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November 7, 2017

MEMORANDUM

TO: Fish and Wildlife Committee Members

FROM: Tony Grover

SUBJECT: Adult anadromous fish in the Columbia Basin

BACKGROUND:

Presenter: Tony Grover, Director, Fish and Wildlife Division

Summary: Between 2008 and 2017 an annual average of about 1.5 million adult salmon and steelhead returned to the Columbia River and successfully passed Bonneville Dam. About 850,000 of these adult fish made it above McNary dam. An annual average of approximately 255,000 adult fish survived to pass above Lower Granite dam on the Snake River. Annually, about 267,000 adult fish ascended the Columbia River to pass Wells dam. Of these fish 207,000 of the annual average were sockeye. Jacks were not included in this analysis.

The Council's goal expressed in the 2014 Fish and Wildlife Program is to "...increase total adult salmon and steelhead runs, with an emphasis on those above Bonneville dam, by 2025 to an average of 5 million annually."

A series of simple graphs in the accompanying PowerPoint presentation illustrate how anadromous fish count information changes from downstream dams to upstream dams for each fish run.

General observations:

- Spring Chinook go up the Snake River

- Summer Chinook go up the Columbia River
- Fall Chinook stay in the lower Columbia River, most of these fish seem to be migrating no higher than the Hanford Reach
- Coho numbers drop off pretty fast above Bonneville dam with relatively few going up the Columbia and less up the Snake
- Sockeye, not surprisingly, head to the upper Columbia
- Steelhead that make it out of the lower Columbia mostly go up the Snake
- Lamprey seem to prefer to migrate into the upper Columbia if they make it past The Dalles dam

Workplan: Background information for the upcoming Fish and Wildlife Program amendment process.

Background: Adult salmon, steelhead and pacific lamprey are routinely counted at fourteen federal and mid-Columbia Public Utility District dams on the Columbia and Snake rivers, beginning at Bonneville dam in 1938. Adult count information at all fourteen dams is readily available for the time period 2008 to 2017. Spring, summer and fall chinook, coho, sockeye, steelhead and lamprey are counted from Bonneville Dam to Wells dam on the Columbia and to Lower Granite dam on the Snake, though care must be exercised in using the passage numbers because different counting systems are used at different dams and the fish do not always complete their migration in a single year. This adult fish passage information can be analyzed for a general sense of how fish runs move through the mainstem Columbia and Snake Rivers.

More Info: <http://www.fpc.org/>

Adult fish in the Columbia basin

anadromous salmon, steelhead and lamprey

2017, 2016 and ten year averages

Dam Building Era

- ~70 years, ending by 1980, > 60 major dams
- Rock Island was the 1st on Columbia River
- 14 on the Columbia
- 20 on the Snake
- 7 each on Kootenay and Pend Oreille/Clark
- 18 on Willamette
- 8 on Yakima
- Average 1 major dam ~ every 72 miles

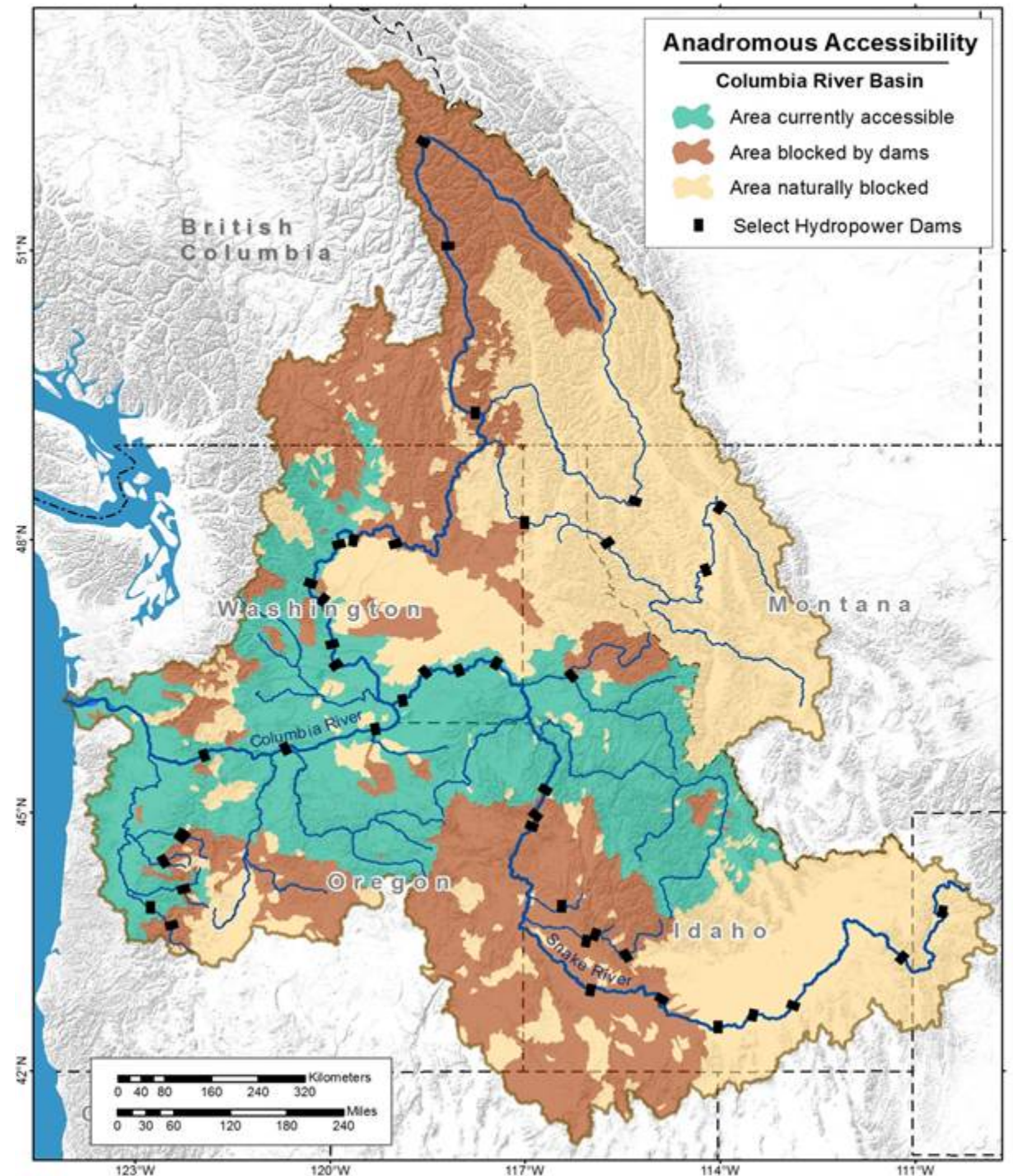
Anadromous Fish Passage in the Columbia River basin

Fish runs considered (not including jacks):

- Spring Chinook
- Summer Chinook
- Fall Chinook
- Coho
- Sockeye (all)
 - Snake River Sockeye
- Steelhead
- Lamprey

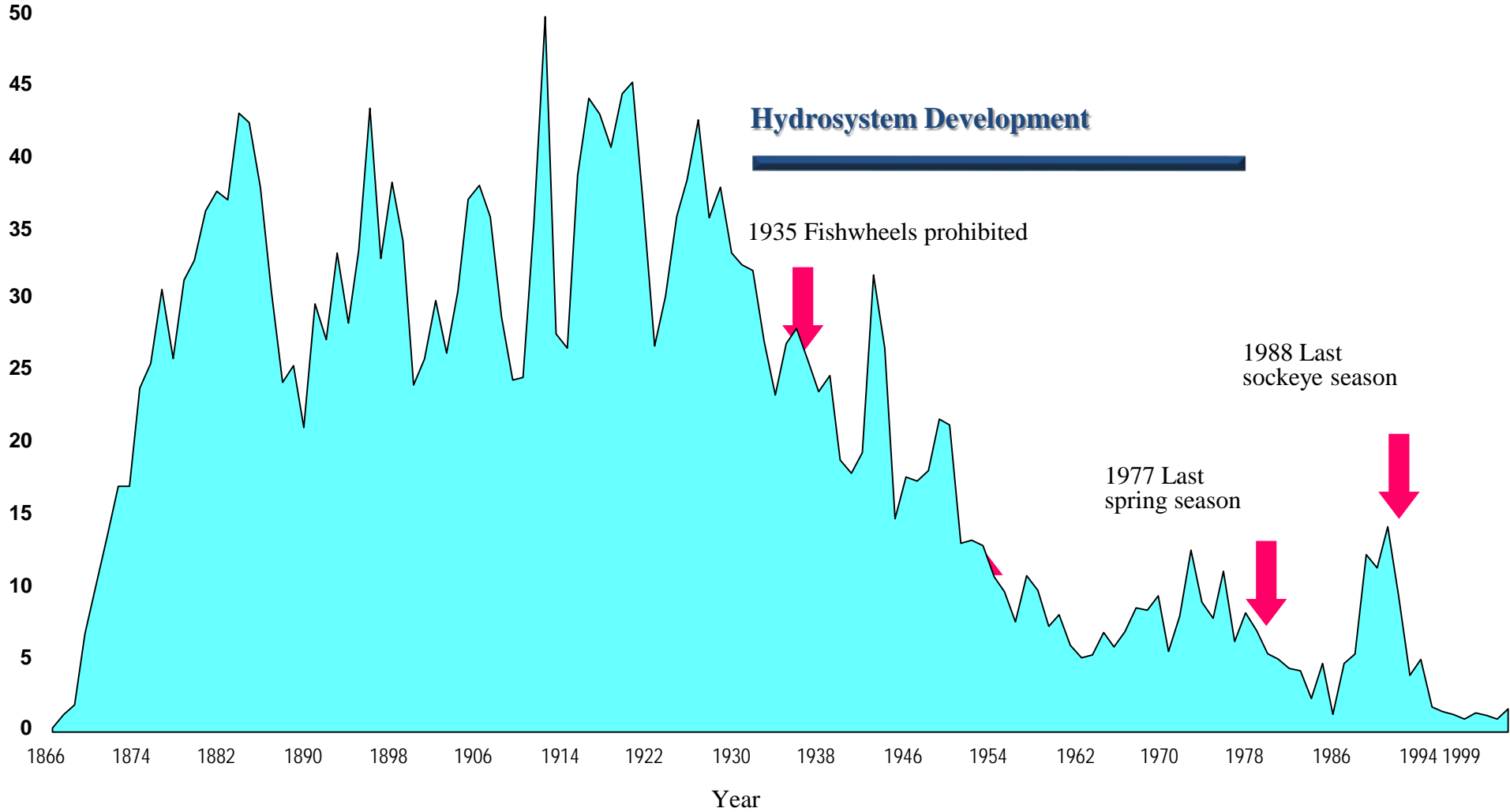
Not considered:

- Chum, Pink, Eulachon, Shad and Willamette fish

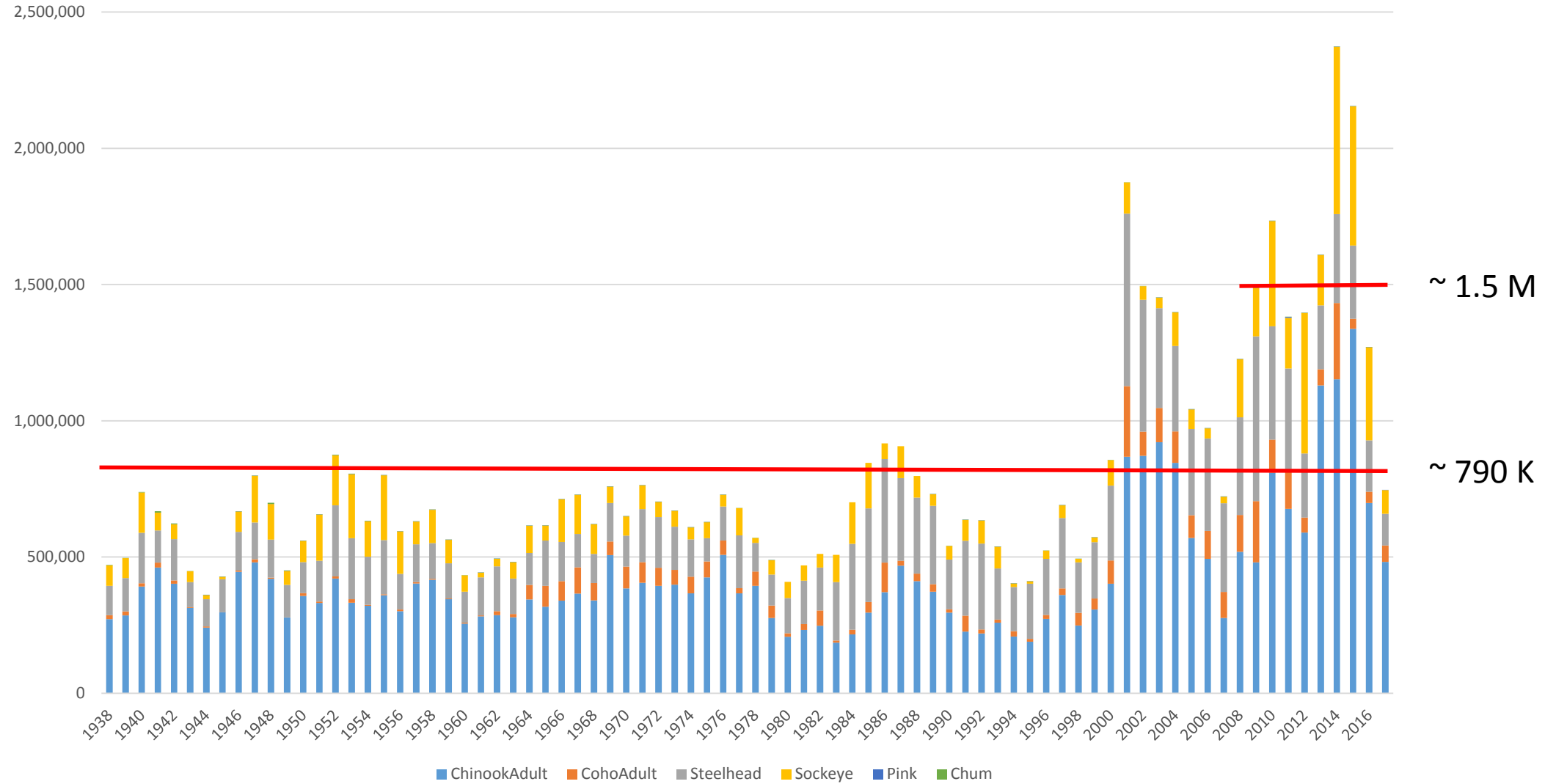


Commercial Landings of Salmon & Steelhead from the Columbia River / 1866-1999

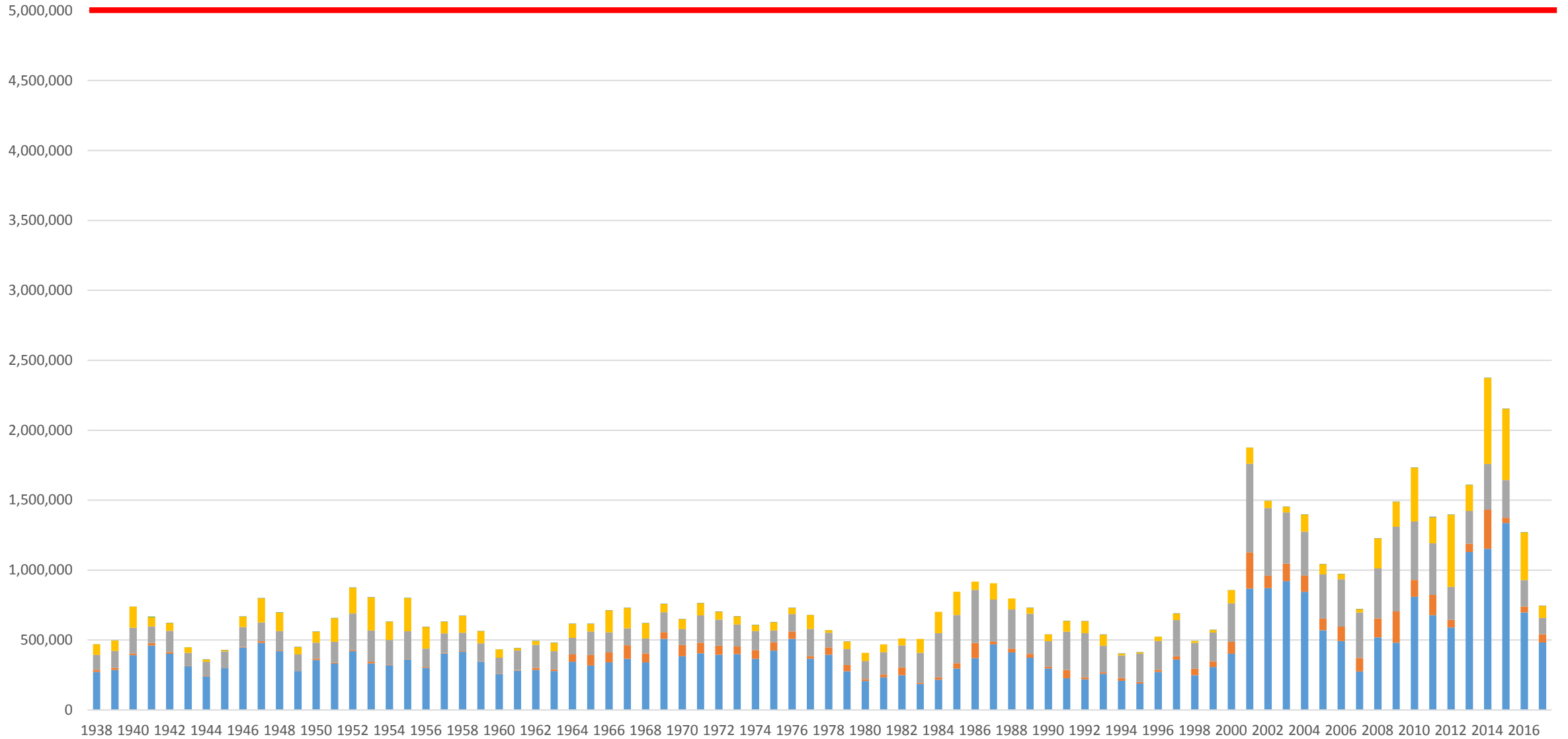
Millions of Pounds



Salmon and steelhead returns counted at Bonneville Dam 1938-2017

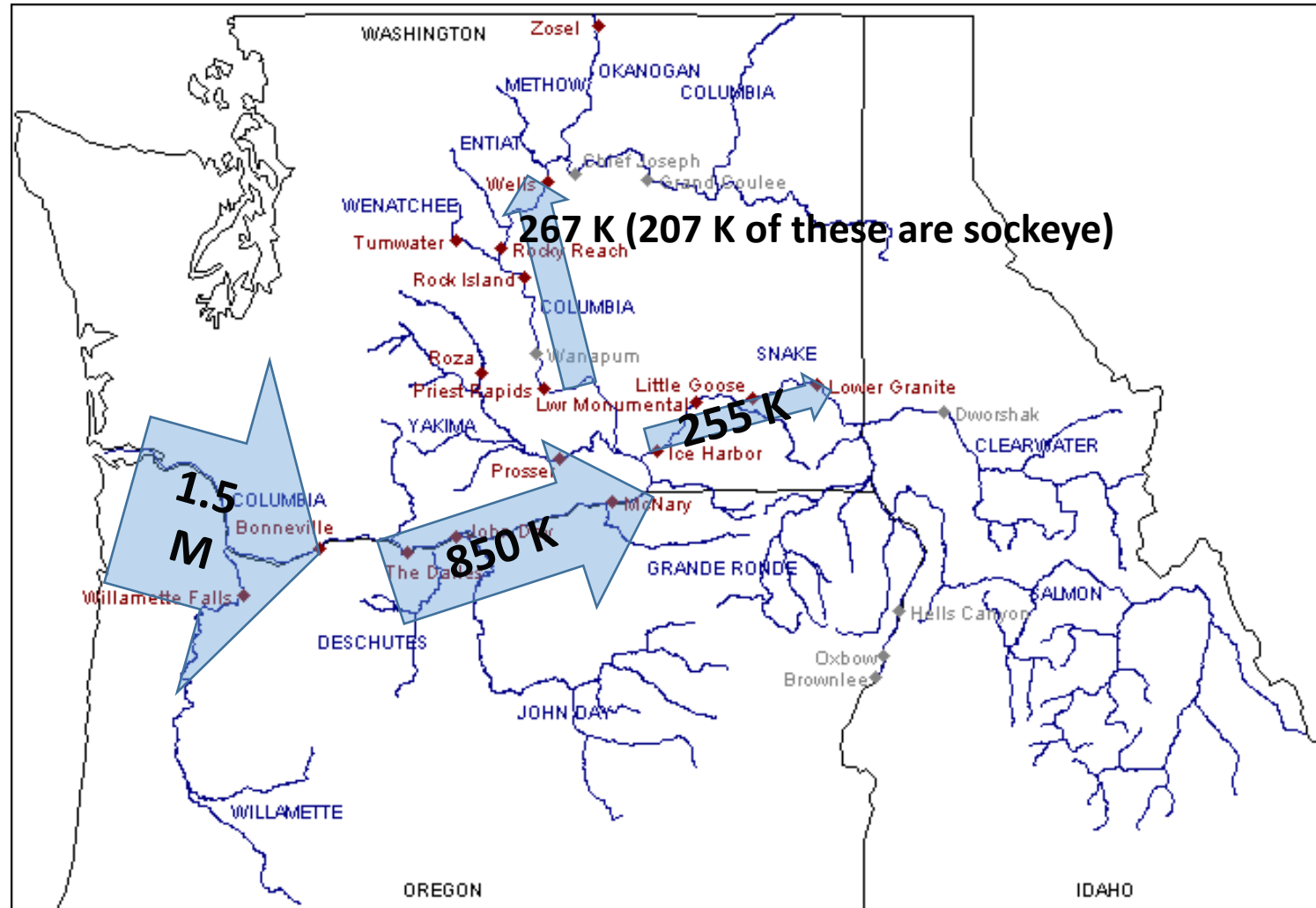


Adult salmon and steelhead returns compared to Fish and Wildlife Program goal



■ ChinookAdult ■ CohoAdult ■ Steelhead ■ Sockeye ■ Pink ■ Chum

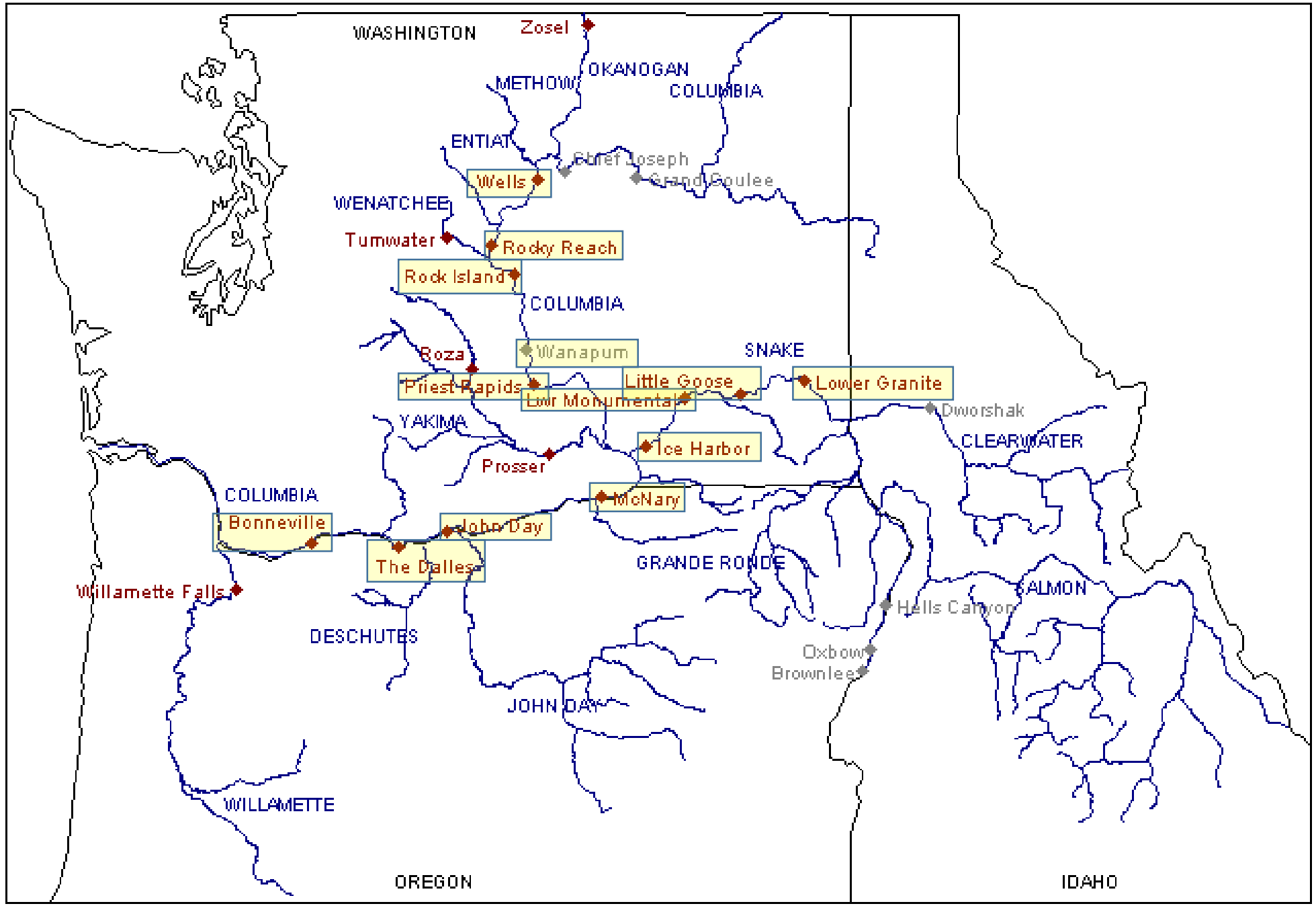
Where do the returning salmon and steelhead go?



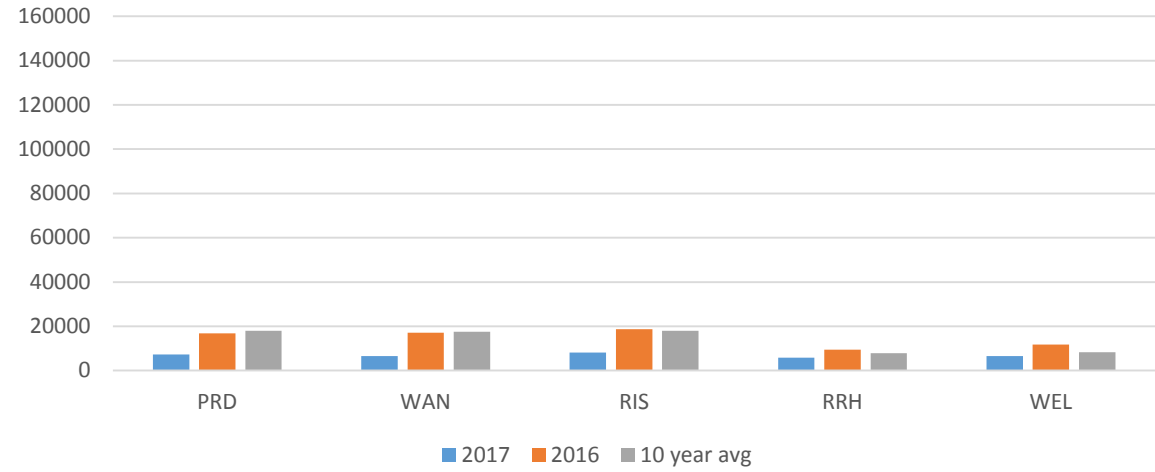
10 year average (2008-2017) of adult fish returns (not including lamprey)

KEY:

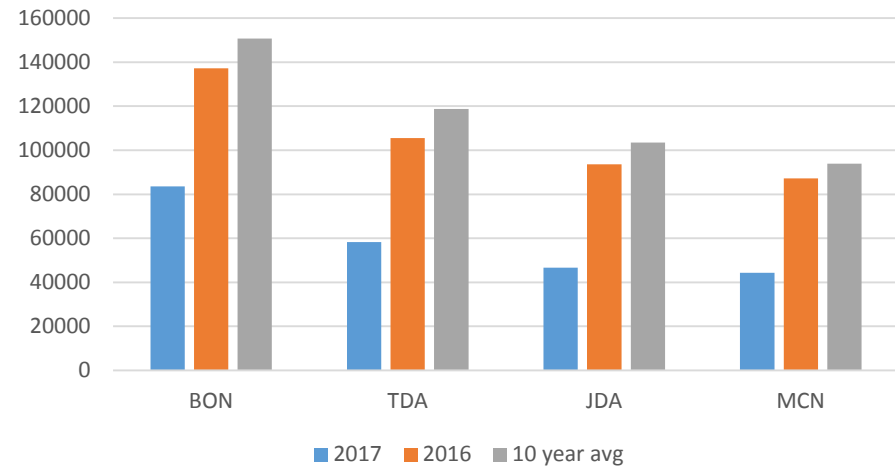
- BON – Bonneville
- TDA – The Dalles
- JDA – John Day
- MCN – McNary
- IHR – Ice Harbor
- LMN – Lower Monumental
- LGS – Little Goose
- LGR – Lower Granite
- PRD – Priest Rapids
- WAN – Wanapum
- RIS – Rock Island
- RRH – Rocky Reach
- WEL – Wells



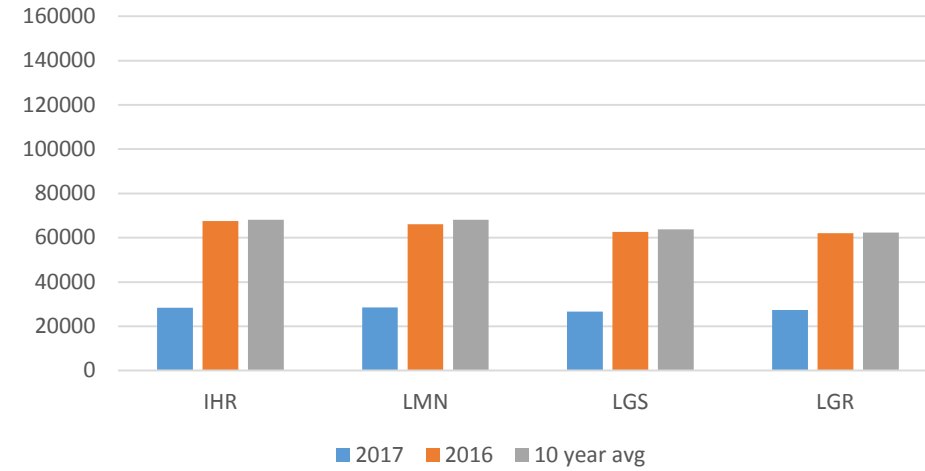
Spring Chinook



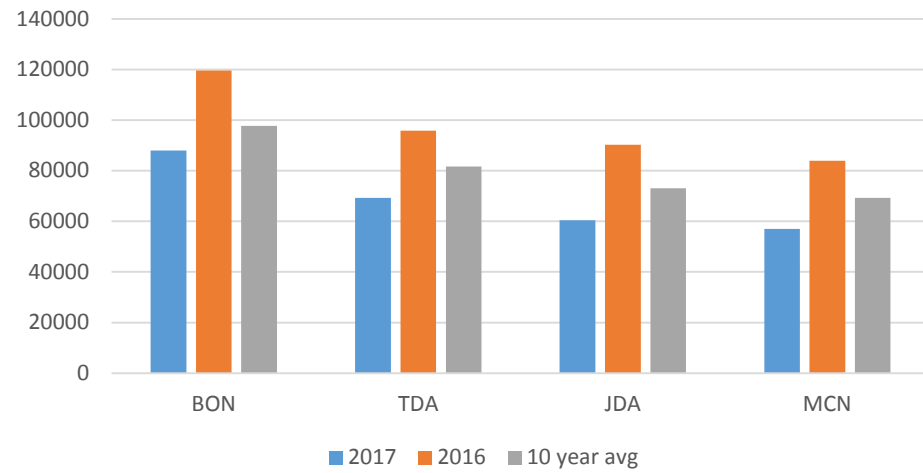
Spring Chinook



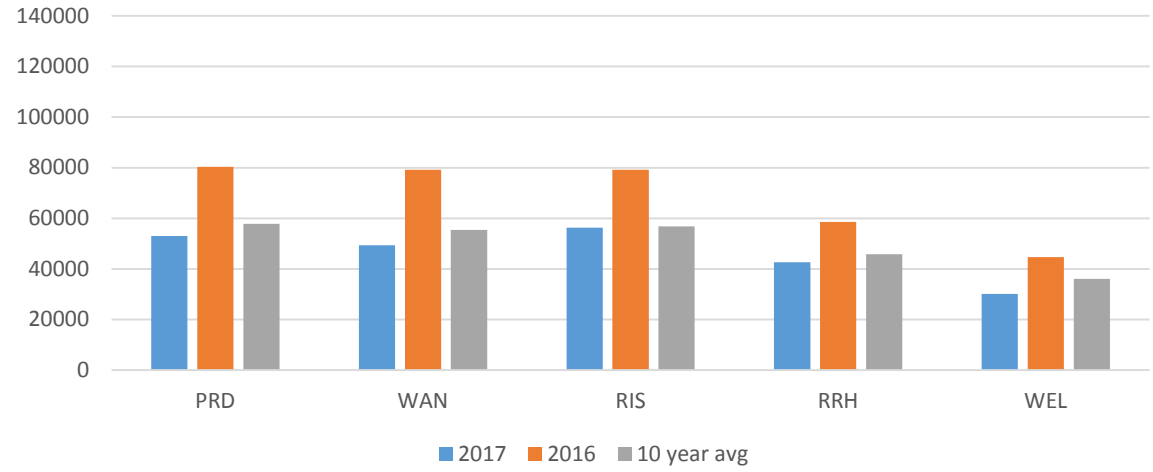
Spring Chinook



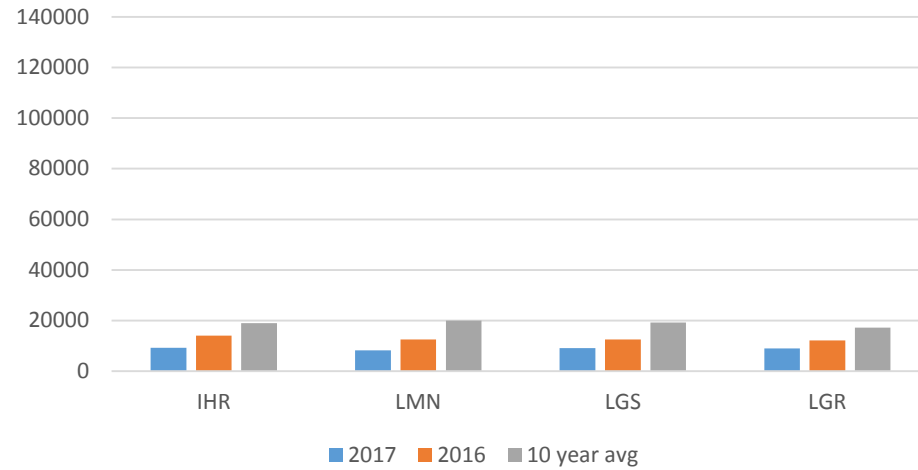
Summer Chinook



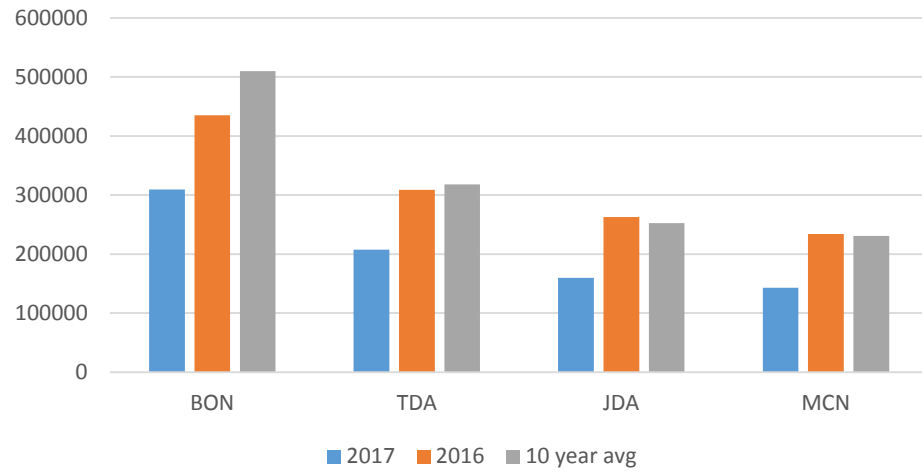
Summer Chinook



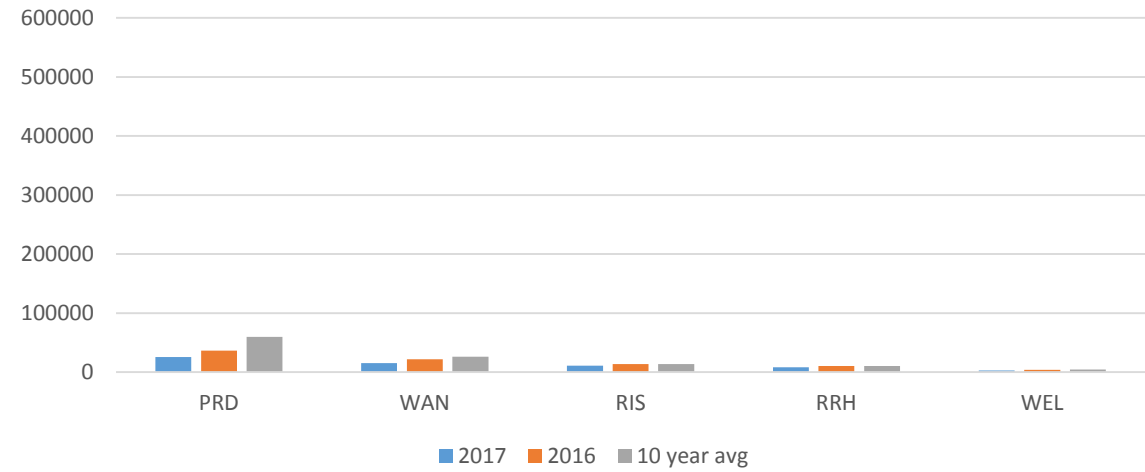
Summer Chinook



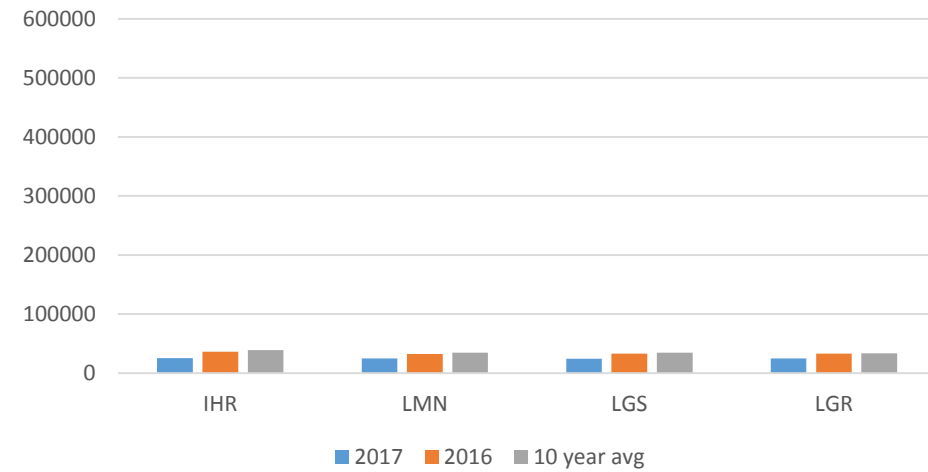
Fall Chinook

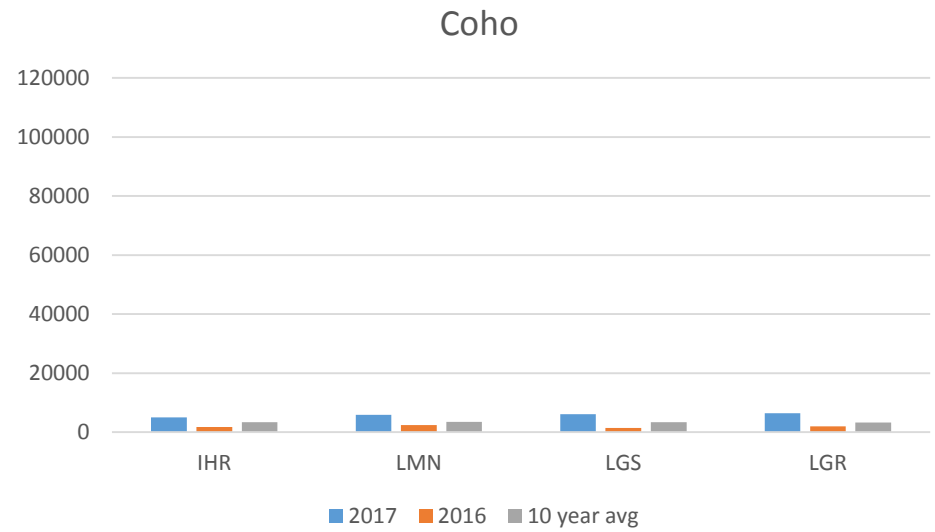
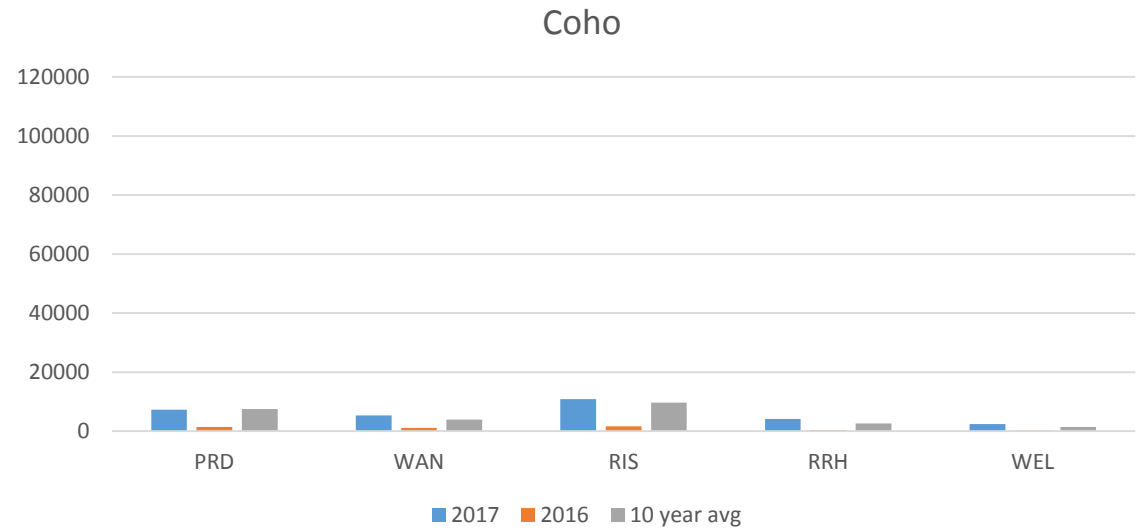
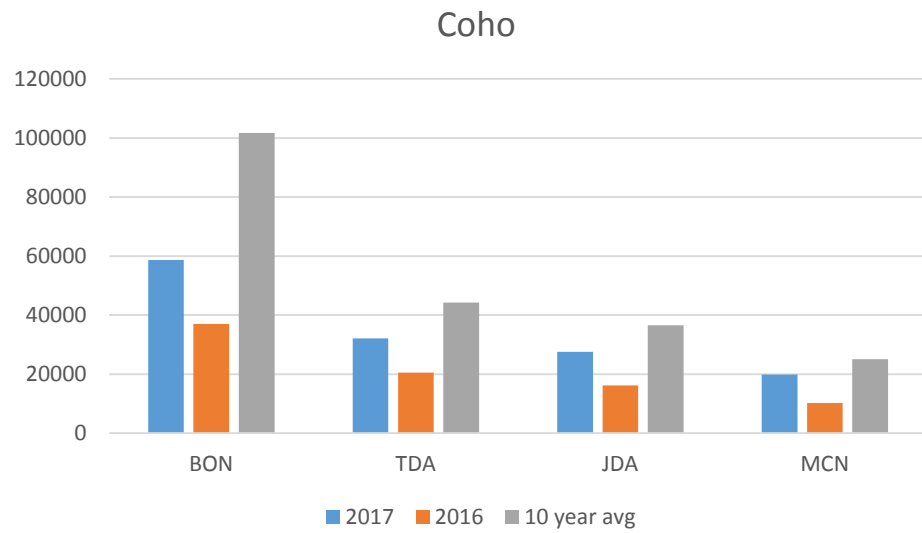


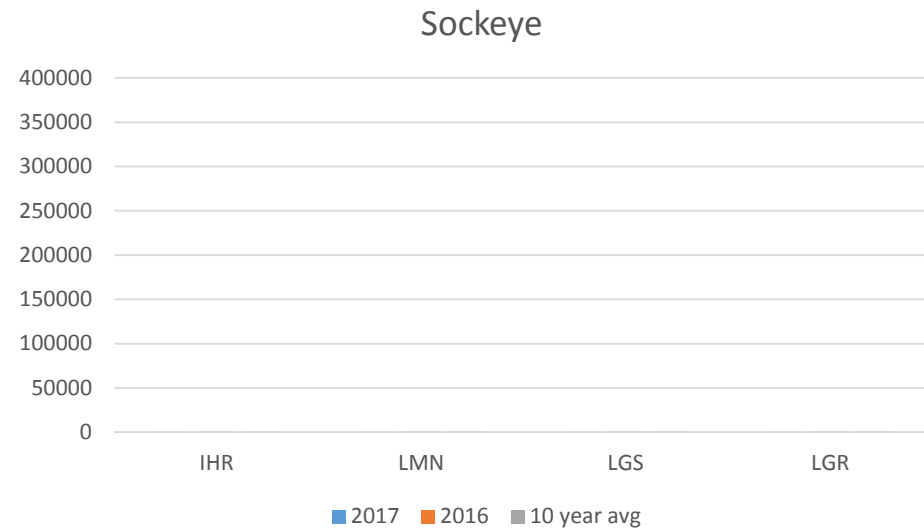
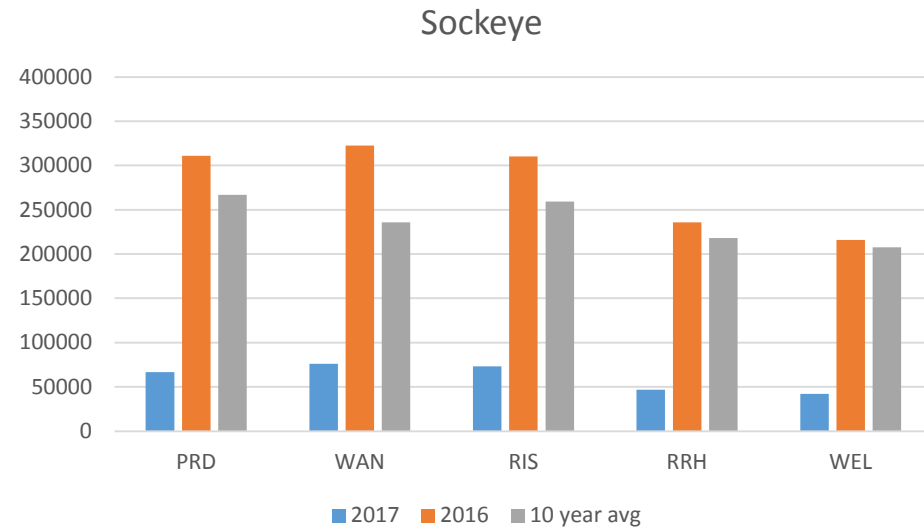
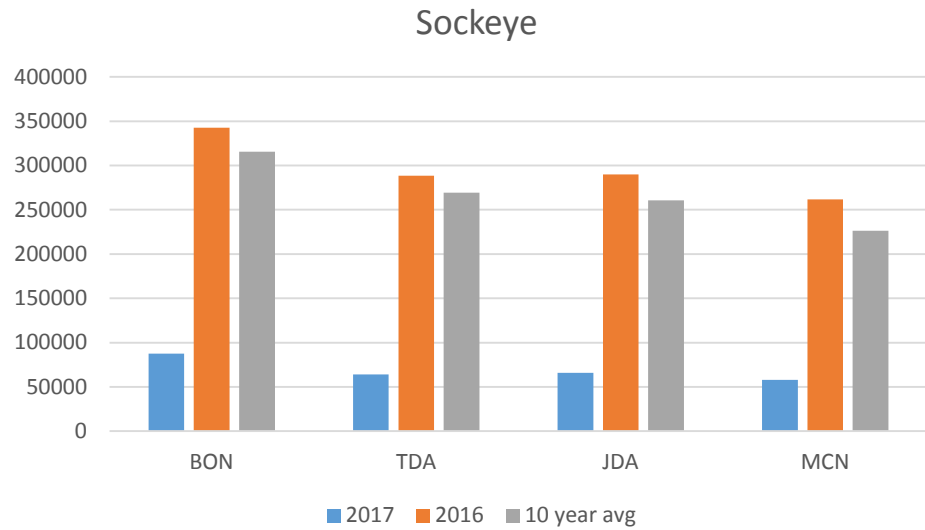
Fall Chinook



Fall Chinook



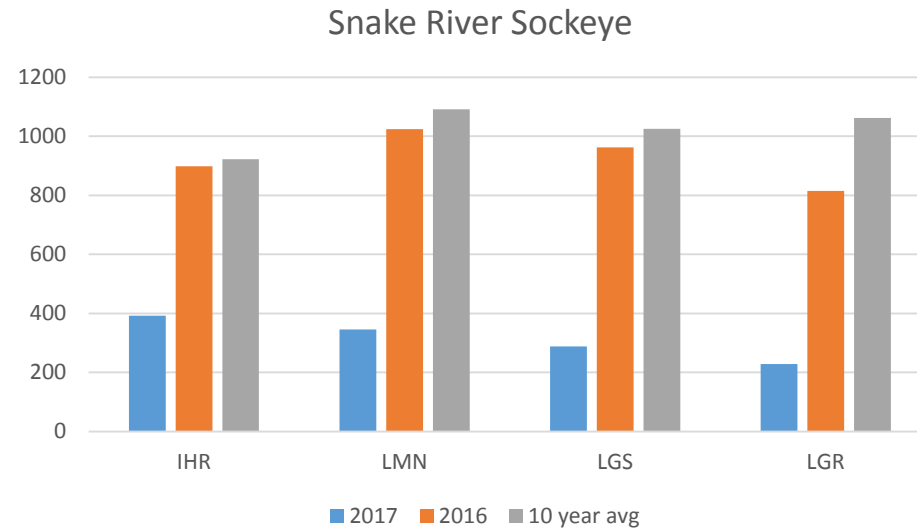


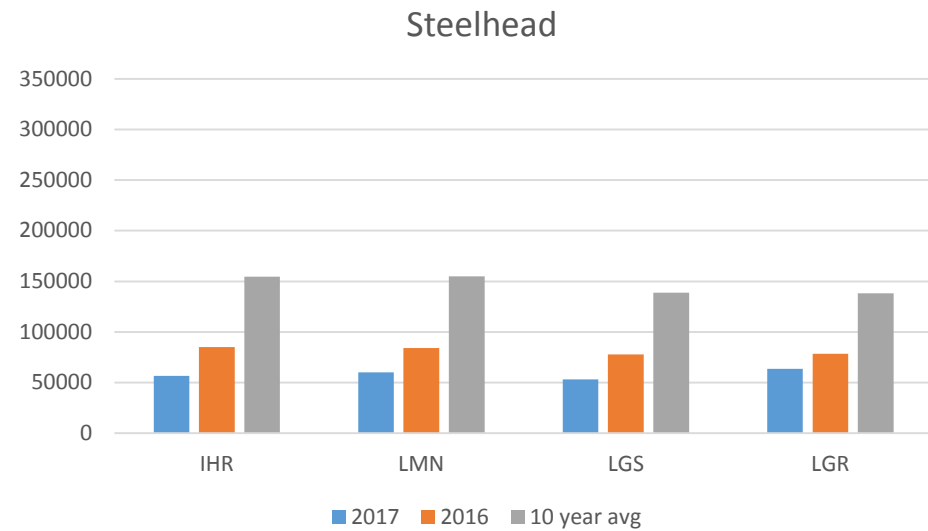
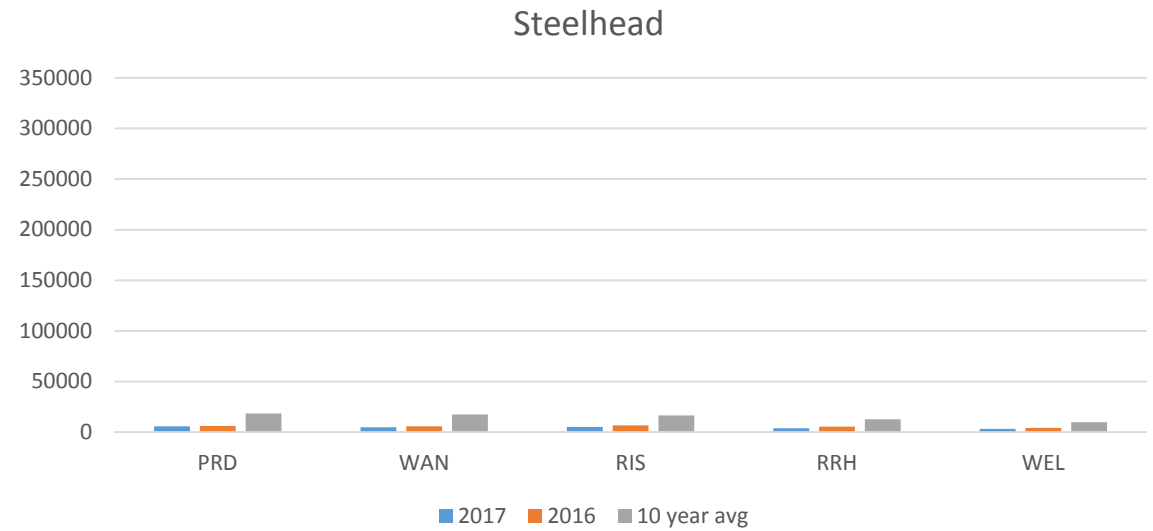
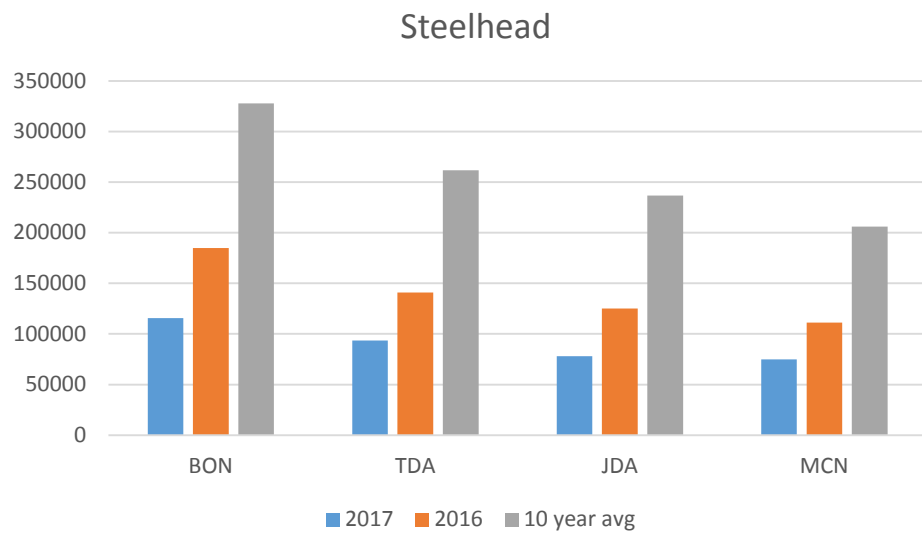


Where did the Snake River Sockeye go?

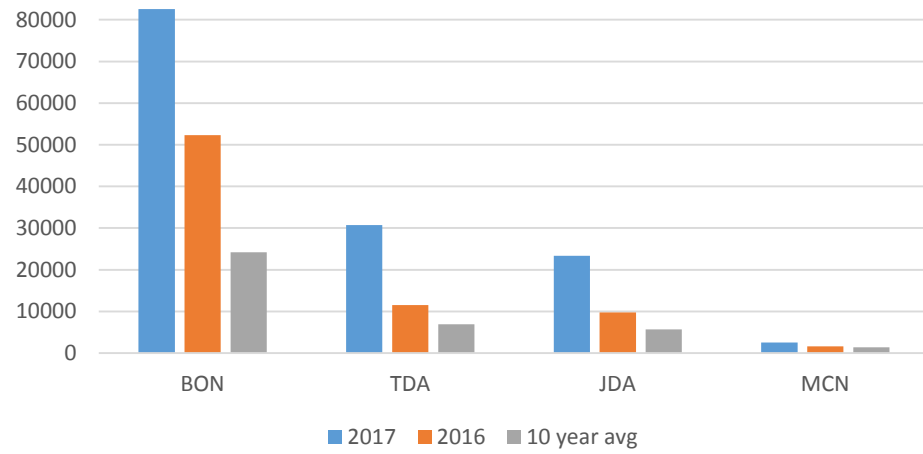
(At the scale of the total sockeye run, there are so few, they almost disappear.)

Here is a closer look:

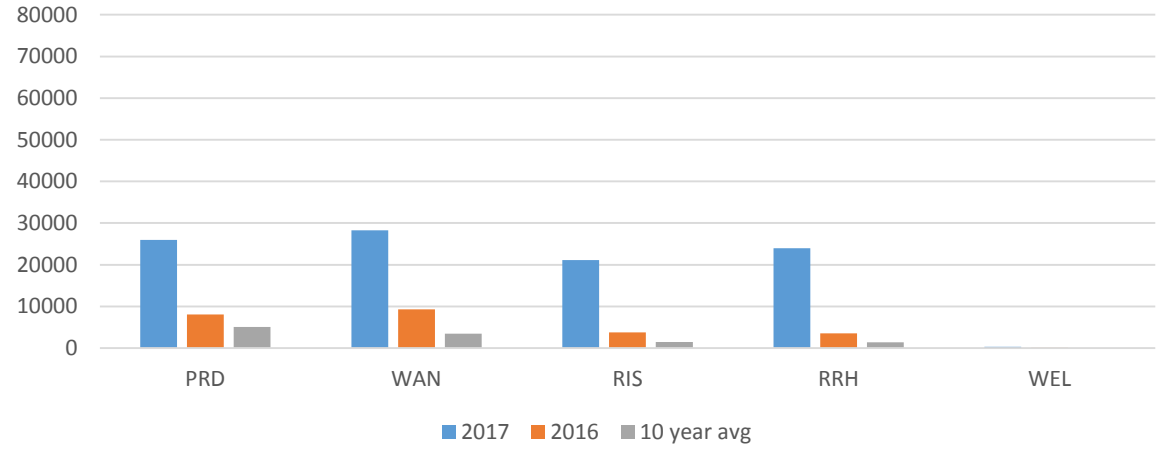




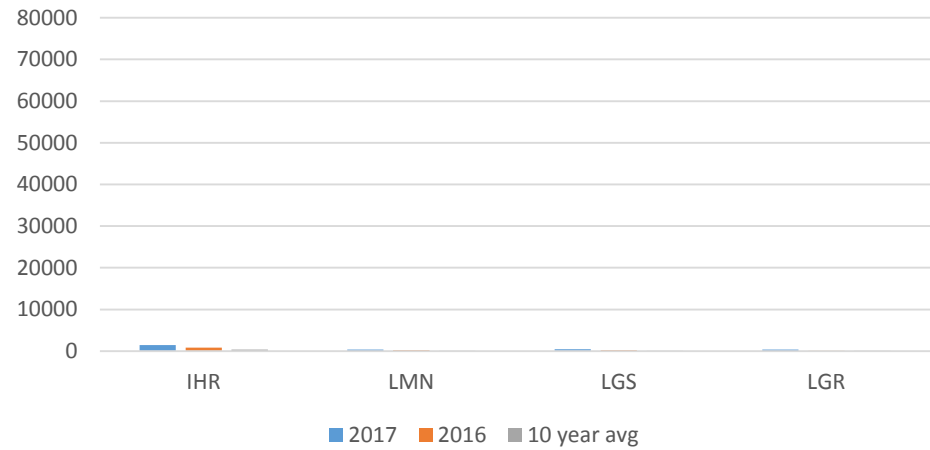
Lamprey



Lamprey



Lamprey



Some observations

- Spring Chinook go up the Snake
- Summer Chinook go up the Columbia
- Fall Chinook stay in the lower river, most fish seem to be migrating no higher than the Hanford Reach
- Coho drop off pretty fast above Bonneville dam with relatively few going up the Columbia and Snake
- Sockeye, not surprisingly, head to the upper Columbia
- Steelhead that make it out of the lower Columbia mostly go up the Snake
- Lamprey seem to prefer the upper Columbia if they make it past The Dalles dam

Caveats: be careful with these exact numbers

The Fish Passage Center encourages you to pay attention to the fish counting [metadata](#) and uses notes at the bottom of [this page](#) to caution the data user about different methods, times and durations of adult passage data collection at the various dams. An obvious example of the numerical differences that result from the different counting approaches at various dams is sockeye at McNary Dam in 2017 were counted as 58,022 adult fish and yet, at the next dam upstream, Priest Rapids, the sockeye count for 2017 was reported as 66,670 fish. Different counting techniques.

Another example is Little Goose Dam steelhead counts in 2017 were 53,748 fish while the dam upstream, Lower Granite, had a count of 64,329 fish in 2017. The FPC notes: *“Steelhead counts appear higher at Lower Granite Dam because most years a group which migrated into the river system between October and December overwinters below LGR and continues its migration in early March.”*

Conclusion: Salmon migration is complicated and counting consistently between dams with different designs and operations is very difficult.

Key to dam abbreviations

Lower Columbia Dams (USACOE)

- BON – Bonneville
- TDA – The Dalles
- JDA – John Day
- MCN – McNary

Snake Dams

- IHR – Ice Harbor
- LMN – Lower Monumental
- LGS – Little Goose
- LGR – Lower Granite

Upper Columbia Dams

Grant PUD dams:

- PRD – Priest Rapids
- WAN – Wanapum

Chelan PUD dams:

- RIS – Rock Island
- RRH – Rocky Reach

Douglas PUD dam:

- WEL – Wells