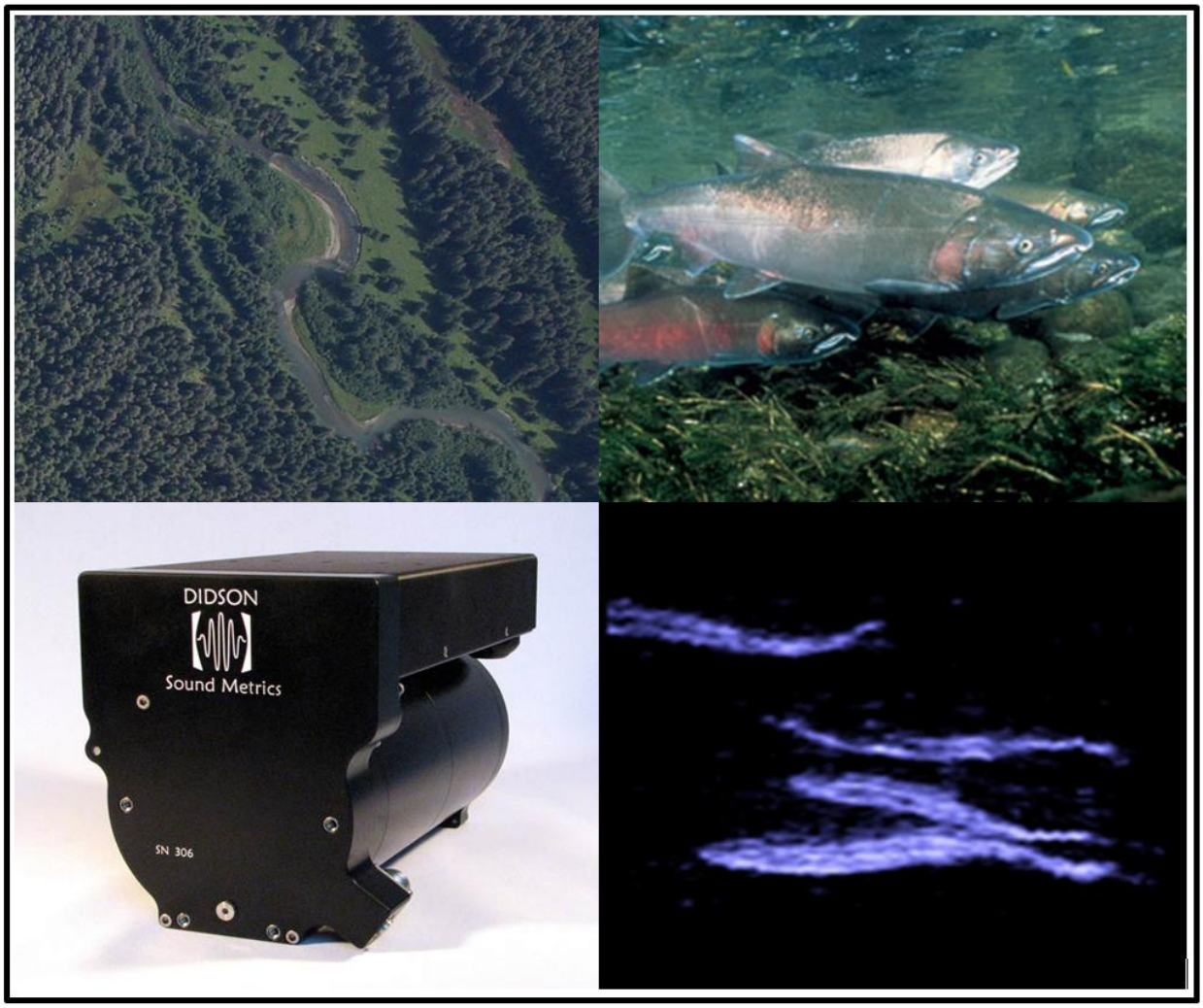
National Park Service
U.S. Department of the Interior

Glacier Bay National Park and Preserve
Alaska

DIDSON Sonar Installation on the Bartlett River

Environmental Assessment
April 2011



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1.0 PURPOSE AND NEED FOR ACTION

1.1 Purpose and Need

The National Park Service (NPS) is considering installation of a DIDSON (dual frequency identification sonar) sonar on the Bartlett River in Glacier Bay National Park's wilderness (Figure 1) to conduct a 4-year study of coho salmon escapement beginning in 2011. Escapement is that portion of an anadromous fish population that escapes the commercial and recreational fisheries and reaches the freshwater spawning grounds.

The DIDSON sonar is a relatively new technology for measuring salmon escapement accurately and reliably in rivers with similar conditions as the Bartlett River. The DIDSON produces near video quality imagery of migrating salmon and can enumerate aquatic species abundance in river systems where visibility is often obscured by turbid water quality or low light conditions.

Fig. 1. Proposed DIDSON installation site along the Bartlett River.

Understanding fish abundance and year to year variation provides context against which harvest can be compared to evaluate sustainability. Accurate and reliable quantitative information will assist the NPS and Alaska Department of Fish and Game to make and justify management decisions to ensure sustainable fishery harvest given increasing on-stream fishing effort and changing habitat.

This Environmental Assessment (EA) analyses the potential impacts which could result from the proposed action and no-action alternative. The EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, regulation of the Council on Environmental Quality (40 CFR 1508.9) and the NPS NEPA compliance guidance handbook (Director's Order (DO) 12, *Conservation Planning, Environmental Impact Analysis, and Decision Making*).

1.2 Background

Glacier Bay National Park's Bartlett River has a popular recreational fishery for coho salmon. This complex lake-stream system provides habitat for a diverse array of salmonids including sockeye, pink and chum salmon, Dolly Varden char, steelhead, rainbow and cutthroat trout in addition to coho salmon. The river is accessed either by foot or by boat from Bartlett Cove.

Angler effort and harvest are thought to be increasing despite rather limited Alaska Department of Fish and Game Statewide Harvest Survey data for this stream system that suggests stable or declining fishing effort and coho harvest since 2005. Bartlett River angler counts conducted periodically by the NPS since 2005 indicate a two fold increase in angler effort since creel surveys were conducted in the late 90's. Estimates of angler effort and coho salmon harvest exist from creel surveys conducted by the NPS during the coho salmon run in the mid 1990s determined that anglers harvested between 400-800 coho salmon annually during the 1996-98 period. There is growing concern about the sustainability of recreational fishing harvest.

The project area is part of the Bartlett River system which is likely experiencing rapid and poorly understood changes due to global climate change (Bryant 2009) and high uplift rates (Larsen et al. 2004) in this area. These are anticipated to negatively affect both the quality and quantity of salmon spawning and rearing habitat over the long term (Faber 2008, Neal 2007). Salmon population abundance is anticipated to decline in the future as a consequence of these natural and anthropogenic changes.

Accurate quantitative salmonid escapement information for the Bartlett River is extremely limited. Estimates of sockeye abundance obtained via visual enumeration methods have ranged from 1,000 to 100,000 fish and no estimates of coho salmon escapement exist. This is due to the fact that coho salmon runs typically occur late in the season during high discharge and turbidity and abbreviated daylight levels.

In 2007, an effort to accurately enumerate Bartlett River coho salmon resulted in the determination that accurate visual estimation of coho in the Bartlett River system is not possible due to chronic low water clarity, likely dispersed spawning grounds, and spawning during the rainy and snowy late fall season. Similarly, mark and recapture methods, because of the relative inaccessibility of this system as well as typical water clarity conditions prohibiting visual assessment of tagged fish, was determined as infeasible. A complete description of these efforts is available in the 2007 Bartlett River Fieldwork Summary (Murdoch and Soiseth, 2007).

Concurrent with assessing that visual enumeration methods for coho were not adequate, the NPS explored the possibility of installing a floating board weir on the Bartlett River. While this method would be the most accurate method for assessing salmonid escapement, it would have high impacts to wilderness character; installations are prohibited by the Wilderness Act, Section 4(c) unless they are the minimum necessary for the preservation of wilderness character. The weir also physically stops (or trammels) the salmon migration, another affront to the qualities of wilderness character the Park Service is mandated to protect. Additionally, the project would require a 24 hour human presence, halt fish passage (including non-target species), and fish held by the weir may attract fish eating birds and mammals including bears, making the fish more vulnerable to predation and injury and habituating bears to human presence. A floating board weir on the Bartlett River did not receive support due to management concerns about the impacts stated above.

The DIDSON technology was identified by NPS fisheries staff as a lower impact, "wilderness friendly" alternative to achieve accurate salmon escapement numbers on the Bartlett River. The DIDSON technology greatly reduces estimation error associated with visual survey methods attempted in 2007 and has lower levels of impact than a floating board weir. It was judged the "minimum activity" through the Wilderness Minimum Requirement Analysis process (Appendix A).

1.3 Purpose and Significance of the Park

Glacier Bay National Monument was established by presidential proclamation in 1925, and then expanded by presidential proclamation in 1939. The presidential proclamations of 1925 and 1939 established and expanded Glacier Bay National Monument to preserve and protect the area's tidewater glaciers, vegetation, unique opportunities for scientific study of glaciers and related flora and fauna changes over time, and historic value associated with early explorers and scientists.

The Alaska National Interest Lands Conservation Act (ANILCA) of 1980 provided additional direction including the renaming of the national monument to Glacier Bay National Park

designating much of park's terrestrial lands and some of its marine waters as wilderness. It also states that the park shall be managed for the following purposes, among others:

- To protect the Alsek River, fish and wildlife habitats and migration routes, and a portion of the Fairweather Range including the northwest slope of Mount Fairweather.
- Preserving lands and waters containing nationally significant natural, scenic, historic, archeological, geological, scientific, wilderness, cultural, recreational and wildlife values
- Preserving the unrivaled scenic and geological values associated with natural landscapes
- Maintaining sound populations of, and habitat for, wildlife species of inestimable value to the citizens
- Preserving the natural, unaltered state of the coastal rain forest ecosystem
- Preserving wilderness resources and related recreational opportunities
- Maintaining opportunities for scientific research and undisturbed ecosystems
- Allowing Glacier Bay National Park to remain " . . . [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."

General Management Plan

Glacier Bay National Park and Preserve's *General Management Plan* (NPS 1984) sets the overall direction for management of natural and cultural resources, visitor use, land protection, and facility development. The following general management plan objectives pertain to this EA:

- Manage Glacier Bay National Park and its use in such a manner as to conserve this extraordinary segment of Alaska and its continuing natural succession processes in a natural condition, as a backdrop for use, understanding, and enjoyment by the public;
- Manage the natural resources, both terrestrial and marine, to ensure perpetuation of values basic to the area's establishment, thus following the principle that natural processes proceed unchecked.
- Establish and/or maintain a balanced relationship between resource preservation and visitor needs.
- Ensure patterns of use that enable visitors to enjoy and understand the natural features. Witness the interrelated stories of geology, climate, glaciation, and

biological communities of land and sea; and appreciate the dynamic natural forces still at work.

Other sections of the 1984 General Management Plan also apply to this project:

- Wilderness Management Policies (page 19): Wilderness management should not mold nature to suit people. Rather, it should manage human use and influences so that natural processes are not altered. Managers should do only what is necessary to meet wilderness objectives, and use only the minimum tools, force, and regulation required to achieve those objectives.

- Sport Fisheries (page 53): Sport fishing will continue to be allowed subject to ADF&G and NPS regulations. Sport harvest of any aquatic species threatened by excessive harvest pressure may be regulated in the future. However, the National Park Service will work closely with the Alaska Department of Fish and Game for the establishment of such regulations. Stream surveys will be conducted by the Park Service or the Department of Fish and Game to ascertain their importance as spawning rivers.

Wilderness Visitor Use Management Plan

The Wilderness Use Visitor Management Plan (NPS 1989) was developed and signed in 1989. In the section F) Resource Management, 1) Resource Inventory, it states "the establishment of sound wilderness management practices is dependent upon information gathering. Research data and basic inventory information contribute to the understanding of park resources and the effects that visitor use activities may have on park values. The review of existing data and acquisition of new baseline data are essential…"

1.4 Legal Mandates, Regulations and Policies

NPS Organic Act

The 1916 Organic Act, which created the National Park Service, directs the Service to conserve park resources "unimpaired" for the enjoyment of future generations. The 1970 National Park System General Authorities Act, as amended in 1978, prohibits the Service from allowing any activities that would cause derogation of the values and purposes for which the parks have been established (except as directly and specifically provided by Congress). Taken together, these two laws establish for NPS managers (1) a strict mandate to protect park resources and values; (2) a responsibility to actively manage all park uses; and (3) when necessary, an obligation to regulate their amount, kind, time, and place in such a way that future generations can enjoy, learn, and be

inspired by park resources and values and appreciate their national significance in as good or better condition than the generation that preceded them.

The evaluation of whether impacts of a preferred alternative would lead to an impairment of park resources and values is included in this EA. Impairment is more likely when there are potential impacts to a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- essential to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the park's GMP or other relevant NPS planning documents.

Wilderness Act of 1964

The Wilderness Act of 1964 (Public Law 88-577, 16 USC §§ 1131-1136, 78 Stat. 890) established the National Wilderness Preservation System and identified the National Park Service as one of the four federal agencies responsible for protecting and preserving the nation's wilderness resource. The Wilderness Act defines wilderness as follows:

> A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this chapter an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Section 4(c) of the Wilderness Act defines prohibited uses as:

> Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this Act and, except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no

landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.

The minimum requirement concept is used when making all decisions concerning management of wilderness, including administrative practices, proposed special uses, scientific activities, and equipment use (including weather stations) in wilderness. When the minimum requirement is determined, the potential disruption of wilderness character and the physical resource is considered and given more weight than economic efficiency and convenience. If a compromise of wilderness resource or character is unavoidable, only those actions that preserve wilderness character and/or have localized, short-term adverse impacts will be acceptable. The minimum requirement analysis for this project is included in Appendix B.

Therefore, a two-step process is used:

1) Determine whether the proposed management action is needed, necessary for the purpose of wilderness, and does not pose a threat to wilderness resources and character.
2) Determine the techniques and type of equipment needed to ensure that impact to wilderness resources and values is minimized.

NPS Management Policies

NPS Management Policies 2006 (NPS, 2006a) addresses the importance of and need for resource monitoring efforts in a number of sections:

Section 2.3.1.5 *Science and Scholarship* "The collection and analysis of information about park resources will be a continuous process that will help ensure that decisions are consistent with park purposes."

Section 6.3.6 *Scientific Activities in Wilderness* "The statutory purposes of wilderness include scientific activities, and these activities are encouraged and permitted when consistent with the Service's responsibilities to preserve and manage wilderness".

Section 6.3.6.1 *General Policy* "The National Park Service has a responsibility to support the appropriate scientific activities in wilderness and to use science to improve wilderness management. The Service recognizes that wilderness can and should serve as an important resource for long-term research into, and study, and observation of, ecological processes and the impacts of humans on these ecosystems. The National Park Service further recognizes that appropriate scientific activities may be critical to the long- term preservation of wilderness".

"Scientific activities are to be encouraged in wilderness. Even those scientific activities (including inventory, monitoring, and research) that involve a potential impact to wilderness

resources or values (including access, ground disturbance, use of equipment, and animal welfare) should be allowed when the benefits of what can be learned outweigh the impacts on wilderness resources or values. However, all such activities must also be evaluated using the minimum requirement concept and include documented compliance that assesses impacts against benefits to wilderness. This process should ensure that the activity is appropriate and utilizes the minimum tool required to accomplish project objectives".

1.5 Issues and Impact Topics

Issues and concerns with this project are grouped into distinct impact topics to aid in analyzing environmental consequences, which allows for a standardized comparison of alternatives based on the most relevant information. The impact topics were identified on the basis of federal laws, regulations and orders, NPS Management Policies 2006, and NPS knowledge of potentially affected resources. A brief rationale is provided for each issue or topic that is analyzed in the environmental consequences section of this EA.

1.5.1 Impact Topics Selected For Detailed Analysis

Vegetation

The proposed action would require walking to and from the DIDSON installation site, placement and storage of equipment, and camping resulting in trampling of native vegetation or increasing the likelihood of the transport of invasive plants seed sources.

Aquatic Biota and Habitat

The proposed action would require the installation of the DIDSON unit and short sections of fish diversion fence in the Bartlett River. This could degrade fish habitat by disturbing bottom sediments and increasing downstream turbidity and sedimentation beyond inherent, natural, background levels. Some fish capture will be conducted upstream of the DIDSON installation to ensure valid species apportionment. However, captured fish will be quickly enumerated, measured and released. This will cause some stress to individual fish. This could lead to some unquantifiable but insignificant mortality.

Wildlife

The proposed action could cause some temporary displacement of wildlife in the immediate area given presence, proximity and disturbance sensitivity. The equipment itself could pose a potential attractive nuisance to bears.

Wilderness Character

Under the Alaska National Interest Lands Conservation Act, 2,658,186 acres (1,075,730 hectares) of the park's total of 3,283,168 acres (1,328,651 hectares) are congressionally designated as part of the National Wilderness Preservation System (see table 3-3).

Table 1.5.1 Designations within Glacier Bay National Park and Preserve

Designation	Acres (hectares)	Percentage of Total
Land		
Wilderness land	2,610,548 (1,056,451)	97.7%
Non-wilderness preserve land	54,811 (22,181)	2%
Non-wilderness land	8,504 (3,441)	0.3%
Total Land Acreage	2,673,863 (1,082,073)	100%
Water		
Non-wilderness waters	559,418 (226,388)	92%
Wilderness waters	47,638 (19,278)	8%
Total Water Acreage	607,056 (245,666)	100%

Note: Non-wilderness preserve land includes a large contiguous area south and west of Dry Bay, incorporating most of the park. Non-wilderness park land is located mostly at and near Bartlett Cove.

The acreage totals in Table 3-3 differ from those listed in section 701 of the Alaska National Interest Lands Conservation Act because of the use of more exact mapping techniques and isostatic rebound. These wilderness resources include most of the land in the park and five marine wilderness waterways: the Beardslee Islands, Dundas Bay, the Hugh Miller / Scidmore complex, Adams Inlet, and Rendu Inlet. Unless within designated wilderness waters, land below mean high tide is not designated wilderness. The potential installation site lies within designated wilderness.

With its calving tidewater glaciers, temperate rainforest, plant diversity, and terrestrial and marine wildlife, including threatened and endangered species, the Glacier Bay wilderness encompasses a large, intact ecosystem with few lasting impacts from human intrusion. Although the Huna Tlingit lived in Glacier Bay for centuries and non-native trappers, miners, and fishermen lived and worked throughout the park, little evidence of human settlement or activity is visible to the typical visitor. Existing developments within wilderness include severely deteriorated remains of indigenous and historic structures which are largely hidden from public view and permitted scientific instrumentation, markers and facilities. Although visitor use is largely confined to waterways and a narrow band of coastline, there is little evidence of litter or other recent human use (i.e., cut branches, campfires, etc.). Glacier Bay wilderness provides unique opportunities for visitors to experience solitude and unconfined recreation in a largely

pristine environment. With the exception of commercial and sport fishing effects, ecological processes proceed, for the most part, without interference from humans.

1.5.2 Impact Topics Dismissed From Further Analysis

Water Quality

The proposed action could degrade water quality by disturbing bottom sediments and increasing turbidity during installation and removal of the DIDSON for each year during the duration of the project. Fine sediments in water create turbidity, which is a quantifiable water quality characteristic. The size and volume of the Bartlett River and its existing turbidity in comparison with input quantities of sediment from the installation and removal of the DIDSON installation is a major determinant of the level of the effect. Project-associated sediments would be diluted to undetectable levels. Some small amount of current scouring around the fish fence supports could occur. But the effect (installation and removal over 4 seasons) would be negligible and undetectable compared to natural system-wide erosion, sediment disturbance, turbidity and sedimentation (transport and deposition) effects.

Air Quality

The DIDSON Sonar installation will be powered by an EFOY fuel cell. The only byproducts of the EFOY are carbon dioxide and water and will not cause any impact to the air quality in the project area.

Threatened and Endangered Species

There are no known endangered or threatened species or critical habitat for any endangered or threatened species in the project area.

Cultural Resources

The project lies within the traditional cultural property (TCP) of *L'eiw Shaa Shakee.aan*, Town on Top of the Sand Hill. The TCP encompasses the waterways of Bartlett Cove, the Bartlett River, Bartlett Lake and the Beardslee Islands, as well as portions of certain surrounding lands. GLBA initiated consultation with the Hoonah Indian Association on February 28, 2011, affording the tribe the opportunity to comment on possible effects to the TCP from this undertaking. There have been no effects identified from this consultation, which will remain open through the public comment period.

Subsistence

Glacier Bay National Park is closed to subsistence uses under federal regulations. The proposed action and alternatives would not affect regional subsistence use. Effects on subsistence uses

and resources are addressed in detail in the ANILCA Section 810 Summary Evaluation and Findings (Appendix E).

Visitor Use

Recreational use of the Bartlett River could be affected by the presence of the fishery crew travelling to and from the installation site. It is possible that an occasional hiker may enter the installation site. One or two groups of recreational packrafters travel the stream per year and may encounter the installation.

Soils

Equipment will be housed in a bear proof container on flat ground. Placement of the container will require only minimal disturbance to upland soils, as it will be secured to the ground with duckbill or earth (screw type) anchors. The cable and conduit will run from the container to the DIDSON unit in the water. This shall also be secured with duckbill anchors at 4-6 foot intervals. This amount of disturbance to area soils is negligible.

Soundscape

Natural soundscapes are important as intrinsic elements of the environment. It is anticipated that there will be negligible increase in noise during the installation process, mostly a result of hand driven (mechanical) post pounders, handtools, and non-motorized equipment and personnel talking.

Environmental Justice

Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low-income Populations" requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The EA alternatives would have no health or environmental effects on minorities or low-income populations or communities.

1.6 Permits and Approvals Needed to Implement Project

Permits and approvals needed to implement the DIDSON sonar installation are summarized below:

State of Alaska Coastal Management Program: The NPS would submit a Negative Determination to the State of Alaska, Department of Natural Resources, Office of Project Management and Permitting(Appendix X). The NPS would apply for appropriate permits identified during the review process.

A Title 42 Fish Habitat Permit from the State of Alaska, Department of Fish and Game, Habitat Division may be required for this installation.

Army Corps of Engineers, Nationwide Permit No. 5.

GLBA's Cultural Resource Program Manager reviewed this project in accordance with the 2008 Service-wide Programmatic Agreement (PA) for Section 106 compliance. The project qualifies under the streamlined review, Section III (C)(8), which permits the installation of environmental monitoring units for wildlife stations with limited size and number of borings.

2.0 ALTERNATIVES

2.1 Introduction

This section includes a description of the no-action alternative and one action alternative for enumerating salmon on the Bartlett River in Glacier Bay National Park's wilderness. It also includes alternatives considered but dismissed from further analysis and mitigating measures.

2.2 Alternative A - No Action

No escapement estimates would be established for the coho fishery on the Bartlett River. The contribution of these populations to area fisheries would be determined through angler counts and periodic creel surveys. This alternative represents a continuation of the existing situation and provides a comparative baseline for evaluating the changes and impacts of the action alternatives.

2.3 Alternative B - DIDSON Sonar Installation

A dual frequency identification sonar (DIDSON) would be installed in the Bartlett River approximately 3.2 miles upstream from the end of the Bartlett River boardwalk (about 1.9 miles above the upper extent of most recreational harvest). The installation footprint would be approximately 32 ft^2 and consists of a DIDSON sonar, a fish diversion fence, fuel cell power source, 2 backup batteries and a laptop pc and data storage devices. Electronic equipment would be housed in a (48 x 36 x 24 in.) water and bear resistant enclosure within 50 feet of the stream bank. The DIDSON unit would be placed on an H mount and installed in the water near the bank and a fish diversion fence would encompass the unit and divert the fish to the ideal distance for focused imaging. Some netting and measurement of fish will need to be conducted to ensure proper species apportionment.

Fish diversion fences (13 m and 4 m) will be installed along each bank to direct fish across the ensonified zone and removed at the end of each season. The diversion fences or aluminum bipod

"wings" will be held in place using driven pipe "pins," steel t-fence posts and/or sand bags. Seven bipod wings will necessitate the installation of at least 14 five to seven foot driven pipe (1.5 in diam.) pins along the river right half of the channel. Pins will be driven 3-4 ft. into the stream bed to secure the bipod wings. Two or three additional pipe pins or t-posts will secure the fish diversion fence (chicken wire or Vexar mesh) along the left bank. A metal fence post driver will be used to mechanically drive the pipe and t-posts to the appropriate depth.

Fig. 2. DIDSON Sonar on an H-mount (CRITFC.org).

Because fish must pass through the ensonified cone in order to be detected, it is crucial that they be directed to pass along a specific cross section of the stream channel "seen" by the DIDSON camera. If they pass behind the DIDSON "camera" or under or behind woody debris or other channel obstructions they will not be detected. Should the proposed installation site contain instream woody debris it will need to be removed or trimmed using hand-tools.

Equipment would be installed and operated from August 1 through October 31 each season and removed each fall and winter for 4 seasons. The site would be visited 2-4 times each week on average with more site visits occurring during installation and removal. When possible the site will be accessed as nearly as possible from the Bartlett River using non-motorized vessels. At the end of each season, all of the electronics including DIDSON, EFOY fuel cell, batteries, etc., would be removed from the project area and stored off-site. The other materials such as the equipment storage box, fish diversion fencing materials, and H-mount, would be stored at the installation site for use the following season.

Species apportionment is a critical aspect of accurate salmon escapement estimates in mixed stock runs. Species such as coho and chum have overlapping length ranges and are in the river at the same time, which makes DIDSON ineffective for species apportionment without physical sampling. Physical sampling in the Bartlett River would require using nets (fyke or seine) to capture, measure (total lengths) and identify species (visual sampling methods will not be effective due to turbid water conditions). These nets would allow the passage of fish and the amount of time the fish will be held or impeded in these nets would be as short as possible (estimated at this time to be < 1 minutes). These counts would be conducted during the coho run

from August 20 through the end of October of each year. The amount of sampling necessary is undetermined but could be up to 4-5 days a week during the pilot year and less frequently in subsequent years. Once statistically sound species apportionment ratios are determined they would be applied to the fish count data from the DIDSON.

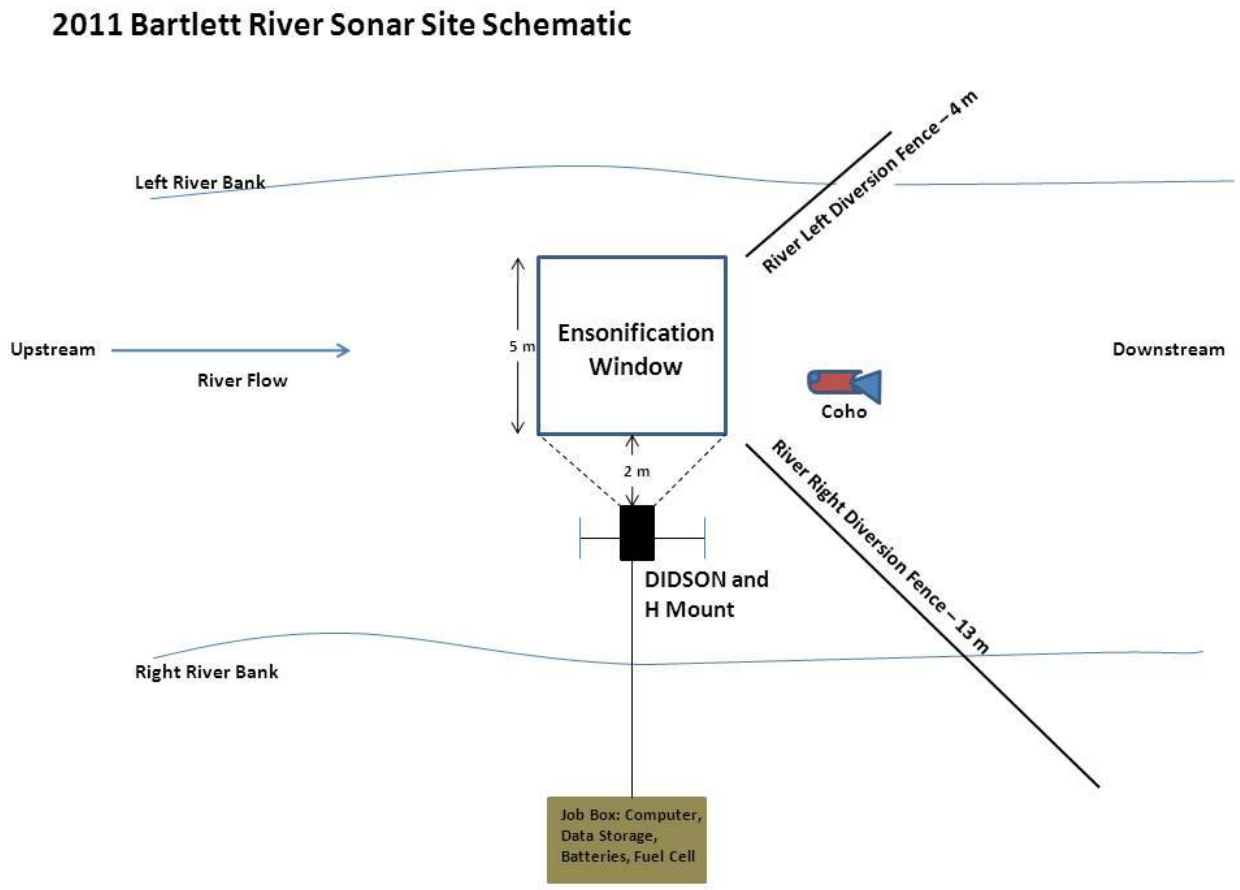

Fig 3. Bartlett River DIDSON installation plan view.

Mitigation Measures:

Local residents in Gustavus and park visitors in Bartlett Cove would be notified of the expected dates, nature, and duration of the disturbance.

Shoes, clothing and equipment will be cleaned and checked for the presence of non-native seed sources prior to accessing the site. The installation site will be periodically checked for non-native plants for 2 years following project termination.

All personnel will be trained in Leave No Trace techniques, efforts will be made to avoid enlarging the existing wildlife trail leading to the site. Campsite and installation sites will be rehabilitated upon completion of the project.

To prevent potential erosion, road fabric will likely be placed on the streambank and streambed in the immediate area of the diversion fence.

2.4 Environmentally Preferred Alternative

The Environmentally Preferred Alternative is the alternative that will promote the national environmental policy expressed in the NEPA section 101(b) of the NPS DO-12 Handbook and Director's Order (NPS, 2005a). The Environmentally Preferred Alternative is the action which results in the least damage to the biological resources and environment while protecting preserving and enhancing the historic, cultural, and natural resources. Alternative A would be considered the Environmentally Preferred alternative.

2.5 Description of Actions Considered but Eliminated from Detailed Study

2.5.1 Visual Enumeration

Estimation of salmon escapement from visual surveys on foot is one of the oldest methods used for obtaining population estimates, but it is subject to a variety of factors which may introduce bias or limit reliability. The accuracy of this method varies greatly with experience of observers, stream character and conditions when surveyed, and the characteristic of run timing and duration. It is generally agreed that this method underestimates escapement. Under the most ideal conditions (i.e. experienced observers, narrow, shallow, clear water stream, with short spawning peak) this method may obtain 80 to 90 % of a total escapement determined with a weir. Under normal or less than ideal conditions (like those present in the Bartlett River) this method may produce estimates that are no better than ± 50% (Cousins et al 1982).

Coho salmon populations can be estimated using visual counting methods such as foot, aerial, or snorkel counts that do not require an onsite installation. These methods were piloted in 2007 on the Bartlett River system by the NPS fisheries crew. A complete description of these efforts is available in the 2007 Bartlett River Fieldwork Summary (Murdoch and Soiseth, 2007). Turbid water quality and poor visibility conditions are the biggest obstacles to obtaining accurate fish escapement numbers on the Bartlett River system and make estimating the salmon populations visually the least accurate method. The data collected via visual escapement surveys would be inaccurate and unreliable for meaningful statistical conclusions. For these reasons, this alternative is not being considered in this EA.

2.5.2 Floating Board Weir

The most accurate method for assessing salmonid escapement in the Bartlett River, because of typical turbid water clarity, is a floating board weir. Enumerating salmon returning up the Bartlett River as they pass through the weir would provide the most accurate population estimate of all methods but correct species identification could still be problematic depending on water depth and clarity conditions. Selective subsampling and species identification of a proportion of returning fish could potentially inform the species apportionment and enumeration process. The margin of error would likely be lowest of all the alternatives provided species apportionment could be determined accurately and weir integrity could be maintained during flood events. But water clarity conditions would undoubtedly influence feasibility and accuracy of this method.

This alternative would have a significant effect on the wilderness character of the project area. The weir would restrict fish passage including non-target species. Slowed fish passage and aggregation at the weir may attract fish eating birds and mammals including bears, making them more vulnerable to predation and injury. For these reasons, this alternative was precluded from further consideration. The Wilderness Minimum Requirement Analysis determined that the floating board weir was not the "minimum activity" (Appendix A).

3.0 AFFECTED ENVIRONMENT

3.1 Project Area

The project area extends 50 feet along both sides of the Bartlett River Trail from the trail access at park headquarters to the end of the maintained trail. From there the project area includes the river corridor and extends 50 feet from the western edge of the river and 150 feet from the eastern edge of the river 3.02 miles to the installation site. The project area also includes the waterway extending from the park headquarters to the mouth of the river. This waterway may be used for intermittent non-motorized vessel access to and from the installation site during high tide.

The maintained trail extends 1.48 miles; use trails to the popular fishing sites extend 1.91 miles beyond that. From there, apparent to obscure wildlife trails extend along both sides of the river 1.11 miles to the proposed DIDSON installation site on the Bartlett River. The installation site lies approximately 4.5 miles from the trailhead, and about 1.11 miles above the upper extent of most recreational fish harvest. Its coordinates are 58° 30' 35.77 N, 135° 40' 43.43 W.

Fig. 4 Project Area

3.1.1 Vegetation

In the immediate vicinity of the project area, the river moves through closed Sitka spruce forest, tall willow and alder scrub, mesic herbaceous meadows, and wet grass and horsetail vegetation communities. The lower reaches of the Bartlett River are bordered by supratidal meadow. This plant community is dominated by herbaceous vegetation and is located between the high tide line and the forest edge.

3.1.2 Aquatic Biota and Habitat

The Bartlett River watershed is a relatively large, complex system fed by more than a dozen lakes and associated wetlands. It flows more than 20 miles from its headwaters on Excursion Ridge northeast of Beartrack Cove southwesterly to the mouth at the head of Bartlett Cove. Much of the lower 9 miles of stream is relatively low gradient, ranging from an elevation of just over 100 feet at the main lake feeding the middle and lower reaches to sea level in the Beardslee Islands. The steep upper reaches of this watershed are fed by alpine snow fields from altitudes of over 1,600 feet.

This complex lake-stream system provides habitat for a diverse array of salmonids and other freshwater and estuarine fishes, including coho, sockeye, chum and pink salmon, as well as rainbow and steelhead trout, cutthroat and Dolly Varden char, coastrange sculpin, threespine

stickleback, starry flounder and staghorn sculpin. All salmonid species, coastrange sculpin and stickleback can be found in or migrating through the proposed project area. Starry flounder and staghorn sculpin would rarely occur there except perhaps during extreme high tides

Woody debris, overhanging riparian vegetation and beaver activity occur throughout the watershed. The upper portion of the river (starting at the upper extent of recreational activity on Fig. 3) is entrenched in a generally narrow former floodplains, is lined with a variety of mostly forest vegetation, and alternatives between braided riffles and rocky rapids. The lower portion of the river from the mouth reaching to the upper extent of recreational activity, slows and broadens onto a much wider supratidal meadow.

The river typically supports a standing crop of algae, moss, *Ranunculus spp.* and diatom periphyton occupying its bottom substrate. Bottom substrate is comprised mainly of cobble, gravel, sand and sediment are excellent spawning substrate for most salmonids; stream productivity and stability are good; it is an excellent salmon system (Blackie, et al 1989).

The project area is part of the Bartlett River system which is likely experiencing rapid and poorly understood changes due to global climate change (Bryant 2009) and high uplift rates (Larsen et al. 2004) in this area. These are anticipated to negatively affect both the quality and quantity of salmon habitat over the long term (Faber 2008, Neal 2007).

Fig. 5 Streamside view (looking downstream) of proposed DIDSON site location (located from bank to bank between field staff).

3.1.2 Wildlife

The project area provides habitat for a variety of wildlife species that make use of the varied habitat found along the Bartlett River's forest and supratidal meadows. No comprehensive wildlife survey of the area has been conducted, however, based on wildlife observations and habitat, black and brown bears and moose are likely the most abundant large mammals in the project area. The project area provides habitat, at least at times, for low numbers of wolves, coyotes, river otters, beaver, mink short-tailed weasel, porcupine and vole species. Forested portions of the project area provide nesting habitat for bald eagles. Other avian species present may include gulls, cormorants, various waterfowl species and shorebirds, American dippers, ravens, crows and a host of songbirds including warblers, thrushes and other forest, meadow and riparian species.

3.1.3 Wilderness Character

Under ANILCA, 2,658,186 acres of Glacier Bay National Park's total of 3,283,168 acres are congressionally designated as part of the National Wilderness Preservation System. These wilderness resources include most of the land in Glacier Bay National Park and five marine wilderness waterways. These marine wilderness waterways comprise 47,638 acres (about 8%) of the total marine waters in the park.

Glacier Bay National Park's wilderness offers some of the most unique resources and values in the National Wilderness Preservation System. With its calving tidewater glaciers, temperate rainforest, plant diversity, and terrestrial and marine wildlife, the wilderness of Glacier Bay National Park is an untrammeled, relatively undeveloped, and intact ecosystem. Within the project area, natural processes such as isostatic rebound occur in combination with other unique attributes, such as the interface with marine ecosystems.

The project area specifically contains one of the most highly used areas in Glacier Bay National Park's wilderness. Trail counts have recorded up to 40 people a day during the visitor use season. This number includes both hikers and anglers. Beyond the end of the maintained trail and upper extent of most recreation activity, visitor use becomes extremely limited (virtually non-existent).

Fig. 6 Aerial view of proposed DIDSON site.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

This chapter provides an evaluation of the potential effects or impact of each of the alternatives on the resources described in the issue statement presented in Chapter 1, Purpose and Need for Action.

4.2 Impact Criteria and Assessment

Impacts identified for each issue are based on the intensity, duration, and extent of the impact. Summary impact levels are characterized as negligible, minor, moderate or major. Impact level thresholds are defined in Table 4.2.

Table 4.2 Impact Levels

Negligible	Minor	Moderate	Major
Little or no impact to the resource would occur; any change that might occur may be perceptible but difficult to measure.	Change in resource would occur, but no substantial impact would result. The change would be perceptible and measurable but not alter resource condition.	Noticeable and measurable change in a resource would occur and would alter resource condition, but the integrity of the resource would remain.	Substantial impact to a resource would occur that is easily defined, highly noticeable, and would measurably alter the integrity of the resource.

4.3 Impact of Alternative A: No Action

4.3.1 Vegetation

Under this alternative most angler counts and creel surveys will take place in areas of high angler and hiker use along the existing trail. Vegetation trampling associated with these activities would be minimal.

Cumulative Effect

Currently a maintained trail extends 1.48 miles from the trailhead to the Bartlett River. The maintained trail concentrates impact to the travel corridor which is built to withstand use. From there, user built social trails and wildlife trails extend along both sides of the Bartlett River affecting vegetation. The cumulative effect on vegetation would be negligible The no-action alternative would result in a very small additional impacts to vegetation in the project area.

Conclusion: The no-action alternative would have a negligible impact to vegetation from vegetation trampling associated with creel surveys and angler counts.

4.3.2 Aquatic Biota and Habitat

Under this alternative fishes and stream habitat would not be impacted. There would be no additional human presence or instream installation or removal of equipment to impact aquatic biota and habitat. Fish would not be ensonifed, captured or handled. Impacts resulting from bank erosion, or stream sediment suspension, transport and deposition would not occur.

Cumulative Effects:

Recreational fishing for coho salmon is a popular activity for many local residents and visitors to Glacier Bay National Park. This activity results in the harvest and direct mortality of Bartlett River coho. Soiseth et al. estimated that between 1996 and 1998, up to 3,300 coho were caught and between 400 – 800 coho were harvested annually by sport anglers. More recent estimates indicate a two fold increase in angling pressure since 1998, but no recent estimates of harvest exist (Murdoch et al. unpublished). Coho caught and released by anglers likely exhibit decreased fitness and higher mortality than fish not caught by anglers. Generally, the physical location in which the fish is hooked, associated hook damage and subsequent bleeding, as well as angling methods while playing, handling and releasing fish, all have significant effects on a fish's survival. Hooking mortality as high as 68% has been documented for coho salmon (Muoneke and Childress 1994).

Recreational anglers not only affect aquatic biota, but also aquatic habitat. Anglers can cause bank erosion when accessing the river. Degraded riparian vegetation from angler foot traffic can destabilize river bank soils and increase erosion of sediment into the river. Anglers also suspend sediment and alter natural sediment transport and deposition through wading activity. Although no data exists, these seasonal anthropogenic effects occurring over a very small segment of the entire river reach are relatively insignificant in comparison with natural, system-wide effects of sediment transport and deposition.

The project area as part of the Bartlett River system is likely experiencing poorly known or unquantifiable impacts due to global climate change, at sea commercial and sport fishing, as well as on-stream sport angling. Climate change is anticipated to negatively affect coho productivity over the long term. Marine commercial and sport fisheries harvest some unknown and unquantifiable amount of Bartlett River coho. On-stream recreational harvest, because it is a terminal fishery targeting returning Bartlett River coho, represents a quantifiable harvest that is estimable.

Though coho salmon are a resilient species they have highly adapted life history strategies that may suffer from alterations in their environment caused by climate change. As with other species of salmon, alterations in the freshwater temperature regime during egg incubation may affect development rates and emergence timing (Tang et al 1987). Additionally, important off- channel rearing habitat may become unsuitable if increases in air temperature result in water temperatures that approach or exceed physiological limits (Bryant 2009). These examples describe only two of many aspects of coho life history that are vulnerable to climate change. These natural effects on salmon productivity are difficult to quantify and address in a relevant time frame for managers. However with accurate estimates of salmon escapement and angler harvest, mangers can address potential impacts resulting from the sport fishery.

Commercial and sport fishing occur for coho stocks at sea. Mixed stocks of coho salmon (coho from different rivers) migrate great distances at sea throughout the Gulf of Alaska before returning to freshwater. In northern Southeast Alaska commercial and sport fishermen target migrating coho salmon in Cross Sound and Icy Strait where fish are concentrated as they move from the Gulf of Alaska through inside waters to their natal streams before spawning. Commercial troll fishermen in Icy Strait from 2003 to 2008 harvested between 137,352 – 240,887 coho each year (unpublished CFEC data 2010). In the same area and during the same period sport anglers harvested an estimated 2,526 – 13,867 coho each year (SWHS 2010). Because fishers target mixed salmonid stocks it is not possible to determine the effect on any one stock of coho. Any effects from at sea commercial and sport fishing on Bartlett River coho are unquantifiable at this time.

Cumulative effects of both natural phenomena and human-caused change have had a moderate effect on aquatic biota and habitat in the project area. Without accurate escapement estimates, it is unknown whether the current or anticipated fishing pressure on coho salmon runs in the Bartlett River is having an adverse ecological impact on this population. The no-action alternative would not add any incremental impacts to coho salmon.

Conclusion: The no action alternative would have a negligible impact on aquatic biota and habitat.

4.3.3 Wildlife

Personnel conducting angler counts and creel surveys could cause some negligible displacement of wildlife.

Cumulative Effects

About .61 acres of wildlife habitat has been converted to trails within the project area. Disturbance and displacement of wildlife sensitive to human activity is most pronounced during the summer months and into the fall when most hiking and recreational sport fishing occurs. There is an occasional and growing concern that some bears have become habituated to human presence and associate humans with food. Fish entrails, heads and carcasses left over from recreational sport fishing activities have resulted in several bear/human interactions in the last few years. Existing human activity would have a negligible effect on wildlife. The no-action alternative would result in extremely small additional impacts to wildlife in the project area. This additional impact would be negligible.

Conclusion: The no-action alternative would have a negligible impact on wildlife.

4.3.4 Wilderness Character

Untrammeled

Under the no action alternative, there would be no anthropogenic changes to the natural processes in the project area other than climate change.

Undeveloped

Under the no action alternative, there would be no additional installations placed in the project area.

Natural

Under the no action alternative, there would be no anthropogenic change to the naturalness of the project area other than climate change.

Outstanding opportunities for solitude or a primitive and unconfined type of recreation

Anglers would still need to comply with fishing regulations and submit to license checks. They would not encounter additional numbers of NPS personnel, opportunities for solitude and primitive and unconfined type of recreation would remain the same.

Cumulative Effects

The project area contains one of the most highly used areas in Glacier Bay National Park's wilderness. The trail receives up to 40 visitors a day. Fishing pressure coupled with natural and anthropogenic changes beyond the Park's control could lead to a decline in the coho salmon population resulting in a degradation of the untrammeled and natural qualities of wilderness character. Without accurate coho salmon escapement information it is not possible to gauge the extent or seriousness of this threat.

The no action alternative would result in no change to the opportunities for solitude or primitive and unconfined types of recreation.

Glacier Bay National Park currently has 42 medium to large sized installations within wilderness. Some of these are permanent, while 24 are slated for removal in the next three years. Within the project area there are three installations; a permanent staff gauge, a trail bridge and boardwalk. Under this alternative, no new installations would be placed in wilderness. The cumulative effects to wilderness would be negligible.

Conclusion: This alternative would have a negligible overall effect on wilderness character.

4.4 Impact of Alternative B: DIDSON Sonar

4.4.1 Vegetation

During sonar instrument installation, operation, and removal by NPS staff, vegetation trampling would exceed that caused by recreational anglers and visitors in the reach of river along which this access occurs. Some upstream trailing has occurred over the years due to recreational angler and hiker access and it remains discernable from year to year. While much of the access to the proposed installation site will be by kayak or canoe, there would be an increased amount of hiking beyond the maintained trail to access the site, concentration of activities around the installation site, and overnight camping in an area where it previously occurred only rarely. The additional foot traffic above the upper extent of most recreation activity and at the installation site would incrementally add to that already evident as animal trails. However, the additional traffic incurred as a consequence of this project would not be measureable or discernable above that caused by recreational anglers or other visitors. The overall impact would be much less than that incurred in the areas of recreational activity, and these trailing effects and campsite impacts would be rehabilitated and would be obscured within 1 to 2 year after the end of the project.

The increased foot traffic and equipment could provide a pathway for non-native seed dispersal. NPS field crews would mitigate this risk by checking clothing, footwear and equipment for non-native seed sources prior to entering the field.

Cumulative Effect
Currently a maintained trail extends approximately 1.48 miles from the trailhead to the Bartlett River through a closed Sitka spruce forest. Willow and alder are also present and along the stream banks are mesic and wet herbaceous plants such as sedges, grasses and *Equisetum sp*. The maintained trail concentrates impact to the travel corridor which is built to withstand use. From there, user built social trails and wildlife trails extend along both sides of the Bartlett River. Some of the existing wildlife trails would be more noticeable due to this additional traffic and visitors may follow these trails should they be more apparent. Still the amount of additional use is relatively insignificant and short lived relative to existing use by anglers and visitors. The cumulative effect on vegetation would be negligible. The installation of the DIDSON sonar would result in only negligible additional impacts to vegetation in the project area.

Conclusion: The impact to vegetation from the proposed project would be negligible.

4.4.2 Aquatic Biota and Habitat

The fish fence used to direct fish passage across the DIDSON ensonified field may impact fish habitat through stream sedimentation and turbidity as well as aquatic biota. The fish diversion fences would not impede movement, cause migration delays or lead to unnatural aggregations that could be targeted by predators. It is possible that the placement of fish fences, pins, t-post and/or sand bags could limit access to a very small amount of spawning habitat. Substrate type at the proposed location is primarily gravel and fine sand which meets the general spawning

substrate requirement for salmonids. However, the total footprint of the area potentially impacted is so small that it would have a minimal effect on the amount and availability of spawning substrate for the variety of species throughout this stream.

Installation and removal of the pins and t-posts securing the bipod wings fish diversion fences would have a minimal impact on aquatic habitat and biota. Manual driving of these pins and posts would generate noise that may temporarily displace aquatic biota and disturb stream sediment. Similarly, removal at the end of each season would cause some small amount of sediment disturbance, resuspension and downstream displacement. Some amount of disturbed sediment, depending on substrate size and current velocity, would be transported downstream and deposited. However, because substrate composition at the proposed site is primarily course gravel with some sand and sediment, only the finer sand and sediment would be transported downstream. Downstream deposition of fine sediment on developing eggs and embryos could reduce survival. However, the aggregate effect is anticipated to be substantially less than that caused by recreational anglers wading within the stream over the 3-4 month angling season.DIDSON sonar transmits sound pulses and converts the returning echoes from encountered objects into digital images, much like medical ultrasound. Limited published data on the effects of sonar shows no fish mortality or tissue damage (Popper and Hastings 2009) and fish exposed to high-frequency (1.8 MHz) sound associated with the DIDSON sonar consistently show no behavioral avoidance. Thus there is unlikely to be any significant negative effect of this technology on target species. This technology has been used widely for a variety of fisheries applications over the last decade.

Depending on timing, it is possible that installation of the DIDSON could impact developing eggs or embryos spawned at the proposed installation site. Developing salmonid eggs and embryos in stream sediments can be killed by wading anglers, particularly if impacts occur during the sensitive neurulation period of development. Similar to effects of pin and t-post removal, these effects would be minimal in comparison with recreational angler wading effects which would occur over a much broader spatial and temporal scale and have the potential to impact a much greater number of redds.

Fish fence installation and removal, staff instream wading and netting operations all have the potential to disturb the bottom sediment resulting in sediment resuspension, transport and downstream deposition. Periodic increased turbidity would occur. However, these effects would occur within close proximity to the installation site (within perhaps 30-50 feet downstream) and over relatively short duration (up to perhaps 1 hour). This increase in turbidity may not be measureable given relatively high ambient natural turbidity levels.

Capturing fish upstream of the DIDSON installation would occur using actively fished fyke nets or seines. Sets would likely occur over brief intervals of 1 hour or less and fish would be released

as soon as possible after capture. Fish would incur some amount of stress upon net retrieval, species identification, measurement and release. However, the actual handling duration would be approximately one minute or less for each fish. No mortality is anticipated; however it could occur from stress due to capture. Appropriately sized netting and mesh size would be employed to mitigate these effects.

Cumulative Effects:
The cumulative effects to aquatic biota and habitat are the same for both alternatives except that alternative B would have the added impacts associated with DIDSON installation, maintenance, and removal (see Cumulative Effects in section 4.3.2).

Additional stress would be placed on the coho captured for species apportionment. No mortality is expected, but it could occur due to capture.

There would be additional effects to aquatic habitat from bank erosion, sediment suspension, transport, turbidity and deposition during site visits, equipment installation and removal. Some amount of disturbed sediment, depending on substrate size and current velocity, would be transported downstream and deposited. However, because substrate composition at the proposed site is primarily course gravel with some sand and sediment, only the finer sand and sediment would be transported downstream. Downstream deposition of fine sediment on developing eggs and embryos could reduce survival

Cumulative effects of both natural phenomena and human-caused change have likely had a moderate effect on aquatic biota and habitat in the project area. Without accurate escapement estimates, it is unknown whether the current or anticipated increased fishing pressure on coho salmon runs in the Bartlett River is having an adverse ecological impact on this population. The installation of the DIDSON sonar would result in only negligible additional impacts to aquatic biota and habitat in the project area.

Conclusion: Overall impact from the proposed action to aquatic biota and habitat would be minor.

4.4.3 Wildlife

Wildlife could be temporarily displaced by the presence of NPS staff at the DIDSON site during installation, monitoring and removal of this equipment. Impacts would be greatest during installation and removal periods when NPS staff would be present for several days. During periodic monitoring and maintenance visits, staff presence would be much reduced to perhaps 2-4 hours every few days. Access to and from the site also has the potential to disturb wildlife.

The equipment itself could pose an attractive nuisance to black and brown bears in the area. Semi-aquatic mammals and birds such as otters, beaver, mink, and dippers could potentially be impacted by the DIDSON sonar and associated fish fences, Bears and other wildlife are naturally curious and may investigate and damage the installation equipment. To prevent damage, all electrical wires will be placed in protective conduit and associated equipment would be enclosed in bear resistant containers. It is possible but not likely that wildlife would be harmed by investigating the installation equipment.

Cumulative Effects
About .61 acres of wildlife habitat has been converted to trails within the project area. Disturbance and displacement of wildlife sensitive to human activity is most significant during the summer months and into the fall when most hiking and recreational sport fishing occurs. There is an occasional and growing concern that some bears have become habituated to human presence and associate humans with food. Fish entrails, heads, and carcasses left over from recreational sport fishing activities have resulted in several bear/human interactions in the last few years. The installation of the DIDSON sonar would cause little additional impact in the area already popular with recreational sportfishing. There would however, be additional human presence above the extent of most recreational activity and concentrated human activity at the installation site itself. This would cause temporary displacement of wildlife in an area where this did not previously occur. The overall scope and scale of potential impact to wildlife as a consequence of this project would be minimal when compared to ongoing recreational angling and other visitation impacts. The cumulative effect to wildlife from the proposed action would be negligible.

Conclusion: Overall impact to wildlife from the proposed action would be negligible.

4.4.4 Wilderness Character

Untrammeled

The installation of a DIDSON Sonar unit would effect the untrammeled quality for this portion of the river in wilderness by restricting (but not stopping) the natural passage of fish temporarily during each year of the study. The physical sampling required for species apportionment would also impact the untrammeled nature of the salmon run. There would be a minor effect to the untrammeled quality.

Undeveloped

Installations such as this are prohibited by the Wilderness Act, Section 4(c) unless they are the minimum necessary for the preservation of wilderness character:

The DIDSON SONAR was found to be the minimum necessary through Minimum Requirements Analysis Process (Appendix A). Still, the installation would be noticeable and measurable, and

would alter the conditions of the wilderness resource. However, this alteration would be seasonal and temporary; lasting only the four year duration of the project. Upon project termination and rehabilitation, the alteration to the resource would be unnoticeable. The overall effect to the undeveloped quality of wilderness would be minor.

Natural

There would be adverse effects to wildlife due to direct disturbance during installation, operation, and removal of the DIDSON unit. There would be an impact to the natural condition of the area due to informal trailing and expansion of existing wildlife trails due to the frequent visits required to install, maintain and remove the DIDSON unit. These disturbances would be short-lived and negligible.

Outstanding opportunities for solitude or a primitive and unconfined type of recreation

Though the upstream areas above the extent of most recreational activity are infrequently visited, those rare visitors in have a much higher expectation for solitude. An unlikely encounter with a NPS crew, or observations of the DIDSON installation would therefore have a magnified impact on these visitors. Visitors typically access the Bartlett River through the park frontcountry zone on one trail. Visitors would expect to see some evidence of human use in this portion of the study area. During these months angler visitation is high and social trailing and vegetation trampling is probably expected and accepted. The effect of the installation and increased NPS presence would have a negligible impact for approximately 3 months of each calendar year the installation is in place.

Cumulative Effects

The project area contains one of the most highly used areas within Glacier Bay's wilderness. More than 20 people can be seen along the banks of the river during the late September fishing season. This fishing pressure coupled with natural and anthropogenic changes beyond the Park's control could lead to a decline in the coho salmon population resulting in a degradation of the untrammeled and natural qualities of wilderness character. Without accurate coho salmon escapement information it is not possible to gauge the extent or seriousness of this threat.

Glacier Bay National Park currently has 42 medium to large sized installations within wilderness. Some of these are permanent, while 24 are slated for removal in the next three years. Within the project area there are three installations; a permanent staff gauge, a trail bridge and boardwalk. The proposed DIDSON installation is a temporary installation; it will cause a short term increase to the number of installations in the project area and in Glacier Bay's Wilderness. Over the next three years, the number of medium to large size installations in Glacier Bay's Wilderness is expected to decrease. The cumulative effect of the proposed action on wilderness character is negligible.

Conclusion: The proposed alternative's overall impact to wilderness character is minor.

5.0 CONSULTATION AND COORDINATION

5.1 Public Involvement

This environmental assessment is available for public review and comment for 30 days. It is available online at the National Park Service Planning, Environment, and Public comment (PEPC) website. Go to http://parkplanning.nps.gov to access the PEPC site. Public comments on this environmental assessment can also be provided on the PEPC website.

Initial public review was received during a comment period open from December 15, 2010 through January 15, 2011. A press release announcing the final public comment period and availability of the environmental assessment was issued by the National Park Service, Glacier Bay National Park and Preserve on April 8, 2011.

5.2 Consultation and Coordination

US Department of the Interior, National Park Service

Glacier Bay National Park and Preserve
Barbara Miranda Bruno, Wilderness Coordinator
Allison Banks, Environmental Protection Specialist
Chad Soiseth, Fisheries Biologist
Craig Murdoch, Fisheries Biologist

Alaska Regional Office
Glen Yankus, Environmental Protection Specialist
Adrienne Lindholm, Environmental Specialist

Consultation and Coordination

- Debby Burwen Biologist, ADFG Division of Sport Fish and Commercial Fisheries (use of DIDSON on Anchor R near Homer)

- Carole Coyle, Sportfish Division Biologist, ADFG (use of DIDSON for steelhead on Peterson Creek near Juneau)

- Brian Glynn, Juneau Area Management Biologist, Sportfish Division Biologist, ADFG (DIDSON, recreational harvest on the Bartlett and Salmon Rivers)

- Roger Harding, Sportfish Division Biologist, ADFG (use of weir diversion panels, DIDSON installation and Carol Coyle's time)

- Kate Kanouse, Habitat Biologist, ADFG (habitat permitting)

- Suzanne Maxwell, Biologist, ADFG Division of Sport Fish and Commercial Fisheries (use of DIDSON on Anchor R near Homer)

- Brad Palach, ADFG, State-Federal Issues (formal consultation process with the state)

- Bob Starbard, HIA (mandatory gov to gov SHPO consultation)
  GLBA initiated consultation with the Hoonah Indian Association in March 2011, affording the tribe the opportunity to comment on possible effects to the TCP from this undertaking.

- Hermann Enzenhofer at Fisheries and Oceans Canada (DIDSON project power options, transducer H-mount, instrumentation housing)

- Derrek Faber, Biologist with Oregon Department of Fish and Wildlife (general use of hydroacoustics and DIDSON recommendation)

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