

In this review:

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

Huettmann, F. and Czech, B. **The steady state economy for global shorebird and habitat conservation.** *Endangered Species Research* 2: 89-92, 2006.

Butchart, S.H.M., Stattersfield, A.J., and Brooks, T.M. **Going or gone: defining 'Possibly Extinct' species to give a truer picture of recent extinctions.** *Bulletin of the British Ornithologists' Club* 126A: 7-24, 2006.

Gilman, E., Brothers, N., and Kobayashi, D.R. **Comparison of three seabird bycatch avoidance methods in Hawaii-based pelagic longline fisheries.** *Fisheries Science* 73(1): 208-210, 2007.

B. Recent publications available online

Piatt, J.F., Kuletz, K.J., Burger, A.E., Hatch, S.A., Friesen, V.L., Birt, T.P., Arimitsu, M.L., Drew, G.S., Harding, A.M.A., and Bixler, K.S. 2007. **Status review of the Marbled Murrelet (*Brachyramphus marmoratus*) in Alaska and British Columbia.** U.S. Geological Survey Open-File Report 2006-1387, 258 p.

Available at: <http://pubs.usgs.gov/of/2006/1387/pdf/ofr20061387.pdf>

Notes: The Marbled Murrelet is a small diving seabird that resides in coastal waters of the North Pacific from central California to the western Aleutian Islands and Bering Sea. The species nests primarily on moss-covered branches of old-growth conifers, such as hemlock, firs and spruce. Losses of nesting habitat to logging led the USFWS to list the Marbled Murrelet in the Lower 48 states as threatened under the Endangered Species Act in 1992. The status of murrelets in Alaska and British Columbia was of interest to ongoing deliberations on the status of the Marbled Murrelet in the lower 48. The principal finding of the report is that Marbled Murrelet populations in Alaska and British Columbia appear to have declined within the past 2 decades. Compiling available information on abundance of Marbled Murrelets in Alaska, USGS estimated that in the recent past, Marbled Murrelets in Alaska numbered about 1 million birds. USGS examined trend information from at-sea surveys at sites spanning a wide geographic range in Alaska. USGS found that murrelet populations declined at 5 of 8 sites. For British Columbia, the historic population size of Marbled Murrelets is unknown. Trend information from sites in the Haida Gwaii (Queen Charlotte Islands) and Vancouver Island showed that population declines of similar magnitude had also occurred. The USGS concluded that the declines were likely the result of the combined and cumulative effects of human activities, such as logging, gillnet bycatch and oil pollution, and natural factors, such as climate-driven changes in oceanographic patterns and predation. USGS estimated the amount of potential murrelet nesting habitat that has been lost due to timber harvest. In southeast Alaska, for example, USGS estimated that about 15% of potential nesting habitat has been lost. For British Columbia, they estimated that 33 to 49% of potential murrelet nesting habitat has been lost. Habitat loss in some areas has been accompanied by increases in avian predators of murrelets, such as eagles, jays and ravens. This report also updated information on the genetic structure of Marbled Murrelet populations and reviewed studies on the species' nesting and feeding biology.

C. Recent articles with abstracts

Sekercioglu, C.H. **Increasing awareness of avian ecological function.** *Trends in Ecology and Evolution* 21(8): 464-471, 2006.

Notes: Birds are one of the most diverse groups of ecosystem service providers, whose ecological functions range from creating soil to shaping primate behavior, Nevertheless, the impression that birds have little influence on ecological processes has been hard to change. Given the ongoing declines in avian functional groups, there is a pressing need to compare avian ecological functions to those of other taxa, to understand how these functions translate to ecosystem services and to estimate the ecological implications of bird declines. Here, I review the ecological functions of birds, link them to ecosystem services and outline research priorities for understanding avian contributions to ecosystem functioning.

Peterson, C.H., Bishop, M.J., Johnson, G.A., D'Anna, L.M., and Manning, L.M. **Exploiting beach filling as an unaffordable experiment: Benthic intertidal impacts propagating upwards to shorebirds.** *Journal of Experimental Marine Biology and Ecology* 338(2): 205-221, 2006.

Notes: Cold-season filling using much coarser sediments than the native caused dramatic suppression of beach macroinvertebrates, demonstrably degrading habitat value for foraging shorebirds. As a dual consequence of persistent steepening of the foreshore, which translated to reduction in habitat area by 14-29%, and disturbance-induced depression of invertebrate densities on filled beaches, abundances of *Donax* spp. and haustoriid amphipods averaged less than 10% of control levels. *Donax* spp. is the biomass dominant and a key prey for higher trophic levels. Haustoriids lack pelagic larvae. Recovery on filled beaches was not initiated by either taxon during the March-November sampling. *Emerita talpoida*, an order of magnitude less abundant than *Donax* spp. on control beaches, exhibited a pattern of initial depression on filled beaches but recovered by mid summer. Polychaetes, mostly the small *Scolelepis squamata*, experienced a warm-season bloom of equal magnitude on filled and control beaches. Summertime recruitment of predatory ghost crabs appeared inhibited on filled beaches, perhaps by persistent shell hash. Intertidal shell cover on filled beaches averaged 25-50% in mid summer as compared to 6-8% on control beaches. Largely in response to prey depression, but perhaps also to surface shell armoring and/or coarsening of sediments, shorebird (mostly sanderling) use plummeted by 70-90% on filled beaches until November. Thus, despite likely adaptations to natural sediment dynamics, the high intensity of sediment deposition, cumulative spatial scope (10.8 km), and unnaturally coarse shelly character of the Bogue Banks beach nourishment resulted in a perturbation that exceeded biotic resistance and degraded the trophic transfer function of this highly productive habitat for at least one warm season.

Durant, J.M., Anker-Nilssen, T., and Stenseth, N.C. **Ocean climate prior to breeding affects the duration of the nestling period in the Atlantic puffin.** *Biology Letters* 2(4): 628-631, 2006.

Notes: Time-series covering 23 years for a long-lived seabird, the Atlantic puffin (*Fratercula arctica* L.) at Rost, northern Norway, was used to explore any indirect effects of climatic variations on chick production. By fitting statistical models on the duration of the nestling period, we found that it may be estimated using the average sea temperature and salinity at 0-20 m depth in March (having a positive and a negative effect, respectively). We propose that when the phytoplankton bloom occurs in early spring, adverse oceanographic conditions, i.e. low temperature and high salinity in March, have a negative effect on puffin reproduction by degradation of the prey availability (mainly *Clupea harengus*) for chick-feeding adults three months later.

Lemoine, N., Schaefer, H.C., and Bohning-Gaese, K. **Species richness of migratory birds is influenced by global climate change.** *Global Ecology and Biogeography* 16(1): 55-64, 2007.

Notes: *Aim* Global climate change is increasingly influencing ecosystems. Long-term effects on the species richness and composition of ecological communities have been predicted using modelling approaches but, so far, hardly demonstrated in the field. Here, we test whether changes in the composition of bird communities have been influenced by recent climate

change. *Location* Europe. *Methods* We focus on the proportion of migratory and resident bird species because these groups are expected to respond differently to climatic change. We used the spatial relationship between climatic factors and bird communities in Europe to predict changes in 21 European bird communities under recent climate change. *Results* Observed changes corresponded significantly to predicted changes and could not be explained by the effects of spatial autocorrelation. Alternative factors such as changes in land use were tested in a first approximation as well but no effects were found. *Main Conclusions* This study demonstrates that global climate change has already influenced the species richness and composition of European bird communities.

Peters, K.A. and Otis, D.L. **Shorebird roost-site selection at two temporal scales: is human disturbance a factor?** *Journal of Applied Ecology* 44(1): 196-209, 2007.

Notes: 1. Roost-site selection in shorebirds is governed by ambient factors, including environmental conditions and human disturbance. Determination of the extent to which these factors affect roost use and the associated implications for shorebird habitat protection is important for conservation strategies and informed management of human recreational use of these habitats. Shorebird conservation as a whole is a high priority world-wide because a large proportion of shorebird species is in decline. However, little is understood about the consistency of roost use by different species, what conditions affect species-specific roost-site selection, and at what spatial and temporal scales conditions influence selection. 2. We studied high-tide roost-site selection by eight species of non-breeding shorebirds on a critically important stopover and wintering refuge. We calculated spatial and temporal variability in roost use for each species based on counts and consistency of incidence. We then examined roost-site selection in relation to structural, environmental and human disturbance factors, and how this varied across spatial and temporal scales. 3. Most roosts were used less than 50% of the time, although larger roosts were used more consistently. This varied among species, with red knot *Calidris canutus* tending to concentrate at a few roosts and American oystercatcher *Haematopus palliatus*, dowitcher *Limnodromus griseus* and *Limnodromus scolopaceus* and ruddy turnstone *Arenaria interpres* more diffusely distributed among roosts. 4. At an annual scale, the principal factors affecting shorebird presence at roosts were roost length (size), local region, substrate and aspect. The extent and direction of these effects varied among species. Among years, red knots avoided roosts that had high average boat activity within 1000 m, but disturbance did not appear to be a factor for other species. 5. Daily roost use was influenced primarily by wind speed and the ability of roosts to provide shelter from the wind. Only dowitchers appeared to track daily disturbance, avoiding prospective roosts when boat activity within 100 m was high. 6. Synthesis and applications. Our findings emphasize the need to consider species-specific differences in temporal- and spatial-scale effects of roost-site selection factors, including human disturbance, when employing conservation measures for shorebirds. We suggest that conservation management should aim to provide a wide range of potential roosts (both natural and artificial) that could be used under different wind conditions and that are within reasonable travelling distance of preferred feeding areas. Roost use is often highly variable, and monitoring efforts must take this into account before making inferences about changes in use or selection of roost sites.

McGowan, C.P. and Simons, T.R. **Effects of human recreation on the incubation behavior of American Oystercatchers.** *Wilson Journal of Ornithology* 118(4): 485-493, 2006.

Notes: Human recreational disturbance and its effects on wildlife demographics and behavior is an increasingly important area of research. We monitored the nesting success of American Oystercatchers (*Haematopus palliatus*) in coastal North Carolina in 2002 and 2003. We also used video monitoring at nests to measure the response of incubating birds to human recreation. We counted the number of trips per hour made by adult birds to and from the nest, and we calculated the percent time that adults spent incubating. We asked whether human recreational activities (truck, all-terrain vehicle [ATV], and pedestrian traffic) were correlated with parental behavioral patterns. Eleven *a priori* models of nest survival and behavioral covariates were evaluated using Akaike's Information Criterion (AIC) to see whether incubation behavior influenced nest survival. Factors associated with birds leaving their nests ($n = 548$) included ATV traffic (25%), truck traffic (17%), pedestrian traffic (4%), aggression with neighboring oystercatchers or paired birds exchanging incubation duties (26%), airplane traffic (1%) and unknown factors (29%). ATV traffic was positively associated with the rate of trips to and away from the nest ($\beta_1 = 0.749$, $P < 0.001$) and negatively correlated with percent time spent incubating ($\beta_1 = -0.037$, $P = 0.025$). Other forms of human recreation apparently had little effect on incubation behaviors. Nest survival models incorporating the frequency of trips by adults to and from the nest, and the percentage of time adults spent incubating, were somewhat supported in the AIC analyses. A low frequency of trips to and from the nest and, counter to expectations, low percent time spent incubating were associated with higher daily

nest survival rates. These data suggest that changes in incubation behavior might be one mechanism by which human recreation affects the reproductive success of American Oystercatchers.

Van der Werf, E.A., Wood, K.R., Swenson, C., LeGrande, M., Eijzenga, H., and Walker, R.L. **Avifauna of Lehua Islet, Hawai'i: Conservation value and management needs.** *Pacific Science* 61(1): 39-52, 2007.

Notes: We conducted surveys from 2002 to 2005 and compiled historical information on the avifauna of Lehua Islet, Hawai'i, to assess its conservation status and management needs. Thirty-five bird species have been observed on Lehua since 1931, including 18 seabirds endemic or indigenous to the Hawaiian Islands, one resident indigenous waterbird, six migratory waterbirds, and 10 alien land birds. We observed 29 of these species during surveys from 2002 to 2005, 13 of which had not been recorded on the islet previously. Over 25,000 pairs of eight seabird species were documented to breed on Lehua, including previously unknown breeding colonies of Black-footed Albatross (*Phoebastria nigripes*) and Laysan Albatross (*P. immutabilis*), and the largest breeding colonies of Brown Booby (*Sula leucogaster*) and Red-footed Booby (*S. sula*) in the Hawaiian Islands. Remains of a Newell's Shearwater (*Puffinus auricularis newelli*) chick and a Band-rumped Storm-Petrel (*Oceanodroma castro*) chick were found, demonstrating that those species have nested on the islet and probably still do. The nesting season varied among species, with most species breeding from March to August, and at least one species breeding in every month. Predation by alien Polynesian rats (*Rattus exulans*) and Barn Owls (*Tyto alba*) is the most serious threat to nesting seabirds on Lehua. Sediment beneath a Barn Owl roost contained hundreds of bones from a variety of bird species, including Brown Noddy (*Anous stolidus*), which has been extirpated from the islet. Feral rabbits (*Oryctolagus cuniculus*) are suppressing vegetation that could provide additional nest sites for Red-footed Boobies and help prevent erosion and burying of seabird burrows. The most urgent management needs on Lehua are eradication of alien Polynesian rats, alien Barn Owls, and feral rabbits. Rocky offshore islets like Lehua may become increasingly important in seabird conservation because their small size makes it more feasible to manage threats, and because they are less likely to be affected by increases in sea level associated with climate change.

Bart, J., Brown, S., Harrington, B., and Morrison, R.I.G. **Survey trends of North American shorebirds: population declines or shifting distributions?** *Journal of Avian Biology* 38(1): 73-82, 2007.

Notes: We analyzed data from two surveys of fall migrating shorebirds in central and eastern North America to estimate annual trends in means per survey and to determine whether trends indicate a change in population size or might have been caused by other factors. The analysis showed a broad decline in means per survey in Atlantic Canada and the northeastern United States (North Atlantic region). For example, 9 of 9 significant trends in this region were < 1 ($P = 0.004$), and the mean, annual rate of change among 30 species was 0.9783, a decline of -2.17 % per year ($P < 0.001$). Trends in the midwestern United States (Midwest region) showed no clear pattern. The mean among 29 species was 1.0090 ($P = 0.35$). Only 4 of the trends were significant. Several hypotheses were evaluated to identify causes of the declining means per survey in the North Atlantic region. The most likely hypothesis appears to be a decline in the breeding populations that supply migrants to the North Atlantic region, but a change in movements, for example passing through the region more quickly in recent years, cannot be excluded as an explanation. Further surveys of arctic breeding areas coupled with analysis of long-term survey data from western North America would be helpful in determining whether the declines found in this analysis are also occurring in other areas.

Oropesa, A.L., Perez-Lopez, M., Hernandez, D., Garcia, J.P., Fidalgo, L.E., Lopez-Beceiro, A., and Soler, F. **Acetylcholinesterase activity in seabirds affected by the Prestige oil spill on the Galician coast (NW Spain).** *The Science of the Total Environment* 372(2-3): 532-538, 2007.

Notes: In November 2002, the tanker Prestige broke in two and sank at the bottom of the ocean spilling about 70,000 t of fuel oil, which reached the coast of Galicia. It was considered the largest spill in maritime history, greatly affecting marine and related avian species. The spilled fuel oil contained high concentrations of polycyclic aromatic hydrocarbons (PAHs). Many species were affected and were found dead, although ongoing research is still being carried out on the sublethal effects. In this sense, little is known about the action of PAHs on cholinesterase activity in seabirds. Consequently, the purpose of this study was to provide more information on the neurotoxicity of fuel oil on the seabirds most affected by the Prestige accident:

common guillemot, Atlantic puffin and razorbill. On the other hand, data on normal values of acetylcholinesterase (AChE) activity were obtained to supply non-exposed values in seabirds. The oil spill produced a clear inhibitory effect on brain AChE activity in common guillemot (16%, $p \leq 0.01$) and razorbill (22%, $p \leq 0.01$), but not in Atlantic puffin (4%). Physiological levels of brain AChE, expressed in nmol acetylcholine hydrolysed $\text{min}^{-1} \text{mg}^{-1}$ protein were similar in non-exposed common guillemot (388.6 ± 95.0) and Atlantic puffin (474.0 ± 60.7), however, razorbill values were higher (644.6 ± 66.9).

Romano, M.D., Piatt, J.F., and Roby, D.D. **Testing the junk-food hypothesis on marine birds: Effects of prey type on growth and development.** *Waterbirds* 29(4): 407-414, 2006.

Notes: The junk-food hypothesis attributes declines in productivity of marine birds and mammals to changes in the species of prey they consume and corresponding differences in nutritional quality of those prey. To test this hypothesis nestling Black-legged Kittiwakes (*Rissa tridactyla*) and Tufted Puffins (*Fratercula cirrhata*) were raised in captivity under controlled conditions to determine whether the type and quality of fish consumed by young seabirds constrains their growth and development. Some nestlings were fed rations of Capelin (*Mallotus villosus*), Herring (*Clupea pallasii*) or Sand Lance (*Ammodytes hexapterus*) and their growth was compared with nestlings raised on equal biomass rations of Walleye Pollock (*Theragra chalcogramma*). Nestlings fed rations of herring, sand lance, or capelin experienced higher growth increments than nestlings fed pollock. The energy density of forage fish fed to nestlings had a marked effect on growth increments and could be expected to have an effect on pre- and post-fledging survival of nestlings in the wild. These results provide empirical support for the junk-food hypothesis.

Robert, M. and Savard, J.P.L. **The St. Lawrence River Estuary and Gulf: A stronghold for Barrow's Goldeneyes wintering in eastern North America.** *Waterbirds* 29(4): 437-450, 2006.

Notes: From 1997 to 2005, the distribution, seasonal abundance, and age and sex ratios of wintering Barrow's Goldeneyes (*Bucephala islandica*) was documented in the St. Lawrence River Estuary and Gulf, Canada, with a combination of ground and helicopter surveys. Ground surveys showed that Baie-Comeau and Baie-des-Rochers were the most important localities, with monthly averages of 250 (max. = 1020) and 273 (604) individuals, respectively, from November through April. Helicopter surveys showed that four areas (Baie-Comeati, Baie-des-Rochers, Baie-Sainte-Catherine and La Malbaie/Cap-a-l'Aigle) harboured on average 74 % of all Barrow's Goldeneyes in the estuary, that numbers of individuals were more stable at these sites, and that the distribution of Common Goldeneyes (*Bucephala clangula*) within the estuary differed from that of Barrow's Goldeneyes. Because of ice conditions, goldeneyes were not found on the south shore of the estuary during the coldest winter months, although they were quite numerous in spring and fall. In contrast, large numbers of goldeneyes used the north shore of the estuary all winter long and through the end of April. In January-February of 1999, 2002 and 2005, helicopter surveys (N = 8) yielded on average 2428 Barrow's Goldeneyes (CV = 8 %), 2503 Common Goldeneyes (6 %) and 1320 Red-breasted Mergansers (*Mergus serrator*, 70 %) per year in the estuary. These species averaged 2087 (CV = 81 %), 2214 (41 %) and 2898 (34 %) individuals/year, respectively, in the gulf in January-February of 2002 and 2005 (N = 3). Helicopter survey results indicated possible identification errors between these three species, stressing the need to survey them concurrently. The January-February ratio of adult males and 'brown heads' was greater in 1998 (57.0 %) than in 1999 (51.8 %), partly because there were more immatures in the population in 1999 (18.1 %) than in 1998 (10.2 %). Adult sex ratios were significantly different from 1/1 in January-February of 1998 ($P < 0.0001$) and 1999 ($P = 0.0072$), whereas immature sex ratios were not ($P \geq 0.27$). The monthly proportion of immatures increased between January and May of 1998 ($P < 0.0001$) and 1999 ($P < 0.0001$), because of adults departing for breeding areas. The eastern North American wintering population of Barrow's Goldeneyes may include a maximum of 6187 individuals, of which > 90 % would winter along the St. Lawrence Estuary and Gulf. Thus, the St. Lawrence corridor should undoubtedly be considered as the winter stronghold for Barrow's Goldeneyes in eastern North America.

Navedo, J.G. and Masero, J.A. **Measuring potential negative effects of traditional harvesting practices on waterbirds: a case study with migrating curlews.** *Animal Conservation* 10(1): 88-94, 2007.

Notes: Because of potential conflicts between commercial and conservation interests, one challenge in coastal-area management is how to regulate harvesting practices in coastal areas without adversely affecting the survival of migratory waterbirds. In most Spanish intertidal areas of importance for shorebirds, managers have concentrated only on stock

management of the shellfish species. Here, we studied aspects of the foraging behaviour of Eurasian curlews *Numenius arquata* migrating through a Ramsar area in north Spain in the presence and absence of hand harvesters. We aimed to assess potential negative effects on curlews with a view to making coastal management recommendations that would help reduce conflict between local people and waterbirds. The average density of hand harvesters and foraging curlews at low tide was 0.56 ± 0.09 persons per 10 ha and 16.47 ± 0.73 birds per 10 ha, respectively. The presence of harvesters had a significant effect on foraging activity (no harvesting: $86.47 \pm 1.01\%$; harvesting: $82.70 \pm 1.00\%$). However, the absence of significant differences in all other foraging variables, between days with and without harvesting, indicated that curlews were able to compensate for the impact of harvesters on their foraging activity. We recommend, as a point of departure, that intertidal coastal managers of this Spanish site and similar areas of importance for shorebirds limit the harvesting load to < 0.56 persons per 10 ha⁻¹ at least during autumn migration.

Oro, D. and Martinez-Abraín, A. **Deconstructing myths on large gulls and their impact on threatened sympatric waterbirds.** *Animal Conservation* 10(1): 117-126, 2007.

Notes: Owing to increasing population trends and facultative predatory habits, large gulls have been identified as significant agents of change in the alteration of many ecological communities. Often, they are perceived as negatively impacting the population trends of most sympatric waterbirds. Consequently, culling programs have been implemented to remove adults, chicks and eggs intensively. Here, we review the interactions recorded in the literature between the yellow-legged gull *Larus michahellis* and 10 sympatric waterbirds in the Mediterranean region, all threatened and classified as species of conservation concern. We also used 177 long-term population trends derived from previous studies to study the population dynamics of these species and the culling effort performed. We show that gulls negatively affected survival, fecundity, foraging ecology and nesting habitat availability for many species. However, the annual population growth rates of most sympatric waterbirds showed positive values, even at sites where culling has yet to be initiated and local yellow-legged gull populations are large and increasing. Our results suggest clearly that population increase has not been exclusive of yellow-legged gulls, especially at the regional level. Yet, growth rates of both yellow-legged gulls and sympatric waterbirds were positively associated. Strikingly, the population extinction rate was similar between colonies of yellow-legged gulls and those of sympatric species. Thus, evidence exists to state that the success of gull control programs is relatively low in the long term. We recommend that conservation agencies heed several basic principles of population and community ecology before initiating control, for instance that (1) yellow-legged gulls have bred historically with other bird species and have likely developed defensive mechanisms against this predator and (2) populations of large gulls are regulated by density-dependent mechanisms in both space and time. Incoming European environmental policies on fishing discards and rubbish management should control more naturally and efficiently the density of large gulls and the composition of seabird communities in the long term.

Verreault, J., Bech, C., Letcher, R.J., Ropstad, E., Dahl, E., and Gabrielsen, G.W. **Organo-halogen contamination in breeding glaucous gulls from the Norwegian Arctic: Associations with basal metabolism and circulating thyroid hormones.** *Environmental Pollution* 145(1): 138-145, 2007.

Notes: Exposure to organohalogenes in endotherms has been suggested to impose chemically induced stress by affecting functions related to maintenance energy requirements. Effects on basal metabolic rate (BMR) have been suggested to be, in part, mediated through interactions with the thyroid hormones (THs). We investigated the relationships between plasma concentrations of major organochlorines, PBDEs, hydroxylated (OH)- and methoxylated (MeO)-PBDEs and OH-PCBs, circulating TH levels and BMR in breeding glaucous gulls (*Larus hyperboreus*) from the Norwegian Arctic. Negative associations were found between BMR and concentrations of Σ PCB, Σ DDT and particularly Σ chlordanes, which combined made up 91% of the total contaminant burden. Levels of THs (thyroxine and triiodothyronine) were not associated significantly with variation of BMR or concentrations of any of the compounds determined. The present study suggests that BMR may be altered in glaucous gulls exposed to high loadings of persistent contaminants in the Norwegian Arctic environment.

Borga, K., Hop, H., Skaare, J.U., Wolkers, H., and Gabrielsen, G.W. **Selective bioaccumulation of chlorinated pesticides and metabolites in Arctic seabirds.** *Environmental Pollution* 145(2): 545-553, 2007.

Notes: Chlorinated pesticides and metabolites (CPs) were quantified in the seabird species: little auk (*Alle alle*), Brunnich's guillemot (*Uria lomvia*), black guillemot (*Cepphus grylle*) and black-legged kittiwake (*Rissa tridactyla*). The purpose was to evaluate avian accumulation of selected CPs based on their concentrations and relative patterns, their relation to dietary descriptors (stable isotopes of carbon and nitrogen), to enzymes involved in biotransformation, as well as CPs' accumulation potential relative to the recalcitrant polychlorinated biphenyl PCB-153. In all species, the CP pattern was dominated by p,p'-dichlorodiphenyltrichloroethane (DDE) and hexachlorobenzene (HCB). Except for HCB, concentrations were not related to trophic position. Most CPs were quantified in black guillemot, indicating a slower elimination compared to other seabird species. Brunnich's guillemot showed efficient elimination of chlordanes, whereas the opposite was found for little auk. Kittiwake showed higher accumulation of persistent CP and metabolites than auks, whereas accumulation of less recalcitrant CPs was low.

Kunisue, T., Nakanishi, S., Oka, N., Sato, F., Tsurumi, M., and Tanabe, S. **Dioxins and related compounds in albatrosses from the Torishima Island, Japan: Accumulation features by growth stage and toxicological implications.**

Environmental Science and Technology 40(22): 6919-6927, 2006.

Notes: Concentrations of dioxins and related compounds (DRCs), such as polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), and coplanar polychlorinated biphenyls (Co-PCBs), were determined in eggs, nestlings, and adults of black-footed albatross (BfA; *Diomedea nigripes*) and short-tailed albatross (StA; *Diomedea albatrus*) collected from the Torishima Island in Japan during 2002, which is one of their breeding grounds. Observed DRC concentrations, especially PCDFs and non-ortho Co-PCBs, in eggs of BfA and StA were relatively higher than those in other oceanic, coastal, and inland wild birds reported recently and were comparable to those in a pooled BfA egg from Midway Atoll in 1993, implying continuous input of these contaminants into open ocean and possible albatross-specific exposure. Concentrations of PCDDs except 12378-P₅CDD and high-chlorinated PCDFs in 3-month-old BfA nestling were lower than those in 1-month-old nestling, indicating their developmental dilution. On the other hand, higher levels of T₄-H₆CDFs and Co-PCBs, especially low-chlorinated congeners such as 2378-T₄CDF and T₄CB77, were found in 3-month-old BfA nestling, suggesting specific exposure to these contaminants, possibly due to their higher transportability than high-chlorinated congeners. Estimated biomagnification factors of almost all the congeners in adults were apparently greater than those in nestlings, except 2378-T₄CDF, T₄CB77, and H₇-O₈CDD/Fs. This could be due to preferential metabolism of 2378-T₄CDF and T₄CB77 and lower uptake efficiency of high-chlorinated congeners through the gastrointestinal tract in adults. Toxic equivalents in BfA and StA eggs estimated using WHO-avian toxic equivalency factors exceeded some toxicity thresholds for avian embryos, indicating possible adverse effects of DRCs to albatross embryos.

Troisi, G.M., Bexton, S., and Robinson, I. **Polyaromatic hydrocarbon and PAH metabolite burdens in oiled Common Guillemots (*Uria aalge*) stranded on the East Coast of England (2001- 2002).** *Environmental Science and Technology* 40(24): 7938-7943, 2006.

Notes: Aside from the physical effects of oiling (e.g., hypothermia, dehydration, emaciation), chronic toxicity of polycyclic aromatic hydrocarbons (PAHs) contamination is an important factor influencing long-term recovery of oiled sea birds following an oil spill. Monitoring PAH exposure can help identify populations at risk from toxic effects of PAHs for further study and/or protection. This is the first study to quantify PAH and metabolite tissue burdens in sea birds directly oiled following oil spills. PAHs and hydroxylated PAHs were quantified in liver samples from oiled Common Guillemots (*Uria aalge*) stranded along the East Coast of England using gas chromatography-mass spectroscopy (GC-MS). Mean parent and metabolite PAH concentrations were 0.25 ± 0.09 (range 0.04-0.97) and 0.52 ± 0.14 (range 0.05-1.48) $\mu\text{g/g}$ (wet wt.), respectively. The main source of PAH exposure was via ingestion of crude oil during preening, resulting in PAH uptake and tissue contamination beyond levels expected from exposure via the food chain. PAH composition corresponded with number of benzene rings in each compound and was typical of contamination from petrogenic sources; pentacyclic < tri- and tetracyclic < tricyclic < dicyclic PAHs. The occurrence of PAH metabolites detected in liver samples also provided evidence of the presence and stereoselectivity of hepatic microsomal CYP1A1 in common guillemots.

Wallander, J., Isaksson, D., and Lenberg, T. **Wader nest distribution and predation in relation to man-made structures on coastal pastures.** *Biological Conservation* 132(3): 343-350, 2006.

Notes: Coastal pastures and other wet grasslands are important but decreasing breeding habitats for many waders (Charadrii). Since loss of suitable habitat is a major reason for population declines, protection and restoration of these habitats is crucial. Reduction of the often high rate of nest predation is a potentially important tool in future conservation work. Here, we focus on predators' use of raised structures in the landscape when searching for prey. Hooded crows (*Corvus corone cornix*) use man-made structures such as stone walls and barbed wire fences when foraging on coastal pastures in SW Sweden. However, few studies have examined wader breeding success in relation to man-made structures, and the extent to which such structures are used by searching nest predators. We measured the spatial distribution and rate of predation on wader nests in relation to such structures. Crows spent more time at or near man-made structures than expected by chance, but we found no significant difference in nest predation relative to distance from man-made structures. However, wader nests were placed farther away from man-made structures than expected by chance in two out of three years. Waders thus tend to avoid breeding close to man-made structures, which therefore reduce the suitable breeding area and probably also the local wader population size.

Ellenberg, U., Mattern, T., Seddon, P.J., and Jorquera, G.L. **Physiological and reproductive consequences of human disturbance in Humboldt penguins: The need for species-specific visitor management.** *Biological Conservation* 133(1): 95-106, 2006.

Notes: Over the last decade the Humboldt penguin, *Spheniscus humboldti*, has become a focus for ecotourism. Current management applies visitor guidelines similar to those developed for Magellanic penguins, *Spheniscus magellanicus*. However, unlike these, Humboldt penguins are extremely sensitive to human presence. Breeding success was significantly reduced at frequently visited sites. Heart rate telemetry during disturbance experiments revealed that Humboldt penguins respond more strongly to human presence than do any other penguin species thus far studied. A person passing an incubating penguin at 150 m distance already provoked a significant heart rate response. Recovery times were up to half an hour after direct human approach, causing increased energy expenditure without any overt behavioural reaction. Being extraordinary sensitive to human activity with little habituation potential the Humboldt penguin proves to be a difficult focal species for ecotourism. For sustainable ecotourism visitors are required to stay out of sight of Humboldt penguin breeding and moulting areas. Management guidelines need to acknowledge that even closely related species may react very differently towards human presence.

Awkerman, J.A., Huyvaert, K.P., Mangel, J., Shigueto, J.A., and Anderson, D.J. **Incidental and intentional catch threatens Galapagos waved albatross.** *Biological Conservation* 133(4): 483-489, 2006.

Notes: As large, long-lived seabirds with delayed and slow reproduction, albatrosses have low intrinsic mortality rates and are especially vulnerable to extinction from extrinsic sources of mortality such as fishery bycatch. Leg-band recovery information for waved albatrosses revealed mortality from both incidental catch and intentional catch for human consumption. Annual adult survival in 1999-2005, estimated from capture-mark-recapture data, was lower than historical estimates. This recent increase in adult mortality probably contributed to recent and dramatic shrinkage of the breeding population; periodic matrix models confirm that population growth rate is most sensitive to changes in adult survival. Banding data and recovery information also suggest that capture by fisheries is male-biased, which should reduce fecundity in this species with obligate biparental care. This new documentation of bycatch, harvesting, and associated demographic consequences provides reason for serious concern about the persistence of the single breeding population of the waved albatross.

Lopes, R.J., Pardal, M.A., Murias, T., Cabral, J.A., and Marques, J.C. **Influence of macroalgal mats on abundance and distribution of dunlin *Calidris alpina* in estuaries: a long-term approach.** *Marine Ecology Progress Series* 323: 11-20, 2006.

Notes: Estuaries used by shorebirds during the non-breeding season face many types of human pressure, including eutrophication and consequent occurrence of macroalgal blooms. The impact of this phenomenon on the abundance of dunlin *Calidris alpina* in the Mondego estuary, Portugal, was explored using long-term, monthly time series, between 1993 and 2003. The data series included total macroalgal cover, macroinvertebrate biomass and dunlin abundance. We observed an

increase in dunlin abundance during this period that matched the decrease in macroalgal cover, especially since the promotion of management actions in 1998. We suggest that this increase was related to the increase of some of its main prey species, the polychaete *Hediste diversicolor* and the bivalve *Scrobicularia plana*. At smaller scales, no effect of macroalgae was observed on the proportion of dunlin that chose to feed in alternative habitats (salinas) during the low tide period. However, there was a small effect of the level of algal cover on the proportion of birds recorded on macroalgae at intermediate levels of coverage (around 25% of total mudflat area).

Osterblom, H., Casini, M., Olsson, O., and Bignert, A. **Fish, seabirds and trophic cascades in the Baltic Sea.** *Marine Ecology Progress Series* 323: 233-238, 2006.

Notes: In the relatively simple Baltic Sea ecosystem, zooplankton-feeding sprat *Sprattus sprattus* is a major food source for breeding seabirds and piscivorous fish, and an important resource for commercial fisheries. Large-scale and long-term ecosystem changes resulting mainly from overfishing and recruitment failure of cod *Gadus morhua*, which is the main fish predator of sprat, have affected natural-history patterns in a piscivorous seabird, the common guillemot *Uria aalge*, in a complex way. As the sprat stock increased, leading to lower energy content of fish, common guillemot chick body mass at fledging decreased. However, chick fledging body mass recovered in recent years as the sprat stock diminished, which brought about corresponding increases in sprat weight-at-age and energy content. The cod and sprat fishery affect the common guillemots in the Baltic Sea, but the effects differ depending on the management strategy.

Jodice, P.G.R., Roby, D.D., Turco, K.R., Suryan, R.M., Irons, D.B., Piatt, J.F., Shultz, M.T., Roseneau, D.G., Kettle, A.B., and Anthony, J.A. **Assessing the nutritional stress hypothesis: relative influence of diet quantity and quality on seabird productivity.** *Marine Ecology Progress Series* 325: 267-279, 2006.

Notes: Food availability comprises a complex interaction of factors that integrates abundance, taxonomic composition, accessibility, and quality of the prey base. The relationship between food availability and reproductive performance can be assessed via the nutritional stress (NSH) and junkfood (JFH) hypotheses. With respect to reproductive success, NSH posits that a deficiency in any of the aforementioned metrics can have a deleterious effect on a population via poor reproductive success. JFH, a component of NSH, posits specifically that it is a decline in the quality of food (i.e. energy density and lipid content) that leads to poor reproductive success. We assessed each in relation to reproductive success in a piscivorous seabird, the black-legged kittiwake *Rissa tridactyla*. We measured productivity, taxonomic composition, frequency, size, and quality of meals delivered to nestlings from 1996 to 1999 at 6 colonies in Alaska, USA, 3 each in Prince William Sound and Lower Cook Inlet. Productivity varied widely among colony-years. Pacific herring *Clupea pallasii*, sand lance *Ammodytes hexapterus*, and capelin *Mallotus villosus* comprised ca. 80% of the diet among colony-years, and each was characterized by relatively high energy density. Diet quality for kittiwakes in this region therefore remained uniformly high during this study. Meal delivery rate and meal size were quite variable among colony-years, however, and best explained the variability in productivity. Parent kittiwakes appeared to select prey that were energy dense and that maximized the biomass provisioned to broods. While these results fail to support JFH, they do provide substantial support for NSH.

Niehaus, A.C. and Ydenberg, R.C. **Ecological factors associated with the breeding and migratory phenology of high-latitude breeding western sandpipers.** *Polar Biology* 30(1): 11-17, 2006.

Notes: Environmental conditions influence the breeding and migratory patterns of many avian species and may have particularly dramatic effects on long-distance migrants that breed at northern latitudes. Environment, however, is only one of the ecological variables affecting avian phenology, and recent work shows that migration tactics may be strongly affected by changes in predator populations. We used long-term data from 1978 to 2000 to examine the interactions between snowmelt in western Alaska in relation to the breeding or migration phenologies of small shorebirds and their raptor predators. Although the sandpipers' time of arrival at Alaskan breeding sites corresponded with mean snowmelt, late snowmelts did delay breeding. These delays, however, did not persist to southward migration through British Columbia, likely due to the birds' ability to compensate for variance in the length of the breeding season. Raptor phenology at an early stopover site in British Columbia was strongly related to snowmelt, so that in years of early snowmelt falcons appeared earlier during the sandpipers'

southbound migration. These differential effects indicate that earlier snowmelt due to climate change may alter the ecological dynamics of the predator-prey system.

Quintana, F., Punta, G., Copello, S., and Yorio, P. **Population status and trends of Southern Giant Petrels (*Macronectes giganteus*) breeding in north Patagonia, Argentina.** *Polar Biology* 30(1): 53-59, 2006.

Notes: The actual breeding population of the Southern Giant Petrel from the northern Patagonian colonies of Argentina on Isla Arce and Isla Gran Robredo was estimated to be 2,300 pairs. The available data sets are small, but showed a positive linear trend at Isla Gran Robredo over the last 14 years, but no trend was detected by a linear model at Isla Arce over a 17-year-period. Our study suggests higher population numbers in recent years. The close presence of increasing penguin, elephant seal and sea lion colonies, the low capture rates by longliners at the Patagonian shelf and/or the extensive use of waste from an increasing fleet of trawlers and jiggers as extra food supply might be some of the reasons for such a population increase.

Banks, J., Van Buren, A., Cherel, Y., and Whitfield, J.B. **Genetic evidence for three species of rockhopper penguins, *Eudyptes chrysocome*.** *Polar Biology* 30(1): 61-67, 2006.

Notes: The taxonomy of rockhopper penguins, *Eudyptes chrysocome* (Forster 1781), is contentious. Some authorities recognise three subspecies based on morphological differences and geographical separation of breeding populations while others suggest that morphological differences support classifying rockhopper penguins as two distinct species. The taxonomy of rockhopper penguins is of more than academic interest as breeding colonies worldwide have declined markedly in size since the 1930s and rockhopper penguins are currently listed as vulnerable by the IUCN. We compared the genetic distances between three mitochondrial gene regions from the three putative rockhopper penguin subspecies with the distances between various penguin sister species to clarify the taxonomy and systematics of rockhopper penguins. Genetic distances between the rockhopper penguin taxa, relative to other closely related penguin species, support reclassifying the three rockhopper penguin subspecies as species. Reclassification of rockhopper penguins as three species could result in their conservation status being upgraded from vulnerable to endangered.