Tufted Puffin Range-wide Conservation and Management Coordination Trip Summary August 12-17, 2022

OBJECTIVES:

1. Bring tufted puffin species experts and partners from across the North American range together to foster professional collaboration and coordination.
2. Conduct site visits to tufted puffin breeding areas to highlight challenges to colony-based population monitoring and discuss methods to count and monitor puffins at sites across the species' North American range. Lessons and ideas will help inform a range-wide colony census and monitoring framework, work being undertaken by a post-doc at the University of Washington.
3. Identify research and conservation knowledge gaps for tufted puffin; identify and prioritize research, conservation, and other projects and build relationships in support of a shared conservation vision.

DAILY ACTIVITY LOG:

August 12 – Anchorage to Dutch Harbor

- The field team (see photo) traveled to Dutch Harbor, AK to board the R/V *Tiĝlax̂* August 12.
- One presentation was delivered remotely by Brie Drummond prior to departure providing an overview of the Alaska Maritime NWR Tufted Puffin Sampling Protocol (see Christ et al. 2021). Two presentations were delivered this evening: 1) Marc Romano provided an overview of the Biological Monitoring Program at Alaska Maritime NWR; 2) Nora Rojek presented an overview of historical tufted puffin monitoring on Alaska Maritime National Wildlife Refuge.
- The R/V *Tiĝlax̂* traveled from Dutch Harbor to Aiktak Island overnight.

August 13 – Aiktak Island

- On Aiktak Island, Alaska Maritime NWR Biological Technicians demonstrated survey methods for long-term tufted puffin fixed population index plots (see AMNWR 2022, AMNWR Wildlife Inventory Plan Protocol #13, v. 1.5).
- The field team conducted rapid assessment tufted puffin Apparent Occupancy Surveys using a series of 1-m quadrats along randomly oriented transect lines (see Christ et al. 2021, AMWNR Wildlife Inventory Plan Protocol #32, v. 1.2). The team surveyed a total of 143 quadrats on the island.
- The evening discussion focused on a debrief of the day, including how well fixed plots and rapid assessment quadrat surveys estimate puffin burrow density and burrow occupancy (including as proxies for breeding population) and capture changes through time, the need for clearly defined monitoring objectives, and alternative monitoring methods for islands of varying size.
- The team discussed trialing an alternative survey method to assess density and occupancy at tufted puffin colonies, specifically counting burrows within randomly placed circular plots (see Pearson et al. 2013) and assessing burrows for signs of apparent occupancy. For data and method comparison, the team decided to simultaneously conduct surveys using 1-m quadrats and 2.5-m circle plots.
- The R/V *Tiĝlax̂* moved from Aiktak Island overnight to shelter near Kaligagan Island.

August 14 – Kaligagan Island

- On Kaligagan Island, the team attempted to locate five permanent tufted puffin burrow plots, established in 1996 (see Byrd and Williams 1996) and for which we lacked GPS coordinates and

more recent survey data. Three plots were located in the time available, and two of those were surveyed using the long-term monitoring protocol.

- The team conducted Apparent Occupancy Surveys (i.e., 1-m quadrats) in roughly the same area as the 2018 surveys (see Christ et al. 2021), with 94 quadrats surveyed, as well as apparent occupancy surveys based on a 2.5-m radius circular plot, with 34 circle plots surveyed. In the 2.5-m radius circular plots, the two burrows closest to the center were assessed for occupancy.
- The team opportunistically collected eggshell and other tissue samples, plus chick diet samples.
- The R/V *Tiĝlax̂* moved from Kaligagan Island this afternoon and evening, to shelter near Poa and Puffin Islands. Seas limited evening discussions to a debrief of the day and plan for the next.

August 15 – Poa Island

- On Poa Island, efforts were focused on locating and resurveying 6 permanent plots established in 2010 during the first of two years of rabbit eradication (Alaska Maritime NWR unpubl. data). The team was asked to watch for signs of rabbit presence; no evidence was observed.
- The team opportunistically collected eggshell and other tissue samples, plus chick diet samples, which were processed and preserved in the wet lab this evening.
- The evening discussion included a debrief of the day, and two presentations were delivered: 1) Josh Adams presented on the challenges of monitoring burrow and crevice nesters, and lessons from petrels and shearwaters; 2) Lisanne Petracca presented her preliminary post-doc research on an optimized range-wide monitoring strategy for tufted puffins.

August 16 – Puffin Island

- On Puffin Island, the field team completed 150 quadrats and 35 circular plots, roughly following the route of the 2019 survey (see Christ et al. 2021).
- The team encountered thick vegetation across much of the island, including along cliff edges (preferred tufted puffin breeding habitat), which differed from the *Leymus* grass-dominated habitat found on cliff edges of previous islands surveyed on this trip, and appeared to be limiting puffin access to potential (and previously occupied) breeding habitat. The team collected samples of non-*Leymus* grasses, one or more of which were also observed on Poa the previous day.
- The team opportunistically collected eggshell and other tissue samples, plus chick diet samples, which were processed and preserved in the wet lab this evening.
- The evening discussion included a debrief of the day, and three presentations were delivered: 1) Shawn Stephensen presented on tufted puffin monitoring and current research in Oregon; 2) Mark Hipfner presented on tufted puffin monitoring and current research in Canada, plus ideas from his work with rhinoceros auklets; 3) Scott Pearson presented on a model-based approach for estimating burrow nesting seabird colony size and trends, plus tufted puffin monitoring in Washington.

August 17 – Baby Islands (off Unalga Island), Dutch Harbor to Anchorage

- The R/V *Tiĝlax̂* moved from Poa and Puffin Islands this morning, to arrive at the Baby Islands. Due to time constraints, activities were limited to a skiff-based reconnaissance of the major islands in the Baby Islands group (primarily Adokt, Auklet, Excelsior, and Tangagm). The team recorded all seabird species observed and assessed potential puffin habitat from the water.
- The R/V *Tiĝlax̂* transported the puffin team back to Dutch Harbor beginning in late morning. While underway, Marc Romano and Megan Boldenow led a discussion of next steps for the coordination project, including identifying critical knowledge gaps and brainstorming research and project ideas.
- The team departed Dutch Harbor on the evening flight, arriving in Anchorage late on August 17.

Take-home Messages and Next Steps ("Top Accomplishments"):

- This trip brought together researchers and managers grappling with the challenges of monitoring burrow nesting species, to visit tufted puffin colonies of varying size and density and trial survey methods. This opportunity provided context for team discussions on census methods and objectives.
- Key points learned from the discussions and fieldwork will be incorporated into Lisanne Petracca's post-doctorate work, to develop suggestions for an optimized range-wide monitoring strategy.
- This trip allowed partners to establish and/or strengthen existing connections with other experts and managers from across the tufted puffin's North American range. These connections are already allowing for better coordination of research and will be invaluable as we work together to initiate a range-wide conservation framework for this species
- Virtual workshops are planned for the upcoming months, prior to the Pacific Seabird Conference, when we hope to present a complete draft report identifying tufted puffin knowledge gaps, and research and conservation projects identified as key for range-wide species management.
- Eggshell and other tissue samples will be contributed to datasets for genetics (PI Burg) and/or stable isotope (graduate student Stoner) analyses, and chick diet samples will be sent to NOAA partners for species identification.

Tufted Puffin Field Team: First row – Nora Rojek (USFWS), Megan Boldenow (USFWS), Lisanne Petracca (University of Washington); Second Row – Scott Pearson (Washington Department of Fish and Wildlfie), Shawn Stephensen (USFWS), Marc Romano (USFWS), Mark Hipfner (Environment and Climate Change Canada), Josh Adams (USGS), R/V *Tiĝlax̂* Captain John Faris. Absent: Brie Drummond (USFWS), Gerry McChesney (USFWS), Heather Renner (USFWS), John Piatt (USGS)

REFERENCES:

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Byrd, G. V. and J. C. Williams. 1996. Seabird and marine mammal surveys in the central and eastern Aleutian Islands, Alaska, in June 1996. U.S. Fish and Wildlife Service Report, AMNWR 96/06. Homer, Alaska.

Christ, A. M., B. A. Drummond, and N. A. Rojek. 2021. Tufted puffin population sampling protocol at Alaska Maritime National Wildlife Refuge sites in 2018-2021. U.S. Fish and Wildl. Serv. Rep., AMNWR 2021/11. Homer, Alaska.

Pearson, S. F., P. J. Hodum, T. P. Good, M. Schrimpf, and S. M. Knapp. 2013. A model approach for estimating colony size, trends, and habitat associations of burrow-nesting seabirds. The Condor 115(2): 356-365.

Table 1. Eastern Aleutian Islands Tufted Puffin Coordination Trip Bird Observation List, August 10-17, 2022

Common Name	Scientific Name	Aiktak	Kaligagan	Poa	Puffin	Baby Islands	At Sea (from ship)
Green-winged Teal	*Anas crecca*	x					
Common Eider	*Somateria mollissima*					x	
Harlequin Duck	*Histrionicus histrionicus*					x	
Black Oystercatcher	*Haematopus bachmani*	x	x	x	x	x	
Western Sandpiper	*Calidris mauri*	x					
Pigeon Guillemot	*Cepphus columba*		x	x	x		
Marbled Murrelet	*Brachyramphus marmoratus*						x
Kittlitz's Murrelet	*Brachyramphus brevirostris*					x	
Cassin's Auklet	*Ptychoramphus aleuticus*			x			
Least Auklet	*Aethia pusilla*					x	
Whiskered Auklet	*Aethia pygmaea*					x	
Crested Auklet	*Aethia cristatella*						x
Horned Puffin	*Fratercula corniculata*	x	x	x	x	x	
Tufted Puffin	*Fratercula cirrhata*	x	x	x	x	x	
Black-legged Kittiwake	*Rissa tridactyla*						x
Glaucous-winged Gull	*Larus glaucescens*	x	x	x	x	x	
Northern Fulmar	*Fulmarus glacialis*						x
Sooty Shearwater	*Ardenna grisea*						x
Red-faced Cormorant	*Urile urile*	x					
Bald Eagle	*Haliaeetus leucocephalus*	x	x	x			
Steller's Sea Eagle	*Haliaeetus pelagicus*			x			
Peregrine Falcon	*Falco peregrinus*	x	x				
Common Raven	*Corvus corax*	x		x			x
Pacific Wren	*Troglodytes pacificus*	x	x				
American Pipit	*Anthus rubescens*	x	x	x			x
Gray-crowned Rosy-Finch	*Leucosticte tephrocotis*		x	x			
Snow Bunting	*Plectrophenax nivalis*	x					
Fox Sparrow	*Passerella iliaca*	x					
Savannah Sparrow	*Passerculus sandwichensis*	x	x	x			x
Song Sparrow	*Melospiza melodia*	x	x	x			x