UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

May 14, 2009

Kimberley D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

Re: Comments, Draft Application for ORPC Alaska's Cook Inlet Tidal Energy Project (P-12679-002)

Dear Secretary Bose:

The National Marine Fisheries Service (NMFS) has reviewed the draft license application for ORPC Alaska's proposed Cook Inlet Tidal Energy Project, dated March 31, 2009. The draft application follows the Federal Energy Regulatory Commission's (FERC's) Pilot Licensing procedures for ocean kinetic projects. Contents of the application include the Pilot License Criteria, Process Plan and Schedule, Request for Designation as Non-Federal Representative, Exhibit A - Project Description and Proposed Mode of Operation, Draft Environmental Report, and Appendix A - Consultation Record and Appendix B - Project Monitoring and Study Plans.

NMFS raises concerns regarding the potential effects of the ORPC tidal energy project on CI beluga whales and other trust marine mammal, fish and habitat resources in this unique and productive area. Many, if not most of these concerns have the potential to be addressed by sufficient collection of baseline data. NMFS recommends expanding the proposed pre- and post deployment fisheries and marine mammal monitoring plans to provide better and longer baseline data on which to estimate any project effects.

NMFS offers the attached specific comments relative to the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSA). If you have any questions regarding these comments, please contact Kate Savage, Protected Resources Division, (907-586-7312 or kate.savage@noaa.gov) or Sue Walker, Habitat Conservation Division (907- 586-7646 or Susan.Walker@noaa.gov).

Sincerely,

Robert D. Mecum

Robert D. Mecum
Acting Administrator, Alaska Region

e-filed
FERC, Docket Number P-12679-002

National Marine Fisheries Service Comments on the Draft Application for the Cook Inlet Tidal Energy Project
May 14, 2009

I. Pilot License Criteria

This project must meet FERC's criteria for Pilot projects to proceed under this licensing procedure. NMFS questions whether ORPC's Cook Inlet project has 1) sufficiently met the criteria to avoid "sensitive" locations and, 2) whether the draft license application is sufficient to support environmental analysis.

On April 17, 2007, FERC issued a preliminary permit to ORPC for two locations in Upper Cook Inlet (UCI), one site adjacent to Cairn Point in Knik Arm, the other adjacent to Fire Island. The endangered Cook Inlet beluga whale (*Delphinapterus leucas*) seasonally moves throughout much of Cook Inlet; however, some of the most valuable habitat for the whales is located in the region of UCI containing the two ORPC permitted sites. Both sites are located in an area designated as Type 1 Habitat of high value/high sensitivity as defined by the 2008 Conservation Plan for the Cook Inlet Beluga Whale (Figure 1). Cairn Point is an area of defined sensitivity because it serves as a migratory corridor to the upper reaches of Knik Arm. Consequently, NMFS recommended that ORPC focus on the Fire Island site rather than Cairn Point.

It is also possible that the project action area adjacent to Fire Island is a high use area for Cook Inlet belugas; however, there is insufficient data available to confirm this. Baseline studies of sufficient duration and rigor are required in order to determine the project area's inherent level of sensitivity for Cook Inlet belugas and to provide the information necessary for environmental analysis.

II. Process Plan and Schedule

One of the FERC Pilot License criteria is that the project be of short term duration, generally five years, though modifications are allowed on a case-by-case basis. ORPC has requested an extension to eight years. ORPC expects that baseline studies of Cook Inlet beluga whale habitat use conducted between May and November of 2009 will be sufficient to determine whether a Biological Assessment is necessary. This will be followed by the deployment and operation of a single power generation module in 2011, and deployment and operations of four additional modules between 2013 and 2018.

ORPC states that the pre-deployment monitoring of Cook Inlet beluga whales "will take place over the course of the 2009 field season (May-November) and is expected to begin in late May." A single field season is insufficient to characterize beluga whale activity within the action area and NMFS continues to recommend the schedule be extended.

If the Pilot licensing process restricts sufficient collection of the baseline data necessary both to establish the relative sensitivity of the area as well as for preparation of an ESA Section 7 Biological Assessment, then another FERC licensing procedure may be more appropriate for this project. Furthermore, ORPC repeatedly states in the application that "the precise location of the

observation site [for beluga whale pre-deployment monitoring] and details of the study methodology will be refined in consultation with appropriate regulatory and resource agencies prior to initiating the survey." However, as of the date of this letter, NMFS has not been contacted regarding details of the monitoring plan which is scheduled to start later this month.

III. Request for Designation as Non-Federal Representative

ORPC has been designated as FERC's non-federal representative to initiate informal Section 7 consultation with NMFS following the submittal of the final Pilot license application. Section 7 of the ESA specifies a process for interagency cooperation and consultation during project review to ensure that actions funded, authorized or implemented by a federal agency are not likely to jeopardize the continued existence of any listed species, or result in the destruction or adverse modification of critical habitat. As FERC's representative, ORPC will initially need to determine whether the proposed project "will have no effect", "may affect, but is not likely to adversely affect" or "may affect, and is likely to adversely affect" listed species within the action area as part of the Section 7 process. Depending upon ORPC's effects determination, either informal consultation or formal consultation with NMFS may commence. Further information on Section 7 consultation may be found at: http://alaskafisheries.noaa.gov/protectedresources/esa/

With respect to the ORPC draft license application as it relates to Section 7 consultation:

1. ORPC expressed an intention to seek an Incidental Harassment Authorization (IHA) under the MMPA for the construction and operation of the project (Draft Environmental Report, E-15, P1). Because an IHA grants a specific number of "takes," applying for an IHA for beluga whales precludes the determination of "no effect" or "may affect but not likely to adversely affect," and thus suggests that formal ESA consultation will be necessary.

2. The terms "informal consultation" or "formal consultation" pertain to specific processes between NMFS (or USFWS) and the federal action agency or its designee. Formal or informal consultation with NMFS has not yet been initiated. However, ORPC claims to have "initiated informal consultation in February 2008" (Draft Environmental Report, E-15, P1) which may be misconstrued as the ESA Section 7 consultation process. For the sake of clarity, NMFS recommends ORPC amend document language accordingly to reflect the distinction between "consultation" and "communication."

3. Section 7 consultation geographically encompasses an action area which includes "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action" (50 CFR §402.02). The action area may be larger or smaller than the project deployment area or the project boundary.

IV. Exhibit A - Project Description and Proposed Mode of Operation.

The ORPC tidal energy project will consist of a phased deployment with a single module projected to be in place during May/June of 2011 and an additional four modules added in July/August of 2012. Each module is composed of two half-modules. The half modules are each

91 feet long, by 28 feet high, by 14 feet wide, located approximately 42 feet below the surface at the Mean Lower Low Water, and spaced 200 feet apart. Each half module contains two cross-flow turbines. Each module will be moored by eight mooring lines secured to the substrate by eight, thirty-foot deep, screw anchors. The submarine transmission cable for the single module will lay on the surface of the seabed secured periodically with sandbags. When five modules are in place, the transmission cable will be buried five feet below the seabed using a jetplow. The submarine cable length will be approximately 3,560 feet from the project to the shore.

V. Volume 1 - Draft Environmental Report

The ORPC application considered project impacts on hydrodynamics and sediment transport, marine vegetation, invertebrates, benthos, fish, harbor seal (*Phoca vitulina*) and harbor porpoise (*Phocoena phocoena*) as well as CI beluga. ORPC identified the five potential effects of deploying and operating the project on marine life as: turbine strike, collision/entanglement, underwater noise/vibration, electromagnetic radiation fields (EMF) and alteration of habitat. NMFS would also like to add displacement caused by avoidance of habitat due to presence of the turbines and associated infrastructure as another potential impact.

- **Turbine Strike**

ORPC considers the likelihood of turbine strike on fish and marine mammals to be low because, 1) the pressure wave created by the rotating blades would be an effective barrier, and 2) marine mammals have an inherent ability to detect and move around structures in the water. Any uncertainty in the possibility of turbine strike will be addressed through post-deployment monitoring and using emergency shutdown procedures. It is unknown how fish will interact with the turbines, including whether they would avoid swimming through the units.

NMFS agrees that CI marine mammals typically have the capacity to avoid and evade marine structures. However, turbine blades present a threat unlike anything previously experienced by these animals, and the risk of turbine strike is therefore difficult to estimate. In reviewing collision risks between marine mammal species and marine devices, Wilson (2007) found that underwater collision risks typically become well studied after they have become a conservation concern. Aside from direct strike, injury may also be possible due to cavitation associated with sudden water pressure changes adjacent to the blades (Cada 2008). The capacity for marine mammal avoidance is dependent upon their ability to detect objects, which may be compromised by, for example, background noise or activity. Aside from a detection failure, other factors that may come into play for all species include the possibility of distraction, confusion, and attraction, as well as factors indirectly affecting the animals' movements such as disease, life stage, diving constraints or unexplained behavior. Furthermore, each species may have individual reactions. Harbor porpoises tend to be wary of novel installations whereas seals may be positively attracted (Wilson 2007). Faber, Maunsell and Metoc (2007) estimated harbor porpoise and seal sensitivity to exposed moving parts to be "high" in an area of high tidal flow. They further described the possibility of a "group effect," where animals characteristically traveling in a group, such as beluga pods, collectively suffer a negative effect. Baseline data collected should accurately assess marine mammal presence in the area – if marine mammals are not typically found around the proposed project site, the likelihood of marine mammal/ device

interaction is decreased. NMFS advocates more extensive baseline data collection beyond the proposed initial 2009 summer season.

ORPC plans to conduct post-deployment monitoring using video quality sonar (such as DIDSON) mounted on the modules to assess the near-turbine behavior of and effects to fish and marine mammals. NMFS has previously suggested that this monitoring be expanded to the pre-deployment phase using DIDSON type technology at the project site to gather site-specific baseline data on fish and marine mammal habitat use. Without year-round site specific species presence and use data, the total environmental effects of the project cannot be comprehensively determined, most importantly any displacement effects the project may cause would not be discernable.

In its discussion of the habitat values of upper Cook Inlet, ORPC includes the following summary: "Additionally, the combination of high turbidity and suspended sediment levels, extreme tides and currents, highly variable salinity, and seasonal ice formation has lead to the widely held belief that except for the seasonal passage of the Pacific salmon and eulachon, and the beluga whale which feed upon them, the UCI is a very unproductive environment for marine organisms (U.S.Environmental Protection Agency [USEPA] 1990)." NMFS disagrees with this outdated mischaracterization of the productivity of Cook Inlet. In our comments on proposed development activities in UCI over the past several years, we have cited a number of recent scientific studies that indicate UCI serves as much more productive habitat for marine life than previously recognized.

- **Collision/entanglement**

ORPC has designed the module's mooring lines to remain taut and thereby avoid marine mammal entanglements, with any uncertainty to be addressed through post-deployment monitoring. The initial submarine cable will lie on the seabed floor weighted periodically with sandbags as needed to allow for easy removal.

In general, whale entanglements have significantly decreased since the 1980's due to the introduction of coaxial cables as well as changes in cable characteristics, which include the use of torque-balance cables less prone to self-coiling, laying of armored cable under slight tension or non-armored cables with minimum slack, the avoidance of rough topography, cable burial and the use of fault repair procedures that reduce slack (Wood and Carter, 2008). Thick, taut mooring cables are considered to be less dangerous with respect to marine mammal entanglement (Boehlert 2008), though it has been speculated that, while smaller dolphins and pinnipeds such as harbor porpoise and harbor seals may move through mooring cables with ease, larger whales may have difficulty either sensing the presence of mooring cables or moving through numerous, closely spaced cables (Michel et al., 2007).

Regarding potential entanglements or collisions, NMFS recognizes the inherent uncertainty associated with CI beluga interaction with the mooring or submarine cables. There is some question whether the sandbags will be sufficient to hold the initial submarine cable in place given the high water velocity and sediment bedload transport characteristic of the project area. NMFS requests a more detailed description of how the cable will be placed and weighted, and

assurance that the submarine cable will be monitored to ensure it remains in place or will be re-secured if the sandbag weighting system fails. NMFS requests descriptions of how the cable can be re-secured should it become loose during all operating conditions in all seasons of operation. Should either the transmission cable or mooring lines become unsecured, they could pose an entanglement threat to any marine mammals in the vicinity.

The summary of project construction describes pre-placement of the anchoring system and mooring lines. NMFS requests more detail about how this will be accomplished and is concerned that the anchorage system could present an entanglement hazard if a web of slack mooring lines is placed in the inlet prior to installing the tidal generators.

- **Underwater noise/vibration**

ORPC maintains that the underwater noise and vibration associated with the different phases of the project will not negatively affect CI beluga whales. Noise associated with construction and vessel traffic is expected to be short term and likely to cause only minor disturbance and possibly some avoidance. ORPC does not anticipate noise levels associated with project operations to be significant enough to cause an adverse effect. Because of associated uncertainty, ORPC will conduct an underwater acoustic assessment to evaluate operational noise.

Of all the impacts associated with marine hydrokinetic projects, noise is considered of extreme concern and possibly the most complex effect to study. Anthropogenic noise has the capacity to harass or injure marine mammals and fish, and may interfere or compete with their ability to communicate or locate prey. Potential noise associated with the project construction and operations may include: seafloor drilling of anchor screws for mooring lines, rotating machinery, flexing joints, structural noise, moving air, moving water, vibrations through mooring and anchor lines, electrical noise and instrumentation noise.

Both harbor seals and harbor porpoise may be considered highly vulnerable to marine noise (Faber Maunsell and Metoc, 2007, Boehlert 2008). Sound transmission and receipt is also very important to Cook Inlet belugas, which spend their lives in the turbid and regularly darkened waters of Cook Inlet and thus are almost wholly dependent on the acoustic environment. Scientific research on both captive and wild belugas has demonstrated adverse behavioral reactions to in-water noise. Obvious changes in whale behavior as a result of noise harassment would include sudden direction changes away from the noise source, whereas subtle changes in whale behavior may include complete avoidance of the areas near the noise sources. It is difficult to assess the acoustic effects of project construction and operations on fish, CI beluga whales and other marine mammals before an accurate acoustic study is completed.

Pacific herring are also sensitive to noise and were the second most common fish species sampled in surface tow nets (Moulton 1997). Little is known about the seasonal distribution of herring in CI, especially their winter distribution, so project effects on this important prey species are unknown and should be addressed.

- **Electromagnetic Fields**

ORPC expects any Electromagnetic Field (EMF) effects of the pilot project to be extremely minor and localized. NMFS agrees that the current transmitted from the one or five MW turbine arrays, shielded by armored cable and trenching associated with the latter, are not likely to cause significant effects. However, the proposed project is theoretically a prototype for a full scale project, which is expected to be equal to or greater than 50 – 100 MW. A full build-out would necessitate a more in-depth effects analysis, though NMFS also agrees with ORPC that there are major areas of uncertainty associated with the environmental effects of electric (E) and magnetic (B) fields as well as associated induced electric (iE) fields. EMF effects require more thorough analysis and monitoring in order for the results of the pilot project to be useful in designing the future commercial project.

- **Alteration of Habitat and Avoidance/Displacement**

The ORPC application addresses alteration of habitat primarily relative to benthic fauna. However, alteration of habitat and avoidance or displacement may be the most crucial effects of the project on CI belugas, other marine mammals and fish. The presence of CI belugas, other marine mammals and fish in the action area and their use of that habitat, e.g., foraging vs. transiting, is currently unknown. Many marine mammals opportunistically forage on a seasonal basis. CI belugas, for example, rely on seasonally rich forage fish such as eulachon to help meet year round demands. The action area may include important foraging opportunities that are not yet recognized. CI belugas may use the tidal currents in the project area as an energy-saving strategy while in transit to other foraging grounds. Both physical structures and noise could have a "wall effect" that could force the whales to move a distance around them, changing local migratory patterns (Boehlert 2008). Though habituation to noise and structures is a possibility, marine mammals may also eventually avoid areas on a permanent basis because of continuous sound or activity, leading to the abandonment of important foraging areas, mating grounds or migratory routes (Michel 2007). Wilson (2007) cited the energetic penalties of repeatedly swimming around a disturbing object and habitat exclusion as the most relevant to disturbance and avoidance. NMFS advocates an accurate baseline determination of marine mammal use of the area before assessing the potential for habitat avoidance or alteration.

The ORPC application also mentioned colonization of a particular area because of the creation of new shelter or cover. Physical structures permanently placed in the marine environment may create habitat that serves as a fish aggregation device (FAD). The food and shelter offered by these structures may attract small fish, which in turn attracts larger fish and predators, thereby creating a virtually new ecosystem (Dempster 2005). Though the deployment of the half-modules over the scheduled time frame will probably not dramatically change the surrounding habitat, the final commercial build-out of modules has the potential to change the surrounding habitat. The effect a change in habitat surrounding the project may have on CI belugas is a function of beluga use of the area, which should be determined in baseline studies of beluga and prey species.

VI. Volume 2, Appendix B - Project Monitoring and Study Plans

In December of 2008, ORPC requested NMFS' evaluation of proposed monitoring plans pertinent to Cook Inlet beluga whales and other marine mammals in the project area. NMFS Protected Resources Division subsequently provided ORPC with several recommendations (pers. comm: K. Savage, Jan 12, 2009, M. Migura, Dec. 31, 2008). Because ORPC's monitoring plans have not substantially changed since NMFS' initial recommendations and because pre- and post-deployment monitoring are virtually identical except for the presence of a module or modules, the following recommendations include both previous suggestions as well as further additions or modifications and pertain to both pre- and post-deployment monitoring.

- **Pre-Deployment Beluga Whale Observations, Draft Study Plan - 3/23/09.**
  Post-Deployment Beluga Whale Observations, Draft Monitoring Plan – 3/23/09.

This project's qualification for a FERC pilot project license depends upon how well the licensing procedure criteria are met. One criterion is project avoidance of sensitive sites. Because the project area is located within highly valued habitat of an endangered species as defined by NMFS in the 2008 Conservation Plan for the Cook Inlet Beluga Whale, accurately describing the extent of beluga whale activity in the proposed project area is crucial in determining whether the project has met FERC's criterion for "avoidance of sensitive sites." To describe whale activity as accurately and sufficiently as possible, NMFS recommends the following be added to the beluga whale monitoring plan:

1. Increase temporal coverage. A single field season of monitoring is insufficient to characterize beluga behavior within the action area. NMFS recommends additional monitoring for at least two field seasons, and reviewing the first season's data with NMFS prior to planning the second season's efforts. NMFS further recommends that field seasons parallel the project timing as closely as possible, stopping and restarting only when the ice density precludes or allows for meaningful observations. Less frequent monitoring using aerial surveys should be conducted when ice conditions preclude accurate land-based observations.

   The monitoring plan states that "monitoring session frequency will coincide with habitat use patterns." Since the purpose of the monitoring sessions is to determine habitat use patterns, observations/monitoring should be based on that objective, and provide adequate temporal coverage to accurately determine habitat use.

2. Increase the scope of monitoring modalities. Fire Island is approximately 0.7 miles away from the deployment site and observations from shore, especially given any challenging weather or sea conditions, may not be sufficient to characterize beluga movements in the area. Other observation methods include the use of passive acoustic gear around the deployment site (pre- and post-deployment), aerial surveys or the use of remote video monitoring.

- **Pre- and Post Deployment Fisheries, Draft Study Plan**

The potential effects of this technology on fish are basically unknown. Due to the proposed location, design and placement of the generating units, and the lack of information on fish interactions with them, NMFS is concerned that the pre- and post deployment fish studies and monitoring plans adequately assess the baseline fish resources in the project area and the effects of the project on these fish.

The proposed sampling methodology includes both hydro-acoustics and net sampling that are intended to provide the data needed to determine where and how fish are using the project area. The ORPC study proposal indicates that baseline sampling would occur in 2009 only. NMFS suggests that the proposed sampling schedule be expanded to allow assessment of inter-annual variability in species relative abundance and habitat use. At least two years of baseline data will be necessary to determine the fish use of the project site.

Fisheries study results should be distributed and discussed with resource management agencies prior to selection of final, precise locations of the generating units

NMFS shares the concerns previously raised by the U.S. Fish and Wildlife Service that the sampling frequency is insufficient to determine the relative abundance and distribution by depth of juvenile and adult fish. The study proposal indicates that hydro-acoustic transects would be sampled twice per month during ice-free months. There is large annual variability in timing of Cook Inlet salmon runs, and juvenile and adult salmon migrate at different times. Static bimonthly sampling will miss some of these pulsed runs of fish. Because of the uncertainty in run timing especially of adult fish, we recommend increasing sampling frequency to capture pulses of fish and timing sampling to coincide with expected migrations (such as salmon spawning runs, juvenile outmigrations, eulachon and herring spawning events), and then sampling frequently during those events until they are completed or the peak has passed.

Sampling during the ice-free months is necessary, however, the project is being designed to operate continually, in all seasons, and NMFS continues to request that methods for winter fish sampling be developed in order to determine if the project has an effect on any fall, winter or spring fish use at the proposed site. Such monitoring will need to be remote as direct sampling in Cook Inlet during conditions of moving ice is likely impossible. Video quality sonar imaging on a submerged platform or anchorage could be useful in gathering winter habitat data, or in determining if there is limited or no winter use of the project site by fish. These data may be useful for other planning purposes such as determining the effectiveness of anchorage systems or cable persistence. Since the project is intended to gather data on environmental effects of the project for use in designing the eventual commercial-scale project, it will be necessary to determine the effects of the project on fish and wildlife resources in all seasons of proposed operation. Barring any virtual or proxy estimate of effects, consideration should be given to operating the pilot project only during seasons when environmental baseline data and post-deployment effects data can be collected.

Fisheries study plans should clearly define objectives for both adult and juvenile fish, and should specify a level of precision for those objectives so that the information gathered will adequately

answer the stated study objective. Clearly defined objectives can determine the intensity of sampling that is necessary to develop estimates with the desired level of confidence, and may result in revised sampling procedures.

- **Underwater Acoustic Assessment, Draft Study Plan - 3/23/09**

ORPC's draft plan for assessing underwater acoustics includes identical pre- and post-deployment sampling effort and survey sites, with up to one minute of recordings taken from three different vertical locations and radial horizontal stations at 820 ft, 1640 ft, 3280 ft, 4921 ft, 6561 ft, 9840 ft and 13,120 ft from the module. NMFS questions the significance of these distances and recommends an adaptive approach to determine the location of sampling stations to yield the most accurate and fine scale assessment of the project's acoustic effects.

VII. Conclusion

CI is a rich and vital ecosystem for CI beluga whales, both in terms of providing the necessary environment for successful reproduction as well as providing intensive, energy rich foraging opportunities. NMFS supports the development of pilot hydrokinetic projects as a means to develop this nascent technology and gather information on the potential environmental impacts. NMFS recognizes that pilot projects can be effective in guiding future large-scale developments in an environmentally sound manner. At the same time, NMFS is mindful of the need to protect environmental resources during project development by adhering to standard licensing procedures unless circumstances warrant a deviation, following careful consideration.

NMFS recommends expanding the proposed pre- and post deployment fisheries and marine mammal monitoring plans to provide better and longer baseline data on which to estimate any project effects We also recommend modifying the acoustic monitoring plan to better characterize potential effects. Once this information is collected, further study plans can be modified through an adaptive approach.

REFERENCES

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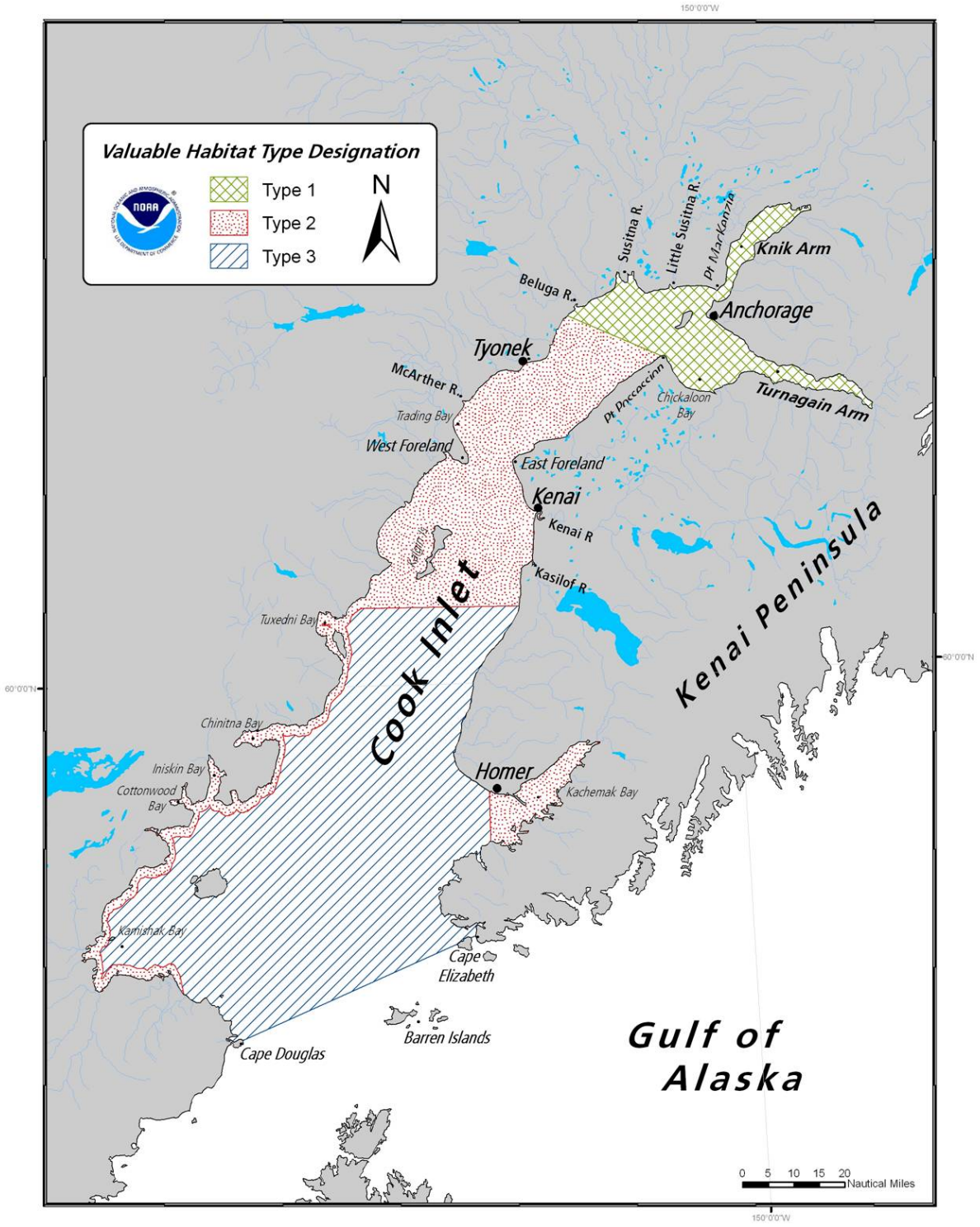

Document Content(s)

Cook Inlet Tidal ORPC.PDF.....1-12