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Population Dynamics and Trends of an Endangered Seabird: Tufted Puffins (Fratercula cirrhata) in Washington

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Introduction

- Understanding population dynamics and trends is fundamentally important to inform and advance the recovery of threatened and endangered species.
- Based on rapidly declining population trends over recent decades, seabirds are considered to be one of the most threatened groups of birds globally.

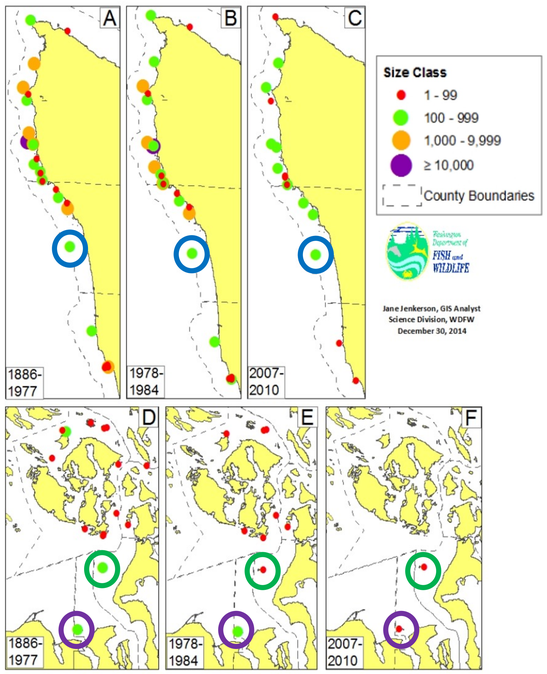

Figure 1. Locations and historical maximum population estimates for 44 TUPU historic breeding colonies documented in Washington (Hanson and Wiles 2015). Circled are the Islands covered in my study; Destruction (blue), Protection (purple), and Smith land (green).

- Tufted Puffins (TUPU; *Fratercula cirrhata*) are currently listed as Endangered by Washington State.
- TUPUs in Washington have undergone widespread colony abandonment, with the population declining by 90+% (Figure 1).
- TUPU population trends in Washington are consistent with patterns of regional decline throughout the California Current System.

TUPU populations are predicted to continue to decline in Washington due to ongoing threats from multiple factors and to become functionally extinct within 40 years. An understanding of population dynamics and trends is critical to developing informed conservation planning for Tufted Puffins.

Research Goal and Objectives

Primary Goal:

- Assess TUPU breeding population dynamics and trends on three active breeding sites in Washington (Destruction, Protection, and Smith islands) by conducting an inter-annual comparison of variability in colony attendance patterns, burrow occupancy, and breeding success.

Specific Research Objectives:

- Contribute 2022 breeding season data to time series for Destruction and Smith islands and conduct inter-annual comparisons in reproductive parameters.
- Conduct a comprehensive survey of TUPU population on Protection Island for the 2022 season to determine size of breeding population.

Current Progress

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Destruction Island (DI):

- From early June to early August 2022, we conducted land-based surveys to determine total number of burrows, burrow occupancy rates, and breeding success of the TUPU. We mapped all active burrows onto established colony photographic maps, recorded visits and the delivery of prey to individually marked burrows and used an infra-red camera system to determine contents and fates of marked burrows.

Protection Island (PI):

- From late May to late July 2022, we conducted land- and boat-based surveys to determine burrow locations and burrow occupancy of the TUPU population.

Smith Island (SI):

- Similar to the method described for PI, in mid-July, we conducted boat-based surveys to determine breeding burrow locations and burrow occupancy rates of the TUPU population.

I created a database for all previous years of DI, PI, and SI reproductive success, colony attendance patterns and chick provisioning rates.

References

Hanson T., and G.J. Wiles, 2015 Washington State Status Report for the Tufted Puffin (2015) - WDFW Publications | Washington Department of Fish & Wildlife. WDFW Publications.

Future Directions

I will conduct an interannual comparison of variability in Island burrow occupancy (both Destruction and Smith islands) and breeding success data (Destruction Island only) from past seasons along with data we collected in the 2022 breeding season.

- Have burrow occupancy and breeding success changed over multiple seasons?
  - Chi-square statistical tests will analyze burrow occupancy, activity patterns, and breeding success over time.

This study will form the basis for my senior thesis, and I will present my findings at the 2023 Pacific Seabird Group conference.

This study will contribute to conservation planning and priority-setting for the species in Washington.

Acknowledgments

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