

Glacier Bay-Admiralty Island Biosphere Reserve



Periodic Review
November, 2013



PERIODIC REVIEW FOR UNITED STATES BIOSPHERE RESERVES

(July 22, 2013)

INTRODUCTION

The World Network of Biosphere Reserves, which now includes 621 sites in 117 countries, is an important means to incorporate biodiversity conservation and ecosystem management activities into sustainable development. This opportunity for U.S. biosphere reserves is especially valuable with respect to cooperation with U.S. neighbors Canada and other countries having ecological conditions similar to parts of the U.S. The following survey instrument is provided to help U.S. biosphere reserve authorities prepare the required periodic review of biosphere reserves in the U. S. This survey instrument implements provisions of the Statutory Framework of the World Network of Biosphere Reserves that encourage countries to elaborate and implement national criteria for biosphere reserves to take into account the diversity of national and local situations. An important goal of U.S. biosphere reserves is to serve as models of voluntary collaboration in land management and sustainable development by securing the support and involvement of local people; therefore, the periodic review of U.S. biosphere reserves will focus on how the reserves perform the following functions through voluntary cooperative approaches involving local people and their elected officials:

1. Conservation- contribute to the conservation of landscapes, ecosystems, species and genetic variation;
2. Development- foster economic and human development which is socio-culturally and ecologically sustainable;
3. Logistic support- facilitate local demonstration projects, environmental education and training, and research and monitoring related to local, regional, and global opportunities for conservation and sustainable development.

PERIODIC REVIEW REPORT



1. BIOSPHERE RESERVE

Name of reserve, year designated, and names and affiliations of persons preparing and participating in the review.

Glacier Bay-Admiralty Island Biosphere Reserve
Designated in 1986

Glacier Bay-Admiralty Island Biosphere Reserve was designated in 1986, representing an outstanding example of the marine and terrestrial ecosystems of the Sitkan Biogeographic Province of North America. This Biosphere Reserve in southeastern Alaska (United States) is managed by two United States land management agencies: the National Park Service (NPS; under the Department of the Interior) and the United States Forest Service (USFS; under the Department of Agriculture). Combined, the two units (Glacier Bay National Park and Preserve (NPS); Admiralty Island National Monument (USFS)) of the biosphere reserve make up over 1.5 million hectares. The Glacier Bay area is a superlative example of the ice-affected landscapes typical of the northern portion of the Sitkan biogeographic province, while the forest of Admiralty Island is the greatest remaining block of productive old-growth temperate rain-forest in the world.

The entries below address the periodic report criteria applying a consistent format: an Admiralty Island unit entry supported by bullet points followed by a Glacier Bay National Park unit entry supported by bullet points.

The National Park Service and U.S. National Forest Service are committed to the sustainable conservation of the Glacier Bay-Admiralty Island Biosphere Reserve, consistent with the objectives of the World Network of Biosphere Reserves. Over the past decade, the Glacier Bay-Admiralty Island Biosphere Reserve has excelled in its ability to achieve the conservation, development, and logistic support functions.

Persons participating in this periodic review:

Susan Boudreau, Superintendent, Glacier Bay National Park and Preserve
Lisa Etherington, Chief of Resource Management, Glacier Bay National Park and Preserve
Tom VandenBerg, Acting Chief of Interpretation, Glacier Bay National Park and Preserve
Laura Buchheit, Supervisory Interpretive Ranger, Glacier Bay National Park and Preserve
Mary Beth Moss, Cultural Anthropologist, Glacier Bay National Park and Preserve
Lewis Sharman, Ecologist, Glacier Bay National Park and Preserve
Chris Gabriele, Wildlife Biologist, Glacier Bay National Park and Preserve
Tania Lewis, Wildlife Biologist, Glacier Bay National Park and Preserve
Scott Gende, Senior Science Advisor, Glacier Bay National Park and Preserve
Jamie Womble, Wildlife Biologist, Glacier Bay National Park and Preserve
Allison Banks, Environmental Protection Specialist, Glacier Bay National Park and Preserve
Chad Soiseth, Fisheries Biologist, Glacier Bay National Park and Preserve
Marilyn Trump, Concessions Specialist, Glacier Bay National Park and Preserve
Jake Ohlson, Facility Management Systems & Safety Specialist, Glacier Bay National Park and Preserve
John Schoen, Wildlife Ecologist, retired
Paul Alaback, Professor Emeritus of Forest Ecology, University of Montana
Natalie Dawson, Associate Director, Wilderness Institute, University of Montana
Gwen Baluss, Wildlife Technician, Juneau Ranger District, U.S. Forest Service
Kevin Hood, Wilderness Manager, Admiralty Island National Monument
Chad VanOrmer, Monument Ranger, Admiralty Island National Monument



2. CONSERVATION

- a) *Have there been significant changes over the past decade in habitats, biodiversity and ecosystems in your biosphere reserve? If so, describe examples and provide any related weblinks.*

Admiralty Island is particularly well protected as a Biosphere Reserve unit since it is a large oceanic island and well buffered from effects of development on other islands or the mainland. Additionally, the Admiralty Island unit is both National Forest and National Monument, and largely designated wilderness ([the Kootznoowoo Wilderness](#)). Its current management structure emphasizes protection and preservation and provides for only modest development and extraction. What may be most remarkable about the Admiralty Island unit over the last decade is that its healthy habitats, biodiversity and ecosystems have not significantly changed – they have retained their natural integrity. What may be the most significant change is a perceptual shift: our enhanced understanding of and appreciation for Admiralty Island, as research continually reveals the Biosphere Reserve’s unique biodiversity and ecosystem values. Noteworthy considerations regarding its change and stability include:

- Admiralty Island continues to host one of the highest densities of nesting bald eagles (*Haliaeetus leucocephalus*) in the world (more than found in the other 49 states combined), one of the world's densest populations of brown bear (*Ursus arctos*; 1 animal per square mile, or approximately 1600 brown bears in total) and unique island biota distinct from mainland species.
- Recent research has illuminated the extent of Admiralty Island's unusual island endemism and led some to call for managing the area as its own distinct biological unit to preserve populations of high conservation significance.
- Out of Southeast Alaska's 22 biogeographic provinces, the Admiralty Island province:
 - ranks 2nd highest in relative biological value for focal species brown and black bear (*Ursus americanus*), marbled murrelet (*Brachyramphus marmoratus*), Sitka black-tailed deer (*Odocoileus hemionus sitkensis*), salmon and large-tree forest and estuarine ecological systems;
 - ranks 6th highest in percentage of original habitat remaining intact
 - ranks 4th highest in percentage of existing habitat protected
 - ranks 6th highest in percentage of original habitat values at risk
 - scores as the only province that is both highly productive for the full suite of focal resources and also managed primarily for fish and wildlife conservation and ecosystem integrity. (Albert & Schoen 2007)
- Recent studies have documented that Admiralty Island contains some of the best remaining examples of highly productive lowland Sitka spruce (*Picea sitchensis*) – western hemlock (*Tsuga heterophylla*) temperate rainforest, including 602,708 acres (243,913 hectares) of productive old growth and 99,937 acres (40,444 hectares) of large-tree old growth (the highest timber volume) (Schoen & Dovichin 2007).
- The last commercial logging on Admiralty Island, occurring on a 22,890-acre inholding owned by Shee Atiká, Incorporated, ended in 2001. Other commercial logging operations had ceased decades prior.
- Other parts of the Sitkan Biogeographic province assessed by the United Nations in the 1980's, prior to selecting the Glacier Bay – Admiralty Island Biosphere Reserve, have since been overharvested with rare and critical forest ecosystems lost. This loss heightens Admiralty's value as a Biosphere Reserve where these habitat types (e.g., large-tree old-growth) are still abundant in their natural diversity.
- In 2013, [the Greens Creek mine](#), the largest silver-producing mine in North America which operates on approximately 265 acres at the north end of Admiralty Island National Monument, was given permission to expand its tailing disposal facility to a limited extent that will develop an additional 18 acres of Monument habitat (primarily muskeg and scrub forest) and extend the mine's projected operating life by 10 years to 2029.
- A significant administrative change since designation of the Admiralty Island unit of the Biosphere Reserve is that in 1990 the U.S. Congress renamed the Admiralty Island National Monument Wilderness Area the Kootznoowoo Wilderness Area. "Kootznoowoo" is the native Tlingit name for Admiralty Island and it translates as "Fortress (or Den) of the Bears." The new name honors Admiralty's Native Alaskan heritage and accurately describes the island.

Within the Glacier Bay National Park and Preserve unit of the Biosphere Reserve, the significant changes observed over the past decade, 2003-2013, have been those related to natural causes, not anthropogenic sources. Glacier Bay protects a natural biophysical landscape that is continually changing through large-scale natural disturbance followed by the biological succession of plants and animals, and accompanied by an evolving physical environment. Over the past 250 years, glaciers have retreated rapidly leaving over 70 miles of deep marine fjords and extensive barren landscapes with subsequent and ongoing successional changes in plant and animal communities. Particular marine and terrestrial species that have exhibited significant changes over the past decade are highlighted below.

- The number of humpback whales (*Megaptera novaeangliae*) that seasonally utilize Glacier Bay has increased about 5% annually (e.g., 2004=139 observed; 2012=208 different individuals photographically documented).
- The number of Steller sea lions (*Eumetopias jubatus*) in the Glacier Bay region increased 8.2%/yr. from 1970 to 2009, representing the highest growth rate for this species in Alaska. The most rapid growth occurred at South Marble Island (16.6%/yr from 1991-2009) a site in Glacier Bay that was first colonized by sea lions in the 1980's (Mathews et al. 2011). In addition, sea lions have colonized several new haulout sites and a new rookery. Sea lions from two distinct population segments occur in Glacier Bay. The eastern population was removed from the Endangered Species List in 2013, while the western population is still listed as Endangered.

- The number of sea otters (*Enhydra lutris*) in Glacier Bay has increased, from 2000 to 8000 in the past 10 years, and their range has substantially increased. This population increase and range expansion has significantly affected benthic communities (e.g., kelp beds, crustaceans, bivalves).
- The number of harbor seals (*Phoca vitulina*) observed in Glacier Bay has declined sharply (between 8-9% since 1992) despite stable or slightly increasing trends in nearby populations (Mathews & Pendleton 2006, Womble et al. 2010). Recent studies suggest that nutritional constraints, disease, and disturbance by vessels are not primary factors driving the decline (reviewed in Womble & Gende, 2013).
- Brown bears (*Ursus arctos*) have expanded their range in Glacier Bay. Sightings have increased in southern Glacier Bay including the developed areas around park headquarters and the neighboring town of Gustavus.
- After first arriving in the 1960's, moose (*Alces alces*) have expanded their range. Populations irrupted on the Gustavus Forelands and have subsequently decreased to sustainable levels.
- Glacier Bay's countless glaciers continue to shape the landscape. [Glacial dynamics continue to be extensively studied](#), especially in relation to climate change. Glacier Bay demonstrates a unique glacial dynamic with several advancing glaciers, growing due to their source in the towering coastal range mountains

b) *Does the reserve contribute significantly to biodiversity conservation? If so, briefly describe how it does.*

The Admiralty Island Biosphere Reserve unit contributes significantly to biodiversity conservation. The Tlingit have called Admiralty Island home and recognized it as valuable brown bear habitat since time immemorial. The Island received its first forest management protections in 1909 and its first protective hunting regulations (restricting bear hunting) in the 1930's. President Jimmy Carter recognized its significance to conservation [when he designated Admiralty Island a National Monument on December 1, 1978](#), extolling its biological values and proclaiming it “the largest unspoiled coastal island ecosystem in North America.” Congress realized its intent to preserve “extensive unaltered ... coastal rainforest ecosystems” and “sound populations of, and habitat for, wildlife species of inestimable value ...” as expressed in the Alaska National Interest Lands Conservation Act of 1980, by designating the majority of the island as wilderness (almost 1 million acres). The following brief descriptions further detail its contributions to biodiversity conservation:

- Biologists Joseph Cook, Natalie Dawson and Stephen MacDonald detail the newfound relevance of Alexander Archipelago islands, such as Admiralty Island, in terms of biodiversity conservation:

Pleistocene glacial advances along the coast fragmented species, leaving clear genetic signatures and a strongly diversified fauna. Organisms recolonized the coast following deglaciation from multiple northern (Beringia), southern (West Coast and Continental) or North Pacific Coastal refugia. Several species are composed of multiple, genetically distinctive lineages (in some cases, incipient or new species) due to independent colonization histories from distinct, divergent source populations. Second, the insular landscape of the Alexander Archipelago has produced highly endemic populations. These centers of endemism should be thoughtfully managed as hotspots of lineage diversity. Until a better understanding of connectivity among these divergent populations is developed, each island should be considered an independent biological unit. (Cook et al. 2006)
- Admiralty Island hosts various endemic populations of mammals: endemic subspecies (beaver (*Castor canadensis*), meadow vole (*Microtus pennsylvanicus*) and ermine (*Mustela erminea*); an endemic lineage (Pacific marten; *Martes caurina*), and an evolutionarily distinct lineage of brown bear (with polar bear ancestry, found also on Baranof and Chichagof Islands) – all of which “represent populations of high conservation significance” (Schoen & Dovichin 2007).
- Recent work has also shown that salmon are a keystone species for these northern temperate rainforest ecosystems with key functions in animal food webs both in coastal marine and upland terrestrial ecosystems (Orians and Schoen 2013). Admiralty is exceptional in that most of its coastal watersheds are still intact, and it is the only island in the Southeast Alaska region which has king salmon (*Oncorhynchus tshawytscha*) breeding habitat (they usually breed in large mainland watersheds). Salmon populations on the island are particularly important for monitoring the effects of global climate change in the region (Bryant, 2009).
- Admiralty Island is one of the largest forest reserves for a number of North Pacific coast rain forest bird species. At least a dozen songbird species that are dependent on mature conifer forest have significant population strongholds within Admiralty, including northern residents such as Brown Creeper (*Certhia Americana*), and long-distance migrants such as Pacific-slope Flycatcher (*Empidonax difficilis*).

- Marbled Murrelets were detected over land on breeding bird surveys on Admiralty Island. Old growth forests provide essential nesting areas for this seabird which is listed under the Endangered Species Act elsewhere in its range. (Piatt et al. 2007) Likewise, the Queen Charlotte Goshawk breeds within Admiralty Island. The subspecies has been petitioned for listing, but declined because sufficient wilderness habitat has been set aside. (U.S. Fish and Wildlife Service 2007)
- Relatively sheltered and less disturbed near shore waters provide an important refuge for molting White-winged Scoter (*Melanitta fusca*) and Surf Scoter (*Melanitta perspicillata*); surveys indicate that at least 16,000 scoters molt in the northern half of Seymour Canal. These sea ducks have been experienced troubling population declines in the last decade.
- The large peat bog “muskeg” complexes such as found on the Glass Peninsula provide a unique habitat. Locally important Vancouver Canada Geese (*Branta canadensis fulva*) are genetically distinct from other populations and adapted to breed in these forested bogs. (Hupp et al. 2011; Hupp et al. 2010)
- Admiralty Island also contains the [Pack Creek Zoological Area](#) which encompasses [a unique world-class brown bear viewing site](#) that is frequented by brown bears that have tolerated human presence in close proximity for generations. This rare situation has allowed thousands of visitors to appreciate bears in a nonconsumptive and nondisruptive manner, to overcome their innate fear of large carnivores and to learn of the need for conservation of large intact ecosystems.

Glacier Bay was designated a national park to preserve a dynamic tidewater glacial landscape and associated natural successional processes for science and discovery in a wilderness setting. Through its diversity of large, contiguous, intact ecosystems, Glacier Bay protects ecological integrity. Furthermore, as a living laboratory, it provides outstanding opportunities to learn about and be inspired by the natural world.

- The biodiversity of Glacier Bay includes the following flora and fauna: 242 species of birds, 41 species of mammals, 160 marine and freshwater fish, 3 amphibians, 333 vascular plants, and 662 species of lichens.
- Glacier Bay’s protected ecosystem stands in contrast to surrounding areas that are subject to extraction and development, including: timber harvest, wildlife harvest, road construction, and exploration and extraction of mineral resources. The park serves as a reserve for habitats and species that are impacted in surrounding areas
- Glacier Bay National Park preserves one of the largest units of the United States wilderness preservation system, encompassing more than 2.7 million acres of glacially influenced marine, terrestrial, and freshwater ecosystems.
- Glacier Bay preserves one of the largest (nearly 600,000 acres) areas of federally protected marine ecosystems in Alaska (including submerged lands) against which other less protected marine ecosystems can be compared. Glacier Bay National Park’s designation as a Marine Protected Area in 2007 further highlights the marine conservation value of this area to the global community.
- Glacier Bay National Park and Preserve protects a number of federally listed endangered species (under the U.S. Endangered Species Act; ESA), including the humpback whale (*Megaptera novaeangliae*) and Steller sea lion (*Eumetopias jubatus*; Western Distinct Population Segment), which are found in abundance in the reserve. Kittlitz’s murrelet (*Brachyramphus brevirostris*) is a rare seabird that recently was considered for listing as threatened or endangered under ESA; Glacier Bay provides important feeding and nesting habitats and supports 37% of the range-wide population.
- Glacier Bay National Park and Preserve protects genetically unique individuals of several species, and thus, is critical in protecting biodiversity of the region. For example, recent genetic analysis of brown bears (*Ursus arctos*) in Glacier Bay has determined that the park is home to an endemic population of brown bears, a result of early isolated colonization after recent glacial retreat (Lewis 2012). Black bears found from Glacier Bay to Yakutat Bay (an area almost entirely in the park) are recognized as a subspecies (*Ursus americanus emmonsii*) and it is likely that Glacier Bay is also home to one or more unique populations of black bears, including an uncommon color variant (known as glacier or blue bears) that is almost exclusively in northern Southeast Alaska. Further, harbor seals in Glacier Bay and adjacent Icy Strait were recently designated by NMFS as one of 12 unique stocks of harbor seals in Alaska (Allen & Angliss 2011).
- Glacier Bay spreads strong messages of biodiversity conservation through outreach and education. In 2013, resource conservation messages were shared by park rangers with 600,000 visitors in the park, over 8,000 visiting youth and local school children through special youth programming, 46 classrooms world-wide through distance learning presentations, and countless audiences through social media sites and the park website. Printed materials also communicate conservation messages (see attached Fairweather visitor guide and park brochure).

c) *Does the reserve provide an opportunity to explore and demonstrate voluntary approaches to sustainable development on a landscape or regional scale? If so, briefly describe how it does.*

Admiralty provides a unique example of sustainable development in the northern Sitkan province in that - unlike other island ecosystems with highly productive lowland forest - for a variety of specific historical reasons (in particular the high wildlife conservation value of this island) it has largely retained its native old growth temperate rainforests (Nie 2006, also see Alexander 2010). It has developed a very successful alternative model of resource use with a high dependence on local and national ecotourism activities, most notably brown bear observation areas, highly-regulated brown bear hunting opportunities, a rapidly growing economic sector related to the rich freshwater and marine fisheries resources and a large network of cabins, shelters and trails, including the Cross-Island Canoe Route, for low impact hiking and camping opportunities. It is also considered one of the premier areas for sea kayaking and related wilderness recreational activities. Admiralty Island is also highly regarded for its subsistence opportunities. The Village of Angoon on the island is an active center for human activities on the island, including continuing a long history of traditional spiritual, recreational, economic and subsistence use of island resources. The Biosphere Reserve will continue to provide these ecosystem services only as long as development and economic activity occur sustainably. While overarching legislation affords Admiralty Island with levels of protection, there are still ample opportunities that favor voluntary measures to find the most sustainable approaches. Examples include:

- Guided brown bear hunting is a high-value business that depends on constant cooperation amongst the guides to determine who will operate where, when and for how long, and to refine plans to accommodate noncommercial hunters and other users. Voluntary coordination has proven to be the most effective means for preserving quality opportunities for all. Additionally the Unit 4 Brown Bear Management Team, consisting of agency staff and interested citizens, [makes insightful recommendations](#) to ensure the long term viability of the brown bear population of Admiralty, Baranof and Chichagof Islands.
- The Alaska State Department of Fish & Game, in conjunction with the U.S. Forest Service, is conducting salmon research and monitoring centered around Kanalku Lake and Creek. Kanalku has long been an area of significance to the inhabitants of Angoon as evidenced by archeological sites. It is still an area of immense importance to the local population for its subsistence sockeye fishery. The ongoing research/monitoring connects local fish population studies to subsistence and commercial fishing harvest in mixed stock areas. The intent is to find a voluntary balance between commercial and subsistence harvesting that precludes the need for further regulations.
- The Alaska State Department of Fish & Game, in conjunction with the U.S. Forest Service, has collared bears at Pack Creek to uncover the range for bears that are habituated to human presence. This research, combined with public support, has convinced the State Board of Game to establish a no-hunting zone around the Pack Creek Zoological Area and to rebuff petitions to open the area to hunting, thereby preserving the sustainable economy of recreational tourism centered around bear viewing.

Glacier Bay provides opportunity for voluntary demonstrations of sustainable development through collaboration with stakeholders. Park management plans and strategies provide guidance to ensure natural resources are maintained in the face of future development pressures. Glacier Bay regulations set conservation standards that are regularly exceeded by many participating companies to reach shared conservation goals.

- Glacier Bay vessel Quota and Operating Regulations allow for sustainable recreational opportunities that provide for a variety of visitor experiences while minimizing impacts to natural and cultural resources.
- Since 2011, cruise ships have voluntarily reported their whale sightings throughout Southeast Alaska to the National Marine Fisheries Service. With this data, a weekly map is provided to all cruise ships to decrease the chance of whale collisions.
- Concession companies, especially cruise lines, voluntarily establish environmentally conscientious practices as part of their bid for operating permits in Glacier Bay. Practices include: allowing park service wildlife observers on board; use of fuel with lower sulfur content (below 1.5%) while in Glacier Bay; operating at lower exhaust opacity levels; and obtaining vessel “sound signatures” to better understand the influence of vessel noise to the acoustic environment of marine mammals.
- Cruise ships that enter Glacier Bay allow NPS observers to record information on marine mammal sightings and behavior. This data is utilized to evaluate the severity and frequency of close encounters between ships and wildlife. Such information helps park managers to understand the effectiveness of management measures to reduce impacts.

- In response to attention drawn to the issue of whale-ship collisions in Glacier Bay, the Alaska cruise industry developed "Cruise Industry Whale Avoidance Best Management Practices" which was adopted by the Northwest and Canada Cruise Ship Association in 2012.
- While vessel numbers within Glacier Bay are regulated, the vessels voluntarily communicate and coordinate to meet visitor experience goals maximizing the wilderness experience within the Biosphere Reserve. For example, cruise ships will coordinate their schedules so that there will only be one ship at the face of a tide-water glacier at one time. Smaller vessels will coordinate their shore expeditions to maximize opportunities for solitude and minimize impact on resources and other visitors.
- Through backcountry orientations, all campers and boaters are introduced to *Leave No Trace* ethics and principles. The result is a reduced impact to park resources.
- Of the more than 3.2 million acres within Glacier Bay National Park and Preserve, 57,000 acres are part of the preserve, where subsistence and sport hunting, trapping, commercial fishing, and limited off-road vehicle use are permitted according to the Alaska National Interest Lands Conservation Act (ANILCA).

d) *Have biodiversity and ecosystem services assessments been done? If so, briefly describe available databases and relevant reports.*

Biodiversity and ecosystem services assessments that cover Admiralty Island in its entirety or in specific areas include:

- The newly released [North Pacific Temperate Rainforests: Ecology and Conservation](#), published in 2013 and edited by Gordon Orians and John Schoen comprises expert analysis from a range of disciplines as to the pertinent issues relevant to conserving the temperate rainforest from Northern British Columbia through Southeast Alaska.
- Audubon Alaska and The Nature Conservancy published "[A Conservation Assessment and Resource Synthesis for the Coastal Forests & Mountain Ecoregion in Southeastern Alaska and the Tongass National Forest](#)" by Dave Albert and John Schoen in 2007. This work inventories ecosystem and habitat values through Southeast Alaska.
- [Cook et al. \(2006\)](#) analyze the lineage diversity of fifteen Southeast Alaskan mammals, find remarkable endemism (including the possible emergence of new species) and suggest that more remains to be discovered.
- [The 2008 Tongass Forest Plan](#) includes forest-wide assessments of resources such as wildlife, plants, fisheries, heritage, soils, timber, subsistence, wilderness and recreation. Admiralty Island constitutes its own distinct evaluation area.
- Admiralty Island staff have written several environmental assessments for specific areas within the Monument that evaluate resources such as wildlife, plants, fisheries, heritage, soils, timber, subsistence, wilderness and recreation. Area assessments include [Mitchell Bay Landscape Assessment](#), [Pack Creek Zoological Area Landscape Assessment](#) and the [Kanalku Fish Pass Enhancement Environmental Assessment](#).
- The [Unit 4 Brown Bear Management Strategy](#) provides a citizen and agency advisory group's review of resource management and human activities that affect brown bears and recommendations to ensure a long term viable population.
- The Kootznoowoo Wilderness Information Needs Assessment is a Forest Service interdisciplinary assessment of Admiralty's natural wilderness assets and an evaluation of the risks threatening them.

Over the past decade a variety of basic resource inventories have been conducted in Glacier Bay. In the late 1990s the National Park Service nationwide Inventory and Monitoring Program established the Southeast Alaska Network (SEAN) which includes Glacier Bay National Park and Preserve. SEAN implements long-term ecological monitoring of key vital signs and provides scientifically sound natural resource information to park managers.

- Basic inventories include: base cartography, hydrography, geologic resources (in progress), soil resources (in progress), air quality, water quality, vegetation, and species occurrence and distribution.
- In addition to these relatively "coarse" inventories principally based on existing information, several in-depth biological field inventories were conducted on higher-level taxa between 1999 and 2003; these included birds, fishes, amphibians and reptiles, mammals, and vascular plants.
- Also as part of the SEAN program, several rigorous long-term monitoring programs have been designed and are being implemented for high-priority resources including oceanography, marine contaminants, freshwater water quality, and Kittlitz's murrelets (*Brachyramphus brevirostris*). Still in development are formal protocols for weather and climate, landform and landcover, glacial dynamics, airborne contaminants, freshwater contaminants, streamflow, and marine predators.

- Data and reports on all [SEAN inventories and monitoring programs](#) are available online.
- External to SEAN inventory efforts, Glacier Bay National Park and Preserve sponsored a comprehensive inventory of lichens for select areas of the park in 2011-2012, resulting in a list of 560 species, at least 44 of which appear to be new to science.

e) *How does the reserve contribute to knowledge generation, capacity building, and assessment of biodiversity and ecosystem services? If so, briefly describe the contributions.*

A seasoned wildlife ecologist best describes how the Admiralty Island Biosphere Reserve unit contributes to knowledge generation, capacity building and assessment of biodiversity and ecosystem services:

“Admiralty Island, in my opinion, is one of the most valuable landscapes on Earth. I have spent over 50 years exploring the North Pacific Coast from Puget Sound to the Kenai Peninsula and traveled the coast of the Russian Far East, and I have never found a better representation of a North Pacific temperate rainforest ecosystem that is still largely intact and maintains all of its post Pleistocene flora and fauna, including robust populations of Pacific salmon, brown bears, bald eagles, marbled murrelets, and many other species that have been extirpated or declined throughout their original ranges. Admiralty has also been home to the aboriginal Tlingit Indians for 10,000 years and the Tlingit people still maintain a vigorous community on Admiralty at the village of Angoon. For nearly 100 years, biological explorations and scientific studies have been conducted on Admiralty Island, and I have personally had the great privilege to conduct research on Sitka black-tailed deer and brown bears there from 1977 through 1989. And then in 2004, working with Audubon Alaska and The Nature Conservancy, we initiated a conservation assessment of southeast Alaska which found that of 22 biogeographic provinces within the region, Admiralty Island was unique in having very high biological values and over 90 percent of its original habitats still intact, including salmon spawning and rearing habitat and the rare large-tree old-growth habitat that has been the target of logging for over half a century. I believe there are few places left in the world with greater opportunities than Admiralty Island for conducting long-term ecological research and monitoring or for providing environmental education programs in an intact ecosystem that still maintains all its functional parts.”

~ John W. Schoen, Ph.D., Wildlife Ecologist, as cited in [Admiralty Voices](#), a Friends of Admiralty publication

Glacier Bay gathers and protects records of exploration, scientific endeavor and human use, and provides for understanding the landscape through the lens of human experience and study. As a preserved living laboratory, Glacier Bay fosters unique opportunities for scientific studies of tidewater glacial landscapes and associated natural successional processes.

- Glacier Bay coordinates continued research, inventory, and monitoring to support a greater understanding of the park’s physical, biological, and cultural resources.
- More than 500 biological, physical, cultural, and social science studies have been completed, or are in progress since Glacier Bay was established as a National Monument in 1925. These studies, along with artifacts, oral histories and journals of exploration, are preserved as part of the collection that chronicles the natural and cultural history of the park. This baseline information serves as valuable information against which to measure environmental and cultural changes.
- Scientific knowledge acquired in Glacier Bay is utilized by park management to enhance decision-making and stewardship of park resources.
- The Park Service works cooperatively with indigenous groups to document traditional knowledge related to the resources and natural systems of the park. In specific, an oral history translation project serves to retain the Tlingit native language and history that is being lost with the passing of this generation of elders. The Tlingit language and history is being lost with the knowledgeable elders passing



3. DEVELOPMENT

- a) *Have the prevailing local economic trends and their environmental and economic outcomes changed over the past decade? If so, briefly describe them (e.g. agriculture and forest activities, recreational activities, non-renewable resource activities, manufacturing and construction, urban development, tourism and recreation, and other service industries).*

Economic trends in Southeast Alaska that have affected Admiralty Island over the last decade include growth in recreation tourism, a resumption and expansion in mining, a decline in commercial logging and investment in infrastructure. Recreation tourism tends to be seasonal and prone to broader national economic trends, but over the long term it has been a steadily growing economic sector. Mining is a more consistent industry that affords year-round work and relatively high salaries. The mines in and around the Admiralty Island unit are projected to operate for at least another decade. Infrastructure projects related to Admiralty Island are still in the planning and permitting phases; when realized they should provide year-round employment for construction, operation, and maintenance and contribute toward an improved economy. The community of Angoon has yet to fully realize a reliable and sustainable economy that offsets the high cost of living for a remote Alaskan settlement, but positive strides are being made. Specific aspects follow:

- Angoon is playing an increasingly significant role as a center for growing recreation tourism on and around Admiralty Island including: wildlife viewing and hunting; fishing; nature photography; kayaking and hiking, and camping.
- Lodges on Admiralty, such as Whaler's Cove, Favorite Bay Lodge, Cannery Cove Lodge and Thayer Lake Lodge depend entirely on recreational tourism. Their ability to survive the recent economic downturn indicates their resiliency and long-term prospects for contributing to the local economy on a sustainable basis.
- [The Greens Creek Mine](#) on the northern end of Admiralty Island National Monument produces silver, gold, zinc and lead. It is one of Southeast Alaska's largest private employers, supporting about 400 jobs, including around 20 for Angoon residents. It opened in 1989 and recently extended its projected operating life to 2029.
- The Federal Aviation Administration is in the planning phase for an [Angoon airport](#) (currently the community is accessed by boat or floatplane) that should facilitate recreation tourism and increase Angoon's role as a vital hub.
- The Federal Energy Regulatory Committee is in the permitting phase for [a hydroelectric project in Thayer Creek](#) that will provide Angoon with more affordable power than the diesel generators currently used.
- Tidal power studies have been conducted in Mitchell Bay that suggest a potent local sustainable energy source for Angoon, but no projects are currently planned.

The primary changes in economic trends affecting Glacier Bay National Park and Preserve relate to tourism and recreation with the subsequent impacts on recreational activities. Recently established ferry service to the gateway community of Gustavus has created easier access to Glacier Bay, with visitors now able to bring their own vehicles and backcountry camping gear to Glacier Bay. This access has also brought associated development and resource pressures. Despite the economic recession several years

ago, visitation has doubled over the past 20 years, reaching over ½ million in 2013. Visitors to Glacier Bay come from many countries and U.S. states. Many visit as part of a tour that includes other regions of Alaska. The vast majority of visitors experience Glacier Bay from the deck of a cruise ship, never disembarking, which greatly minimizes visitor impact on the terrestrial environment.

- The gateway community of Gustavus recently installed a modern ferry dock and the Alaska Marine Highway provides regular service throughout the year, opening new alternatives for independent travelers. While this has increased business opportunities for local entrepreneurs, there have also been resource and economic impacts with visitors bringing their own supplies. A need has been identified for recreational vehicle camping facilities.
- The recent ferry service has also facilitated ease of bringing construction materials to Gustavus, which could lead to increased population, development, and resource demands.
- A variety of tour vessels and charter services provide multi-day visits and ecotourism opportunities in and around Glacier Bay.
- Changes in commercial fisheries and timber industries in surrounding lands/waters have increased local communities' interest in, and need to, develop sustainable tourism.

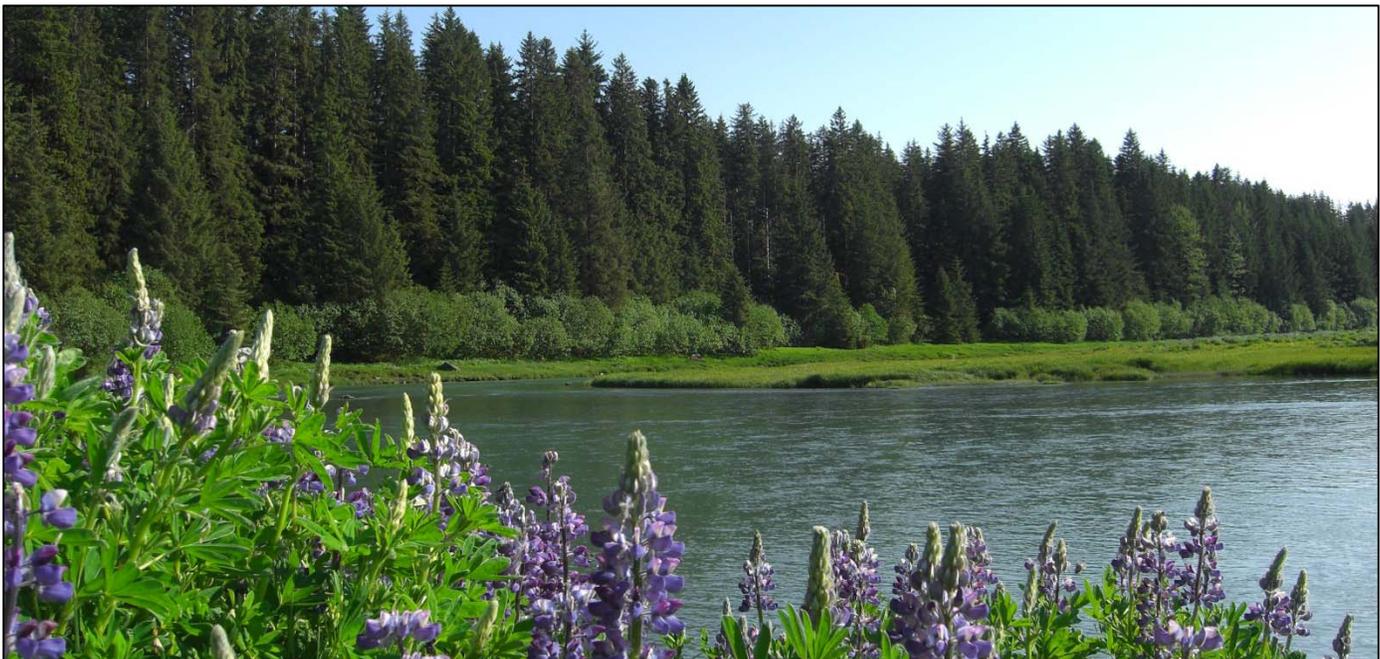
b) *Have there been local business, tourism and other economic development initiatives related to the biosphere reserve or other programs that promote ecologically and culturally sustainable development in the area? If so, briefly describe them and the key successes and challenges in fulfilling the development function.*

A variety of local business, tourism and other economic development initiatives related Admiralty Island Biosphere Reserve unit promote ecologically and culturally sustainable development in the area.

- The U.S. Congress has passed the [Secure Rural Schools Act](#) which helps rural communities economically in areas where a large portion of the land is managed by the federal government (and hence exempt from local tax revenue). The Resource Advisory Committee for Lynn Canal and Icy Straits, the local body designated to allocate federal assistance funds, has supported various programs on Admiralty Island. A good example would be the multi-year funding granted to the Angoon Community Association to staff the Watershed Crew charged with stewardship projects in the Mitchell Bay region surrounding the town. Challenges include the need to educate communities on how to craft funding proposals and meet deadlines and the constant reality that the funding available doesn't cover all of the region's needs.
- The U.S. Forest Service recently conducted a Prospectus process to allow interested commercial operators the opportunity to bid on allocated guided use for the Pack Creek brown bear viewing area. Key criteria for awarding use included detailed descriptions as to how the commercial operations would uphold the wilderness character of the area and provide high quality visitor experiences. Operations awarded use included Kootznooowoo Incorporated, local guiding businesses based in Juneau and tour boat operators based elsewhere in the Pacific Northwest.
- The U.S. Forest Service is in the process of revising the Shoreline Outfitter/Guide Environmental Impact Statement which will determine how much commercial use can be accommodated without compromising visitor experiences and natural resources. Once Shoreline is updated, new rounds of Prospectuses will occur for Admiralty Island (beyond the aforementioned Pack Creek) allowing commercial operators, offering services such as brown bear hunts, fly fishing outings and sea kayaking excursions, to bid for authorized use. Prospectus criteria will require operators to detail how their services will uphold wilderness character and offer quality visitor experiences.
- Current infrastructure projects will benefit Angoon's economy and introduce new impacts requiring mitigation. The [Angoon Airport](#) will bring greater numbers of visitors who will benefit the local economy. The outside influx may bring new culture to Angoon and create new visitor impacts in popular sites and sensitive areas. The [Thayer Creek Hydro Project](#) should lower the price of power in town, but will also add a new transmission line corridor across Monument lands.
- Native artists from Angoon employ their expert craftsmanship to create high value art that can be sold. For example, woodworkers carve and inlay wood canoe paddles with intricate imagery. The U.S. Forest Service has helped procure grants for artists to conduct workshops where they train local youth in their traditional skillcraft.
- Admiralty Staff have drafted guidance allowing commercial crabbers to store their crab pots on Monument/Wilderness lands. This rectifies the long-standing situation where crab pots and associated gear were strewn about with little regard for Biosphere Reserve values. There will be an educational period where commercial crabbers learn which storage spots are approved and which aren't and it will take time and money to clean up abandoned gear, but there will be steady improvement in accountability and natural integrity of the crabbing areas.

Local businesses in the gateway community of Gustavus support tourism and recreation within and surrounding Glacier Bay. Many local, regional, and international businesses promote environmental awareness and sustainable development through initiatives and business practices. Businesses are primarily challenged economically by the remote location and restricted access to Glacier Bay. Vessel entry regulations, while protecting wilderness and resource values, also challenge businesses marketing and scheduling Glacier Bay experiences.

- Glacier Bay National Preserve, a part of the reserve with different regulations than the National Park, protects a productive, evolving, glacial outwash ecosystem at the terminus of the Alsek River and provides a setting for subsistence uses, commercial fishing activities and hunting as outlined by the Alaska National Interest Lands Conservation Act.
- Conservation areas bordering the park in the community of Gustavus provide a buffer area surrounding the Biosphere Reserve and offer additional recreational opportunities. A local constituency recently formed the “Gustavus Land Legacy” whose efforts resulted in a conservation partnership agreement between the local community group, Alaska Department of Fish and Game, and The Nature Conservancy. This cooperative endeavor was heralded as a spectacular example of governments and private organizations working together to protect wildlife and local community values.
- Concession contracts provide mechanisms for promoting sustainable development, requiring businesses to maintain certain environmental standards for operating within the Biosphere Reserve.
- Recreational opportunities supported by local and regional businesses include kayaking, marine and terrestrial wildlife watching, flight seeing, glacier viewing, hiking, mountaineering, and fishing. The [Gustavus Visitors Association](#) and affiliated businesses promote environmental stewardship in their marketing and messages to visitors.
- Several local and regional businesses operating in Glacier Bay utilize their environmental awareness as a marketing promotion. For example, [Un-Cruise Tour Lines](#) pronounces its dedication to sustainable business, following *Leave No Trace* guidelines and making a positive difference in local communities. Also the locally owned Glacier Bay Sea Kayaks [states its conservation ethic](#) on its website.
- Friends of Glacier Bay (a conservation group) is dedicated to ecological integrity, opportunities for solitude, and appropriate research in Glacier Bay National Park and Preserve.
- Charter vessels are transitioning to more environmentally sound engines and sustainable practices, utilizing locally produced and caught food for clients.
- The primary challenges result from operating recreation businesses in a remote location. While Glacier Bay’s large intact natural ecosystem is an appealing destination for visitors, it provides challenges for businesses to sustain themselves economically.





4. LOGISTICS

- a) *What principal institutions conduct research or monitoring in the biosphere reserve? Briefly describe the main research and monitoring themes undertaken during the past ten years, and data bases that are available.*

Principal institutions conducting research and monitoring in the Admiralty unit of the Biosphere Reserve include the conventional array of federal and state agencies, universities and conservation groups. Research projects range from species-specific examinations, such as population counts, DNA analysis and behavioral studies to systemic studies such as carbon uptake/sequestration in old growth forests and peat bogs, area inventories of plants and wildlife and other encompassing works. It should be noted that Admiralty Island's remoteness and costly access combined with Southeast Alaska's inclement weather makes research and monitoring difficult leaving some data gaps. A list of the more conventional research and monitoring institutions includes:

- USDA Forest Service
- Pacific Northwest Research Station (of the USDA Forest Service)
- Alaska Department of Fish and Game
- U.S. Fish and Wildlife Service
- University of Alaska (Anchorage, Fairbanks and Southeast campuses) and out-of-state universities
- National Oceanic and Atmospheric Administration & National Marine Fisheries Service
- The Nature Conservancy
- Audubon Alaska
- Boreal Partners in Flight, a multi-agency and citizen ornithological working group consisting of biologists from agencies, universities and non-profit organizations.

Glacier Bay fosters unique opportunities for scientific studies of tidewater glacial landscapes and associated natural successional processes. Many institutions recognize these opportunities for conducting pioneering research. Long-term monitoring has been established in many topics, some studies pre-dating the establishment of the park.

- The principal institutions conducting research are: National Park Service, other federal agencies (e.g. National Oceanic and Atmospheric Administration (NOAA), United States Fish and Wildlife Service (USFWS), United States Geological Survey (USGS)), state agencies (e.g. Alaska Department of Fish and Game), universities (e.g. University of Alaska), tribal governments, and non-profit organizations.

- The primary investigative themes at Glacier Bay are: glaciers, landscape succession following glacial retreat, marine ecosystem, cetaceans and pinnipeds, terrestrial wildlife, visitor use and adaptive management, oceanography, climate, archeological and ethnographic research.
- An extensive [compilation of Glacier Bay research](#), including investigator annual reports, research summaries and highlights, and an interactive bibliography is located on-line through the park website.
- Databases for the [National Park Service Inventory and Monitoring Program](#) provide an additional wealth of material.
- An [Integration of Resource Management Applications \(IRMA\) database](#) is also online for easy access.

b) *What education and training programs are conducted in the biosphere reserve area, and how has traditional and local knowledge been collected and utilized?*

In the last several years there has been an increase in the number and breadth of educational and training programs conducted in the Admiralty Island unit. With Admiralty staff increasing their community engagement, this trend is likely to continue as long as declining agency budgets can be mitigated. It should be noted that programs pertaining to Admiralty also occur in Juneau.

Educational and training programs conducted include:

- The U.S. Forest Service Tribal Relations & Heritage program regularly conducts programs on Admiralty Island, providing hands-on experience conducting archeological surveys and also documenting traditional experiential knowledge of Native Alaskans. A good example of the latter is the recent publication *Our Food is Our Tlingit Way of Life* which documents Tlingit expertise in procuring, preparing and storing food from the land and sea.
- The Forest Service and other partners have conducted an Angoon Outdoor Skills Initiative aimed at local youth. Skills such as safe and proper gun handling, Leave No Trace ethics and fly fishing are taught in order to further personal and professional skills.
- Admiralty Staff conduct week-long Teacher's Expeditions each year, bringing teachers from around the U.S. together for an intensive trip through the Biosphere Reserve, focusing primarily on strategies for teaching youth the value of intact ecosystems and public lands. The Staff also host several student interns each year from local communities who job shadow the Pack Creek brown bear viewing area crew.
- The Angoon Community Association Watershed Crew and fisheries monitoring crews with local hires attend comprehensive training at the beginning of each summer. Sessions include an overview of Admiralty Island management, bear behavior, wilderness first aid, safe aviation, boating and firearms practices. These crews also provide valuable on-the-job training regarding recreation and fisheries management.
- Conservation education programs emphasizing wilderness awareness and Leave No Trace ethics are taught by Admiralty staff at the local Angoon school to all grade levels.
- Volunteers who partake in stewardship projects such as beach clean-ups and weed pulls are also taught Leave No Trace ethics and broader wilderness awareness.

A wide variety of education and training programs are offered throughout the year in the park and local communities, and worldwide through emerging technology. Collaboration and partnerships with native people has increased collection and dissemination of traditional knowledge. Close ties with local communities ensures sharing and support of resources. While in the park, over ½ million people annually learn about Glacier Bay's global significance for scientific study and conservation. Additionally, through outreach efforts, the National Park Service conservation message is extended worldwide.

- Ongoing ethnographic/archeological/historic research provides inform to enhance education programs. Education programs are regularly offered on board cruise ships, tour vessels, and at the park Visitor Center in Bartlett Cove. In addition, newly installed informational trailside panels describe traditional uses of plants, cultural resources, native history, and the importance of Glacier Bay as the spiritual homeland of the Huna Tlingit.
- The park supports a partnership with Huna Totem "Native Voices" an Alaska Native Claims Settlement Act (ANCSA) Village Corporation. This program facilitates the sharing of cultural history and traditional connections on board cruise ships, tour vessels and at the park Visitor Center.
- Researchers with Alaska Department of Fish and Game Southeast Native Subsistence Commission and Glacier Bay collaborated with the Hoonah Traditional Tribal Council and Hoonah Indian Tribal Association to work with elders to compile a list of named places throughout the Glacier Bay territory. The resulting map has informed scientific

understanding of dramatically changing landscapes and the history of the Huna people. Available on-line and in print, this map communicates the significant cultural and spiritual ties to the park as the spiritual homeland of the Huna Tlingit.

- A traditional Tlingit Tribal House to be constructed by 2016 near the Glacier Bay Visitor Center will facilitate interpretation of Huna Tlingit culture and life ways and provide a venue for tribal members to reconnect with their traditional homeland through workshops, culture camps, and other programs.
- Ongoing ethnographic research documents traditional knowledge and incorporates it in management actions ranging from proposed traditional gull egg harvest to determining appropriate cruise ship numbers.
- Park education staff provide long-distance education programs utilizing green-screen video conference technology for virtual visits to Glacier Bay. Requests for these popular interactive presentations are growing exponentially. In 2013, programs reached over 1400 students in dozens of states.
- Traditional knowledge of Huna Tlingit has been integrated with biological and geological research to understand the ecosystem and landscape changes over time. For example, oral histories recorded from elders have [informed scientific understanding of neoglacial ice advances in Glacier Bay](#). The results of this interdisciplinary research have been published in peer-reviewed journals.
- Various annual field-based educational programs connect all ages of Huna and Yakutat Tlingit tribal members with traditional homeland. These programs provide for intergenerational learning and re-invigorate traditional practices (harvest of berries, seafood, goat hair, spruce roots, and potentially gull eggs).
- Glacier Bay is working with local schools in neighboring Hoonah to cooperatively develop a culturally-responsive curricula for middle/high school students to investigate the question, "Why did the Huna Tlingit Settle in Glacier Bay?" In addition, the park co-sponsored a week-long science camp designed to explore the significance of salmon populations to the Glacier Bay ecosystem and its traditional people, the Huna Tlingit.
- Cooperative programs with tribal governments have encouraged the transmission of traditional skills including form line design, carving, and spruce root weaving from Master Craftsmen to Apprentices and others.
- Oral histories are collected and/or compiled and integrated into packages to nominate sites as Traditional Cultural Properties on the National Register of Historic Places. Such packages also serve as "single source documents" for all stories, songs, histories, etc. associated with particular traditional places and are made available to traditional people.
- Orientations for all visiting backcountry campers and boaters include native perspectives and area knowledge as well as minimum impact principles and practices.
- The "First Bloom" education program integrates traditional knowledge and plant conservation in programs for youth.
- Through the park volunteer program, local residents have opportunities to assist with research activities (whale surveys, fish monitoring, bird counts).
- Glacier Bay's new "Artist-In-Residence" program has enabled artists to develop wilderness-inspired musical and photographic pieces that will be shared with a diverse public. See <http://bahrimages.com/news/KayakingWithGrizzlies.html> and <http://www.stephenlias.com/home.aspx>.

c) *Describe the reserve's main internal and external communication methods and strategies. If there is a website, please provide the link.*

The primary communication methods and strategies for the Admiralty Island Biosphere Reserve unit are the traditional means of personal engagement via meetings and phone calls. It is worth noting that not all constituencies invested in Admiralty Island use (or even have access to) the internet. It is further worth noting that this is an area where the U.S. Forest Service can improve. Our own institutional bureaucracy challenges our ability to keep up with modern communication methods. Some communications of note are:

- The U.S. Forest Service meets regularly with the Angoon Community Association (Angoon's federally recognized Tribe), [Kootznoowoo Incorporated](#) (Angoon's native corporation) and the Angoon City Council to discuss pertinent issues such as Resource Advisory Committee/Secure Rural Schools funding, Monument administration and permitted commercial use. Admiralty Staff also meet regularly with local conservation groups such as [Friends of Admiralty](#), [the Southeast Alaska Conservation Council](#) and others.
- The Forest Service maintains basic websites pertaining to [Pack Creek brown bear viewing area](#) and [cabin rentals](#). A contractor maintains a website (www.recreation.gov) enabling visitors [to purchase Pack Creek permits](#) or to reserve nights in the thirteen public use cabins (e.g. [Admiralty Cove Cabin](#)) on Admiralty Island.

- The Forest Service maintains websites that apprise readers of projects and newsworthy events pertaining to Admiralty Island and [the Tongass](#). The agency regularly uses local media (print and radio) to publicize hearings and projects and has recently started using Twitter.
- The agency also has an internal newsletter Sourdough Notes that keeps personnel about work-related current events.

Glacier Bay communicates its significance directly to visitors and through multiple avenues to audiences world-wide. The primary method of engaging public involvement is through direct communication from rangers to the visiting public on board ships in Glacier Bay. In 2013 over ½ million visitors interacted with a park ranger, learning the park's role in conservation. Many were directly involved in park planning efforts through multiple avenues of commenting on park management on local and national levels.

- A Glacier Bay Communications Plan was developed in 2003. A multi-disciplinary team evaluated existing publications and methods. Results included an emphasis on a uniform and professional message for all communication (e.g. newsletters, brochures, exhibits, videos, news releases, site bulletins).
- The [Glacier Bay National Park and Preserve website](#) provides a wealth of information about park significance, current research and resource information.
- Social Media Sites include the [Glacier Bay Facebook Page](#) and [Glacier Bay Twitter Feeds](#).
- Press releases are distributed within local communities and posted online through the [Glacier Bay News Page](#).
- Direction for public communication is outlined in the Glacier Bay Long Range Interpretive Plan. By outlining visitor experience goals and identifying primary themes, the plan provides direction for all communication with the public.
- Practically 100% of Glacier Bay visitors have the opportunity to interact with a park ranger through camper/boater orientations and presentations at visitor center and on tour vessels/cruise ships. This direct interaction with park rangers increases opportunities for visitors to understand and appreciate the significance of Glacier Bay as a conservation area. The park's annual visitor surveys consistently reflect the effectiveness of these personal interactions.
- The park is constantly utilizing emerging technology to connect with new audiences, such as green screen technology, incorporating natural sound into presentations, and utilizing wireless devices to allow visitors to access research databases while traveling on vessels in Glacier Bay.
- Glacier Bay regularly consults with Alaska Claims Native Settlement Act (ANCSA) village and regional corporations.
- [The Planning, Environment and Public Comment \(PEPC\) website](#) provides the public with a consolidated source for current park planning efforts and provides an avenue for public comments on park plans, projects and environmental assessments.

d) Describe any collaboration, or interest in collaboration, with other biosphere reserves, especially as related to important international and trans-border issues such as migratory and invasive species, and the effects of climate change on ecosystems. Describe the key contributions that activities taking place in the biosphere reserve can make to enhance the benefits of American biosphere reserves and the World Network.

The U.S. Forest Service, including Admiralty Island staff, has collaborated with other agencies, organizations and countries to share expertise in wilderness management, recreational tourism, wildlife viewing sites and brown bear management. The agency has also dedicated significant time internally to addressing complex issues such as determining the most effective management in regards to migratory birds, invasive species and climate change. The Forest Service is highly interested in collaborating further with other Biosphere Reserves regarding these and additional international/transborder issues. Three examples of Forest Service collaboration are:

- Recent work in global assessments of temperate rainforests has brought researchers together from Southeast Alaska and British Columbia among other regions. In the past decade, [the Alaska Coastal Rainforest Center](#) has been established at the University of Alaska Southeast as a collaborative institute between the various campuses of the University of Alaska, U.S. Forest Service, National Park Service, U.S. Geological Survey, Central Council of the Tlingit and Haida Indian tribes, The Nature Conservancy, National Oceanic and Atmospheric Administration and other State, Federal, and local agencies as well as local private research institutes. The Center recently sponsored an international conference on temperate rainforest ecology and conservation. They are sponsoring a cross boundary data integration group which

should combine the Admiralty Island biosphere reserve unit with others in British Columbia for future regional assessments.

- [Boreal Partners in Flight](#), a multi-agency and citizen ornithological working group, identifies species dependent on mature conifer forest as priorities for Southeast Alaska. Participants in Boreal Partners include biologists from the U.S. Fish & Wildlife Service, U.S. Geological Survey, U.S. Forest Service, the Bureau of Land Management, the Department of Defense, Alaska Department of Fish & Game, the University of Alaska (Anchorage & Fairbanks campuses) and also various nonprofit organizations (namely the Alaska Bird Observatory). Boreal Partners in Flight produces documents that highlight conservation and monitoring needs and that make recommendations to land management agencies. The group also steers regular monitoring at sites statewide (including on Admiralty Island) through the Alaska Landbird Monitoring System.
- The U.S. Forest Service International Programs department has sponsored Admiralty Staff traveling to and working in Africa to provide expertise in recreation tourism planning, managing wildlife viewing areas and constructing durable trails. Admiralty Staff have also participated in international wilderness conferences in Germany, Spain, Mexico and Alaska and hosted international colleagues from Brazil, Germany and Mexico seeking a better grasp of U.S. wilderness management methods.

e) *Describe the key contributions that activities taking place in the biosphere reserve can make to enhance the benefits of American biosphere reserves and the World Network.*

Admiralty Island, as one of the premier examples of intact temperate rainforest has been included in several regional and global assessments. Additionally, its wilderness designation and healthy brown bear population require effective management strategies that have been honed over the years and afford special expertise to the World Network. Other contributions may arise, such as experience in gaining the successful enfranchisement of Native Alaskans in the Biosphere Reserve management or the successful development of a sustainable economy for a Native village; however it would be premature to claim success as of yet when more learning and growing lay ahead. Established contributions include:

- The Biosphere Reserve will play a key role in documenting the effects of global climate change on ecological conditions in the region due to both the long history of research on the island as well as its representation of globally rare intact highly productive temperate rainforest landscapes.
- Admiralty Island managers with decades of experience have participated in international bear conferences to share expertise with other professionals dedicated to conserving bears in other countries. The expertise gained by Admiralty Island staff includes providing for high value guided brown bear hunting conducted in a sustainable manner, managing a world class brown bear viewing site where bears and people are in close proximity and mitigating issues arising from food-conditioned bears in towns, cabin areas and campsites.
- Admiralty Island is engaging in a wilderness stewardship model that synthesizes diverse studies such as island endemism, carbon sequestration, fisheries health and yellow cedar decline in a comprehensive map of wilderness character comprising positive indicators and negative detractors. Such progressive and comprehensive mapping allows for the public to grasp the resiliency and vulnerability of the Biosphere Reserve and to gain a sense of its overall health. This model is being adopted across U.S. wilderness areas and could be used to assess the integrity of other biosphere reserves.

Over the past decade the collaborations with other biosphere reserves has focused on coordination and collaboration with other National Park Service units, particularly those within Alaska (Denali National Park and Preserve; Gates of the Arctic National Park and Noatak Preserve). Nevertheless, staff from the biosphere reserve is open to future collaboration amongst biosphere reserves across the globe through sharing knowledge, exchanging experiences, and promoting best practices. Cooperative work between the two administrative units from differing federal agencies within the biosphere reserve could serve as an example of the value of partnerships and collaboration from various agencies on management of the reserve. Areas where Glacier Bay might contribute to the World Network of Biosphere Reserves are highlighted below:

- Glacier Bay's history of glacial change and resulting successional processes provides excellent opportunities to collaborate with other biosphere reserves in facing the effects of rapidly accelerating global climate change and in exploring human perspectives in the face of such change. Currently Glacier Bay is involved in a [multi-park research program to identify and document the status and trends of glaciers within Alaska National Parks](#).

- Glacier Bay’s collaboration with native and local communities and inclusion of traditional knowledge in area management.
- Glacier Bay’s history of managing a vast natural area while balancing the intricacies of recreational demands and preservation policies and mandates.
- Glacier Bay’s established environmental education program and methods of providing multi-media outreach to a worldwide community.



5. BIOSPHERE RESERVE COORDINATION

- a) *What mechanisms for coordination of the reserve’s cooperative activities exist, and how do these mechanisms secure the involvement and support of local people?*

The most important mechanisms for coordination of the Admiralty Island Biosphere Reserve unit’s cooperative activities are: a) individuals committed to collaboration, conservation and sustainability; b) regular interaction between management, civic, tribal, conservation and business institutions to communicate and cultivate relationships, and c) formal agreements and informal teamwork. Regulations exist that require consultation and cooperation in authorities ranging from the Tongass National Forest Management Plan to the Alaska National Interest Lands Conservation Act of 1980; however professional rapport and a shared sense of purpose play at least as large a role. These mechanisms secure the involvement and support of local people by providing regular forums that gather, hear and respect all voices. They build relationships over time that foster the trust and camaraderie essential to resolve complex issues. Examples of coordination and cooperative activities follow:

- [The Unit 4 Brown Bear Management Team](#) makes recommendations to the State of Alaska pertaining to brown bear hunting regulations for Admiralty Island, Baranof Island and Chichagof Island. The Management Team is composed of representatives from: State and Federal agencies; native corporations; conservation groups; professional hunter and guide associations; tourism organizations and citizen advisory groups.
- Admiralty Island National Monument leadership and staff regularly participate in tribal, city council and native corporation meetings in Angoon.
- Glacier Bay National Park and the U.S. Forest Service are increasingly collaborating, such as conducting joint management excursions to the remote Endicott River Wilderness and sharing visual emissions reading methods for monitoring cruise ship impacts to air quality.
- U.S. Forest Service participates in Friends of Admiralty meetings. Friends of Admiralty is a conservation group dedicated to upholding the natural integrity of Admiralty Island and its board and members have deep affiliations with the place.

- The Forest Service has signed formal agreements for cooperative work with: the Alaska Department of Fish & Game; the Angoon Community Association (a federally recognized tribe); [Wilderness Volunteers](#) (citizen advocates) and the Southeast Alaska Conservation Council (a prominent regional conservation group).
- The U.S. Forest Service employs an Angoon resident to provide agency support in town and a receptive ear for any concerns. Our liaison also coordinates projects based out of Angoon and shares Forest Service housing for non-agency partners in need of lodging. The agency commonly shares its transportation between Admiralty Island and Juneau which alleviates substantial travel costs for the Village Tribe, citizen volunteers and other partners.

Glacier Bay encourages public involvement. As a federal land management agency, public involvement is integrated into all park planning and compliance activities. Examples of specific mechanisms for coordination are mentioned below:

- Public involvement, including issue scoping, public informational meetings, public review and comment on all park and preserve planning and development proposals, is conducted as directed by the National Environmental Policy Act (NEPA) of 1969 and Council on Environmental Quality regulations.
- Glacier Bay maintains a government-to-government relationship with Hoonah Indian Association and Yakutat Tlingit Tribe, working directly with appropriate tribal government officials whenever plans or activities may directly or indirectly affect tribal interests, practices, and/or traditional use areas, such as sacred sites.
- Collaborative partnerships with other agencies include National Oceanic and Atmospheric Administration. (NOAA), U.S. Coast Guard (USCG), U.S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS), Alaska Department of Fish and Game (ADFG), as well as local governments and schools.
- [The Planning, Environment and Public Comment \(PEPC\) website](#) provides the public with a consolidated source for current park planning efforts and provides an avenue for public comments on park plans, projects and environmental assessments.

b) How are particular cultural groups and demographic groups (e.g. young people) involved in the biosphere reserve's organizations and community decision-making process? If so, briefly describe how their interests and needs have been considered, and what incentives or programs were used to encourage their participation.

Cultural and demographic groups commonly involved in Admiralty Island Biosphere Reserve organizations and community decision-making include youth, Native Alaskans, the elderly and residents of rural communities. Other cultures and demographic groups also partake. Examples include:

- U.S. Forest Service and Alaska Department of Fish & Game crews generally appeal to young people with many days spent outdoors conducting hard work for the sake of conservation. The crews often hire locals who already have Southeast Alaska experience and housing. Crews on Admiralty Island include the staff at the Pack Crew bear viewing area, the Cabins & Trails crew, researchers studying fish, birds and bears and wilderness rangers.
- The Angoon Community Association, with help from the Forest Service, secured multi-year funding from federal sources to hire Angoon residents for a Watershed Crew dedicated to the stewardship of the Mitchell Bay area. Locals recruited for the Crew were attracted to a secure summer season job, a purpose that melded with their own experience and skill set and an opportunity to care for the land that has
- Educators from the Forest Service conduct presentations in Angoon schools teaching about archeology, wilderness and Leave No Trace and conducting discussions with older students about local conservation issues (such as where would be the best location for an airport).
- Many recreation tourism businesses hire young local talent to guide their clients safely on excursions. These businesses include hunting operations, wilderness lodges, wildlife viewing tours, hiking and kayaking trips, fly fishing expeditions and scenic tours.
- The Forest Service consults regularly with the Angoon Community Association (Angoon's federally recognized tribe), the Angoon City Council and Kootznoowoo Incorporated, the native corporation for the Village of Angoon. These consultations ensure that Native Alaskan perspectives are heard and incorporated into management strategy for Admiralty Island.
- It is worth noting that Admiralty Island stewardship projects such as beach clean-ups, invasive weed pulls, campsite and solitude monitoring and trail projects are increasingly popular, including with older retired people who have time and

who want to contribute to a good cause. The 2013 beach clean-up volunteer crew on the southern end of Admiralty Island ranged in age from 16 to 65 and included people from Juneau, Sitka, Yakutat and Skagway.

Glacier Bay welcomes involvement in park decision making from local, national, and international constituents. This includes local residents, businesses, park visitors, tribal members, and park enthusiasts. Highlights include:

- Glacier Bay maintains a government-to-government relationship with Hoonah Indian Association and Yakutat Tlingit Tribe, working directly with appropriate tribal government officials whenever plans or activities may directly or indirectly affect tribal interests, practices, and/or traditional use areas, such as sacred sites.
- Glacier Bay's management team includes a native elder from Hoonah serving as a management assistant. This position provides a valuable exchange of information and facilitates incorporating native perspectives in park management decisions.
- Glacier Bay employs a cultural anthropologist stationed in the native village of Hoonah. This position enhances opportunities for direct communication and participation in park planning.
- Involvement in management and development decisions is conducted as directed by the National Environmental Policy Act (NEPA) and regulations of the Council on Environmental Quality

c) *Briefly describe successes and challenges over the past ten years to fulfilling this function.*

Challenges to Admiralty Island Biosphere Reserve coordination include dedicating the years necessary to build rapport and bridge cultural gaps, covering the expenses of travelling by plane or boat between remote communities and planning meetings with difficult logistics of gathering dispersed constituents and accounting for travel, weather delays, limited budgets and busy schedules. Distrust from historic disenfranchisement or anti-government perspectives sometimes must be overcome in building relations between the U.S. Forest Service and Angoon residents, conservation groups, permitted commercial operators and other constituencies. These groups may not always reach consensus to resolve issues, such as finding proper balances between providing for modern tourism and development while preserving traditional culture and natural integrity. Until recently, the Forest Service cycled through several Monument Rangers every few years which made it difficult to cultivate substantive relationships. Fortunately the current Monument staff is composed of employees dedicated to coordinated stewardship of Admiralty Island and attending regular meetings and building good relations are high priorities. Despite the aforementioned challenges, coordination, communication and relations have improved markedly in recent years allowing for progress on several fronts:

- [The Thayer Creek Hydroelectric Project](#) is provided for in the Alaska National Interest Lands Conservation Act of 1980, but it has taken a long time to align the various parties involved in the planning and permitting process. This project is finally coming to fruition and will replace Angoon's diesel generator powered electricity costing up to \$.55/kilowatt hour with locally-generated hydroelectric power that will cost significantly less.
- The Angoon Community Association Watershed Crew employing several Angoon residents to help steward the Monument demonstrates the success of agency-tribe collaboration. Remaining challenges include instilling a common high standard for Leave No Trace work and camp practices and a unified sense of purpose in tackling invasive weed infestations.
- After an initial period of unease between the Alaska Department of Fish & Game and the U.S. Forest Service, Pack Creek has evolved to become a cooperatively-managed world-class brown bear viewing area drawing visitors from around the globe.
- The Forest Service has dedicated the time needed to build a healthy relationship with the Angoon Community Association, Angoon's federally recognized tribe. Communications and meeting logistics are still complicated by distances between Angoon and Juneau.
- Similarly, the agency has enjoyed a cooperative agreement with the Angoon native corporation [Kootznoowoo Inc.](#) The agreement has expired and needs to be renewed, but a meeting where differences over the wording of the new agreement can be worked out has yet to occur.
- The U.S. Forest Service has cooperated with the [Friends of Admiralty](#) conservation group to highlight Admiralty Island's unique values, including conducting a successful Brown Bear Forum and celebrating the 25th anniversary of Admiralty Island's Monument designation.



Glacier Bay serves as a catalyst for cooperation and coordination in a wide variety of disciplines and pursuits, providing opportunities for people of diverse interests to experience their rich natural and cultural heritage. A few of Glacier Bay's many successes and continuing challenges are noted below:

- In recent years Glacier Bay has facilitated many tribal connections to the Tlingit homeland. Foremost among these is the current Huna Tribal House project. By constructing a traditional tribal house on the shores of Glacier Bay, the Tribal House will serve as a physical symbol of connection to homeland for the modern Tlingit whose ancestors once resided within Glacier Bay. As part of this project, the park has provided resources that allow for resurgence in traditional carving and crafting skills, passing on traditional knowledge and reinvigorating cultural connections. Artwork produced through this program will ultimately embellish the interior and exterior of the Tribal House.
- Glacier Bay enjoys a long cooperation with Alaska Department of Fish and Game through mutual support and combined research of animals such as moose, wolves and mountain goats.
- Interdisciplinary research in the fields of archeology, geology, dendrochronology, Tlingit oral histories, and ethnographic studies has enhanced understanding of post-ice age Southeast Alaska. Through outreach, field visits and public presentations, the park has shared these discoveries with local tribes. This work is fostering continued understanding of Glacier Bay's cultural past and laying the framework for continued collaboration.
- A remote location and restricted access (only by boat or plane) are the primary challenges faced in all aspects of Glacier Bay operations. Communities are isolated and separated by large bodies of water. The expense of travel for even the closest communities is often prohibitive for meetings, workshops, ceremonies and celebrations. Fiscal realities have resulted in reduced travel ceilings and limited budgets, all of which add to the difficulty of coordination.

d) Does the reserve foster the involvement of public and private stakeholders in carrying out of the functions of a biosphere reserve? If so, briefly describe how it does.

The Admiralty Island unit fosters the involvement of public and private stakeholders in carrying out its Biosphere Reserve functions. Inclusive and transparent processes are mandated by law (e.g. by the National Environmental Policy Act of 1969 and the Federal Advisory Committee Act of 1972) and are hallmarks of the Admiralty Island National Monument staff's professional management of public lands, especially where constituencies have deep ties to places. Beyond planning, many groups actively partake in the management, use and enjoyment of the Biosphere Reserve and Admiralty Staff often participate in meetings conducted by community groups. Important public and private stakeholder groups include:

- Key Angoon stakeholders include the federally recognized tribe the Angoon Community Association, the village native corporation Kootnoowoo Incorporated and the Angoon City Council. These groups have a long history with Admiralty Island and they weigh in on many issues, especially those pertaining to the village infrastructure, the recreation tourism economy and subsistence opportunities. Angoon also has commercial businesses and residents vested in the Biosphere Reserve functions.

- State and Federal agencies manage the habitat, wildlife, fisheries, infrastructure, commercial, recreational and subsistence use of the Biosphere Reserve. Key Alaska State agencies include the Department of Fish & Game, the Department of Environmental Conservation, the Department of Natural Resources and the Department of Transportation & Public Facilities. Key Federal agencies besides the U.S. Forest Service include the U.S. Fish & Wildlife Service, the Environmental Protection Agency, the National Oceanic and Atmospheric Administration, the Federal Aviation Administration, the Federal Energy Regulatory Commission and the Bureau of Land Management.
- Conservation groups conduct education campaigns to expand awareness and appreciation of Admiralty Island, engage in stewardship projects and provide critical oversight to ensure the natural integrity remains intact. Involved conservation groups include [Friends of Admiralty](#), [The Nature Conservancy](#), [Audubon Alaska](#), [the Southeast Alaska Conservation Council](#), the Tongass Group of [the Sierra Club](#) and others.
- Hunting groups represent another key constituency, such as the [Alaska Professional Hunters Association](#), the Territorial Sportsmen and others who often weigh in on issues affecting hunting opportunities.
- Commercial operators authorized to use Admiralty Island are another key stakeholder group. Commercial operators include hunting guides, wildlife viewing guides, kayaking, hiking and camping guides, fly fishing guides and lodge owners. They often express interest in tourism and permitting matters and have ties to certain areas.
- Admiralty Island also has a few dozen private cabins that the Alaska National Interest Lands Conservation Act grandfathered in and that will be phased out over time. Their owners comprise another vested stakeholder group with significant ties to the Island.
- The majority of Admiralty Island is public land. Members of the public have a right to weigh in on how to manage the area. Beyond Angoon, the U.S. Forest Service regularly confers with other communities such as Juneau, Hoonah, Kake, and others. Additionally, people from around the United States have expressed an interest in the management of Admiralty Island. All federal actions are listed in publically accessible reports that contain the means to provide input.

Glacier Bay holds a prominent place in local communities as a cherished source of recreation, inspiration, and subsistence. As a destination for worldwide travelers, it provides nearby communities with opportunities for economic development. Whether a resident of the gateway community of Gustavus, a tribal member, a guest at a local lodge, or a cruise ship captain, public and private stakeholders have a deep vested interest in park functions. Fostering involvement and good communication with these stakeholders is an on-going effort, inherent in the mission of the NPS.

- Through comment cards, letters, on-line discussions, annual reviews and public meetings, Glacier Bay invites and responds to feedback from a wide array of stakeholders. Comments and feedback from local communities, park visitors, concession operators, and regional businesses are valued.
- Direct lines of communication have been established with operators of cruise ships and tour vessels, resulting in immediate and positive feedback for improved visitor experiences and conservation measures.
- Management and development proposals are made available for public review and comment as directed by the National Environmental Policy Act (NEPA) and the Council on Environmental Quality.
- “Friends of Glacier Bay” is a volunteer group dedicated to ecological integrity, opportunities for solitude, and appropriate research in Glacier Bay National Park and Preserve. This group often provides feedback on projects and activities within the biosphere reserve, playing a collaborative and supportive role when possible and appropriate.
- The park values and encourages healthy dialogue with the City of Gustavus. Input from these stakeholders enables the park to gain the best perspective on issues and challenges.





6. PROGRESS MADE AND ANTICIPATED

- a) *Highlight the main achievements of your biosphere reserve over the past ten years and what contributions it has made and could make to North American biosphere reserves and to the World Network of Biosphere Reserves.*

Four main achievements and potential contributions of the Admiralty Island Biosphere Reserve unit are:

- Major strides have been made over the last several years in partnering with Angoon by having a regular dedicated U.S. Forest Service presence. The agency is benefiting from a new generation of staff who are committed to Admiralty Island and from putting in the time it takes to build community relations. The stronger ties have given the Forest Service a better understanding of the Native cultural role in contemporary land management principles.
- In 2012 the Forest Service conducted a Pack Creek brown bear viewing area Prospectus with wilderness character criteria that awarded sustainable businesses with a conservation ethic. It is hopeful that the completion of the unit-wide Shoreline Outfitter/Guide Environmental Impact Statement in a few years will afford the chance to conduct a broader bidding process with the same sustainable standards. This Prospectus model could be replicated in or refined by other biosphere reserves.
- Discussions have begun with Shee Atika, Incorporated to see if the U.S. Forest Service might be able to use federal conservation dollars to acquire some or all of their 22,890 acres. Any land acquired by the agency would be converted to Monument and possibly wilderness status. The Shee Atika lands constitute the largest private inholding in any U.S. designated wilderness area. The lands would serve as an excellent opportunity to measure how logged and roaded lands rewild.
- The last decade has seen a rapid evolution in how the Forest Service manages wilderness. The agency structured stewardship as a multidisciplinary endeavor that coordinated managers with experts to plot methodical approaches complete with evaluations and refinements to continually advance in areas such as air quality, invasive species, campsite monitoring, wilderness education and others. The forward vision continues synthesizing to create an overall map of wilderness character. Admiralty Island staff can share this approach with other reserves.

As a world renowned national park and part of a World Heritage Site, Glacier Bay's accomplishments have been recognized locally, nationally and globally. Several recent accomplishments are highlighted below:

- Glacier Bay National Park and Preserve completed a Vessel Quota and Operating Requirements (VQOR) decision-making process in 2006. This process limits the daily number of commercial and private vessels within the bay and specifies operating restrictions to protect sensitive natural and cultural resources. Resource management agencies in and outside the U.S. (Gwaii Hanaas and Saint-Lawrence Saguenay in Parks Canada system, U.S. National Marine Fisheries Service) have emulated Glacier Bay National Park's regulatory framework to develop their own vessel management strategies to protect whales and other sensitive resources.
- In 2011 Glacier Bay signed a sister park agreement with Francisco Coloane Marine and Coastal Protected Area (FCMCPA) in Chile, the first marine national park in Chile. The primary objective for the establishment of FCMCPA

was to conserve a recently discovered population of humpback whales in the Strait of Magellan. As part of this agreement, park personnel from both countries worked collaboratively to produce the first abundance estimate ever for humpback whales in FCMCPA, and generated estimates of risk as a function of the large level of commercial shipping traffic through the Strait. Several joint scientific publications are being completed.

- Over the past decade, the Southeast Alaska Network (SEAN) of National Parks – which includes Glacier Bay - has developed resource inventories and conducted long-term monitoring of resources of particular interest. Refer to *Section 2: Conservation* which highlights the development of programs to monitor key indicators of ecosystem health.
- Following the signing of Memoranda of Understanding with the Hoonah Indian Association (HIA) and Yakutat Tribes, Glacier Bay has worked cooperatively with local tribes to strengthen relationships, maintain tribal connections to homeland, preserve cultural traditions, and incorporate traditional knowledge and input into park management processes. The park - in collaboration with tribal entities - has instituted numerous mechanisms toward that end, including frequent government-to-government meetings; regular information exchange; educational programs; sponsored camps and workshops; improved diversity hiring practices; stationing park personnel in native villages; and allocating funding toward ethnographic and archeological research, cultural education in village schools, Journey to Homeland experiences; and the construction of a Tribal House.
- Significant changes have occurred in commercial fishing within Glacier Bay. In 1999 federal law authorized continuation of specific commercial fisheries in waters of Glacier Bay National Park outside Glacier Bay Proper, instituted a phase-out and grandfathering process (Lifetime Access Permit) for qualifying fishermen and fisheries in Glacier Bay Proper, and established areas closed to commercial fishing. Based on the age distribution of fishermen authorized to continue fishing within Glacier Bay Proper under a Lifetime Access Permit, it is estimated that most commercial fishing will cease by 2050. Legally authorizing and limiting commercial fishing in Glacier Bay Proper within the core of the National Park unit to three authorized fisheries (i.e., Pacific halibut, Tanner crab and Chinook salmon) has reduced biomass extraction and associated fisheries effects on the marine ecosystem. Eighteen percent (107,166 of 590,203 acres) of park waters are currently closed to commercial fishing year round and 56% (331,062 total acres) of park waters will be permanently closed after cessation of commercial fishing within Glacier Bay Proper. Author James Mackovjak's 2010 treatment of the NPS resolution of the commercial fishing issue entitled "[Navigating Troubled Waters: A History of Commercial Fishing in Glacier Bay, Alaska](#)" highlights the difficult politics, economic impact and conservation ideals of the National Park Service from which other protected areas and conservation organizations can learn.
- New technology and social media has provided opportunities unimagined ten years ago to reach greatly expanded audiences with park education and conservation messages. On-line education curriculums, blogs, social media conversations, and multilingual videos engage diverse audiences. Glacier Bay has emerged as a leader in using [video conferencing technology](#) to provide long distance learning. In one day classrooms as disparate as Dallas, Texas and Ramallah, Palestine can virtually visit Glacier Bay while interacting with a park ranger.
- Glacier Bay is recognized as a NPS leader in environmental management and stewardship. Designated as a Climate Friendly Park, Glacier Bay has received the NPS Environmental Achievement Award for efforts in waste reduction and pollution prevention. Additional honors include the Environmental Protection Agency's (EPA) Champions of Environmental Leadership and Green Government award for efforts in waste reduction and energy conservation (e.g., the park currently diverts 80% of its total waste stream from landfills). In 2010, the park initiated an alternative transportation program which encourages staff to use alternative transportation such as carpooling and bicycling to commute to and from work. This successful program has been a model for programs implemented in other parks within the NPS system.
- Glacier Bay successfully collaborated with a variety of federal land management agencies in developing a new [process to evaluate proposals for scientific activities in wilderness](#). The resulting framework is now widely used by all four Federal wilderness managing agencies to improve wilderness stewardship.

b) *Describe the contributions the reserve and its partners have made and could make to address transnational and trans-border issues such as migratory and invasive species, and shared biodiversity and ecosystem resources.*

The U.S. Forest Service, including Admiralty Island staff, has collaborated with other agencies, organizations and countries to share expertise in wilderness management, recreational tourism, fisheries research, wildlife viewing sites and brown bear management. The agency has also dedicated significant time internally to addressing complex issues such as determining the most effective management in regards to migratory birds and salmon, invasive species and climate change. The Forest Service is highly

interested in collaborating further with other Biosphere Reserves regarding these and additional international/transborder issues. Examples of Forest Service potential and realized contributions include:

- The U.S. Forest Service is one of the funding partners for [The Alaska Coastal Rainforest Center](#) based in Juneau, Alaska. The Center recently sponsored an international conference on temperate rainforest ecology and conservation and they are sponsoring a cross boundary data integration group for Southeast Alaska and British Columbia.
- [Boreal Partners in Flight](#), a multi-agency and citizen ornithological working group, is supported by the Forest Service and conducts inventorying and monitoring on Admiralty Island. Their work focuses on both resident and migrating species of birds and often contrasts the health of Admiralty's habitat and populations with impacted areas and numbers.
- Admiralty Island could demonstrate how a largely intact ecosystem responds to invasive weeds. The Monument has invasive plants, such as garlic mustard, bindweed and hemp nettle, primarily in areas with a history of human disturbance. The last few years Admiralty has partnered with Wilderness Volunteers and the Southeast Alaska Conservation Council to conduct weed pulls with volunteer citizen groups.
- Admiralty Island models the habitat needs for species listed as endangered or threatened elsewhere, such as brown bears, bald eagles, the five salmon species (*Onchorhynchus tshawytscha*, *O. kisutch*, *O. nerka*, *O. gorbuscha*, *O. keta*), steelhead trout (*O. mykiss*), and marbled murrelets, which could help other regions develop recovery plans.
- Admiralty Island fisheries staff has come to specialize in noninvasive procedures of inventorying and monitoring salmon runs, pioneering swim-through weirs with redundant video cameras that leave the salmon run unimpeded. They are also at the vanguard of research documenting how hatchery salmon affect the biodiversity of wild salmon stocks and other endemic fish populations (e.g. herring (*Clupea pallasii*) and eulachon (*Thaleichthys pacificus*)).

In addition to open waterways teeming with migrating marine life, Glacier Bay is part of a much larger International World Heritage Site (sharing land borders with Kluane National Park and Alsek-Tatsenshini Provincial Park). Glacial valleys, rivers, and coastal plains serve as important corridors for wildlife. Here, mammals, birds, and salmon continue their ancient travels through a rugged and remote landscape.

- The NPS has initiated an effort, which is to include all park units, to generate a program focusing on the conservation of migrations and migratory species. This effort has been in development for the past 4 years.
- Glacier Bay staff served on the steering committee that designed and carried out SPLASH, a three-year international [collaborative study of North Pacific humpback whales](#). With over 50 research groups and more than 400 researchers in 10 countries this is one of the largest international collaborative studies of any large whale. It was designed to determine the abundance, trends, movements, and population structure of humpback whales throughout the North Pacific and to examine human impacts on this population. SPLASH results, including an online database, will likely be an authoritative source of information on this species for many years to come.
- Glacier Bay National Park and Preserve staff participated in a symposia for the International Committee on Marine Mammal Protected Areas, a group that convened to share resource management concerns and strategies across borders.
- Glacier Bay National Park and Preserve communicates regularly with the Northwest and Canada Cruise Ship Association on issues related to prevention of whale-vessel collisions.
- From 2004-2012, Glacier Bay National Park and Preserve implemented an annual program of invasive plant inventory and control. This effort extended to the Alsek River trans boundary connecting the park to protected areas in Canada.
- Reserve managers have developed extensive collaborative partnerships between NPS, National Marine Fisheries Service (NMFS), USFS, USFWS, ADFG, Parks Canada, Yukon Parks, and British Columbia Parks to monitor and manage wildlife species that migrate across national and reserve boundaries.
- Glacier Bay communicates and collaborates with Canada in management of the Alsek River corridor, a significant route of discovery and migration through the coastal mountain range to the Pacific Ocean. Regular meetings with Parks Canada maintain cooperative management to achieve conservation of resources and preservation of a unique visitor experience.



7. SUPPORTING DOCUMENTS AND MATERIALS

- a) Location map with coordinates. Vegetation map if available.
 - See Appendix A and B.
- b) Key bibliographic references from the past ten years (to be annexed).
 - See Appendix C.
- c) Contact information to include mailing addresses, phone numbers, and e-mails (if available).

Susan L. Boudreau, Superintendent
Glacier Bay National Park and Preserve
PO Box 140
Gustavus, AK 99826
907-697-2230 (phone)
907-697-2660 (fax)
Susan_boudreau@nps.gov

Lisa Etherington, Chief of Resource Management
Glacier Bay National Park and Preserve
PO Box 140
Gustavus, AK 99826
907-697-2640 (phone)
907-697-2660 (fax)
Lisa_etherington@nps.gov

Chad VanOrmer, Monument Ranger
Admiralty Island National Monument
8510 Mendenhall Loop Road
Juneau, AK 99801
907-789-6202 (phone)
907-789-8808 (fax)
cvanormer@fs.fed.us

Kevin E Hood
Wilderness Manager
Admiralty Island National Monument
8510 Mendenhall Loop Road
Juneau, Alaska 99801
907-789-6220 (phone)
kehood@fs.fed.us

- d) Promotion and communication materials including photos (to be annexed).
 - See Appendices D-G:
 - a. Glacier Bay Visitors' Guide *The Fairweather*
 - b. Glacier Bay National Park Map and Guide
 - c. Glacier Bay Fact Sheet
 - d. Tlingit Place Names in Glacier Bay
 - e. Glacier Bay Foundation Statement

- e) Relevant websites and/or links.
- a. [Glacier Bay National Park and Preserve Website](#)
 - b. [Glacier Bay Facebook](#)
 - c. [Glacier Bay Twitter Feed](#)
 - d. [“Voices of Glacier Bay” Soundscape Project](#)
 - e. [“Glacier Bay Ranger Minutes” Podcasts](#)
 - f. [Glacier Bay Middle School Scientists](#)
 - g. [Tongass National Forest](#)
 - h. [Pack Creek Brown Bear Viewing Area](#)
 - i. [Admiralty Island cabin rentals](#)

Appendices

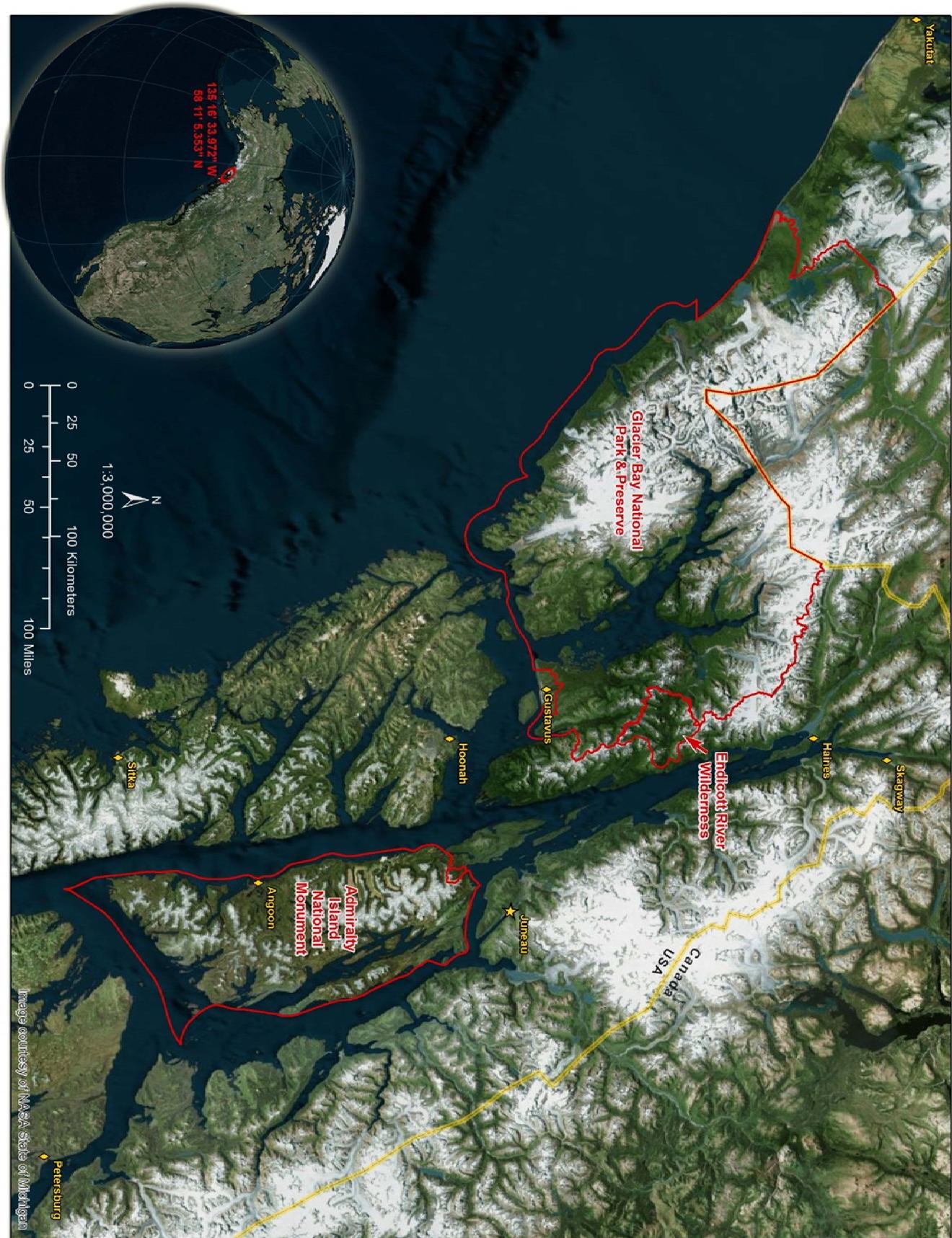
- A. Location map.
- B. Vegetation map.
- C. Key bibliographic references from the past ten years.
- D. Glacier Bay Visitors’ Guide *The Fairweather*
- E. Glacier Bay Park Map and Guide
- F. Glacier Bay Fact Sheet
- G. Tlingit Place Names in Glacier Bay
- H. Glacier Bay Foundation Statement

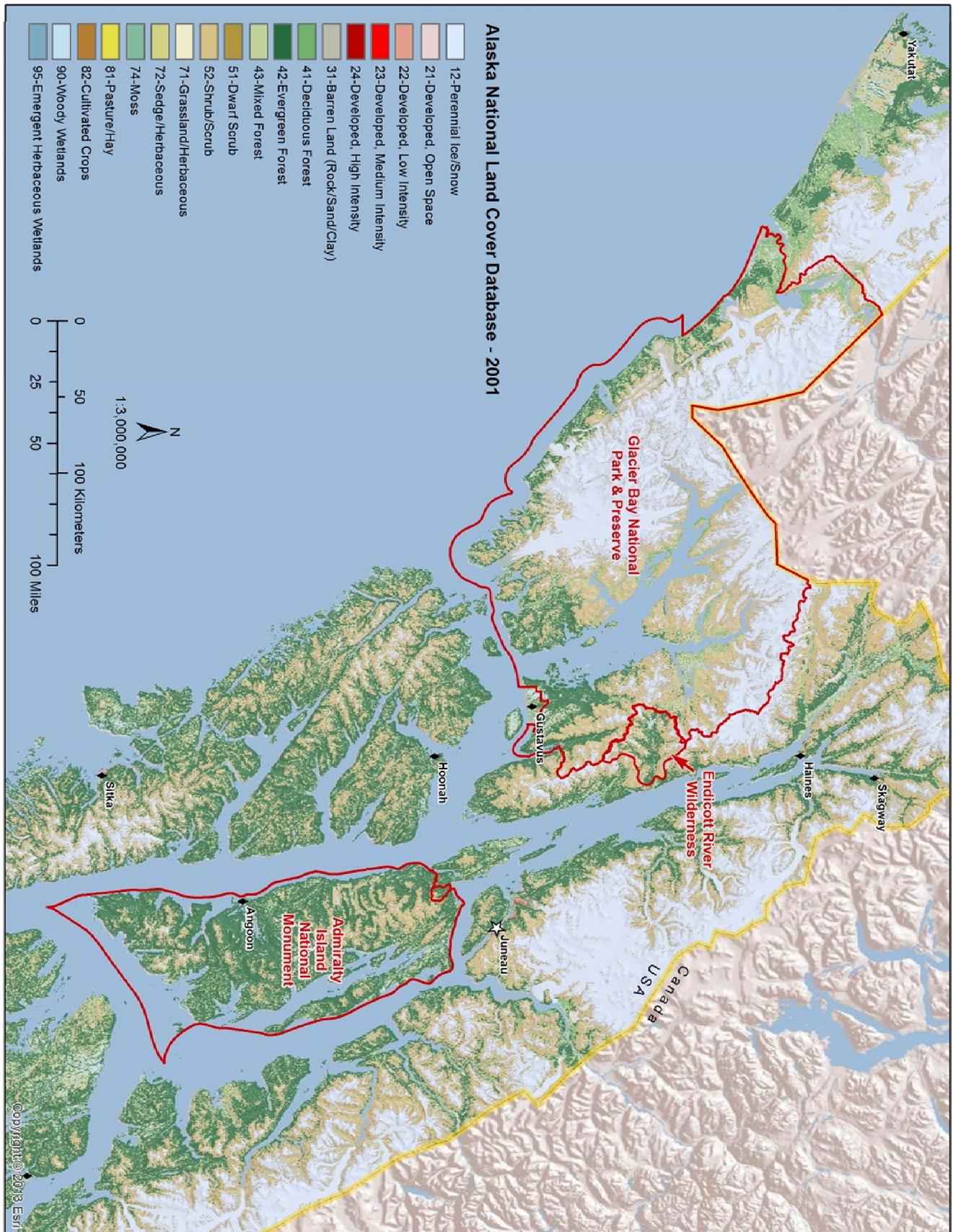
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Appendix A. Location map of Glacier Bay-Admiralty Island Biosphere Reserve, southeastern Alaska, United States.





Appendix C. Key Bibliographic References.

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