

Marine Science Review – 195

Marine and coastal birds



In this review:

- A. Recent articles – no abstract available
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A. Recent articles – no abstract available

Braune, B.M., Mallory, M.L., and Gilchrist, H.G. **Elevated mercury levels in a declining population of ivory gulls in the Canadian Arctic.** *Marine Pollution Bulletin* 52(8): 978-982, 2006.

B. Recent publications available online

Wormworth, J. and Mallon, K. 2006. **Bird Species and Climate Change: The Global Status Report** (version 1.0). A report to: World Wide Fund for Nature. 74 pp.

Available at: <http://assets.panda.org/downloads/birdsclimatereportfinal.pdf>

Notes: This status report reviews more than 200 scientific articles and finds a clear and escalating pattern of climate change impacts on bird species around the world, suggesting a trend towards a major bird extinction from global warming. Specific groups of birds are at high risk from climate change: migratory, mountain, island, wetland, Arctic, Antarctic and seabirds. While bird species that can move easily to new habitat are expected to continue to do well, bird species that thrive only in a narrow environmental range are expected to decline, and to be outnumbered by invasive species. The report concludes that birds suffer from climate change effects in every part of the globe and notes that scientists have found declines of up to 90 per cent in some bird populations, as well as total and unprecedented reproductive failure in others.

C. Recent articles with abstracts

Morse, J.A., Powell, A.N., and Tetreau, M.D. **Productivity of Black Oystercatchers: Effects of recreational disturbance in a national park.** *Condor* 108(3): 623-633, 2006.

Notes: National parks in Alaska are generally assumed to be high-quality, undisturbed wildlife habitats. However, these parks attract recreational users, whose presence may reduce the suitability of key habitats for nesting shorebirds. In Kenai Fjords National Park, Black Oystercatchers (*Haematopus bachmani*) often breed on gravel beaches that are also popular campsites. In this study, we examined the effects of recreational activities in coastal Alaska on reproductive performance of Black Oystercatchers. We monitored survival of nests and chicks on 35 to 39 breeding territories annually during four breeding seasons (2001-2004). Most recreational disturbance on these territories occurred after the peak hatching date of first clutches. Annual productivity was low (average of 0.35 chicks per pair), but was not strongly affected by recreational disturbance. Daily survival of nests varied annually and declined over the season. Our results suggest that nest survival was lower during periods of extreme high tides. Daily survival rate of broods increased over the season and was higher on island than mainland territories, likely due to differences in predator communities. Territory occupancy rate and site fidelity were high; 95% of color-banded oystercatchers returned to the same breeding territory in the subsequent year. We conclude that Black

Oystercatchers are resilient to low levels of recreational disturbance. However, in light of projected increases in recreation, we suggest managers move campsites away from the traditional nest sites identified in this study to minimize future disturbances.

Terauds, A., Gales, R., Baker, G.B., and Alderman, R. **Population and survival trends of Wandering Albatrosses (*Diomedea exulans*) breeding on Macquarie Island.** *Emu* 106(3): 211-218, 2006.

Notes: Wandering Albatrosses (*Diomedea exulans*) are globally threatened owing to declines in populations, and the breeding population of Macquarie Island is particularly vulnerable as it comprises fewer than 20 breeding pairs. We describe population trends of Macquarie Island Wandering Albatrosses between 1955 and 2004, combining long-term population data with demographic data collected between 1995 and 2004. Rates of annual breeding effort and survival varied markedly over time and breeding numbers declined from a peak in 1968 to near extinction in the mid-1980s. Underlying this decline was a significant decrease in juvenile survival and, to a lesser extent, adult survival. These changes in survival coincided with changes in long-line fishing effort in the Southern Ocean. Breeding numbers slowly recovered on Macquarie Island through the late 1980s and 1990s, reaching a total of 19 breeding pairs in the mid-1990s. The population remained at about this level in 2004. Relative trends in numbers and survival in the population are similar to those observed in other populations in the Indian Ocean, including Marion Island and Iles Crozet.

Jouventin, P., Cuthbert, R.J., and Ottvall, R. **Genetic isolation and divergence in sexual traits: evidence for the northern rockhopper penguin *Eudyptes moseleyi* being a sibling species.** *Molecular Ecology* 15(11): 3413-3423, 2006.

Notes: The taxonomic status of populations of rockhopper penguins (*Eudyptes chrysocome*) is still enigmatic. Northern populations differ from southern ones in breeding phenology, song characteristics and head ornaments used as mating signals. We conducted a molecular analysis using mitochondrial DNA sequencing to test if there is a gene flow barrier between northern (subtropical) populations and southern (subantarctic) populations in relation to the Subtropical Convergence, a major ecological boundary for marine organisms. Sequences of the control region and the ND2 gene were analysed in rockhopper penguins and in the macaroni penguin (*Eudyptes chrysolophus*), a closely related species. Genetic distances and phylogenetic analyses showed a clear split into three clades, two rockhopper clades and the macaroni penguin. Moreover, θ_{ST} and gene flow estimates also suggested genetic structuring within the northern rockhoppers. Our results add further support to the notion that the two rockhopper penguin taxa, often considered as two subspecies, can be recognized as two species *E. chrysocome* and *E. moseleyi*. The divergence in mating signals found between these two taxa seems to have occurred recently and relatively rapidly. Thus, the behavioural changes may have been enough to isolate these taxa without the need for morphological differentiation. The findings have important conservation implications, since *E. moseleyi* is far less abundant than *E. chrysocome*, but more populations may warrant an uplisting to endangered status if full species status should be recognized for more subpopulations.

Sydeman, W. J., Bradley, R.W., Warzybok, P., Abraham, C.L., Jahncke, J., Hyrenbach, K.D., Kousky, V., Hipfner, J.M., and Ohman, M.D. **Planktivorous auklet *Ptychoramphus aleuticus* responses to ocean climate, 2005: Unusual atmospheric blocking?** *Geophysical Research Letters* 33(22): art. L22S09, 2006.

Notes: In spring-summer 2005, anomalous atmospheric-oceanographic coupling caused unprecedented reproductive failures and redistribution of a planktivorous marine bird in both central California (37°N) and southern British Columbia (50°N). At SE Farallon Island, CA, the birds abandoned the breeding colony *en masse* between 10-20 May, a unique behavioral response; for the first time in 35 years, reproductive success was zero. At Triangle Island, B.C., only 8% of the nesting pairs were successful, the worst year on record. Surveys of birds at sea revealed a peak in relative abundance south of Point Conception (34°N) in summer and fall, suggestive of emigration from the north. Prey (euphausiid crustacean) biomass in the Gulf of the Farallones was reduced, but remained high south of Point Conception. Change in predator and prey may be explained, in part, by unusual atmospheric blocking in the Gulf of Alaska in May, which caused the jet stream to shift southwards resulting in poor upwelling-favorable winds and anomalously warm SST. This study demonstrates the deleterious consequences of this climate event for a top marine predator in the central-northern California Current System.

Mallory, M.L., Braune, B.M., and Forbes, M.R.L. **Contaminant concentrations in breeding and non-breeding northern fulmars (*Fulmarus glacialis* L.) from the Canadian high arctic.** *Chemosphere* 64(9): 1541-1544, 2006.

Notes: Persistent organic pollutants (POPs) were measured in livers of male and female northern fulmars (*Fulmarus glacialis*) shortly after egg-laying on northern Devon Island, NU, Canada. Breeding females had lower hepatic POPs (lipid normalised) than breeding males, but non-breeding males and females had similar concentrations. We suspect that breeding females are eliminating some of their POPs during egg formation. Concentrations of measured POPs were lower than those associated with avian health concerns, and there was no evidence that POPs in the birds were contributing to additional breeding stress.

Brown, C.S., Luebbert, J., Mulcahy, D., Schamber, J., and Rosenberg, D.H. **Blood lead levels of wild Steller's eiders (*Polysticta stelleri*) and black scoters (*Melanitta nigra*) in Alaska using a portable blood lead analyzer.** *Journal of Zoo and Wildlife Medicine* 37(3): 361-365, 2006.

Notes: Sea duck populations are declining in Alaska. The reasons for the decline are not known; environmental lead exposure is one suspected cause. Thirty wild Steller's eider ducks (*Polysticta stelleri*) and 40 wild black scoter ducks (*Melanitta nigra*) were tested for blood lead levels using a portable blood lead analyzer (LeadCare®; ESA, Inc., Chelmsford, Massachusetts 01824, USA). Sixty-seven and one-tenth percent of the sea ducks had undetectable blood lead levels, 30.0% had values indicating normal or background lead exposure, and 2.9% had values indicating lead exposure. None of the birds had values indicating lead toxicity, and no birds demonstrated clinical signs of toxicity. Birds in areas with higher human population density had higher blood lead levels than those in less densely populated areas. This is the first time a portable blood lead analyzer has been utilized with sea ducks in a field setting. Because it provides immediate results, it is valuable as a screening tool for investigators carrying out surgical procedures on birds in the field as well as establishing baseline blood lead data on sea ducks. Lead exposure does occur in wild sea ducks, and the study indicates that additional research is needed in order to determine the role environmental lead plays in declining sea duck populations.

Moller, A.P., Flensted-Jensen, E., and Mardal, W. **Dispersal and climate change: a case study of the Arctic tern *Sterna paradisaea*.** *Global Change Biology* 12(10): 2005-2013, 2006.

Notes: Dispersal is an important evolutionary process that can affect admixture of populations and cause rapid responses to changing climatic conditions due to gene flow from populations at different altitudes or latitudes already experiencing these conditions. We investigated long-term patterns of natal and breeding dispersal in a coastal seabird, the Arctic tern *Sterna paradisaea*, that experiences specific climatic conditions in the northern temperate and Arctic climate zones during breeding and different climatic conditions in the Antarctic during winter. Long natal and breeding dispersal distances were costly as shown by their effects on delayed breeding. Dispersal distances varied significantly among years, with natal dispersal showing a strong temporal increase during the last 70 years. Annual differences in dispersal distance could be accounted for by climate conditions in the breeding grounds and the winter quarters. Natal dispersal was related to climate conditions in both the year of hatching and the year of breeding, whereas breeding dispersal was only related to climate conditions in the second year of the dispersal event. Only the north Atlantic oscillation (NAO) index for winter showed a consistent temporal trend, suggesting that the temporal trend in natal dispersal distance must be caused by changes in the NAO (or associated phenomena). These findings indicate that dispersal can change rapidly in response to changing climate conditions.

Hario, M. and Rintala, J. **Fledgling production and population trends in Finnish common eiders (*Somateria mollissima mollissima*) - evidence for density dependence.** *Canadian Journal of Zoology* 84(7): 1038-1046, 2006.

Notes: We present a 57-year time series of a common eider, *Somateria mollissima mollissima* (L., 1758), population from one of the core monitoring areas in the Baltic Sea, the Soderskar bird sanctuary, Gulf of Finland. We applied permutation tests to inspect the relationships between breeding parameters and population density. Of the parameters studied, only fledging rate (during a 34-year period) showed a significant negative relationship with population size, indicating density dependence. Furthermore, the fledging rate responded strongly to the population growth rate and to the rate of recruitment. Clutch size and duckling (downy young entering the water) rate did not show negative density dependence. Thus, losses during brood

rearing seem to be the regulatory factor. The population decline at Soderskar is similar to those recorded in many other monitoring sites around the southern coast of Finland. Compared with data from more productive sea districts in northwestern Europe (Dutch Wadden Sea and Scottish North Sea), the Finnish fledging rates do not seem excessively bad. There are indications of viral infections playing an increasingly central role in duckling mortality, whereas adult female mortality has not been affected.

Abbott, C.L., Double, M.C., Gales, R., Baker, G.B., Lashko, A., Robertson, C.J.R., and Ryan, P.G. **Molecular provenance analysis for shy and white-capped albatrosses killed by fisheries interactions in Australia, New Zealand, and South Africa.** *Conservation Genetics* 7(4): 531-542, 2006.

Notes: Shy and white-capped albatrosses, *Thalassarche cauta* and *T. steadi*, respectively, are phenotypically similar and are known to suffer fisheries-related bycatch mortality across their foraging range. Assessments of the extent or scale of impact of bycatch mortality on these species have previously been precluded by difficulties identifying bycatch carcasses to species level. In this study, a fast and simple molecular test based on a single nucleotide polymorphism in mtDNA of shy and white-capped albatrosses was used to determine the species composition of fisheries bycatch carcasses recovered from Australian, New Zealand, and South African waters. The only area where bycatch mortality of both species co-occurred was in Tasmanian waters; in all other zones the bycatch was exclusively comprised of white-capped albatrosses. Genotypic provenance assignment tests of shy albatrosses, a species with significant genetic structure between island colonies, correctly assigned 72% to their island of origin. These data are the first to provide insight into the relative vulnerability of shy and white-capped albatrosses to bycatch mortality across their foraging range, and to establish the vast differences in the at-sea distributions of these two species.

Butchart, S.H.M., Stattersfield, A.J., and Collar, N.J. **How many bird extinctions have we prevented?** *Oryx* 40(3): 266-278, 2006.

Notes: Considerable resources and efforts have been directed at biodiversity conservation in recent years, but measures of the success of conservation programmes have been limited. Based on information on population sizes, trends, threatening processes and the nature and intensity of conservation actions implemented during 1994-2004, we assessed that 16 bird species would have probably become extinct during this period if conservation programmes for them had not been undertaken. The mean minimum population size of these 16 species increased from 34 to 147 breeding individuals during 1994-2004. In 1994, 63% of them had declining populations but by 2004, 81% were increasing. Most of these species (63%) are found on islands. The principal threats that led to their decline were habitat loss and degradation (88%), invasive species (50%) and exploitation (38%), a pattern similar to that for other threatened species, but with exploitation and invasive species being relatively more important. The principal actions carried out were habitat protection and management (75% of species), control of invasive species (50%), and captive breeding and release (33%). The 16 species represent only 8.9% of those currently classified as Critically Endangered, and 1.3% of those threatened with extinction. Many of these additional species slipped closer to extinction during 1994-2004, including 164 that deteriorated in status sufficiently to be uplisted to higher categories of extinction risk on the IUCN Red List (IUCN, 2006). Efforts need to be considerably scaled up to prevent many more extinctions in the coming decades. The knowledge and tools to achieve this are available, but we need to mobilize the resources and political will to apply them

Burnham, W., Burnham, K.K., and Cade, T.J. **Past and present assessments of bird life in Uummannaq District, West Greenland.** *Dansk Ornitologisk Forenings Tidsskrift* 99(4): 196-208, 2005.

Notes: From 1905 to 1920 Alfred Bertelsen documented 210 avian breeding sites for 32 species in the Uummannaq District, Greenland, between 70°03' and 72°03' N and 50°20' and 55°40' W, a land area of about 12 000 km². In 2000 we re-surveyed 207 of those sites and the remainder of the coastal area, providing results for 25 species, our aim being to determine presence/absence and density of coastal nesting species. For 10 species reported by Bertelsen as common and with quantified numbers (breeding sites and population) at his locations, we found the number of occupied sites was the same for one species (Northern Fulmar *Fulmarus glacialis*) while nine others had declined. Assuming some species may have relocated breeding sites over time and including all locations where we found those species, when compared to Bertelsen's results, the number of sites

remained the same for two species and declined for eight. Comparing the total observed population numbers (birds present) between Bertelsen's and our 2000 survey, one species remained about the same or slightly increased (Northern Fulmar) and nine decreased. The species with the most dramatic declines were the Thick-billed Murre *Uria lomvia* (from 8 sites and over 500 000 pairs to zero), Black-legged Kittiwake *Rissa tridactyla* (27 sites and 268 000 birds to 7 sites and c. 1100 birds), Razorbill *Alca torda* (17 sites to 3), Common Eider *Somateria mollissima* (26 sites to 16), and Gyrfalcon *Falco rusticolus* (28 sites to 7). The Great Cormorant *Phalacrocorax carbo* and Great Black-backed Gull *Larus marinus* are the only species we could determine with certainty that had increased in number of breeding sites (1 to 12 and 0 to 4 sites, respectively). Population declines appear to be a combination of human persecution and human-caused reduction in prey and habitat quality. Unless further conservation measures are taken, continued avian declines are probable.

Bustnes, J.O., Helberg, M., Strann, K.B., and Skaare, J.U. **Environmental pollutants in endangered vs. increasing subspecies of the lesser black-backed gull on the Norwegian coast.** *Environmental Pollution* 144(3): 893-901, 2006.

Notes: Organochlorine (OC) residues were measured in eggs and blood of different subspecies of the lesser black-backed gull, *Larus fuscus*, on the Norwegian coast: a) increasing *L. f. intermedius* in the North Sea; b) endangered *L. f. fuscus* near the Arctic Circle; c) *L. f. fuscus* and greyish-mantled gulls, with a *L. f. intermedius* appearance, in the Barents Sea region. The dominating OCs in lesser black-backed gulls were polychlorinated biphenyls (PCB) and p,p'-dichlorodiphenyldichloroethylene (DDE). DDE and β -hexachlorocyclohexane (β HCH) residues were higher in *L. f. fuscus* compared to *L. f. intermedius* and greyish-mantled birds in the Barents Sea region. In the latter area, blood residues of PCB and DDE in lesser black-backed gulls were as high as in great black-backed gulls, *Larus marinus*, while in the other regions they were lower. The higher DDE residues in endangered *L. f. fuscus* compared to increasing *L. f. intermedius* and greyish-mantled birds, which are invading northern Norway, suggest that OCs may have played a role in the population decline of *L. f. fuscus*, possibly in combination with nutrient stress.

Verreault, J., Letcher, R.J., Ropstad, E., Dahl, E., and Gabrielsen, G.W. **Organohalogen contaminants and reproductive hormones in incubating glaucous gulls (*Larus hyperboreus*) from the Norwegian Arctic.** *Environmental Toxicology and Chemistry* 25(11): 2990-2996, 2006.

Notes: Organohalogen contaminants detected globally in avian wildlife, including populations from the Arctic, have been related to various reproductive hormone potencies, and altered hormonal balance and functions. Besides legacy organochlorine (OC) substances, that is, polychlorinated biphenyls (PCBs) and OC pesticides and by-products, endocrine-disruptive properties have been defined for chemicals of new and emerging environmental concern, such as polybrominated diphenyl ethers (PBDEs) and metabolically derived products like methylsulfonyl (MeSO₂)- and hydroxyl (OH)-PCBs. We investigated the relationships between plasma concentrations of selected legacy OCs, PBDEs, and MeSO₂- and OH-PCB metabolites and the circulating reproductive hormones testosterone (T), 17 β -estradiol (E₂), and progesterone (P₄) in incubating male and female glaucous gulls (*Larus hyperboreus*) from the Norwegian Arctic. Principal component and regression analyses demonstrated that P₄ levels in male glaucous gulls were associated positively with variations of sum (Σ) PCB, dichloro-diphenyl-trichloroethane (Σ DDT), chlordane (Σ CHL), and Σ PBDE concentrations, which were the most recalcitrant organohalogens determined in glaucous gulls. No such relationship was found for female glaucous gulls as well as between concentrations of any of the selected organohalogens and levels of T for both sexes. The E₂ was not detected in any plasma samples. Present results were highly suggestive that exposure to high organohalogen concentrations in glaucous gulls, particularly the most persistent compound classes, may have the potential to interfere with steroidogenesis and impinge on circulating P₄ homeostasis. Because significant effects were found in males exclusively, it cannot be completely ruled out that male glaucous gulls are more sensitive than females to organohalogen-mediated alteration of P₄ synthesis and breakdown.

Mallory, M.L., Gilchrist, H.G., and Mallory, C.L. **Ross's gull (*Rhodostethia rosea*) breeding in Penny Strait, Nunavut, Canada.** *Arctic* 59(3): 319-321, 2006.

Notes: We found a small, previously undiscovered breeding colony of Ross's gulls (*Rhodostethia rosea*) in Nunavut, Canada, approximately 80 km from a previous colony location occupied during the 1970s. The birds nested in association with arctic terns (*Sterna paradisaea*). The collective observations from this region of the High Arctic suggest that Ross's gulls may move colonies each year, or that colony occupation is intermittent.

Wanless, S., Frederiksen, M., Daunt, F., Scott, B.E., and Harris, M.P. **Black-legged kittiwakes as indicators of environmental change in the North Sea: Evidence from long-term studies.** *Progress in Oceanography* 72(1): 30-38, 2007.

Notes: Top predators, particularly seabirds, have repeatedly been suggested as indicators of marine ecosystem status. One region currently under pressure from human fisheries and climate change is the North Sea. Standardized seabird monitoring data have been collected on the Isle of May, an important seabird colony in the northwestern North Sea, over the last 10-20 years. Over this period oceanographic conditions have varied markedly, and between 1990 and 1999 a major industrial fishery for sandlance (*Ammodytes marinus*), the main prey of most seabird species, was prosecuted nearby. Sandlance fishing grounds close to seabird colonies down the east coast of the UK were closed in 2000 in an attempt to improve foraging opportunities for breeding seabirds, particularly black-legged kittiwakes (*Rissa tridactyla*). Initially this closure seemed to be beneficial for kittiwakes with breeding success recovering to pre-fishery levels. However, despite the ban continuing, kittiwakes and many other seabird species in the North Sea suffered severe breeding failures in 2004. In this paper, we test the predictive power of four previously established correlations between kittiwake breeding success and climatic/trophic variables to explain the observed breeding success at the Isle of May in 2004. During the breeding season, kittiwakes at this colony switch from feeding on 1+ group to 0 group sandlance, and results up until 2003 indicated that availability of both age classes had a positive effect on kittiwake breeding success. The low breeding success of kittiwakes in 2004 was consistent with the late appearance and small body size of 0 group sandlance, but at odds with the two variables likely to operate via 1 group availability (lagged winter sea surface temperature and larval sandlance cohort strength in 2003). The reason for the discrepancy is currently unknown, but analysis of 1 group sandlance body composition indicated that lipid content in 2004 was extremely low, and thus fish eaten by kittiwakes during pre-breeding and early incubation were likely to be of poor quality. Monitoring of reproductive success of kittiwakes, although useful, was clearly not sufficient to tease apart the complex causation underlying the 2004 event. Monitoring programs such as this, therefore, need to be complemented by detailed research to identify the mechanisms involved, and to attribute and predict the effects of natural and human-induced environmental change.

Falk, K., Merkel, F., Kampp, K., and Jamieson, S.E. **Embedded lead shot and infliction rates in common eiders *Somateria mollissima* and king eiders *S. spectabilis* wintering in southwest Greenland.** *Wildlife Biology* 12(3): 257-265, 2006.

Notes: The large numbers of common eiders *Somateria mollissima* and king eiders *S. spectabilis* wintering in southwest Greenland are subject to intensive hunting, and in addition to direct harvest an unknown number of birds are wounded and become carriers of embedded lead shot. We conducted the first assessment of the magnitude of this undesirable side effect of hunting in Greenland by X-raying 879 common and 114 king eiders collected by local fishermen and hunters during three winters (2000-2002). On average, 22% of all common eiders carried embedded shot, but proportions were strongly age dependent; of first-winter (1W) birds 13.2%, of immatures (IM) 16.4%, and of adults (AD) 29.1% were carriers. For king eiders the proportions were similar: 11.3, 10 and 20%, respectively, were carriers. Adult common eiders collected in fjord areas were significantly less burdened (24.5%) than birds collected in the more heavily hunted coastal areas (35.0%). Among inflicted birds, 1W birds contained more pellets (mean 2.2) than AD (mean 1.7), despite the adults' longer time to accumulate pellets from multiple inflictions, which suggests that the most burdened juveniles die before entering the older age class. From the proportion of wounded 1W birds (13.2%) we modelled the infliction rates, i.e. the proportion of an age class that become pellet carriers each year, for older birds (IM+AD) to be at least 1.8-3%, assuming that annual survival of adult eiders falls within the range 0.8-0.9. Assuming that roughly 35% of the 463,000 common eiders estimated to winter in southwest Greenland are juveniles, 13% are immatures, and 52% adults (fourth winter and older), then each winter up to 30,000 eiders would become new carriers of embedded shot (21,000 juveniles, 1,200-1,800 immatures and 4,800-7,300 adults). As wounded birds may risk increased mortality in severe winters and reduced reproductive output, the infliction has implications for the demographic models used to assess sustainable eider harvest levels. There is a need for follow-up studies of regional variation in infliction, and to identify ways to possibly reduce the hunters' unintended impact on their game populations.

van Gils, J.A., Piersma, T., Dekinga, A., Spaans, B., and Kraan, C. **Shellfish dredging pushes a flexible avian top predator out of a marine protected area.** *PLoS Biology* 4(12): e376, 2006.

Notes: There is a widespread concern about the direct and indirect effects of industrial fisheries; this concern is particularly pertinent for so-called "marine protected areas" (MPAs), which should be safeguarded by national and international law. The intertidal flats of the Dutch Wadden Sea are a State Nature Monument and are protected under the Ramsar convention and the European Union's Habitat and Birds Directives. Until 2004, the Dutch government granted permission for ~75% of the intertidal flats to be exploited by mechanical dredgers for edible cockles (*Cerastoderma edule*). Here we show that dredged areas belonged to the limited area of intertidal flats that were of sufficient quality for red knots (*Calidris canutus islandica*), a long-distance migrant molluscivore specialist, to feed. Dredging led to relatively lower settlement rates of cockles and also reduced their quality (ratio of flesh to shell). From 1998 to 2002, red knots increased gizzard mass to compensate for a gradual loss in shellfish quality, but this compensation was not sufficient and led to decreases in local survival. Therefore, the gradual destruction of the necessary intertidal resources explains both the loss of red knots from the Dutch Wadden Sea and the decline of the European wintering population. This study shows that MPAs that do not provide adequate protection from fishing may fail in their conservation objectives.

Louzao, M., Hyrenbach, K.D., Arcos, J.M., Abello, P., de Sola, L.G., and Oro, D. **Oceanographic habitat of an endangered Mediterranean procellariiform: Implications for marine protected areas.** *Ecological Applications* 16(5): 1683-1695, 2006.

Notes: Marine protected areas (MPAs) require ecologically meaningful designs capable of taking into account the particularities of the species under consideration, the dynamic nature of the marine environment, and the multiplicity of anthropogenic impacts. MPAs have been most often designated to protect benthic habitats and their biota. Increasingly, there is a need to account for highly mobile pelagic taxa, such as marine birds, mammals and turtles, and their oceanic habitats. For breeding seabirds foraging from a central place, particular attention should be paid to distant foraging grounds and movement corridors, which can often extend to hundreds of kilometers from breeding colonies. We assessed the habitat use by the most threatened Mediterranean seabird, the Balearic Shearwater, *Puffinus mauretanicus*, using vessel-based surveys during the chick-rearing period (May-June). We used a hierarchical modeling approach to identify those environmental variables that most accurately reflected the oceanographic habitat of this species by (1) delineating its foraging range using presence/absence data and (2) identifying important foraging grounds where it concentrates in dense aggregations. The foraging range comprised the frontal systems along the eastern Iberian continental shelf waters (depth < 200 m) and areas close to the breeding colonies in the Balearic Islands. Shearwater's aggregated in productive shelf areas with elevated chlorophyll *a* concentrations. Following the model of a core-buffer MPA, we envisioned those areas of dense aggregation (i.e., the area of influence of the Ebro River discharge and Cape La Nao regions) as the core regions deserving elevated protection and more stringent management. More diffuse protective measures would be applied within the larger buffer region, delineated by the foraging range of the species. Marine zoning measures can greatly benefit the conservation of the Balearic Shearwater and other far-ranging seabirds by extending protective measures beyond their breeding colonies during both the breeding and nonbreeding seasons.

McKinney, R.A., McWilliams, S.R., and Charpentier, M.A. **Waterfowl-habitat associations during winter in an urban North Atlantic estuary.** *Biological Conservation* 132(2): 239-249, 2006.

Notes: Coastal habitats near urban centres in North Atlantic estuaries often support substantial numbers of wintering waterfowl, but little is known of the effects of landscape setting and urbanisation on habitat use. We conducted surveys of waterfowl at 32 wintering sites in Narragansett Bay, Rhode Island, to identify characteristics that may influence habitat use. Sites were chosen along a gradient of urbanisation and reflected the dominant habitat types used by waterfowl in the Bay. Mean waterfowl abundance was 206.7 +/- 209.5 birds per site, and sites in the inner part of the estuary had higher overall waterfowl abundances ($r^2 = 0.40$, $p = 0.021$). Species richness ranged from 3.2 to 13.0 and decreased with increasing hunting activity ($r^2 = 0.36$, $p = 0.040$). Hunting activity and habitat characteristics (e.g., latitude, shoreline configuration, prey density) explained 13-27% of the variation in waterfowl abundance and species richness among sites, but landscape characteristics (e.g., surrounding residential development, vegetated land, or wetland surrounding the sites and the extent of wetland edge) explained an additional 1-26%. The landscape characteristics extent of adjacent residential development and vegetated upland were the most common variables entering into the models; most species were more abundant at sites with more adjacent vegetated upland and less adjacent residential development. Our results suggest that landscape setting may be influencing the

distribution of wintering waterfowl, and should be considered when developing strategies for the conservation for these species in urban North Atlantic estuaries.

Robertson, G., McNeill, M., Smith, N., Wienecke, B., Candy, S., and Olivier, F. **Fast sinking (integrated weight) longlines reduce mortality of white-chinned petrels (*Procellaria aequinoctialis*) and sooty shearwaters (*Puffinus griseus*) in demersal longline fisheries.** *Biological Conservation* 132(4): 458-471, 2006.

Notes: Longline fisheries have been responsible for the deaths of large numbers of seabirds worldwide. Two of the most difficult seabird species to deter from baited hooks are the white-chinned petrel (*Procellaria aequinoctialis*) and sooty shearwater (*Puffinus griseus*). Longlines with integrated weight (IW) sink faster than normal, unweighted (UW), longlines and have the potential to reduce the numbers of these species killed. The relative differences in the number of white-chinned petrels and sooty shearwaters killed on UW longlines and IW longlines containing 50 g/m beaded lead core were investigated in 2002 and 2003 in the New Zealand ling (*Genypterus blacodes*) autoline fishery. Effects on catch rates of target and non-target fish species, and operational aspects of the use of IW gear, were also assessed. A single bird scaring streamer line was deployed on all sets of longlines. In 2002 and 2003, compared to UW lines IW lines reduced mortality of white-chinned petrels by 98.7% and 93.5%, respectively. In 2003 IW lines reduced sooty shearwater mortality by 60.5%. Catch rates of white-chinned petrels (including on sets when no fatalities were recorded) by IW gear were low: 0.005/1000 hooks (UW: 0.4) and 0.01/1000 hooks (UW: 0.17) in 2002 and 2003, respectively. Equivalent rates for sooty shearwaters in 2003 were 0.06/1000 hooks by IW and 0.13/1000 hooks by UW. No albatrosses were caught on either line type in 2002; in 2003 a single Salvin's albatross (*Thalassarche salvini*) was caught on UW gear. Both the number of ling and the mean masses of ling caught in 2003 by IW (mass: 189.3; CL_{95%} 162.7-220.3 kg/1000 hooks) and UW (200.6; CL_{95%} 178.2-225.9 kg/1000 hooks) longlines were similar statistically. Use of IW longlines and streamer lines in autoline fisheries should yield major conservation benefits to seabirds interacting with these fisheries worldwide.

Veit, R.R. and Montevecchi, W.A. **The influences of global climate change on marine birds.** *Acta Zoologica Sinica* 52(Supplement): 165-168, 2006.

Notes: Global climate fluctuates at several temporal scales. For the purposes of this review, we characterize these scales as "cycles", "trends" and "regime shifts", as exemplified by ENSO, Global Climate Change and the North Atlantic Oscillation respectively. We investigate whether seabird populations have experienced changes in abundance that correlate with climate variability at each of these scales. There are numerous examples of seabird populations responding to cyclic variation in climate, especially ENSO. Indications so far are that, by virtue of longevity, seabirds recover quickly from declines caused by El Niño. More recently, data have accumulated to demonstrate longer-term changes in populations that correlate with longterm (decadal or more) changes in oceanic climate. While there are clear examples of past regime shifts in the marine ecosystems of the North Pacific, North Atlantic and Antarctic Oceans, these shifts have not yet resulted in major changes in the structure of seabird communities.

Moller, H. **Are current harvests of seabirds sustainable?** *Acta Zoologica Sinica* 52(Supplement): 649-652, 2006.

Notes: This paper reviews seabird harvests towards evaluating whether monitoring, research and management are adequate to assess their sustainability. The low productivity of adult seabirds makes their populations extremely vulnerable to overharvest unless only eggs and chicks are taken. A critical lack of information on density dependence and other potential compensatory mortality adjustments makes assessment of sustainability very difficult even in the few cases where adequate monitoring and population research are underway. Research must be very long-term for robust demographic predictions. There is neither evidence for unsustainability of most current seabird harvests, nor evidence that harvesting is sustainable.

Louzao, M., Igual, J.M., McMinn, M., Aguilar, J.S., Triay, R., and Oro, D. **Small pelagic fish, trawling discards and breeding performance of the critically endangered Balearic shearwater: improving conservation diagnosis.** *Marine*

Notes: Conservation diagnosis should identify which demographic parameters (or vital rates) are having a negative effect on the population growth rate of a threatened organism. Diagnosis can analyse how the environment is influencing the vital rates of this organism. In the present study, we tried to improve the diagnosis of a critically endangered seabird, the Balearic shearwater *Puffinus mauretanicus*, through analysis of the spatio-temporal variability of breeding performance, using long-term data sets covering most of its breeding range. We also analysed the potential influence of 2 food resources, namely small pelagic fish and trawling discards, as measured by purse-seine and trawling landings, respectively. We found inter-annual variability in breeding performance, which could be related to the changes in the availability of both small pelagic fish and trawling discards. Results showed that these variations affected all study colonies in a similar way, thus supporting previous investigations that identified a major foraging area for the whole breeding population. A fitness landscape suggested that current values of breeding success are not responsible for the sharp decline of the species, although incoming fisheries policies could affect its breeding performance in the long term. Factors affecting adult survival, both at sea and in colonies, remain the most important threat, and conservation efforts should concentrate on these issues to prevent the extinction of this endemic species of the Mediterranean region.

Martinez-Abraín, A., Velando, A., Oro, D., Genovart, M., Gerique, C., Bartolome, M.A., Villuendas, E., and Sarzo, B. **Sex-specific mortality of European shags after the Prestige oil spill: demographic implications for the recovery of colonies.** *Marine Ecology Progress Series* 318: 271-276, 2006.

Notes: Oil spills are extreme environmental perturbations (i.e. ecological catastrophes) affecting marine food webs and especially top predators, in which effects are likely amplified. As such, seabirds suffer from direct mortality and food depletion, with potentially important consequences for the population growth rate and probability of extinction. However, little is known about the effects of sex-skewed mortality (due to sex spatio-temporal differences in at-sea distribution) in seabird population dynamics. We analyzed the mortality of European shags *Phalacrocorax aristotelis* after the Prestige oil spill and its effects on breeding colonies in Galicia (southwest North Atlantic). Most adults found dead were females (85%). The year after the spill, Monte Carlo simulations of population trajectories predicted a reduction of 11% in the number of breeding pairs when skewed mortality was considered, and a lower rate (8%) when assuming random sex distribution of adult mortality. The further reduction predicted with the sex-biased mortality was probably the result of unmated adults unable to reproduce. This difference, although slight, is a concern for conservation owing that the colonies studied were already showing a 5% annual decline due to other factors also related to human activities.

Traut, A.H., McCann, J.M., and Brinker, D.F. **Breeding status and distribution of American Oystercatchers in Maryland.** *Waterbirds* 29(3): 302-307, 2006.

Notes: The Atlantic coast population of the American Oystercatcher (*Haematopus palliatus*) has seen mixed success in its recovery from historic lows at the turn of the 20th century. During the mid-1980s, breeding numbers in Maryland were estimated at 50-75 pairs based on incidental observations and the results of the state's first breeding bird atlas project. With growing national and regional concern for the species and a need for current information on its status in Maryland, the state's first comprehensive survey of nesting oystercatchers was conducted during the 2003 breeding season. Both hatching success and fledging success were relatively high, with some breeding birds nesting in areas where they were not previously found in the state. Most oystercatchers nested on salt marsh islands, as opposed to the extensive barrier island found along Maryland's coast. Although a similar number of birds nested in the Chesapeake Bay and Coastal Bays, nest success was significantly greater in the Chesapeake Bay. Landscape type proved to be the only variable that was significantly associated with statewide nest success, though it did not explain the differences in success between Chesapeake Bay and Coastal Bay birds. Several existing and potential threats require consideration in future studies and management of this species.

Liu, Y., Holt, P.I., Lei, J.Y., Zhang, Y., and Zhang, Z.W. **Distribution, numbers and age structure of Relict Gull *Larus relictus* in Bohai Bay, China.** *Waterbirds* 29(3): 375-380, 2006.

Notes: The Relict Gull (*Larus relictus*) is considered vulnerable due to its declining world population. Non-breeding season ecology of this species is poorly understood. Recent observations on wintering Relict Gulls indicated that Bohai Bay, Tianjin municipality, China, is important for this species. From 2003-2005, surveys were carried out there in order to provide data on distributions, numbers and population structure of the gulls during the non-breeding season. The results show that Bohai Bay is of international importance for Relict Gulls based on the 1% Ramsar criterion. The maximum wintering flock was composed of 3,362 individuals, which is nearly one third of the world population. Proportions of the three age groups (first-year, second-year and adult) changed through the migration season. Loss of intertidal flats and human disturbance are regarded as the main threats to the gulls. Further surveys on population size, distribution and age structure should be conducted along the coasts of southern Bohai Bay and the Yellow Sea during the winter in the near future

Molina, K.C. and Erwin, R.M. **The distribution and conservation status of the Gull-billed Tern (*Gelochelidon nilotica*) in North America.** *Waterbirds* 29(3): 271-295, 2006.

Notes: The Gull-billed Tern (*Gelochelidon nilotica*) has until recently received little conservation and management attention within North America despite a relatively low overall population size and significant declines in parts of the breeding range. This lack of attention may stem in part from the wide distribution of the species, encompassing parts of six continents, and from its tendency to nest in relatively small, scattered and often ephemeral colonies. Populations of North American subspecies are alarmingly small. The current population of the eastern subspecies *aranea* in the U.S. is unlikely to exceed 3,600 pairs, with over 60% of these birds occurring in Texas. The Texas population has remained generally stable, but declines of populations in Maryland (where probably extirpated), Virginia, North Carolina, Florida, and possibly Georgia give cause for concern for this subspecies. For the western subspecies *vanrossemi*, as few as 250 pairs nest at only two locations in the U.S., both in California. When Populations in western Mexico are considered, the entire *vanrossemi* population numbers only 600-800 pairs. Currently the Gull-billed Tern is listed as "endangered" or "threatened" in four states, and is considered to be of management concern in five others. The breeding range of the species has contracted and shifted slightly from its known historic range in the middle Atlantic states, but otherwise occupies its historic range in the United States and has expanded slightly to coastal southern California. Some range contraction in Mexico (e.g., in Sonora) may have occurred. In eastern Mexico, historical information is almost non-existent and knowledge of current distribution and abundance is incomplete. Main threats to populations in North America include loss of natural nesting islands through beach erosion or perturbations to estuarine functions, development or modification of upland habitats near breeding areas that may be important for foraging, and disturbances to colonies by humans and feral or human-subsidized predators. This species often nests on man-made substrates suggesting it could be responsive to management of breeding sites. Key research needs include more frequent and refined population monitoring, a better understanding of demographics, metapopulation dynamics and factors limiting populations as well as refinement of subspecies' breeding distributions and wintering ranges.
