Alaska Maritime National Wildlife Refuge

Seabird Monitoring 2013

Breeding Status and Population Trends

Greg Thomson/USFWS

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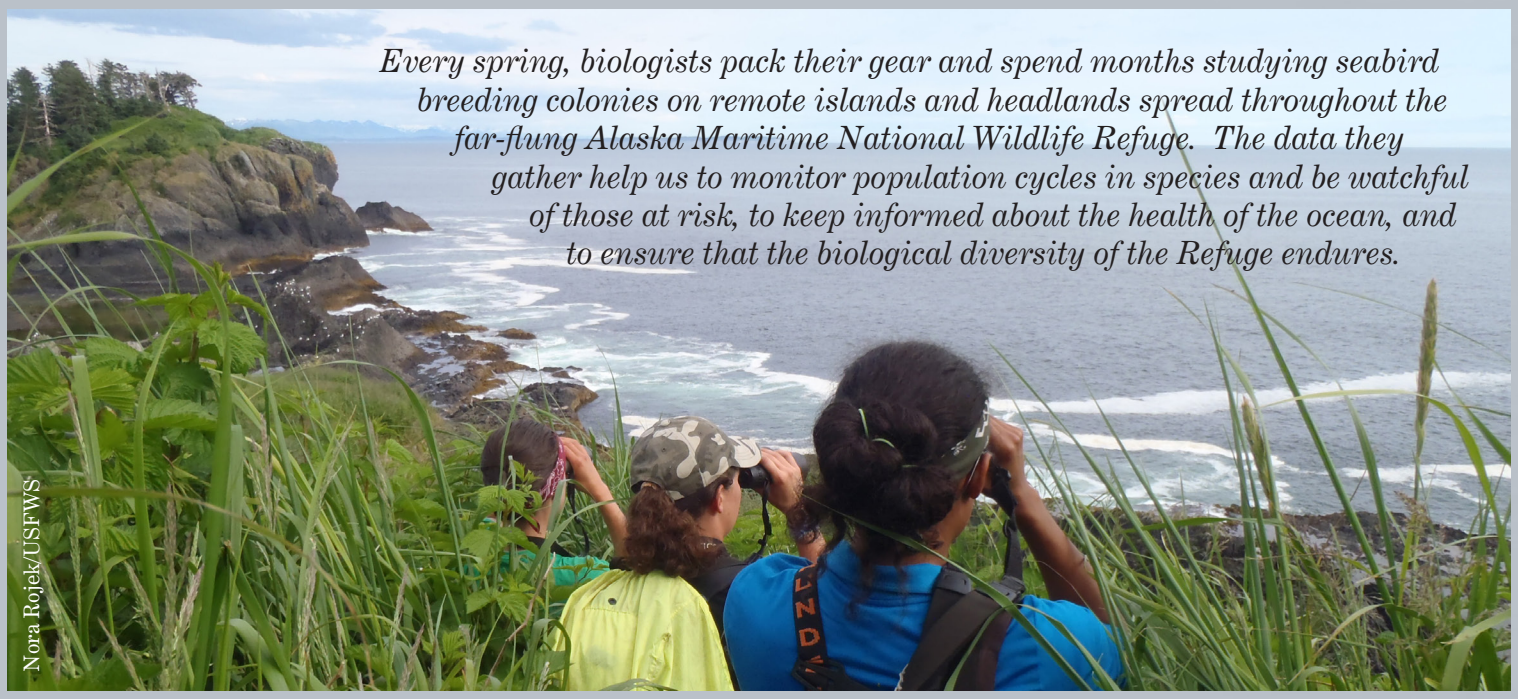
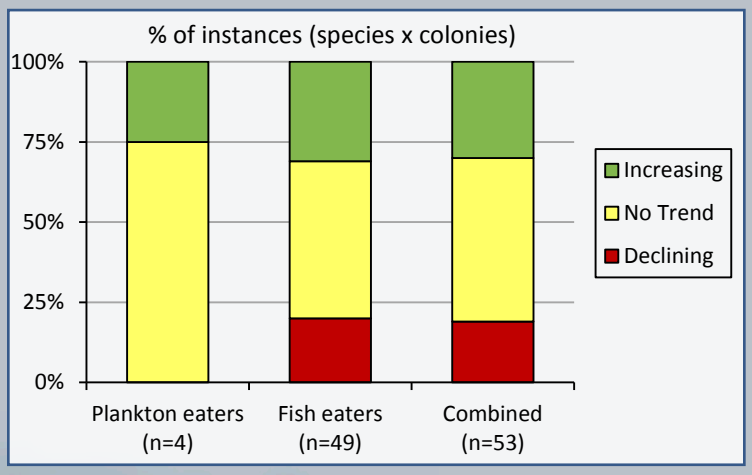


Every spring, biologists pack their gear and spend months studying seabird breeding colonies on remote islands and headlands spread throughout the far-flung Alaska Maritime National Wildlife Refuge. The data they gather help us to monitor population cycles in species and be watchful of those at risk, to keep informed about the health of the ocean, and to ensure that the biological diversity of the Refuge endures.

What did we learn in 2013?

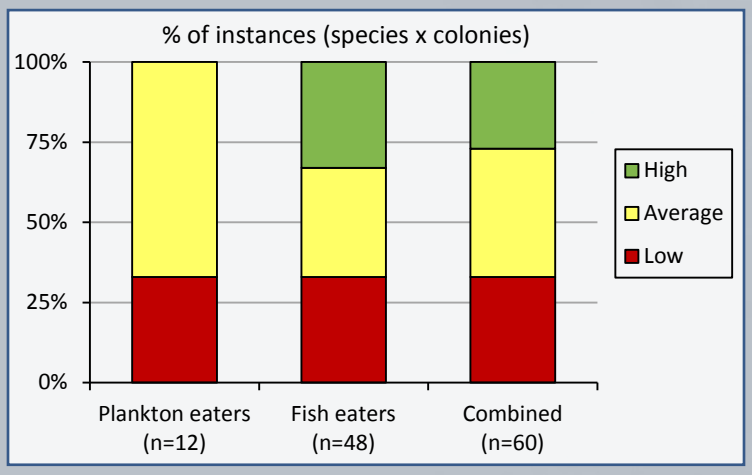
Population trends 2004-2013

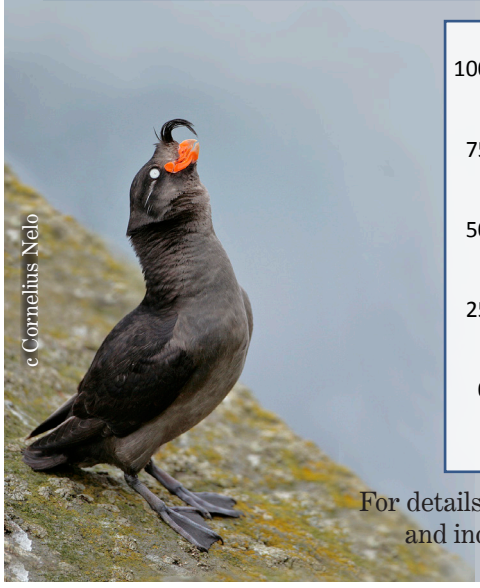
We defined a trend in a species' population as a change of 3% or more per year at a site, averaged over the last 10 years. Populations either increased or were stable in most instances, although northern fulmars declined in all regions where they were monitored.

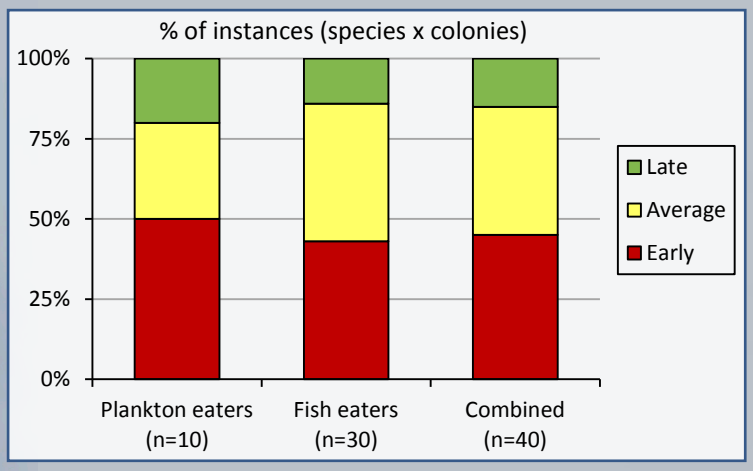


Reproductive Success

Reproductive success was average or high (more than 20% above the long-term site average) in most instances. Success was high across the state for pelagic cormorants, rhinoceros auklets and tufted puffins, but was low (more than 20% below the long-term site average) for glaucous-winged gulls, parakeet auklets and crested auklets.







Timing of breeding

Mean hatch date was average or early (more than 3 days earlier than the long-term site average) in most instances. Storm-petrels, red-legged kittiwakes, ancient murrelets and crested auklets hatched early, whereas least auklets hatched later than normal at all sites where they were monitored.

For details by region and species, see *http://alaska.fws.gov/nwr/akmar/whatwedo/bioprojects/publications.htm* and individual site reports at *https://absilcc.org/science/amnwr/sitepages/library.aspx*

So how are Alaska's seabirds doing?

Seabird populations in Alaska have remained relatively stable in the last decade. In 2013 reproductive success for most species was average or above average, indicating that most birds had access to the resources they needed to raise their chicks. In general, most species are doing well at most colony sites, but there are a few exceptions and the occasional enigma. Our monitoring program gives us tools to determine which species and areas are at risk, and some information to understand reasons for observed changes. However, because the system is complex, anomalies often require further research. For example, the average hatch date of kittiwake chicks at the Pribilof Islands has been as much as 16 days earlier in the last decade than previous periods. This earlier hatch trend was not found at other kittiwake colonies, some of which now hatch later than average. Why are kittiwakes responding to their environment in this way in the Pribilofs but not elsewhere? For individual site information, find the detailed reports at *http://alaska.fws.gov/nwr/akmar/whatwedo/bioprojects/publications.htm*.

Why study seabirds?

The Alaska Maritime National Wildlife Refuge was established to conserve marine mammals, seabirds and other migratory birds, and the marine resources upon which they rely. Most of the marine ecosystem is challenging to study; however, seabirds are relatively easy to observe, especially colonial species that come ashore each year to breed at consistent sites. Because seabirds are affected by what is happening in the rest of the ocean, they offer important insights into the health of marine ecosystems and can serve as indicators of change.

Which species do we study?

Because there are tens of millions of seabirds in Alaska, we select representative members of different foraging guilds to act as surrogates for many other species. A foraging guild comprises birds with similar feeding habits that use (and thus effectively sample for us) a certain component of the marine environment, such as nearshore or offshore, eating primarily fish or zooplankton, foraging on the surface or by diving. We also target some species like red-legged kittiwakes, red-faced cormorants and whiskered auklets, for which the Alaska Maritime National Wildlife Refuge represents a substantial portion of their range. In 2013 we studied 19 species of seabirds - including fulmars, storm-petrels, cormorants, kittiwakes, gulls, murres, guillemots, murrelets, auklets and puffins.

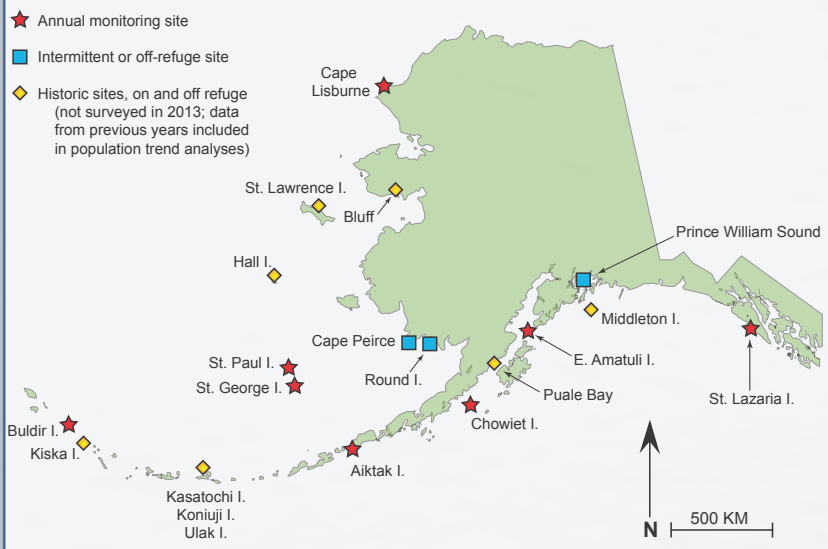
How are Refuge data used?

Refuge management

By monitoring many species in a wide variety of locations, we get a broad-based view of what's happening in Alaska's seabird communities and the marine environment. Our 40-year seabird data sets allow us not only to evaluate the status of species entrusted to the U.S. Fish & Wildlife Service, but also to distinguish between normal fluctuations and the effects of stressors such as oil spills, fisheries bycatch, introduced predators, and climate change. Our long-term seabird monitoring program directly benefits Refuge management by allowing us to respond promptly to problems and test hypotheses about changes in the marine environment.

Where do we work?

The Refuge's 3.4 million acres include the spectacular volcanic islands of the Aleutian chain, the seabird cliffs of the remote Pribilofs and islands along the Alaska Peninsula, icebound lands washed by the Chukchi Sea, and majestically forested islands in southeast Alaska. This wide range of nesting habitats supports some 40 million seabirds, representing more than 30 species. It is impossible to visit every seabird colony every year, so we selected nine sites roughly 500 kilometers apart for detailed annual monitoring, and dozens of sites in between, which are visited intermittently.



In 2013 we gathered data at 11 sites across Alaska, including eight of nine annual monitoring sites on the Refuge.

Planning and Response

Inventory data collected by the Refuge are submitted to the North Pacific Seabird Data Portal, a readily accessible online database that identifies the location of seabird colonies in the region and archives species composition and breeding population size at each colony. These data are an essential part of conservation planning

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and resource management, and are used in land protection planning (acquisition/trades), special use permits, environmental assessments, species status reviews, and sensitive area and marine spatial planning. Colony inventory data have been used by state and federal resource managers to identify birds of conservation concern; by BirdLife International and the National Audubon Society to help identify marine Important Bird Areas; by Risk Assessment Projects for adaptive planning and response activities for shipwrecks, vessel groundings, and marine pollution events; and by the Alaska Department of Environmental Conservation in the permitting process for offshore seafood processors and wastewater discharge regulations. *http://axiom.seabirds.net/portal.php*

Ecosystem Report Cards / Fishery Management

Seabird reproductive success data and other parameters collected by the Refuge are used by the National Oceanic and Atmospheric Administration (NOAA) to help monitor ecosystem-wide trends in the Arctic, the Gulf of Alaska, and Bering Sea. The seabird data are combined with other data sets to provide "report cards". The North Pacific Fishery Management Council uses this information to shape commercial fisheries regulations and allocate fisheries quotas in the Gulf of Alaska and Bering Sea. *http://access.afsc.noaa.gov/reem/ecoweb/Eco2010.pdf* *http://arctic.noaa.gov/reportcard/seabirds.html*

Scientists / Academia

Refuge scientists rely on and foster broad collaborations with other agencies, universities, and international researchers to study marine resources and understand the causes of population change. Each year, more than two dozen peer-reviewed scientific articles are published using data collected by or on the Refuge. A few recent examples:

1. Pre-eruption data from Kasatochi Island are integral to current research seeking to understand the relative importance of survivors, colonists and the role of island biogeographical concepts in structuring communities following a disturbance.

2. Refuge monitoring data on crested auklets at Buldir and Kasatochi islands provided a comparison of effects of an introduced predator (rats) on the colony at Kiska Island, and a risk assessment of the Kiska auklet colony.

3. Researchers used Refuge data to demonstrate that climate and associated effects on ocean productivity and frequency and intensity of storms influenced variation in reproductive performance of planktivorous seabirds on a decadal scale.

4. NOAA researchers used Refuge data from the Pribilof Islands to study the relationship between environmental conditions and seabird breeding activity. One of their most interesting findings is that changes in the birds' food supply or physical environment can affect the birds' breeding activity up to two years later.

5. One Bering Sea Integrated Ecosystem Research Program project investigated the relationship between seabird productivity and the distance between breeding colonies and productive oceanographic features. Researchers found thick-billed murres breeding closest to areas with plentiful and high-quality prey spent more time attending nests and had lower levels of stress hormone than murres feeding in less productive areas or commuting long distances. Interestingly, these factors did not affect the murres' breeding success.

6. Researchers from Memorial University, Newfoundland, deployed geolocator tags to discover where auklets (crested, parakeet and whiskered) go when they leave the breeding colonies at Buldir and Gareloi islands. Results will yield winter distribution and duration of use of areas, as well as the effects of tags on adult survival. The Refuge's monitoring program provides information about what's happening during the few months seabirds are on land, but since these birds spend much of their life at sea, and until now we've not known where, spatial studies like this will help us understand whether stressors are occurring on land or at sea.

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