

# **Citizen science seabird nest monitoring at Cape Perpetua Marine Reserve/Protected Area**

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## **Background & justification**

Five marine reserves/marine protected areas (MR/MPAs) have been designated in Oregon waters. The largest one at Cape Perpetua officially entered the implementation phase in 2014. With this transition, we enter a critical time to monitor the effectiveness of this marine reserve for both human benefit and for ecological health. Oregon Department of Fish and Wildlife (ODFW), the lead agency tasked with managing the marine reserves, has decided to focus ecological monitoring on benthic habitats and associated invertebrate and fish communities. Seabird monitoring has not been prioritized by ODFW and no academic research on seabirds is currently being conducted in the Cape Perpetua Marine Reserve or any of the designated Marine Reserves in Oregon’s Territorial Sea. Globally, research on seabird reproductive and foraging ecology has informed MR/MPA site identification and assessment as well as providing vital information on the subsequent changes in the marine community following MR/MPA establishment (Pichegru et al. 2010, Thaxter et al. 2012)

Seabirds main prey, forage fish species like sardines, sand lance, and smelt, are protected in the marine reserves and there is even a “seabird protection Area” in the Cape Perpetua Marine Protected Area (see study map below). Forage fish species are of conservation concern as they form the prey base for upper level predators including seabirds as well as larger fish of economic importance such as salmon and halibut as well as marine mammal species. Yet, despite growing commercial forage fish fisheries, many forage fish species are currently unassessed and unregulated. Forage fish are particularly important in providing vital nutrients for growing seabird chicks. By monitoring nesting seabird populations that use the marine reserve we can better understand the efficacy of marine reserves with respect to seabirds and the forage fish they depend on.

In addition to collecting vital scientific information that will be used by Oregon State University researchers, this project would allow wider recognition of marine reserves and forage fish conservation through local community participation and associated outreach. Community buy-in and engagement will be essential for the marine reserve system to be successfully implemented. This project would engage the coastal birding community and involve the participation of a local business (Sea Lion Caves). Outreach events including public presentation and updates through Portland Audubon media would reach their 14,000 members. Thousands of visitors that go to Sea Lion Caves (150,000 visitors annually) would have a chance to learn more about marine reserves, seabirds, and forage fish from the citizen science volunteers.

## **Project objectives**

We propose to initiate a citizen science seabird monitoring effort to help quantify effectiveness and increase awareness of marine reserves. Core objectives include:

1. Assess seabird nest productivity and record predator interactions across multiple years in the colonies adjacent to Cape Perpetua MR/MPA/Seabird Protected Area.
2. Promote community engagement and raise awareness in the coastal community and wider public about marine reserves and forage fish issues through citizen science participation and targeted outreach.
3. Coordinate data collection and analysis with Oregon State University researcher, Rob Suryan's Seabird Oceanography lab with on-going seabird productivity studies at Yaquina Head.

## **Study area & species**

In the initial season we will focus data collection on one species, pelagic cormorants, in colonies at Sea Lion Caves and/or on Heceta Head (see study map below). Pelagic Cormorant nests are relatively easy to monitor (compared to other seabird species) as their nests are easy to distinguish and widely-spaced. Pelagic cormorants are also a good candidate for monitoring because they forage primarily close to shore ( $\leq 9$  km) and in depth ranges ( $\leq 42.2$  m) found within the Cape Perpetua MR/MPA (Kotzerka et al. 2011). During the breeding season they spend most of their time foraging near-shore or in shallow, intertidal waters and show little interannual variability in foraging ranges and preferred microhabitats (Ainley and Boekelheide 1990; Hobson 2013). Wintering pelagic cormorants also stay within relatively small foraging areas (Hatch et al. 2011). Therefore, it is reasonable to assume that pelagic cormorants breeding in the colonies we monitor will glean their prey primarily from MR/MPA waters. The diet of the pelagic cormorant is varied but a main component includes near-shore non-schooling forage fish species like Pacific sand lance, sculpins, gunnels, juvenile rock fish as well as crustaceans (Ainley et al. 1981; Hobson 2013). Our efforts to document upper trophic level responses to MR/MPA establishment will complement and expand upon ODFW efforts to characterize benthic and fish communities.

## **Basic Methodology**

We will use a field protocol developed by Portland Audubon using standard seabird monitoring methods used successfully for years at seabird colonies on Yaquina Head. The minimum level effort will involve monitoring 60-120 individual cormorant nests during the entire nesting season (late April-early August) to determine if each nest was successful (fledged at least 1 chick) or failed, and to estimate reproductive success (# of chicks fledged per nesting pair). Volunteers will use spotting scopes set up at locations where nest contents can be easily viewed. Nest locations will be grouped into 4-6 "plots", each containing 15-20 nests. A blown-up photograph of the plot will be used as a map to mark nest locations so they can be tracked throughout the season. Between nest initiation (~ late April) until fledging (~ early August) volunteers will visit the colony at least twice a month (approx. 8 visits) to determine nest status and nesting stage (laying, incubation, hatchling, etc.) for

all nests. Ideally, volunteers will visit the sites each week. Volunteers will also record any interactions of predators (e.g. bald eagles) with nesting birds and whether or not the predator affected nest survival.

The volunteers we target will have at least some birding experience, be patient and observant, and willing to commit to the minimum effort. Ideally volunteers will work in team of two. One of the two must have access to a spotting scope. All volunteers must be willing to talk about the monitoring they are doing and the overarching conservation issues with the public.

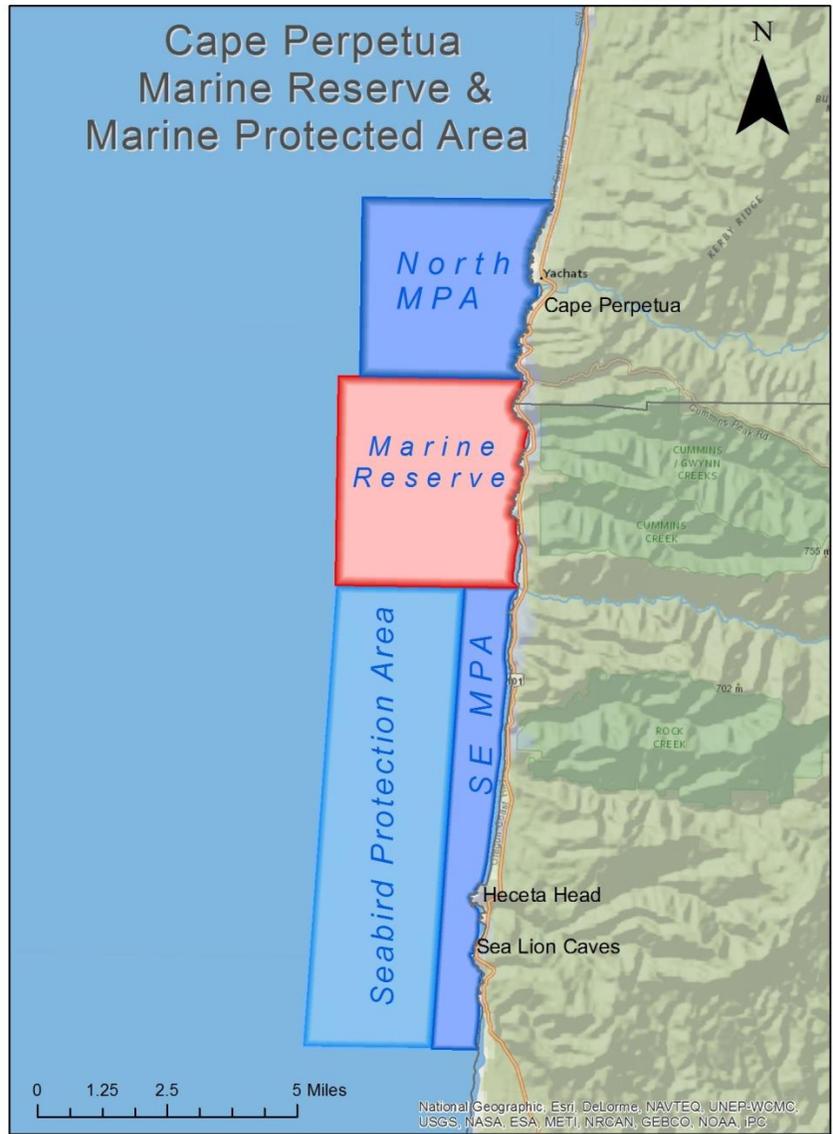
This project will complement our on-going Marbled Murrelet Citizen Science project where we work with Kim Nelson from OSU training volunteers to detect Murrelet activity in specific locations with the recently designated Globally Significant IBA for the Murrelet – the 80,000 acres that is adjacent the Cape Perpetua MR/MPA/SPA.

### **Potential for project expansion**

Depending on the success of the initial effort, we may expand the number of colonies monitored, as well as include additional seabird species (e.g. Common Murre, Western Gull, Brandt's Cormorant, Pigeon Guillemot, Black Oystercatcher, Harlequin Duck). We may also include diet studies to identify prey items delivered to chicks, which is a good indicator of changes in forage fish availability. This would require a volunteer who owns an SLR camera with a telephoto lens or digiscoping adapter (for Common Murre and Pigeon Guillemot). Additional diet studies might include collection of regurgitated boluses once the birds have left the colony (for gulls and cormorants). A paid volunteer coordinator (approximate budget \$10K) and prey identification expert may need to be hired if this effort expands significantly.

### **Literature Cited**

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Study Map. Cape Perpetua Marine Reserve/Marine Protected Area / Seabird protection Area boundaries. Potential seabird nesting colony sites to be monitored would be at Heceta Head and Sea Lion Caves.