

# Draft Marine Mammal Monitoring and Mitigation Plan

Crowley Kotzebue Dock Upgrade  
Kotzebue, Alaska  
July 2020

## Prepared For:

Crowley Fuels, LLC  
201 Arctic Slope Avenue  
Anchorage, Alaska 99518

## By:

PND Engineers, Inc.  
1506 W 36th Ave.  
Anchorage, AK 99502



## TABLE OF CONTENTS

SECTION	PAGE
1 Introduction .....	4
1.1 Proposed Action .....	4
1.2 Project Activities .....	4
2 IHA Authorization .....	6
2.1 Permitted Species .....	6
2.2 Authorized Take Numbers .....	6
2.3 Mitigation Zones .....	6
3 Mitigation Methods .....	8
3.1 Protected Species Observers .....	8
3.2 Monitoring Locations .....	9
3.3 Equipment .....	10
3.4 Pre- and Post-Season Monitoring .....	10
3.5 Monitoring Techniques .....	10
3.6 Data Collection .....	12
3.7 Project Impact Avoidance and Minimization Measures .....	13
4 Reporting .....	14
4.1 Injured or Dead Marine Mammal .....	14
4.2 Annual Report .....	15

LIST OF TABLES	PAGE
Table 1. Effective Shutdown and Monitoring Zones .....	7

LIST OF FIGURES	PAGE
Figure 1. Project Overview .....	5
Figure 2. Observer Stations .....	9

## LIST OF APPENDICES

Appendix A. Monitoring Zones  
Appendix B. Protected Species Observation Record

## ACRONYMS AND ABBREVIATIONS

4MP	Marine Mammal Monitoring and Mitigation Plan
BA	Biological Assessment
BMP	best management practice
cy	cubic yards
Crowley	Crowley Fuels, LLC
DPS	distinct population segment
ft	feet
GPS	Global Positioning System
HTL	high tide line
IHA	Incidental Harassment Authorization
m	meters
MHW	mean high water
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act (of 1972)
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OCSP	OPEN CELL SHEET PILE®
PND	PND Engineers, Inc.
PSO	protected species observer
USACE	United States Army Corps of Engineers

## 1 Introduction

The purpose of this Marine Mammal Monitoring and Mitigation Plan (4MP) is to provide a protocol for monitoring affected species during the Crowley Fuels, LLC (Crowley) upgrade of their existing sheet pile bulkhead dock in Kotzebue, Alaska. This plan was developed to support the project's application for an Incidental Harassment Authorization (IHA) under the Marine Mammal Protection Act, Section 101(a)(5)(D).

A protected species monitoring program will be implemented at the start of specified construction activities and will follow the protocols outlined in this 4MP. The primary goals of the monitoring program are:

- To monitor the mitigation zones, to estimate the number of marine mammals exposed to noise at (or exceeding) established thresholds, and to document animal responses and behaviors;
- To minimize impacts to the marine mammal species present in the project area through implementation of mitigation procedures; and
- To collect data on takes, occurrence, and behavior of marine mammal species in the project area and record and report any potential impacts from the project.

### 1.1 Proposed Action

The new dock will be constructed with an OPEN CELL SHEET PILE® (OCSP) structure, a bulkhead utilizing flat-web sheet piles, fabricated connector wyes, and anchor piles. This type of bulkhead is a flexible steel sheet pile membrane supported by soil contact with the embedded steel pile tail walls. No demolition is planned for this project, so the new sheet pile bulkhead will provide additional protection for the existing fuel header system and associated piping.

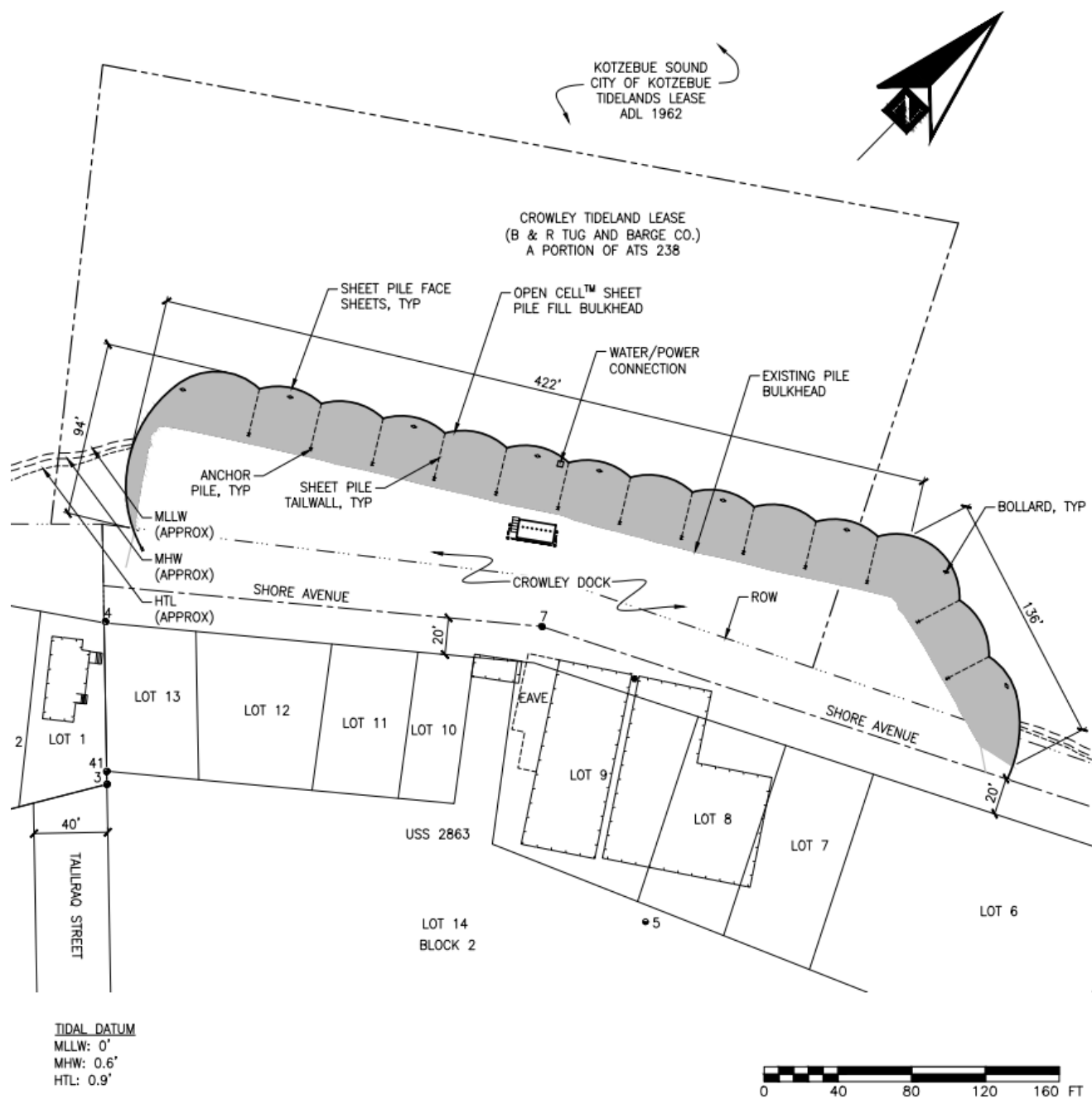
Construction is anticipated to begin June, 2020 with an expected duration of approximately three months resulting in construction completion by September, 2020. A detailed description of the project materials and construction methods is included in the BA and IHA Application.

### 1.2 Project Activities

The following activities requiring monitoring are described in detail in the IHA Application:

- Temporary template pile installation – up to 170 steel pipe piles (18-inch or smaller) or H-piles (14-inch or smaller);
- Sheet Piles – up to 650 twenty-inch sheet piles, driven in pairs;
- Anchor Piles – up to 15 steel anchor piles (14-inch pipe piles);
- Temporary template pile removal – up to 170 steel pipe piles (18-inch or smaller) or H-piles (14-inch or smaller);
- Fill Placement – gravel fill placed and compacted using conventional construction equipment from land or barge; and
- Bollard Piles – up to 9 steel bollard piles (24-inch pipe piles), driven into completed upland cells.

In addition, any in-water work not detailed above will require monitoring and/or mitigation as described below.





## 2 IHA Authorization

This project's IHA specifically authorizes the take of certain marine mammals in during permitted activities by non-injurious harassment. Situations and takes of species not covered under the IHA are not permitted.

### 2.1 Permitted Species

The IHA authorizes Level B take of a limited number of bearded seals (ugruk), ringed seals (natchiq), spotted seals (qasigiaq), ribbon seals (qaigulik), minke whales, gray whales (agvigluaq), killer whales (aaglu), harbor porpoises, and beluga whales (sisuaq).

Level B takes may not exceed the number of authorized takes for this project. Level A harassment is not authorized for any species as a result of this project. For authorized species, work will shut down if an individual enters a Level A Zone or if the number of authorized takes for that species has been exceeded.

Work will shut down if any unauthorized protected species enters any harassment zone. This may include, but is not limited to, bowhead whales (agvik), humpback whales, fin whales, narwhals, polar bears (nanuq), pacific walrus (aiviq), short-tailed albatross, Steller's eider (igniquauqtuq), spectacled eider (qavaasuk), or Eskimo curlew, each of which have (or had) ranges overlapping the project area but are not anticipated within the project area during the construction period and are not included within the IHA. Level B take of unauthorized species is not permitted.

### 2.2 Authorized Take Numbers

Total authorized take numbers will be outlined in the IHA. Take numbers may not be exceeded under any circumstances. Crowley shall coordinate with NMFS regularly to determine the assumed number of takes based on sightings.

Shutdown measures must be implemented if the number of any allotted marine mammal takes reaches the limit under the IHA and if such marine mammals are sighted within the vicinity of the project area and are approaching their respective Level A or Level B harassment monitoring zone.

### 2.3 Mitigation Zones

Crowley has established effective shutdown, monitoring, and assumed-take zones to delineate areas in which mitigation methods will be implemented. These zones incorporate the Level A and Level B harassment radii discussed in the IHA as well as other factors. The effective zones are summarized in Table 1 below. Selection of the appropriate observation zone depends on the concurrent work activities.

NMFS may adjust the shutdown zones and revise the Level A and Level B harassment zones as appropriate pending review and approval of the results of acoustic monitoring.

#### 2.3.1 Shutdown zones

Work which could cause noise levels to rise above non-permitted thresholds will shut down if protected species are approaching shutdown zones. For permitted species, work will shut down if individuals approach the Level A harassment radius. Following a shutdown, permitted activities must not resume except by the protocols described in Section 3.

If a species for which authorization has not been granted or a species for which authorization has been granted but the authorized take numbers are met is observed approaching or within the Level B harassment radius, permitted activities must shut down immediately using protocols described in Section 3.

During all in-water or over-water construction activities having the potential to affect marine mammals, a shutdown zone of 10 meters will be enforced to ensure that animals are not endangered by physical interaction with construction equipment. These activities could include, but are not limited to support-vessel activities, barge operations, the positioning of piles via a crane (“stabbing” the pile), the removal of piles via a crane (“deadpull”), or the over-water slinging of construction materials.

### 2.3.2 Monitoring Zones

Monitoring zones (with the exception of the assumed-take zones described in Section 2.3.3) will be continuously observed to record permitted species occurrences and behavior as described in Section 3. Level B take of permitted species will be recorded for each individual observed within the monitoring zone during the associated construction activity.

Monitoring zones do not exist for non-permitted species, as no take of these individuals is permitted. Permitted activities must cease if a non-permitted species is observed within the range of Level B harassment.

Level A take is not permitted for any species for this project.

**Table 1. Effective Shutdown and Monitoring Zones**

	Construction Method	Shutdown Zone – Authorized Species	Monitoring Zone	Shutdown Zone – Unauthorized Species
<b>Temporary template piles (Pipe or H-Pile)</b>	Vibratory Installation/ Removal	10 m	3500 m	Visible range (within monitoring zone limits)
<b>Anchor piles (14" H-Pile)</b>	Vibratory Installation/ Removal		4000 m	
<b>Sheet piles</b>	Vibratory Installation		5200 m	
<b>Gravel Fill</b>	Conventional Machinery		100 m	100 m

### 2.3.3 Assumed-Take Zones

Due to the lack of high ground or significantly tall infrastructure in Kotzebue, it will not be possible for observers to perceive the entire monitoring zone. Anticipated visible range from the monitoring locations is estimated to be 2,000 meters in fair weather. Assumed-take zones are sections of the monitoring zone that are beyond observers’ ability to directly monitor and will be assumed to have permitted species present at an agreed rate of take during permitted activities. These zones need not be visible in order for work to begin.

Species that are not included within the IHA application are assumed to be so unlikely within the project area that they will not be present within the Level B radius during construction and are not included in the assumed-take calculations. In the unlikely event that a non-permitted individual is sighted within the range of Level B harassment, permitted activities will cease.

### 3 Mitigation Methods

Implementation of mitigation measures will be conducted by qualified, trained protected species observers (PSOs). PSOs will be located on-site before, during, and after permitted activities for monitoring protected species within (and approaching) mitigation zones. PSOs will be in continuous contact with the construction personnel in order to implement appropriate mitigation measures.

An employee of the construction contractor will be identified as the monitoring coordinator for PSOs at the start of each construction day. PSOs will report directly to the monitoring coordinator when a shutdown is deemed necessary.

Crowley (or its designee) will conduct briefings for construction supervisors and crews, the monitoring team, and applicant staff prior to the start of all pile driving activity and when new personnel join the work, in order to explain responsibilities, communication procedures, monitoring protocols, and operational procedures.

#### 3.1 Protected Species Observers

Monitoring will be conducted by independent, qualified PSOs with no other assigned tasks. At least one lead PSO must have prior experience working as an observer during construction activities. Other PSOs may substitute education (a degree in biological science or related field), training, or equivalent Alaska Native traditional knowledge for experience. PSOs must possess:

- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Ability to conduct field observations and collect data according to assigned protocols;
- Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance;
- Physical capability of performing essential duties, including sitting or standing for periods of up to four hours, using binoculars or other field aid, and documenting observations;
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates, times, and reason for implementation of mitigation (or why mitigation was not implemented when required); and marine mammal behavior; and
- Ability to communicate orally, by radio and in person, with project personnel to provide real-time information on marine mammals observed in the area and the appropriate mitigation response for the circumstances.



PSOs will conduct observations, meet training requirements, fill out data forms, and report findings in accordance with this MMMP. Crowley will submit PSO qualifications for approval by NMFS prior to the onset of pile driving.

### 3.2 Monitoring Locations

In order to monitor effectively, PSOs will be positioned at the best practicable vantage points, taking into consideration security, safety, access, and space limitations. Observer locations must be identified that (1) have an unobstructed view of the work being conducted and (2) unobstructed view of all the water within the Level A Zone and as much of the Level B zone as possible. Potential observation locations are depicted in Figure 2. Optimal observation locations will be selected based on visibility and the type of work occurring.



**Figure 2. Observer Stations**

Three PSOs will be on duty during pile driving activities. Due to the geography of the area, we do not anticipate that PSOs will be able to observe the entire monitoring zone. However, Observer 1 will be able

to closely monitor the shutdown zone and Observers 2 and 3 will monitor for approaching animals within the nearshore area and the approach channels. Maximum effective observation distance is estimated at up to 2,000 meters, but PSOs will observe as much of the monitoring zone as is visible on a given day.

During fill placement and in-water work, a single observer will be on duty at the dock at whatever vantage point gives an unobstructed view of the monitoring zone. If construction activities impede visibility of the zone, a second observer will be stationed at another location.

Observers will be stationed on elevated platforms to increase visible zone.

### 3.3 Equipment

The following equipment will be required to conduct observations for this project:

- Appropriate personal protective equipment;
- Portable radios for the PSOs to communicate with the monitoring coordinator and other PSOs;
- Cellular phone with local service as a backup for radio communication and for safety purposes;
- Contact information for the other PSOs, monitoring coordinator, and NMFS point of contact;
- Daily tide tables for the project area;
- Watch or chronometer;
- Binoculars (quality 7 x 50 or better) or spotting scope with built-in rangefinder or reticles (rangefinder may be provided separately);
- Hand-held GPS unit, map and compass, or grid map to record locations of marine mammals;
- Notebook with pre-approved Observation Record forms on weatherproof paper; and
- Copies of 4MP, IHA, and/or other relevant permit requirement specifications.

### 3.4 Pre- and Post-Season Monitoring

Two PSOs will begin monitoring for protected species occurrence and behaviors one week prior and one week following pile-driving.

### 3.5 Monitoring Techniques

During observation periods, PSOs will continuously scan the area for marine mammals using binoculars and the naked eye. PSOs will work shifts of a maximum of four consecutive hours followed by a rotation or a 1-hour break and will work no more than 12 hours in any 24-hour period. PSOs will collect data as listed below.

Observation necessitates that daylight is sufficient for PSOs to visualize the entirety of the monitoring zones, so observations and permitted activities will commence and complete during daylight hours as required by the IHA.

#### 3.5.1 Pre-Activity Monitoring

The following monitoring methodology will be implemented prior to commencing permitted activities:

- Observation of shutdown and monitoring zones will take place from 30 minutes prior to initiation through 30 minutes post-completion of all permitted activities.

- The shutdown zone will be cleared when marine mammals have not been observed within the zone for that 30-minute period. If a marine mammal is observed within the shutdown zone, permitted activities cannot proceed until the animal has left the zone of its own volition or has not been observed for 15 minutes (for pinnipeds) and 30 minutes (for cetaceans).
- If permitted species are present within the monitoring zone, work will not be delayed, but PSOs will monitor and document the behavior of individuals that remain in the monitoring zone.
- When all applicable shutdown zones are clear of protected species, the PSOs will radio the monitoring coordinator. Permitted activities will not commence until the monitoring coordinator receives verbal confirmation the zones are clear.
- In case of inclement weather (e.g., fog, heavy rain) or reduced visibility, PSOs must be able to see the entirety of shutdown and monitoring zones before permitted activities can be initiated. Assumed-take zones do not need to be fully visible for work to start.
- In the event of a delay or shutdown of activity resulting from marine mammals in the shutdown zone, their behavior must be monitored and documented until they leave of their own volition, at which point the activity may begin.

#### *3.5.2 During-Activity Monitoring*

The following monitoring methodology will be implemented during permitted activities:

- If permitted species are observed within the monitoring zone during permitted activities, an exposure will be recorded and behaviors documented. Work will not stop unless an animal enters or appears likely to enter the shutdown zone.
- For assumed-take zones, monitors will extrapolate a rate of take commensurate with observed exposure rates and appropriate to the area of the assumed-take zone. Crowley shall coordinate with NMFS regularly to determine the assumed number of takes based on sightings.
- Total exposures will be reported based upon the combined recorded takes and extrapolated takes.

#### *3.5.3 Inclement weather*

Pre-activity monitoring must be conducted with the visibility requirements described above. However, work that has begun with a fully cleared monitoring zone may continue during inclement weather (e.g., fog, heavy rain) or periods of limited visibility with the following limitations:

- This method will only be used if the monitoring zone was visible during the start of work (with the exception of the assumed take zone) and no shutdowns greater than 30 minutes have occurred.
- If the monitoring zone becomes obscured, an assumed rate of take appropriate to the area of the obscured monitoring zone will be used to estimate the number of sightings to be reported during those periods.
- Total exposures will be recorded and extrapolated based upon the assumed rate of take and the percentage of the Level B harassment zone that was not visible.

Should environmental conditions deteriorate such that marine mammals within the entire shutdown zone would not be visible, permitted activities must be delayed until the PSO is confident marine mammals within the shutdown zone could be detected.

#### 3.5.4 *Shutdown*

If a protected species enters or appears likely to enter a shutdown zone, the PSOs shall immediately radio to alert the monitoring coordinator and all permitted activities will be immediately halted. PSOs will continue to monitor and document protected species behaviors until the animal leaves the shutdown zone of its own volition.

In the event of a shutdown, permitted activities may resume only when the animal(s) within or approaching the shutdown zone has been visually confirmed beyond or headed away from the shutdown zone, or when 15 minutes have passed without re-detection of the animal. Observers will then notify the monitoring coordinator that activities can re-commence.

#### 3.5.5 *Breaks in Work*

During a delay in permitted activities, the mitigation zones will continue to be monitored. This includes breaks due to scheduled or unforeseen construction practices or breaks due to permit-required shutdown. No exposures will be recorded for permitted species in the monitoring or assumed-take zones if there are no concurrent permitted construction activities. If shutdown zones are free of protected species and monitoring has continued, work can recommence.

If permitted activities cease for more than 30 minutes and monitoring has not continued, pre-activity monitoring must recommence before permitted activities.

#### 3.5.6 *Post-Activity Monitoring*

Observation of the shutdown and monitoring zones will continue for 30 minutes following completion of pile driving. A post-monitoring period is not required for other in-water construction. These surveys will record sightings, focusing on observing and reporting unusual or abnormal behavior of protected species. Observation Record forms will be used to document observed behavior.

### 3.6 *Data Collection*

PSOs will collect sighting data and behaviors of marine mammal species that are observed in the shutdown and monitoring zones during permitted activities. PSOs will use an approved Observation Record (Appendix A) which will be completed by each PSO for each survey day and location. Observation Records will be used to record the following:

- Date and time that permitted construction activity begins or ends;
- Weather parameters (e.g. percent cloud cover, percent glare, visibility, wave height) and sea state (the Beaufort Wind Force Scale will be used to determine sea-state);
- Species, numbers, and, if possible, sex and age class of observed marine mammals;
- Construction activities occurring during each sighting;
- Marine mammal behavior patterns observed, including bearing and direction of travel;
- Specific focus should be paid to behavior just prior to and during permitted activities and shutdown procedures;
- Location of marine mammal, distance from PSO to the marine mammal, and distance from pile removal activities to marine mammals;

- Record of whether an observation required the implementation of mitigation measures, including shutdown procedures and the duration of each shutdown.

NMFS recommends that monitoring measures, “should be designed to accomplish or contribute to one or more of the following goals: (a) 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. (b) An increase in our understanding of the nature, scope, or context of the likely exposure of marine mammal species to a variety of stressors associated with the action. (c) An increase in our understanding of how individual marine mammals respond to the specific stressors associated with the action. (d) An increase in our understanding of how anticipated individual responses, to individual stressors or anticipated combinations of stressors, may impact either: 1) the long-term fitness and survival of an individual; or 2) the population, species, or stock. (e) An increase in our understanding of the effectiveness of mitigation and monitoring measures. (f) A better understanding and record of the manner in which the authorized entity complies with the incidental take authorization and incidental take statement, and (g) An increase in the probability of detecting marine mammals, both specifically within the exclusion zone and in general.”

### 3.7 Project Impact Avoidance and Minimization Measures

Crowley and its designees will implement the following best management practices (BMPs) in order to minimize impacts to waters of the U.S.:

- New sheet piles will be installed seaward of the existing dock, containing it and removing the need for demolition or disturbance of the existing dock. Enclosing the existing dock will also provide more dockside space for safe handling of bulk fuel deliveries.
- A silt curtain will be deployed during pile driving operations to prevent turbidity and negative impacts to water quality. This measure will also prevent fish from entering the injury isopleth for fish during pile driving. Both results will reduce the potential for impacts to prey species.
- Fill placed in the tidelands will be clean gravel fill. Fill will contain relatively few fines to reduce impacts to turbidity and/or sedimentation. Fill placement will be placed in completed sheet pile cells, providing containment and removing the need for a silt curtain.
- The dock will be maintained in a manner that does not introduce any pollutants or debris into the harbor or cause a migration barrier for fish.
- Fuels, lubricants, and other hazardous substances will not be stored below the ordinary high-water mark. All chemicals and petroleum products will be properly stored to prevent spills. No petroleum products, cement, chemicals, or other deleterious materials will be allowed to enter surface waters.
- Oil booms will be readily available for containment should any releases occur.
- The contractor will check for leaks regularly on any equipment, hoses, and fuel storage that occur at the project site.
- Noise levels will be minimized during construction by the use of appropriately-sized piles. The use of vibratory pile driving methods will also reduce sound levels entering the water during construction and reduce the impacts to marine mammals, fish, and seabirds. Properly sized equipment will be used to drive piles.



- To minimize impacts from vessels interactions with marine mammals, the crews aboard project vessels will follow NMFS's marine mammal viewing guidelines and regulations as practicable. (<https://alaskafisheries.noaa.gov/protectedresources/mmv/guide.htm>).

The mitigation measures and BMPs that will be implemented are expected to reduce the project's impacts within the action area.

## 4 Reporting

### 4.1 Injured or Dead Marine Mammal

In the event that personnel involved in the construction activities discover an injured or dead marine mammal, the IHA-holder shall report the incident to the Office of Protected Resources (301-427-8401) and the NMFS Alaska Regional Stranding Coordinator (877-925-7773) as soon as feasible. The report must include the following information:

- Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);
- Observed behaviors of the animal(s), if alive;
- If available, photographs or video footage of the animal(s); and
- General circumstances under which the animal was discovered.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as serious injury, or mortality, applicant must immediately cease the specified activities and report the incident to the NMFS Office of Protected Resources Alaska Region Stranding Coordinator. Permitted activities may not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with the applicant to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. The applicant may not resume their activities until notified by NMFS.

In the event the applicant discovers an injured or dead marine mammal and the lead observer determines that the cause of the injury or death is unknown and the death is relatively recent (e.g., in less than a moderate state of decomposition), the applicant must immediately report the incident to the Office of Protected Resources, and the Alaska Region Stranding Coordinator. The report must include the same information listed above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with the applicant to determine whether additional mitigation measures or modifications to the activities are appropriate.

In the event that the applicant discovers an injured or dead marine mammal and the lead observer determines that the injury or death is not associated with or related to the specified activities (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the applicant must report the incident to the Office of Protected Resources, and the Alaska Region Stranding Coordinator, within 24 hours of the discovery.



Care should be taken in handling dead specimens, if encountered, to preserve biological materials in the best possible state for later analysis of cause of death. In preservation of biological materials from a dead animal, the finder (i.e. PSO) has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed.

## 4.2 Annual Report

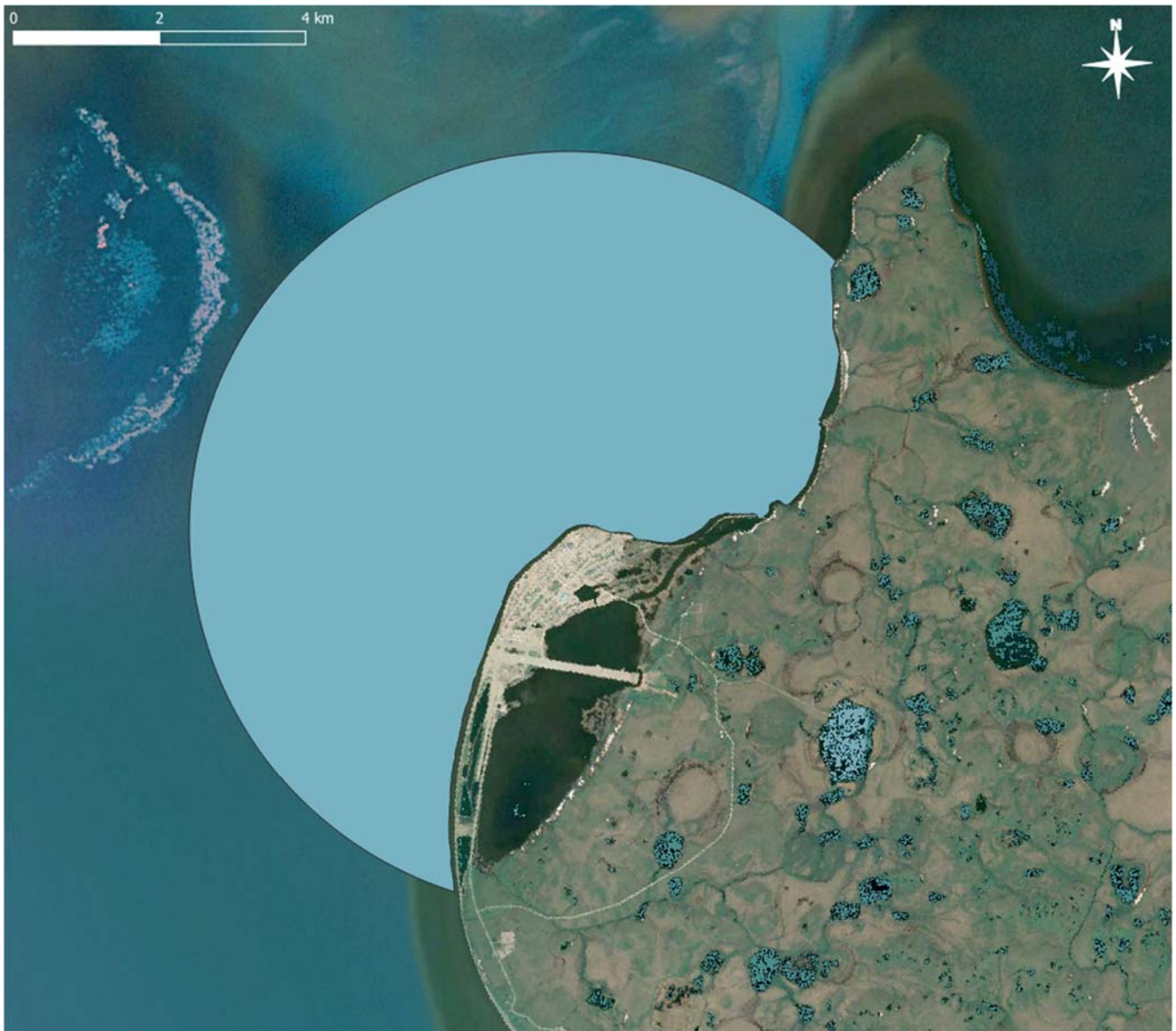
A comprehensive monitoring report documenting marine mammal observations will be submitted to NMFS at the end of the in-water work season. The draft report will be submitted to NMFS within 90 calendar days of the completion of the monitoring program or sixty days prior to the issuance of any subsequent IHA for this project. A final report will be submitted within thirty days of the resolution of comments on the draft report.

The report will include marine mammal observations (pre-activity, during-activity, and post-activity) during permitted activities. At a minimum the reports shall include:

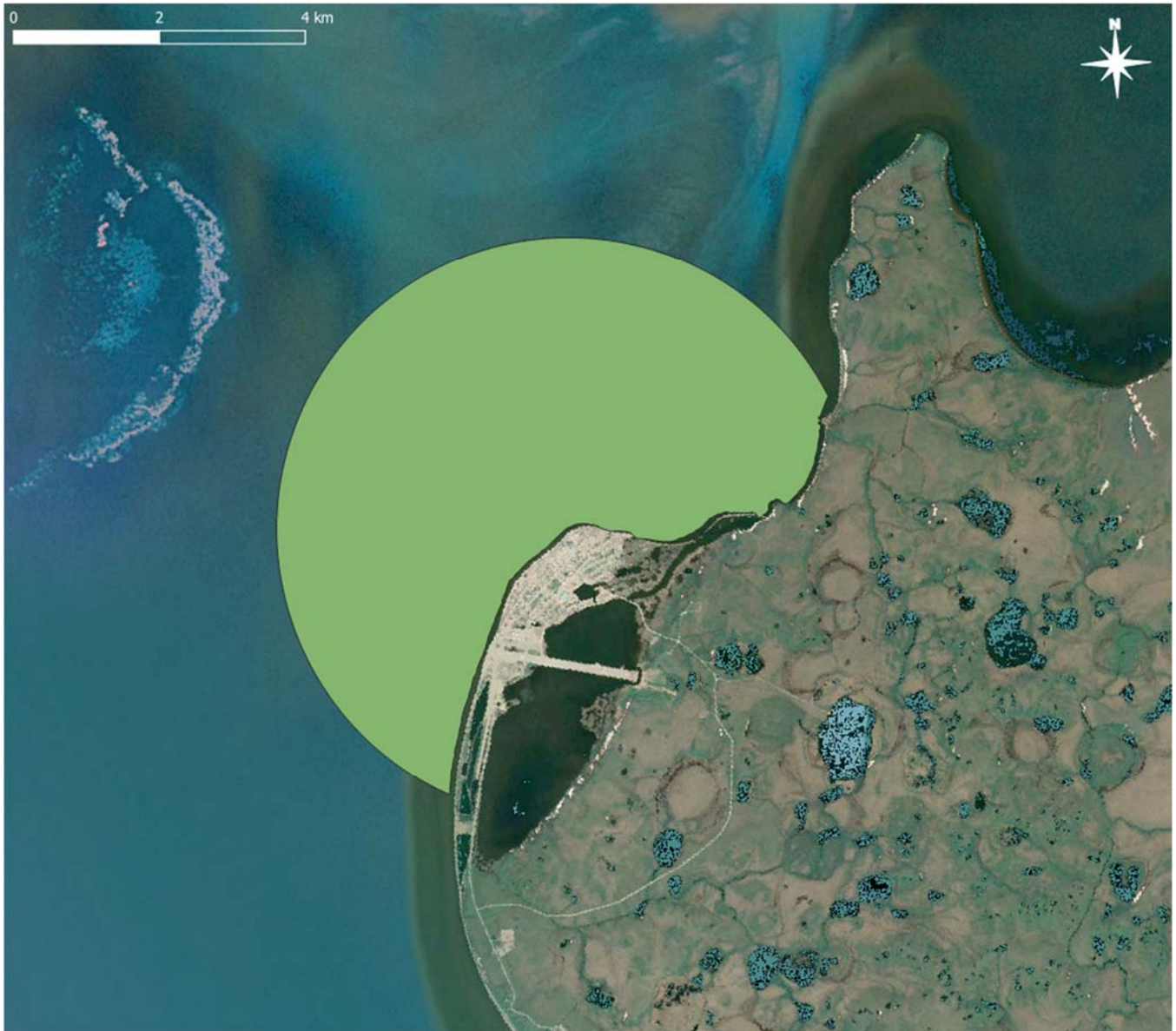
- Dates and times (begin and end) of all marine mammal monitoring.
- Construction activities occurring during each daily observation period, including how many and what type of piles were driven or removed and by what method (*i.e.*, impact or vibratory).
- Weather parameters and water conditions during each monitoring period (*e.g.*, wind speed, percent cover, visibility, sea state).
- The number of marine mammals observed, by species, relative to the pile location and if pile driving or removal was occurring at time of sighting.
- Age and sex class, if possible, of all marine mammals observed.
- PSO locations during marine mammal monitoring.
- Distances and bearings of each marine mammal observed to the pile being driven or removed for each sighting (if pile driving or removal was occurring at time of sighting).
- Description of any marine mammal behavior patterns during observation, including direction of travel.
- Number of individuals of each species (differentiated by month as appropriate) detected within the monitoring zone, and estimates of number of marine mammals taken, by species (a correction factor may be applied to total take numbers, as appropriate).
- Detailed information about any implementation of any mitigation triggered (*e.g.*, shutdowns and delays), a description of specific actions that ensued, and resulting behavior of the animal, if any.
- Description of attempts to distinguish between the number of individual animals taken and the number of incidences of take, such as ability to track groups or individuals.
- An extrapolation of the estimated takes by Level B harassment based on the number of observed exposures within the Level B harassment zone and the percentage of the Level B harassment zone that was not visible, and the days when monitoring did not occur.

Submit all PSO datasheets and/or raw sighting data (in a separate file from the Final Report referenced immediately above).

## **Appendix A. Monitoring Zones**

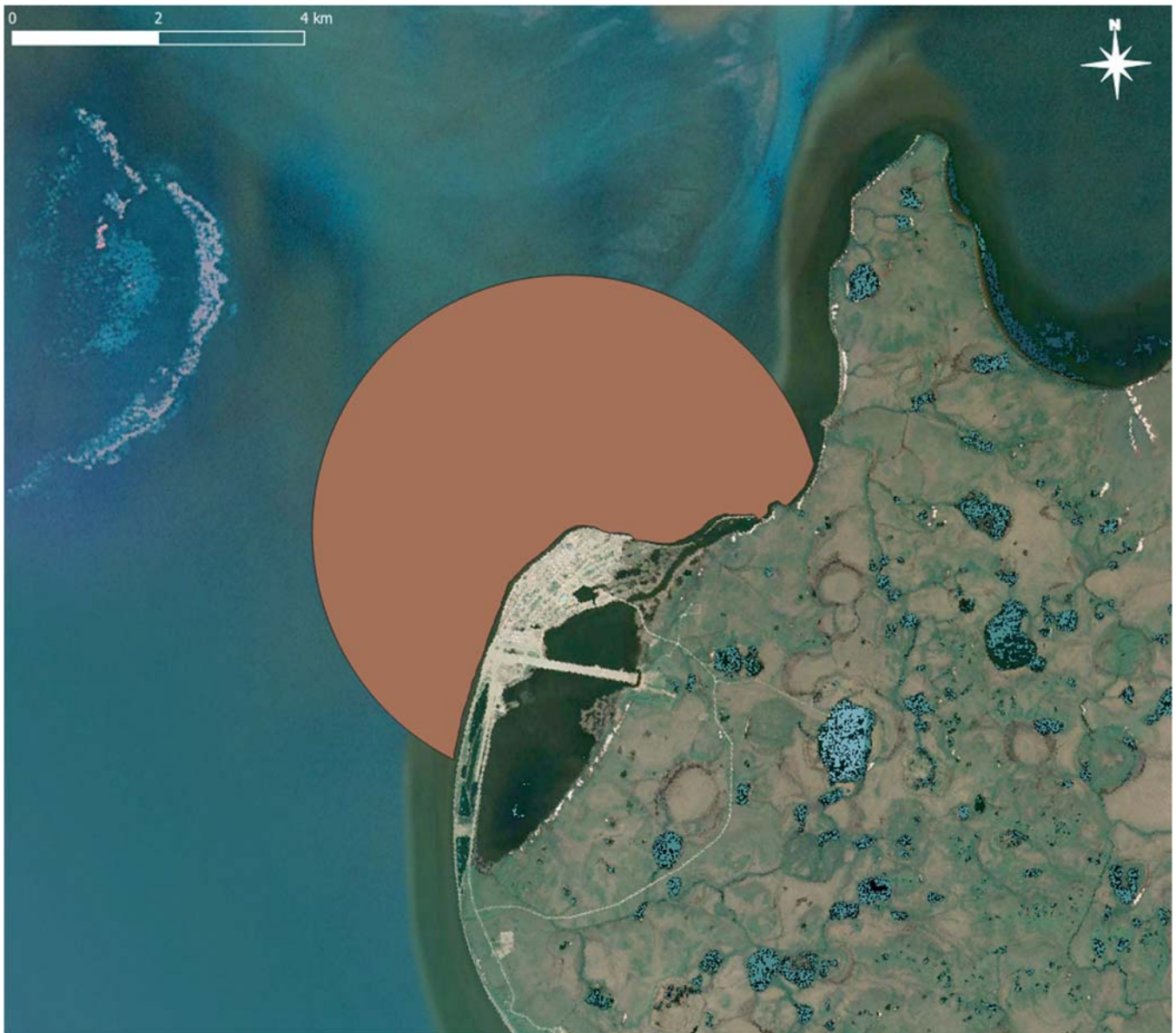


5200-Meter Monitoring Zone

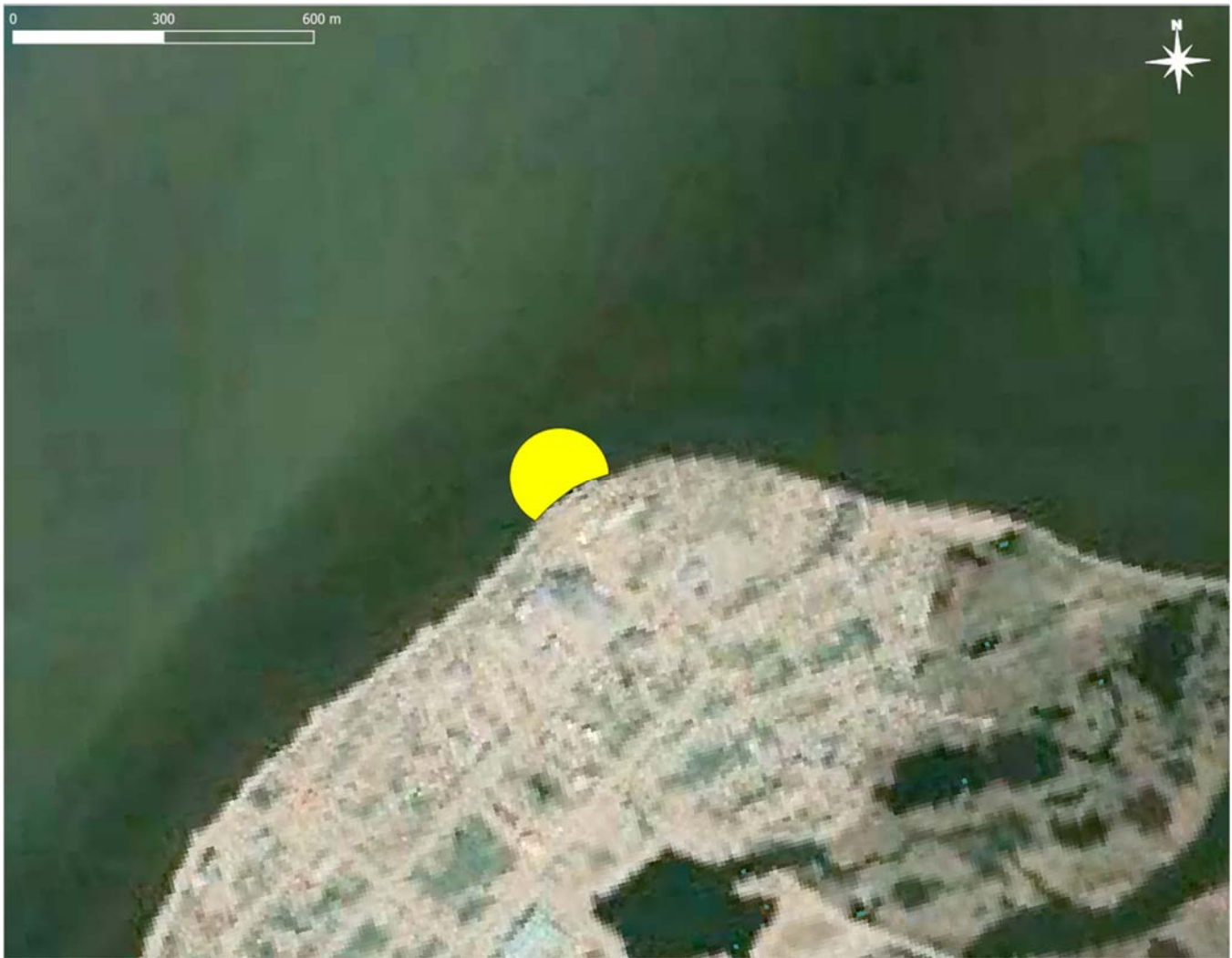


4000-Meter Monitoring Zone





3500-Meter Monitoring Zone



100-Meter Monitoring Zone





Anticipated Observable Area