



The All-Bird Bulletin

Bird Conservation News and Information

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Advancing integrated bird conservation in North America

Marine Bird Conservation: Challenges, Progress, and Opportunities

Jennifer Wheeler, Waterbird Conservation for the Americas Coordinator, U.S. Fish and Wildlife Service

“Out of sight, out of mind” is a truism that challenges the conservation of some groups of birds, including the secretive in habit, the nocturnal, and in particular, the marine. Less seen and less familiar to people, the marine realm and its inhabitants have not received the conservation attention that terrestrial habitats have. About 71 percent of the Earth’s surface is covered by marine waters, yet less than one percent of the oceans has protected status as compared to 12 percent of the Earth’s land area. Furthermore, an analysis of the International Union for the Conservation of Nature (IUCN) Red List over time indicates that the birds most associated with the marine environment—the pelagic seabirds that spend the bulk of their lives at sea—are becoming increasingly threatened and at a faster rate globally than all other species-groups of birds. Almost 40 percent of the world’s pelagic seabirds are at risk and listed on the IUCN Red List.



Masked Booby, Dog Island, Anguilla, West Indies. / Garry Donaldson, Environment Canada

Pelagic seabirds are members of the families Diomedidae (albatrosses), Procellariidae

(shearwaters, petrels, fulmars), Hydrobatidae (storm-petrels), Phaethontidae (tropicbirds), Sulidae (boobies, gannet), and Fregatidae (frigatebirds), as well as various alcids (auks, murres, puffins) and tropical larids (tropical terns, noddies). However, many other bird species also rely on marine habitats. The term “seabird” is also used to refer to more coastal species such as pelicans, cormorants, murrelets, jaegers, skuas, gulls, terns, and skimmers. Marine habitats are also crucial to many “non-seabirds” that rely on nearshore coastal waters, coastal wetlands, and intertidal areas, such as loons, waterfowl (sea ducks, wintering geese), waders (egrets, herons, flamingos), and shorebirds (plovers, sandpipers, knots).

Marine habitats are subject to the same broad array of anthropogenic stressors found on land: overconsumption of natural resources, pollution and contamination, disturbance, creation of structures dangerous to wildlife, and increasingly, the

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physical and chemical effects of climate change. Understanding and preventing these threats offshore is made more difficult by two overarching themes: 1) the complexity of the marine environment, the elements of which are constantly changing and moving, and 2) the marine environment as a publicly owned commons lacking a cohesive framework for management and jurisdiction.

Fortunately, as the articles in this issue of *The All Bird Bulletin* attest, the conservation community is becoming increasingly concerned about the status of the marine environment and the birds that rely on it. Over the past few years, several significant events in the arenas of policy, planning, science, emerging threats, and partnerships have occurred. This special issue reports on this progress and encourages conservationists to actively address the serious issues facing marine systems.

New U.S. NABCI Coordinator Chosen

In January 2011, Allison Vogt was selected to be the new U.S. NABCI Coordinator and Association of Fish and Wildlife Agencies (AFWA) Bird Conservation Coordinator. In previous work experience, Allison served as the Executive Director of the Bicycle Coalition of Maine, Coordinator of the East Gulf Coastal Plain Joint Venture, Legislative Assistant to Congressman Tom Allen, and Program Coordinator for the Institute for Fisheries Resources & Pacific Coast Federation of Fishermen's Associations. Allison brings a wealth of experience in meeting coordination and group facilitation, strategic planning, grant writing, and program administration. She also has many contacts in the bird conservation community.

Allison holds a B.S. in Biological Science and Environmental Sciences from Notre Dame and an M.S. in Ecology and Nonprofit Management from the University of Georgia. She will begin work at the AFWA on February 28, but will be working part-time in the coming weeks in preparation for the North American Conference and in follow-up of the January 2011 U.S. NABCI meeting. You can contact Allison at AVogt@fishwildlife.org

The U.S. NABCI Committee expresses its enormous gratitude to Deb Hahn for her hard work and dedication over the last five years as U.S. NABCI Coordinator. During her tenure, the initiative grew significantly, focused its work, and accomplished a host of projects. She is being promoted within the AFWA and will serve as the International Resources Director. Best of luck to Deb!

Headlining this issue is the formal approval by the U.S. NABCI Committee to add Marine Bird Conservation Regions (BCRs) to the BCR map (page 3). Applying this widely accepted planning framework to the marine environment acknowledges the importance of these ecosystems to birds and the need to direct conservation activity there. Another notable development in the arena of policy and planning is the recent release of a National Ocean Policy for the U.S. (page 5). This policy makes clear that improved stewardship of ocean resources is a critical national issue. Subsequent articles on the U.S. National Oceanic and Atmospheric Administration (NOAA) and Bureau of Ocean Energy, Management, Regulation, and Enforcement (BOEMRE) (pages 6 and 8) describe two agencies at the center of national ocean management, and whose work has significant implications for bird conservation.

Of course marine bird conservation extends well beyond U.S. national borders. Conservation efforts for the Pink-footed Shearwater (page 10) illustrate the trans-boundary and multinational issues so common to conserving highly migratory species. In fact, placing

seabird management and conservation into a worldwide perspective was one of the goals of the 2010 World Seabird Conference, the largest gathering of marine bird conservationists ever held (page 12). This groundbreaking conference focused on the science applications and data needs to comprehensively address global seabird conservation issues.

The second half of this newsletter showcases a variety of current projects related to marine bird conservation, including oil spill response, long-distance tracking, designation of critical and protected habitats, and marine-focused regional partnerships. Specifically, assessment of the immediate response to the Deepwater Horizon oil spill (page 14) highlights ways to improve our ability to respond to this pervasive and serious marine hazard. Improved knowledge of biology, migration, and marine habitat use is the goal of the Sea Duck Joint Venture's satellite telemetry investments (page 16). These studies and others allow improved mapping of marine areas important for birds, which is the focus of articles on Pacific Coast Marine Important Bird Areas (page 18) and the national system of Marine Protected Areas (page 20).

Finally, the article on the Northwest Atlantic Marine Bird Conservation Cooperative (page 22) describes how multiple marine conservation issues and needs stimulated regional cooperation among a variety of partners—an approach that is at the heart of NABCI.

U.S. NABCI Endorses Marine Bird Conservation Regions (BCRs)

Deborah Hahn, International Resources Director, Association of Fish and Wildlife Agencies, former U.S. NABCI Coordinator

The map of Bird Conservation Regions (BCRs), developed by the NABCI community in 1999, was always intended to be a dynamic tool, with revisions occurring over time. In 2009, the U.S. NABCI Committee developed a process to solicit and deliberate on changes to the U.S. portions of the BCR map. Representatives from the Waterbird Conservation for the Americas initiative proposed that areas identified as pelagic BCRs in the North American Waterbird Conservation Plan (2002) officially be added to the system of BCRs within the U.S. In August 2010, the U.S. NABCI Committee endorsed this proposal. Since NABCI partners in Canada and Mexico also have independently developed or embraced marine spatial frameworks, a tri-national group is working to combine these units into a single map.

NABCI's recognition of marine BCRs reinforces two truths that marine conservationists have long known: (1) the marine environment is not homogenous and (2) marine waters provide critical habitats for many species of birds. The marine environment is composed of distinct, but connected, habitats created by massive circulating currents interacting with geological features. These habitats change in size, shape, magnitude, and even location through time as water masses of varying temperature, salinity, and/or velocity converge and diverge. For example the edges of major currents are relatively predictable, while others habitat such as localized upwellings, eddies, fronts are unpredictable and ephemeral.

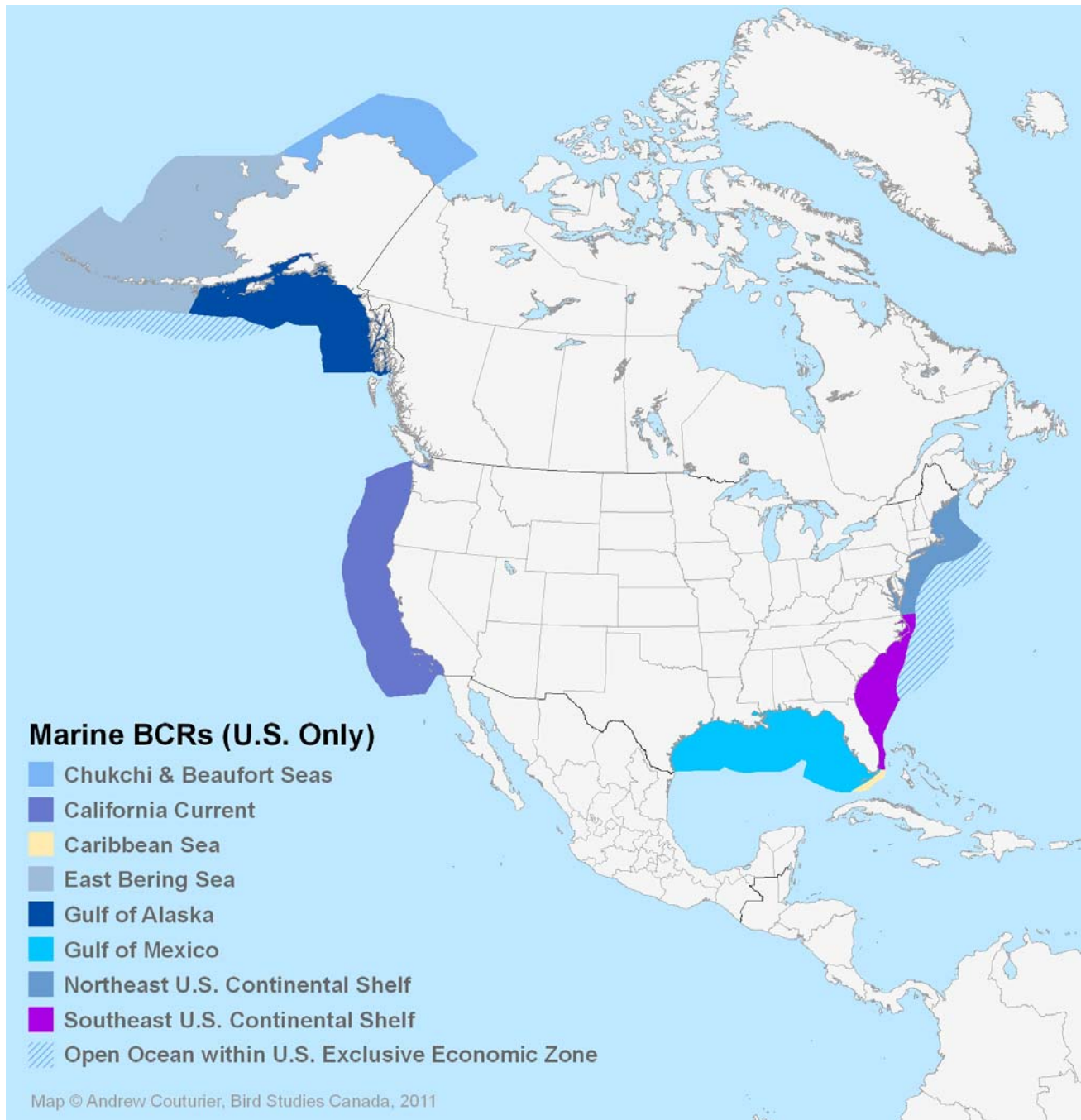
The use of marine habitats by birds varies. Some pelagic seabirds spend almost their entire lives in, on, or over marine waters, returning to terrestrial habitats (usually islands) only to nest. Even during the breeding season, these species may cover vast areas, foraging far distances from their colonies. Other seabirds are more coastal in their foraging habitats, but still utterly reliant on marine waters for food. There are several species of loon, grebe, and waterfowl that essentially become marine birds in winter months, foraging and sheltering in nearshore waters or estuaries. Finally many terrestrial species traverse marine waters on migration, not using these waters directly, but still subject to some of the anthropogenic threats to marine habitats (e.g., offshore wind turbines).

The U.S. NABCI marine BCRs were developed from Large Marine Ecosystems (LMEs) created by the United Nations Environment Program (UNEP), the U.S. National Oceanic and Atmospheric Administration (NOAA), and the Intergovernmental Oceanographic Commission of UNESCO (IOC) (<http://www.lme.noaa.gov/>). These organizations have continued to use the LME framework to measure the changing states of marine systems and to work toward the recovery and sustainability of degraded goods and services. During waterbird conservation planning, modifications were made to the LME system to address the needs of seabirds. Deliberative and extensive consultations with hundreds of individuals and institutions, in particular regional resource managers, were conducted in 1999-2001, to develop appropriate units. Modifications were largely minor and practical in nature; however, because the LME system is limited to continental coastal waters, it was important to designate adjacent open ocean areas because of their use by foraging or migrating pelagic birds.

Regional waterbird conservation planners in the U.S. subsequently recognized marine areas as bird habitat and embraced ecological units. The Seabird Conservation Plan for the U.S. Fish and Wildlife Service Pacific Region (2005), for example, describes seabird use of the North Pacific Central Water, the transition zone with Pacific Subarctic Water, the Equatorial Pacific, and the California Current (as does Point Reyes Bird Observatory's California Current Marine Bird Conservation Plan, 2005). Alaskan biologists recognize that their surrounding Arctic and north Pacific seas are unique ecosystems used differentially by seabirds breeding within and outside Alaska (see the Alaska Seabird Information Series, 2006).

The Northwest Atlantic Marine Bird Conservation Cooperative formed in 2007 (see article on Page 22) and is committed to developing new alliances to sustain marine birds in a core area of Atlantic offshore

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Marine Bird Conservation Regions (marine BCRs) relevant to the United States. These BCRs are truncated at the boundaries of the U.S. Exclusive Economic Zone, although the importance of other Open Ocean areas to migrants and foraging pelagic birds should be noted. Not shown here is the Insular Pacific-Hawaiian marine BCR, which includes the main Hawaiian Islands as well as the outer northwest islands and their near-shore boundaries. Nor does the map depict the numerous other Pacific Islands under U.S. jurisdiction that are critically important to many seabird populations and spread across a great expanse of ocean [155M mi² (60M km²)]. Currently, these all are grouped under the Open Ocean designation for the Pacific, although there are important zonal differences within the pelagic waters of the Pacific Ocean basin.

Source: Bird Studies Canada (a not-for-profit organization and long-standing member of NABCI) is serving as the official repository of the GIS datasets for NABCI's BCRs. Authoritative shapefiles, reflecting recent adjustments to terrestrial BCRs and the addition of marine BCRs, are under development and will be available in the coming months. Contact Andrew Couturier, acouturier@bsc-eoc.org for more information.

The New National Ocean Policy and Coastal and Marine Spatial Planning

Chris Darnell, Fisheries and Habitat Conservation, U.S. Fish and Wildlife Service

Bird conservationists, who espouse the NABCI themes of enhanced coordination and a landscape-level approach, will be gratified to know that these priorities underpin the President's new National Ocean Policy, announced in the July 2010 Executive Order on the Stewardship of the Ocean, Our Coasts, and the Great Lakes. This Executive Order established for the first time a comprehensive, integrated national policy, appointing a National Ocean Council to provide sustained, high-level, and coordinated attention to marine and Great Lakes issues, and specifying a framework for integrating environmental, social, economic, health, and security goals across multiple scales.

Prior to this Executive Order, the nation operated without a unifying framework to coordinate the federal government's ocean and coastal activities. Federal departments and agencies were left to independently implement a labyrinth of nearly a hundred different laws, policies, and regulations related to the ocean, our coasts, and the Great Lakes. Comprehensive reports of the Pew Oceans Commission (2003) and the U.S. Commission on Ocean Policy (2004), which were based on substantial scientific, public, and stakeholder input, showed that the absence of a national policy and the lack of integrated national priorities for the federal government, were resulting in duplication, inefficiency, waste, and ad-hoc decision-making.



In July 2010, President Barak Obama signs the Nation's first National Policy for the Stewardship of the Ocean, Our Coasts, and the Great Lakes.

In addition, the complexity and structure of the existing regulatory regime created gaps and challenges to efforts to protect healthy ecosystems and conserve natural resources. While many existing permitting processes include aspects of cross-sector planning (e.g., the National Environmental Policy Act), most focus solely on a limited range of management objectives. Furthermore, the review of a proposed activity's impact on the environment takes place after an application is submitted, and after significant time and resources have been invested in a project proposal. The new National Ocean Policy partitions the marine holdings of the United States into nine large marine ecosystems (LMEs) and calls for the development of proactive, integrated, and ecosystem-based coastal and marine spatial plans within three to five years by regional planning bodies made up of federal, state, tribal, and quasi-governmental authorities. This approach requires that stakeholders consider the big picture—the landscape, or in this case, the seascape—in advance of any specific proposal.

Coastal and Marine Spatial Planning (CMSP) also requires stakeholders to think comprehensively about ocean, coastal, and Great Lakes resources, including consideration of the goods and services they provide, the potential trade-offs in how we use them, and how to conserve them for current and future generations. CMSP will provide a more comprehensive assessment of multi-sector demands and help regional planning bodies balance the cumulative effects and the relative risks associated with different types of uses. This approach could potentially avoid and minimize activities that threaten natural resources from being located in the most sensitive environmental areas. Ecosystem health and services should be better protected when human uses are considered together with the conservation of important ecological areas, such as areas with rare or imperiled living marine resources and migratory corridors.

The recommendations adopted by the Executive Order do not call for new regulations, restrict uses or activities, or supersede any agency or department's existing authority. Rather, they call for a more

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Conservation at Work: NOAA's Responsibility for Managing Important Habitat and Bird Resources

Jeff Shenot, Strategic Planning and Policy Coordinator, National Oceanic and Atmospheric Administration Restoration Center, and Kim Rivera, National Seabird Coordinator, National Marine Fisheries Service

The mission of National Oceanic and Atmospheric Administration (NOAA) is to understand and predict changes in the Earth's environment and to conserve and manage coastal and marine resources to meet the nation's economic, social, and environmental needs. NOAA implements its programs throughout all U.S. coastal and marine jurisdictions, including territorial waters of the U.S. Exclusive Economic Zone (EEZ).



Sooty Shearwaters. / Jen Zamon, National Marine Fisheries Service

The primary agencies in NOAA that deal with marine and coastal areas are the National Marine Fisheries Service (NMFS) and National Ocean Service (NOS). The NMFS is responsible for the science-based management, conservation, and protection of all living marine resources within the EEZ. The NOS' Office of Ocean and Coastal Resource Management is responsible for overseeing federally protected marine areas, coastal zones, and estuarine research reserves. NOAA is a large organization that hosts several other important offices responsible for global satellite data collection; climatic, oceanic, coastal, and atmospheric research; and weather monitoring and reporting.

NOAA and Important Habitats for Conserving Migratory Bird Species. Although no bird species nest in or on the ocean, many populations could not be sustained without the food and habitats provided by healthy oceans.

NOAA has a variety of statutory mandates and formal agency policies with responsibilities to conserve, protect, and restore wildlife and fishery resources, including migratory birds and important forage or habitat resources within coastal and marine environments that are federally owned or managed. NOAA manages coastal and oceanic habitats that are critically important for a variety of birds, especially for seabirds dependent on marine resources. In cooperation with the Department of the Interior (DOI) and others, NOAA also manages coastal wetlands and intertidal areas, which provide vital habitat for a variety of coastal waterfowl, waders, and shorebirds. With respect to seabirds, NOAA has the primary responsibility to mitigate the direct take of seabirds by fisheries (e.g., incidental catch or bycatch, gear entanglement) and to understand the effects of seabird bycatch, addressing both domestic and international fishery issues.

National Seabird Program. The NOAA Fisheries' National Seabird Program is a cross-agency effort that addresses an array of seabird issues—monitoring and reducing seabird bycatch in U.S. marine fisheries, working globally to reduce seabird interactions in international fisheries, and promoting the importance of seabirds as ecosystem indicators and vital components of healthy ocean ecosystems. More programmatic info is at: <http://www.fakr.noaa.gov/protectedresources/seabirds/national.htm>.

Seabirds are well-known indicators of ecosystem condition and seabird data obtained from monitoring fisheries bycatch, as well as from other oceanic research, can be used to improve ecosystem-based management. Seabird distribution and abundance can reflect physical and biological oceanographic changes, abundance and distribution of mid trophic-level organisms, and the effects of climate change on apex predators. The use of predictive models on directly managed species can help address the effects of climate change or contribute to marine spatial planning that is science-based and at broad geographic scales. By sharing data among national and international partners, NOAA hopes to advance ecosystem modeling to further improve bycatch reduction efforts and improve the management of seabirds and their important habitats.

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National Observer Program (NOP). NMFS' NOP collects and manages fisheries bycatch data on seabird interactions in 42 of the nation's commercial fisheries. In addition, observers record the use of experimental and required seabird bycatch reduction devices. More programmatic info is at <http://www.st.nmfs.noaa.gov/st4/nop/index.html>.

The program recently completed NOAA's first National Bycatch Report, a compilation of bycatch estimates in U.S. commercial fisheries, where available, for fish, marine mammals, sea turtles, and seabirds. The report is anticipated for public release in spring of 2011 and highlights where seabird data are available and for which species as well as bycatch levels of individual species and fisheries. This information will be of value to fisheries managers and seabird scientists in understanding the impact of NOAA authorized fishing activities on seabird populations, as well in identifying species/fisheries where bycatch reduction efforts should be considered. In addition, the evaluation of bycatch data and seabird estimation methods will highlight research needs. For example, the Northeast region did not produce seabird bycatch estimates at the time of the report, but has since developed these estimates for inclusion in subsequent editions. This is the type of data gap/resolution that NOAA hopes the report will encourage. More programmatic information is at <http://www.st.nmfs.noaa.gov/st4/nop/index.html>.



Shearwaters over Bering Sea. / Philip Clapham, National Marine Fisheries Service

Marine Protected Areas (MPA) Center - MPA Inventory Data. The National MPA Center maintains the MPA Inventory, a nationwide geospatial database that catalogs all marine protected areas within U.S. waters. The Inventory is used to maintain geospatial statistics on MPAs at the regional and national scale. It can serve as the basis for various spatial analysis efforts, as it provides a consistent data source for analyzing conservation and management attributes (e.g., how many sites prohibit commercial fishing and what area of the marine environment do they cover). For example, a recent spatial analysis of seabirds in the California Current was completed, and is available at http://www.mpa.gov/pdf/helpful-resources/mpa_wildlife_hotspots_ca.pdf. (see article on page 20).

Damage Assessment, Remediation, and Restoration Program (DARRP). Whenever marine or coastal resources are damaged or injured by a vessel grounding, oil spill, or hazardous material contamination, NOAA's DARRP must collaboratively work with other Trustees (i.e., DOI, states, tribes etc.) to compensate the public for impacts from these injuries. Migratory birds and their important habitats are often injured when there is a grounding, spill, or contaminant release in marine areas. NOAA comprehensively evaluates the injury, determines appropriate restoration in consultation with the co-Trustees and responsible party, litigates a settlement, and implements the restoration actions. Read more about this program <http://www.darrp.noaa.gov>.

Contaminant levels in seabirds can provide insight into possible pollution events in particular ecosystems. And, unlike so many marine organisms, seabirds are relatively easy to sample. Ecosystem integrators and indicators such as seabirds are critical components of Integrated Ecosystem Assessments and can advance the science of ecosystem management for NOAA Fisheries. Moreover, this knowledge of seabirds as ecosystem indicators can provide an understanding of seabirds themselves and ultimately lead to more effective conservation and management.

The Role of the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) in Seabird Research

Sally J. Valdes, Environmental Protection Specialist, Bureau of Ocean Energy Management, Regulation and Enforcement

Within the Department of the Interior, the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) is responsible for managing ocean energy and mineral resources on the U.S. Outer Continental Shelf (OCS). This includes regulation of oil and gas, renewable energy, and sand and gravel extraction. The OCS is defined as including submerged lands, subsoil, and seabed between the jurisdiction of the states (which usually ends at 3 nautical miles offshore) and the seaward limit of U.S. jurisdiction (200 nautical miles).

Within BOEMRE, it is the mission of the Environmental Studies Program (ESP) to provide information that helps predict, assess, and manage the impacts on human, marine, and coastal environments from offshore energy and marine minerals exploration, development, production, and decommissioning activities. This includes research on birds and, because of BOEMRE's geographic responsibilities, seabirds are a major focus.



The threatened Spectacled Eider is the focus of a BOEMRE study in the Chukchi Sea. / Mark Wilson, U.S. Fish and Wildlife Service

The development of research priorities is an annual process. ESP headquarters and regions canvass internal and external experts regarding the scientific needs of the Offshore Program. An ESP Studies Development Plan is provided to an OCS Scientific Committee, which provides guidance on research priorities. Much of the work is done through research partnerships, for example, BOEMRE has ongoing agreements with Louisiana State University and the University of Alaska. BOEMRE frequently partners with state and federal agencies, and participates in several of the Cooperative Ecosystem Studies Units.

There is a continuing need to assess seabird distributions, nesting sites, and habitat use. In addition, species listed under the Federal Endangered Species Act receive special consideration to meet information needs for consultations and assessment of risks. Finally, under the Energy Policy Act of 2005, BOEMRE was given additional responsibilities for offshore renewable energy projects. To meet the information needs associ-

ated with environmental reviews and management of offshore wind, a number of Atlantic studies have been initiated.

The following are examples of recent and current research projects:

In Alaska. In recent years, there have been a series of research projects (see text box) on the distribution and migratory behaviors of King, Common, Spectacled, and Steller's eiders. An ongoing project, in conjunction with the U.S. Geological Survey (USGS) and the University of Alaska, is focused on the migration and habitat use of the threatened Spectacled Eider in the Eastern Chukchi Sea in both the near and offshore environments.

In the Pacific (excluding Alaska). BOEMRE has recently established an interagency agreement with USGS to survey seabird and marine mammals off the northern California, Oregon, and Washington coasts in areas of potential renewable energy development.

Importance of the Alaskan Beaufort Sea to King Eiders, OCS Study MMS 2005-057. Using satellite telemetry, the study team collected location data on 60 individual King Eiders over three years. King Eiders spent more than two weeks on average staging offshore in the Beaufort Sea after breeding. During post-breeding staging and migration, males were distributed more widely; females concentrated in the Harrison and Smith Bays. Distribution of locations did not vary by sex during spring migration. The report recommended minimizing disturbance of core use areas in the Harrison and Smith Bays during the post-breeding period.

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In the Gulf of Mexico. A completed study of the interactions of migratory birds with offshore oil and gas platforms in the northern Gulf of Mexico, although more focused on migratory landbirds, produced information on waterfowl, shorebirds, and seabirds. Seabird studies in this region are often combined with those for marine mammals and sea turtles.

In the Atlantic. BOEMRE has initiated or is participating in the following studies:

- *Compendium of avian information.* BOEMRE is working with USGS and the U.S. Fish and Wildlife Service to compile existing seabird and shorebird data sets collected in the offshore environment from Maine to Florida, and to integrate these data into a GIS database. This information is being used to model seabird occurrence.
- *Potential for interaction of endangered and candidate bird species with wind facility operations on the Atlantic Coast.* Studies involve tracking Red Knots through the use of light-sensing tags and evaluating the avoidance behavior of Roseate Terns.
- *Automated analysis of bird vocalization recordings.* BOEMRE is supporting work at the Cornell Lab of Ornithology.
- *Pilot study of high definition aerial surveys.* BOEMRE has funded a study to develop protocols for aerial surveys of wildlife in the Atlantic OCS using high definition imagery.
- *Acoustic and thermographic monitoring of temporal and spatial abundance of birds near OCS structures.* The device that is being developed and tested is expected to be solar-powered, remotely operated, and capable of operating for six months or more without maintenance. It will allow determination of flight heights.



Red Knots can be tracked using this light-sensitive data logger. / Joanna Burger, Rutgers University, Pandion Systems (under contract with BOEMRE)

To access completed research project reports, visit

<https://www.gomr.boemre.gov/homepg/espis/espisfront.asp>. To find out about BOEMRE's current study plans and research opportunities, visit

<http://www.boemre.gov/eppd/sciences/esp/WorkingWithUs.htm>

Early History of Avian Research (1973-1989)

Through Fiscal Year 1988, the Offshore Environmental Studies Program spent about \$22.5 million on studies of coastal birds and seabirds. This was roughly five percent of the overall ESP research budget. About 93 percent was spent in the Alaska and Pacific Regions. These funds were used to map species distributions, nesting sites, and habitat use (56 percent); study trophic and population dynamics (29 percent); study the effects of oil and disturbances (10 percent); combine existing data and develop models (3 percent); and synthesize existing literature. Source: MMS Report 91-0028. *The Offshore Environmental Studies Program (1973-1989)*



Roseate Tern in flight. /Chris Dau, U.S. Fish and Wildlife Service

Bridging the Hemispheres: The Challenges of Conserving Highly Migratory Seabirds

Peter Hodum, Co-director of the Juan Fernandez Islands Conservancy, Oikonos Ecosystem Knowledge

Long-distance migrations undertaken by animals are among the most dramatic wildlife spectacles on the planet. The intricacy and complexity of these vast movements across continents and between hemispheres is remarkable, especially given the exquisite timing required for them to coincide with seasonally favorable breeding, wintering, and foraging conditions. Whether the species are Monarch butterflies, baleen whales, neotropical landbirds, arctic-breeding shorebirds, or pelagic seabirds, their complex life histories present unique conservation challenges as well as opportunities.



Pink-footed Shearwater. / Peter Hodum, Oikonos

The complexity of conserving highly migratory species derives from the immense spatial scales that such species utilize. The annual cycle of most migratory species, including seabirds, can be partitioned into three basic stages, each of which is physically discrete from the others: breeding grounds, migratory routes, and wintering grounds. Migratory species are inherently vulnerable to changes in the timing of favorable conditions, availability of suitable habitat, and/or abundance of food in any of the regions used during their annual life cycle. A breakage in any link between these interconnected habitats could prevent seasonal movements essential to the long-term survival of a particular migratory species.

These potentially fragile linkages are a real issue for migratory seabirds. The challenge of conserving species that travel thousands of kilometers across potentially multiple international jurisdictions as well as international waters is undeniably daunting. Furthermore, our relative lack of knowledge of the migratory movements of many seabirds presents another significant issue.

Yet it is essential that such challenges be dealt with explicitly—conservation efforts will only be successful if threats during all life cycle stages are addressed. For example, colony-based conservation efforts such as introduced mammal eradications and habitat restoration must be coupled with assessments of at-sea threats, including those during migration.

Until recently, the movements of pelagic seabirds were largely a mystery, with at-sea surveys providing the only insights into the possible magnitude of their travels. However, with the advent of increasingly smaller satellite and GPS tracking devices, we are beginning to develop a deeper understanding of the vast spatial scale on which many seabirds operate, during both the breeding and non-breeding seasons.

Studies of a number of Southern Ocean albatross species in the 1990's revealed individual foraging trips to provision chicks on the scale of thousands to tens of thousands of kilometers. Sooty Shearwaters have been shown to utilize virtually the entire Pacific Basin on their migratory sojourns, and Arctic Terns have been tracked transiting the entire length of the Atlantic Ocean. Clearly, conserving the integrity of migratory routes at these trans-national, trans-hemispheric scales will require commitments from the international community.

The Pink-footed Shearwater, a threatened species endemic to Chile, presents a useful case study of both the conservation challenges and opportunities that confront highly migratory seabirds. The non-profit organization, Oikonos, has been conducting conservation-based research on Pink-footed Shearwaters since 2001. In addition to long-term research focused on breeding colony-based threats, we have also collaborated with American Bird Conservancy, the Commission for Environmental Cooperation (CEC), the National Ocean and Atmospheric Administration (NOAA), U.S. Geological Survey (USGS), and

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Tagging of Pacific Predators (TOPP) to use satellite transmitters and geolocation tags to track Pink-footed Shearwaters during the chick-provisioning period, along their migratory routes, and on their wintering grounds. (See <http://www.oikonos.org/projects/fardela.htm>.)

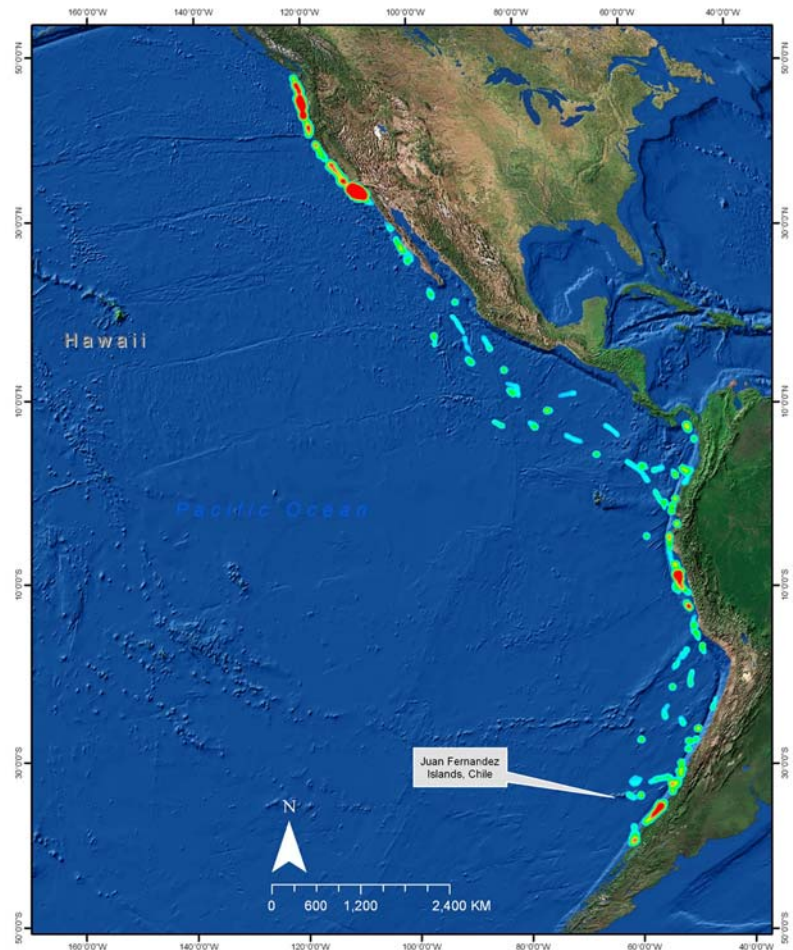
Results indicate that during the chick-rearing period, Pink-footed Shearwaters, breeding in the Juan Fernández Islands, typically travel more than 1,600 km per trip to feed in the productive waters of the Humboldt Current. Identified foraging hotspots coincide with the most intensively fished region in Chile. Although spatial overlap does not necessarily imply interactions with fisheries, the tracking data have indicated that a potential threat may exist on their Chilean foraging grounds.

Following the conclusion of the breeding season, Pink-footed Shearwaters follow the waters over the continental shelf and shelf break (i.e., a depth zone where the continental shelf drops rapidly down the continental slope) as they head northward along the Chilean coast and into Peruvian waters. The rich upwelling conditions along the continental shelf of Peru appear to be an important hotspot for the shearwaters. It had previously been thought that the species simply moved through Peruvian waters en route to their wintering grounds, but tracking data now indicate that at least some of the population remains in Peruvian waters throughout the non-breeding season. These findings suggest that the region may be an important wintering hotspot.

Those individuals that continue their migration follow shelf waters into Ecuador and then rapidly traverse the deep water of the tropics, hitting the tip of the Baja California peninsula and moving along the shelf and shelf-break waters of Baja, California, Oregon, Washington and British Columbia. They may spend up to five months of the year in North American waters before migrating back to Chile.

During the course of these annual travels, Pink-footed Shearwaters may travel through the waters of as many as seven countries. Given that they primarily utilize continental shelf and shelf-break habitats, shearwaters spend the vast majority of their time in territorial waters. The challenge, therefore, is to coordinate conservation activities across multiple nations. In addition, these relatively shallow waters also receive a disproportionate amount of shipping traffic and intensity of fishing activities.

Conversely, the fact that Pink-footed Shearwaters spend so little time in international waters means that legislation and programs can be more easily developed and implemented at the national level, whether it be for marine protected areas, endangered species actions, or local educational opportunities. Encouragingly for the Pink-footed Shearwater, this is beginning to happen through the creation of national recovery strategies in Chile and Canada, seabird fishery observer programs in multiple countries along their migratory flyway, and community-based education efforts such as those begun in Chile.



Movements of migrating and wintering Pink-footed Shearwaters tracked using satellite transmitters from June-December 2009. Colors correspond to intensity of use, with warmer colors indicating areas of disproportionate use/importance. Thus, red areas represent hotspots in Chile, Peru, and regions along the Pacific coast of North America.

The First World Seabird Conference: Linking the World's Oceans

Marischal De Armond, Conference Secretariat, 1st World Seabird Conference

Victoria, the capital of British Columbia, was an eminently suitable venue to have held the First World Seabird Conference (WSC), September 7-11, 2010. Nestled at the southeastern tip of Vancouver Island, separated from mainland Canada by the Strait of Georgia to the east, and from the United States by the Strait of Juan de Fuca to the south and southeast, many of the conference delegates arrived by sea, allowing for fortunate sightings of Orca, Humpback, and Grey whales and of course a very healthy showcase of Pacific seabirds.



Most of the student paper awards judging panel: Flavio Quintana, Lisa O'Neill, Nicholas Carlile, Gail Davoren, Mark Tasker, Sophy Allen, Tom Van Pelt, Pablo Yorio and Pep Arcos (missing were Julia Parrish, Matt Rayner and Ross Wanless). / Mark Tasker, Agreement on the Conservation of Albatrosses and Petrels

The First World Seabird Conference had been in planning for four years, masterminded by the International Steering Committee. The Committee included representatives of 27 professional seabird and research organizations. The conference theme, "Linking the World's Oceans," reflects the goals of the conference: To put seabird management and conservation into a worldwide perspective and to comprehensively address global issues and data needs for this group of birds, most of which inhabit multiple countries and waters within their own ranges.

The conference was opened by His Royal Highness, The Prince of Wales, who delivered a pre-recorded welcoming address. "As some of you may know, the plight of seabirds has long been close to my heart," he said. "They are, without doubt, some of the world's most charismatic and iconic species." Participants were reminded of the urgent need for action in the light of statistics such as 97 (28 percent) of

the world's 346 species of seabirds—and over 75 percent of albatross species—are under global threat of extinction. "That they face such challenges to their continued survival is, frankly, terrifying," said The Prince.

Over 900 participants from more than 40 countries, representing most of the world's seabird scientists, attended this inaugural conference. Spread over four days, the packed scientific program included over 700 presentations. Abstracts for these presentations are available as a download from the conference website (<http://www.worldseabirdconference.com>). The program was diverse and included topics such as climate change, seabird-fishery interactions, protection of marine habitats, seabird colony restoration, marine debris, forage fisheries, conservation genetics, marine protected areas, life history (e.g., foraging and diet, breeding, migration and dispersal, ageing), and research and analytical tools (e.g., population modeling, colony monitoring).

A series of legacy workshops were convened to facilitate improved interaction between seabird groups, to establish better opportunities and systems for assembling and linking data, and to improve access and utilization of seabird data at regional and global scales. The first of the workshops introduced <http://www.seabirds.net>, a site designed as a one-stop gateway for information on the world's seabirds. This session was followed by a technical discussion about seabirds.net as a portal for accessing comprehensive seabird databases.

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The Seabird Tracking Database workshop involved fascinating presentations from various database providers: The Global Procellariiform Tracking Database (<http://www.seabirdtracking.org>), The OBIS-Seamap database (<http://seamap.env.duke.edu>), and the Movebank database (<http://www.movebank.org>). The discussion that followed centered around how such databases could be made inter-compatible, and how intellectual property rights could be maintained.

The legacy workshop on establishing seabirds at sea databases included presentations and discussions revealing the considerable heterogeneity that exists in survey methods and the need for some degree of standardization. Fortunately, this issue has been largely overcome in European waters, and a core group of willing volunteers is ready to tackle the assembly of different datasets from around the globe.

Participants at the world seabird monitoring database workshop discussed proposals for such a database with the ability to combine datasets on trends in seabird abundance and demographic parameters to make more powerful analyses spanning ocean systems. The challenge is formidable, but technical solutions exist and with participants' enthusiastic engagement, a world seabird monitoring database could indeed become a reality. Finally, a joint spatial ecology workshop/protected areas symposium was very positive. The proceedings from this workshop, along with other selected papers that were presented at the conference, will be published in a special issue of *Biological Conservation*.



Black-footed Albatross. / Robert Pitman, National Marine Fisheries Service

Included among the many outcomes of the conference are:

1. Support for the formation of a World Seabird Union, a global network of seabird scientists and managers that will plan future World Seabird Conferences, develop the website seabirds.net, and help facilitate and coordinate global and regional seabird database development.
2. Steps towards development of effective communication networks between databases, needed to underpin a range of conservation and management objectives. Particular goals relate to a World Seabird Colony Register, creating joined databases for seabird monitoring studies, and a new database for mortality events.
3. Confirmation of the urgent need to use all available data on seabird distribution to identify candidate sites for marine protected areas (and for best-practice marine managed areas) both within national Economic Exclusive Zones and especially on the high seas. It is vital to ensure that seabird sites are represented within the proposed candidate Ecologically and Biologically Sensitive Areas under the Convention on Biological Diversity.
4. Improved access to information on habitat restoration, especially for seabird islands, including developing an agreed-upon register of priority sites for eradication of alien invasive species, together with advice on best-practice techniques.
5. Enhanced worldwide collaboration to address seabird-fishery interactions, especially bycatch, noting the likelihood of increasing problems from gillnet bycatch and from commercial exploitation of forage fish (anchovies, krill etc.).

The World Seabird Conference was acclaimed as an outstanding success. It provided an unrivalled review of all recent, current, and prospective research on seabirds, with a particular focus on potential science applications to management and conservation.

In Deep Water: Lessons from the Gulf Oil Disaster

Michael Parr, Vice President, American Bird Conservancy

The capping of the Deepwater Horizon oil spill marked the end of the beginning of the Gulf oil disaster. We now enter a protracted period of damage assessments, scientific analyses, and legal wrangling. The immediate impacts of the spill on birds appear to have been somewhat less of a disaster than some had predicted, but nevertheless, large numbers of birds were affected, and some 8,000 dead birds were recovered, suggesting a much larger but unknown actual mortality. The fact that the spill happened so far from shore, that dispersants appear to have kept much of the oil inside the water column, that wind and weather conditions cooperated and deterred many large slicks from reaching the shore, and that many seabirds remain close to the coast during the nesting season, all contributed to the immediate impact being less than “worst case scenario” for birds.



Brown Pelican being fed by staff from International Bird Research and Rescue at the rescue center at Fort Jackson, Louisiana. / Mike Parr, American Bird Conservancy

The headline-grabbing images of oiled Brown Pelicans will be the enduring memory of the spill for most people, but it may be years—if ever—before we know if the spill has significantly impacted the underlying ecosystem and food chain for wildlife in the affected area. In the meantime, there are some specific lessons that can be learned from the spill and the response efforts that could be applied to any similar future spills.

First it was clear to anyone who visited the main spill-affected seabird breeding islands in Barataria Bay that the boom that had been deployed to prevent the islands from becoming oiled had failed to do so. This “harbor boom” was widely deployed during the spill along the Gulf Coast, but was broken apart or over-washed in all but the most sheltered areas. In contrast, the robust “ocean boom” that was used to protect outer islands such as Breton Island remained intact and was very

effective in protecting islands from oiling, even in quite rough sea conditions. The harbor boom was also supplied to shrimp boats or “vessels of opportunity” that were used to try to skim oil close to the coast. These vessels were again ineffective in all but the calmest conditions, and it was clear that deployment of more specialized equipment was needed to skim oil before it reached the shore. While most of the heavy-duty equipment was deployed close to the spill site, better coordination between spotter planes and some heavy skimming vessels near-shore could have prevented more of the oil from reaching the coast.

One problem caused by the cleanup effort was the damage to habitat for beach-nesting birds caused by heavy machinery and the thousands of people walking through Least Tern nesting areas, in particular. While some of these sites were clearly marked, others were not, and some nests were certainly destroyed by vehicles. This could have been avoided if biologists had accompanied crews to mark the locations of nesting colonies. These colonies are found high enough on the beaches that only small amounts of oil would have reached the areas immediately around the nests. So protecting them would have had little, if any, impact on cleanup operations. Most of the impact was caused by vehicles and crews unintentionally disturbing or damaging habitat due to a lack of awareness of the importance of these areas.

Clearly the Gulf region is suffering from significant long-term problems relating to sedimentation, dredging, subsidence, and a host of other threats. While the longer-term issues are being addressed, seabird

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populations could be enhanced immediately through the restoration of the few predator-free nesting islands that are the main breeding sites for pelicans and other seabirds along the coast of Louisiana and Mississippi. These islands, now heavily eroded, also once contributed more significantly to mitigating storm surge and are part of the coast's natural defenses.

Following a field visit to the affected area in July 2010, American Bird Conservancy (ABC) staff produced the following recommendations to help mitigate the impacts of any future similar spills:

1. *The use of more effective "ocean boom" to protect bird colonies.* Numerous instances were observed where "harbor boom" was in complete disarray, including being washed up on shore.
2. *The employment of better fencing and other measures to protect sensitive beach nesting areas and to reduce disturbance to birds.* Clean-up crews were clearly unaware in several instances of the negative impacts they were causing to birds and their habitat.
3. *The deployment of adequately sized and equipped oil skimmers close to the coast with real-time oil reports to eliminate oil before it reaches the beaches and marshlands.* ABC observed an instance of a substantially heavy oil slick about a half-mile offshore while cleanup vessels were operating in very mildly oiled waters about one mile away—apparently unaware.
4. *The restoration of eroded island habitat for nesting birds.* Breton Island, for example, is a fraction of its original size and in desperate need of rebuilding.



Boom washed up on Elmer's Island, LA. Both white sorbent boom, which is designed to absorb oil, and yellow harbor boom are visible. / Mike Parr, American Bird Conservancy

Fortunately, major oil spills are still relatively rare occurrences and with the global advent of double-hulled tankers, they should become even less common. What we do know, however, is that it is the spill that you don't expect that can hurt you and a major event could happen at any time, perhaps with an even worse location and timing for birds.

The conservation community needs to ensure that lessons learned from the Deepwater Horizon oil spill are integrated into future oil spill response plans, in case, for example, Delaware Bay were to be hit with a major spill in mid-May during the height of shorebird migration when horseshoe crab spawning is at its peak. Such a spill, if not contained, rapidly could wipe out an entire generation of crabs and birds.

There are other locations such as the Copper River Delta and Bay of Fundy where beached oil at the wrong time of year could spell a mega-disaster for birds. Even a small spill, if poorly timed, could wreak havoc on birds such as the Xantus's Murrelet that use just a few islands for breeding. Making sure that oil spill response plans for such areas include the measures identified above should be an urgent priority.



Young Brown Pelicans ready for release at the rescue center in Fort Jackson, LA. / Mike Parr, ABC

Satellites and Sea Ducks: Tracking Marine Waterfowl

Tim Bowman, U.S. Fish and Wildlife Service, Sea Duck Joint Venture Coordinator

Most sea ducks breed at northern latitudes and winter in coastal, offshore, and major inland waters, including the Great Lakes. Concern about apparent population declines, the impact of hunting, and a lack of understanding of what regulates sea duck populations led to the formation of the Sea Duck Joint Venture (SDJV) in 1999. The SDJV has helped support research and monitoring studies to better understand this poorly known group of waterfowl.



Male Surf Scoter. / Jay Osentowski

Sea ducks are one of the primary wildlife species utilizing coastal habitats along the Atlantic Ocean during winter, and may serve as good barometers of environmental health. There also is evidence of greater use of the lower Great Lakes during winter by sea ducks, most notably Long-tailed Duck, possibly due to increases in benthic food resources such as introduced zebra mussels.

Driven by a lack of knowledge of sea duck distribution, migration patterns, and seasonal habitat use, the SDJV has launched an ambitious, large-scale satellite telemetry study of sea ducks in the Atlantic Flyway. From 2010 to 2013, more than 200 transmitters are being deployed on four species: Black Scoter, Surf Scoter, White-winged Scoter, and Long-tailed Duck—all species of high conservation concern.

The ducks are captured using a variety of techniques, including mist-netting, net-gunning, and night-lighting. Transmitters then are surgically implanted in the ducks and provide location data every few days for one to two years. The study will generate a wealth of detailed information on coastal and marine habitats used by sea ducks, particularly during winter.

The study is designed to answer several questions, such as:

- Where do birds from a particular wintering area breed and molt?
- Where are the most important wintering and staging areas for sea ducks?
- How much annual variability is there in migration patterns?
- Do sea ducks return to the same wintering and breeding areas each year?
- How should surveys be designed to most effectively monitor sea ducks?

In addition to a lack of basic knowledge about sea duck biology, migration, and habitat use, another compelling reason for this study is to help identify offshore areas of the Atlantic coast and Great Lakes where wind power facilities would have the least impact on sea ducks. Sea ducks often use the same offshore areas where wind farms are proposed for development, prompting concerns about displacement of birds, which equates to a loss of habitat, and even collisions with structures. Many offshore wind projects have been proposed and thus cumulative effects on sea ducks throughout the flyway need to be considered.

Capture events are also providing biologists with unprecedented opportunities to collect tissues samples that can be used to examine relationships among populations based on genetics and stable isotopes, screen for diseases, and determine contaminant loads (e.g., mercury).

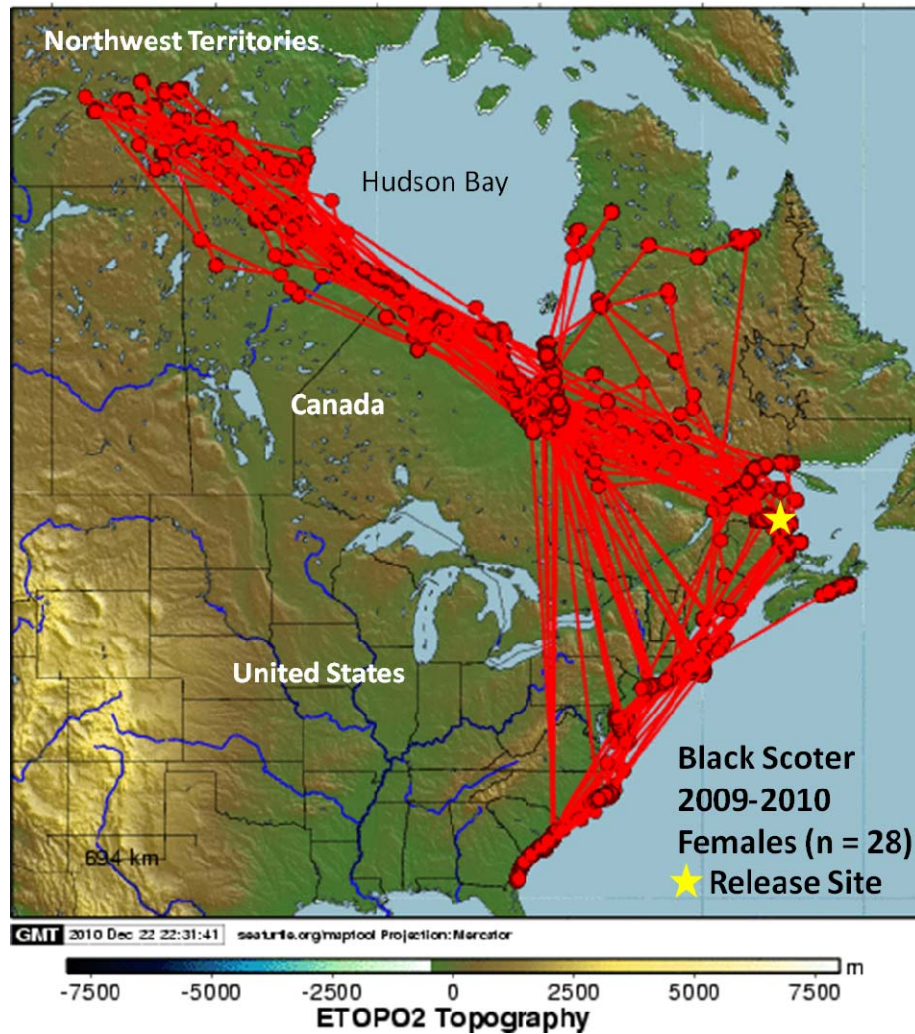
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Although the SDJV is facilitating this study via financial support and coordination, there is a growing partnership helping to make it happen. Current partners include the USFWS, U.S. Geological Survey, Rhode Island Dept. of Environmental Conservation, Massachusetts Audubon, Ducks Unlimited, Canadian Wildlife Service, Bird Studies Canada, BioDiversity Research Institute, and New Brunswick Department of Natural Resources.

Maps illustrating migration patterns of marked birds and other information about this study can be found at:
http://seaduckjv.org/atlantic_migration_study.html.



Untangling Black Scoter from mist net. / Scott Gilliland, New Brunswick

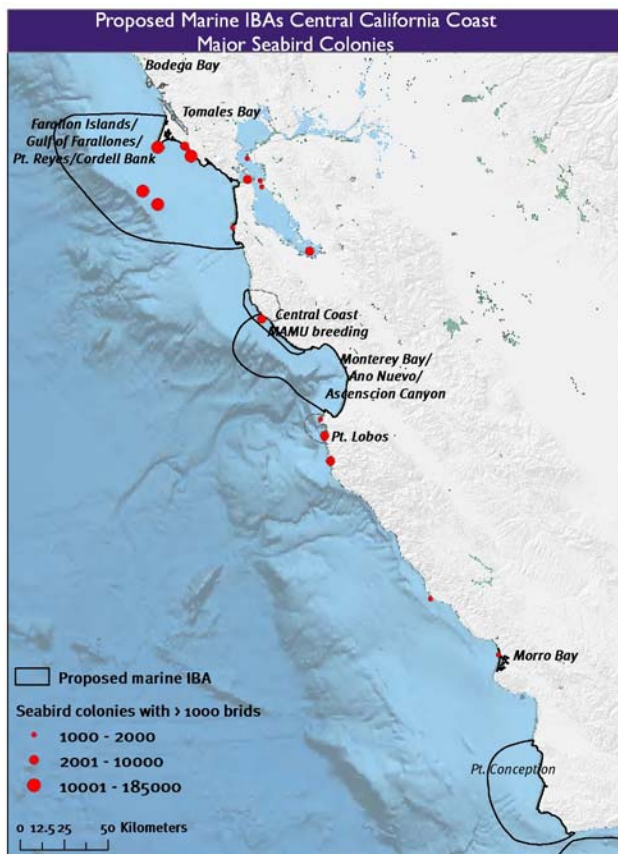


Annual migration pattern for female Black Scoters marked at Restigouche River, New Brunswick and Quebec in spring 2009 and 2010, and locations through December 2010.

Barrow to Baja Initiative: Identifying Important Bird Areas in the Northeast Pacific

Gary Langham, Director of Bird Conservation, Audubon California

If someone asked you for a great spot to start pelagic birding, where would you recommend? Monterey Bay is always a safe bet, but really the entire northeast Pacific is full of seabird hotspots. Alaska hosts more than 100 million seabirds alone, with 10 million more in the California Current. Over 50 breeding species across a broad taxonomic spectrum reflect the diversity of habitats in the region, from cold arctic to warm subtropical waters, and a diverse bathymetry (i.e., the measurement of underwater depths) with deep canyons and broad shelves.



Projection NAD 1983 UTM Zone 10N
Data sources: Carter et al. 1992. General Bathymetric Chart of the Oceans 2008 / Trisha Distler

The California Current—Vancouver Island through central Baja California—includes several rich seabird feeding areas due to strong coastal upwelling combined with bathymetric features which aggregate prey, such as euphausiids, and mid-level forage fishes, such as anchovy, sardines, and herring. These upwelling centers attract large numbers of marine predators from all over the Pacific during the late spring and summer when secondary productivity peaks, including pods of Blue Whale, millions of Sooty Shearwaters, and tens of thousands of Black-footed Albatross.

In some ways, seabirds in the California Current and Alaska marine systems are well-protected due to the actions of private organizations and public agencies such as NOAA's Marine Protected Area Center (see page 20). Introduced predators and herbivores have been removed from many key breeding islands in Mexico, the U.S. mainland, Alaska, and Hawaii. Most gillnetting has been banned, minerals exploration has been prohibited in National Marine Sanctuaries, and longline gear has been modified to reduce seabird bycatch.

But other threats persist or are increasing. Climate change has already dramatically altered the distribution and reduced the abundance of zooplankton and forage fish in the California Current, humans are increasingly competing with marine birds and other wildlife for fish and invertebrates, disturbance has increased at breeding islands and headlands, and offshore energy development is accelerating.

To help safeguard our rich and diverse seabirds into the future, Audubon California and Audubon Alaska undertook an effort to identify marine Important Bird Areas to provide a framework for conservation action, and to give policymakers a tool for considering the needs of marine birds in tri-national policy, planning initiatives such as marine reserves, marine spatial planning, ecosystem-based fisheries management, and offshore alternative energy siting. How then to choose Important Bird Areas from the bounty of the northeast Pacific Coast and, perhaps more daunting, how to draw meaningful boundaries on the ocean maps?

Important Bird Areas, a program of BirdLife International, are generated with a defined set of methodologies that have traditionally been used to identify terrestrial locations. Efforts to identify marine Important Bird Areas are very new; in fact Spain is the only area where marine Important Bird Areas are established. In collaboration with BirdLife International, we harnessed the expertise of over 20 marine

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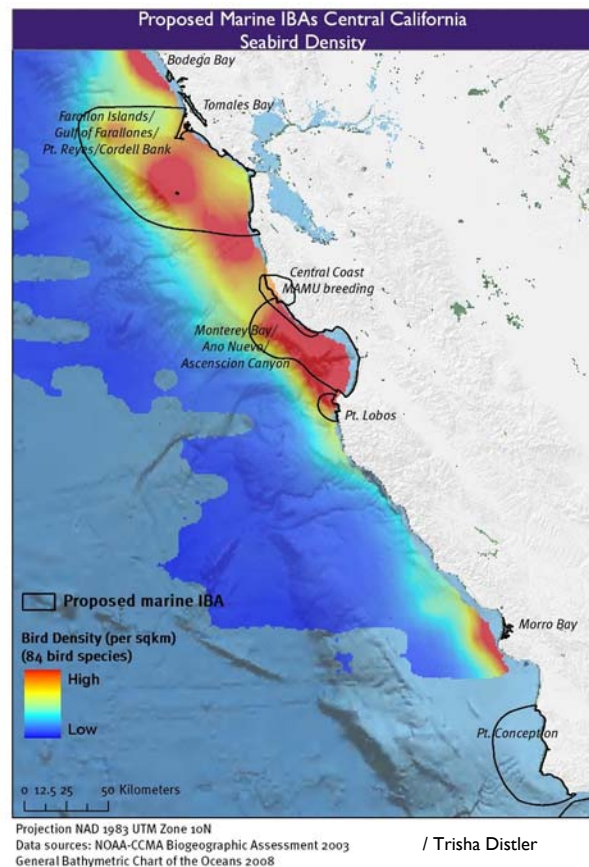
ornithologists in the region, who volunteered their time to identify areas that stand out as important for breeding, feeding, and migration of globally threatened species (as defined by the International Union for the Conservation of Nature) and for large aggregations of any marine bird species.

The general approach was to: (1) develop a list of potential sites, (2) gather supporting data, (3) apply standard criteria, (4) determine boundaries, if possible, (5) produce a site description, (6) nominate the site for review by a technical committee, (7) share the information with the public, and (8) develop and implement conservation planning and implementation activities.

Our technical committee produced draft maps of marine Important Bird Areas for Barrow to Baja that are made up primarily of major colonies and at-sea “foraging destinations,” such as Monterey Bay, which are used by locally breeding and visiting seabirds.

How do we determine the boundaries of these sites in the dynamic ocean environment? Our committee of experts is determining boundaries at individual sites through a combination of survey data, habitat suitability models, and what we call the ‘GIS in their heads’—the sense of where important areas are, gained from years or decades on the water. The combination of expert opinion, at-sea surveys, colony databases, and ecosystem process analyses comes together to form a relatively simple map.

We expect to issue a final report on Barrow to Baja in June 2011. However, designation is just the first step of many to ensure adequate protection for seabirds in the northeastern Pacific. At the recent World Seabird Conference in Victoria, BC, Audubon hosted a party to thank the experts who have contributed to the Barrow to Baja project. Even in a region with as much conservation data as Central California, we’ve come to realize that relationships with people are our most valuable assets for seabird conservation. It is these stakeholders that will not only help us undertake next steps, but will ensure that these important marine areas are protected and enjoyed for generations. More information can be found at: <http://ca.audubon.org/>



Marine Protected Areas and Wildlife and Hotspots In the California Current

Jaime Jabncke, Director, Marine Ecology, Point Reyes Bird Observatory Conservation Science and Rondi Robinson, Conservation Planner, National Oceanic and Atmospheric Administration's Marine Protected Areas Center

The National Oceanic and Atmospheric Administration's (NOAA) National Marine Protected Areas Center (MPA Center) and PRBO Conservation Science (PRBO) undertook a study to assess the current management and protection status of important seabird foraging habitats in the Pacific Ocean off the coasts of Washington, Oregon, and California. This effort used geographic information system (GIS) techniques to combine data on west coast MPA boundaries with foraging seabird hotspots identified by PRBO. Results showed that more than 100 MPAs containing seabird hotspots restrict some resources from being extracted, while other extractive and non-consumptive uses are allowed.



The MPA Inventory is a comprehensive geospatial database designed to catalog and classify marine protected areas within U.S. waters. The inventory contains information on over 1,600 sites nationwide and provides detailed classification information related to resource protection and management to assist in the development of the National System of MPAs.

The seabird hotspot dataset, used in conjunction with the MPA Inventory, was derived from an analytical modeling process, conducted by PRBO, to identify regions throughout the California Current system that are key foraging areas for 16 select seabird species: Black-footed Albatross, Bonaparte's Gull, Brandt's Cormorant, Brown Pelican, Cassin's Auklet, California Gull, Common Murre, Fork-tailed Storm-Petrel, Glaucous-winged Gull, Heermann's Gull, Herring Gull, Leach's Storm-Petrel, Red-necked Phalarope, Sabine's Gull, Sooty Shearwater, and Western Gull.

The spatial data included hotspots identified using three separate criteria calculated independently: (1) abundance - areas where a species was predicted to occur in high concentrations; (2) importance - locations that are part of a species' core area (the smallest area that contained the top 25 percent of the predicted density); and (3) persistence, number of years (out of 11) that a location was predicted to have high abundance (top 5 percent).

The two datasets were combined and spatially analyzed to determine the number and types of MPAs in the region that have identified hotspots for foraging seabirds, as well as the number of MPAs without foraging seabird hotspots. The

seabird dataset uses data for the 16 seabird species, but also indicates important foraging areas where wildlife (e.g., krill, fish, squid) are likely to be more abundant than elsewhere in the region. The spatial analysis focused on the entire California Current from the Straits of Juan de Fuca in Washington to the California/Mexico Border (with the exception of the Puget Sound region).

Within the California Current study region, there are 266 MPAs (excluding the Puget Sound MPAs). The MPAs in the study region protect nearly 389,000 sq. km. and include 16 percent of the nation's MPAs.

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MPAs vary greatly in size: while 87 MPAs protect less than 1 sq. km each, 16 protect over 1,000 sq km, including an Essential Fish Habitat Conservation area spanning over 330,000 sq. km. from Washington to California.

The analysis results indicate that 236 sites include at least one of the hotspot criteria (when evaluated individually), with a maximum of 225 sites for the persistence criteria. At least two criteria were included within the boundaries of 210 sites, and 30 sites did not contain any of the hotspot criteria. When analyzed together, 193 sites (73 percent) include hotspots for all three seabird criteria. The level of government of these MPAs with hotspots include 43 federal, 145 state, and 5 partnership sites.

MPAs in the U.S. vary widely in the level and type of legal protection afforded to the site's natural and cultural resources and ecological processes. Any MPA, or management zone within a larger MPA, can be characterized by one of six levels of protection, which will directly influence its effects on the environment and human uses (see text box).

Of all the MPAs with seabird hotspots, 138 sites are designated for uniform multiple use, allowing a wide variety of activities within their boundaries, while 37 are no-take sites that prohibit removal or disturbance of resources. Ten other MPAs with hotspots are classified as no access, which is the highest level of protection, restricting all human access to the site.

To achieve conservation objectives, MPAs can restrict or prohibit certain types of fishing within their boundaries or within distinct zones. This can be achieved by restricting certain gear types, limiting certain types of fishing seasonally or by species, or by prohibiting fishing activities entirely within site boundaries. In the study region, 151 MPAs (78 percent) that contain hotspots have some level of fishing restrictions, with 70 prohibiting commercial fishing, 49 prohibiting recreational fishing, and 46 prohibiting both.

Most MPAs have legally established goals, conservation objectives, and intended purpose(s). Most MPAs with seabird hotspots (167) focus on natural heritage, with significantly fewer (26) that focus on sustainable production. Within the study area, 72 MPAs with seabird hotspots are members of the National System, and over 100 additional sites are eligible for nomination to the National System. The National System provides technical assistance and establishes partnerships to enhance MPA stewardship. Criteria for joining the National System are listed at <http://www.mpa.gov>.

This study shows that more than 100 MPAs containing seabird hotspots within the California Current restrict some resources from being extracted, while other extractive and non-consumptive uses are allowed. Future work will focus on more detailed evaluation of MPA restrictions and hot spot management and on the types of human uses occurring throughout the study region and within MPA boundaries.

Level of Protection

Uniform Multiple-Use: MPAs or zones with a consistent level of protection and allowable activities, including certain extractive uses, across the entire protected area.

Zoned Multiple-Use: MPAs that allow some extractive activities throughout the entire site, but that use marine zoning to allocate specific uses to compatible places or times in order to reduce user conflicts and adverse impacts.

Zoned Multiple-Use With No-Take Area(s): Multiple-use MPAs that contain at least one legally established management zone in which all resource extraction is prohibited.

No-Take: MPAs or zones that allow human access and even some potentially harmful uses, but that totally prohibit the extraction or significant destruction of natural or cultural resources.

No Impact: MPAs or zones that allow human access, but that prohibit all activities that could harm the site's resources or disrupt the ecological or cultural services they provide.

No Access: MPAs or zones that restrict all human access to the area in order to prevent potential ecological disturbance, unless specifically permitted for designated special uses such as research, monitoring or restoration.



Fork-tailed Storm-Petrel. / Carla Stanley, U.S. Fish and Wildlife Service

Cooperative Marine Bird Conservation in the Northwest Atlantic

Melanie Steinkamp, Mid-Atlantic Coordinator, Atlantic Coast Joint Venture, U.S. Fish and Wildlife Service

Not nearly enough is known about northwest Atlantic seabirds and their vulnerability to a number of ongoing and emerging threats while in their primary offshore habitats. Data on their pelagic distribution and abundance are critical for monitoring population trends; understanding their basic ecology and role in marine ecosystems; assessing actual or potential impacts from oil spills, fisheries bycatch, and offshore development (e.g., shipping, wind generation, gas and mineral exploration); identifying critical marine habitats; marine spatial planning; and educating the public about marine conservation issues.



Razorbill, Gannet Islands, Labrador. / Jennifer Lavers, University of Tasmania

The Northwest Atlantic Marine Bird Conservation Cooperative (Cooperative) formed in 2007 and is committed to engaging resource agencies and partners within and outside its membership to develop new alliances to prioritize and implement research, management, and education for sustaining marine birds in their offshore environments. Through Cooperative partnerships, a number of projects are underway, including the newly formed Atlantic Marine Assessment Program for Protected Species (AMAPPS)—the country's largest-ever survey of protected marine species in the Atlantic and Gulf of Mexico. The survey is being conducted to coordinate use of marine areas and resources through marine spatial planning. Other projects include ships of opportunity surveys, individual tracking studies on puffins, Greater Shearwaters, and Arctic Terns, Northern Gannet studies, and more.

The Cooperative works through function-specific ad hoc working groups which form and dissolve as issues are identified and addressed. Presently, working groups are focusing on distribution and abundance, individual tracking, seabird bycatch, and oil spills. An offshore energy working group is being considered. The Cooperative meets annually, with the next meeting in Portland Maine in February 2011.

Partners began AMAPPS this summer. This five-year, \$36-million joint effort will document where and when whales, dolphins, porpoises, seals, sea turtles, and seabirds are present and in what numbers. The information will be used by the study sponsors—National Oceanic and Atmospheric Administration (NOAA), Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), U.S. Fish and Wildlife Service (USFWS), Atlantic Coast Joint Venture (ACJV), U.S. Geological Survey, and the U.S. Navy (USN)—as they work toward more coordinated use of marine areas and resources through marine spatial planning.

This summer, NOAA and the ACJV coordinated both ship-based and aerial surveys. By mid-August, researchers by sea surveyed offshore waters along the east coast U.S. from Maine to Cape Fear, North Carolina. In July and August, aerial teams from both NOAA and the USFWS covered nearshore waters of the northwest Atlantic Ocean and Gulf of Mexico. On shore, NOAA, BOEMRE and the USN are working to connect the new data to existing data, allowing a longer-range perspective about protected species' use of the Atlantic and Gulf of Mexico to better understand how their agencies' activities may influence the species.

The project will also test new remote sensing technologies that increasingly make it easier to gather more data and at a lower cost. Some of the technologies include underwater recorders that capture the sounds the animals make; pattern recognition software that helps scientists identify species; tags attached to

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animals that transmit information about the animals' locations and ocean conditions whenever the animal surfaces; and underwater robots outfitted with a variety of sensors.

This project will give a clear picture of the very complex relationships between animals and ocean conditions, as well as how human activities influence both. Study results will help us make more informed choices about human uses of the ocean, such as offshore energy projects and military training areas. Finally, this partnership will give us much better scientific information about seabird populations, so that we can more clearly define the needs of these species and make better management decisions.

For more information on the Cooperative, visit <http://www.acjv.org/marinebirds.htm>.

"All 67 ocean bird species such as albatrosses, petrels, shearwaters, boobies, tropical terns, tropicbirds, frigatebirds, puffins and related species in U.S. waters show a medium or high vulnerability to climate change.

Many seabirds possess traits that make them sensitive to effects of climate change, such as low reproductive potential; nesting on low-lying islands that may be inundated by rising sea levels; strong fidelity to breeding sites; and reliance on marine ecosystems that are sensitive to sudden change.

Even where scientists have determined that changing climate has influenced seabird populations, the exact mechanisms are not completely known. What is known is that climate influences reproduction, food resources, and population dynamics. Some species will be favored, others will not. Many effects have already been documented including increased water temperatures; decreased ice cover; altered water chemistry; more intense storms; and changes in marine diversity, population sizes, movements, and life cycles.

Reproductive failure of seabirds resulting from changes in marine productivity is a documented natural occurrence, such as when Pacific Coast seabird chicks starve during El Niño years. If catastrophic events become more frequent, intense, or longer as a result of climate change, population recovery is less likely. Warmer waters have apparently led to decreases in the abundance of fish in Prince William Sound, the Gulf of Alaska, and the California Current region, which is likely to reduce the abundance of fish-eating birds."

Excerpt from the *State of the Birds 2010 Report on Climate Change*. To view the full report, visit <http://www.stateofthebirds.org/>.



Short-tailed Albatross and Northern Fulmars, Alaska. / Clint Mecham

From *BCRs*, Page 4

waters, a conservation priority noted in both the Southeast U.S. and Mid-Atlantic/New England/Maritimes waterbird conservation plans (both 2006). In each of the above cases, partners delineated focus areas that may deviate somewhat from the now official marine BCRs; however, the U.S. NABCI Committee is not requesting their revision. Rather, the emphasis on a regional approach, using ecologically based units to draw in partners and identify connections, is applauded.

Similar to terrestrial BCRs, marine BCRs are not proposed as static regional units. In fact stasis is particularly irrelevant to marine ecoregions because of the shifting nature of the marine environment over multiple temporal scales. Additionally, like terrestrial BCRs, marine BCRs could be partitioned into smaller ecological units. For example, the Commission for Environmental Cooperation completed a classification of marine ecoregions in 2009 (Wilkinson 2009) that provides four finer-scale levels of classification that nest well within the LME system. Finally, marine BCRs may be aggregated to facilitate conservation partnerships across species ranges—an extremely important consideration since many seabird species cross multiple regional boundaries in their annual, seasonal, and often daily cycles.

The North American Bird Conservation Initiative (NABCI) is a coalition of organizations and initiatives dedicated to advancing integrated bird conservation in North America.

The vision of NABCI is to see populations and habitats of North America's birds protected, restored, and enhanced through coordinated efforts at international, national, regional, state, and local levels, guided by sound science and effective management.

The goal of NABCI is to deliver the full spectrum of bird conservation through regionally based, biologically driven, landscape-oriented partnerships.

The All-Bird Bulletin is a news and information-sharing publication for participants of NABCI.

For subscription or submission inquiries, contact the Editor, Roxanne Bogart, U.S. Fish and Wildlife Service, 802-872-0629 ext. 25 or Roxanne_Bogart@fws.gov. To download back issues, visit <http://www.nabci-us.org/news.html>.

The All-Bird Bulletin publishes news updates and information on infrastructure, planning, science, funding, and other advancements in the field of integrated bird conservation and management. Include author's name, organization, address, telephone and fax numbers, and e-mail address. Pictures are welcome but not necessary.

From *Policy*, Page 5

proactive, integrated, and ecosystem-based approach to managing the ocean, our coasts, and the Great Lakes. CMSP is intended to provide an improved framework for coordinated planning and application of existing authorities. The new cabinet-level National Ocean Council will provide a forum for sustained, senior-level leadership and facilitate coordination with state, tribal, and local governments.

In the last decade, states have led the way toward more integrated ocean planning, as seen in efforts in Massachusetts, California, Rhode Island, and Oregon, and in the regional governance organizations that have been established (e.g., Gulf of Mexico Alliance, Northeast Regional Ocean Council, and the West Coast Governors' Agreement on Ocean Health). Regional planning bodies will be instructed to build upon these important efforts, which bodes well for bird conservation interests. For example, the Massachusetts Ocean Management Plan, released in January 2010, was the nation's first comprehensive plan and is generally applauded by New England environmental groups, including Massachusetts Audubon and the Conservation Law Foundation. However, as stakeholders, they acknowledged that the plan, by design, is a living document that will need to be periodically updated and they intend to remain engaged.

Coordinated engagement in emerging ocean policies and activities is an important conservation strategy for all organizations—local to international—concerned about the welfare of marine birds. For more information visit <http://www.whitehouse.gov/administration/eop/oceans/policy>.



Common Murre with chicks. / Finley and Bowman, U.S. Fish and Wildlife Service



<http://www.waterbirdconservation.org/>