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Natural Resource Stewardship and Science

Bears in Glacier Bay National Park and Preserve

Sightings, Human Interactions, and Research 2010–2017

Natural Resource Report NPS/GLBA/NRR—2020/2134





ON THIS PAGE
A glacier bear cub, a very rare color-phase of black bear, with black sibling and mother.
Photograph courtesy of the National Park Service, Elisa Weiss.

ON THE COVER
A brown bear in Johns Hopkins Inlet.
Photograph courtesy of the National Park Service, Tania Lewis.

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Natural Resource Report NPS/GLBA/NRR—2020/2134

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A brown bear pursues a mountain goat on Gloomy Knob in Glacier Bay National Park. (NPS/TANIA LEWIS)

Executive Summary

Bears in Glacier Bay National Park and Preserve (GBNPP) are key components in the ecosystem and highly sought for viewing opportunities by visitors. GBNPP is home to both brown (*Ursus arctos*) and black bear (*Ursus americanus*) species, including the rare blue-grey color phase of black bear (also known as glacier bears), which are endemic to the park and surrounding region. GBNPP offers unique opportunities to study bears in a recently deglaciated landscape where animals are preserved and protected. This report describes bear sightings, human-bear interactions, and bear research in GBNPP from 2010 through 2017. It is intended to highlight events that have characterized what we know about bears in GBNPP, including sightings, annual variability in bear numbers based upon sightings, encounters, incidents, frontcountry interactions, and field research projects. Key findings include:

- From 2010–2017, brown bears were observed more frequently than black bears from the daily tour vessel transiting Glacier Bay. Brown bears were sighted primarily in recently deglaciated areas in the northern parts of Glacier Bay, whereas black bears were sighted primarily in the southern parts of the bay. Although it is difficult to draw broad conclusions due to inter-annual variability, bear sightings were consistently high at Gloomy Knob and the Russell Island outwash plain over the eight-year span. The number and proportion of bear cubs of both species varied greatly between years. Most bears observed were foraging or traveling.
- From 2011–2017 the annual number of human-bear incidents (defined as an interaction involving conflict) fluctuated from a low of 2/yr in 2015 and 2016 to a high of 15/yr in 2017. Incidents were most frequent in July and the most common areas where incidents occurred were Bartlett Cove and the West Arm of Glacier Bay. In the backcountry, brown bears were more often associated with incidents than black bears, yet in the frontcountry (Bartlett Cove) only black bears were involved. Severe incidents, such as a bear making contact and/or injuring a person have not occurred in GBNPP since 1980; however, since 2011, there have been 20 cases of property damage by bears and five instances in which bears are known to have obtained human food. The most common incidents involved bears approaching people or entering camp, followed by bears damaging property, although the two often co-occurred.
- Bear-related advisories to the public were issued every year from 2011–2017 ranging from a low of 2/yr in 2016 to a high of 13/yr in 2017.
- Area closures to human use were issued in four out of seven years in response to bear activity and/or incidents.
- Bear research from 2010–2017 included the following studies: an experiment on vessel disturbance of brown bears, distribution of bear species across GBNPP, genetic population structure of brown bears, population and activity monitoring of bears at two areas of management concern (Gustavus and South Sandy/Spokane Coves), two humpback whale carcass scavenging studies, and ongoing genetic work on black bears in northern Southeast Alaska (including glacier bears).

Acknowledgments

Over the past decade, numerous individuals have contributed to bear monitoring and research efforts within GBNPP. Our work is made possible by the cooperation of community members, staff, collaborating groups, and visitors.

We would like to thank all previous report authors, including GBNPP bear technicians Christopher Behnke, David Culp, Katja Mocnik, Kyle Pinjuv, and Elisa Weiss. Without the support and cooperation of the current and past members of the Glacier Bay Bear Committee, the bear management program would not be possible. We are sincerely appreciative of Visitor Information Station staff for communicating bear sightings and helping to educate backcountry visitors about bear safety, and of the law enforcement rangers for enforcing regulations and communicating with the public regarding human-bear incidents. Thank you also to the interpretive rangers for passing on bear safety information to the public and for reporting human-bear interactions to bear management staff, and additionally for collecting bear sighting information from the daily tour boat. Fieldwork was made possible by the logistical efforts of Captains Todd Bruno, Justin Smith, and Deb Johnson, and the captains and crew of the M/V Serac and law enforcement staff. We know far more about Glacier Bay's bears because of the many visitors, researchers, locals, and staff who have reported sightings and incidents from all over the park. We also thank those who provided peer review of this report.

Last but not least, we would like to thank the bears for thriving in Glacier Bay National Park and Preserve, and being tolerant of our human presence as we share this wild landscape.

List of Terms and Acronyms

ADF&G	Alaska Department of Fish and Game
ANILCA	Alaska National Interest Lands Conservation Act, 1980
Backcountry	Area of Glacier Bay National Park not surrounding park headquarters in Bartlett Cove
Bear spray	Hot pepper aerosol spray specifically designed to deter bears by irritating their mucus membranes
BMP	Bear Management Plan
BRFC	Bear Resistant Food Canisters
Day boat	M/V Baranof Wind (or similar) is the Glacier Bay Lodge tour vessel which runs daily tours in Glacier Bay
Frontcountry	Area of Glacier Bay National Park surrounding park headquarters in Bartlett Cove
GIS	Geographic Information System
GBNPP	Glacier Bay National Park and Preserve
Hazing	Management action that uses negative stimuli to move bears
Human-Bear Incident	Interaction between human and bear in which there was a conflict over food, gear, or personal space including injury to human or bear, loss of property, or other negative interactions between the species
Non-lethal Firearm	Firearm shooting pyrotechnics or non-lethal ammunition such as rubber bullets or bean bag rounds
NPS	National Park Service
VIS	Bartlett Cove Visitor Information Station

Introduction

Glacier Bay National Park and Preserve (GBNPP) comprises 3.28 million acres, of which 2.66 million (approximately 80%) is designated as Wilderness and offers extensive habitat for wildlife. Approximately 270 years ago during the Little Ice Age, Glacier Bay proper (hereafter, "Glacier Bay", Figure 1) was covered in glaciers while portions of the surrounding areas remained ice-free, providing refugia to land plants and animals (Connor et al. 2009). Rapid glacial retreat has led to a chronosequence, or gradient of ages, of terrestrial ecosystems that range from newly deglaciated barren rock at the head of the bay to young and old growth forests near the mouth of the bay and inland. Thus, bear habitat in the park varies greatly across the landscape and consequently provides a wealth of diverse food resources available to bears (Appendix A). Both black bears (*Ursus americanus*) and brown bears (*Ursus arctos*) occupy the park with considerable geographic overlap between the species (Lewis 2012). Initially established in 1925, Glacier Bay National Monument was expanded significantly in 1939 to create a brown bear sanctuary due to public concern of overharvest (Catton 1995). In 1980, the monument was expanded and further protected through designation as a National Park and Preserve under the Alaska National Interest Lands Conservation Act (ANILCA) to "preserve wilderness resources and related recreational opportunities while providing a large sanctuary where fish and wildlife may roam free, developing their social structure and evolving over long periods of time as nearly as possible without the changes that extensive human activities would cause" (ANILCA 1980). Black and brown bears in the park and preserve are considered species of management concern under the Government Performance and Results Act. As such, the park seeks to learn more about the populations of each species, including their distribution and ecology, and integrates this knowledge into park management. Bear conservation and management is vital for GBNPP because bears are essential components of this ecosystem, human-bear interactions are a major safety concern, and visitors greatly value bear-viewing opportunities (NPS 2013).

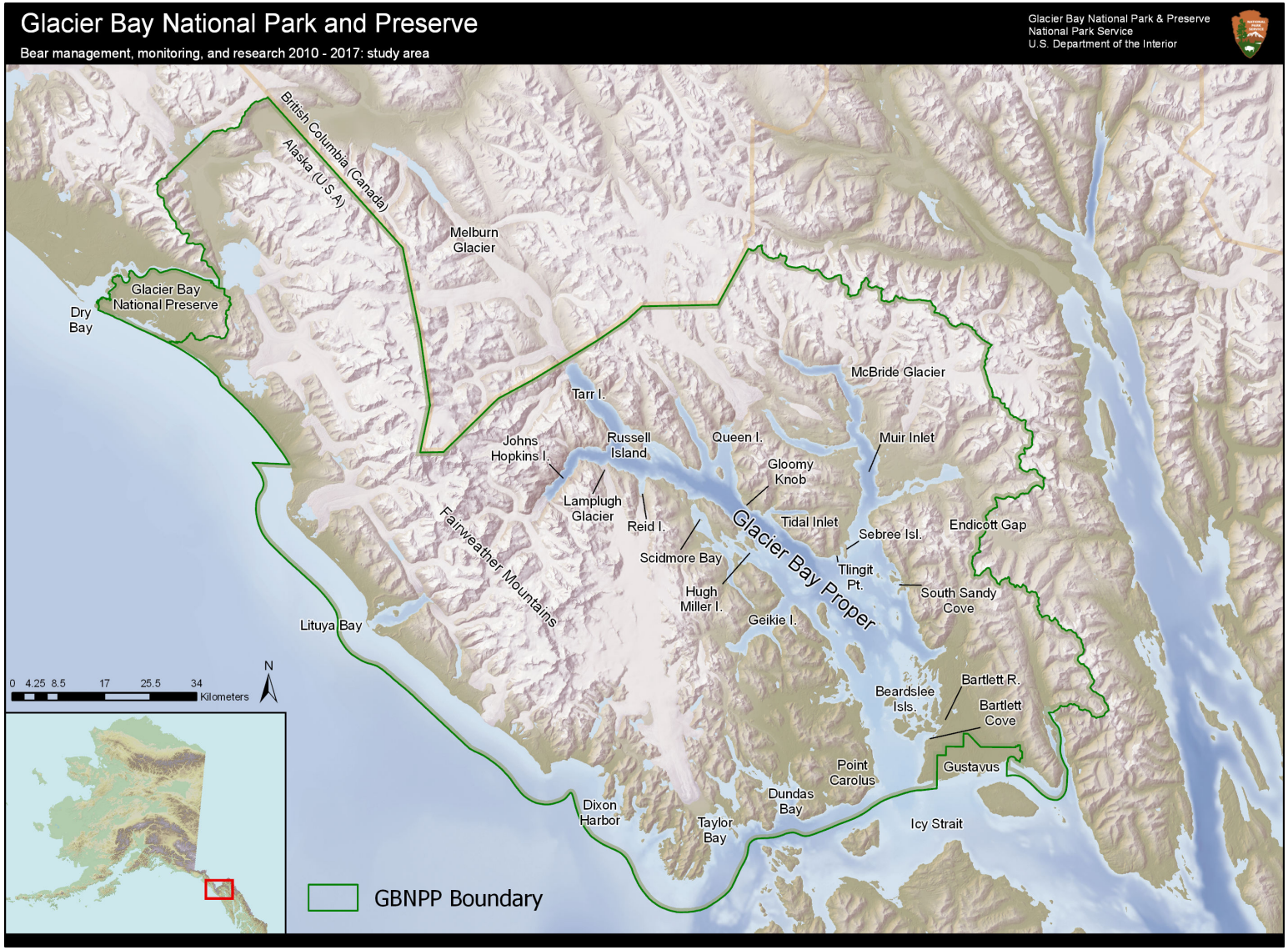


Figure 1. Map of Glacier Bay National Park and Preserve – bear management, monitoring, and research study area.

Bear management in GBNPP involves three primary components: preventing human-bear conflicts, responsive management, and information management. Human-bear conflicts are defined as injury to human or bear, loss of property, or other negative interactions between the species. Conflict between bears and humans must be minimized to ensure that bears retain their natural habits, to optimize bears' longevity and reproduction, and to protect people and property. Managers at GBNPP understand that human-bear conflicts can be minimized through preventive, responsive, and informed management as described in the GBNPP Bear-Human Management Plan (2013). Prevention is the first and most important step towards minimizing human-bear conflicts (NPS 2013). Food conditioning is the primary factor associated with human-bear incidents and bear-inflicted human injury in national parks (Herrero 2018; Herrero and Fleck 1990). Human attractants such as food and trash must be controlled in ways that prevent access by bears throughout all habitats. Regulations in GBNPP for securing attractants are based on the best available science, yet are flexible enough so that new innovations in technology can be incorporated when appropriate. Informing and educating the public in methods to secure attractants are integral components of any efforts to reduce human-bear conflicts. Enforcement of food storage regulations is also critical to the success of these policies. Current regulations for food storage require that food and beverages, garbage, and lawfully taken fish or wildlife must be stored in bear resistant food canisters (BRFC) that are approved by a state or federal bear committee, in a hard-sided building or vehicle, or suspended 10 feet above the ground and four feet from a tree (GBNPP Compendium 2.10[d]). Violation of this restriction is prohibited throughout GBNPP, including the Bartlett Cove developed area (Figure 1), although it does not apply to food that is being transported, consumed, or prepared for consumption. Another integral part of preventive bear management is educating the public on how to minimize bear conflicts and how to behave during a bear encounter. The park uses its website, social media, printed materials, and personal orientations to teach park staff, contractors, researchers, and the public about bear behavior and safety to decrease adverse interactions in the front- and backcountry.

In addition to actions geared towards preventing human-bear incidents, NPS staff engage in responsive bear management. Methods of responding to bears and human-bear incidents include monitoring bears in the Bartlett Cove developed area, hazing bears, conducting site investigations in areas of human-bear conflicts, documenting reports of bears in the backcountry, and issuing advisories or closures in response to conflicts or safety concerns.

A final piece to bear management in GBNPP is information management. Our knowledge of bears in GBNPP and the Gustavus area is based on scientific research and a network of NPS staff, residents, and visitors who contribute invaluable information regarding bear sightings and interactions throughout the summer seasons. Park staff regularly document bear sightings from the day boat (M/V Baranof Wind) and greet campers returning from the backcountry to prompt the reporting of any bear encounters or interactions. Park rangers and the day boat crew also ask campers if they had any adverse bear encounters and encourage them to document the interaction on a Bear Information Management (BIM) form (Appendix B).

In this report, we compile information regarding bear sightings, human-bear interactions, and bear research from GBNPP from 2010 through 2017. Some of this information was documented previously in unpublished annual bear reports (Behnke et al. 2011; Behnke et al. 2012; Behnke et al. 2013; Behnke et al. 2014; Lewis and Behnke 2015; NPS 2013). Examining areas of high bear activity and locations where human-bear interactions occur allows park managers to initiate preventative management and issue advisories before potential conflicts occur and facilitates preventing and minimizing human-bear conflicts (NPS 2013). By investigating and documenting human-bear conflicts, we can gain a better sense of how to coexist in bear habitat by better understanding the complexities of these interactions. Focused research studies based in a largely undisturbed ecosystem provides context on the basic ecology and motivations of bears in the park. Effective bear management in GBNPP utilizes this information to ensure opportunities for present and future generations of visitor to view and encounter bears safely.

Bear Sightings 2010–2017

Introduction and Methods

A high-speed catamaran tour boat (generally the 22 m in length M/V Baranof Wind, hereafter: day boat) provides approximately eight-hour tours of Glacier Bay daily, usually from the last week of May through the first week of September. The day boat is the primary means by which most visitors who are not traveling on another vessel (i.e., cruise ship, tour/charter/private vessel, or kayak) are able to access and view the glaciated portions of northwestern Glacier Bay. The day boat departs Bartlett Cove and returns at the same time daily (7:30 am and 3:30 pm, respectively) and operates along the same general route daily (~210 km round trip) with slight variations based on weather, wildlife activity, and captain's preference. In general, from Bartlett Cove, the vessel travels north along the eastern shore of the West Arm of Glacier Bay and returns south along the western shore of Glacier Bay (Figure 2). Given its regularity, the day boat trip functions as a standardized daily transect for wildlife observations. The ship's crew of four, plus an NPS interpretive ranger and passengers, search for and identify wildlife along the route. In addition to educating visitors about the natural and cultural history aspects of the park, the NPS ranger completes the naturalist log at the end of each day. The information recorded in the naturalist log includes wildlife species, location, number of animals, whether young were present, and any notable behavior.

We entered all bear sightings from the day boat naturalist log from 2010–2017 into ArcGIS (ESRI, Redlands, CA) and assigned each sighting to one of 80 subdivisions of the Glacier Bay shoreline that are potentially visible to the day boat along its route. These subdivisions were created to account for the general and/or vague location descriptions that were often reported in the logs. We summarized the resulting black and brown bear sighting data using R (R Core Team 2018) and ArcGIS.

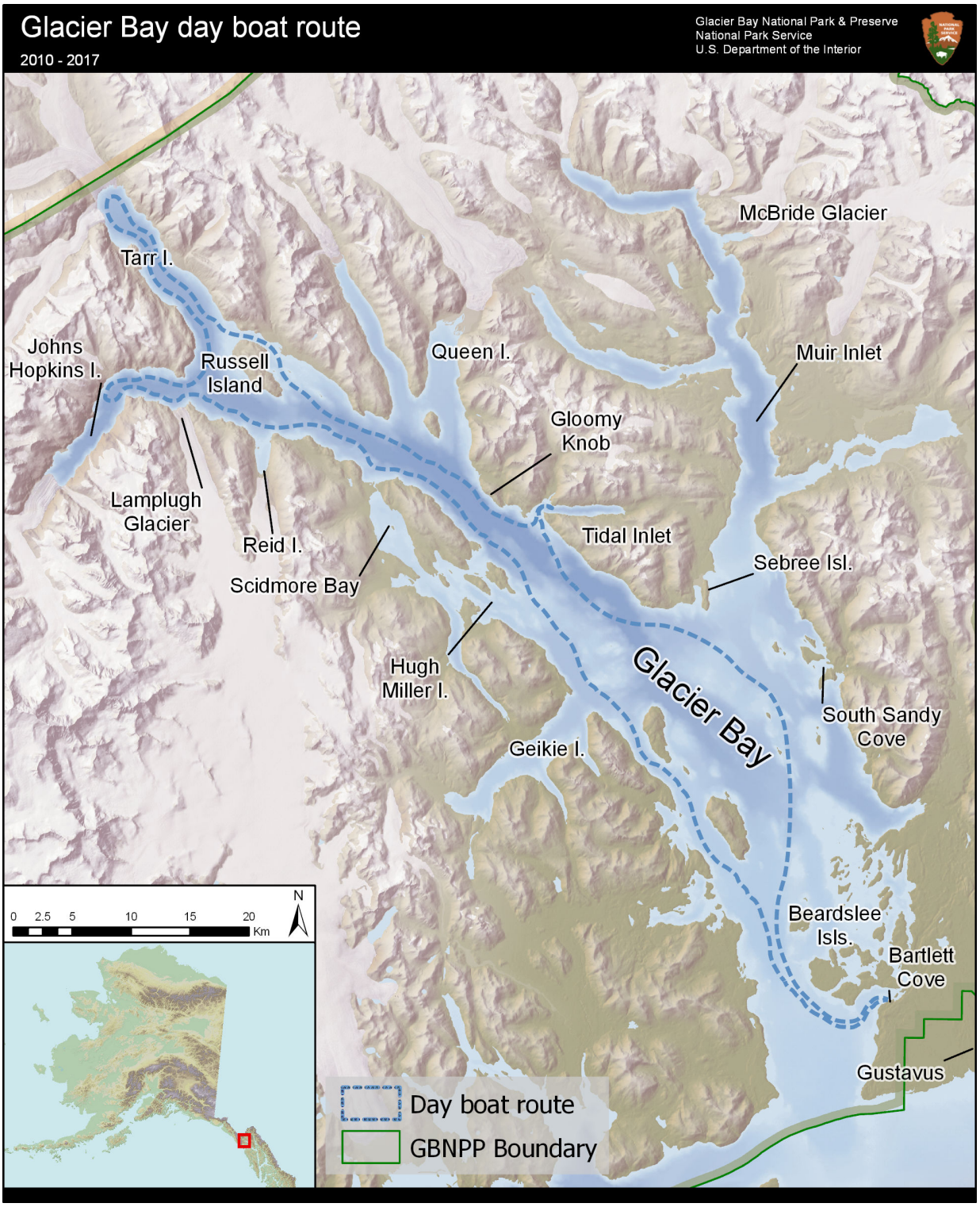


Figure 2. The general route of the day boat, M/V Baranof Wind, in Glacier Bay, Alaska. Note that this route varies on a daily and/or seasonal basis due to seasonal closures of Johns Hopkins Inlet (May 1–June 30), differing camper drop-off locations, and captain's preference.

Results

Of the 792 days the day boat operated from 2010–2017, the naturalist log was recorded on ~80% of those trips (623 days; Table 1). Unless stated otherwise, the metrics reported here are relative to the number of days recorded. The absolute number of bears observed varied widely between summer months (June, July, August) and years (ranging from 22 bears in June 2015 to 104 bears in August 2017; Figure 3). However, the proportion of days bears were observed remained relatively high across all years (mean = 79%, range 70%–89%; Table 1). Black bears were observed less frequently than brown bears and comprised 12% of the total bear sightings, with a range from 6% in 2011 to 19% in 2013. On average, 2.4 bears were observed per day, with a range from 1.8 bears/day in 2011 to 3.3 bears/day in 2017.

Table 1. Summary of day boat bear observations in Glacier Bay, Alaska, from 2010 through 2017 including: the total days the day boat ran each year, number of days the naturalist log was completed, number of bears by species observed, total number of bears, and the number of bears observed per recorded day, and the proportion of days where bears were observed.

Year	Total days	Days recorded	Black bears	Brown bears	Total bears	Bears per day	% Days bears obs.
2010	98	68	16	135	151	2.2	82
2011	95	81	16	131	147	1.8	70
2012	99	76	14	208	222	2.9	86
2013	98	89	38	163	201	2.3	80
2014	98	88	17	147	164	1.9	77
2015	104	59	10	100	110	1.9	71
2016	99	71	13	174	187	2.6	80
2017	101	91	47	257	304	3.3	89
Total	792	623	171	1315	1486	2.4	79

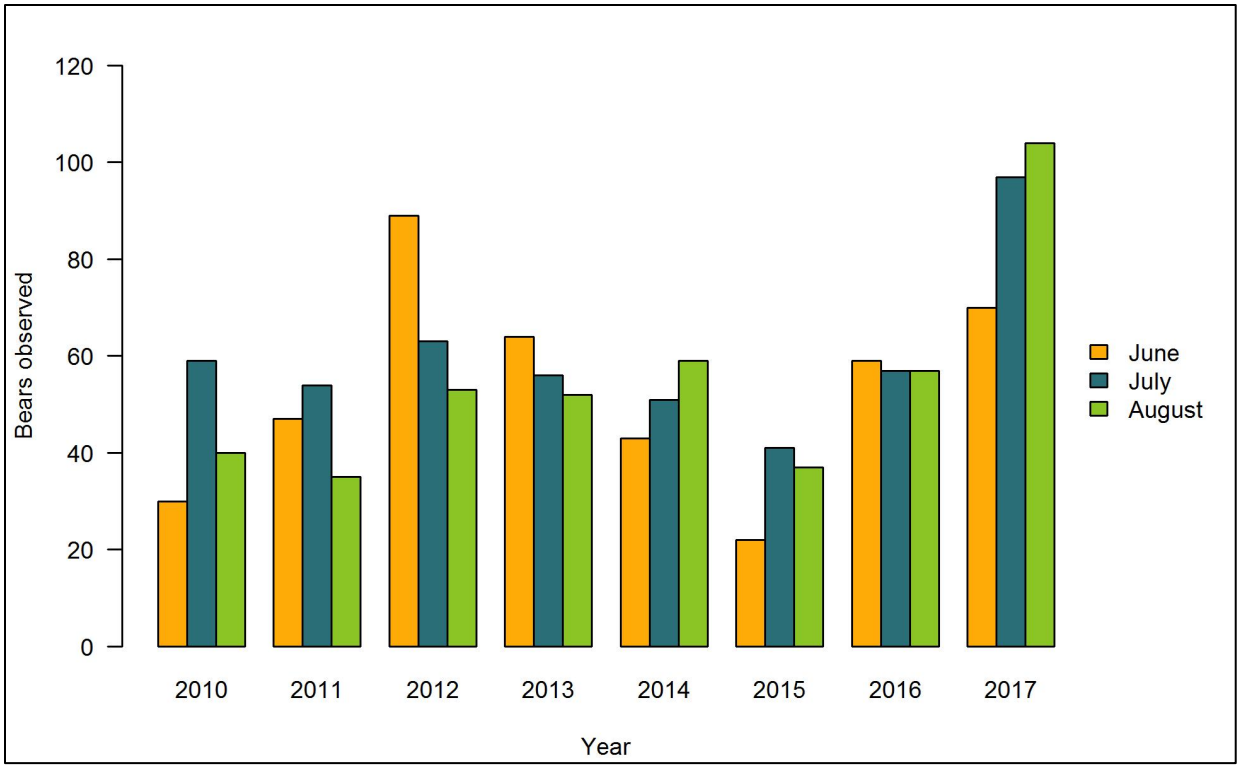


Figure 3. Summary of day boat bear observations (n = 623 days and 1486 bears) by month and year in Glacier Bay, Alaska from 2010 through 2017.

Brown bears were primarily observed in recently deglaciated areas in the northern parts of the bay, whereas black bears were most often observed in the southern parts of the bay (Figure 4). There are some places around Glacier Bay where both black and brown bear species commonly overlap, including Tlingit Point, Sebree Island, and the coastline from Reid Inlet to south of Geikie Inlet. Occasionally, individual black bears were observed in the very northern reaches of the bay, such as an individual spotted in Tarr Inlet Most observations of brown bears occurred along the eastern shore of the West Arm, from Tidal Inlet to Tarr Inlet (Figure 4). Six out of eight of the subdivided areas where brown bears were most often observed lie along this shoreline. This section of coastline accounts for 72% (1073 out of 1486) of all bear sightings (Figure 5), with most occurring along the shoreline north of Gloomy Knob (n = 346) and on the mainland east of Russell Island (n = 274) in the area also known as the Russell Cut (Table 2).

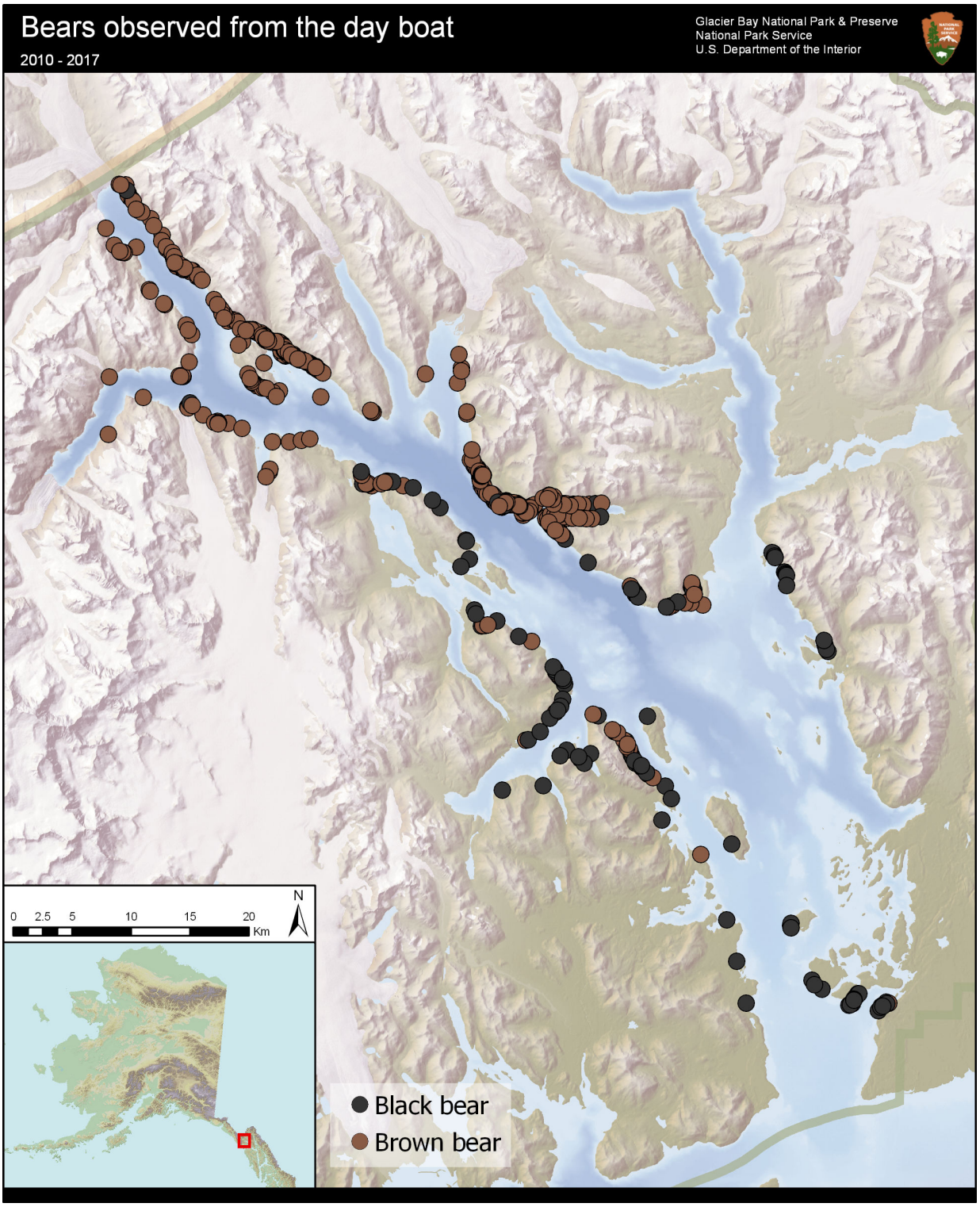


Figure 4. Bear sightings by species as observed from the day boat in Glacier Bay, Alaska, from 2010 through 2017 (n = 1486). One sighting occasionally involves multiple bears (i.e. sow with cubs).

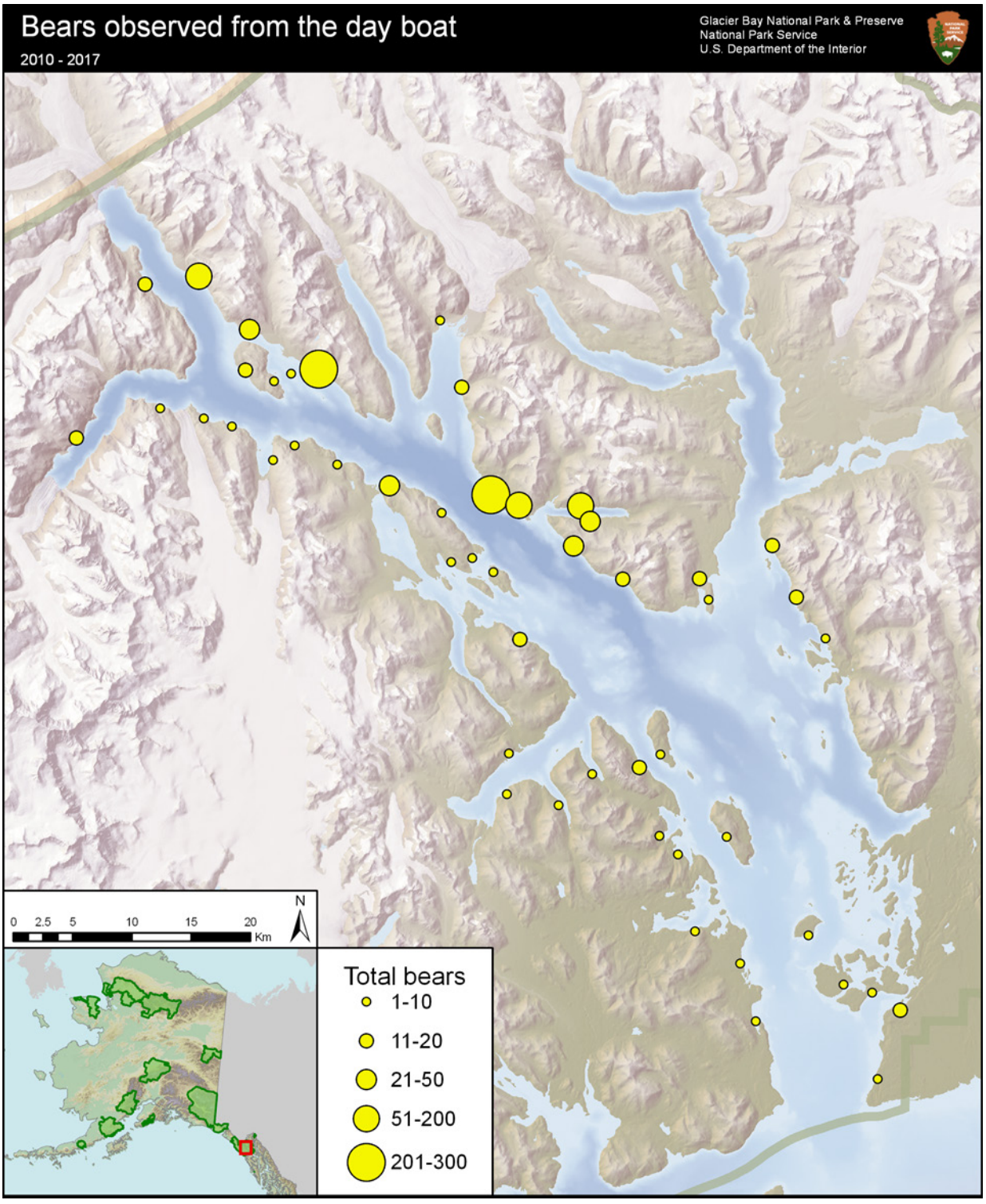


Figure 5. Total number of bears observed from the day boat at general locations throughout Glacier Bay, Alaska, from 2010 through 2017 (n = 1486).

Table 2. Locations with most frequent bear sightings from the day boat in Glacier Bay, Alaska from 2010 through 2017 (n = 1486).

General location	Number of bears
Gloomy Knob and North	346
Russell Island, Mainland Northeast of Island	274
Tarr Inlet, East Side	132
South of Gloomy Knob	115
Russell Island, Mainland North of Island	115
Tidal Inlet, North Side	91
North of Scidmore Bay	45
Tidal Inlet, South Side	43
Other (i.e., all locations with <43 bears)	325

In addition to general bear activity levels, the relative number of cubs (dependent young 0, 1, 2, or 3 years old) observed provides insight into the productivity of Glacier Bay bears. The proportion of bear observations that included cubs ranged from 6% in 2014 to 24% in 2016 (2010–2017 mean = 16.3%) (Figure 6). In 2014, the fewest number of cubs were observed (n = 10) (Figure 7) with 2014 and 2015 being the lowest for all bears. More cubs were observed in 2017 (n = 51) than in previous years but this corresponded with more bears being observed overall (the proportion of cubs in 2017 (16.8%) was typical). Black bear cubs comprised only 8% of the cubs sighted over all years. The number of sightings of black bear cubs per year ranged from zero (2013–2015) to eight (2017) (Figure 7). Brown bear cubs were observed in all years.

Bear behaviors reported in the naturalist logs fell into three main categories: resting, traveling, or activities associated with foraging (Figure 8). The majority of bears observed in Glacier Bay (36%) were foraging in the intertidal, above the intertidal, or at salmon (*Oncorhynchus* spp.) streams. The second most common behavior after foraging activities was traveling (10%).

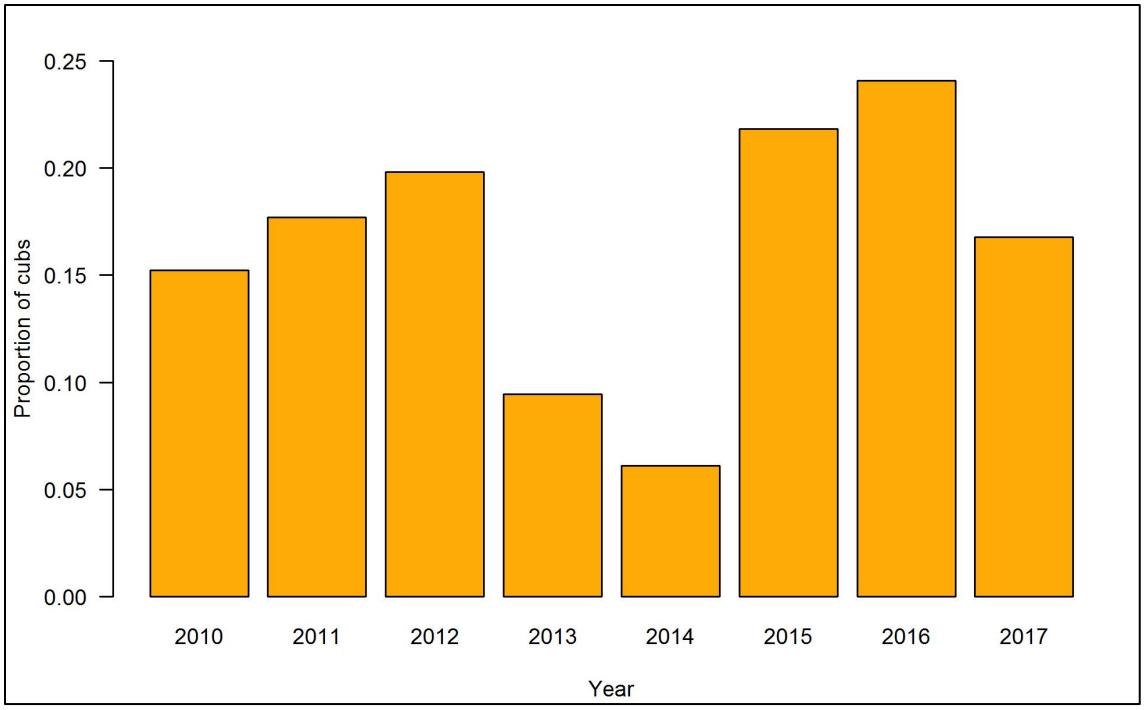


Figure 6. Cubs as a proportion of total bears (black and brown combined) observed from the day boat in Glacier Bay, Alaska from 2010 through 2017 (mean = 0.16).

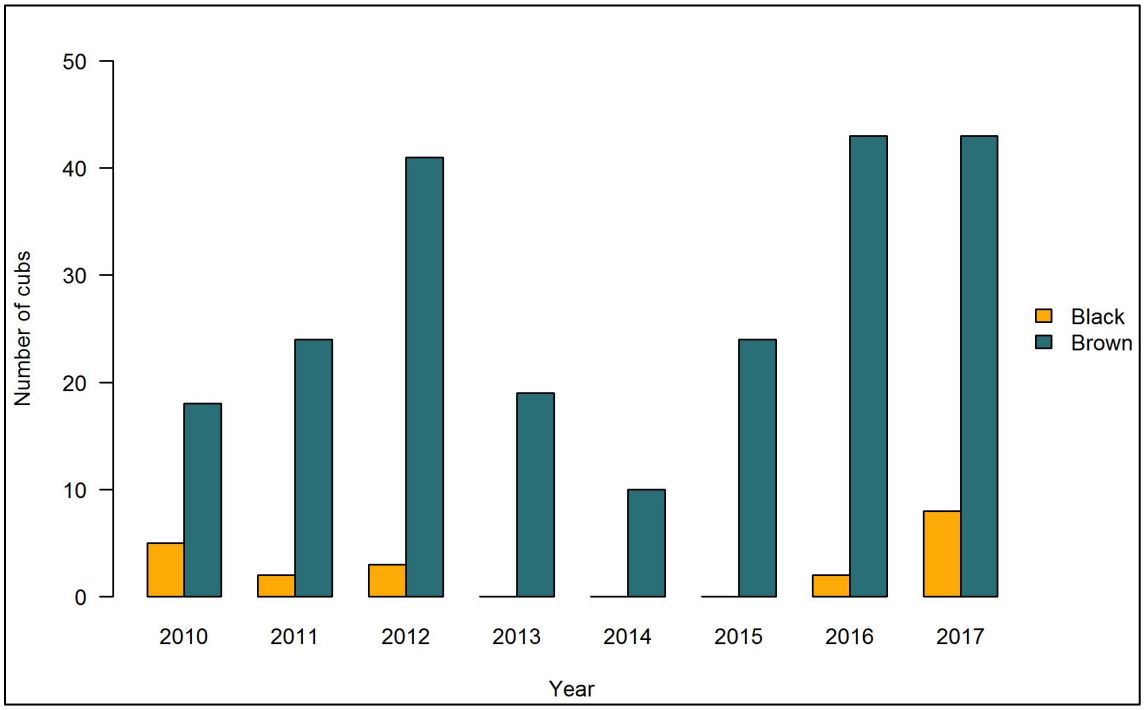


Figure 7. The number of cubs observed from the day boat in Glacier Bay, Alaska from 2010 through 2017 (black n = 20, brown n = 222).

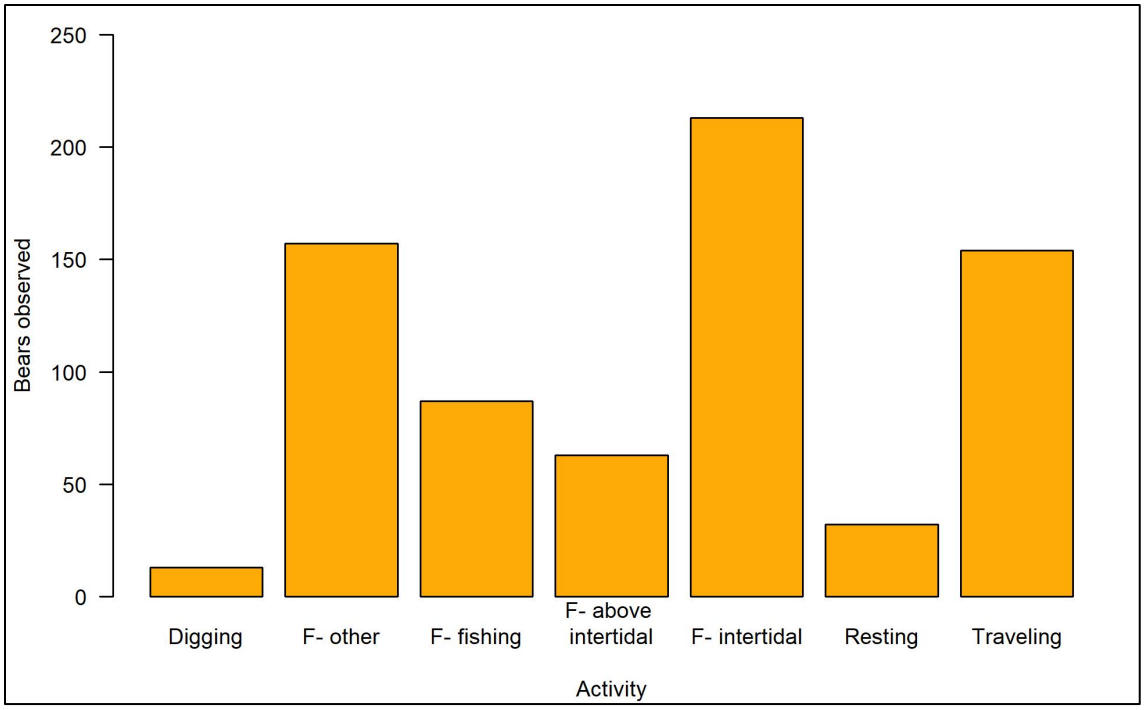


Figure 8. Activities of bears observed from the day boat in Glacier Bay, Alaska, from 2010 through 2017 (n = 719; activity not reported, n = 767). "F" indicates a foraging activity.

Discussion

Bears are a highlight of many visitors' experiences in GBNPP. The day boat naturalist log provides insight into the relative frequency with which visitors are able to view bears, basic information on black and brown bear distribution and yearly productivity, and information on areas of high bear activity. It is important to note that we do not have comparable bear activity information for the East Arm or other areas outside of the day boat's route. One potential source of bias in the locations of observation is that the day boat often spends more time looking for bears in areas where the day boat crew and NPS ranger anticipate seeing bears (such as the northern shoreline of the West Arm) potentially inflating the relative number of bears seen in some areas. Conversely, the crew and visitors may be less focused on spotting bears when lunch is being served or at times of other activities, reducing the frequency with which bears are observed at other locations. Additionally, it is important to recognize that annual increases in the frequency of bear sightings does not necessarily indicate changes in bear populations, but may reflect increased sightability caused by bears utilizing the shoreline food resources more during those years and repeat sightings of the same individuals who may use those areas.

Bears are omnivorous and consume a range of dietary resources, usually associated with seasonal and geographical availability. They forage on various types of vegetation, intertidal organisms, carcasses and berries throughout the spring, summer, and fall, and often travel to salmon streams when the salmon are spawning (Appendix A). The abundance of food can drastically influence bear locations and behavior. Although usually solitary outside of family groups, it is not uncommon to see multiple bears at one time in a stream when salmon are abundant. If salmon run sizes are relatively low, bears

may rely more heavily on berries and intertidal food sources, and may be less apt to congregate at streams. Populations and individual bears can have notably different dietary constituents, largely depending on the availability of different resources across their home range. Brown bears from the coast of Glacier Bay were included in a study investigating the components of brown (grizzly) bear diets across North America (Mowat and Heard 2006). Through stable isotope analysis ($\delta\ ^{13}C$ and $\delta\ ^{15}N$) of hair samples from seven individuals sampled on the shoreline of Glacier Bay, Mowat and Heard (2006) estimated the proportion of nutrients coming from plant, marine, and terrestrial prey sources in Glacier Bay brown bears over the timespan of a year. Their results indicated a spring/summer diet of 69% plants, 31% marine derived nutrients (including salmon), and 0% terrestrial prey. The proportion of marine derived nutrients found in the diets of Glacier Bay brown bears is low compared to diets of brown bears along the coastline of British Columbia and other areas in Alaska. For example, brown bear diets on Chichagof Island were found to be 46% plants and 54% marine derived nutrients, and in Katmai National Park 37% plants and 63% marine derived nutrients (Mowat and Heard 2006). Marine carbon and nitrogen were attributed to salmon, although bears in Glacier Bay are often observed foraging for other marine sources such as barnacles (*Balanus* spp.), mussels (*Mytilus edulis*), and rock gunnels (*Pholis gunnellus*). It is also important to remember that the value of 31% marine derived nutrients in Glacier Bay brown bears represents the assimilated carbon and nitrogen coming from marine sources and does not indicate the total biomass consumed. Thus, based on this work on a small sample size (n = 7), marine derived nutrients are an important part of the yearly diet of shoreline brown bears in GBNPP, but vegetation likely comprises the majority of food consumed by bears.

Due to the relatively recent deglaciation of the shoreline of Glacier Bay, salmon are less ubiquitous relative to other areas of Southeast and coastal Alaska. Based on field observations and crude scat analysis, grass, herbaceous vegetation, and berries accounted for the overwhelming majority of food consumed by bears in Glacier Bay (Partridge et al. 2009). Barnacles and mussels were also common in scats across multiple sites and summer months, as were salmon in the latter half of the summer at sites with anadromous streams. Partridge et al. (2009) found study sites in Queen Inlet and the mainland adjacent to Russell Island contained a high diversity and abundance of bear food resources which corresponded to high levels of bear activity. Gloomy Knob, Tidal Inlet, and the mainland adjacent to Russell Island also have active salmon streams that attract bears in summer and into fall. The diversity, abundance, and high quality of food resources in addition to the visibility offered in non-forested areas likely explain the high number of sightings of brown bears on the northern shoreline of the West Arm by the day boat. Brown bears were observed occasionally south of the West Arm reflecting their recently (since 2009) expanded range, which now includes southern Glacier Bay and Gustavus (Lewis 2012). Black bears were observed predominantly along the shoreline in the southern portion of Glacier Bay (Figure 4), likely due to their close association with forested habitats (Lewis 2012). Black bears represented a small proportion of the total bears sighted each year, possibly also due to their association with the forest that may minimize viewing potential from vessels.



The daily tour boat that takes visitors up the West Arm of Glacier Bay, also known as the day boat. (NPS)

Human-bear Interactions 2011–2017

Introduction and Methods

To ensure the safety of residents and visitors and to better understand bear activity in Glacier Bay, GBNPP biologists and managers study human-bear interactions in the frontcountry (area surrounding Park headquarters at Bartlett Cove) and backcountry (all other areas including the Preserve in Dry Bay). Staff, visitors, and Bartlett Cove residents are asked to report human-bear interactions to wildlife biologists via a Bear Information Management (BIM) form (Appendix B). Using information provided on the form and through in-person discussions, each interaction reported is classified into two primary categories: encounters or incidents (Appendix C). Human-bear encounters are broadly defined as benign interactions between bears and humans that are not considered incidents. Encounters include a bear running from a person or approaching a person but being easily deterred. Human-bear incidents are interactions between bears and humans involving concerning behavior by bears and/or human responses to bears. Incidents primarily include interactions where: a bear made contact with, injured, or killed a person, damaged property, obtained human food or trash (including angler caught fish), or entered a permanent structure or vehicle. Additionally, if a person responds to a bear's actions by deploying bear spray or firearms, these interactions are also considered incidents. Lastly, an interaction that does not fall into these categories may still be deemed an incident by the wildlife biologist when a bear was especially persistent and/or aggressive towards humans, which is determined on a case-by-case basis.

Human-bear incidents have been tracked in Glacier Bay since 1959, though with varying definitions and effort (NPS 2013). For this report, we compiled human-bear interactions reported from 2011–2017 and categorized them as encounters or incidents. We further analyzed incidents during this time frame by assigning one or multiple categories of bear behavior and human responses. These years were selected for in-depth analysis because the human-bear interaction data generated during this time frame was detailed and consistent. We compared the yearly number of incidents to the total number of people in the backcountry as reported by the Visitor Information Station camper database (NPS unpublished data) as a general proxy to yearly human visitation. Bear behavior categories included: passing or indifferent (generally only occurs in an incident in combination with other bear behaviors), curious, approached people or entered camp, surprised, defensive or threatened, persistent in approaching humans or property, defended natural food sources, involvement of angler caught fish/guts, damaged property, obtained human food or trash, entered permanent structure or vehicle, or caused human injury. Human responses are identified by the following categories: used low-level deterrents (yelled, made noise, etc.), stood ground, retreated from camp, deployed bear spray, deployed firearms, used high-level deterrents (such as non-lethal projectiles, pyrotechnics, etc.), no action, and did not see interaction (definitions in Appendix C).

We also compiled the number of advisories and closures due to bear activity or human-bear incidents from 2011–2017. As interactions and other bear activity were reported, the GBNPP bear management team used the information to update the public on current bear activity through advisories and closures in accordance with the GBNPP Bear-Human Management Plan (NPS 2013), which details management strategies to reduce human-bear incidents. Advisories were released in

various forms including formal or informal. Formal advisories included news releases in which information regarding bear activity or an incident were released to the public on the GBNPP website and other news outlets. Informal advisories were distributed primarily to visitors at the Bartlett Cove Visitor Information Station (VIS) as they obtained backcountry permits or during camper orientations, and were often directed towards people intending to visit areas with known bear activity. Additionally, flyers or leaflets were sometimes posted and/or distributed to visitors and residents in Bartlett Cove. All advisories were intended to educate people on bear activity and bear safety. In rare cases, specific areas were deemed unsafe for visitors because of bear activity, at which time a foot-traffic and/or camping closure was enacted. Closures were either in response to a specific incident or issued as a preventive measure.

Results

Between 2011 and 2017, 106 human-bear interactions were reported (Figure 9); 36 of which were classified as incidents, while the remaining 70 were considered encounters (details by year in Appendix D). The annual number of incidents was variable (range: 2/yr in 2015 and 2016 to 15/yr in 2017). Of the 36 incidents, the majority occurred in the backcountry (n = 23; 64%) and the remainder occurred in the frontcountry (n = 13; 36%). The general visitor season in GBNPP is May through September. The Visitor Information Station is not open outside of these months to receive bear reports, though there is little backcountry use during that time. Incidents occurred most often in July (64%; Figure 10), which corresponds to the month with the highest backcountry visitor use (NPS unpublished data). Since 2011, backcountry camper numbers have been relatively stable (ranging from ~800 to 1000 visitors/yr) and bear incidents in the backcountry have remained relatively infrequent (range: infrequent (range: 1–6/yr, Figure 9). Locations with the highest number of total human-bear incidents from 2011–2017 were Bartlett Cove (n = 13) and Gloomy Knob (n = 4; Figure 11).

Brown bears were more often associated with incidents in the backcountry than black bears, yet only black bears were involved in incidents in the frontcountry when the bear species could be identified (Figure 12). The most common events associated with incidents were when bears approached people or entered camp, followed by damaging property, though the two often co-occurred (Figure 12). The incidents of particular concern to managers were those in which bears damaged property or obtained human food or trash. Since 2011, there has been at least one case of property damage each year (range 1–7), for a total of 20 cases, and five instances when bears obtained human food (Figure 13). More severe incidents, including a bear making contact or injuring a person have not occurred since 1980 (NPS 2013). The number of incidents involving defensive bears (n = 1) and angler fish (n = 1) were notably low from 2011–2017.

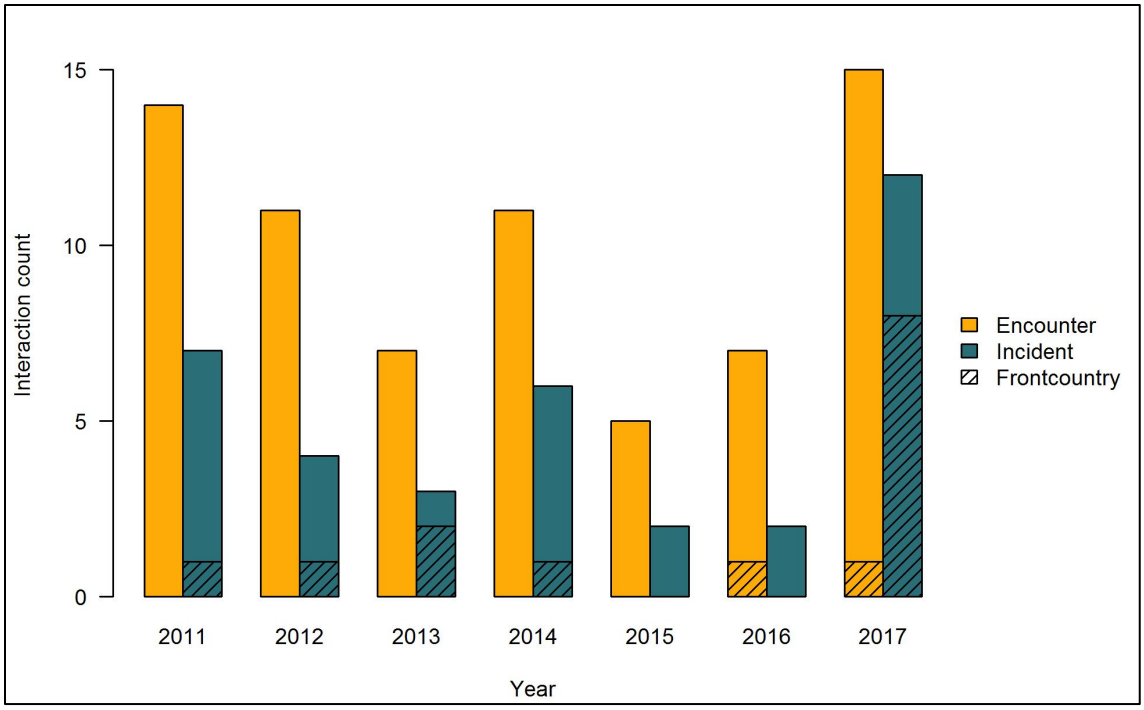


Figure 9. Number of human-bear interactions (encounters = 70, incidents = 36) reported via bear information management (BIM) forms to NPS staff in Glacier Bay, by year, from 2011 through 2017. Interactions occurring in the frontcountry are identified by hash marks.

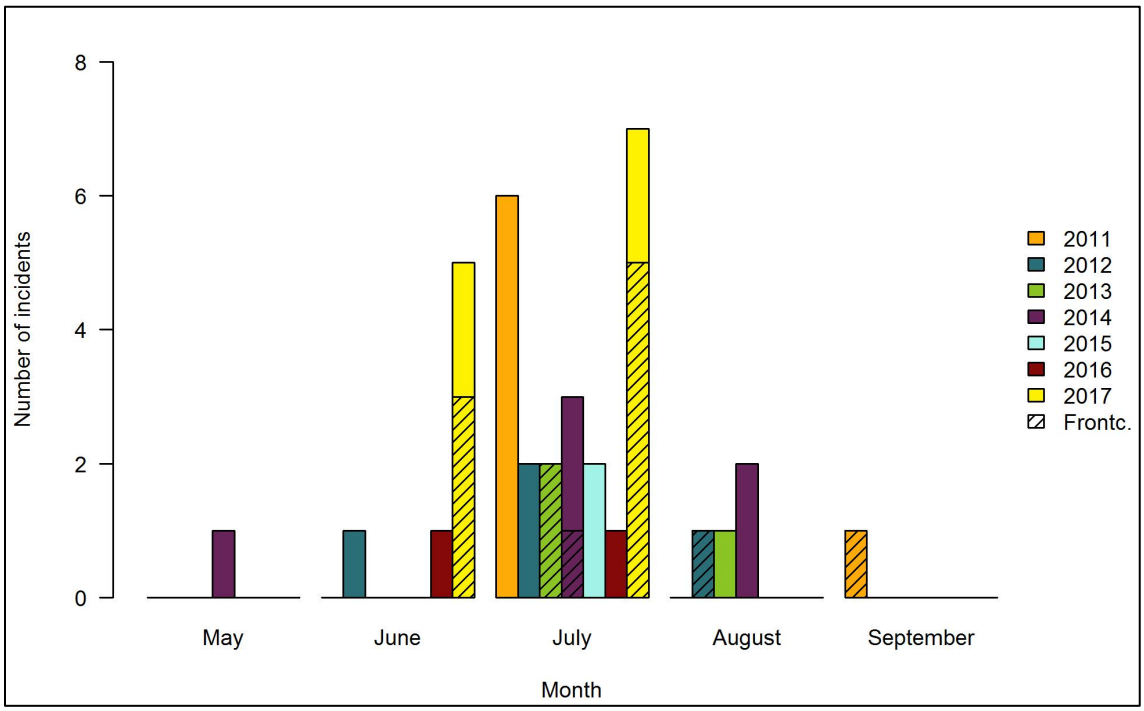


Figure 10. Human-bear incidents reported to NPS staff by month and year in Glacier Bay, from 2011 through 2017 (n = 36). Incidents occurring in the frontcountry (Frontc.) are identified by hash marks.

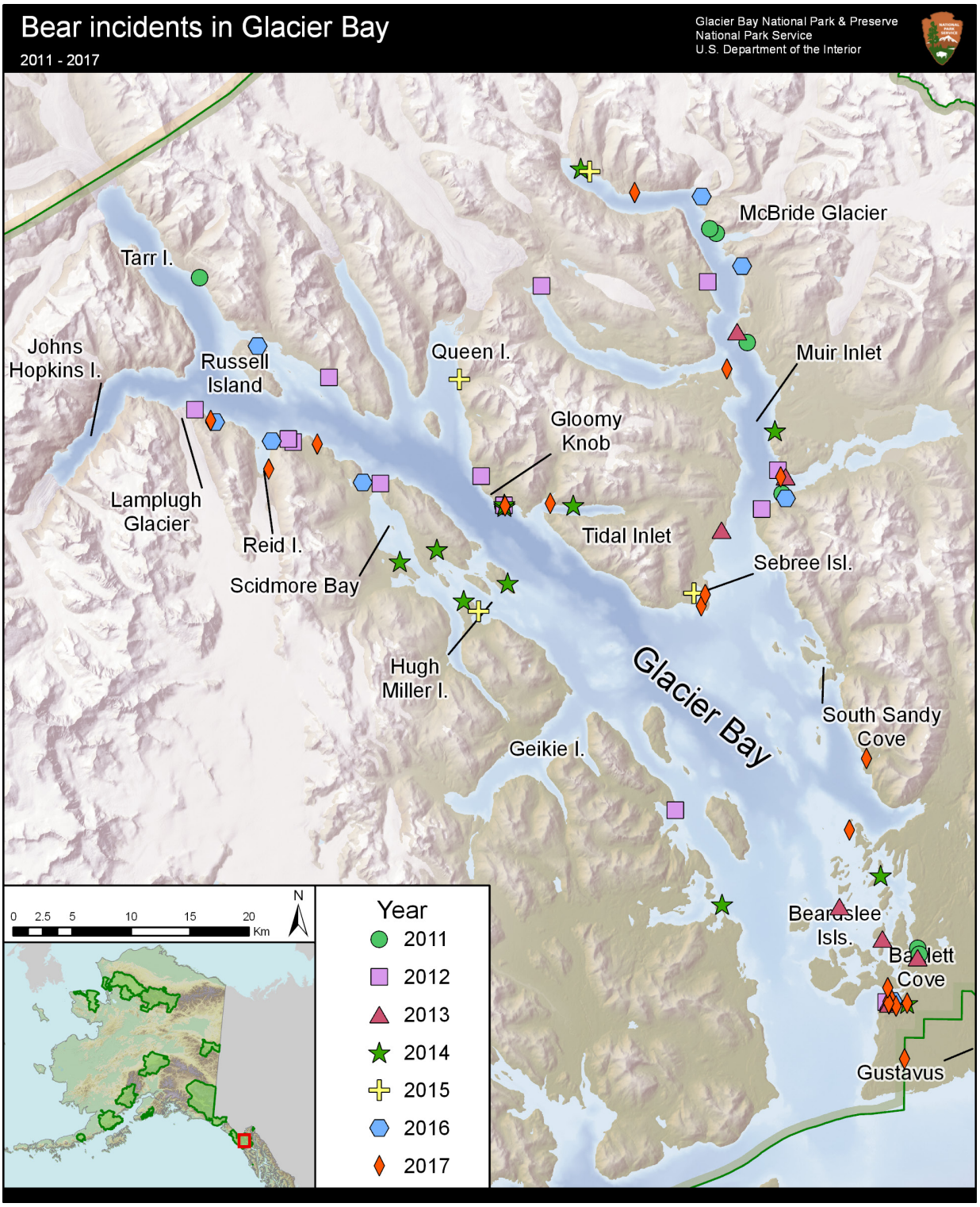


Figure 11. Locations of human-bear incidents from 2011 through 2017 along the shoreline of Glacier Bay, Alaska (n = 36).

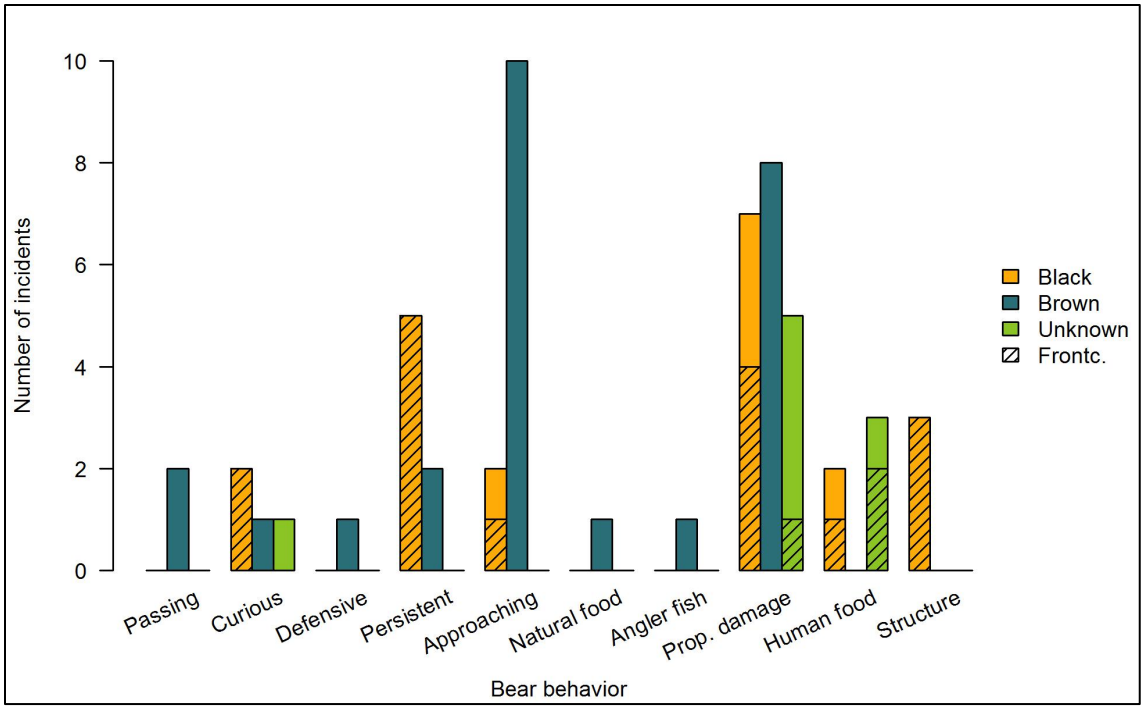


Figure 12. Bear behaviors (n = 56) associated with incidents (n = 36), by species, occurring in Glacier Bay from 2011 through 2017. Incident may be associated with more than one behavior. Incidents occurring in the frontcountry (Frontc.) are identified by hash marks. See Appendix C for detailed behavior definitions.

Passing = Passing or indifferent bear
Curious = Curious bear
Defensive = Defensive bear
Persistent = Persistent bear
Approaching = Bear approached people or entered camp
Natural food = Incident was associated with a natural food source
Angler fish = Incident was associated with angler caught fish or guts
Prop. damage = Bear damaged gear or property
Human food = Bear obtained human food or trash
Structure = Bear entered permanent structure or vehicle

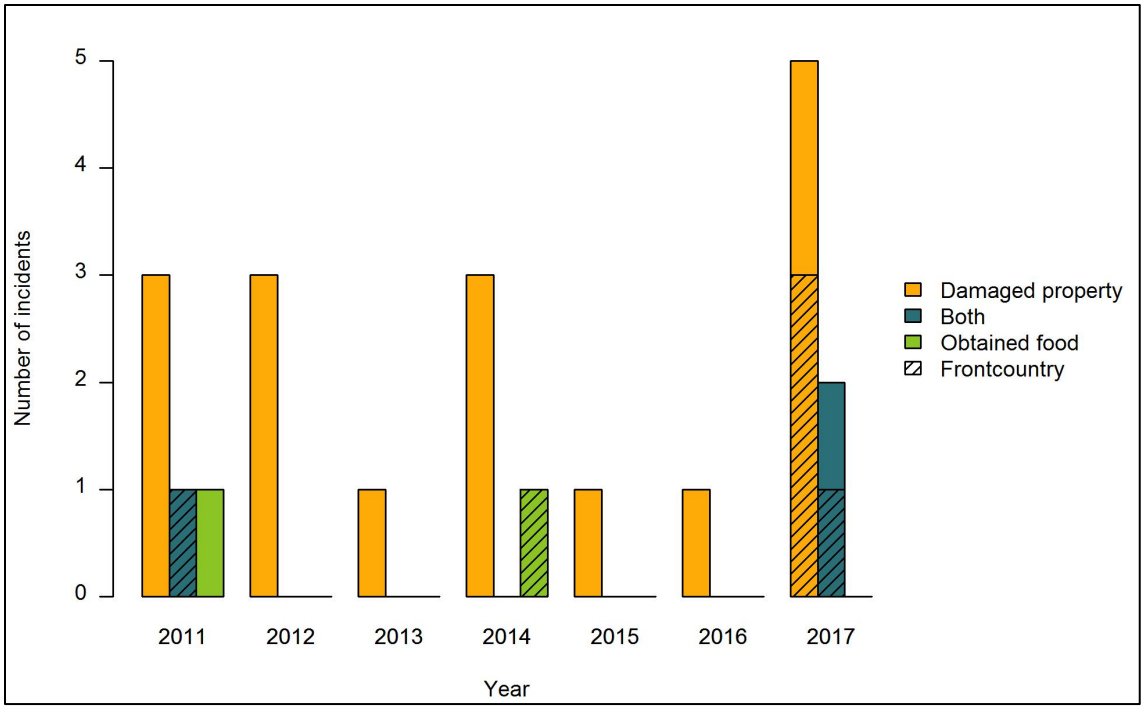


Figure 13. Numbers of incidents in which bears damaged property (n = 17), obtained food (n = 2), or both (n = 3), in Glacier Bay, by year, from 2011 through 2017. Incidents occurring in the frontcountry (n = 6) are identified by hash marks, all others occurred in the backcountry (n = 16).

Of the 25 incidents in which people observed the bear, low-level deterrents (yelling or clapping) were regularly but not always used to deter the bear (n = 16), whereas firearms (n = 1), non-lethal firearms (n = 3), or bear spray (n = 5) were deployed in nine incidents, and usually only after low-level hazing was insufficient to deter the bear (Figure 14). Bear spray is the primary tool backcountry visitors carry to defend themselves from bears in Glacier Bay. Though it was deployed in five cases (n = 2 in backcountry, n = 3 in frontcountry), none involved an aggressive or defensive bear (one damaged property, one passed through a camp, the three frontcountry incidents involved curious or persistent bears). In the two cases where bear spray was deployed in the backcountry, visitors reported that the spray did not reach the bears. In the three frontcountry incidents, spray was deployed twice by park staff and once by Glacier Bay Lodge staff. Two of the bears sprayed in the frontcountry responded by running off, however one responded by running up a tree, but later moved on. Bears that were sprayed were generally being persistent and attempting to obtain human food or trash and did not respond to low-level deterrents. In 2016 a visitor discharged a firearm in an apparent attempt to scare the bear away and there were no reports of injury to the bear. A full list of human-bear interactions can be found in Appendix D.

Bear-related advisories were issued every year from 2011–2017 ranging from a low of two in 2016 to a high of 13 in 2017 (Figure 15). Four temporary closures were issued to foot traffic and camping in 2011, 2012, 2015, and 2016. Three closures were in response to natural food sources, and one was a result of a persistent bear that damaged gear. A full list of bear management actions can be found in Appendix E.

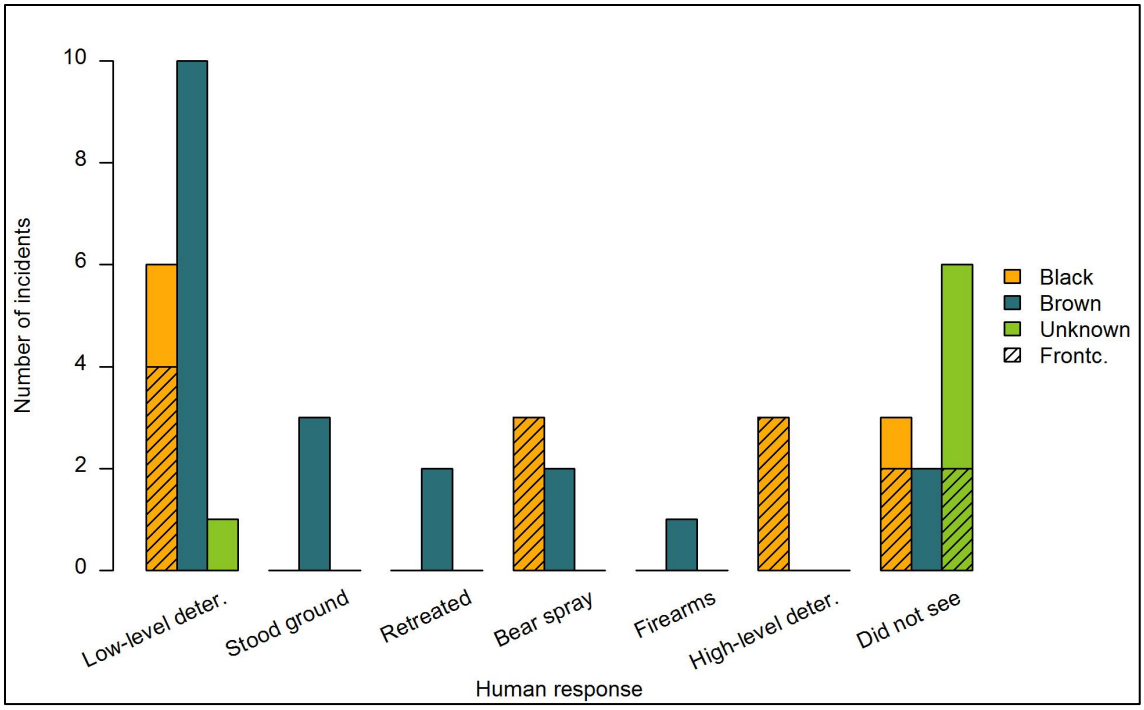


Figure 14. Human responses (n = 42) to bear incidents (n = 36) by species, occurring in Glacier Bay from 2011 through 2017. An incident may be associated with more than one response. Incidents occurring in the frontcountry (Frontc.) are identified by hash marks. See Appendix C for detailed response definitions.

Low-level deter. = low-level deterrents such as yelling or clapping were used
Stood ground = people present reported standing their ground during the incident
Retreated = people retreated or left their camp because of the bear
Bear spray = bear spray was deployed
Firearms = firearms were discharged
High-level deter. = high-level deterrents such as non-lethal firearms used
Did not see = bear was not observed during the incident

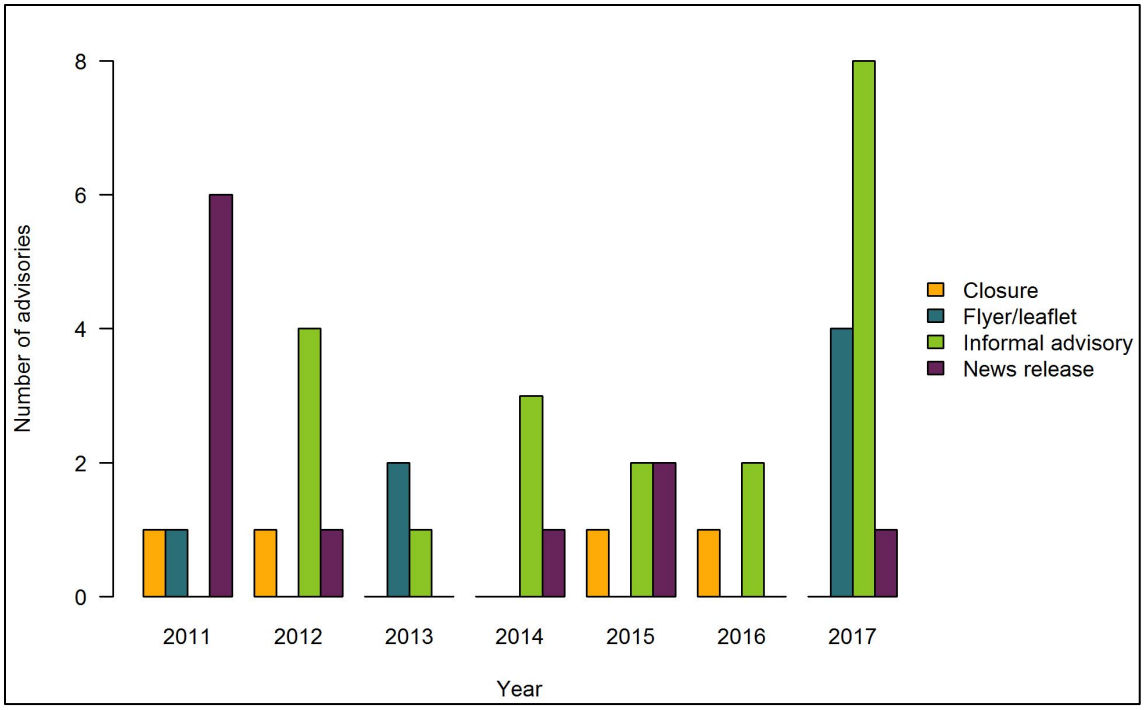


Figure 15. Number of bear-related advisories and closures in Glacier Bay, by year, from 2011 through 2017.

Discussion

Historical accounts of human-bear incidents in Glacier Bay date back to 1912 when Allen Hasselberg was mauled by a brown bear as he was hunting up the Bartlett River (Howe, 1996). Settlers raising cattle in Gustavus in the 1920s to 1950s were challenged by "marauding" brown bears when, according to homesteaders' recollections, bears of both species were reportedly shot on sight (Kurtz 1995; Mackovjak 1988), and in 1939, Bert Parker shot and killed a brown bear that he claimed stalked him at his mining camp above Ptarmigan Creek in the West Arm of Glacier Bay (Been 1940). The number of human-bear incidents ranged from 1–32/yr from 1959–2017 (Figure 16). Reported bear incidents were minimal (1–2 per year) and minor from 1960–1975 (Figure 16). In 1976, however, a lone kayaker camping in the East Arm of Glacier Bay was killed and consumed by a brown bear. In 1978, Glacier Bay National Monument staff wrote the first bear management plan and made attempts to bear-proof garbage cans and the landfill in Bartlett Cove to deal with an estimated 25 black bears in the frontcountry that were partially or entirely dependent upon human food sources (Ritter 1978). The plan defined methods to reduce human-bear incidents as well as protect and maintain natural habitat for black and brown bears.

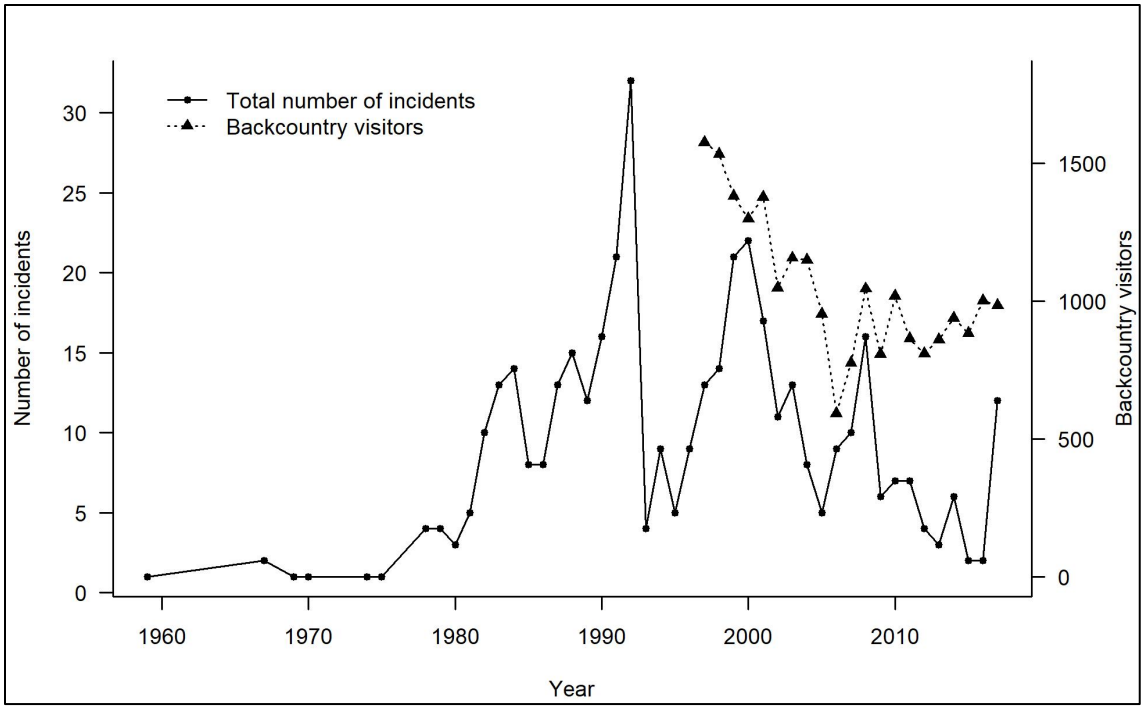


Figure 16. The number of human-bear incidents occurring in Glacier Bay National Park, relative to the number of overnight backcountry visitors, by year from 1959 through 2017.

After the first bear management plan was written, the number of human-bear incidents continued to increase, particularly along the northwest shoreline of Glacier Bay. In 1980 another lone kayaker was killed by a black bear in South Sandy Cove on the East side of the bay. These events led to repeated yearly seasonal camping closures of two large sections of coastline: Sandy and Spokane Coves, and West Tarr/North Johns Hopkins Inlet, referred to from here on as the Sandy Cove and Tarr Inlet closure areas. In addition to the camping closures, these areas were subject to periodic monitoring of bear distribution, habitat, and abundance throughout the 1980s.

In 1988, Glacier Bay, now a national park, completed its second bear management plan which further detailed methods of reducing human-bear incidents while preserving bears and their habitat and allowing for visitor education and enjoyment (NPS 1988). Although the bear management plans of 1978 and 1988 both outlined specific methods for eliminating all human food sources for bears as an important step to reducing human-bear incidents, bears continued to obtain human food and trash in the backcountry throughout the 1980s and into the early 1990s. In 1991, the park began mandating the use of bear-proof food storage techniques such as Bear Resistant Food Canisters (BRFC) in the backcountry, and incidents in which bears obtained food dropped over the next few years. In the frontcountry, bears continued to get human food regularly, despite the bear-proof garbage cans, until the summer of 1992 when a black bear with three cubs of the year repeatedly obtained food from people in Bartlett Cove and was subsequently captured and relocated to Geikie Inlet. After this season, food storage in the developed area improved significantly with bear-resistant trash containers and landfill, and overall numbers of human-bear conflicts decreased throughout the park for a few years.

Human-bear incident numbers began to rise again after 1995 and peaked at 22 in 2000. Most of the incidents during this time occurred in the backcountry. Backcountry visitation increased through the 1990s, peaking at 1576 campers during the 1997 season, the first year for which we have data on overnight backcountry users (Kralovec et al. 2007). After 1997, the number of campers slowly decreased and eventually leveled out to an average of 921 campers per year from 2008–2017 (NPS unpublished data) (Figure 16).

Increases in backcountry use and human-bear incidents in the late 1990s led to the initiation of several bear research projects from 2000–2005 designed to evaluate the ongoing Sandy Cove and Tarr Inlet closure areas (Partridge et al. 2009), to minimize human-bear incidents, and to inform a comprehensive, updated bear management plan. Lessons learned in the first few years of this phase of bear research led to an overhaul of the park's bear safety message beginning in 2003. The new safety message taught campers how to interpret basic elements of bear behavior, how to react accordingly during bear encounters, and encouraged campers to maintain control of their gear and stand their ground to approaching bears in most situations, and to carry bear pepper spray as a deterrent.

Since 2011 the yearly number of incidents has been relatively low (≤7) with the exception of 2017 when two subadult black bears frequented the frontcountry, damaging property and obtaining human food on several occasions. Human-bear incidents in which bears become defensive are low, probably because most people camp and hike on the open shoreline of Glacier Bay (NPS unpublished data) where surprise encounters of bears may be less likely than in brushy areas of low visibility. Regulations invoked in 2011 in the park's Compendium to reduce angler-bear incidents prohibit anglers from filleting fish and leaving the carcasses in the river and require anglers to keep their caught fish and packs with food within six feet of their bodies at all times to prevent bears from becoming food conditioned to angler caught salmon. These regulations appear to have been effective at keeping angler-bear conflicts at a low level. Details on human-bear interactions from 2011 through 2017 can be found in Appendices C and D.

Bear Management Research Projects 2010–2017

Introduction

The deep fjords, islands, and mountains which characterize Southeast Alaska were shaped by a mixture of geological and tectonic processes with dramatic glacial periods of advance and retreat. Two hundred and seventy years ago Glacier Bay was largely covered in ice. Since then, the glaciers have receded at an unprecedented rate, exposing a new bay and a freshly sculpted land. Plants and animals colonized Glacier Bay as the glaciers receded. As mammals migrated into the area, the glaciated and mountainous landscape and wide fjords geographically influenced the colonization by acting as barriers and directing the flow of migration. The shoreline of Glacier Bay currently includes a wide spectrum of habitat, ranging from moonscape-like glacial outwash near the glacier faces to rich old-growth forest in areas not glaciated during the Little Ice Age. Wildlife activity patterns may also be influenced by the >500,000 visitors who visit Glacier Bay proper by motor vessel every year as well as the ~1000 people who camp on the shoreline of Glacier Bay and the >500 people that live and work in the gateway community of Gustavus each summer (NPS and Gustavus Visitor Association unpublished data). These biogeographic and anthropogenic factors contribute to the behavior, diet, distribution, and genetic population structure of black and brown bears in Glacier Bay National Park and Preserve. From 2010–2017, eight bear management research projects were conducted in GBNPP and each project is described in brief here with references to any available reports, theses, etc.

Brown Bear Vessel Disturbance

To study the effects of vessel-based bear-viewing on the behavior of brown bears in Glacier Bay, from 2008–2010 park researchers experimentally approached 24 brown bears from motorized vessels and recorded the distance from boat to bear using rangefinder binoculars. During these 1–10 minute approaches, the bear's behavior was documented every 15–30 seconds. Bear behaviors were categorized as either energetic gain (beneficial; feeding, resting, etc.) or stress (detrimental; vigilance, mouthing, etc.) behaviors. Results indicate that energetic gain behaviors did not change significantly with boat proximity, but the frequency of stress behaviors increased significantly when a vessel approached a bear within 100 m (NPS unpublished data). In addition, the majority of bears approached within 100 m fled short distances, though several bears were displaced completely from the beach. These results led to outreach material for boaters in Glacier Bay with recommendations to stay at least 100 yards (109.6 m) from bears on the beach as well as to watch for disturbance behaviors that might indicate that one's vessel was too close.

Black and Brown Bear Distribution

Brown bears range across the Southeast Alaska mainland and many of the northern islands including Admiralty, Baranof and Chichagof (ABC Islands). Brown bear densities are among the highest across their range on the ABC Islands at approximately one bear per square mile (Schoen and Gende 2006). Although densities of most mainland brown bear populations have not been measured, within Southeast Alaska it is thought that they are highest in the game management unit (5A) encompassing Glacier Bay National Preserve at Dry Bay (Sell 2015), followed by the upper Lynn Canal region and Chilkat River Valley, and may be lowest in Glacier Bay (Schoen and Gende 2006). The Alaska

Department of Fish and Game (ADF&G) assessment is that the mainland population of brown bears is stable (Bethune 2015; Sell 2015).

Black bears in Southeast Alaska are common along the mainland coast and on the southern islands. Although few population studies on black bears have been conducted in northern Southeast Alaska, ADF&G estimates densities of approximately 1.3–1.5 bears/square mile in forested habitat throughout the region, except where they are displaced by brown bears on the Yakutat forelands (Scott 2014; Sell 2014a; Sell 2014b). In Southeast Alaska, black bears are the least studied of all big game species (Schoen and Peacock 2006).

Until recently, it was thought that brown bears colonized Southeast Alaska from the north, and black bears from the south, after the end of the last great ice age approximately 10,000 years ago (Klein 1965). However, black and brown bear fossils found in caves on Prince of Wales Island in the 1990s were dated to ~40,000 years old, indicating that both species coexisted in the area through at least part of the Late Wisconsin glaciation, and further substantiating the theory that habitable coastal refugia existed in Southeast Alaska during this time (Heaton et al. 1996).

Species distribution in the park has varied widely over the past 100 years. In the 1920s and 30s, brown bears were regularly reported in Gustavus and Bartlett Cove, yet were essentially absent in these areas from the 1960s through the late 1990s. Since that time, brown bears have returned and are reported often. Conversely, black bears were more prevalent on the lower outer coast of Glacier Bay in the 1960s and 1970s (Streveler 1974; Streveler 1975) but now brown bears appear to predominate area (Lewis 2012). A similar increase in brown bears is noticeable over the last decade in western Dundas Bay, at Point Carolus, and in Bartlett Cove and the lower Beardslee Islands. Currently black bears appear to predominate in the forested regions of the lower bay, while brown bears predominate in the open, recently deglaciated upper bay and along much of the outer coast to Dry Bay, with wide mixing zones of the two species in the mid portions of Glacier Bay and in bays and inlets along Icy Strait and the outer coast.

Changes in bear distribution over time are likely influenced by a range of factors including receding glaciers providing access to new territory, subsequent plant and stream succession, immigration of individuals through travel corridors, and colonization of new areas. Streveler and Smith (1987) describe two migration corridors into Glacier Bay besides the shoreline: the Tarr Inlet – Melbern corridor in the upper West Arm and the Goddess River – Endicott River corridor, otherwise known as the Endicott Gap, in the lower East Arm. They inferred that the Endicott Gap corridor has played a large role in the establishment of mammals, including brown and black bears, in upper Glacier Bay since the ice retreated over the past 200 years.

Competition between the brown and black bears has been hypothesized to play a major role in colonization success when there is a large dietary overlap between the species (Mattson et al. 2005). Mattson et al. (2005) concluded that brown bears have an advantage over black bears when high quality foods are concentrated at predictable times, allowing brown bears to dominate foraging through interference, resource defense, or competition. When food resources are more dispersed and less predictable, however, black bears, with smaller body size (less dietary requirements) and higher

densities, are able to dominate foraging opportunities through exploitation competition. This could explain why brown bears are less prevalent in the lower forested areas of Glacier Bay, where berries and forb resources are dispersed and higher densities of black bears are able to exploit the dispersed food resources. Exceptions may occur at salmon streams where brown bears are able to dominate a high quality resource.

During the summers of 2009 and 2010, GBNPP researchers used direct observations, track identification, and genetic analysis of bear hair collections to examine the distribution of black and brown bears across the shoreline of the park relative to the stage of succession of the landscape using an occupancy modeling framework while accounting for differences in detectability (Lewis 2012). Through this work, the park found that black bears are most closely associated with closed forest cover in the southern two-thirds of the bay, and are essentially absent from recently deglaciated (<150 years) habitats. Over time, the distribution of black bears will likely move northward as forest develops in newly deglaciated areas. Brown bears were documented at all study sites, with the highest levels of activity occurring in recently deglaciated areas of open scrub (<150 years) and old growth forest outside Glacier Bay proper (>300 years), and lowest levels of activity in the young forests of southern Glacier Bay (Lewis 2012). The current distribution of black and brown bears in the park will undoubtedly continue to change as plant and stream communities continue to mature.

Population and Landscape Genetics of Brown Bears

As part of the black and brown distribution study from 2009–2010, bear hair collected from the sites distributed across the shoreline of the park as well as harvest samples obtained from outside the park by ADF&G were further analyzed to examine the genetic population structure of brown bears across northern Southeast Alaska. Microsatellite genetic analysis identified 105 individual brown bears. Genetic and landscape analyses were used to examine how the landscape and population structure of brown bears are intertwined in GBNPP, and to help determine likely sources for brown bear recolonization in the recently deglaciated region.

Through this analysis, Lewis et al. (2015) identified three genetically distinct groups of brown bears in Glacier Bay and concluded that the rugged Fairweather Range and the wide fjords of Glacier Bay are both barriers to dispersal. Two genetic groups range far beyond the parks boundary, both to the west and east, whereas one group has been isolated long enough to undergo genetic drift and develop a genetic signature unique to northern Glacier Bay (Lewis et al. 2015). This endemic subpopulation likely stems from an original group of colonizers from the east, while the other two groups are more recent immigrants. One recently immigrated group likely moved into the bay from the northwest, while the other arrived from the northeast, and represent a second wave of colonization along the shoreline of Glacier Bay. These more recent immigrants are now beginning to mix with the original colonizers after years of separation, and soon the unique genetic signal of the original colonizers will likely vanish.

Humpback Whale Scavenger Study 2010

After a humpback whale (*Megaptera novaeangliae*) carcass was found washed ashore at Scidmore Cut in the spring of 2010, GBNPP and collaborators maintained remote cameras at the site from May 19–September 17 to document the use of the carcass by scavengers (Lewis and Lafferty 2014). Up to

12 bald eagles (*Haliaeetus leucocephalus*) at a time scavenged heavily throughout May and June. Brown bears and wolves (*Canis lupus*) were both present at the whale carcass repeatedly throughout the entire summer appearing to tolerate each other at this abundant food source. As many as six brown bears at a time fed on the carcass with the highest activity during the mornings and evenings. Up to seven wolves were observed with activity highest in the early morning, and four wolf pups joined their parents at the feast in early August. Photos were analyzed in what ended up being one of the longest scavenger events of a single carcass ever documented, and a unique opportunity to observe wolves and bears simultaneously scavenging (Lewis and Lafferty 2014).

In September 2010, the majority of the carcass washed from the Scidmore Cut and drifted south with a brown bear on top of it! The next spring the carcass was discovered again north of the mouth of Geikie Inlet and a remote camera was established at the site. The same pack of wolves from 2010 continued to feed on the carcass throughout the summer of 2011 in the new location as evidenced by repeated photos of wolves from the motion-sensor camera, a heavily worn canine trail along the beach fringe, and wolf hair and teeth marks on the whale flesh and bones. As the flesh of the whale was reduced, there was increasing evidence of wolves eating the bones, particularly the round ends of ball joints. Brown bears also visited the carcass over the summer as well as a single black bear, but with less frequency than wolves. Once the soft tissue of the whale was completely consumed, scavengers continued to consume bone and marrow out of ribs and large vertebrae. A large brown bear was chewing on bones on November 6th, and the pack of wolves with glossy thick winter coats scavenged on the bones as late as November 27th. In the spring of 2012, scavengers were no longer reported frequenting the carcass site and only a few bones remained.

Gustavus Forelands Bear Populations Project

Black and brown bears provide important wildlife viewing opportunities within Glacier Bay National Park, and sport hunting opportunities in areas near the park, such as Gustavus and in the Preserve at Dry Bay. During 2011 and 2012 Glacier Bay National Park and Preserve and ADF&G collaborated on a study to assess the bear population in a 200 km study area of the Gustavus Forelands using genetic analysis of bear hair from bear rub trees (see photo below) and scented hair traps.

Wildlife managers often rely on population estimations to guide decisions on harvest levels of game species. Many game animals regularly cross federal and state jurisdictions, creating a shared interest in population data across multiple agencies, which pertains to the black bear in northern Southeast Alaska. Until this project, there had been no regional population studies on this species despite management goals of 10% harvest rates. Over the course of the study, researchers collected 196 hair samples from 25 rub trees and eight baited hair traps, and identified 33 individual black bears and 14 individual brown bears. Pinjuv (2013) estimated that the likely population of black bears in this region to be 54.5 ± 10.3 individuals (estimate ± SE). Ten bears were harvested in 2011 and four in 2012 (ADF&G unpublished data) for an average of 7 bears indicating that the level of harvest was above 10% during this time. Looking at a longer timeframe, harvest was highly variable between years but the average number of black bears killed by humans annually from 2010 through 2017 was 4.13 individuals (range 1–10). Continued monitoring of population and harvest rates would allow

state and federal wildlife managers to ensure black bear harvest and viewing opportunities into the future.

The number of individual brown bears identified (n = 14) in the Gustavus Forelands in 2011–2012 was surprising because they had been seen only rarely and are only thought to have begun using the area recently after a 50-year absence, however these findings provide further evidence of brown bears' recent range expansion as documented by Lewis (2012). Information from this study and others has led to increased community outreach regarding brown bear behavior and safety in the town of Gustavus.



A remote sensor camera captures a brown bear using a scented rub tree where the hair is collected for genetic analysis. (NPS)

South Sandy/Spokane Cove Closure Study

Following a fatal mauling of a kayaker by a black bear in 1980, the shoreline surrounding South Sandy Cove was closed to camping for over 20 years. In 2004 and 2005 the park conducted a study to assess bear activity and habitat quality to determine whether the area should be re-opened (Partridge et al. 2009). It was determined that Sandy Cove ranked consistently high in black bear activity (no brown bears were documented at this location) and habitat quality and consequently, the

area remained closed to camping. Ten years later, in 2014, the park again initiated a study to assess whether the area remained hazardous to campers, or if it could be re-opened. In this assessment, GBNPP bear management staff visited the site monthly to assess bear activity levels and camped within the closure for five nights to test the safety of opening the camping closure to the public.

Bear activity levels were assessed in multiple ways, including motion sensor cameras overlooking bear rub trees, scat counts from bear sign surveys, activity rates from time-lapse cameras, and direct bear sightings. Habitat was assessed qualitatively using an index of bear food species richness. Bear activity along the shoreline appeared to have decreased since 2004–2005 as evidenced by decreased scat counts and activity on time-lapse cameras (NPS unpublished data). However, many bears of both species and all cohorts used the area throughout the summer, providing further evidence of brown bears' recent range expansion as documented by Lewis (2012).

Habitat diversity is extremely high and an extensive system of well-defined game trails surrounding South Sandy and Spokane Coves indicates high levels of bear (and other large mammal) movement to and from the shoreline. Abundant well-used rub trees (14+) further indicate the importance of this area to bears in the region.

The camping closure was lifted in 2015 after this study, in part because of substantial improvements to food storage requirements and compliance, in addition to public education and bear management practices. Additionally, there was no evidence that bear activity in the area was higher than many other areas of the park that are currently open to camping. Lastly, there had been no reported human-bear incidents in the last 20 years from day use of the closed area or from campers using the area outside of the seasonal closure. No human-bear incidents have been reported in the area since it was opened to camping in 2015.

Humpback Whale Scavenger Project 2016

On June 26, 2016 a dead humpback whale was discovered floating in park waters in Icy Strait. The whale was towed to shore on the mainland just east of Dundas Bay and a necropsy was completed by a group of park staff, volunteers, and a veterinary pathologist. The cause of death was eventually determined to be nutritional stress likely brought on by the Northeast Pacific heatwave in addition to multiple tissue and bone infections (Taylor et al. in press). Following the necropsy, the GBNPP terrestrial wildlife team set up a remote camera to record the scavenger activity on the carcass from June 29, 2016–September 20, 2016.



Scavengers (top: eagles, bottom: wolf) making use of a whale carcass in July 2016, captured by a motion activated camera, Glacier Bay National Park. (NPS)

Because most whale carcasses eventually sink to the ocean floor instead of ending up on land, little research has been done on the impact that a marine subsidy as large as a whale carcass can have on a terrestrial ecosystem. This case provided a unique opportunity to study the composition, activity level, and interactions of scavengers that fed on the whale carcass during its existence. Over the three months of the study, a variety of wildlife species were recorded feeding on the carcass including eagles (only bald eagles were identified, though golden eagles (*Aquila chrysaetos*) may have been present), corvids such as Northwestern crows (*Corvus caurinus*) and ravens (*Corvis corax*), wolves, gulls (*Larus* spp.), and a few other birds. Eagles were the first scavengers to show up in high numbers, and they remained at the carcass for about a month. As soon as the eagles largely stopped feeding, the smaller birds such as corvids and gulls arrived. Wolves fed throughout the process, though they were mainly detected in the mornings and late afternoons, in contrast to the birds who fed at the carcass all day. Interactions were mostly intraspecific, and mostly occurred at the beginning of the consumption process between eagles.

Surprisingly, no bears were detected feeding on the carcass. This is in contrast to a previous study done in Glacier Bay in 2010 on a humpback whale carcass where bears were detected on the carcass nearly every day (Lewis and Lafferty 2015). It is unknown why bears did not scavenge this carcass. It is possible that bears never found the carcass or that alternative food resources (such as berries or salmon) were plentiful that summer, thus bears may not have needed to feed at the carcass. After all the soft tissue of the carcass was gone, at least one brown bear was detected, though it was moving through the area and did not feed on any remains.

This study provided the park with additional information following the 2010 humpback whale scavenger study on what happens to a whale carcass when it washes up on land. These results can help to inform potential management decisions in the park (e.g. where to tow a whale carcass for necropsy) as well as aid in determining future research needs.

Population Genetics of Black and Glacier Bears

Glacier bears, also known as blue bears, are uncommon color variants of black bears whose pelage ranges from white to black with silver hair tips. This unusual color morph has only been recorded in northern Southeast Alaska and extreme northwestern British Columbia (Figure 17). Glacier bears are rare, and there is very little scientific knowledge regarding their range, the frequency, or the genetic basis of their unusual pelage color. This lack of knowledge makes it difficult to manage and predict the future survival of glacier bears.

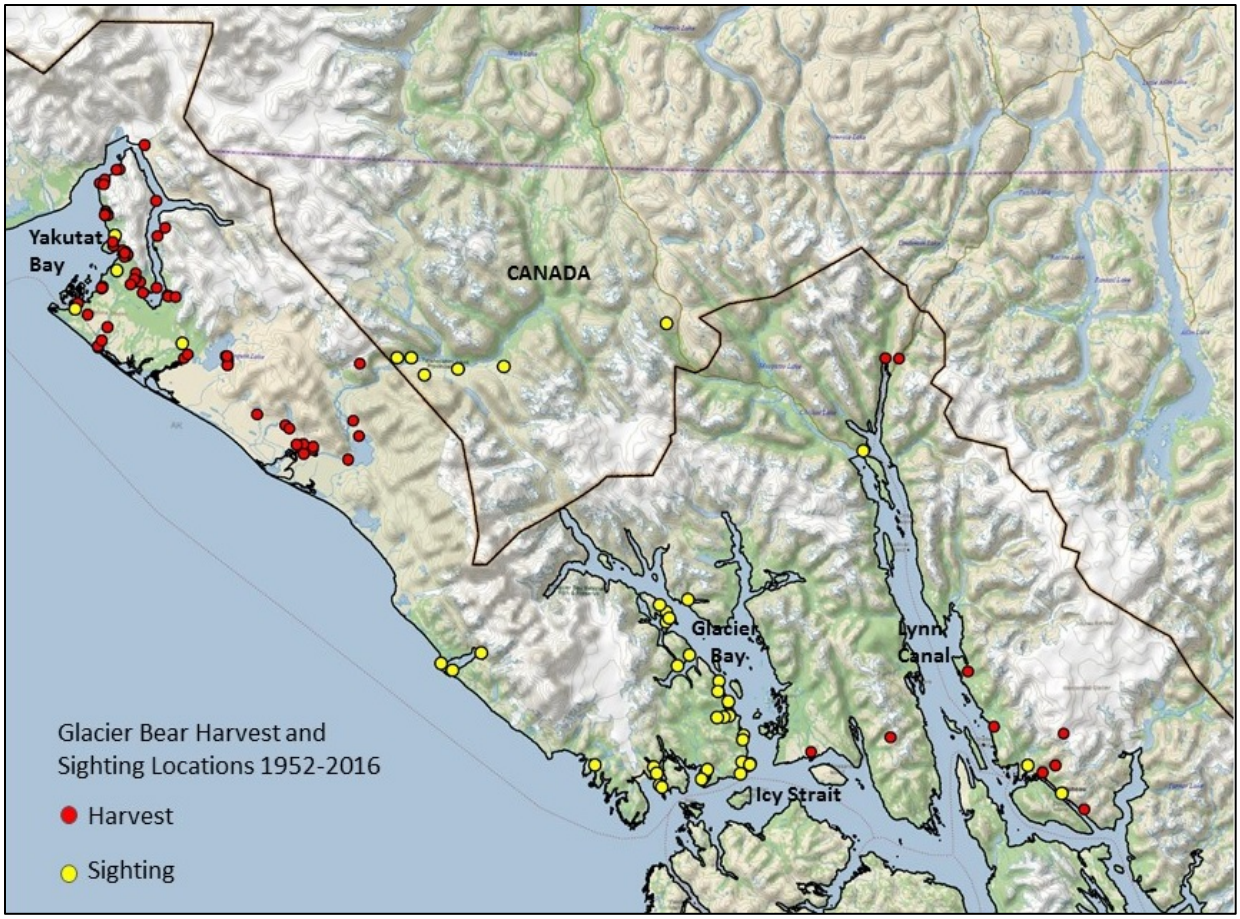


Figure 17. Range of glacier bears in northern Southeast Alaska based on harvest records and reported sightings from 1952 through 2016 (NPS unpublished data compiled by Linda Wiggins and Tania Lewis).

Glacier Bear Morphology

Glacier bear pelage contains silver-blue/gray hairs of varying proportion. Often the lighter coloration in glacier bears is found on the bear's back and shoulders while their legs and belly may be dark and even black. Black-colored bears can give birth to glacier-pelage offspring (see photo below) and vice versa. It is unknown if pelage color is the only physical characteristic distinguishing glacier bears from other black bears. Joe Ibach, a miner in Reid Inlet of Glacier Bay from the 1920s to the 1950s, shot two glacier bears in 1930 (Home 1973) and a number of others as a big game guide up until the early 1960s. Ken Youmans, retired Glacier Bay NPS employee, recalled that Ibach described glacier bears to be quite different in appearance and behavior from other black bears; namely, that they were smaller, rangier, more secretive, and tended to favor high, barren country (Greg Streveler, retired NPS biologist, pers. comm.). Ibach claimed that glacier bears were a separate species based on the small size of his specimens and a thin covering of bone on the rear molars (Home 1973). This claim has never been substantiated.

Citing "scanty knowledge" of glacier bears, Wilfred Hudson Osgood (1909) of the Chicago Field Museum of Natural History (now the Field Museum) described a single glacier bear skin specimen in 1909. This particular specimen was largely black with gray hairs scattered throughout its pelage.

Osgood also referred to approximately eight other glacier bear skins and fragmentary skulls that were collected in the previous 15 years from Lynn Canal to Cape St. Elias. Based on these imperfect and largely incomplete specimens, Osgood found no proof that glacier bears differ from other black bears in cranial characteristics. He explained the small size of many of the skulls by the young age of most of the specimens collected. Osgood concluded that the only distinguishing feature of glacier bears is their gray color, which is subject to high variation. ADF&G harvest records from 1960–2005 in northern Southeast Alaska show no significant skull size differences between glacier pelage bears (n = 87) and other black bears (n = 4276) (Figure 18).

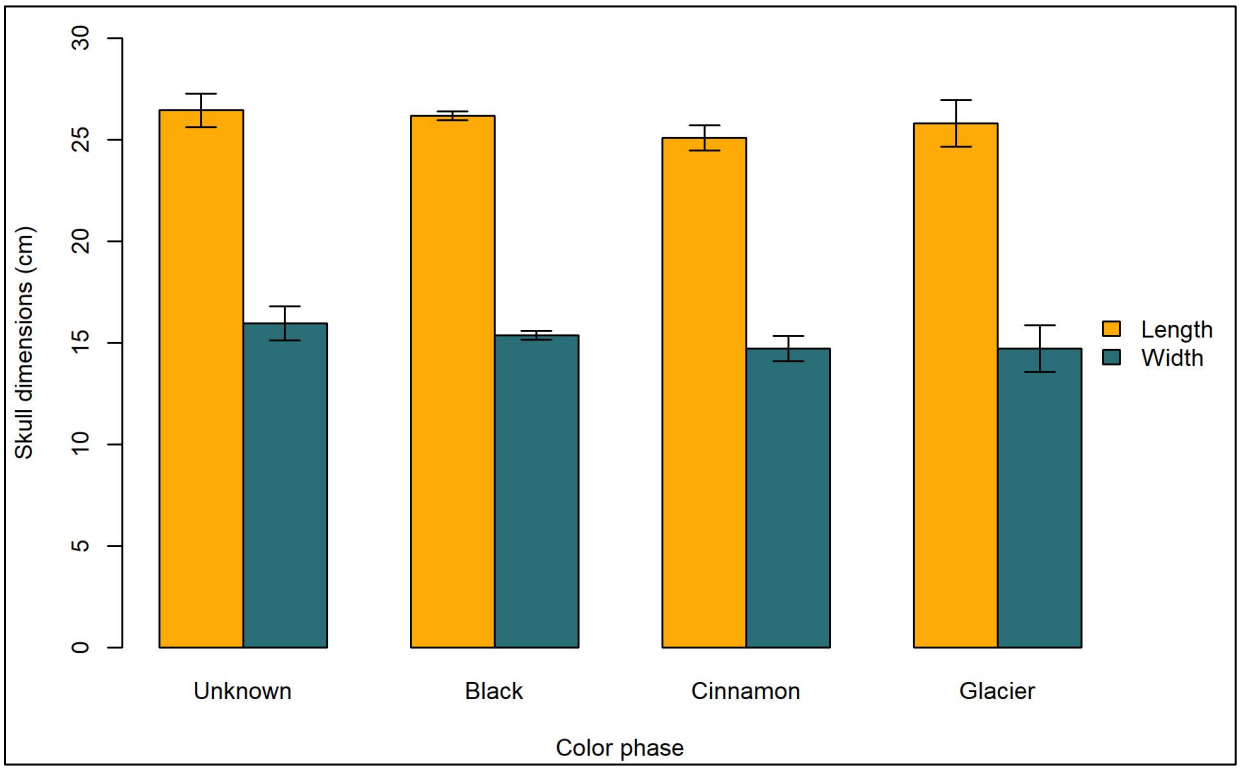


Figure 18. Average (mean ± 95% CI) skull length and width measurements of unknown (n = 185), black (n = 3571), cinnamon (n = 520), and glacier (n = 87) color phase black bears from ADF&G harvest records in GMU 1C, 1D, and 5A from 1960 through 2005 showing no significant size difference between glacier and other pelage black bears (ADF&G unpublished data).

Another Black Bear Color Phase: Kermode Bear

There is a distinct white pelage morph black bear on the coast of British Columbia known as the Kermode Bear. Logging threats on Princess Royal Island in the 1990s led to research on the population structure of and genetic basis for *U. a. kermodei* (Kermode Bear Scientific Panel 2007). Genetic analysis found the Kermode (white) color morph to be caused by a single nucleotide substitution that caused an amino acid change in the melanocortin 1 receptor (Mc1r) locus. This receptor responds to levels of melanocyte-stimulating hormone to regulate pigment production (Ritland et al. 2001). This gene is recessive, so only animals homozygous at this locus express the Kermode color phase and heterozygotes may act as a reservoir for the gene in the population.

“Kermodism” is believed to have been established and maintained by genetic isolation and reduced population sizes (Marshall and Ritland 2002).



A black pelage bear with two glacier bear color-phase cubs. (NPS/CODY EDWARDS)

Glacial Refugia

Byun et al. (1997) found that Haida Gwaii black bears, endemic to the Queen Charlotte Islands, were genetically indistinguishable from coastal black bears of British Columbia and Vancouver Island but highly distinct from continental black bears. It is hypothesized that the coastal lineages were isolated in northern coastal glacial refugia during the Pleistocene while continental lineages were isolated in southern and eastern North America. Northern coastal glacial refugia likely include Hecate Strait (named the Haida Gwaii glacial refugium) and terraces north and south of Lituya Bay on the outer coast of Glacier Bay National Park. While trees were likely present in Haida Gwaii during the last glacial maximum, the pollen record does not show evidence of trees in the Lituya terrace refugium, so it is unknown if the area could have supported large mammals (Dan Mann, University of Alaska Fairbanks, pers. comm.). Associations between these refugia, lineages, and pelage colors have not been examined.

Traditional Knowledge of Glacier Bears

George Ramos, a Tlingit elder from Yakutat recalled that traditionally glacier bears were considered to be a third kind of bear that were smaller than both black and brown bears and possibly mated with

black bears. The Tlingit name for these bears was “sik noon” which translates into “a bear that disappears” in reference to their small size, their elusiveness, and their ability to blend in with snowfields. Due to their rarity, Ramos claimed that glacier bears were not hunted as were black and brown bears. Traditional hunters did not encounter glacier bears often so when they did, elders advised that they “look at them and leave them go”. Ramos reported that glacier bears were not hunted until Outside trophy hunters came to the area in the 1940s.

Harvest of Glacier Bears

Glacier bears are targeted and opportunistically harvested by sport hunters in areas of their range. One to four glacier bears are harvested in game management unit (GMU) 5A (NW of Glacier Bay) per year with no increasing trend (ADF&G harvest data, 1965–2005). Approximately one glacier bear every other year is harvested in GMU 1C (East of Glacier Bay) and glacier bears are killed in defense of life and property occasionally in the cities of Juneau and Skagway (Neil Barten, ADF&G, pers. comm.). Alaska Board of Game hunting regulations specify that white-colored bears may not be taken in GMUs 1C and 1D (NE of Glacier Bay) as of 2008. Non-white glacier bears are not protected. Glacier bears are protected from legal harvest in a large portion of their range encompassed by Glacier Bay and Klondike Gold Rush National Parks. Hunting is allowed in Glacier Bay National Preserve, directly adjacent to the park, and seven (9%) of the 78 glacier bears taken in the Yakutat area from 1965–2005 were taken from the preserve (ADF&G harvest data).

Potential Threats

Potential current threats to glacier bears include overharvest and gene swamping. There is currently no evidence to suggest glacier bears are being overharvested, but without knowledge on the distribution and frequency of the glacier bear phenotype, it is difficult to monitor their harvest levels to ensure persistence of the color morph. There is also a potential for a decreasing frequency in glacier-pelage phenotypes due to continued interbreeding with individuals without glacier-pelage phenotypes and subsequent loss of associated genetic diversity.

Current Research

Preliminary results of the contemporary population structure of black bears within the range of the glacier bear morph suggest that Lynn Canal and Glacier Bay, both approximately 100 km long, 10–18 km wide north-south fjords, are barriers to genetic connectivity. Glacier bears are found in four different black bear populations including Juneau, Haines, Western Glacier Bay, and Yakutat. Further analysis is currently underway. This information is needed to identify, manage, and maintain genetic diversity within black bear populations containing glacier bears.

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Appendix A: Bear food resources present in Glacier Bay National Park and Preserve

Table A-1. Bear food resources present in Glacier Bay National Park and Preserve (adapted from Partridge et al. 2009).

Category	ID Code	Common name	Scientific name	Habitat type; targeted part; season
Herbaceous plants	ACRU	Baneberry	*Actea rubra*	Forest; unknown; unknown
	ANSP	Sea watch/white angelica	*Angelica* spp.	Meadow; stalk, flower, roots; spring, summer
	ARUV	Bearberry	*Arctostaphylos uva-ursi*	Open dry; berry: fall and spring
	ARDI	Goatsbeard	*Aruncus dioicus*	Forest; unknown; summer
	ASSP	Vetch	*Astragulus* spp.	Open dry; root; summer
	ATFI	Lady fern	*Athyrium filix-femina*	Forest; leaves; summer
	BAOR	American wintercress	*Barbarea orthoceras*	Meadow; unknown; unknown
	BORO	Groundcone	*Boschniakia rossica*	Alder; bulb; summer
	COCH	Pacific hemlock-parsley	*Conioselium chinense*	Meadow; leaves and flowers; summer
	EQSP	Horsetail	*Equisetum* spp.	Wetlands; all; spring and summer
	FRCH	Strawberry	*Fragaria chiloensis*	Meadow; berries; summer
	GLLI	Beach Carrot	*Glehnias littoralis*	Sand dunes; root; late summer
	HEAL	Alpine sweet-vetch	*Hedysarum alpinum*	Meadow; roots; spring, summer, fall
	HELA	Cow parsnip	*Heracleum lanatum*	Meadow; stalk, flower, seed; summer
	LAMA	Beach pea	*Lathyrus maritimus*	Meadow; unknown; unknown
	LIHU	Beach lovage	*Ligusticum hultenii*	Meadow: leaves and flower; summer
	LUSP	Lupine	*Lupinus* spp.	Meadow; roots; late summer
	OPHO	Devil's club	*Oplopanax horridus*	Forest; berries; summer and fall
	OSDE	Licorice root	*Osmorhiza depauperata*	Forest; unknown; unknown

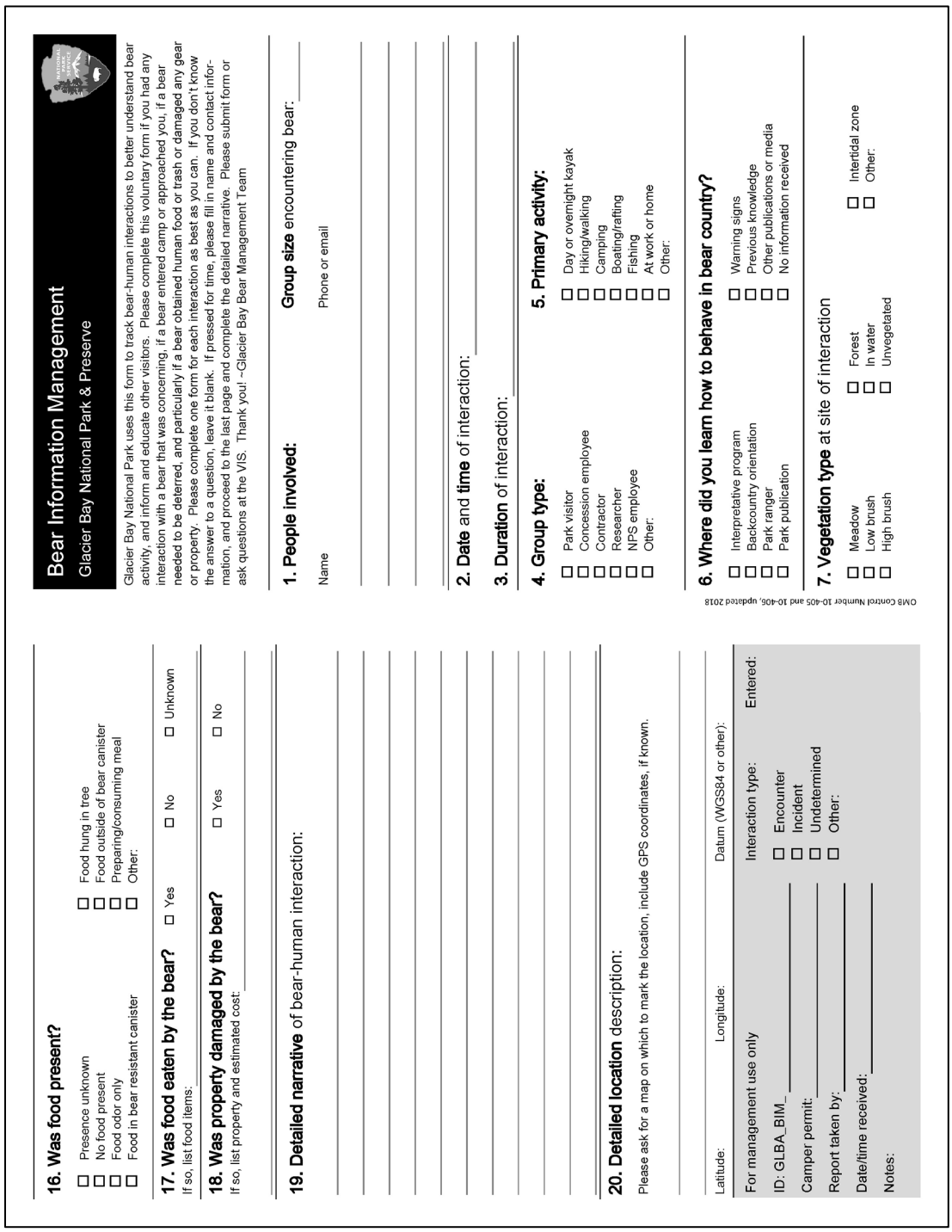
Table A-1 (continued). Bear food resources present in Glacier Bay National Park and Preserve (adapted from Partridge et al. 2009).

Category	ID Code	Common name	Scientific name	Habitat type; targeted part; season
Herbaceous plants (continued)	OXCA	Field locoweed	*Oxytropis campestris*	Meadow; flowers, seeds, roots; summer
	PLMA	Goose tongue	*Plantago maritima*	Intertidal; leaves; unknown
	RISP	Currant	*Ribes* spp.	Forest; berry; summer and fall
	RUAR	Nagoonberry	*Rubus arctica*	Meadow and forest; berry; summer
	RUSP	Salmonberry	*Rubus spectabilis*	Forest; berry; summer
	SARA	Red-elderberry	*Sambucus racemosa*	Forest; berry; summer and fall
	SHCA	Soapberry	*Shephardia canadensis*	Open dry; berry; summer and fall
	STAM	Twisted stalk	*Streptopus amplexifolius*	Forest; stalk; spring and summer
	TASP	Dandelion	*Taraxacum* spp.	Meadow; flower; spring and summer
	TRMA	Sea arrow-grass	*Triglochin maritimum*	Intertidal; leaves; unknown
	VASP	Blueberry/huckleberry	*Vaccinium* spp.	Forest; berry; summer and fall
	VIED	High-bush cranberry	*Viburnum edule*	Forest and open; berry; fall
Grasses	ELAR	Rye-grass	*Elymus arenarius*	Beach meadow; blade; spring
	ELPA	Creeping spike rush	*Eleocharis palustris*	Wetland; blades; summer
	CASP	Sedges	*Carex* spp.	Wetland; blades; spring and summer
	PUNU	Pacific alkaligrass	*Puccinellia nutkaensis*	Intertidal: blades; spring and summer
	UNGR	Unknown graminoid	–	Variable: blades; spring and summer
Animals	ALAL	Moose	*Alces alces*	Variable; calves; spring
	BASP	Barnacles	*Balanus spp.*	Intertidal; inside; all seasons
	MYED	Blue mussels	*Mytilus edulis*	Intertidal; inside; all seasons
	ONSP	Salmon	*Onchorynchus* spp.	Streams; all parts; summer and fall

Table A-1 (continued). Bear food resources present in Glacier Bay National Park and Preserve (adapted from Partridge et al. 2009).

Category	ID Code	Common name	Scientific name	Habitat type; targeted part; season
Animals (continued)	ORAM	Mountain goat	*Oreamnos americanus*	Variable; all parts; all seasons
	TRSP	Amphipods	*Traskorchestia* spp.	Intertidal; all parts; spring and summer
	PHSP	Gunnels/sticklebacks	*Pholis/Xiphister* spp.	Intertidal; all parts: all seasons
	MISP	Voles	*Microtus/Clethrionomys spp*	Meadow; all parts; all seasons
	VESP	Wasps/bees	*Vespula/Bombous* spp.	Variable; all parts; summer

Appendix B: Bear Management Form



Bear Information Management

Glacier Bay National Park & Preserve

Glacier Bay National Park uses this form to track bear-human interactions to better understand bear activity, and inform and educate other visitors. Please complete this voluntary form if you had any interaction with a bear that was concerning, if a bear entered camp or approached you, if a bear needed to be deterred, and particularly if a bear obtained human food or trash or damaged any gear or property. Please complete one form for each interaction as best as you can. If you don't know the answer to a question, leave it blank. If pressed for time, please fill in name and contact information, and proceed to the last page and complete the detailed narrative. Please submit form or ask questions at the VIS. Thank you! –Glacier Bay Bear Management Team

1. People involved: **Group size** encountering bear: _____

Name Phone or email

2. Date and **time** of interaction: _____

3. Duration of interaction: _____

4. Group type:

- ☐ Park visitor
- ☐ ☐ Concession employee
- ☐ ☐ Contractor
- ☐ ☐ Researcher
- ☐ ☐ NPS employee
- ☐ Other:

5. Primary activity:

- ☐ Day or overnight kayak
- ☐ ☐ Hiking/walking
- ☐ Camping
- ☐ ☐ Boating/rafting
- ☐ Fishing
- ☐ ☐ At work or home
- ☐ Other:

6. Where did you learn how to behave in bear country?

- ☐ Interpretative program
- ☐ ☐ Backcountry orientation
- ☐ Park ranger
- ☐ Park publication
- ☐ Warning signs
- ☐ ☐ Previous knowledge
- ☐ Other publications or media
- ☐ No information received

7. Vegetation type at site of interaction

- ☐ Meadow
- ☐ ☐ Low brush
- ☐ ☐ High brush
- ☐ Forest
- ☐ ☐ In water
- ☐ ☐ Unvegetated
- ☐ Intertidal zone
- ☐ Other:

OMB Control Number 10-405 and 10-406, updated 2018

16. Was food present?

- ☐ Presence unknown
- ☐ ☐ No food present
- ☐ ☐ Food odor only
- ☐ ☐ Food in bear resistant canister
- ☐ Food hung in tree
- ☐ ☐ Food outside of bear canister
- ☐ ☐ Preparing/consuming meal
- ☐ ☐ Other:

17. Was food eaten by the bear? ☐ Yes ☐ No ☐ Unknown

If so, list food items: _____

18. Was property damaged by the bear? ☐ Yes ☐ No

If so, list property and estimated cost: _____

19. Detailed narrative of bear-human interaction:

20. Detailed location description:

Please ask for a map on which to mark the location, include GPS coordinates, if known.

Latitude: Longitude: Datum (WGS84 or other):

For management use only

ID: GLBA_BIM_____

Camper permit: _____

Report taken by: _____

Date/time received: _____

Notes:

Interaction type:

- ☐ Encounter
- ☐ Incident
- ☐ Undetermined
- ☐ Other:

Entered:

Figure B-1. Page 1 of the Bear Information Management Form. OMB Control Number 10-405 and 10-406, updated 2018. The form's text is provided below.

8. General Location (nearest; include specific description after narrative):

Backcountry
- ☐ Bartlett River
- ☐ Beardslee Islands
- ☐ Beartrack Cove
- ☐ Sandy Cove (North/South)
- ☐ Muir Point
- ☐ Adams Inlet
- ☐ McBride Inlet
- ☐ Muir Inlet
- ☐ Wachusett Inlet
- ☐ Tlingit Point (Sebree)
- ☐ Tidal Inlet
- ☐ Gloomy Knob
- ☐ Queen or Rendu Inlet
- ☐ Russell Island
- ☐ Tarr Inlet
- ☐ Johns Hopkins Inlet
- ☐ Ptarmigan Creek
- ☐ Reid Inlet
- ☐ Scidmore Bay/Cut
- ☐ Hugh Miller/Blue Mouse
- ☐ Charpentier
- ☐ Geikie Inlet
- ☐ Berg or Fingers Bay
- ☐ Alsek River

Frontcountry
- ☐ Bartlett Cove—HQ
- ☐ Bartlett Cove—Lodge
- ☐ Bartlett Cove—Residential area
- ☐ Bartlett Cove—Recycling/Maint.
- ☐ Bartlett Cove—Campground
- ☐ Forest Loop Trail
- ☐ Bartlett River/Lake Trail
- ☐ Dry Bay

☐ If you did not see the bear check this box and jump to question 16.

9. Description	First Bear	Second Bear	Third Bear
Species	☐ Brown ☐ Black ☐ Unknown	☐ Brown ☐ Black ☐ Unknown	☐ Brown ☐ Black ☐ Unknown
Color	☐ Blonde ☐ Lt. Brown ☐ Dark Brown ☐ Cinnamon ☐ Black ☐ Unknown	☐ Blonde ☐ Lt. Brown ☐ Dark Brown ☐ Cinnamon ☐ Black ☐ Unknown	☐ Blonde ☐ Lt. Brown ☐ Dark Brown ☐ Cinnamon ☐ Black ☐ Unknown
Size	☐ Small ☐ Medium ☐ Large ☐ Unknown	☐ Small ☐ Medium ☐ Large ☐ Unknown	☐ Small ☐ Medium ☐ Large ☐ Unknown
Age	☐ Cub of the year ☐ Yearling ☐ Sub-adult ☐ Adult ☐ Unknown	☐ Cub of the year ☐ Yearling ☐ Sub-adult ☐ Adult ☐ Unknown	☐ Cub of the year ☐ Yearling ☐ Sub-adult ☐ Adult ☐ Unknown
Sex	☐ Male ☐ Female ☐ Unknown	☐ Male ☐ Female ☐ Unknown	☐ Male ☐ Female ☐ Unknown
Other markings, radio collar, tags, or scars:			

More than three bears? Describe: _____

10. What were **you doing prior** to seeing the bear?
- ☐ Sleeping
- ☐ Eating/cooking
- ☐ Hiking
- ☐ Running
- ☐ Boating
- ☐ Sitting
- ☐ Photographing
- ☐ Breaking down/setting up camp
- ☐ Paddling
- ☐ Other:

11. What was the **bear** doing when it was **first observed**?
- ☐ Feeding on vegetation
- ☐ Feeding on carcass
- ☐ Hunting
- ☐ Digging
- ☐ Standing
- ☐ Resting
- ☐ Running away from people
- ☐ Mating
- ☐ Playing with _____
- ☐ Traveling
- ☐ Walking toward people
- ☐ Running toward people
- ☐ Investigating property
- ☐ Other:

12. What was the **bear's initial reaction**?
- ☐ Not aware of people
- ☐ Stood up
- ☐ Growled/woofed/gnashed teeth
- ☐ Walked away
- ☐ Ran away
- ☐ Remained in area, ignored people
- ☐ Watched people
- ☐ Walked towards people
- ☐ Bluff charged
- ☐ Made contact with person
- ☐ Investigated property
- ☐ Other:

13. What did **you do then?**
- ☐ Walked/backed away
- ☐ Ran away
- ☐ Followed the bear
- ☐ Continued hiking, same direction
- ☐ Remained still/quiet
- ☐ Stood my/our ground
- ☐ Made noise
- ☐ Threw something at the bear
- ☐ Photographed the bear
- ☐ Abandoned property
- ☐ Deployed pepper spray
- ☐ Other:

14. How did the **bear react?**
- ☐ Not aware of people
- ☐ Stood up
- ☐ Growled/woofed/gnashed teeth
- ☐ Walked away
- ☐ Ran away
- ☐ Remained in area, ignored people
- ☐ Watched people
- ☐ Walked towards people
- ☐ Bluff charged
- ☐ Made contact with person
- ☐ Investigated property
- ☐ Other:

15. How close were you to the bear (include units)? _____

Management use: GLBA_BIM_

Figure B-2. Page 2 of the Bear Information Management Form. OMB Control Number 10-405 and 10-406, updated 2018. The form's text is provided below.

Bear Information Management Form Text

Bear Information Management
Glacier Bay National Park & Preserve

Glacier Bay National Park uses this form to track bear-human interactions to better understand bear activity, and inform and educate other visitors. Please complete this voluntary form if you had any interaction with a bear that was concerning, if a bear entered camp or approached you, if a bear needed to be deterred, and particularly if a bear obtained human food or trash or damaged any gear or property. Please complete one form for each interaction as best as you can. If you don't know the answer to a question, leave it blank. If pressed for time, please fill in name and contact information, and proceed to the last page and complete the detailed narrative. Please submit form or ask questions at the VIS. Thank you! ~Glacier Bay Bear Management Team.

1. People involved:

   Name (text field)

   Phone or email (text field)

   Group size encountering bear: (text field)

2. Date and time of interaction: (text field)

3. Duration of interaction: (text field)

4. Group type: (choices below)
   - ☐ Park visitor
   - ☐ Concession employee
   - ☐ Contractor
   - ☐ Researcher
   - ☐ NPS employee
   - ☐ Other: (text field)

5. Primary activity: (choices below)
   - ☐ Day or overnight kayak
   - ☐ Hiking/walking
   - ☐ Camping
   - ☐ Boating/rafting
   - ☐ Fishing
   - ☐ At work or home
   - ☐ Other: (text field)

6. Where did you learn how to behave in bear country? (choices below)
    - ☐ Interpretative program
    - ☐ Backcountry orientation
    - ☐ Park ranger
    - ☐ Park publication
    - ☐ Warning signs
    - ☐ Previous knowledge
    - ☐ Other publications or media
    - ☐ No information received
7. Vegetation type at site of interaction (choices below)
    - ☐ Meadow
    - ☐ Low brush
    - ☐ High brush
    - ☐ Forest
    - ☐ In water
    - ☐ Unvegetated
    - ☐ Intertidal zone
    - ☐ Other: (text field)
8. General Location (nearest, include specific description after narrative): (choices below)

    Backcountry

    - ☐ Bartlett River
    - ☐ Beardslee Islands
    - ☐ Beartrack Cove
    - ☐ Sandy Cove (North/South)
    - ☐ Muir Point
    - ☐ Adams Inlet
    - ☐ McBride Inlet
    - ☐ Muir Inlet
    - ☐ Wachusett Inlet
    - ☐ Tlingit Point (Sebree)

- ☐ Tidal Inlet
- ☐ Gloomy Knob
- ☐ Queen or Rendu Inlet
- ☐ Russell Island
- ☐ Tarr Inlet
- ☐ Johns Hopkins Inlet
- ☐ Ptarmigan Creek
- ☐ Reid Inlet
- ☐ Scidmore Bay/Cut
- ☐ Hugh Miller/Blue Mouse
- ☐ Charpentier
- ☐ Geikie Inlet
- ☐ Berg or Fingers Bay
- ☐ Alsek River

Frontcountry

- ☐ Bartlett Cove—HQ
- ☐ Bartlett Cove—Lodge
- ☐ Bartlett Cove—Residential area
- ☐ Bartlett Cove—Depot/Maint.
- ☐ Bartlett Cove—Campground
- ☐ Forest Loop Trail
- ☐ Bartlett River/Lake Trail
- ☐ Dry Bay
- ☐ If you did not see the bear check this box and jump to question 16.

9. Description

First Bear

Species (choices below)

- ☐ Brown
- ☐ Black
- ☐ Unknown

Color (choices below)

☐ Blonde

☐ Lt. Brown

☐ Dark Brown

☐ Cinnamon

☐ Black

☐ Unknown

Size (choices below)

☐ Small

☐ Medium

☐ Large

☐ Unknown

Age (choices below)

☐ Cub of the year

☐ Yearling

☐ Sub-adult

☐ Adult

☐ Unknown

Sex (choices below)

☐ Male

☐ Female

☐ Unknown

Other markings, radio collar, tags, or scars: (text field)

Second Bear

Species (choices below)

☐ Brown

☐ Black

☐ Unknown

Color (choices below)

☐ Blonde

☐ Lt. Brown

☐ Dark Brown

☐ Cinnamon

☐ Black

☐ Unknown

Size (choices below)

☐ Small

☐ Medium

☐ Large

☐ Unknown

Age (choices below)

☐ Cub of the year

☐ Yearling

☐ Sub-adult

☐ Adult

☐ Unknown

Sex (choices below)

☐ Male

☐ Female

☐ Unknown

Other markings, radio collar, tags, or scars: (text field)

Third Bear

Species (choices below)

☐ Brown

☐ Black

☐ Unknown

Color (choices below)

☐ Blonde

☐ Lt. Brown

☐ Dark Brown

☐ Cinnamon

☐ Black

☐ Unknown

Size (choices below)

☐ Small

☐ Medium

☐ Large

☐ Unknown

Age (choices below)

☐ Cub of the year

☐ Yearling

☐ Sub-adult

☐ Adult

☐ Unknown

Sex (choices below)

☐ Male

☐ Female

☐ Unknown

Other markings, radio collar, tags, or scars: (text field)

More than three bears? Describe: (text field)

10. What were you doing prior to seeing the bear? (choices below)

☐ Sleeping

☐ Eating/cooking

☐ Hiking

☐ Running

☐ Boating

☐ Sitting

- ☐ Photographing
- ☐ Breaking down/setting up camp
- ☐ Paddling
- ☐ Other: (text field)

11. What was the bear doing when it was first observed? (choices below)
    - ☐ Feeding on vegetation
    - ☐ Feeding on carcass
    - ☐ Hunting
    - ☐ Digging
    - ☐ Standing
    - ☐ Resting
    - ☐ Running away from people
    - ☐ Mating
    - ☐ Playing with: (text field)
    - ☐ Traveling
    - ☐ Walking toward people
    - ☐ Running toward people
    - ☐ Investigating property
    - ☐ Other: (text field)
12. What was the bear's initial reaction? (choices below)
    - ☐ Not aware of people
    - ☐ Stood up
    - ☐ Growled/woofed/gnashed teeth
    - ☐ Walked away
    - ☐ Ran away
    - ☐ Remained in area, ignored people
    - ☐ Watched people
    - ☐ Walked towards people
    - ☐ Bluff charged
    - ☐ Made contact with person

- ☐ Investigated property
- ☐ Other: (text field)

13. What did you do then? (choices below)
    - ☐ Walked/backed away
    - ☐ Ran away
    - ☐ Followed the bear
    - ☐ Continued hiking, same direction
    - ☐ Remained still/quiet
    - ☐ Stood my/our ground
    - ☐ Made noise
    - ☐ Threw something at the bear
    - ☐ Photographed the bear
    - ☐ Abandoned property
    - ☐ Deployed pepper spray
    - ☐ Other: (text field)
14. How did the bear react? (choices below)
    - ☐ Not aware of people
    - ☐ Stood up
    - ☐ Growled/woofed/gnashed teeth
    - ☐ Walked away
    - ☐ Ran away
    - ☐ Remained in area, ignored people
    - ☐ Watched people
    - ☐ Walked towards people
    - ☐ Bluff charged
    - ☐ Made contact with person
    - ☐ Investigated property
    - ☐ Other: (text field)
15. How close were you to the bear (include units)? (text field)

16. Was food present?

- ☐ Presence unknown
- ☐ No food present
- ☐ Food odor only
- ☐ Food in bear resistant canister
- ☐ Food hung in tree
- ☐ Food outside of bear canister
- ☐ Preparing/consuming meal
- ☐ Other: (text field)

17. Was food eaten by the bear?

- ☐ Yes
- ☐ No
- ☐ Unknown

If so, list food items: (text field)

18. Was property damaged by the bear?

- ☐ Yes
- ☐ No

If so, list property and estimated cost: (text field)

19. Detailed narrative of bear-human interaction: (text field)

20. Detailed location description: (text field)

Please ask for a map on which to mark the location, include GPS coordinates, if known.

Latitude: (text field)

Longitude: (text field)

Datum (WGS84 or other): (text field)

For management use only

ID: GLBA_BIM (text field)

Camper permit: (text field)

Report taken by: (text field)

Date/time received: (text field)

Notes: (text field)

Interaction type:

☐ Encounter

☐ Incident

☐ Undetermined

☐ Other: (text field)

Entered: (text field)

Appendix C: Human-bear interaction definitions and examples

Bear Observations: A bear or bear sign is observed but does not interact with people.

- Bear sign – Observation of bear sign such as scat, tracks, rub trees, mark trails, etc.
- Sighting – A person sees a bear but has no apparent interaction. Bear may or may not be aware of human presence. May include avoidant bears where bear was aware of people and changed its behavior or activity to avoid people or changed its direction of travel to avoid people or leave foraging area.

Human-bear Interactions: A bear and a human are mutually aware of each other and interact in some manner.

- Encounter – Bear and human interact, but there is no resulting human-bear conflict or incident.
- Incident – Synonymous with human-bear conflict. Human-bear interaction in which one or more of the following occur:
    - Bear made contact with or injured a person,
    - Bear damaged property,
    - Bear obtained human food, angler caught fish products, or trash,
    - Bear entered a permanent structure or vehicle,
    - Bear was especially persistent and it took unusual time or effort to deter the bear. Determined on a case-by-case basis. A persistent bear can be an encounter or an incident. This category provides some leeway for if an interaction should be classified as an incident but does not fall into other categories,
    - Bear charges person in a defensive manner at very close range. Determined on a case-by-case basis,
    - Human deployed bear spray or firearms toward a bear.

Bear Behavior Categories

Bear behavior categories are not mutually exclusive, one bear may display more than one behavior in a single encounter or incident.

- Passing/indifferent bear: bear was aware of human presence and appeared indifferent. The bear continued its activities in the presence of humans.
    - Passing people and camps or remaining near people while foraging and/or traveling.
    - Habituated bears encountered in their natural habitat.
- Curious bear:
    - Touched property but did not cause damage
    - May follow people for a short period of time, particularly if they are backing up. Does not include “stalking” bears.

- Approached people/entered camp in spite of bear knowing people are present and or making noise.
- Persistent bear: Bear was especially persistent and it took unusual time or effort to deter the bear.
  - Interactions where bears acted aggressively towards humans (this includes when bears persistently approach people once they have identified them and the people have taken steps to deter the bears from further interactions).
  - Stalking bear
  - Dominance testing – subadults may approach people repeatedly, or even charge
- Surprised bear: Surprise encounters at close proximity where the bear showed signs of stress.
  - When a human surprises a bear and the bear remains calm. May also become a defensive/threatening bear when surprised.
- Defensive bear
  - Female defending cubs or bear defending natural food source
  - Includes behaviors often interpreted as aggressive, huffing, jaw popping, chopping, short hops and/or bouncing, "bluff" charges. If these behaviors are persistent or at very close range, they may be considered an incident.
- Carcass/fish natural food source
- Entered permanent structure or vehicle
- Angler caught fish or guts
  - If a bear obtains angler caught fish or guts the interaction is an incident. However, if they were not obtained, but the conflict was associated with them, it is an encounter.
- Obtained human food or trash
  - Bears obtained food/garbage/fish from humans or their facilities
- Damaged gear or property
  - Includes gear in the backcountry or human property/structures
- Bear caused human injury or contact
  - Bear attacked or made contact with human

Human Response Categories

- High-level hazing/deterring – People (usually bear management personnel) used non-lethal pyrotechnics or projectiles fired from a shotgun
- Firearms – firearms with lethal (or unknown) rounds were discharged
- Bear pepper spray – was deployed, regardless of whether it was appropriate, or if it reached the bear.

- Low-level hazing/deterring – humans used mild aversive stimuli such as yelling, waving arms, clapping, and/or throwing objects to deter the bear.
- Retreated/left camp – people retreated or left their camp as a result of the bear.
- Stood ground – people noted that they stood their ground and did not back down in the presence of the bear
- Did not see – person was not present or did not observe the bear
- No action – remained quiet

Appendix D: Human-bear interactions (incidents and encounters) in Glacier Bay during the summer seasons of 2011 through 2017.

Table D-1. Human-bear interactions (incidents and encounters) in Glacier Bay during the summer seasons of 2011 through 2017.

Date	General location	Observation type	Bear behavior	Human response	Management response
7/4/2011	Muir Point	Incident	Damaged property	Low-level hazing	–
7/9/2011	Bartlett River	Incident	Persistent bear, Approached people/entered camp, Carcass/fish natural food source	Low-level hazing, Retreated/left camp	Formal advisory
7/12/2011	Bartlett River	Incident	Passing bear/indifferent, Angler caught fish or guts	Low-level hazing, Stood ground	–
7/13/2011	Muir Inlet	Incident	Obtained human food or trash	No action – did not see	Formal advisory
7/27/2011	Tarr Inlet	Incident	Damaged property	Low-level hazing	Formal advisory
7/31/2011	Muir Inlet	Incident	Damaged property	No action – did not see	–
9/9/2011	Bartlett Cove – Lodge	Incident	Damaged property, Obtained human food or trash	No action – did not see	–
6/8/2012	Reid Inlet	Incident	Approached people/entered camp, Damaged property	Low-level hazing	Formal advisory
7/16/2012	Russell Island	Incident	Damaged property	No action – did not see	–
7/27/2012	Tidal Inlet	Incident	Damaged property, Approached people/entered camp	Low-level hazing, Stood ground	–
8/20/2012	Bartlett Cove – Campground	Incident	Curious bear	Low-level hazing, Bear spray deployed	–
7/1/2013	Bartlett Cove – Lodge	Incident	Entered permanent structure or vehicle	Low-level hazing	Informal advisory
7/5/2013	Bartlett Cove – Lodge	Incident	Persistent bear	High-level hazing	–

Date	General location	Observation type	Bear behavior	Human response	Management response
8/8/2013	Beardslee Islands	Incident	Damaged property	No action – did not see	–
5/25/2014	Beardslee Islands	Incident	Approached people/entered camp, Damaged property	Low-level hazing	–
7/2/2014	Blue Mouse Cove	Incident	Approached people/entered camp, Curious bear, Damaged property	Retreated/left camp	Informal advisory
7/5/2014	Muir Inlet	Incident	Approached people/entered camp, Touched property	Low-level hazing	Informal advisory
7/7/2014	Bartlett Cove – Recycling center	Incident	Obtained human food or trash	No action – did not see	–
8/4/2014	Tidal Inlet	Incident	Passing bear/indifferent, Approached people/entered camp	Bear spray deployed	Formal advisory
8/8/2014	Tidal Inlet	Incident	Curious bear, Damaged property	Low-level hazing	–
7/2/2015	Muir Inlet	Incident	Approached people/entered camp, Behaved threateningly/aggressively	Low-level hazing, Stood ground	Formal advisory
7/18/2015	Dry Bay	Incident	Behaved defensive or threatening, Surprised bear, Damaged property	Low-level hazing	–
6/26/2016	Scidmore Bay/Cut	Incident	Approached people/entered camp, Damaged property	Low-level hazing, Bear spray deployed	Closure
7/9/2016	Reid Inlet	Incident	Approached people/entered camp	Firearms deployed	Citation issued
6/11/2017	Bartlett Cove – Lodge	Incident	Damaged property	High-level hazing	Hazing, notices to lodge management, lodge employees, and GLBA employees
6/12/2017	Bartlett Cove – Lodge	Incident	Approached people/entered camp, Persistent bear	Bear spray deployed	Informal advisory

Date	General location	Observation type	Bear behavior	Human response	Management response
6/12/2017	Reid Inlet	Incident	Approached people/entered camp, Persistent bear	Low-level hazing	–
6/14/2017	Tidal Inlet	Incident	Damaged property	No action – did not see	Informal advisory
6/28/2017	Bartlett Cove – Recycling center	Incident	Persistent bear, Damaged property	No action – did not see	–
7/12/2017	Bartlett Cove – Residential area	Incident	Damaged property, Obtained human food or trash, Entered permanent structure or vehicle	Low-level hazing	Formal advisory
7/12/2017	Bartlett Cove – Residential area	Incident	Persistent bear	Bear spray deployed	–
7/13/2017	Bartlett Cove – Lodge	Incident	Curious bear, Persistent bear	High-level hazing	–
7/14/2017	Bartlett Cove – Recycling center	Incident	Damaged property	Low-level hazing	Informal advisory
7/24/2017	Gustavus	Incident	Damaged property, Obtained human food or trash	No action – did not see	–
7/27/2017	Bartlett Cove – Lodge	Incident	Entered permanent structure or vehicle	No action – did not see	–
7/29/2017	Wachusett Inlet	Incident	Damaged property	No action – did not see	Informal advisory
5/19/2011	Beartrack Cove	Encounter	Curious bear, Approached people/entered camp	No action – remained quiet	–
5/28/2011	Adams Inlet	Encounter	Passing bear/indifferent	Low-level hazing	–
6/5/2011	Reid Inlet	Encounter	Passing bear/indifferent, Behaved defensive or threatening	Low-level hazing	–
6/26/2011	Reid Inlet	Encounter	Passing bear/indifferent, Curious bear	Low-level hazing	–
6/29/2011	Adams Inlet	Encounter	Curious bear	No action – remained quiet	–

Date	General location	Observation type	Bear behavior	Human response	Management response
7/9/2011	Bartlett River	Encounter	Persistent bear, Approached people/entered camp, Carcass/fish natural food source	Retreated/left camp	–
7/12/2011	Tidal Inlet	Encounter	Persistent bear	Low-level hazing	Formal advisory
7/15/2011	Adams Inlet	Encounter	Passing bear/indifferent, Curious bear	Retreated/left camp	–
7/22/2011	Outer Coast	Encounter	Behaved defensive or threatening	Retreated/left camp	–
7/29/2011	Muir Point	Encounter	Curious bear	No action – did not see	–
7/31/2011	Muir Inlet	Encounter	Passing bear/indifferent	Low-level hazing	–
9/8/2011	Dry Bay	Encounter	Persistent bear, Approached people/entered camp, Angler caught fish or guts	Low-level hazing	–
9/11/2011	Bartlett River	Encounter	Angler caught fish or guts	Low-level hazing	–
9/17/2011	Bartlett River	Encounter	Behaved defensive or threatening, Carcass/fish natural food source	Retreated/left camp	–
5/21/2012	Fingers Bay	Encounter	Passing bear/indifferent	Low-level hazing	Informal advisory
5/26/2012	Wachusett Inlet	Encounter	Curious bear, Approached people/entered camp, Persistent bear	Low-level hazing	Informal advisory
5/31/2012	Reid Inlet	Encounter	Approached people/entered camp	Low-level hazing, Retreated/left camp	Informal advisory
6/18/2012	Adams Inlet	Encounter	Approached people/entered camp, Curious bear	Low-level hazing	Informal advisory
6/29/2012	Scidmore Bay/Cut	Encounter	Approached people/entered camp	Low-level hazing, Retreated/left camp	Informal advisory
7/6/2012	Muir Point	Encounter	Behaved defensive or threatening, Approached people/entered camp	Low-level hazing, Retreated/left camp	–
7/29/2012	Tidal Inlet	Encounter	Curious bear, Approached people/entered camp	Low-level hazing	–

Date	General location	Observation type	Bear behavior	Human response	Management response
7/29/2012	Scidmore Bay/Cut	Encounter	Curious bear	Low-level hazing	–
7/31/2012	Muir Inlet	Encounter	Passing bear/indifferent, Approached people/entered camp	No action – remained quiet	–
8/21/2012	Reid Inlet	Encounter	Passing bear/indifferent	Low-level hazing, Stood ground	–
8/22/2012	Reid Inlet	Encounter	Passing bear/indifferent	Low-level hazing	–
6/3/2013	Adams Inlet	Encounter	Passing bear/indifferent, Behaved defensive or threatening	Low-level hazing, Stood ground	–
6/18/2013	Muir Inlet	Encounter	Passing bear/indifferent, Approached people/entered camp	Low-level hazing	–
6/24/2013	Beardslee Islands	Encounter	Passing bear/indifferent, Approached people/entered camp, Curious bear	Low-level hazing	–
7/13/2013	Muir Inlet	Encounter	Passing bear/indifferent	Low-level hazing	–
7/16/2013	Bartlett River Trail	Encounter	Angler caught fish or guts	Retreated/left camp	–
8/22/2013	Russell Island	Encounter	Curious bear	Low-level hazing	–
9/5/2013	Bartlett River	Encounter	Passing bear/indifferent, Angler caught fish or guts	Low-level hazing	–
5/27/2014	Scidmore Bay/Cut	Encounter	Approached people/entered camp	Low-level hazing	–
6/7/2014	Hugh Miller Inlet	Encounter	Curious bear, Behaved defensive or threatening, Approached people/entered camp	Low-level hazing	–
6/14/2014	Tidal Inlet	Encounter	Curious bear	Low-level hazing	–
6/17/2014	Muir Inlet	Encounter	Passing bear/indifferent, Approached people/entered camp	Low-level hazing	–
6/23/2014	Scidmore Bay/Cut	Encounter	Passing bear/indifferent, Curious bear	No action – remained quiet	–
6/30/2014	Berg Bay	Encounter	Behaved defensive or threatening	Retreated/left camp	–

Date	General location	Observation type	Bear behavior	Human response	Management response
7/9/2014	Tidal Inlet	Encounter	Passing bear/indifferent	Low-level hazing, Stood ground	–
7/10/2014	Muir Inlet	Encounter	Passing bear/indifferent	Low-level hazing	–
7/15/2014	Charpentier Inlet	Encounter	Passing bear/indifferent, Approached people/entered camp	Low-level hazing	Informal advisory
8/7/2014	Giekie Inlet	Encounter	Passing bear/indifferent	Low-level hazing, retreated	–
8/29/2014	Tlingit Point (Sebree)	Encounter	Curious bear	No action – remained quiet	–
6/19/2015	Queen Inlet	Encounter	Passing bear/indifferent, Curious bear	Low-level hazing	–
6/25/2015	Hugh Miller Inlet	Encounter	Curious bear	Low-level hazing	–
7/23/2015	Tlingit Point (Sebree)	Encounter	Approached people/entered camp, Curious bear	Low-level hazing, Stood ground	–
7/26/2015	Muir Point	Encounter	Passing bear/indifferent	No action – remained quiet	–
8/20/2015	Wachusett Inlet	Encounter	Approached people/entered camp	Low-level hazing	–
6/18/2016	Tarr Inlet	Encounter	Passing bear/indifferent, Approached people/entered camp, Persistent bear	Low-level hazing, Retreated/left camp	Informal advisory
6/18/2016	Muir Inlet	Encounter	Passing bear/indifferent, Persistent bear	Low-level hazing	–
6/26/2016	Muir Inlet	Encounter	Approached people/entered camp	Low-level hazing	–
7/7/2016	Adams Inlet	Encounter	Passing bear/indifferent	Low-level hazing, Retreated/left camp	–
7/10/2016	Scidmore Bay/Cut	Encounter	Curious bear	No action – remained quiet	–
7/26/2016	Reid Inlet	Encounter	Passing bear/indifferent	No action – remained quiet	–
9/25/2016	Bartlett Cove – Residential area	Encounter	Curious bear	Low-level hazing	Informal advisory
5/30/2017	Reid Inlet	Encounter	Curious bear, Approached people/entered camp	Low-level hazing	Informal advisory

Date	General location	Observation type	Bear behavior	Human response	Management response
5/31/2017	Muir Inlet	Encounter	Passing bear/indifferent, Curious bear	Low-level hazing	Informal advisory
6/4/2017	Tarr Inlet	Encounter	Curious bear, Approached people/entered camp	Low-level hazing	Informal advisory
6/4/2017	Beardslee Islands	Encounter	Passing bear/indifferent	Low-level hazing	–
6/10/2017	Bartlett Cove – Lodge	Encounter	Curious bear	Low-level hazing	Informal advisory
6/25/2017	Scidmore Bay/Cut	Encounter	Approached people/entered camp	Low-level hazing	–
7/6/2017	Scidmore Bay/Cut	Encounter	Approached people/entered camp	Low-level hazing	–
7/8/2017	Adams Inlet	Encounter	Approached people/entered camp	Low-level hazing, Stood ground	–
7/9/2017	Muir Inlet	Encounter	Curious bear, Approached people/entered camp	Low-level hazing, Retreated/left camp	Informal advisory
7/18/2017	Tlingit Point (Sebree)	Encounter	Approached people/entered camp	Low-level hazing	Informal advisory
7/21/2017	Tlingit Point (Sebree)	Encounter	Approached people/entered camp	Low-level hazing	–
7/27/2017	Beartrack Cove	Encounter	Approached people/entered camp	Low-level hazing	–
8/1/2017	Beardslee Islands	Encounter	Curious bear	Low-level hazing	–
8/27/2017	Reid Inlet	Encounter	Behaved defensive or threatening, Carcass/fish natural food source	Retreated/left camp	–
9/12/2017	Tidal Inlet	Encounter	Curious bear, Persistent bear	Low-level hazing	–

Appendix E: Bear Management 2011 through 2017

2011 Bear Management Highlights

- 41 reported bear sightings in the Bartlett Cove area.
- Brown bears were observed in Gustavus Forelands for second consecutive year (see photo below).
- A large cinnamon black bear was observed at least five times in Bartlett Cove.
- New fishing regulations for the Bartlett River were enacted: anglers may only deposit fish entrails and gills in river (filleted carcasses are prohibited) and must keep caught fish within 6 feet of them at all times.
- One incident was reported in the frontcountry when bear got into trash bags at the Glacier Bay Lodge dumpsters after the Lodge closed for the season.
- Two incidents near the Bartlett River involved bears attempting to or obtaining fish from anglers.
- In the Preserve, an adult brown bear was found dead at the mouth of the East Alsek River and a pair of subadult brown bears were reportedly approaching anglers repeatedly in attempts to obtain fish.
- Four human-bear incidents were reported in the backcountry.
    - In one, a bear obtained food from an improperly closed BRFC can overnight.
    - There were three incidents of damaged property where people did not have direct control of their gear.

Training, Education, Outreach, and Advisories

- Tania Lewis presented to USFWS and NPS employees in Yakutat on bear safety, management, and aversive conditioning as well as how to develop a comprehensive bear management plan.
- "Bear Necessities Night" was hosted by the GBNPP wildlife team at the Gustavus library to teach residents about bear safety, behavior, and local bear activity.
- Two advisories were issued regarding bears on the Bartlett River and to inform anglers of fish waste management regulations aimed to reduce negative human-bear interactions.
- Four backcountry advisories were issued in response to bear activity.
- Starting on May 11, the beach north of Geikie Inlet was closed for the summer because of a humpback whale carcass and the associated increase in bear and wolf activity.



A brown bear searches for fish on the Bartlett River, a reminder for bear awareness as humans and bears share the same habitat and food source. (NPS/KYLE PINJUV)

2012 Bear Management Highlights

- Bears frequently using the Bartlett Cove area included two groups of sows with three cubs each (see photo below).
- Two subadult black bears were hazed for testing dominance with people (approaching directly).
- Two brown bears were observed near the campground and Bartlett River trail.
- New bear-resistant dumpsters were installed at Glacier Bay Lodge.
- Park staff assisted a Gustavus resident with installation of an electric fence surrounding a soft sided dwelling (yurt) after a black bear obtained food.
- Bear spray was deployed by NPS staff towards a subadult black bear that was investigating the trash and recycling area in the VIS parking lot.
- In the Preserve, a subadult brown bear repeatedly approached anglers in attempts to obtain fish. The bear team visited Dry Bay to talk to locals and anglers.
- Three incidents occurred in the backcountry, with gear damaged in each.
- A formal advisory was issued on 6/18/2012 in response to a brown bear approaching people and damaging gear, for the area from Ptarmigan Creek to Lamplugh Glacier.

Training, Education, Outreach and Advisories

- The GLBA wildlife team hosted WILD Night at the Gustavus school open to the public, featuring presentations by NPS and ADF&G researchers.

- The area just south of Gloomy Knob was closed to foot traffic and camping on 7/25/2012 in response to increased wildlife activity including multiple single and family groups of brown bears as well as a pack of wolves with pups that were feeding on returning salmon.



A young black bear consumes devil's club berries in the Bartlett Cove area. (NPS/CHRISTOPHER BEHNKE)

2013 Bear Management Highlights

- A subadult black bear that showed little fear of humans was a frequent visitor to Bartlett Cove (see photo below). Incidents attributed to the subadult included:
- Bear entered a Glacier Bay Lodge guest room that was open for cleaning. The bear was verbally hazed from the room.
- Bear was insistent at staying underneath a Glacier Bay Lodge building after low-level hazing. Consequently, the bear was shot with a rubber slug and responded by running into the woods.
- Bear was suspected of knocking over one of the barbeque grills in NPS seasonal housing, and leaving paw prints on a parked vehicle.
- Multiple incidents of property damage in Dry Bay led to the bear team traveling there to help mitigate problems.
- Only one incident occurred in the backcountry: a tent was flattened and sleeping pad was punctured after a group left their tent up for the day in the Beardslee Islands.

Training, Education, Outreach, and Advisories

- Tania Lewis and Emma Johnson (Interpretation Division) gave bear safety presentations in the Gustavus School for grades 1–12.
- The pamphlet "Smart Angling in Bear Country" was created for anglers within Glacier Bay National Park and Preserve as well as United States Forest Service lands north of the preserve. The brochure provides basic bear safety information as well as tips for preventing bear problems such as storing fish in bear-proof containers, in backpacks on back or within 12 feet of angler (with the exception of Bartlett River, which is within 6 feet).



A black bear forages on blueberries and passes near NPS Headquarters in Bartlett Cove. (NPS/CHRISTOPHER BEHNKE)

2014 Bear Management Highlights

- Numerous black bear family groups were observed in Bartlett Cove including: four sightings of a sow with two spring cubs, three sightings of a sow with three spring cubs, and one sow with a single yearling.
- At NPS housing, a bear tipped over a can of water-based stain and proceeded to walk through it, leaving footprints.
- Non-latching bear-resistant trash containers at Glacier Bay Lodge were repaired.

- Bear spray was deployed once in an incident at the Vivid Lake outlet (just south of Gloomy Knob), where an indifferent or passing brown bear approached a camper, and the camper "tested" the spray. The bear did not appear to receive any spray.
- There were three instances where bears damaged gear, including a case when campers at the Vivid Lake outlet reported that bears had punctured their unattended dry bags.

Training, Education, Outreach and Advisories

- A formal advisory was issued for the Vivid Lake outlet with recommendation to not camp in the area due to high bear activity and human-bear incidents (see photo below).
- Tania Lewis presented on brown bear genetics research results at the Mendenhall Glacier Fireside Lecture series in Juneau and at the Sitka Sound Science Center natural history program in Sitka.
- Tania Lewis joined Gustavus Elementary students on the C/V SeaWolf in the spring for a trip into Glacier Bay.



A brown bear at the Vivid Lake outflow stream just south of Gloomy Knob, an area of frequent bear sightings and human-bear incidents. (NPS/TANIA LEWIS)

2015 Bear Management Highlights

- No incidents were reported in the Bartlett Cove developed area.
- There were very few reported bear sightings throughout GBNPP (above).
- One incident was reported in Dry Bay where a dog was bitten by a surprised brown bear sow with a cub.
- One incident was reported at Upper Muir Inlet in which a brown bear entered a camp and visitors had to deter the bear.

Training, Education, Outreach and Advisories

- An advisory was issued to campers 7/9/2015 regarding the incident in Upper Muir Inlet.
- A camping closure was enacted for the area around Gloomy Knob on 7/10/2015 in response to the increased activity of bears and wolves feeding on salmon.
- An advisory was issued to campers on 7/13/2015 recommending people avoid the north side of the Scidmore Cut due to a moose carcass.



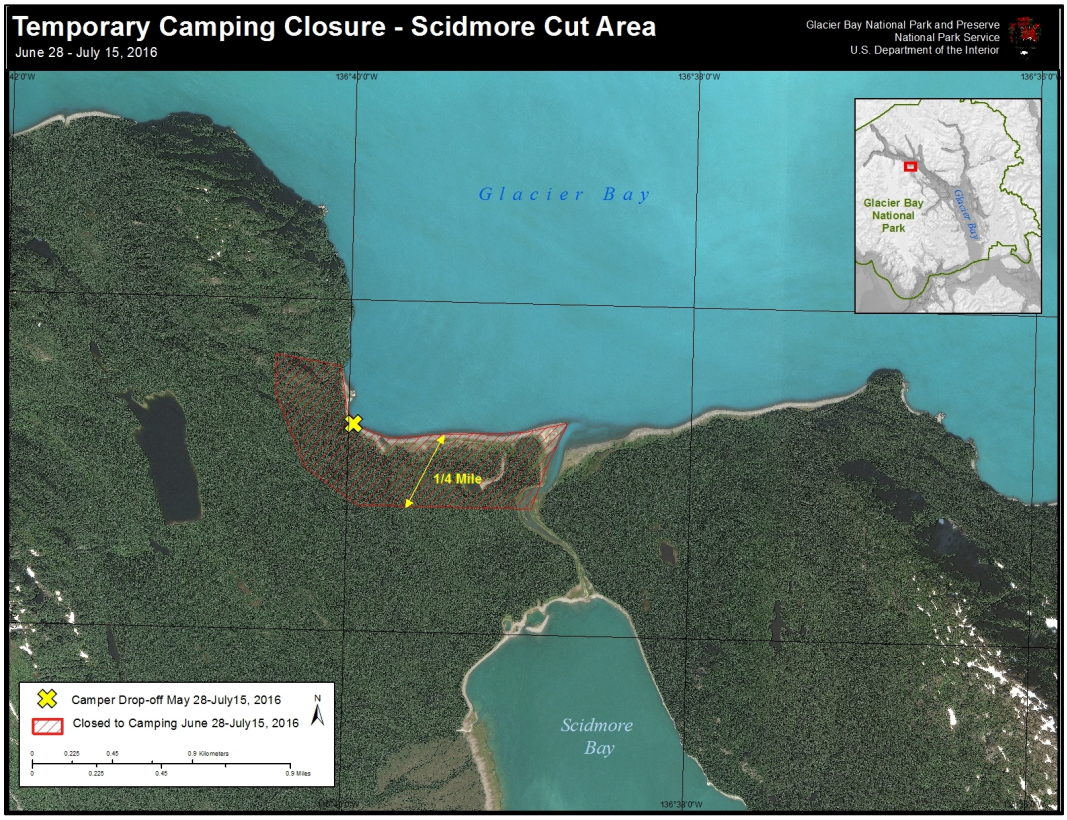
In a rare bear sighting for 2015, a black bear strolls across an island in the northern Beardslee Islands. (NPS/CHRISTOPHER BEHNKE)

2016 Bear Management Highlights

- No incidents were reported in the Bartlett Cove developed area.
- At least one adult black bear and one small young black bear were observed periodically in the Bartlett Cove developed area, though they were wary of humans.
- There was one incident of damaged gear in the backcountry. A bear approached unattended gear at the Scidmore Cut drop-off and proceeded to tear into a dry bag containing a stove and gas canisters. The visitors deployed bear spray but did not think it reached the bear.
- NPS interpretative ranger heard a firearm deployed four times in Reid Inlet for which a citation was issued by GBNPP law enforcement rangers.

Training, Education, Outreach and Advisories

- A two-week camping closure was enacted for the area surrounding the Scidmore Cut drop-off on 6/27/2019 in response to the incident with a persistent bear damaging gear (below).
- Tania Lewis attended and presented at the International Bear Conference in Anchorage.



Temporary camping closure in response to human-bear incidents in 2016. (NPS)

2017 Bear Management Highlights

- After a few seasons of relative calm, bears were frequently seen in Bartlett Cove. The storage of food waste and trash were constant issues throughout the summer. One to two subadult black bears regularly accessed or attempted to access the Glacier Bay Lodge trash area and their primary focus seemed to be compost buckets.
- At least one black bear likely became habituated prior to Glacier Bay Lodge staff notifying NPS of its presence and activity. It was suspected that there was at least one bear that received a food reward; it was frequently referred to as “Scruffy” or “Hot Dog” by Lodge staff.
- A subadult black bear had to be hazed with a beanbag round after damaging a sewer pipe and remaining underneath the Glacier Bay Lodge Employee Dining Room.
- A subadult black bear entered a permanent NPS residence; it obtained food and damaged property. Nobody was inside the home at the time, but the front door had been left open and the bear entered through the screen.

- A bear was found one morning inside the Glacier Bay Lodge trash area and as it ran off it took with it an empty orange compost bucket with a lid. The remainder of the day was spent tracking and hazing (see photo below), aversively conditioning, and marking the bear (bear received three rounds of a marked beanbag). It was during this aversive conditioning that a second, similar-looking bear was found.
- A subadult black bear was found climbing on a vehicle in the GBNPP maintenance yard, apparently trying to access orange compost buckets which were in the enclosed bed of the truck.
- There were three cases of damaged property in the backcountry.
- An unoccupied tent was sat on and tent poles were bent near Gloomy Knob
- An NPS employee left a backpack unattended with food inside; the bear damaged the bag, punctured a can of bear spray, and obtained food.
- A bear punctured the dinghy, action packers, and fuel jugs of researchers at the mouth of Wachusett Inlet.

Training, Education, Outreach and Advisories

- An electric fence was installed surrounding the Glacier Bay Lodge trash area and at the GBNPP "Depot" (Bartlett Cove trash containment and incinerator area) for portions of the summer.
- The bear team regularly released advisories and informative flyers for educating Bartlett Cove residents and visitors on bear activity and safe storage of food and gear.



A black bear in Bartlett Cove balances along the fence before entering and being hazed by slingshot from the trash area at the Glacier Bay Lodge. (NPS/KIANA YOUNG)

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

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