

Bird Conservation Regions

REGION 3: Arctic Plains and Mountains

Many birders catch only brief glimpses into the lives of arctic-breeding birds—a flock of fleeting redpolls on a wintry day, a male King Eider bobbing amid ocean waves, the hurried passage of hormonally-charged shorebirds on spring migration. These brief encounters of shrouded lives are invigorating yet unfulfilling. Unless witnessed firsthand on the breeding grounds, it is hard to appreciate the vivacious aerial displays and vocal repertoire of the otherwise ordinary, mud-probing, gray-drab Stilt Sandpiper. Time in the arctic slowly exposes the secrets of such elusive birds and brings the textbook writings of intrepid explorers to life. The intense fighting of two territorial male Tundra Swans, the cooperative-hunting ballet performed by a Pomarine Jaeger pair, the fanatical brood defense of a male Willow Ptarmigan—all reaffirm why we are drawn to the arctic and its birds. Hordes of mosquitoes, charges by muskoxen, snow squalls in July, and fallen arches have not dampened our enthusiasm for spending field seasons in the arctic.

The Arctic Setting

Stretching more than 30° in latitude and 100° in longitude, the Arctic Plains and Mountains constitute the largest Bird Conservation Region (BCR #3) in North America. The land area encompassed by this BCR borders three main marine systems that have been designated as Pelagic Bird Conservation Areas—the Chukchi

Prudhoe Bay, Alaska; June 1994. © Kevin T. Karlson.

In the wet tundra of BCR #3, **Yellow-billed Loons** (opposite page) and **Sabine's Gulls** (below) nest on small islands within lakes and ponds.



Colville River Delta, Alaska; June 1999. © Tom Walker.

and Beaufort Seas, the Arctic Ocean, and Hudson Bay—and includes Nunavut, Canada, and the United States. As its name implies, the BCR's terrestrial landscapes range from sea-level tidal flats to mountain peaks exceeding 2,000 meters (6,500 feet) in height. The tallest mountains are found on the western edge of the BCR in the Brooks Range of northern Alaska and along the BCR's eastern border of Ellesmere, Devon, and Baffin Islands. The "plains" portion of the BCR consists primarily of relatively flat, often wet, coastal tundra. Presence of permafrost and past effects of glaciation greatly influence current patterns of bird distribution in the arctic. Humans in the region tend to congregate in small, largely aboriginal communities and in association with the infrastructure of natural resource extraction industries.

Precipitation in the BCR ranges from 70 to 200 millimeters (2.8 to 7.9 inches) per year and generally decreases as latitude increases; much of the precipitation falls as snow. Temperatures also decrease with increasing latitude, particularly in winter. Summer temperatures average between 0° and 10° C (32–50° F) but can reach 22–25° C (68–77° F). Minimum temperatures routinely reach –30° to –40° C (–22° to –40° F), and temperatures of –70° C (–94° F) have been recorded. The winter months feature a stretch without sunrise, and summer is typified by continuous daylight. Temperature and precipitation levels divide the BCR into three zones: low, mid-, and high arctic. Low temperatures, little precipitation, and rocky substrates have formed sparsely-vegetated polar deserts in the high arctic.

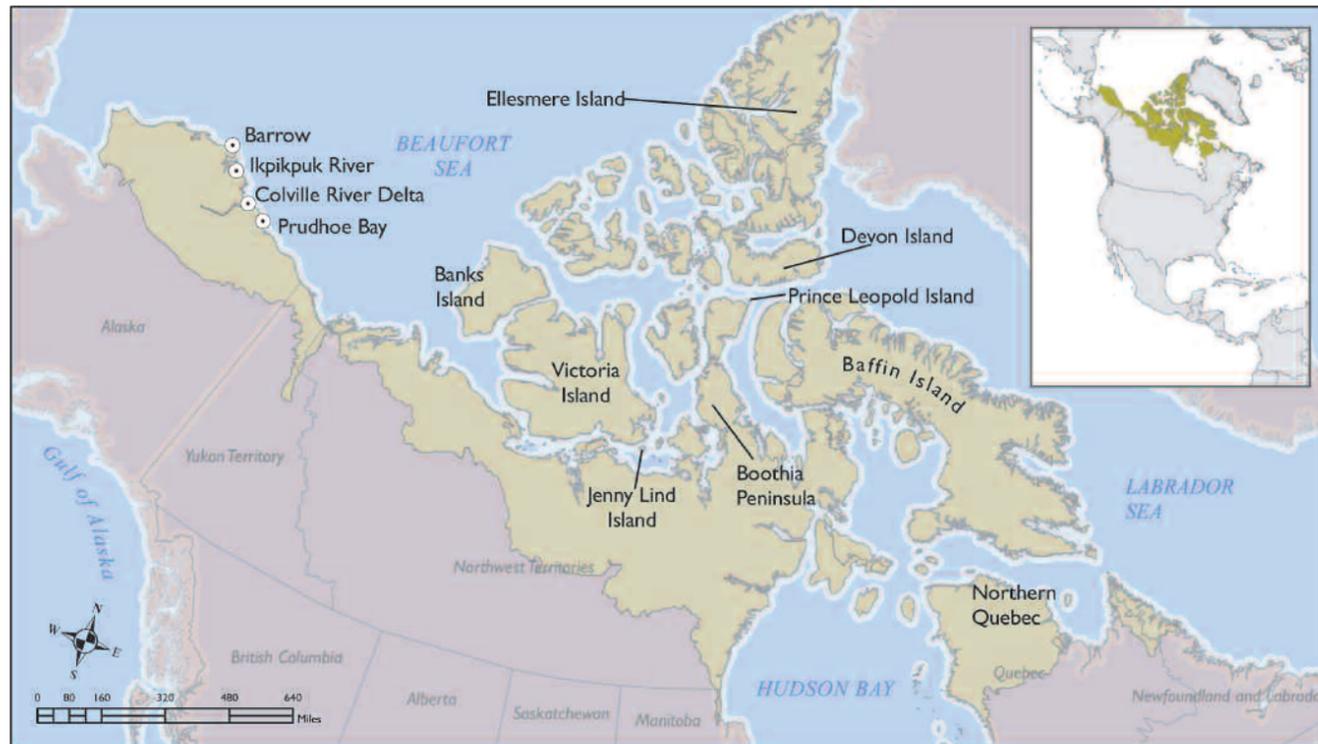
Unlike many Bird Conservation Regions, the Arctic Plains and Mountains BCR supports an avifauna that comprises mainly aquatic bird families (for example, loons, waterfowl, sandpipers, and gulls). The poor drainage caused by surficial (i.e., close to the surface) permafrost or bedrock underlying coastal plains creates a landscape dominated by shallow lakes and ponds and saturated soils. These conditions, in combination with low temperatures, limit development of a di-

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BCR #3 spans 30 degrees of latitude and 100 degrees of longitude. Map by © Kei Sochi.

verse vertical plant structure, which in turn limits diversity of songbirds throughout much of the BCR. Shrub vegetation is more developed on mainland portions of the BCR, and in general, bird abundance and richness is greatest in the low-arctic parts of the BCR, which are warmer, wetter, and woodier the mid- and high arctic. Only a few bird species manage to eke out an existence in the barely vegetated polar deserts of the high arctic.

Because of the longitudinal extent of the BCR, biogeographic affinities of breeding birds vary markedly across an east-west gradient, and many species exhibit recognizable population differences across this gradient. Of the 24 populations of shorebirds restricted to breeding mainly in the BCR, five have a western Alaska affinity, thirteen are mostly confined to North America, four are shared mainly with Europe, and two have a circumpolar distribution. Consequently, arctic-breeding birds use a multitude of routes to migrate between wintering and breeding ranges. Indeed North American arctic-breeding birds migrate to every continent (table, p. 000).

Arctic Bird Habitats

Although often portrayed as a uniform expanse of snowy, flat tundra, the arctic is vibrant with birdlife in summer. Slogging through soggy tundra, it is nearly impossible to be indifferent to the strong pulse of life. The greatest avifaunal

abundance and richness occur in wet, sedge-dominated tundra. Moisture dictates vegetation patterns, which, in turn, influence bird use. (The hiker's barometer of tundra moisture-level lists designations such as: standing water, boot print fills with water, get your butt wet eating lunch, can safely sit down for 10 minutes). In general, the wettest tundra lies closest to the coast. An aerial view of sedge tundra reveals the pervasive surface patterning formed by permafrost and freezing-thawing cycles—low-centered polygons, high-centered polygons, frost boils, earthen hummocks—and a landscape dotted with lakes and ponds. This ice-imposed surface micro-relief provides ideal nesting and foraging sites where loons, waterfowl, and shorebirds breed in high densities. In some parts of the Canadian arctic, near-surficial bedrock forms the impermeable layer that permafrost ice provides in other regions. Traipsing about the tundra, you are likely to encounter Yellow-billed Loons, Brants, and Sabine's Gulls nesting on small islands within lakes and ponds; you are sure to startle an incubating White-rumped or Pectoral Sandpiper. Sandpipers often build their nests in small clumps of sedge (tussocks), where their brown-speckled green eggs, despite a proportionately large size, are difficult to locate. In response to lemming abundance, Snowy Owl nests can be found every several kilometers in one year and be completely absent the next. Lemming cycles and weather also have significant effects



Rock Ptarmigans (adult male with caribou antlers shown here) are most common in rocky, sparsely vegetated habitats in BCR #3. Polemond River, Québec; June 2002. © Brad A. Andres.

on the reproductive success of waterfowl, shorebirds, and songbirds; when lemmings are scarce, predators such as foxes and jaegers switch to a mainly-avian diet.

As elevation increases, moisture decreases, sedges form impressive ankle-twisting tussocks, and birds become less abundant. Before the tussocks grow too large, you may stumble upon an incubating Greater White-fronted Goose (they blend into the surrounding tundra amazingly well), become distracted by an injury-feigning American Golden-Plover, and be constantly serenaded by the aerial songs of Lapland Longspurs. The presence of low shrubs (those between your knee and waist) encourages nesting of Eastern Yellow Wagtails (in Alaska), enterprising American Tree Sparrows, and taxonomically-questionable Hoary Redpolls. Small ponds and wetlands inland from the coast are favorite haunts of Long-billed Dowitchers (Alaska and western Canada) and Red-necked Phalaropes (widespread in the BCR).

In the more-southerly mainland parts of the BCR, climatic conditions, in combination with adequate soil nutrients and moisture, permit the growth of taller vegetation. Shrubs—consisting of birches, willows, and alders—may form small tundra islands. They occur more frequently along riparian corridors. Tall riparian shrubs (higher than your head) allow boreal-breeding birds entry into arctic environments; Gray-cheeked Thrushes, Yellow Warblers, White-crowned Sparrows, and, in Alaska, Bluethroats are common shrub inhabitants. While searching for shrub-bound songbirds, you may hear Wilson's Snipe winnowing overhead. The constant scouring of arctic rivers also creates an abundance of cliff sites for the aeries of Rough-legged Hawks, Gyrfalcons, and, perhaps surprisingly, Taverner's Cackling Geese.

With increased elevation and latitude, the land's surface becomes rockier and drier, and dwarf shrubs replace the grasses, sedges, and forbs. Willows, mountain avens (*Dryas*

octopetala), and bearberry (*Arctostaphylos* spp.), for example, are all lower than knee-high and some are prostrate. Sparse vegetation eventually yields to bare ground, mud boils, or expanses of frost-shattered rock. Like the wet tundra, surface patterns influenced by the glacial past are evident—fluting in exposed bedrock, raised beach ridges of ancient seas, and sand and gravel deposits (eskers) of meltwater rivers. Some bird species have developed a particular preference for these habitats. Dwarf-shrub-

dominated terraces are prime cabarets for flashdancing male Buff-breasted Sandpipers. In the high arctic, Red Knots, Sanderlings, and Ruddy Turnstones seek small clumps of dwarf shrubs in which to place their cryptic nests. Snow Buntings and Northern Wheatears harvest the sparse vegetation to build nests within rocky crevices. Ivory

Winter destinations and breeding locations of selected species that nest in the Arctic Plains and Mountains Bird Conservation Region. Note: The wintering regions listed below are representative; the entire wintering range of each species is considerably more extensive. Data are derived from specific band recoveries and other tracking instruments.

Species	Breeding Location	Wintering Region
Red-throated Loon	Colville River delta, Alaska	Korean peninsula
Northern Fulmar	Prince Leopold Island, Canada	northern Atlantic Ocean
Brant	Prudhoe Bay, Alaska	northwestern Mexico
King Eider	Devon Island, Canada	Greenland
Bar-tailed Godwit	Ikkipuk River, Alaska	southeastern Australia
Red Knot	Ellesmere Island, Canada	United Kingdom
Semipalmated Sandpiper	Boothia Peninsula, Canada	Suriname
White-rumped Sandpiper	Jenny Lind Island, Canada	Argentina
Dunlin	Barrow, Alaska	Japan
Arctic Tern	Banks Island, Canada	Antarctic marine waters
Sabine's Gull	Baffin Island, Canada	west African marine waters
Snowy Owl	Victoria Island, Canada	north-central United States
Northern Wheatear	Northern Québec, Canada	northwestern Africa



Seward Peninsula, Alaska; June 2001. © Brian E. Small.



Prudhoe Bay, Alaska; June 1995. © Kevin T. Karlson.

Songbird diversity is low in BCR #3. The reason? Poor drainage and low temperatures limit development of vertical structure in the plant community—a key determinant of avian species diversity. **Eastern Yellow Wagtails** (left) nest where there are low shrubs in the western reaches of the BCR, and **Snow Buntings** (right) favor drier, more-barren habitats throughout the northern reaches of the BCR.

Gulls have the unique habit of nesting on the cliff faces of nunataks (mountain peaks protruding among glaciers) in the eastern Canadian arctic.

As mentioned earlier, BCR #3 is surrounded by vast ex-

panses of marine waters. Although the ocean is covered with ice for much of the year, many birds use the ocean environment, and its interface with land, for feeding sites. Ocean areas that do not completely freeze (polynyas) provide some wintering habitat for seabirds and waterfowl and are critical for spring-returning waterbirds. Molting Long-tailed Ducks and fall-migrating Red Phalaropes seek refuge in the waters of barrier islands, while migrant Dunlins and Semipalmated Sandpipers forage frantically on estuarine mud flats. Earlier in the season, barrier-island driftwood offers nest sites for Common Eiders, Glaucous Gulls, and Black Guillemots. The eastern Canadian colonies of Northern Fulmars, Black-legged Kittiwakes, and Thick-billed Murres are usually located where the sea ice is discontinuous and marine food resources are readily accessible; some colonies contain more than 100,000 individuals.

Arctic Conservation Issues

Because of the BCR's large size and remoteness, foundational knowledge of the abundance and distribution of many arctic species is lacking. Although some waterfowl and seabird colonies are routinely surveyed, studies of other taxa are much less regular. A BCR-wide monitoring scheme for arctic-breeding shorebirds is being developed to determine population size and trends for most species. Because of the long distances traveled by arctic breeders, factors far outside the arctic likely influence dynamics

of arctic bird populations. For example, the harvest of arctic-nesting geese as they migrate through southern Canada and the United States has been monitored for decades, and bag limits are adjusted yearly according to breeding-ground

surveys and harvest surveys. Recently, subsistence harvest surveys have been initiated on the breeding grounds to produce a better estimate of total harvest.

Beyond the basic objective of status assessment, information on distribution and abundance is needed to determine how global climate change might affect arctic-breeding birds. Warming is altering arctic bird habitats by increasing shrub abundance, raising the sea level, and increasing terrestrial surface water (due to permafrost melt). Warming may also be decoupling the synchronous timing of bird reproduction with insect food availability. Already, increases in tundra shrub cover and decreasing sea ice cover are evident in the arctic. Predicted effects of climate change will vary across this large BCR and will affect species in different ways. Coupled with global climate change is a magnified decrease in atmospheric ozone in polar regions. As a result, cancer-causing ultraviolet radiation is increased; marine phytoplankton are particularly sensitive to these damaging rays, and shifts in food webs may result. Particulate pollution enters the arctic through atmospheric and ocean current conduits and can even be transported by migratory seabirds. Unusually high levels of heavy metals and persistent organic pollutants have been found in organisms from humans to polar bears.

Although the arctic is often perceived as pristine, the human touch here has not been soft. Mineral extraction and associated transportation pose serious changes to arctic-breeding bird habitats and the arctic wilderness ethos. Primary effects of mineral extraction on birds include the loss of habitat through the building of roads, power lines, oil pads, pipelines, mines, and associated human settlements. In ad-

dition, development may increase levels of dust, alter hydrology, thaw permafrost, and contaminate waterways, which may in turn decrease bird habitat quantity and quality. Development also encourages population increases of predatory species by providing den or nest sites and by supplying food, through human garbage, during stressful win-



Prudhoe Bay, Alaska; June 1995. © Kevin T. Karlson.



Barrow, Alaska; June 1995. © Mike Danzenbaker.

BCR #3 is most notable for its impressive diversity and large populations of aquatic species. It would be a mistake, though, to imagine that all aquatic species favor similar habitats across the BCR. For example, **Buff-breasted Sandpipers** (left) court and nest on higher, drier sites, whereas **Red Phalaropes** (right) tend to be found in lower, wetter habitats.

Arctic Adventure Birding

Despite the remoteness of the North American arctic, many representative sites are accessible. If venturing to Alaska on your own, information on arctic destinations can be found in George West's *Birder's Guide to Alaska*, published by the American Birding Association. Many birding tour companies offer trips to the various parts of the North American arctic. Barrow, Alaska, is a popular destination, and trips there are offered by High Lonesome Birdtours and Eagle-Eye Tours, among others. Flying with Jim Helmericks to his homestead on the Colville River delta is a good alternative to the more-popular destinations. From Fairbanks, Alaska, you can now drive your motor home north along the Dalton Highway to Deadhorse (Prudhoe Bay oilfield). You can also drive the Yukon's Dempster Highway to the village of Inuvik, in the MacKenzie River delta's boreal forest, where you can charter flights to Herschel Island, other communities in the delta, and nearby national parks (backpacking/camping). From Edmonton or Calgary, you can fly to the Nunavut communities of Ikalukutiak (Cambridge Bay) or Ursuqtuq (Gjoa Haven). Hotels with meals are available in these and many other communities (see the Inns North web site <www.innsnorth.com> as an example). Be sure to check with locals about polar bear activity. Regularly scheduled flights are also available from Montreal or Ottawa to a number of communities in the eastern arctic (primarily on Baffin and Cornwallis Islands). From villages on these islands (for example, Pond Inlet, Iqaluit, and Resolute Bay), you can arrange back-country trips into, for example, Quttinirpaaq, Auyuittuq, and Sirmilik National Parks. Trips into other remote sites, such as Somerset Island, are possible for the adventuresome. Packing the right gear is essential for trips to the arctic, and always be sure to pack your patience.

fortunately, oil spill response is largely ineffective in arctic waters. Difficulty of access, poor weather conditions, and the behavior of hydrocarbons in very cold environments all work against successful spill mitigation and cleanup.

To help ensure the welfare of the arctic's breeding birds, the governments of Nunavut and the Northwest Territories, as well as the Canadian Wildlife Service, are in the process of identifying areas of critical habitat for certain poorly known species. There already exists a network of protected areas across the arctic, under designations such as national parks, wildlife areas, refuges, and tribal parks. Some of these (for example, Migratory Bird Sanctuaries in Canada), were created specifically to protect birds and their habitats. Unfortunately, many protected areas are severely underfunded and understaffed and cannot achieve their mandates for wildlife conservation. Others are compromised by conflicts between conservation and industrial development within and adjacent to their borders.

To be sure, migratory birds build a strong connection between the arctic and many other parts of the globe. As with all long-distance migrants, they are subjected to a variety of perils throughout their annual cycle. Changes in their arctic breeding grounds, which are influenced by our faraway actions, further jeopardize the survival of these birds. Despite pressing problems, the arctic continues to captivate. We encourage you to venture forth to "the land of the midnight sun" to behold an astonishing spectacle of courting and nesting birds, one we are sure you will always remember. Once heard, the mournful call of a Red-throated Loon will be forever etched in your mind, as will the graceful image of a Black-bellied Plover's courtship flight. Observing the reproductive behavior of otherwise mundane shorebird migrants will greatly enrich your birding experience. You may even get to the point where you don't miss the trees.

ter months. Global climate change could have consequences such as new mineral development threats created by the opening of new marine transportation corridors. Un-