

Effects of High Columbia River Temperatures in 2015

Columbia Gorge Fisheries and Watershed Science Conference

April 19, 2015

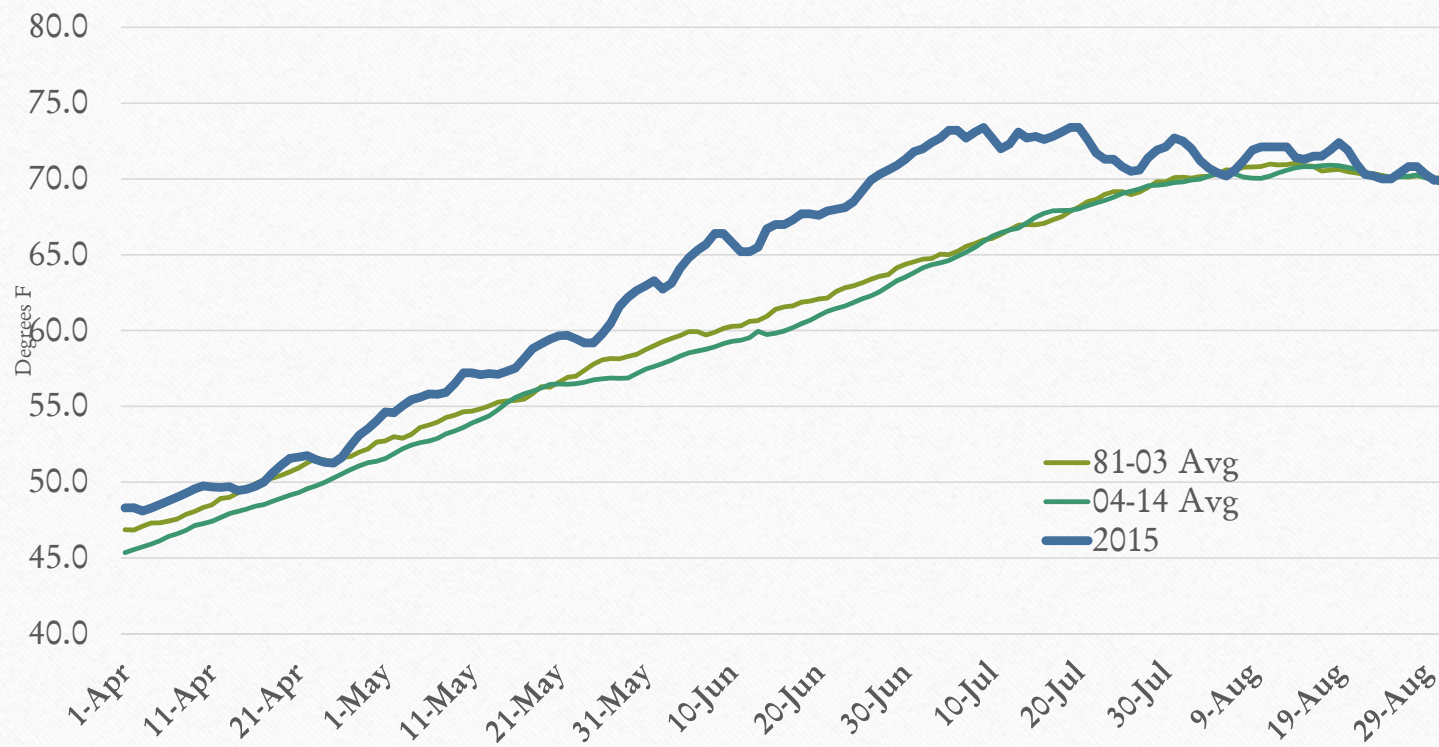
Stuart Ellis, Columbia River Inter-Tribal Fish Commission



Topics

- **Temperature Patterns**
- **Effects on Upstream Migrants and other fish**
- **Effects on Management**

Spring Summer Temperature at Bonneville Dam



High Temperature

- Record and near record temperatures were recorded at numerous mainstem dams
- Mainstem temperatures moderated to average levels by early August
- Many tributary temperatures where very high
 - Lower Salmon River daily high temps over 70 from late June to Late July. Peak near 78
 - Lower Okanagan River over 70 beginning mid June. Peak ~ 82 on July 3

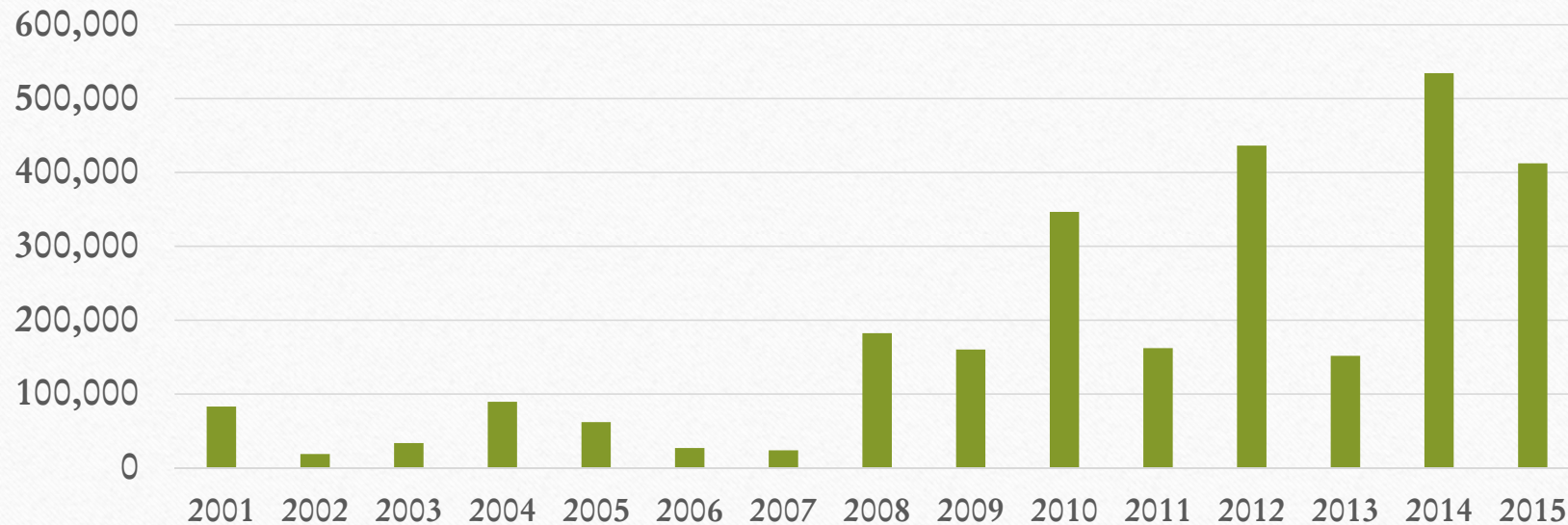
Effects on Upstream Migrants

- Most significant effects have been noted for sockeye and sturgeon
 - Some impacts on spring chinook in Willamette
- Effects can occur:
 - directly from temperature
 - Increased disease
 - Behavior/ timing changes

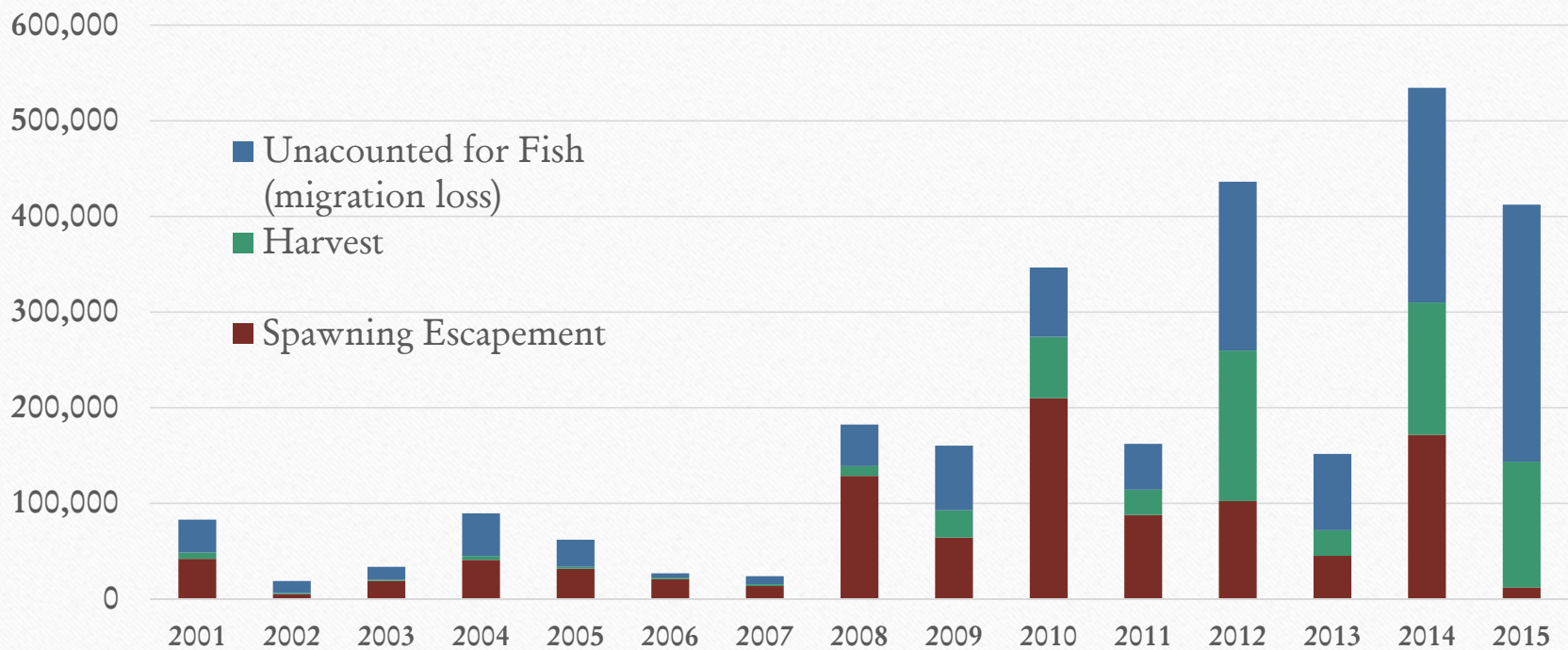
Sockeye

- River mouth run size for all stocks was 512,000, the third largest since Bonneville Dam construction
- Largest stock is the Okanagan stock
- Snake River sockeye are ESA listed
- Sockeye migration patterns affected
 - Sockeye present in various Zone 6 tributaries including Drano Lake
- Disease noted

River Mouth Run Size of Okanagan Sockeye

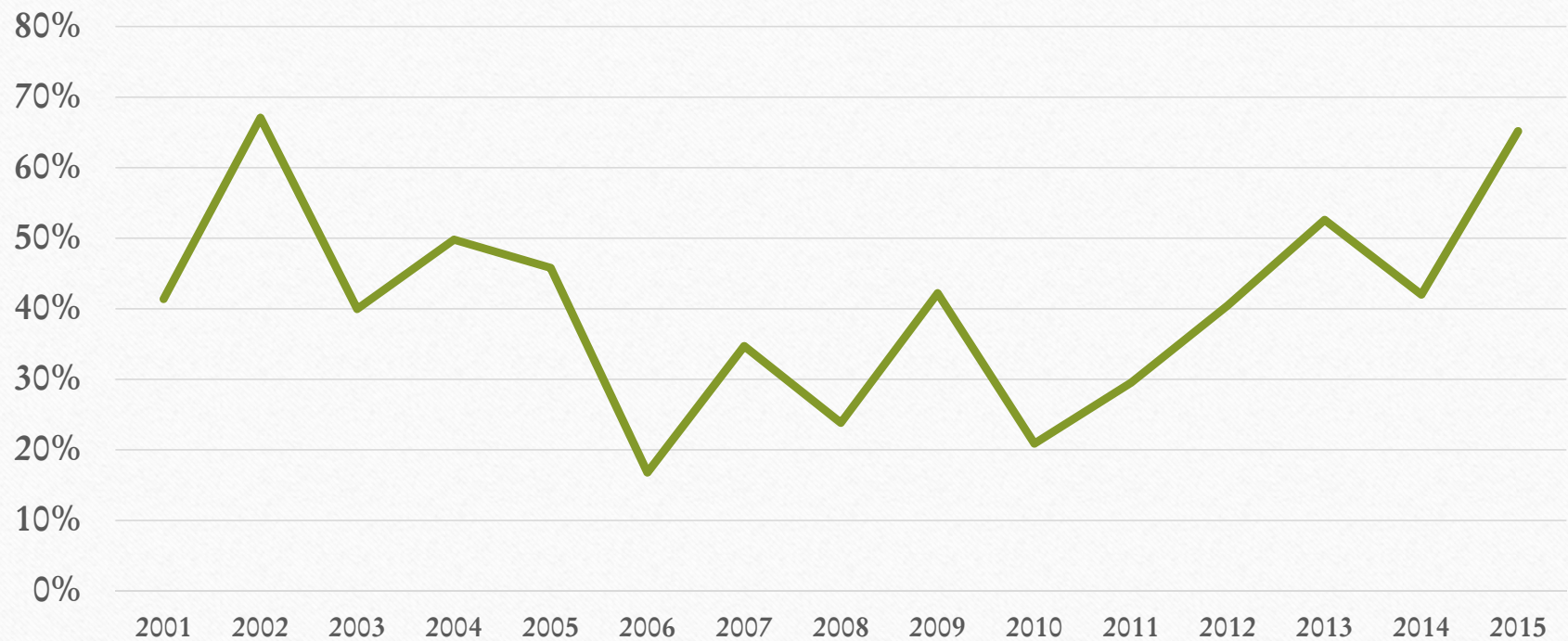


Okanagan Sockeye Accounting

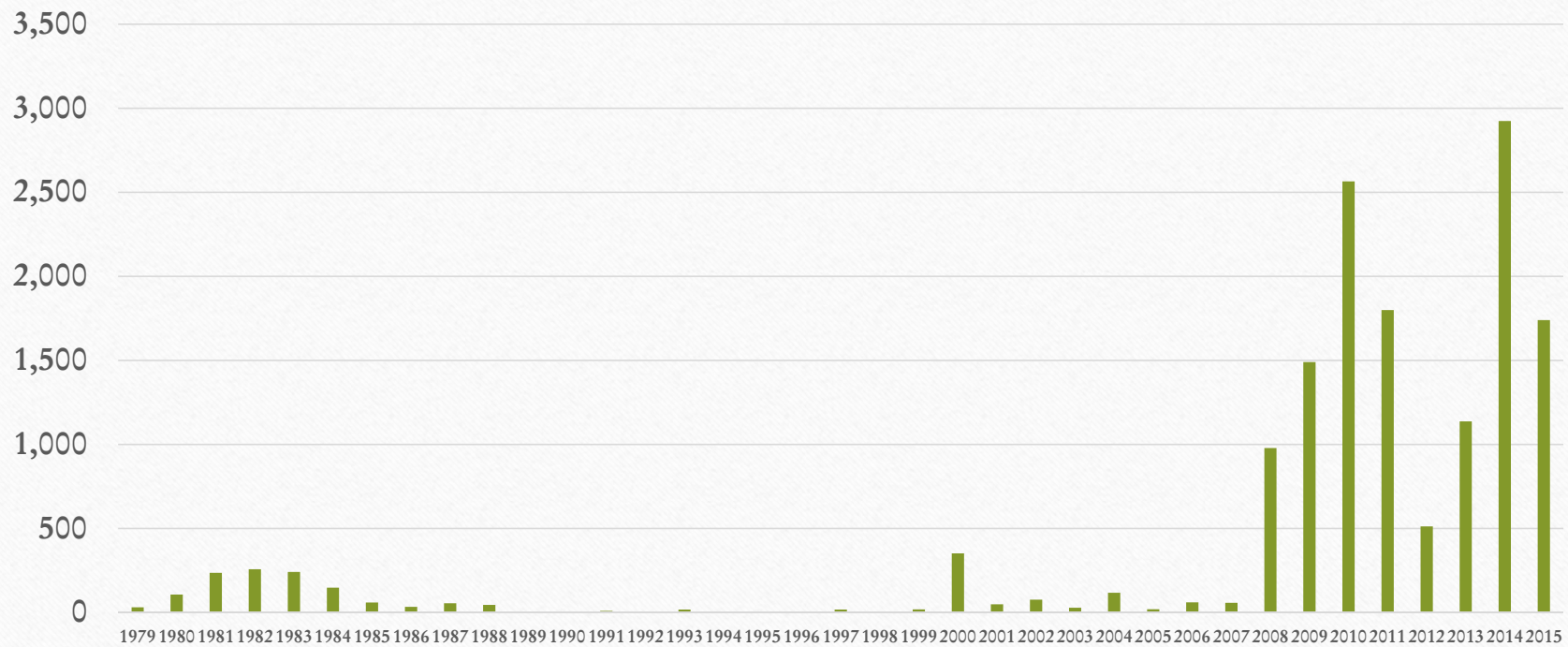


Data from CDFO, ONA, WDFW, Colville, Treaty Tribes

Loss Rate for Okanagan Sockeye

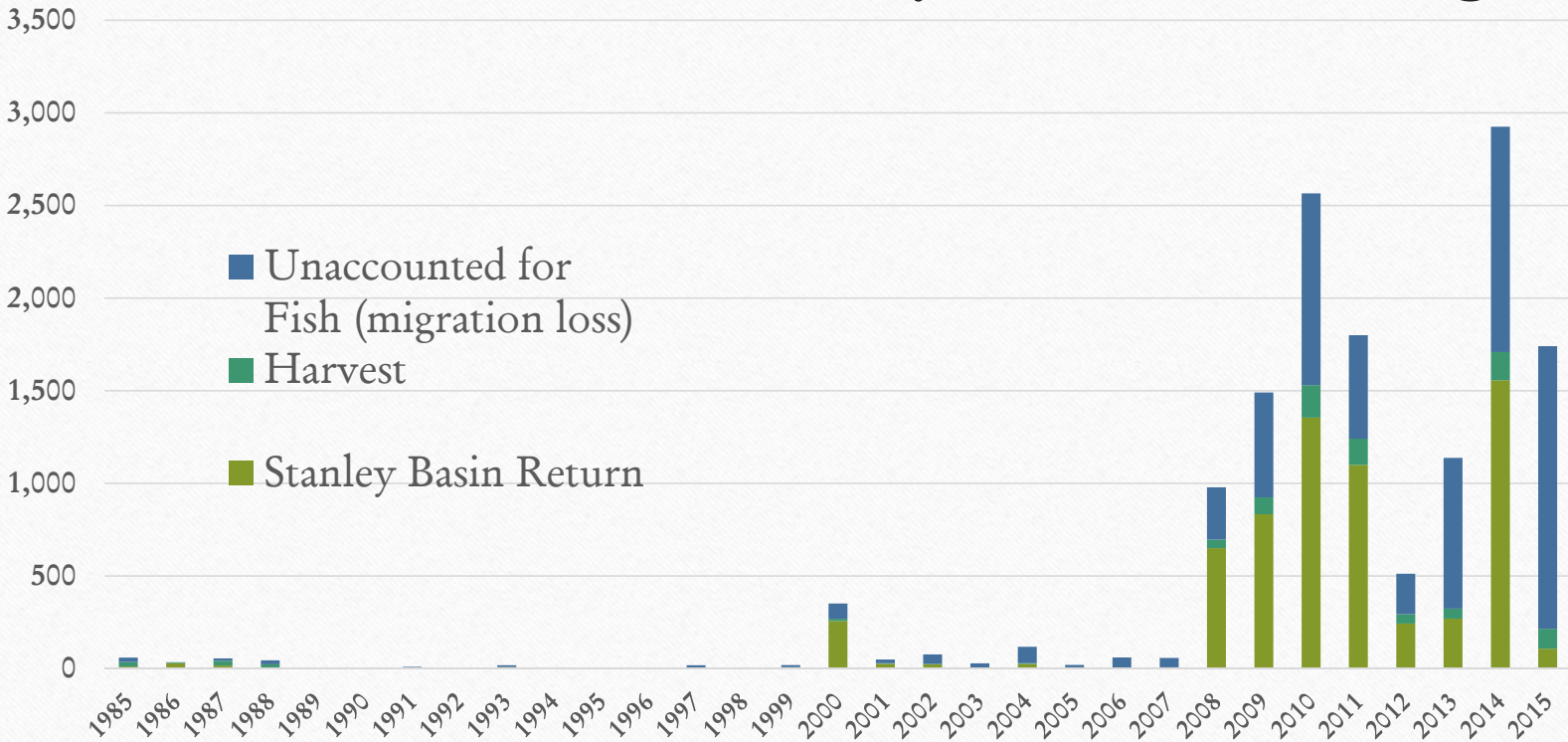


Snake River Sockeye – Columbia River Mouth Returns 1979-2015

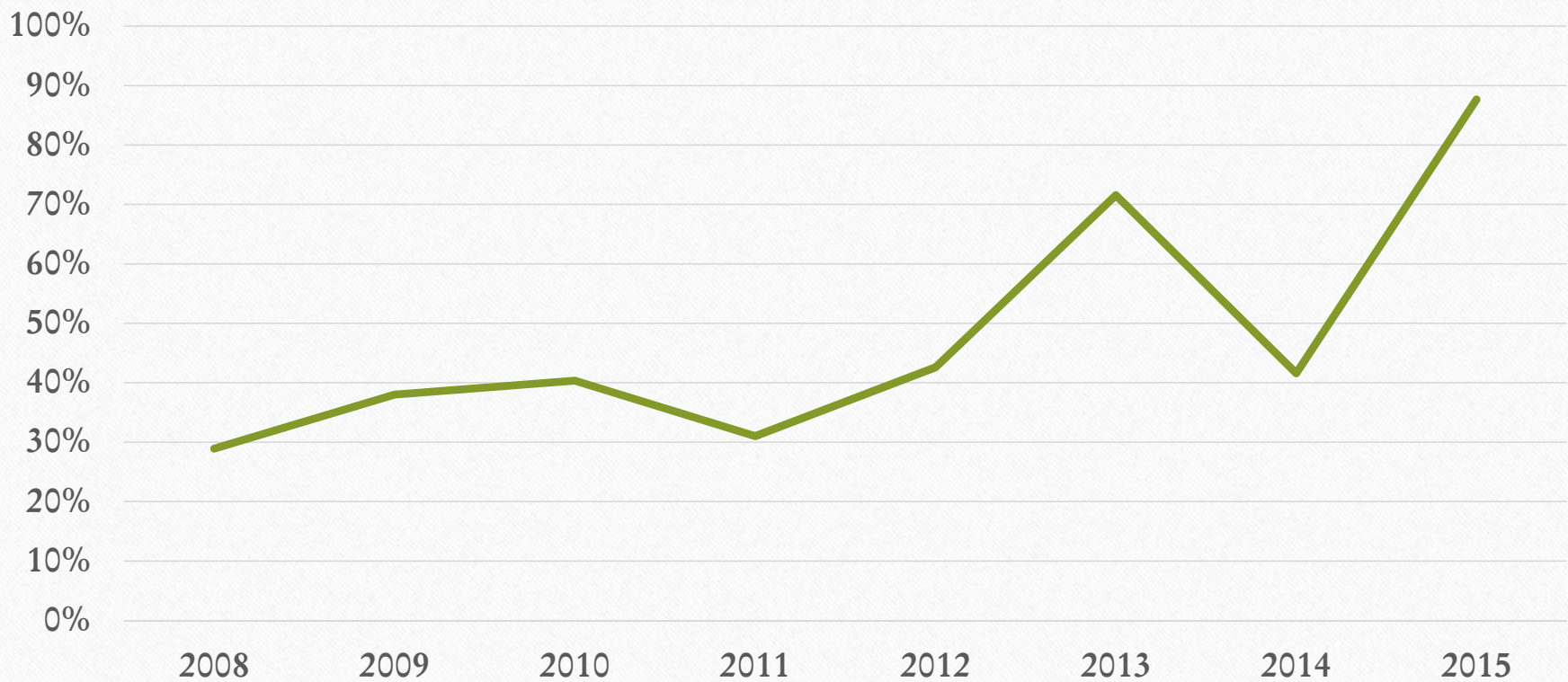


Recent year PIT tag based estimates are higher

Snake River Sockeye Accounting



Sockeye Loss Rates (mouth to Stanley Basin)



PIT tag methods will result in higher loss rates

Snake River Sockeye

- Sockeye survival from Bonneville to McNary dropped over time
- Transported sockeye survive at lower rates compared to in-river migrants
- In many years high loss occurs between Lower Granite and Stanley Basin (many years around 50% or less survival)
 - In 2015 survival from Granite to Stanley Basin was 13%
 - No sockeye passing Granite after July 16 are known to have survived
 - Final 37% of the run to Lower Granite failed completely
- 51 sockeye were transported from Lower Granite to Stanley Basin

Sturgeon Mortality

- Warm water appears to have been a factor in unusually high sturgeon mortality in June and July
- State staff conducted carcass surveys in the Willamette River downstream from Willamette Falls, in the Columbia River below Bonneville Dam, and in the four lowermost Columbia River reservoirs
- 182 sturgeon mortalities including 160 spawning size were documented
- Over 2% of spawning size population in The Dalles and John Day reservoirs died
- Many dead sturgeon were feeding on dead sockeye
- Most carcasses were found well upstream from Tribal gill-net fisheries, and crews did not find an unusual level of hooking or gill-net marks on the dead fish.

Effects on Management

- Trapping fish for stock monitoring purposes occurs at Bonneville and Lower Granite Dam
- Data from trapping is used for a variety of purposes including run reconstruction and forecasting and estimating steelhead run sizes
 - IDFG and NPT use data in season for planning Snake Basin fisheries
- No trapping July 3-23 at Bonneville
 - No data collected from 22% of the Sockeye run and 37% of the Upper Columbia Summer Chinook run
- No trapping in early to mid July at Lower Granite
- Earliest periods with no trapping ever

Summary/Uncertainties

- High temperatures definitely contributed to mortality and poor upstream survival of some stocks
- Not possible to determine total impact or assign how much was caused by temperatures
- Impacts to other stocks? Pre-spawning mortality?
- Possible impacts on out-migrating juveniles?

Questions

- Thank you for information provided by a long list of CRITFC, Tribal and State and NMFS Staff 😊