

2022 Hydrology and Hydro Project Operations

Cowlitz Annual Program Review
and Science Conference

August 22, 2023

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Overview

- Physical setting
- Review 2022, 5-year context
 - Inflows: Rain and runoff
 - Reservoir elevations
 - Instream flow at Mayfield
- Looking to 2023



Stewardship of the Cowlitz River

Factors we must balance:

- Public safety
- Environment - fish and wildlife
- Grid reliability
- Recreation
- Power production
- Flood control

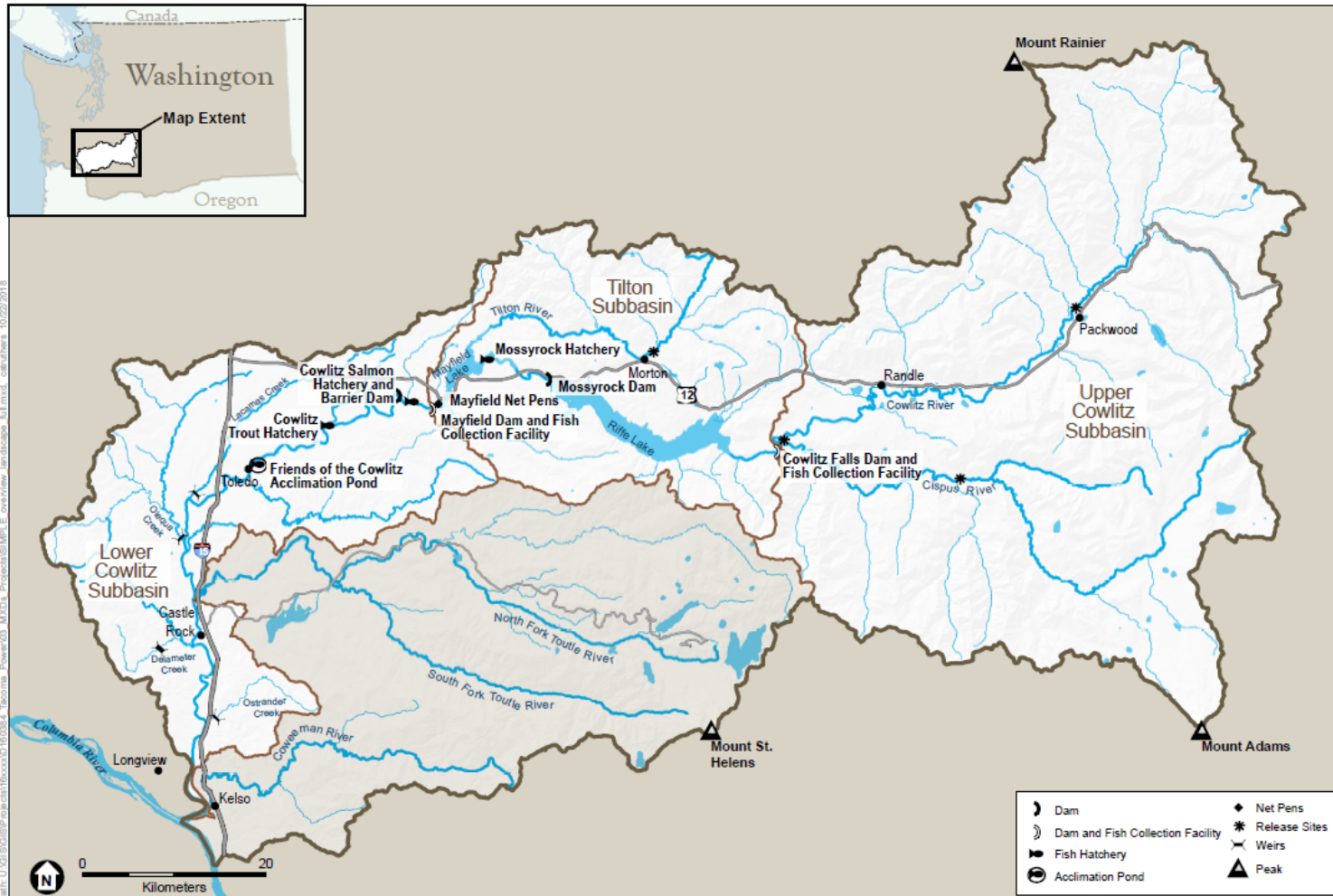


Stewardship of the Cowlitz River



Modified operations at Riffe Lake

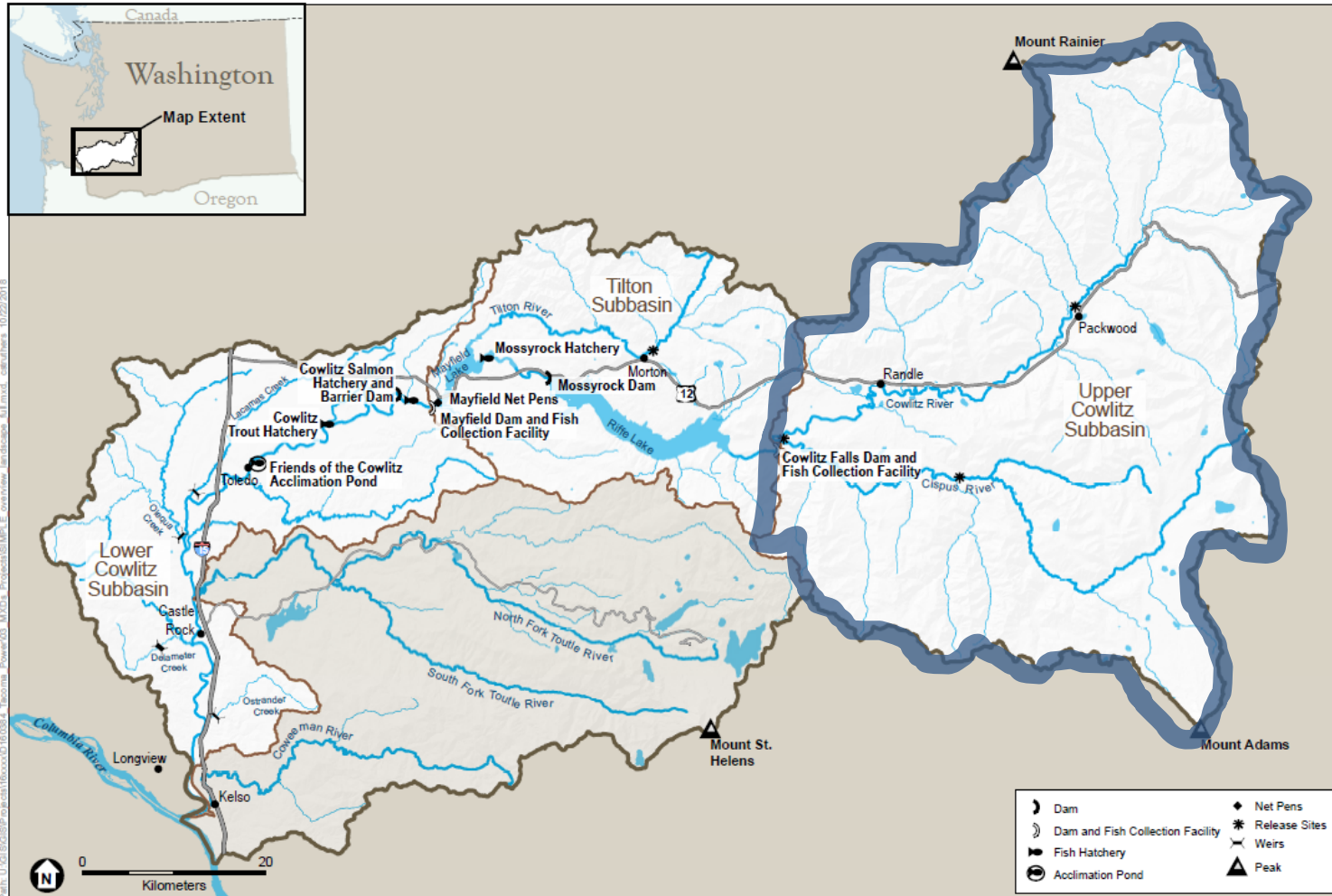
Watershed and Subbasins



SOURCE: SWIFD, 2014; WDNR, 2017

Tacoma Power
Figure 1
 Cowlitz River Subbasins

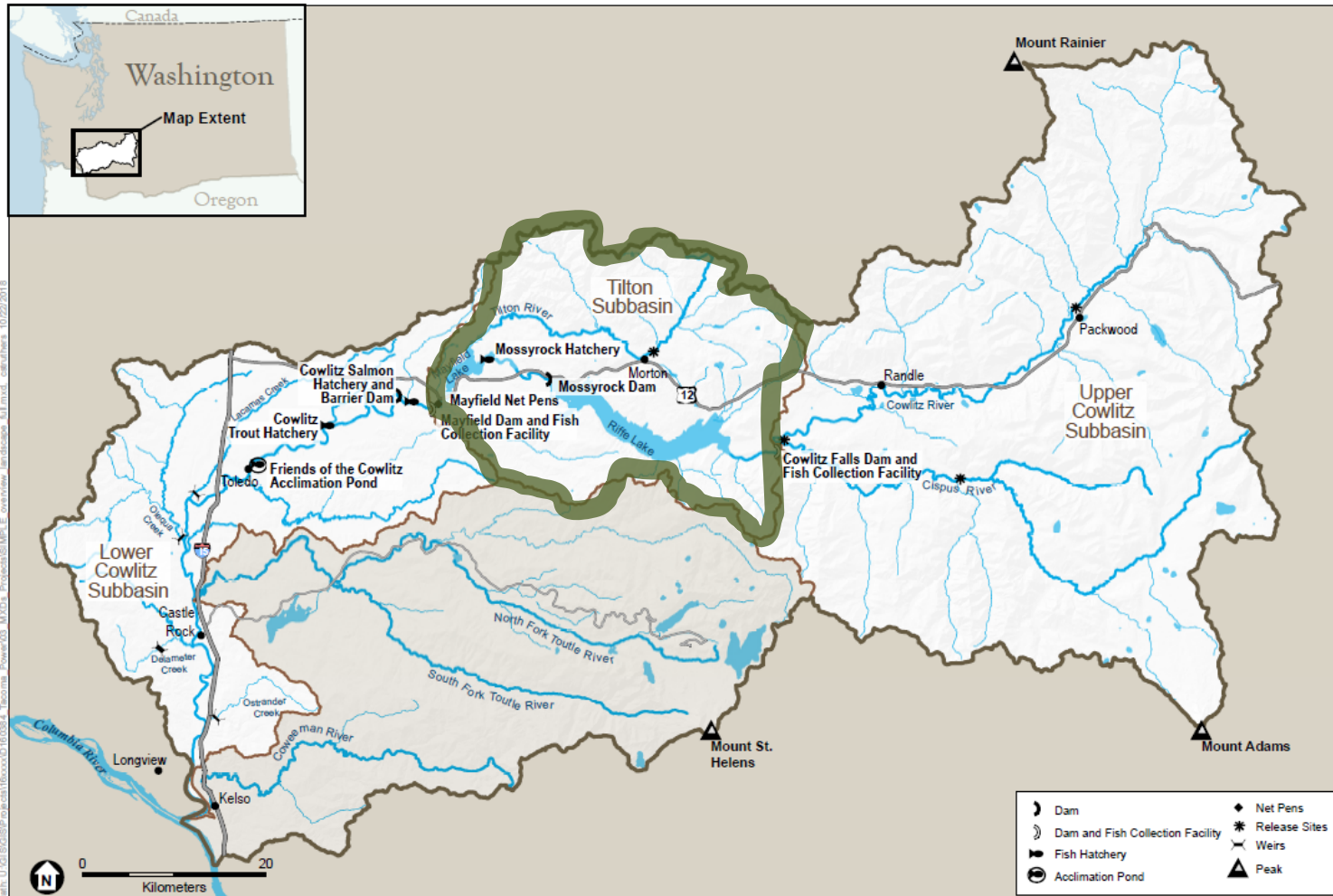
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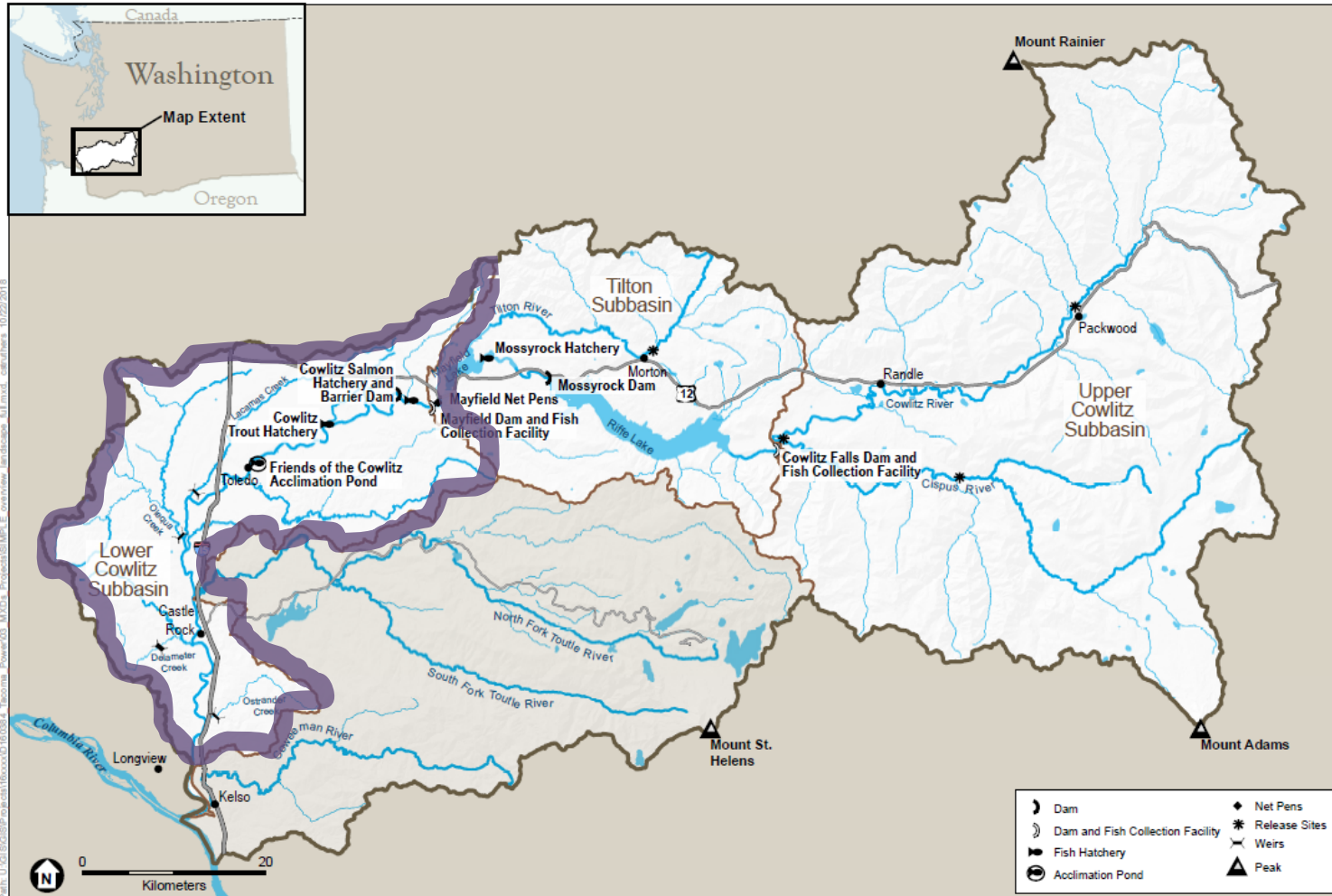
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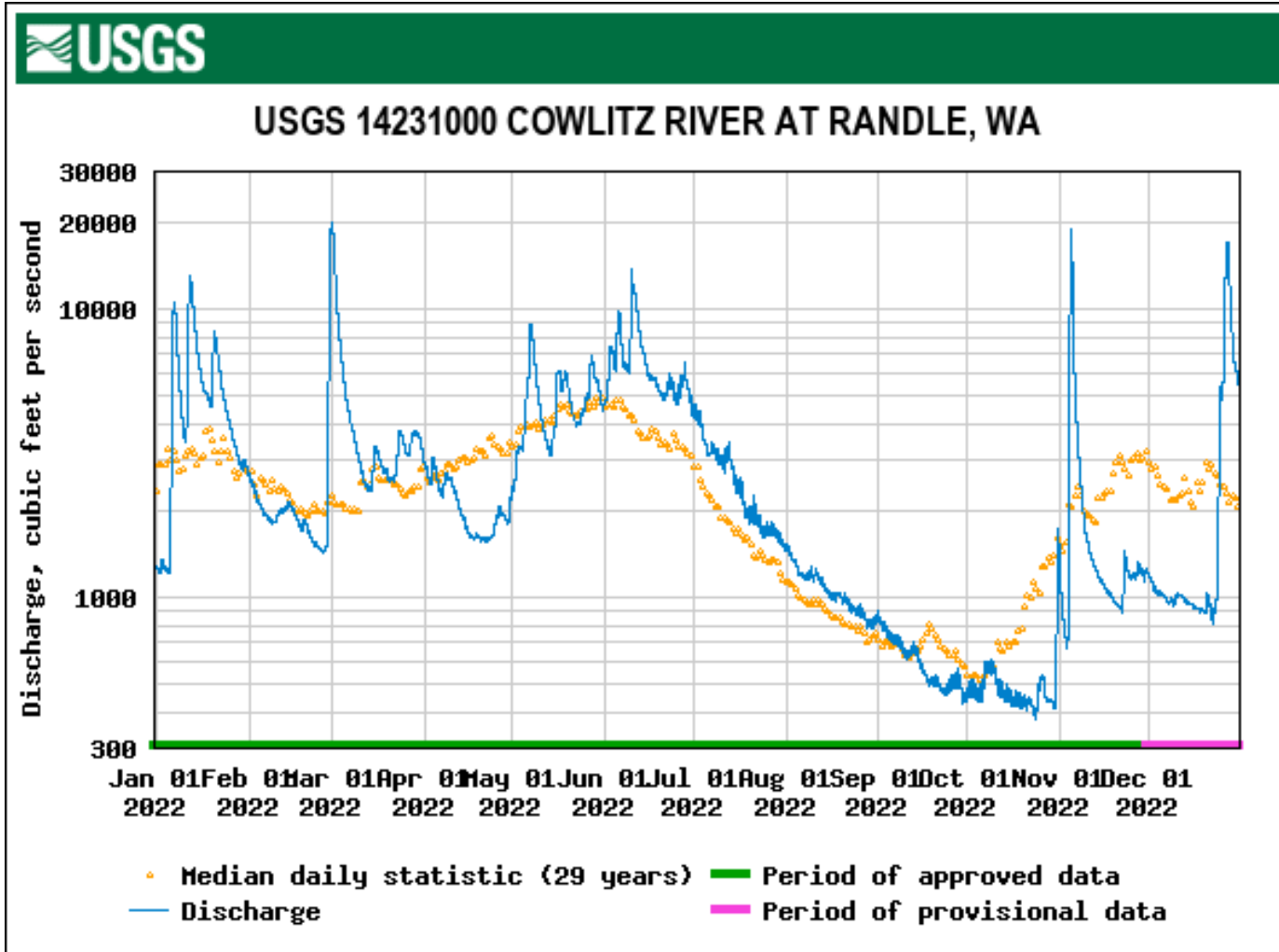
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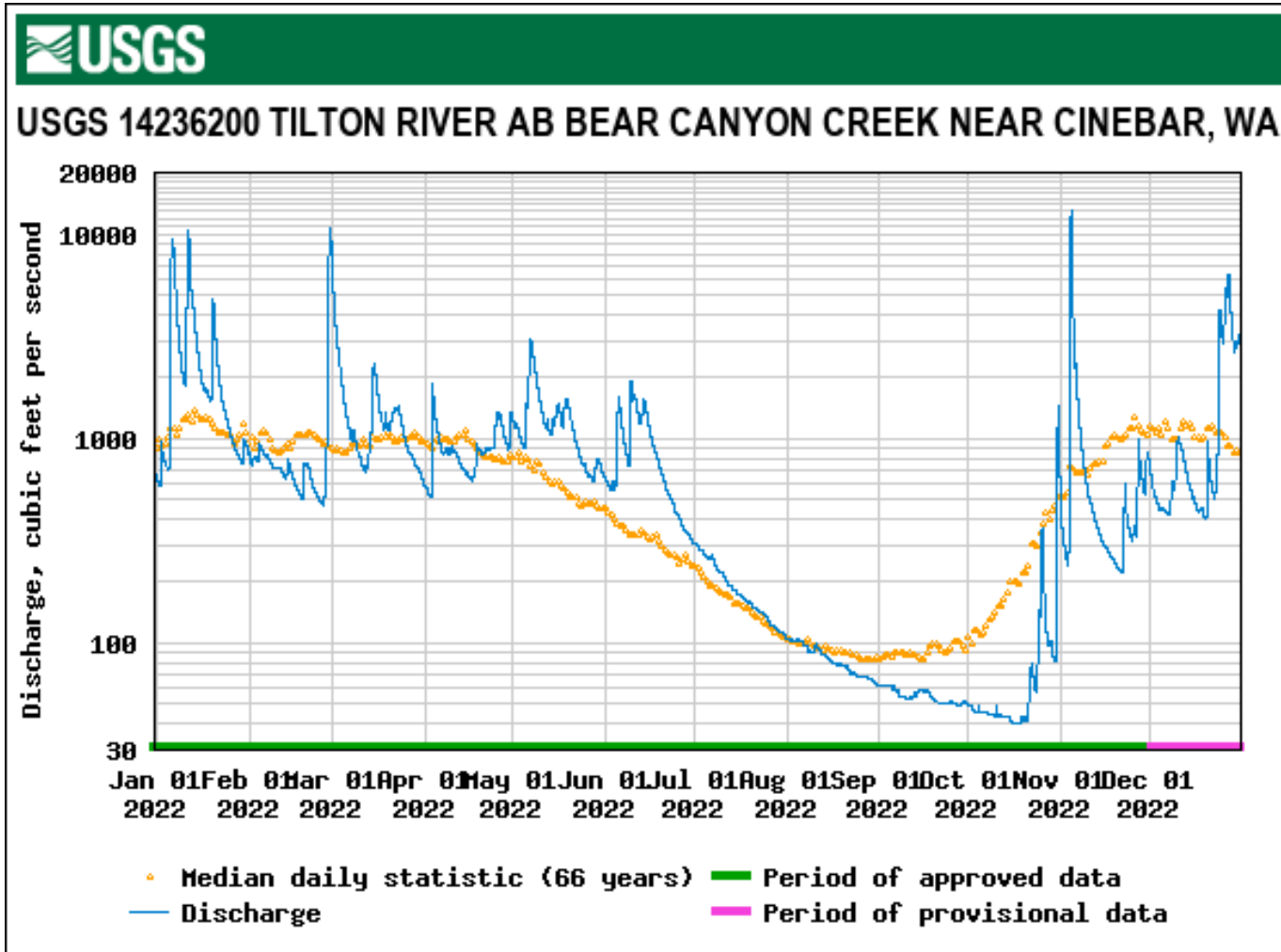
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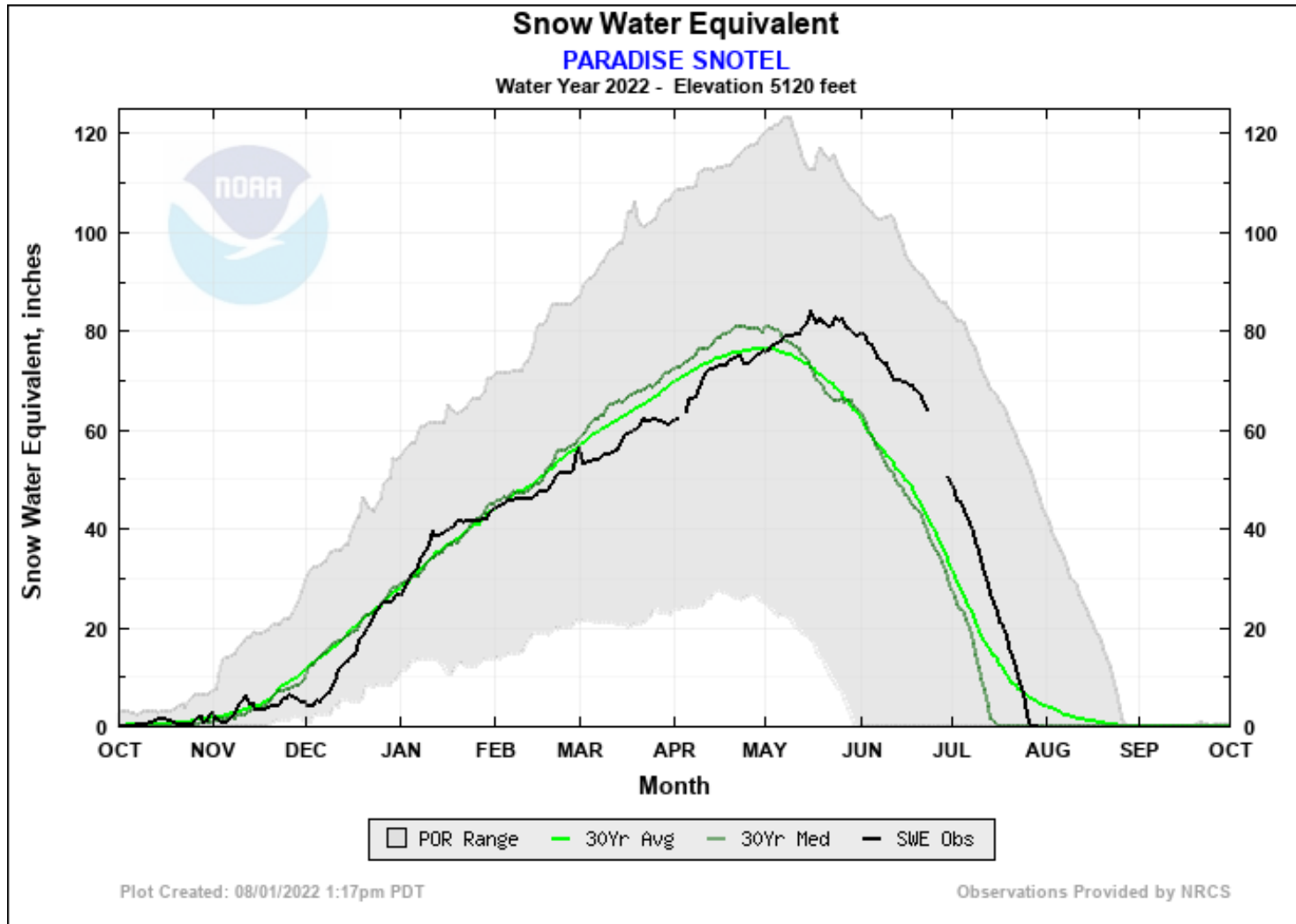
2022 Inflows: Rain and Runoff



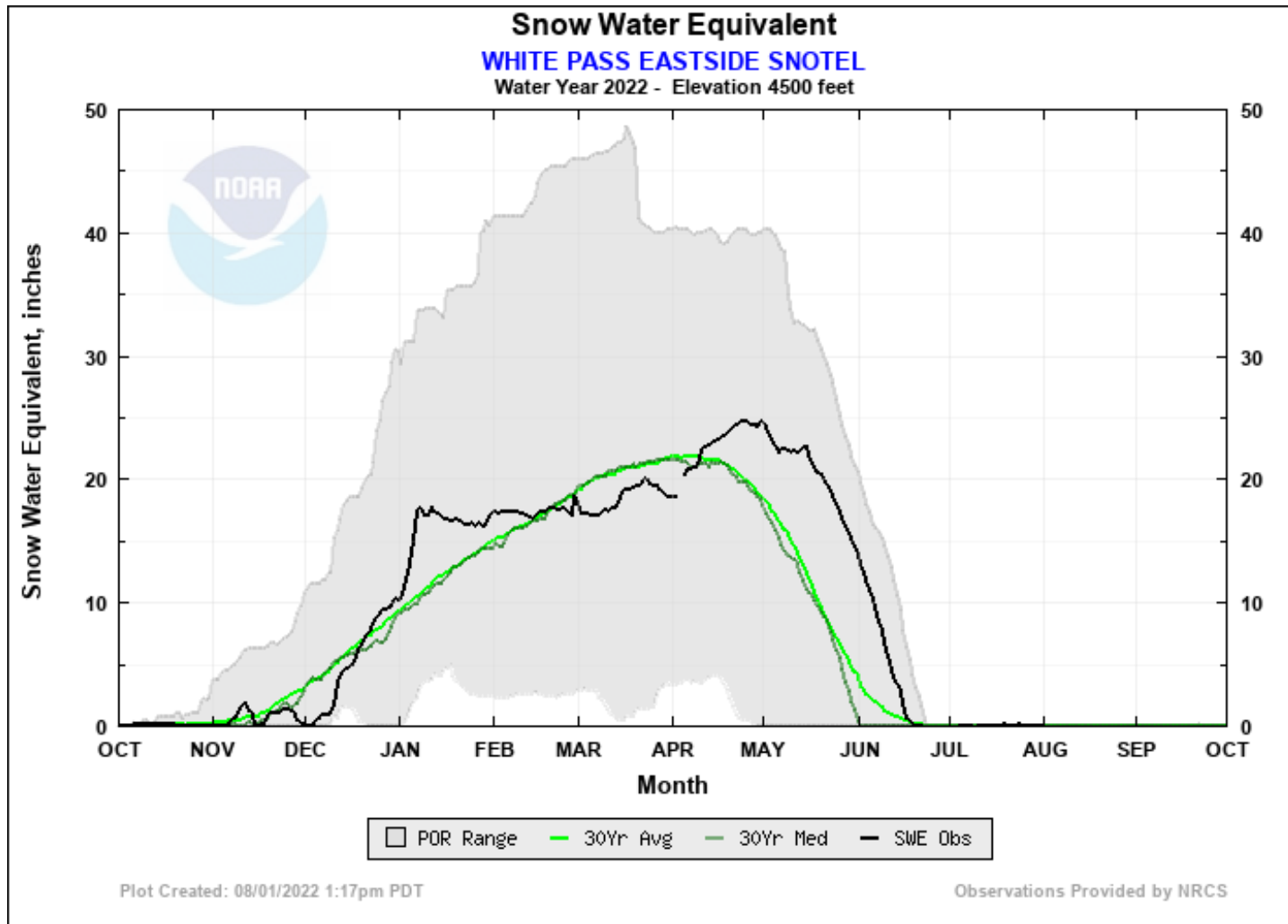
2022 Inflows: Rain and Runoff



2022 Inflows: Snowpack (Oct. 2022 – Sept. 2023)

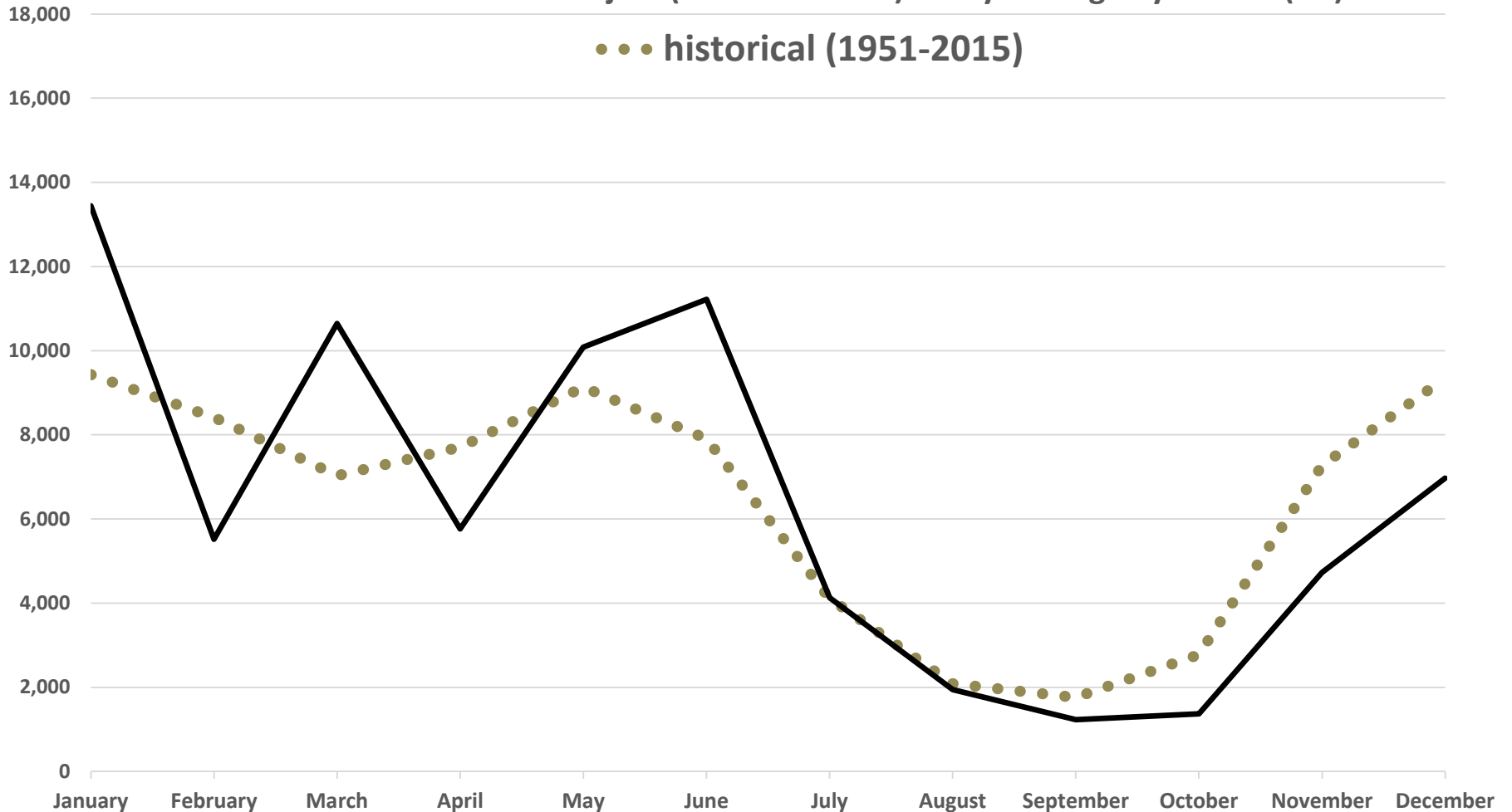


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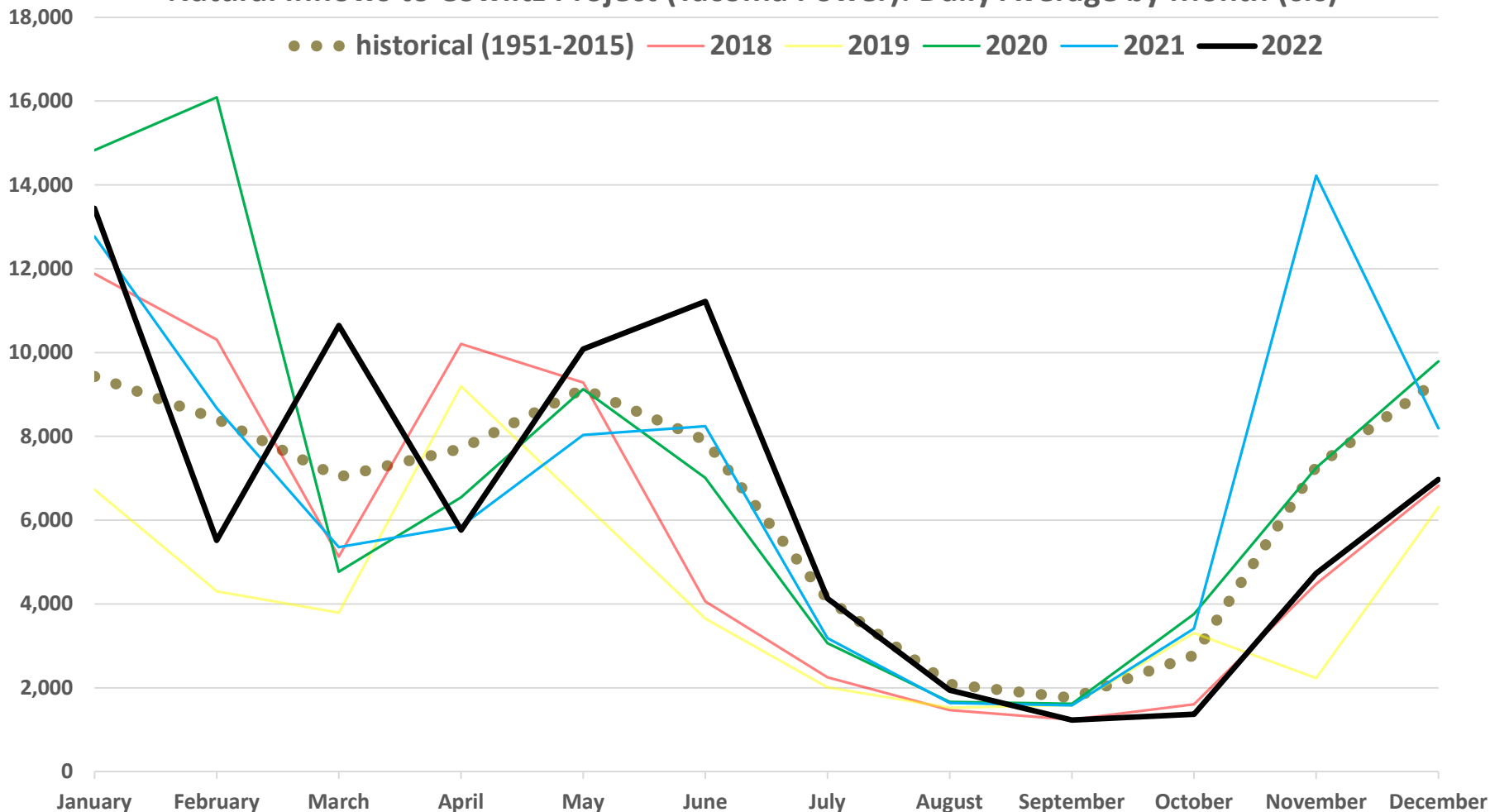
2022 Inflows: By Month

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



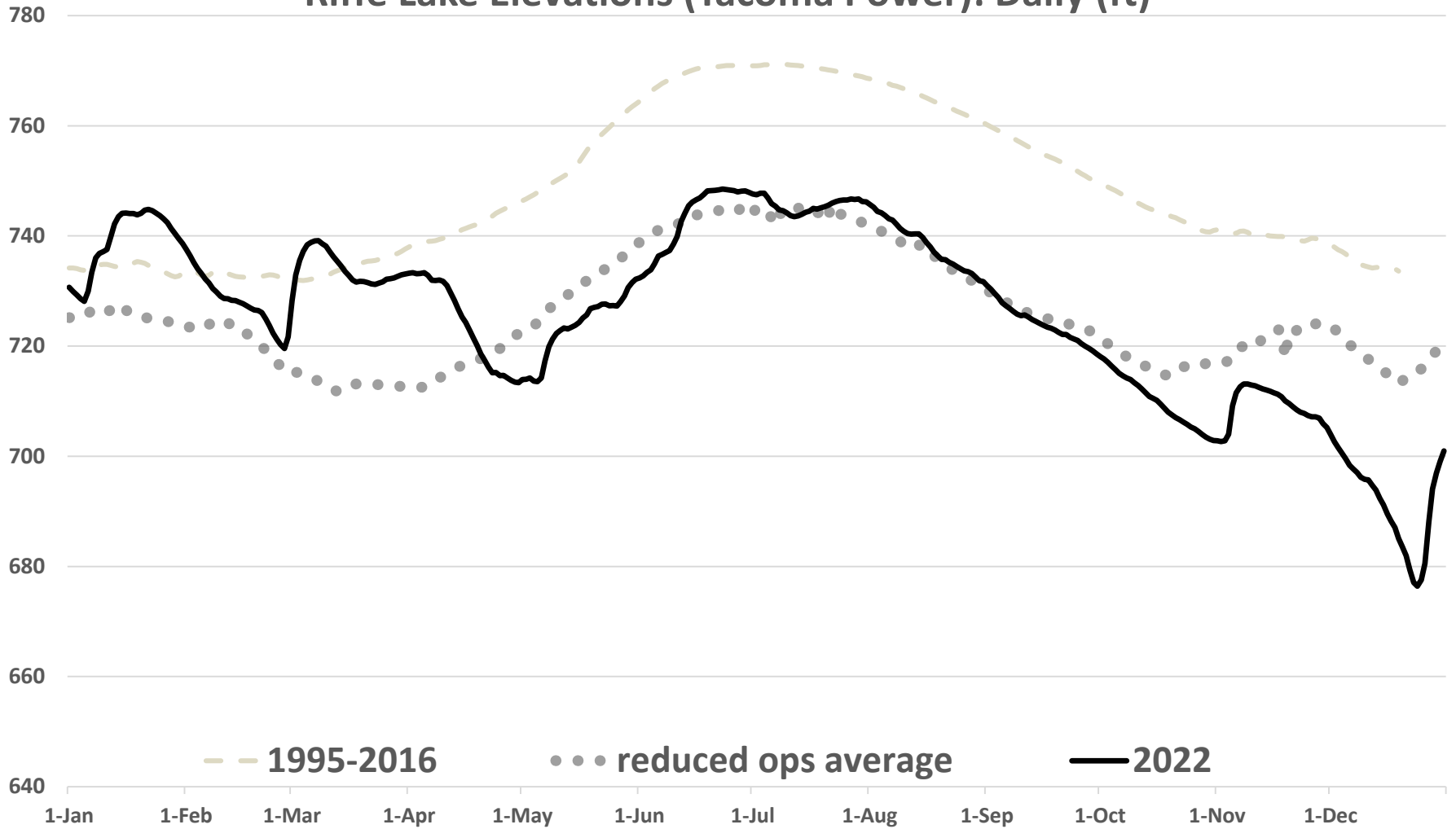
2022 Inflows: 5-Year Context

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



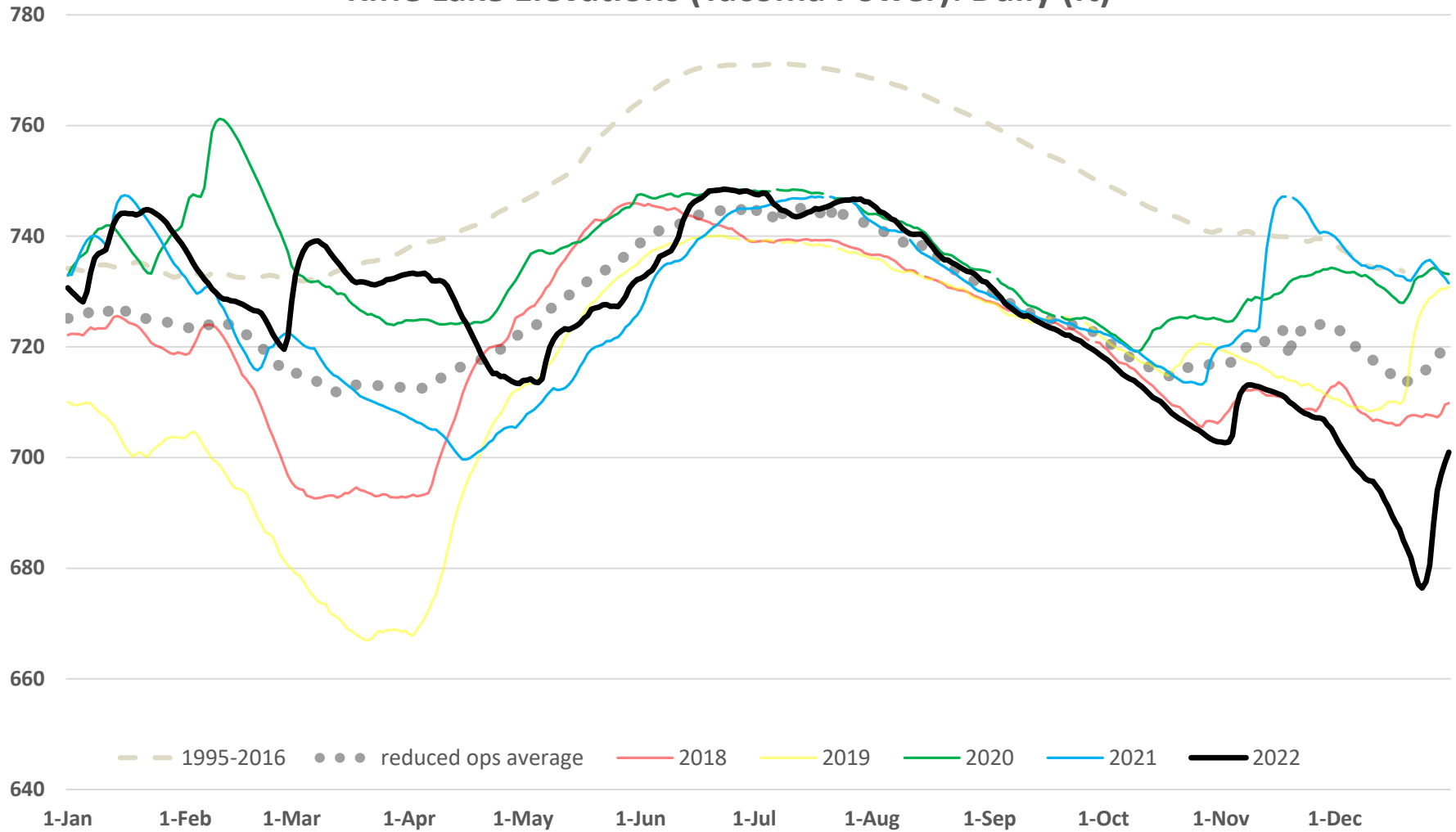
2022 Reservoir Elevations

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

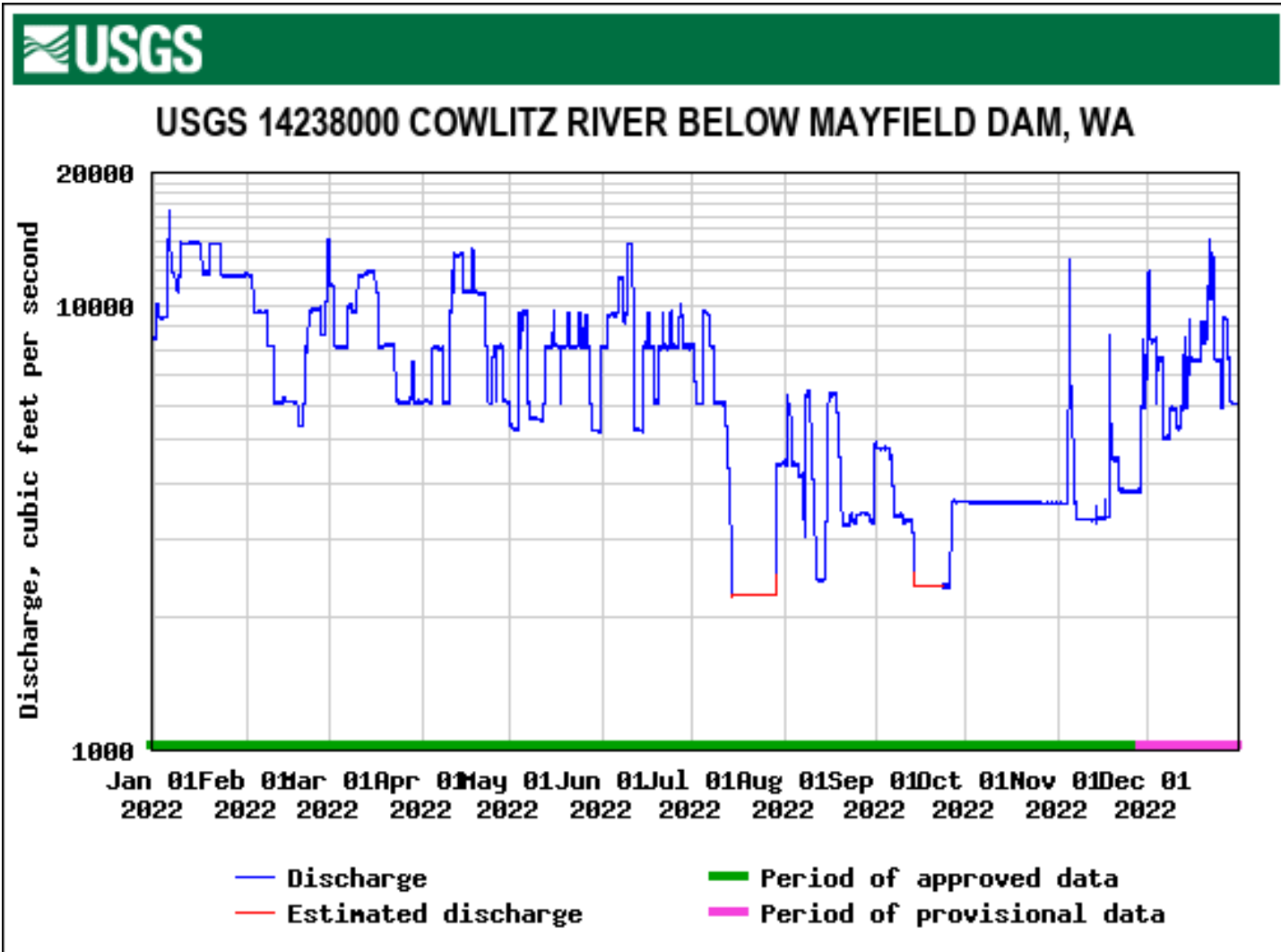


2022 Reservoir: 5-Year Context

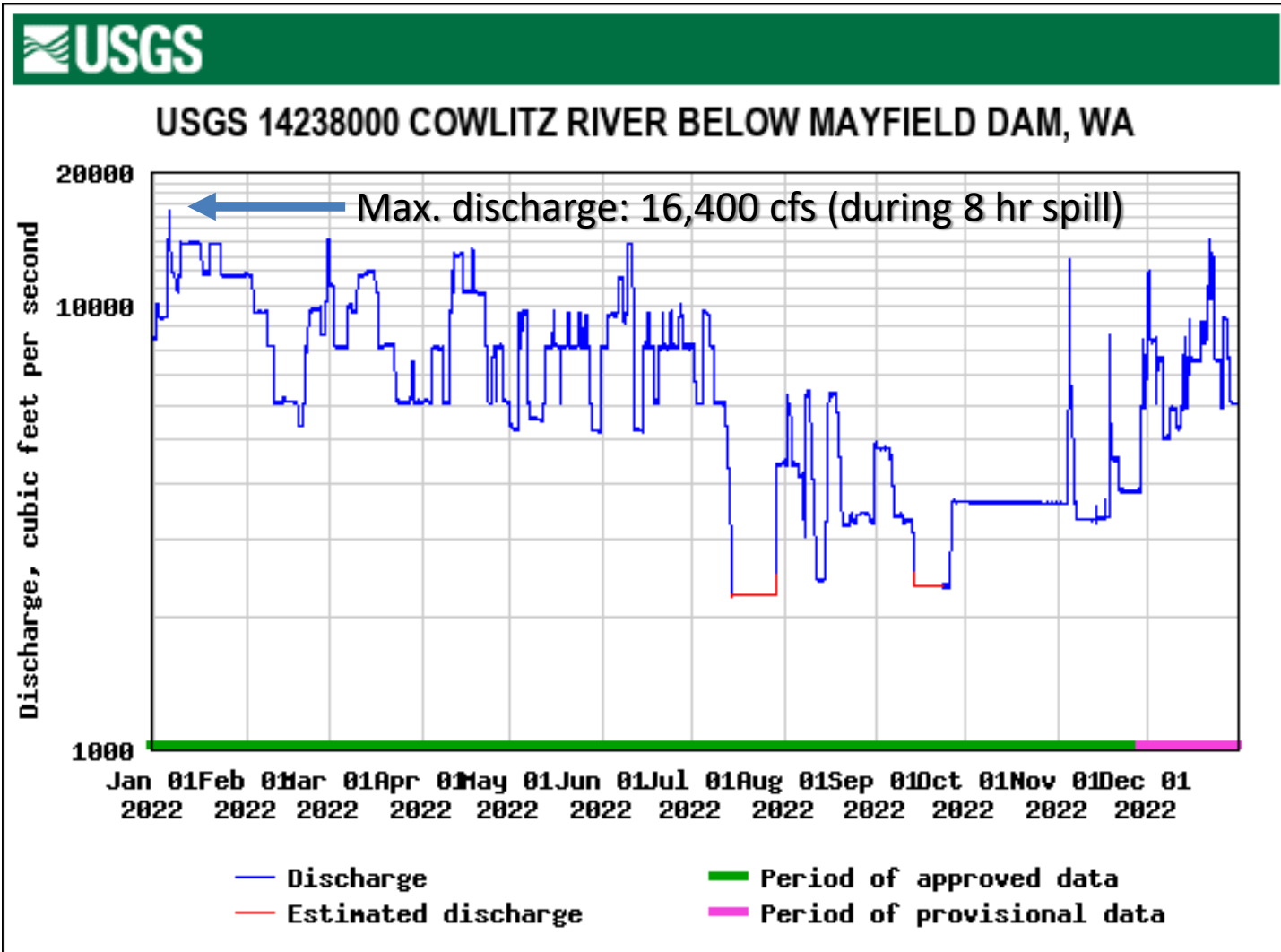
Riffe Lake Elevations (Tacoma Power): Daily (ft)



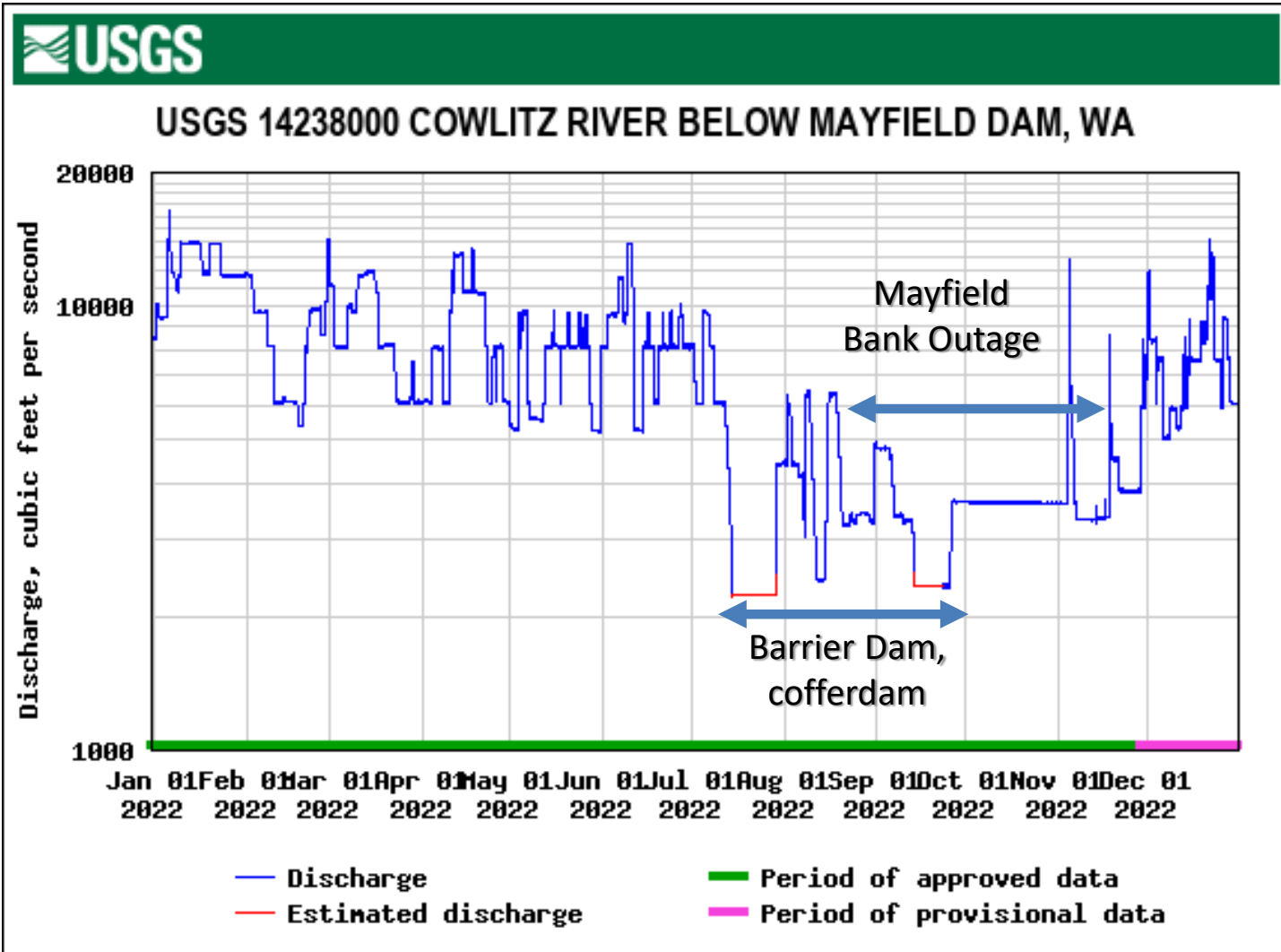
2022 Outflows



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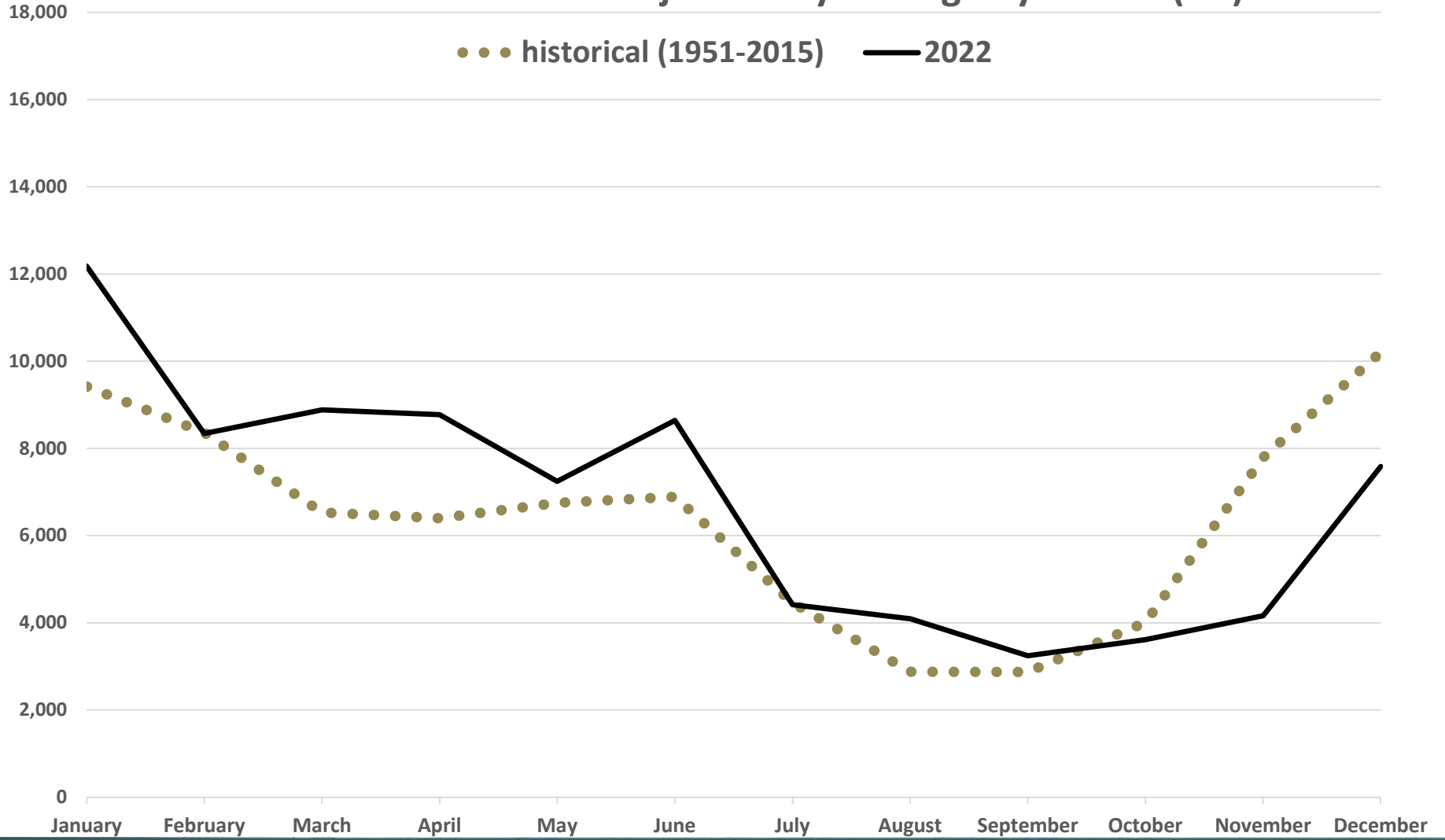


2022 Outflows



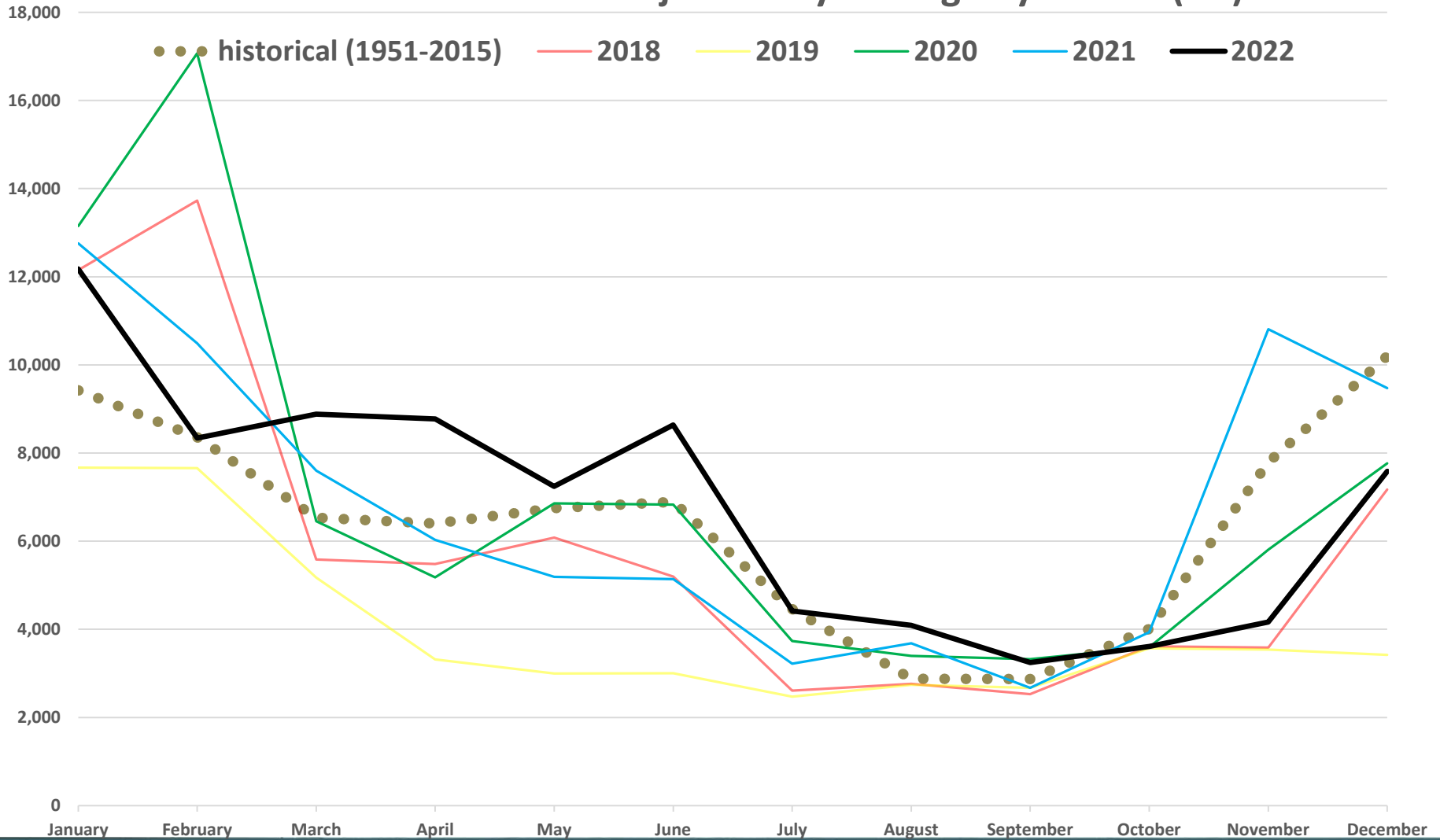
2022 Outflows By Month

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



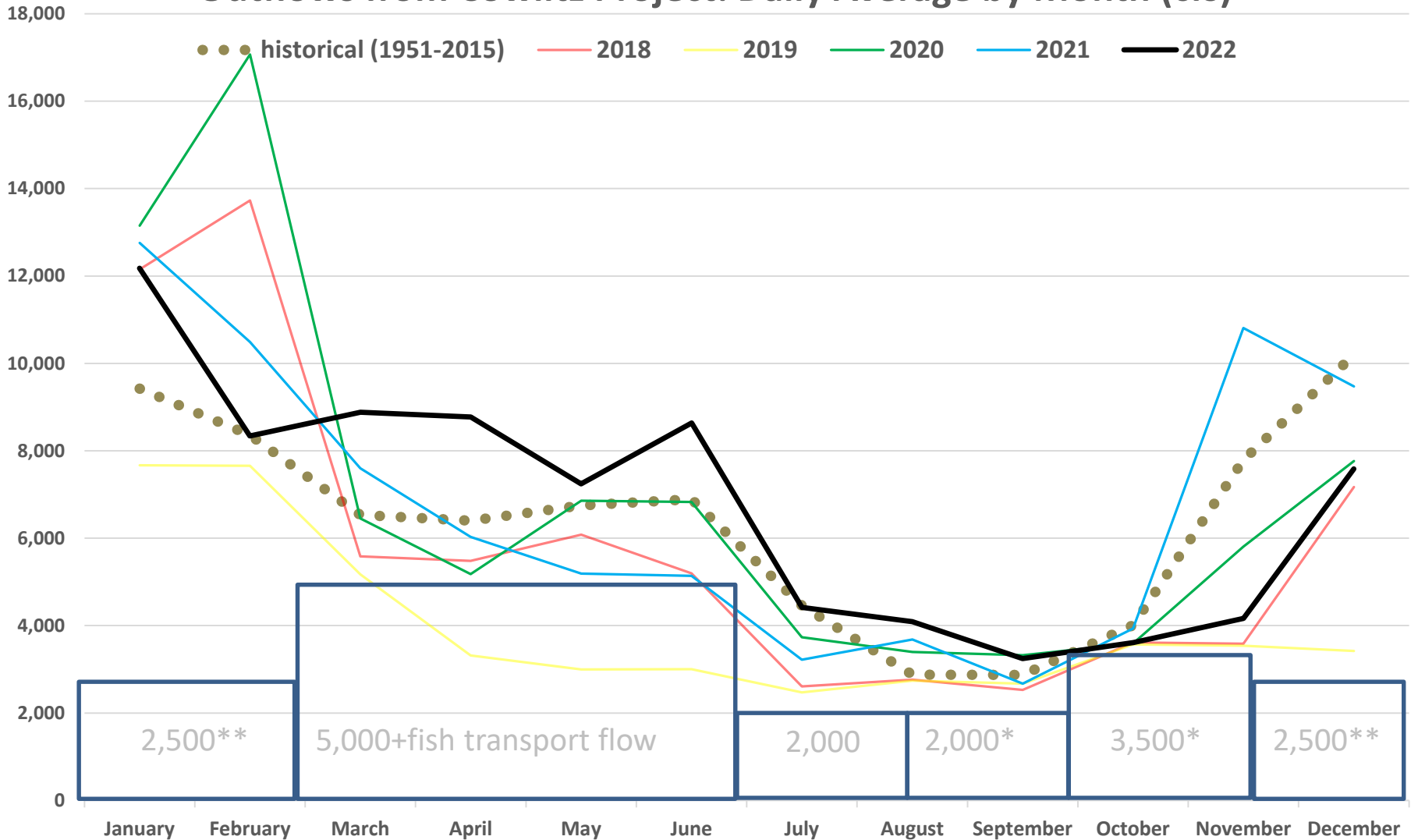
2022 Outflows: 5-Year Context

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



Outflows By Month: 5-Year Context

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



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

** Absolute minimum if no 5-day consecutive average >3,500 cfs

Key Points, 2022 Highlights

- Inflows split: generally higher January -June, lower July - December
- No prolonged spill
- Snowpack built late, runoff into July
- Barrier Dam and Mayfield Bank constraints
- Reservoir refilled for summer, drafted very low after September (low inflows, cold December)

Key Points, 5-Year Context

- Ongoing constraints related to reservoir capacity
- 2022 notable for split inflows, late snow and runoff, and low reservoir starting in October (especially December)
- By month, highest flow periods above and below the Project were in 2020 (February) and 2021 (November).
- Generally, 2019 had the lowest inflow and discharge in the last 5 years

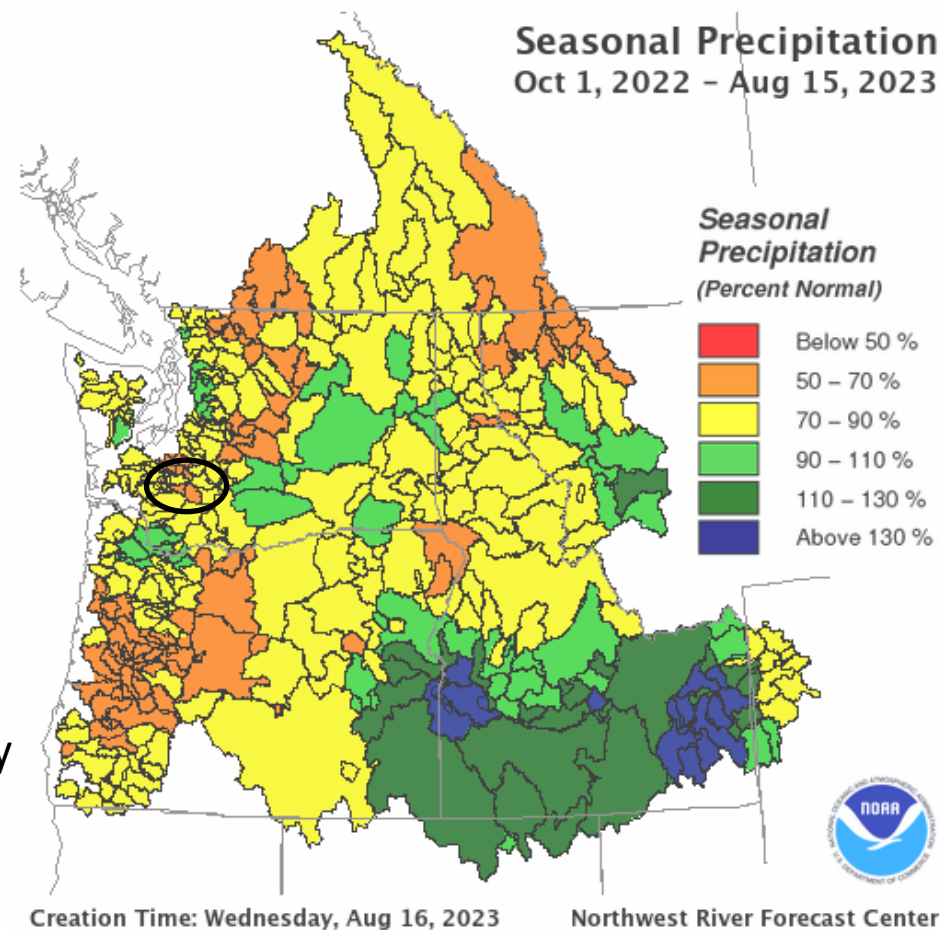
2023 Preview

Hydrology

- Low inflows and precipitation to date
- Near-average snowpack, but ran off early
- Climate outlook: likely warmer and potentially lower precipitation than normal through October

Operations

- Reservoir very low, except for late spring (5-year and long term)
- Discharge near minimums since late February
- Minimum flow reduced to 4,000 cfs early April to early May
- Refilled to 740 ft., drafting since early June



Any Questions?

