Marsh Creek East Program

PLAN OF OPERATIONS
WINTER SEISMIC SURVEY

Submitted by:

Kaktovik Iñupiat Corporation (KIC)

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Marsh Creek Plan of Operations

Winter Plan of Operations 2020-2021 Project Description

1.0 Introduction

Kaktovik Iñupiat Corporation (KIC), is pleased to submit the plan of operations for the Marsh Creek East Program. KIC is requesting permits to conduct a seismic survey within the Coastal Plain (1002 Area) of the Arctic National Wildlife Refuge (ANWR) during the winter season of 2020-2021. KIC intends to conduct operations through a third-party acquisition company during open tundra travel winter season within this boundary. The estimated start date of December 2020 is to conduct the forward-looking infrared (FLIR) aerial surveys for maternal dens in December, followed by a second FLIR survey in January, followed by ice checking as soon as tundra conditions allow (typically late December/early January) and continuing with acquisition until the close of tundra or the sea ice deteriorates. Land ownership within this boundary area is the Alaska Native Corporation (ANC) surface land owned by KIC, ANC subsurface land owned by Arctic Slope Regional Corporation (ASRC), and federal lands owned by the Department of Interior (DOI).

2.0 Scope

KIC is proposing to acquire seismic data from within ANWR with the opening of the 1002 Area for oil exploration. KIC would like to be the entity that initiates the exploration phase of the 1002 Area as this area represents the interests of the people of the local communities. Operational activities that will be conducted as part of the 3D seismic survey within the program area includes an operator that will support one crew for one winter season to complete the acquisition. The planned operations will cover the winter season of 2020-2021, beginning with the FLIR survey for dens in early December 2020, a second survey in January 2021; mobilization approximately December 31, 2020 or tundra opening; and ending on approximately May 31, 2021 or tundra closure. Additionally, during the summer months of 2021, the operator will return to conduct cleanup activities and a thorough inspection of the area after all snow is gone, typically in the July to early-August 2021 timeframe. This phase of the project will require one helicopter for approximately 15 days, including possible weather days. The area of the cleanup will be determined by the completed program area during the winter season.

3.0 Location

The survey permit area encompasses approximately 847.8 sq. miles. The project area will include parts, or all the following townships:

All of
U006N035E, U006N036E, U006N037E, U007N035E, U007N036E, U007N037E, U008N033E, U008N034E, U008N035E, U008N036E
Part of
U005N034E, U005N035E, U005N036E, U005N037E, U005N038E, U006N034E, U006N038E, U007N031E, U007N032E, U007N033E, U007N034E, U007N038E, U008N031E, U008N032E, U008N037E, U008N038E, U009N032E, U009N033E, U009N034E, U009N035E, U009N036E

The program areas are defined by the enclosed boundary map in Appendix A.

4.0 Environmental Management

KIC and its operator are dedicated to minimizing the effect of operations on the environment. We are unified in a commitment to environmental excellence and continuous improvement. We will constantly assess our impact on the environment and will apply what past projects have learned over the past several years.

KIC and its operator will manage our equipment and follow procedures to minimize environmental impact caused by seismic operations. KIC's operator, SAExploration has vast experience across the North Slope and has successfully implemented many environmental improvements, of which a few are listed below:

- Reduced the number of equipment on the tundra through new technology, thereby reducing the total environmental impact of the crew.
- Minimized the compaction of the tundra and risk of damage through the use of articulating, rubber tracked, low ground pressure vehicles.
- Reduced vehicle size.
- Modified seismic equipment to minimize the risk of hydrocarbon spills to the tundra:
    - Containments systems
    - High resolution rear mounted vehicle monitoring cameras, aids in spill detection.
    - Daily and weekly maintenance of equipment.
    - Daily equipment inspections.
    - Hourly equipment walk-arounds.
    - The use of biodegradable, environmentally sensitive products is number one priority when operating in delicate regions such as the NPRA and ANWR. This includes lubricants, hydraulic fluids, greases and glycol that have readily biodegradable based oils that are virtually non-toxic, still

delivering maximum protection to our equipment aiding in preventing breakdowns.

5.0 Cultural Interface

KIC will coordinate its seismic activities with the local communities and villages to mitigate and to prevent potential conflicts when operating in close proximity of subsistence users. Prior to the commencement of the 2020-2021 winter season, KIC and its operator will hold a meeting with the village of Kaktovik to discuss the planned activities. These discussions will include text and visual documentation of the crew's activities, as well as the project boundaries. It is anticipated that as a result of these meetings, various protocols and procedures can be developed and implemented which will allow both subsistence and exploration activities to co-exist with respect to this project. Any subsistence hunting and fishing that will be in the area of operations can be documented at this time with the help of community members. All meetings will be documented and kept on file as a resource during and after activities. We are dedicated to enhance, sustain and develop locally based economic and employment opportunities primarily for the community of Kaktovik and other North Slope businesses and residents as needed.

6.0 Oversight Community Liaison

KIC will require a community liaison for subsistence and the native community of Kaktovik will be developed to address subsistence issues and will report back to the communities near the project area and the agencies overseeing the project. This community liaison will be the local point of contact and have the responsibility for the following:

- Meet with the Kaktovik Community prior to the season start to discuss the concerns.
- Document past subsistence activities in the area.
- Conduct scouting with the operator and a local subsistence representative from the community.
- Help to identify local subsistence observers to be employed to work on the seismic crew
- Address any key issues with communities.
    - "An issue is a significant opportunity, problem, factor or trend or a challenge to our mission, direction, way of doing business, or culture".

7.0 KIC's Operator's Hiring Processes

- The operator is required by KIC to attract and hire locally to employ the best in the industry to operate the crew.

- A comprehensive pre-employment screening is required for new hires.
- Prospective employees are administered a drug and alcohol screening test.
- Prospective employees must complete a Physical exam and Functional Capacity Exam.
- Prospective employees will be required to complete an eight-hour Health, Safety and Environmental orientation and task specific training as well as a competency assessment while on the crew.

The Operator's Training Processes will:

- Ensure the operations are managed by highly qualified arctic-experienced personnel.
- Provide unique employment opportunities for its employees.
- Holds an HSE Seminar for the full crew prior to project start.
- Provide comprehensive online training and testing.
- Hold daily orientation and safety briefings (for each shift) accounting for: hazards which could be encountered, other conflicting operations, daily conditions, and review of the day before and the day ahead.
- Tailgate meetings are held to review procedures in areas of known hazard or where operational requirements have changed from those expected.
- New hire and refresher training for employees, including:
    - Remote medicine training
    - Arctic survival training
    - first aid/CPR
    - Hazard recognition, rating and mitigation seminars
    - NSTC refreshers
    - Hazwoper training
    - Hazcom awareness training
    - Behavior based safety awareness training
    - Wildlife interaction training
    - Permit stipulation reviews

8.0 Marsh Creek East Permit Requirements

Provided below is a list of permits, approvals, authorizations and supporting documents required for the operations described in this Plan. Land ownership within this boundary area is the Alaska Native Corporation (ANC) surface land owned by KIC, ANC subsurface land owned by Arctic Slope Regional Corporation (ASRC), federal lands owned by the Department of Interior (DOI). and private holdings all within the NSB.

Agency	Authorization
Federal Government	
Bureau of Land Management (BLM)	Geophysical Exploration Permit / ESA consultation
US Fish and Wildlife Service (USFWS)	Incidental Harassment Authorization (IHA), Polar Bear Marine Mammal Protection Act consultation
National Marine Fisheries Service (NMFS)	Consultation while working on Sea ice.
North Slope Borough (NSB)	
Planning Department	Land Management Development Permit for seismic: Landing Strips: Mobilization Route
IHLC Department	Form 600
TLUI Department	Administrative Approval form 400
ICAS Department	Coordination
State of Alaska	
Alaska Department of Natural Resources, State Historic Preservation Office	Letter of Concurrence
Department of Natural Resources, Division of Mining Land and Water	Temporary Water Use Permit (if necessary) Tundra Travel Permit
Alaska Department of Environmental Conservation	Kitchen Potable Water Permits Discharge Permits
State of Alaska Fish and Game	Fish Habitat Permit, Stream and River Crossing and Water Withdrawal Permit (if necessary)
Other Approvals	
Native Allotments	“No go buffers” placed around lands.

9.0 Mobilization and Access

KIC’s operator will have equipment staged at existing facilities in Deadhorse. Camp and equipment will be transported via a preferred access route from Deadhorse to Kaktovik (red line in Appendix C) or along an secondary sea ice route (green line in Appendix C). The secondary selection of the sea ice route is dependent upon the thickness of the sea ice. The crew will mobilize to the program area. Mobilization will begin on or around December 31, but after the December FLIR, at which time KIC estimates there will be sufficient snow cover for mobilization and all permits for tundra travel from the State of

Alaska have been received. All mobile equipment will have a navigation system installed for logistics and hazard identification. All transit outside of the 1002 Area will be covered under the existing 2016-2021 Beaufort Sea Incidental Take Regulations (ITRs). The length of each trail is 219.6 km (136.5 mi) for the tundra access route (red line) and 106.8 km (66.4 mi) for the sea ice access route (green line). Using a 100-m (328-ft) buffer on each side, the area of the tundra access route is 43.9 km2 (17.0 mi2) and 21.4 km2 (8.2 mi2) for the sea ice route as shown on the map in Appendix C.

Tracked and wheeled tundra vehicles along with the camp will be used to transport the sled camp along the tundra. The camp will remain close to the survey activities and will move every five to seven days, depending on the survey progress and snow cover. When the survey is completed, the camp and equipment will travel along the tundra or sea ice to back to Deadhorse or to a Kaktovik pad location for a summer barge de-mob. Snow-packed trails will be made throughout the Program Area, these trails will be used to reduce environmental impact and crew travel /re-supply. The location of these trails will depend on snow coverage and terrain conditions. The Operator will attempt to coordinate with companies to use any existing or planned trails.

10.0 KIC's Contractors Operational Program

10.1 Survey and Ice check

Advanced crews will perform a survey for hazards, including ice integrity of rivers, lakes, and sea ice. One of the highest risk potentials for arctic operations is properly verifying the integrity of the ice. This will be done by "ice checking units" consisting of a Tucker vehicle capable of supporting 24-hour operations, manned by two personnel. Snow machines may also be used for survey and ice check operations. The survey units will be equipped with ground penetrating radar systems (GPR), which are extremely accurate on freshwater. In addition, each ice check unit is equipped with battery-operated ice auger which is used to verify the calibration of the GPR, measure ice depths on sea ice, or verify if depths where the GPR units cannot reach. Freeboard testing (ice stabilization) is also conducted when working on floating ice to ensure the ice has the strength to safely hold the equipment. Tucker vehicles that are conducting the advance ice check operations will also have a handheld or vehicle-mounted FLIR device to scan at tributary crossings for potential dens in defined polar bear denning habitat. Preliminary trails or snail trails will be established for every foot that the vibrators must travel on the sea ice, lakes or rivers, which will minimize the potential for breaking through the ice. Surveyors will also map each hazard that is discovered and placed into our navigation system that allows each vehicle to display the Program Area, hazards, and avoidance areas.

Snow surveys will be conducted to substantiate depths and will be recorded for equipment movement efforts. Thermistors will be deployed in the fall in representative locations near Kaktovik to gauge soil temperature and snow depth to comply with ROP 11. If snow or ice conditions are not adequate, they will continue scouting an area for

suitable snow cover. Areas not to be passable by the camp or vehicles will be lathed off for avoidance.
Snow survey crews will move out ahead of the main crew by approximately 7-20 days, accessing the Program Area. The crew includes camp trailers, fuelers, Steigers, Tuckers, and support trailers and consists of three to four crews of two personnel per crew. These crews work independently of each other to check ice conditions, identify and mark hazards, and scout safe routes for seismic operations. Depending on the number of locations needed to be verified, crews can complete and travel up to 10 miles per day per day. At the end of each day, crews return to camp. Once operations are too far from camp, the camp is moved to stay close to operations. When the main camp arrives with the recording crew, the advance camp will merge with main camp.

10.2 Willow Protocol

KIC requires the operator to operate in a manner that all its operations or activities do not damage or affect the social, cultural or community in the areas where we work. If it is determined that willows are in the area, from aerial or satellite imagery, then the crews on the ground will find access in and around dense willow areas or steep slopes using snowmachines, on foot or with tucker vehicles. The operator has developed a willow protocol approved by the agencies that ensures willow areas are mapped and defined by size and avoided where possible. It is the responsibility of the survey manager to ensure that willow areas are recorded on the hazard maps and appropriate markings are in place. During the ground truthing of willows, Subsistence Representatives will be responsible for assisting in identifying sensitive willow areas and defining size. Survey will mark trials to be follow by the crews if it is determined that the area is accessible. A copy of the willow protocol is attached for reference in Appendix G.

10.3 Recording Operations

The method of acquisition is Source Driven Shooting (SDS). combined with a Compressive Sensing design. Seismic operations will be conducted utilizing rubber tracked/buggy vibrators and wireless, autonomous recording channels (nodes). These nodes will be laid out on foot by crews traveling in rubber tracked approved vehicles. Vibrators will typically operate within a distinct area proximal to each other. Vibrator source points will be located along source lines. Geophone receiver lines will run perpendicular to source lines, and both source and receiver lines are spaced approximately 1320 and 660 feet apart respectively. Geophones will be located along receiver lines every 165-220 feet. Up to 5 receiver lines could be placed on the ground at one time. Wireless nodes and geophones will be laid out by crews on foot and through the use of rubber tracked tundra travel approved vehicles. Each station will be placed individually and will be surveyed by GPS upon deployment. Upon retrieval, all GPS data is then entered into a database.

Using the SDS methodology, multiple vibrators can collect data at the same time. This methodology means that only a single vibrator is required to travel down any source line, thereby reducing risk compaction or damage to the tundra. The AHV IV Vibrators will only operate on snow covered tundra or grounded sea ice. The lighter Univibes are utilized to further reduce potential disturbance in narrow riverbeds and on ungrounded lakes, reducing the risk from working in areas that do not have grounded landfast ice, and reduce noise levels.
Recording Operations continue for 24 hours per workday and are based on two 12-hour shifts. Communications with the crews while out in the field will be via VHF radio systems and wireless data transfer radios.

10.4 Camp Facilities

Each camp can accommodate up to 180 persons. Equipment included at camp stations will include long haul fuel tractors, remote fuelers, water maker, incinerator, resupply and survival sleigh, tractors, loaders and tuckers. Sanitary conditions in the kitchen and diner and washrooms will be maintained in full compliance with governmental regulations. Gray water will be filtered to meet the discharge requirements of the Alaska Department of Environmental Conservation (ADEC) Alaska Pollutant Discharge Elimination System (APDES) permit prior to discharge; a current APDES discharge permit is in place for this purpose.

The camp may stay at current location up to seven days. Typically, the camp will move 1-2 miles every 5-7 days, which could be 4-6 camp moves per month. Moves are determined by the efficiency of the crew or the conditions of the tundra. Camp locations are prescouted by the sub rep and project manager prior to occupying an area. The camp will generally remain in the center of the spread moving as the spread moves. A maximum footprint for a large camp is approximately 300 ft x 400 feet.

Mobilization of equipment and vehicles will occur coming off of a pad in Deadhorse and travel along our mobilization route as described in Appendix C.
A pre-determined route will be used to move equipment to the project location. Camp travels in a single file configuration pulled by a rubber tracked Steiger or CAT. Each string of camp has five trailers and typically camp consist of eight strings but can consist up to 10 strings. Camp trails during project will be scouted out in advance by project manager or survey personnel to avoid hazards and to measure and ascertain proper snow depth.

The HSE advisor and the local hire subsistence representative will revisit every camp site, after camp has moved on, to review the area and sign-off that no damage occurred.

10.5 Water Withdrawal

Potable water will be produced at camp with a skid-mounted snow-melter. Water is produced by melting snow or if it is a low snow year this can be supplemented by withdrawing water from lakes, it is then processed through our ADEC approved water system. The operator will identify lakes and will be permitted if used. If lakes are used, the operator has fish and game approved water withdrawal pumps that will be utilized during this process. If there is not an adequate source of snow, water may need to be transported to each camp from an approved source, either in Kaktovik or Deadhorse.

10.6 Temporary Snow Airstrips

The project will need airstrips to transport crews on crew change days. Having temporary airstrips will save several hours of tundra travel. The operator will create a flat area on predetermined grounded, frozen lakes, or tundra to serve as landing strip to receive the aircraft for crew changes. When creating a landing strip on the tundra, there will be no tundra disturbance or impact as in compliance with ROP 11 (b)(c), but an effort will be made to find a level area and then groomed to help the aviation operator have a safe landing on level ground with skis.
An advance scouting trip will be identifying grounded lakes and or tundra locations that can be used for this purpose. The landing strip will only be on areas that have adequate space for safely landing aircraft. On lakes, a rubber tracked Steiger with a blade will clear the snow down to ice approximately 75-100 feet wide and 2300 to 3500 feet long for the aircraft to land. Black bags filled with snow will be placed along the side of the berm to delineate the edge of landing strip along with lighting.

After crew has mobilized and initial scouting has been done lakes which may support this operation will be documented for possible airstrip locations. The GPS location of the landing strip will be documented.

The strips will be used for landing and will not be maintained unless the same location is needed again. After use of the strip is no longer necessary, the crews will inspect the location and record that area that was used by GPS location to be included in the final reporting. An example of airstrip is listed in Appendix E.

10.7 River Crossings

There may be areas where floating ice is encountered that may not safely support the weight of some equipment. In these cases, the Operator will permit this activity with the State of Alaska Department of Fish and Game (ADF&G) to apply water to increase the thickness of the ice to establish temporary river crossings. There also may be areas on rivers, streams, and lakes that need to be protected with snow for traversing from tundra

to ice for crossing. As identified in Section 10, KIC has committed to several mitigation measures specifically for drainages through reduction of the number of source lines crossing major drainages by using a slope analysis tool. The slopes along these lines can be measured during the preplanning and advance crew phases of the operations. Equipment will only cross these areas at the lowest possible relief points, as vibrators are not able to shake on slopes greater than 10º. KIC is requiring its Operator to place a 25-m (82.5-ft) buffer on each side of slopes greater than 10º. For areas that are defined denning critical habitat (16° slope and height of 1.6 m [5.2 ft]), a 100 m (328 ft) buffer will be used. The area will be mapped using digital elevation modeling (DEM) data for slopes. Ramp areas or transits across these areas will be cleared by the advance ice check crews with handheld or truck-mounted FLIR prior to movement. An example of pre mapping slope >10° can be seen below (Figure 1) as well as a previous survey post-plot diagram (Figure 2) demonstrating this best practice.

The Operator will make snow ramps in these areas and establish that the ice is grounded or the ice is of sufficient ice depth to cross. This will eliminate any impact to river banks and/or tundra. Scouting by the Operator will determine locations of river crossings based on the best available information from advanced scouting, environmental and terrain conditions, local knowledge, surveys, and operational safety.

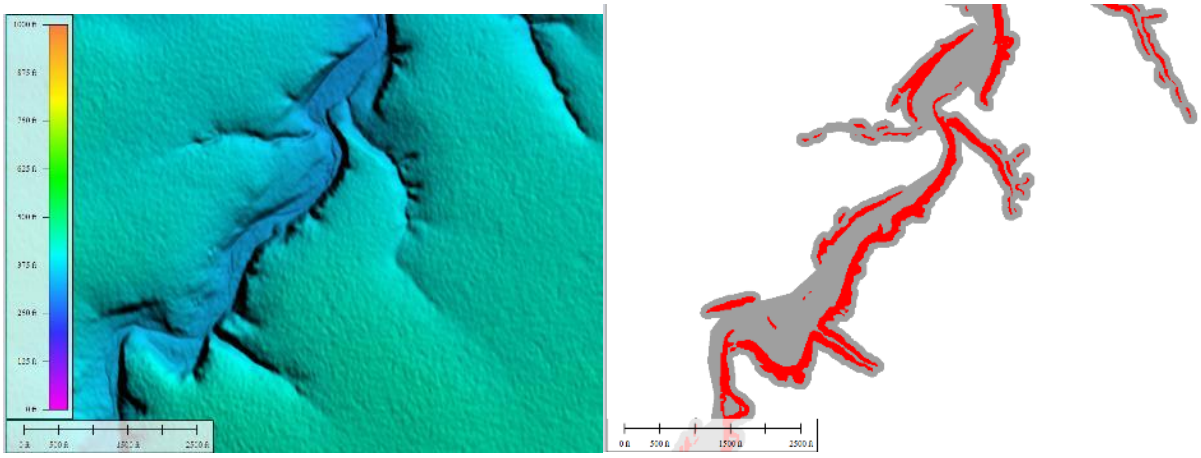


Figure 1. Example of Pre-Mapping of Survey Area.

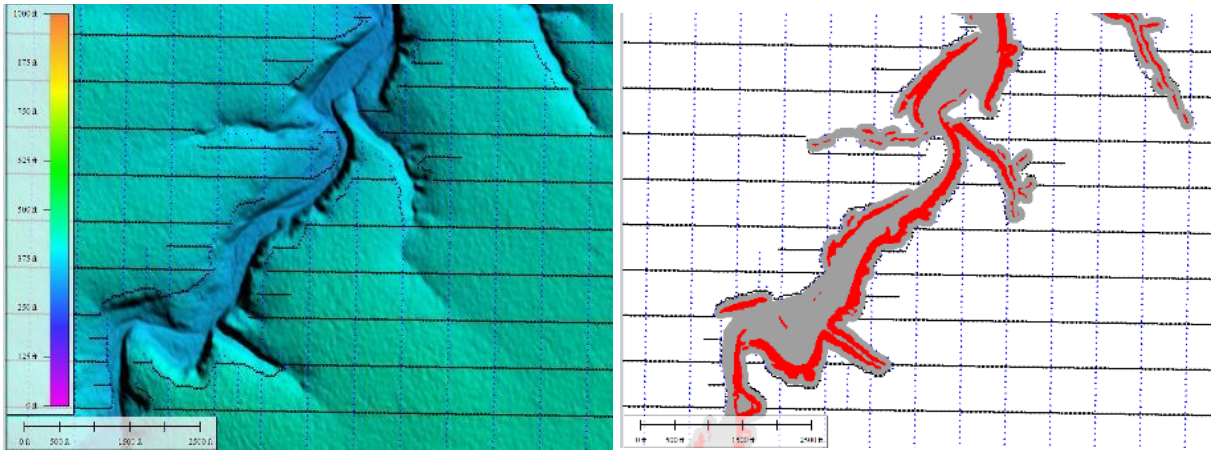
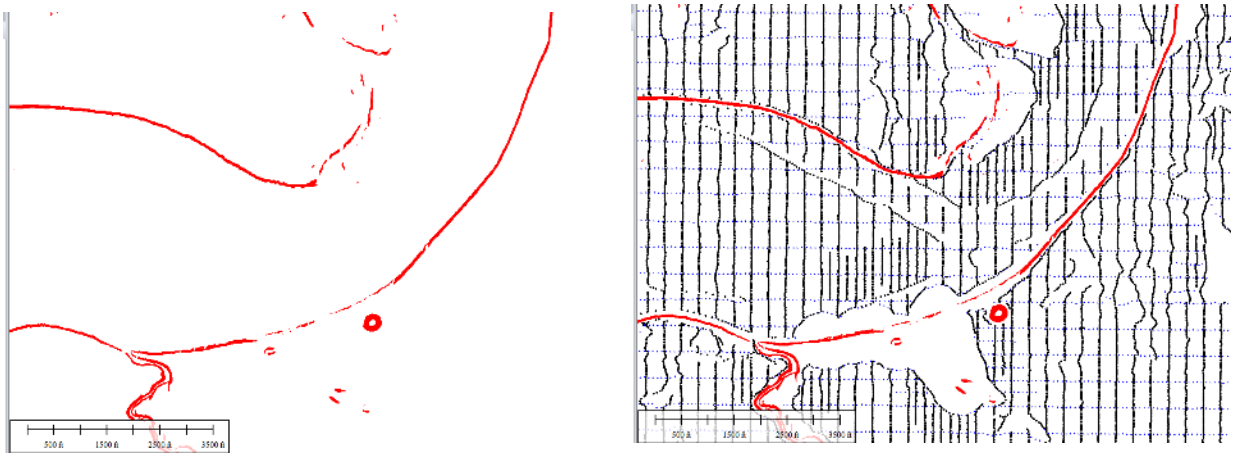


Figure 2. Actual Positions from 2020 Acquisition



10.8 Fuel Supply and Storage

Long haul sleigh tanks will be used for fueling. All fuel will be ultra-low sulfur for vehicles and equipment. Fuel will be delivered using over land Rolligon or rubber tracked carriers. In the event the supply is disrupted by weather or other unforeseen events fuel may have to be delivered by aircraft, the operator will use temporary airstrips for these occasions. An advance scouting trip will assist in identifying existing airstrips if any that can be used for this purpose. Off-loading fuel from aircraft will be done in accordance with operators fueling procedure. Fueling storages and fueling activity will be located at least 100 feet from any water body. All equipment fuel locations will be tracked and recorded. The fueling procedures include spill management practices such as drip plan placement under any vehicle parked and placement of vinyl liners with foam dikes under all valves or connections to diesel fuel tanks. All fuel tanks are double- wall tank construction. Fuel dye is added to all fuel as part of spill detection.

All spills, no matter what the size are tracked and cleaned up by operator and used for spill prevention operations. The operator also holds a Spill Prevention Countermeasure Control (SPCC) plan for our fueling and fuel storage operations associated with seismic operations. This SPCC plan is site specific and will be amended for each new project. All reportable spills will be communicated through the proper agencies and reporting requirements.

10.9 Waste Management

Food waste generated by the field operations will be stored in vehicles until the end of the shift. The garbage will then be consolidated at camp in wildlife resistance containers for further disposal. All food waste generated in camp will also be collected and stored in the same consolidation area. A skid-mounted incinerator will be used for daily garbage waste. This equipment falls within the regulatory requirements of 40 CFR 60. This cyclonator will use on an average 1 to 2 gallons of fuel per hour while in use. The use of electricity is for the motor to the unit that maintains the air to fuel mixture. The operator will collect data to provide the required records on a calendar basis of description and weight of camp wastes burned.

Any wastes generated by seismic operations will be properly stored and disposed of in accordance with applicable permit stipulations and operator controls. Food waste is continually incinerated to avoid attracting wildlife. Gray water generated from the mobile camp will be discharged according general permit AKG332000 and 18 AAC 83.210 and NPDES discharge limits. Toilets are “PACTO” type to eliminate “black water”. Ash from the incinerator will be back-hauled to the North Slope Borough disposal facility in Deadhorse. The sleigh camp will move approximately every two to five days depending on weather conditions. An inspection by the HSE Advisor will be done after camp has left to ensure that the area is clean of all debris.

11.0 Wildlife

Wildlife that may be in the area during the winter season are owls, ravens, arctic fox, wolverine, musk ox, and, possibly, over-wintering caribou, ringed seals, and polar bears. Grizzly bears also inhabit the general area in the project but are likely to be inactive during the winter season. Polar bears may be seen along the coastal areas and out on the sea ice. Although encounters with polar bears or grizzly bears are unlikely, the operator and its contractors will exercise caution during the project. Should a grizzly bear or polar bear be encountered, KIC requires the operator follow the procedures as outlined in our comprehensive Wildlife Interaction Plan that is approved by the Alaska Department of Fish and Game (ADF&G) and United States Fish and Wildlife Service (USFWS). Food and food waste will be kept inside vehicles while out in field. All polar bear sightings will be reported to the USFWS as per the authorization from USFWS. Any type of bear dens suspected or confirmed will be reported to the USFWS or ADF&G agency personnel.

KIC through its contractors and operator will work with agencies to avoid and minimize interactions with wildlife; this includes abiding by relevant regulations and obtaining required authorizations. Our Wildlife Interaction Plan is listed in Appendix F.

12.0 Historic and Cultural Resources

KIC has commissioned a Cultural Resources Study to identify the historic and cultural resources in the program area. The Cultural Resources Study will inform KIC's operator's activities. Cultural resources known and new that fall within the mapped area will have avoidance buffers placed around them. Any known existing studies will be reviewed. The operator will not be accessing any native allotments without permission of the owners. A licensed archeologist will work with the NSB, State of Alaska and the Refuge manager to review existing records. The studies will include the use of the Alaska Heritage Resource Survey (AHRS) database, maintained by the Alaska Department of Natural Resources (ADNR) and the Traditional Land Use Inventory (TLUI) database, maintained by the NSB.

Previously recorded and any new AHRS sites will not be affected by any of the proposed seismic activities. All areas will have 500-foot buffers placed around them as a non-activity zone. These buffers will be placed in our navigation system and placed on maps to ensure no vehicles enter avoidance areas.

13.0 Summer Cleanup Activities

After all snow is gone, in the late-July to early-August 2021 timeframe, a single helicopter will be contracted to perform flyovers of the Program Area looking for any debris that may have been left behind in July or August. The cleanup crew will also land inspect all camp locations and any area that had an unplanned release or tundra

disturbances. Source and receiver lines will be travelled and inspected. The aircraft will land and pick up any seen debris during the flight travels on the program area. Typically, each day of flyover inspections, there may be roughly 100 miles of flight time and approximately 30-40 landings. This phase of the project will require one helicopter for approximately 15 days, including possible weather days. The area of the cleanup will be determined by the completed portion from that winters acquisition and will not go beyond the Program Area.

14.0 Communication & Supervision

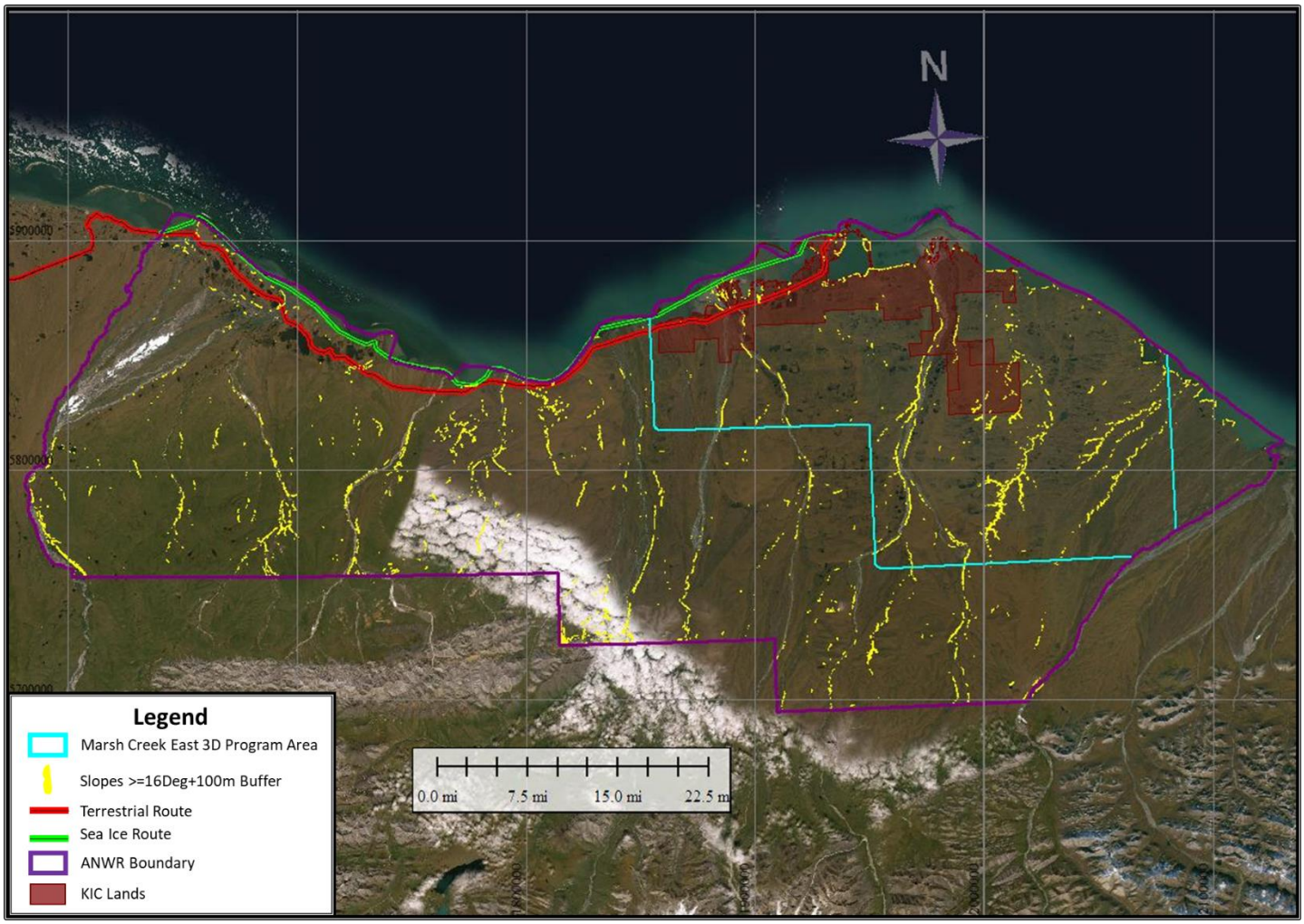
The following personnel can be contacted for information during the permitting survey program are:

Matthew Rexford KIC, President Applicant Matthew.Rexford@gmail.com 907-640-0082
Teresa Imm KIC Representative Teresa-imm@outlook.com 907-519-5057

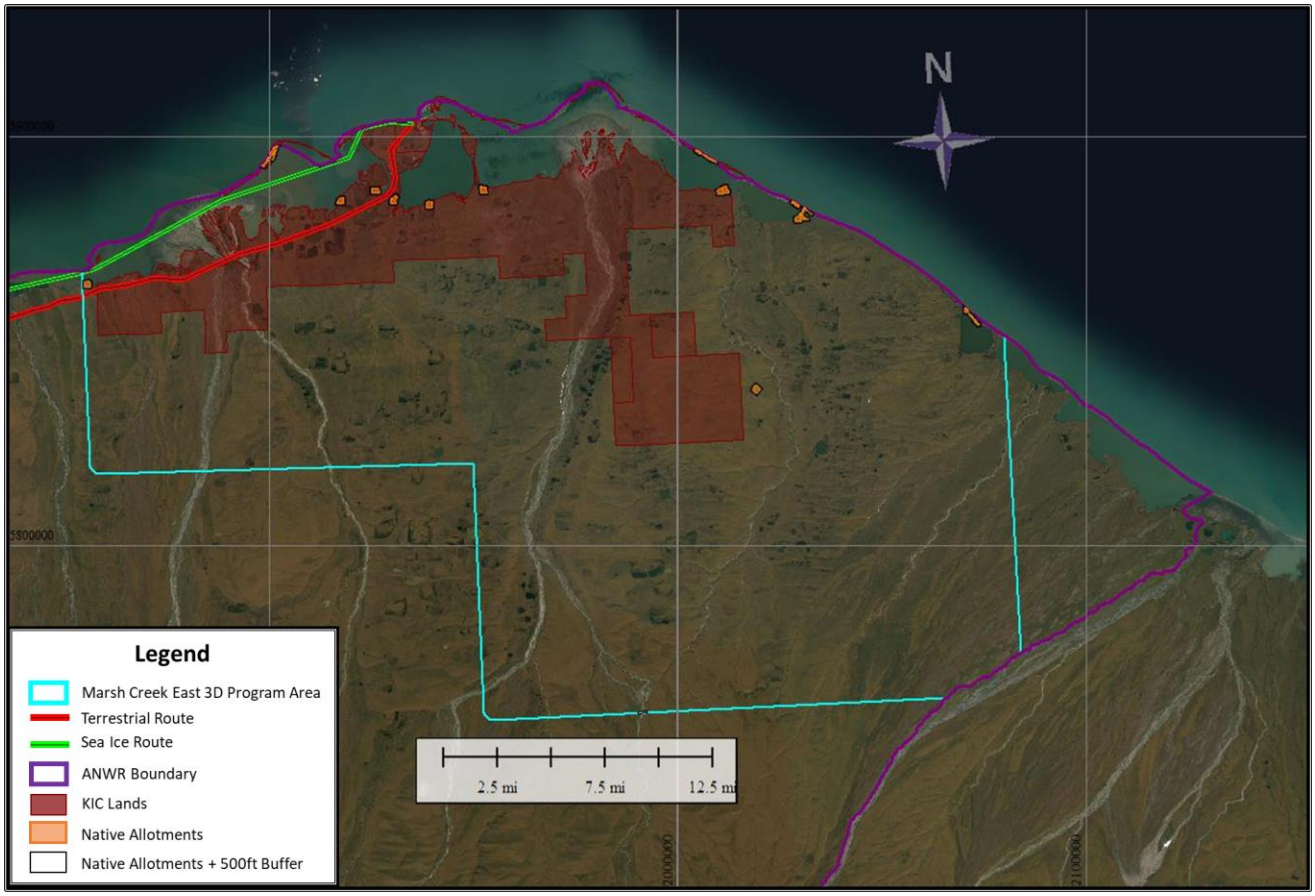
15.0 Appendices

Appendix A - Project Area Maps
Appendix B - Equipment List
Appendix C - Example Map of Mobilization Route
Appendix D- Equipment Pictures
Appendix E- Example of Temporary Airstrip
Appendix F- Wild Life Interaction Plan
Appendix G- Willow Protocol
Appendix H- Equipment Weights

Appendix A: Project Area Maps
Project Area



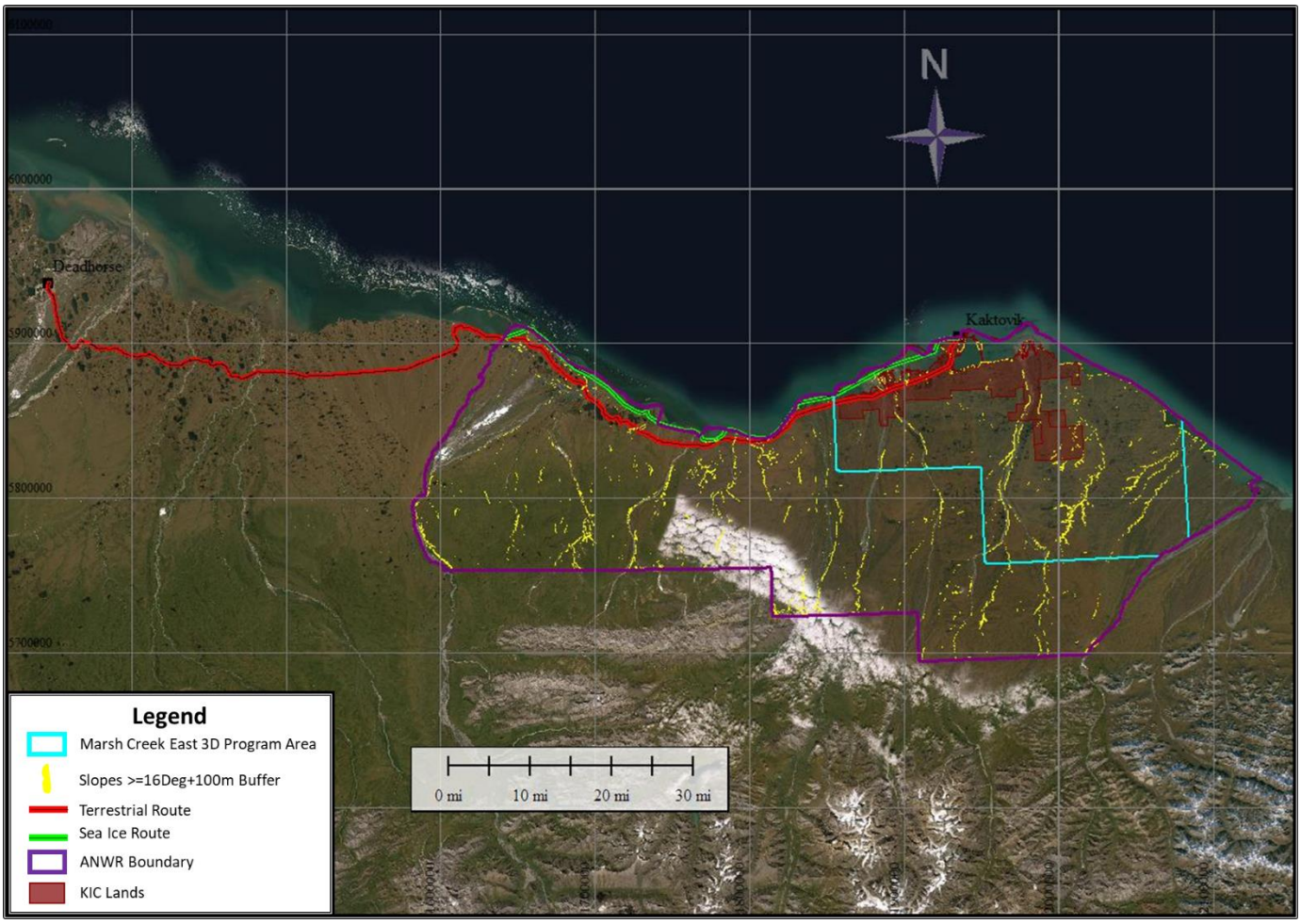
Project Area with Land Status



Appendix B: Operator's Equipment List Per Crew

Number	Equipment Type	Description
12	AHV-4 vibe trucks	Tracked Vibrator
9	Case or Steiger tractor	Fuel, camp and ramp support
2	Dozer / loader	Camp support
8	Fuel tanks	Tracked and ski tanks
3	GPS base	Survey station support
10	Support tracked trailers	Support to camp
8	Taco trailers	Ski trailers to haul recording equipment
10	Tucker	Node Tuckers
5	Tucker	Ice Cat
4	Tucker	Support tuckers
1	Tucker	Client Tucker
3	Tucker	Personal Carrier
2	Piston Bully	Groomer
1	Skid Steer	Camp support vehicle for lifting
4	Snow Machine	Support around willows
2	Univibe	Vibrator for water bodies
30000	Nodes	Recording equipment (nodal receivers)
50	Camp trailers	160-180 man camp trailers

Appendix C: Example of Mobilization Route



Appendix D: Operator's Equipment Pictures

NODES
Cable-Free/Radio-Free Autonomous Data Recording
Seismic Recorder (GSX)

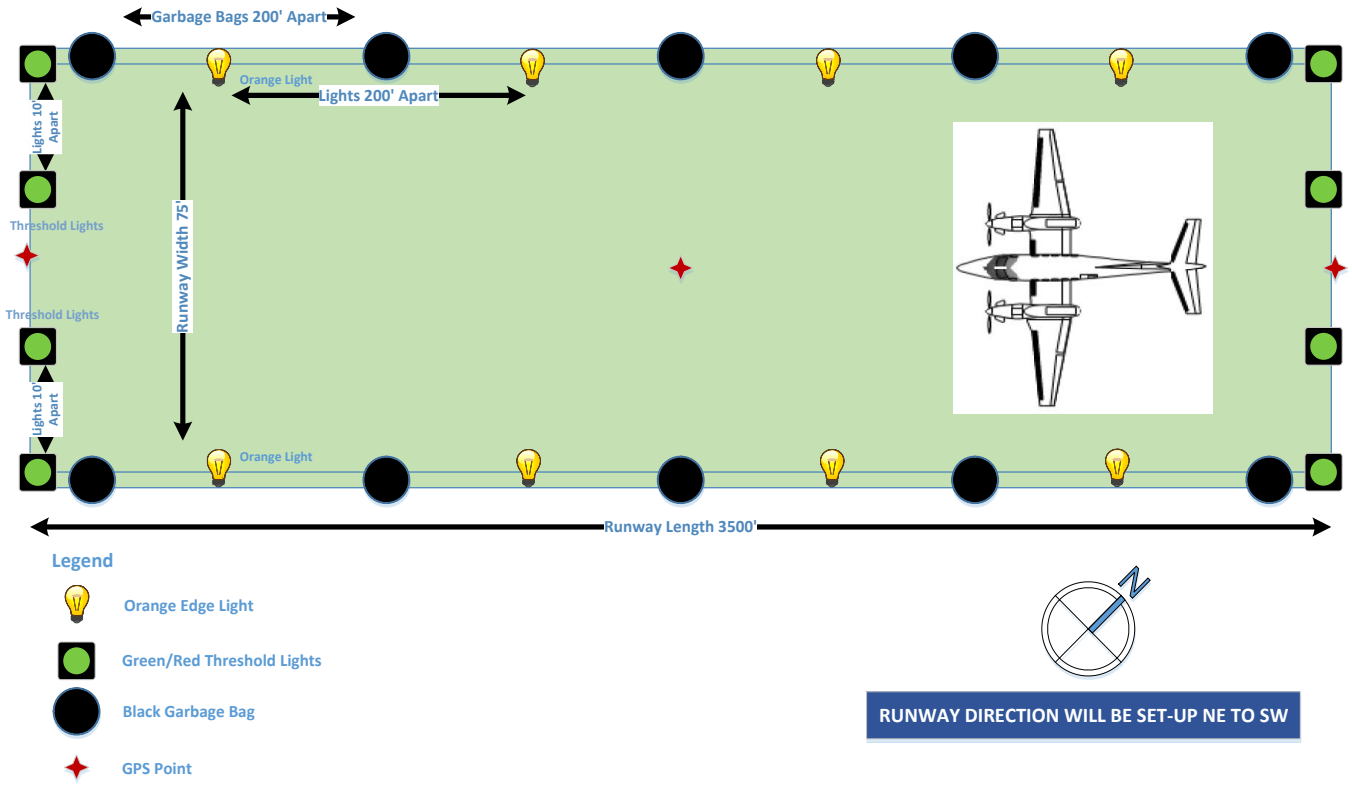
Tucker

Approximately 90,000 pounds with Tracks, 60,000 with tires
AHV4 Commander Vibrator (Source Equipment)

UNIVibe

Vibe rectangular baseplate

Appendix E: Example of Temporary Airstrip



Appendix F: Polar Bear and Other Wildlife Interaction Plan

Wildlife Interaction Plan/ Mitigation Plan

Purpose: To provide guidelines for monitoring and prompt reporting of polar bear sightings or incidents involving animals that are protected by the Marine Mammal Protection Act (MMPA) of 1972. This document is intended to meet the requirement of a site specific Polar Bear Avoidance and Interaction Plan (Plan) as required by 50 Code of Federal Regulations (CFR) 18.124(c)(3), to meet the requirements for a Marine Mammal Monitoring and Mitigation Plan (4MP) as required by 50 CFR 18(g), and to meet the requirements for an Incidental Harassment Authorization (IHA) for the non-lethal, incidental and non-intentional take of polar bear. Any permit stipulations that may be requested by permitting agencies will be added to this document, as necessary.

Objectives of 4MP:

- Real-time mitigation
- Estimate the number of “takes” of marine mammals by harassment
- Collect data on the occurrence, distribution, and behaviors of marine mammals in the areas where the activity was conducted; and,
- Evaluate the distances, distributions, behaviors, and movements of marine mammals relative to the IHA activities

Responsibility: The Project Manager(s) has overall responsibility. The Project Manager is responsible for coordination and implementation of all surveillance or monitoring personnel who deal with wildlife/human encounters, sightings, and reporting on the North Slope.

Monitoring: Crews will be trained to maintain a constant level of awareness for the potential presence of polar bears. In areas where the potential of an encounter is high, KIC requires the operator to implement a local person for dedicated watch for polar bears in the area of operations. Continuous watch will always be in effect and the crew will have a dedicated person or persons for oversight in areas of known activity.

A polar bear training program will be provided to all workers prior to the start of operations or at commencement of employment on the North Slope. Polar bear awareness refresher briefings will be held as part of regular safety briefings. Workers will be instructed to notify the Project Manager or Health, Safety, and Environment (HSE) Advisor immediately whenever a bear is detected. All personnel will be aware of the restrictions regarding "taking” of polar bears as described by the MMPA.

If a polar bear is observed in the immediate area, workers will stay inside to avoid potential interactions with the bear. Approaching a bear for any reason is strictly forbidden. This protocol will be kept on site during all operations.

Mitigation:

Land based activities:

1. Utilize digital elevation model (DEM) data to help with the pre-planning effort

in and around the defined denning critical habitat.

a. KIC requires the operator to placing a 100-m (330-ft) buffer on each side of defined denning critical habitat (16° slope and height of 1.6 m [5.2 ft]). The critical habitat will be entered into the navigation system that allows each vehicle to display the Program Area, hazards, and avoidance areas.

2. KIC requires the operator to placing a 25-meter (82.5 ft) buffer on slopes of 10 – 15 degrees for all source points. Two aerial FLIR surveys will be conducted in December and January for maternal polar bear dens to avoid disturbance. An experienced scientist will be on board the survey aircraft to analyze the infrared imagery real-time. The data (infrared video) will be available for United States Fish and Wildlife Service (USFWS) viewing immediately upon return of the survey aircraft to the base of operations in Deadhorse. Data can also be transmitted electronically to USFWS in Anchorage for review. If a suspected den site is located, KIC will consult with USFWS to analyze the data and determine if additional surveys or mitigation measures are warranted. The survey shall be approved by USFWS and reports will be submitted to the agency.
3. Ramp areas or transits across these areas (major drainages and denning critical habitat) will be surveyed for dens using handheld or truck-mounted forward-looking infrared (FLIR) prior to movement.
4. All personnel will use caution when operating near polar bear denning habitat during the denning period. When a polar bear is detected near any part of the operation, the Project Manager or HSE Advisor will be notified immediately and they will then notify the Permits Manager. Personnel will remain inside to avoid interactions with the bear.
5. Survey crew with polar bear awareness training will lead vehicles in the field to scout for signs of polar bears, including potential unknown den sites.
6. Human safety and the protection of human life is the primary priority. The second priority is to avoid any situation that could potentially injure a polar bear.
7. If a polar bear is observed in the camp, the Project Manager will be notified. The “air horn” will be sounded with 5 short blasts and a radio announcement of the sighting will be made on all crew channels. At the sound of the air horn, all personnel will go to the nearest vehicle or camp trailer and remain inside with doors and windows secured until the ALL CLEAR is given over the radio.
8. If a polar bear is observed in the field, the driver of each vehicle will inform members of their crew to get inside the vehicle and wait until further notice.
9. If a polar bear takes refuge near or in a vehicle, the HSE Advisor will be notified immediately. No action will be taken unless authorized by the USFWS or their designated agents.
10. If a sighting is made by a standalone vehicle, the vehicle will not approach the bear. The crew will notify the Project Manager and/or the HSE Advisor to alert them. The crew will cease operations and avoid the bear. Workers

may move to a different location.

11. Personnel will avoid any known polar bear den by at least a 1.6 kilometer (km; 1-mile [mi]) distance in all directions. Known dens with this exclusion zone will be logged into the Tiger-Nav system.

12. SAE will observe a 1.6 km (1 mi) operational exclusion zone around all known polar bear dens during the denning season (November-April, or until the female and cubs abandon the area). An exclusion zone will not be removed without approval from USFWS. If an unknown den is discovered within 1.6 km (1 mi) of activities, work must cease, and the agency will be contacted for guidance.

13. A Polar Bear Sighting Report will be completed for every sighting of a polar bear(s) during operations. This report to the Office of Marine Mammals Management, Christopher Putnam by phone (907-786-3810), fax (907-786-3816), or email (fw7_ak_marine_mammals@fws.gov) within 24 hours.

14. If tracks or other potential signs of polar bear presence are observed, the employee shall photograph the tracks and report to the Project Manager or HSE Advisor.

15. There will be no hunting or fishing on this project.

Waste Management:

1. A skid-mounted incinerator will be used for solid waste incineration. Garbage containing food will be bagged, stored inside bear-proof facilities, and incinerated two times per day. The resulting ash will be back hauled to the North Slope Borough disposal facility during the winter season.

2. All garbage will be properly stored, and no garbage will be left in the vehicle at the end of shift.

Subsistence Hunting:

1. KIC's Operator is required to employ a subsistence advisors / representative on the crew.

2. Project vehicles and aircraft will avoid subsistence hunting areas.

Aircraft:

1. Aircraft will not operate within 805 m (0.5 mi) of a polar bear(s).

2. Aircraft will remain 457 m (1,500 ft) above ground level (AGL), except during landing and takeoff, and when required for safety reasons such as inclement weather. Aerial infrared surveys for maternal polar bear den will be conducted below this altitude with USFWS approval.

3. During summer flyovers, the helicopter will not land within 805 m (0.5 mi) of a polar bear(s).

4. If a polar bear is observed while the aircraft is on the ground, personal will board the aircraft and leave the area. The pilot will not fly over the bear.

5. Aircraft routes will be planned to minimize potential conflict with active or anticipated subsistence hunting, as determined through community

consultations.

Reporting:

The Project Manager, HSE Advisor, or Permits Manager will be notified immediately when a polar bear is observed and will be responsible for completing the Polar Bear report form. The Permits Manager will send sighting reports to the USFWS when a bear is observed.

Permits manager will send all Reports to:

Christopher Putnam
USFWS-Marine Mammals Section
1011 East Tudor Road
Anchorage, AK 99503
Telephone: 907-786-3800
Fax: 907-786-3816
Email: fw7_ak_marine_mammals@fws.gov

Field Operating Procedure
Polar Bear Protocol

Purpose: To provide guidelines for assuring the prompt reporting, investigation, and documentation of Polar Bear sightings or incidents involving animals that is protected by the Marine Mammal Protection Act of 1972.

Scope: This procedure applies to all sightings or interaction with Polar Bears occurring during operations on the North Slope.

Responsibility: The Project Manager and HSE Advisor have overall responsibility. They are responsible for coordination and implementation of all surveillance or monitoring personnel who deal with wildlife/human encounters or sightings on the North Slope.

Procedure:

1. A polar bear den detection survey shall be conducted prior to activities occurring in polar bear denning habitat during the maternal denning period (November to mid-April). All personnel must use caution when operating near polar bear denning habitat during the denning period.

2. When a Polar Bear is detected near any part of the operation, any employee (permanent, temporary, or contract) or visitor shall immediately notify the Project Manager or HSE Advisor.

3. The first priority is the protection of human life. The second priority is to avoid any situation in which a bear will be harmed.

4. The Administrative Office will sound the “air horn” with 5 short blasts and make a radio announcement on all crew channels of the sighting. At the sound of the “air horn, EVERYONE in camp is to go to the nearest trailer or vehicle and remain inside with doors and windows secured until the ALL CLEAR is given over the radio. The all clear signal is a long blast on the “air horn”.

5. In the field, drivers of each vehicle will advise the personnel they are responsible for and have them get inside the vehicles and wait until further notice.

6. If the bear takes refuge near, in, or under a trailer or vehicle and does not appear likely to move, crew HSE security will be notified depending on the location of operation. No action will be taken unless authorized by the USFWS or their designated agents. The District Manager and North Slope Security must be contacted at this time.

7. Areas which have been identified as possible denning sites will be avoided per the permit stipulations. (Typically, prior to mobilization, Polar Bear den locations are received and entered into our hazard mapping system.) Survey crew, trained in Polar Bear awareness, will be responsible as the lead vehicles in the field to scout for possible additional locations and bring to the crew’s attention at the daily safety meetings those locations. Possible locations will be staked in the field and entered on the hazard maps for the crew per permit stipulations. If a den is encountered protocols from USFW will be followed. Operations will then be evaluated and modifications to the operation will be implemented that will allow the avoidance of the denning site and the continuation of exploration activity.

8. When a sighting is made by a stand-alone vehicle, such as the survey crew, they must not approach the bear further. The crew will notify the Project Manager or HSE Advisor via radio to alert them. The crew must avoid the bear and if necessary cease operations until the bear has left the area. The bear’s distance from camp will determine whether step 3(b) is required. All personnel must remain at least a one mile distance in all directions from any known bear dens. The radio announcement must indicate whether this will be necessary or not. An all-clear signal will be sounded when the area is determined to be safe.

9. After any individual sighting or interaction with Polar Bears during operations on the North Slope, a Polar Bear Sighting Report shall be completed by the HSE Advisor. This report to the Office of Marine Mammals Management as listed in the plan of operations.

10. A skid-mounted incinerator will be used for solid waste incineration. All garbage that contains any food will be bagged, stored inside the facilities and incinerated on site two times per day. The resulting ash will be back hauled to the North Slope Borough disposal facility during the winter season.

11. Winter crews will be trained to maintain a constant level of awareness for the potential conflict with Polar Bears. In areas where high potential of conflict exists, the operator will evaluate and if required, place a dedicated watch for Polar Bears in the area of

operations. This is not to say that a continuous watch is not always in effect but rather that the crew will have a dedicated person or persons for oversight in areas of known denning or activity. A Polar Bear education program will be given to all workers on-site prior to the start of operations or at commencement of employment on the North Slope. Polar Bear awareness refresher briefings will be held as part of regular safety briefings. A dedicated Health, Safety and Environmental (HSE) Advisor will be based at the camp for the duration of the winter seismic program, and workers will be instructed to notify the Project Manager or HSE Advisor immediately whenever a bear is detected. All personnel will be aware of the restrictions regarding "taking" of Polar Bears as described by the Marine Mammals Protection Act. Approaching a bear for taking pictures or any other reason is strictly forbidden.

12. Plan all aircraft routes to minimize any potential conflict with active or anticipated polar bear subsistence hunting activity as determined through community consultations.

Permits Manager will send reports to:

Christopher Putnam
USFWS-Marine Mammals Section
1011 East Tudor Road
Anchorage, AK 99503
Telephone: 907-786-3800
Fax: 907-786-3816

U.S. Fish And Wildlife Service
Marine Mammals Management
POLAR BEAR SIGHTING REPORT

Company: _____ **LOA #:** _____
Date: _____ **Observer Name:** _____
Time: _____ **am / pm / 24** **Phone/Email:** _____

Location: _____
_____

Latitude: _____ **Longitude:** _____ **Datum:** _____

Weather Conditions: Fog_____ Snow_____ Rain_____ Clear_____ Temperature_____°F / °C

Wind Speed_____ mph / kts Wind Direction (from) _____ N NE E SE S SW W NW

Visibility: Poor_____ Fair_____ Good _____ Excellent_____

Total Number of Bears: _____ (total number of bears & how many of each type)

	adult	sub-adult	2 year-old	yearling	cub of year
Male	_____	_____	_____	_____	_____
Female	_____	_____	_____	_____	_____
Unknown	_____	_____	_____	_____	_____

Closest Distance of Bear(s): from personnel_____ facility/vessel_____ m / yd / ft

Bear Behavior (Initial Contact): curious ignore aggressive walk run swim hunt feed rest other
_____

Bear Behavior (After Contact): curious ignore aggressive walk run swim hunt feed rest other
_____

Description of Encounter: _____
_____
_____
_____

Duration of Encounter: _____ **Possible Attractants Present:** Y / N

Describe Attractants: _____

Deterrents Used & Distance: If Yes, submit report within 48 hours of incident

Vehicle	Y / N	____	m / yd / ft _____	Spotlight/Headlight	Y / N	____	m / yd / ft ____
Horn/Siren/Noise	Y / N	____	m / yd / ft _____	Other (describe)	Y / N	____	m / yd / ft ____
Crackershell	Y / N	____	m / yd / ft _____	_____			
Rubber Bullet	Y / N	____	m / yd / ft _____	_____			
Bean Bag	Y / N	____	m / yd / ft _____	_____			

Report Sent To: FW7_MMM_REPORTS@FWS.GOV Date: _____ Time: _____

For further information contact USFWS Marine Mammal Office: 907-786-3800 or 1-800-362-5148

Other Wildlife Interaction Plans

Black bears / Brown Bears : (Ursus americanus) are the most abundant and widely distributed of the three species of North American bears. An estimated 100,000 black bears inhabit Alaska.

Black bears are most easily distinguished from brown bears by their straight facial profile and their claws, which rarely grow more than 1 ½ inches in length. Black bears have adequate sense of sight and hearing, but have an outstanding sense of smell.

Responsibility: The Project Manager and wilderness guides have overall responsibility. They are responsible for coordination and implementation of all surveillance who deal with wildlife/human encounters, sightings and reporting.

Procedure:
Crews will be trained to maintain a constant level of awareness for the potential conflict with bears. In areas where high potential of conflict exists, KIC will evaluate and if required, place a dedicated wilderness guides in the area of operations. This is not to say that a continuous watch is not always in effect but rather that the crew will have a dedicated wildlife guide for oversight in areas of known activity. Bear education program will be given to all workers at a pre-job conference or on-site prior to the start of operations or at commencement of employment. Bear awareness refresher briefings will be held as part of regular safety briefings. A dedicated Health, Safety and Environmental (HSE) Advisor will be based with the survey crew for the duration of the seismic program, and workers/wilderness guides will be instructed to notify the Project Manager or HSE Advisor whenever a bear is sited by use of a hazard card. When a bear is in the immediate area of the crew location, workers will stay inside vehicles or aircraft and away from the bear. Approaching a bear for taking pictures or any other reason is strictly forbidden.

1. When a bear is detected near any part of the operation, any employee (permanent, temporary, or contract) or visitor shall immediately notify the Project Manager or HSE Advisor.

2. The first priority is the protection of human life. The second priority is to avoid any situation in which a bear will be harmed.

3. In a camp situation, the lead person with crew shall radio Project Manager/Administrative Office. The Administrative Office will sound the “air horn” with 5 short blasts and make a radio announcement on all crew channels of the sighting. At the sound of the air horn, EVERYONE is to go to the nearest vessel, helicopter, or vehicle and remain inside with doors and windows secured until the ALL CLEAR is given over the radio. The all clear signal is a long blast on the “air horn”.

4. In the field, drivers of each vehicle will advise the personnel they are responsible for and have them get inside the vehicles and wait until further notice. If no vehicles are near, the wilderness guide shall lead crew away from bear.

5. If the bear takes refuge near or in a vehicle and does not appear likely to move, crew HSE will be notified depending on the location of operation. No action will be taken unless authorized by the AKFG or their designated agents.

6. The crew must avoid the bear and if necessary cease operations until the bear has left the area. The bear's safe distance from the crew will determine by the wilderness guide. The distance should be far enough as not to affect the bears behavior. The radio announcement must indicate whether this will be necessary or not. An all-clear signal will be sounded when the area is determined to be safe.

7. Personnel must report any active bear dens. These dens will be mapped and sent to AKFG. After any individual interaction with bears during operations, the Bear Sighting Report shall be completed by the HSE Advisor or the wilderness guide. The IGP Permits Manager will forward this report to the agencies which are listed in the permit stipulations of all permits within 24 hours.

Spectacle and Steller's Eiders: (Polysticta stelleri) is a smallish sea duck that breeds along the Arctic coasts of eastern Siberia and Alaska. The lined nest is built on tundra close to the sea, and 6-10 eggs are laid.

It winters somewhat farther south in the Bering Sea, northern Scandinavia and the Baltic Sea. It can form large flocks, up to 200,000 birds on suitable coastal waters. It is scarce south of its wintering range.

If the proposed project area is within Spectacle eider and Steller eider habitat range the following protocol will be adhered too:

Spectacled eiders nest and brood-rear in the area from mid-May to early June until late August to early September. Similarly, Steller's eiders nesting areas are present in the Canning River, from mid-May through September. Migration from nesting and breeding grounds to molting areas occurs late summer and fall. There is potential for impacts on eiders when survey personnel travel by foot off the road systems and through tidelands and small drainages on the Canning River delta. To avoid and minimize impacts on nesting eiders or eider's broods, crews would implement the following:

1. Adhere to eiders' nesting windows established by USFWS.

2. If working within the established windows, the summer field crew may scout the survey area looking for potential for nesting and/or breeding habitat (tundra areas adjacent to small ponds or within drained lake basins and wetlands) for avoidance.

Caribou / Foxes / Wolverines or Other wildlife:

The most important safety precautions with these wildlife are to slow down while driving and to always give all of these wildlife plenty of space; never approach any of these animals. It is also illegal – and dangerous – to feed these animals on the North Slope. This is true for all wildlife; there is no feeding or harassment of any type of wildlife.

Responsibility: The Project Manager will have overall responsibility. They are responsible for coordination and implementation of all surveillance who deal with wildlife/human encounters, sightings and reporting.

Procedure:

1. Avoid any interaction with wildlife.

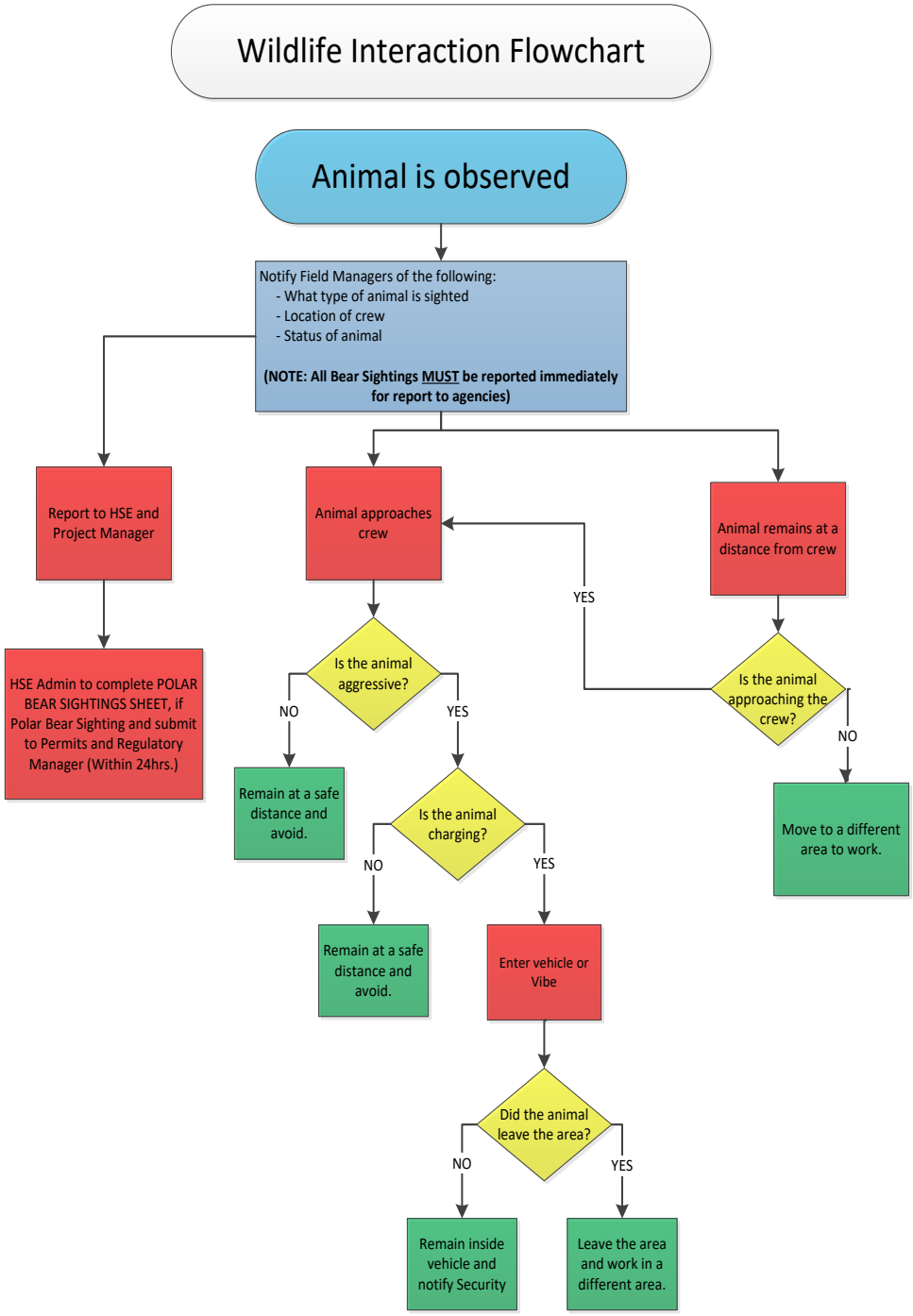
2. Do not take any actions that would cause the animals to change course or behavior unless approved by Alaska Fish and Game.

3. After any individual interaction with any types of wildlife during operations, the Wildlife Sighting Report shall be completed by the HSE Advisor. The Project Manager will forward this report to the permit Manager for KIC and then submitted to agencies which are listed in the permit stipulations of all permits.

4. If foxes or other wildlife take up shelter within camp area, notify the Project manager.

5. Feeding of animals is strictly prohibited.

6. There is no hunting or fishing allowed on project.


Wildlife Interaction Flowchart
Animal is observed
Notify Field Managers of the following:
- What type of animal is sighted
- Location of crew
- Status of animal
(NOTE: All Bear Sightings MUST be reported immediately for report to agencies)
Report to HSE and Project Manager
HSE Admin to complete POLAR BEAR SIGHTINGS SHEET, if Polar Bear Sighting and submit to Permits and Regulatory Manager (Within 24hrs.)
Animal approaches crew
Is the animal aggressive?
NO
YES
Remain at a safe distance and avoid.
Is the animal charging?
NO
YES
Remain at a safe distance and avoid.
Enter vehicle or Vibe
Did the animal leave the area?
NO
YES
Remain inside vehicle and notify Security
Leave the area and work in a different area.
Animal remains at a distance from crew
Is the animal approaching the crew?
YES
NO
Move to a different area to work.

Jack Winters
Habitat Biologist
Division of Habitat
Department of Fish and Game
1300 College Road
Fairbanks, Alaska 99701
907-459-7285

Date:_____
Time:_____

Bear Interaction Report

Location:_____
_____

Observer name: _____

Weather conditions: Fog ___ Snow ___ Rain ___ Clear ___ Wind Speed ___
Wind Direction ____ Approx. Temp ___

Total number of bears: ___ Sow/cubs __/__ Adult ___ Subadult ___

Estimated distance of bear from personnel/facility: _____/_____

Possible attractants present: _____

Bear behavior: Curious ___ Aggressive ___ Predatory ___ Other ___

Description of encounter:_____
_____
_____
Injuries sustained: Personnel _____

Bear _____

Deterrents used/distance: Vehicle ___ Noise-maker ___ Firearms ___
Other ___
Duration of encounter: _____
Agency Contacts: _____Time:_____Date:_____
ADF&G_____Time:_____Date:_____
KIC_____Time:_____Date:_____

KIC Representative:_____Date:_____

Jack Winters
Habitat Biologist
Division of Habitat
Department of Fish and Game
1300 College Road
Fairbanks, Alaska 99701
907-459-7285

Date:_____
Time:_____

Wildlife Sighting Report

Location:_____
_____

Observer name: _____

Weather conditions: Fog ____ Snow ____ Rain ____ Clear ____ Wind Speed ____
Wind Direction _____ Approx. Temp ____

Total number of animals: ____ Type ____/____ Adult ____ Subadult ____

Estimated distance from personnel/facility: _____/_____

Possible attractants present: _____

Animal behavior: Curious ____ Aggressive ____ Predatory ____ Other ____

Description of encounter:_____
_____
_____

Injuries sustained: Personnel _____

Animal _____

Deterrents used/distance: Vehicle ____ Noise-maker ____ Firearms ____
_____Other ____
Duration of encounter: _____
Agency Contacts: _____Time:_____Date:_____
ADF&G_____Time:_____Date:_____
KIC_____Time:_____Date:_____

KIC Representative:_____Date:_____

Appendix G – Willow Protocol

PROCEDURES

Three stages of Willow protocols will determine how to conduct our winter activities on Native Corporation, Alaskan State and BLM lands. KIC and their operator, SAExploration is committed to operate in a manner that all its operations or activities do not damage or affect the social, cultural or community surroundings as well as the renewable and non-renewable natural resources that can be found within the seismic exploration area.

Stage 1:
Defined Stage: Known willow area with sparse low lying stands <36 inches.
Equipment allowed: All activity allowed in Stage 1 – Trails marked for all vehicles.

Surveying in a known willow area with sparse low lying willow stands <36 inches.

1. Use the map to look for spot that could support willows
2. Use the map to locate area that would give us a route through this kind of area, typically a road/trail or even another part of the drainage
3. When we are surveying and find willows, we try to locate a way through them by driving along the edge of the patch, marking the trails where they intersect the non-accessible willow patches with lath that is marked with **RED** reflective tape.
4. If what looks like a way through and a trail is established, three sets of cross lath (reflective tape – **GREEN**) will be used to mark that trail
5. Once a way around has been established, points in the willow area will surveyed by backpack. Chain-notes will be used to note these walk only points.
6. Points are backpacked in
7. Area is put on a map
8. Ice Check uses the information to get the vibes around the same area
9. Chain-notes are included with the map for the crew

Stage 2:
Defined Stage: Known willow area with smaller but thicker concentrations <36 inches.
Equipment allowed: Single file trail to reduce trail impact or to avoid thicker willow concentrations; keeping to areas of low concentrations allowed in Stage 2 – Trails marked for all vehicles.

Surveying in a known willow area with smaller but thicker concentrations <36 inches.

1. Use the map to look for spot that could support willows
2. Use the map to locate area that would give us a route through this kind of area, typically a road/trail or even another part of the drainage
3. When we are surveying and find willows, we try to locate a way through them by driving along the edge of the patch, marking the trails where they intersect the non-accessible willow patches with lath that is marked with **RED** reflective tape.
4. If what looks like a way through and a trail is established, three sets of cross lath (reflective tape – **GREEN**) will be used to mark that trail
5. Once a way around has been established, points in the willow area will surveyed by backpack. Chain-notes will be used to note these walk only points
6. Points are backpacked in
7. Area is put on a map
8. Ice Check uses the information to get the vibes around the same area
9. Chain-notes are included with the map for the crew

Stage 3:
Defined Stage: Thicker and tall concentrations >36 inches
Equipment allowed: Single file trail to avoid larger willows that are sparse but maneuverable; snowmobile/walk only with equipment in thick, tall concentrations of willows. Source possible with special permission in select areas.

Surveying in thicker and tall concentrations >36 inches.

1. Use the map to look for spot that could support willows
2. Use the map to locate area that would give us a route through this kind of area, typically a road/trail or even another part of the drainage
3. When we are surveying and find willows, we try to locate a way through them by driving along the edge of the patch, marking the trails where they intersect the non-accessible willow patches with lath that is marked with **RED** reflective tape.
4. If what looks like a way through and a trail is established, three sets of cross lath (reflective tape – **GREEN**) will be used to mark that trail
5. Once a way around has been established, points in the willow area will surveyed by backpack. Chain-notes will be used to note these walk only points
6. Points are backpacked in
7. Area is put on a map
8. Ice Check uses the information to get the vibes around the same area

9. Chain-notes are included with the map for the crew

RESOURCES:

- Division of Land, Mining & Water (State of Alaska)
- North Slope Borough Permitting Office
- Kuukpik Subsistence Over-site Panel
- Kuukpik Corporation Lands Manager

REFERENCE

North Slope Borough (NSB) Permit Stipulation
Department of Natural Resources GCD-25

Appendix H – Equipment Weights and displacement

Equipment	Contact Area Tractor	Contact Area Trailer Track/ski	Track/ski displacement (PSI)	TARE (lbs.)	PAYLOAD (lbs.)	GVW (lbs.)	Fresh Ice (inches)	Sea Ice (inches)
Tucker Vehicles								
Tucker 1643	8320		1.38	9,200	2,300	11,500	18	23
Tucker 1644 line truck (loaded)	8320		1.68	11,700	2,300	14,000	20	25
Trailers - 4 track								
Tucker Trailer - Vibe Tender		6677	5.24	13,000	22,000	35,000	28	34
Vibe tender & Steiger	8640	6677	10.42	68,000	22,000	90,000	47	51
Tucker Trailer - Batt Shack		6677	4.49	13,000	17,000	30,000	28	34
Battery shack & Steiger	8640	6677	9.84	68,000	17,000	85,000	45	50
Tucker Trailer - Recorder		6677	4.04	13,000	14,000	27,000	28	34
Recorder & Steiger	8640	6677	9.49	68,000	14,000	82,000	43	48
Dozers and Loaders								
D7G	6677		8.39			56,000	37	47
977 Loader	5008		11.18			56,000	39	47
Vibrators								
AHV IV ATI Tracks (on plate)	12380		7.67			95,000	54	66
AHV IV ATI Tracks (traveling)	12380		7.67			95,000	46	52
UniVibe	10972		2.5			27,500	29	33
AHV IV Wheels (on plate)	7692		9.49			73,000	48	54
AHV IV Wheels (traveling)	7692		9.49			73,000	42	48
Steigers (single)								
Steiger with winch	8640		6.37			55,000	35	41
Steiger with blade/loader	8640		7.06			61,000	36	42
Steigers & Trailers - 4 track								
Steiger with Tucker Trailer	8640	6677	9.95	68,000	18,000	86,000	45	50
Steiger with Challenger Trailer	8640	6677	15.19	82,000	49,280	131,280	60	64
Camp Ski and Trailers								
Camp Shop GS		11520	4.34			50000		
Oil Room GS		11520	4.77			55000		
Laundry GS		11520	3.91			45000		
Men's Combo GS		11520	3.91			45000		
Vibe Storage GS		11520	4.77			55000		
Food Storage GS		11520	4.34			50000		
Medic		6912	4.34			30000		
Admin Office		6912	4.34			30000		
HSE		6912	4.34			30000		
Tech Room		6912	4.34			30000		
/omen's Washroom 7 Man Sleeper		6912	5.79			40000		
Client Conference		6912	4.34			30000		
Conference Room		6912	4.34			30000		
Sleepers x 11		6912	4.34			30000		
Kitchen		6912	6.51			45000		
Diner		6912	4.34			30000		
Survey		6912	4.34			30000		
Spike Room		6912	5.79			40000		