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Grant Application Cover Sheet

Please complete the following coversheet. See the grant application guidelines on our website www.myowf.org/grants to complete your application. Volunteer organizations without nonprofit status must have a tax-exempt fiscal sponsor. You may scan and email this cover sheet and your application.

About You

- 1 Project Title: *Enhancing our understanding of the declining population of tufted puffins (Fratercula cirrhata) on the Oregon coast through a multi-pronged non-invasive approach*
- 2 Organization: Oregon State University
- 3 volunteer organizations without nonprofit status, list your fiscal sponsor:
- 4 Tax id number (not required for governmental applicants):
- 5 Project Manager Name: Rachael Orben Title: Assistant Professor
- 6 City: Newport Address: 2030 SE Marine Science Dr. Zip Code: 97365
- 7 Phone (office): (541)-867-0223 Phone (mobile): ()- - email: orbenr@oregonstate.edu

8 Tell us about yourself (brief biographical statement): Rachael is a marine ecologist with a background in oceanography and field ecology. She is interested in how individual marine animals interact with their environment through movement: from fine-scale flight behavior to migrations. Rachael’s research combines biologging technology and field techniques to link movements to intrinsic individual characteristics, such as body condition, breeding success, and physiology to provide context for how marine animals interact with their environment. Recently, her work has taken her to Alaska, the northwest Hawaiian Islands, and the Falkland Islands. Rachael leads the Seabird Oceanography Lab at Hatfield Marine Science Center and is an active collaborator with GEMM Lab and various USFWS projects.

9 Have you applied for a grant from Oregon Wildlife Foundation before? Yes No

10 If “yes”, what was the name of the project?

About Your Proposed Project

11 What type of project are you proposing? Fish Wildlife Other

12 Will it address an Oregon Conservation Strategy habitat or species? Yes No

If “yes”, please name the habitat and/or species addressed: Tufted puffins (Fratercula cirrhata)

13 Proposed start date: May 2021 Anticipated end date: September 2021

14 Project Location (attach map): Oregon coast Nearest town or city: Cannon Beach County: Clatsop

15 Has a local, state, or federal biologist reviewed this project? Yes No



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If "yes", what is their name? Shawn Stephensen Phone: (541)-867-4550 email: shawn_stephensen@fws.gov

1 If "no", what is your plan for an external review of the project?

6
1 Estimated project cost: \$28,081 Funding you are requesting: \$7081

7
How will you use the requested funds? Support from the Oregon Wildlife Foundation will be used to help support the equipment acquisitions such as a
1 DLSR camera for diet composition data collection as well as support the
8 contractor costs associated with this project (in particular support of the the graduate student contractor who will be the on-site lead during the field season).

What will you accomplish (ex., stream miles enhanced, acres planted? This project is designed to accomplish two major goals:

1) Through low-cost, non-invasive and community science driven projects we will greatly enhance our understanding of tufted puffin ecology and population
1 status along the Oregon coast, specifically at Haystack Rock in Cannon Beach,
9 Oregon.

2) We will test a suite of pilot projects that will give coastal conservation managers a foundation to rely on moving forward. The projects designed in this study, if successful, can be carried out as additions to long term monitoring of Oregon's declining tufted puffin population.

2 Check the following box to be added to our email distribution list:

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Project Abstract/Summary

2 Limited to 750 characters. *Do not begin your narrative here or link to other*
1 *pages:* Tufted puffins are experiencing a range contraction that is adversely impacting populations in its southern ranges such as Oregon. We will carry out a suite of cost-efficient, non-invasive and community-forward pilot projects that will enable us to collect vital, but currently missing, data on tufted puffin ecology, particularly chick diet composition during fledgling season. This data will consequently provide us with further understanding of forage fish availability and distribution along areas of the coast where tufted puffins forage. Tufted puffin research in Oregon is minimal and thus our project will lay a foundation for long term research and conservation management of an iconic Oregon strategy species on the brink.

Certifications

2 Check here to certify that you have already or will obtain necessary permits
2 from all requisite agencies *as applicable to the proposed project.*

2 I have included pre-project pictures or video as well as a picture or video
3 entry of myself.

2 I understand that I'm required to submit a Project Completion Report,
4 copies of any publications or social media posts crediting the Foundation's support, and post-project pictures at the completion of my project.

2 I warrant that I am the legal owner of all pictures and video submitted in

OREGON WILDLIFE FOUNDATION

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5 application and grant permission for the Foundation to reproduce, exhibit, or publish them for all general purposes in relation to Oregon Wildlife Foundation's work.

2 Signature of Applicant or Authorizing

6 Official:



RESEARCH PROPOSAL FOR OREGON WILDLIFE FOUNDATION WITH RESPECT TO THE 2021 FIELD SEASON

*Enhancing our understanding of the declining population of tufted puffins (*Fratercula cirrhata*) on the Oregon coast through a multi-pronged non-invasive approach*

Principal Investigator: Dr. Rachael Orben

Principal Investigator's Unit Leader: Selina Heppell

Principal Investigator's Institution/Department: Oregon State University, College of Agricultural Sciences, Department of Fisheries and Wildlife

Major cooperators(s): Shawn Stephensen, Wildlife Biologist, USFWS, Oregon Coast National Wildlife Refuge Complex

Graduate student contractor: Noah Dolinajec

Primary location of work: Cannon Beach, Oregon

Secondary and tertiary location of work: Three Arch National Wildlife Refuge, Goat Island/Hunter Island (Southern Oregon coast)



Photo: Courtesy of Tim Halloran from Friends of Haystack Rock

The tufted puffin (*Fratercula cirrhata*) is *the* emblematic seabird species of the Oregon Coast. Its image can be seen on buses, t-shirts and mugs, a large tufted puffin statue looks out over Coquille Point and visitors to the Oregon Coast Aquarium can view tufted puffins from close proximity. Tufted puffins are a member of the auk family. Known for their wide geographic breeding range and adaptability to relatively extreme climatic differences. Tufted puffins nest in earthen burrows and rocky crevices on off-shore islands in the North Pacific - ranging from Japan to the Aleutian Islands, Bering Sea, Gulf of Alaska and south to the US West Coast. Tufted puffins are diving seabirds and rely on the availability of forage fish (Piatt & Kitaysky 2002). However, despite this wide range of distribution, populations in the southern reaches of the species' range are experiencing contractions making observing tufted puffins in the wild an arduous exercise along the Pacific coast.

The tufted puffins in the California Current Large Marine Ecosystem (CCLME), have seen large declines in population numbers over the recent decades. In 1988, the U.S. Fish and Wildlife Service (USFWS) conducted a coast-wide survey of Oregon islands; this survey recorded 4,858 birds nesting on 49 distinct islands. In 2008, the next coast-wide survey found just 142 birds observed on 15 islands (Kocourek et al. 2009). Furthermore, habitat modeling has identified that populations reliant on suitable rocky island habitats in n. California, Oregon and Washington are at risk of complete (or virtually complete) extirpation by 2050 under climate change scenarios (Hart et al. 2018). In addition to climate change, oil spills, fisheries bycatch, mammalian and avian predation, invasive species competition and anthropogenic disturbances can all negatively contribute to tufted puffin populations (USFWS 2020).

In 2018, the USFWS began a species status assessment for tufted puffins to be listed under the U.S. Endangered Species Act (ESA). The Species Status Assessment (SSA) was drafted in March of 2020 and in early December of 2020, the USFWS published their decision not to list the tufted puffin under the ESA due to insufficient data differentiating the populations of tufted puffins in the southern ranges of their distribution from the stable/increasing Alaskan populations. A better understanding of genetic analysis of individuals from Oregon, diet data and, and predation events on colonies are necessary to make informed management and conservation decisions.

The SSA determined the impact of predators on puffin populations in the California Current as "low, however there is little quantitative data in Oregon". Both avian and mammal predators have had substantial impacts on other seabird species in Oregon (e.g. common murre, Leach's storm-petrel) in recent decades. The Oregon Coast National Wildlife Refuge Complex (OCNWRC) is planning an Oregon tufted puffin survey for the summer of 2021 (delayed from 2020 due to Covid-19). The survey will provide a rare chance to visit these islands through boat-based surveys. However, the observations will be short and additional efforts are required to better understand both the current status and the decline of tufted puffins in Oregon. In addition to the pilot projects described in this proposal, we are planning to work closely with USFWS to participate in the survey and use this opportunity to develop further ideas for non-invasive research methods.

Project Goals

For Oregon, the SSA identified climate change as the biggest risk to tufted puffin populations. Obtaining tufted puffin diet and population data (and some genetic material) would fill an immediate information gap and provide regional context for the influence of prey availability (forage fish) and predator disturbance events on colony attendance and burrow occupancy.

Our goal for this project is to develop simple and effective non-invasive methods to enhance our understanding of tufted ecology and populations on the Oregon coast. This is necessary to both inform future conservation strategy and potentially provide substance for resubmission of the tufted puffin for the consideration of endangered species listing. To do this we will design and carry out a suite of small pilot studies and projects:

- 1) Coordinate TUPU genetic sampling
- 2) Adaptation and implementation of predator disturbance protocol at Haystack Rock in coordination with USFWS and their community science volunteer observer.
- 3) Photograph and identify the composition of bill loads of tufted puffins delivering prey to their chicks at the Haystack Rock colony.
- 4) Develop “Birds with Fish”, a community science program designed to source photos of piscivorous coastal birds.

Coordinate tufted puffin genetic sampling efforts in Oregon

The impact of human disturbance on tufted puffin colonies has been shown to result in significant declines in reproductive success and often leads to chick abandonment (Pierce & Simmons 1986). Because Oregon’s population numbers are already low, non-invasive methods must be used to collect any physical samples. In line with the “Bill Loads” project, we will work directly with USFWS, Coastal Observation and Seabird Survey Team (COASST), Wildlife Center of the North Coast, Friends of Haystack Rock and Haystack Rock Awareness Program to advertise a public-forward campaign encouraging beachgoers to contact our team regarding any washed up (post-mortem, sick or injured) tufted puffins to obtain specimens for genetic analysis.

The recent denial of tufted puffins for listing under the U.S. Endangered Species Act is likely predicated heavily on the absence of data presenting clear genetic differentiation between populations in the southern range and Alaskan populations. Genetic analysis of specimens from Oregon or n. Californian birds could provide integral baseline data for resubmission of tufted puffins for federal protections.

Adaptation/Implementation of predator disturbance protocols

Avian and mammalian predators can have substantial impacts on seabird populations. Invasive/introduced and native mammalian predators can impact burrow nesting seabirds disproportionately through predation of adults, chicks and eggs in easily accessible domains. Additionally, if predators dig-out burrows this may cause long term or permanent nesting habitat loss. Aerial avian predators such as eagles and peregrine falcons can directly predate adult seabirds such as common murre, marbled murrelets and tufted puffins. Eagle or falcon disturbance events can cause temporary colony evacuations, known as flushing events, which

leave eggs or chicks unattended and at-risk to secondary predation (from species such as western gulls, ravens, turkey vultures etc. - which all have wide distributions along the Oregon coast).

In Oregon, a rebounding bald eagle population has already been observed restructuring the breeding distribution of the common murre and have shown measurable impacts on reproductive success. Furthermore bald eagles are thought to be a major cause of mortality for marbled murrelets, a fellow species of the auk family (J. Rivers, personal comm). Another predator that has impacts on seabird distribution and success on the Oregon coast is the western gull, a ubiquitous opportunistic seabird that ranges the entire coastline. Western gulls have commonly been observed nesting on the same islands where tufted puffins have attendance. Western gulls can employ kleptoparasitic strategies to steal prey from seabird species that carry prey in their bills, as tufted puffins do. This behavior may not have detrimental effects on large puffin colonies but for small populations like those on the Oregon coast, this could have notable repercussions.

It's important that we enhance our understanding of how avian predators are impacting tufted puffins in Oregon. To do so, we will modify the eagle disturbance protocol used at Yaquina Head for common murres and implement a disturbance monitoring scheme at Haystack Rock. Additionally, we will work with USFWS to initiate counts of the western gull colonies on the same islands as tufted puffin colonies using their long-term photographic data to better understand how western gull populations in direct interaction with tufted puffin colonies have changed over time. Lastly, the trail cameras planned for deployment on the s. Coast islands will provide not only monitoring of colony attendance and burrow occupancy but also a metric of avian and mammalian predation in the vicinity of more accessible puffin colonies.

Investigation of chick diet composition through analysis of digital photography

Understanding the composition of a seabird's diet supplies vital information regarding regional variations in the health and function of marine ecosystems and provides insight into the marine food web structure. For tufted puffins in Oregon, this information could fill valuable data gaps in pelagic feeding habits of tufted puffins, who rely heavily on forage fish, and how these habits may affect population numbers.

In Alaska, tufted puffins rely on a range of forage fish species during chick rearing (Schoen et al. 2018). But, in Oregon the exact prey species of tufted puffins have not been quantified. We know from common murre diets that there has been a measurable shift in forage fish availability over the last two-decades, which likely has direct impacts on tufted puffins as well.

We anticipate the collection of chick diet data for tufted puffins to be a laborious process. To ensure the best chance of obtaining the data we'd like, we will trial three means of collection. First, during the chick rearing period an observer will photograph tufted puffins with bill-loads at Haystack Rock. This approach appears to be feasible as exemplified by photos taken in the past few summers at Haystack (Fig. 2). Secondly, we will attempt to place trail cameras at various burrow sites in order to photograph puffins with bill loads. Thirdly, we will initiate a

wide-spread community science outreach program “Bill Loads” that encourages professional and skilled amateur photographers to contribute to the collection and submission of photos of coastal birds with fish to a centralized web portal.

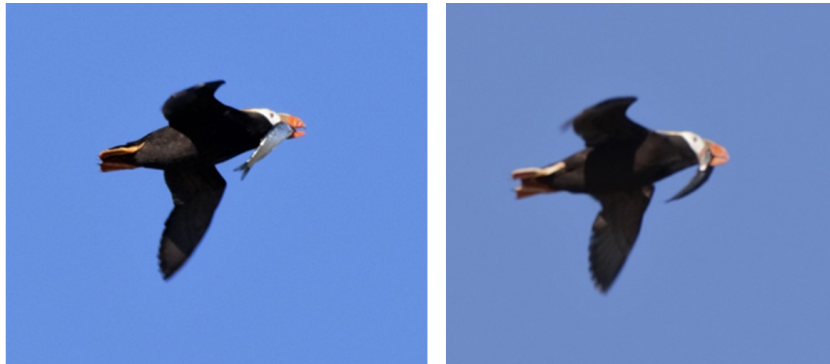


Fig. 2. Tufted puffin with a fish (left: potentially a Pacific Herring, right: unidentified). These photos were taken near Haystack Rock during the summer of 2020. USFWS.

We anticipate this portion of the project to be highly interactive with the public and to produce useful results for tufted puffins and other piscivorous seabirds of interest on the Oregon coast.

Manual Bill Load Photography & “Birds with Fish” Web Portal

Photographic analysis of seabirds carrying bill loads has proven to be a dynamic and effective way to collect data on seabird diet in virtually complete non-invasive methods (Gaglio et al. 2017). Using a DSLR camera, an observer (N. Dolinajec) will trial vantage points, times of day and weather/tide conditions for taking photos of puffins with bill loads. Time observing will be recorded regardless of collection of bill load photos. We anticipate that there will be entire field days without the collection of a data point (bill load photograph). But, the collection of even a small sample size (~n=30) bill load photographs in a fledgling season will provide invaluable baseline information.

As the outreach component of the Graduate Certificate program, N. Dolinajec will develop a community science driven program to promote the involvement of skilled wildlife photographers to submit photographs and metadata of birds with fish along near known tufted puffin colonies (Haystack Rock, Three Arch NWR and s. Oregon). The main species of interest will be the tufted puffin, but photographers will be encouraged to submit photos/metadata for other species as well (e.g. common murre, pigeon guillemots, marbled murrelets, ospreys and eagles). The campaign will be advertised in collaboration with the OCNWRC, Friends of Haystack Rock, Haystack Rock Awareness Program, and the Oregon Wildlife Foundation through social media, blogs and targeted outreach to groups such as the Portland Audubon Society and Lincoln County Audubon Society.

Colony Attendance & Burrow Occupancy

Due to the large reduction in tufted puffin numbers observed in 2008 (Kocourek et al. 2009), a monitoring program was initiated at Haystack Rock in Cannon Beach, Oregon (Stephensen

2018). The program has matured into a decadal data set that exemplifies the potential of an even more robust community science driven project to collect important data on tufted puffins in Oregon.

The current monitoring program has an on-shore observer that counts birds and tracks which burrows are being attended (Fig. 1). This same protocol is used at other colonies in n. California (Farallon Islands and Castle Rock). The data provide information on breeding season burrow occupancy, breeding phenology and a general population estimate. Population counts from the Haystack program indicate there is a very small but relatively stable population on the island which makes it ideal for continued monitoring. Haystack is Oregon’s lone colony that allows for direct on-shore observation. However, other Oregon colonies with notable estimated population counts (i.e. Goat Island, Saddle Rock and Hunter Island on the s. Coast) are ideal for observations from trail cameras. In addition, there is a significant population still colonizing Three Arch National Wildlife Refuge but the only current method of observation is via boat.

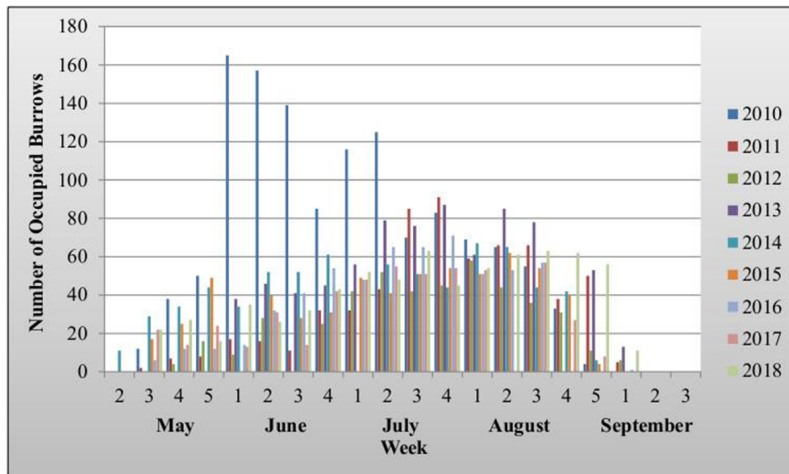


Fig. 1. Mean weekly occupied burrows at Haystack Rock during May to September of 2010-2018 (USFWS 2018).

We aim to pilot the use of trail cameras on the s. Coast colonies to provide analogous information for tufted puffin colonies located on human accessible islands.

Support from Oregon Wildlife Foundation

With support from the Oregon Wildlife Foundation, we will develop a suite of dynamic pilot studies during the summer of 2021. Funding for these projects by Oregon Wildlife Foundation will provide us with the resources necessary to test multiple non-invasive strategies to observe tufted puffin populations along Oregon’s coast and collect vital data that can play a role in future federal listing and conservation. These projects not only contribute to building a more complete understanding of Oregon’s iconic tufted puffins but also provide Oregon’s coastal communities with a chance to have an active role in the continued monitoring and conservation projects aimed at tufted puffins and other coastal birds.

Under the head of the PI of Oregon State University’s Seabird Oceanography Lab, in collaboration with OCNWRC and with field work and analysis led Research Intern (N. Dolinajec),

the results from this project will form the basis of a capstone project for the Graduate Certificate of Wildlife Management at OSU.

The combination of efforts designed in this project will produce comprehensive observational data on tufted puffin ecology and population dynamics on the Oregon coast. This information will fill critical and time sensitive knowledge gaps necessary for tufted puffin monitoring in the long term. Successful completion of this project will lay the foundation for further study and funding proposals of this species in Oregon.

The Oregon Wildlife Foundation's support will contribute to the purchase of suitable equipment such as a DSLR camera, field supplies and contracting support for the entirety of the field season.

Conclusion

Oregon's coastal environment and marine ecosystems are expected to undergo continued changes due to climate change; This project is designed to dramatically enhance our understanding of Oregon's tufted puffin populations, a declining yet emblematic and important seabird on the Oregon coast. The tufted puffin, along with the forage fish they depend on, are Strategy Species in the Oregon Nearshore Strategy. Forage fish management occurs under ODFW's Forage Fish Management Plan, which aims to quantify and enact conservation and management of Oregon's forage fish populations that play a central role in the health of both Oregon's coastal ecosystems and fisheries. This project will develop effective and easily manageable non-invasive methods to collect vital data on tufted puffin ecology and consequently nearshore forage fish prey availability. Tufted puffin research in Oregon is minimal and our project would provide the foundation for long term research and conservation of an iconic Oregon species on the brink.

We will focus heavily on engaging coastal communities in the research and process through a calculated community science effort. In addition to our goals of publishing the results of this study in a peer-reviewed journal, we plan on devising a series of communication methods with coastal community members through conversations with visitors of the Haystack Rock, blog posts updating the project status, targeted outreach to wildlife photographers and birders, and status reports shared with our collaborators and support groups such as Friends of Haystack Rock, Haystack Rock Awareness Program, Portland and Lincoln County Audubon Societies, the USFWS, ODFW, Oregon State University Hatfield Marine Science Center and with the support of the Oregon Wildlife Foundation.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Oregon Coast National Wildlife Refuge Complex
2127 SE Marine Science Drive
Newport Oregon 97365
Ph: 541-867-4550



January 18, 2021

Oregon Wildlife Foundation:

The U.S. Fish and Wildlife Service (USFWS), Oregon Coast National Wildlife Refuge Complex manages National Wildlife Refuge lands and associated trust resources along the Oregon Coast. The tufted puffin is an iconic seabird that nests on the refuge and we have documented an order of magnitude decline in the breeding population. USFWS is concerned and is taking action to help conserve the species.

This is a letter of support that documents the USFWS and Oregon State University (OSU) personnel will cooperatively conduct a scientific study of the tufted puffin that will fill data gaps and initiate management actions. The USFWS will provide time and equipment as in-kind support such as:

- Boats – to conduct water based observations and surveys
- 35 mm digital cameras, binoculars, and associated equipment – to photo-document prey items
- Motion detecting trail cameras – to document on island activities
- Housing – a bunkhouse room will be provided for Noah Dolinajec while conducting work on the south coast
- Time – USFWS Biologist will contribute time to initiate the study, operate equipment, and provide logistical support

The USFWS and OSU personnel plan to initiate the tufted puffin study during spring and summer 2021. We are seeking support from other individuals, organizations, agencies, or groups that will aid in the success of the project. If there are questions or concerns please contact me.

Sincerely,

Shawn W. Stephensen

Shawn W. Stephensen
USFWS Wildlife Biologist

**EXAMPLES OF BILL LOAD PHOTOGRAPHS OF TUFTED PUFFINS AT HAYSTACK ROCK,
CANNON BEACH, OREGON**



Photo courtesy of USFWS Volunteer Tim Halloran

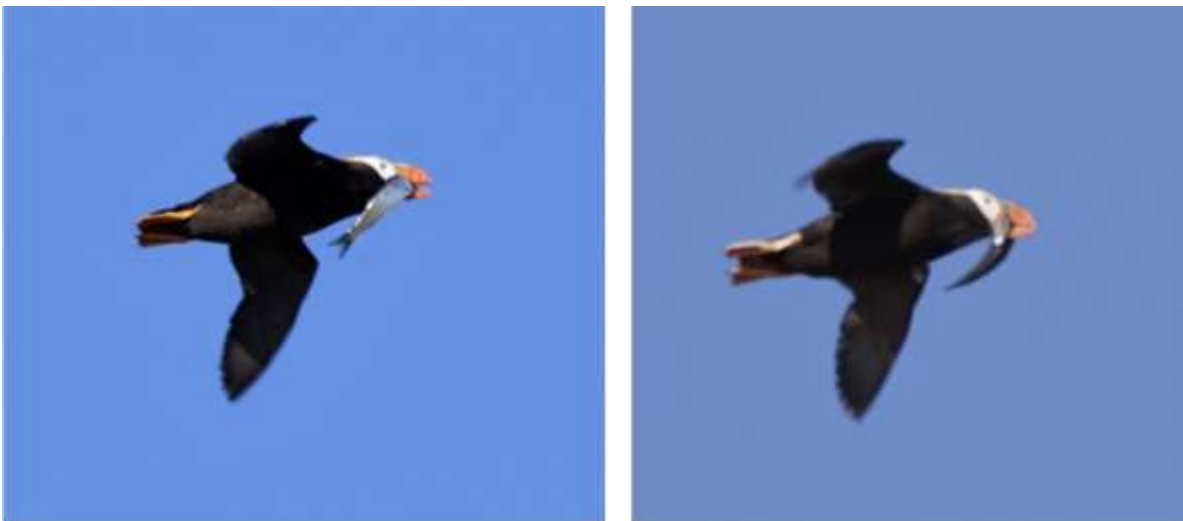


Fig. 2. Tufted puffin with a fish (left: potentially a Pacific Herring, right: unidentified). These photos were taken near Haystack Rock during the summer of 2020. USFWS.

PROPOSED FIELD SITES FOR SUMMER 2021 (WITH HEAVY EMPHASIS ON HAYSTACK ROCK COLONY IN CANNON BEACH, OREGON)

Proposed TUPU sample sites



The majority of the project is centered at Haystack Rock in Cannon Beach, Oregon. COVID-limitations will dictate whether the project can be extended to Three Arch Rocks NWR and Goat Island. Funding is unaffected by COVID challenges and provides the same support regardless of if the project is able to extend to the second and third colonies.