points, 5-Year Context

- Ongoing constraints related to reservoir capacity
- 2023 notable for low inflows and discharge, and reservoir elevations
- 2019 had the lowest inflow and discharge in the last 5 years (longer/ deeper spring flow reduction)
- By month, highest flow periods above and below the Project were in 2020 (February) and 2021 (November).

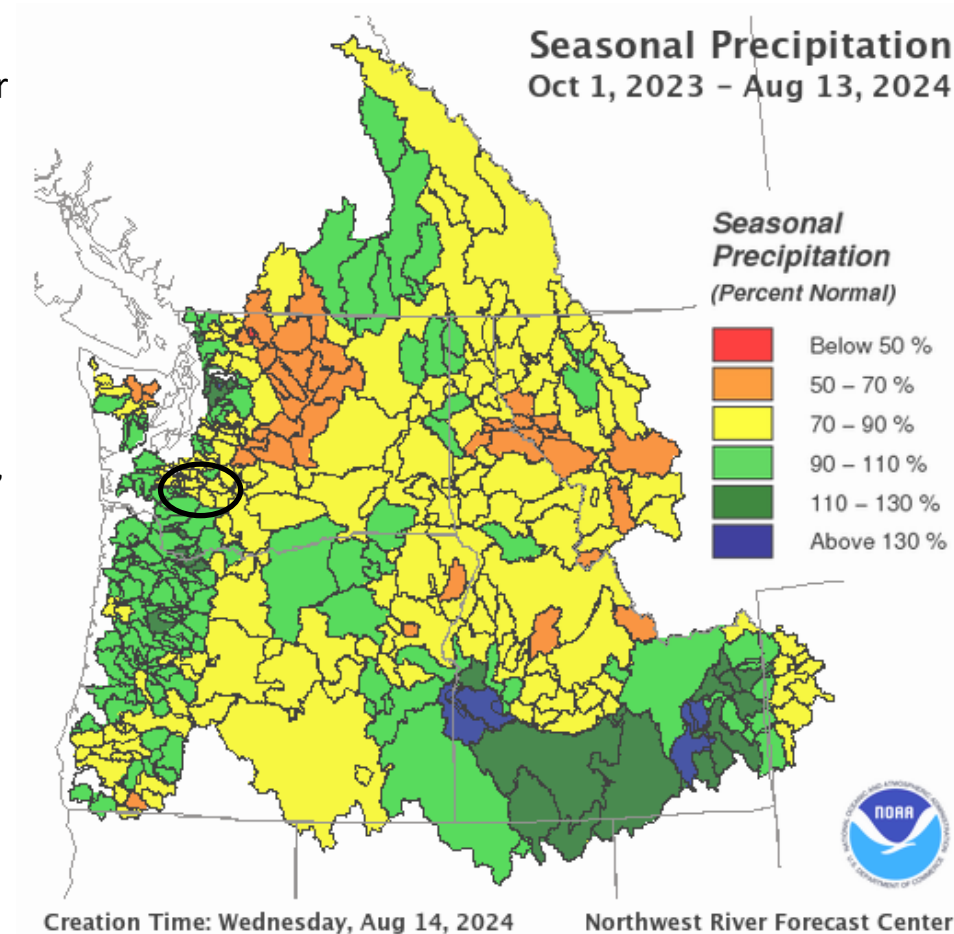
2024 Preview

Hydrology

- Low inflows and precipitation to date, except for December/January
- Variable snowpack in the basin
- Atypical June atmospheric river
- Fall climate outlook: neutral September, tilt toward wetter than average fall, La Niña

Operations

- Very low reservoir elevation through November, then maintained near or above winter average (5-year and long term)
- Discharge near minimums until June storm (moved away from potential spring flow reduction)
- Refilled in June; 745 ft July 1; currently near recent average
- More typical summer discharge including some generation



Any Questions?

