

Hydrology and Hydro Project Operations

Cowlitz River Annual Program Review
and Science Conference

May 19, 2021

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Overview

- Physical setting
- Review 2020, 5-year context
 - Inflows: Rain and runoff
 - Reservoir elevations
 - Instream flow at Mayfield
- Looking to 2021

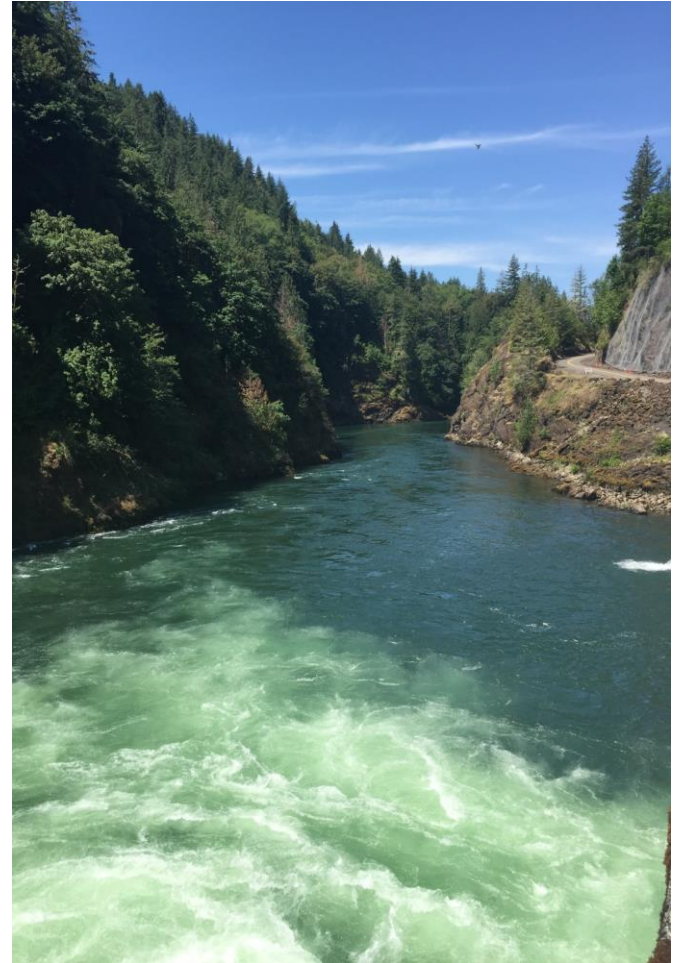


Stewardship of the Cowlitz River

Our top priority is public safety.

Factors we must balance:

- Environment - fish and wildlife
- Grid reliability
- Recreation
- Power Production

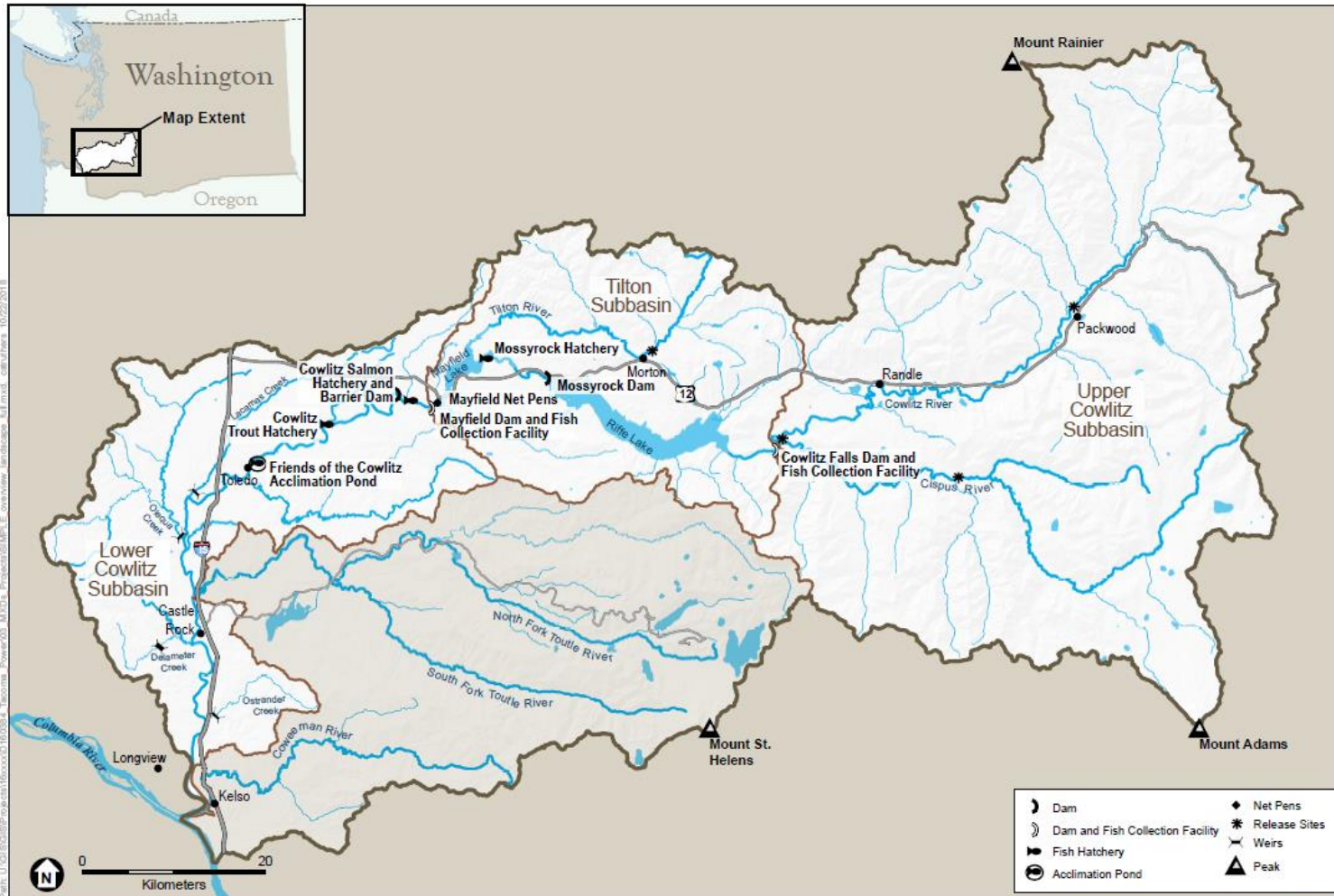


Stewardship of the Cowlitz River



Modified operations at Riffe Lake

Watershed and Subbasins



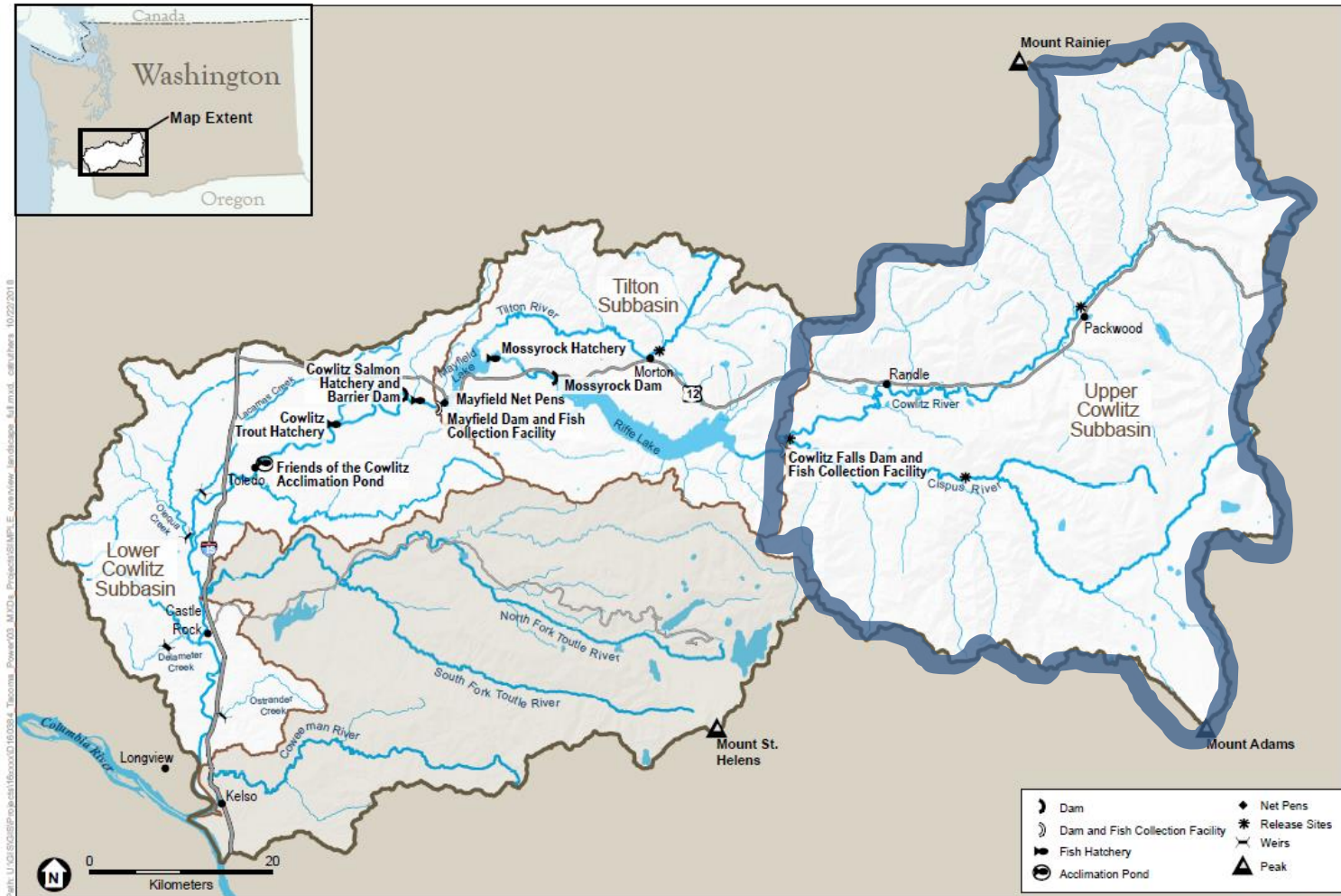
SOURCE: SWIFD, 2014; WDNr, 2017

Tacoma Power

Figure 1

Cowlitz River Subbasins

Watershed and Subbasins



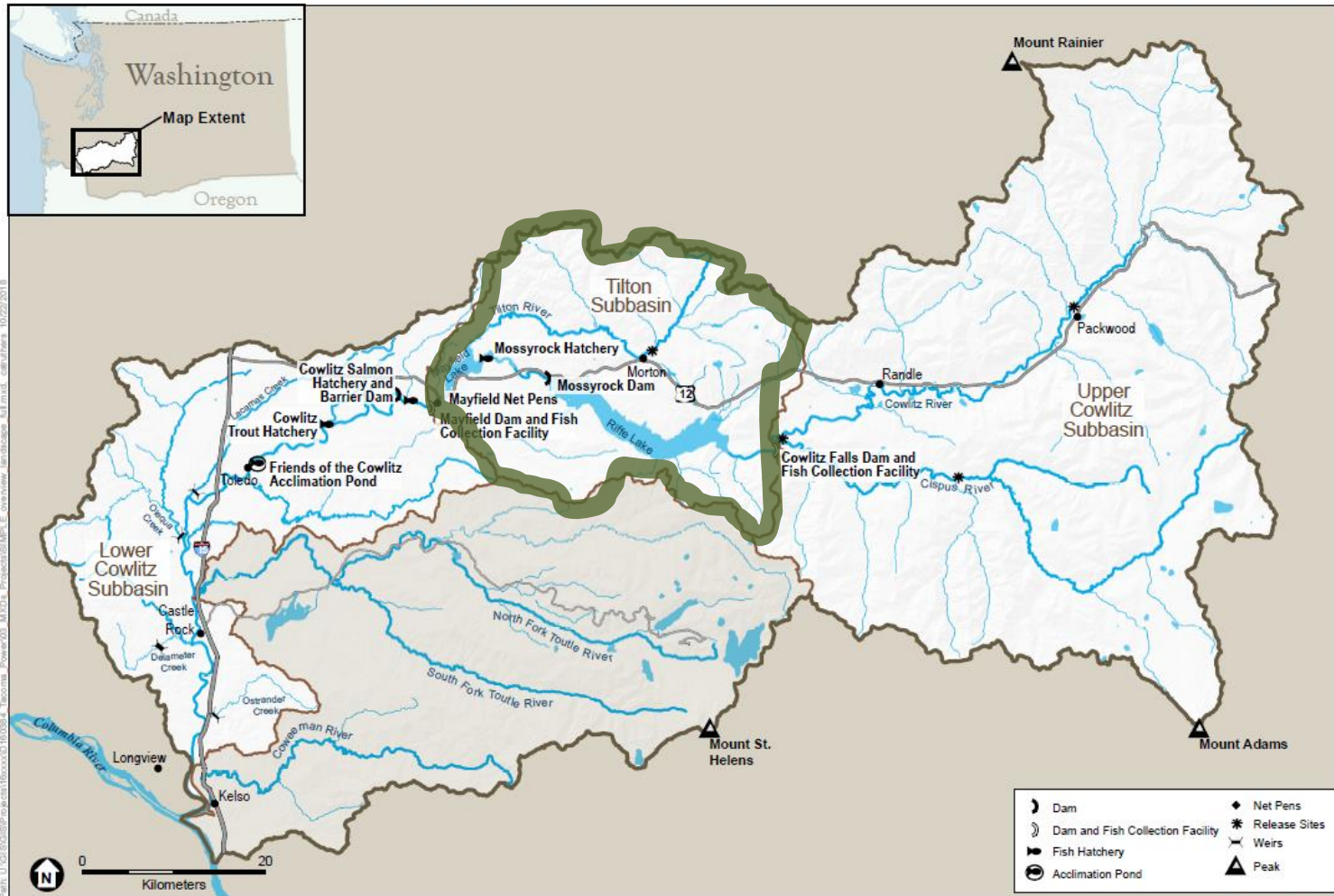
SOURCE: SWIFD, 2014; WDNR, 2017.

Tacoma Power

Figure 1

Cowlitz River Subbasins

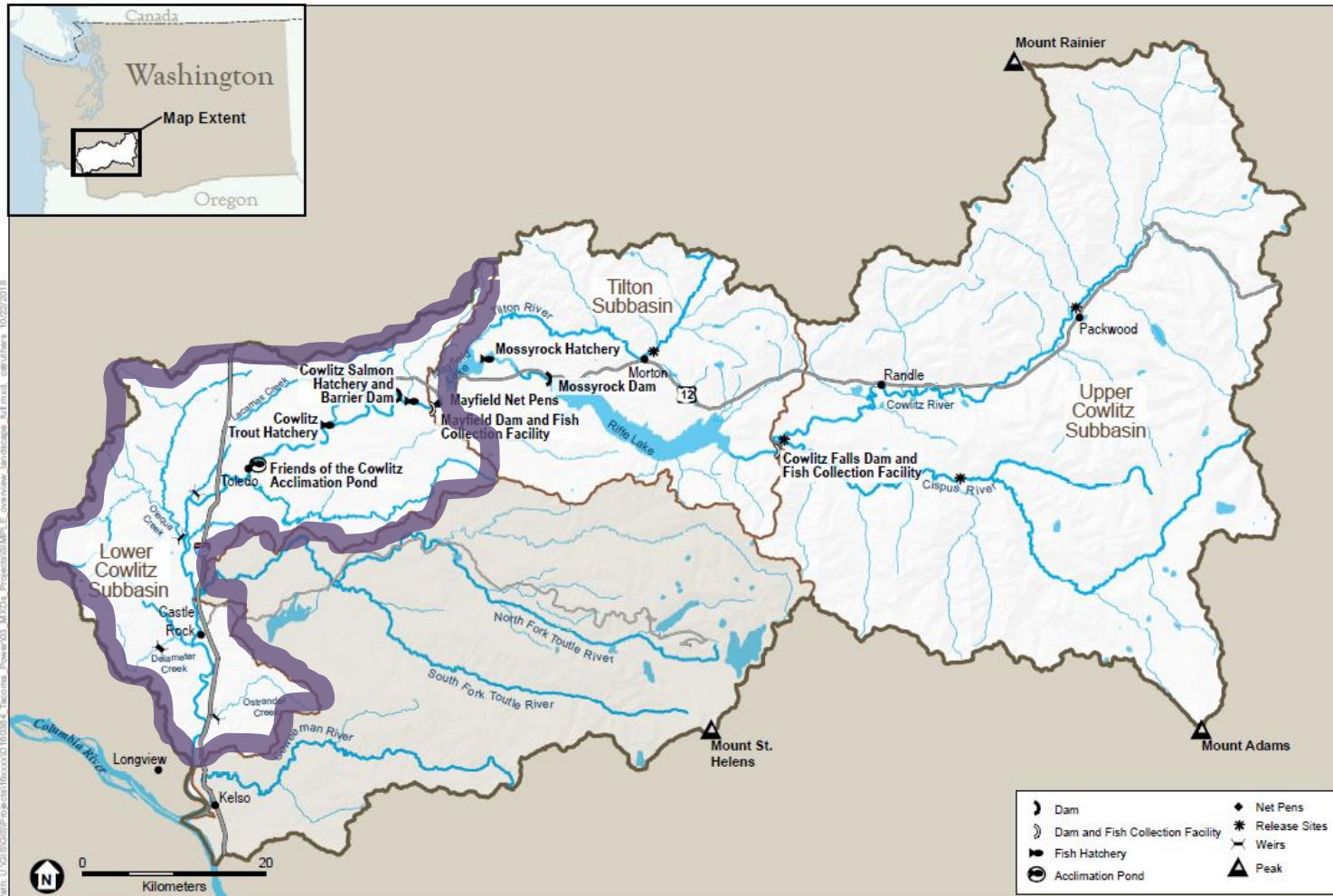
Watershed and Subbasins



SOURCE: SWIFD, 2014; WDNr, 2017

Tacoma Power
Figure 1
Cowlitz River Subbasins

Watershed and Hydro Facilities



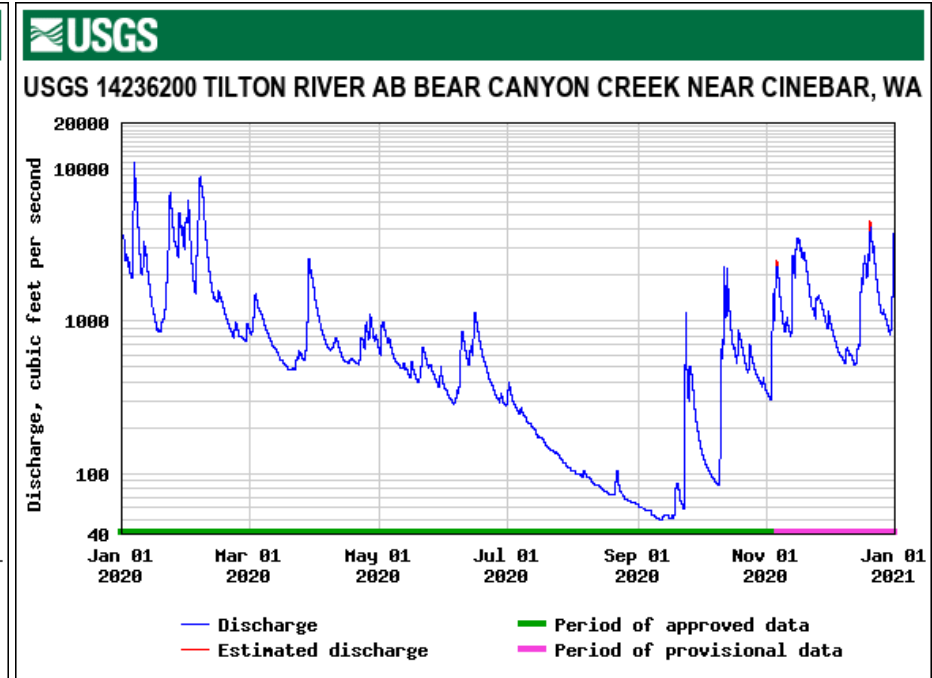
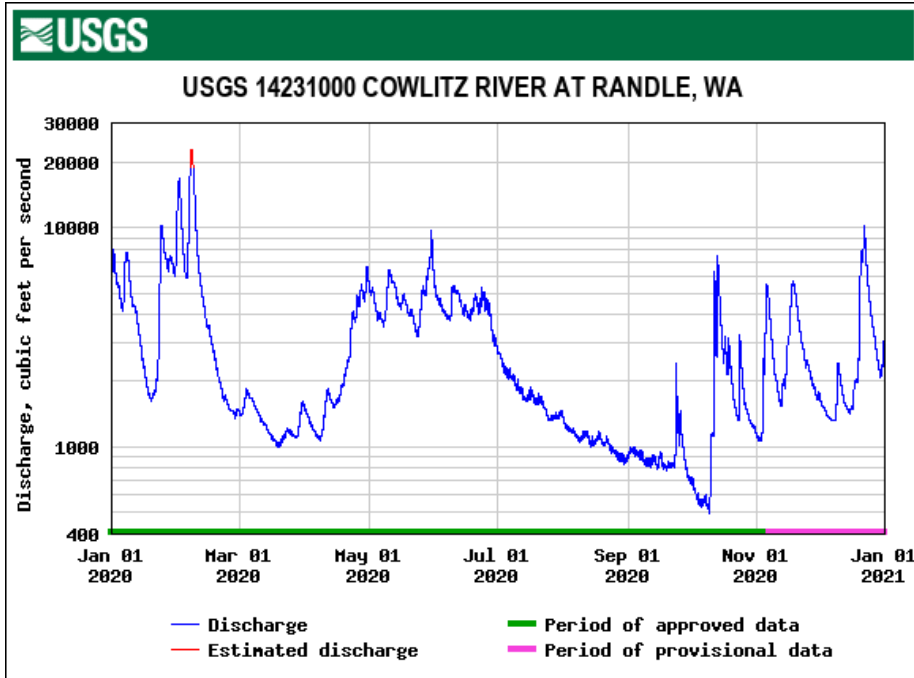
SOURCE: SWIFD, 2014; WDNr, 2017

Tacoma Power

Figure 1

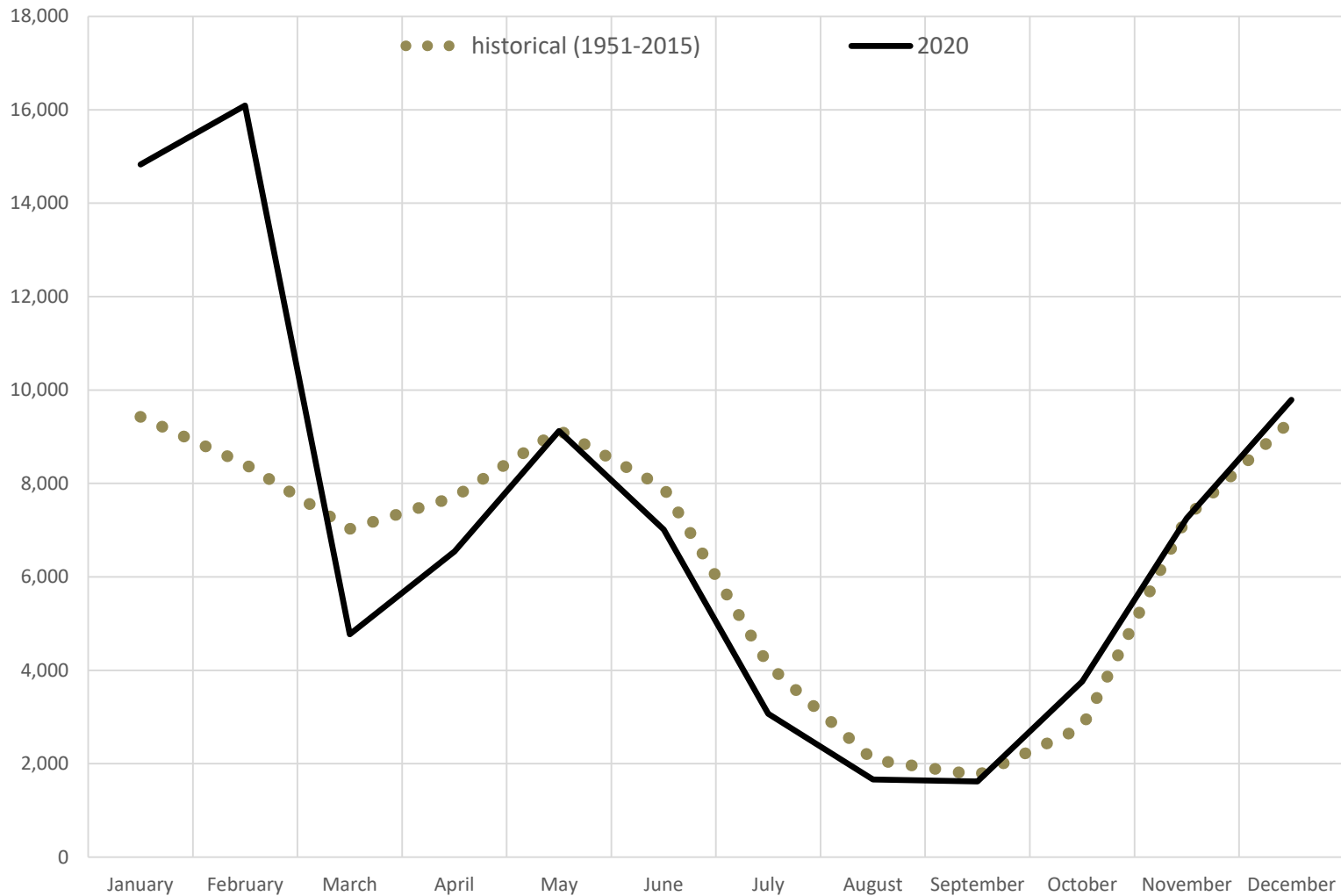
Cowlitz River Subbasins

Inflows: 2020 Rain and Runoff



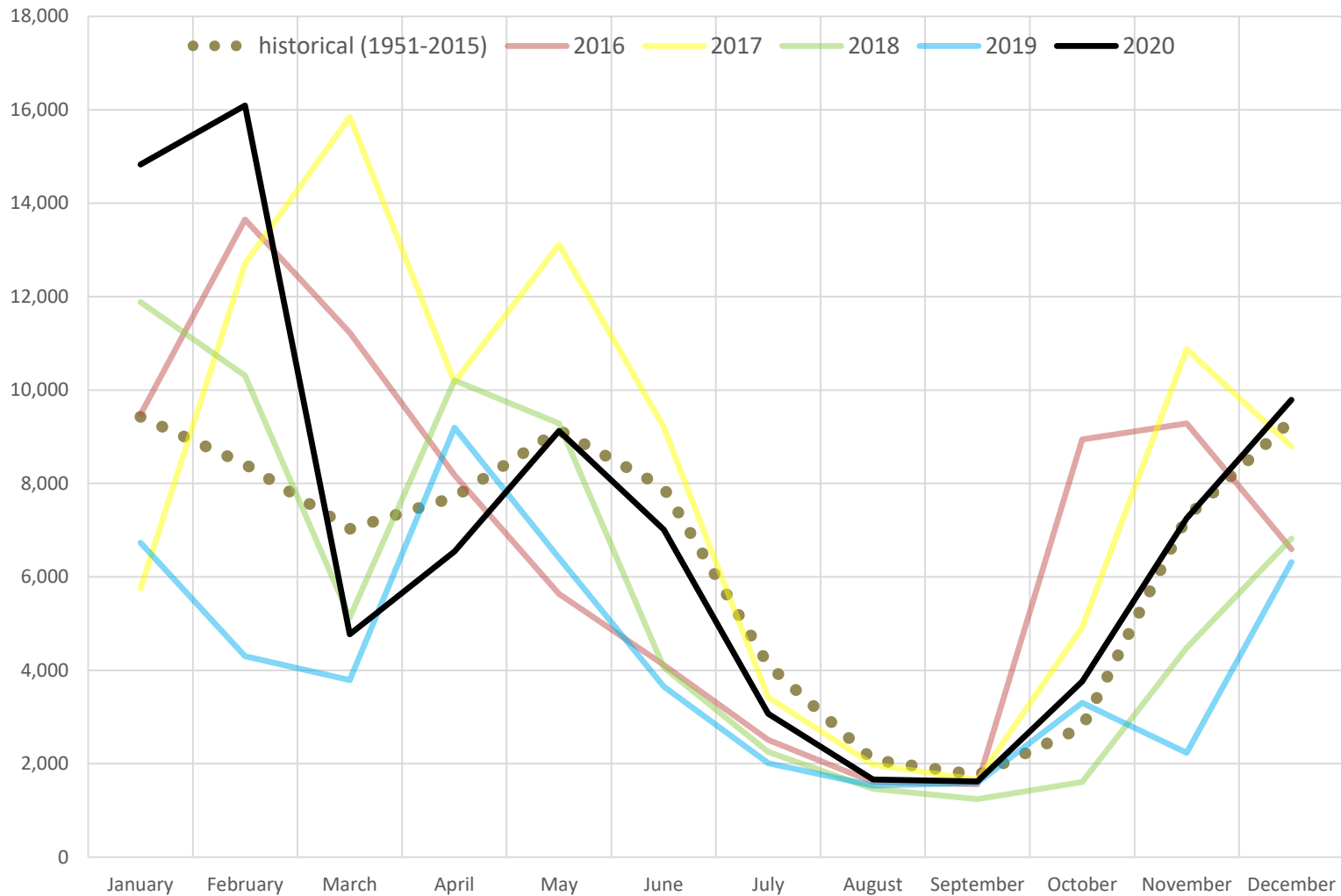
Inflows: 2020

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



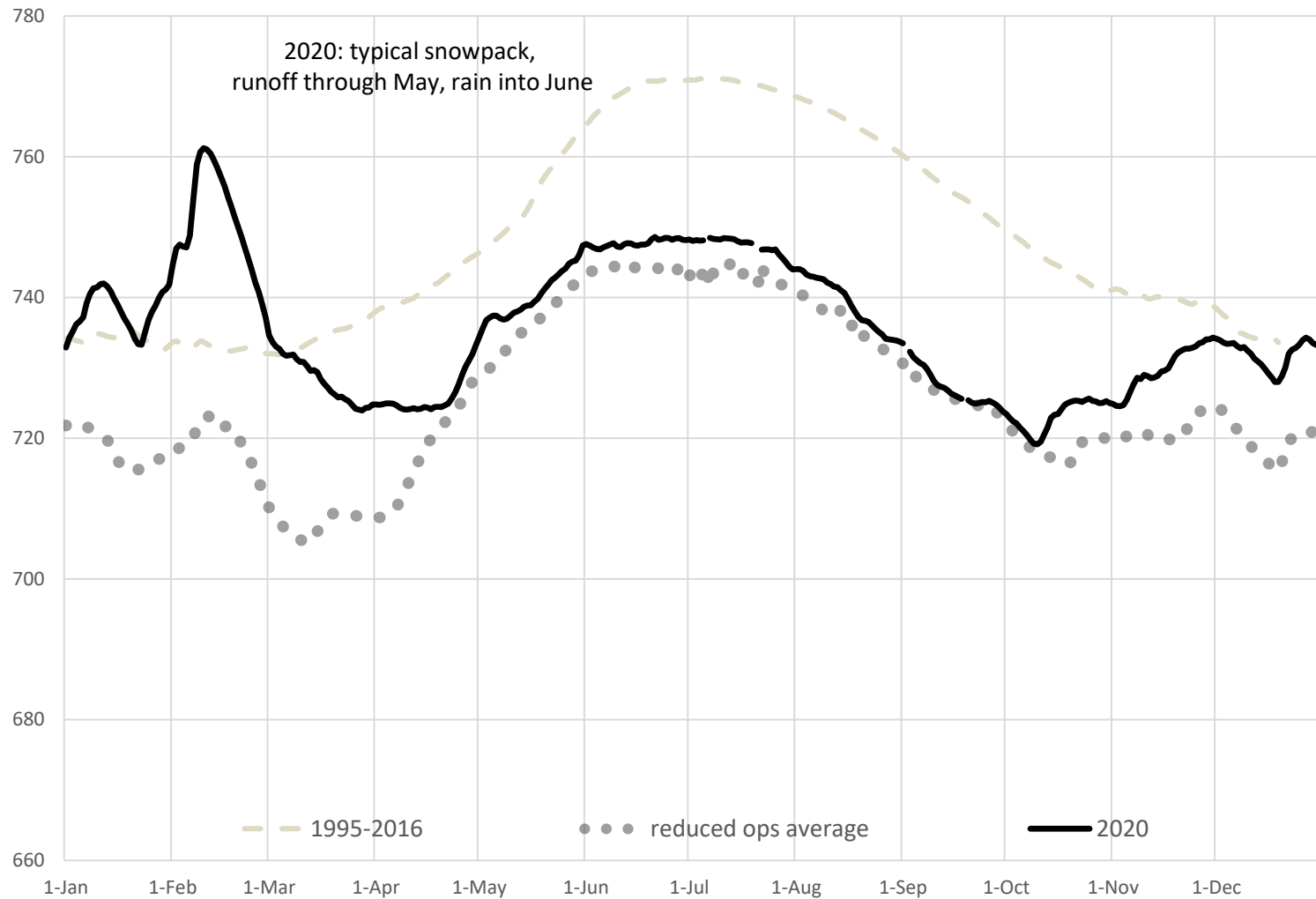
Inflows: 5-year context

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



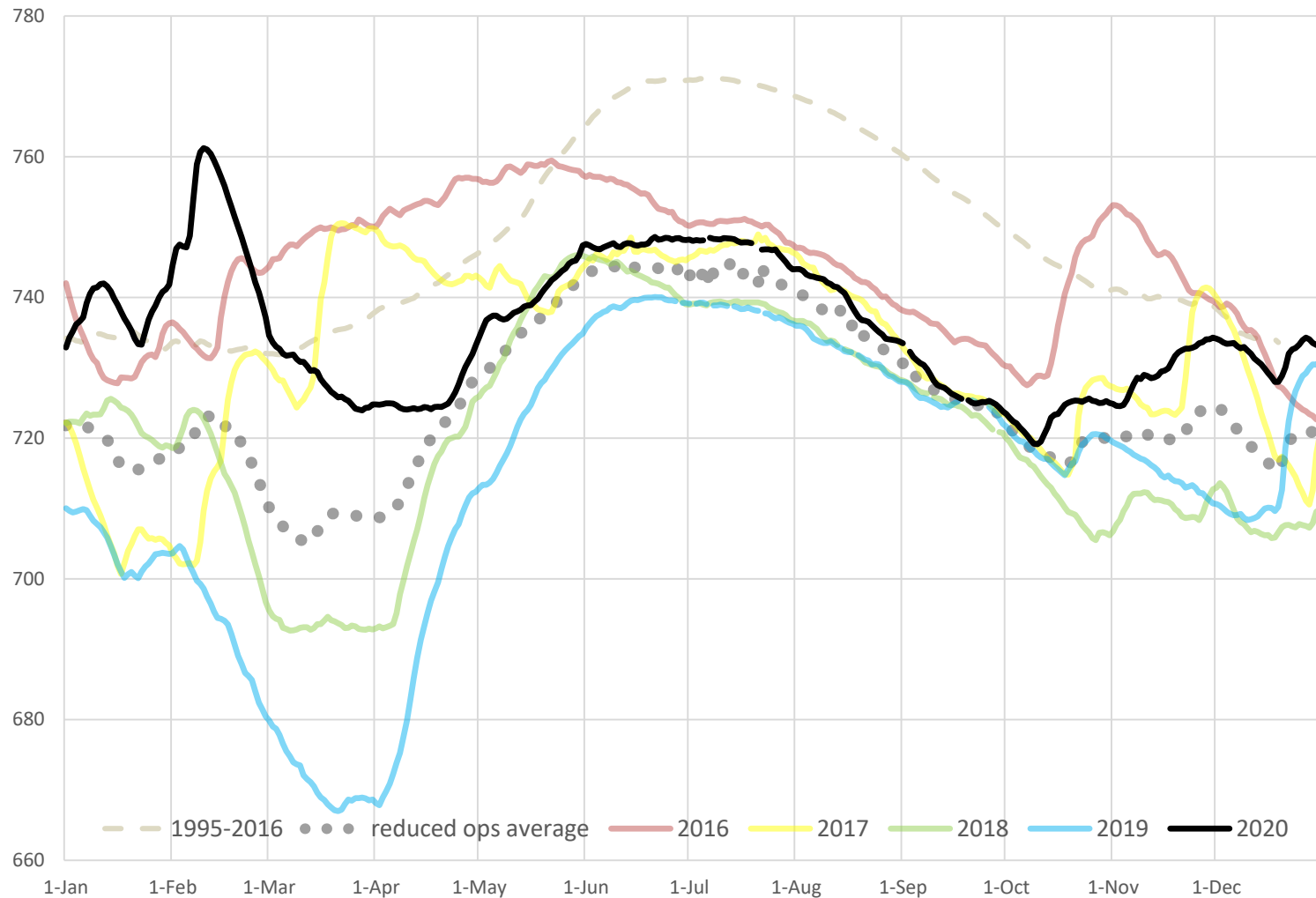
Reservoir Elevations: 2020

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



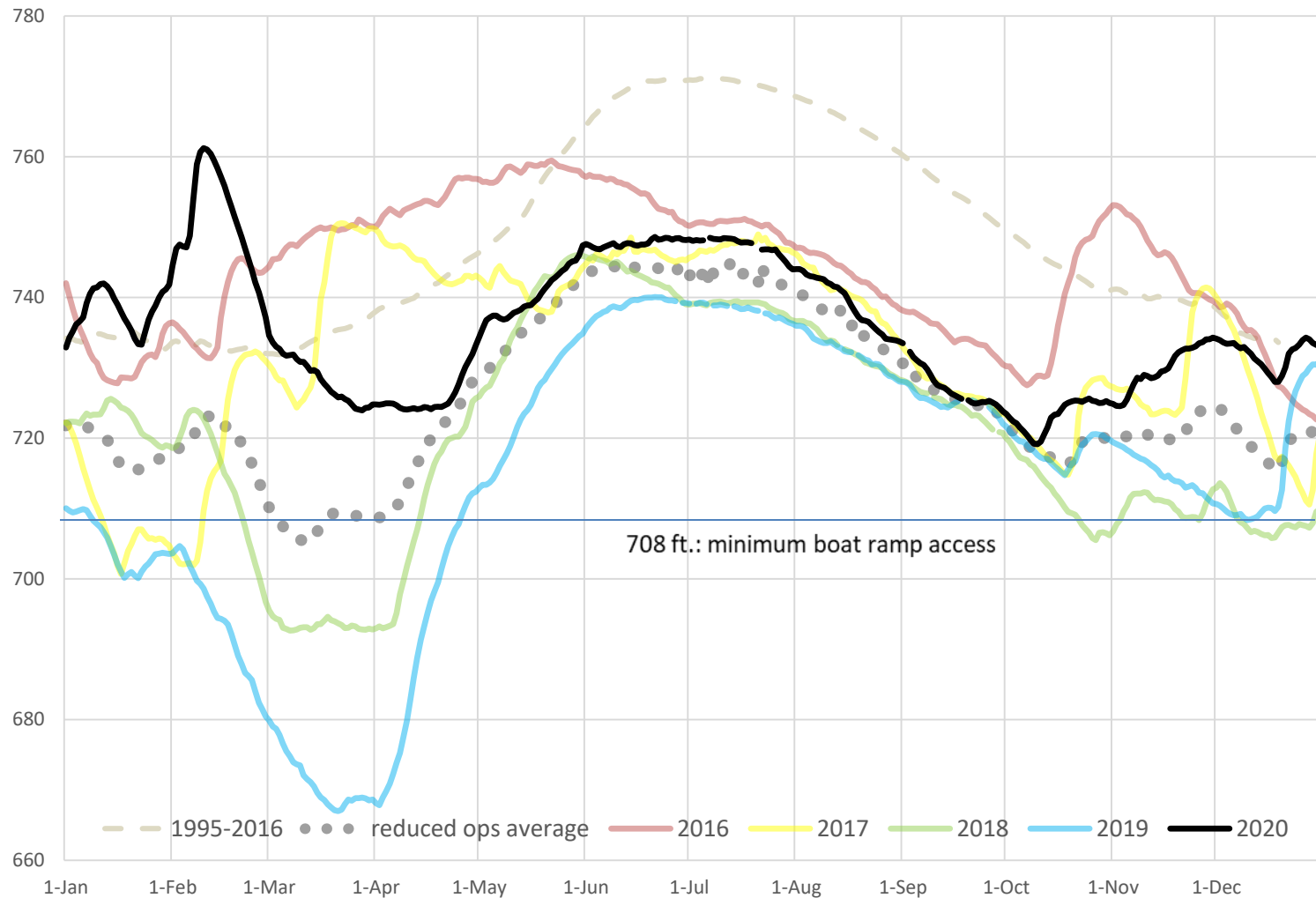
Reservoir Elevations: 5-year context

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

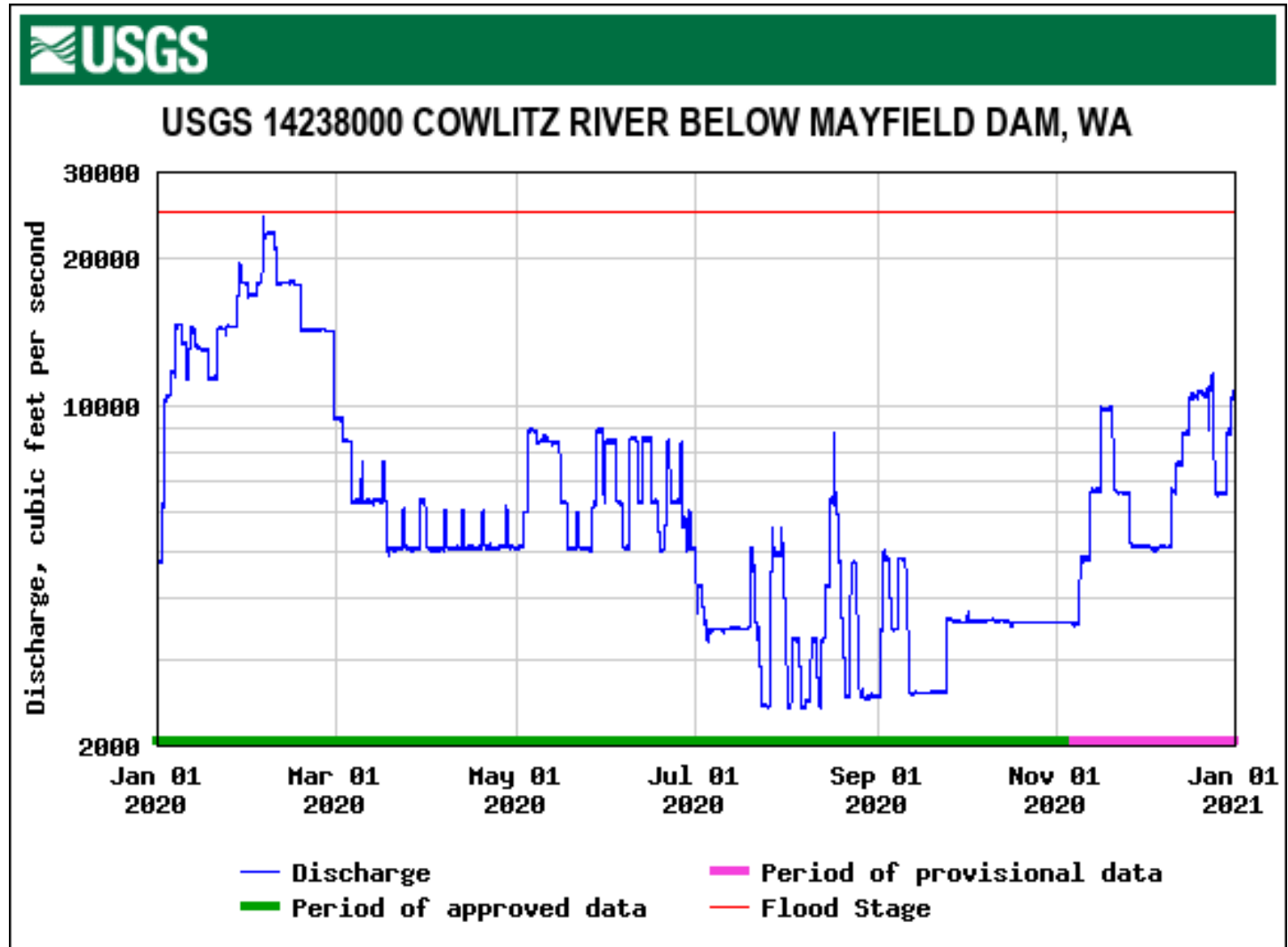


Reservoir Elevations: 5-year context

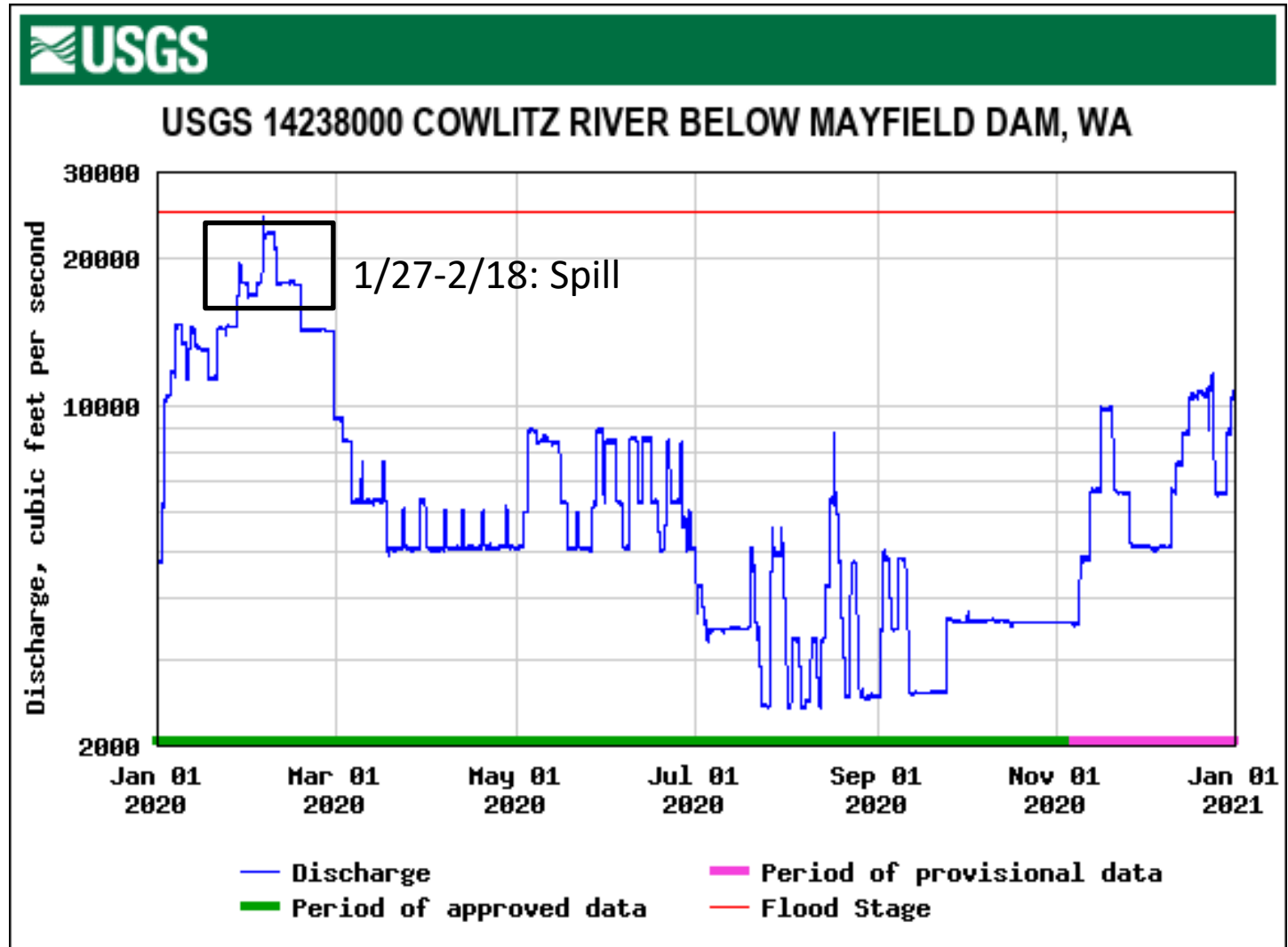
Riffe Lake Elevations (Tacoma Power): Daily (ft)



Instream Flow at Mayfield: 2020

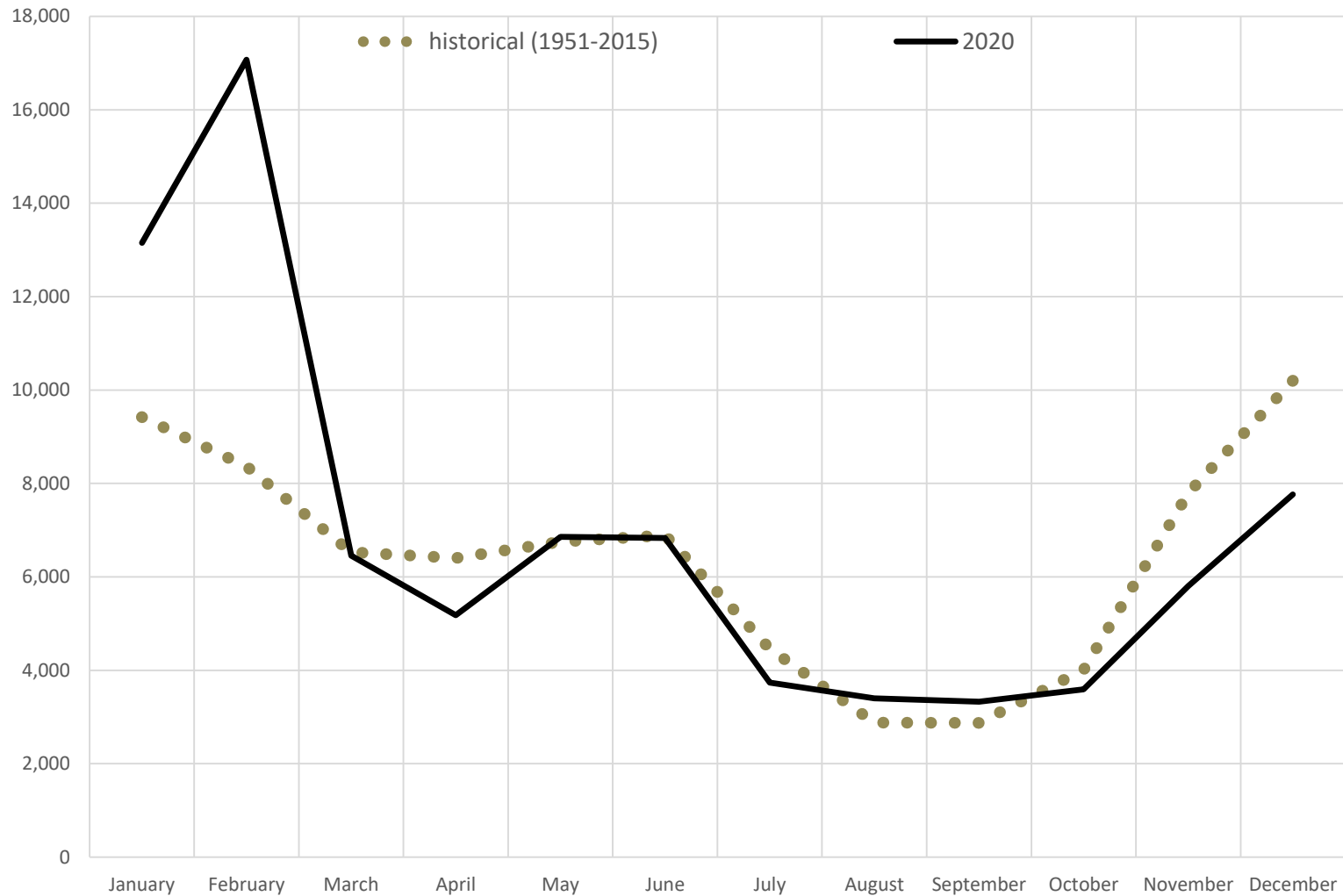


Instream Flow at Mayfield: 2020



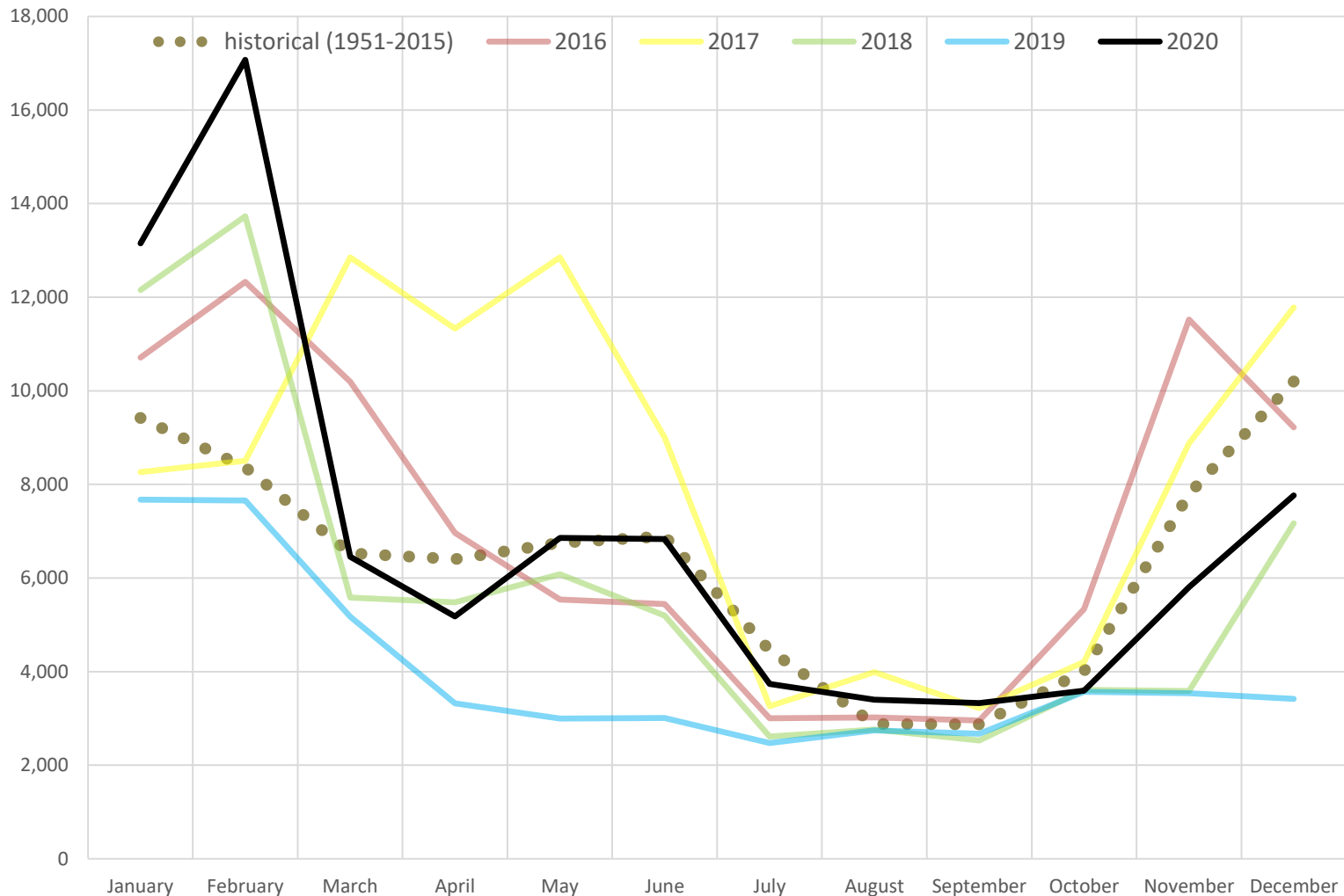
Instream Flow: 2020

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



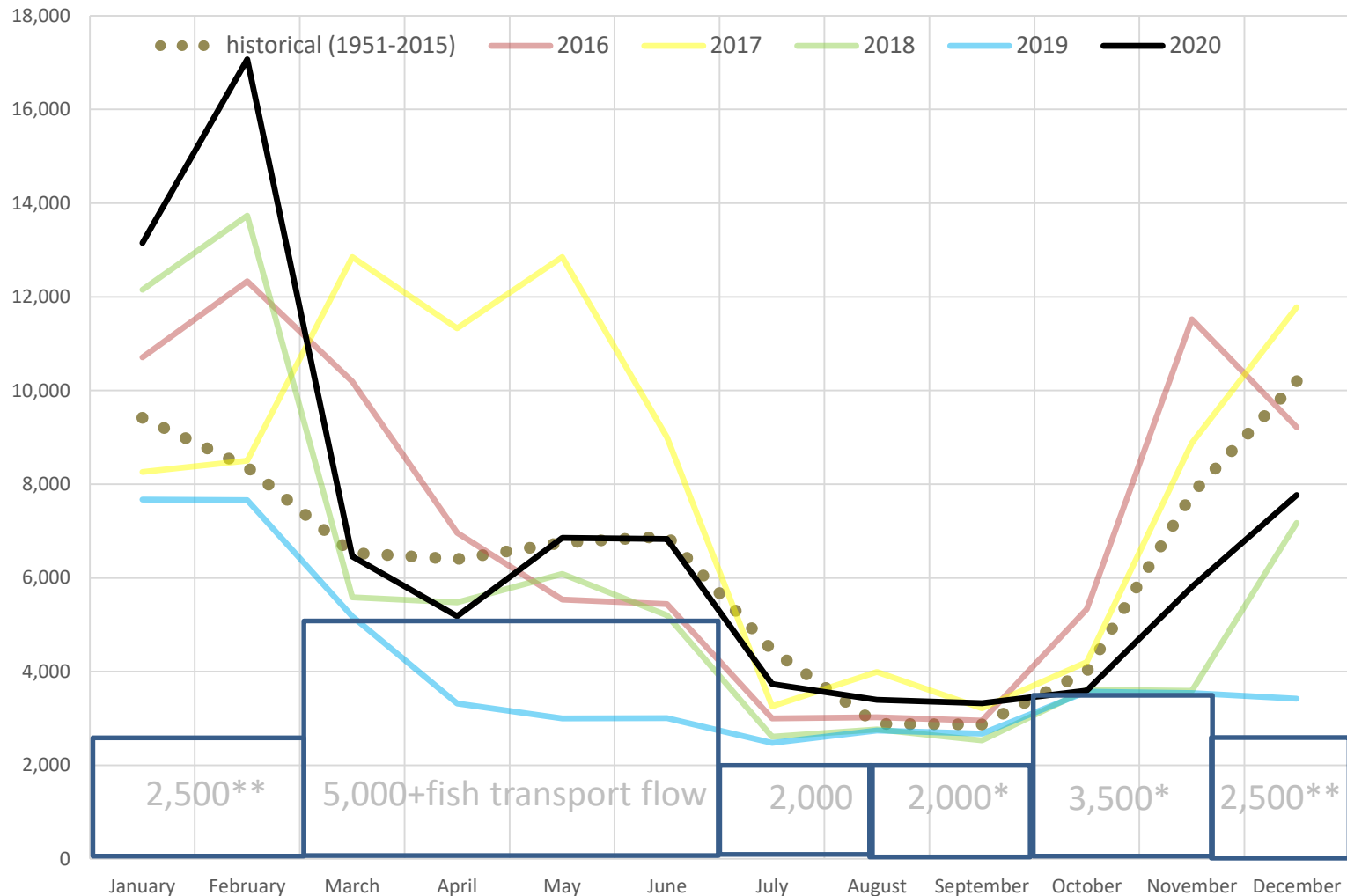
Instream Flow: 5-year context

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



Instream Flow: 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

Instream Flow: Minimum Flow

- Fall to winter variable minimums:
 - 2020: 5,000 cfs 11/16
 - 2019: 3,700 cfs 11/21
 - 2018: 2,900 cfs 11/21
 - 2017: 5,000 cfs 11/10
 - 2016: 5,000 cfs 11/2
- Minimum flow consistently met
- Adjusted for refill in 2019 (2,900 cfs + fish transport flow)

Key Points

- 2020 hydrologic highlights
 - Winter storms, high flows, first spill in 5 years
 - Then, generally “good” conditions
 - Achieved summer refill
 - Opportunities for generation and recreation
 - Supported instream flows
- 5-year context
 - Variability in seasonal and overall conditions
 - Constraints related to reservoir capacity

2021 Preview

- Hydrology
 - High snowpack, record dry spring
 - Dry outlook
- Operations
 - Winter/spring conditions resulted in low reservoir
 - Planned major projects additionally constrain reservoir and instream flow

Any Questions?



February 13, 2020 ~3,300 cfs spill at Mayfield