

**Request for Marine Mammal Protection Act Incidental Take Authorization (LOA)**

**Monitoring activities in Alaska's National Parks:**

**Glaucous-winged Gull and Climate Monitoring & Research in Glacier Bay National Park,  
Alaska**

**And**

**Marine Bird and Mammal Monitoring in National Parks and adjoining coastlines in the  
Northern Gulf of Alaska**

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**Submitted to:**

**Permits, Conservation, and Education Division**

**National Marine Fisheries Service (NMFS)**

**Office of Protected Resources**

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## Permit Application Summary

The NPS in Alaska is applying for a Letter of Authorization (LOA) for an array of activities across three National Parks that span the Gulf of Alaska. Glacier Bay National Park is applying for an LOA permit to access island study sites for two projects within Glacier Bay National Park (GLBA), in southeastern Alaska: 1) glaucous-winged gull monitoring and 2) weather station operation for long-term climate monitoring. The gull monitoring studies are mandated by a Record of Decision of an Legislative Environmental Impact Statement (NPS 2010) which states that Glacier Bay National Park must initiate a monitoring program for glaucous-winged gulls (*Larus glaucescens*) to inform future native egg harvest by the Hoonah Tlingit in Glacier Bay, Alaska. Installation of a new weather station on Lone Island has been completed as one of several installations intended to fill coverage gaps among existing weather stations in GLBA (NPS 2015). These new stations will be operated as the foundation of a new long-term climate monitoring program for GLBA.

To effectively access the islands for gull monitoring and weather station operation, occasional minimal disturbance (or Level B harassment) of harbor seals may occur. We are requesting an Letter of Authorization permit to access four study sites up to five times per year for gull research and monitoring activities. We are requesting permission to access Lone Island an additional three times per year for weather station maintenance and operation. We expect that the disturbance to harbor seals from both projects will be minimal and will be limited to Level B harassment and will not result in serious injury or death. We have previously held IHAs from NMFS for this study in 2014 (during which there was no activity), and 2015-2017 (Table 1) and have applied for an IHA for 2018. Glacier Bay National Park actively monitors harbor seals at breeding and molting sites to assess population trends over time (e.g., Mathews & Pendleton 2006; Womble et al. 2010). GLBA & NPS-Glacier Bay Field Station coordinates pinniped monitoring and research programs with the Alaska Fisheries Science Center, Marine Mammal Laboratory, and Alaska Department of Fish & Game and plans to continue these collaborations and sharing of monitoring data in the future.

The Southwest Alaska Network (SWAN) of National Parks Inventory and Monitoring Program is applying for an LOA permit to conduct marine bird and mammal multi-species nearshore surveys along the coastlines of Katmai National Park and Preserve (KATM), Kenai Fjords National Park (KEFJ) and in Kachemak Bay (KBAY) in support of long-term monitoring programs in these regions. Occasional minimal disturbance of Steller sea lions and harbor seals may occur during surveys. Sea lion and harbor seal habitat coincides with surveyed nearshore transects. Transect locations for KATM and KEFJ are provided in the following pages. Proposed transect locations are provided for KBAY. We expect that the disturbance to these marine mammals will be minimal and will be limited to Level B harassment and will not result in serious injury or death. We also hope to foster further collaborations with NOAA and share monitoring data in the future.

## **1. A detailed description of the specific activity or class of activities that can be expected to result in incidental taking of marine mammals**

### Glacier Bay Gull Monitoring and Research

Glaucous-winged gulls are common inshore residents along the northwestern coast of North America (Hayward and Verbeek 2008). These gulls nest colonially in small and large aggregations, often on islands. Glaucous-winged gulls are abundant in Southeast Alaska throughout the year and nest colonially on islands in Glacier Bay from mid-May to August (Patten, 1974). Traditionally the Huna Tlingit, whose ancestral homeland encompasses Glacier Bay National Park, harvested gull eggs annually during the spring and early summer months (Hunn, 2002). This historic egg harvest in Glacier Bay was an important activity both for cultural and nutritional purposes. Legislation has been passed (Huna Tlingit Traditional Gull Egg Use Act: S. 156 and H. R. 3110) to allow native subsistence harvest of glaucous-winged gulls at up to 15 locations in Glacier Bay National Park. A Legislative Environmental Impact Statement (LEIS) for gull egg harvest was developed and finalized in 2010 (NPS 2010). The LEIS Record of Decision mandates that the National Park Service (NPS) develop a monitoring program to inform a yearly traditional harvest plan and ensure that harvest activities do not impact park purposes and values (NPS 2010). Annual monitoring requirements outlined in the LEIS include: identify the onset of gull nesting, conduct mid-season adult counts, count number of eggs in nests during harvest, conduct complete nest surveys just before hatch on harvested islands, and document other bird and marine mammal species present that may be impacted by harvest activities. Harvest sites will be selected based on several characteristics including size of colony; population parameters including productivity, population status, recent harvest, age of colony; and minimizing disturbance to other species present.

The goal of this project is to collect data on the number and distribution of nesting glaucous-winged gulls to fulfill the mandates of the LEIS Record of Decision and to inform annual gull egg harvest (Lewis et al. 2017). Gull monitoring will be conducted using a combination of ground and vessel surveys. Ground surveys will be used to obtain information on numbers of nests and contents (eggs or chicks) in the Glacier Bay gull colonies because terrain and vegetation prevent most nests from being visible from an offshore vessel or airplane. From May 01 – Sept. 30 each year we will conduct ground surveys (1-3 visits each) at the largest glaucous-winged gull colonies: South Marble Island, Boulder Island, Lone Island, Geikie Rock, Flapjack Island, and Tlingit Point Islet (Figure 1) to determine the onset of laying, distribution and abundance of gull nests and eggs, and other species present. The observers would access each island using a kayak, a 32.8 to 39.4-foot (ft) (10 to 12 meter (m)) motorboat, or a 12 ft (4 m) inflatable rowing dinghy. The landing craft's transit speed would not exceed 4 knots (4.6 miles per hour (mph)). Ground surveys generally last from 30 minutes to up to two hours depending on the size of the island and the number of nesting gulls. Glacier Bay NP will discontinue ground surveys after they detect the first hatchling to minimize disturbance to the gull colonies. Ground surveys will be conducted by two trained observers conducting complete nest counts of the

colonies (Zador 2001, Arimitsu et al. 2007). The survey will encompass all portions of the gull colony accessible to humans and thus represent a census of the harvestable nests. GPS locations of nests and associated vegetation along with the number of live and predated eggs will be collected during at least one visit to obtain precise nest locations to characterize nesting habitat. On subsequent surveys, nest counts will be tallied on paper so observers can move through the colony more quickly and minimize disturbance. Ground surveys will be discontinued after the first hatched chick is detected to minimize disturbance and mortalities. During ground surveys, observers will also record other bird and marine mammal species in proximity to colonies.

From May 01 - Sept. 30 we will also conduct 1-2 vessel surveys of South Marble Island, Boulder Island, Lone Island, Geikie Rock, Tlingit Point Islet, and other suspected gull colonies. Vessel surveys will be conducted from the deck of a 5 – 20 m motorized vessel and will be used to count the number of adult and fledgling gulls that are visible from the water (Zador 2001, Arimitsu et al. 2007). Vessel surveys give us a more reliable estimate of the numbers of gulls in the colony than ground surveys because we can count nesting birds in areas that are inaccessible by foot and because the birds do not flush from our presence. We will conduct these surveys by circling the islands at approximately 100 m and counting the number of adult and chick gull as well as other bird and mammal species present.

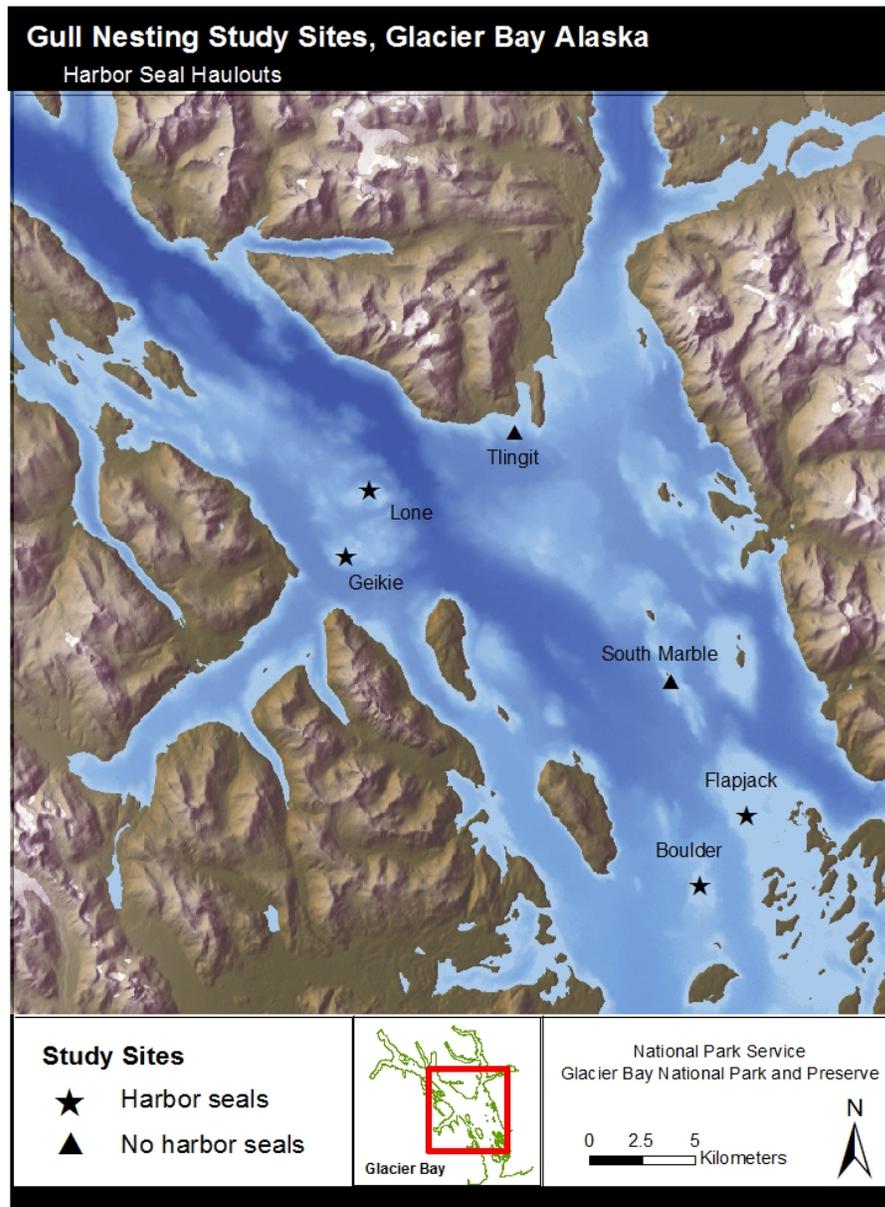
Preliminary data collection conducted in 2012 - 2014 found that several gull colony study sites are islands that are sometimes occupied by harbor seals. Additionally, portions of one site South Marble Island, were always occupied by Steller sea lions. Researchers were able to stay at least 100 m from Steller sea lions to avoid disturbance and still access South Marble Island, but were not able to access other sites while staying at least 100 - 500 m needed to avoid disturbance harbor seals. Effort was made to stay at least 100 - 500 m from harbor seals, which often resulted in not accessing the islands. This prevented data collection vital to the development of egg harvest management strategies and increased field costs as repeated visits were necessary to determine if marine mammals were present. In years 2019-2023, we are requesting authorization to cause visual and noise disturbance to a limited number of harbor seals from vessels and from the ground in order to conduct gull surveys, similar to IHAs issued for this project in 2015, 2016 and 2017.

### Glacier Bay Climate Monitoring

Weather and climate were chosen as priorities for long-term monitoring of the Glacier Bay ecosystem during development of the Southeast Alaska Network Vital Signs Monitoring Plan (Moynahan et al. 2008). An inventory of existing weather stations revealed the need for additional station installations to represent the park's geographic (i.e., east-west and north-south) and elevation-related climate gradients (Davey et al. 2007). A system of eight new stations were ultimately identified to meet this goal, including the Lone Island station, described further in a 2015 Environmental Assessment and associated Finding of No Significant Impact (NPS 2015). Formal protocols for the operation of this new climate monitoring program are currently in review with final publication anticipated in early 2018. These protocols will ensure that methods

for data acquisition, quality control, storage, and dissemination meet the highest standards of scientific rigor to maximize utility within the National Park Service and for our partners. Station configuration is typical of Remote Automated Weather Stations (RAWS) operated by land management agencies for weather and climate monitoring, fire weather observation, and other uses. A number of design elements will be modified as mitigation to reduce station visibility along a popular cruise ship route. An 8-ft tripod or monopole and associated guy lines will be installed onto which instrumentation and an environmental enclosure will be secured (Figure 2). A fuel cell and sealed 12V battery housed in a watertight enclosure will provide power to the station. Standard meteorological sensors for measuring precipitation, wind, temperature, solar radiation, and snow depth will be used. Data will be housed in internal memory and communicated via satellite telemetry to the Wildland Fire Management Institute where it is relayed to a variety of repositories such as the Western Regional Climate Center in near real-time.

Lone Island will be accessed by a 10-20 meter motor vessel to maintain the weather station. Materials will be carried by hand to the location. The Principle Investigator worked with National Park Service bird and pinniped biologists to locate the weather station in an area that will minimize effects on nesting seabirds and harbor seals so that it is possible that the weather station can be accessed in a fashion that will not disturb hauled out harbor seals, but we are requesting authorization to cause visual and noise disturbance to a limited number of harbor seals from vessels and from the ground to ensure our ability to perform yearly maintenance of the weather station. Steller sea lions have not been observed hauled out at Lone Island.



*Figure 1.* Study sites for Glacier Bay glaucous-winged gull and climate monitoring sites in 2019-2023 with symbols indicating locations where harbor seals have been observed hauled out (stars) and locations where harbor seals have not been observed hauled out (triangles). Steller sea lions occupy parts of South Marble Island.



*Figure 2.* Photo of the Nunatak Upper weather station in Glacier Bay National Park. The station at Lone Island is planned to be powered by a fuel cell rather than the solar panel pictured. Sensors may also be positioned closer to the ground to limit visibility. Configuration is otherwise similar.

### SWAN Marine Bird and Mammal Surveys

Marine Birds are predators near the top of marine nearshore food webs. Marine birds are long-lived, conspicuous, abundant, widespread members of the marine ecosystem and are sensitive to change. Because of these characteristics marine birds are good indicators of change in the marine ecosystem. Many studies have documented that their behavior, diets, productivity, and survival changed when environmental conditions change. Public concern exists for the welfare of seabirds because they are affected by human activities like oil pollution and commercial fishing (Dean et al. 2014, Coletti and Wilson 2018, Coletti et al. 2018).

SWAN Standardized surveys of marine birds are conducted in KATM and KEFJ between late June and early July and are generally conducted from small vessels (5-8 m length) traveling at speeds of 8-12 knots along randomly selected sections of coastline that represent independent transects. The survey design consists of a series of transects along shorelines such that a minimum of 20% of an NPS park shoreline is surveyed. Transects are systematically selected beginning at a random starting point from the pool of contiguous 2.5-5 km transects that are

adjacent to the mainland or islands. The transect width is 200 – 300 m, depending on the elevation of the observer platform, and the survey boat represents the midpoint. Transects are surveyed by a team of three. The boat operator generally surveys the 100 - 150 m offshore area of the transect, while a second observer surveys the 100 - 150 m nearshore area. The third team member enters the observations into a laptop running program dLOG, specifically designed for this type of surveying, and the third team member can assist with observations when needed. All marine birds and mammals within the 200 - 300 m transect swath are identified and counted. Detailed descriptions of methods and procedures can be found in the Marine Bird and Mammal Survey SOP (Bodkin 2011). SWAN is also proposing similar surveys be implanted in KBAY proper in cooperation with USGS and Gulf Watch Alaska. A survey design has been proposed (Figure 5) and will be implemented in 2019. Summer surveys will occur annually either in June or July. No winter (March) surveys have been proposed.

**2. The date(s) and duration of such activity and the specific geographical region where it will occur:**

Glacier Bay

Maintenance of the Lone Island weather station will begin March 1 2019. Generally site visits to this location will be scheduled between October 1 and April 30 to avoid the gull nesting period. Unscheduled maintenance that is needed outside of the regularly scheduled October 1 through April 30 time period will require Superintendent authorization to ensure protection of park resources and values. Any such unscheduled visits will be coordinated with gull researchers to limit the number of visits to Lone Island as much as possible. Datalogger memory constraints and sensor calibration requirements established by instrument manufacturers dictate annual station visits to maintain station operability and preserve data usability. These annual maintenance visits will require approximately 2 hours per visit. Responses to unanticipated station failures would vary by the complexity of the problem, but could require up to 8 hours on site. Each year, up to three visits maximum are anticipated.

Ground and vessel surveys for nesting gulls will be conducted from yearly from May 01 - Sept. 30 on bird nesting islands in Glacier Bay National Park and Preserve (Figure 1, Table 1) and other suspected gull colonies. There will be 1-3 ground visits and 1-2 vessel surveys at each site per summer adding up to a maximum of 5 visits per site per year. Duration of surveys will be 0.5 – 2 hours each.

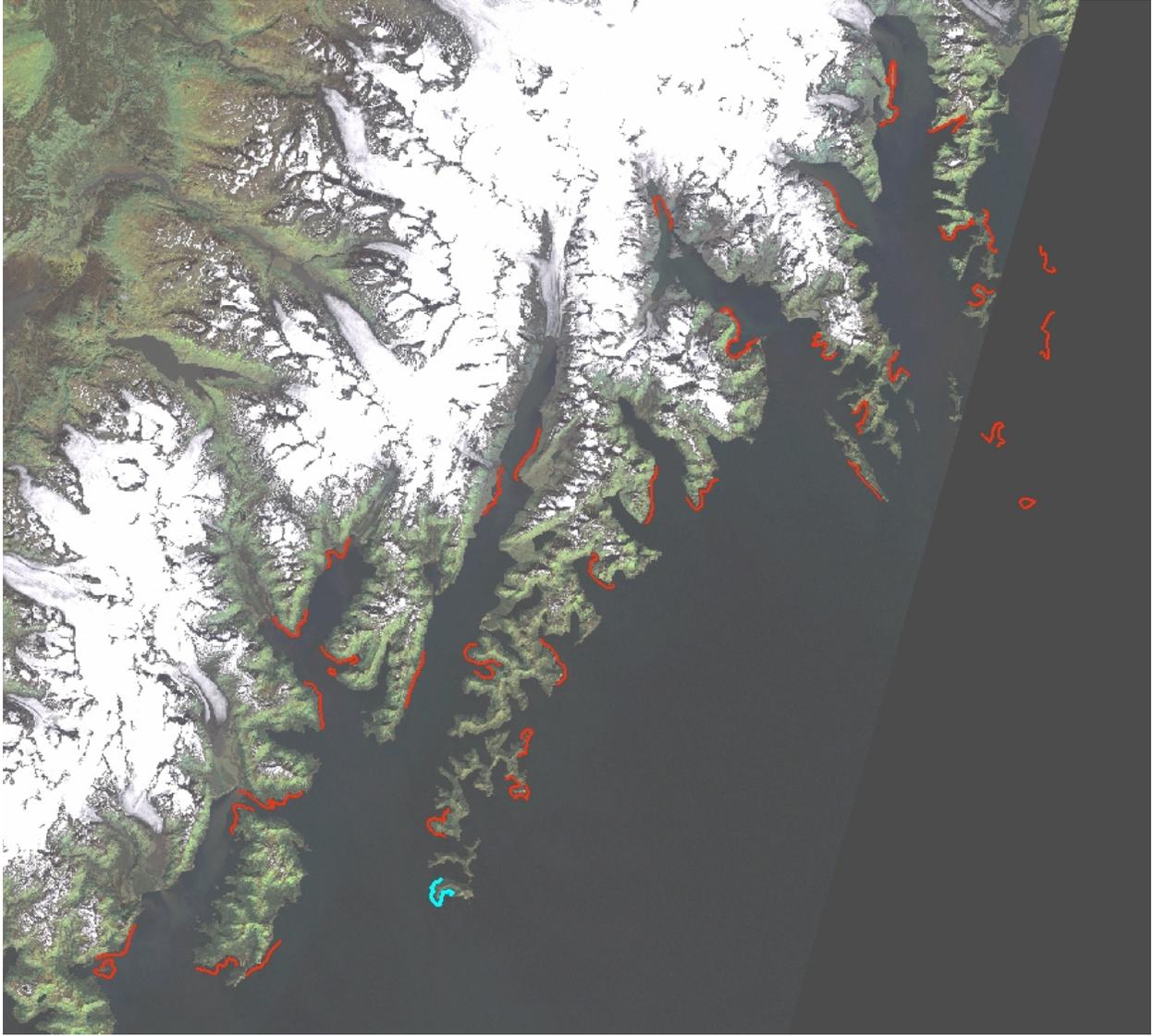
SWAN

Standardized surveys of marine birds are conducted yearly in KATM and KEFJ between late June and early July and are generally conducted from small vessels (5-8 m length) traveling at speeds of 8-12 knots along randomly selected sections of coastline that represent independent transects. Winter surveys are conducted in March and consist of the same set of transects

surveyed in the summer months. Only one region per winter season is surveyed. Regions surveyed in the winter are on a rotation. Each survey takes 3-4 days to complete with two crews operating. While not yet fully implemented, similar surveys are proposed in KBAY (Figures 3-5).



*Figure 3.* SWAN transects (red) along the KATM coast.



*Figure 4.* SWAN transects (red) along the KEFJ coast. The single transect highlighted in blue is in close proximity to a Steller sea lion rookery. This transect has not been surveyed since the design was implemented because of the proximity to critical rookery habitat.

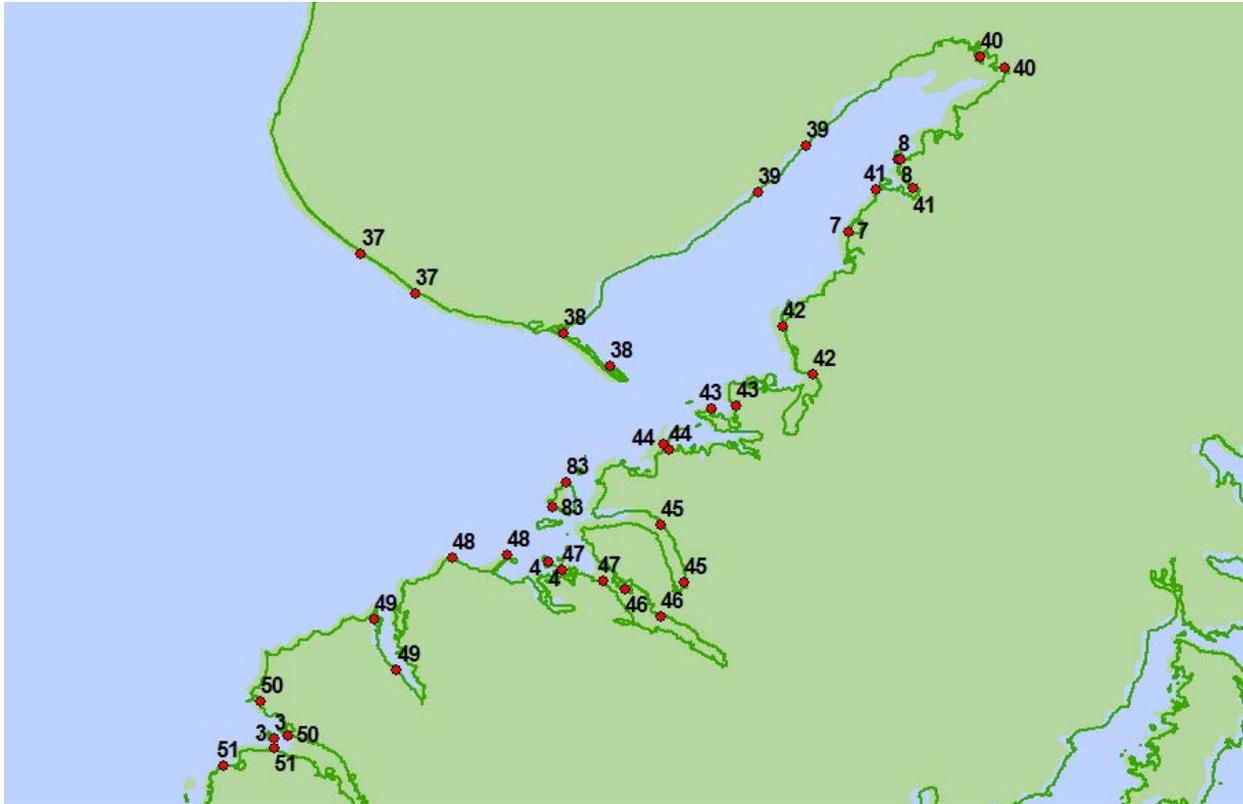


Figure 5. SWAN start and end point (red) along in Kachemak Bay. No known Steller sea lion haulouts or rookeries exist in this area.

### 3. The species and numbers of marine mammals likely to be found within the activity area:

#### Glacier Bay

Harbor seal (*Phoca vitulina richardii*) from the Glacier Bay/Icy Strait stock may be found hauled-out at gull monitoring study sites (Table 1). Counts from gull monitoring surveys likely represent a minimum estimate due to difficulty observing marine mammals from a vessel. Harbor seal counts conducted during aerial photographic surveys in June and August provide a more accurate number of animals using the study sites seasonally (Table 2). However, counts from aerial photographic surveys represent the minimum number of seals ashore as there is some unknown proportion in the water, unavailable to be counted. Up to 2000 Steller sea lion (*Eumetopias jubatus*), Eastern and Western U.S. Distinct Population Segments, are also present on South Marble Island, however, the numbers of sea lions vary seasonally (Womble et al. 2009, Mathews et al. 2011). Gull researchers observed 395 – 900 Steller sea lions at South Marble Island during surveys in 2012 - 2017. These counts likely represent a minimum estimate due to difficulty observing marine mammals from a vessel. However, no Steller sea lions have been disturbed during gull surveys and hence no incidental harassment of this species is requested or anticipated. Additionally, humpback whales (*Megaptera novaeangliae*), mostly from the Hawaii DPS (94%, not listed under the ESA) with some from the Mexico DPS (6%, listed as threatened

under the ESA), are present in Glacier Bay (Neilson et al. 2018). Humpback whales are occasionally observed when transiting in Glacier Bay but are rarely observed in the immediate vicinity of the study sites so disturbance of this species is not expected. Killer whales (*Orcinus orca*) are also rarely observed in the study area but so infrequently that disturbance of this species is also not expected.

*Table 1.* Number of harbor seals takes (categories 2 and 3 on the 3-point scale of level B harassment; see section 13 for details) under Incidental Harassment Authorizations at gull study sites from 2015-2017 in Glacier Bay, Alaska.

Site Name	Latitude (dd)	Longitude (dd)	2015 Observed/Take	2016 Observed/Take	2017 Observed/Take
Boulder	58.55535	-136.01814	13/11	21/0	4/0
Flapjack	58.58698	-135.98251	0/0	101/41	0/0
Geikie	58.69402	-136.31291	45/14	37/0	33/33
Lone	58.72102	-136.29470	98/32	58/39	49/0
<b>TOTAL</b>			<b>156/57</b>	<b>217/80</b>	<b>86/33</b>

*Table 2.* Average and maximum counts of hauled out harbor seals vulnerable to disturbance at glaucous-winged gull study sites during harbor seal monitoring aerial surveys including *a)* all harbor seals from 2007-2016, and *b)* harbor seal pup counts from 2007-2016 (Womble et al. 2010, 2013, 2015, and unpublished data).

*a) All harbor seals*

Site	Average of Count	StdDev of Count	Max of Count	Number of Surveys
Boulder Island				
2007	3.9	5.2	14	9
2008	2.3	2.3	6	9
2009	11.1	16.7	43	10
2010	28	30.6	82	9
2011	38.7	31.6	92	7
2012	28.8	45.8	118	8
2013	55.4	72.8	175	9
2014	33.6	20.6	53	5
2015	35.3	15.9	53	3
2016	21.4	48.9	132	7
Flapjack Island				
2007	51	61.4	150	11
2008	55.4	44.4	131	10
2009	99.7	58	182	15
2010	111.1	42.7	175	8

2011	194.8	52.4	285	11
2012	158.3	66.4	273	11
2013	83.5	43.5	151	11
2014	130.2	44.3	173	6
2015	151	49.4	181	3
2016	87.5	73.5	217	8
Geikie Rock				
2007	4.6	6.7	16	10
2008	7.1	5.2	17	10
2009	3.6	5	13	9
2010	2.7	3.6	10	7
2011	13.2	20.8	46	6
2012	2.1	6	17	8
2013	5.4	13.1	35	7
2014	0	0	0	5
2015	0	0	0	4
2016	0	0	0	8
Lone Island				
2007	7.1	10	29	11
2008	6.8	4.5	13	9
2009	20.1	12.8	35	9
2010	21.1	10.8	38	7
2011	17.3	5.6	22	6
2012	9.3	5.7	19	8
2013	23.4	24.4	59	7
2014	18.4	10.6	26	5
2015	8	6.5	15	4
2016	8	13.4	32	6

*b) Harbor seal pups only*

<b>Site</b>	<b>Average of Pup Count</b>	<b>StdDev of Pup Count</b>	<b>Max of Pup Count</b>
Boulder Island	0.8	1.3	5
Flapjack Island	14.9	11.5	43
Geikie Rock	0.1	0.4	2
Lone Island	0.8	0.9	4
Grand Total	4.74	9	43

## SWAN

For the SWAN surveys, estimates of harbor seal and Steller sea lion densities from these specific surveys have not been estimated at this time. However, harbor seals from the Cook

Inlet/Shelikof Strait stock may be found in KATM and KBAY and Prince William Sound stock may be found in KEFJ. The most recent estimates for both stocks are from NMFS stock assessment report of 2015, summarizing survey data from 2011. The 2011 abundance estimate for the Prince William Sound stock was 29,889 (SE = 13,846) with a positive trend in growth. The 2011 abundance estimate for the Cook Inlet/Shelikof Strait stock was 27,386 (SE = 3,328) with a positive trend in growth (NMFS, 2015).

However, both KATM and KEFJ parks (not KBAY) are part of the western stock of Steller sea lions. Stock assessments state that the western population size declined from 265,000 animals during the 1970's to approximately 50,000 currently. That said, there is considerable regional variation in trends. For the central and eastern Gulf of Alaska (c and e GOA), increasing trends have been observed (NMFS, 2016). Specific population estimates for the cGOA and eGOA are not currently available. A map of Steller sea lion haulouts and rookeries show some overlap with SWAN park transects at haulouts (Fig. 6 and 7) within KATM and KEFJ, but no overlap in KBAY. A rookery along the KEFJ coastline is located near one of the designated SWAN transects. However, because of the transects' proximity to a rookery, the transect has not been surveyed in recent years.

Additionally, humpback whales (*Megaptera novaeangliae*) are observed along the KEFJ and KATM coastlines. Humpback whales are rarely observed on transect or in the immediate vicinity of the study sites so disturbance of this species is not expected. KBAY is designated as critical habitat for the beluga whale (*Delphinapterus leucas*), however, no beluga whales have been sighted in KBAY for many years.



*Figure 6.* SWAN transects (red) and Steller sea lion designated haulout sites (green triangles) along the KATM coast.

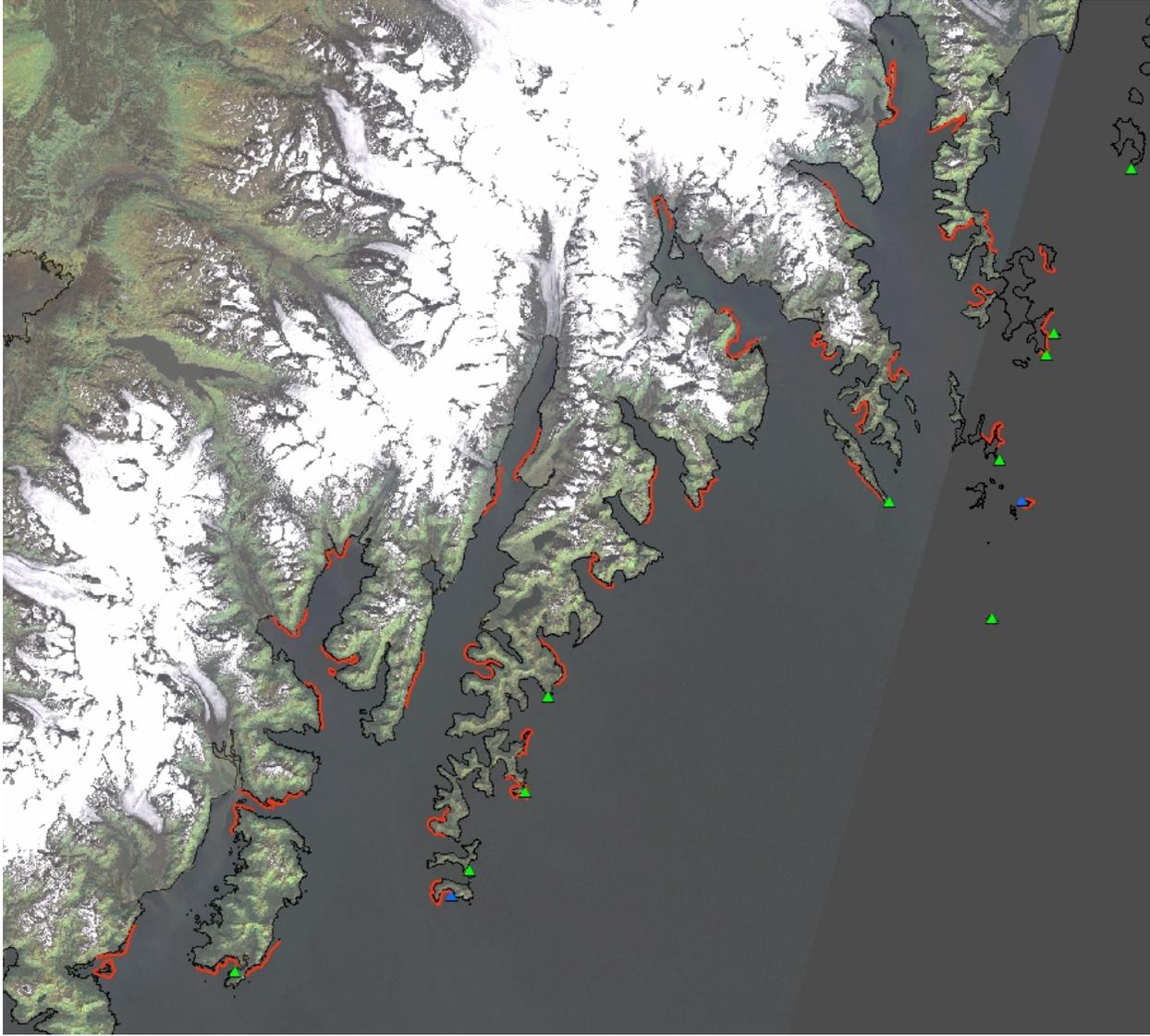


Figure 7. SWAN transects (red), Steller sea lion designated haulout sites (green triangles) and rookery sites (blue triangles) along the KEFJ coast.

**4. A description of the status, distribution, and seasonal distribution (when applicable) of the affected species or stocks of marine mammals likely to be affected by such activities:**

***Harbor seal (*Phoca vitulina richardii*), Glacier Bay/Icy Strait stock***

Harbor seals are the most widely distributed pinniped in the northern hemisphere and occupy a diverse array of habitats along the North Pacific Rim, including small islands, beaches, and glacial ice emanating from tidewater glaciers. Historically, harbor seals in Alaska have been managed as three stocks (Bering Sea, Gulf of Alaska, Southeast Alaska); however, in 2010, the National Marine Fisheries Service and their co-management partners, the Alaska Native Harbor Seal Commission, revised the stock structure and identified 12 separate stocks of harbor seals

based largely on the genetic structure. Although genetic samples were not obtained continuously throughout the range, a total evidence approach was used to consider additional factors such as population trends, observed harbor seal movements and traditional native use areas in the final designation of stock boundaries. The twelve stocks of harbor seals identified in Alaska are 1) the Aleutian Islands stock, 2) the Pribilof Islands stock, 3) the Bristol Bay stock, 4) the North Kodiak stock, 5) the South Kodiak stock, 6) the Prince William Sound stock, 7) the Cook Inlet/Shelikof stock, 8) the Glacier Bay/Icy Strait stock, 9) the Lynn Canal/Stephens stock, 10) the Sitka/Chatham stock, 11) the Dixon/Cape Decision stock, and 12) the Clarence Strait stock (Allen & Angliss 2011).

Population monitoring of harbor seals has a long history in Glacier Bay spanning from the 1970's to the present (Streveler 1979, Calambokdis et al. 1987, Mathews and Pendleton 2006, Womble et al. 2010) representing one of only a few sites in Alaska where such long-term monitoring efforts for harbor seals exist (Pitcher 1990, Frost et al. 1999, Jemison et al. 2006, Hoover-Miller et al. 2011). The primary objectives of Glacier Bay National Park harbor seal population monitoring are to (1) evaluate population status, trend and distribution within the park; (2) help determine whether conservation and management strategies are effective in reversing the decline; (3) share the survey data with NOAA Fisheries-National Marine Mammal Laboratory in order to estimate Alaska-wide trends, and (4) inform the National Marine Fisheries Stock Assessments for harbor seals in Alaska. Stock assessment of harbor seals is required under section 117 of Marine Mammal Protection Act of 1972.

During the harbor seal breeding (May-June) and molting (August) periods, ~66% of seals in Glacier Bay inhabit the primary glacial ice site and ~22% of seals are found in and adjacent to the a group of islands in the southeast portion of Glacier Bay. Harbor seals are also found at smaller terrestrial sites that are scattered throughout Glacier Bay and at 2 small glacial ice sites (Mathews and Pendleton 2006; Womble et al. 2010). From 1992-2002, the number of harbor seals counted declined precipitously at terrestrial and glacial ice sites in Glacier Bay (Mathews and Pendleton 2006). The numbers of non-pups declined in the primary glacial ice site by 6.6%/yr (-39%/8yr) in June and by 9.6%/yr (-63%/11yr) in August and at all other haulout by 14.5%/yr (-75%/10yr) during August (Mathews and Pendleton 2006). The precipitous declines documented in the number of seals counted in Glacier Bay (Mathews and Pendleton 2006) were in contrast to trends for nearby regions in Ketchikan and Sitka (Small et al. 2003), thus raising questions regarding possible factors that may have contributed to declines in the number of seals in Glacier Bay.

The observed declines in harbor seals resulted in new research efforts which were initiated in 2004 and were aimed at trying to further understand the biology and ecology of seals and possible factors that may have contributed to the declines (e.g., Herreman et al. 2009, Blundell et al. 2011, Hueffer et al. 2012, Womble and Gende 2013a, Womble et al. 2014) with an emphasis on possible factors that may have contributed to the declines. The recent studies suggest that (1) harbor seals in Glacier Bay are not significantly stressed due to nutritional constraints (Blundell et al. 2011), (2) the clinical health and disease status of seals within Glacier Bay is not different

than seals from other stable or increasing populations (Hueffer et al. 2012), and (3) disturbance by vessels does not appear to be a primary factor driving the decline (Young 2009). The most recent long-term trend estimate for harbor seals at terrestrial sites in Glacier Bay for the 22-year period from 1992-2013 is -6.91 % / yr (SE=0.40, 95% CI = -7.69, -6.13). This trend is less negative than previous estimates from 1992-2001 (-14.5%/year: -17.07, -11.85, CI) (Mathews and Pendleton 2006) and 1992-2008 (-11.5%/year; -12.7, -10.4, CI) (Womble et al. 2010). From 2004-2013, there was a 10-yr trend estimate of 9.64% % / yr (SE=1.66, 95% CI = 6.40, 12.89) (Womble et al. 2015). Similarly, estimates of number of seals at terrestrial and ice sites combined further indicate that the decline has lessened and seal numbers may even be increasing since 2004 (Table 3: Womble et al. 2015). Results from satellite telemetry studies suggest that harbor seals traveled extensively beyond the boundaries of Glacier Bay during the post-breeding season (September-April); however, harbor seals demonstrated a high degree of inter-annual site fidelity (93%) to Glacier Bay the following breeding season (Womble and Gende 2013b). Glacier Bay is also home to the only enforceable regulations in United States waters aimed at protecting harbor seals from vessel and human-related disturbance (Jansen et al. 2010). Spatial and temporal regulations for vessels transiting in and near harbor seal breeding areas, and operating regulations once in those areas, are all aimed at reducing impacts of human visitation.

*Table 3.* Trend estimates and annual change (%) in the number of harbor seals counted at terrestrial sites and two glacial ice sites (Tarr Inlet and McBride Inlet) during the molting period in late July-August (1992-2013) and the pupping period in June (2007 to 2013) in Glacier Bay National Park. Previous trend estimates are from Mathews & Pendleton (2006) and Womble et al. (2010). From Womble et al. 2015, Table 2, p. 19.

<b>Years</b>	<b>Annual Change (%)</b>	<b>SE</b>	<b>Lower 95% CI</b>	<b>Upper 95% CI</b>	<b>Trend Period (yr)</b>	<b>Season</b>	<b>Source</b>
1992-2002	-14.46	1.33	-17.07	-11.85	10	Molting	Mathews & Pendleton 2006
1992-2008	-12.41	0.66	-13.70	-11.11	17	Molting	Womble et al. 2010
1992-2011	-9.27	0.49	-10.22	-8.31	20	Molting	Womble et al. 2015
1992-2013	-6.91	0.40	-7.69	-6.13	22	Molting	Womble et al. 2015
2004-2013	9.64	1.66	6.40	12.89	10	Molting	Womble et al. 2015
2009-2013	13.25	4.37	4.69	21.82	5	Molting	Womble et al. 2015
2007-2013	4.36	1.79	0.85	7.86	7	Pupping	Womble et al. 2015

**The following text was taken from the most recent NOAA stock assessment reports (NMFS 2015, 2016)**

*“Harbor seal (Phoca vitulina richardii), Prince William Sound stock*

The Prince William Sound stock includes harbor seals both within and adjacent to Prince William Sound proper. Within Prince William Sound proper, harbor seals declined in abundance by 63% between 1984 and 1997 (Frost et al. 1999). In Aialik Bay, adjacent to Prince William Sound proper, there has been a decline in pup production by 4.6% annually from 40 down to 32 pups born from 1994 to 2009 (Hoover-Miller et al. 2011). The current (2007–2011) estimate of the Prince William Sound population trend over a 5-year period is +26 seals per year with a probability that the stock is decreasing of 0.56.

***Harbor seal (Phoca vitulina richardii), Cook Inlet / Shelikof Strait stock***

A multi-year study of seasonal movements and abundance of harbor seals in Cook Inlet was conducted between 2004 and 2007. This study involved multiple aerial surveys throughout the year, and the data indicated a stable population of harbor seals during the August molting period (Boveng et al. 2011). Aerial surveys along the Alaska Peninsula present greater logistical challenges and have therefore been conducted less frequently. The current (2007-2011) estimate of the Cook Inlet/Shelikof Strait population trend is +313 seals per year, with a probability that the stock is decreasing of 0.38.

***Steller sea lion (Eumetopias jubatus), Western stock***

Surveys in Alaska in 2002, were the first to note an increase in counts, which suggested that the overall decline of western Steller sea lions stopped in 2000-2002 (Sease and Gudmundson 2002). Using data collected through 2015, there is strong evidence that non-pup and pup counts of western stock Steller sea lions in Alaska increased at ~2% y-1 between 2000 and 2015 (Fritz et al. 2015). However, there are strong regional differences across the range in Alaska, with positive trends east of Samalga Pass (~170°W) in the Gulf of Alaska and eastern Bering Sea and negative trends to the west in the Aleutian Islands.”

**5. The type of incidental taking authorization that is being requested (i.e., takes by harassment only; takes by harassment, injury and/or death) and the method of incidental taking:**

Glacier Bay

A Letter of Authorization (LOA) for Level B harassment is being requested. We anticipate visual and noise disturbance of hauled out harbor seals from a vessel and researchers approach the island or from shore as researchers conduct data collection and/or equipment maintenance. We do not expect any death or serious injury to harbor seals as a result of the proposed activities. We also do not expect to disturb Steller sea lions or humpback whales (see mitigations in section 11).

SWAN

A Letter of Authorization (LOA) for Level B harassment is being requested. We anticipate visual and noise disturbance of hauled out harbor seals and Steller sea lions from survey vessels. We do not expect any death or serious injury to harbor seals or Steller sea lions as a result of the proposed activities. We also do not expect to disturb humpback whales or beluga whales. Mitigation measures are designed to minimize disturbance of humpback whales, and any impacts will result in minimal behavioral changes, but the nature of the survey may not allow complete avoidance of humpback whales

**6. By age, sex, and reproductive condition (if possible), the number of marine mammals (by species) that may be taken by each type of taking identified in paragraph (a)(5) of this section, and the number of times such takings by each type of taking are likely to occur:**

Glacier Bay

*Table 4.* Annual number of marine mammals expected to be taken by incidental harassment during glaucous-winged gull and climate monitoring in Glacier Bay, Alaska.

Species	Lifestage	Sex	Animals per Year	# surveys at each island per year	Total Takes in 5 Years	Procedures	Details
Harbor seal	ALL	Male and female	267	9 on Lone and 5 on other islands	1335	Ground and vessel surveys	Incidental visual and noise disturbance when approaching or surveying study sites on the ground or by vessel.

*Table 5.* Number of harbor seals observed at each site during glaucous-winged gull monitoring from 2015-2017 in Glacier Bay, means of all counts (rounded to whole numbers), and calculation of estimated takes per year.

Location	Date	Number of Adults	Average of 2015-2017 per site	Multiplied by 5 site visits(Lone x 8)
Boulder	5/25/2017	0		
Boulder	6/2/2017	0		
Boulder	6/21/2017	3		
Boulder	8/8/2017	1		
Boulder	5/23/2016	0		
Boulder	6/9/2016	0		
Boulder	7/14/2016	21		
Boulder	8/17/2016	0		
Boulder	5/26/2015	0		
Boulder	6/9/2015	2		
Boulder	8/6/2015	11	3.45	17.27
Flapjack	6/21/2017	0		
Flapjack	5/19/2016	41		
Flapjack	5/19/2016	50		
Flapjack	6/7/2016	10		

Flapjack	6/22/2016	0		
Flapjack	8/17/2016	0		
Flapjack	5/26/2015	0		
Flapjack	6/9/2015	0		
Flapjack	6/16/2015	0		
Flapjack	8/9/2015	0	10.10	50.50
Geikie	5/24/2017	0		
Geikie	6/2/2017	0		
Geikie	6/21/2017	12		
Geikie	8/7/2017	21		
Geikie	5/23/2016	0		
Geikie	6/7/2016	0		
Geikie	7/13/2016	37		
Geikie	8/16/2016	0		
Geikie	5/28/2015	0		
Geikie	6/11/2015	0		
Geikie	8/5/2015	30		
Geikie	8/5/2015	15	9.58	47.92
Lone	8/7/2017	26		
Lone	8/8/2017	23		
Lone	5/23/2016	6		
Lone	6/8/2016	20		
Lone	6/8/2016	13		
Lone	7/13/2016	17		
Lone	8/16/2016	5		
Lone	5/28/2015	7		
Lone	6/11/2015	33		
Lone	8/5/2015	35		
Lone	8/5/2015	23	18.91	151.27
			<b>Total/year</b>	<b>267</b>
			<b>Total 5 years</b>	<b>1335</b>

### *Harbor seals*

Harbor seals may be disturbed when vessels approach or researchers go ashore for the purpose of monitoring gull colonies or maintaining the Lone Island weather station. Harbor seals tend to haul out in small numbers (average < 50 animals) at most sites with the exception of Boulder and Flapjack Islands (Table 2). However, harbor seals hauled out at Flapjack Island are generally on the southern end whereas the glaucous-winged gull colony is on the northern end. We try to access the island from the north with a motor vessel, but when we use kayaks we generally need to approach from the south. Similarly, harbor seals on Boulder Island tend to haul out on the southern end while the gull colony is located and can be accessed on the northern end without disturbing the marine mammals. Lone and Geikie are small enough islands that even if we can approach without disturbing hauled out harbor seals, we will likely disturb them when conducting gull surveys. We do not know the likelihood of disturbing hauled out seals on Lone Island during the weather station maintenance, but believe that we can service the station without disturbing harbor seals in most situations. Results from satellite telemetry studies suggest that harbor seals traveled extensively beyond the boundaries of Glacier Bay during the post-breeding

season (Womble and Gende 2013b) but we do not know how many seals continue to use this island to haul out during the non-breeding harbor seal seasons of September-April so we will base out take estimates on the observations that we have (Table 5).

Aerial survey maximum counts show that harbor seals sometimes haul out in large numbers at all four locations (Table 2), and sometimes individuals and mother/pup pairs occupy different terrestrial locations than the main haulout (J. Womble, *personal observation*). We believe an annual take of 267 harbor seals per year for a total of 1335 harbor seals over five years is a reasonable estimate that will allow access to gull colonies and climate stations for monitoring. Although recent preliminary results suggest increasing number of seals at terrestrial sites and two glacial sites in Glacier Bay (Table 3; Womble et al. 2015), those increasing trends are likely driven by increases at the largest terrestrial site in Glacier Bay at Spider Reef, not at the haulout sites that are accessed by gull and climate monitoring. The yearly take estimate was calculated by multiplying the average number of seals observed during the last 3 years at each site during gull surveys and multiplying this by 5 visits for Flapjack, Geikie, and Lone Islands and 9 visits to Lone Island (5 for gull monitoring and 3 for climate monitoring; Table 5). The totals were calculated as follows: Boulder average of 3.45 seals per visit x 5 visits = 17, Flapjack average of 10.10 seals per visit x 5 = 50, Geikie average of 10.10 seals per visit x 5 = 51, and Lone Island average of 18.91 seals per visit x 8 visits = 151 for a total of 267 harbor seals per year over five years equals 1335 harbor seals. The highest number of annual visits to each gull study site will be 8 at Lone Island, therefore it is expected that individual harbor seals at a given site will be disturbed no more than 8 times per year at Lone and 5 times per year at all other locations.

SWAN

The estimates of harbor seal and Steller sea lion take are based on counts of observed pinnipeds from 2013 surveys, similar to those proposed in KATM, KEFJ, and KBAY. Data from 2013 surveys were used to estimate take because in 2013, most of the transects were able to be completed, therefore giving us the larger count-based estimate. These 2013 surveys only included KATM and KEFJ, so estimated numbers for harbor seals have been increased to account for the KBAY survey. These estimated numbers are conservative because they are based on counts of observed pinnipeds, and not all pinnipeds observed during a survey would experience harassment or take.

*Table 6.* Annual number of marine mammals expected to be taken by incidental harassment during SWAN surveys across KATM, KEFJ and Kachemak Bay, combined. ‘Animals per year’ are estimates from survey data from a single year across regions based on total count.

Species	Lifestage	Sex	Animals per Year	Total Takes in 5 Years	Procedures	Details
Harbor seal	ALL	Male and female	300	1500	Vessel surveys	Incidental visual and noise disturbance when conducting surveys.

Steller sea lion	ALL	Male and female	200	1000	Vessel surveys	Incidental visual and noise disturbance when conducting surveys.
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**7. The anticipated impact of the activity upon the species or stock:**

Glacier Bay and SWAN

We anticipate potential temporary behavioral disturbance of individual harbor seals and Steller sea lions as a result of our activities. We do not anticipate death, injury, or reduction in reproductive fitness of any marine mammal species or stocks due to the temporary nature of the disturbance of a small number of individuals. Temporary disturbance constitutes Level B harassment that should not result in negative impacts to individual or stocks of marine mammals. No long-term negative effects are anticipated and every effort will be made to minimize the potential for stampeding and disturbance of dependent young (see #11).

**8. The anticipated impact of the activity on the availability of the species or stocks of marine mammals for subsistence uses:**

Glacier Bay

Subsistence harvest of harbor seals by Alaska Natives is authorized under the Marine Mammal Protection Act; however, subsistence harvest of harbor seals has not been permitted in Glacier Bay National Park since 1974 (Catton 1995). Yet the extensive post-breeding seasonal distribution of seals from Glacier Bay (Womble and Gende 2013b) may expose seals to subsistence harvest outside of the park. Subsistence surveys and anthropological studies demonstrate that harbor seals may be harvested during all months; however, there are typically two distinct seasonal peaks for harvest of seals which occur during spring and in autumn/early winter (de Laguna 1972; Emmons 1991). These time periods co-occur with the time period during which seals travel beyond the boundaries of Glacier Bay (Womble and Gende 2013b). The level of subsistence harvest on seals from Glacier Bay/Icy Strait stock has not been quantified; however, subsistence reports from nearby communities have documented subsistence harvest (e.g., Wolfe et al. 2009). Due to the prohibition of subsistence harvest at the gull study sites and the temporary non-lethal nature of marine mammal disturbance caused by this project, we anticipate no impacts to subsistence harvest of marine mammals in the region.

SWAN

As mentioned above, subsistence harvest of marine mammals is allowed by Alaska Natives. However, no known harvest occurs within the SWAN survey areas at this time so no impact to subsistence is anticipated.

**9. The anticipated impact of the activity upon the habitat of the marine mammal populations, and the likelihood of restoration of the affected habitat:**

This activity will not impact marine mammal habitat.

**10. The anticipated impact of the loss or modification of the habitat on the marine mammal populations involved:**

There will be no loss or modification to marine mammal habitat.

**11. The availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, their habitat, and on their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance:**

Glacier Bay

The NPS lead biologist will instruct additional survey crew on appropriate conduct when in the vicinity of hauled-out marine mammals. In addition, the training shall brief survey personnel on marine mammals (inclusive of identification as needed, e.g., neonates). The NPS research teams will maintain a quiet working atmosphere by avoiding making unnecessary noise and by using hushed voices while near hauled out seals; will remain at least 50 m from seals when possible; and will choose pathways to study sites that will minimize disturbance to seals.

Disturbance to hauled out marine mammals will be further minimized as follows:

1. We will conduct pre-survey monitoring before deciding to access study sites of Boulder, Lone, Flapjack, or Geikie, using high-powered binoculars to determine and document the number species and location of hauled-out marine mammals on each island. Prior to deciding to land onshore to conduct the study, the researchers will use high-powered image stabilizing binoculars from the watercraft to document the number, species, and location of hauled out marine mammals at each island. The vessels would maintain a distance of 328 to 1,640 ft (100 to 500 m) from the shoreline to allow the researchers to conduct pre-survey monitoring.

2. If we observe harbor seals hauled out at survey site, we will minimize potential disturbance by boat travel and pedestrian approach during research activities by:

- a) Performing controlled and slow (approximately 2 to 3 knots/2.3 to 3.4 mph) ingress to study site to prevent stampede, and
- b) Selecting a pathway of approach farthest from the hauled out harbor seals to minimize disturbance.
- c) If a pup less than one week of age (neonate) is spotted during the proposed pre-survey monitoring or general monitoring activities, survey activities will conclude.

3. During pre-survey monitoring, we will monitor for offshore predators and conclude survey activities if harbor seals are hauled out and killer whales are observed within 1 mile of the study site.

4. We will not approach Steller's sea lions closer than 100 meters to conduct gull [or climate] monitoring research vessel surveys at South Marble Island will be conducted while maintaining 100 m minimum distance from Steller sea lions at all times, and ground surveys will only be conducted if the researchers are able to land on the island at a distance of at least 100 m from any hauled out Steller sea lion. If hauled out Steller sea lions occupy all landing beaches on the island, a ground survey will not be conducted.

5. We will follow regulations protecting humpback whales in Glacier Bay by avoiding operation of a motor vessel within ¼ mile of a whale. If accidentally positioned within 1/4 nautical mile of a whale, we will slow our speed to 10 knots or less and maintain our course away from the whale until at least 1/4 nautical mile of separation exists.

6. We will maintain a quiet research atmosphere in the presence of pinnipeds.

7. We will record the date, time, and location of each visit to research sites.

### SWAN

As mentioned in previous sections, SWAN conduct standardized surveys of marine birds and mammals from small vessels (5-8 m length) traveling at speeds of 8-12 knots along randomly selected sections of coastline that represent independent transects. The survey design consists of a series of transects along shorelines such that a minimum of 20% of an NPS park shoreline is surveyed. Transects are systematically selected beginning at a random starting point from the pool of contiguous 2.5-5 km transects that are adjacent to the mainland or islands. The transect width is 200 – 300 m, depending on the elevation of the observer platform, and the survey boat represents the midpoint.

Disturbance to hauled out marine mammals will be minimized by ensuring:

1. The survey vessels maintain a distance of 100 to 150 m from the shoreline at all times.

2. If we observe harbor seals and Steller sea lions hauled out, we will minimize potential disturbance during survey activities by:

- a) Maintaining survey speed and distance from the haulout
- b) Attempt to conduct survey (counts) of observed animals from a distance > 150m, if conditions allow

3. We will follow regulations protecting humpback and beluga whales by avoiding operation of a motor vessel within ¼ mile of a whale. If accidentally positioned within 1/4 nautical mile of a

whale, we will slow our speed to 10 knots or less and maintain our course away from the whale until at least 1/4 nautical mile of separation exists.

**12. Where the proposed activity would take place in or near a traditional Arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for Arctic subsistence uses, the applicant must submit either a "plan of cooperation" or information that identifies what measures have been taken and/or will be taken to minimize any adverse effects on the availability of marine mammals for subsistence uses:**

Not applicable

**13. The suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species, the level of taking or impacts on populations of marine mammals that are expected to be present while conducting activities and suggested means of minimizing burdens by coordinating such reporting requirements with other schemes already applicable to persons conducting such activity:**

Glacier Bay

Gull and climate researchers will report all observations of marine mammals and document all disturbances to state and federal agencies conducting marine mammal research in this region. Monitoring reports will be submitted annually to NMFS within 90 days after activities have concluded for the year. We will also coordinate with state and federal marine mammal biologists to determine what additional data or observations may be useful for monitoring marine mammals and haul outs in Glacier Bay. At a minimum we will collect and report the following for each site visit:

- a) Composition of marine mammals sighted, such as species, gender and life history stage.
- b) Information on the numbers by species of marine mammals observed during surveys.
- c) Species counts of numbers of adults and juveniles
- d) Number of disturbances by species and age according to a three-point scale of intensity including: (1) Alert: Seal head orientation or brief movement in response to disturbance, which may include turning head towards the disturbance, craning head and neck while holding the body rigid in a u-shaped position, changing from a lying to a sitting position, or brief movement of less than twice the animal's body length, (2) Movement: Movements in response to the source of disturbance, ranging from short withdrawals at least twice the animal's body length to longer retreats over the beach, or if already moving a change of direction of greater than 90 degrees., and (3) Flush: All retreats (flushes) to the water. Take will be recorded for categories 2 and 3 on the 3-point scale.
- e) Information on weather and tidal height.
- f) If applicable, observations of marked or tag-bearing pinnipeds or carcasses as well as any rare or unusual species of marine mammal.

- g) If applicable, note the presence of offshore predators including date, time, number and species.

## SWAN

SWAN researchers will report all observations of marine mammals and document all disturbances through monitoring reports submitted annually to NMFS within 90 days after activities have concluded for the year. We will also coordinate with state and federal marine mammal biologists to determine what additional data or observations may be useful for monitoring marine mammals and haul outs in the SWAN survey areas. At a minimum we will collect and report the following for each site visit:

- a) Information on the numbers by species of marine mammals observed during surveys.
- b) Number of disturbances by species and age (if possible) by recording the number of animals flushed (retreat to the water) during a given survey.
- c) If applicable, observations of marked or tag-bearing pinnipeds or carcasses as well as any rare or unusual species of marine mammal.

## **14. Suggested means of learning of, encouraging, and coordinating research opportunities, plans, and activities relating to reducing such incidental taking and evaluating its effects:**

### Glacier Bay

Glacier Bay National Park actively monitors harbor seals at breeding and molting haul out locations to assess trends over time (e.g., Mathews & Pendleton 2006; Womble et al. 2010, Womble and Gende 2013, Womble et al. 2015). This monitoring program involves collaborations with biologists from the Alaska Department of Fish and Game, and the National Marine Mammal Laboratory. We will continue these collaborations and encourage continued or renewed monitoring of marine mammal species. Additionally, we will report vessel-based counts of marine mammals, branded or injured animals, and all observed disturbances to state and federal agencies.

### SWAN

SWAN has been conducting nearshore coastal surveys along the KATM and KEFJ since 2006 and 2007, respectively (Coletti et al, 2018). SWAN collaborates closely with USGS, USFWS, UAF and others under the Gulf Watch Alaska (<https://www.gulfwatchalaska.org/>) program, primarily funded by the *Exxon Valdez Oil Spill* Trustee Council. SWAN will continue these collaborations and encourage continued or renewed monitoring of marine mammal species. Additionally, we will report vessel-based counts of marine mammals, branded or injured animals, and all observed disturbances to state and federal agencies.

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