Russia's

Commander Islands Nature Reserve

Islands of Biodiversity in the Bering Sea

BERING SEA ECOREGION PROGRAM

WWF

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Cover photos

Main: Bering Island
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Top Inset: red-legged kittiwakes
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Bottom inset: northern fur seals
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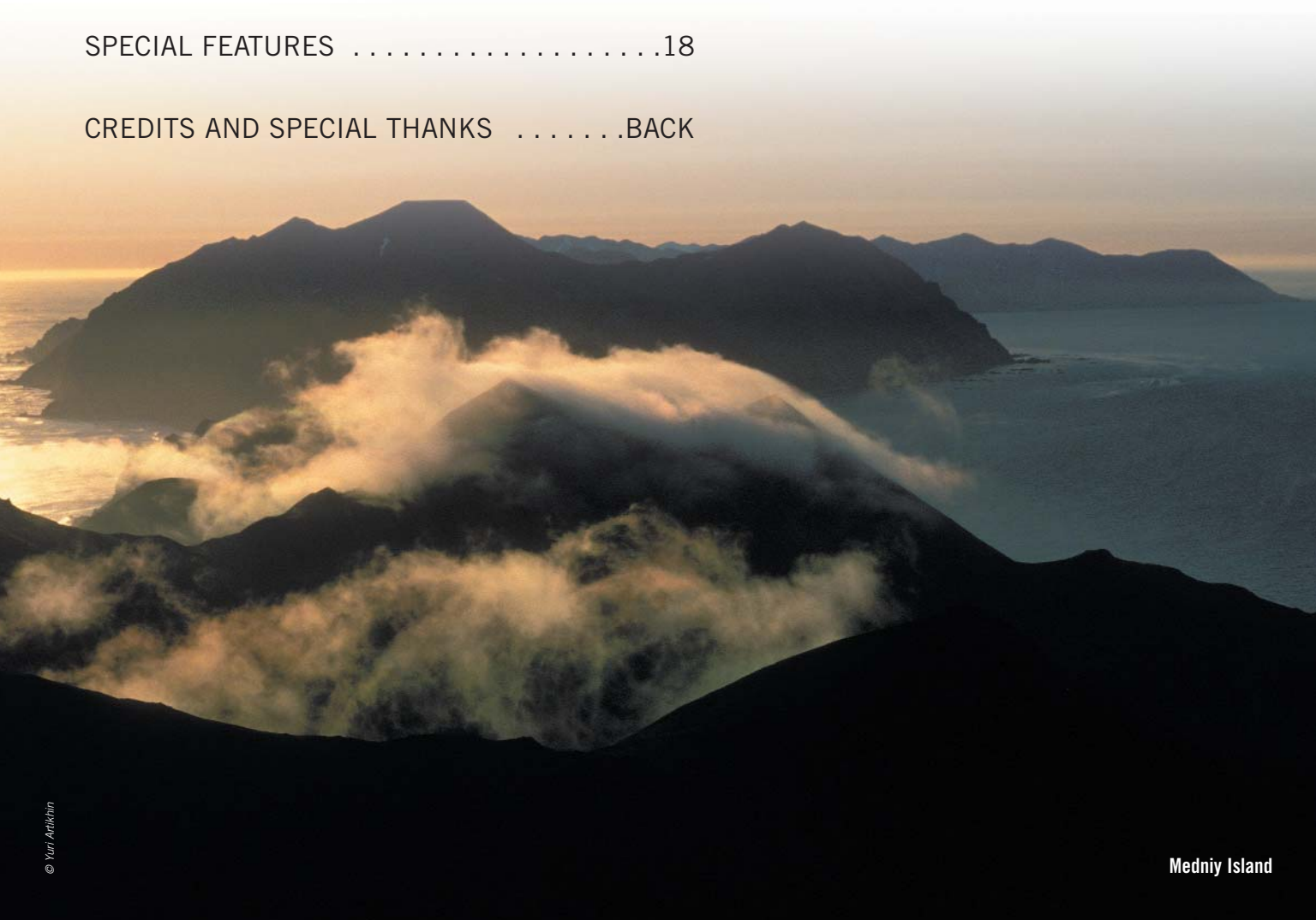
Sea otters

Contents

In 1999, WWF worked with The Nature Conservancy of Alaska, University of Alaska, various institutes of the Russian Academy of Sciences, and many other Russian and American experts to identify key areas of biodiversity for the Bering Sea ecoregion. Of the 20 areas selected as important for conservation, the Commander Islands ecosystem was recognized as a high priority and as globally significant for biological diversity.



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Medniy Island

ISLANDS IN A STORM

When first sighted from aboard a ship, the fog-draped and wave-pounded Commander Islands can appear quite somber, if not menacing. On closer approach, an awe-inspiring scene unfolds as some of the most exciting concentrations of marine wildlife in the world come into view.

Few spectacles in nature can compare with the life-and-death drama being played out on these remote island shores. The bawling calls of thousands of northern fur seals resound from their crowded rookeries as killer whales (Orcas) patrol offshore. Nearby, clouds of seabirds take flight from towering seaside cliffs, as a diving peregrine falcon singles out the most vulnerable of its winged prey.

Whether circumnavigating the islands by boat through storm-tossed seas, or walking a remote, wave-battered, wilderness beach, the scenes are truly inspirational to those who love nature. Along with the thrill of discovery, the visitor can reflect on the adventures, hardships, and heroic achievements of early explorers, traders, scientists, and settlers whose dreams drew them to these distant shores. But it is in experiencing the yet-bountiful wildlife and stark beauty, peace, solitude, and serenity only true wilderness can provide that the true spirit of this special wild place is felt.

Setting

The Commander Islands archipelago lies in the far southwest corner of the Bering Sea between the Aleutian Islands (186 miles to the east) and the Kamchatka Peninsula (197 miles to the west). The islands represent the rugged tops of an underwater mountain range that rises to 13,123 feet above the surrounding Kamchatka and Aleutian abyssal plains. In such a geographic setting the Commander Islands have served as stepping-stones both for wildlife and people traveling between the Eurasian and North American continents.

The archipelago's two largest islands are Bering (named after its discoverer Vitus Bering) and Medniy (meaning "copper" in Russian and named for the island's low-grade copper deposits). There are two smaller islands, Toporkov and Ariy Kamen, along with numerous small islets and offshore rocks.

Pillars of Science

It was physician-naturalist Georg Wilhem Steller of the Second Kamchatka Expedition to America who initiated the long and impressive history of scientific discovery in the Commander Islands. In 1741, on the expedition's return trip to Russia, the *St. Peter* shipwrecked in these islands, and Captain-Commander Vitus Bering and many crew members were dying of scurvy and malnutrition. Yet Steller was undaunted by these misfortunes, and his love of nature and scientific curiosity inspired him to study and document Bering Island's flora and fauna in great detail.

Steller's high standards for courage, commitment, and rigorous scientific discipline gained the respect of a cadre of contemporary Russian scientists, particularly wildlife biologists, who have built an enviable scientific database to guide protection and management efforts. Especially notable is Dr. Sergei Marakov, who lived on the islands from 1952-1960 and returned there annually to study their wildlife until his death in 1986. He authored some 120 articles on Commander Islands flora and fauna and firmly believed that sound science is vitally important to the protection of wildlife. Dr. Marakov is fondly remembered for inspiring a generation of his students at the Kirov Institute. Many made names for themselves as authorities on the rich biological heritage of the Russian Far East, including the Commander Islands.

Northern fur seal colony

Global Importance

Indeed, the Commander Islands possess many values worthy of protection for the benefit of humankind. First to be considered are those especially important to local people, who despite ongoing hardships, continue to choose this special place as home. Nikol'skoye village on Bering Island is the only permanently inhabited settlement in the archipelago. This heterogeneous community is composed of about 800 hardy residents, about one-half of whom are Native Aleuts. By most standards life is very hard in this remote outpost, but the friendly, generous, and hospitable people make life out of what they have.

The Russian government recognized the archipelago's values to the nation through designation of a 30-mile-wide marine protected area around the islands in 1958. This constitutes the largest protected continental shelf area in Russia and one of the few in the world. Then in 1993, the islands were included in Russia's extensive system of strictly protected nature reserves, called zapovedniks (zap-o-VĒD-niks).

The Nature Reserve is 9,015,885 acres in size (458,071 acres terrestrial and 8,412,025 acres marine) and lies within the Aleutian Region of the Kamchatskaya Oblast. It is administered by the Ministry of Nature Conservation and Natural Resources of the Russian Federation. Reserve headquarters are in the mainland city of Petropavlovsk-Kamchatsky with a field station is Nikol'skoye village.

From the beginning, the Komandorskiy Zapovednik (Commander Islands Nature Reserve) was planned in accordance with UNESCO's biosphere reserve zonal management concept to protect biodiversity as well as to perpetuate the lives and culture of its local Native population.

The Nature Reserve's great importance to the global community was demonstrated in 2002 when UNESCO designated it for inclusion in the World Network of Biosphere Reserves. The Nature Reserve has also been proposed for designation as a World Cultural and Natural Heritage Site.

The World Wildlife Fund (WWF) has identified the Commander Islands as a high-priority area for conservation in the Bering Sea ecoregion, one of 200 ecoregions in the world globally important for conserving the planet's biodiversity. And the Important Bird Area (IBA) program of BirdLife International, National Audubon Society, and Russian Bird Conservation Union has identified the Commanders as one of the 137 sites in the Bering Sea ecoregion supporting globally important bird populations.

Painful Transition

With the collapse of the Soviet communist government and the painful economic transition that ensued, Commander Island residents and Nature Reserve managers are facing many difficulties. The decline in central government support, combined with the absence of a sustainable island economy, has resulted in serious socioeconomic and environmental conditions. The local human population is declining, and financial resources are inadequate for Nature Reserve managers to fulfill their mission. Poaching of fish and wildlife has become commonplace. The Commander Islands are indeed in need of a helping hand.

Weather & Climate

The Commander Islands are located in one of the most harsh and unstable climatic regions on Earth. Moisture-laden winds from Aleutian Low pressure systems sweep in off the North Pacific and collide with cold northwesterly winds of the Siberian High. This results in stormy weather predominated by overcast skies, high humidity, fierce winds, fog, and year-round precipitation totaling 18.5 inches. Summers are short, cool, and rainy; winters are characterized by blizzards and freezing temperatures. Average temperature of the warmest month (August) is 54.26 ˚F, and the coldest (February) 22.46 ˚F.

Oceanography

The Nature Reserve's violent weather results in seawater turbulence conducive to high marine biological productivity. Wind stress, upwellings of deep ocean waters, tidal mixing, eddy pumping, and the southward-flowing

Voldopad River, Bering Island

Kamchatka Current combine to create a nutrient- and oxygen-rich marine environment. Absence of ice cover helps to stabilize the system from what would otherwise be drastic fluctuations in seasonal water temperatures.

Tidal currents are vital to dispersal of benthic and intertidal planktonic organisms around the islands. Tides enter the Bering Sea past the Commander and Aleutian Islands as progressive waves out of the North Pacific. They constitute the most important and consistent driving force for maintaining the high biological productivity of shelf waters by creating a flux of salts, nutrients, and heat.

Landscape Features

The Commander Islands archipelago occupies the great geological "Ring Of Fire" bordering the Bering Sea. Throughout their history the islands have been subjected to volcanism and frequent earthquakes. Uplift caused by under-thrusting of the North Pacific Plate has resulted in the formation of rugged, folded-block mountains dominated by volcanic tuffs, basalt, and sedimentary rocks. The highest point on Bering Island is 2,460-foot Steller Mountain, while on Medniy it is Stejneger Mountain at 2,122 feet.

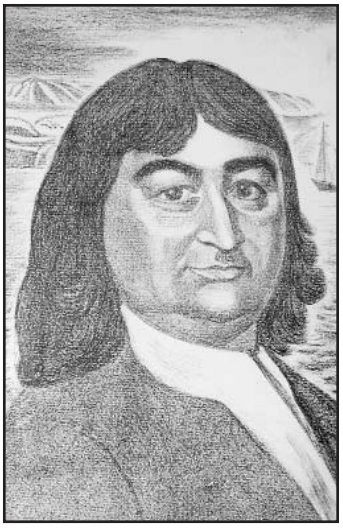
The forces of erosion have led to the formation of extensive alluvial outwash plains. Stretches of coast are bordered by spectacular cliffs that rise several hundred feet above wave-battered shores. Rocky shorelines interspersed with volcanic sand beaches in wide sweeping embayments interrupt the precipitous coastline.

Short streams and rivers fed by snowmelt cut the mountainous terrain into V-shaped valleys. The waterways flow down to the sea along steep gradients, often cascading over beautiful coastal waterfalls.

The permafrost-free substrates are dominated by nutrient poor, brown tundra soils interspersed with sandy areas and peat bogs. Lagoon lakes and flood plain marshes occur on the north end of Bering Island.

Extensive geological surveys have failed to reveal any major hardrock mineral, coal, or oil and gas deposits. Attempts to mine a low-grade copper deposit on Medniy Island in 1755 proved unsuccessful. Agates, opals, jasper, and petrified wood found on island beaches, as well as the fossilized bones of the extinct Steller's sea cow, provide some opportunity for a local arts and crafts industry.

HISTORY



Vitus Bering

Although archeological evidence has revealed that Neolithic hunter-gatherers once lived on the Commander Islands, there were no human inhabitants there at the time of their discovery by Captain-Commander Vitus Bering (who ship-wrecked on Bering Island in 1741). The Bering Sea and Bering Island, along with Commander Bay where he succumbed to ill health attempting to return to Russia from a voyage of discovery to America, were named in honor of this Danish sea captain in service to the Russian czar.

Physician-naturalist Georg Wilhelm Steller, a key member of the Second Kamchatka Expedition, was the first to catalog and describe Commander Island's flora and fauna during his winter of survival on Bering Island in 1741-1742. Several landscape features including Steller Cave, Steller Mountain, and Steller Arch were named in his honor, as was the Steller's sea cow, Steller's eider, Steller sea lion, Steller's sea eagle, and numerous plant species.

When survivors of Bering's crew finally managed to reach their home port of Petropavlovsk in a makeshift boat in August 1742, the furs they displayed and tales they told of the rich bounty of fur-bearing animals discovered on islands to the east, opened an era of rapacious exploitation of Commander Islands wildlife. Russian fur traders and their hunters *(promyshleniki)* were soon sailing to the newly discovered "fur islands" to slaughter northern fur seals, sea otters, and Arctic

Vitus Bering memorial on Bering Island

Steller sea cow skeleton

"Several enormous dark-colored forms like over-turned boats were drifting slowly along the reef, feeding underwater with only their backs exposed. Sometimes one would lift its snout and expel air with explosive snort..."

- Georg Wilhelm Steller

foxes with hopes of becoming rich. Within little more than a decade the hunting had nearly wiped out the once-prolific fur seals and sea otters. The species to pay the greatest price for the "Fur Rush" were the Steller sea cow and spectacled cormorant. The northern version of the manatee and the slow-moving cormorant were driven to extinction.

From the Commanders the promyshleniki were lured east into the Aleutians, the Pribilof Islands, and eventually down the Pacific Coast of North America in pursuit of what might have appeared as an inexhaustible bounty of fur animals. Hunting of sea otters continued into the 19th century as the most important industry on the Pacific Coast. During this period the Commander Islands were used as stepping-stones and over-wintering posts by the fur-hunting brigades. By 1830, this marine fur-bearer had become so rare that the Russian government was finally persuaded to protect the remnant populations.

The Russian Navy patrolled Commander waters during the early part of the 20th century to guard against foreign poaching of marine mammals. From the 1930s through 1950s, the Soviet government introduced various forms of animal husbandry to the islands in attempts to strengthen the local economy.

The first serious effort to provide greater protection for the archipelago's unique avifauna occurred in 1980 with establishment of a Bird Refuge. This was followed by Regional Zoological Refuge designation in 1983.

Russian scientists helped convince their national government that it was in their country's national interest to provide the Commander Islands permanent protection. Their goal was finally accomplished with establishment of the marine protection zone in 1958 and nature reserve in 1993.

BIODIVERSITY

Vegetation

Chocolate lily

The Commander Islands archipelago is treeless, with mountain tundra the predominant vegetative type. Meadow tundra occupies lee slopes at higher elevations while herbaceous meadows and brushy tundra plains are found at lower elevations along the coast.

The flora is of the Boreal Biome with East-Asian characteristics. Botanists have catalogued nearly 500 species of vascular plants. Of these, 35 are introduced and at least 37 subspecies are considered rare, including a pink ladyslipper. Among the array of colorful summer wildflowers are some, like the chocolate lily, that are of both Eurasian and North American distribution. Others, including the golden rhododendron and bushy mountain ash, are restricted to Eurasia. The Alaska blueberry finds its westernmost occurrence on Medniy Island.

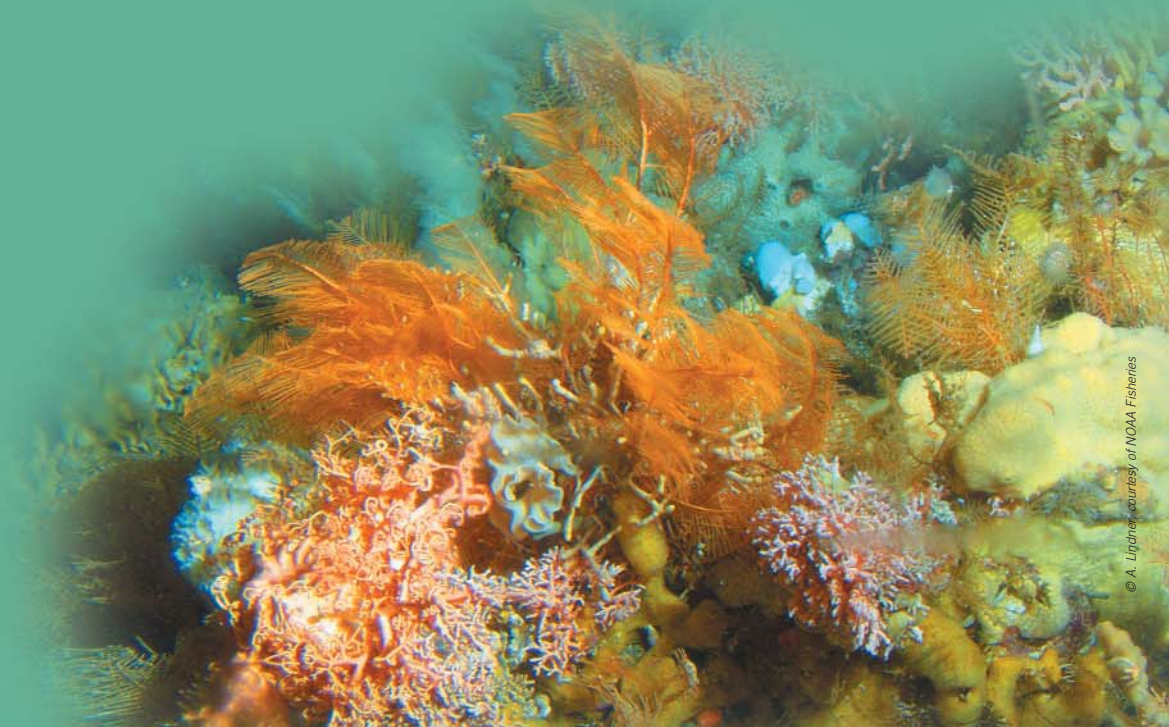
Diverse communities of colorful mosses and lichens and flowering plants decorate rock faces at seabird colonies where they are enriched by bird guano.

In adjacent coastal waters extensive underwater kelp forests provide food and shelter for a diversity of marine wildlife. The inflated floats and frond mats rising and falling in ocean swells serve as resting platforms for birds and sea otters, as well as habitat for a host of invertebrates and fishes.

Eelgrass meadows such as those on the north side of Bering Island are vital habitat to a diversity of sea life from crabs to diatoms, sea squirts, bryozoans, and polychaete worms. They are also attractive as nursery grounds for juvenile salmon, herring, crabs, and mollusks. Herring deposit their eggs on eelgrass blades where they constitute a rich food source for many fish and bird species. Eelgrass meadows have also been found to enrich coastal ecosystems through the release of tons of carbon, nitrogen, and phosphorous.

Invertebrates

Nutrient- and oxygen-rich waters surrounding the Commanders promote unusually high phytoplankton production. This, in turn, supports one of the most prolific assemblages of marine invertebrates in the Bering Sea. Included are squid, along with golden and blue king crab, and snow (Tanner) crab. Surging waters of the intertidal zone are haven to an amazing diversity of colorful starfish, sea cucumbers, sand dollars, barnacles, mollusks, sea urchins, clams, and myriad other invertebrate forms.



It is suspected that the ocean floor surrounding the Commander Islands may contain coral gardens like these, photographed in the Aleutian Islands.

Sockeye salmon

Fish

The Nature Reserve's diverse and food-rich habitats in the littoral and pelagic zones support high fish abundance, particularly on the Pacific side where upwellings are strongest. Although Commander fishes remain among the least studied in the North Pacific region, 216 species of 56 families have been identified. The 6,561-foot-deep-ocean trenches that surround the islands have led to development of isolated populations. Thus, the Commander marine ecosystem serves as a "refugium" for many marine fishes threatened elsewhere.

Sculpins (35 species), eelpouts, flounders, snailfishes, sticklebacks, skates, pouchers, and rockfishes and scorpionfishes constitute the eight families that account for 52 percent of the deepwater bony fishes present. In terms of greatest biomass, however, Pacific cod and walleye pollock take top billing. These two species are highly sought after by the Bering Sea commercial bottomfish fleet. There are 14 taxa of right-eyed flounders including Pacific halibut, flathead sole, northern rock sole, and yellowfin sole. Four species of sharks and nine species of skates are among the cartilaginous fishes.

Dense schooling populations of Pacific herring, capelin, and smelt inhabit shelf waters where they constitute a nutritious food source for a variety of seabirds and marine mammals. Island littoral habitats provide vital spawning grounds for these important food fishes.

Five species of Pacific salmon occur: pink, sockeye, chum, silver, and king. Pinks and sockeyes are most abundant and constitute economic and subsistence mainstays for Nikol'skoye villagers. Sarannoye Lake in the northern part of Bering Island is a favored spawning ground for sockeye salmon.

Dolly Varden and Arctic char along with toothed smelt are other anadromous species present. Three- and nine-spined sticklebacks are the most common freshwater species. Freshwater forms of sockeye and silver salmon and Dolly Vardens are also reported. In 1976 German carp were introduced to Bering Island lakes and are now reported as being abundant.

Bird Life

Some of the most extensive ornithological research in Russia has been conducted on the Commander Islands. Biologists have identified a total of 203 bird species, 58 of which are confirmed nesters. Six species/subspecies are endemic, that is, found nowhere else: the spectacled cormorant (now extinct), rock ptarmigan, rock sandpiper, ancient murrelet, northern wren, and gray-crowned rosy finch. The Commander forms of the wren and rosy finch are the largest of their species.

Short-tailed albatross, gyrfalcon, peregrine falcon, emperor goose, and red-legged kittiwake are among 25 species of island birds listed in the Red Data Book of the Russian Federation as threatened or endangered and therefore in need of an extra measure of protection.

This is the only location in Asia where several species of North American origin are known to breed. These include the glaucous-winged gull, red-legged kittiwake, gray-crowned rosy finch, and subspecies of peregrine falcon, pigeon guillemot, and snow bunting.

Because marine waters are the most productive and vast of Commander habitats, seabirds dominate island avifauna. Biologists estimate the total seabird population at one million with 19 species represented. Northern fulmars are by far the most numerous at some 200,000 pairs. This is one of the largest fulmar populations in Asia and the North Pacific.

The 16,200 pairs of red-legged kittiwakes constitute one of only four populations of this species that is endemic to the Bering Sea. Black-legged kittiwakes, one of the most abundant of seabirds, are also common nesters as are tufted puffins, and common and thick-billed murres.

Crested and least auklets are considered rare, and ancient murrelets and rock ptarmigan are species of "conservation concern" because of serious declines in abundance.

Commander Islands rock ptarmigan

Tufted puffins

Among the raptorial birds, peregrine falcons nest on coastal cliffs in close proximity to seabird colonies. Gyrfalcons often appear in winter, probably to target rock ptarmigan. Rough-legged hawks and snowy owls are among the island's new arrivals. The threatened white-tailed sea eagle and Steller's sea eagle are seen only infrequently as vagrants.

The threatened Steller's eider and emperor goose are among the thousands of ducks and geese that winter in island coastal waters. This is the only place in Russia where emperors winter on a regular basis. Sizable numbers of seabirds – cormorants, gulls, and alcids – also winter in these same waters.

A total of 36 species of shorebirds have been recorded in the Commanders, including the rare Pacific oystercatcher, spotted greenshank, and spoon-billed sandpiper. The endemic rock sandpiper is common and the population of 10,000 appears stable. This rusty-colored wader is a year-round resident most commonly encountered around wetlands on Bering Island during the breeding season, on tundra uplands in company with the also-common Mongolian plover in late summer, and foraging in coastal littoral areas during winter.

New breeding birds on the islands include rough-legged hawk, pomarine jaeger, slaty-backed gull, snowy owl, red-throated pipit, yellow wagtail, Kamchatka wagtail, Siberian rubythroat, and tree sparrow. The fox sparrow has been seen as a rare accidental visitor.

Current customary and traditional subsistence bird harvests consist primarily of the gathering of glaucous-winged gull eggs and tufted puffins on Toporkov Island. Historically, fulmars were favored in the Aleut subsistence take. Sport harvest of waterfowl is permitted during spring and fall seasons in the wetlands on the north end of Bering Island. The number of ducks taken has increased in recent years, and poaching is reported to be widespread. There is also considerable hunting pressure on rock ptarmigan, even though this is prohibited by regulation.

Northern fulmars and chick

Mammals

A diversity and abundance of marine mammals is one of the most notable characteristics of the Commander Islands. An estimated 225,000 northern fur seals, 22 percent of the world's population, haul out at four island rookeries during the June-July breeding season. Being expert fishers, they may dive as deep as 600 feet at night in pursuit of atka mackeral, salmon, squid, pollock, and more than a dozen other species.

Steller sea lions are present in Nature Reserve waters year-round. The species was hunted to near-extinction by the middle of the 18th century. The first reproduction in more than a hundred years occurred on Medniy Island in 1962. The current population of about 1,000 occupies five haulouts and one breeding rookery at Southeast Cape on Medniy Island.

While it was sable that led pioneering Russians to Pacific shores, it was the sea otter that led them to America. From an 18th century Commander Islands population estimated at 10,000, over-exploitation by fur hunters during a 150-year period pushed sea otters to the verge of extinction. Following closure of hunting, the population recovered and the animals repopulated the archipelago between 1960 and 1990. More than 5,000 sea otters can today be found scattered along island coastlines often rafted-up in kelp beds. These marine carnivores and relatives of the weasels are bottom foragers targeting sea urchins, crabs, and other forms of subtidal prey. Biologists remain puzzled why the Commander sea otter population remains stable while populations in Alaska waters have declined by 80-90 percent.

An estimated 3,000 harbor seals are permanent inhabitants along island coasts where they occupy 60 known haulouts. Only a limited number are taken for subsistence under special permit.

Steller sea lion rookery

Northern fur seals

Of the 18 species of whales, dolphins, and porpoises recorded in Nature Reserve waters, 10 (56 percent) are listed in the Russian Red Data Book as rare or endangered. Their status in the Commanders is unknown since they have been little studied.

Compared to marine mammals, the Nature Reserve's terrestrial fauna is impoverished with only one native species, Arctic fox, being present. This is explained by the islands' extreme isolation from mainland habitats. Separate and distinctly different races (ecotypes) of fox occur on Bering and Medniy Islands, where they constitute the most ancient and isolated populations of canines in the world. Although their origin is unclear, scientists suspect that the fox may have reached the Commanders over pack ice during a climatic cold period. The two separate races possess unique ecological adaptations. This is attributed to them having evolved in total iso-lation along narrow coastal habitats.

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Arctic fox

During the 18th and 19th centuries, foxes occurred in exceptionally high densities with up to 2,000 trapped in some years. This unusual abundance has been attributed to the relatively simple and stable winter food sources provided by carcasses of beached sea cows and whales. This food abundance was later augmented by wastes from the fur seal harvests. This all changed following extinction of the sea cow and overexploitation of whales, along with overtrapping and the outbreak of an epizootic disease carried by an ear tick. Only a very limited trapping take is currently allowed on Bering Island.

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Steller Arch

ZONAL MANAGEMENT REGIME

Killer whale and fishing boat

Medniy Island coastal rock formation

Russia's Commander Islands

Key

- Seabird colonies
- Northern fur seal & sea lion rookeries
- Harbor seal rookeries
- Whale concentration areas
- Settlement

MEDNIY ISLAND

Bobrovye Kamny Rookery

Peschanaya Bay

Preobrajenskoe Settlement (abandoned)

Gladkovskoe Lagoon

Korabel'naya Bay

Uril'e Rookery

Glinka Bay

Peresheek Bay & Isthmus

Southeastern Rookery

Pigeon guillemots

CONSERVATION PRIORITIES

Greater International Support Needed

The key to future success in protecting the Commander Islands Nature Reserve lies in balancing conservation and sustained use of natural resources by island residents. The Nature Reserve has great potential to serve as a model for other marine biosphere reserves, providing that financial resources can be found to achieve science-guided management objectives. Given Russia's ongoing economic crisis, however, this will require greater international collaboration, including both public and private investment and support.

Recognizing what is at stake, dedicated Russian scientists, government officials, conservationists, local people, and NGOs are collaborating like no time in history with their American partners to secure a brighter future for the Nature Reserve's wildlife and people. The basic strategy is to take proactive and practical approaches to basic problems in pursuit of achievable goals. All see this as an historic opportunity to help make the Commander Islands a model for conservation and sustainable use, an inspiration to humankind.

WWF is committed to assisting the Commander Islands Nature Reserve, as well as its village of Nikol'skoye. WWF's priorities include: supporting science and stewardship in the reserve; addressing factors that threaten the wildlife and habitats; and building public support for and local involvement in the protected area. Only with community participation and support will this globally important marine reserve be able to thrive.

Since 2000, WWF has supported a youth education program in the Nikol'skoe school, and more recently provided funds for a group of university students to spend a summer field season in the Nature Reserve, working closely with scientists and rangers. In 2004, WWF organized and financed two international marine expeditions, in April and June, to achieve several objectives. One of these was to improve enforcement of the marine zone: inspectors on board helped to patrol the rich waters surrounding the islands, and tested software to better monitor fishing boats through a satellite-based vessel monitoring system. The software, developed with WWF support by Sevvostrybvod, the regional fisheries management agency, will be an important part of future monitoring activities in the larger Bering Sea ecosystem. The expedition supported scientific research, plankton studies, pelagic bird counts, and surveys of the islands' seabird colonies. Finally, a group of expedition members spent several days in Nikol'skoe to meet with community members and learn about their concerns and priorities regarding education, conservation, and resource management. The expedition was filmed by Russian and American film producers, whose footage WWF will use to promote the Nature Reserve internationally.

Future areas of WWF activity in the Commanders include: continued support for environmental education and public participation; science and stewardship within the Nature Reserve; addressing threats such as illegal fishing, poaching, potential oil spills and pollution, and non-native species; and promoting international collaboration and funding for this unique area of biodiversity in the Bering Sea.

The U.S. Fish & Wildlife Service is already sharing its wealth of experience through cooperative seabird and sea otter projects, and in environmental education. The U.S. National Marine Fisheries Service could be of great help in conducting joint fishery stock assessments, deep-sea exploration, and monitoring of fur seal and sea lion populations.

A number of important international agreements are in place to enhance such collaboration. Especially noteworthy are the 1972 U.S.-Russia Environmental Agreement, 1973 Working Group on Marine Mammals, and 1976 U.S.-Russia Migratory Bird Convention. Russia also has conventions with Japan and South Korea for the conservation of birds and their habitats.

With the help of Russian and U.S. bird specialists, Audubon Alaska developed a species list and database for Commander Island avifauna. This information will help guide development of a bird conservation strategy for the islands that strikes a better balance between conservation and sustainable development.

Major Conservation Concerns & Action Priorities

FUNDING SUPPORT

Concern
Inadequate Nature Reserve finances and management presence

Actions
- Provide international financial assistance
- Upgrade research and monitoring programs
- Provide staff benefits commensurate with training & responsibilities
- Train managers in public outreach and law enforcement
- Procure satellite phones and internet connections
- Upgrade field cabins
- Procure high-speed patrol vessel

RESEARCH & MONITORING

Concern
Programs seriously underfunded & outdated

Actions
- Develop international cooperative programs
- Delineate & map seabird foraging areas & reproductive success
- Monitor winter gatherings of Steller's eiders, emperor geese & other seabirds
- Conduct contaminant analyses on Steller sea lions
- Determine sea otter population trends
- Explore for likely presence of deep-sea coral & sponge communities
- Determine customary & traditional subsistence needs of local population
- Determine the extent of poaching

FISHERIES

Concern
Extensive poaching within marine protected zone

Actions
- Insist on greater cooperation among agencies with law enforcement responsibilities
- Institute an aggressive interagency patrol system in marine waters

Concern
High seabird mortality in high-seas commercial fisheries

Actions
- Ban Japanese high-seas salmon gillnet fishery
- Require employment of seabird avoidance devices in longline fishery

INVASIVE SPECIES

Concern
Norway rat & American mink predation on ground nesting birds

Action
- Institute rat & mink eradication & preventive measures

Concern
Overgrazing by domestic reindeer

Action
- Develop a herd management plan to avoid damage to native flora

POLLUTION

Concern
Danger of spills from offshore oil development

Action
- Develop state-of-the-art oil spill response system

Concern
Dispersal of industrial pollutants on air and water currents

Action
- Attempt to identify major sources of most dangerous pollutants

Concern
Fuel spills, bilge pumping, & disposal of fish nets & garbage at sea

Actions
- Vigorously enforce ocean dumping laws
- Initiate beach cleanup efforts & wildlife disentanglement program
- Conduct a risk and mitigation assessment of regional shipping lanes

Concern
Toxic materials lost at sea or deposited in island waste dumps

Action
- Monitor contaminant levels in island wildlife & eliminate sources

CLIMATE CHANGE

Concern
Threatened disruption of highly synchronized wildlife life cycles

Action
- Support international efforts to curb greenhouse gas emissions

SUSTAINABLE ECONOMIES

Concern
Extremely weak local economy with high levels of unemployment

Actions
- Establish an "International Biosphere Research Station" on Bering Island
- Support small-scale kelp & salmon processing businesses
- Encourage low-impact ecotourism

COMMUNITY OUTREACH

Concern
Local people ill-informed about Nature Reserve programs

Actions
- Share findings of research
- Expand public education activities

Concern
Little involvement of local people about Nature Reserve programs

Actions
- Utilize traditional knowledge & experience of local people
- Provide meaningful job opportunities

Concern
Frequent violation of hunting regulations

Actions
- Conduct preventive law enforcement
- Vigorously enforce hunting regulations

THREATENED AND ENDANGERED WILDLIFE OF THE COMMANDER ISLANDS NATURE RESERVE

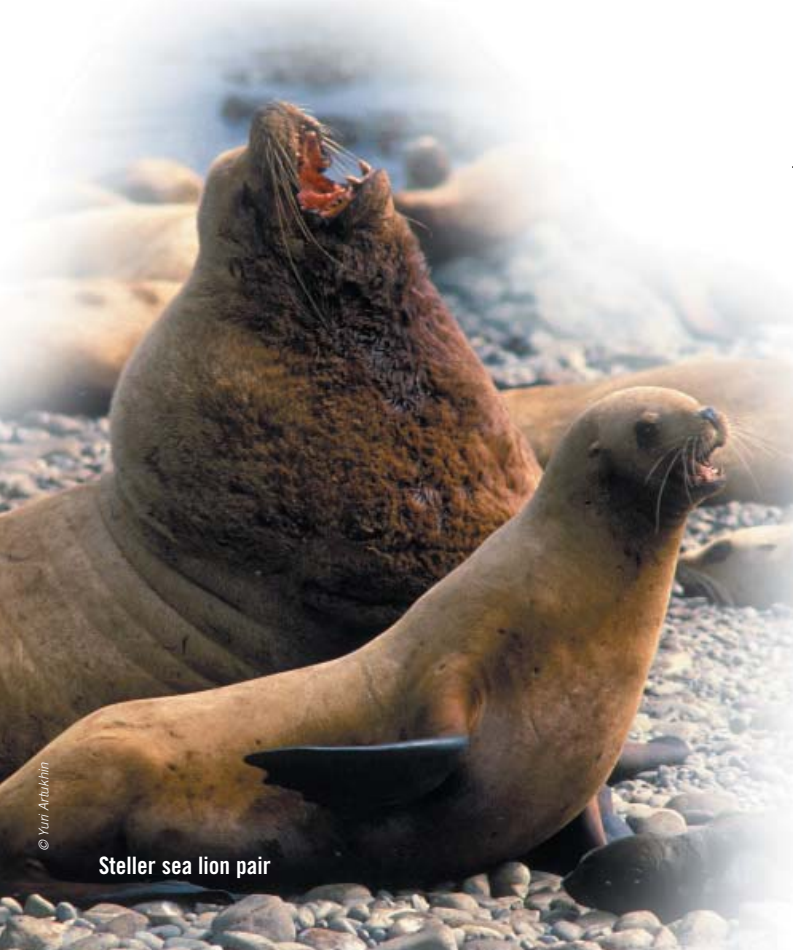
Birds

Yellow-billed loon, *Gavia adamsii*
Short-tailed albatross, *Phoebastria albatrus*
Aleutian Canada goose, *Branta canadensis leucoparia*
Brent (brant) goose, *Branta bernicla nigricans*
Lesser white-fronted goose, *Anser erythropus*
Emperor goose, *Chen canagicus*
Swan goose, *Anser cygnoides*
Whistling swan, *Olar columbianus*
Baikal teal, *Anas formosa*
Chinese merganser, *Mergus squamatus*
Osprey, *Pandion haliaetus*
White-tailed sea-eagle, *Haliaeetus albicilla*
Bald eagle, *Haliaeetus leucocephalus*
Steller's sea eagle, *Haliaeetus pelagicus*
Gyrfalcon, *Falco rusticolus*
Peregrine falcon, *Falco peregrinus*
Watercock, *Gallicrex cinera*
Oystercatcher, *Haematopus ostralegus*
Spotted greenshank, *Tringa guttifer*

© Hiroshi Hasegawa

Short-tailed albatross

Spoon-billed sandpiper, *Eurynorhyrnchus pygmaeus*
Far eastern curlew, *Numenius madagascariensis*
Red-legged kittiwake, *Rissa brevirostris*
Ivory gull, *Pagophila eburnea*
Aleutian tern, *Sterna aleutica*
Long-billed murrelet, *Brachyramphus perdix*



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Steller sea lion pair

Mammals

Bowhead whale, *Balaena mysticetus*
Northern right whale, *Eubalaena glacialis*
Blue whale, *Balaenoptera musculus*
Fin whale, *Balaenoptera physalus*
Sei whale, *Balaenoptera borealis*
Humpback whale, *Megaptera novaeangliae*
Gray whale, *Eschrichtius robustus*
Cuvier's beaked whale, *Ziphius cavirostris*
Stejneger's beaked whale, *Mesoplodon stejnegeri*
Harbor porpoise, *Phocoena phocoena vomerina*
Harbor seal, *Phoca vitulina stejnegeri*
Steller sea lion, *Eumetopias jubatus*
Sea otter, *Enhydra lutris*
Medniy Island Arctic fox, *Alopex lagopus semenovi*

Source: Red Data Book of the Russian Federation, Moscow, 2001

SPECIAL FEATURES OF THE RESERVE MOST CRITICAL TO THE CONSERVATION OF BIODIVERSITY

- Coastal sea cliffs on Bering, Medniy, Toporkov, and Ariy Kamen Islands: nesting seabirds.
- Haulouts and rookeries for northern fur seals, Steller sea lions, and harbor seals.
- Intertidal zone: nutrient-rich primodial habitats for diverse invertebrate life-forms.
- Littoral zone: kelp forests and brown and red algae communities.
- Shelf domain: diverse zooplankton, invertebrate, and fish habitats.
- Shelf break: highly productive feeding area for predatory fish, birds, and marine mammals. Possible deepwater coral and sponge communities.
- Subsea platform between Bering and Medniy Islands: important nursery area for schools of juvenile Pacific cod, pollock, Pacific halibut, and flounder.
- Piypa Volcano: deepwater hydrothermal communities.
- Northwest Bering Island eelgrass meadows: fish and crab nursery and waterfowl feeding area.
- Northern Bering Island wetlands: nesting and migrating waterfowl and shorebirds.
- Sarannoye Lake, Bering Island: sockeye salmon spawning grounds.
- Gladkovskaya Lagoon, Medniy Island: highly stratified water column with unique mollusk and oligochaete worm communities.
- Lisinskoye Lake, Bering Island: unique fish population.
- Coastal marshes, Bering Island: waterfowl nesting and brood rearing.
- North Bering Island littoral: over-wintering waterfowl.

Gladkovskaya Lagoon, Medniy Island

Credits

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Ariy Kamen seabird colony