

Avian and Piscivorous Predation on Juvenile Salmon in the Columbia River – Death from Above and Below

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Overview

- **Avian Predation**
 - Key predators
 - Impacted reaches
 - Location, Location, Location
 - Impacts
 - Management actions-Success or Failure
 - Crystal Ball
- **Piscivorous Predation**
 - Key Predators
 - Impacted areas
 - Why now
 - Management actions-Success or Failure
 - Crystal Ball



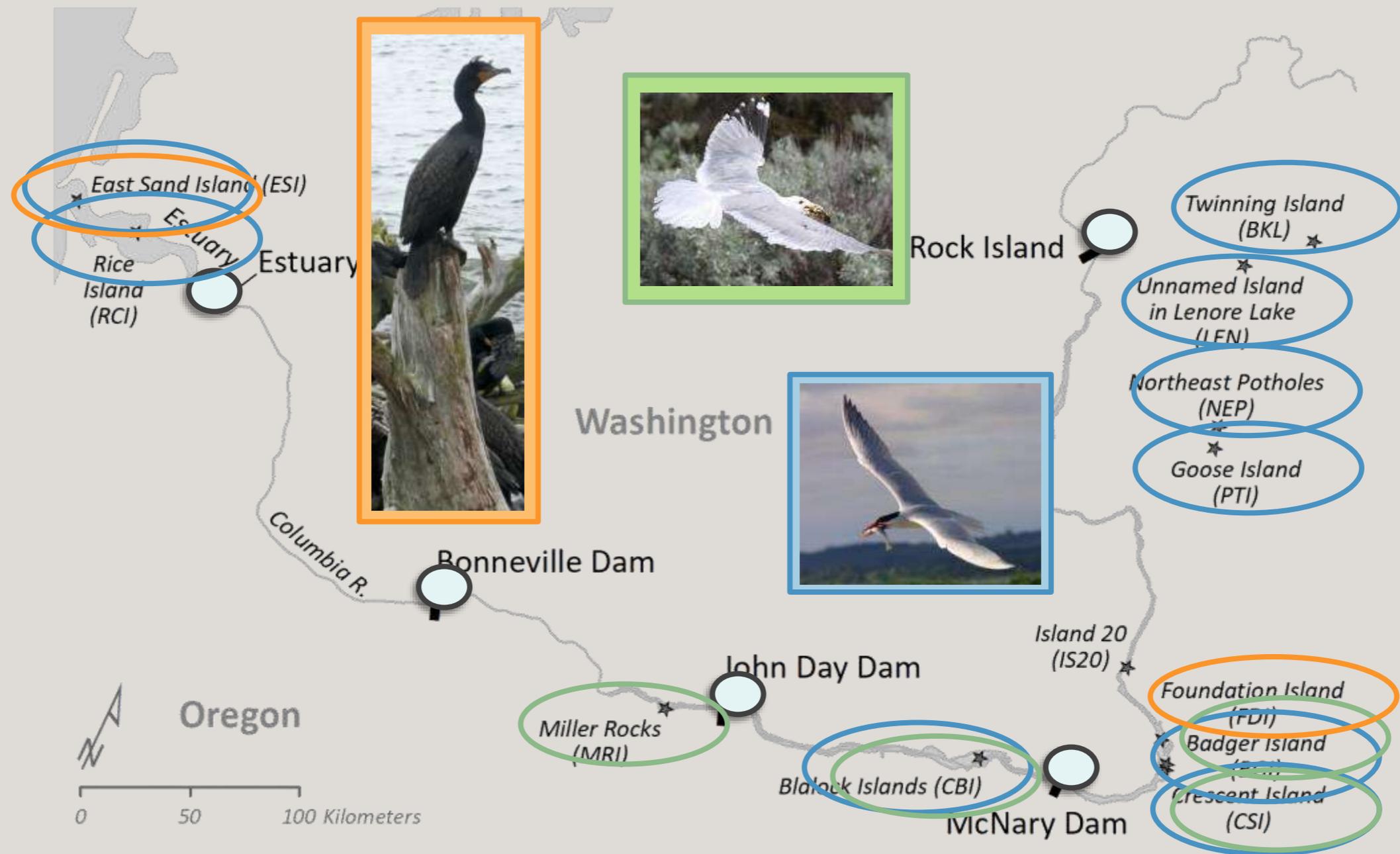
Avian Predators

- Birds, birds, birds, and more birds..
- Gulls, terns, cormorants, mergansers, herons, pelicans..
- Native species, but exploiting the altered nature of the Columbia with ever expanding populations and impacts on juvenile salmonids
- Historically, the dynamic nature of wild Columbia and Snake rivers did not create favorable foraging and nesting conditions for most avian predators, particularly for colonial nesting water birds (i.e. double crested cormorants, various gull species and Caspian terns)
- Hydroelectric development with its' stable flow regimes, coupled with permanent & protected nesting habitat has created optimal conditions for avian predators and a gauntlet for out migrating juvenile salmonids
- Cumulative losses can exceed



Avian Predation Zones

from Quinn Payton et al. 2017



Avian Predation Impacts – Caspian Terns

- Predation by piscivorous colonial waterbirds on Upper Columbia River steelhead smolts is large
 - Account for nearly 50% of all mortality
 - \geq all other sources of mortality combined
 - Note gull predation increases have offset decreases in tern predation in some years
- Predation by Caspian terns has been an additive source of smolt mortality
 - Expected smolt survival rates to BON were consistently higher than the observed rates
 - Expected adult return rates in the absence of terns estimated to have been 2 to 3 times higher than observed return rates
- Caspian tern predation greatest from McNary Dam downstream to the estuary.
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From Quinn Payton*, Allen Evans, Nate Hostetter, Brad Cramer, Aaron Turecek, Ken Collis, and Dan Roby (USACE Pred. Workshop 11/8/18)

Columbia River Inter-Tribal Fish Commission



East Sand Island

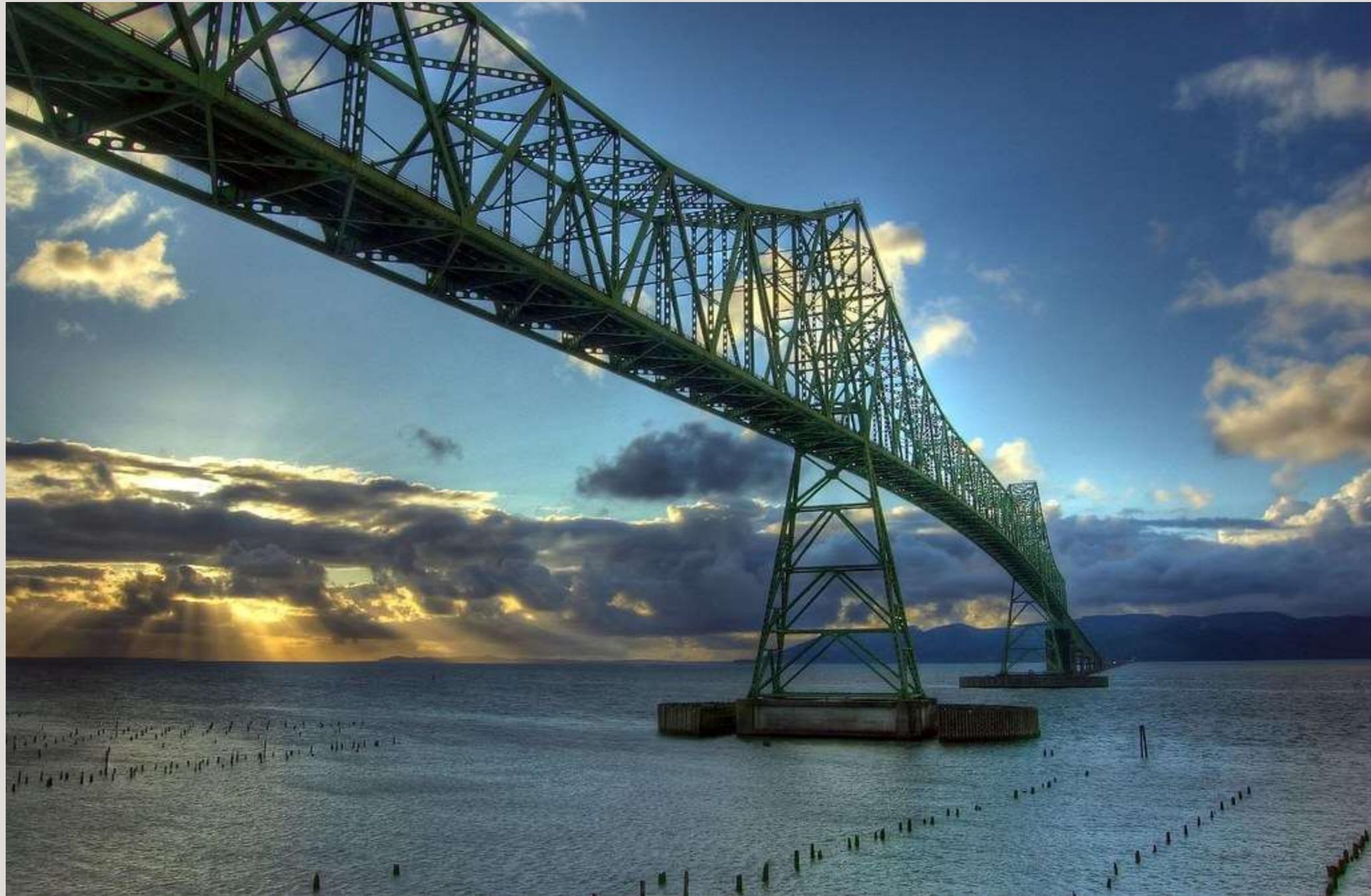


Avian Predation Impacts – Double Crested Cormorants

- Double crested cormorants (DCC) are found throughout the basin, although the greatest impacts are from Bonneville Dam downstream to the estuary.
- Major breeding colonies were found on bridges, high voltage towers, and at East Sand Island (ESI) in 2018. At the time of this presentation, DCC's were still returning to these areas for the 2019 breeding season, so it is unknown what will occur this year.
- This year, recent terrain modifications (February and March 2019) on ESI done as part of the 2015 EIS & management actions. Habitat modification are the second Phase, after some limited lethal removal and egg oiling.
- The EIS and resulting management was necessary to halt the tremendous losses ~15 million smolts annually, from 2003 to 2013, with the peak colony size of ~ 26,000 DCC's.
- COE and USFWS agreed that the goals of the ESI DEIS are completed, however this population will quickly rebound in the coming years, continuing to consume millions of salmon, until more stringent measures are enacted.



Astoria Megler Bridge



Avian Predation Impacts – Gulls

- California gull and ring billed gulls are the primary species that prey on smolts
- Other species such as western and glaucous wing gulls are species, as they prey on the eggs and young of CT's and DCC's on ESI
- Losses are particularly high in the reach from McNary dam to The Dalles dam, from the colony at Miller Rocks, just off the mouth of the Deschutes River.
- Losses of upper Columbia River steelhead attributed to this colony exceed 20%.
- At the present, there is no Federal plan to manage the gulls and they will continue to consume a significant portion of listed steelhead stocks.



Miller Rocks Gull Colony 2018



Avian Predation Summary

- Management Actions to Date
 - Goose Island/Crescent Island Caspian Terns/
 - Failed! Moved terns off island, but they relocated to Blalock Islands, where the impacts continue protected by the Umatilla National Wildlife Refuge Management (USFWS).
 - East Sand Island Caspian Terns
 - Failed! Tern numbers are nearly double that of the management plan (2,750 pairs), yet the COE and USFWS consider it completed, losses continue to be in the millions.
 - East Sand Island Double Crested Cormorants
 - Failed! Between incomplete lethal removal and egg oils, eagle attacks, and migration to the ESI, there are still 10's of thousands of DCC continuing to consume smolts in the salt of the estuary.



And from Below...



Smallmouth Bass and Walleye

- Estimated loss of sub-yearling chinook taken by smallmouth bass from Hells Canyon to Lower Granite Dam 2013-2014 was 835,296 fish. Tiffin and Erhardt (2017 Fall Chinook Symposium, SRFC Summaries, USGS)
- Smallmouth bass consumption of salmonids in the Yakima River between March and June were estimated to average 200,406 fish per year 1998-2001. (Fritts et al. 2004)
- Salmonids represented 13.8% of the walleye and 14.2% of the small mouth bass diet by weight in the Lower Columbia River reservoirs between 1990 and 1996. (Zimmerman 1999).
- “At locations in the Columbia River, smallmouth bass and walleye consumed between 18,000 to 2,000,000 and 170,000 to 300,000 juvenile salmonids per year, respectively. Similar predation rates were noted in all geographic areas (Columbia, Snake, and Yakima rivers, and Washington lakes and coast). Results from studies measuring the percentage of an outmigrating juvenile salmon run consumed by one predator species ranged between zero and 40%.” (Sanderson et al. 2009)



Exotic Piscivorous Fish Management

- States of Oregon and Washington removed management regulations on bass, walleye and catfish in 2015-16 on the Columbia and Snake rivers.
- No daily bag limits, possession limits or size restrictions.
- New research efforts emphasize use of river/flow manipulation to management populations of exotic predatory fish.



They're Coming



Mechanical Suppression: Methodology

- Narrow window for effective (pre-spawn) netting
- Gillnet specifications and strategy:
 - 150' x 6' mono experimental gillnets (1", 1.25", 1.5", 1.75", 2")
 - 2 crews/boats up to 32 nets/day for 4-7 days/week
 - Net ice edge early then expand with pike (target <2 m water depth)



Questions

