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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XE442

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Subsea Cable-laying Operations in the Bering, Chukchi, and Beaufort Seas

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 12 species of marine mammals incidental to a subsea cable-laying operation in the state and federal waters of the Bering, Chukchi, and Beaufort seas, Alaska, during the open-water season of 2016.

DATES: This authorization is effective from June 1, 2016 through October 31, 2016

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 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."

Section 101(a)(5)(D) of the MMPA established an expedited process by which citizens of the United States can apply for an authorization to incidentally take small numbers of marine mammals by harassment. Section 101(a)(5)(D) of the MMPA establishes a 45-day time limit for NMFS's review of an application followed by a 30-day public notice and comment period on any proposed authorizations for the incidental harassment of small numbers of marine mammals. Within 45 days of the close of the public comment period, NMFS must either issue or deny the authorization.

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].

Summary of Request

On October 29, 2015, NMFS received an IHA application and marine mammal mitigation and monitoring plan (4MP) from Quintillion for the taking of marine mammals incidental to conducting subsea cable-laying activities in the U.S. Bering, Chukchi, and Beaufort seas. After receiving NMFS' comments on the initial application, Quintillion made revisions and updated its IHA application and 4MP on February 3, 2016. NMFS determined that the application and the 4MP were adequate and complete on February 5, 2016. NMFS published a notice on March 30, 2016 (81 FR 17666) making preliminary determinations and proposing to issue an IHA. The notice initiated a 30-day comment period.

Quintillion proposed to install a subsea fiber optic network cable along the northern and western coasts of Alaska in the U.S. Bering, Chukchi, and Beaufort seas during the 2016 Arctic open-water season. The activity would occur between June 1 and October 31, 2016. Noise generated from the cable vessel's dynamic positioning thruster could impact marine mammals in the vicinity of the activities. Take, by Level B harassments, of individuals of 12 species of marine mammals from the specified activity is authorized by the IHA.

Description of the Specified Activity

A detailed description of Quintillion's subsea cable-laying program is provided in the **Federal Register** notice for the proposed IHA (81 FR 17666; March 30, 2016). Since that time, no changes have been made to the proposed construction activities. Therefore, a detailed description is not provided here. Please refer to that **Federal Register** notice for the description of the specific activity

Comments and Responses

A notice of NMFS' proposal to issue an IHA to Quintillion was published in the **Federal Register** on March 30, 2016 (81 FR 17666). 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 comments from the Marine Mammal Commission (Commission) and the North Slope Borough (NSB). Specific comments and responses are provided below.

Comment 1: The Commission recommends that NMFS issue the requested incidental harassment authorization, subject to inclusion of the proposed mitigation, monitoring, and reporting measures.

Response: NMFS concurs with the Commission's recommendation and has included the mitigation, monitoring, and reporting measures contained in the proposed authorization in the issued IHA.

Comment 2: The NSB requests Quintillion continue coordination with the Alaska Eskimo Whaling Commission (AEWC), and its member communities, and other Alaska Native marine mammal user groups as appropriate, and participation in the well-established and effective Conflict Avoidance Agreement (CAA) process.

Response: Quintillion has worked closely with AEWC, the co-management groups, and the villages to develop a Plan of Cooperation (POC) that recognizes the time and place of subsistence use and provides an effective plan for avoiding active subsistence areas. Quintillion stated that it has discussed the potential for a CAA with the AEWC and that they agreed it is not necessary for Quintillion to sign a CAA for its subsea cable-laying project; therefore, Quintillion is not signing a CAA. NMFS has conducted a thorough analysis of the potential impact on

subsistence activities from Quintillion's proposed subsea cable-laying operations and determined that the proposed project would not have unmitigable impacts to subsistence use of marine mammals in the vicinity of the project area, given that Quintillion is required to implement a number of mitigation and monitoring measures (see "Impacts on Availability of Affected Species for Taking for Subsistence Use" section below for details). In addition, Quintillion has prepared a POC, which includes detailed maps showing scheduled cable-laying activity relative to seasonal subsistence use. Quintillion states that these maps have been reviewed and the schedule is supported by AEWC. NMFS has reviewed the POC and believes it contains all necessary information for us to make the above determination.

Comment 3: The NSB requests Quintillion to communicate with all villages near its operations to make sure its activities do not disrupt subsistence activities, and to ensure the life, health and safety of Borough residents who may be out on the ocean.

Response: As stated earlier in *Response to Comment 2*, the POC provided by Quintillion contains all necessary information for us to make a determination that Quintillion's proposed subsea cable-laying activity would not have an unmitigable impact to subsistence use of marine mammal resources in the vicinity of the project area. This POC also includes the daily communication plan that Quintillion will be implementing. Further, Quintillion stated it is donating to AEWC and landing villages memberships to Marine Exchange Alaska, which will allow real-time tracking of Quintillion vessels during its subsea cable-laying operations.

Comment 4: The NSB requests Quintillion conduct a robust visual and acoustical monitoring program with input from subsistence hunters and the Borough's Department of Wildlife Management.

Response: For the issuance of the IHA to Quintillion, NMFS worked with the applicant, NMFS' biologists in the Alaska Region and Alaska Fisheries Science Center, and an independent peer-review panel to ensure that robust visual and acoustical monitoring programs are in place to provide adequate monitoring measures during Quintillion's subsea cable-laying operations in the Arctic. For visual monitoring, Quintillion is required to place both Inupiat and non-native Protected Species Observers (PSO) on three cable-laying vessels to conduct visual monitoring throughout the entire project during the daylight period, including all vessel transits. Quintillion is also required to provide substantial financial support to two existing passive acoustical monitoring (PAM) programs that will be monitoring both marine mammals and vessel noise in the cable-laying project area. These include supporting the National Marine Mammal Laboratory's (NMML) PAM program in the northern Chukchi and western Beaufort Seas, and the Kotzebue Sound PAM in the southern Chukchi Sea. Support of these active programs, in lieu of a separate and unproven PAM program, was recommended by Dr. Robert Suydam with the NSB Department of Wildlife Management during the monitoring plan independent peer-review process. This approach was additionally supported by Dr. Manuel Castellote with NMML, who would also be the acoustical liaison for both PAM projects and would help to ensure the PAM projects provide the necessary information on marine mammal vocalizations and ship underwater sound needed for the 90-day report.

Description of Marine Mammals in the Area of the Specified Activity

The Bering, Chukchi, and Beaufort seas support a diverse assemblage of marine mammals. Table 1 lists the 12 marine mammal species under NMFS jurisdiction with confirmed or possible occurrence in the proposed project area.

Table 1. Marine mammal species with confirmed or possible occurrence in the proposed

action area.

Common Name	Scientific Name	Status	Occurrence	Seasonality	Range	Abundance
Odontocetes Beluga whale (Beaufort Sea stock)	*Delphinapterus leucas*	-	Common	Mostly spring and fall with some in summer	Mostly Beaufort Sea	39,258
Beluga whale (eastern Chukchi Sea stock)		-	Common	Mostly spring and fall with some in summer	Mostly Chukchi Sea	3,710
Beluga whale (eastern Bering Sea stock)		-	Common	Year round	Bering Sea	19,186
Killer whale (Alaska resident stock)	*Orcinus orca*	-	Occasional/ Extralimital	Mostly summer and early fall	California to Alaska	2,347
Harbor porpoise (Bering Sea stock)	*Phocoena phocoena*	-	Occasional/ Extralimital	Mostly summer and early fall	California to Alaska	48,215
Mysticetes *Bowhead whale (W. Arctic stock)	*Balaena mysticetus*	Endangered; Depleted	Common	Mostly spring and fall with some in summer	Russia to Canada	19,534
Gray whale (E. North Pacific stock)	*Eschrichtius robustus*	-	Somewhat common	Mostly summer	Mexico to the U.S. Arctic Ocean	20,990
*Fin whale (N. East Pacific)	*Balaenoptera physalus*	Endangered; Depleted	Rare	Mostly summer	N.E Pacific Ocean	1,650
Minke whale	*Balaenoptera acutorostrata*	-	Rare	Mostly summer	N.E. Pacific Ocean	810
*Humpback whale (Central North Pacific stock)	*Megaptera novaeangliae*	Endangered; Depleted	Rare	Mostly summer	North Pacific Ocean	10,103
*Humpback whale (western North Pacific stock)		Endangered; Depleted	Rare	Mostly summer	North Pacific Ocean	1,107
Pinnipeds Bearded seal (Alaska stock)	*Erigathus barbatus*	-	Common	Spring and summer	Bering, Chukchi, and Beaufort Seas	155,000
Ringed seal (Alaska stock)	*Phoca hispida*	-	Common	Year round	Bering, Chukchi, and Beaufort Seas	249,000

Spotted seal (Alaska stock)	*Phoca largha*	-	Common	Summer	Japan to U.S. Arctic Ocean	460,268
Ribbon seal (Alaska stock)	*Histriophoca fasciata*	-	Occasional	Summer	Russia to U.S. Arctic Ocean	49,000

*Endangered, threatened, or species of concern under the Endangered Species Act (ESA); Depleted under the MMPA

Among these species, bowhead, humpback, and fin whales are listed as endangered species under the Endangered Species Act (ESA). In addition, walrus and polar bear could also occur in the Bering, Chukchi, and Beaufort seas; however, these species are managed by the U.S. Fish and Wildlife Service (USFWS) and are not considered in this Notice of Issuance of an IHA.

Of all these species, bowhead and beluga whales and ringed, bearded, and spotted seals are the species most frequently sighted in the proposed activity area. The proposed action area in the Bering, Chukchi, and Beaufort seas also includes areas that have been identified as important for bowhead whale reproduction during summer and fall and for beluga whale feeding and reproduction in summer.

Most bowheads migrate in the fall through the Alaskan Beaufort Sea in water depths between 15 and 200 m (50 and 656 ft) deep (Miller *et al*. 2002), with annual variability depending on ice conditions. Hauser *et al*. (2008) conducted surveys for bowhead whales near the Colville River Delta (near Oliktok Point) during August and September 2008, and found most bowheads between 25 and 30 km (15.5 and 18.6 mi) north of the barrier islands (Jones Islands), with the nearest in 18 m (60 ft) of water about 25 km (16 mi) north of the Colville River Delta. No bowheads were observed inside the 18-m (60-ft) isobath. Most of the cable-lay activity planned for the Beaufort Sea will occur in water deeper than 15 m (50 ft), where migrating bowhead whales could most likely be encountered.

Three stocks of beluga whale inhabit the waters where cable-lay is planned to occur:

Beaufort Sea, Eastern Chukchi Sea, and Eastern Bering Sea (O'Corry-Crowe *et al*. 1997). All three stocks winter in the open leads and polynyas of the Bering Sea (Hazard 1988). In spring, the Beaufort Sea stock migrates through coastal leads more than 2,000 km (1,200 mi) to their summering grounds in the Mackenzie River delta where they molt, feed, and calve in the warmer estuarine waters (Braham *et al*. 1977). In late summer, these belugas move into offshore northern waters to feed (Davis and Evans 1982, Harwood *et al*. 1996, Richard *et al*. 2001). In the fall, they begin their migration back to their wintering grounds generally following an offshore route as they pass through the western Beaufort Sea (Richard *et al*. 2001).

The Beaufort Sea stock beluga whales take a more coastal route during their fall migration, but compared to the vanguard of population and the survey effort expended, nearshore travel appears to be relatively rare. Most belugas recorded during aerial surveys conducted in the Alaskan Beaufort Sea in the last two decades were found more than 65 km (40 mi) from shore (Miller *et al*. 1999, Funk *et al*. 2008, Christie *et al*. 2010, Clarke and Ferguson 2010, Brandon *et al*. 2011). For the most part, beluga whales from this stock are expected to occur well north of the proposed cable route through the Beaufort Sea at the time of cable-lay activity.

The Eastern Chukchi Sea beluga whale stock summers in Kotzebue Sound and Kasegaluk Lagoon where they breed and molt, and then in late summer and fall they also move in the Beaufort Sea (Suydam *et al*. 2005). Suydam *et al*. (2005) satellite-tagged 23 beluga whales in Kasegaluk Lagoon and found nearly all the whales move into the deeper waters of the Beaufort Sea post-tagging. However, virtually none of the whales were found in continental shelf waters (<200 m deep) of the Beaufort Sea, and all were in waters at least 65 km (40 mi) north of the northern Alaska coastline. The most recent stock estimate is 3,710 animals (Allen and Angliss 2015). The planned cable-lay activity is most likely to encounter this stock while laying the

Kotzebue and Wainwright branch lines, but the routes do avoid the Kasegaluk Lagoon breeding and molting area.

There is little information on movements of the East Bering Sea stock of beluga whales, although two whales that were satellite-tagged in 2012 near Nome wintered in Bristol Bay (Allen and Angliss 2015). Whales from this stock might be encountered while laying the Nome branch line.

In addition, a few gray whales are expected to be encountered along the main trunk line route through the north Bering and Chukchi seas. However, they are expected to be commonly observed along the nearshore segments of the branch lines, especially the Wainwright branch, where they are commonly found in large feeding groups.

Three of the ice seal species – ringed, bearded, and spotted seals – are fairly common in the proposed subsea cable-laying areas. However, there are no pinnipeds haulouts in the vicinity of the action area.

Fin whale, minke whale, and ribbon seal are not common in the vicinity of the project area, though they could occur occasionally.

Further information on the biology and local distribution of these species can be found in Quintillion's application (see **ADDRESSES**) and the NMFS Marine Mammal Stock Assessment Reports, which are available online at: *http://www.nmfs.noaa.gov/pr/sars/species.html*.

Potential Effects of the Specified Activity on Marine Mammals

The effects of the stressors associated with the specified activity (e.g., acoustic effects of operation of dynamic thrusters) have the potential to result in harassment of marine mammals. The **Federal Register** notice for the proposed IHA (81 FR 17666, March 30, 2016) included a discussion of the effects of acoustic stimuli on marine mammals. Therefore, that information is

not repeated here. No instances of injury, serious injury, or mortality (Level A take) are expected as a result of the subsea cable-laying operation activities, nor are any Level A take authorized by this IHA.

Anticipated Effects on Marine Mammal Habitat

Project activities that could potentially impact marine mammal habitats include acoustical impacts to prey resources from thruster noise and impacts associated with laying cable on sea bottom. Regarding the former, however, acoustical injury from thruster noise is unlikely. Previous noise studies (e.g., Greenlaw *et al*. 1988, 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 decibels (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, United Kingdom, 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 ploughs or jets to cut trenches in the sea floor sediment. Cable ploughs 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. The plough 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 plough blade, plough skid, or remote operating vehicle (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 2 to 3 m (7-10 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 its source. Suspended sand particles generally settle within about 20 m (66 ft). BERR (2008) 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 plough operations rated the lowest at 1, with jetting rating from 2 to 4, depending on substrate. Dredging rated the highest (6) relative sediment disturbance.

The maximum amount of trenching possible is about 1,900 km (1,180 mi), but the width of primary effect is only about 3 m (10 ft). Thus, the maximum impact footprint is less than 6 km^2 (2.3 mi^2), an insignificantly small area given the Chukchi Sea area alone is 595,000 km^2 (230,000 mi^2). Overall, cable-laying effects to marine mammal habitat and prey resources are considered not significant.

Mitigation Measures

In order to issue an incidental take authorization 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 adverse 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.

The primary purpose of these mitigation measures is to detect marine mammals and avoid vessel interactions during the pre- and post-cable-laying 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) Establishing Zone of Influence (ZOI)

A PSO would establish a ZOI where the received level is 120 dB during Qunitillion's subsea cable-laying operation and conduct marine mammal monitoring during the operation.

(b) 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), 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 Conclusions

NMFS has carefully evaluated prescribed mitigation measures for Quintillion's planned subsea cable-laying project and considered a range of other measures in the context of ensuring that NMFS prescribes the means of effecting the least practicable impact on the affected marine mammal species and stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to one another:

- The manner in which, and the degree to which, the successful implementation of the measures are expected to minimize adverse impacts to marine mammals;
- The proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and
- The practicability of the measure for applicant implementation.

Any mitigation measure(s) prescribed by NMFS should be able to accomplish, have a reasonable likelihood of accomplishing (based on current science), or contribute to the accomplishment of one or more of the general goals listed below:

1. Avoidance or minimization of injury or death of marine mammals wherever possible (goals 2, 3, and 4 may contribute to this goal);

2. A reduction in the numbers of marine mammals (total number or number at biologically important time or location) exposed to received levels of activities expected to result in the take of marine mammals (this goal may contribute to 1, above, or to reducing harassment

takes only);

3. A reduction in the number of times (total number or number at biologically important time or location) individuals would be exposed to received levels of activities expected to result in the take of marine mammals (this goal may contribute to 1, above, or to reducing harassment takes only);

4. A reduction in the intensity of exposures (either total number or number at biologically important time or location) to received levels of activities expected to result in the take of marine mammals (this goal may contribute to 1, above, or to reducing the severity of harassment takes only);

5. Avoidance or minimization of adverse effects to marine mammal habitat, paying special attention to the food base, activities that block or limit passage to or from biologically important areas, permanent destruction of habitat, or temporary destruction/disturbance of habitat during a biologically important time; and

6. For monitoring directly related to mitigation – an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

Based on our evaluation of the applicant's planned measures, as well as other measures considered by NMFS, NMFS has determined that the prescribed mitigation measures provide the means of effecting the least practicable impact on marine mammals species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance. Prescribed measures to ensure availability of such species or stocks for taking for certain subsistence uses are discussed later in this document (see "**Impact on Availability of Affected Species or Stock for Taking for Subsistence Uses**" section).

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 IHAs 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. Quintillion submitted a marine mammal monitoring plan as part of the IHA application. The plan has not been modified or supplemented based on comments or new information received from the public during the public comment period or from the peer review panel (see the "*Monitoring Plan Peer Review*" section later in this document).

Monitoring measures prescribed by NMFS should accomplish one or more of the following general goals:

1. An increase in our understanding of the likely occurrence of marine mammal species in the vicinity of the action, i.e., presence, abundance, distribution, and/or density of species;

2. An increase in our understanding of the nature, scope, or context of the likely exposure of marine mammal species to any of the potential stressor(s) associated with the action (e.g. sound or visual stimuli), through better understanding of one or more of the following: the action itself and its environment (e.g. sound source characterization, propagation, and ambient noise levels); the affected species (e.g. life history or dive pattern); the likely co-occurrence of marine mammal species with the action (in whole or part) associated with specific adverse effects; and/or the likely biological or behavioral context of exposure to the stressor for the marine mammal (e.g. age class of exposed animals or known pupping, calving or feeding areas);

3. An increase in our understanding of how individual marine mammals respond

(behaviorally or physiologically) to the specific stressors associated with the action (in specific contexts, where possible, e.g., at what distance or received level);

4. An increase in our understanding of how anticipated individual responses, to individual stressors or anticipated combinations of stressors, may impact either: the long-term fitness and survival of an individual; or the population, species, or stock (e.g. through effects on annual rates of recruitment or survival);

5. An increase in our understanding of how the activity affects marine mammal habitat, such as through effects on prey sources or acoustic habitat (e.g., through characterization of longer-term contributions of multiple sound sources to rising ambient noise levels and assessment of the potential chronic effects on marine mammals);

6. An increase in understanding of the impacts of the activity on marine mammals in combination with the impacts of other anthropogenic activities or natural factors occurring in the region;

7. An increase in our understanding of the effectiveness of mitigation and monitoring measures; and

8. An increase in the probability of detecting marine mammals (through improved technology or methodology), both specifically within the safety zone (thus allowing for more effective implementation of the mitigation) and in general, to better achieve the above goals.

Monitoring Measures

Monitoring will provide information on the numbers of marine mammals affected by the subsea cable-laying 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 2016 by conducting vessel-based monitoring and passive acoustic

monitoring to document marine mammal presence and distribution in the vicinity of the operation area.

Visual monitoring by PSOs during subsea cable-laying 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 PSOs

Vessel-based monitoring for marine mammals would be done by trained PSOs throughout the period of subsea cable-laying operation. The observers will monitor the occurrence of marine mammals near the cable-laying vessel during all daylight periods during operation. PSO duties include watching for and identifying marine mammals; recording their numbers, distances, and reactions to the survey operations; and documenting "take by harassment."

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 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 would 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 a NMFS-approved observer training course designed to familiarize individuals with monitoring and data collection procedures.

(2) 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.

Acoustic Monitoring

(1) Sound Source Measurements

Quintillion will conduct a sound source verification (SSV) on one of the cable-lay ships and the anchor-handling tugs when both are operating near Nome (early in the season).

(2) Passive Acoustic Monitoring

After consulting with NMFS’ Office of Protected Resources, the National Marine Mammal Laboratory (NMML), and the North Slope Borough Department of Wildlife, Quintillion will contribute to the 2016 joint Arctic Whale Ecology Study (ARCWEST)/Chukchi Acoustics, Oceanography, and Zooplankton Study-extension (CHAOZ-X).

The summer minimum extent of sea ice in the northern Bering Sea, Chukchi Sea, and western Beaufort Sea has diminished by more than 50*percent* over the past two decades. This loss of ice has sparked concerns for long-term survival of ice-dependent species like polar bears, Pacific walrus, bearded seals, and ringed seals. In contrast, populations of some Arctic species such has bowhead and gray whales have increased in abundance, while subarctic species such as humpback, fin, and minke whales have expanded their ranges into the Arctic in response to warmer water and increased zooplankton production. The joint ARCWEST/CHAOZ-X program has been monitoring climate change and anthropogenic activity in the Arctic waters of Alaska since 2010 by tracking satellite-tagged animals, sampling lower trophic levels and physical oceanography, and passively acoustically monitoring marine mammal and vessel activity. The current mooring locations for the PAM portion of the joint program align closely with the proposed Quintillion cable-lay route. Operating passive acoustic recorders at these locations in

2016 would not only provide information on the distribution and composition of the marine mammal community along the proposed cable-lay route at the time cable-lay activities would be occurring, but they could also record the contribution of the cable-lay activity on the local acoustical environment where the route passes close to these stations.

Reporting Measures

(1) Sound Source Verification Report

A report on the preliminary results of the sound source verification measurements, including the measured source level, shall be submitted within 14 days after collection of those measurements at the start of the field season. This report will specify the distances of the ZOI that were adopted for the survey.

(2) Technical Report (90-day Report)

A draft report will be submitted to the Director, Office of Protected Resources, NMFS, within 90 days after the end of Quintillion's subsea cable-laying operation 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.

The draft report shall be subject to review and comment by NMFS. Any recommendations made by NMFS must be addressed in the final 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.

(3) 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 Chief of 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 Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS Alaska Stranding Hotline and/or by email to the Alaska Regional Stranding Coordinators. 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 Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS Alaska Stranding Hotline and/or by email to the Alaska Regional Stranding Coordinators, 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 operation in the Bering, Chukchi, and Beaufort seas. The panel met via web conference in early March 2016, and provided comments to NMFS in April 2016.

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) Additional PAM recorders be deployed closer to shore, if possible. This would allow for monitoring of sounds generated by nearshore cable-laying barges, as well as for detection of

marine mammals. The panel identified waters near Kotzebue as a high priority for additional acoustic monitoring due to the presence of marine mammals sensitive to acoustic disturbance, such as beluga whales and bearded seals, and the reliance on those species for subsistence purposes;

(2) Quintillion contributes funding to assist in the analysis of existing data from passive acoustic monitors deployed in 2013-2015 near Kotzebue. These data could serve as a baseline for noise levels and marine mammal distribution and vocalization rates during years in which cable-laying activities were not operating. Given financial constraints, the Panel recommends funding analyses of these additional PAM data at the expense of Quintillion's proposed plan for PSOs to visually monitor for marine mammals;

(3) If possible, PSOs be deployed on shallow-water barges. If accommodations are limited, PSOs could be deployed on a daily basis. If PSOs cannot be deployed, the panel recommends that crew members receive PSO training;

(4) Infra-red systems have improved considerably and should be considered as an additional monitoring tool for operations at night or in low visibility conditions;

(5) If subsea cable-laying operations are not completed by mid-September in the Beaufort Sea, Quintillion should have a contingency plan for monitoring potential impacts to marine mammals, generally, and bowheads specifically. Because of the sensitivity of bowheads to anthropogenic sounds and the importance of the western Beaufort Sea as a feeding area, the monitoring plan should include methods for monitoring "over-the-horizon." This plan might include aerial surveys, scout vessels with PSOs, or some other method. The information collected during this monitoring effort, if needed, would be very helpful in developing a

mitigation and monitoring plan if Quintillion lays cable through the remainder of the Beaufort Sea in the future;

(6) Quintillion should also have an appropriate communication plan in place to avoid impacting fall hunts of bowhead whales in the Beaufort (Kaktovik, Nuiqsut, and Barrow) and Chukchi seas (Barrow, Wainwright, and Point Lay), as much as possible; and

(7) Quintillion should also ensure all sources of noise are included in SSV measurements and in its description of anticipated source levels (not just thrusters but winches under tension, plough hydraulics, active transducers, jetting, etc.). The ROV includes two jets, and it would be useful to get SSV measurements of the ROVs also.

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) Conducting additional PAM in nearshore waters near Kotzebue;

(2) Contributing an additional $20,000 funding to assist in the analysis of existing data from passive acoustic monitors deployed in 2013-2015 near Kotzebue;

(3) Using infra-red systems for marine mammal monitoring at night or in low visibility conditions;

(4) Quintillion is required to have an appropriate communication plan in place to avoid impacting fall hunts of bowhead whales in the Beaufort (Kaktovik, Nuiqsut, and Barrow) and Chukchi seas (Barrow, Wainwright, and Point Lay), as much as possible. The communication plan is part of the POC that Quintillion submitted to NMFS; and

(5) Conducting SSV measurements on all noise sources, including noise from the cable ship during plowing operations, and noise from the nearshore barge during winching, anchor-handling, and ROV operations.

However, in discussions with Quintillion, NMFS determined that the following recommendations from the peer-review panel cannot be implemented.

(1) It is not possible to deploy PSOs on the shallow water barge, and training crew members is unrealistic. Quintillion states that the shallow water barge is a small, flat barge with a deck, only a few feet off the water surface, and two modules to house offices and berths. Deck space is small and dangerous, and there is no elevated platform to monitor from. Crew members will be working on the deck at their normal jobs, and will have no time to watch for marine mammals.

(2) Quintillion has worked closely with AEWC and other subsistence groups to develop a POC that allows Quintillion to complete their program in 2016, while minimizing impacts to subsistence use. However, if Quintillion cannot complete the work by mid-September in the Beaufort Sea, Quintillion states that it could not afford to conduct aerial surveys and/or use scout vessels for additional monitoring. Furthermore, as stated earlier in *Response to Comment 4*, NMFS believes that Quintillion's visual and acoustic monitoring plans are robust for its proposed subsea cable-laying activity. Therefore, additional monitoring utilizing aerial surveys and/or scout vessels is not warranted.

Estimated Take by Incidental Harassment

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].

Takes by Level B harassments of some species are anticipated as a result of Quintillion's proposed subsea cable-laying operation. NMFS expects marine mammal takes could result from noise propagation from dynamic position thrusters during cable-laying operation. NMFS does not expect marine mammals would be taken by collision with cable and support vessels, because the vessels will be moving at low speeds, and PSOs on the vessels will be monitoring for marine mammals and will be able to alert the vessels to avoid any marine mammals in the area.

For non-impulse sounds, such as those produced by the dynamic positioning thrusters during Quintillion's subsea cable-laying operation, NMFS uses the 180 and 190 dB (rms) re 1 μPa isopleth to indicate the onset of Level A harassment for cetaceans and pinnipeds, respectively; and the 120 dB (rms) re 1 μPa isopleth for Level B harassment of all marine mammals. Quintillion provided calculations of the 120-dB isopleths expected to be produced by the dynamic positioning thrusters during the proposed cable-laying operation to estimate takes by harassment. NMFS used those calculations to make the necessary MMPA findings. Quintillion provided a full description of the methodology used to estimate takes by harassment in its IHA application, which is also provided in the following sections. There is no 180 or 190-dB zone from the planned activities.

Noise Sources

The planned cable-laying activity is expected to generate underwater noises from several sources, including thrusters, plows, jets, ROVs, echo sounders, and positioning beacons. The predominant noise source and the only underwater noise that is likely to result in take of marine

mammals during cable-laying operations is the cavitating noise produced by the thrusters during dynamic positioning of the vessel (Tetra Tech 2014). Cavitation is random collapsing of bubbles produced by the blades. The vessel of Quintillion's contractor Alcatel-Lucent Submarine Networks, the *C/S Ile de Brehat*, maintains dynamic positioning during cable-laying operations by using two 1,500 kW bow thrusters, two 1,500 kW aft thrusters, and one 1,500 kW fore thruster. Sound source measurements have not been conducted specific to the *C/S Ile de Brehat*, but other acoustical studies have shown thruster noise measurements ranging between 171 and 180 dB re 1 μPa (rms) at 1 m (Nedwell *et al*. 2003, MacGillivary 2006, Samsung 2009, Hartin *et al*. 2011, Deepwater Wind 2013, Tetra Tech 2014).

Various acoustical investigations in the Atlantic Ocean have modeled distances to the 120-dB isopleth, with results ranging between 1.4 and 3.575 km (Samsung 2009, Deepwater Wind 2013, Tetra Tech 2014) for water depths similar to where Quintillion would be operating in the Arctic Ocean. However, all these ranges were based on conservative modeling that included maximum parameters and worst-case assumptions.

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 *C/S Ile de Brehat* (1,500 kW). Measured dominant frequencies were 110 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 the same water body where Quintillion's cable-laying operation would occur, as opposed to a conservatively modeled value from the Atlantic Ocean, it is the value used in calculating marine mammal exposure estimates. Sound source levels from the *Fugro Synergy* during dynamic positioning did not exceed 180 dB, thus there are no Level A harassment or injury concerns.

Acoustic Footprint

The acoustical footprint (total ensonified area) was determined by assuming that dynamic position would occur along all trunk and branch lines within the proposed fiber optics cable network, regardless of the cable-lay vessel used. The sum total of submerged cable length is 1,902.7 km (1,182.3 mi). Assuming that the radius to the 120-dB isopleth is 2.3 km (1.4 mi) (Hartin *et al*. 2011), then the total ensonified area represents a swath that is 1,902.7 km (1,182.3 mi) in length and 4.6 km (2.8 mi) in width (2 x 2.3 km) or 8,752.4 km^2 (3,379.3 mi^2). The Nome branch (194.7 km [121.0 mi]) and 87.1 km (54.1 mi) of the trunk line between branch unite (BU) Nome and BU Kotzebue fall within the Bering Sea. The combined length of those is 281.8 km (175.1 mi) and the total ensonified area is 1,296.3 km^2 (500.5 mi^2). The Oliktok branch (73.9 km [45.9 mi]) and 254.1 km (157.9 mi) of the trunk line between Barrow and Oliktok are found in the Beaufort Sea. Here the combined length is 328 km (203.8 mi) and total ensonified area is 1,508.8 km^2 (582.6 mi^2). The remaining area 5,947.3 km^2 (2,296.3 mi^2) falls within the Chukchi Sea.

Marine Mammal Densities

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 2014 Aerial Surveys of Arctic Marine Mammals (ASAMM) program (Clarke *et al*. 2012, 2013, 2014, 2015). The planned cable routes cross ASAMM survey blocks 2, 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 the 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 are 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), while spotted and bearded seal densities in the Beaufort Sea were developed by assuming both represented 5 percent of ringed seal densities. 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 2 (Chukchi/Bering) and Table 3 (Beaufort) below. The specific parameters used in deriving these estimates are provided in the discussions that follow.

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

Species	Summer	Fall
Bowhead Whale	0.0025	0.0438
Gray Whale	0.0680	0.0230
Beluga Whale	0.0894	0.0632
Harbor Porpoise	0.0022	0.0022
Ringed Seal	0.0846	0.0507
Spotted Seal	0.0423	0.0253
Bearded Seal	0.0630	0.0440

Table 3. Marine mammal densities (#/km^2) in the Beaufort Sea.

Species	Summer	Fall
Bowhead Whale	0.0444	0.0742
Gray Whale	0.0179	0.0524
Beluga Whale	0.0021	0.0142
Ringed Seal	0.3547	0.2510
Spotted Seal	0.0177	0.0125
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 Sea during the 2011 to 2014 ASAMM program (Clarke *et al*. 2012, 2013, 2014, 2015). 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, which 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 this point. During these four years, 87 bowhead whales were recorded in the three Beaufort Sea blocks during 12,161 km (7,556mi) of summer survey effort (0.0072/km), and 201 whales during 16,829 km (10,457mi) of fall effort (0.0019/km). In the five Chukchi Sea survey blocks, 11 bowheads were recorded during 27,183 km (16,891 mi) of summer effort (0.0004/km), and 160 during 22,678 km (14,091 mi) of fall survey (0.0071/km). Applying an effective strip half-width (ESW) of 1.15 (Ferguson and Clarke 2013), and a 0.07 correction factor (Ferguson, personal communication) for whales missed during the surveys, results in corrected densities of 0.0444 (Beaufort summer), 0.0742 (Beaufort fall), 0.0025 (Chukchi summer), and 0.0438 (Chukchi fall) whales per km^2 (Tables 2 and 3).

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, 35 gray whales were recorded in the three Beaufort Sea blocks during 12,161 km (7,557 mi) of summer survey effort (0.0029/km), and 142 gray whales during 16,829 km (10,457 mi) of fall effort (0.0084/km). In the five Chukchi Sea survey blocks, 298 gray whales were recorded during 27,183 km (16,891 mi) of summer effort (0.0084/km), and 84 during 22,678 km (14,091 mi) of fall survey (0.0037/km). Applying an effective strip half-width (ESW) of 1.15 (Ferguson

and Clarke 2013), and a correction factor of 0.07, results in corrected densities of 0.0179 (Beaufort summer), 0.0524 (Beaufort fall), 0.0680 (Chukchi summer), and 0.0230 (Chukchi fall) whales per km^2 (Tables 2 and 3).

Beluga Whale: Beluga whale density estimates were derived from the ASAMM transect data collected from 2011 to 2014 (Clarke *et al*. 2012, 2013, 2014, 2015). During the summer aerial surveys (June-August) there were 248 beluga whale observed along 3,894 km (2,420 mi) of transect in waters between 21 to 200 m (13-124 ft) deep and between longitudes 154°W and 157°W. This equates to 0.0637 whales/km of trackline and a corrected density of 0.0894 whales per km^2, assuming an ESW of 0.614 km and a 0.58 correction factor (Ferguson, personal communication). Fall density estimates (September-October) for this region were based on 192 beluga whales seen along 4,267 km (2,651 mi). This equates to 0.0449 whales/km of trackline and a corrected density of 0.0632 whales per km^2, assuming an ESW of 0.614 km and a 0.58 correction factor.

During the summer aerial surveys (June-August), there were 30 beluga whales observed along 20,240 km (12,577 mi) of transect in waters less than 36 to 50 m (22-31 ft) deep and between longitudes 157°W and 169°W. This equates to 0.0015 whales/km of trackline and a corrected density of 0.0021 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 231 beluga whales seen during 22,887 km of transect (1,794 mi). This equates to 0.0101 whales/km and a corrected density of 0.142 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 porpoise 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. Hartin *et al*.'s (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 2.

Ringed and Spotted Seals: Aerts *et al*. (2014) conducted a marine mammal monitoring program in the northeastern Chukchi Sea in association with oil & gas exploration activities between 2008 and 2013. For seal sightings that were 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. Applying this ratio to the combined densities results in species densities of 0.0846 seals/km^2 (summer) and 0.0507 seals/km^2 (fall) for ringed seals, and 0.0423 seals/km^2 (summer) and 0.0253 seals/km^2 (fall) for spotted seals. These are the densities used in the exposure calculations (Table 2) and 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 Alaskan Beaufort Sea coast, while 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 3). 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 5percent of all phocid sightings recorded by Green and Negri (2005) and Green *et al*. (2006, 2007) were spotted seals, which provide a suitable estimate of the proportion of ringed seals versus spotted seals in the Colville River Delta and Harrison Bay, both areas close to the proposed Oliktok branch line. Thus, the estimated densities of spotted seals in the cable-lay survey area were derived by multiplying the ringed seal densities from Moulton and Lawson (2002) and Kingsley (1986) by 5percent.

Spotted seals are a summer resident in the Beaufort Sea and are generally found in nearshore waters, especially in association with haulout sites at or near river mouths. Their summer density in the Beaufort Sea is a function of distance from these haul out sites. Near Oliktok Point (Hauser *et al*. 2008, Lomac-McNair *et al*. 2014) where the Oliktok cable branch will reach shore, they are more common than ringed seals, but they are very uncommon farther offshore where most of the Beaufort Sea cable-lay activity will occur. This distribution of density is taken into account in the take authorization request.

Bearded Seal: The most representative estimates of summer and fall density of bearded seals in the northern Bering and Chukchi seas come from the 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 sea cable-lay areas (Table 2).

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 (/km^2) were determined by multiplying ringed seal density from Moulton and Lawson (2002) and Kingsley (1986) by 5*percent* as was done with spotted seals.

Level B Exposure Calculations

The estimated potential harassment take of local marine mammals by Quintillion's fiber optics cable-lay project was determined by multiplying the seasonal animal densities in Tables 2 and 3 with the seasonal area that would be ensonified by thruster noise greater than 120 dB re 1 µPa (rms). The total area that would be ensonified in the Chukchi Sea is 5,947 km^2 (2,296 mi^2), and for the Bering Sea is 1,296 km^2 (500 mi^2). Since there are no marine mammal density estimates for the northern Bering Sea, the ensonified area was combined with the Chukchi Sea for a total ZOI of 7,243 km^2 (2,796 mi^2). The ensonified area for the Beaufort Sea is 1,509 km^2 (583 mi^2).

Because the cable-laying plan is to begin in the south as soon as ice conditions allow and work northward, the intention is to complete the Bering and Chukchi seas portion of the network (1,575 km, [979 mi]) during the summer (June to August), and Beaufort Sea portion (328 km [204 mi]) during the fall (September and October). Thus, summer exposure estimates apply for the Bering and Chukchi areas and the fall exposure estimates for the Beaufort (Table 4).

Table 4. The authorized number of Level B harassment exposures to marine mammals.

Species	Exposures Bering/Chukchi	Exposures Beaufort	Exposures Total
Bowhead Whale	18	112	***130***
Gray Whale	493	79	***572***
Beluga Whale	648	21	***669***
Harbor Porpoise	16	0	***16***
Ringed Seal	613	379	***992***
Spotted Seal	306	19	***325***
Bearded Seal	451	19	***470***

The estimated takes of marine mammals are based on the estimated exposures for marine mammals with known density information. For marine mammals whose estimated number of exposures were not calculated due to a lack of reasonably accurate density estimates, but for which occurrence records within the project area exist (i.e., humpback whale, fin whale, minke whale, killer whale, and ribbon seal), a small number of takes relatively based on group size and site fidelity have been requested in case they are encountered. A summary of estimated takes is provided in Table 5.

Table 5. Level B take request as percentage of stock.

Species	Stock Abundance	Level B Take Authorized	% Request Level B Take by Stock
Bowhead whale	19,534	130	0.8%
Beluga whale (Beaufort Sea stock)	39,258	669	1.7%
Beluga whale (E. Chukchi Sea stock)	3,710	669	18.0%
Beluga whale (E. Bering Sea stock)	19.186	669	3.5%
Gray whale	20,990	572	2.7%
Humpback whale (W.N. Pacific stock)	1,107	15	1.36%
Humpback whale (Cent. N. Pacific stock)	10,103	15	0.14%
Fin whale	1,652	15	0.91%
Minke whale	1,233	5	0.40%

Killer whale	2,347	5	0.21%
Harbor porpoise	48,215	16	0.03%
Ringed seal	249,000	992	0.49%
Spotted seal	460,268	325	0.07%
Bearded seal	155,000	470	0.08%
Ribbon seal	61,100	5	0.01%

The estimated Level B takes as a percentage of the marine mammal stock are less than 18*percent* in all cases (Table 5). The highest percent of population estimated to be taken is 18*percent* for Level B harassments of the East Chukchi Sea stock of beluga whale. However, that percentage assumes that all beluga whales taken are from that population. Most likely, some beluga whales would be taken from each of the three stocks, meaning fewer than 669 beluga whales would be taken from any individual stock. The Level B takes of beluga whales as a percentage of populations would likely be below 1.7, 18, and 3.5*percent* for the Beaufort Sea, East Chukchi Sea, and East Bering Sea stocks, respectively.

Analysis and Determinations

Negligible Impact

Negligible impact is "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 Level B harassment 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 behavioral harassment, NMFS must consider other factors, such as the likely nature of any

responses (their intensity, duration, etc.), the context of any responses (critical reproductive time or location, migration, etc.), as well as the number and nature of estimated Level A harassment takes, the number of estimated mortalities, effects on habitat, and the status of the species.

To avoid repetition, this introductory discussion of our analyses applies to all the species listed in Table 5, given that the anticipated effects of Quintillion's subsea cable-laying operation on marine mammals, taking into account the proposed 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 operation, and none are authorized. Additionally, animals in the area are not expected to incur hearing impairment (i.e., temporary hearing threshold shift [TTS] or permanent hearing threshold shift [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 of 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 12 marine mammal species likely to occur in the proposed cable-laying area, bowhead, humpback, and fin whales are listed as endangered under the ESA. These species are also designated as "depleted" under the MMPA. 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, Quintillion's proposed cable-laying operation would only briefly transit through the area in a slow speed (600 meters per hour). As discussed earlier, the Level B behavioral harassment of marine mammals from the proposed activity is expected to be brief startling reaction and temporary vacating of the area. There is no long-term biologically significant impact to marine mammals expected from the proposed subsea cable-laying activity.

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 proposed monitoring and mitigation measures, NMFS finds that the total marine mammal take from Quintillion's proposed subsea cable-laying operation in the Bering, Chukchi, and Beaufort seas is not expected to adversely affect the affected species or stocks through impacts on annual rates of recruitment or survival, and therefore will have a negligible impact on the affected marine mammal species or stocks.

Small Numbers

The requested takes represent less than 18 *percent* of all populations or stocks potentially impacted (see Table 5 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 likely effects of the specified activity on marine mammals and their habitat, NMFS finds that small numbers of marine mammals will be taken relative to the populations of the affected species or stocks.

Impact on Availability of Affected Species for Taking for Subsistence Uses

The planned cable-lay activities will 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 varies 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, 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, located 70 km (44 mi) east of Oliktok.

Beluga are also annually harvested by the above villages. 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 village. 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 a year (Frost and Suydam 2010).

All villages utilize 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 planned 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 laying of cable along that branch would occur in late summer or early fall, long after the bearded seal hunt is over.

Based on the planned cable-lay time table relative to the seasonal timing of the various subsistence harvests, cable-lay activities into Kotzebue (bearded seal), Wainwright (beluga whale), and around Point Barrow (bowhead whale) could overlap with important harvest periods. Quintillion will work closely with the AEWC, the Alaska Beluga Whale Committee, the Ice Seal Committee, and the North Slope Borough to minimize any effects cable-lay activities might have on subsistence harvest.

Plan of Cooperation or Measures to Minimize Impacts to Subsistence Hunts

Regulations at 50 CFR 216.104(a)(12) require IHA applicants for activities that take place in Arctic waters to provide a POC 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.

Quintillion has prepared a 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, Quintillion has contracted with Alcatel-Lucent Submarine Networks to furnish and install the cable system. Alcatel-Lucent's vessel, C/S *Ile de Brehat*, participates in the Automatic Identification System (AIS) vessel tracking system allowing the vessel to be tracked and located in real time. The accuracy and real time availability of AIS information via the web for the Bering, Chukchi, and Beaufort seas will not be fully known until the vessels are in the project area. If access to the information is limited, Quintillion will provide alternate vessel information to the public on a regular basis. Quintillion can aid and support the AIS data with additional information provided to the local search and rescue, or other source nominated during the community outreach program.

In addition, Quintillion will communicate closely with the communities of Pt. Hope, Pt. Lay, and Wainwright should activities progress far enough north in late June to mid-July when the villages are still engaged with their annual beluga whale hunt. Quintillion will also communicate closely with the communities of Wainwright, Barrow, and Nuiqsut to minimize impacts on the communities' fall bowhead whale subsistence hunts, which typically occur during late September and into October.

Prior to starting offshore activities, Quintillion will consult with Kotzebue, Point Hope, Wainwright, Barrow, and Nuiqsut as well as the North Slope Borough, the Northwest Arctic Borough, and other stakeholders such as the EWC, the AEWC, the Alaska Beluga Whale Committee (ABWC), and the Alaska Nanuuq Commission (ANC). Quintillion will also engage in consultations with additional groups on request.

A copy of the POC can be viewed on the Internet at: *http://www.nmfs.noaa.gov/pr/permits/incidental.html*.

Endangered Species Act (ESA)

Within the project area, the bowhead, humpback, and fin whales are listed as endangered under the ESA. NMFS' Permits and Conservation Division consulted 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 May 2016, 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 operations in the Bering, Chukchi, and Beaufort seas during the 2016 open-water season is not likely to jeopardize the continued existence of the endangered bowhead, humpback, and fin whales. No critical habitat has been designated for these species, therefore none will be affected.

National Environmental Policy Act (NEPA)

NMFS prepared an Environmental Assessment (EA) that includes an analysis of potential environmental effects associated with NMFS' issuance of an IHA to Quintillion to take marine mammals incidental to conducting subsea cable-laying operations in the Bering, Chukchi, and Beaufort seas. The draft EA was available to the public for a 30-day comment period before it was finalized. NMFS has finalized the EA and prepared a Finding of No Significant Impact

(FONSI) for this action. The FONSI was signed in May, prior to this issuance of the IHA. Therefore, preparation of an Environmental Impact Statement is not necessary.

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 in the Bering, Chukchi, and Beaufort seas during the 2016 open-water season, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: June 16, 2016.

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Donna S. Wieting,
Director,
Office of Protected Resources,
National Marine Fisheries Service.

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