



THE MOUNTAINEERS BOOKS

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- 200 full-color photos from award-winning nature photographers Subhankar Banerjee, Steven Kazlowski, Hugh Rose, Michio Hoshino, and Arthur Morris, taken within the Arctic National Wildlife Refuge
- Essays by noted writers, biologists, and conservationists including David Allen Sibley, Kenn Kaufman, and Debbie Miller
- Life histories of bird species from every major group including shorebirds, songbirds, and raptors
- Dramatic stories of migration and strategies for survival
- Packaged with a CD of birdsong recorded in the Arctic Refuge, searchable by species

*Through the eyes of well-known authors and photographers, **Arctic Wings** reveals how all of us, no matter where we live, are connected to these northernmost breeders. A bird perched in your backyard during the winter, or a flock passing overhead, may represent some of these amazing Arctic travelers.*

—Jimmy Carter, from the Foreword

Imagine the Northern Wheatear, a remarkable insect-eating thrush, perched next to elephants on the African savannah in winter and then standing near caribou on the Arctic tundra in summer. Consider that a bird perched in your backyard today may be just visiting, midway in its annual journey to far northern climes and back. The world is connected by birds, and nowhere is this more apparent than in the Arctic National Wildlife Refuge. Each spring millions of birds from six continents and all fifty US states—a total of 194 species—begin their incredible migrations to reach the refuge to nest and rear their young. **ARCTIC WINGS: Birds of the Arctic Wildlife Refuge**, edited by Stephen Brown, Ph.D., of The Manomet Center for Conservation Sciences, is a celebration in word and image of these remarkable creatures and the grand cycle of birth and renewal that has occurred every year since time immemorial (produced jointly by The Mountaineers Books and The Manomet Center for Conservation Science, published on July 20, 2006; hardcover \$39.95, trade paperback \$27.95).

Images from the Height of the Breeding Season on the Arctic Refuge

ARCTIC WINGS presents unique portraits of birds we may know only as winter visitors. Here you'll see birds in their seasonal breeding plumage; you'll witness courtship ritual and nesting behavior. You'll see the "babies" that have only a few short weeks to grow and mature before the season turns and they must set off on paths that will disperse them around the world. You'll also enjoy the beauty of the Arctic Refuge itself, and how each bird species makes itself at home within it. Almost all of the 200 color photographs contained in the book were taken inside the Arctic National Wildlife Refuge; the few exceptions are noted in individual photo captions. For a comprehensive credit list by photographer, see pp. 186-87.

Subhankar Banerjee is the author of *Arctic National Wildlife Refuge: Seasons of Life and Land* (published by The Mountaineers Books). Solo exhibits of Banerjee's Arctic Refuge photographs have been on display at the Smithsonian National Museum of Natural History in Washington, D.C., American 1001 SW Klickitat Way, Suite 201, Seattle, WA 98134 Phone: 206-223-6303 fax: 206-223-6306 www.mountaineersbooks.org

Museum of Natural History in New York, California Academy of Sciences in San Francisco, and in other institutions.

Steve Kazlowski is an independent wildlife photographer. His images have been featured in *Audubon*, *Backpacking*, *Canadian National Geographic*, and *Time* magazines. His books include *Alaska Wildlife Impressions* and *Alaska Wildlife of the North*.

Michio Hoshino, a native of Japan, studied wildlife management at the University of Alaska. His first book, *Grizzly*, received an Anima award for distinguished wildlife photography. His photographs have been published in numerous American and international magazines.

With more than 20,000 of his images in publication, **Arthur Morris** is widely recognized as the world's premier bird photographer. His book *The Art of Bird Photography* is the classic how-to work on the subject. He is a popular *Photography* magazine columnist and currently travels, photographs, teaches, and speaks across North America each year.

Hugh Rose worked as a naturalist guide in Denali National Park for six years and since then has guided natural history trips from Alaska to Antarctica and places in between. His travels have taken him to the Arctic National Wildlife Refuge in all seasons of the year.

Mark Wilson is a staff photographer at the *Boston Globe*. He has returned to the Arctic over and over again, drawn by the amazing light, the incredible birds, and its great sense of space and time. He and his wife Marcia, both naturalists and avid birders, offer slide programs about the Arctic to audiences in New England.

Essays Detail Life Histories of Birds and Their Sojourns on the Arctic Refuge

Essays by noted biologists and conservationists detail the life histories of representative bird species of the Arctic Refuge from every major group including loons and waterfowl, raptors, shorebirds, gulls and terns, owls, and songbirds, and how the unique habitats of the Arctic Refuge are critical to all. You'll hear of their death-defying migrations, the long odds they face along the way, and the inexorable pull the Arctic Refuge exerts upon them—how the almost continuous daylight hours of the Arctic summer results in an explosion of rich food sources and round-the-clock opportunities for hunting and foraging. As the Arctic Refuge is the birthplace for more than 190 species, essayists spotlight courtship and nesting behavior, and detail the care and development of their young. There's a spotlight, too, on the remarkable 26 species of birds that overwinter in the Arctic Refuge and the special adaptations that allow them to survive and thrive in this frigid environment. The effects of development within the Arctic Refuge and the costs of oil exploration on these bird populations—effects that would ripple throughout the world—are also addressed. These are only a few of the themes covered in **ARCTIC WINGS**. Among the highlights:

David Allen Sibley, *Introduction*

Sibley is the author of *The Sibley Guide to Birds* and *The Sibley Guide to Bird Life and Behavior*. In his introduction, he traces the migratory patterns of birds and gives a calendar of their arrivals and departures on the Arctic Refuge. He speaks of the refuge as one of the last places on earth where due to the absence of automobiles and buildings and modern technology—all the insulating forces of our modern lifestyle—we can still hear the natural rhythms of the earth.

“Now that we know the routes and patterns of the birds, they can give us a sense of place, of our location on the globe. We watch them trace a line across the sky and can imagine extending the line back to where they came from and ahead to where they are going. It may be hot and sunny in the Lower 48 in July, but the migrating sandpipers bring a touch of the Arctic with them. They may have seen snowflakes and icebergs just a few days before, and consorted with eiders and Arctic Terns and longspurs. They come south to take advantage of the wetlands, warmth, and easy prey that they instinctively know are there.

As we imagine the migratory paths and patterns being honed over millennia, it also gives us a sense of time and history. Hearing the Sandhill Cranes migrating overhead on a cold north wind, we can imagine the same sounds filtering down from the clouds on a similar day 5000 years ago...

Debbie Miller, *Songs from Around the World*

Miller is a thirty-year Alaska resident who has extensively explored and studied the Arctic Refuge. Her books include *Midnight Wilderness: Journeys in Alaska's Arctic National Wildlife Refuge*.

“For a moment, visualize the astounding migration [of the Northern Wheatear]: Sometime in late winter or early spring, the wheatears leave the herds of elephants [in East Africa], flying often at night, alone or in flocks. They fly beyond Kenya and Ethiopia, and across the Red Sea. They may pass over the oilfields of Saudi Arabia, war-torn Iraq, and Iran, beyond the mountains of Afghanistan, onward across the vast interior of Siberia. Following its ancestral route, the Northern Wheatear knows of no political boundaries. It is one of the world's most diplomatic birds. In mid-May, [they] begin to arrive on the Seward Peninsula [of Alaska] after crossing two continents and the Bering Strait.

It is a wonder that so many states and countries are connected to the Arctic Refuge through the birth of birds, their unique songs, and their ancestral migration routes that thread the world. Each thread, each bird, each song, holds the world together without political boundaries. Birdsong is a universal language what we all can enjoy whether we live in America, Australia, Canada, Siberia, France, Kenya, Iraq, Bolivia, Oaxaca, or Borneo.”

Kenn Kaufman, *After an Arctic Season*

Kaufman, best known for his *Focus* series of bird guides, is a field editor for *Audubon* magazine.

“The wheel of the seasons has made a quarter-turn from summer; it is September, and I am far to the east and south of the Arctic Refuge, on a barrier beach in the Carolinas.

In making this shift in geography, I am not alone. Out on the open flat in front of me are three Buff-breasted Sandpipers, exquisite small birds with soft colors and subtle feather patterns, walking about with quick, delicate steps. They are migrants, probably just arrived from nesting grounds far above the Arctic Circle. I might have seen the parents of these very birds when I was in the Arctic Refuge in June. But not these individuals: At that time, they were not yet alive...

Thus, during the off-season, birds from the Arctic Refuge may be dispersed over half the globe, from the pack ice of the Bering Sea to the pampas of Argentina, from open plains of Kansas to ocean currents south of Africa. When all those birds return next spring, the tundra will be crowded. The Arctic may look vast on a map, but it is a finite landscape after all, and during the spectacular burst of summer activity it seems that every acre is crucial, every acre is filled to the brim with life.”

Mark Wilson, *Where the Rivers Flow North*

Biologist and wildlife photographer Mark Wilson wrote “The Backyard Birder” and “Camera” columns for *The Boston Globe*, where he is a staff photographer. He takes us on an exploration of the Arctic Refuge to give us a sense of place, to see and feel what the land is about and understand what is at stake. His 18-day canoe trip down the Canning River starts in the mountains, descends to the foothills, and traverses the coastal plain. In daily diary entries he describes the incredible wealth of bird species encountered and to see for himself the Alaska pipeline at its source, to see the sprawl of working oilfields, the footprint that oil extraction makes on the tundra—to see what supplying petroleum to consumers like him entails.

Sarah James, *Cultural Reflections*

James is a Gwich'in activist who lives in Arctic Village, just south of the Arctic National Wildlife Refuge. She has spoken across the country against development in the refuge.

“The Gwich'in believe everything is related: Every species has a responsibility to the earth in order for it to be complete. We don't single out only one bird's responsibility or one animal's responsibility. Around the globe, all indigenous people see things this way: All things are related. To harm one part of creation puts all of creation out of balance. That is why I drum—to help educate others in the ways of our culture

and to bring awareness to others that we must save the birds and the caribou and all the creatures that live in the Arctic in order to keep the balance of the natural world.”

Birdsong CD Makes Audible the Swell of Bird Life on the Arctic Refuge

Birds of the Arctic National Wildlife CD, recorded in the Arctic Refuge in June at the height of the breeding season by Martyn Stewart of www.naturesound.org, offers 60 minutes of continual play. This recording includes individual species tracks in the foreground over layers of true Arctic National Wildlife Refuge ambient background sounds. You can listen to the CD as a single ambient recording or search for your favorite birds by numbered track. Says Stewart of his experience in making his recordings:

“When the peace and quiet resumed after the bush plane departed, I realized that I had been placed into the most fantastic cacophony of sounds...the White-crowned Sparrows sing at any given hour, Lapland Longspurs fill the air with song, and a million birds join the chorus in this never-ending theater of light. I had found recordist’s paradise—no manmade noise pollution, no cars, no trucks or urban sprawl...On the enclosed CD you will hear the gentle transitions from the Arctic foothills out to the coastal plain with multiple calls of individual species mingling throughout...This is nature’s musical passage with amazing progressions from one song to another, a soundsprint of the living voices of these ecosystems.”

Stewart has been commissioned to work for radio, television, and film, contributing to such diverse sources as BBC and NPR radio; the London, San Diego, Melbourne, and Glasgow zoo exhibitions; birding reference tapes and compact discs, and more.

About the Editor of ARCTIC WINGS

Stephen Brown, Ph.D., is Director of the Shorebird Conservation Research Program for The Manomet Center for Conservation Sciences. He was the lead author on the U.S. Shorebird Conservation Plan and maintains a research program in the Arctic National Wildlife Refuge.

About The Manomet Center for Conservation Sciences

Based in Manomet, Massachusetts, The Manomet Center for Conservation Sciences is one of the nation’s oldest independent environmental research organizations. Manomet uses science to bring people together and guide them in the development of practical strategies that improve conditions for wildlife, habitats, and people.

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Did You Know?

Interesting facts from the pages of *Arctic Wings*

194 bird species have been recorded in the Arctic Refuge.

26 species of birds live in the Arctic Refuge year round, even in the depths of winter at minus 50 and 60 degrees F. They include the Common Raven, Gray Jay, American Three-toed Woodpecker, Spruce Grouse, Rock and Willow Ptarmigan, White-winged Crossbill, Gray-headed and Boreal Chickadee, and the American Dipper. Many of these birds have special adaptations that allow them to survive the frigid conditions.

Even in temperatures of 50 and 60 degrees below zero, **there are river locations in the refuge where there is open water in winter**—allowing a water bird, the American Dipper, to survive and thrive in these frigid conditions.

Birds are drawn on death-defying migrations to the Arctic Refuge every year by **an explosion of rich food sources produced by the intensity of 24-hour Arctic summer daylight**. The long days allow for continuous foraging, necessary for feeding of the young as well as for building up fat reserves in preparation for the long journey back to wintering grounds at the end of the short Arctic season.

What does it take for a bird to succeed in a long nonstop migration? Fat. To imagine eating enough to double your weight in only a month, consider this: An average human male weighting 160 pounds would be required to consume about 560,000 extra calories that month—on top of a normal diet. This is about the equivalent of eating 1600 cheeseburgers—that's 53 every day for a month!

How determined are birds to reach the Arctic Refuge?

- **The Arctic Tern makes the longest annual migration of any bird on the planet.** They fly a minimum of 24,000 miles a year, essentially from the north polar areas to the south polar areas and back. They might spend three months during the Arctic summer nesting and raising their young in the north, and then take three months to make the long journey back to their northern summer home in the Arctic. They spend most of their lives on the wing and in daylight.
- **An American Golden-Plover travels approximately 9,000 miles each way between the Arctic and Argentina**, for a total round trip of 18,000 miles or more each year.
- **The one-ounce Semipalmated Sandpiper makes a nonstop flight from Nova Scotia to South America**, traveling 2400 miles in 72 hours and burning fat equal to about half its body weight.

How crowded is the Arctic Refuge at the height of breeding season?

- There are an estimated 230,000 shorebirds nesting on the coastal plain during the breeding season.
- There are somewhere between 9,000 and 22,000 American Golden Plovers that nest in the Refuge, which is about 5 to 11% of the population thought to exist.

Some bird species live very different lifestyles during their summer breeding season on the Arctic Refuge than they do the rest of the year in other climates:

- The Long-tailed Jaeger, Sabine's Gull, and Arctic Tern live, nest, and hunt on land during their Arctic summer; they then head south for the open ocean south of the equator for the rest of the year—with striking modifications in their behavior and the prey they seek.
- Because of the long summertime daylight hours in the Arctic, owls in the Arctic Refuge hunt by day during much of the breeding season only to return to a more nocturnal lifestyle during the fall and winter seasons.
- Like other birds that fall silent in winter, shorebirds do not vocalize much during migration or on their wintering grounds. But when they arrive on their Arctic breeding grounds in late May, they burst into song, vividly advertising for mates and staking out their territories.

Bird species that winter on the Arctic Refuge exhibit special adaptations that help them endure frigid conditions:

- Chickadees roost in tree cavities in a state of “regulated hypothermia,” in which their body temperature drops as much as twenty degrees F below their normal daytime body temperature. As a result, they don’t have to expend as much energy, stored in fat reserves, to heat their bodies. They also have other cold-weather adaptations: By shivering their muscles, they use stored fat reserves to generate heat and to regulate their body temperature when cooling down at night.
- The White-winged Crossbill has an enlarged crop known as a gular pouch. They store extra seed in the gular pouch as they eat, especially toward nightfall and at the onset of inclement weather. This “lunch box” of extra food will carry the birds through the night and the cold by allowing them to slowly digest while resting in a sheltered spot. Another way they cope with the Arctic cold is by growing more down feathers in the fall and fluffing up these feathers as they remain completely still in their snow-enclosed spruce shelters.
- Ptarmigan not only grow very thick, downy body plumage to hold in warmth, but their feet are also heavily feathered to the tips of their sharp claws and act as snowshoes to allow them to walk more easily on the surface of the snow. On cold winter nights they burrow into the snow to sleep, allowing the insulating value of the snow to keep them warm. They, too, have a gular pouch in which they store food for digestion during the night or a winter snowstorm.
- The American Dipper, a water bird that thrives in river locations on the Arctic plain where there is open water in winter, has added insulation; it has more contour feathers than other passerines of similar size—approximately 4200 feathers compared with 3000 or fewer in other birds. Dippers also have a heavy layer of down between their feather tracts, and their eyelids are covered by tiny wisps of feathers. Dippers have a metabolic rate that is 35 percent lower than other passerines of the same size, so they can function well at very low temperatures.
- The feathers of the Snowy Owl have been shown in laboratory experiments to protect the owls to ambient temperatures reaching minus forty degrees F.
- The asymmetrical ear positions of the Great Gray Owl enable it to locate prey under several inches of snow. It then plunges down through the snow to capture its prey.
- Many species of owls are known to kill prey and cache it for future use. During extreme cold, some species of owls are known to “incubate” frozen prey that had been previously cached in order to eat it.

What are some possible effects of development on the Arctic Refuge?

- On average, there are more than 400 spills of oil and other toxic substances in and around North Slope oilfields annually.
- The effects of oilfield infrastructure extend far beyond the immediate footprint of the facilities. For example, dust from roads can speed snowmelt in the spring, which may encourage early nesting by small birds, possibly to their detriment. Roads and placement of gravel pads on the tundra can alter the flow of water and create ponds or deeper water, which then affect birds in and around those habitats.
- One key difference between the Prudhoe Bay/central Arctic oilfield area and the Arctic Refuge is that there is much less coastal plain habitat in the Arctic Refuge. Hence, for birds dependent on low, wet habitats, there is less available in the way of alternative habitats.
- The U.S. Department of the Interior estimates that oil development could displace Snow Geese from as much as 45 percent of their preferred feeding habitat within that portion of the Arctic Refuge that is proposed for oil development.
- The Spectacled Eider is listed formally under the Endangered Species Act—most of the US Arctic population nests where oil leases are likely to be developed.
- According to the National Research Council, increased predation is the most apparent effect of oil development on birds that nest in oilfields. For example, at Howe Island, near the Endicott Causeway northeast of Prudhoe Bay, predation by foxes and bears drawn by human habitation (and the resulting garbage produced) appears to be responsible for low nest success and even complete failures in a colony of Snow Geese from 1991-2001.