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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XF341

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Conducting Subsea Cable Operations and Maintenance Activities in the Arctic Ocean

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an incidental harassment authorization (IHA).

SUMMARY: In accordance with regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that NMFS has issued an IHA to Quintillion Subsea Operations, LLC (Quintillion) to take, by harassment, small numbers of 13 species of marine mammals incidental to conducting subsea cable-laying and maintenance activities in the Beaufort, Bering, and Chukchi seas, during the open-water season of 2017.

DATES: This authorization is valid from July 1, 2017, through November 15, 2017.

FOR FURTHER INFORMATION CONTACT: Shane Guan, Office of Protected Resources, NMFS, (301) 427-8401.

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity

(other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

NMFS has defined "negligible impact" in 50 CFR 216.103 as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

The MMPA states that the term "take" means to harass, hunt, capture, kill or attempt to harass, hunt, capture, or kill any marine mammal.

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our proposed action with respect to environmental consequences on the human environment.

NMFS prepared the Final Environmental Assessment for the Issuance of an Incidental Harassment Authorization for the Take of Marine Mammals by Harassment Incidental to the Alaska Phase of the Quintillion Subsea Project in the U.S. Arctic Ocean (2016 EA) and issued a Finding of No Significant Impact (FONSI) for the issuance of an IHA to Quintillion in 2016. After reviewing and considering (1) Quintillion's 2017 IHA application, (2) the 2016 EA and FONSI, and (3) the 2016 Quintillion monitoring report, NMFS determined the issuance of an IHA to Quintillion for its 2017 activities falls within the scope of the analysis in the 2016 EA. NMFS determined issuance of another IHA to Quintillion would not result in significant adverse effects, individually or cumulatively, on the human environment. As such, NMFS determined the issuance of an IHA to Quintillion does not require the preparation of a Supplemental Environmental Assessment.

NMFS' 2016 EA is available at *www.nmfs.noaa.gov/pr/permits/incidental/research.*

Summary of Request

On November 18, 2016, Quintillion submitted an IHA application and marine mammal mitigation and monitoring plan (4MP) for the taking of marine mammal species incidental to conducting subsea cable-laying and operation and maintenance (O&M) activities in the Beaufort, Bering, and Chukchi seas. After receiving NMFS' comments on the initial application, Quintillion made revisions to its IHA application on December 20, 2016, and January 23, 2017. NMFS determined that the application and the 4MP were adequate and complete on February 13, 2017.

The request continues work conducted in the 2016 open-water season, which was covered under a previous IHA (81 FR 40274; June 21, 2016). Noise generated from cable-laying and associated maintenance and repair activities could impact marine mammals in the vicinity of

the activities. Take, by Level B harassment, of individuals of 13 species of marine mammals is authorized from the specified **Description of Proposed Activity.**

Overview

In 2016, Quintillion installed substantial portions of a subsea fiber-optic cable network along the northern and western coasts of Alaska to provide high-speed internet connectivity to six rural Alaska communities. In 2017, Quintillion plans to complete the cable installation work that includes a 76-kilometer (km) (47-mile (mi)) Oliktok branch, system testing, branching unit (BU) burial, and operations and maintenance of any areas that do not meet testing requirements.

Dates and Duration

The proposed subsea cable installation, maintenance, and repair activities for the 2017 open water season are planned between July 1 and November 15. All associated activities, including mobilization, cable lay, and demobilization of survey and support crews, will occur between the above dates. Pre-trenching operations at the Oliktok branch will begin as soon as the cable vessels can access open water, but not before the IHA is issued.

Specified Geographic Region

The proposed cable-laying activities in the 2017 open-water season would be conducted between the Horizontal Directionally Drilled (HDD) pile and the Oliktok BU in coastal Beaufort Sea, as shown in Figure 1-2 of the IHA application.

Operations, maintenance, and repair activities could occur anywhere along the subsea cable lines within the Bering, Chukchi, and Beaufort seas. All areas along the subsea cable lines were considered in the 2016 EA. The existence and location of any potential faults in the system is unknown at this time. If a fault is found, a section of the cable would be retrieved, repaired, and laid back down. Several BUs, located at the junction of the mainline and a branching route,

were not buried in 2016. They will be buried in 2017, with protective concrete mattresses placed over them.

Detailed Description of Specific Activities

Quintillion intends to complete the 76-km (47-mi) Oliktok segment in summer 2017 using a variety of cable-laying equipment, depending on water depth. The branch line will be addressed in three sections:

Section 1: An approximately 6.0-km (3.7-mi) very shallow nearshore segment (from the HDD exit to approximately Kilometer Point (KP) 6.5) where trenching will occur using a construction barge equipped with a vibro plow. The barge will winch itself along the route using moored anchors. A pontoon barge that will be positioned in place with a small river tug will first place the moored anchors. The moorings will be placed with a derrick operating from the deck of the barge. The pontoon barge will also be used to retrieve the mooring after the cable is laid. Dominant noise will emanate from the river tug maneuvering the barges. The tug will not pull anchors along this section.

Section 2: An approximately 12.5-km (7.8-mi) transition section (KP 6.5 to KP 16) where the work will be conducted from the construction barge again using a vibro plow. Here the barge will winch along anchor lines as within Section 1, but the anchors will be placed and pulled by a midsize anchor-handling tug, which will produce the dominant noise along this section.

Section 3: An approximately 60-km (37-mi) offshore section (KP 16 to KP 76) where the cable will be laid by the cable-ship *Ile de Batz* using a sea plow that both cuts a trench and lays the cable.

Prior to cable-laying, seafloor sediment along the 60-km route segment will be loosened by making multiple passes of the route with the sea plow (sans the cable), set to varied depths. The dominant noise will be from the ship's drive propeller and thrusters while pulling the plow.

In addition to the activities described above, Quintillion plans to conduct an O&M program in 2017, whereby the cable system is tested for faults and repaired as needed (using the *Ile de Batz*). Repair operations would involve retrieving, reinstalling, and then potentially reburying cable. The amount of cable that would need to be retrieved is dependent on water depth and could involve several kilometers for each fault repair. If required, the cable would then be reburied using a remove operated vehicle (ROV) equipped with a jetting tool. BUs will be buried after the Oliktok branch cable is laid, or before if ice delays the *Ile de Batz* access to the branch. O&M activities may also include testing of equipment, including the sea plow, prior to pre-trenching to ensure performance standards will be met.

Detailed description of each project component is provided in the **Federal Register** notice for the proposed IHA (82 FR 22099; May 12, 2017).

Comments and Responses

A notice of NMFS' proposal to issue an IHA to Quintillion was published in the **Federal Register** on May 12, 2017 (82 FR 22099). That notice described, in detail, Quintillion's activity, the marine mammal species and subsistence activities that may be affected by the proposed subsea cable-laying project, and the anticipated effects on marine mammals and subsistence activities. During the 30-day public comment period, NMFS received comment letters from the Marine Mammal Commission (Commission) and the North Slope Borough (NSB). Specific comments and responses are provided below.

Comment 1: The Commission states that the method used to estimate the numbers of takes during the proposed activities, which summed fractions of takes for each species across project days, does not account for and negates the intent of NMFS's 24-hour reset policy. The Commission further states that it understands NMFS has developed criteria associated with rounding and that the Commission looks forward to reviewing those criteria and resolving this matter in the near future.

Response: While for certain projects NMFS has rounded to the whole number for daily takes, the circumstance for projects like this one when the objective of take estimation is to provide more accurate assessments for potential impacts to marine mammals for the entire project, rounding in the middle of a calculation would introduce large errors into the process. In addition, while NMFS uses a 24-hour reset for its take calculation to ensure that individual animals are not counted as a take more than once per day, that fact does not make the calculation of take across the entire activity period inherently incorrect. There is no need for daily (24-hour) rounding in this case because there is no daily limit of takes, so long as total authorized takes of marine mammal are not exceeded. In short, the calculation of predicted take is not an exact science and there are arguments for taking different mathematical approaches in different situations, and for making qualitative adjustments in other situations. NMFS also looks forward to discussing this issue with the Commission in the near future.

Comment 2: The NSB requests that NMFS require Quintillion to develop and employ a more comprehensive monitoring plan than was required in 2016, which includes monitoring of bowhead whales in the far-field. The NSB states that during Quintillion's 2016 cable-laying operation, although whaling activities in Kaktovik and Nuiqsut were successful and did not appear to have been impacted by any industrial activities, Barrow whalers had to travel

considerable distances to the east and northeast to locate and harvest whales. NSB states that several whalers expressed concerns that Quintillion's operations may have impacted the behavior and distribution of bowhead whales when they arrived near Barrow.

Response: In reviewing and assessing Quintillion's 2017 marine mammal mitigation and monitoring plan for its potential impacts to subsistence use of marine mammal species, NMFS convened an independent peer-review panel (Panel) to review Quintillion's monitoring plan. The peer-review panel included one member from the NSB. The Quintillion's 2017 operations is much less in scope than its cable-laying operations in 2016, which may had larger impacts to marine mammal species.

The Panel considered whether conducting far-field monitoring would provide valuable information on marine mammal distribution relative to Quintillion's 2017 operations. The Panel discussed two types of PAM to achieve this monitoring goal: fixed passive acoustic moorings that archive data for later analysis, and real-time passive acoustic monitoring (PAM). Completion of the cable-laying activities will be at a fixed location, offshore of Oliktok Point. Long-term acoustic moorings in the vicinity of the Oliktok branch could provide information on noise and marine mammal presence before, during, and after Quintillion's operations. These data would need to be analyzed after the moorings were recovered. Hence, there would be a considerable lag between when the operations occurred and when results from PAM mooring data were available, and these results would not be useful for mitigation purposes during the whaling season. The Panel inquired about, but is not aware of, any plans by other researchers to collect this type of data near Oliktok Point in 2017. From a logistical perspective, it is unlikely that Quintillion would be able to place moorings far enough in advance of the commencement of their operations or recover them long enough after completion for these data to be useful.

Therefore, the Panel does not recommend that Quintillion invest in long-term PAM near Oliktok Point.

Alternatively, Quintillion could deploy buoys in whaling areas for real-time PAM to serve as an alert system for detecting anthropogenic noise. However, this type of monitoring is expensive: buoys must be deployed and recovered, and the buoys operate via satellite link (or cell phone link if close to shore with coverage) to send summaries of noise levels on an hourly or daily basis, depending on what the user wants. The Panel did not consider real-time PAM to be a cost-effective option and does not recommend Quintillion incorporate it into their 2017 4MP.

One panel member recommended that Quintillion stage PSOs on vessels stationed at a distance from the primary noise sources associated with either cable-laying or O&M activities to conduct far-field monitoring. However, a different panel member did not support this recommendation due to concerns about an increase in the acoustic footprint when more vessels operate in the general area. Given these reservations about the reliability of the data collected by Quintillion's vessel-based PSOs, this panel member did not think additional monitoring by vessel-based or aerial PSOs hired by Quintillion would be valuable. In general, the ability to detect changes in bowhead whale distribution due to Quintillion's efforts using data collected by a dedicated aerial survey focused on Quintillion's activities will depend upon the whales' density, the amount of survey effort achieved, and the magnitude of the whales' change in distribution. The lower the whale density, survey coverage, or magnitude of deflection, the more difficult it would be to identify changes in whale distribution.

Based on the peer-review panel's recommendation and NMFS assessment, we do not consider requiring far-field monitoring during Quintillion's subsea cable-laying and maintenance operations would improve mitigation and monitoring effectives. Nevertheless, Quintillion is

required to implement rigorous measures to communicate with subsistence users to prevent any unmitigatable adverse impacts it may have on subsistence activities during its subsea cable-laying and maintenance operations in the 2017 open-water season (see below).

Comment 3: The NSB requests that NMFS require Quintillion to make the data it collected in 2016 and the data it will collect in 2017 publicly available.

Response: Quintillion is required to make the marine mammal and underwater acoustic data it collected in 2016 and the data it will collect in 2017 publicly available. All PSO observation data from the 2016 operations were included in the 90-day reports. All PSO observation data from the 2017 operations will be provided in the 2017 90-day reports. Additionally, Quintillion states that it has provided vessel location data for all vessels during the 2016 whale hunt to the North Slope Borough upon request.

Comment 4: The NSB requests that NMFS require Quintillion to cease operations on August 25, 2017, until the fall hunts in Kaktovik, Nuiqsut, and Barrow are complete.

Response: The fall hunts typically end around November 15. Requiring Quintillion to cease operations between August 25 and November 15 would only allow Quintillion to perform its subsea cable-laying and maintenance between July 1 and August 24. This measure would be impracticable for the company to perform its cable-laying and maintenance work during the 2017 open water season. In addition, the 2017 Quintillion operations are focused on installation of the fiber optic cable from Oliktok Point to a location 76 km north of the point. Neither past nor current Open Water Season Conflict Avoidance Agreements (CAAs) have identified this as an area where season shutdowns have been requested.

To ensure that Quintillion's proposed cable-laying and maintenance work will have no unmitigable impacts on subsistence use of marine mammals, Quintillion is required to implement

effective communication with the subsistence community during its operations. In addition, from August 31 to October 31, transiting vessels in the Chukchi Sea or Beaufort Sea by Quintillion vessels will remain at least 20 miles offshore of the coast of Alaska from Icy Cape in the Chukchi Sea to Pitt Point on the east side of Smith Bay in the Beaufort Sea, unless ice conditions or an emergency that threatens the safety of the vessel or crew prevents compliance with this requirement. Therefore, NMFS believes that Quintillion is able to achieve mitigable measures for subsistence use of marine mammals without ceasing its operations between August 25 and the end of fall hunting season.

Comment 5: The NSB requests that NMFS require Quintillion to enter into the Open Water Season Conflict Avoidance Agreement (CAA) with the Alaska Eskimo Whaling Commission (AEWC).

Response: Under sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*), an IHA or LOA would be granted to U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if NMFS finds that the taking of marine mammals will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for certain subsistence uses, and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth. In other words, no marine mammal take authorizations may be issued if NMFS has reason to believe that the proposed cable-laying and maintenance activities would not have an unmitigable adverse impact on the availability of marine mammal species or stock(s) for Alaskan native subsistence uses. Although Federal laws do not require consultation with the native coastal communities until after Quintillion's operational plan have been finalized, permitted, and authorized, pre-permitting consultations

between the Quintillion and the Alaskan coastal native communities are considered by NMFS when the agency makes a determination whether such activities would have an unmitigable adverse impact on the availability of marine mammal species or stock(s) for subsistence uses. For the proposed subsea cable-laying and maintenance operations, Quintillion has conducted Plan of Cooperation (POC) meetings for its proposed operations in the Arctic Ocean in Anchorage and in the communities and villages of Utqiagvik, Kotzebue, Point Hope, and Wainwright.

Quintillion has not signed the 2017 CAA with AEWC. The CAA is only applicable to activities related to oil and gas exploration in the Arctic. In addition, Quintillion states that it met with AEWC and the Barrow Whaling Captains Association (BWCA) on multiple occasions, and while the CAA was discussed, neither organization has requested participation in the CAA.

NMFS has scrutinized all of the documents submitted by Quintillion (e.g., IHA application, Plan of Cooperation and marine mammal monitoring and mitigation plan) and the recommendations by the peer-review panel and concluded that harassment of marine mammals incidental to Quintillion's activities will not have an unmitigable adverse impact on the availability of marine mammals for taking for subsistence uses. This finding was based in large part on NMFS' definition of "unmitigable adverse impact", the proposed mitigation and monitoring measures, the scope of activities proposed to be conducted, including time of year, location and presence of marine mammals in the project area, and Quintillion's Plan of Cooperation. In addition, based on the 90-day report from Quintillion's 2016 cable-laying activity, there is no observed effects to overall marine mammal in the project area. Many of the mitigation and monitoring measures are summarized in Response to Comment 4 above and are

listed below in "Mitigation" section. Therefore, NMFS does not believe that signing a CAA is warranted.

Description of Marine Mammals in the Area of Specified Activities

We have reviewed the Quintillion's species information, which summarizes available information regarding status and trends, distribution and habitat preferences, behavior and life history, and auditory capabilities of the potentially affected species, for accuracy and completeness and refer the reader to Sections 3 and 4 of the applications, as well as to NMFS's Stock Assessment Reports (SAR; *www.nmfs.noaa.gov/pr/sars/*), instead of reprinting all of the information here. Additional general information about these species (e.g., physical and behavioral descriptions) may be found on NMFS's website (*www.nmfs.noaa.gov/pr/species/mammals/*), in the National Marine Mammal Laboratory's (NMML) Aerial Surveys of Arctic Marine Mammals (ASAMM) website (*https://www.afsc.noaa.gov/nmml/cetacean/bwasp/*). Table 1 lists all species with expected potential for occurrence in the U.S. Beaufort, Bering, and Chukchi seas and summarizes information related to the population or stock, including potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2016). PBR, defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population, is considered in concert with known sources of ongoing anthropogenic mortality to assess the population-level effects of the anticipated mortality from a specific project (as described in NMFS's SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality are included here as gross indicators of the status of the species and other threats. Species that could potentially occur in the proposed

project areas but are not expected to have reasonable potential to be harassed by the subsea cable-laying and maintenance activities are described briefly but omitted from further analysis. These include extralimital species, which are species that do not normally occur in a given area but for which there are one or more occurrence records that are considered beyond the normal range of the species. For status of species, we provide information regarding U.S. regulatory status under the MMPA and ESA.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study area. NMFS's stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock.

Fifteen marine mammal species (with 18 managed stocks) are considered to have the potential to co-occur with the proposed survey activities. However, polar bear and walrus are managed by the U.S. Fish and Wildlife Service and are not considered further in this document. All managed stocks in this region are assessed in NMFS's U.S. Alaska SAR (Muto *et al.*, 2016). All values presented in Table 1 are the most recent available at the time of publication and are available in the 2015 SAR (Muto *et al.*, 2016) and draft 2016 SARs (available online at: *www.nmfs.noaa.gov/pr/sars/draft.htm*).

Table 1. Marine mammal species within the Quintillion cable-laying and maintenance project area.

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance (CV, Nmin, most recent abundance survey)[2]	PBR	Annual M/SI[3]
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						

Family Eschrichtiidae						
Gray whale	*Eschrichtius robustus*	Eastern North Pacific	N	20,900	624	132
Family Balaenidae						
Bowhead whale	*Balaena mysticetus*	Western Arctic	Y	16,892	161	44
Family Balaenopteridae (rorquals)						
Fin whale	*Balaenoptera physalus*	Northeast Pacific	Y	NA	NA	0.6
Minke whale	*B. acutorostrata*	Alaska	N	NA	NA	0
Humpback whale	*Megaptera novaeangliae*	Central North Pacific	Y	10,103	83	24
		Western North Pacific	Y	1,107	3.0	2.6
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Beluga whale	*Delphinapterus leucas*	Beaufort Sea	N	39,258	649	166
		Eastern Chukchi Sea	N	3,710	NA	57.4
		Eastern Bering Sea	N	19,186	NA	181
Killer whale	*Orcinus orca*	Eastern North Pacific Alaska Resident	N	2,347	24	1
Family Phocoenidae (porpoises)						
Harbor porpoise	*Phocoena phocoena*	Bering Sea	N	48,215	NA	0.4
Order Carnivora – Superfamily Pinnipedia						
Family Otariidae (eared seals and sea lions)						
Steller sea lion	*Eumetopias jubatus*	Western U.S.	Y	50,983	306	201
Family Phocidae (earless seals)						
Ringed seal	*Phoca hispida*	Alaska	Y	NA	NA	1,062
Spotted seal	*Phoca largha*	Alaska	N	460,268	11,730	5,267
Bearded seal	*Erigathus barbatus*	Alaska	Y	NA	NA	443
Ribbon seal	*Histriophoca fasciata*	Alaska	N	184,000	9,785	3.8

[1]Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

[2]NMFS marine mammal stock assessment reports online at: *www.nmfs.noaa.gov/pr/sars/*. CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance. In some cases, CV is not applicable [explain if this is the case]

[4]These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.*, commercial fisheries, ship strike). Annual M/SI often cannot be determined precisely and is in some cases

presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species have equal hearing capabilities (e.g., Richardson *et al*., 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall et al. (2007) recommended that marine mammals be divided into functional hearing groups based on directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e*., low-frequency cetaceans). Subsequently, NMFS (2016) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 dB threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall et al. (2007) retained. The functional groups and the associated frequencies are indicated below (note that these frequency ranges correspond to the range for the composite group, with the entire range not necessarily reflecting the capabilities of every species within that group):

- Low-frequency cetaceans (mysticetes): generalized hearing is estimated to occur between approximately 7 Hz and 35 kHz, with best hearing estimated to be from 100 Hz to 8 kHz;

- Mid-frequency cetaceans (larger toothed whales, beaked whales, and most delphinids): generalized hearing is estimated to occur between approximately 150 Hz and 160 kHz, with best hearing from 10 to less than 100 kHz;
- High-frequency cetaceans (porpoises, river dolphins, and members of the genera Kogia and Cephalorhynchus; including two members of the genus Lagenorhynchus, on the basis of recent echolocation data and genetic data): generalized hearing is estimated to occur between approximately 275 Hz and 160 kHz.
- Pinnipeds in water; Phocidae (true seals): generalized hearing is estimated to occur between approximately 50 Hz to 86 kHz, with best hearing between 1-50 kHz;
- Pinnipeds in water; Otariidae (eared seals): generalized hearing is estimated to occur between 60 Hz and 39 kHz, with best hearing between 2-48 kHz.

The pinniped functional hearing group was modified from Southall *et al*. (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al*., 2006; Kastelein *et al*., 2009; Reichmuth and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2016) for a review of available information. Thirteen marine mammal species (eight cetacean and five pinniped (one otariid and four phocid) species) have the reasonable potential to co-occur with the proposed cable-laying and maintenance activities. Please refer to Table 1. Of the cetacean species that may be present, five are classified as low-frequency cetaceans (*i.e*., all mysticete species), two are classified as mid-frequency cetaceans (*i.e*., all delphinid), and one is classified as high-frequency cetaceans (*i.e*., harbor porpoise).

Potential Effects of Specified Activities on Marine Mammals and their Habitat

This section includes a summary and discussion of the ways that components of the specified activity may impact marine mammals and their habitat. The "Estimated Take by Incidental Harassment" section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by this activity. The "Negligible Impact Analysis and Determination" section considers the content of this section, the "Estimated Take by Incidental Harassment" section, and the "Mitigation" section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and how those impacts on individuals are likely to impact marine mammal species or stocks.

The Quintillion subsea cable-laying and maintenance activities could adversely affect marine mammal species and stocks by exposing them to elevated noise levels in the vicinity of the activity area.

Exposure to high intensity sound for a sufficient duration may result in auditory effects such as a noise-induced threshold shift—an increase in the auditory threshold after exposure to noise (Finneran, 2015). Factors that influence the amount of threshold shift include the amplitude, duration, frequency content, temporal pattern, and energy distribution of noise exposure. The magnitude of hearing threshold shift normally decreases over time following cessation of the noise exposure. The amount of threshold shift just after exposure is the initial threshold shift. If the threshold shift eventually returns to zero (i.e., the threshold returns to the pre-exposure value), it is a temporary threshold shift (Southall *et al*., 2007).

Threshold Shift (noise-induced loss of hearing) – When animals exhibit reduced hearing sensitivity (*i.e*., sounds must be louder for an animal to detect them) following exposure to an intense sound or sound for long duration, it is referred to as a noise-induced threshold shift (TS). An animal can experience temporary threshold shift (TTS) or permanent threshold shift (PTS).

TTS can last from minutes or hours to days (*i.e.*, there is complete recovery), can occur in specific frequency ranges (*i.e.*, an animal might only have a temporary loss of hearing sensitivity between the frequencies of 1 and 10 kHz), and can be of varying amounts (for example, an animal's hearing sensitivity might be reduced initially by only 6 decibels (dB) or reduced by 30 dB). PTS is permanent, but some recovery is possible. PTS can also occur in a specific frequency range and amount as mentioned above for TTS.

The following physiological mechanisms are thought to play a role in inducing auditory TS: effects to sensory hair cells in the inner ear that reduce their sensitivity, modification of the chemical environment within the sensory cells, residual muscular activity in the middle ear, displacement of certain inner ear membranes, increased blood flow, and post-stimulatory reduction in both efferent and sensory neural output (Southall *et al.*, 2007). The amplitude, duration, frequency, temporal pattern, and energy distribution of sound exposure all can affect the amount of associated TS and the frequency range in which it occurs. As amplitude and duration of sound exposure increase, so, generally, does the amount of TS, along with the recovery time. For intermittent sounds, less TS could occur than compared to a continuous exposure with the same energy (some recovery could occur between intermittent exposures depending on the duty cycle between sounds) (Kryter *et al.*, 1966; Ward, 1997). For example, one short but loud (higher) sound pressure level (SPL) sound exposure may induce the same impairment as one longer but softer sound, which in turn may cause more impairment than a series of several intermittent softer sounds with the same total energy (Ward, 1997). Additionally, though TTS is temporary, prolonged exposure to sounds strong enough to elicit TTS, or shorter-term exposure to sound levels well above the TTS threshold, can cause PTS, at least in terrestrial mammals (Kryter, 1985). In the case of Quintillion's subsea cable-laying

operation, NMFS does not expect that animals would experience levels high enough or durations long enough to result in TS given that the noise levels from the operation are very low.

For marine mammals, published data are limited to the captive bottlenose dolphin, beluga, harbor porpoise, and Yangtze finless porpoise (Finneran, 2015). For pinnipeds in water, data are limited to measurements of TTS in harbor seals, an elephant seal, and California sea lions (Kastak, *et al*., 1999; Finneran, 2015).

Lucke *et al*. (2009) found a TS of a harbor porpoise after exposing it to airgun noise with a received SPL at 200.2 dB (peak-to-peak) re: 1 micropascal (μPa), which corresponds to a sound exposure level of 164.5 dB re: 1 μPa^2 s after integrating exposure. NMFS currently uses the root-mean-square (rms) of received SPL at 180 dB and 190 dB re: 1 μPa as the threshold above which PTS could occur for cetaceans and pinnipeds, respectively. Because the airgun noise is a broadband impulse, one cannot directly determine the equivalent of rms SPL from the reported peak-to-peak SPLs. However, applying a conservative conversion factor of 16 dB for broadband signals from seismic surveys (McCauley, *et al*., 2000) to correct for the difference between peak-to-peak levels reported in Lucke *et al*. (2009) and rms SPLs, the rms SPL for TTS would be approximately 184 dB re: 1 μPa, and the received levels associated with PTS (Level A harassment) would be higher. This is still above NMFS' current 180 dB rms re: 1 μPa threshold for injury. However, NMFS recognizes that TTS of harbor porpoises is lower than other cetacean species empirically tested (Finneran, 2015).

Marine mammal hearing plays a critical role in communication with conspecifics, and interpretation of environmental cues for purposes such as predator avoidance and prey capture. Depending on the degree (elevation of threshold in dB), duration (*i.e*., recovery time), and frequency range of TTS, and the context in which it is experienced, TTS can have effects on

marine mammals ranging from discountable to serious (similar to those discussed in auditory masking, below). For example, a marine mammal may be able to readily compensate for a brief, relatively small amount of TTS in a non-critical frequency range that occurs during a time where ambient noise is lower and there are not as many competing sounds present. Alternatively, a larger amount and longer duration of TTS sustained during a time when communication is critical for successful mother/calf interactions could have more serious impacts. Also, depending on the degree and frequency range, the effects of PTS on an animal could range in severity, although it is considered generally more serious because it is a permanent condition. Of note, reduced hearing sensitivity as a simple function of aging has been observed in marine mammals, as well as humans and other taxa (Southall *et al*., 2007), so one can infer that strategies exist for coping with this condition to some degree, though likely not without cost.

Masking. In addition, chronic exposure to excessive, though not high-intensity, noise could cause masking at particular frequencies for marine mammals that utilize sound for vital biological functions (Clark *et al*,. 2009). Acoustic masking is when other noises such as from human sources interfere with animal detection of acoustic signals such as communication calls, echolocation sounds, and environmental sounds important to marine mammals. Therefore, under certain circumstances, marine mammals whose acoustical sensors or environment are being severely masked could also be impaired from maximizing their performance fitness in survival and reproduction.

Masking occurs at the frequency band which the animals utilize. Therefore, since noises generated from anchor handling, pre-trenching, and DP thrusters are mostly concentrated at low frequency ranges, it may have less effect on high frequency echolocation sounds by odontocetes (toothed whales). However, lower frequency man-made noises are more likely to affect

detection of communication calls and other potentially important natural sounds such as surf and prey noise. It may also affect communication signals when they occur near the noise band and thus reduce the communication space of animals (e.g., Clark *et al.,* 2009) and cause increased stress levels (e.g., Holt *et al.,* 2009).

Unlike TS, masking, which can occur over large temporal and spatial scales, can potentially affect the species at population, community, or even ecosystem levels, as well as individual levels. Masking affects both senders and receivers of the signals and could have long-term chronic effects on marine mammal species and populations. Recent science suggests that low frequency ambient sound levels have increased by as much as 20 dB (more than 3 times in terms of sound pressure level) in the world's ocean from pre-industrial periods, and most of these increases are from distant shipping. All anthropogenic noise sources, such as those from vessel traffic and cable-laying while operating anchor handling, contribute to the elevated ambient noise levels, thus increasing potential for or severity of masking.

Behavioral Disturbance. Finally, exposure of marine mammals to certain sounds could lead to behavioral disturbance (Richardson *et al.* 1995), such as: changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where noise sources are located; and/or flight responses (e.g., pinnipeds flushing into water from haulouts or rookeries).

The onset of behavioral disturbance from anthropogenic noise depends on both external factors (characteristics of noise sources and their paths) and the receiving animals (hearing, motivation, experience, demography) and is also difficult to predict (Southall *et al.* 2007).

Currently NMFS uses a received level of 160 dB re 1 μPa (rms) to predict the onset of behavioral harassment from impulse noises (such as impact pile driving), and 120 dB re 1 μPa (rms) for continuous noises (such as operating DP thrusters). No impulse noise within the hearing range of marine mammals is expected from the Quintillion subsea cable-laying operation. For the Quintillion subsea cable-laying operation, only the 120 dB re 1 μPa (rms) threshold is considered because only continuous noise sources would be generated.

The biological significance of many of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification could be biologically significant if the change affects growth, survival, and/or reproduction, which depends on the severity, duration, and context of the effects.

Effects on Marine Mammal Habitat

Project activities that could potentially impact marine mammal habitats include physical and acoustical impacts to prey resources associated with cable-laying, maintenance, and repair activities. Regarding the former, however, acoustical injury from thruster noise is unlikely. Previous noise studies (e.g., Davis *et al*., 1998, Christian *et al*., 2004) with cod, crab, and schooling fish found little or no injury to adults, larvae, or eggs when exposed to impulsive noises exceeding 220 dB. Continuous noise levels from ship thrusters are generally below 180 dB, and do not create great enough pressures to cause tissue or organ injury. Nedwell *et al*. (2003) measured noise associated with cable trenching operations offshore of Wales, and found that levels (178 dB at source) did not exceed those where significant avoidance reactions of fish would occur.

Cable burial operations involve the use of plows or jets to cut trenches in the seafloor sediment. Cable plows are generally used where the substrate is cohesive enough to be “cut” and

laid alongside the trench long enough for the cable to be laid at depth. In less cohesive substrates, where the sediment would immediately settle back into the trench before the cable could be laid, jetting is used to scour a more lasting furrow. The objective of both is to excavate a temporary trench of sufficient depth to fully bury the cable (usually 1.5 to 2 m (4.9 to 6.6 ft)). The plow blade is 0.2 m (0.7 ft) wide producing a trench of approximately the same width. Jetted trenches are somewhat wider depending on the sediment type.

Potential impacts to marine mammal habitat and prey include: 1) crushing of benthic and epibenthic invertebrates with the plow blade, plow skid, or ROV track; 2) dislodgement of benthic invertebrates onto the surface where they may die; and 3) and the settlement of suspended sediments away from the trench where they may clog gills or feeding structures of sessile invertebrates or smother sensitive species (BERR 2008). However, the footprint of cable trenching is generally restricted to a 2- to 3-m (7- to 10-ft) width (BERR, 2008), and the displaced wedge or berm is expected to naturally backfill into the trench. Jetting results in more suspension of sediments, which may take days to settle during which currents may transport it well away (up to several kilometers) from the source. Suspended sand particles generally settle within about 20 m (66 ft).

BERR (2008) critically reviewed the effect of offshore wind farm construction, including laying of power and communication cables, on the environment. Based on a rating of 1 to 10, they concluded that sediment disturbance from plow operations rated the lowest at 1, with jetting rating from 2 to 4, depending on substrate. As a comparison, dredging rated the highest relative sediment disturbance.

However, with the exception of the 76-km (47-mi) Oliktok branch, all cable planned for burial was buried in 2016, and any BU burial or O&M activities conducted in 2017 will just be re-disturbing areas previously disturbed.

Estimated Take

This section provides an estimate of the number of incidental takes authorized under this IHA, which will inform both NMFS' consideration of whether the number of takes is "small" and the negligible impact determination.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes would be by Level B harassment only, in the form of disruption of behavioral patterns for individual marine mammals resulting from exposure to operating sea plow and anchor handling associated with cable-laying and maintenance and repair activities. Based on the nature of the activity, Level A harassment is neither anticipated nor authorized.

As described previously, no mortality is anticipated or authorized for this activity. Below we describe how the take is estimated.

Described in the most basic way, we estimate take by considering: 1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; 2) the area or

volume of water that will be ensonified above these levels in a day; 3) the density or occurrence of marine mammals within these ensonified areas; and, 4) and the number of days of activities. Below, we describe these components in more detail and present the take estimate.

Acoustic Thresholds

Using the best available science, NMFS has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment for non-explosive sources – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (e.g., frequency, predictability, duty cycle), the environment (e.g., bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.*, 2007, Ellison et al., 2011). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 μPa (rms) for continuous (e.g. vibratory pile-driving, drilling) and above 160 dB re 1 μPa (rms) for non-explosive impulsive (e.g., seismic airguns) or intermittent (e.g., scientific sonar) sources.

Applicant's proposed activity includes the use of continuous noise (noise from sea plow and anchor handling), therefore the 120 dB re 1 μPa (rms) is applicable.

Level A harassment for non-explosive sources - NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Technical Guidance, 2016) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive).

These thresholds were developed by compiling and synthesizing the best available science and soliciting input multiple times from both the public and peer reviewers to inform the final product, and are provided in the table below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2016 Technical Guidance, which may be accessed at: http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm.

Table 2 summarizes the current NMFS marine mammal take criteria.

Table 2. Current Acoustic Exposure Criteria for Non-explosive Sound Underwater.

Hearing Group	PTS Onset Thresholds		Behavioral Thresholds	
	Impulsive	**Non-impulsive**	**Impulsive**	**Non-impulsive**
Low-Frequency (LF) Cetaceans	$L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	$L_{E,LF,24h}$: 199 dB	$L_{rms,flat}$: 160 dB	$L_{rms,flat}$: 120 dB
Mid-Frequency (MF) Cetaceans	$L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	$L_{E,MF,24h}$: 198 dB		
High-Frequency (HF) Cetaceans	$L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	$L_{E,HF,24h}$: 173 dB		
Phocid Pinnipeds (PW) (Underwater)	$L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	$L_{E,PW,24h}$: 201 dB		
Otariid Pinnipeds (OW) (Underwater)	$L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	$L_{E,OW,24h}$: 219 dB		
* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.				

Note: Peak sound pressure (L_{pk}) has a reference value of 1 µPa, and cumulative sound exposure level (L_E) has a reference value of 1µPa^2s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (i.e., varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that will feed into identifying the area ensonified above the acoustic thresholds.

The predominant noise source during previous cable-lay operations at other locations has been the cavitation noise produced by thrusters during dynamic positioning of the vessel (Tetra Tech 2013). Cavitation is the random collapsing of bubbles produced by the blades. However, Illingworth & Rodkin (I&R 2016) conducted sound source verification (SSV) measurements of the *Ile de Brehat* while operating near Nome at the beginning of the 2016 field season and found that the primary noise source emanated from the drive propellers while towing the sea plow. Resistant seafloor sediments resulted in a need to increase power (resulting in increased cavitation) as compared to cable-lay operations at other locations.

I&R (2016) determined that the distance to the NMFS Level B harassment threshold 120 dB re 1 µPa (rms) for continuous noise was 5.35 km (3.32 mi) when the *Ile de Brehat* was pulling the sea plow. It is assumed that the same measurements apply for the sister ship *Ile de Batz* that will pull the sea plow during cable-lay operations in the offshore segment of the Oliktok branch.

In addition to sea plow operations (which includes pre-trenching), cavitation noise potentially exceeding the NMFS Level B harassment threshold of 120 dB re 1 μPa (rms) for continuous noise is expected during anchor-handling operations.

Results from past measurements of cavitation noise associated with anchor handling have varied greatly with distances to the 120-dB isopleth ranging from a few kilometers to over 25 km (16 mi), depending on the size of both the tug and the anchor, and the amount of power needed to retrieve the anchor. Source levels for large (45 to 83 m (148 to 272 ft) in length) anchor-handling tugs during anchor-pulling operations have been measured at between 181 and 207 dB re 1 μPa (rms) (Laurinolli *et al*. 2005, Austin *et al.* 2013, LGL/JASCO/Greeneridge 2014). However, smaller (<35 m [<115 ft]) tugs produce underwater noise levels <180 dB re 1 μPa (rms) when pulling (Richardson *et al*. 1995, Blackwell and Greene 2003). Blackwell and Greene (2003) measured the underwater noise levels from a tug maneuvering a large barge near the Port of Anchorage and recorded maximum sound pressure levels equating to 163.8 dB re 1 μPa (rms) at 1-m source when the tug was pushing the barge, which increased to 178.9 dB re 1 μPa (rms) when thrusters were additionally operated during docking maneuvers. Quintillion intends to use the 27-m (88-ft) *Dana Cruz* and the 29-m (95-ft) *Daniel Foss* tugs to handle anchors. In the absence of sound source data for these smaller tugs it is assumed that each would have a source level of 178.9 dB re 1 μPa (rms) based on Blackwell and Greene (2003), which would imply a radius to threshold of about 8.45 km (5.25 mi) based on a 15 Log (R) spreading model.

During O&M activities (including burying BUs) the primary noise source will be the vessel (*Ile de Batz*) thrusters when using dynamic positioning to remain on station. There will be noise associated with the ROV propulsion and jetting, but these are expected to be subordinate to thruster noises. Various acoustical investigations of thruster noise in the Atlantic Ocean have

modeled distances to the 120-dB isopleth with results ranging between 1.4 and 4.5 km (0.8 and 2.7 mi) (Samsung 2009, Deepwater Wind 2013, Tetra Tech 2013) for water depths similar to those where Quintillion will be operating in the Chukchi and Beaufort seas. However, Hartin *et al*. (2011) physically measured dynamic positioning noise from the 104-m (341-ft) *Fugro Synergy* operating in the Chukchi Sea while it was using thrusters (2,500 kW) more powerful than those used on the *Ile de Brehat* (1,500 kW). Measured dominant frequencies were 110 Hz to 140 Hz, and the measured (90th percentile) radius to the 120-dB isopleth was 2.3 km (1.4 mi). Because this radius is a measured value from Alaska Arctic waters, it likely is a better approximation of expected sound levels associated with thruster operation during O&M activities.

Other acoustical sources include the echo sounders, transceivers, sonar, and transponders that will be used to continually reference the water depth and the position of the plow and ROV that operate behind the vessel. Based on actual field measurements or manufacturer-provided values, some of this equipment produces noise levels exceeding the vessel thrusters. However, this equipment is impulsive, producing pulses every 1 to 3 seconds (sec), and the sound energy is focused downward in very narrow conical beams. There is very little horizontal propagation of the noise levels. Measured distances to the 160-dB isopleth for echo sounders and acoustical beacons ranged between 26 and 44 m (85 and 144 ft) (Ireland *et al*., 2007, Reider *et al.*, 2013). I&R (2016) attempted to measure echo sounder and transponder sound levels associated with the *Ile de Brehat*, but could not detect them, even at a very close range to the ship. They assumed that this was due to the downward focus and lack of horizontal spread of the sound beam.

As mentioned earlier, Quintillion's 2017 activities will include installing cable on the remaining approximately 76 km (47 mi) of the Oliktok branch cable. Quintillion will then test

the system to identify any faults. Until testing is complete, it is not possible to know how much retrieval and reburial of cable will be necessary during O&M activity in 2017. To account for this uncertainty, the acoustical footprint (total ensonified area) for purposes of this application was determined by conservatively assuming that cavitation noise would occur along all remaining 76 km (47 mi) of carry-over cable-lay operations (Oliktok branch), and 100 km (62 mi) of potential O&M work in either the Bering or Chukchi seas. Table 3 lists the area ensonified by underwater sound exceeding 120 dB re 1 μPa (rms) associated with each activity.

Table 3. Estimated distance to the Level B harassment threshold (120 dB) for each of Quintillion's 2017 cable-lay activities and the length of route over which these activities would occur.

Operation	Season	Water body	Distance to 120-dB (km)	Route length (km)	Ensonified area (km^2)
Sea plow (pre-trenching & cable-laying by *Ile de Batz*)	Summer	Beaufort	5.35	187	2,001
Anchor handling (in association of cable-laying by barges)	Summer	Beaufort	8.45	16	270
ROV (O&M)	Fall	Bering & Chukchi	2.30	100	460

It is assumed that the pre-trenching and cable-laying work in the Beaufort Sea will occur only in the summer (July and August) with a collective zone of influence (ZOI) of 2,271 km^2. It is assumed that the remaining O&M activities in the Bering and Chukchi seas (ZOI of 460 km^2) would occur in the fall, although some burying of BUs and equipment testing might occur in the summer if the Oliktok area is not yet free of ice when the *Ile de Batz* arrives.

For Level A harassment zones, calculations were performed using NMFS optional spreadsheet (NMFS 2016) for mobile source: non-impulse source with input from various sources listed above. The results show that distances to the PTS isopleths for the five hearing

groups from various sources ranged from 0 to 4 m. Due to such a small impact zones, NMFS considers it highly unlikely that Level A takes would occur for this project.

Marine Mammal Occurrence

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations.

Density estimates for bowhead, gray, and beluga whales were derived from aerial survey data collected in the Chukchi and Beaufort seas during the 2011 to 2016 Aerial Surveys of Arctic Marine Mammals (ASAMM) program (Clarke *et al*., 2012, 2013, 2014, 2015, NMFS Unpubl. Data). The proposed cable routes cross ASAMM survey blocks 3, 11, and 12 in the Beaufort Sea, and blocks 13, 14, 18, 21, and 22 in the Chukchi Sea. Only data collected in these blocks were used to estimate densities for bowhead and gray whales. Beluga densities were derived from ASAMM data collected for depth zones between 36 and 50 m (118 and 164 ft) within the Chukchi Sea between longitudes 157 ° and 169 °W, and the depth zones between 21 and 200 m (68.9 and 656.2 ft) in the Beaufort Sea between longitudes 154 ° and 157 °W. These depth zones reflect the depths where most of the cable-lay will occur. Harbor porpoise densities (Chukchi Sea only) are from Hartin *et al.* (2013), and ringed seal densities from Aerts *et al.* (2014; Chukchi Sea) and Moulton and Lawson (2002; Beaufort Sea). Spotted and bearded seal densities in the Chukchi Sea are also from Aerts *et al.* (2014). Spotted seal density in Beaufort Sea is based on Green and Negri (2005) and Green *et al*. (2006, 2007) surveys during barging activity between West Dock and Cape Simpson, and corrected using observations by Hauser *et al.* (2008) and Lomac-McNair *et al.* (2014) in areas closer to Oliktok (see below). Bearded seal density is estimated as 5 percent of ringed seals, based on studies by Stirling *et al.* (1982) and Clarke *et al.* (2013, 2014).

Too few sightings have been made in the Chukchi and Beaufort seas for all other marine mammal species to develop credible density estimates.

The density estimates for the seven species are presented in Table 4 (Chukchi and Bering seas) and Table 5 (Beaufort Sea) below. The specific parameters used in deriving these estimates are provided in the discussions that follow.

Table 4. Marine mammal densities (#/km^2) in the Chukchi and Bering Seas.

Species	Summer	Fall
Bowhead whale	0.0035	0.0481
Gray whale	0.0760	0.0241
Beluga whale	0.0015	0.0090
Harbor porpoise	0.0022	0.0021
Ringed seal	0.0645	0.0380
Spotted seal	0.0645	0.0380
Bearded seal	0.0630	0.0440

Table 5. Marine mammal densities (#/km^2) in the Beaufort Sea.

Species	Summer	Fall
Bowhead whale	0.1239	0.1285
Gray whale	0.0097	0.0034
Beluga whale	0.0778	0.0316
Ringed seal	0.3547	0.2510
Spotted seal	0.1171	0.0837
Bearded seal	0.0177	0.0125

Bowhead Whale: The summer density estimate for bowhead whales was derived from June, July, and August aerial survey data collected in the Chukchi and Beaufort seas during the 2011 to 2016 ASAMM program (Clarke *et al.*, 2012, 2013, 2014, 2015, NMFS Unpubl. Data). Fall data were collected during September and October. Data only from the survey blocks that will be crossed by the proposed cable route were used in the calculations, and included blocks 3, 11, and 12 in the Beaufort Sea and 13, 14, 18, 21, and 22 in the Chukchi Sea. ASAMM surveys did not extend more than about 25 km (15.5 mi) south of Point Hope, and there are no other

systematic survey data for bowhead whales south of the point. During these three years, a total of 478 bowhead whales were recorded in the three Beaufort Sea blocks during 23,955 km (14,885 mi) of summer survey effort (0.0200/km), and 684 whales during 33,056 km (20,054 mi) of fall effort (0.0207/km). In the five Chukchi Sea survey blocks, 23 bowheads were recorded during 41,373 km (25,708 mi) of summer effort (0.0006/km), and 302 during 39,015 km (24,243 mi) of fall survey (0.0077/km). Applying an effective strip half-width (ESW) of 1.15 (Ferguson and Clarke 2013), and a 0.07 correction factor for whales missed during the surveys, results in corrected densities of 0.1239 (Beaufort summer), 0.1285 (Beaufort fall), 0.0035 (Chukchi summer), and 0.0481 (Chukchi fall) whales per km^2 (Table 4 and Table 5).

Gray Whale: Gray whale density estimates were derived from the same ASAMM transect data used to determine bowhead whale densities. During the four years of aerial survey, 39 gray whales were recorded in the three Beaufort Sea blocks during 23,955 km (14,885 mi) of summer survey effort (0.0016/km), and 19 gray whales during 33,056 km (20,054 mi) of fall effort (0.0006/km). In the five Chukchi Sea survey blocks, 529 gray whales were recorded during 41,373 km (25,708 mi) of summer effort (0.0128/km), and 158 during 39,015 km (24,243 mi) of fall survey (0.0040/km). Applying an effective strip half-width (ESW) of 1.201 (Ferguson and Clarke 2013), and a correction factor of 0.07, results in corrected densities of 0.0097 (Beaufort summer), 0.0034 (Beaufort fall), 0.0760 (Chukchi summer), and 0.0241 (Chukchi fall) whales per km^2 (Table 4 and Table 5).

Beluga Whale: Beluga whale density estimates were derived from the ASAMM transect data collected from 2011 to 2016 (Clarke *et al.*, 2012, 2013, 2014, 2015, 2016, NMFS Unpubl. Data). During summer aerial surveys (June-August), there were 376 beluga whale observed along 6,786 km (4,217 mi) of transect in waters between 21 to 200 m (13 to 124 ft) deep and

between longitudes 154 °W and 157 °W. This equates to 0.0554 whales/km of trackline and a corrected density of 0.0778 whales per km^2, assuming an ESW of 0.614 km and a 0.58 correction factor. Fall density estimates (September-October) for this region were based on 239 beluga whales seen along 10,632 km (6,606 mi) of transect. This equates to 0.0225 whales/km of trackline and a corrected density of 0.0316 whales per km^2, assuming an ESW of 0.614 km and a 0.58 correction factor.

During summer aerial surveys (June-August), there were 40 beluga whale observed along 38,347 km (23,828 mi) of transect in waters less than 36 to 50 m (22 to 31 ft) deep and between longitudes 157 °W and 169 °W. This equates to 0.0010 whales/km of trackline and a corrected density of 0.0015 whales per km^2, assuming an ESW of 0.614 km and a 0.58 correction factor. Calculated fall beluga densities for the same region was based on 237 beluga whales seen during 36,816 km (22,876 mi) of transect. This equates to 0.0064 whales/km and a corrected density of 0.0090 whales per km^2, again assuming an ESW of 0.614 km and a 0.58 correction factor.

Harbor Porpoise: Although harbor porpoise are known to occur in low numbers in the Chukchi Sea (Aerts *et al.*, 2014), no harbor porpoise were positively identified during Chukchi Offshore Monitoring in Drilling Area (COMIDA) and ASAMM aerial surveys conducted in the Chukchi Sea from 2006 to 2013 (Clarke et al. 2011, 2012, 2013, 2014). A few small unidentified cetaceans that were observed may have been harbor porpoise. Hartin *et al.* (2013) conducted vessel-based surveys in the Chukchi Sea while monitoring oil and gas activities between 2006 and 2010 and recorded several harbor porpoises throughout the summer and early fall. Vessel-based surveys may be more conducive to sighting these small, cryptic porpoise than the aerial-based COMIDA/ASAMM surveys. The Hartin *et al.* (2013) three-year average summer densities ($0.0022/km^2$) and fall densities ($0.0021/km^2$) were very similar, and are included in Table 4.

Ringed and Spotted Seals: Aerts *et al.* (2014) conducted a marine mammal monitoring program in the northeastern Chukchi Sea in association with oil and gas exploration activities between 2008 and 2013. For sightings of either ringed or spotted seals, the highest summer density was 0.127 seals/km^2 (2008) and the highest fall density was 0.076 seals/km^2 (2013). Where seals could be identified to species, they found the ratio of ringed to spotted seals to be 2:1. However, monitoring the cable-lay activity in 2016 showed a nearly 1:1 ratio for ringed and spotted seals in all Bering and Chukchi seas, with the exception of Kotzebue where high numbers of spotted seals were observed. Kotzebue is a fall concentration for feeding spotted seals. Because the cable-lay work at Kotzebue is complete, and any 2017 work there is either unlikely or would be brief, Kotzebue nearshore densities are not taken into special account in the overall estimated spotted seal density for the Bering and Chukchi seas. The 1:1 ratio observed in 2016 is taken into consideration by splitting the above Aerts *et al.* (2014) densities equally for each species: 0.064 seals/km^2 for summer and 0.038 seals/km^2 for fall. These are the densities used in the exposure calculations (Table 4) to represent ringed and spotted seal densities for both the northern Bering and Chukchi seas.

Moulton and Lawson (2002) conducted summer shipboard-based surveys for pinnipeds along the nearshore Alaska Beaufort Sea coast, while the Kingsley (1986) conducted surveys here along the ice margin representing fall conditions. The ringed seal results from these surveys were used in the exposure estimates (Table 4). Neither survey provided a good estimate of spotted seal densities. Green and Negri (2005) and Green *et al*. (2006, 2007) recorded pinnipeds during barging activity between West Dock and Cape Simpson, and found high numbers of ringed seal in Harrison Bay, and peaks in spotted seal numbers off the Colville River delta where a haulout site is located. Approximately 5 percent of all phocid sightings recorded by Green and

Negri (2005) and Green *et al.* (2006, 2007) were spotted seals, which provide an estimate of the proportion of ringed seals versus spotted seals in the Colville River delta and Harrison Bay, both areas relatively close to the proposed Oliktok branch line. However, monitoring conducted nearer to Oliktok Point by Hauser *et al.* (2008) and Lomac-McNair *et al*. (2014) indicated that spotted seals are more commonly observed in waters nearest shore than ringed seals. While only a small portion of the Oliktok branch that remains to be installed occurs in waters within 5 km (3 mi) of shore, much of the work within 5 km (3 mi) will take more days of activity to complete than offshore work and, hence, could result in a disproportionately higher number of spotted seal sightings than existing survey data might predict. Therefore, as a conservative measure, the ringed seal density data from Moulton and Lawson (2002) and Kingsley (1986) is applied to both species, especially given the 2016 results indicate that outside Kotzebue, observers were reporting a nearly 3:1 ratio of both species.

Bearded Seal: The most representative estimates of summer and fall density of bearded seals in the northern Bering and Chukchi seas come from Aerts et al. (2014) monitoring program that ran from 2008 to 2013 in the northeastern Chukchi Sea. During this period the highest summer estimate was 0.063 seals/km^2 (2013) and the highest fall estimate was 0.044 seals/km^2 (2010). These are the values that were used in developing exposure estimates for this species for the northern Bering and Chukchi seas cable-lay areas (Table 4).

There are no accurate density estimates for bearded seals in the Beaufort Sea based on survey data. However, Stirling *et al*. (1982) noted that the proportion of eastern Beaufort Sea bearded seals is 5 percent that of ringed seals. Further, Clarke *et al*. (2013, 2014) recorded 82 bearded seals in both the Chukchi and Beaufort Seas during the 2012 and 2013 ASAMM surveys, which represented 5.1 percent of all their ringed seal and small unidentified pinniped

sightings (1,586). Bengtson *et al.* (2005) noted a similar ratio (6 percent) during spring surveys of ice seals in the Chukchi Sea. Therefore, the density values in Table 3 were determined by multiplying ringed seal density from Moulton and Lawson (2002) and Kingsley (1986) by 5 percent.

Take Calculation and Estimation

Here we describe how the information provided above is brought together to produce a quantitative take estimate.

As stated earlier in the document, ensonified distances to Level A harassment from various sources ranged from 0 to 4 m for all marine mammal hearing groups. It's highly unlikely that an animal will reach to this close distance to the vessel. Therefore, we consider there is no concern for level A take.

The estimated potential harassment take of local marine mammals by the project was determined by multiplying the seasonal animal densities in Table 4 and Table 5 with the maximum seasonal area that would be ensonified by the estimated operational underwater noise greater than 120 dB re 1 µPa (rms) during each activity by each season (shown in Table 3). The resulting exposure calculations are provided in Table 6.

For marine mammals for which reliable density estimates do not exist in the project area (*i.e.*, humpback whale, fin whale, minke whale, killer whale, harbor porpoise, Steller sea lion, and ribbon seal) due to low abundance, potential exposures are based on recorded observations of these species in the recent past as discussed earlier in this document (Hashagen *et al.*, 2009; Green and Negri, 2005; Green *et al.*, 2007) and from Quintillion's Marine Mammal Monitoring Report during its 2016 subsea cable-laying operations (Quintillion 2017). The take numbers for harbor porpoise are adjusted upwards to account for group size.

Table 6. Estimated and Requested Takes of Marine Mammal by Level B Harassment.

Species	Beaufort summer exposures	Chukchi & Bering fall exposure	Total requested take	Abundance	Percentage of stock
Bowhead whale	292	22	314	16,892	1.87%
Gray whale	23	11	34	20,990	0.16%
Beluga whale (Beaufort Sea)	184	4	188	39,258	0.48%
Beluga whale (E. Chukchi Sea)	184	4	188	3,710	5.07%
Beluga whale (E. Bering Sea)	184	4	188	19,186	0.98%
Harbor porpoise	0	15	15	48,215	0.03%
Ringed seal	838	17	855	170,000	0.50%
Spotted seal	279	17	296	460,268	0.06%
Bearded seal	42	20	62	299,174	0.02%
Humpback whale	0	60	60	10,103	0.59%
Fin whale	0	15	15	5,700	0.26%
Minke whale	0	15	15	2,020	0.74%
Killer whale	0	5	5	2,347	1.07%
Ribbon seal	0	5	5	18,400	0.21%
Steller sea lion	0	8	8	50,983	0.02%

Effects of Specified Activities on Subsistence Uses of Marine Mammals

The availability of the affected marine mammal stocks or species for subsistence uses may be impacted by this activity. The subsistence uses that may be affected and the potential impacts of the activity on those uses are described below. Measures included in this IHA to reduce the impacts of the activity on subsistence uses are described in the Mitigation section. Last, the information from this section and the Mitigation section is analyzed to determine whether the necessary findings may be made in the Unmitigable Adverse Impact Analysis and Determination section.

Underwater noise generated from the Quintillion's proposed cable-laying and O&M activities could affect subsistence uses of marine mammals by causing the animals to avoid the hunting areas and making the animals more difficult to approach by the hunters.

The cable-lay activities that might occur in 2017 as a result of repair work could occur within the marine subsistence areas used by the villages of Nome, Wales, Kotzebue, Little Diomede, Kivalina, Point Hope, Wainwright, Barrow, and Nuiqsut. Subsistence use various considerably by season and location. Seven of the villages hunt bowhead whales (Suydam and George 2004). The small villages of Wales, Little Diomedes, and Kivalina take a bowhead whale about once every five years. Point Hope and Nuiqsut each harvest three to four whales annually, and Wainwright five to six. Harvest from Barrow is by far the highest with about 25 whales taken each year and generally split between spring and fall hunts. Point Hope and Wainwright harvest occurs largely during the spring hunt, and Nuiqsut's during the fall. Nuiqsut whalers base from Cross Island, 70 km (44 mi) east of Oliktok.

Beluga are also annually harvested by the villages noted above. Beluga harvest is most important to Point Hope. For example, the village harvested 84 beluga whales during the spring of 2012, and averaged 31 whales a year from 1987 to 2006 (Frost and Suydam, 2010). Beluga are also important to Wainwright villages. They harvested 34 beluga whales in 2012, and averaged 11 annually from 1987 to 2006 (Frost and Suydam, 2010). All the other villages (Nome, Kotzebue, Wales, Kivalina, Little Diomede, and Barrow) averaged less than 10 whales per year (Frost and Suydam, 2010).

All villages use seals to one degree or another as well. Ringed seal harvest mostly occurs in the winter and spring when they are hauled out on ice near leads or at breathing holes.

Bearded seals are taken from boats during the early summer as they migrate northward in the Chukchi Sea and eastward in the Beaufort Sea.

Bearded seals are a staple for villages like Kotzebue and Kivalina that have limited access to bowhead and beluga whales (Georgette and Loon, 1993). Thetis Island, located just off the Colville River delta, is an important base from which villagers from Nuiqsut hunt bearded seals each summer after ice breakup.

Spotted seals are an important summer resource for Wainwright and Nuiqsut, but other villages will avoid them because the meat is less appealing than other available marine mammals.

The proposed cable-lay activity will occur in the summer after the spring bowhead and beluga whale hunts have ended, and will avoid the ice period when ringed seals are harvested. The Oliktok branch will pass within 4 km (2 mi) of Thetis Island, but the actual laying of cable along that branch near the island should occur after the bearded seal hunt is over.

Quintillion states that it will work closely with the AEWC, the Alaska Beluga Whale Committee (ABWC), the Ice Seal Committee (ISC), and the NSB to minimize any effects cable-lay activities might have on subsistence harvest (see below).

Mitigation

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses. NMFS regulations require applicants for incidental take authorizations to include information about 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 and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat, as well as subsistence uses. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned) the likelihood of effective implementation (probability implemented as planned). and;

2) The practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

Mitigation for Marine Mammals and their Habitat

The primary purpose of these mitigation measures is to detect marine mammals and avoid vessel interactions during the pre- and post-cable-laying and O&M activities. Due to the nature of the activities, the vessel will not be able to engage in direction alteration during cable-laying operations. However, since the cable-laying vessel will be moving at a slow speed of 600 meter/hour (0.37 mile per hour or 0.32 knot) during cable-laying operations, it is highly unlikely

that the cable vessel would have physical interaction with marine mammals. For Quintillion's proposed subsea cable-laying project, NMFS is requiring Quintillion to implement the following mitigation measures to minimize the potential impacts to marine mammals in the project vicinity as a result of its planned activities.

(a) Vessel Movement Mitigation during Pre- and Post-cable-laying Activities:

When the cable-lay fleet is traveling in Alaskan waters to and from the project area (before and after completion of cable-laying or O&M operations), the fleet vessels would:

- Not approach concentrations or groups of whales (an aggregation of 6 or more whales) within 1.6 km (1 mi) by all vessels under the direction of Quintillion;
- Take reasonable precautions to avoid potential interaction with any bowhead whales observed within 1.6 km (1 mi) of a vessel; and
- Reduce speed to less than 5 knots when visibility drops, to avoid the likelihood of collision with whales. The normal vessel travel speeds when laying cable is well less than 5 knots.

Mitigation for Subsistence Uses of Marine Mammals or Plan of Cooperation

Regulations at 50 CFR 216.104(a)(12) further require IHA applicants conducting activities that take place in Arctic waters to provide a Plan of Cooperation or information that identifies what measures have been taken and/or will be taken to minimize adverse effects on the availability of marine mammals for subsistence purposes. A plan must include the following:

- A statement that the applicant has notified and provided the affected subsistence community with a draft plan of cooperation;

- A schedule for meeting with the affected subsistence communities to discuss proposed activities and to resolve potential conflicts regarding any aspects of either the operation or the plan of cooperation;
- A description of what measures the applicant has taken and/or will take to ensure that proposed activities will not interfere with subsistence whaling or sealing; and
- What plans the applicant has to continue to meet with the affected communities, both prior to and while conducting the activity, to resolve conflicts and to notify the communities of any changes in the operation.

Quintillion has prepared a Plan of Cooperation (POC), which was developed by identifying and evaluating any potential effects the proposed cable-laying operation might have on seasonal abundance that is relied upon for subsistence use.

Specifically, the vessels that Quintillion will use will participate in the Automatic Identification System (AIS) vessel-tracking system allowing the vessel to be tracked and located in real time via the Marine Exchange of Alaska (MEA). Quintillion will sponsor memberships in the MEA such that local subsistence groups can monitor Quintillion vessel movements.

In addition, Quintillion will distribute a daily activity report by email to all interested parties. Daily reports will include vessel activity, location, subsistence information, and any potential hazards.

Quintillion project vessels will monitor local marine VHF channels as requested for local traffic and will use log books to assist in the standardization of record keeping.

A copy of the POC can be viewed on the Internet at:

www.nmfs.noaa.gov/pr/permits/incidental/research.htm.

In addition, Quintillion shall monitor the positions of all of its vessels and will schedule timing and location of cable-laying segments to avoid any areas where subsistence activity is normally planned.

For vessels transiting to and from Quintillion's project area, Quintillion shall implement the following measures:

(A) Vessels transiting in the Beaufort Sea east of Bullen Point to the Canadian border shall remain at least 5 miles offshore during transit along the coast, provided ice and sea conditions allow. During transit in the Chukchi Sea, vessels shall remain as far offshore as weather and ice conditions allow, and at all times at least 5 miles offshore.

(B) From August 31 to October 31, transiting vessels in the Chukchi Sea or Beaufort Sea shall remain at least 20 miles offshore of the coast of Alaska from Icy Cape in the Chukchi Sea to Pitt Point on the east side of Smith Bay in the Beaufort Sea, unless ice conditions or an emergency that threatens the safety of the vessel or crew prevents compliance with this requirement. This condition shall not apply to vessels actively engaged in transit to or from a coastal community to conduct crew changes or logistical support operations.

(C) Vessels shall be operated at speeds necessary to ensure no physical contact with whales occurs, and to make any other potential conflicts with bowheads or whalers unlikely. Vessel speeds shall be less than 10 knots when within 1.6 kilometers (1 mile) of feeding whales or whale aggregations (6 or more whales in a group).

(D) If any vessel inadvertently approaches within 1.6 kilometers (1 mile) of observed bowhead whales, except when providing emergency assistance to whalers or in other emergency situations, the vessel operator will take reasonable precautions to avoid potential interaction with the bowhead whales by taking one or more of the following actions, as appropriate:

- Reducing vessel speed to less than 5 knots within 900 feet of the whale(s);
- Steering around the whale(s) if possible;
- Operating the vessel(s) in such a way as to avoid separating members of a group of whales from other members of the group;
- Operating the vessel(s) to avoid causing a whale to make multiple changes in direction; and
- Checking the waters immediately adjacent to the vessel(s) to ensure that no whales will be injured when the propellers are engaged.

(E) Quintillion shall complete operations in time to ensure that vessels associated with the project complete transit through the Bering Strait to a point south of 59 degrees North latitude no later than November 15, 2017. Any vessel that encounters weather or ice that will prevent compliance with this date shall coordinate its transit through the Bering Strait to a point south of 59 degrees North latitude with local subsistence communities.

(F) Quintillion vessels shall, weather and ice permitting, transit east of St. Lawrence Island and no closer than 10 miles from the shore of St. Lawrence Island.

Based on our evaluation of the applicant's measures, NMFS has determined that the prescribed mitigation measures provide the means effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for subsistence uses.

Monitoring and Reporting

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth, "requirements pertaining to the monitoring and reporting of such taking."

The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density).
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas).
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors.
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks.
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat).

- Mitigation and monitoring effectiveness.

Monitoring Measures

Monitoring will provide information on the numbers of marine mammals affected by the subsea cable-laying and O&M operation and facilitate real-time mitigation to prevent injury of marine mammals by vessel traffic. These goals will be accomplished in the Bering, Chukchi, and Beaufort seas during 2017 by conducting vessel-based monitoring to document marine mammal presence and distribution in the vicinity of the operation area.

Visual monitoring by protected species observers (PSO) during subsea cable-laying and O&M operations, and periods when the operation is not occurring, will provide information on the numbers of marine mammals potentially affected by the activity. Vessel-based PSOs onboard the vessels will record the numbers and species of marine mammals observed in the area and any observable reaction of marine mammals to the cable-laying operation in the Bering, Chukchi, and Beaufort seas.

Vessel-based Protected Species Observers

Vessel-based visual monitoring for marine mammals shall be conducted by NMFS-approved PSOs throughout the period of subsea cable-laying and O&M activities. PSOs shall be stationed aboard the cable-laying vessel throughout the duration of the subsea cable-laying and O&M operations.

A sufficient number of PSOs would be required onboard each survey vessel to meet the following criteria:

- 100 percent monitoring coverage during all periods of cable-laying and O&M operations in daylight;
- Maximum of 4 consecutive hours on watch per PSO; and

- Maximum of 12 hours of watch time per day per PSO.

PSO teams will consist of Inupiat observers and experienced field biologists. Each vessel will have an experienced field crew leader to supervise the PSO team. The total number of PSOs may decrease later in the season as the duration of daylight decreases.

(1) PSOs Qualification and Training

Lead PSOs and most PSOs will be individuals with experience as observers during marine mammal monitoring projects in Alaska or other offshore areas in recent years. New or inexperienced PSOs must be paired with an experienced PSO or experienced field biologist so that the quality of marine mammal observations and data recording is kept consistent.

Resumes for candidate PSOs will be provided to NMFS for review and acceptance of their qualifications. Inupiat observers would be experienced in the region and familiar with the marine mammals of the area. All observers will complete an observer training course designed to familiarize individuals with monitoring and data collection procedures.

(2) Establishing Zone of Influence

A PSO would establish a ZOI where the received level is 120 dB during Qunitillion's subsea cable-laying and O&M operations and conduct marine mammal monitoring during the operation. The measured 120 dB ZOI is 5.35 km from the cable-laying vessel.

(3) Marine Mammal Observation Protocol

PSOs shall watch for marine mammals from the best available vantage point on the survey vessels, typically the bridge. PSOs shall scan systematically with the unaided eye and 7 x 50 reticle binoculars, and night-vision and infra-red equipment when needed. Personnel on the bridge shall assist the marine mammal observer(s) in watching for marine mammals; however, bridge crew observations will not be used in lieu of PSO observation efforts.

Monitoring shall consist of recording of the following information:

1. The species, group size, age/size/sex categories (if determinable), the general behavioral activity, heading (if consistent), bearing and distance from vessel, sighting cue, behavioral pace, and apparent reaction of all marine mammals seen near the vessel (e.g., none, avoidance, approach, paralleling, etc.);

2. The time, location, heading, speed, and activity of the vessel, along with sea state, visibility, cloud cover and sun glare at (I) any time a marine mammal is sighted, (II) at the start and end of each watch, and (III) during a watch (whenever there is a change in one or more variable);

3. The identification of all vessels that are visible within 5 km of the vessel from which observation is conducted whenever a marine mammal is sighted and the time observed;

4. Any identifiable marine mammal behavioral response (sighting data should be collected in a manner that will not detract from the PSO's ability to detect marine mammals);

5. Any adjustments made to operating procedures; and

6. Visibility during observation periods so that total estimates of take can be corrected accordingly.

Distances to nearby marine mammals will be estimated with binoculars (7 x 50 binoculars) containing a reticle to measure the vertical angle of the line of sight to the animal relative to the horizon. Observers may use a laser rangefinder to test and improve their abilities for visually estimating distances to objects in the water. Quintillion shall use the best available technology to improve detection capability during periods of fog and other types of inclement weather. Such technology might include night-vision goggles or binoculars as well as other instruments that incorporate infrared technology.

PSOs shall understand the importance of classifying marine mammals as "unknown" or "unidentified" if they cannot identify the animals to species with confidence. In those cases, they shall note any information that might aid in the identification of the marine mammal sighted. For example, for an unidentified mysticete whale, the observers should record whether the animal had a dorsal fin. Additional details about unidentified marine mammal sightings, such as "blow only," "mysticete with (or without) a dorsal fin," "seal splash," etc., shall be recorded.

(4) Monitoring Measures that Support Impact Analyses

Quintillion shall evaluate whether the angle of the vessel relative to the recording location has any effect on the received levels for its 2016 SSV tests, and work with the National Marine Mammal Laboratory (NMML) to compare the SSV received levels with the levels obtained by the mooring-based PAM data to determine whether the results from the SSV testing need to be corrected based on the bearing of the recording equipment to the ship. The results will be included in the 2017 monitoring report.

Quintillion will contribute $20,000 to the University of Alaska, Fairbanks for their bowhead whale feeding study in the eastern Chukchi Sea or western Beaufort Sea during the open water season.

Quintillion shall undertake efforts to further evaluate potential impacts of the 2016 activities on bowhead whales and, subsequently, whaling efforts, if being requested.

Quintillion shall make the marine mammal and underwater acoustic data it collected in 2016 and the data it will collect in 2017 publicly available.

(5) Passive Acoustics Monitoring

Quintillion shall conduct sound source verification on the vibro plow that would be used for cable-laying in the Beaufort Sea.

Reporting Measures

A draft marine mammal monitoring report will be submitted to the Director, Office of Protected Resources, NMFS, within 90 days after the end of Quintillion's subsea cable-laying and O&M operations in the Bering, Chukchi, and Beaufort seas. The report will describe in detail:

1. Summaries of monitoring effort (*e.g.*, total hours, total distances, and marine mammal distribution through the project period, accounting for sea state and other factors affecting visibility and detectability of marine mammals);

2. Summaries that represent an initial level of interpretation of the efficacy, measurements, and observations;

3. Analyses of the effects of various factors influencing detectability of marine mammals (e.g., sea state, number of observers, and fog/glare);

4. Species composition, occurrence, and distribution of marine mammal sightings, including date, water depth, numbers, age/size/gender categories (if determinable), group sizes, and ice cover;

5. Estimates of uncertainty in all take estimates, with uncertainty expressed by the presentation of confidence limits, a minimum-maximum, posterior probability distribution, or another applicable method, with the exact approach to be selected based on the sampling method and data available; and

6. A clear comparison of authorized takes and the level of actual estimated takes.

Quintillion shall provide NMFS with a draft monitoring report within 90 days of the conclusion of the subsea cable-laying and O&M activities or within 90 days of the expiration of the IHA, whichever comes first. The draft report shall be subject to review and comment by NMFS. Any recommendations made by NMFS must be addressed in the report prior to acceptance by NMFS. The draft report will be considered the final report for this activity under this Authorization if NMFS has not provided comments and recommendations within 90 days of receipt of the draft report.

Notification of Injured or Dead Marine Mammals

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA, such as a serious injury, or mortality (*e.g.*, ship-strike, gear interaction, and/or entanglement), Quintillion will immediately cease the specified activities and immediately report the incident to the Permits and Conservation Division, Office of Protected Resources, NMFS, and the Alaska Regional Stranding Coordinators. The report would include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hours preceding the incident;
- Water depth;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);

- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS would work with Quintillion to determine the necessary measures to minimize the likelihood of further prohibited take and ensure MMPA compliance. Quintillion would not be able to resume its activities until notified by NMFS via letter, email, or telephone.

In the event that Quintillion discovers a dead marine mammal, and the lead PSO determines that the cause of the death is unknown and the death is relatively recent (*i.e.*, in less than a moderate state of decomposition as described in the next paragraph), Quintillion would immediately report the incident to the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS Alaska Stranding Hotline. The report would include the same information identified in the paragraph above. Activities would be able to continue while NMFS reviews the circumstances of the incident. NMFS would work with Quintillion to determine whether modifications in the activities would be appropriate.

In the event that Quintillion discovers a dead marine mammal, and the lead PSO determines that the death is not associated with or related to the activities authorized in the IHA (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), Quintillion would report the incident to the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS Alaska Stranding Hotline, within 24 hours of the discovery. Quintillion would provide photographs or video footage (if

available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network. Quintillion can continue its operations under such a case.

Monitoring Plan Peer Review

The MMPA requires that monitoring plans be independently peer reviewed "where the proposed activity may affect the availability of a species or stock for taking for subsistence uses" (16 U.S.C. 1371(a)(5)(D)(ii)(III)). Regarding this requirement, NMFS' implementing regulations state, "Upon receipt of a complete monitoring plan, and at its discretion, [NMFS] will either submit the plan to members of a peer review panel for review or within 60 days of receipt of the proposed monitoring plan, schedule a workshop to review the plan" (50 CFR 216.108(d)).

NMFS convened an independent peer review panel to review Quintillion's 4MP for the proposed subsea cable-laying and O&M operations in the Bering, Chukchi, and Beaufort seas. The panel met via web conference in late March 2017, and provided comments to NMFS in April 2017. The full panel report can be viewed on the Internet at: *http://www.nmfs.noaa.gov/pr/permits/incidental.html*.

NMFS provided the panel with Quintillion's IHA application and monitoring plan and asked the panel to answer the following questions:

1. Will the applicant's stated objectives effectively further the understanding of the impacts of their activities on marine mammals and otherwise accomplish the goals stated above? If not, how should the objectives be modified to better accomplish the goals above?

2. Can the applicant achieve the stated objectives based on the methods described in the plan?

3. Are there technical modifications to the proposed monitoring techniques and methodologies proposed by the applicant that should be considered to better accomplish their stated objectives?

4. Are there techniques not proposed by the applicant (i.e., additional monitoring techniques or methodologies) that should be considered for inclusion in the applicant's monitoring program to better accomplish their stated objectives?

5. What is the best way for an applicant to present their data and results (formatting, metrics, graphics, etc.) in the required reports that are to be submitted to NMFS (i.e., 90-day report and comprehensive report)?

The peer-review panel report contains recommendations that the panel members felt were applicable to the Quintillion's monitoring plans. Specifically, the panel recommended the following:

(1) When marine mammals are sighted within the Level B harassment zone, Quintillion should reduce, where possible, all sound sources that have the potential to exceed the threshold for Level B harassment. These may include reducing speed or temporarily stopping winch operations, reducing underwater ploughing speed, temporarily stopping jetting, stopping or reducing beacon pinging rate and other subordinate noise sources to decrease the project's overall acoustic footprint;

(2) Quintillion continue to work with subsistence organizations, such as the Alaska Eskimo Whaling Commission (AEWC), and the Arctic Waterways Safety Committee (AWSC) to identify local contacts in each community that Quintillion can regularly communicate with to inform the communities and accept feedback about their ongoing operations;

(3) Quintillion evaluate whether the angle of the vessel relative to the recording location has any effect on the received levels for its 2016 SSV tests, and work with the National Marine Mammal Laboratory (NMML) to compare the SSV received levels with the levels obtained by the mooring-based PAM data to determine whether the results from the SSV testing need to be corrected based on the bearing of the recording equipment to the ship;

(4) Because it is unlikely Quintillion will be able to minimize disturbance to marine mammals and is not proposing to conduct pre-activity, post-activity, or far-field monitoring, Quintillion should contribute to existing or ongoing studies to identify, quantify, or forecast bowhead whale prey and its associated distribution in the eastern Chukchi Sea or western Beaufort Sea during the open water season;

(5) Quintillion undertake efforts to further evaluate potential impacts of the 2016 activities on bowhead whales and, subsequently, whaling efforts. If data warrant a thorough evaluation, Quintillion could contribute financially to analysis efforts; and

(6) Quintillion stated in its IHA application that it would forego additional SSV testing on the vibro plow, instead of using SSV tests conducted on similar equipment near France in 2014 as a proxy. If so, Quintillion should provide additional details to NMFS and the Panel to justify why conducting an SSV on the vibro plow in the Arctic is not warranted. Specifically, how might factors such as difference in the substrate type, depth of the ocean bottom, sound speed profile, and plow speed and operation mode affect the sound radiation and propagation from the vibro plow when operating off France compared to in the Beaufort Sea.

NMFS discussed the peer review panel report and the list of recommendations with Quintillion. For the aforementioned monitoring measures, NMFS requires and Quintillion agrees to implement the following:

(1) Continue to work with subsistence organizations, such as the Alaska Eskimo Whaling Commission (AEWC), and the Arctic Waterways Safety Committee (AWSC) to identify local contacts in each community that Quintillion can regularly communicate with to inform the communities and accept feedback about their ongoing operations;

(2) Contribute $20,000 to the University of Alaska, Fairbanks for their bowhead whale feeding study in the eastern Chukchi Sea or western Beaufort Sea during the open water season; and

(3) Conduct sound source verification on the vibro plow that would be used for cable-laying in the Beaufort Sea.

Regarding whether the angle of the vessel relative to the recording location has any effect on the received levels for its 2016 SSV tests, Quintillion's contractor Illingworth and Rodkin has already examined these question regarding the 2016 data. The results will be included in the 2017 monitoring report. For SSV tests planned in 2017, acoustic recordings from all angles will be examined and the results will be included in the 2017 monitoring report.

Regarding the recommendation that require Quintillion to undertake efforts to further evaluate potential impacts of the 2016 activities on bowhead whales and subsequently, whaling efforts, Quintillion states that it will continue to support scientific evaluations of the potential impact of 2016 activities on bowhead whales and, consequently, whaling efforts, by providing vessel and observation data and other in-kind support as appropriate.

However, regarding the recommendation that requires Quintillion to reduce vessel speed or temporarily stopping winch operation, reduce underwater ploughing speed, or temporarily stop jetting, these measures are not feasible during cable-laying activities as they would cause

safety concerns or affecting the cable-laying and maintenance operations. Therefore, this measure is not included in the IHA issued to Quintillion.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as "an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival" (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, this introductory discussion of our analyses applies to all the species listed in Table 6, given that the anticipated effects of Quintillion's subsea cable-laying and O&M operations on marine mammals (taking into account the prescribed mitigation) are expected to be relatively similar in nature. Where there are meaningful differences between species or stocks,

or groups of species, in anticipated individual responses to activities, impact of expected take on the population due to differences in population status, or impacts on habitat, they are described separately in the analysis below.

No injuries or mortalities are anticipated to occur as a result of Quintillion's subsea cable-laying and O&M operations, and none are authorized. Additionally, animals in the area are not expected to incur hearing impairment (*i.e.*, TTS or PTS) or non-auditory physiological effects. The takes that are anticipated and authorized are expected to be limited to short-term Level B behavioral harassment in the form of brief startling reaction and/or temporary vacating the area.

Any effects on marine mammals are generally expected to be restricted to avoidance of a limited area around Quintillion's proposed activities and short-term changes in behavior, falling within the MMPA definition of "Level B harassment." Mitigation measures, such as controlled vessel speed and dedicated marine mammal observers, will ensure that takes are within the level being analyzed. In all cases, the effects are expected to be short-term, with no lasting biological consequence.

Of the 13 marine mammal species likely to occur in the proposed cable-laying area, bowhead, humpback, fin whales, ringed and bearded seals, and Steller sea lion are listed as endangered or threatened under the ESA. These species are also designated as "depleted" under the MMPA. However, the levels of potential impacts to these species are expected to be minor and brief in the form of short-term changes in behavior, as with other species discussed above. The behavioral disturbances caused by exposure to elevated noise levels from cable-laying and maintenance activities are not expected to affect the population level of these species. None of the other species that may occur in the project area are listed as threatened or endangered under the ESA or designated as depleted under the MMPA.

The project area of the Quintillion's proposed activities is within areas that have been identified as biologically important areas (BIAs) for feeding for the gray and bowhead whales and for reproduction for gray whale during the summer and fall months (Clarke *et al.,* 2015). In addition, the coastal Beaufort Sea also serves as a migratory corridor during bowhead whale spring migration, as well as for their feeding and breeding activities. Additionally, the coastal area of Chukchi and Beaufort seas also serve as BIAs for beluga whales for their feeding and migration. However, the Quintillion's proposed cable-laying and O&M operations would briefly transit through the area in a slow speed (600 meters per hour). As discussed earlier, the Level B behavioral harassment on marine mammals from the proposed activity is expected to be brief startling reaction and temporary vacating of the area. There are no long-term or biologically significant impacts to marine mammals expected from the proposed subsea cable-laying activity.

In summary and as described above, the following factors primarily support our determination that the impacts resulting from this activity are not expected to adversely affect the species or stock through effects on annual rates of recruitment or survival:

- No mortality is anticipated or authorized;
- No injury or hearing impairment is anticipated or authorized;
- Only Level B behavioral disturbances by exposed marine mammals are likely;
- The levels and duration of marine mammals exposure to noises are low and brief; and
- Only a small fraction of marine mammal populations is expected to be affected.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the prescribed monitoring and mitigation measures, NMFS finds that the total marine mammal take

from the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under section 101(a)(5)(D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

The requested takes represent less than 5.07 percent of all populations or stocks potentially impacted (see Table 6 in this document). These take estimates represent the percentage of each species or stock that could be taken by Level B behavioral harassment. The numbers of marine mammals estimated to be taken are small proportions of the total populations of the affected species or stocks.

Based on the analysis contained herein of the proposed activity (including the prescribed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

In order to issue an IHA, NMFS must find that the specified activity will not have an "unmitigable adverse impact" on the subsistence uses of the affected marine mammal species or stocks by Alaskan Natives. NMFS has defined "unmitigable adverse impact" in 50 CFR 216.103

as: "an impact resulting from the specified activity: (1) That is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by: (i) Causing the marine mammals to abandon or avoid hunting areas; (ii) Directly displacing subsistence users; or (iii) Placing physical barriers between the marine mammals and the subsistence hunters; and (2) That cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

As discussed earlier in this document, Quintillion worked with the cable-landing communities, tribal/subsistence organizations, and co-management groups to develop mutually agreed monitoring and mitigation measures. These measures rely strongly on effective communication between operations and communities to ensure that Quintillion's proposed subsea cable-laying and O&M operations will not have unmitigable adverse impact to subsistence use of marine mammals in the affected areas. In addition, the issued IHA requires Quintillion to implement time and area limitations and vessel speed restrictions when passing through certain subsistence areas and/or encountering bowhead whales.

Based on the description of the specified activity, the measures described to minimize adverse effects on the availability of marine mammals for subsistence purposes, and the prescribed mitigation and monitoring measures, NMFS has determined that there will not be an unmitigable adverse impact on subsistence uses from Quintillion's proposed activities.

Endangered Species Act (ESA)

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq*.) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance

for the issuance of IHAs, NMFS consults internally, in this case with the NMFS Alaska Region Protected Resources Division Office, whenever we propose to authorize take for endangered or threatened species.

Within the project area, the bowhead, humpback, and fin whales are listed as endangered and the ringed and bearded seals and Steller sea lion are listed as threatened under the ESA. NMFS' Permits and Conservation Division has initiated consultation with staff in NMFS' Alaska Region Protected Resources Division under section 7 of the ESA on the issuance of an IHA to Quintillion under section 101(a)(5)(D) of the MMPA for this activity. In June 2017, NMFS finished conducting its section 7 consultation and issued a Biological Opinion concluding that the issuance of the IHA associated with Quintillion's subsea cable-laying and maintenance work in the Bering, Chukchi, and Beaufort seas during the 2017 open-water season is not likely to jeopardize the continued existence of the endangered bowhead, humpback, and fin whales, and Steller sea lion. No critical habitat has been designated for these species, therefore none will be affected.

Authorization

As a result of these determinations, NMFS has issued an IHA to Quintillion for the take of marine mammals, by Level B harassment, incidental to conducting subsea cable-laying operations and maintenance work in the Bering, Chukchi, and Beaufort seas during the 2017 open-water season, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: August 10, 2017.

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Donna S. Wieting,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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