

AMERICAN WHITE PELICAN PREDATION OF SMOLTS IN THE UMATILLA RIVER

By Jerimiah Bonifer, Gene Shippentower, Aaron Quaempts, Zoe Johnson and Craig Contor, Department of Natural Resources Confederated Tribes of the Umatilla Indian Reservation

Introduction

Project Objectives:

- 1) Estimate pelican predation rates of natural steelhead and spring Chinook migrating out of the upper Umatilla River Basin during the spring.
- 2) Estimate the abundance and distribution of pelicans in the Umatilla Basin throughout the year

We used PIT tags to estimate predation rates of naturally produced salmonid smolts by American white pelicans in the Umatilla River during 2023 (Figure 1). CTUIR has observed a dramatic increase in the number of pelicans feeding on the Umatilla River since the creation of artificial bird colony islands in the Columbia River in 1993 (mean of 259 birds/day). In-river survival of natural steelhead and salmon smolts has been low (31% in 2021 for example, Contor et al 2022).

Methods

We hand fed PIT tagged fish to pelicans and confirmed the consumption of 478 PIT tagged fish during May and June of 2023 (Table 1 and Figure.1). Real Time Research detected 146 (30.5%) of those PIT tags on Badger (145) and Foundation (1) Islands on the Columbia River near Kennewick, WA. PIT tag detection rate of known tags was 89% on Badger island (Allen Evans, personal communication, 2023).

We estimated pelican abundance and distribution from the air each week beginning in April and into June with monthly counts from July through December. Weekly bird counts included the lower 129 kilometers of the Umatilla River.

Results

Pelicans consumed 4.6% of naturally produced steelhead smolts and 4.9% of naturally produced spring Chinook smolts migrating from Meacham Creek and less than 1% of natural smolts migrating out of the upper Umatilla River during 2023 (Tables 1 and 2).

An average of 259 white pelicans were observed per day on the Umatilla River during the spring of 2023 (max of 422, Figures 2 and 3). Most pelicans left the Umatilla river after smolt migration ended in June. No pelicans were observed after September during 2023 (Figure 3).

Discussion

Estimated pelican predation of salmonid smolts in the Umatilla River by pelicans during 2023 was less than 5%. However, variation of predation rates within and between years remains unknown. Pelican's abundance and distribution on the Umatilla River during the spring smolt migration appears to be expanding. Pelican abundance monitoring and the assessment of their predation on smolts in the Umatilla River will continue through 2025. Predation potential by pelicans on smolts is high. Each pelican consumes 1.8 to 2.3 kg of fish per day (Evans and Knopf 1993). Annual consumption of smolts by pelicans in the Umatilla River could exceed 45,000 kg each spring (90 days x 250 pelicans/day, times 2 kg/day).

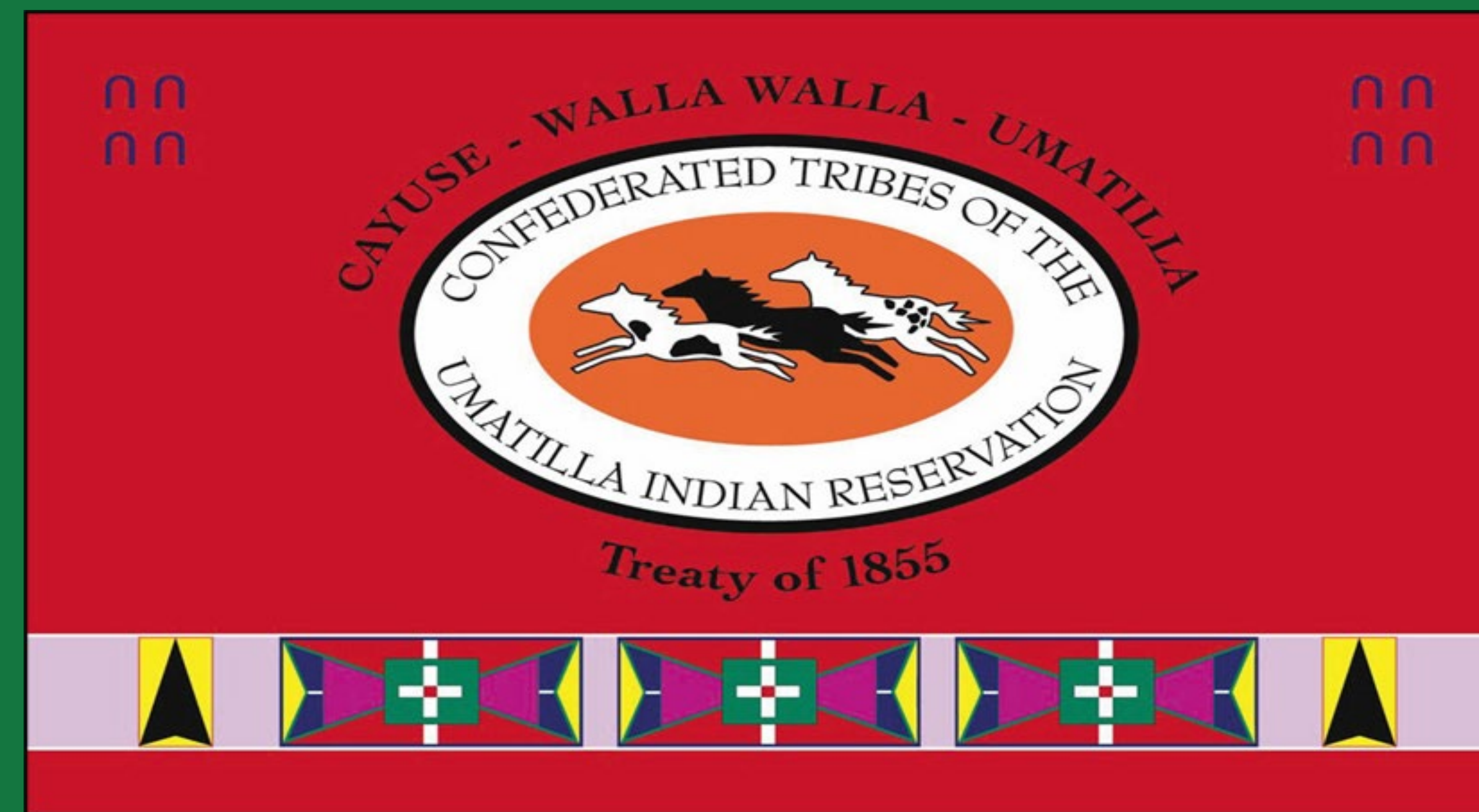


Figure 1. American white pelicans at Three Mile Falls Dam forebay waiting to be fed fish embedded with PIT tags, Umatilla River, 2023.

Table 1. PIT tags fed to American white pelicans at Three Mile Falls Dam Forebay and PIT tag detections on bird colony islands, 2023.

Metric	Results	Notes
PIT tagged fish handfed to pelicans during 2023	478	478 successful PIT tag feedings out of 498 attempts
Number of handfed PIT tags detected on bird islands	146	Posted by Real Time Research on PTAGIS

Table 2. Smolts PIT tagged at the Umatilla River and Meacham Creek traps, estimates of total smolt production, and estimates of the percentage of smolts eaten by American white pelicans, 2023.

Smolt Monitoring Location	Species	Smolts PIT Tagged in 2023	Natural Smolt Production Estimate (95% CI)	Smolt PIT Tags Detected on Islands *	2023 Umatilla Pelican PIT Tag Deposition Rate on Badger Island	On Island PIT Tag Detection Probability *	Up-River origin PIT tagged Smolts Eaten By Pelicans in 2023	Percentage of Smolts Eaten by Pelicans 2023
Upper Umatilla River	Natural Spring Chinook	1,068	4,527 (3,109-5,945)	1	0.305439	0.89	4	0.34
Upper Umatilla River	Natural Summer Steelhead	1,241	10,281 (7,422-13,120)	3	0.305429	0.89	11	0.89
Meacham Creek	Natural Spring Chinook	75	726 (156-1,297)	1	0.305429	0.89	4	4.90
Meacham Creek	Natural Summer Steelhead	792	16,602 (8,639-24,565)	10	0.305429	0.89	37	4.64

* Colony Islands were scanned for PIT tags by Real Time Research. PIT tag detections are available on PTAGIS. On island PIT tag detection probability provided by Real Time Research, 2023, Personal Communication.

Citations:

Contor, Editor. 2022. Umatilla natural production M&E project annual report, 2021. Project 1990-005-01 BPA contract 73982, release 126.

Evans and Knopf .1993. American white pelican. The Birds of North America. 57:1-20.

Evans, Allen. 2023. Personal communication via email on November 11, 2023.

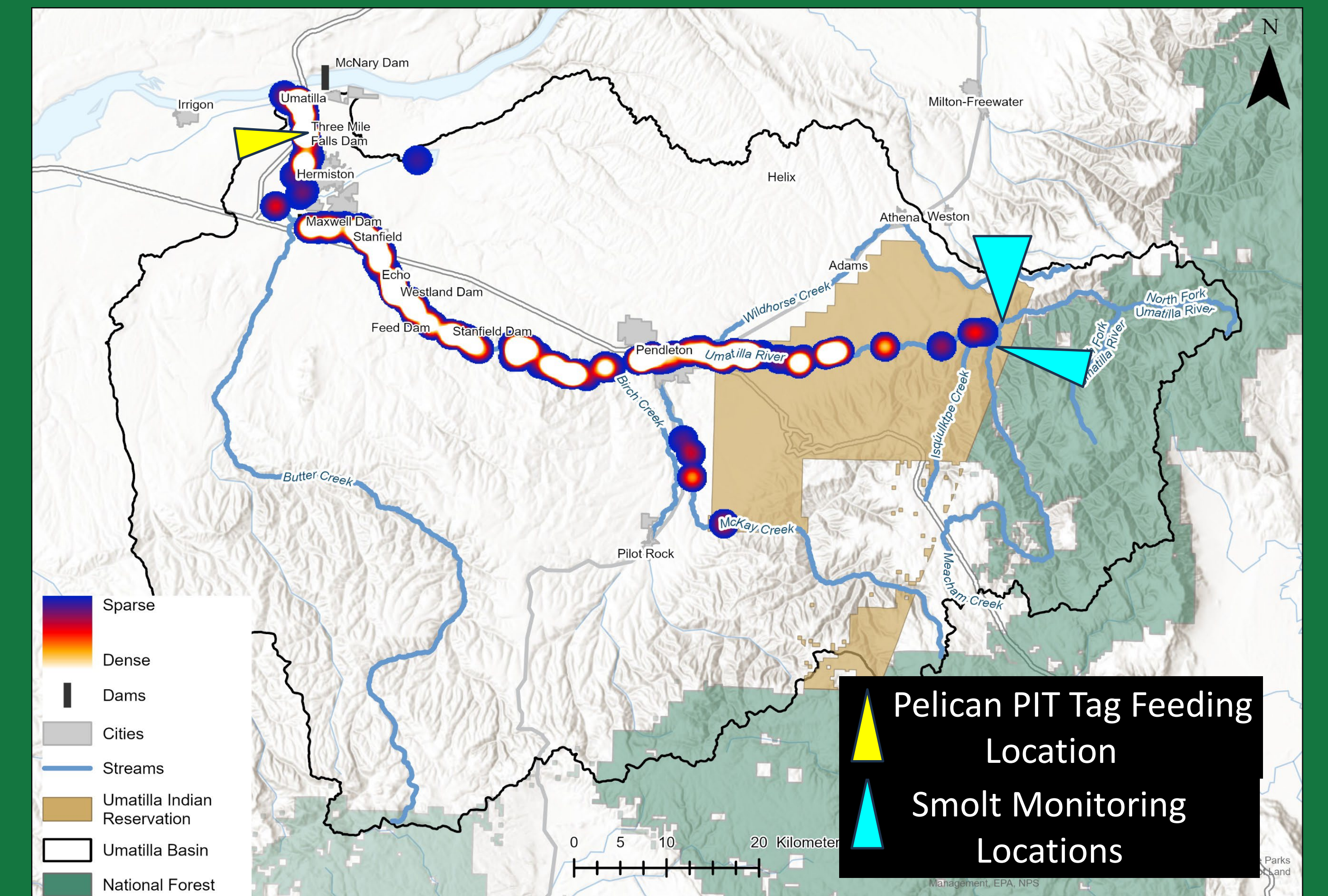


Figure 2. Pelican density ellipses on the Umatilla River Basin based on aerial bird counts during 2023 (April – September).

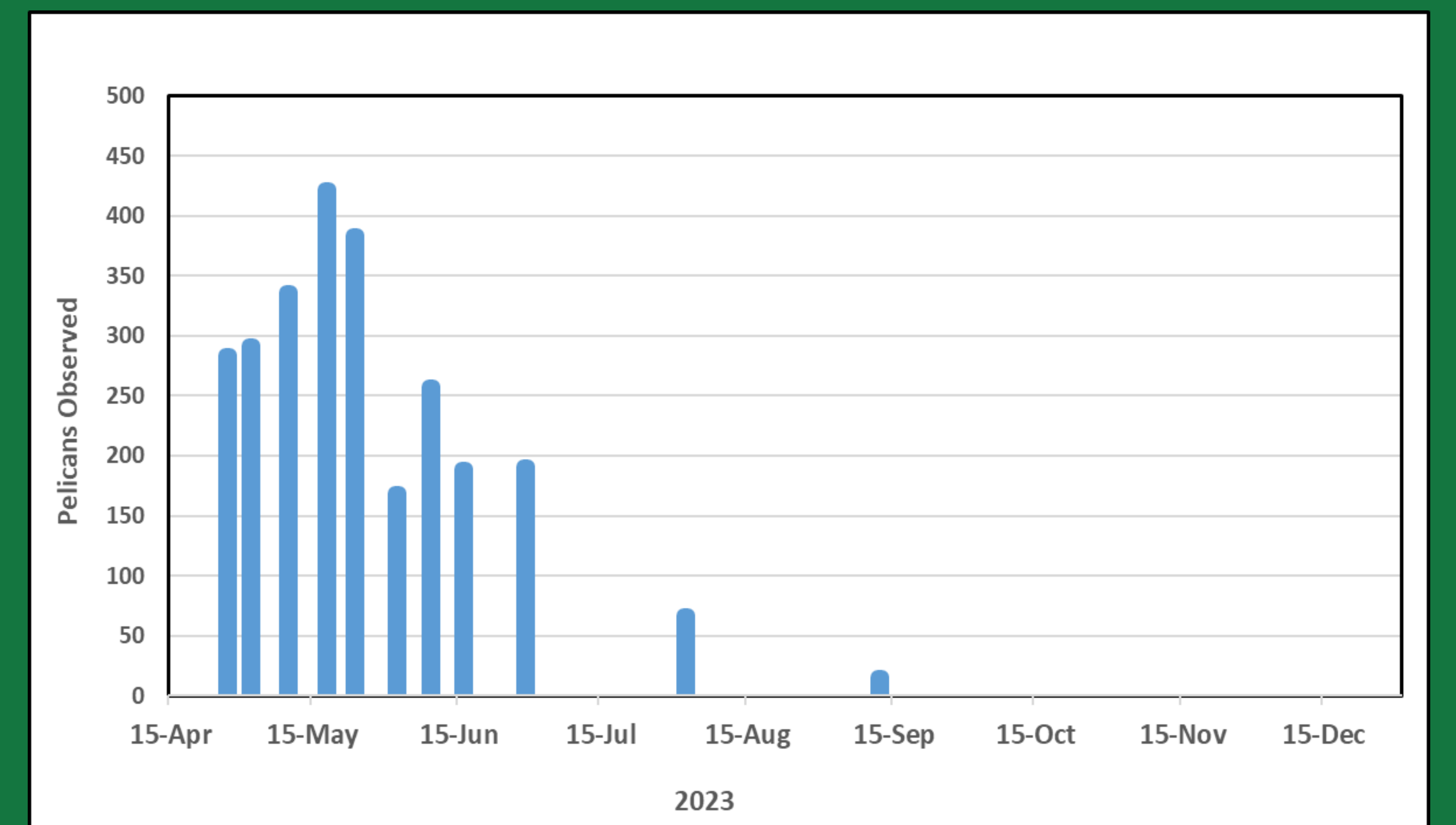


Figure 3. The number of American white pelicans observed on the Umatilla River during aerial bird counts, 2023.



Funding provided by NOAA Fisheries through the Pacific Coastal Salmon Recovery Fund Columbia River Inter-Tribal Fish Commission provided PCSRF contract administration, development, and coordination

