



Seabird nest colony monitoring – Oregon Marine Reserve/Protected Areas Sampling protocol

PROJECT OBJECTIVES

1. Assess seabird nest productivity and record predator interactions across multiple years in colonies adjacent to Oregon Marine Reserves and Marine Protected Areas.
2. Promote community engagement & raise awareness in the coastal community and wider public about marine reserves and forage fish issues through citizen science participation and outreach.

FOCAL SPECIES

Pelagic and Brandt's Cormorants will be the focal species because they are near-shore fish-eating bird species that build discrete nests. Cormorant nests are not packed in tightly (like murre) and so are relatively easy to monitor. Additionally we may monitor Double-crested Cormorants if they are nesting in areas adjacent to Brandt's Cormorant nests. If cormorant nests are not accessible, we will target alternate species including, in order of priority: Common Murre and Western/Glaucous-winged Gull.

BREEDING BIOLOGY

For seabirds in general, initiation of nesting can be quite variable and is influenced by a number of factors including prey availability, climatic conditions, photoperiod, etc. Some seabirds build nests (e.g. cormorants) while others lay their eggs directly in a scrape or depression (e.g. Common Murre). All the species we will monitor are biparental nesters (both adults incubate and feed young).

Summary of nesting schedule by focal species in Oregon^{1,2,3}

Species	Nest building	Laying	Clutch size	Incubation	Hatching	Fledging
Pelagic Cormorant*	Late Mar – early May	Mid-Apr to Mid-May	3-4	~31 days	Early-Mid June	40-50 days after hatch
Common Murre	N/A	5-29 May	1	~32 days	~ 4 July	~23 days after hatch
Western / Glaucous-winged Gull	May-July	Late May- Early July	2-3	25-30 days	Mid June- early Aug	~ 1 day but stay in area ~ 40 days

* Similar nesting chronology for Brandt's Cormorant and slightly earlier for Double-crested cormorants

COLONY SITES & NEST PLOT SELECTION

- Project supervisors will select a minimum of **two “primary” colonies**. Additional **“alternate” colonies** may be selected as “back-ups” in case the primary ones are abandoned or we are unable to monitor them for unforeseen reasons.
- All colonies selected will be on the coastline adjacent to a Marine Reserve/MPA boundary.

1. Marshall, DB, MG Hunter, and AL Contreras. 2003. Birds of Oregon: A general reference. Oregon State University Press, Corvallis, OR. 768 Pp.
2. Suryan, R, et al. 2013. Yaquina Head seabird colony monitoring 2013 season summary. Unpublished Report. Oregon State University, Hatfield Marine Science Center, Newport, OR, 10pp.
3. Poole, A (Editor). 2005. The Birds of North America Online: <http://bna.birds.cornell.edu/BNA/>. Cornell Laboratory of Ornithology, Ithaca, NY.



- At each monitored colony, select one or more “**plots**”. Each plot is a subset of roughly **10-20** nests that can be easily viewed from the observation point, and for which visual boundaries can be easily identified by multiple observers (e.g. distinctive rock formation, edge of cliff). These nests will be continually monitored for nest productivity. A photograph of the plot with marked and numbered nests will be used as a map to monitor the same nests throughout the season (see example plot map below). An entire colony may be monitored if ≤ 25 nests are present. We will be targeting a total of **4-6 plots** to monitor (among all colonies collectively).

NEST MONITOR SCHEDULE

- Nest monitoring should take place during the full breeding season from nest initiation to chick fledging. For cormorants this will be roughly from **mid-May to mid-August (If nest are still being built we will not start until June)**.
- Each plot should be monitored a minimum of **8 times** (twice / month) during the breeding season however we recommend **once or twice per week** if possible.
- It is best to monitor nests in the morning when birds are most active and lighting is optimal.

NEST MONITOR VISITS

- During each visit, refer to your plot map to set up your scope (or binoculars if a scope is not needed) at the preselected viewpoint where the plot and numbered nests can be easily monitored. Be sure to identify nests with the correct number as labeled on the plot map (e.g. N1 = nest 1, N2 = nest 2, etc.). You will receive assistance identifying the correct nests for the first two weeks of monitoring. Record any visible nest contents (e.g. eggs or chicks).
- Record the time at which you start and end your observation and environmental conditions (e.g. weather). This will provide a measure of observation effort and quality, and can be used to standardize predation observations across years.
- Write the appropriate information for nest productivity and predator observations data forms (described below). Record interactions with predators (e.g. Bald Eagles) as a predator observation if the predator is within 100 meters of the colony or a predator disturbance if an interaction results in at least one cormorant leaving its nest (see data form). It may be easier to record data in a Rite-in-the-rain notebook and then transfer data to the data form when back from the field.
- Our ultimate goal is to determine if each nest in the plot is successful (hatched and/or fledged young) or if the nest fails (no chicks hatched/fledged) and the number of fledglings produced per nest.
 - We define a **hatched** nest when at least 1 chick is observed in a nest.
 - We define a **fledged** nest when at least 1 chick is still present in or near nest **40 days after hatch or flight feathers are developed**.

DATA RECORDING DETAILS

1. General information

- a. **Colony name:** Name of specific colony being monitored as listed on the plot map and photos.
- b. **Plot ID #:** Unique identifying # for the subset of nests (plot) being monitored at a colony record as listed on the plot map and photos.
- c. **Date:** Date of survey (mm/dd/yy). Please include year.
- d. **Start time:** Time you started your nest monitor survey (use military time).



- e. **End time:** Time you completed your nest monitor survey (use military time).
- f. **Observer(s):** Name(s) of all volunteer(s) that conducted the survey.
- g. **Outreach:** The number of people you talked to about this project, Marine Reserves/MPAs, or forage fish issues.
- h. **Weather conditions:** See Beaufort scale table at end of this protocol.

2. Nest productivity information

- a. **Nest ID #:** The unique identification # given to a specific nest in the plot (e.g. N1 = Nest 1).
- b. **Nest Status:** Use appropriated code from “*Nest productivity status code*” table below. It is OK to use more than one code if necessary, if so, please separate by a comma. Confirm all egg and chick counts with a second count before recording the number. Count chicks by bills/heads not by body.
- c. **Age Young:** For cormorants, use the appropriate code from “*Cormorant chick codes*” table below. For other species, use the approximate hatching date to estimate # days since hatch.
- d. **Mate Switch (Y/N):** Indicate yes if observation was made during a mate switch, where adults switch nest incubation.
- e. **Comments:** Any additional information to confirm nest status and other notable observations that could influence nest productivity.

3. Predator information

- a. Record any primary predator within 100 meters of the colony, for more common predators (e.g. vultures, pelicans) using a tally system works best. Do not record secondary predators (e.g. gulls and crows) here.

4. Predator disturbance information

- a. **Start time:** Initial time one or more cormorants left their nest sites (use military time).
- b. **End time:** Time that > 80% of the birds returned to their nest sites (use military time)
- c. **Primary Predator species:** Record predator species on, above or near the colony that appeared to cause the monitored species to leave their nest sites. Use the four letter code for predator species (Bald Eagle=**BAEA**, Turkey Vulture=**TUVU**, Brown Pelican=**BRPE**). If you observe another type of predator, write out the entire name in the notes if unsure of the code.
- d. **Secondary Predator species:** Record predator species that visited the colony AFTER the initial cause of the disturbance event (e.g. Western Gull=**WEGU**, Heerman’s Gull=**HEGU**, Gull unidentified=**UNGU**, Common Raven=**CORA**, American Crow=**AMCR**), and took adults, chicks or eggs as food items. Use the four letter code for predator species (see above).
- e. **Primary predator species #:** Number of primary predator.
- f. **# adults / # eggs / # chicks:** Number of these food items taken by the predator.
- g. **# nests flushed:** Record the number of nests adult birds left unattended as a result of a predator for cormorants/gulls. At Common Murre colonies, estimate the percent of birds in the colony (or part of the colony that you can see) that fly up into the air in response to predator presence.
- h. **Notes:** Any other noteworthy predator interaction not captured by previous entries. It may be helpful to record the series of events here during the disturbance.

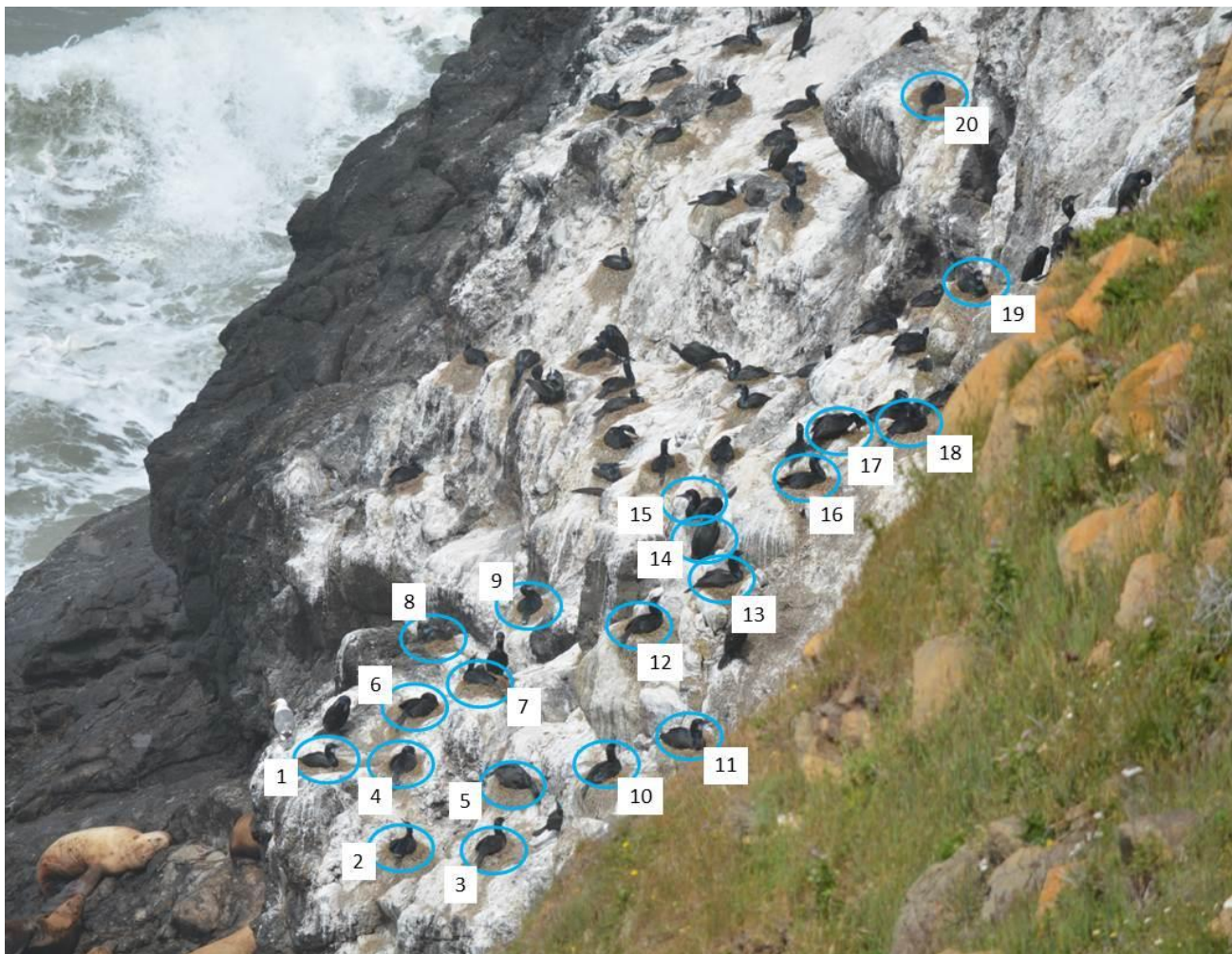


EQUIPMENT

- Appropriate clothing for cool / rainy weather,
- Binoculars and spotting scope (not necessary at all plots). We will have scopes available to those that don't have their own.
- Data forms / plot map, clipboard, Rite-in-the-rain notebook, and writing implement.

IMPORTANT: When you finish monitoring, notify Amelia O'Connor and return your completed data form in person, by email: ameliajoconnor@gmail.com, or by mail: Amelia O'Connor, 6330 Nellie Ave., Otter Rock, OR 97369

EXAMPLE PLOT MAP



Colony: Sea Lion Caves, Plot: Headland 1



NEST STATUS CODES⁴

Code	Nest Status	Detailed description
O	Empty nest	Empty nest with no egg or chick present. Adult bird may or may not be present. Use when sure no egg or chick is present
BU	Bird w/Unknown	Adult bird occupying site with no egg or chick visible . Used when observer cannot see the entire nest contents
E	Egg	Egg present with or without an adult present Use numbers and/or "+" to indicate more than 1 (e.g. E2+ = at least 2 eggs)
E?	Possible egg	Suspect egg present
C	Chick	Chick present with or without adult present Use numbers and/or "+" to indicate more than 1 (e.g. C2+ = at least 2 chicks)
C?	Possible chick	Suspect chick present
Cw	Chick wet	Indicates chick hatched that day
Cd	Chick dead	Chick actually observed dead (not just disappeared from nest)
X	Empty Nest	Empty nest site or nest destroyed/no longer present. Used when an egg or chick that was in the nest has been lost and no adult is present
NC	Not Checked	Used between the first and last nest check when a site was not checked (e.g. could not be relocated on that date)





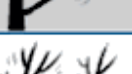








CORMORANT CHICK SIZE CODES⁴

Code	Chick size	Detailed description
T	Tiny	Barely visible in nest bowl, eyes closed, wormy head, totally naked, barely larger than egg (<7 days old)
S	Small	Naked, able to lift head, eyes open
M	Medium	Downy, big enough to stand up and move around but still pretty small
L	Large	Tall and lanky but still gawky and mostly downy, wing feathers emerging
H	Huge	Almost as big as fledglings, and mostly feathered, might start sitting beside rather than in nest.
F	Fledgling	Fully feathered (no down visible), as big as adults. May no longer be associated with the nest

4. Adapted from: Wildlife Inventory Plan. Aleutian Islands Unit, Alaska Maritime National Wildlife Refuge, U.S. Fish and Wildlife Service. Unpublished protocol



Beaufort Scale

Beaufort number	Wind Speed (mph)	Seaman's term		Effects on Land
0	Under 1	Calm		Calm; smoke rises vertically.
1	1-3	Light Air		Smoke drift indicates wind direction; vanes do not move.
2	4-7	Light Breeze		Wind felt on face; leaves rustle; vanes begin to move.
3	8-12	Gentle Breeze		Leaves, small twigs in constant motion; light flags extended.
4	13-18	Moderate Breeze		Dust, leaves and loose paper raised up; small branches move.
5	19-24	Fresh Breeze		Small trees begin to sway.
6	25-31	Strong Breeze		Large branches of trees in motion; whistling heard in wires.
7	32-38	Moderate Gale		Whole trees in motion; resistance felt in walking against the wind.
8	39-46	Fresh Gale		Twigs and small branches broken off trees.
9	47-54	Strong Gale		Slight structural damage occurs; slate blown from roofs.
10	55-63	Whole Gale		Seldom experienced on land; trees broken; structural damage occurs.
11	64-72	Storm		Very rarely experienced on land; usually with widespread damage.
12	73 or higher	Hurricane Force		Violence and destruction.



Predator Observations

Species	Number of species within 100m of colony
Bald Eagle (BAEA)	
Brown Pelican (BRPE)	
Turkey Vulture (TUVU)	
Other:	
Other:	

Predator Disturbance

Start time	End time	Primary pred. sp. & #	# adults (taken by prim. Pred.)	# eggs (taken by prim. Pred.)	# chicks (taken by prim. Pred.)	Secondary pred. sp.&#	# adults (taken by sec. Pred.)	# eggs (taken by sec. Pred.)	# chicks (taken by sec. Pred.)	# nests flushed

Predator disturbance notes: