

National Park Service  
U.S. Department of the Interior

Glacier Bay National Park and Preserve  
Alaska



# Marine Management Plan

A VISION FOR MARINE STEWARDSHIP, PROVIDING DIVERSE VISITOR EXPERIENCES AND  
BALANCED ACCESS, AND AN ENDURING COMMITMENT TO TLINGIT HOMELAND VALUES

ENVIRONMENTAL ASSESSMENT INCLUDING UPDATES TO  
VESSEL QUOTAS AND OPERATING REQUIREMENTS

FINDING OF NO SIGNIFICANT IMPACT

February 2023



Muir Glacier by Thomas Hill, Anchorage Museum, 1976.50.1

*A káx yan tudél wé éil'*  
Taking care of the ocean

# Managing for Balance

## Letter from the Superintendent

Glacier Bay National Park is a jewel in the national park system, visited each year by roughly 650,000 people, most of whom enjoy the park on marine vessels. Since 1979, marine vessels have been managed to balance the protection of park resources with providing a range of rewarding experiential opportunities for visitors consistent with the park's purpose and values.



The Tlingit who have called Glacier Bay their Homeland for countless generations hold a core belief in the essential nature of balance in all things - *wooch yas kadál* - that underlies all community interaction and human relationship with the natural world.

This plan reaffirms these concepts of balance applied to the National Park Service's continued management of ~537,000 acres of marine park waters. The plan provides targeted refinements to the successful vessel management system, considered a model for balancing visitor enjoyment while protecting resources. It also provides management frameworks and adaptive tools for current and future park managers to maintain balance as changes occur, including tidewater glacial retreat and evolving visitation patterns.

Thanks to all who contributed to the development of this document during public scoping (August - September 2022) and draft plan and Environmental Assessment review (November - December 2022). This document incorporates changes based on your feedback and concerns.

Thank you for your commitment to Glacier Bay National Park and its core values.

A handwritten signature in black ink that reads "Philip Hooge".

Philip Hooge, Superintendent  
Glacier Bay National Park and Preserve



# Glacier Bay



(above) From sea to summit, Glacier Bay National Park offers limitless opportunities for adventure and inspiration, covering 3.2 million acres of rugged mountains, dynamic glaciers, temperate rainforest, wild coastlines, and deep sheltered fjords. The park is also a Biosphere Reserve and part of a 25-million acre World Heritage Site—one of the world’s largest international protected areas. It also encompasses a Tlingit Homeland originally peopled by the ancestors of tribal members now primarily living nearby in Hoonah and Yakutat.

*The purpose of Glacier Bay National Park and Preserve is to protect a dynamic tidewater glacial landscape and associated natural successional processes for science and discovery in a wilderness setting.*



(above) Glacier Bay National Park is a sanctuary that protects both land and water. Much of the marine world is unseen by visitors—the three dimensional intact marine ecosystems and submerged lands below mean high tide.

These marine areas were set aside starting in 1925 when Glacier Bay National Monument was established for: 1) public enjoyment of unusually accessible tidewaters glaciers in a magnificent setting of lofty peaks, 2) preservation of forests and bare areas recently covered in ice, 3) scientific study of the glacial environment, and 4) protection of America’s shared heritage of exploration.

National Park status was achieved in 1980 when the Alaska National Interest Lands Conservation Act (ANILCA) re-designated these marine areas, carrying forward their original purposes, while adding new policies and management guidance, including to provide opportunities for Alaska Natives and Alaskans in adjacent areas. At the same time, Congress excluded ANILCA provisions to allow federal subsistence fishing and hunting, and explicitly identified Glacier Bay National Park as one of four areas to serve as “Large sanctuaries where fish and wildlife may roam freely, developing their social structures and evolving over long periods of time as nearly as possible without the changes that extensive human activities would cause” (ANILCA Senate Committee Report 96-413, p. 137).

The conservation status and federal title of these marine waters and submerged lands was reaffirmed in 2005 by the U.S. Supreme Court (*Alaska v. United States*, 545 U.S. 75, 125 S. Ct. 2153). By 2009, marine park waters were further recognized as a federal Marine Protected Area (MPA) within a larger nationwide system of MPAs that provide lasting protection for natural and cultural resources for the benefit of present and future generations (2009 Federal Register, List of National System Marine Protected Areas, Document Number E9-9335).

FIGURE 1. GLACIER BAY NATIONAL PARK

## Haa Éil': Our Ocean

Recognizing and honoring the rich cultural tapestry of Indigenous use and occupation in marine waters, and supporting the enduring connection between the Tlingit and their Homeland, this plan highlights Indigenous Homeland values embraced by Glacier Bay's original people and advances agency-wide conversations about diverse cultural perspectives and values. Toward this end, we collaborated with Tlingit elders and speakers to incorporate, as appropriate, Tlingit language to encourage readers to consider the concepts presented here through the world view of those who consider Glacier Bay National Park Homeland.



(left) Satellite image of Glacier Bay, Icy Strait, and the Gulf of Alaska.

(images below) Huna Tlingit past and present in Homeland.



The traditional territory of the Huna Tlingit encompasses all the lands and waters of Glacier Bay National Park and the Yakutat Tlingit clans have strong ties to Dry Bay (within Glacier Bay National Preserve) and much of the northern Outer Coast. The Tlingit evolved with and adapted to the dynamic Glacier Bay landscape—just as they, in turn, shaped the natural resources and ecosystems. Today, Glacier Bay National Park encompasses *Tlingit Aanii* (Homeland) and protects traditional lifeways and a living cultural landscape that physically and spiritually sustains past, present, and future generations.

FIGURE 2. OUR GRANDPARENTS' OCEAN WATERS, HAA LÉELK'U HÁS, HAS DU ÉIL'Í

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# **Glacier Bay National Park**

## **Part I - Marine Management Plan**

**February 2023**



# Marine Management Plan

## Planning Area

Glacier Bay National Park and Preserve

National Park Service

U.S. Department of the Interior




### Legend

Glacier Bay National Park

 ~3.2 Million Acres

Marine Management Planning Area

 ~537,000 Acres

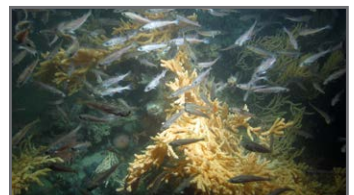


FIGURE 3. PLANNING AREA

Park marine waters are a globally important sanctuary for many species.

## CHAPTER 1 INTRODUCTION

### WHAT IS IN THIS DOCUMENT? DAA SÁYÁ TÓOWU YÁ X'ÚX'? (WHAT IS IN THIS BOOK?)

This Marine Management Plan (plan) provides a framework for the National Park Service (NPS) to manage approximately 537,000 acres of Glacier Bay National Park (see figure 1) waters—a three-dimensional marine environment that extends from the seafloor up to the mean high tide line—and to continue balanced approaches to Glacier Bay access and vessel management with targeted refinements to a framework initially set in 1979 and comprehensively updated in 2003.

The plan meets statutory requirements for broad direction under a 1984 General Management Plan (GMP) focusing on resource preservation and the conditions needed for visitors to access, understand, enjoy, and appreciate the significant and fundamental park resources and values that merited national designation.

The plan is organized into four chapters that include the following contents:

- **Chapter 1: Introduction.** This chapter outlines the plan's organization, purpose, and scope. It then presents background and foundational management contexts, including relevant policies, and relates this document to other park plans. Next, it summarizes the planning process and presents key planning issues, framed under three broad themes that are repeated in the plan (science and stewardship, balanced visitor experiences, and Tlingit Homeland). It then highlights Tlingit perceptions about the marine environment presented through the worldview of those who consider the park Homeland.
- **Chapter 2: General Management Direction.** This chapter outlines the general management direction for the planning area. This includes a long-term management vision, objectives, zoning, and desired conditions (statements of aspiration) that the park strives to achieve and maintain in a particular area for resource conditions, visitor experiences and opportunities, and facilities and services.
- **Chapter 3: Management Strategies and Actions.** This chapter identifies specific strategies and actions including how they relate to zoning to achieve and maintain desired conditions.
- **Chapter 4: Monitoring, Adaptive Management, and Capacity.** This chapter describes monitoring to support implementation of the plan, including methods for evaluating changes in resource or experiential conditions. It also details adaptive management frameworks and addresses visitor capacity statutory requirements (54 United States Code [USC] § 100502).

### PLANNING FOR PARK MARINE WATERS, HAA LÉELK'U HÁS ÉIL'I JEEYÍS ÁYÁ YÁ X'ÚX' (A WORKING BOOK FOR OUR GRANDPARENTS' OCEAN)

#### Purpose, Daat Gáa Sá X'úx' (What is the Book For?)

The purpose of the plan is to provide for the protection of natural and cultural resources and values and to support high-quality visitor experiences aligned with park purposes and values (see figure 1) within a biologically and scientifically significant marine environment, scenic wilderness setting, and Tlingit Homeland (see figure 2), with important human connections.

To achieve these purposes, the plan defines desired conditions, zoning, and adaptive management strategies. The plan also provides a vision for marine management that is responsive to evolving visitor interests, recreational use patterns, collaboration with tribes, park purpose as a living laboratory for research, and information from ongoing resource inventory and monitoring activities.

The management strategies identified in this plan will be accomplished over time and may be adjusted as needed during the implementation phase.

## Scope

The plan project area encompasses approximately 537,000 acres of nonwilderness marine park waters in Glacier Bay National Park (the park), from just north of Cape Fairweather on the outer coast to Excursion Inlet in Icy Strait (see figure 3). The scope is inclusive of submerged lands (seafloor), the marine water column, and the shorelines and biological communities below mean high tide within the park. The plan also supports motorized vessel management for balanced access to Glacier Bay, including through targeted refinements to management frameworks initially established in 1979 and comprehensively updated in 2003. Some vessel management frameworks (including quotas and operating requirements) apply to designated Wilderness waters and Bartlett Cove waters (west of the fuel dock) while other management aspects are outside the scope of the plan (see details below).

This extensive marine area was conserved as a National Monument starting in 1925 and expanded again in 1939 for the purposes of scientific study, protection of rich and varied flora and fauna, historic interest, and visitor access to and enjoyment of the glacial environment. In 1980, the area was designated a national park under the Alaska National Interest Lands Conservation Act (ANILCA). The conservation status and NPS jurisdiction of park marine waters and submerged lands was confirmed in 2005 by a Supreme Court ruling (*Alaska v. United States*, 545 US 75, 125 S. Ct. at 2153).

Due to its marine nexus, the scope of the plan includes reefs and terrestrial sites near sea-level with US Coast Guard permitted installations and activities that support maritime aids to navigation and provide a national distress and response system, including the Cape Spencer Light and communication site, Ancon Rock Buoy #2 (Point Gustavus), Rush Point Shoal Buoy #2 (lower Glacier Bay near Ripple Cove), Libby Island Light (Graves Harbor), Graves Harbor Day Beacon #2, and Lituya Bay Entrance Front and Rear Range Lights.

Also due to their marine nexus, the plan includes management actions and proposals specific to existing terrestrial communication and weather station sites in designated Wilderness. Some of these installations predate the designation of park wilderness under the 1980 ANILCA with allowance for “reasonable access to and operation and maintenance” under *§1310 Navigation Aids and Other Facilities*. Other sites were installed in park designated Wilderness under a comprehensive 2015 Climate Monitoring Program EA (NPS 2015a) including a Minimum Requirements Analysis for prohibited uses under section 4(c) of the Wilderness Act of 1964.

## Areas Outside the Scope of This Plan

Some marine areas in the park subject to vessel management decisions (including vessel quotas and operating requirements) set by this plan are zoned and managed by other park plans to better address their unique visitor use patterns and stewardship considerations:

- Bartlett Cove, the Inner Lagoon, and part of the Beardslee Islands Tidal Cut (~1,900 acres) are managed under the Frontcountry Management Plan (FMP) (NPS 2019a).
- Designated Wilderness marine waters in the park (~53,000 acres) will be managed under the Backcountry and Wilderness Management Plan (BWMP) (in preparation). At the same time, marine management planning does consider the interconnectedness of marine ecosystems and the importance of holistic park visitor management with respect to:
  - Marine environment activities that adversely affect wilderness character in designated Wilderness.
  - Glacier Bay social science research results indicating that visitor experiences of “wildness” do not require setting foot in designated Wilderness (Furr et al. 2021; Swanson and Vande Kamp 2011).
  - Where saltwater and freshwater meet, this plan defers to regulatory definitions to clarify where Wilderness Act management frameworks apply (e.g., freshwater means all inland waters; inland waters are separated from salt water at the mouths of creeks, streams and rivers at a line between extremities of the latter’s banks at a mean high tide).

The NPS will continue to exercise various marine management authorities inclusive of all park marine waters for a comprehensive and coordinated approach, including vessel quotas and operating requirements, the issuing of commercial contracts and permits, and conducting parkwide operations (resource management, research, search and rescue, law enforcement, risk management, spill response, etc.). In addition, the content in appendix D, Mitigation Measures and Best Management Practices has broad applicability across all marine park settings.

## PLAN BACKGROUND AND CONTEXT, SHKALNEEK (THE STORY)

America’s national parks are among our nation’s greatest treasures, managed for the enduring benefit and legacy of present and future generations. A gem among these national treasures, the park (figure 1) offers a sample of truly wild America, an awe-inspiring place to experience nature on its own terms in a dynamic landscape, where ancient Tlingit heritage blends with living cultural traditions.

First protected as a National Monument, generations of visitors have been inspired by Glacier Bay’s rugged mountains, dynamic glaciers, dense temperate rainforest, wild coastlines, and deep sheltered fjords. Designated a national park in 1980 and a Biosphere Reserve in 1986, the park today includes 3.2 million acres, which is part of the even larger 25-million-acre Kluane/Wrangell-St. Elias/Glacier Bay/Tatshenshini-Alsek World Heritage Site—one of the world’s largest international protected areas.

Within southeast Alaska and North Pacific destinations for marine cruising and recreation, the park offers a one-of-a-kind experience that few places on the planet can match. Most of the park’s visitation occurs in the park’s productive marine waters and the adjoining shorelines of Glacier Bay, one of the most biologically rich, intact marine ecosystems in the world, and a globally important marine conservation area for many species. Traveling within protected scenic fjords, intimate inlets and bays, or along rugged

coastal waters, visitors experience the magnificent setting of lofty peaks, intact ecosystems where natural forces and processes predominate, dynamic tidewater glacial landscapes (with most of the park's glaciers in retreat), abundant marine and terrestrial wildlife, and diverse succession habitats ranging from bare new beaches to lush estuary wildflower meadows and dense rainforests.

Generations have been captivated by this ever-changing park experience, making Glacier Bay one of the most beloved and popular cruise destinations worldwide (Sloan 2018). Glacier Bay is also a destination for adventure and the more intimate marine visitor experience of paddling and camping along the shoreline, or exploring numerous branches, inlets, lagoons, and passages from the vantage of a vessel. As a national park experience, the park delivers powerful experiences every day, while annually serving around 672,087 visitors (NPS 2019b). On average, visitors travel more than 3,000 miles from home to visit the park from around the world (20%), across the country (80%), within the state (>5%), or from nearby areas (2%) (NPS 2015b).

Economic and social studies attribute large intact ecosystems, wilderness character, and abundant wildlife as significant drivers of Alaska visitation, and the park offers the competitive tourism advantage of all these being accessible through water-based visits that can be accomplished by reasonable modes of transportation and within a reasonable amount of time (Bright 1985). Overall park visitor annual expenditures and contributions (2019 data) total \$402 million in economic output, support an estimated 2,929 jobs, provide \$121 million in labor income, and add \$213 million in total contributions to the national gross domestic product, with visitor spending predominantly made by non-local visitors (98.7%) (NPS 2019b).

### **Enabling Legislation and Park Purpose, Daat Gáa Sá Park? (What is the Park For?)**

Glacier Bay National Park and Preserve protects “a dynamic tidewater glacial landscape and associated natural successional processes for science and discovery in a wilderness setting” (NPS 2010a). Within broader park purposes (figure 1) marine park waters support diverse people experiencing the fundamental resources and values of the park, primarily from the deck of a vessel. Park significance themes emphasized in the Glacier Bay National Monument enabling legislation (1925 establishment and 1939 expansion) that are relevant to marine management include:

- **Tidewater Glaciers in a Magnificent Setting.** Central to the formation of Glacier Bay as a National Monument in 1925 was the presence and ability to access and enjoy “tidewater glaciers of the first rank in a magnificent setting of lofty peaks, and more accessible to ordinary travel...” The desire by visitors to see and enjoy tidewater glaciers remains just as relevant today—even though their extent has changed dramatically over the past century (and will continue to change given the characteristic dynamism of Glacier Bay and due to climate change). Providing these experiences remains relevant to meeting the park’s fundamental purpose.
- **A Living Laboratory.** When Glacier Bay and surrounding lands were first set aside, the principal lobby group was the scientific community; they wanted to ensure preservation of the area’s potential to contribute to scientific knowledge with “unique opportunities for the scientific study of glacial behavior and of resulting movements and development of flora and fauna and of certain valuable relics of ancient interglacial forests.” Scientists were first drawn to Glacier Bay in the late 1800s because of its dynamic, rapidly-deglaciating landscape and the associated colonization of new land by plants and animals. Glaciologists, geologists, plant ecologists, and other scientists came from all over the world to study the unfolding phenomena, and soon Glacier Bay became widely known as a living laboratory. Glacier Bay became the quintessential example of a park for

science. Today, having hosted more than a century of research resulting in countless important contributions to science, including many specific to marine wildlife and the fjord marine environment, the park is considered a globally important conservation area for learning about nature and helping the NPS and other management agencies wisely manage protected areas around the world. Importantly, the park has also modeled the values of incorporating traditional ecological knowledge into research design and analysis.

- **Historic Interest.** The proclamation also describes Glacier Bay’s historical significance and the need to preserve valuable historic records. These cultural resources manifest relative to the marine environment as maps, photos, journals, and artifact assemblages, including submerged and shoreline artifacts that represent records of past events and utilization, and living Tlingit Homeland ethnographic resources.

In 1980, Title II of ANILCA created new units and additions to existing units of the National Park System in Alaska for the “benefit, use, education, and inspiration of present and future generations for their nationally significant natural, scenic, historic, archeological, geological, scientific, wilderness, cultural, recreational, and wildlife values.”

ANILCA Section 203 provides for the administration of lands, waters, and interests therein withdrawn or reserved for the former Glacier Bay National Monument to be incorporated within and made a part of Glacier Bay National Park, subject to valid existing rights. Specific statutory language from ANILCA relevant to marine management and public use of the park includes:

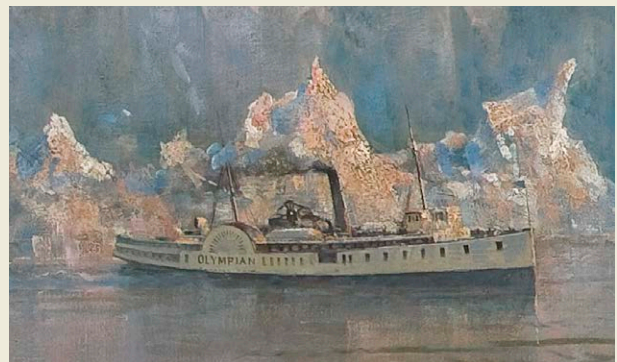
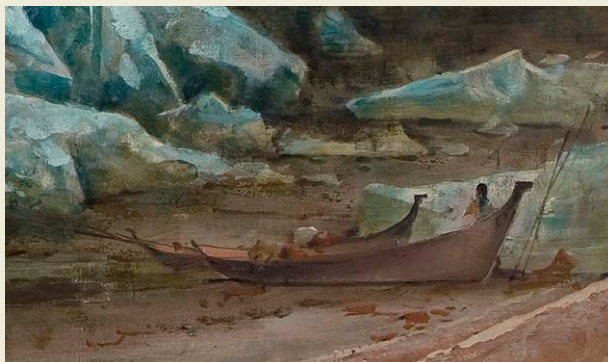
- **Transportation Methods.** Motorboats, airplanes, and nonmotorized surface transportation methods are allowed under (ANILCA Section 1110(a)) except where access restrictions are necessitated and justified following the procedures outlined in 43 CFR 36.
- **Authorized Access.** Where guaranteed rights exist (reserved rights, inholdings, mineral interests), the NPS will honor “adequate and feasible access” requirements within the planning area consistent with ANILCA, including “for economic and other purposes” subject to reasonable regulations (ANILCA Section 1110(b)).
- **Navigation Aids and other Facilities.** Access to and the operation and maintenance of sites critical to marine safety, research, and navigation will be provided (ANILCA Section 1310) subject to reasonable regulations.

### **Visitor Characteristics – Glacier Bay by Vessel, Aadóo Sáwé Hás Wé Sh Tuwáa Kasyéiyi? (Who Are the Visitors?)**

Most visitors experience the park from the deck of a vessel continuing a tradition that started in the late 1800s when the first steam cruisers arrived in Glacier Bay with sightseers and curious scientists who became instrumental to preserving Glacier Bay as a living laboratory (figure 4). Following a natural waterway from Alaska’s Inside Passage, these water-based scenic tours offer one of the most accessible national park experiences in Alaska for diverse visitors of all ages and abilities (figure 5), where many feel a deep connection to park resources and conservation values even without setting foot on shore (Furr et al. 2021; Swanson and Vande Kamp 2011).



(Photos above) Glacier Bay waters sustain human relationships with the living ocean, including as Homeland for the Tlingit and their rich maritime culture (top row). Since the first steam cruisers arrived in the 1880s, millions of visitors have experienced these waters from the deck of a boat (middle row). Visitor surveys find that many develop a strong connection to park resources and conservation values even without setting foot on shore.



(Cover art, details above) *Muir Glacier* by Thomas Hill Anchorage Museum, 1976.50.1. Commissioned by John Muir, this 1889 painting captures three marine management themes emphasized in this plan:

**1) Balanced Tlingit Homeland.** Traditional lifeways are an integral part of the scene which includes *Tlingit yaakw*, canoes, on the shoreline. The Tlingit adapted to the Glacier Bay marine environment, while also shaping these ecosystems in a relationship completely in balance with the natural world - *wooch yas kadál*.

**2) Visitor access to the glacial environment.** The first steam cruisers in Glacier Bay in the late 1800s launched a visitor experience and an industry that today brings well over half a million visitors to the park. Since 1979, management of marine vessels and this industry have evolved to balance the protection of park resources and values with providing a range of rewarding experiences for visitors consistent with the park's purpose and values.

**3) Dynamic living laboratory.** John Muir was intrigued by what Glacier Bay's glacial environment could offer science as a living laboratory for dynamic natural change. Since then, successive generations of researchers from many disciplines have been asking and answering important questions about glacial landscapes and fjord marine ecosystems. Relevant to this plan, scientists now have park specific data sets and analyses spanning decades that can inform resource stewardship and park management.

FIGURE 4. HUMAN CONNECTIONS TO THE MARINE ENVIRONMENT



Glacier Bay marine waters support one of the most accessible national park experiences in Alaska for visitors of all ages and abilities. Surrounded by designated Wilderness and traditional cultural landscapes, visitors experience tidewater glaciers (left), a spectacular setting visibly shaped by glacial and dynamic natural forces (middle), and a variety of marine and terrestrial wildlife (right).



Glacier Bay is a global destination where most visitors experience the park by boat on commercial tours. Most never go ashore, visiting on board cruise ships, where economies of scale and evolving technology contribute to reduced impacts per visitor. Limited entry competitive contracts for commercial operations (cruise ships, tour vessels, and charter vessels) often achieve some of the highest environmental standards in the industry. Park economic contributions total (in 2019) \$402 million in economic output, \$121 million in labor income, and add \$213 million in total contributions to the national gross domestic product, with visitor spending predominantly made by non-local visitors (98.7%).

For independent visitors, Glacier Bay is a trip of a lifetime destination that requires advance planning. Some visit by private boat as the capstone experience of an Alaska Inside Passage voyage, typically for five days or less. Other private boaters live in the region and typically take more frequent day trips and a few overnight trips per season. Others seek the intimate experience of a human powered visit often combining kayaking with shoreline camping, and accessing the park's ~2.6 million acres of designated Wilderness.

FIGURE 5. THE GLACIER BAY VISITOR MODEL



Most marine visitors are cruise ship passengers who travel up to the West Arm to glacial destinations and spend 12 hours or less in park waters entirely onboard with park rangers and cultural interpreters providing in-person programs and experiences. Park social science characterizes the most important trip experiences to cruise ship passengers as experiencing scenic beauty, the wonder of nature, and a pristine environment. Visitor profiles highlight that the majority (85%) of these passengers are US residents not from Alaska, experiencing their first visit to Glacier Bay (94%), and that many never previously have visited a national park. The average age is 56 years old, with an average education equivalent of college or skilled vocation training (16.4 years) (Swanson and Vande Kamp 2011). Typically, cruisers travel in two-person parties, although there is a growing trend toward family and multi-generational cruises, with the average cruise party consisting of approximately four travelers who cruise for seven days. The cost per day of the Glacier Bay cruise-based experience introduces diverse audiences, including youth, to a national park and Alaskan wilderness setting. Park rangers annually deliver on average 227 Junior Ranger programs on ships, reaching an audience of 6,916 participants.

The next largest visitor segment arrives aboard excursion class marine tour vessels that carry an average of 80 visitors (as low as 25, as high as 120 individuals). Tour vessel passengers typically spend anywhere from 14 to 24 hours in the park (sometimes overnight) and are highly motivated by learning, viewing wildlife, experiencing glaciers, exploring off-vessel including experiencing designated Wilderness (hiking, kayaking), participating in frontcountry activities, and spending time with family and friends. Tour boat passengers are also typically (89%) US residents not from Alaska experiencing their first visit to the park (91%). They tend to be older (70% age 60 to 89) with a graduate or professional education training level (17.6 years) and are higher-earning individuals or retirees (Furr et al. 2021; Swanson and Vande Kamp 2011).

Some frontcountry visitors enjoy a “day boat” scenic tour that travels a daily route from Bartlett Cove to the tidewater glaciers at the head of Glacier Bay in the West Arm. Typically operating from late May until early September using a high-speed catamaran, this vessel carries visitors who generally find accommodations in Bartlett Cove (at the Glacier Bay Lodge or campground) or a nearby gateway community.

The marine visitors who enjoy the most unstructured experiences either explore the park aboard a smaller vessel (private or hired charter) or via kayak. Charter vessels, intended for smaller groups, are usually customized to the specific group with trips being one to several days in length. These services are intended to address the needs of visitors who do not have their own vessel and do not have the skills or desire to lease a vessel (bareboat charter), but still desire a more personalized visit than might be provided by the larger cruise ships or tour vessels and are also not interested in an entirely nonmotorized means of access such as kayaking or hiking. The charter vessel passenger average party size is 4.6 people, with more than half traveling with family. Charter passengers are strongly motivated by opportunities to view wildlife, scenic beauty, and experience the wonder of nature. This group also values the flexibility to seek out and obtain solitude (78% indicate this is at least moderately important), and most select guides that will minimize encounters and use smaller vessels that can travel where larger vessels cannot go. Charter passengers are also typically (91%) US residents not from Alaska experiencing their first visit to the park (79%). Passenger average age is 52 years old, with passengers more likely to be male (62%) (Swanson and Vande Kamp 2011).

Private vessel users typically stay two to four nights in Glacier Bay and are highly motivated by viewing scenery, wildlife, and tidewater glaciers and taking photographs. Although most private vessel respondents (89%) did not plan their trip to minimize seeing or hearing other vessels, among those who did (11%), 76% reported that they planned their trips to avoid cruise ships. Similar to those on tour

vessels, visitors on private vessels tend to be older (average age 54 years old) with a graduate or professional education training level (17 years) (Swanson and Vande Kamp 2011).

Backcountry campers and kayakers spend an average of 4.2 days in the backcountry (NPS 2022e) and are highly motivated by experiencing glaciers, solitude and natural sounds, natural connection and renewal, and adventure. The feeling of self-sufficiency and viewing wildlife were elements that added the most to backcountry visitors experiencing adventure (Furr et al. 2021). A portion use day boat drop-off services in targeted locations or hire charter vessels. Fluctuations in the level of backcountry camper and kayaker visitation use over the past few decades have prompted ongoing park studies to monitor campsite impacts and better understand and address desired social conditions.

### **Vessel Management in Glacier Bay, Wáa Sá Glacier Bay Káx̄ Has Gaḡdus.óox̄? (How Will They Drive the Boats in Glacier Bay?)**

Over the decades that it took for this marine park visitor experience to evolve (alongside a multi-billion-dollar global tourism industry that pioneered southeast Alaska as a cruise destination), successions of park managers have been on the frontlines of applying the NPS Organic Act mission to provide enjoyment in such manner and by such means to conserve resources for future generations.

By 1979, intensifying pressures for marine access to Glacier Bay led the park service to manage different classes of motorized vessels through quotas and operating requirements. Since then, the requirements have evolved to include:

- **2003 Vessel Quota and Operating Requirements (VQOR) Environmental Impact Statement (EIS) Record of Decision (ROD).** Rationale and framework articulated for five types of motorized watercraft managed by quota: cruise ships, tour vessels, charter vessels, private vessels, and a passenger ferry to Bartlett Cove.
- **2023 Marine Management Plan Environmental Assessment (EA) Including Updates to Vessel Quotas and Operating Requirements Finding of No Significant Impact (FONSI).** Rationale and framework targeted updates to the private vessel permit system, new vessel categories (nonmotorized, administrative, and lower-impact), conditional transit permit, extended dates for nonmotorized waters (Upper Muir Inlet and Wachusett Inlet), and a small vessel experience in the East Arm/Muir Inlet.
- **36 CFR Part 13 Subpart N.** NPS special regulations for Glacier Bay National Park and Preserve.
- **Park Compendium.** Under discretionary Superintendent’s authority some vessel permit details and restrictions may be adjusted annually within CFR set parameters.
- **Commercial Services Contracts and Operating Conditions.** As in all national parks, commercial business activities are limited and require specific authorization and approval. Over decades the park has managed commercial vessels in park waters through exclusive and highly competitive partnerships with the tourism industry at some of the highest environmental standards in the industry. These long-term relationships between commercial operators and the park consistently deliver powerful visitor experiences in a scenic wilderness setting that connects visitors to the park’s dynamic natural and living cultural landscapes and founding purposes. These relationships also encourage park friendly investments, as evolving technology and competitive contracts for limited entries continue to reduce per-passenger impacts, especially by

the cruise industry—primarily because of a 61% increase in the number of passengers per vessel between 2007 and 2019 (see figure 6).

The Glacier Bay approach to marine vessel management is recognized as an international model for optimizing environmental and experiential conditions specific to the park.

### **Planning History and Context, Adax Yéi Jiwtuwanéi Át (The Things We Worked On)**

The NPS is charged with managing park marine waters to provide for public enjoyment while protecting nationally significant resources and values, unimpaired for the enjoyment, education, and inspiration of this and future generations. This plan provides a management framework to achieve these mandates and applies visitor use management best practices set by an Interagency Visitor Use Management Council.

Managing the interconnected relationship between park lands and waters tiers from the broad direction of the park's 1984 GMP and a dynamic portfolio of tiering management plans that serve as internal agency tools that guide decision making and satisfy law and policy, as described below. The park planning portfolio creates a logical, trackable guide for park management actions consistent with The National Parks and Recreation Act of 1978 (54 USC § 100502) requiring each unit of the national park system to have a plan or series of plans that address the four statutory requirements:

- measures for the preservation of the area's resources;
- indications of types and general intensities of development (including visitor circulation and transportation patterns, systems and modes) associated with public enjoyment and use of the area, including general locations, timing of implementation, and anticipated costs;
- identification of an implementation commitment for visitor carrying capacities for all areas of the unit; and
- indications of potential modifications to the external boundaries of the unit and the reasons therefore.

The park's 1984 GMP also incorporated plan requirements and consideration factors listed at Section 1301(b) and (c) of ANILCA.

The park's existing general management planning documents continue to provide relevant guidance and are listed below and in some cases are further detailed in appendix G. These may be supplemented through the development of additional planning documents:

- General Management Plan (NPS 1984)
- Vessel Quota and Operations Requirements (NPS 2003a)
- Foundation Document (NPS 2010a)
- Frontcountry Management Plan (NPS 2019a)
- *Chookanhéeni* (Berg Bay) Warranty Deed (2020) reserving Hoonah Indian Association real property rights that enable reasonable tribal member access for traditional cultural purposes
- Backcountry and Wilderness Management Plan (in progress)

This plan is consistent with the general guidance of the existing documents listed above and described in more detail in the park Foundation Document. Further, its proposed recreation use is consistent with the overall management objectives of the park as outlined in the GMP.



In the late 1800s and early 1900s Glacier Bay explorers, adventurers, and scientists typically arrived by steam cruiser.



By the late 1980s modern cruise ships began competing for contracts to access Glacier Bay with measures applied to help protect the environment. While an improvement from steamships and black smoke, the park asked cruiselines to propose their own solutions to reduce haze from exhaust gases (sulfur oxides), particulate matter, and aerosols (2009 example, above) to reduce pollution and enhance the visitor experience.



Since 2016, the fuel quality of cruise ships in Glacier Bay has improved significantly (from 1.5%-2.5% to 0.0055% marine gasoil sulfur levels) with a notable reduction in visible air pollution (2022 cruise ship in the background). The NPS is also working to transition to lower emission and lower-impact vessels and recently replaced a 1997, 700 hp vessel with a more fuel efficient and quieter 2020, 170 hp design (foreground Serac transfer vessel) that delivers rangers, cultural interpreters, and Alaska Geographic books, merchandise, and staff to the cruise ships.

FIGURE 6. LIMITED ENTRY COMMERCIAL CONTRACTS AND LOWER-IMPACT VESSELS

Numerous ongoing studies have been conducted by park and independent researchers on topics such as visitor use, wildlife, cultural landscapes, acoustic resources, Homeland values, and vessels. These studies and subsequent reports provide insights into visitor experiences of the park and park resource conditions and are available through online searches by park and topic through the Integrated Resource Management Applications online portal and many are included in the reference list for this plan and the EA.

### **Legislative Context, A Káa Kuwdudziteeyí Yoo X'atánk (The Things We Live By)**

The management of marine waters in the park is guided by laws, regulations, policy, and guidance. Some of the top legislative actions applicable to park marine management are listed below and further detailed in appendix G:

- Organic Act (1916)
- Presidential Proclamation 1733 (1925) and 2330 (1939)
- National Historic Preservation Act (1966)
- National Environmental Policy Act (1970)
- Marine Mammal Protection Act (1972)
- Endangered Species Act (1973)
- Redwood Act (1978)
- Alaska National Interest Lands Conservation Act (1980)
- Omnibus Parks and Public Lands Management Act (1996)
- NPS Concessions Management Improvement Act (1998)
- Glacier Bay Fisheries Act (1999)
- Passenger Ferry to Bartlett Cove Stipulations, Public Law 105-83 (Section 127)
- Glacier Bay National Park Resource Management Act (2000)
- Public Law 107-63 (155 Stat 414) (2001)
- Huna Tlingit Traditional Gull Egg Act (2014)

### **Planning Process, Wáa Sá Át Wooneiyín Yáat'aa Shukwát? (How Did We Complete the Plan?)**

Marine management planning began in 2020 with a park review of the existing marine management framework, visitor opportunities, and resource conditions. Consultation with federally recognized tribes also was initiated at this early stage and will continue as implementation occurs, recognizing the marine systems as a unique cultural landscape that informed, and is integral to, the culture and identity of the Huna and Yakutat Tlingit.

An NPS planning team articulated a draft vision of the outcomes the park was hoping to achieve and key planning issues. These were used to formulate an NPS proposal and newsletter that was released for a 30-day public scoping comment period (August 9 to September 9, 2022). The public reviewed three NPS proposals—alternatives A, B, and C described in the EA (part II of this document). During the public

process informative public scoping meetings were held in Gustavus (August 18), Juneau (August 19), and Hoonah (August 20), and the NPS heard many ideas and feedback that helped to shape a new alternative D and informed the development of a plan and aspects of an Environmental Assessment (EA) released as Part II of the plan document. The draft plan and EA were released for a 30-day public review comment period (November 30 to December 30, 2022) with public hearings held in Gustavus (December 7) and Juneau (December 13), and formal consultation initiated (see details, EA chapter 4). The NPS considered and responded to all substantive comments and made changes and corrections where appropriate. The NPS signed a decision document (Finding of No Significant Impact) presented in Part III of this document that includes amendments or modifications to the selected action based on feedback.

**Planning Issues, Haa Jeex' a Náḵ Has Woo.aat. (They left these behind in our care).**

The need for a marine-focused management plan was specifically identified during three larger parkwide efforts that helped to highlight critical resource issues and trends, specific management needs, and resource stewardship considerations applicable to the marine environment:

- **Natural Resource Condition Assessment (2017).** This resource assessment for the entire park highlighted a number of threats and stressors influencing the marine environment and data gaps for understanding resource conditions and trends. Where sufficient data were available, overall resource conditions were assessed (good condition, moderate concern, or significant concern).
- **State of the Park Report (2017).** This report card to the American public identified key issues and challenges facing the park to help inform park management planning, including related to park fundamental resources and values.
- **Resource Stewardship Strategy (2018).** This planning document addresses the specific management concerns raised during these two previous efforts. Management priorities, goals, and projects were developed through collaboration across all park divisions and with subject matter experts both inside and outside the park, including the Southeast Alaska Inventory and Monitoring Network.

Following are the central issues the NPS identified during these pre-planning efforts driving the need for a comprehensive Marine Management Plan and possible changes to the vessel management quotas set in 2003. The summary is organized under three planning issue topic areas that are thematically repeated as sub-headers throughout the rest of the plan:

- Protecting Marine Ecosystems with Science and Stewardship
- Providing Diverse Visitor Experiences and Balanced Access
- Sustaining an Enduring Commitment to Huna and Yakutat Tlingit Homeland Values

Note that the following sections primarily rely on pre-pandemic visitor data. While global pandemic disruptions to visitation did affect Glacier Bay in 2020, recoveries in 2021 and 2022, in combination with 2023 forecasts led NPS to conclude that the park will return to pre-COVID visitor levels by 2025, and that visitor data pre-COVID was robust to inform future management decisions.

## **Protecting Marine Ecosystems with Science and Stewardship, Haa Éil'i Káx Yánde Gaxtoodéil, Haa Át Sakóowuteen (Our Ocean, We Will Watch Over It With Our Knowledge)**

Marine waters make up nearly one-fifth of the park (940 square miles), and no point of land is more than 30 miles from the coast. Further, most of the park's visitation occurs in Glacier Bay's productive marine waters and the adjoining biologically rich shorelines, effectively shrinking the 3.2-million-acre park into a relatively modest usable area.

National parks are charged with managing the park unimpaired for the enjoyment, education, and inspiration of this and future generations (NPS Organic Act). This mandate requires continual balance between conservation, visitor enjoyment, and NPS operational demands (e.g., access, safety, communications). In its founding legislation Glacier Bay was established as a living laboratory. Its 1980 redesignation to national park status under ANILCA added a further emphasis on science and preservation balanced with the benefit, use, education, and inspiration of present and future generations. Moreover, as Congress developed ANILCA, Glacier Bay National Park was envisioned as a "...large sanctuary where fish and wildlife may roam freely, developing their social structures and evolving over long periods of time as nearly as possible without the changes extensive human activity would cause" (ANILCA Senate Committee Report 96-413, p. 137).

The presence of humpback whales, listed as endangered in 1970, was crucial to originally establishing vessel quotas in Glacier Bay and using speed limits and vessel area restrictions (e.g., nearshore areas of lower Glacier Bay) to reduce the risk of collision and disturbance. Humpback whale population monitoring, begun in 1985 and continuing to the present day, has been a keystone program that provides whale distribution data used in real time to create dynamic 'whale waters' areas where speed and/or course restrictions mitigate vessel disturbance and collision risk. Speed reductions have been shown to decrease the likelihood of vessel strikes resulting in whale fatality and reduce vessel sound output, which reduces disturbance and facilitates communication among whales. Additional measures to reduce the risks of whale-vessel collision and disturbance include motorized vessel distance to shore requirements to separate vessel traffic from typical humpback whale feeding areas along shore and a mid-channel travel requirement for cruise ships. Ongoing science in Glacier Bay demonstrates specific ways that motorized vessels can operate to limit impacts to wildlife in a sensitive marine environment.

The park's humpback whale monitoring program is one of the longest continuous studies of a whale species anywhere in the world and continues to be relevant in these decades of rapid ocean change. Most of the whales that feed in Glacier Bay are part of the Hawaii Distinct Population Segment, which was removed from the Endangered Species List in 2016 after decades of population growth. However, a severe marine heatwave in 2014–2016 revealed the continuing vulnerability of this population, which experienced sharp declines in abundance, reproduction, and survival associated with the marine heatwave (Gabriele et al. 2022). Continuing to monitor whales, the underwater sound environment, and oceanographic conditions in Glacier Bay are paramount to understanding how climate change is changing the world's oceans and will shape the park's marine ecology for decades to come. Marine management will benefit from adaptive tools that continue to reduce direct impacts of vessels on marine wildlife, for example, monitoring the number of close encounters per day between vessels and humpback whales and whale-vessel collisions per season to inform if and when management action is needed to respond to a declining condition.

Up to 2,000 seals aggregate seasonally in Johns Hopkins Inlet for pupping, resting, and molting (Mathews and Pendleton 2006; Womble et al. 2010, 2020a), prompting the park to enact seasonal motorized vessel

restrictions in specific waters of Glacier Bay. The park has historically supported one of the largest aggregations of harbor seals in southeastern Alaska (Calambokidis et al. 1987). In 2011, harbor seals in Glacier Bay and Icy Strait were designated as one of 12 unique stocks of harbor seals in Alaska (Allen and Angliss 2011). Harbor seals in Glacier Bay are one of the most protected marine mammal populations in the world (Womble and Gende 2013), yet the population has declined precipitously over the last three decades (Mathews and Pendleton 2006; Womble et al. 2010, 2020a). Relatively large changes in the spatial distribution of seals in Glacier Bay have occurred, due in part to changes in the tidewater glaciers and the availability of icebergs, which serve as habitat for resting, pupping, nursing young, and molting (Womble et al. 2021). Ongoing monitoring indicates that the number of seals in Johns Hopkins Inlet has continued to decline over the 26-year period from 1992 to 2017 (Womble et al. 2020a). Declines of harbor seals in the park are important because seals play important ecological roles both as a predator and also as prey for other upper-trophic level species, such as transient killer whales.

Harbor seals are the most numerous marine mammal in the park and are a highly sought-after viewing experience for visitors. Studies demonstrate that seals may flush from icebergs if approached too closely by vessels, particularly cruise ships (Jansen et al. 2010; Young et al. 2014). Disturbance of seals by vessels can result in the separation of pups from their mothers, which may have negative consequences for pup energy budgets and survival (Jansen et al. 2010). Protections for this iconic marine mammal currently include annual population monitoring to estimate abundance and spatial distribution in glacial ice and terrestrial habitats, seasonal closures in Johns Hopkins Inlet to protect harbor seals when they are hauled out during pupping season in May and June, speed reduction when the inlet is open, and a minimum approach distance to reduce disturbance on ice and at terrestrial haul-outs. Harbor seals are also vulnerable to changes in the availability of icebergs as a result of receding of tidewater glaciers because they rest and rear their newborn pups on icebergs in Johns Hopkins Inlet, McBride Inlet, and Tarr Inlet. Marine management will benefit from appropriate and balanced responses as glacier ice becomes a limiting factor for both harbor seals and park visitors.

Another keystone of marine management is oceanographic monitoring (Etherington et al. 2007), which became a “vital sign” for the Southeast Alaska Inventory & Monitoring Network in 2009. In the Vital Signs program, NPS scientists measure physical, chemical, and biological conditions for a broad understanding of how Glacier Bay functions. This monitoring program has built extensive data sets that can be explored in a variety of ways, from tracking seasonal dynamics to detecting long-term change. Oceanographic monitoring was recently expanded to include outer coast waters. Core oceanographic indicators of environmental health also influence patterns in abundance and distribution of the wildlife that thrive in Glacier Bay and draw thousands of visitors each year. Recent results indicate Glacier Bay marine waters are currently warming at 0.1° Celsius per decade while its surface waters are freshening by 0.28 PSU.<sup>1</sup> The rich data set has expanded the understanding of Glacier Bay’s unique glacially influenced fjord and has connected it with oceanographic processes across Alaska. As with weather data for terrestrial studies, the oceanographic data sets provide a crucial base layer to understand marine ecology. Oceanographic data show that the salinity in the upper bay has decreased slightly as a result of increased glacier melt, in parallel with conditions in the Gulf of Alaska where water temperature and acidification have increased slightly (NPS 2017).

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<sup>1</sup> Ocean salinity is generally defined as the salt concentration (e.g., sodium and chloride) in sea water. It is measured in units of PSU (Practical Salinity Unit), which is a unit based on the properties of sea water conductivity.



These changes in the physical environment impact the entire food web, including phytoplankton, zooplankton, invertebrate, forage fish, and marine mammal communities. Studies suggest these cascading effects caused ecological disruption during the 2014–2016 marine heat wave (Gabriele et al. 2022); however, oceanographic conditions mostly reverted to within normal variability several years later (NPS unpublished data). The NPS cannot stop or even slow large-scale marine ecosystem regime shifts such as those driven by climate change; however, the NPS is collecting data that may allow the agency to better understand how the future marine ecosystem will function. Each exploration of this rich data set inspires curiosity and new questions while linking the marine environment of this unique glacially influenced fjord to other research efforts at the park and across Alaska.

More recently, park science is also helping managers begin to understand underwater sound impacts to marine mammal communication and highlight the importance of airborne noise, which easily travels across water especially in Glacier Bay’s narrow fjord areas, on visitors and wildlife. Glacier Bay has a symphony of natural sounds both above and below the water that management can help to protect.

Finally, park science is considering how managers can address human disturbances to wildlife uses along Glacier Bay’s marine shorelines. These areas are essential to many terrestrial animals’ foraging and nesting and are also hotspots for visitor wildlife viewing. Wildlife dispersal is tied to patterns of glacial recession and landscape connectivity. Emerging science indicates that threshold levels of human activity can displace species, and points to strategies to promote coexistence, especially for tour vessels that have the capacity to take large numbers of visitors to shoreline areas and concentrate off-vessel activities in specific areas, but also including backcountry campers (Sytsma 2022).

### **Providing Diverse Visitor Experiences and Balanced Access, Woosh Gunayáade Át Ka Wooch Yáx Naxdatee (Different Experiences and Make Them Equal).**

At a park level, marine visitation currently provides considerable visitor access balanced across a range of recreation opportunities and access types, from cruise ships to kayaks. These diverse opportunities (see figure 5) are intentionally aligned with the purpose and significance of the park and uphold a high standard of experiential and environmental conditions. The mechanisms for aligning this range of access types with resource and experience goals were primarily developed between 1979 and 2003 as motorized vessel quota decisions and operating requirements. Park managers today continue to apply these tools, while periodically addressing any emerging issues or concerns through commercial services contracts and operating conditions, monitoring, education, and the annual Park Compendium. Marine management will benefit from appropriate and balanced application of a comprehensive approach to marine access, including targeted updates. While much of this existing framework is robust to meet current and future marine management needs, some guidance and minor adjustments are needed to optimize this balance. Additionally, some new tools are needed to help park managers evaluate changes in resource or experiential conditions over time to inform if and when management action is needed.

The following is a summary of current visitor uses by vessel type highlighting the current management direction and areas where additional management guidance was identified as needed in this plan:

**Cruise Ships.** Visitation by cruise ship (around 96% of marine-based visitors) fulfills one of the 1925 enabling proclamation purposes to provide visitor access to the tidewater glaciers in Glacier Bay. NPS rangers and cultural interpreters board cruise ships to connect visitors with park significance themes, fundamental resources, values, and Homeland contexts. This form of transportation incorporates many modern services and amenities and enables a high number of visitors to enjoy a wilderness setting with limited personal risk or physical challenge. Since 1979, the park has actively managed cruise ship access

and intensity of use (vessel quotas), and subsequently set trip timing and duration constraints (12-hour tour to the West Arm, required number of hours in the glacial environment). It also applied evolving restrictions and operating conditions that aim to protect natural and cultural resources as well as park values. Targeted monitoring, formal and informal monitoring, and education also help maintain experiential and environmental desired conditions.

The park did not identify the need to change quotas for cruise ships in this plan, as current use levels and patterns provide a high level of access in a way that is generally consistent with desired conditions for visitor experience and resources. Additionally, the current commercial quotas support a market-based mechanism to continually better align this use with park purposes and values, where limited entry to Glacier Bay and competitive contracts provide economic incentives for cruise ships to adopt environmentally friendly technology through economy of scale investments (see figure 6), and to comply with stringent regulations and operating conditions, as repeat infractions disqualify companies from seeking future contracts.

However, cruise ships are not without negative impacts. For example, from a social science perspective, the presence of cruise ships may negatively affect visitor experiences (Swanson and Vande Kamp 2011; Furr et al. 2021) and impact Huna Tlingit ethnographic resources (Deur and Thornton 2014). From a natural resource perspective, cruise ship routes in Glacier Bay overlap temporally and spatially with humpback whale high-use areas (Webb 2015), resulting in frequent surfacing events near transiting ships' bows (Gende et al. 2011; Williams 2016). In 2001, a cruise ship in Glacier Bay struck and killed a pregnant humpback whale, and elsewhere in Alaska numerous lethal whale collisions involving cruise ships have occurred. Broader natural resource concerns (e.g., air quality, water pollution, underwater noise) in a pristine marine environment are also inherent to cruise ship travel, especially given the growing size of cruise vessels (some cruise ships exceed 1,000 feet in length and can carry over 5,000 passengers). Increasingly bigger ships translate to higher risks to park resources and public safety in the event of mechanical failures, vessel grounding, or incidents associated with natural hazard risks in Glacier Bay due to the park's dynamic landscape (e.g., landslide, tsunami, changing seafloor bathymetry, extreme tides).

The NPS recognizes the visitor use-resource impact tradeoffs inherent in this form of visitor use, and the need for biological metrics and long-term monitoring to discern whether risks to resources (e.g., humpback whales) from cruise ships continue to be acceptable (Gende et al. 2018; Gabriele 2017). The park also applies a range of science-based mitigations (mid-channel course and speed restrictions, situational awareness tools for ship captains) to further reduce risks. At this time, the park feels that the past several decades' experience has demonstrated the correct balance between the many positives of cruise ship tourism and the negatives of larger ships, given that the alternative means of access for the large and increasing number of visitors desiring to experience Glacier Bay would have even greater negative impacts.

**Tour Vessels.** Visitation by tour vessel (around 3% of marine-based visitors) also fulfills the 1925 enabling proclamation purpose to provide visitor access to glacial environments. This form of transportation incorporates some amenities and accommodates larger groups experiencing a wilderness setting with limited personal risk or physical challenge. The tour vessel experience is supplemented by optional off-vessel day excursion opportunities in the marine environment (skiff rides, kayaking, paddleboarding, shoreline hikes) where personal risk and challenges are largely mitigated by guides and easy access back to the tour vessel. Park rangers and onboard tour vessel naturalists inform passengers about the park and share NPS provided materials to connect visitors with park resources. The park "day boat" also operates under a tour vessel permit. This scenic tour operates seasonally as a concession that

travels daily the ~60-mile route from Bartlett Cove to the tidewater glaciers in the upper West Arm. The day boat also provides camper drop-off services to rotating locations. Since 1979, the park has actively managed the intensity of tour vessel use (vessel quotas) and has subsequently largely retained tour vessels' freedom of movement except where managing their access is needed to protect resources (approach distances, speed limits, closures) or social conditions (group sizes, encounter rates, prohibitions on commercial services in designated Wilderness). Park-specific monitoring and education also are in place to uphold social and environmental conditions.

At this time, there is no indication of a need to change tour vessel quotas including the park day boat. Desired conditions are being met under the current vessel quotas for this vessel type. Though most of the use of the park occurs in marine areas, 99% of the adjoining terrestrial areas of the park are designated Wilderness. Therefore, management of the marine environment needs to be compatible with the management of the backcountry and wilderness areas. Since 2010, tour vessel off-vessel activities have grown substantially, so that passengers are increasingly recreating in the same areas as backcountry campers, along the edge between nonwilderness waters and designated Wilderness shorelines and uplands. Part of this is due to high demand near visitor attractions such as tidewater glaciers. Visitation is further concentrated by geography and physical conditions including steep terrain, dense vegetation, and limited beaches.

This tendency for human activity to occur primarily on narrow bands of marine shoreline (in a 3.2-million-acre park) is increasing visitor densities in these areas, which could lead to a decline in experiential and natural resource conditions in these specific areas. The shoreline land-water interface is essential to many terrestrial wildlife species for foraging and nesting, making it a hot spot for wildlife viewing by boat. Even low levels of human shoreline activity in Glacier Bay can decrease animals' use of shoreline habitats (Sytsma et al. 2022), reducing opportunities for wildlife enjoyment while increasing the potential for human-wildlife conflicts. Tour vessel use of this land-water interface also affects visitor experiences on the shorelines and may result in conflicts of expectations and impacts to backcountry experiences (Furr et al. 2021). Most tour vessels travel on flexible schedules and choose settings for off-vessel activities based on variable conditions (weather, tides, passenger interest) that leads to pulses of more intense activity over several hours in localized areas. Backcountry and human-powered visitors travel under their own power between campsites, limiting visitors' ability to quickly and easily relocate and avoid these pulses of activity.

These issues can be addressed without changes in tour vessel quotas using concessions contracts and the guidance of the BWMP (in preparation). The park has managed impacts of off-vessel activities to other visitors using commercial operating condition requirements to recreate out of sight and sound of other visitors. Under the BWMP, commercial use is concentrated where safe marine vessel approaches provide access to the glacial environment (the Glacier Access Zone) as a strategy to manage protecting wilderness character while also providing access to the glacial environment as specified in the park's enabling proclamation.

This plan identifies one area of concern for tour vessels where updated guidance can help monitor and manage marine resource and experiential conditions:

- Nonmotorized vessel use, including from tour vessels, is not distributed evenly across all park waters. The park has some tools to assess trends in resource conditions and biophysical impacts that result from backcountry recreation (Goonan 2015). Social scientists also have measured perceptions of crowding and coastal resource conditions in overnight settings in Glacier Bay and found that group sizes of less than six people are preferred on beaches where kayaks and tents are

visible (Furr et al. 2021). Therefore, this plan includes tools to monitor nonmotorized use levels to better evaluate how to balance maximizing opportunities for users to freely explore the park with tradeoffs of managing use to better protect park resources and provide quality experiences.

**Passenger Ferry to Bartlett Cove.** Congress has allocated one vessel permit per day for ferry access to Glacier Bay (Public Law 105-83, Section 127). The park has interpreted this broadly to support fare-paying transportation trips open to the public from Juneau and other regional communities on the Alaska Marine Highway. A ferry is defined as a motor vessel authorized by the Superintendent to engage in the transport of passengers for hire to Bartlett Cove (36 CFR § 13.1102), is subject to a commercial permit, and must travel on a direct course between the mouth of Glacier Bay and Bartlett Cove (36 CFR § 13.1156(e)). The park is not proposing any change to this authorization but has proposed ways to use this vessel quota to align with park purposes and management objectives. First, the FMP (NPS 2019a) sets a course for Bartlett Cove to become a more traditional national park frontcountry area with concentrated visitor use, facilities, and services as a welcoming destination that strengthens visitors' connections to larger park purposes. The FMP also identifies the potential for collaboration with the Hoonah Indian Association on a tribal transportation ferry between Hoonah and Bartlett Cove that facilitates tribal and frontcountry visitor access. Second, the NPS helped secure federal investment for an Alaska Marine Highway System ferry terminal in Gustavus (in 2011) to meet community transportation and freighting demands. Locating this infrastructure in Gustavus outside a national park setting (rather than at Bartlett Cove) helps retain a high-quality frontcountry visitor experience and reduced conflicts associated with NPS restrictions against non-visitor-related commercial activities in the park frontcountry.

**Charter Vessels.** Visitation by charter vessel (around 0.4% of marine visitors) also fulfills the 1925 enabling proclamation purpose to provide visitor access to glacial environments, as well as a park GMP objective (NPS 1984) to “balance forms of access and use to obtain a feeling of the ruggedness and wildness of this dynamic landscape and the solitude that early inhabitants found.” Intended for smaller parties (no more than 12 passengers overnight and no more than 49 passengers for daytime use), charter vessels usually provide customized services and support a variety of visitor activities including sightseeing (both day use and overnight), drop-off and pickup for backcountry visitors, guided saltwater sport fishing, and off-vessel activities such as hiking and kayaking. The park has concluded that desired conditions are being met related to this use type and there is no need to change quotas for this vessel class at this time. Further, a 2018 shift to 10-year exclusive contracts for charter vessel services better aligns this activity with park purposes and management objectives in marine settings. Charter vessels were previously managed as commercial use authorizations with unlimited operator entries. Starting in 2018, a limited number of contracts were awarded through a competitive process to a diverse range of high-quality operators with extensive local knowledge. These operators are allocated charter vessel use days within Glacier Bay as well as in park waters outside of the bay, and are managed under contracts and operating conditions that add more consistency for public safety and resource protection. These contracts and operating conditions can evolve in the future to effectively address changing resource or visitor needs, further negating the need to alter quotas for this vessel class.

**Private Vessels.** Visitation by private vessel (around 0.4% of marine visitors) also fulfills the 1925 enabling proclamation purpose to provide visitor access to glacial environments, as well as the park GMP objective (NPS 1984) to “balance forms of access and use to obtain a feeling of the ruggedness and wildness of this dynamic landscape and the solitude that early inhabitants found.” Private boaters explore wild expanses and sheltered coves after receiving orientations and resources to guide their travel in a safe and legal manner. Existing management frameworks (private vessel quotas and permit system) are implemented out of a Visitor Information Station (VIS) in Bartlett Cove. Specific to this class of vessel

use, the NPS identified several areas where updated management guidance could better align this activity with park purposes and enhance visitor opportunities:

- First, private vessel permits are being utilized by private vessels longer than 79 feet (sometimes called megayachts), comparable in size to tour vessels and in some cases to small cruise ships. These vessels create many times the impacts of smaller private vessels but only benefit a few visitors. If the capacity existed for the park to accommodate more larger vessels these entries would be allocated to vessels serving a larger number of visitors or to multiple smaller vessels. The presence of megayachts was not considered or addressed in 2003, despite clear discrepancies within the purposes of the vessel quota system as well as the regulatory inconsistencies of classifying these very large vessels as private vessels with lower impact. Growing concerns include the number of these vessels in park waters and their substantially increasing size (a mirror of worldwide trends). In addition, vessels longer than 79 feet almost always require paid commercial crew and many such vessels have operational and ownership characteristics of commercial entities that are also not allowed in the private vessel class. Therefore, this plan clarifies any regulatory and management ambiguity about private vessels longer than 79 feet in Glacier Bay. Restrictions on vessel size are common throughout the NPS to prevent greater impacts and promote economic fairness in access to the national parks.
- Second, Glacier Bay is a highly sought-after destination for private boaters. There are days in the middle of the summer when visitors are unable to obtain a private vessel permit to access the glacier environment and explore the entire park as stated in park purposes. One barrier to equal access is that not all users have an equal opportunity under the existing permit system, as evidenced by data showing a small number of repeat vessels monopolizing permits, with indications that this demand is related to day use recreation based out of Bartlett Cove. Another factor contributing to this situation is the park's priority system for issuing private vessel permits. Private vessel operators who apply for a permit in person at the VIS have priority over applicants who apply by phone or email; therefore, this system favors local residents. The system also favors those who can make plans at short notice and for whom distance is not a factor, e.g., boats already located in Bartlett Cove or Gustavus. Another barrier is that not all the days of multi-day permits are being fully utilized, largely due to short-notice cancellations. In some cases, these are attempts to guarantee only the weekend portion of permits. For these reasons, this plan includes strategies to provide equitable access opportunities to the glacial environment consistent with park purposes, and to correct permit inefficiencies and underutilization.
- Third, several social science studies confirm that Glacier Bay visitors traveling by private boat seek a diversity of experiences, and that some private vessel-based visitors prefer to avoid areas frequented by cruise ships and tour vessels. The East Arm of Glacier Bay has seen substantial reductions in use by larger commercial vessels due to retreat of tidewater glaciers in this area. This plan formalizes this trend to provide for certainty of an increased diversity of experiences for private vessels and visitors aboard commercial charter vessels.

**Nonmotorized Vessels.** Visitation by nonmotorized vessels (average 912 people annually, 2015–2019 data) further fulfills the 1925 enabling proclamation purpose to provide visitor access to glacial environments, and the park GMP objective (NPS 1984) to “balance forms of access and use to obtain a feeling of the ruggedness and wildness of this dynamic landscape and the solitude that early inhabitants found.” While considered backcountry visitors, nonmotorized vessels travel at will in the marine environment (both nonwilderness and wilderness waters) using small human-powered crafts (like sea

kayaks) and camp overnight on biologically rich shorelines, particularly on accessible beaches. Risks and challenges are moderated (relative to truly remote wilderness trips) by the ability to either immediately hail (or to hike to a nearby motorized waters area to hail) a vessel for assistance. Specific to planning for the nonwilderness marine environment, this plan identifies several areas where updated management guidance can improve opportunities for visitors to access desired experiences, and to better monitor and manage experiential conditions if use levels substantially grow:

- First, several social science studies indicate that in Glacier Bay, nonmotorized visitors seek a diversity of experiences, and prefer to avoid areas frequented by cruise ships and tour vessels. This plan limits cruise and tour vessel use of the East Arm to provide certainty of an increased opportunity to avoid large vessels.
- Second, nonmotorized opportunities in the East Arm are important components of a diversity of visitor experiences in Glacier Bay. This plan expands nonmotorized waters in Upper Muir Inlet and Wachusett Inlet to better align with desired experiences for users of both nonmotorized and motorized vessels.
- Third, nonmotorized vessel use is not distributed evenly across all park waters. Some studies have indicated concerns with differential impacts to resources (Goonan 2015). Social scientists have also measured perceptions of crowding and coastal resource conditions in overnight settings in Glacier Bay and found that group sizes of less than six people are preferred on beaches where kayaks and tents are visible (Furr et al. 2021). This plan identifies tools to monitor nonmotorized use levels to evaluate how to balance opportunities for users to freely explore the park with managing use to protect park resources and desired social conditions.
- Fourth, nonmotorized use is currently not limited. However, there are impacts of nonmotorized use both on park resources and on visitor experiences. While the NPS remains confident that past and existing levels of use do not impair resources or visitor experiences, future increases could do so. As per national guidelines on capacity management, the park set trigger points above current and past visitation levels when the park would begin to examine nonmotorized use levels and distribution and may develop management options to ensure that desired conditions are met.

### **Sustaining an Enduring Commitment to Huna and Yakutat Tlingit Homeland Values, Haa Kusteeyí Káx Yánde Gaxtoodéil (Taking Care of Our Way of Life).**

The park lies within the ancestral Homeland of two Tlingit tribes, the Huna and Yakutat Tlingit, who sustained themselves for many generations from the region's abundant resources. Although exact settlement dates are difficult to determine, archeological evidence and oral history document a long-term, sustained relationship between the Tlingit and both the marine and terrestrial systems of Glacier Bay, Icy Strait, Cross Sound, and the park's outer coast. According to the Tlingit, the park has been peopled since time immemorial; this human presence has shaped, and been shaped by, both land and sea. In particular, the marine and terrestrial ecosystems that developed in Glacier Bay following glacial retreat in the late 1700s evolved with ongoing human interaction until the late 20th century. The relationship between the park's land and waters, and the ancestral and living Tlingit is integral to the park's intact ecosystem.

In particular, the marine system of Glacier Bay is an inextricable part of Tlingit Aaní, Homeland, for the Huna and Yakutat Tlingit clans. It is an artery that circulates food and other sustaining resources and serves as a travel corridor for the Huna clans and their visitors. As importantly, it is Homeland in and of itself. The bays and channels and inlets of Glacier Bay hold stories, both tragic and triumphant, and are

claimed as such by individual clans. Many clan crests attest to historic events associated with marine waters – Yáay, the humpback whale that is claimed by the T'áǵdeintaan Clan; Kéet, the killer whale of the Kaagwaantaan; Tóos', the shark claimed by the Wooshkeetaan, and the giant octopus, Náaǵw, that was slayed by the Chookaneidí hero, Xákutch.

A landmark study commissioned by the NPS (Deur and Thornton 2014) reports that the Huna Tlingit perceive numerous effects associated with vessel traffic in Glacier Bay. Tlingit participants in the study expressed concern that marine pollution may impact natural resources of importance to the Tlingit including marine mammals, fish, seaweed, and mountain goat; degrade the pristine nature of their Homeland; and generally impact ecosystems. As importantly, respondents expressed concern that visitor behavior may negatively impact the spiritual health of Homeland and impact ancestral spirits residing in Homeland. A key concept expressed by many respondents was that park visitors are typically unaware that they are entering Tlingit Homeland and mistakenly believe they are being hosted by the NPS rather than by the clans that claim Glacier Bay territory.

Today, most tribal members live in nearby Hoonah and Yakutat (see figure 2). For legal, political, and practical reasons, the Tlingit maritime cultural connections to the park have been limited or severed in recent decades. However, many continue to connect with traditional Homeland both physically and spiritually. This plan advances the park's commitment to honoring Tlingit Homeland concepts and facilitating marine access for tribal members as presented in figure 7.

# Haa Léelk'u Hás, Has Du Éil'i

## We have traveled far to become who we are: People of the Tides

During long ago migrations, our ancestors journeyed through the terrestrial interior of Alaska and Canada – and some settled and remain there today. But many more of us traveled farther on, searching perhaps for a more temperate climate, a more plentiful Homeland. Our clans hold stories of perilous overland treks among glacial crevasses and treacherous canoe journeys on rivers flowing swiftly beneath miles of glacial ice. Was it two elderly women, an aged couple, or perhaps two young men who sat low in a canoe, braving the unknown to reach the edges of the Pacific Ocean? Each clan has its own story of how we reached the shoreline, how we entered the world that Raven created for us, how we became People of the Tides.

Raven walked these shores long before the Tlingit, tricking his flock of feathered friends, forcing Tide Woman to raise and lower the ocean waters in an orderly fashion, and pulling in the Kudataan Kahidí, the ocean's bounty, to the Outer Coast with his octopus tentacle staff. Our ancestors chose a life with Raven on the ocean's edge, spreading our people from Ketchikan in the south to Yakutat in the north, populating the bays and fjords between. Soon the ordered tides formed the framework of our very existence. In Tlingit Aaní, Tlingit Homeland, tides inform the rhythm of our lives.

**“Bring out the canoe now,  
bring out the canoe now,  
from under the glacier.” That  
is why they sing this song.  
“Come drifting through, come  
drifting through.”**

~ J.B. Fawcett, 1972

It is because Raven pulled in Kudataan Kahidí, the Salmon House, that the ocean brings us fish; cháatl (halibut), xáat (five species of salmon), léik'w (rock fish), and more. Its currents nurture k'áach and laak'ásk, the seaweeds that enrich our diet as well as the yalooleit (cockles), gáal' (clams), and shaaw (gumboot chitons) we search for at low tide. It nourishes the kéidladi (gulls) that lay treasured k'wát' (eggs) on cliff edges just above the reach of

### ***Kudataan Kahidí***

***“Then he [Raven] got the people all down on the beach and extended his cane toward the mysterious object until it reached it. And he began to draw it in little by little, saying to the people, “Sing strong all the time.” When it struck land, a wave burst it open. It was an everlasting house, containing everything that was to be in the waters of the world. He told the people to carry up fish and they did so. If one had a canoe, he filled it; if he had a box, he filled that . . .” ~Deikeenáak'w in Swanton 1909***



FIGURE 7. TLINGIT ÉIL'I





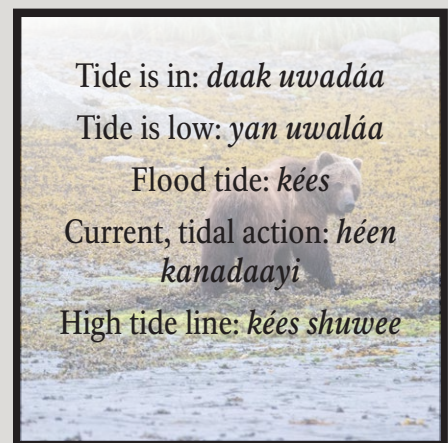
waves and supports the tsaa (harbor seal) and yáxwch' (sea otter) that feed and clothe us. We render oil from saak (hooligan) that school along the nearshore and feast on eggs spawned by yaaw (herring) in the shallows. We gather beach greens, suktétl' (goose tongue) and sukkáadzi (beach asparagus) tasting of salt and rely on the ebb and flow of tides to process and preserve our own unique foods, kaháakw (fermented fish eggs) and k'ínk' (fermented fish).

Over time we used our knowledge of the sea to adapt to the rush of civilization. We built bigger vessels and expanded our fleet, we purchased outboards and hydraulics, morphing our traditional fishing rounds to fit with commercial openings and derbies, fishing for more than ourselves. We know the fjords of Glacier Bay, the boiling waters of Icy Strait, and the open ocean swell of the Fairweather Grounds. Our seiners and trollers follow ancestral routes, still harvesting the ocean's bounty for our own, and other families.

The ocean feeds our bodies and our spirits, but also birthed the stories of our relatives and kin, Kéet (killer whale), Yáay (humpback whale), Cheech (harbor porpoise), Tóos'(shark) and Ch'heet (murrelet) whose crests we claim and carry. In this way, the ocean cradles our history and nurtures the very fabric of our social identity.

Our language is rich with the names of bays and inlets and fast running currents. We named our waterways, as we did terrestrial places, for the resources or histories that occurred there. Sít' Eeti Geiyi (Bay in Place of the Glacier), Yaanash Kwéix near Cape Spencer (Breathe Deeply, You are Out of Peril), and S'ix' Tlein (Big Dish) in Icy Strait. There are spiritual places in the sea, certain eddies and whirlpools, certain unseen spots. See Éit, in the Pacific Ocean is one of those, a rite of passage for anadromous fish, a magical spot that all returning salmon pass through on their return to their natal streams.

The ocean is our medicine. As young warriors, we tested ourselves through immersion in the icy ocean waters near our villages, beating ourselves with hemlock branches. Today our people do the same, dipping beneath gentle waters to heal and strengthen our spirits. Eíl túdei, immersing ourselves in the ocean waters, strengthens each of us and bonds us as ocean people.



**Kaagwaantaan elder, George Dalton, Sr. and Skip Wallen fishing in Glacier Bay (image courtesy Skip Wallen).**



**Hoonah purse seiners gathered in Bartlett Cove in 1992.**



The Tlingit mastered all their Homeland waters, from open ocean swells to calmer bays and inlets.

The inlets and bays and straits and fjords are our trails, our paths, our roads to destinations near and far. Directed by shaman and steered by yaakw yasatáni (boat captains) we make our way to Aangóon (Aangoon), Deishú (Haines), Kéex (Kake), Ltu.aa (Lituya Bay), Sheet'ká (Sitka), and Yaakwdáat (Yakutat) to fight or trade or celebrate. We approach our neighbors from the water, asking permission to bring our canoes ashore. Even today, we sing on the ferries that gather us up for shopping trips, basketball tournaments, memorials, and medical visits. Our children are more comfortable on the water than in the air.

- |  |                                    |
|--|------------------------------------|
| <i>Where is this canoe from?</i>       | Goodáx aa yaakw sáyá?              |
| <i>This canoe is from Glacier Bay!</i> | Sít' Eeti Geiyí dák aa yaakw áyá!  |
| <i>Come ashore.</i>                    | Yándeí gaxyeekoox.                 |
| <i>Here is the sandy beach.</i>        | Yáadu yak'éiyi l'éiw.              |
| <i>We will give you freshwater.</i>    | Héenák'w yee jeedéi gaxtoolashaat. |
| <i>We will warm your hands.</i>        | Yee jín gaxtoolat'áa.              |

These same currents and ocean swells carry in outsiders. First the Russians and French and later the settlers and miners, the cannery workers and scientists, the tourists. They come on frigates and steamers and rowboats, on tour boats and cruise ships and yachts. The ocean carries in their riches and their diseases, their technologies and their Gods. The ocean carries change to our shores.

But it also binds us to the souls of our ancestors who perished in its depths: clan members washed out to sea at Lituya Bay; those whose canoes were pulled under by náakw, the giant octopus, at Dakáa Xoo; the ancestral women whose canoe capsized off Gaanaxáa; our beloved grandparents and parents who perished in a single day at Lanastáak (Dundas Bay). The ocean is gravesite and cemetery to those who lost their lives to engines failed, to unseen reefs, to wind and waves and fog. We feed them whenever we can, proffering tobacco and treasured foods to the sea. We sing in honor of them, Teet Shi, the Wave Song and other mournful cadences.

“See Éit, where the fishes move. It was given to them from the yéik [shaman]. . . But the fish say it’s fun to go through there. Sometimes it cuts their nose off, the head, the tail. But they’re going through there . . .”  
 ~ Lily White 2009



Rough Ocean: *Jiwsitaan*

White Caps: *Xeel*

Whirlpool: *X'óol' or haat kool*



FIGURE 7. TLINGIT ÉIL'I (continued)

**Sít' Eeti Geiyi de yaa ntookúx.** We are traveling to Homeland in our dugout canoes, our seine boats, our skiffs, our double enders, our trollers, our landing craft. **Aadéi áwé yaa ntookoox Haa Shuká Aaní.** We are traveling within Our Ancestor's Homeland. The ocean carries and holds us there. It shapes us, it nurtures us, it cradles us, it empowers us. **Haa Shuká Aaní yaagú áyá yoo shatusiyéik.** We are anchoring our boat in Homeland.

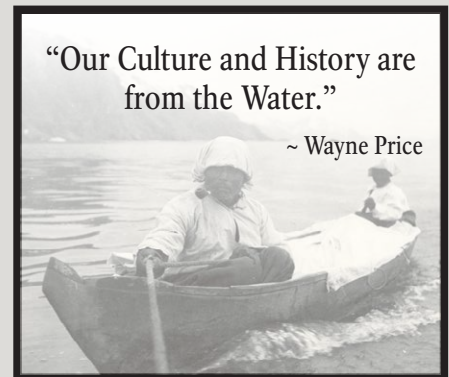


FIGURE 7. TLINGIT ÉIL'I (continued)

## CHAPTER 2 GENERAL MANAGEMENT DIRECTION

The GMP for the park provides high-level guidance on how the park will be managed. This chapter supplements the GMP and lays out a vision and broad direction for marine management and specific descriptions of marine management zones and associated desired conditions.

### **VISION STATEMENT, DAA SÁWÉ TUWATÉEN HAA LÉELK’U HÁS, HAS DU ÉIL’I? (WHAT DO WE SEE IN THE FUTURE FOR OUR GRANDPARENTS’ OCEAN)**

Marine park waters—from the seafloor up to the high tide line—are a protected sanctuary, a living laboratory, and an awe-inspiring setting that invite and inspire people to explore and discover the dynamic and living natural and cultural heritage of the park.

### **MARINE MANAGEMENT OBJECTIVES, DAA SÁ HAA TUWÁA SIGÓO MARINE MANAGEMENT HAS DU YÉI JINÉIYI KÁAX? (WHAT DO WE WANT FROM THIS MARINE MANAGEMENT WORK?)**

The objectives of the plan are the specific outcomes or goals that the NPS is seeking to achieve through consistent management action over time. Objectives can also be considered performance measures to guide decision-making as conditions change. The following objectives will guide future marine management in the park:

- Protect the ecological integrity of the park’s unique and exemplary marine ecosystems and support ongoing study into physical processes and the web of ocean life.
- Preserve marine biodiversity by preventing pollution and habitat modification, and by proactively managing human impacts.
- Manage marine transportation as an essential element of the Glacier Bay experience identified in enabling legislation, where continuing marine vessel management and the stewardship of federally managed waters in the park are optimized to:
  - Welcome diverse audiences by providing reasonable, balanced, and transparent access for visitors on an equitable basis to meaningfully connect with the park’s fundamental resources and values.
  - Provide a range of quality, immersive visitor opportunities that emphasize the park foundational themes and the ruggedness, solitude, and wildness of the setting.
  - Reduce impacts to park resources and conserve natural ecological processes.
  - Advance research as a living laboratory and to inform park management.
  - Facilitate Tlingit tribal members connection to Homeland and park visitor's understanding of Glacier Bay's living cultural heritage.
  - Foster relationships with marine operators as stewardship partners committed to safely navigating park waters, protecting park resources and values, and providing opportunities for transformative visitor experiences.
- Utilize submerged artifacts, maps, journals, and oral histories to tell the park history of marine exploration and our shared American heritage.

- Inspire deep human connections with vital ocean systems in Glacier Bay through an evolving constellation of NPS interpretation.
- Foster understanding of Indigenous Tlingit perceptions of Homeland and protect the enduring spiritual connection between ancestral, living, and future Tlingit in Glacier Bay Homeland in the marine environment.

The rest of this chapter presents marine management direction applied within a GMP zoning framework, first across the entire Nonwilderness Water Zone (see figure 3), and then for three specific subzones defined by this plan. Specifically, it sets desired conditions for management based on internal park discussions, guidance from previous planning efforts, and other NPS policies and guidance. Desired conditions are defined as statements of aspiration that describe resource conditions, visitor experiences and opportunities, and facilities and services that the NPS strives to achieve and maintain in a particular area. They help the NPS answer the question, “What are we trying to achieve?” and focus on fundamental resources and values; the visitor experience opportunities associated with them; and the types and levels of management, development, and access that would be appropriate in a particular location.

### **Protecting Marine Ecosystems with Science and Stewardship, Haa Éil'i Káx Yánde Gaxtoodéil, Haa Át Sakóowuteen (Our Ocean, We Will Watch Over It With Our Knowledge)**

**A Living Marine Laboratory, Ax' Shtudultoowu Daaka Hidi (A Place to Learn).** The NPS actively fulfills park science mandates with marine environments serving as a living laboratory (Glacier Bay National Monument Antiquities Act enabling proclamation, ANILCA, Biosphere Reserve, National Marine Protected Area). Partnerships and research continue to further understandings of Glacier Bay’s remarkable abundance and diversity of marine life and complex array of underwater environments, such as the recent findings of dense thickets of cold-water coral communities associated with the steep walls of the fjord environment (Hartill et al. 2020). Legacy data sets are continued (e.g., glaciology, humpback whale monitoring program since 1985, and oceanographic surveys since 1993), to gain unique scientific perspectives on intact natural systems and worldwide trends, including those due to human influences (e.g., climate change, glacier recession, ocean acidification, wildlife abundance and health). New areas of study are initiated, including marine archeology and the traditional knowledge systems of maritime cultures to support protection and as a lens for considering human relationships with the living ocean.

Researchers recognize the value of and seek out and integrate traditional knowledge held by the original inhabitants of Glacier Bay, the Huna and Yakutat Tlingit clans, into study design and implementation. Traditional knowledge is collected and relates over time to numerous marine resources and topics of concern including harbor seals, commercial fishing activities and fish distribution and abundance, traditional harvest methods of glaucous-winged gull eggs and general information related to seabird and shorebird distribution and abundance, and the geological events associated with the Little Ice Age glacial advance. Traditional ecological knowledge informs key management decisions, remains vital to a wide range of park research, and supports ongoing relationships between tribal scientists, culture bearers, and park researchers.

**Natural Resources, Tl'átk, Ka Daséigu, Ka Éil' (Earth, Air, and Ocean).** Marine management throughout park waters utilizes a science-based approach to preserve the biodiversity and ecological integrity of marine ecosystems. Indigenous Traditional Ecological Knowledge is incorporated into management practice and science. The park manages in harmony with the dynamic ecosystem and natural successional processes that are observed within the park marine environment. While supporting the

interconnectivity of the landscape within the broader region, the park is a world leader in information-based protection of natural resources. As one of the few protected areas in the world that includes extensive saltwater habitat within its jurisdiction, park waters serve as a unique living laboratory where study design and comparison controls can be applied. Future managers may use these findings to consider new ways to protect Glacier Bay's abundance and diversity of marine resources.

The NPS maintains records that illuminate dynamic changes in both landscape and in scientific thought and human use that provide for understanding the ecosystem through the lens of human experience and study. Active research in park waters (by the park and other entities) advances human knowledge of ocean ecosystems, food webs, climate change, ocean acidification, aquatic invasive species, and other anthropogenic and cultural factors connected with the marine environment. The NPS translates this scientific knowledge into understanding for visitors and the broader public through personal services and interpretive media, while informing management decisions.

Glacier Bay is a sanctuary where fish and wildlife may roam freely, developing their social structures and evolving over long periods of time without the changes that extensive human activities would cause. Although wildlife may occasionally experience short-term, localized displacement because of human presence, natural processes and patterns continue unimpeded by people. Fish and marine wildlife populations support spatial studies of comparative abundance (within and outside the park) because of differently applied restrictions (e.g., vessel quotas, motorized waters, commercial fishing, and potential future allowances for traditional tribal fishing and hunting). Results of these comparative studies are shared broadly to tell the story of how historical conservation decisions protect abundance while also documenting the impacts to human cultures and livelihoods (such as described in Hunn et al. 2003, NPS 2010b, and Brakel 1999).

**Cultural Resources, Haa At.óowu Ka Haa Kusteeyí (Our Treasures and Way of Life).** The legacy of marine navigation in park waters is recognized and shared as integral to the story of Glacier Bay. Records of Indigenous activity, exploration, scientific endeavor, and human use in many different forms (maps, photos, journals, artifact assemblages) are appropriately preserved and made available to researchers and others and inform both management actions as well as public education. Glacier Bay's rich maritime history is preserved through the lens of traditional life ways, exploration, human experience, and study, including consideration of designated maritime cultural landscapes as combinations of terrestrial and submerged archaeological and ethnographic cultural resources that reflect the relationship between humans and the water.

Cultural resources are inventoried, documented, and monitored to manage impacts and prevent degradation of these resources and protect the integrity of cultural sites. Restrictions on visitor access and behavior are implemented as necessary to protect cultural resources including sensitive cultural sites (e.g., cemeteries, sacred clan sites), ethnographic resources, and ongoing cultural gatherings, activities, and ceremonial events. Huna and Yakutat Tlingit continue to connect with the maritime environment by participating in traditional activities and perceive growing and sustained public awareness of their deep and enduring connection to Glacier Bay Homeland, their vital role as hosts to all visitors, and culturally respectful behavior.

**Floating Cabins/Seasonally Moored Vessels and Shelters, Hidi Át Wulihaash (Floating Houses).** Floating cabins/seasonally moored vessels are limited to those needed for essential research, law enforcement, and other park purposes, and minimally scaled to meet operational objectives. Larger sleep-aboard vessels would be used for more intensive stays and projects. Locations may be year-round or seasonal and would be carefully sited to minimize impacts to resources, the visitor experience and other

park values. While these are primarily for scheduled use by park staff and partners, they may receive incidental emergency public use (they are left unlocked). At the same time, cabins for public health and safety reasons under ANILCA 1315(d) are not recognized as being needed at this time. The NPS may consider additional cabins if a need is identified. Emergency health and safety situations in the marine environment (e.g., injury, hypothermia, gear failure, wildlife incidents) to date have been best dealt with using modern emergency communication tools (e.g., mayday calls, requests for mutual aid from passing boats or other recreationalists) with rescue by park or US Coast Guard assets, including vessels and helicopters.

**Other Installations, Ch'a Góot'aa Hidi (Other Buildings).** Installations are limited to only those needed for essential communication, research, navigation or other park purposes, and in line with park values when found appropriate. Installations may be permanent or seasonal and would be co-located with existing infrastructure to the extent practicable. Installations are carefully sited to minimize impacts to resources and the visitor experience.

**Marine Operations and Park Fleet, Park Service Yaakw (Park Service Boats).** Access to the marine waters by vessel for administrative purposes is essential to fulfilling the mission and mandates of the park. A diverse NPS marine vessel fleet is maintained that is capable of meeting a variety of functional needs day-to-day, including resource management, researcher support, law enforcement patrols and emergency services, transfer of NPS interpretive rangers and partners to vessels for visitor education, commercial services evaluations for concessions contract compliance, and limited maintenance needs. The park fleet includes an all-weather and all-park-location capable large vessel, comparable to Nunatak 1, 2, and 3 that supported Glacier Bay administrative operations from its early days until the last decade.

The NPS exercises due care in its everyday marine activities with a focus on marine research and monitoring, safety and resource protection through education and incident prevention, response preparedness, risk management, efficiency, and modeling proactive stewardship. See further implementation details in chapter 3 and guidance details in the Best Management Practices and Mitigations (appendix D).

### **Providing Diverse Visitor Experiences and Balanced Access, Woosh Gunayáade Át Ka Wooch Yáx Naxdatee (Different Experiences and Make Them Equal)**

**Visitor Experience, Wáa Sá Has Sh tudinook, Glacier Bay Át Has Wu.aadí? (How Do Visitors Feel about Glacier Bay?).** Park waters convey visitors into a dynamic marine ecosystem interconnected with the surrounding terrestrial landscape and immersed within a living cultural environment. The marine environment provides myriad opportunities for visitors to experience terrestrial and marine wilderness and explore the recreational, scenic, scientific, educational, conservation, cultural, and historical purposes of the park.

The marine environment elicits inspiration, reflection, and understanding of ecosystem connections, from local to global interconnections. Interpretive park rangers and park partners facilitate these visitor connections, and the park provides orientations to help visitors learn about and experience the dynamic tidewater glacial landscape in a manner that supports the ecological integrity of unique and exemplary marine and terrestrial ecosystems in a wilderness setting.

Experiencing the park from the water provides visitors a window to the vast terrestrial designated Wilderness and access to unique marine designated Wilderness areas. The grand undeveloped landscape fosters visitor connection with the rugged wildness and solitude that early inhabitants found here.

Within the marine environment, visitors are aware of the dynamic natural ecosystem and the park's obligation to maintain careful stewardship. Meeting stringent conservation goals, the park applies a globally recognized model of applied science to manage and reduce impacts from visitor access. Self-reliance and the freedom to explore are a key component of the marine visitor experience of some visitors seeking adventure and independent travel by private vessel and human-powered water travel including kayaks. For this group, pre-visit education and orientations support visitor safety, mitigate risks, convey legal requirements, and touch on key park values and concepts, including Tlingit Homeland, leave no trace ethics, and Glacier Bay's active research and role as a living laboratory.

Visitor orientations and authoritative maps are developed that respect the diversity of user experience and are supplemented by resources on targeted topics of interest to marine visitors in Glacier Bay (such as tides, uncharted navigational hazards, ice bergs and tidewater glacier safety). Further, orientation staff and materials would intentionally limit advice on preferred routes and anchorages for these reasons:

- To promote discovery and exploration in untracked and remote places;
- To encourage dispersal and safety where boaters travel and anchor at will; and
- Independent visitors are ultimately responsible for accepting unknowns, determining their own course, using situational awareness to adapt as conditions change (as they often do in park waters), and learning in advance what they need to know to be legal and safe.

Visitors may occasionally encounter infrastructure to support research, communications, emergency response and law enforcement, as well as evidence of research activities or cultural practices. Potential installations are evaluated for impacts to visitor experience and impacts are mitigated to the highest degree possible. Visitor encounters with park staff are infrequent, with administrative vessel traffic carefully managed for trip efficiency and implementing best practices and mitigation measures to reduce impacts to visitor experience and park resources and values.

Closures and restrictions on visitor access and behavior may be required to achieve resource and visitor experience conditions but are minimized to the extent possible.

**Visitor Access, Services, and Opportunity, Daa Sá Yéi Kgisaneí Yáax'?** (What Will You Do Here?).

Marine waters serve as the primary form of park access, and marine transportation is monitored and managed to be consistent with park purposes and values and to balance the forms of access and use across a recreation opportunity spectrum, optimized to park-specific environmental and social conditions.

Necessary and appropriate commercial services support visitor access and experiences and are managed to reduce impacts (including into designated Wilderness), recognizing the interconnectedness of marine ecosystems, the importance of holistic park visitor management, and Glacier Bay social science research results indicating that visitor experiences of "wildness" do not require setting foot in designated Wilderness (Furr et al. 2021; Swanson and Vande Kamp 2011).

The NPS seeks to preserve the sense of discovery and exploration for independent travelers in motorized and nonmotorized vessels by keeping use at levels where these visitors can travel in the park at will without having to reserve a backcountry campsite or place to anchor or otherwise adhere to a pre-defined itinerary. At the same time, quotas and restrictions on visitor access and behavior may be required to achieve resource and visitor experience conditions. These are minimized to the extent possible, and when applied, balance the tradeoffs of decreased opportunity with retaining enhanced experiences aligned with social science and park purposes.



Visitor education and orientations help visitors behave to proactively steward the marine environment and the park holds visitors accountable for actions that negatively impact park resources (see Best Management Practices and Mitigations for details, appendix D).

### **Sustaining an Enduring Commitment to Huna and Yakutat Tlingit Homeland Values, Haa Kusteeyí Káx Yánde Gaxtoodéil (Taking Care of Our Way of Life)**

**Tlingit Homeland, Haa Éil’.** The Huna and Yakutat Tlingit connection to the marine landscape is sustained and facilitated through park support of living traditions and activities compatible with the preservation of intact marine ecosystems. The park sustains a rich and evolving Indigenous maritime culture. The integrity of Homeland values is honored by enhancing relationships between the agency and traditional people, collaboratively stewarding park marine waters, facilitating tribal access to the park and enhancing tribal members spiritual connections to traditional foods in the park.

**Cultural Welcome Protocol and Interpretation.** The park and tribe implement authentic place-based cultural interpretation that conveys traditional tribal protocols for hosting and behaving respectfully in Homeland.

## **MANAGEMENT ZONES**

Management zones enable the NPS to determine and achieve location-specific desired conditions and to manage intensities associated with public enjoyment and other uses of the park. The park’s GMP states that “any zone may be subdivided to meet management needs or to further delineate future resource areas.” This plan would subdivide (but not remove or replace) the existing Nonwilderness Waters Zone in the GMP into three new subzones: the Glacier Bay Zone, the Icy Strait/Cross Sound Zone, and the Outer Coast Zone. The remaining four zones in the GMP would remain unchanged.

While these zones are set to reflect current park needs, the park may designate smaller units for the purposes of monitoring and other administrative needs. Also, while zones are presented as exact distances and locations, those are based on current law, policy, regulation, landforms, and ecological knowledge at the time of publication of the plan.

Following is a description of each zone and location-specific desired conditions to manage intensities associated with public enjoyment and other uses of the park.

### **Glacier Bay Zone, Sít’ Eeti Geiyí**

**Area Description.** Glacier Bay is a glacial fjord 65 miles long and 12 miles at its widest that branches into West and East Arms (see figure 8). Glacier Bay is the most popular and frequently visited area of the park, and encounters with other vessels are more likely, especially during the summer season and within the West Arm. The presence of accessible tidewater glaciers and glacial environments make Glacier Bay a highly desirable location for visitation.

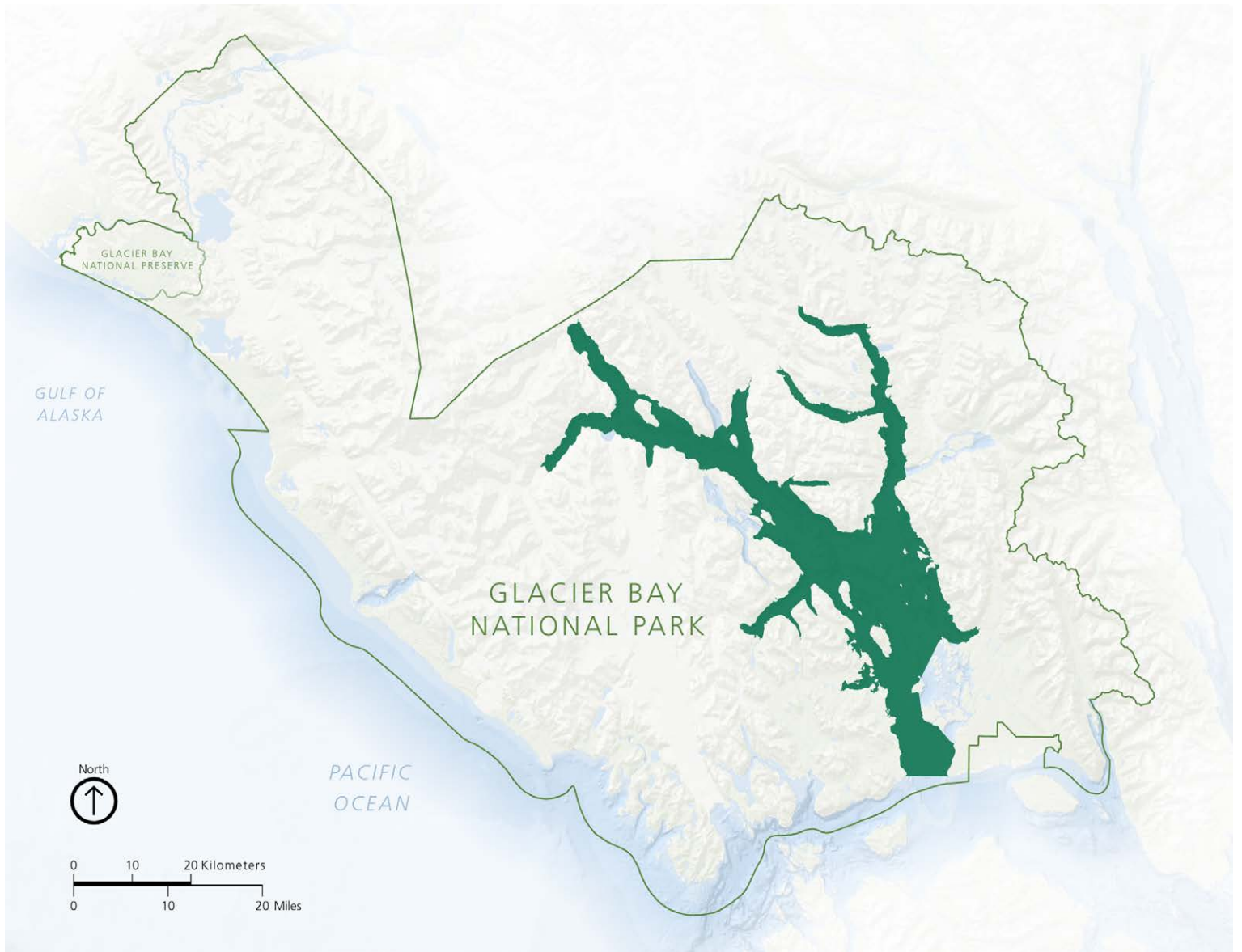


FIGURE 8. GLACIER BAY ZONE

Social science confirms that while visitors come to Glacier Bay to see glaciers and scenic beauty, its biologically rich marine environment supports highly valued visitor experiences of being able to observe wildlife from the deck of a boat (Furr et al. 2021; Swanson and Vande Kamp 2011). Glacier Bay's glacial history and natural successional processes are enshrined in the founding purposes of the park and make it a globally unique sanctuary for many species. Since the 1970s, balancing human use and protection of these attributes in Glacier Bay has been a topic of national discussion resulting in landmark decisions and ongoing park management efforts to minimize impacts to the natural environment, air quality, water quality, and soundscape.

The Glacier Bay Zone is defined as waters contiguous with Glacier Bay lying north of an imaginary line between Point Gustavus and Point Carolus excluding waters managed under the BWMP (in preparation) and the FMP. Within the Glacier Bay Zone, vessel quotas and operating requirements apply as well as to motorized and nonmotorized waters.

### **Desired Conditions**

*Natural and Cultural Resources* — The waters in this zone provide for an intact ecosystem, where natural processes and patterns continue and all biological and physical components of the ecosystem are retained without intervention or alteration, except as allowed under some circumstances (e.g., recreational fishing, limited lifetime access commercial fishing, Huna Tlingit traditional gull egg harvest,<sup>2</sup> noise pollution and other byproducts of motorized visitation, and oil spill response and restoration). The effects of vessels on marine resources are closely monitored and managed to ensure that impacts to habitats, populations and individuals are minimized. The NPS collects and uses data on human-wildlife interactions, including in the underwater and above-water acoustic environment and intertidal and shoreline habitats to inform Glacier Bay-specific approaches to minimizing visitor impacts to the natural environment and wildlife activity patterns (see figure 9).

Fisheries harvests are closely monitored and managed to minimize impacts on the marine ecosystem. Collaboration with fishery management agencies is pursued for data sharing and general support of park conservation goals. Ongoing research and monitoring of oceanography and biological resources help managers document and understand biodiversity, species distribution, and ecosystem processes that may change in the context of glacial retreat and accelerating climate change and ocean acidification, especially for keystone taxa like forage fish, watchable wildlife, protected species such as harbor seals, Steller sea lions, and humpback whales, and sensitive seafloor dwellers such as red tree coral. Seabird populations are regularly monitored to facilitate traditional Huna Tlingit gull egg harvest. Research on glaciers and ecological succession that are foundational to the park's purpose occurs on an ongoing basis. Vital signs research is also ongoing, including to detect airborne and marine contaminants that result from vessel traffic.

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<sup>2</sup> ANILCA and NPS regulations prohibit federal subsistence uses in the park (codified in 36 CFR § 13). Legislation enacted in 2000 (Public Law 106-455) and a legislative environmental impact statement authorize the limited harvest of glaucous-winged gull eggs by the Huna Tlingit in the park under a management plan cooperatively developed by the NPS and the Hoonah Indian Association, the federally recognized tribe of the Huna Tlingit. Glacier Bay is the traditional Homeland of the Huna Tlingit who traditionally harvested eggs prior to park establishment.



Whale Waters speed limits and traffic separation reduce disturbance and collision risk to humpback whales and other marine wildlife.



Seasonal vessel closures are used to minimize human-related disturbance to harbor seals and to avoid the separation of pups from their mothers during the pupping season (left and middle). Island closures and wildlife approach distances are also used to protect multiple marine species from disturbance during critical life stages. Foot traffic is further prohibited in sensitive areas (such as seabird nesting colonies) to protect multiple species where human presence may impact nesting and chick-rearing (right).



The shorelines in Glacier Bay provide an important travel corridor and foraging and nesting habitat for wildlife, as well as the greatest recreational opportunity for visitors, therefore increasing the frequency of human-wildlife interactions (above). Temporary closures are used to minimize the potential for food conditioning of bears and other human-wildlife conflicts, and seasonal closures to foot traffic in sensitive areas such as seabird nesting colonies to protect wildlife. Recent research results have found that even low levels of outdoor recreation can alter wildlife spatial and temporal activity. Using remote cameras, researchers found that if humans were present in an area, the cameras detected fewer than five animals per week across four species (brown bear, black bear, moose and wolves). In most cases, this likely meant that animals avoided areas where humans were present. Second, in backcountry areas, wildlife detections dropped to zero each week once outdoor recreation levels reached the equivalent of about 40 visitors per week (Sytsma 2022).

FIGURE 9. MINIMIZING HUMAN-WILDLIFE CONFLICTS IN GLACIER BAY

The Tlingit are actively engaged in collaborative stewardship of natural and cultural resources through consultation, informal two-way communication, and partnership programs. They continue to visit these waters to engage in traditional activities, including permitted harvest activities, to connect with ancestral spirits, to maintain and pass down intergenerational knowledge, and to hold ceremony. Tlingit presence and interaction with Homeland are integral to an intact ecosystem, just as pristine ecosystems support the integrity of Homeland and a traditional sense of place.

*Visitor Experience (Lower Bay, Mid-Bay and West Arm)* — From the mouth of Glacier Bay up to the upper West Arm, visitors are highly likely to encounter other vessels, commercial activity, and other parties, including Huna Tlingit engaged in traditional practices or ceremony. Due to the accessibility of only a few tidewater glaciers (most experiencing retreat) visitors should expect to see concentrations of vessels in these areas, including cruise ships and tour vessels, especially during the summer season. Anchorages are limited in this area so visitors should expect concentrations of vessels in these areas as well. Visitors should also expect to see the implementation of a variety of management tools to ensure high-quality visitor experiences and resource protection. Park staff actively manage impacts from visitors in this zone, patrol and monitor use, and issue guidance as needed to protect critical resources.

*Visitor Experience (East Arm and Sheltered Inlets)* — Visitors traveling into the East Arm and many of the sheltered inlets throughout Glacier Bay are likely to experience the sights and sounds of humans less frequently than in the main travel corridors and anchorages in the Lower Bay, Mid-Bay, and West Arm, producing more intimate and remote conditions with a higher degree of solitude and challenge. The seasonal absence of motorized vessels in specific areas also provide a more natural soundscape that benefits natural and cultural resources. Visitors in these areas should expect greater self-reliance as a key component of the visitor experience with fewer patrols and less traffic, where trip planning and safety information are limited or only accessible prior to entry.

*Glacier Bay Access and Vessel Management* — The successful Glacier Bay model that has evolved since 1979 continues to be optimized through vessel class quotas, operating conditions, permits, contracts, and the application of nonmotorized waters, to provide diverse visitor experiences and balanced access, consistent with park resources and values. The NPS grants access to inholdings consistent with ANILCA section 1110, special access and access to inholdings. Impacts to park resources and values from commercial operators are minimized in Glacier Bay using a suite of management actions and through the concession contract process as commercial operators compete to bring visitors to Glacier Bay (see figure 10). This creates incentives where cruise lines put their best foot forward in competition for contracts to achieve some of the most stringent cruise ship operating requirements related to air pollution, wastewater discharge, and whale strike avoidance in Glacier Bay. Self-reporting of violations, such as incidental discharges, are required in concession contracts. Commercial services staff at the park provide orientations to commercial operators to clarify operating requirements and provide information on their scientific basis.



NPS and cultural interpretive rangers embark large cruise ships via a small transfer vessel (left) to lead educational programs and commentary that reaches passengers of all ages (right). The efficiencies of mass transit reduce the per-person environmental impact of this national park visit while providing public access to an Alaskan wilderness setting by diverse audiences.

*The park has been successful in leveraging the contracting process and limited entry to Glacier Bay to achieve water quality and air quality standards in the park that exceed federal and state standards. This figure explains how and shares examples where the park has incentivized commercial partners to propose technological solutions and operating practices that result in higher quality standards, and how the park retains leverage to ensure compliance.*

Federal regulations prohibit engaging in or soliciting any business in park areas, except in accordance with the provisions of a permit, contract, or other written agreement with the United States. As in other National Park Service areas, commercial visitor services or other commercial activities are only provided in the park where authorization has been granted (36 CFR § 5.3).

For commercial vessels that hold a concessions contract (including cruise ships, tour vessels, and charter vessels) the park uses concessions law and the competition for and issuance of contracts to minimize impacts to park resources and values. For example, cruise ship operations in Glacier Bay are considered some of the cleanest in the world owing in large part to operational requirements produced as a result of competition for concession contracts.

In sum, every 10 years park managers issue a concessions prospectus seeking bids for a specific business opportunity (cruise ship services, tour vessel services, charter vessel services, etc.). For cruise ships, the prospectus includes five **Principle Selection Factors** including factors related to conserving park resources (0-5 points possible), providing visitor services at reasonable rates (0-5 points possible), experience/performance at providing said services (0-5), financial capability to carry out the service (0-5), and proposed minimum franchise fee paid to the NPS on a per passenger basis (0-4 points). The prospectus also includes **Secondary Selection Factors** (with possible 0-3 points) focused largely on natural resource protection including minimizing impacts to underwater noise and park wildlife, and minimizing waste.

Companies write proposals in response to the prospectus specifically addressing each of the primary and secondary selection factors. Those responses are then reviewed by an independent committee with scores assigned to each factor response based on possible points. Companies receiving the highest point total are then awarded 10-year contracts, and are contractually obligated to operate based on their proposed responses.

The result is that companies (cruise, tour, charter) individually commit to conserve park resources and values, support NPS interpretation services, and to pay a per passenger franchise fee that the park is able to use for marine management and visitor impact research studies, monitoring, equipment, and personnel focused on understanding and mitigating impacts by park visitors.

For example, in the most recent (2020-2029) cruise ship concession prospectus, the Principal Selection Factor focused on conserving air quality includes this language:

*Describe the equipment and technology for controlling or minimizing air pollution to meet or exceed North American Emission Control Area standards to be used by each vessel you propose to operate in the park.*

*Describe operational methods you will use to minimize air pollution emissions for each vessel you propose to operate in the park including engine, generator, incinerator, and oil-fired boiler operations.*

Likewise for conserving water quality, each company proposing was required to address these criteria:

*Explain the operational discharge practices you commit to use while in the waters of Glacier Bay National Park and how those practices will protect the water quality of the bay, including, but not limited to, wastewater, treated and untreated sewage, gray water, ballast water, bilge water, scrubber wash water, hazardous and solid wastes. Describe the nature of the planned discharge(s) in detail including location(s), composition, toxicity, quantity, rate and frequency. A better proposal may commit to eliminating vessel discharge in the waters of Glacier Bay National Park.*

*Describe the discharge practices you commit to use prior to entering the waters adjacent to Glacier Bay, from Cross Sound to the entrance to Glacier Bay, and while in those adjacent waters, and how those practices will protect the water quality of the Bay, including, but not limited to, wastewater, treated and untreated sewage, gray water, ballast water, bilge water, scrubber wash water, hazardous wastes and solid wastes.*

*Describe the nature of the planned discharge(s) in detail including location(s), composition, toxicity, quantity, rate and frequency. A better proposal may commit to eliminating vessel discharge in the adjacent waters described above.*

Each company that was awarded a 10-year contract agreed to operate solely on ultra-low sulfur Marine Gas Oil (MGO) to minimize air quality impacts. As a result, no ships in Glacier Bay operate using emission gas cleaning systems ("scrubbers") with a subsequent production and discharge of a large volume of scrubber 'washwater' (up to 30,000 gallons per hour per engine).

The result is that while in park waters, cruise ships refrain from discharging any treated or untreated wastewater and do not discharge any emissions gas cleaning system washwater. A recent study of Polycyclic Aromatic Hydrocarbons (PAHs) along the route of cruise ships has confirmed the pristine water quality in Glacier Bay (Gende et al. 2020).

In addition to benefiting wildlife, marine organisms, and air and water quality, higher standards also benefit visitor experience as ships only operate on ultra-low sulfur fuel which reduces the chance that haze forms during inversions. Likewise, holding all wastewater and washwater has benefits to the visitor experience of people enjoying the marine environment and shorelines of Glacier Bay.

In terms of compliance, the self-reporting of violations, such as incidental discharges, is a required part of concession contracts. Companies caught violating the contract but not reporting could receive a negative year-end review, two of which could result in the termination of the contract, and prohibition on competing for the next 10-year contract. Thus, the incentive to follow contractually obligated operations and regulations, is extremely high owing to the financial implications of eliminating Glacier Bay from itineraries for up to 19 years.



**NPS observers at the bow of cruise ships in Glacier Bay use high power binoculars to detect humpback whales and communicate positions to captains to support avoidance maneuvers.**



**An NPS Scientist records fuel consumption data to estimate emissions from cruise ships in Glacier Bay.**



**An NPS Scientist inspects the emission gas cleaning system ('scrubber') installed on a cruise ship operating in Glacier Bay.**



**A contractor records engine type and configuration during an inspection of a cruise ship in Glacier Bay.**

## **Icy Strait/ Cross Sound Zone, S'ix' Tlein (Big Dish)**

**Area Description.** This zone extends from Excursion Inlet to Cape Spencer and includes associated bays such as lower Dundas Bay and Taylor Bay (see figure 11). Within Icy Strait and Cross Sound, the marine environment serves as a travel corridor for private vessels, charter vessels, tour vessels, cruise ships, passenger ferries, fishing vessels, and other commercial service operators, including cargo shipping. This zone provides access from the inner waters of the Alexander Archipelago to the Pacific Ocean. To support safe navigation, this zone also includes a Cape Spencer terrestrial site near sea-level with permitted use by the US Coast Guard to support maritime aids to navigation.

The waters of Taylor Bay, Fern Harbor, southern Dundas Bay (nonwilderness portion), and to some degree Excursion Inlet provide safe harbor and shelter for mariners from rough and exposed marine conditions including allowances for non-park purposes (e.g., transportation related and incidental commercial use rather than visitation or recreation use).

Commercial fishing allowances continue a cultural tradition where area waters serve as economic drivers for communities and fishing as a valued way of life. Excursion Inlet also supports more non-park purposes due to marine transportation to support commercial operations at a seafood processing plant at a nearby settlement outside park lands and waters. At the same time, these waters also provide vessel experiences less impacted by visitor use than many of the main travel routes and an opportunity to experience natural marine ecosystems as well as view unique older growth habitats compared with areas inside Glacier Bay.

### **Desired Conditions**

*Natural and Cultural Resources* — This zone allows for commercial fisheries at current levels, but no new or expanded commercial fisheries are permitted (Public Law 105-277 section 123). The waters in this zone provide for intact ecosystem processes, where natural processes and patterns continue without intervention or alteration, except as allowed under special conditions. This includes commercial and recreational fishing as maritime cultural traditions where boats occupy a central place in society connected to the natural cycles of oceans, coasts, and wild country, and humans participating in ecological frameworks (e.g., harvest). This is especially the case for residents in nearby gateway communities (Gustavus, Excursion Inlet, Hoonah, Elfin Cove, Pelican, Tenakee Springs), but also for residents and businesses based in Yakutat, Sitka, and Juneau.

Marine resources are monitored and managed to ensure that impacts to habitats, populations and individuals are minimized. Research and monitoring help managers document and understand biodiversity, species distribution, and ecosystem processes that may change in the context of accelerating climate change and ocean acidification, especially for key taxa like forage fish, watchable wildlife, protected species such as harbor seals, Steller sea lions, and humpback whales, and sensitive seafloor dwellers such as red tree coral. Research foundational to the park's purpose occurs on an ongoing basis. Visitor use impacts to natural and cultural resources are unlikely to occur or to be visible.

The Tlingit are actively engaged in collaborative stewardship of natural and cultural resources through consultation, informal two-way communication, and partnership programs. They continue to visit these waters to engage in traditional activities, including permitted harvest activities, to connect with ancestral spirits, to maintain and pass down intergenerational knowledge, and to hold ceremony. Tlingit presence and interaction with Homeland are integral to an intact ecosystem, just as pristine ecosystems support the integrity of Homeland and a traditional sense of place.



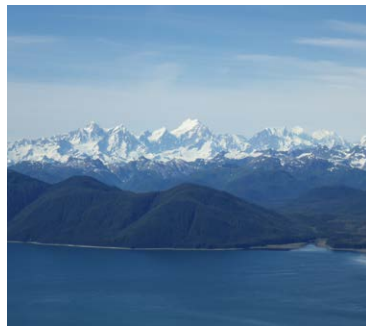


FIGURE 11. ICY STRAIT/CROSS SOUND ZONE

*Visitor Experience* — Within Cross Sound, Icy Strait, and to some degree Excursion Inlet, visitors find some elements that indicate higher use as a travel corridor for vessels of all sizes. Within the associated bays in this area, some visitors may find the opportunity to experience solitude, challenge, and self-reliance. The zone also supports recreational use for park gateway communities and regional boaters with reduced competition for access. The NPS grants access to inholdings consistent with ANILCA section 1110, special access and access to inholdings.

### **Outer Coast Zone, Yan T'iká (Far Away Shore)**

**Area Description.** The coastal waters from Cape Spencer north to Cape Fairweather are exposed waters where few vessels travel close to shorelines (see figure 12). Park-managed waters (a linear stretch of coast around 70 miles long, and 3 miles wide) and shorelines are considered among the most pristine marine and coastal areas in the world, and are especially valuable for transiting marine wildlife migrations in combination with offshore deep waters nearby (outside park waters).

Human uses of the more rugged outer coast waters include exploration and fishing by private and charter vessels, particularly in the southern portion of the outer coast region where bays and inlets provide some protection from the open ocean. Occasionally, visitors may access the coastline from their vessel and travel to the interior for other recreational opportunities such as skiing or mountain climbing. Other shoreline recreational park uses typically involve beach landing planes dropping off users for wilderness trips.

Commercial fishing is common along the outer coast, primarily outside park waters. Specific commercial fisheries are authorized in Outer Coast Zone park waters, subject to state and federal commercial fishing regulations, including king crab pot, Dungeness crab pot, weathervane scallop dredge (specific areas), shrimp pot, groundfish dinglebar and longline, Pacific halibut longline, Tanner crab rings and pots, and Pacific salmon troll, with salmon trolling being the largest fishery in park waters. The outer coast region is also a transit corridor for vessels moving up the coast, though much of the marine transportation along this section of coast is further offshore.

### **Desired Conditions**

*Natural and Cultural Resources* — The park conducts studies in this area where data are traditionally more difficult to obtain, including natural resource vital signs monitoring and work to better document and understand cultural landscapes and a long history of coastal exploration. This area offers unique insights compared with other park waters, including long distance marine pollution (especially marine debris), marine ecosystems less driven by glacial processes, and the impacts of commercial fishing on long lived rockfish and scallops.

This zone allows for commercial fisheries at current levels, but no new or expanded commercial fisheries are permitted (Public Law 105-277 section 123). The park develops strategies to measure the extent of direct and indirect resource impacts from commercial fisheries, which are largely unknown (e.g., scallop dredging that flattens the topographical features of the ocean floor, including habitat impacts and bycatch that change biological composition and productivity). As directed by Congress, these commercial fisheries are managed under a fisheries management plan that is cooperatively developed by the State of Alaska and the Secretary of the Interior, intended to "...provide for the protection of park values and purposes...and for the opportunity for the study of marine resources." The NPS seeks opportunities to work with the State of Alaska to meet this Congressional mandate. The NPS further seeks to collaborate with state and federal fisheries to monitor recreational fishing and address fish and wildlife management concerns along the rocky sections of the coastline north of Cape Spencer.



FIGURE 12. OUTER COAST ZONE

The Tlingit are actively engaged in collaborative stewardship of natural and cultural resources through consultation, informal two-way communication, and partnership programs. They continue to visit these waters to engage in traditional activities, including permitted harvest activities, to connect with ancestral spirits, to maintain and pass down intergenerational knowledge, and to hold ceremony. Tlingit presence and interaction with Homeland are integral to an intact ecosystem, just as pristine ecosystems support the integrity of Homeland and a traditional sense of place.

*Visitor Experience* — The further a visitor travels north along the outer coast, the less likely they are to encounter other vessels or parties close to shorelines. Visitors traveling by boat have the opportunity to experience this landscape as other explorers did before them, including a very high degree of challenge, self-reliance, and risk (long stretches of open water along surf-pounded beaches), extreme waves and weather, few safe harbors and anchorages, no services and limited rescue capacity (nearest emergency services based in Bartlett Cove, Sitka, Pelican, and Yakutat). Visitors not traveling by boat (e.g., hiking the coast) face the additional risks of crossing dynamic coastal streams and rivers, glaciers, and moraines.

## CHAPTER 3 MANAGEMENT STRATEGIES AND ACTIONS

This chapter identifies management strategies and actions to achieve and maintain desired conditions within the three subzones described in chapter 2, placing an emphasis on natural and cultural resource protection, safety, and visitor experience, and in some zones, facilities and infrastructure. A strategy is a general direction of course, and the actions are the specific steps that may be taken to move the strategy forward. During day-to-day implementation, further mitigation measures and best management practices (appendix D) will be applied to ensure protection of the park's fundamental resources and values.

### MANAGEMENT ACTIONS COMMON TO ALL ZONES, DAA SÁ PARK SERVICECH YÉI HAS GUXSANÉI? (WHAT WOULD THE PARK SERVICE DO?)

#### Protecting Marine Ecosystems with Science and Stewardship, Haa Éil'i Káx Yánde Gaxtoodéil, Haa Át Sakóowuteen (Our Ocean, We Will Watch Over It With Our Knowledge)

**Research.** The NPS supports and facilitates ongoing science in the marine environment consistent with park mandates (Glacier Bay National Monument Antiquities Act enabling proclamation(s), ANILCA, National Marine Protected Area, and the Biosphere Reserve) including basic and applied research in all marine zones, subject to permitting review to determine whether the proposed research is consistent with the park's enabling purposes and to minimize adverse impacts to natural and cultural resources, wilderness qualities, and visitor experience through mitigations (including as outlined in appendix D).

**Monitoring Stations.** As part of an interdisciplinary, long-term monitoring program to gather oceanographic data, including salinity, temperature, turbidity, and other biological ocean health indicators, the NPS will annually install oceanographic moorings, with up to three moorings set in the Outer Coast Zone and up to three moorings in Glacier Bay. Each mooring will be anchored to the ocean floor year-round and include removable flotation buoys and tethered equipment at depths and locations that minimize risks to vessels. Anchors may be abandoned on the ocean floor.

**Resource Management.** Glacier Bay has several documents (available online) that outline the resource management direction for the park. These documents stipulate the management priorities for natural, cultural, and wilderness resources parkwide and identify priority stewardship goals and projects. For additional information on resource management guidance see:

- Glacier Bay National Park and Preserve Resource Stewardship Strategy (2018)
- State of the Park Report for Glacier Bay National Park and Preserve (2017)
- Natural Resource Condition Assessment: Glacier Bay National Park and Preserve (2017)
- Bear Management Plan (2013)
- Harvest of Glaucous-Winged Gull Eggs by Huna Tlingit in Glacier Bay EIS (2010)

**Traditional Ecological Knowledge.** Recognizing the value of traditional knowledge held by the original inhabitants of Glacier Bay, the Huna and Yakutat Tlingit clans, the park will continue to seek and incorporate such knowledge in all phases of park-sponsored research, including study design, implementation, and reporting and will encourage and facilitate the acquisition and incorporation of such knowledge in research projects proposed by external park researchers.

**Collaborative Fish and Wildlife Management.** The NPS has the authority to protect fish and wildlife populations from impairment, has statutory direction to ensure the conservation of natural and healthy populations of fish and wildlife, and to address threats to park resources or values (under the Organic Act, ANILCA, and certain federal jurisdiction authorities over lands and waters secured pre-Alaska statehood and pre-ANILCA). The joint master memorandum of understanding (MMOU) with the State of Alaska recognizes the NPS has a responsibility to conserve fish and wildlife resources and the State of Alaska has management authority to protect healthy, unimpaired populations to provide for the sustained yield of fish and wildlife populations across all Alaskan Lands for the benefit of all Alaskans (ADFG and USFWS 1982). At the same time, many federal and state agencies are cooperative partners with complementary responsibilities and management roles applicable to conservation, human safety, or visitor experience concerns related to fish and wildlife.

The State of Alaska has the primary responsibility to manage fish and resident wildlife within the State. If park staff or outside agencies notice a change in fish and wildlife populations which may be the result of human pressures that can be managed at the park level (e.g., overfishing in certain areas of the park, fishing gear impact concerns, reported wildlife incidents) the park will consult with our cooperative partnerships, including the State of Alaska, on this issue to determine needed corrective actions through a science-informed and regulatory decision-making approach to take corrective action. Park actions will generally follow the management action progressions listed below using transparent processes (public press releases, proposals to the State of Alaska, Park Compendium, and CFR public comment opportunities). The NPS is also committed to fostering cooperative relationships to manage fish and wildlife populations, including data sharing, research, incident management, protective measures or emergency closure protocols (such as through the State of Alaska Board of Fisheries process to change sport fishing regulations), MMOU, and a joint fisheries management plan. The MMOU with the State of Alaska, signed in 1982, recognizes the State and the NPS share a mutual concern for fish and wildlife resources and their habitats and a desire to develop a cooperative relationship (ADFG and USFWS 1982). The park will also strengthen the role of federally recognized tribal governments representing the Huna and Yakutat clans in collaborating on indigenous stewardship approaches to fish and wildlife management, these actions will be for the benefit of all fish and wildlife populations.

**Regulations and Closures.** Long-term and temporary restrictions and closures have been proven to minimize human-wildlife conflicts in Glacier Bay (see figure 9). While varying degrees of protection continue to be needed to ensure that natural life processes prevail, years of marine resource data and management experience point to the importance of flexible, science-informed approaches given the park's dynamic post-glacial environment and even more dynamic species distributions.

The option to close areas and restrict visitor use will be exercised using regulations and closures procedures when necessary to ensure that the activity or area is being managed in a manner compatible with the purposes for which the park was established. Closures will occur under existing park service authorities (annual Superintendent's Compendium and under the requirements of 36 CFR § 13.50).

At the same time, in localized areas of the environment, natural processes and continual physical changes reduce signs of anthropogenic activities, such as associated with glacier outwash formation, slope wasting, ocean scouring, and fast rates of isostatic rebound. In this way, Glacier Bay's dynamism poses a unique challenge for NPS resource managers evaluating localized resource damage from marine visitation (e.g., seafloor damage from anchoring, shoreline uses), where mitigating processes may remove any need to implement closures.

**Evolving Stewardship Model.** The NPS will continue to evolve park-specific management approaches that reduce impacts to marine species and environments through applied science, partnerships, emerging technology, and market-based tools, including concessions contracts (especially in the cruise industry where quotas and exclusive contracts have historically leveraged economies of scale to reduce impacts per visitor and drive higher environmental standards across the industry). Specific to whale avoidance (under chapter 4 of this plan), the NPS will continue to evolve programs to provide cruise ship related data on whale-vessel close encounters (e.g., Shipboard Observer) and collaborate with pilots/bridge crew (e.g., whale avoidance simulator training; Whale Alert app). The NPS will also continue to communicate ongoing stewardship efforts to visitors and where appropriate engage citizen participation (e.g., Happywhale, iNaturalist).

**Monitor and Anticipate Major Ocean Regime Shift Changes.** The NPS will continue to facilitate the long-term study of oceanographic conditions in park waters and add strategic monitoring sites (including on the outer coast) to help scientists and park managers quantify spatial and temporal change in physical oceanographic parameters (e.g., salinity, water temperature, ocean acidification). The park will use data to track status and trends in the marine ecosystem including physical oceanography, phytoplankton, zooplankton, invertebrates, forage fish, seabirds, and marine mammals to better understand factors influencing the park marine ecosystem. The NPS will share data publicly and support basic and applied research that contributes to scientific knowledge, discovery, and public understandings of the park's dynamic marine ecosystems, the role of changing conditions outside the NPS control, and ways to conserve our oceans as complex living ecosystems that support life on this planet. The NPS acknowledges and uses scientific findings to inform management decisions related to marine regime changes and cascading effects to species.

**Climate Change Adaptation and Emission Reduction.** As part of a dynamic tidewater glacial landscape, the park offers unique opportunities for diverse audiences to witness the impacts and implications of climate change. The park will continue to utilize long-term data sets and directed research studies to support climate adaptation and develop appropriate and balanced decisions with regards to visitation and resource conservation. For example, as tidewater glaciers continue to recede reducing the amount of ice available for harbor seals, the park will refine strategies for glacier viewing that minimize the chance of disturbing seals by vessels while still meeting the mandate of access and enjoyment of tidewater glaciers. The park will continue ongoing efforts to quantify emissions, including greenhouse gases, and understand comparative carbon budgets between modes of transport and access. The NPS will refine operating conditions to reduce pollutant volumes and continue to leverage commercial operators to reduce greenhouse gas emissions using the concession contract process, such as only awarding contracts to cruise companies that will use cleaner fuels and invest in green technologies. The park will optimize the use of renewable energy sources and manage marine vessels to protect resources (see details in appendix D Mitigation Measures and Best Management Practices). Lastly, the NPS commits to sharing the science on climate change at the park and its causes with the visiting public and broader audiences.

**Oil Spill Prevention and Response.** The NPS will prevent and effectively respond to fuel spills in park waters as a vital part of protecting resources in Glacier Bay National Park. The NPS will proactively apply technological solutions and marine operating practices that protect the marine environment (see appendix D Mitigation Measures and Best Management Practices) including by leveraging their adoption in the competitive bidding process by which businesses compete to carry visitors into the park (see figure 10). The NPS will provide education and resources to professional and recreational mariners (e.g., trip planning tools, mapping resources, navigational aids, and local area orientations). The park will continue to work with the United States Coast Guard and local oil spill response teams to maintain a trained staff

of responders and all the necessary equipment to aid vessels at risk for spills and safely and effectively respond to both minor and major spills. The NPS will maintain communications systems and foster partnerships to support coordinated responses and include tribal and resource specialist input where real time decisions are needed to help protect resources. The NPS will clean up spills in accordance with all applicable state and federal environmental quality laws.

**Manage for Dynamic Landscapes and Hazards.** The NPS will continue to characterize park hazards associated with the combination of a geologically active landscape along the Fairweather Fault and debuttressed slopes following glacial recession (these often produce landslides in subsequent decades). These elevated landslide risks are expected to continue for at least the next century, although it is extremely challenging to quantify the risks. One of North America's largest tsunamis ever recorded occurred in the park in Lituya Bay during a 1958 strike-slip earthquake along the Fairweather Fault. In the past 250 years, huge submarine piles of material close to the Glacier Bay shoreline appear to have been deposited by slope failures (Avdievitch et al. 2020). Rock avalanches have been frequent during the last decade including one in 2022 that covered two square miles of the Lamplugh Glacier and another in 2016 that covered five square miles (Coe et al. 2018; Dufresne et al. 2019). The NPS will continue its collaborations on this topic, including research with the USGS to quantify landslide/tsunami risk due to a slope failure in Tidal Inlet with a goal of determining whether an early warning system can be developed. Recognizing that earthquakes, tsunamis and submarine landslides can pose significant safety risks to people and vessels in their vicinity work with the cruise and tour industry to inform and mitigate risks associated with landslide-induced tsunamis. Lastly, the NPS will continue to mitigate risks to park staff (such as the relocation of an administrative floating cabin from Blue Mouse Cove to South Sandy Cove due to concerns about a Tidal Inlet slump).

**Glacier Bay Special Marine Funding Authorization.** The NPS will optimize the use of park-specific legislation providing cruise ship fees as base/non-appropriated funds (1996 Omnibus Law Public Law 104-333, sec. 703, codified at 16 USC 1a-2(g)) to meet the park responsibilities associated with the increase in cruise ships under a park 1996 Vessel Management Plan EA Finding of No Significant Impact, and to support ongoing marine stewardship and visitor services.

**Marine Capacity for Necessary Park Operations.** The NPS will maintain a marine fleet capable of protecting park resources and values, including a large vessel capable of multi-day trips throughout all three marine management zones on a year-round basis (see figure 13). Optimize the fleet to balance flexible and adaptive use with specialized performance needs (law enforcement, commercial services, park ranger transfers, scientific research). Standardize features that enable operational efficiencies adapted to the remote setting and dynamic environmental conditions, and that minimize operational impacts on resources and visitors.





The NPS marine fleet has historically included an all-water, all-weather capable vessel (left to right: Nunatak I, Nunatak II, and Nunatak III).



A variety of vessels support resource protection for park wildlife (left three) and response to wildlife emergencies (right, whale disentanglement).



Floating cabins (far left) and diverse classes of vessels (right three) support ranger patrols and data collection by NPS staff and outside researchers.



The park marine fleet (left) also supports coordinated marine operations with other agencies (middle) or associated with cruise ship transfers (right).



Marine operations depend on maintenance (left) and managing equipment in an underwater environment (middle and right).



The park responds to distress calls and emergencies (left, grounding) and prepares for incidents (middle, oil spill response; right, cold water survival).

## **Providing Diverse Visitor Experiences and Balanced Access, Woosh Gunayáade Át Ka Wooch Yáx Naxdatee (Different Experiences and Make Them Equal)**

**Interpret park significance.** The park will facilitate diverse and equitable opportunities for visitors and stakeholders to discover relevance and inspiration in Glacier Bay through personal services such as interpretation aboard commercial vessels as well as through interpretive media. Interpretive services will support learning, empowerment and action to protect this and other unique marine areas for all.

**Cruise Ship, Tour Vessel, Day Boat.** Commercial operators partner with the NPS to enable diverse audiences to experience the park by ordinary means (motorized larger boats) consistent with park purposes and values. These larger scale operations provide access to key visitor destinations within the park—particularly tidewater glaciers and more accessible glacial environments—and support onboard programming that connects visitors to park resources and values. While stringent restrictions balance the benefits and tradeoffs related to this scale and intensity of visitor access in a national park setting, the park service also leverages competitive commercial contracts, vessel quotas and operating conditions, and other management tools to further enhance visitor experience quality and reduce environmental impacts per visitor.

**Private Vessel, Charter Vessel, Nonmotorized Vessel.** Visitors can explore the park by boat to visit glacial environments and recreate consistent with park purposes and values. Social science indicates that these visitors highly value opportunities for self-directed exploration in a scenic wilderness setting, and the flexibility to seek out and obtain solitude, and observe wildlife (Furr et al. 2021; Swanson and Vande Kamp 2011, Sytsma 2022). The NPS therefore uses vessel quotas and operating conditions, nonmotorized waters, overnight camping permits, and other management tools to balance the benefits and tradeoffs related to levels of vessel use and visitor experience quality, particularly where higher intensities and concentrations of use create less acceptable environmental and social conditions.

**Frontcountry Marine Access.** The park optimizes access for national park experiences consistent with park purposes and values through point-to-point marine transportation to and from Bartlett Cove connecting with ports outside of park waters, including for park visitors who may not have opportunities to travel deeper into the park (NPS 2019a). This is primarily achieved through tour and charter vessel commercial contracts, and passenger ferry service to Bartlett Cove. Private vessel access continues to be managed under the permit system and through the Superintendent authorities. Further, the NPS supports community partners as they seek to provide the marine services and facilities outside the park desired by local residents and boaters and necessary to support marine-based tourism that are common in other southeast Alaska maritime communities. An example is the federal investment into the Alaska Marine Highway System ferry terminal in Gustavus.

**Visitor Orientation and Education.** The park is committed to providing comprehensive orientations and maps that respect the diversity of the visitor experiences within park waters and the marine environment, supplemented by resources on targeted topics of interest to visitors (such as tides) and skills for recreating in the intertidal zone and along the shoreline (e.g., leave no trace, bear safety, approved guide services best practices). The park is also committed to providing tribally approved Homeland acknowledgments and cultural orientation materials to ensure that park visitors understand Indigenous concepts of hosting, protocols, and respectful behavior in Homeland.

**Guide Activity.** NPS authorized commercial guide services for sea kayaking, marine guided sport fishing, sightseeing, and vessel services for visitor drop-off and pickup in the marine environment provide necessary and appropriate water-based visitor services. Charter and tour vessels operate under a

concessioner's contract to navigate within the park; in addition, guides may offer off-vessel activities including nonmotorized water-based and land-based activities. Recommendations and requirements in this plan apply to commercial guide services as well as the public. Additional information on these commercial services is covered in the BWMP (in preparation) and the FMP.

**Drop-Off Service.** The NPS seeks to enhance the existing day boat operation while exploring other service models for backcountry camping and kayaking drop-off services within existing vessel quotas that help manage visitor dispersal and access, optimized to park-specific environmental and social conditions.

**Communications Upgrades to Include Very High Frequency Radio and Automatic Identification Site Transponder Sites.** The NPS will upgrade existing and deploy new communications infrastructure within the next one to three years, and this will remain a primary communication system for marine operators for at least the next decade. The automatic identification system (AIS) is an automatic vessel tracking system that uses transceivers on vessels and land-based receiver stations and will likely expand its functionality in the next decade. AIS information supplements marine radar, which is the primary method of collision avoidance for marine vessels. AIS is now a required element of all marine concessions contracts to ensure contract provisions and increase safety. AIS infrastructure will enhance safety and search and rescue capabilities in the park. Currently, only one AIS transponder site is located in the park at a US Coast Guard installation that has historically provided aids to navigation on a headland at Cape Spencer.

AIS transponder sites will first be co-located with park very high frequency (VHF) infrastructure at up to 10 sites in the park with the goal of full coverage of park waters. Potential installation locations include Glacier Bay (West Arm, East Arm, Beartrack Mountain), Icy Strait (Excursion Inlet), Cross Sound (Cape Spencer), and the outer coast (Cape Spencer to Icy Point and Icy Point to Cape Fairweather). Only when co-location will not work for AIS will a completely new site be developed, which will require the completion of additional NEPA compliance. Existing VHF radio (e.g., ParkNet) infrastructure will be upgraded (e.g., in the park at Beartrack Mountain, Idaho Ridge, Bartlett Cove, and Deception Hills; also at Althorp Peak [US Forest Service]).

**Accountability and Transparency.** The NPS will enhance visitor service operations and data use (vessel AIS, new vessel database) when implementing this plan to better protect park resources and values and share outcomes with the public. A new vessel database will also provide greater efficiency with the private vessel permit process and implementation.

**Vessel Definition Updates.** The NPS defines vessel types in CFR 36 § 13.1102. The park is currently working on administrative updates to the existing definitions through a rule-making process. The current CFR vessel definitions for the five vessel types managed by the park, as well as the park's proposed changes to the CFR definitions are provided in table 1.

**TABLE 1. NATIONAL PARK SERVICE VESSEL DEFINITIONS**

Vessel Category	CFR Definition	Proposed CFR Changes (see bold text)
Cruise Ship	Cruise ship means any motor vessel of at least 100 tons gross (U.S. System) or 2,000 tons gross (International Convention System) certificated to carry more than 12 passengers for hire.	No changes proposed
Tour Vessel	Tour vessel means any motor vessel of less than 100 tons gross (U.S. System) or 2,000 tons gross (International Convention System) engaged in transport of passengers for hire and certificated to carry more than 12 passengers overnight or more than 49 passengers for daytime use.	No changes proposed
Charter Vessel	Charter vessel means any motor vessel under 100 tons gross (U.S. System) or 2,000 tons gross (International Convention System) engaged in transport of passengers for hire and certified to carry no more than 12 passengers overnight and no more than 49 passengers for daytime use. Charter vessels also include any uninspected motor vessel measuring less than 200 tons gross (U.S. Tonnage “Simplified Measurement System”) and not more than 24 meters (79 feet) in length engaged in transport of passengers for hire.	<i>Charter vessel means (1) any motor vessel under 100 tons gross (U.S. System) or 2,000 tons gross (International Convention System) engaged in transport of passengers for hire and certified to carry no more than 12 passengers overnight and no more than 49 passengers for daytime use; or (2) any uninspected motor vessel measuring less than 200 tons gross (U.S. Tonnage “Simplified Measurement System”) and not more than 24 meters (79 feet) in length engaged in transport of passengers for hire.</i>
Private Vessel	Private vessel means any motor vessel that is not engaged in business (business includes, but is not limited to, transportation of passengers for hire or commercial fishing).	<i>Private vessel means any motor vessel that is not engaged in business (business includes, but is not limited to, transportation of passengers for hire, <b>crew leasing</b>, or commercial fishing) and is not more than 24 meters (79 feet) in length. Private vessels may be a bareboat charter.<sup>a</sup></i>
Passenger Ferry	Passenger ferry means a motor vessel authorized by the Superintendent to engage in the transport of passengers for hire to Bartlett Cove.	No changes proposed

<sup>a</sup> Bareboat charter is when the owner of a vessel leases his or her vessel out to an individual (charterer) for a fixed period of time where no crew or provisions are included, and where the operator assumes all liability and operational responsibility.

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## **An Enduring Commitment to Huna and Yakutat Tlingit Homeland Values, Haa Kusteeyí Káx Yánde Gaxtoodéil (Taking Care of Our Way of Life)**

**Tlingit Homeland, Haa Aaní.** Tlingit Homeland connections will be encouraged and supported in all management zones. Traditional activities occur in all zones. The park collaborates with tribes to develop appropriate tribal welcome and land acknowledgment materials as well as other educational materials/orientations outlining Indigenous concepts of Homeland, hosting, and culturally appropriate visitor behavior. The park continues to collaborate with tribes to collect archeological and ethnographic information to ensure these resources are preserved for future generations and made available, as appropriate, to park managers, researchers, and the public. Visitors may see modern cultural practices or evidence of these practices including resource harvesting, ceremonies, and youth activities. These modern cultural practices do not leave an observable long-term impact on the marine landscape. Other Tlingit spiritual practices continue to occur in the marine environment without the practitioners' physical presence; these practices are outside the scope of park management. Further management direction for protecting Tlingit Homeland values specific to the marine environment focus on strengthening government-to-government communication; documenting a Maritime Cultural Landscape; and commemorating village or other sacred sites in appropriate ways.

**Traditional Cultural Fishery.** The park will collaborate with tribes to explore options for non-commercial cultural fisheries in park waters following the shared NPS-tribal stewardship model of the glaucous-winged gull egg harvest (see Huna Tlingit Traditional Gull Egg Use Act, Public Law 113–142). This will require further NEPA compliance and may require regulatory or legislative changes to implement.

**Traditional Tribal Ceremonial Harbor Seal Hunt.** The park and tribes will explore options for implementing a tribal ceremonial harbor seal hunt combining it with research projects that enhance understandings of marine contaminants in the environment. This will require further NEPA compliance and may require regulatory or legislative changes to implement.

**Marine Cultural Landscape Inventory.** The park will collaborate with tribes to explore options for documenting a Maritime Cultural Landscape which will link the marine natural systems, the ethnographic landscape, and the physical cultural resources. This will be undertaken with the goal of protecting the landscape as intact Homeland, furthering connections between the park and associated people, and potentially nominating the landscape to the national register of historic places.

### **CORRECTIVE MANAGEMENT ACTIONS COMMON TO ALL ZONES**

#### **Management Action Progressions, Daa Sá Park Servicech Yéi Has Guᵗsanéi? (What Will the Park Service Do?)**

The NPS is committed to providing visitors to the park with reasonable access for recreational activities, traditional activities, and for other purposes as described in previous chapters.

The NPS strives to use the least restrictive mechanism or tool necessary to achieve desired future resource and social conditions for an area, to reduce visitor conflict, or to protect visitor safety if action is necessary. As further defined in chapter 4, management triggers reflect a condition of sufficient concern to prompt a management action or strategy to ensure that desired conditions for an area are maintained. The NPS need not wait for conditions to match or exceed a trigger before taking management action; an expectation that conditions would exceed standards is sufficient to mandate a response. Restrictions and

closures will be accomplished consistent with the process outlined in 36 CFR §13.50 and/or other relevant regulations.

Below is a list of tools that may be used to manage vessel access, distribution, or operating requirements, when necessary, arranged in rough order from the least restrictive to the most restrictive. The park Superintendent may pick whichever tool is required generally applying the “least restrictive” approach. There is no implication that the tools must be tried in the listed order and a failure elicited before trying the next one. Some tools are included in other actions outlined in more detail further in this chapter. Additional corrective actions may be required to address specific situations and conditions not addressed below.

**Education.** The NPS will provide printed material, public presentations, videos, targeted presentations to user groups, and internet-based programs with the goal of actively involving visitors in helping the park achieve the desired conditions for all management areas. Tribes will provide similar educational materials specific to protecting cultural resources and values and educating visitors about traditional protocols for visiting Homeland.

**Increased Enforcement of Existing Regulations.** The NPS will prioritize resources to increase enforcement efforts for existing regulations to assist in achieving the desired conditions for all management areas.

**Voluntary Measures.** The NPS will ask visitors to restrict their use voluntarily in areas where limits are not already in place. Examples of such measures could include voluntary registration, use of low-impact equipment, and avoidance of certain areas of the park or avoidance of areas during particular seasons or times of day. Voluntary registration could be accomplished by phone or radio call-in, or a digitally based system.

**Required Registration.** Registration is a means to gather information about visitor use levels and to ensure visitors receive necessary resource protection and safety information. The NPS may require visitors to register in areas where permits are not already required. Upon registration, visitors will be provided information about park rules and conditions for use necessary to protect park resources. Registration conditions could include minimum-impact travel, recreational use, and resource protection requirements; however, a registration process will not limit the number of vessels or the type or amount of access.

**Requirements Governing Means of Access.** To achieve desired conditions for all management areas, the NPS may place requirements on the means of access, potentially including designated routes to concentrate use impacts, specific technologies or access modes to mitigate impacts, vessel operating restrictions such as speed limits, and strategies to stagger or disperse access to help achieve desired conditions, and complete compliance as needed.

**Management of Commercial Activity.** If use levels approach the identified visitor capacity or when conditions are trending away from desired conditions, the National Park Service may adjust commercial authorizations as necessary to achieve management area standards and complete compliance as needed. This may include a change in the level of authorized commercial activity or set limitations on specific locations, seasons, or times of day within commercial services permits, operating conditions, business opportunities and contracts.

**Regulate Numbers of Visitors.** The NPS may initiate new compliance actions to consider changing existing quotas or establishing quotas where there are no existing quotas for vessel or visitor numbers in areas of the park, for specific time periods when the volume of use is high enough that other mechanisms

are not working, and where required to achieve desired conditions. Visitors would be required to obtain a permit, and the number of available permits may be limited.

**Temporal Restrictions.** Using the appropriate authorities, the NPS may restrict access to times of day, days of the week, or other unit of time, or the duration of access could be limited.

**Temporary and Long-Term Closures.** Using the appropriate authorities, the NPS may implement temporary or long-term closures for areas of the park to all types of visitor use or to specific modes of access. Restrictions and closures will be accomplished consistent with the process outlined in 36 CFR §13.50 and/or other relevant regulations.

## GLACIER BAY ZONE, SÍT' EETI GEIYÍ

### New Vessel Definitions

To better manage vessels, resources, and visitor experiences within Glacier Bay (see figure 14), the park will formalize vessel definitions for nonmotorized vessels, lower-impact vessels, and administrative use motorized vessels (see figure 15, overview of all vessel management categories), and will clarify both the vessel definition for private vessels longer than 79 feet as well as the conditional transit permit.

**Nonmotorized Vessel.** A nonmotorized vessel is a vessel without an engine of any kind that is solely propelled by sails or human power such as paddles, pedals, or oars. Vessels in this category include, but are not limited to, kayaks, paddleboards, pedal boats, rowboats, and sailboats without an engine. Any vessel with an engine, even if it is not being used or contains a non-operational motor, is a motorized vessel. Nonmotorized vessels are allowed to operate in nonmotorized waters, as well as in waters that are open to all vessel classes. Nonmotorized vessels are not subject to the private vessel permitting criteria. The NPS is now seeking to manage and account for these diverse activities with an updated, more specific nonmotorized vessel definition, annual monitoring of vessel numbers, and management triggers. The NPS will set two separate management triggers (day use and overnight) to manage use levels in all park waters subject to vessel quotas.

Nonmotorized vessel numbers will be tracked such that one vessel will equal one or more persons (depending on vessel type/size) engaging in a water-based nonmotorized activity on one calendar day. In the future, monitoring may evolve toward more detailed data not available at this time, such as the type of vessel used (e.g., paddleboard, single kayak, double kayak, rowboat, canoe) and the amount of time it spends on the water (e.g., hours, an entire day).

For day use, the management trigger will be set at no more than 18 days per year that exceed 75 nonmotorized vessels per day. For overnight use, the management trigger will be set at no more than 18 days per year that exceed 62 nonmotorized overnight use vessels per day.

The triggers chosen represent the number of visitor-related, nonmotorized vessels (private and commercial) per day that occurred on less than 80% of the days reviewed, thus removing the highest outliers. Observations from 2016 through 2022 indicate that desired conditions can be maintained at these use levels without management action.

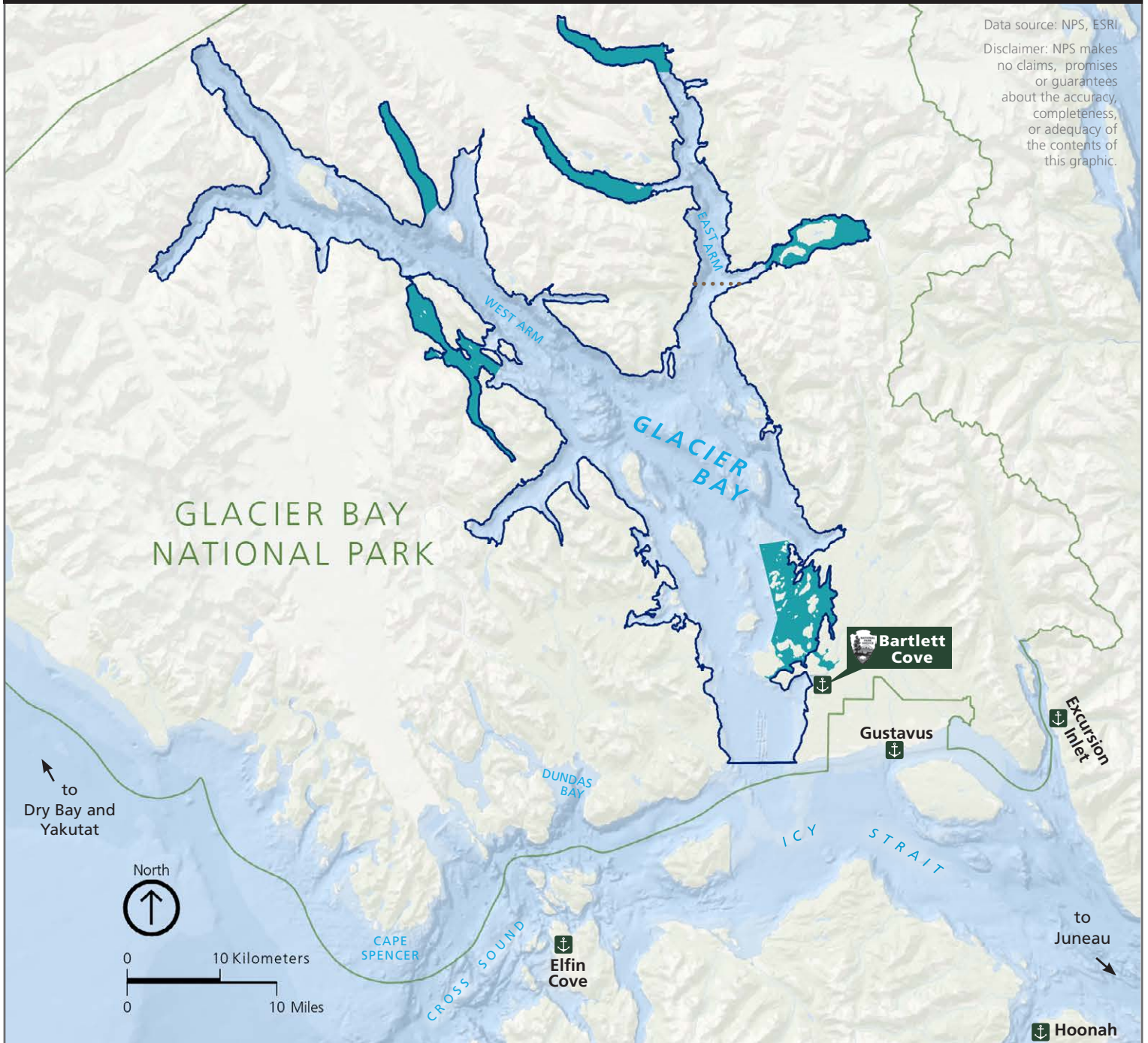
# Marine Management Plan

## Glacier Bay Access and Vessel Management Area

Glacier Bay National Park and Preserve  
National Park Service  
U.S. Department of the Interior



Data source: NPS, ESRI  
Disclaimer: NPS makes no claims, promises or guarantees about the accuracy, completeness, or adequacy of the contents of this graphic.



### LEGEND

#### Public Docks

NPS and gateway community-operated

#### Boundary where vessel permits and quotas apply

Management set within 2003 VQOR ROD, 2023 MMP FONSI, CFR, Contracts, Operating Conditions (including Public Law 105-83, Section 127 stipulations), and the park Compendium.

#### Nonmotorized Waters

Nonmotorized Waters set to provide enhanced opportunities for human-powered recreation in immersive marine settings that emphasize the natural soundscapes of Glacier Bay under 36 CFR 13.1180, "Closed waters, motor vessels and seaplanes."

#### Small Vessel Experience

••• Only nonmotorized vessels and motorized vessels in the private, charter, and administrative use classes are allowed in the East Arm/Muir Inlet north of 58°50.4 N latitude (a line running west from the Dirt Glacier outwash).

FIGURE 14. GLACIER BAY ACCESS AND VESSEL MANAGEMENT AREA



### CRUISE SHIP

- Managed year-round under daily quotas (maximum of 2) and seasonal quotas
- Management set within 2003 VQOR ROD, CFR, Contracts and Operating Conditions, and Park Compendium
- Unused permits may be reallocated to tour, charter, or private vessels longer than 79 feet



### TOUR VESSEL

- Managed year-round under daily quotas (maximum of 3) and seasonal quotas
- Management set within 2003 VQOR ROD, CFR, Contracts and Operating Conditions, and Park Compendium
- Unused permits may be reallocated to charter vessels or private vessels longer than 79 feet



### CHARTER VESSEL

- Managed June through August under daily quotas (maximum of 6) and seasonal quotas
- Management set within 2003 VQOR ROD, CFR, Contracts and Operating Conditions, and Park Compendium



### PRIVATE VESSEL

- Managed June through August under daily quotas (maximum 25) with a seasonal maximum of 2,300
- Management set within 2003 VQOR ROD, MMP 2023 FONSI, CFR, and Park Compendium



### PASSENGER FERRY TO BARTLETT COVE

- Managed year-round under daily quotas (maximum of 1)
- Management set within 2003 VQOR ROD, CFR, Contracts, Operating Conditions (including Public Law 105-83, Section 127 stipulations), and Park Compendium



### NONMOTORIZED VESSEL

- Monitored with annual management triggers:  
*Day Use trigger* = No more than 18 days that exceed 75 nonmotorized vessels per day  
*Overnight Use trigger* = No more 18 days that exceed 62 nonmotorized vessels per day



### ADMINISTRATIVE VESSEL

- Monitored with a management trigger of 600 vessel use days per calendar year
- Includes any motorized vessel engaged in official government business, tribal access for traditional activities, or non-recreational permitted uses (including ANILCA guaranteed access to inholdings, and commercial fishing under a Lifetime Access Permit)



FIGURE 15. GLACIER BAY VESSEL MANAGEMENT FRAMEWORK

**Lower-Impact Vessel.** A lower-impact motorized vessel is a vessel that by design or technology consumes less fuel and produces less pollution (air or water), makes minimal noise, creates smaller wakes, and travels at lower maximum speeds, thereby having fewer negative impacts on wildlife, park resources, and other visitors. In recognition that the impacts of vessels vary based on certain characteristics, the park will encourage the use of these types of vessels by creating a lower-impact vessel category. Initial examples of lower-impact vessels may include those that are operating certain types of propulsion, are  $\leq 75$  horsepower, have a displacement hull (non-planing), and have a maximum speed of  $\leq 10$  knots. The park will annually share the characteristics of a lower-impact vessel and will welcome public feedback. The park may exclude private lower-impact vessels from requirements directly related to the effects of this vessel type under existing regulatory processes (36 CFR § 13.50), such as distance to shore requirements, based on science and visitor experience conditions. The park may discontinue operating requirements tailored to lower-impact vessels if desired conditions are not being met.

**Administrative Use Motorized Vessel.** The 2003 VQOR ROD broadly defined an administrative use vessel as “any vessel involved in administrative use.” During the 2003 VQOR EIS NEPA process, members of the public requested transparent reporting for categories of ongoing motorized vessel operations in Glacier Bay that fell outside the proposed quota requirements, including for NPS-owned vessels. The NPS is now seeking to manage and account for these diverse activities with an updated, more specific administrative use vessel definition, annual monitoring of use levels, and a management trigger.

The new administrative use vessel category will consist of any motorized vessel that is engaged in official business for the state, tribal, or federal government in support of park operations, programs, and for activities that include cultural uses, research, resource protection, education, and emergency services. This category also captures existing NPS-authorized non-recreational uses such as public access for educational activities, tribal access for traditional activities, guaranteed access to inholdings consistent with ANILCA section 1110 special access and access to inholdings, and commercial fishing (where allowed under Public Law 105-277 Sec. 123).

Administrative use vessels include but are not limited to: NPS-owned vessels, NPS-chartered vessels, State of Alaska vessels, US Coast Guard vessels, National Oceanic and Atmospheric Administration vessels, vessels operated by Special Use Permit holders, commercial fishing vessels operated by Lifetime Access Permit holders, contractor vessels, and essential service providers such as marine towing/repair/salvage services and the fuel tug and barge.

Administrative use vessels for cultural purposes include vessels used to provide Hoonah Indian Association access under tribal reserved rights to *Chookanhéeni* (acquired Berg Bay inholding), *Xunaa Shuká Hit* (the Tribal House), and for other non-commercial cultural purposes such as tribally sponsored trips into Glacier Bay.

Recordkeeping on motorized administrative vessel usage has been informal and sporadic, but focused vessel monitoring began in 2015 for all dates in the calendar year. Each day that a motorized administrative use vessel was operating in park waters was counted as one use day, regardless of how many trips the vessel made in and out of the park or Bartlett Cove (this is the same method used to count other motorized vessel classes). Five years of data (2015–2019) found an average of 2.8 administrative use vessels operating per day in park waters in May–September, and an average of 453 vessels operating annually across all dates (minimum = 413 in 2019; maximum = 499 in 2018). The NPS will set an initial calendar year management trigger for administrative use vessels at 600 use days in all park waters subject to vessel quotas (Glacier Bay). This includes existing vessel authorization for cultural purposes to access

*Chookanhéení* and *Xunaa Shuká Hit*. The park will track the number of administrative use vessels daily and evaluate the need to adjust the management trigger annually.

Additionally, the park will periodically report administrative use vessel numbers in Glacier Bay to the public along with rationales for any proposed changes to the annual management trigger.

**Clarification of Vessel Definition for Private Vessels Longer than 79 Feet (24 Meters).** Private vessels longer than 79 feet (overall length) meet the 2003 VQOR ROD size definitions as tour vessels and cruise ships and will not be considered a private vessel class. Specific requirements for these vessels will be published and updated in the Park Compendium and will include stringent operating conditions, similar to those for commercial vessels of equivalent size, that minimize injury or damage to park resources, minimize conflict with other existing users, and ensure that the visit meets the purposes for which the park was established.

Private vessels longer than 79 feet will not be allowed to access Glacier Bay using a private vessel permit. However, the Superintendent may reallocate any unused cruise ship or tour vessel use days for use by private vessels longer than 79 feet that have applied for a permit specifying the range of dates interested, provided proof of liability insurance, and have met other set pre-qualifications.

Unused cruise ship or tour vessel use days will only be issued on the same day the use day is available to retain flexibility and priority for commercial operators that serve the broader public visiting the park under an established contract. Unused cruise ship use days will first be made available to tour vessels, and then to private vessels longer than 79 feet. Unused tour vessel use days will first be made available to charter operators, followed by private vessels longer than 79 feet.

**Clarification of Conditional Transit Permit Stipulations.** Prior to 2011, the park was mandated to administer a private vessel transit permit between Icy Strait and Bartlett Cove (36 CFR § 13.1160). The mandate for a transit permit expired in 2011. However, the Superintendent has the discretion following current law and regulation to use this tool as needed to optimize private vessel entries to Bartlett Cove. Specific requirements and provisions will be implemented in the form of stringent conditions that minimize damage to park resources, minimize conflict with other users, and ensure that the visit meets the purposes for which the park was established.

Specifically, no more than one conditional transit permit will be allowed at any one time, with a limit of one way per day per private vessel, and will depend on availability within the daily private vessel quota. If the private vessel seasonal-use day use quota (2,300 private vessels from June 1 to August 31) is exceeded, the availability of transit permits will be reduced. The first purpose of this permit is to enable private vessels to directly exit or enter Bartlett Cove without reducing permits for visitors seeking a full-day visit for purposes for which the park was established. The second purpose of this permit is to promote high-quality visitor experiences in the ‘frontcountry’ consistent with park management plans. Private vessels using the conditional transit permit will be time-limited and travel solely on a mid-channel or other prescribed course. The conditional transit permit will only be available to owner-occupied private vessels for recreational purposes upon confirmation that the transit is not related to any commercial interests, and where transit for staging the vessel in or out of the park does not offer any commercial advantage (per existing NPS policy).

### **Modified Private Vessel Permit Season and Quotas for Glacier Bay**

**Private Permit Length.** The duration for private vessel permits will be decreased from a current maximum of seven days (six nights) to a default maximum of five days (four nights) per permit.

However, if there are characteristics of a vessel that makes those trips untenable (e.g., slower moving vessel), the NPS may grant a permit extension to seven days (six nights). This decrease is based on the typical permit length in 15 years of park private vessel permit data (2007–2021, excluding 2007–2011 transit permits), illustrating that the majority of vessels obtain a seven-day permit but leave after five days. Although their remaining permit days are often made available to others, they are less likely to be filled by certain user groups because they are effectively short-notice permits. Shortening the default maximum stay to five days will accommodate most visitors and will increase the opportunity for more people to access the park without exceeding the private vessel quota.

**Permit Season and Quota Season.** The private vessel quota season is June 1–August 31. However, the private vessel permit season will be expanded to begin on May 1 and end on September 30 to coincide with the seasonal call-in/call-out requirement, which will remain May 1 through September 30. In May and September, private motorized vessels will be required to hold a permit, but this permit will be obtained online or through in-person registration, and no quotas or capacity thresholds will apply during these months because visitation currently is far below existing summertime use. Boaters will be required to complete an in-person boater orientation prior to entering Glacier Bay May 1 through September 30. Online boater orientations may also be made available. The purpose of expanding the permit and orientation season is to help the park track visitor and vessel use numbers. This information will assist the NPS in providing a high-quality visitor experience and maintaining desired conditions, particularly as shoulder season visitation increases. Additionally, it will allow the NPS to provide important resource protection information to boaters as well as access key trip information from visitors, potentially increasing the NPS’ ability to quickly respond to emergency situations.

**Obtaining a Private Vessel Permit.** Twenty-five private vessel permits will be available each day during the quota season. Fifteen of the 25 permits will be advance-notice permits and made available on February 1 using a random draw lottery with one lottery entry per vessel (each entry allows the boater to try multiple sets of desired permit dates). Applicants will be notified in a timely fashion after the lottery. Any remaining advance-notice permits will be posted before a second random draw lottery with applications accepted April 30 to May 1. After the second lottery, any remaining advance-notice permits will be issued on a first come, first served basis.

Ten of the 25 permits will be short-notice permits. The short-notice permit application window will be increased from two days to three days in advance of the permit start date. Increasing the short-notice permit application window from two days to three days in advance allows more time for planning and transit for vessels originating from surrounding communities or for those on longer voyages to visit the park. Short-notice permit applications will be accepted between midnight (12:01 a.m. AK) to 10:00 a.m. AK time, three days before the permit start date, with one lottery entry per vessel. A random draw lottery will occur around 11:00 a.m. AK time, three days before the permit start date.

At any one time, a private vessel may hold up to two permits (two permits sequentially, or two permits for different date ranges). However, only one advance-notice permit can be held per vessel each year. Permits would be issued to a vessel, not a person, and would be non-transferable between vessels.

**Confirmation of Permit.** From June 1 through August 31, all private vessel permits must be confirmed any time before 5:00 p.m. AK time the day before the start of the permit. The purpose of this change is to release unused permits to the public sooner to maximize use of available entries to the park. This change will allow unused permits to be issued sooner than 10:00 a.m. AK time the day of the permit, as is currently the case.

**Use of Permit.** If a permittee does not utilize the first day of the permit, the entire permit will be relinquished to the NPS to make the unused days available to another vessel. In the event of a safety concern or an emergency that precludes the vessel operator from using the permit, the NPS may consider approving a delay in the permit start date. The permit also must be used on each consecutive day, or it will be terminated, and any remaining permit days will be made available to another visitor. The purpose of this change is to eliminate the practice of holding and not fully utilizing a multiple day permit by releasing unused permits to the public to maximize use of available private vessel quotas in Glacier Bay. In the event of a safety concern or an emergency that precludes the vessel operator from using consecutive permit days, the NPS may consider approving an exception to this policy.

### **Additional Measures**

**Operating Requirements for All Motorized Vessels.** Operators of all motorized vessels will continue to be required to call-in/call-out of Glacier Bay with the VIS from May 1 through September 30 and when the vessel passes the fuel dock leaving or entering Bartlett Cove. Motorized vessels will continue to be prohibited from entering designated nonmotorized waters during the seasonal nonmotorized time periods.

**East Arm Small Vessel Experience.** Only nonmotorized vessels and motorized vessels in the private, charter, and administrative classes are allowed in the East Arm/Muir Inlet north of 58°50.4' N latitude (a line running west from the Dirt Glacier outwash). This will provide a small vessel experience for private, charter, and nonmotorized vessels, and further enhance the perception of being able to travel deeper into the park, and decrease the scale and intensity of use away from routes generally frequented by large vessels in Glacier Bay and the West Arm.

**Upper East Arm Nonmotorized Waters.** Upper Muir Inlet will be designated as nonmotorized waters from May 1 through July 15 with motorized vessels allowed in Upper Muir Inlet from July 16 to April 30. Wachusett Inlet will be designated as nonmotorized waters from July 16 through September 15 with motorized vessels allowed in Wachusett Inlet from September 16 to July 15. This change will result in an update to 36 CFR § 13.1180, "Closed waters, motor vessels and seaplanes," to provide visitors enhanced opportunities for human-powered recreation in immersive marine settings that emphasize human-powered recreation and the natural soundscapes of Glacier Bay.

**Coordinated Marine Mammal and Endangered Species Protections.** The NPS will continue coordinated multi-agency and multi-disciplinary conservation efforts, including involving the scientific community, to protect marine mammals in the park. The NPS will collaborate using Glacier Bay as a living laboratory to refine methods that reduce vessel collision and disturbance. The park will consult with other agencies on endangered and other sensitive species protections as appropriate during cruise ship quota determination updates<sup>3</sup> and cruise, tour, and charter vessel prospectus development (e.g., updated biological assessments to inform operating conditions). The NPS will continue to collaborate with marine pilots to develop mutual understanding about whale collision avoidance. The NPS will engage and educate commercial operators and the general public on specific conservation measures and restrictions for the protection of whales instigated through the 36 CFR 13.50 procedures. Finally, the NPS

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<sup>3</sup> There is an ultimate limit within the 2003 VQOR ROD. Within that limit the NPS has the management discretion to incrementally adjust (upward or downward) cruise ship and tour vessel quotas based on science, conservation goals, and visitor needs.

will share the science and the story of marine mammal species, the successes of the Endangered Species Act and other protections, and the continuing concerns, especially for climate-vulnerable species.

**Humpback Whale Protection Procedures.** Given the importance of minimizing disturbance, close encounters, and collisions between humpback whales and vessels, here the NPS formalizes the park’s long-standing methods of implementing temporary, spatially distinct vessel operating restrictions, referred to as “whale waters,” that are intended to minimize whale collisions and disturbance. These management tools are used in combination with other strategies such as the ¼ nautical mile minimum approach distance to humpback whales in all park waters, per 36 CFR § 13.1174.

When a whale aggregation is observed in an area where whales and motorized vessels overlap, park whale biologists may propose a “whale waters” area to the Superintendent, in consultation with the Resource Management and Law Enforcement division chiefs. Humpback whale monitoring data and other sources of information are used to document whale distribution and detect where and when humpback whales at risk of vessel collision or disturbance are consistently found in one area. Whale waters actions impose speed and/or course restrictions on some or all types of vessels. Generally, a 20-knot or 13-knot speed limit is imposed on all motorized vessels. Limiting or prohibiting vessel traffic within 1 mile of a shoreline is sometimes also appropriate to separate vessels from a whale aggregation. In some circumstances, a whale waters action may impose additional speed restrictions for larger vessels because they are less able to maneuver to avoid close whale encounters, and because when large vessel strikes occur, they are more likely to injure or kill the whale. In the case of a widespread, dense whale aggregation, park management may find it necessary to impose a 13-knot speed limit throughout Glacier Bay for vessels greater than or equal to 80 meters in length, although scheduling constraints related to ensuring that visitors on commercial tours have adequate time for glacier viewing are also considered. In addition, if one or more close encounters are reported (see indicator related to close encounters between whales and vessels), the NPS will increase observation efforts in that area and talk to vessel operators to determine whether a whale or whales could benefit from a whale waters management action. Whale waters actions are communicated to the public using news releases, electronic mail, and social media. Whale waters areas are monitored regularly to ensure that the operating restriction is removed when no longer needed. Whale waters areas are designed to be understandable to mariners and to cover the minimum area needed to protect the whale aggregation, while allowing for the movement of whales to and from the area.

The park uses other standard operating procedures to help decrease the risk of whale collisions and disturbance. Park staff communicate proactively with vessel operators about whale strike risk in the form of boater orientations, conversations with vessel captains, and pre-season briefings for tour and charter operators. For cruise ships, the park provides additional tools that increase situational awareness about concentrations of whales in advance of a ship’s arrival in Glacier Bay (e.g., the Whale Alert Alaska sighting network).

**Harbor Seal Glacial Habitat Protection Procedures.** The NPS will continue long-term monitoring of harbor seals, tidewater glaciers, and ice habitat. As park glaciers recede and ground, the NPS will evaluate the tradeoffs between harbor seal disturbance and tidewater glacier access by visitors enshrined in the park enabling proclamation. The NPS will seek to clarify biologically significant impacts to seals, define thresholds of ‘acceptable’ impacts, and refine protections using long-term monitoring data and scenario-based modelling.

## **OUTER COAST ZONE, YAN T'IKÁ**

### **Floating Cabins/Seasonally Moored Vessels for Administrative Use**

The NPS will install two additional floating cabins/seasonally moored vessels for administrative use, one new floating cabin (Lituya Bay) and the reestablishment of a floating cabin in a previous site (Graves Harbor). Locating floating cabins/seasonally moored vessels for administrative use in these areas will allow more options for identifying management issues and implementing management actions in the Outer Coast Zone. Floating administrative cabins/seasonally moored vessels have existed in these locations in the past. Floating cabins/seasonally moored vessels are currently used to help the park meet its management responsibilities, primarily when overnight shoreline camping is not optimal to support field work, or when NPS motorized vessels travel beyond the range of a reasonable day trip from Bartlett Cove. The floating cabins/seasonally moored vessels also can serve as a remote Ranger Station or emergency shelter for the general public (while recognizing that the nature of marine emergencies across the park's nearly 1,200 miles of shoreline typically demand immediate aid by nearby marine vessels and air-based rescues).

Floating cabins/seasonally moored vessels are preferred in the park to allow seasonal or periodic relocation based on management decisions about the intended mission and changing environmental or safety considerations. They also by design are minimalist structures with limited capacity, recognizing that the park can make use of larger sleep-aboard vessels with amenities when operationally required.

Existing floating cabins are currently moored in South Sandy Cove and offshore of the southeast end of Russell Island (both within Glacier Bay). Regularly scheduled users of these cabins (primarily from May through September) include park and research staff operating in their official capacity.

### **Conservation Buy-Out**

The NPS explores a conservation easement or buy-out of the mineral interests associated with the Brady Icefield copper-nickel deposit. If mine development is proposed, the NPS protects park resources and visitor experiences by managing the scale and intensity of marine transportation-related access and facilities consistent with ANILCA Section 1110, Special Access and Access to Inholdings.

## CHAPTER 4 MONITORING, ADAPTIVE MANAGEMENT, AND CAPACITY

### INDICATORS AND THRESHOLDS, WÁA SÁ GAȲTUSAKÓO? (HOW WILL WE KNOW?)

Monitoring is the process of routinely and systematically gathering information to assess the status of specific resource conditions and visitor experiences and is a critical step in successfully implementing this plan. A monitoring strategy is designed and implemented to generate usable data over time for periodically comparing existing and desired conditions, assessing the need for management actions, and evaluating the efficacy of management actions. A well-planned monitoring strategy provides for transparency, communication, as well as associated documentation and analysis. A monitoring strategy includes selecting indicators, along with establishing thresholds or triggers and associated management strategies. It also includes routine, systematic observations or data collection of the indicators over time as well as associated documentation and analysis.

Indicators, thresholds, triggers, monitoring protocols, and management strategies that would be implemented as a result of this planning effort are described below.

**Indicators** are measurable attributes that allow the park to evaluate change in resource or experiential conditions over time to determine whether desired conditions (see chapter 2 of this plan) are being met.

**Thresholds** represent the minimum acceptable condition for each indicator. They can either represent a maximum (“no more than”) or minimum (“no less than”) amount that is still acceptable. Establishing thresholds does not imply that no action would be taken prior to reaching the threshold. Thresholds identify when conditions are about to become unacceptable and accordingly serve as a “line in the sand,” informing managers that corrective action must be taken to keep conditions acceptable so that progress toward desired conditions can be achieved over time. For all indicators, park staff and subject matter experts identified thresholds based on current conditions of the resource and data collected from recent years of monitoring.

**Triggers (if needed)** reflect a condition of sufficient concern for an indicator to prompt a management action or strategy to ensure that desired conditions continue to be maintained before the threshold is crossed. For some indicators, triggers have been developed.

Thresholds and triggers were established by considering qualitative descriptions of the desired conditions, data on existing conditions, relevant research studies, professional judgment of staff from management experience, and scoping on the qualities that meaningfully contribute to visitor experiences. The park considered the central issues driving the need for this plan (see chapter 1). The indicators described below were considered the most critical, given the importance and vulnerability of the resource or visitor experience affected. The park reviewed the experiences of other park units with similar issues to help identify meaningful indicators.

Not all of the management strategies related to the indicators and thresholds will be implemented immediately, but rather as thresholds are approached or triggers are reached. The progression of management strategies presented in chapter 3 may be applied or more targeted management strategies may be implemented to restore desired conditions.

The following indicators are carried forward in this plan:



- Number of motorized vessels per viewscape at one time at key locations
- Number of motorized vessels at anchorage at one time at key locations
- Percent of hourly underwater sound samples without vessel noise
- Daytime and nighttime average vessel noise free interval (NFI) in underwater acoustic environment
- Daytime and nighttime vessel NFI cumulative probability in airborne acoustic environment
- Maximum daytime vessel NFI in airborne acoustic environment
- Number of close encounters per day between vessels and humpback whales
- Number of humpback whale-vessel collisions per season
- Number of administrative use vessels per year
- Number of nonmotorized day use vessels per year
- Number of nonmotorized overnight vessels per year

**Indicator Topic: Visitor Experience, Wáa Sá Has Sh tudinook, Glacier Bay Át Has Wu.aadí? (How Do Visitors Feel About Their Experience in Glacier Bay?)**

**Indicator 1: Number of Motorized Vessels per Viewscape at One Time at Key Locations.**

*Threshold:*

- No more than the identified number of motorized vessels specific to each location (excluding nonmotorized vessels) in view in 70% of annual surveys during the quota season.
  - Lamplugh Glacier: 5 vessels
  - Upper Tarr Inlet, Margerie/Grand Pacific: 5 vessels
  - Reid Inlet: 5 vessels
  - Upper Johns Hopkins Inlet: 4 vessels
  - McBride Inlet: 3 vessels

*Rationale:*

The majority of visitors to the park, nearly 97%, view the glaciers, surrounding landscape, and wildlife from the deck of a boat and do not disembark within the park. Access to the tidewater glacier environment must be managed purposefully to meet the purposes for which the park was established.

Monitoring the number of motorized vessels per viewscape helps ensure that desired conditions such as opportunities for meaningful experiences that connect visitors to the park's fundamental resources and values are being maintained. Ensuring that the differing visitor use types and vessel types do not meaningfully distract from visitor experiences is a key component of this planning effort. In addition, monitoring the number of vessels at key destination areas can help ensure vessels can safely maneuver and navigate the inlet waters.

Scenic views are one of the most important attributes of a trip to a national park unit. In surveys conducted over the last decade, 90% of visitors say that scenic views are "extremely important" or "very important" to their NPS experience service wide (Kulesza and Hollenhorst 2013). This increases to 93% when considering studies specific to Alaska national parks. Half of all visitors to Alaska national parks

said that scenic views were the most important attribute of their trip (Kulesza and Hollenhorst 2013). Furthermore, research conducted in Glacier Bay found that viewing tidewater glaciers at the park was the primary recreational activity (41%) among visitors, followed by viewing nature and wildlife (20%) (Furr et al. 2021). It is important to note that data for this survey do not include visitors onboard cruise ships and are primarily representative of visitors on the concessioner-operated day boat (tour vessel) and backcountry users (Furr et al. 2021).

A study conducted in Molokini Shoal Marine Life Conservation District in Hawai‘i examined visitors’ level of acceptance regarding the number of boats in a study area (Needham et al. 2011). This study evaluated how various factors, such as visitor encounters with boats and boat size, influence visitor experience. The research found that the number of boats most strongly influenced visitor experience and their level of acceptance with boat encounters, boat size was less influential, and the size of the boat travelers were on did not significantly alter their perception of encounters. This study found that more than 16 boats of any size in a viewscape were considered unacceptable by a majority of visitors. The results also indicated that the size of the boats matter, and more smaller boats are acceptable within a viewscape compared with fewer larger boats (Needham et al. 2011). Although this study was conducted outside Alaska and within a small anchorage, these results bolster the rationale that the number of vessels per viewscape can degrade the visitor experience and that the minimally acceptable condition may differ depending on the size of vessels, which can vary greatly in the park.

Cruise ships in a viewshed can alter a visitor’s experience at the park, making it a key consideration for monitoring vessels per viewscape (Swanson and Vande Kamp 2011). According to a study conducted at the park, for all user groups, cruise ships detracted from a higher percentage of visitors’ enjoyment of the park than any other type of transport (Swanson and Vande Kamp 2011). Across the park, 66.5% of backcountry visitors who encountered a cruise ship stated that it detracted from their enjoyment of the park. The study specifically evaluated how cruise ships detracted from visitor experience, and visitors reported that they impacted four key dimensions: solitude, pristine environment, tranquility, and scenic beauty experiences. These results are consistent with findings from a 2008 qualitative study of Glacier Bay backcountry visitors—a separate study used as a baseline for comparison—in which visitors commonly reported disruption of the “wilderness experience” due to cruise ships (Swanson and Vande Kamp 2011). It is important for the park to remain consistent with desired conditions and provide a range of recreational opportunities for meaningful experiences, considering all potential user groups.

The study (Swanson and Vande Kamp 2011) also evaluated how vessels impacted the visitor experience at Margerie and Grand Pacific Glaciers within the park and how the experience differed depending on the type of vessel the visitor was using. A comparison showed that cruise ship passengers and backcountry users were less likely to report detraction when encountering cruise ships at glaciers compared to when these visitors encountered cruise ships in other areas within the Glacier Bay Zone. In contrast, charter vessel visitors reported that cruise ships detracted from their experience more at the glaciers than throughout the Glacier Bay Zone. Of visitors that encountered cruise ships at the glaciers, those that reported a diminished experience by user group are as follows: charter vessel visitors (78%), backcountry visitors (62.5%), day boat visitors (61.7%), tour vessel visitors (57.3%), private vessel visitors (41.8%), and cruise ship passengers (5.1%) (Swanson and Vande Kamp 2011).

Additionally, this indicator of number of motorized vessels per viewscape at one time at key locations manages for vessel safety. As vessels travel further up bay, the width of the bay becomes narrower. In some areas, larger vessels are unable to turn around and safely exit the area. This becomes even more difficult when these narrower passages are crowded with other vessels. Smaller vessels (e.g., kayaks), which can travel easily in these narrower passages, can be impacted by strong and frequent wakes in more

constrained areas if too many vessels are present. Administratively, too many vessels in a concentrated area cause a variety of safety and navigational issues, potentially impacting park staff's ability to safely conduct research. Managing vessels in the bay allows visitors to safely enjoy the tidewater glacier experience, helps ensure that all vessel categories may safely navigate to desired locations, and allows for research to be properly conducted. This indicator promotes visitor and park staff safety and allows the park to manage toward desired conditions for visitor experience.

*Monitoring:*

Park staff will monitor the number of motorized vessels per viewscape at five key destinations within Glacier Bay: Lamplugh Glacier, Upper Tarr Inlet (Margerie/Grand Pacific), Reid Inlet, Upper Johns Hopkins Inlet, and McBride Inlet. These locations were identified by park staff as areas for monitoring because they are key destinations within the park and these areas provide access and opportunities for visitors to experience glaciers at close range.

For the purposes of monitoring, the viewshed for all of the areas listed above, excluding Reid and McBride Inlets, is a polygon approximately 4 square miles in size. Given the topography of Reid and McBride Inlets, the area to be surveyed for these tidewater glaciers is roughly 1 square mile. These areas were selected by considering the location of the glacier and the surrounding area in which vessels would be able to view the glacier from the water. While consistency in size of the area to be monitored is desired, the thresholds may vary by location depending on the desired conditions.

Park staff currently travel to the identified monitoring locations in various ways such as on-board cruise ships, on the concessioner-operated day vessel, and on administrative vessels to conduct research. During the summer season, park staff onboard administrative vessels and/or cruise ships will conduct observational surveys, targeting one survey per week, to count the number of motorized vessels within each polygon at key locations near these glaciers. While sampling will be conducted observationally, each observer should record the location, day, time of day, and number of motorized vessels seen within viewshed. Each location may not be sampled within a given week, but each should be sampled per year to build a database. During initial monitoring efforts, one scan to count the number of vessels in view will be done per location, regardless of how long the vessel sits at each location in order to reduce staff time for completing the data collection. As the monitoring program becomes more robust, the park may adjust their monitoring methods to account for time spent at each location. A sampling design will be identified for scientific validity and monitoring of this indicator is subject to various frequencies, seasonality, and timing and could change on a regular basis.

The number of motorized vessels per viewscape at key locations will be recorded by park staff while on the boat and then entered into a database upon return to Bartlett Cove. In order to maintain a high-quality visitor experience, if the monitoring indicates that vessels per viewscape exceeds the threshold specific to each location in more than 70% of annual surveys, then associated management and adaptive management strategies would be implemented as described above (in the "Management Action Progressions" section). This monitoring protocol allows park staff to conduct these surveys from the visitor perspective aboard a vessel in key locations throughout Glacier Bay, thus providing a meaningful data set. At this time, nonmotorized vessels, such as kayaks, are not included in the monitoring efforts as previous research suggests they have less of an impact to the visitor experience than motorized vessels. However, park staff may elect to monitor nonmotorized vessels in the future to ensure desired conditions are being achieved.

*Potential Future Monitoring:*

Approximately 40% of vessels that operate within the park carry AIS that indicate where they travel to within the park. Currently, this system is used by larger vessels such as the concessioner-operated day boat, cruise ships, tour and charter vessels, and some private vessels. All commercial concessions contract vessels are required to have and continually use AIS in park waters. Using this technology to monitor the number of vessels at key locations will be a technique to bolster the data set, assuming AIS becomes more common on private vessels throughout the park (as it has in other US and international waters) and the park reaches its goal of all-park AIS coverage through the communication upgrade actions presented in this plan.

*Potential Management Strategies:*

- Develop forecast modeling and communicate key destinations and peak times (e.g., cruise ships tend to be located in front of Margerie Glacier between 10:00 a.m. and 2:00 p.m.) so vessel operators may make educated decisions regarding where and when to travel within the marine environment depending on the experience they are seeking.
- Continue to require commercial services operators to use AIS, and broadly encourage all vessel operators to consult AIS as a tool prior to visiting key destinations to reduce crowding and congestion.

**Indicator 2. Number of Motorized Vessels at Anchorage at One Time at Key Locations.**

*Threshold:*

- No more than the identified number of motorized vessels anchored at one time at the following identified locations in 70% of surveys. Following initial monitoring, additional locations may be added at the park's discretion.
  - Reid Inlet: 5 vessels
  - Blue Mouse Cove: 4 vessels
  - North Sandy Cove: 4 vessels
  - Shag Cove: 2 vessels

*Rationale:*

As highlighted above, opportunities for viewing the glaciers, nature, and wildlife—which are all identified as important features of visiting the park by visitors—can be degraded by the presence of other vessels. While the indicator of number of vessels per viewscape helps ensure desired conditions are achieved at locations with glaciers nearby, monitoring the number of vessels at anchorage at one time at key locations complements that monitoring effort. Monitoring for number of vessels at anchorage at the identified locations will help ensure park staff are managing a marine environment that promotes visitor inspiration, reflection, and opportunities for visitors to obtain a feeling of the ruggedness and wildness of this dynamic landscape and the solitude that early inhabitants found as identified in the desired conditions for the plan.

Ensuring that the differing visitor use types and vessel types do not meaningfully distract from visitor experiences is a key component of this planning effort. This indicator can also promote safety by ensuring popular areas of the bay do not get crowded, allowing vessels to safely maneuver through the marine environment. In addition, both day use and overnight vessels at anchorages may detract from the visitor

experience, including within the adjacent terrestrial backcountry and designated Wilderness areas of the park and the opportunity for solitude, as identified in the park's BWMP (in preparation).

Private, tour and charter vessels may drop anchor at locations throughout the park. After dropping an anchor, some operators may take smaller vessels, such as a single motorized dinghy or kayaks, from the vessel to shore for day use. In addition, these vessels may drop anchor and choose to stay in the area overnight. While the current permit system dictates how many vessels may access Glacier Bay during a given day, park staff encourage freedom for vessels to travel where they desire. Park staff do not identify locations for desirable anchorages to encourage visitors to explore and create their own experience. As a result, there is a need to monitor the spatial distribution of vessels with a goal to maximize the feeling of self-discovery and to prevent concentrated vessel use from degrading the visitor experience.

To successfully monitor this indicator, it is important to consider how topography of the key locations impacts how anchored vessels impact visitor experience. For example, some areas of the park are more open, so that when one vessel anchors it may be visible or audible by all who travel to that area. In contrast, other locations have topography that allows vessels to disperse or to drop anchor in spots that may be less visible and audible to other vessels. Therefore, the threshold for this indicator varies by location.

*Monitoring:*

Monitoring of this indicator will initially occur in conjunction with other monitoring efforts of wilderness character. Park staff currently survey for encounters with other people and groups within a three-hour window at key destinations in the backcountry and wilderness areas. Occasionally during these surveys there is opportunity for park staff to conduct an observational scan to count the number of vessels at identified anchorage locations during the quota season (defined in the EA) and record the information in a database. This strategy allows staff to better understand how vessels in anchorages may impact the visitor experience for those who are both on land seeking a backcountry and wilderness experience and those onboard vessels. A sampling design will be identified for scientific validity and monitoring of this indicator is subject to various frequencies, seasonality, and timing and could change on a regular basis.

*Potential Future Monitoring:*

As technology further develops, all motorized vessels that enter the park may have AIS onboard that transmits their location to receiving stations. This technology would allow park staff to better understand where vessels are located throughout the park and inform vessel operators with these systems about crowded locations to avoid, if desired. Until AIS is more ubiquitous on private vessels and the park has completed installation of its AIS receiving infrastructure, on-the-ground monitoring will be conducted by park staff.

*Potential Management Strategies:*

- Use other educational strategies such as informing visitors of key destinations that are used for anchorages while still encouraging self-discovery and allowing vessel operators to make a well-educated decision regarding where to travel within the marine environment.
- Work with commercial service operators to encourage or require spatial distribution of vessels at key locations by updating the operating annual plan for respective vessels.
- Encourage vessel operators to consult AIS to direct vessels to available anchorages if others are at or near threshold.

- Apply other tools from the “Management Action Progressions” section until the threshold drops to within an appropriate amount of use.

### **Indicator Topic: Underwater Acoustic Environment, Híntáak A Kayéik (Underwater Sound/Noise)**

#### **Indicator 1: Percent of Hourly Underwater Sound Samples without Vessel Noise.**

##### *Threshold:*

- June–August: Monthly percentage of hourly underwater sound samples without vessel noise does not drop below 40% for more than one month per year for two consecutive years.
- January–May and September–December: Monthly percentage of hourly underwater sound samples without vessel noise does not drop below 60% for more than one month per year for two consecutive years.

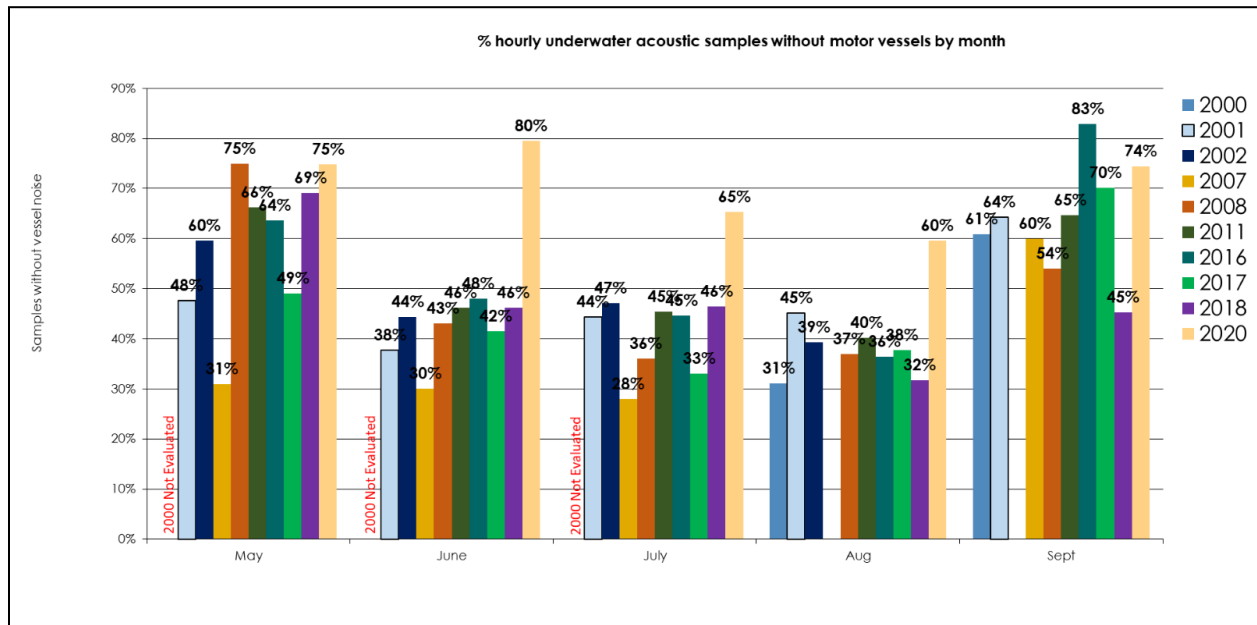
##### *Rationale:*

NPS *Management Policies 2006* directs the NPS to preserve, to the greatest extent possible, the natural acoustic environment of the park. This includes all the natural sounds that occur in the park, including the physical capacity for transmitting those natural sounds and the interrelationships among park natural sounds of different frequencies and volumes. The park preserves one of the largest areas of federally protected marine ecosystems in Alaska, including marine designated Wilderness. Comprehensive protection of the underwater acoustic environment aligns with purposes expressed in the core statutory documents that define the park. Wind-generated surface noise and rain are the primary natural underwater acoustic sources in Glacier Bay, while biological sources (e.g., humpback whales, harbor seals) are important contributors to the underwater acoustic environment.

Since 2000, the NPS has worked with the US Navy to monitor underwater acoustics in Glacier Bay. Ongoing underwater acoustic monitoring conducted offshore near Bartlett Cove shows that vessel noise is pervasive underwater in Glacier Bay. Underwater noise from motor vessels is expected to be present throughout all waters open to motorized vessels and also within some nonmotorized waters. Vessel-generated underwater noise degrades the underwater acoustic environment. It also negatively affects a wide variety of marine wildlife (e.g., larval fish, invertebrates, harbor seals, and humpback whales), that are adapted to rely on sound for everyday activities such as feeding, intraspecific location, intraspecific communication, and detection of predators (Gabriele et al. 2010; Holt et al. 2011). For example, vessel-generated underwater noise can affect marine mammals by decreasing the distance over which they can communicate and detect predators and prey. Typical summer vessel traffic in the park causes communication space losses to singing humpback whales (reduced by 13%–28%), calling humpback whales (18%–51%), and roaring harbor seals (32%–61%), especially during daylight hours (Gabriele et al. 2018). In addition, marine mammals may alter their communication patterns in response to vessel-generated underwater noise. Researchers have observed humpback whales increasing the source level of their vocalizations to overcome increases in ambient sound levels, but the whales are also likely to stop vocalizing as ambient sound levels increase (Fournet et al. 2018) especially if the noise source is a motorized vessel. When vessel noise was present, whales were one-third to nearly one-half as likely to vocalize, compared to vessel-free conditions (Fournet et al. 2018). Vessel noise can also affect humpback whale foraging, including slower descent rates and fewer side-roll feeding events per dive (Blair et al. 2016). Vessel noise may increase the opportunity for collisions between vessels and whales and may cause short-term hearing loss (NPS 2021).

The percentage of time when there is no audible vessel noise is an important indicator of the quality of the underwater acoustic environment. This indicator identifies the anthropogenic noise contribution to the existing ambient noise environment during both day and night, as samples are taken every hour of each day. It is also a proxy for potential impacts to marine wildlife, as it helps identify noise-free periods when wildlife are able to communicate freely and experience their natural habitat.

Thresholds were established using data from underwater acoustic monitoring in Glacier Bay (Bartlett Cove) conducted in all years in which analyzed data were available (2000–2020) (figure 16). The hydrophone system transmits underwater sounds through a 5-mile cable to a computer workstation that takes a sound sample every hour of the day for 30 seconds. An experienced analyst listened to thousands of these samples and determined whether a vessel was present in each one of them (Kipple and Gabriele 2003; McKenna et al. 2017).



Note: 24 samples are taken each day.

FIGURE 16. PERCENT OF HOURLY UNDERWATER ACOUSTIC SAMPLES WITHOUT MOTOR VESSELS NOISE, BY MONTH

The park experiences tourism-related vessel traffic mainly in May through September, with lower vessel traffic in May and September as compared to June, July, and August; subsequently June, July, and August generally have fewer acoustic samples without motor vessel noise (figure 16). Therefore, different threshold values were set for the period from June through August. It should be noted that 2020 had anomalously low vessel traffic due to very low tourism level resulting from the COVID-19 pandemic.

*Monitoring:*

Park staff will continue monitoring the underwater acoustic environment using the cabled calibrated hydrophone system in place in lower Glacier Bay (mouth of Bartlett Cove) since May 2000, or another similar recording system that is calibrated to the sensitivity of the existing hydrophone to ensure consistency. Analysis of the underwater sound samples will occur annually. The NPS has a nationwide standard operating procedure for the collection and analysis of acoustic data that covers all the steps necessary to identify vessel noise events that reach a minimum sound pressure level. The active

monitoring season is May through October. If the NPS sees that the indicator is approaching the threshold during May or October, the NPS will extend the monitoring season.

*Potential Management Strategies:*

See the “Management Action Progressions” section in chapter 3 of this plan.

**Indicator 2: Daytime and Nighttime Average Vessel Noise Free Interval (NFI) in Underwater Acoustic Environment.**

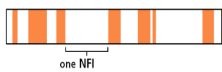
*Threshold:*

- June–August: Average vessel NFI is no less than 7 minutes.
- January–May and September–December: Average vessel NFI is no less than 10 minutes.

*Rationale:*

The park is an important habitat for many protected species that rely on sound for essential life functions. The occurrence of noise events and NFIs (described in the next paragraph and in table 2) are standard metrics used in acoustic environment analysis and attributes that have the potential to affect animal communication patterns. NFIs are a biologically relevant measurement of underwater acoustic conditions for humpback whales and other soniferous species in the park that rely on sound for critical life functions and may be impacted by extended durations of uninterrupted vessel noise (Betchkal and Ward 2019; Erbe et al. 2019; Lynch et al. 2011). As noted above, vessel-generated noise both reduces the communication space for marine mammals and causes marine species to change their communication patterns. Thus, the duration of vessel noise-free conditions is biologically relevant to humpback whales and ostensibly other marine wildlife in the park.

**TABLE 2. DESCRIPTION OF NOISE FREE INTERVAL ACOUSTIC INDICATOR**

Indicator	Acoustic Categories	Definition	Benefits
<b>Noise Free Interval (NFI)</b>	Duration, Timing	<p>The duration of time between when one noise event ends to when the next one starts.</p> 	Sensitive only to important changes in traffic rate or natural ambience, true to experience of noise for animals.

One indicator of the acoustic quality is NFI. NFIs measure the uninterrupted periods of time when only silence or natural sounds are audible. In other words, NFIs describe the fracture of quietude in time. Fracturing is the process by which adding noise events divides a time period into shorter and shorter NFIs. As an indicator, NFIs are only sensitive to important changes in the vessel traffic rate. When the vessel traffic rate is small, the indicator is sensitive to small changes in the traffic rate. Conversely, when the traffic rate is high, the indicator is insensitive to small changes. Table 2 provides an overview of this acoustic indicator.

Preliminary NFI results in the underwater acoustic environment of lower Glacier Bay indicate daytime NFIs are shorter than those at night (NPS unpublished data). Underwater NFIs are considerably shorter than airborne NFIs because of the much greater speed and distance that



sound travels underwater. The initial threshold for mean daytime underwater vessel NFIs is 7 minutes in June through August, and 10 minutes for May through September based upon analysis of existing data from underwater acoustic monitoring in Glacier Bay (Bartlett Cove) conducted in all years in which analyzed data were available (2017–2020) (Haver et al., in press). When further work solidifies these preliminary findings, these thresholds may be adjusted.

*Monitoring:*

Park staff will continue monitoring the underwater acoustic environment using the cabled calibrated hydrophone system in place in lower Glacier Bay (mouth of Bartlett Cove) since May 2000, or another similar recording system calibrated to current levels. Analysis of the underwater sound samples will occur annually. The NPS has a nationwide standard operating procedure for the collection and analysis of acoustic data that covers all the steps necessary to calculate mean NFI. The process involves measuring sound pressure level, and then annotating all noise events within the resulting record that reach a specific sound pressure level. The active monitoring season is May through October. If the NPS sees that the indicator is approaching the threshold during May or October, the NPS will extend the monitoring season.

*Potential Management Strategies:*

See the “Management Action Progressions” section above in chapter 3 of this plan.

**Indicator Topic: Airborne Acoustic Environment, A Kayéik (Sound/Noise)**

**Indicator 1: Daytime and Nighttime Vessel NFI Cumulative Probability in Airborne Acoustic Environment.**

*Threshold:*

- $\geq 30\%$  of vessel NFI in the West Arm are greater than 1.1 hours during the quota season.
- $\geq 30\%$  of vessel NFI in the East Arm are greater than 1.6 hours during the quota season.

*Trigger for Indicator 1:*

- $\geq 30\%$  of NFIs in the West Arm are greater than 1.6 hours during the peak season (defined in the EA).
- $\geq 30\%$  of NFIs in the East Arm are greater than 3.3 hours during the peak season (defined in the EA).

*Rationale:*

Natural quiet and natural sounds play a key role for visitor experience at the park. A 1998 survey of the American public revealed that 72% of respondents thought that providing opportunities to experience natural quiet and the sounds of nature was a very important reason for having national parks, while another 23% thought that it was somewhat important (Haas and Wakefield 1998, as cited in Lynch 2012). In another survey specific to park visitors, 91% of respondents considered enjoyment of natural quiet and the sounds of nature as compelling reasons for visiting national parks (McDonald et al. 1995). According to a recent visitor experience study, many visitors to the park are highly motivated by the opportunity to experience solitude, natural quiet, and the sounds of nature (Furr et al. 2021). On a given day, park visitors might hear an astounding assortment of sounds: glacial ice exploding into a tidal inlet, wolves howling along a wave-washed shore, loon cries echoing between forested islands, humpback whales breathing, and harbor seals growling on ice rafts.

As noted above, NFI is an important indicator of the acoustic environment. The airborne NFI is tied closely to visitor experience. Individuals do not often remember the absolute number of noise events over the course of the day, but they more easily remember how often the stillness of the natural acoustic environment was disrupted. The average length of time where visitors hear only natural sounds is an important part of the visitor experience with respect to natural quiet, sense of solitude, and special auditory experiences such as the calving of glaciers.

In the marine environment of Glacier Bay, human-generated noise from vessels can disrupt visitor opportunities to experience the natural soundscape. According to a study conducted at the park, of all private vessel visitors who reported hearing large cruise ship engines, 43.5% noted that it detracted somewhat from their trip enjoyment, while 51.6% reported that it had no effect (Swanson and Vande Kamp 2011). Similarly, of the charter vessel visitors who heard large cruise ship engines, 59.7% reported it detracted somewhat from their trip enjoyment, while 28.0% reported that it had no effect (Swanson and Vande Kamp 2011). Recent research conducted at the park found that independent visitors using nonmotorized vessels (e.g., sea kayakers) were most bothered by public addresses aboard commercial vessels; however, only 34% of visitors reported hearing these addresses, and the level of bother only reached “moderate” (Furr et al., 2021). Many more visitors (79%) heard motorboats, but the level of bother from these sounds was only “slight” to “moderate.” The researchers concluded that anthropogenic sounds did detract from visitors’ experiences, but not to a level that might reach great concern (Furr et al., 2021). Therefore, existing conditions for the acoustic environment were used to establish thresholds for this indicator topic.

There are two different indicators that track the airborne acoustic environment. The first tracks the vessel NFI lengths throughout the entire monitoring season. In 2011, the NPS completed an initial acoustic inventory at five sites in Glacier Bay. Some of the same sites were monitored again in 2021. Figure 17 shows the cumulative probability distribution function for the vessel NFI at two of these sites: Rendu Inlet and Point McLeod. Rendu Inlet is representative of the West Arm, while Point McLeod is representative of the East Arm. The 80th and 70th percentiles for vessel NFI at each site are indicated at the intersection of the dotted horizontal lines. There are some natural differences in NFI between sites, resulting in different thresholds for different areas. Less impacted sites have longer NFI. At the Rendu Inlet acoustic inventory site in 2011, 30% of NFI lengths were at least 1.1 hours long, while 20% of NFI lengths were at least 1.4 hours long. At the Point McLeod acoustic inventory site in 2011, 30% of NFI lengths were at least 1.6 hours long, while 20% of NFI lengths were at least 3.1 hours long. The 2011 acoustic inventory occurred during mid-August, which is outside of peak vessel traffic. Therefore, thresholds were set for the 70th percentile (i.e., 1.1 hours for West Arm and 1.6 hours for East Arm).

This indicator also has an associated trigger that tracks overall NFI. The NPS will analyze acoustic monitoring data for NFIs between any type of noise events (e.g., vessel, aircraft), and if triggers are reached the NPS will further analyze acoustic monitoring data to determine whether noise events were being caused by vessels or were resulting from other anthropogenic sources (e.g., jet aircraft, propeller aircraft). If 90% of the noise events are coming from vessels, the NPS will evaluate the need for proactive action.

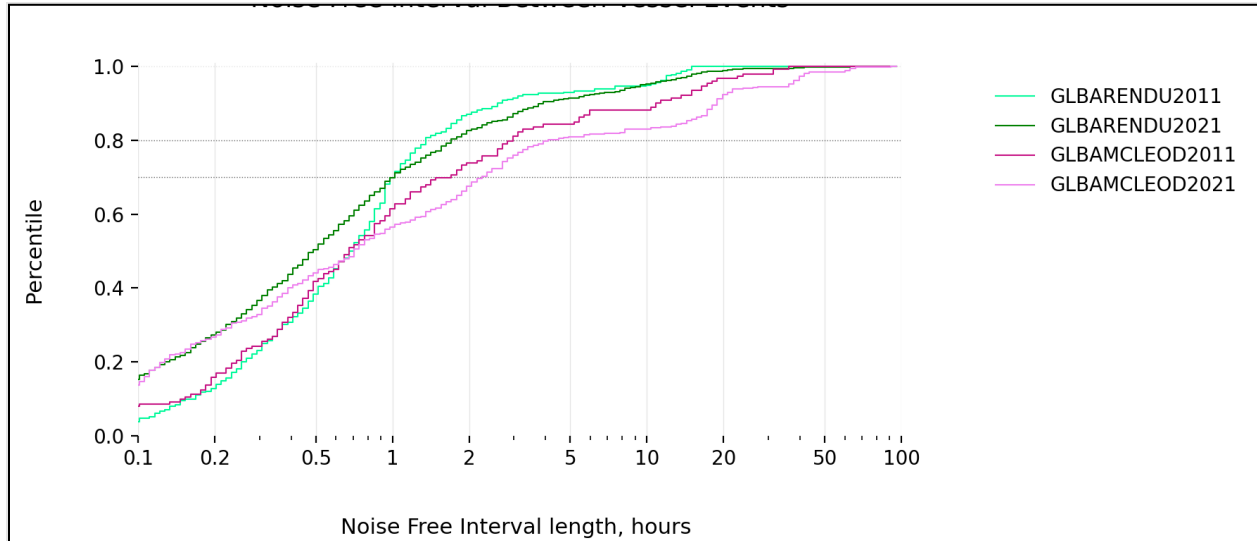


FIGURE 17. NFI LENGTH BETWEEN VESSEL EVENTS AT TWO SITES IN THE PARK (RENDU INLET/WEST ARM AND POINT MCLEOD/EAST ARM)

*Monitoring:*

Acoustic monitoring will occur in the park at least 2 years out of every 10 years, with late June – early July being prioritized. If possible, monitoring would occur in consecutive years. The NPS has a nationwide standard operating procedure for the collection and analysis of acoustic data that covers all the steps necessary to calculate NFI specific to this trigger. The process involves measuring sound pressure level and then annotating all noise events within the resulting record that reach a minimum sound pressure level.

*Potential Management Strategies:*

Should triggers or thresholds be reached, the park will identify which desired conditions are not being met, provide transparent accounting of patterns and how they affect all marine users, and select which management strategies should be used to better align airborne acoustic environment levels with desired conditions, potentially including:

- Explore spatial and temporal strategies to maintain desired conditions and mitigate impacts to specific resources and visitors. This may include:
  - Provide educational resources and soundscape awareness tools that help self-guided marine visitors appreciate when and where the marine environment offers unique soundscape opportunities where quiet behavior is encouraged to optimize their enjoyment of the soundscape (glacier calving areas, bird rookeries, breeding and haul-out sites).
  - During orientations share best practices and ethics to encourage users to not detract from others’ soundscape experience (e.g., voluntary quiet hours).
  - Provide visitors with maps showing the typical variability of soundscape across park waters, and where CFR closures are in place (no generator zones, nonmotorized waters) so they can maximize their soundscape experience.
- Explore ways to conduct business that extend NFI intervals. This may include use of technologies and practices to achieve soundscape goals (e.g., switch to electric motors in specific areas, strategies related to NPS administrative traffic scheduling or quiet zones).

- Use competitive contracts and operating requirements to incentivize partners to create technological solutions that result in higher quality soundscape experiences for visitors.

**Indicator 2: Maximum Daytime Vessel NFI in Airborne Acoustic Environment.**

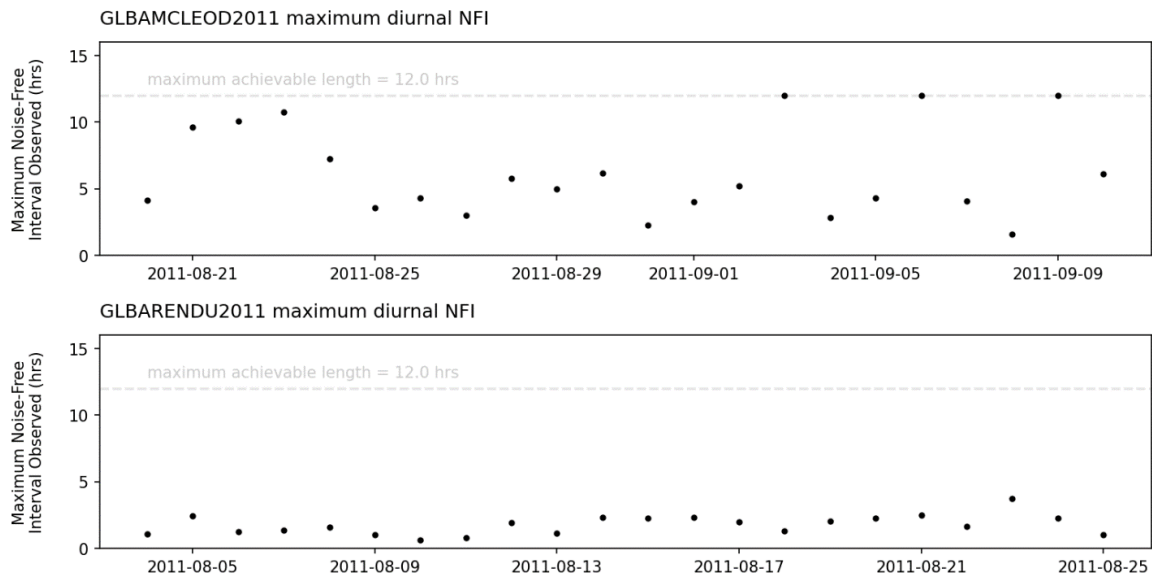
*Threshold:*

- In the West Arm, on 70% of monitored days there is a vessel NFI of at least 1.1 hours in length during the daytime period (07:00–19:00)
- In the East Arm, on 70% of monitored days there is a vessel NFI of at least 3.7 hours in length during the daytime period (07:00–19:00)

*Rationale:*

As highlighted above, opportunities for experiencing natural quiet and natural sounds—which are all identified as important features of visiting the park by visitors—can be degraded by vessel noise. This indicator tracks the maximum vessel NFI during daytime hours (07:00–19:00). The indicator focuses on the daytime visitor’s opportunity to experience at least one extended period of natural quiet, even if the rest of the day is filled with noise. The other airborne acoustic environment indicator, in contrast, assesses all vessel NFIs that occur during both daytime and nighttime, thus monitoring the overall condition of the above-water acoustic environment in Glacier Bay.

Figure 18 shows the maximum vessel NFI experienced during daytime hours at the Rendu Inlet and Point McLeod monitoring sites in 2011. At Rendu Inlet, the shortest maximum vessel NFI recorded on any day was 0.7 hours, while on 80% of days the maximum vessel NFI was at least 1.1 hours. At Point McLeod, the shortest maximum vessel NFI recorded was 1.6 hours, while on 80% of days the maximum vessel NFI was at least 3.7 hours. The 2011 acoustic inventory occurred during mid-August, which is outside peak vessel traffic season. Therefore, thresholds for the quota season were set for the 30th percentile (i.e., on 70% of monitored days there is a NFI of at least 1.1 hours for West Arm and 3.7 hours for East Arm).



Note: Maximum achievable vessel NFI length (as limited by diurnal period length, here, 12 hours) is indicated by a dashed, horizontal line.

FIGURE 188. MAXIMUM VESSEL NFI LENGTHS BY DAY FOR TWO DEPLOYMENTS IN THE PARK

*Monitoring:*

Acoustic monitoring will occur in the park at least 2 years out of every 10 years, with late June through early July being prioritized. If possible, monitoring will occur in consecutive years. The NPS has a nationwide standard operating procedure for the collection and analysis of acoustic data that covers all the steps necessary to calculate NFI cumulative probability. The process involves measuring sound pressure level, and then annotating all noise events within the resulting record that reach a minimum sound pressure level.

*Potential Management Strategies:*

Should thresholds be reached, the park will identify which desired conditions are not being met, provide transparent accounting of patterns and how they affect all marine users, and select which management strategies should be used to better align airborne acoustic environment levels with desired conditions, potentially including:

- Explore spatial and temporal strategies to maintain desired conditions and mitigate impacts to specific resources and visitors. This may include:
  - Provide educational resources and interpretive tools (e.g., NPS Application) that help marine visitors appreciate when and where the marine environment offers unique soundscape opportunities where quiet behavior is encouraged to optimize their enjoyment of the soundscape (e.g., glacier calving areas, bird rookeries, breeding and haul-out sites).
  - During orientations share best practices and ethics to encourage users to not detract from others' soundscape experience (e.g., voluntary quiet hours).
  - Provide visitors with maps showing the typical variability of soundscape across park waters, and where CFR closures are in place (no generator zones, nonmotorized waters) so they can maximize their soundscape experience.
- Explore ways to conduct business that extend NFI intervals. This may include use of technologies and practices to achieve soundscape goals (e.g., switch to electric motors in specific areas, implement strategies related to NPS administrative traffic scheduling or quiet zones).
- Use competitive contracts and operating requirements to incentivize commercial partners to create technological solutions that result in higher quality soundscape experiences for visitors.

**Indicator Topic: Close Encounters Between Motorized Vessels and Humpback Whales, Yáay Déin Yaakw (Boats Near Whales)**

**Indicator. Number of Close Encounters Between Motorized Vessels and Humpback Whales Per Day in Glacier Bay.**

*Threshold:*

- Two or more close encounters (whale surfacing within 1000 meters of a vessel and within 30 degrees of the vessel's direction of travel) between motorized vessels and humpback whales on a single day.

*Trigger:*

- A single close encounter (whale surfacing within 1000 meters of a vessel and within 30 degrees of the vessel's direction of travel) between a humpback whale and a cruise ship.

*Rationale:*

Unintentional vessel-humpback whale encounters have increased over the past few decades as humpback whale populations rebound from the large-scale commercial whaling that mostly ended in the 1960s and as the number of vessels plying the world's waters have increased. In Glacier Bay, encounters between vessels and humpback whales have also likely increased for the same reason (Gende et al. 2010). Vessel-humpback whale encounters within the park represent a trade-off between resource protection and visitor experience. For visitors, sighting a humpback whale represents one of the most thrilling experiences, and the closer the encounter, the more thrilling the encounter. However, the same encounters coveted by visitors on vessels could have adverse impacts on individual humpback whales. If encounters between humpback whales and vessels are too close, lethal collisions may occur.

Within the park, vessels are prohibited from operating within  $\frac{1}{4}$  nautical mile (463 meters) of a humpback whale. However, humpback whales often surface with little or no warning directly in front of the bow of a vessel. For example, four years (2006–2009) of observers recording cruise ship-humpback whale encounters in Glacier Bay indicated that encounters between cruise ships and humpback whales are frequent, with many encounters occurring close to the ships (Gende et al. 2010; Gende et al. 2011). A total of 891 unique cruise ship-humpback whale encounters were recorded at distances ranging from 21 meters to 1000 meters, with 80 (9%) of those encounters within 200 meters (Gende et al. 2011).

This indicator provides a tool for monitoring the number of close encounters between vessels and humpback whales in Glacier Bay, representing situations where the humpback whale was at greater risk of being struck by the vessel. A close encounter is defined as a humpback whale surfacing within 1000 meters of a vessel and within 30 degrees of the vessel's direction of travel; at that proximity, some vessel captains (e.g., cruise ship captains/pilots) are unable to take evasive measures to avoid the whale.

Monitoring close encounters between humpback whales and vessels helps ensure that desired conditions for the park's marine ecosystems are being maintained. Providing for the protection of natural and cultural resources is a component of this planning effort. In addition, taking action to prevent close encounters promotes visitor safety aboard vessels, as human injury and/or property damage may result from collisions between humpback whales and smaller vessels (Neilson et al. 2012).

*Monitoring:*

The NPS will continue humpback whale monitoring (e.g., small boat-based photo identification surveys) to document the distribution and abundance of humpback whales to help anticipate places where close encounters may occur so that whale waters or other management actions can be taken. If a single close encounter occurred, the National Park Service may increase surveillance with direct humpback whale monitoring observation in that area (see Potential Management Strategies section below).

The NPS will develop indicator monitoring protocols that can be implemented as part of ongoing management activities. A study from 2006-2022 placed observers onboard cruise ships to record encounters between humpback whales and cruise ships; the NPS can use this study to build monitoring protocols to collect similar data in the future. The NPS will also opportunistically capture information about encounters between humpback whales and vessels when reported by vessel operators.

*Potential Management Strategies:*

In addition to the management action progressions (chapter 3), the NPS would:

- Increase surveillance with direct humpback whale monitoring observation and actively solicit opportunistic sightings from the day boat operator, park staff, and other groups to determine

whether other parties had observed multiple whales in the same area over multiple days. Park staff will conduct observations of the area opportunistically as other work duties permit. These efforts have already proven effective in helping park staff understand when higher numbers of whales are remaining in one area.

- Increase communications with vessel operators, including informing ship captains of the location and date of close encounters between humpback whales and vessels.
- Provide tools that increase situational awareness around higher concentrations of whales (e.g., Whale Alert).
- Designate temporary whale waters, which limits vessel speeds to 13 knots.
- Impose motorized vessel speed restrictions using temporary whale waters designation.
- Impose a 13-knot speed limit for vessels greater than or equal to 80 meters in length throughout Glacier Bay (set under 2003 VQOR ROD).

Should the trigger be reached, the park will identify which desired conditions are not being met and may implement management action progressions (chapter 3 of this plan) or actions listed above to restore desired conditions.

### **Indicator Topic: Motorized Vessel Collisions with Humpback Whales, Yaakw Yáay Kát Yan Wuxeexí (Boat Striking a Whale)**

#### **Indicator: Number of Humpback Whale-Motorized Vessel Collisions Per Season.**

##### *Threshold:*

- One collision between a motorized vessel and a humpback whale in a single season

##### *Rationale:*

Vessel collisions with whales are a growing concern worldwide. Humpback whales are vulnerable to being struck by vessels. The total number of whale-vessel collisions reported in Glacier Bay from 1986 to 2021 is 14, ranging from kayaks to cruise ships (Neilson et al. 2012; NPS unpublished data). Two lethal injuries to humpback whales from vessel strikes have been confirmed in the park, one in 2001 when a cruise ship collided with and killed an adult humpback whale (Doherty and Gabriele 2001) and another in 2004 when a humpback whale calf washed ashore in park waters with injuries attributed to a collision with a vessel (Doherty and Gabriele 2004). Other vessel collisions have occurred where the fate of the whales involved in these collisions is unknown. In addition, with many whale mortalities, the cause of death cannot be conclusively determined, so the number of whale fatalities related to vessel strikes is likely higher than what is recorded. Vessel strikes are a significant concern from other perspectives as well. Collisions are costly and dangerous to humans. Furthermore, humpback whales are economically and culturally valuable to Alaska residents and visitors (McDowell Group 2020) and have ethnographic and Homeland values to the Tlingit. As a result, the threshold proposed in this planning document is low.

##### *Monitoring:*

The NPS relies on reports from vessel operators to know when a humpback whale strike has occurred, unless park staff happen to be onboard when a whale strike occurs. Per contractual requirements, all cruise ship, tour vessel, and charter vessel concessioners must immediately report to the NPS any suspected or confirmed whale strikes. Private vessel operators are strongly encouraged, but not required,

to report collisions. Private vessel operators are required to report an accident if the damage is \$2,000 or more, or if it results in injury, death, or disappearance of a person. In the event of a whale fatality, whenever feasible an Alaska Marine Mammal Stranding Network response team led by a veterinarian experienced in assessing collision injuries would evaluate the animal to determine whether the fatality was related to a vessel strike.

*Potential Management Strategies:*

In addition to the management action progressions (chapter 3), in the event of a whale-vessel collision, the NPS would:

- Complete a prompt and thorough management review that includes contacting the vessel involved about the circumstances of the collision, investigating whether established whale protection protocols were followed by the park. The NPS will then take any additional precautions that are deemed necessary, and follow through on any legal or contractual violations. The public will be notified of the results of the management review in a timely fashion.

**Indicator Topic: Nonmotorized Vessel Use Levels in Glacier Bay (Excluding Frontcountry Zone), X'oon Yaakw Sá? (How Many Canoes?)**

**Indicator: Nonmotorized Vessel Use Days Per Year.**

*Threshold for Nonmotorized Vessel Day Use:*

- No more than 18 days per year that exceed 75 nonmotorized vessels per day for three consecutive years. Eighteen days represents 20% of the June-August visitor season.

*Trigger for Nonmotorized Vessel Day Use:*

- No more than 18 days per year that exceed 75 nonmotorized vessels per day for two consecutive years.

*Threshold for Nonmotorized Vessel Overnight Use:*

- No more than 18 days per year that exceed 62 nonmotorized overnight use vessels per day for three consecutive years.

*Trigger for Nonmotorized Vessel Overnight Use:*

- No more than 18 days per year that exceed 62 nonmotorized overnight use vessels per day for two consecutive years.

*Rationale:*

Monitoring visitor nonmotorized use levels in Glacier Bay is an important component of the proactive management of the park because it allows the park to understand levels of use in terms of distribution across the season. The goal of this indicator is to provide a measure by which to evaluate and protect park resources and provide quality experiences for nonmotorized vessel users, while maximizing opportunities for users to freely explore the park.

Backcountry permit data from the three highest use months (July 2018, June 2019, and July 2021) over the last five years (2018–2022) and all off-vessel activity reports from tour vessels (2016–2022) and charter vessels (2019 and 2021) were analyzed to better understand what current daily use levels are for both day use and overnight use. The identified threshold and trigger levels represent the number of people



per day that occurred on less than 80% of the days, thus removing the highest outliers. Observations from these years representing the peak visitor season from June to August indicate that desired conditions can be protected and maintained at these use levels (Furr et al. 2021; NPS 2019b).

Vessel use levels do not distribute evenly across all park waters. This indicator signals when there is a notable, sustained change in use levels. Beyond the annual monitoring that the park staff will conduct on this indicator, these triggers also prompt the park staff to ensure the distribution of vessels is consistent with desired conditions and re-evaluate management tools (see the “Management Action Progressions” section in chapter 3 of this plan), if needed, based on new information.

*Monitoring:*

At the end of each vessel permit season, the park will calculate nonmotorized vessel use per day in the Glacier Bay Access and Vessel Management Area (see figure 3), excluding Bartlett Cove day use. The number of days that exceed 75 day use nonmotorized vessels and/or 62 overnight use vessels per day will be calculated, recorded, and periodically reported to the public.

*Potential Management Strategies:*

Should triggers be reached, the park will identify which desired conditions are not being met and would select which management action progressions (chapter 3 of this plan) should be used to better align nonmotorized vessel use levels with desired conditions (chapter 2 of this plan). Given that the significance of this indicator is moderated by wide dispersion of vessels, the likely first step will be to conduct studies on the spatial distribution of nonmotorized users and develop spatially based solutions (e.g., use units and associated quotas) beyond the scope of this plan and its associated EA.

**Indicator Topic: Administrative Use Levels, X’oon National Park Service Ka Huna Ka Ch’a Góot’aa Yaakw Sá? (How Many National Park Service, Tribal and Other [Similar] Boats?)**

**Indicator: Administrative Vessel Use Days Per Year.**

*Threshold:*

- No more than 600 administrative vessel use days per year for three consecutive years.

*Trigger:*

- No more than 600 administrative vessel use days per year for two consecutive years.

*Rationale:*

Monitoring administrative motorized vessel use levels (see chapter 3 for definition) in Glacier Bay is an important component of the proactive management of the park, because it allows the park to ensure that administrative vessel use is balanced with other vessel uses and is consistent with desired conditions.

This indicator signals when there is a notable, sustained change in administrative vessel use levels. Beyond the annual monitoring that the park staff will conduct on this indicator, these triggers also prompt the park staff to ensure the distribution of vessels is consistent with desired conditions and re-evaluate management tools, if needed, based on new information.

Motorized administrative use vessel monitoring began in 2015 for all dates in the calendar year. Each day that a motorized administrative vessel was operating in park waters was counted as one use day, regardless of how many trips the vessel made in and out of the park or Bartlett Cove (this is the same method used to count other motorized vessel classes). Five years of park-collected data (2015–2019)

found an average of 2.8 administrative vessels operating per day in park waters in May–September, and an average of 453 vessels operating annually across all dates (minimum = 413 in 2019; maximum = 499 in 2018).

The identified numbers for threshold and trigger represent the number of administrative vessel use days that are consistent with desired conditions, allow for needed patrol, response, and research to be conducted, and balance administrative use—including providing tribal access to Glacier Bay and its ancestral lands—with other vessel classes.

*Monitoring:*

At the end of each calendar year, the park will calculate the number of administrative vessel use days and will periodically report these numbers to the public. Potential Management Strategies:

Should triggers be reached, the park will identify which desired conditions are not being met, provide transparent accounting of patterns driving increases, and select which internal management strategies should be used to better align administrative use levels with desired conditions, potentially including:

- Require more advance-notice trip planning to consolidate activities.
- Explore ways to conduct business that reduce motorized traffic by park vessels.
- Explore spatial and temporal strategies to maintain desired conditions and mitigate impacts to specific resources and visitors.
- Evaluate trends and determine whether there is a rationale for raising the trigger or threshold.

## **VISITOR CAPACITIES, X'OON GUNAHÍTX' SÁ AADÉ KGWA.ÁAT? (HOW MANY CAN BE THERE?)**

Visitor use management is the proactive and adaptive process of planning for and managing characteristics of visitor use and its physical and social setting using a variety of strategies and tools to sustain desired resource conditions and experiential conditions. Visitor capacity is a component of visitor use management defined as the maximum amounts and types of visitor use that an area can accommodate, while sustaining desired resource conditions and visitor experiences consistent with the purpose for which the area was established.

By identifying and implementing visitor capacities, the NPS can help ensure that resources are protected and visitors have the opportunity for a range of high-quality experiences. The NPS is legally required to complete general management planning that includes identification and implementation of commitments for visitor carrying capacities for all areas of the system unit (54 USC 100502) as outlined by the 1978 National Parks and Recreation Act.

The park's GMP sets the overall direction for management of natural and cultural resources, visitor use, land protection, and facility development. The GMP identified five primary zones for the park: nonwilderness waters, wilderness lands, wilderness waters, development, and special use.

The identification of visitor capacities for all areas of the park are considered an amendment to the GMP and are documented as such. Strategies to manage to those visitor capacities for the wilderness lands and Wilderness Waters Zone falls within the scope of the BWMP (in preparation). Strategies to manage to identified visitor capacities in the Nonwilderness Waters Zone are included as quotas with associated triggers and thresholds in this plan.