

Yakima Klickitat Fisheries Project

Monitoring and Evaluation of Avian Predation on Juvenile Salmonids on the Yakima River



Sara Sohappy
Yakima Klickitat Fisheries Projects



Area of Study:

- Yakima River Basin
- Yakima River
- Yakama Reservation
- Yakama Ceded Lands



YKFP Goals:

- Increase natural production
- Improve harvest opportunities
- Maintain the long-term genetic fitness of the wild and native salmonid populations
- Keep adverse ecological interactions within acceptable limits

Avian Predation Crew Objectives:

Monitor the impacts of avian predation on juvenile salmonids to help achieve YKFP goals.



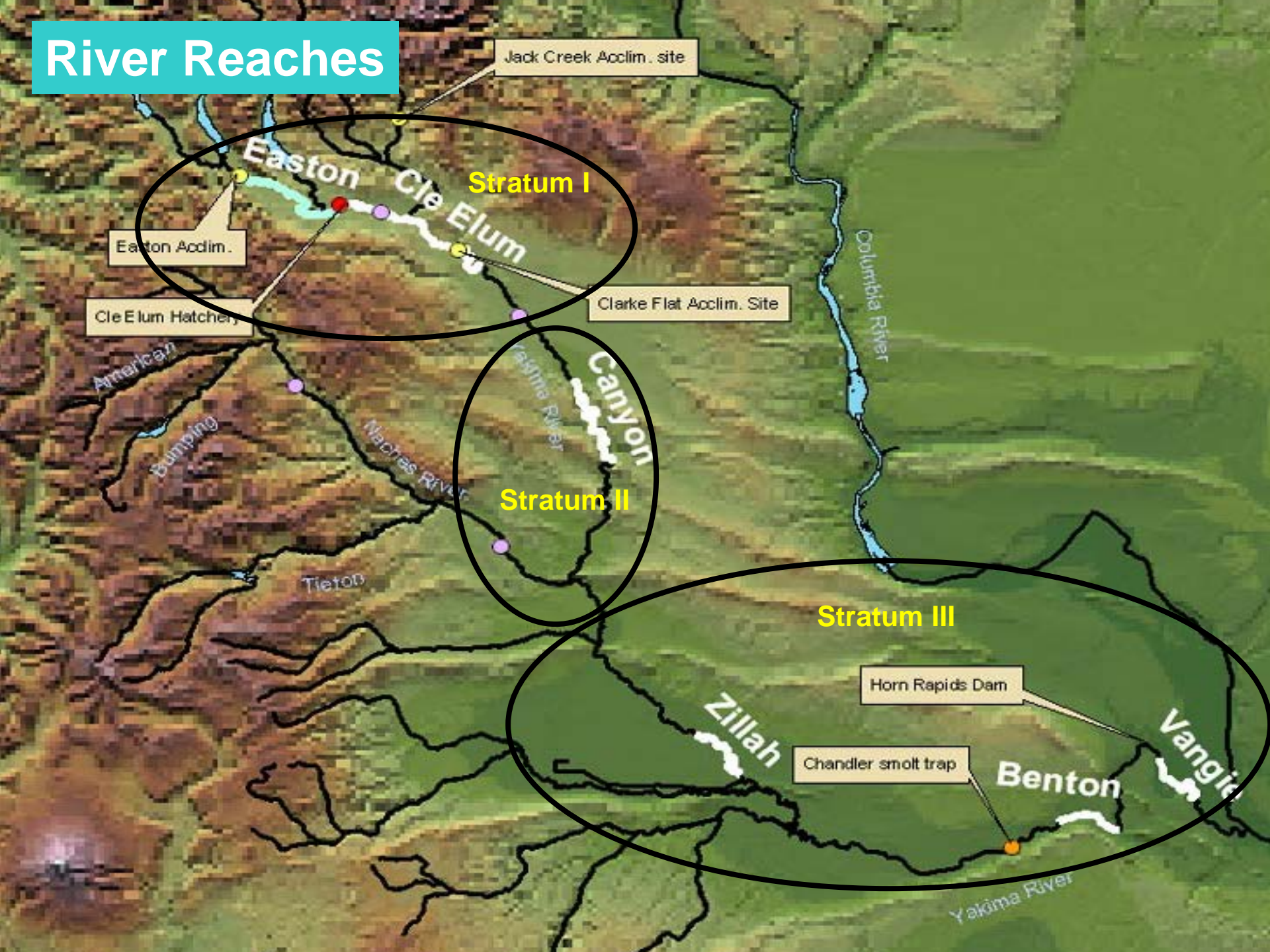
Surveys:

- River Reaches
- Salmonid Acclimation Sites
- Hotspots: Areas of High Avian Smolt Predation
- Yakima River Aerial Survey
- Bird Colonies and Rookeries

Bird Species:

American White Pelican
Bald Eagle
Black-crowned Night Heron
Belted Kingfisher
Caspian Tern
Common Merganser
Double-Crested Cormorant
Forsters Tern
Great Blue Heron
Golden Eagle
Great Egret
California Gull/Ring-billed Gull
Hooded Merganser
Osprey

River Reaches

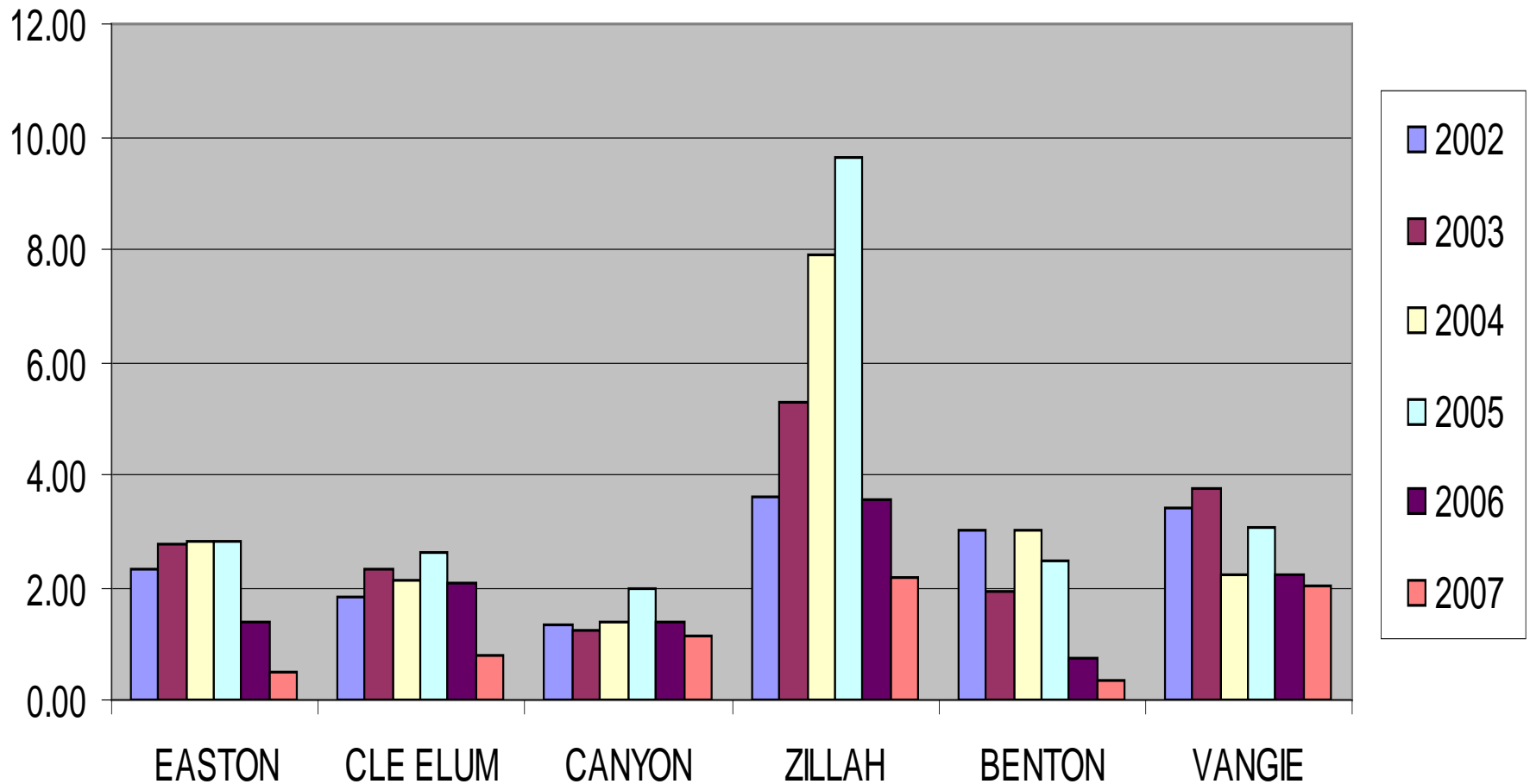


Data Collection Methods – River Reaches

- Six river reaches surveyed via drift boat or raft
- Abundance counts for all species
- Conducted in spring (April - June): all 3 Stratum were surveyed once every two weeks
- In Summer (July – August) Stratum 1 and 2 conducted once every week (due to river cfs levels)

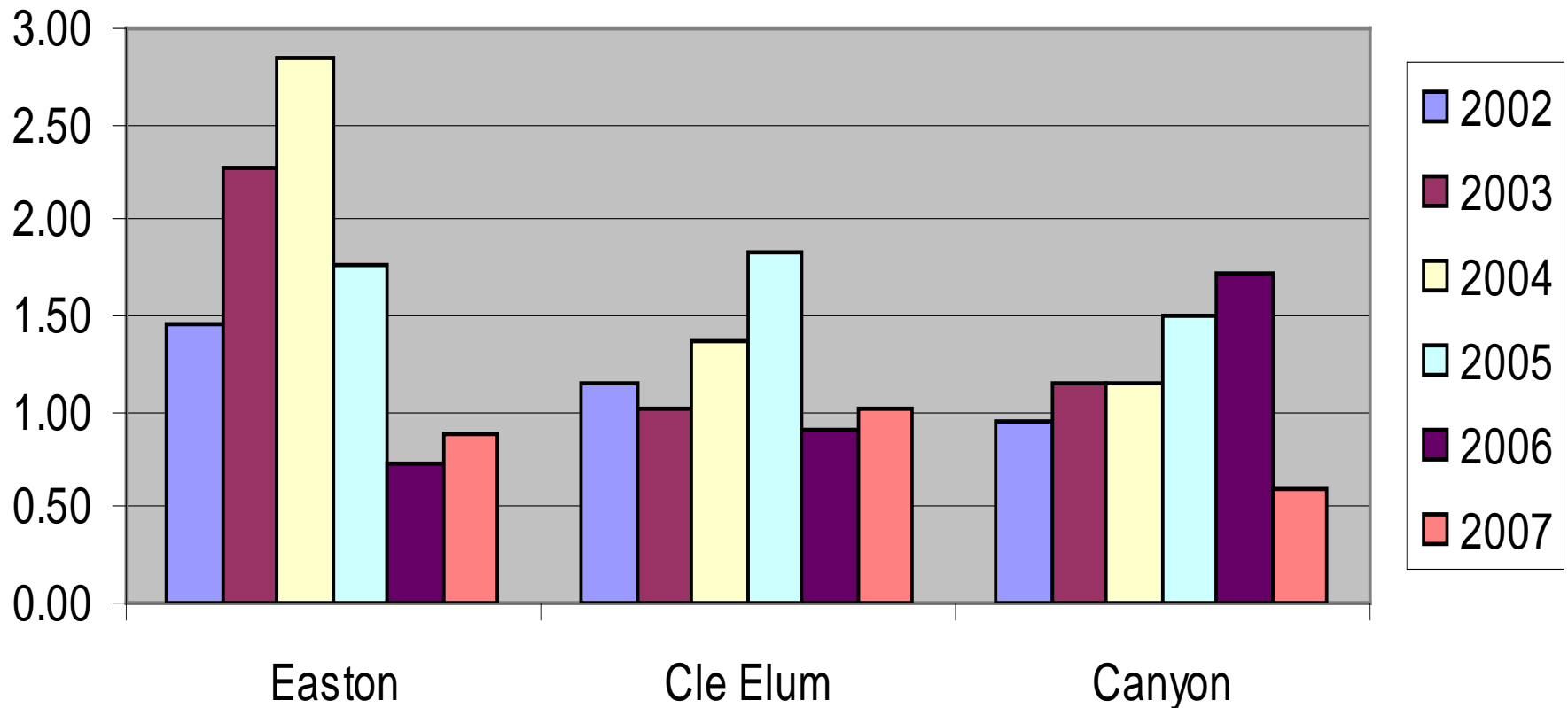
Results – River Reaches

Spring Reaches: Birds Per Km



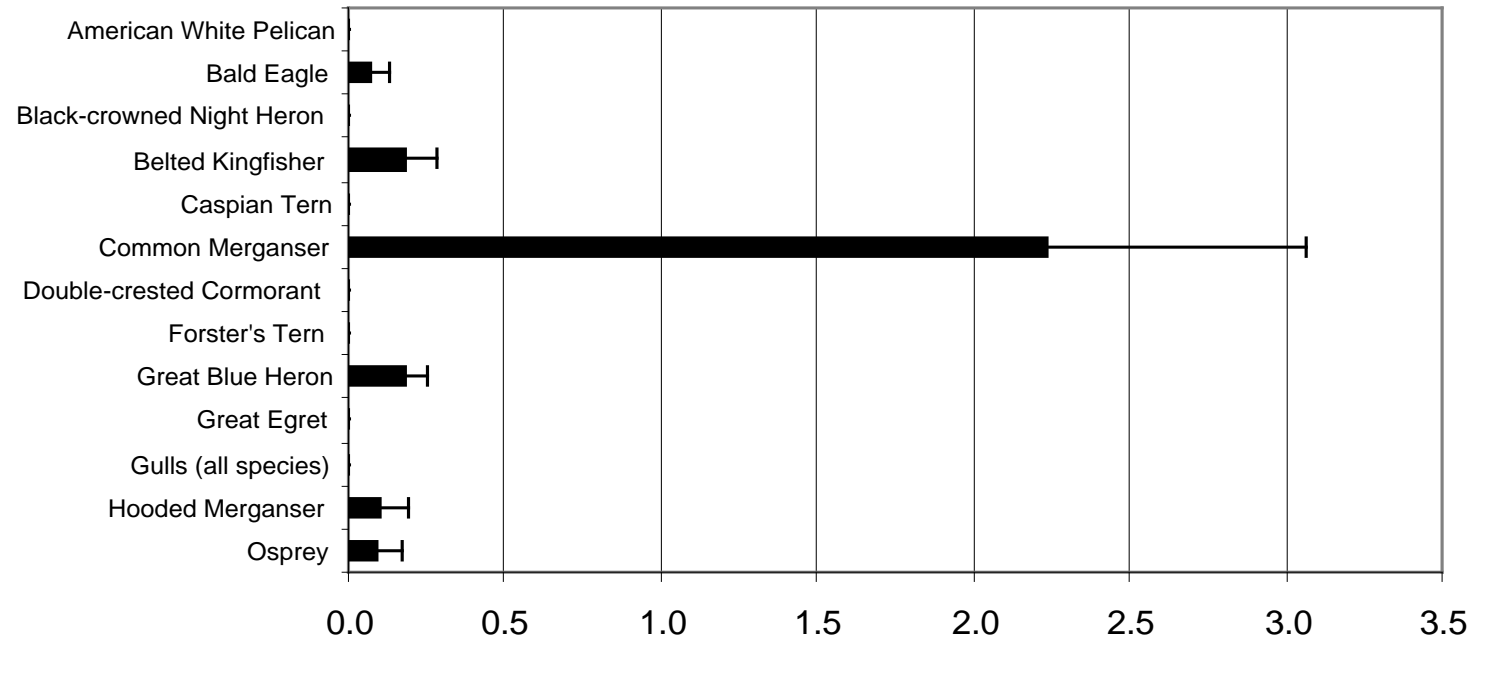
Results – River Reaches

Summer Reaches: Birds Per Km

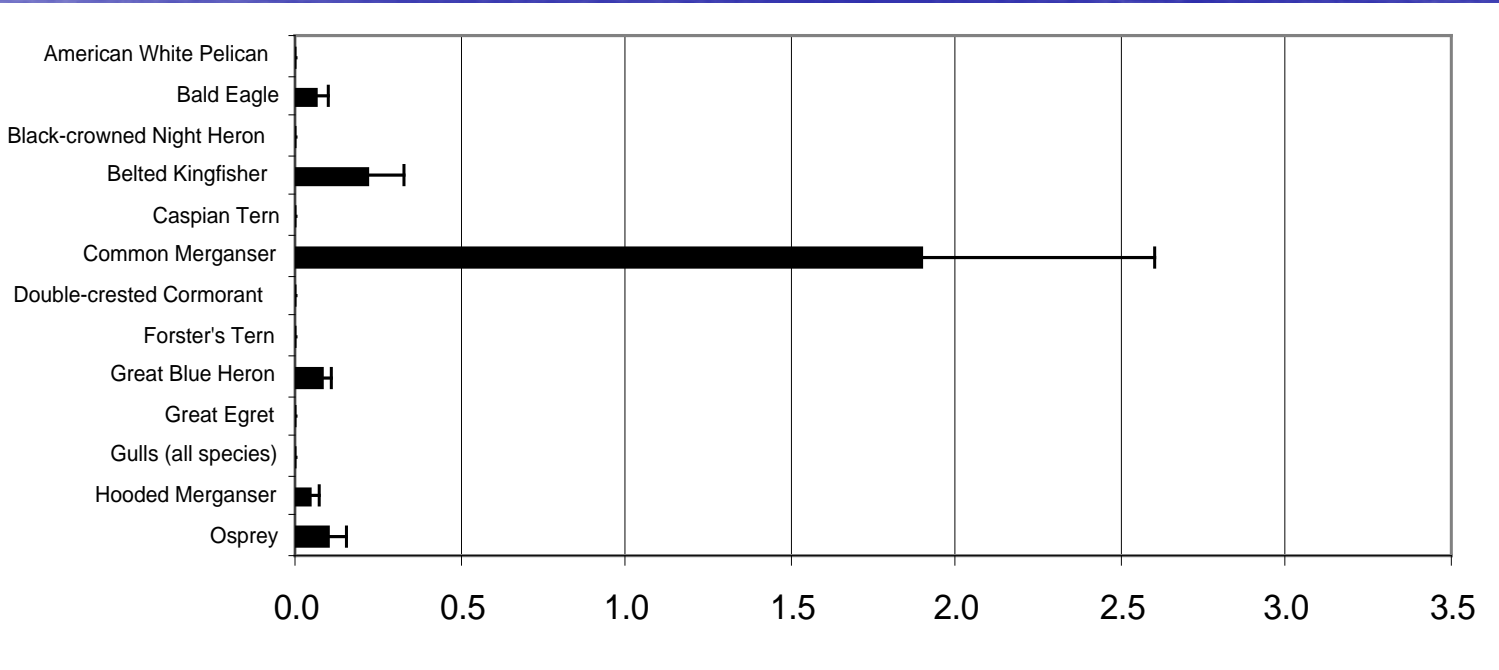


Stratum I

Easton

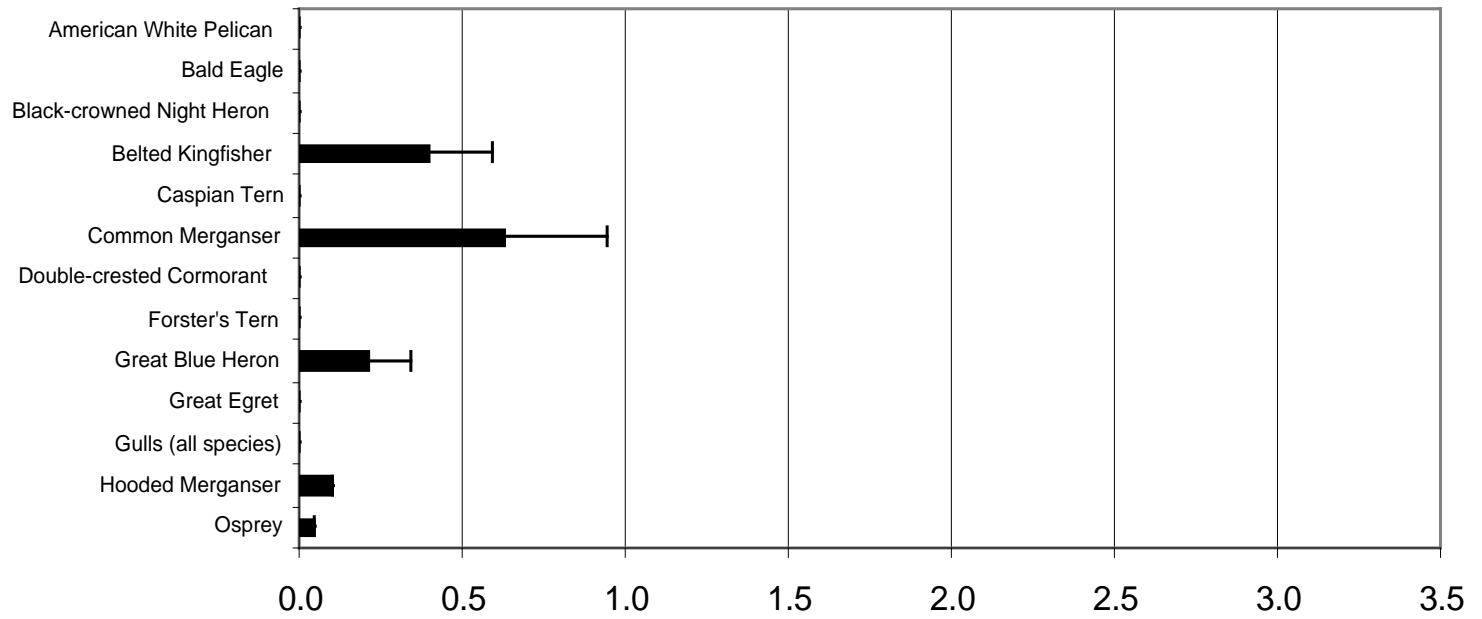


Cle Elum



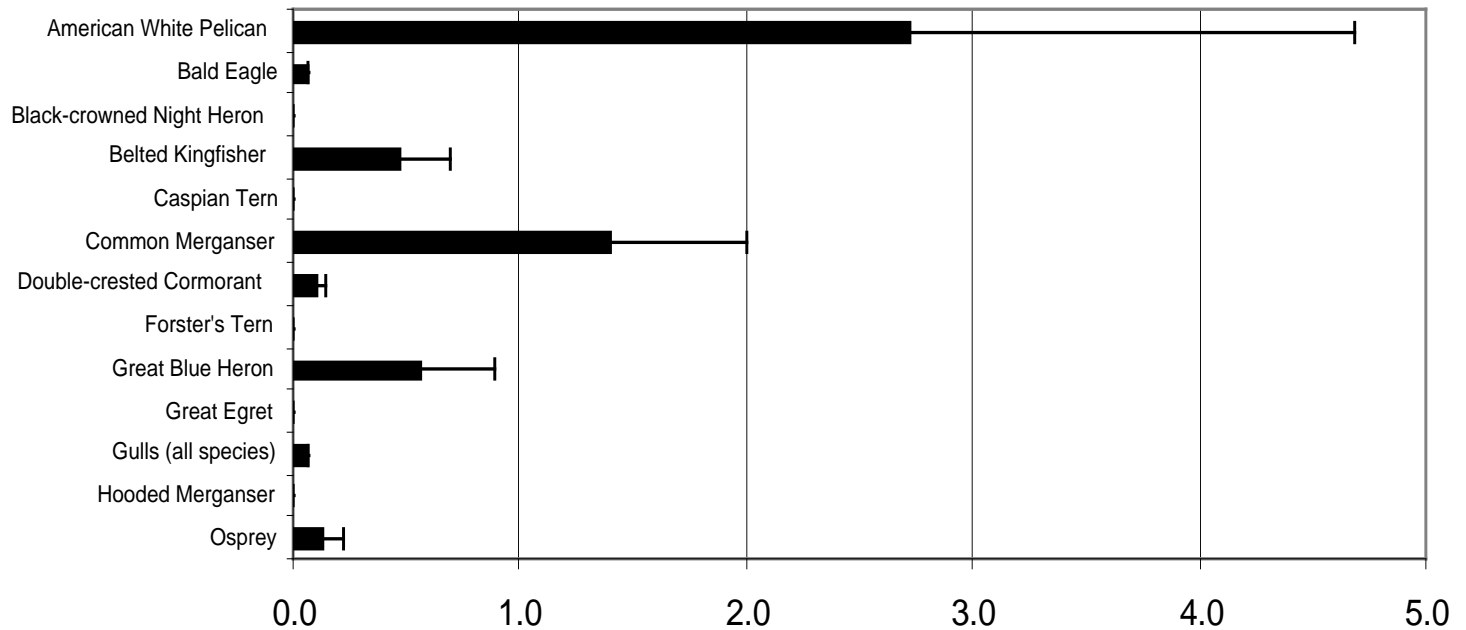
Stratum II

Yakima Canyon



Stratum III

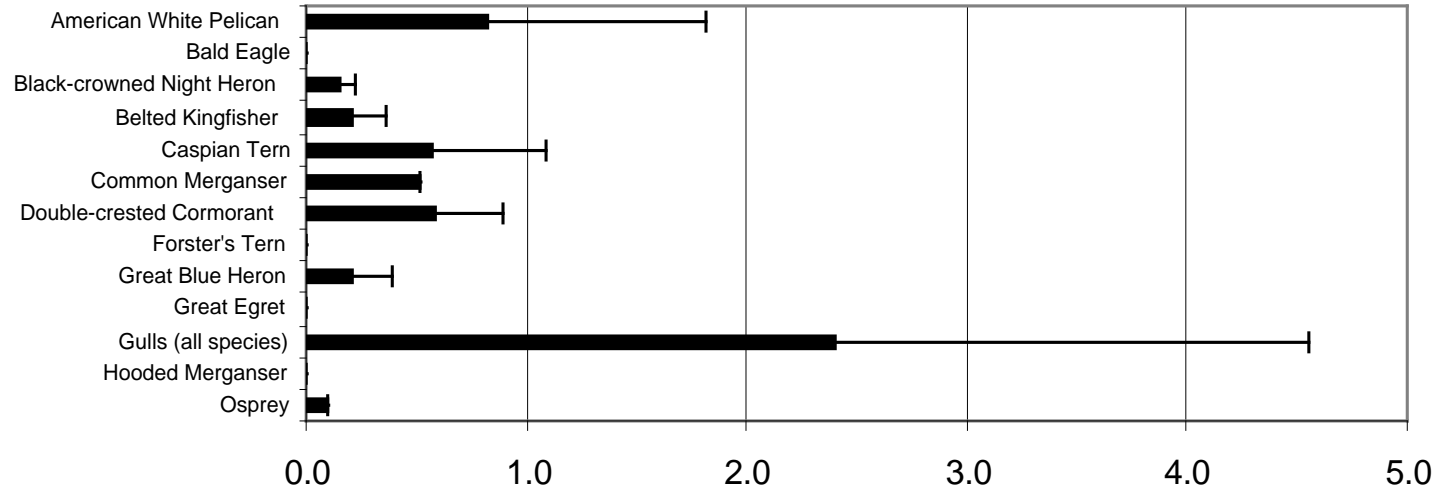
Zillah



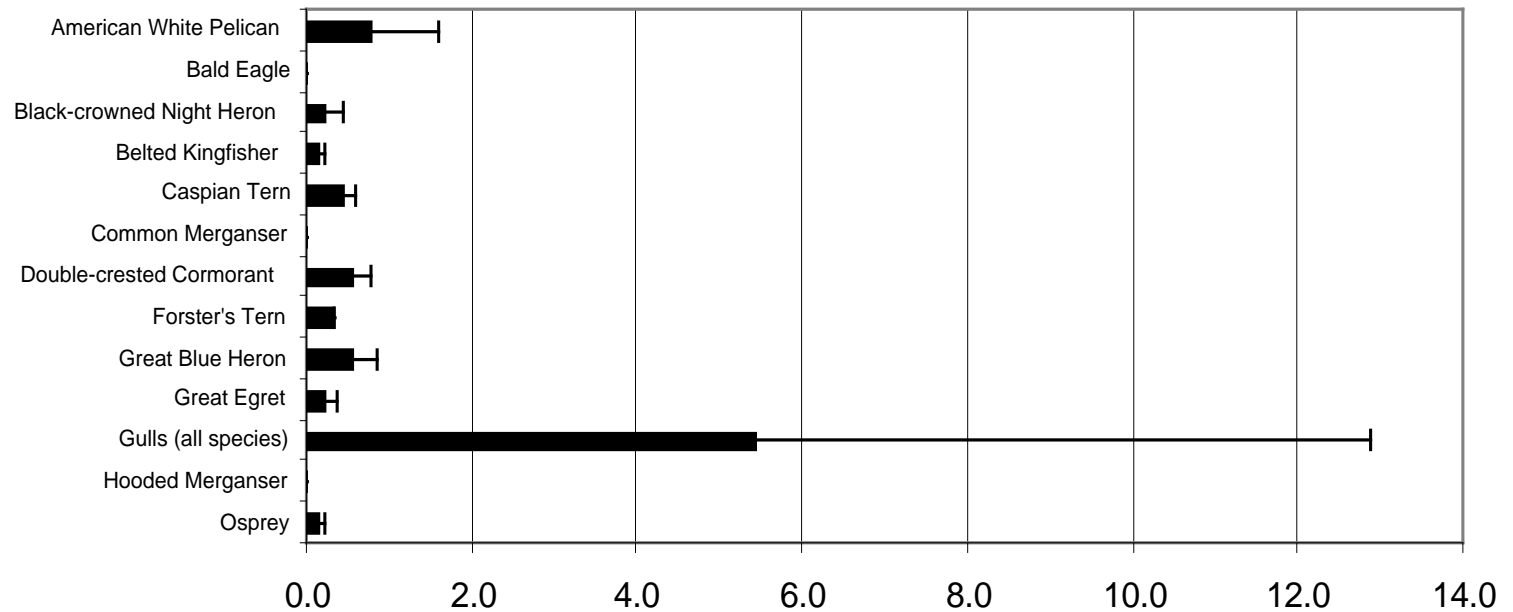
Stratum

III

Benton



Vangie



Hotspots:

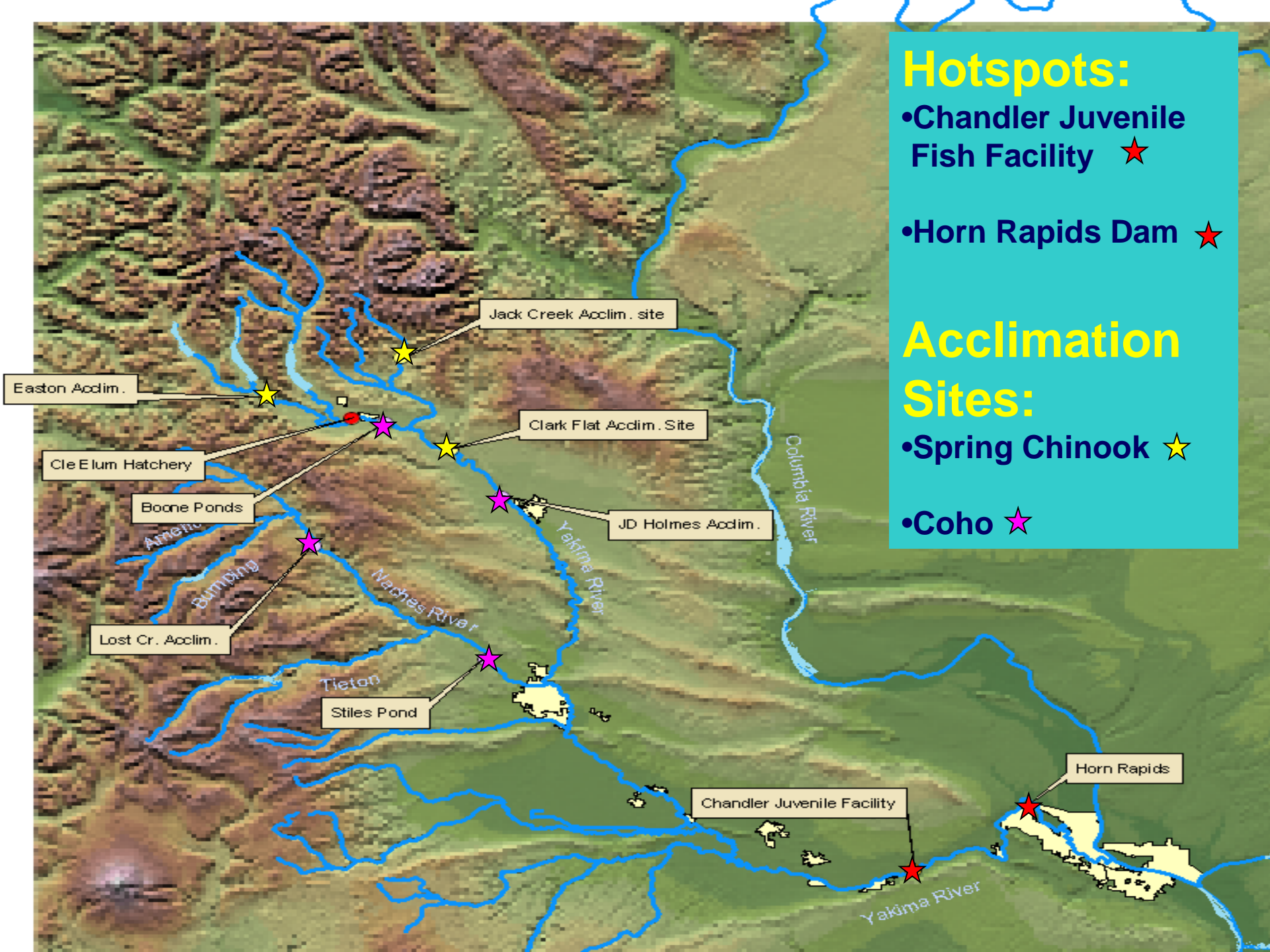
- Chandler Juvenile Fish Facility ★

- Horn Rapids Dam ★

Acclimation Sites:

- Spring Chinook ★

- Coho ★



Data Collection Methods – Hot Spots

Horn Rapids and Chandler

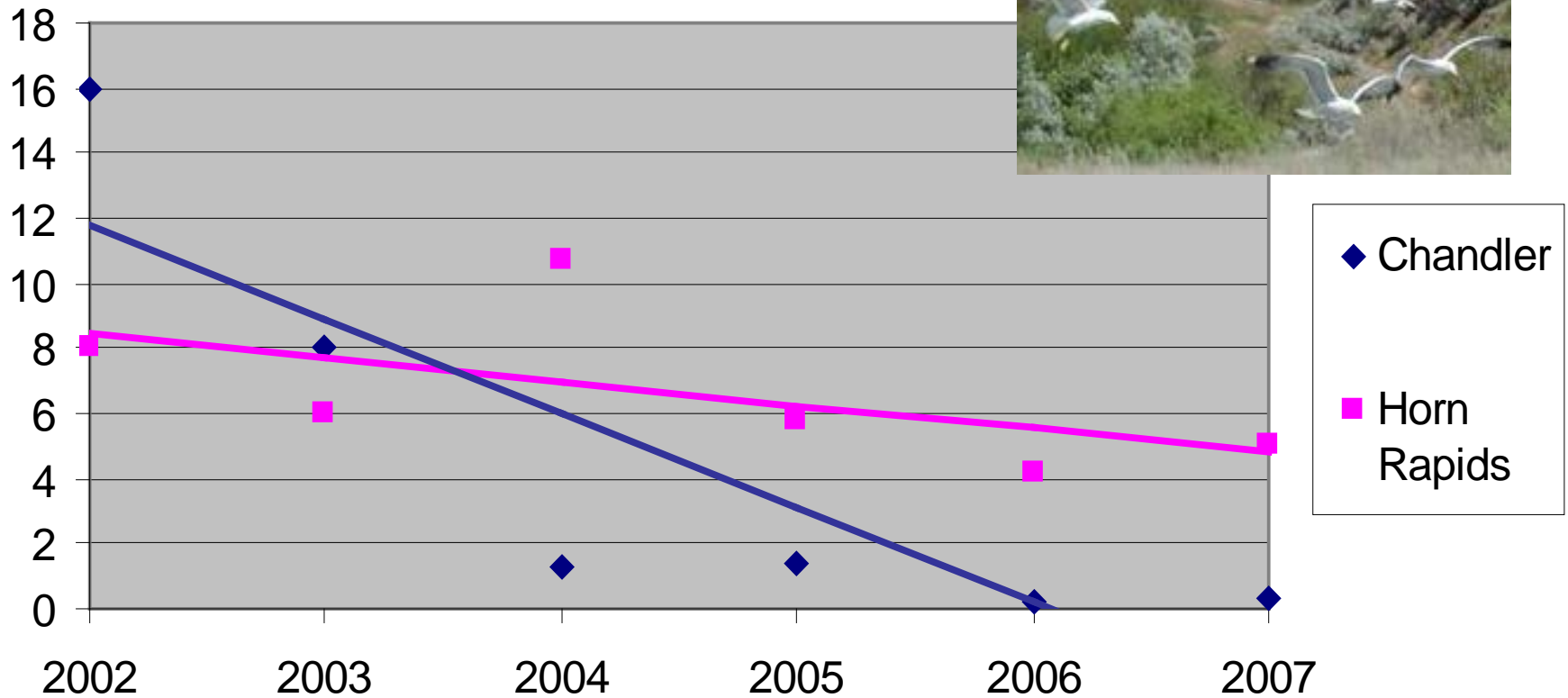
- April to June
- 2x a week
- AM and PM
- Two hour windows, made up of 3, 15 minute blocks
- Abundance counts of all piscivorous birds
- Timed interval between successful takes by a single gull to determine consumption of salmonids



Results - Hotspots

Average Daily Gull Concentrations

Hot Spot: Daily Gull Averages

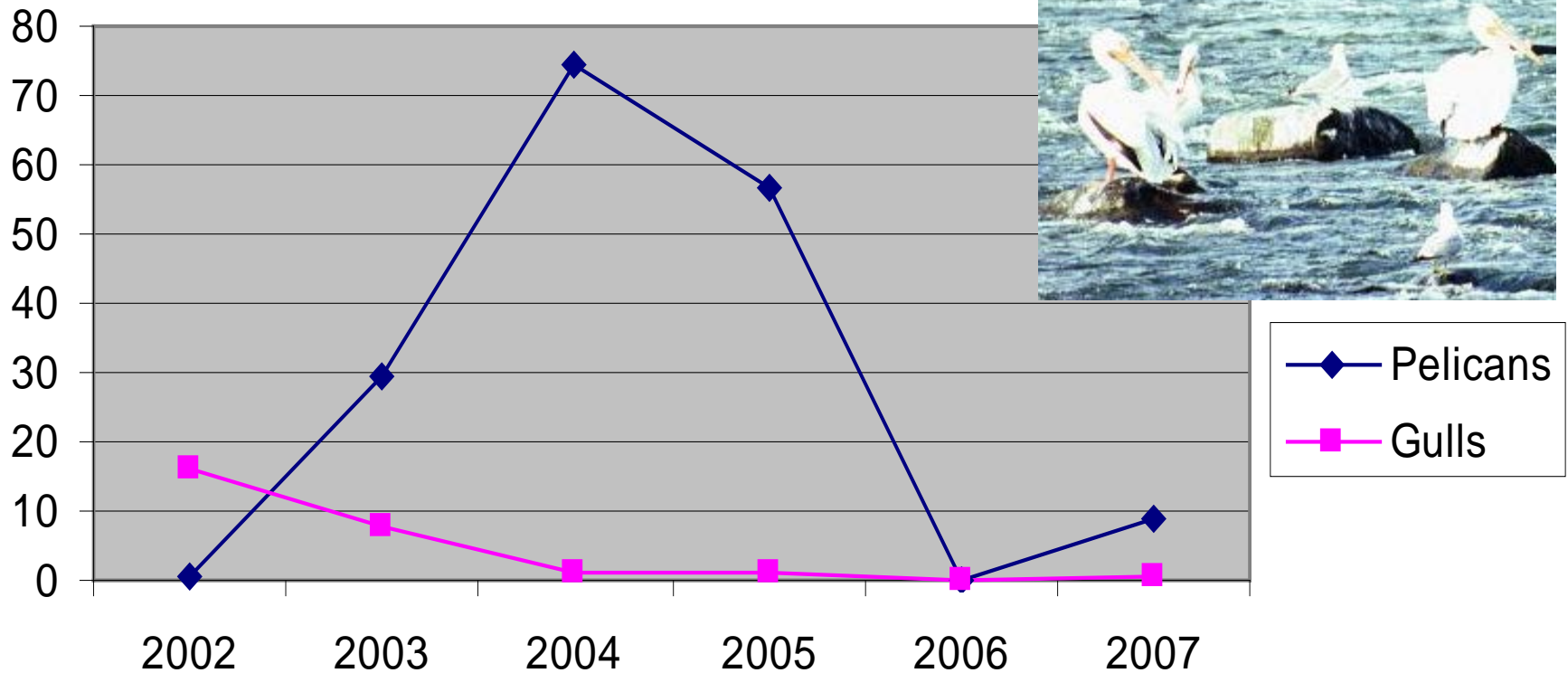


Results – Hotspots

Chandler: Pelicans return in 2000
Washington: 1994

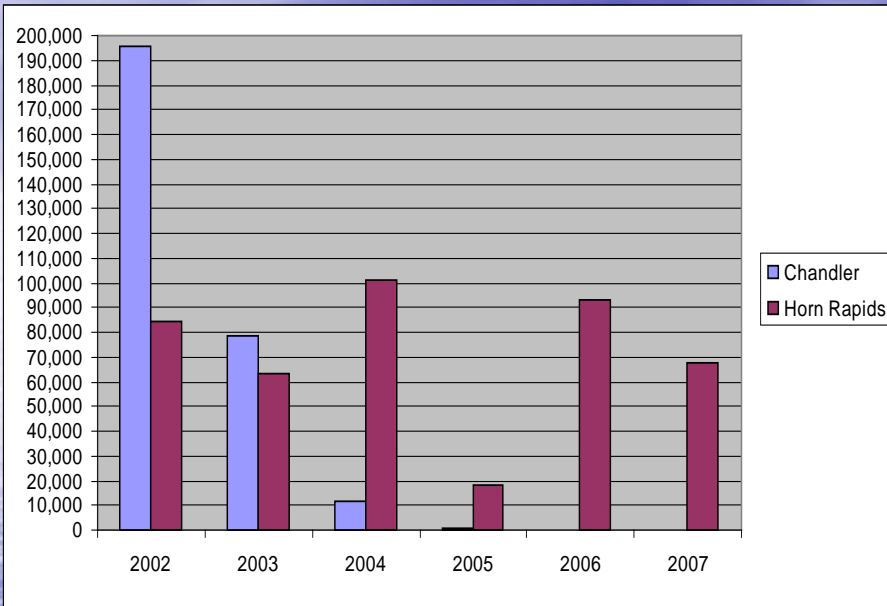
Mean Daily American White Pelican – Chandler

Chandler Pelicans vs Gulls: Daily Averages



Results - Hotspots

Estimated Smolts Consumed by Gulls:

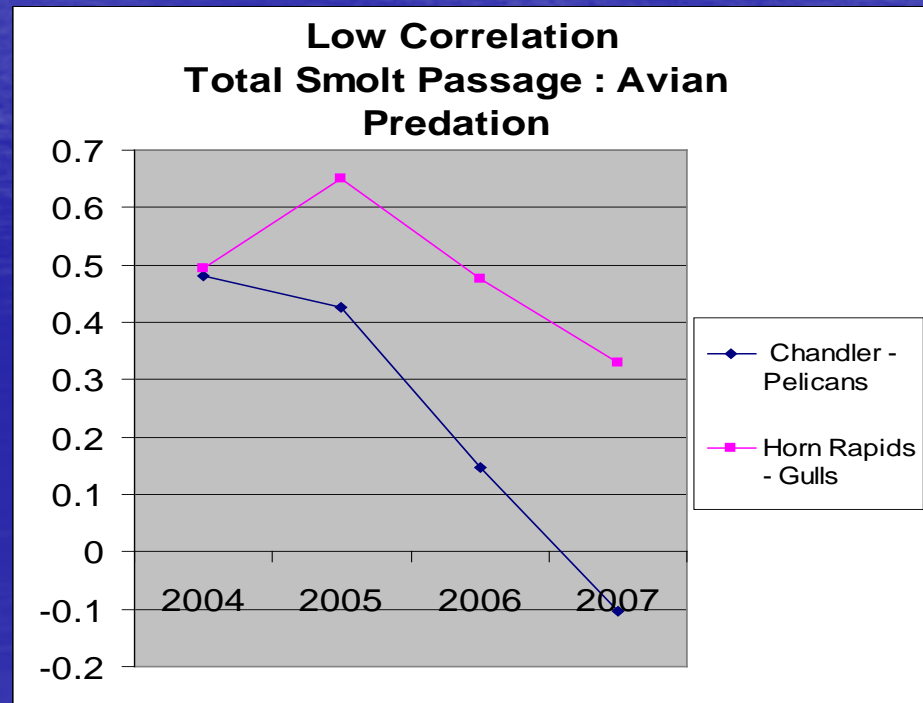


Estimates determined by:

- Total Gull abundance
- Total number of fish taken during observation period
- Fish counts (expanded sampling fractions)

Correlation between smolt passage and avian predation:

- Only the Coho run shows high correlation (bird selecting hotspot by run times)
- Avian predators are not selecting other runs for primary predation



Data Collected Methods - Acclimation Sites



- Surveys conducted between February – May
- Piscivorous birds counted approx. 2-3 times a day
- Surveyed at the site, along the outlet stream, and on the river at the streams confluence

Results Acclimation Sites

Spring Chinook Acclimation Sites:

- Avian piscivorous not present in high concentrations
- Belted Kingfisher

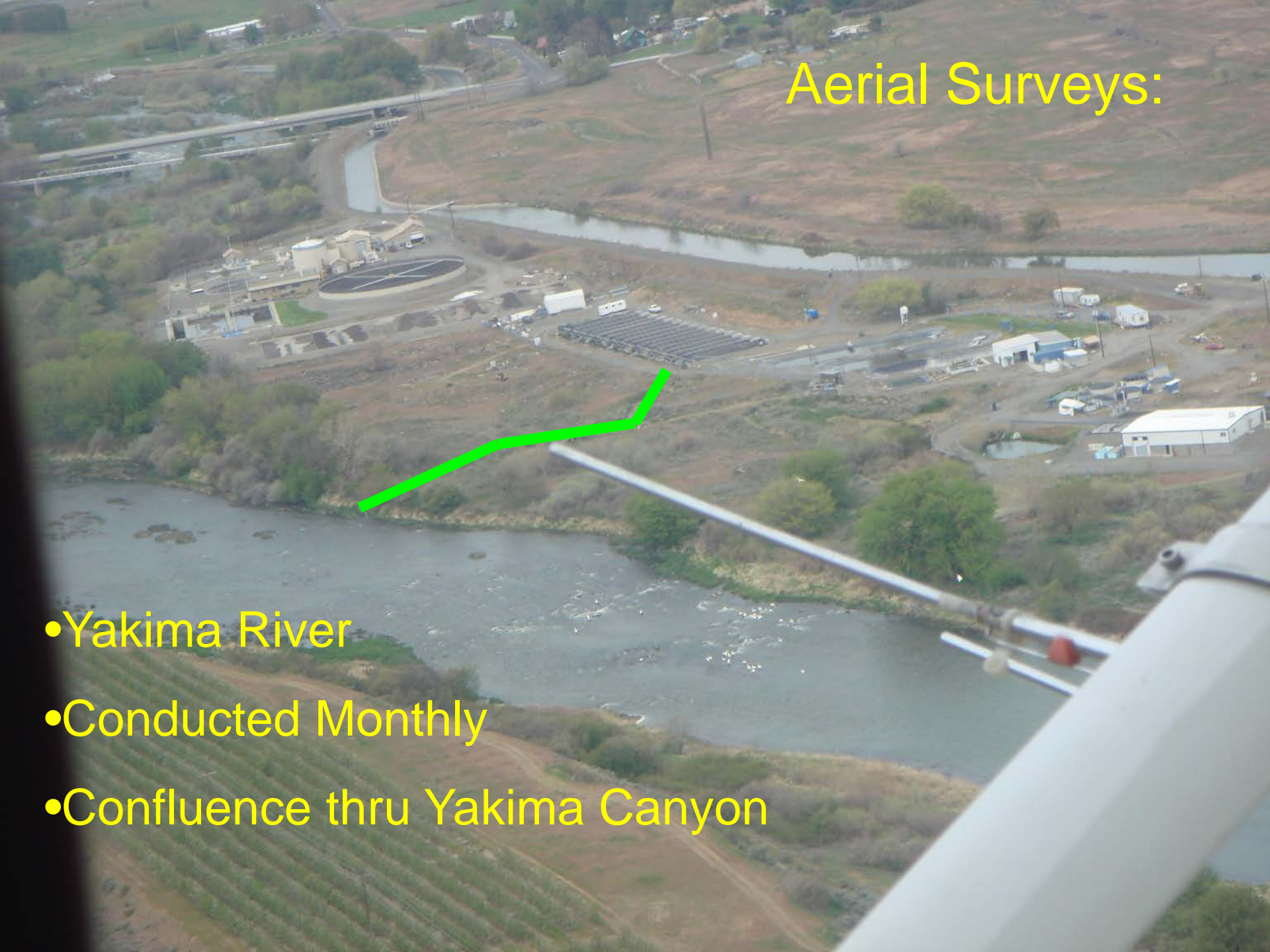


Coho Acclimation Sites:

- Avian piscivorous present in high concentrations
- Common Mergansers

Aerial Surveys:

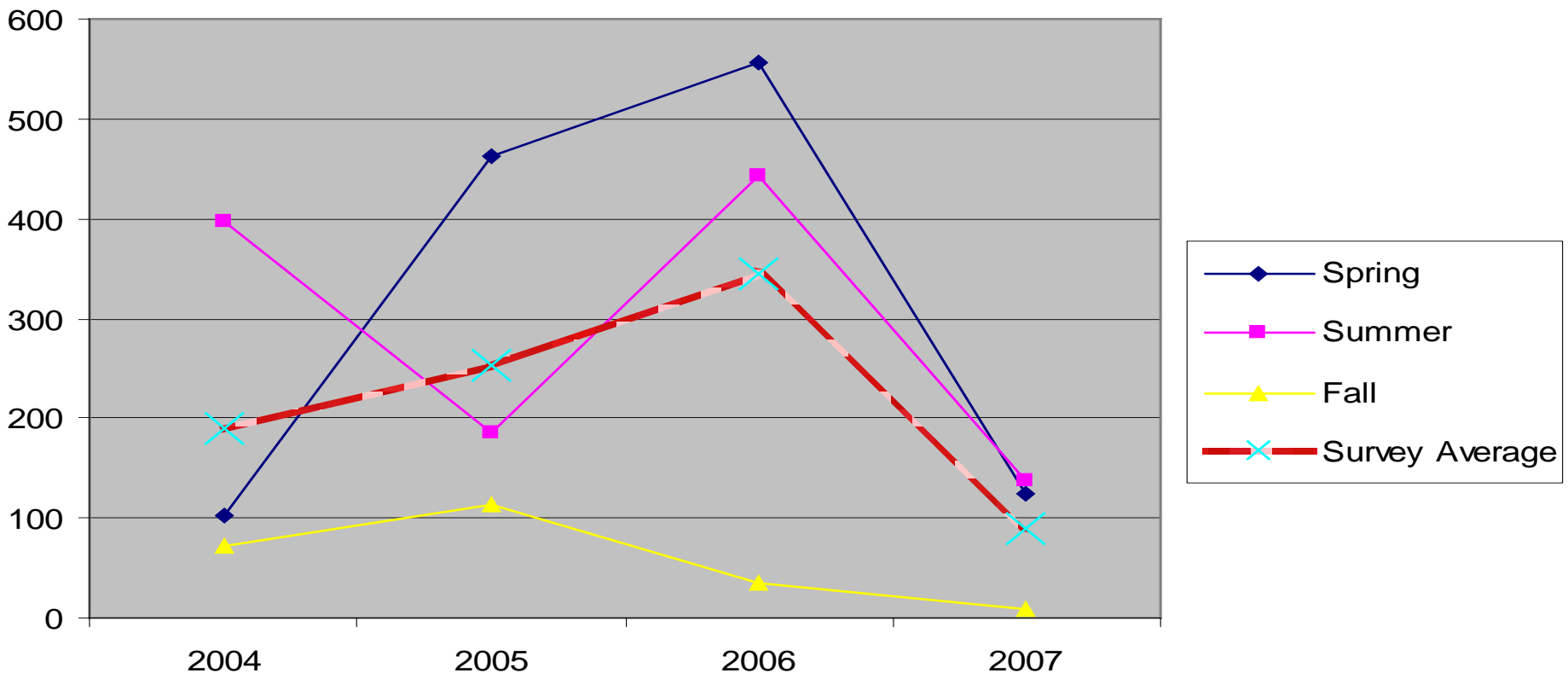
- Yakima River
- Conducted Monthly
- Confluence thru Yakima Canyon



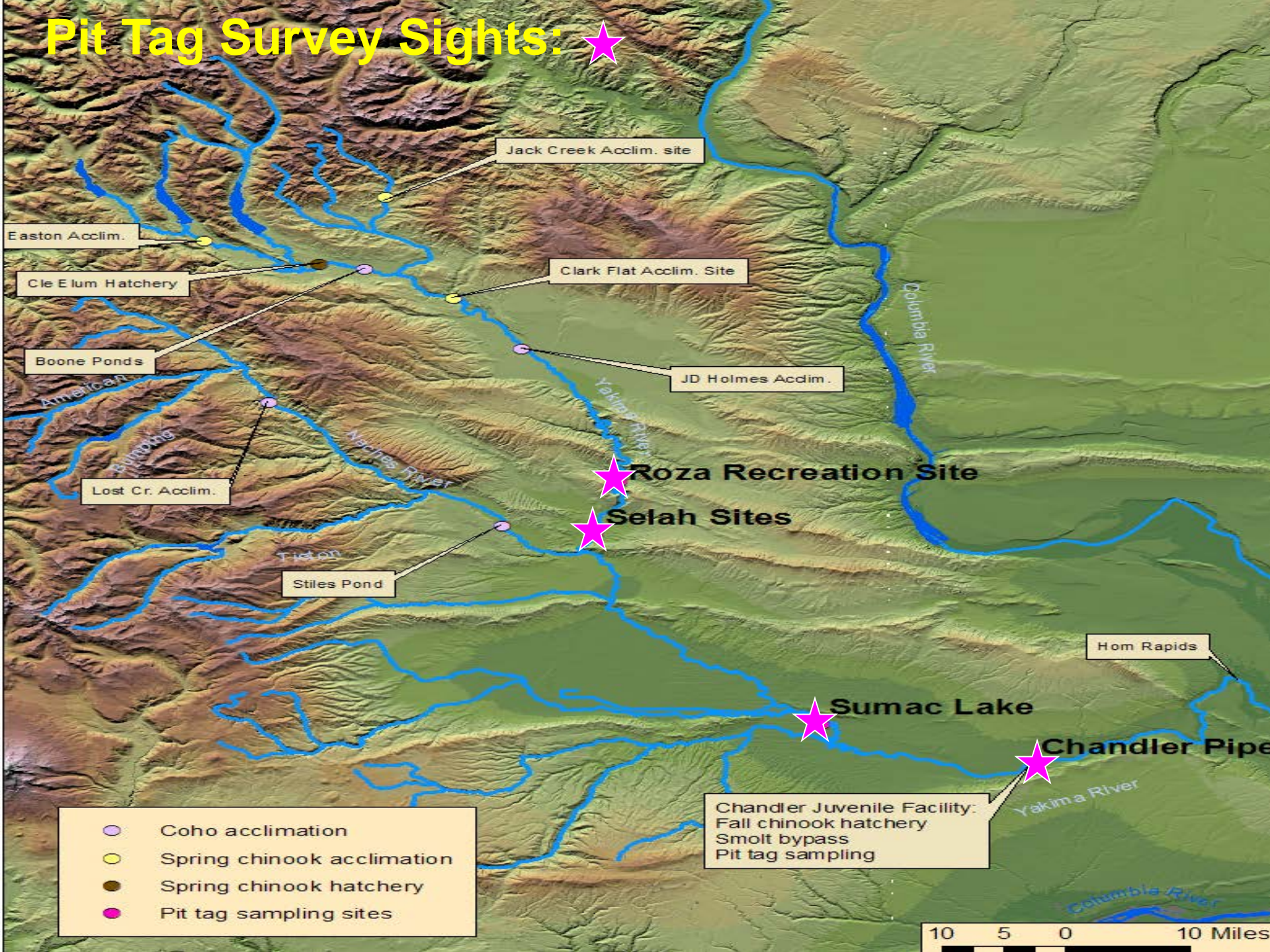
American White Pelican Counts:

- Most AWPE located in Stratum II and Stratum III
- AWPE prefer resting in backwaters off of the main stem Yakima

Yakima River Aerial Surveys



Pit Tag Survey Sights:



Jack Creek Acclim. site

Easton Acclim.

Cle Elum Hatchery

Boone Ponds

Lost Cr. Acclim.

Stiles Pond

Clark Flat Acclim. Site

JD Holmes Acclim.





Roza Recreation Site

Selah Sites

Sumac Lake

Chandler Pipe

Hom Rapids

-  Coho acclimation
-  Spring chinook acclimation
-  Spring chinook hatchery
-  Pit tag sampling sites

Chandler Juvenile Facility:
Fall chinook hatchery
Smolt bypass
Pit tag sampling

10 5 0 10 Miles

Colony Surveys: Pit Tag Sampling

6 sites

- Roza Gravel Bar
- Selah Heron Colony
- Selah Gravel Bar
- Selah Cormorant Rookery (island)
- Sumac Heron colony
- Chandler

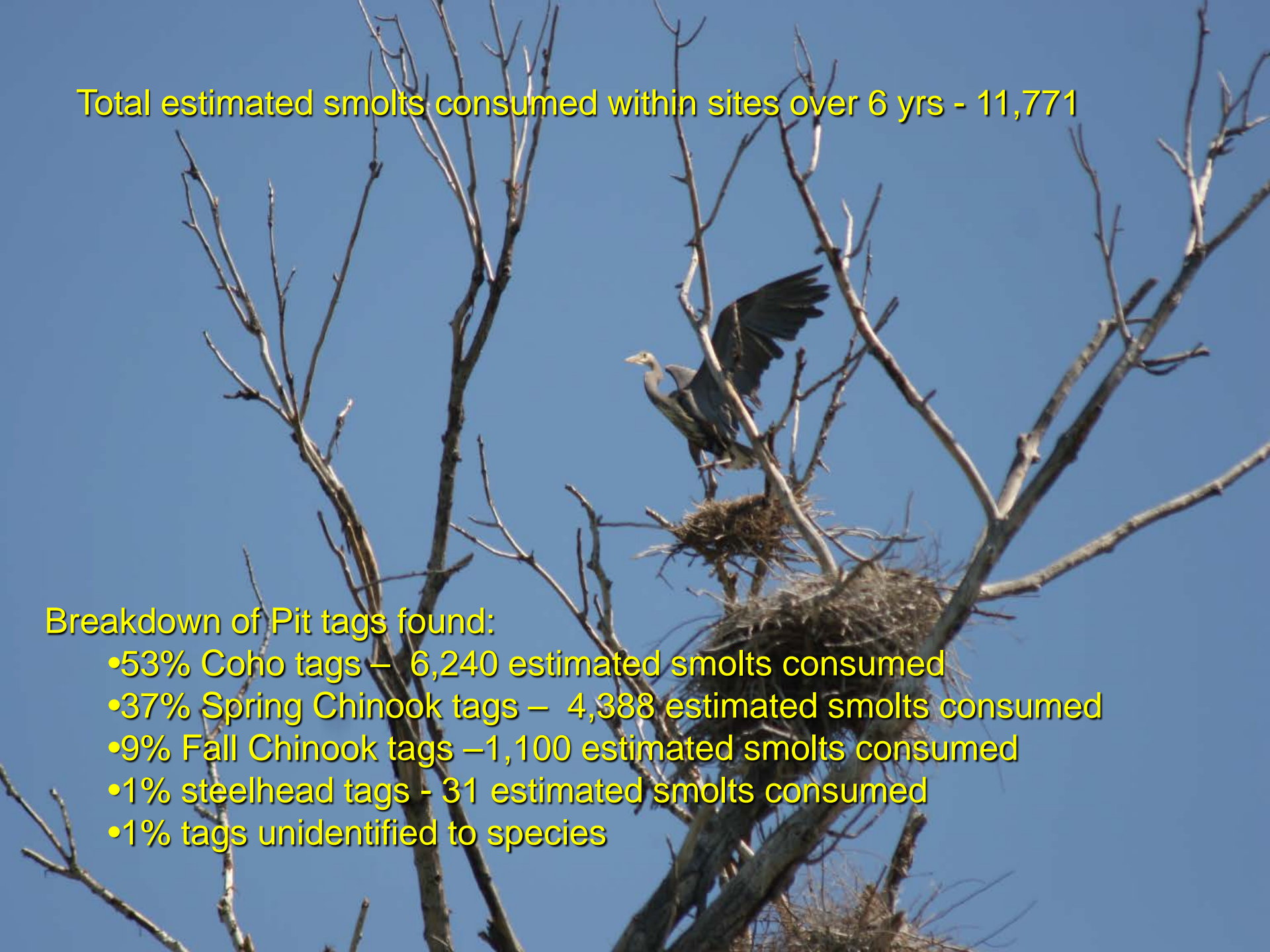
Pit Tags found ranged from 2000 to 2006



Total estimated smolts consumed within sites over 6 yrs - 11,771

Breakdown of Pit tags found:

- 53% Coho tags – 6,240 estimated smolts consumed
- 37% Spring Chinook tags – 4,388 estimated smolts consumed
- 9% Fall Chinook tags –1,100 estimated smolts consumed
- 1% steelhead tags - 31 estimated smolts consumed
- 1% tags unidentified to species



Conclusion – River Reaches

- Mergansers – Consistently the major consumer in the upper and middle river
- Gulls – no longer the major consumer in the lower river
- Growing population of cormorants in middle and lower river.
- Pelicans more common at Roza and Selah.



Yakima River has seen a dramatic increase in Bald Eagles
1990: 1 documented nesting site
2006: Over 10 nesting sites

Conclusions – Acclimation Sites

- Avian Piscivores are not having a high impact on acclimation site salmonids with one exception
- Boone Acclimation Site (Coho pond) is experiencing high predation by the Common Merganser
- The Belted Kingfisher is the main predator in Spring Chinook Acclimation site raceways

Conclusions - Hotspots

- Major Decrease in the consumption of smolts by gulls at Chandler
- Pelicans have completely displaced gulls at Chandler
- Gulls are still the main avian predator at Horn Rapids



Conclusions – Pit Tag Surveys

- Based on PIT sampling higher number of heron predated smolts were found than anticipated.



- Presence of steelhead and fall chinook tags from the lower Yakima, Columbia and Snake Rivers, indicate bird movement between the Columbia and Yakima Rivers.



Current Monitoring Activities

- River reaches 2x a week
- Hotspots 1-2x a week
- Acclimation sites
- Aerial surveys
- Heron and cormorant nesting colonies will be surveyed for pit tags

An aerial photograph of a river winding through a forested area. A large herd of white animals, likely sheep or goats, is gathered on a wide, light-colored gravel bar in the middle of the river. The surrounding landscape is lush with green trees and shrubs. The text 'Thanks to:' is overlaid in the upper left, and several names are listed in white text across the river and its banks.

Thanks to:

Ted Martin

Dave Lind

Jim Siegel

Chris Fredrickson

Dr. Dave Fast

Paul Huffman

Michael Porter

Bill Bosch