

Yaquina Head Seabird Colony Monitoring 2007 Season Summary

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Project Overview

Yaquina Head Outstanding Natural Area is home not only to Oregon's tallest lighthouse, but also the state's largest Common Murre (*Uria aalge*) colony on a single rock. The seabird colonies surrounding Yaquina Head present a unique opportunity for research and monitoring, and this summer a small team began studying several aspects of murre reproductive biology and foraging ecology. The research is a joint project between Oregon State University, U.S. Fish and Wildlife Service, and the Bureau of Land Management. We used the Yaquina Head Lighthouse as a platform for observations. Our project resumes a study originated by Dr. Julia Parrish (University of Washington) and occurring at Yaquina Head during 1998 to 2001.

We are interested in the reproductive success of the colonies and how the diet and foraging activities of birds are affected by changing ocean conditions. Furthermore, we wish to quantify the effects of bald eagles and other sources of predation or disturbance during the breeding season. Building on a previous study conducted during 1998-2001, we mapped out 12 plots on Colony Rock and Flat Top Rock (Figure 1). Within these plots we closely monitored breeding birds (Figure 2), watching and recording when eggs are laid and then following these pairs through the incubation and chick rearing period. We tracked the progress of over 140 eggs. Simultaneously, we watched for disturbances and recorded the frequency and duration of these events. For prey identification, we used a digital camera and spotting scope (digiscoping) to photograph fish in the bills of birds returning to the colony. This information will allow us analyze the birds' diet and provide information about foraging conditions and link to oceanographic investigations adjacent to these seabird colonies.

Results

We logged 149 hours during 30 days of observations between 23 May (some eggs were already present) and 4 August 2007 (Table 1). Common Murre chicks were first observed on 20 June and median hatch date was 27 June. Among plots, 70% (± 0.05 SE, 0.38-1.0 range) of the eggs hatched a chick (hatching success) and 54% (± 0.07 SE, 0.20-0.91 range) of the eggs laid produced chicks that fledged (reproductive success; chicks \geq

15 days were considered fledged; Table 1). Relative to other colonies in the Pacific, Yaquina Head murres in 2007 were below the long-term average at the Farallon Islands (north-central California), but roughly similar to long-term averages for Alaskan colonies.

To determine murre diets, we tested the potential of using “digiscoping” techniques so that even untrained observers could collect diet data. This, furthermore, permits standardization of “bill load” prey identification, which is a very specialized skill, and allows consultation with fish identification experts post data collection. Dominant prey items included smelt (Osmeridae), Pacific herring or sardine (Clupeidae), and northern anchovy (*Engraulis mordax*; Fig. 3). Other prey species included flatfish (Bothidae or Pleuronectidae) and surfperch (Embiotocidae).

Bald eagles (*Haliaeetus leucocephalus*) are known to cause significant disturbance to murre colonies in Oregon and they were the dominant disturbance source during this study (Fig. 4). We were, however, surprised at how little colony-wide disturbance there was once incubation had started. Eagles most often disturbed the north ends of Colony and Flat Top rocks. Murre adults were most frequently killed by eagles on the northern tip of Colony Rock (CRA, Fig. 1) and most eggs in this portion of the colony were removed by secondary predators (Western Gulls, *Larus occidentalis*). Fortunately, most of the disturbance was confined to these small areas, although early-season disturbance (prior to and onset of egg laying) was more widespread. During 149 hrs of observation, we witnessed 10 predation events where 9 adult murres, 0 chicks, and 32 eggs were taken (Table 1, Fig. 4).

Data Considerations

This was primarily a volunteer effort, except for a portion of A. Gladics’ time, which was graciously supported by the U.S. Fish and Wildlife Service. Therefore, most of our observations occurred within the first 4 hours of sunrise (i.e., before “work”). Once a week, however, a two-thirds day observation (morning and afternoon) was included. Observations generally occurred at 2-3 day intervals, but not all eggs or chicks were confirmed during each observation period. However, in all cases we were conservative in our calculations of reproductive metrics and did not extrapolate between observations.

We did not attempt to estimate the number of murre pairs that laid an egg (a valuable metric for estimating the total number of chicks produced at the colony). We also did not estimate feeding frequency (foraging trip duration) or the proportion of “loafing time” (both parents present at colony), which are good indicators of foraging conditions. These observations, however, will be included with increased field efforts in future years. Prey identification was of any item brought to the colony regardless of whether or not it was fed to a chick. Determining the fate of each prey item would require considerably more observer effort.

Future Directions – Project Integration

We plan to continue this project in 2008 with the ultimate goal of establishing long-term monitoring at this site. The colony site is particularly valuable for research and monitoring given the abundant and diverse group of seabirds, its proximity to the Newport Hydrographic Line (sampled twice monthly at stations 1-25 nm offshore) and a wide array of other oceanographic research and monitoring conducted by NOAA

Fisheries and OSU's College of Oceanic and Atmospheric Sciences. We also collected feathers of beach-cast chick carcasses for stable isotope analyses of diet composition and nutrient sources. Eventually we would like to add video monitoring of the colony as a research and public education/outreach tool.

Acknowledgements

Data collection during the 2007 field season would not have been possible without the support of the Bureau of Land Management (Joe Ashor and staff at the Yaquina Head Outstanding Natural Area) and the U.S. Fish and Wildlife Service (Dawn Grafe, Roy Lowe, and Rebecca Chuck of the Oregon Coast National Wildlife Refuge Complex). We also thank Betsy Hall, a volunteer with the USFWS, who assisted with data collection.

Table 1.

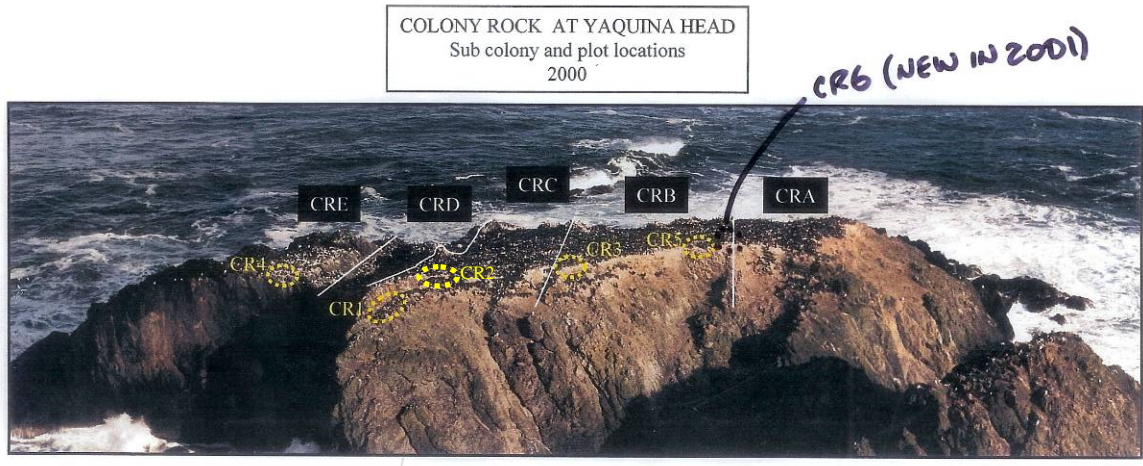
Year	Observation		# plots	Hatch Date		Hatching success ^a	Reproductive success ^b	# predation events	Predation Rate # per hour ^c (total #)		
	Hours	Days		1 st	Med				Egg	Chick	Adult
2007	149	30	11 ^d	6/20	6/27	0.70 (± 0.05 SE)	0.54 (± 0.07 SE)	10	0.21 (32)	0.00 (0)	0.06 (9)

^aChicks hatched per eggs laid (mean among plots)

^bChicks fledged (≥15 days old) per eggs laid (mean among plots)

^cTotal # observed taken/total # observation hours

^dTwo, adjacent plots (CR5 & CR6) were combined because of a low number of visible eggs to follow



Flat Top Rock 2007

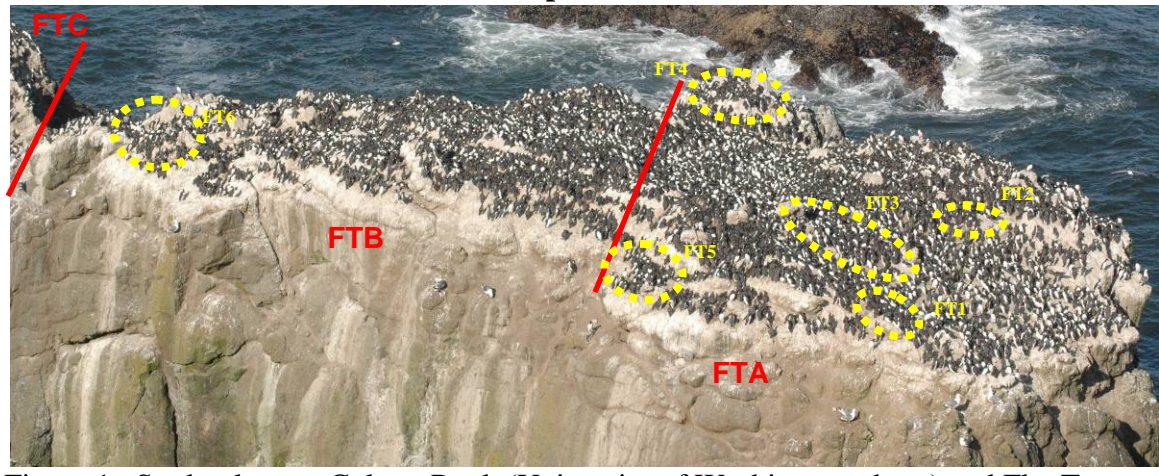


Figure 1. Study plots on Colony Rock (University of Washington photo) and Flat Top.



Figure 2. Close-up of plot CR1 and an adult with a young chick



Figure 3. Example digiscope photos of, from left to right, (a) smelt, (b) herring or sardine, (c) northern anchovy, (d) flatfish, and (e) surfperch in murre bills on Colony and Flat Top rocks taken from the observation deck at the base of the lighthouse.

Colony Disturbances (n = 23)

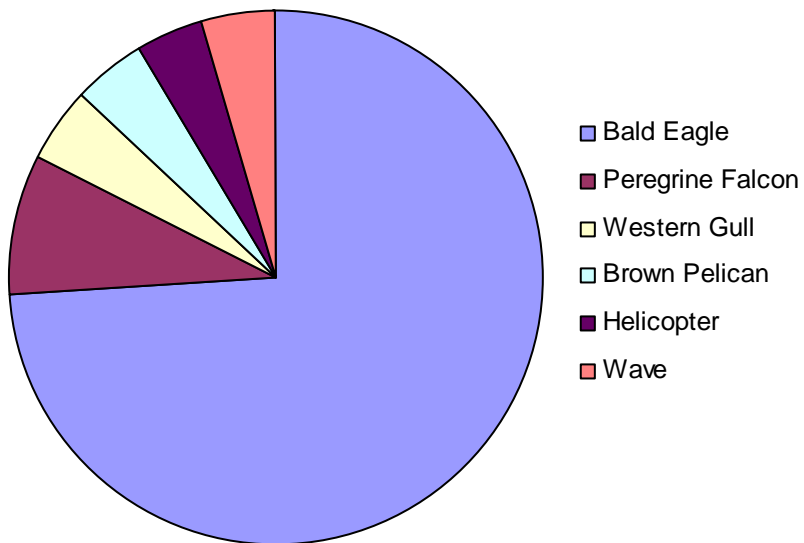


Figure 4. Sources of disturbance (≥ 1 bird leaving colony) to Common Murres.