USGS 2011 Cruise Brief: Shallow Beaufort Sea

2011 USGS Survey for Top/Seaward Extent of Permafrost and Degassing Methane Hydrate Front on the Shallow-Water Beaufort Shelf, Central U.S. Beaufort Coast

Contact: Chief Scientist—Dr. Carolyn Ruppel (cruppel@usgs.gov); 617-806-6768; U.S. Geological Survey, Coastal & Marine Geology, Gas Hydrates Project, Woods Hole, MA 02543

Vessel: *R/V Ugpik* (operated by Bill Kopplin, Southern Cross LLC), < 45 ft long
Timing: ~1 to 12 August, 2011
Duration: Nearly all acoustics will be conducted prior to 8 August, maximum of 12 hour per day operations
Port: West Prudhoe Bay Dock

Instrumentation:

- SIG 2mille 300-500 J mini-sparker (center frequency 800-850 Hz): 135 m for 160 dB isopleth for the planned maximum 500 J operation
- Chirp (Edgetech SB-424) 4-24 kHz subbottom imaging: 75 m for 160 db isopleth
- SEA (Advanced Products) Ltd. SWATHplus-M 234 kHz low-powered sonar: 50 m for 160 dB isopleth
- 500 W rms sonar (83/200/455 kHz) [fishfinder]: unknown for 160 dB isopleth, but we will assume 75 m, which is certainly many times too large
- Short (up to 65 ft) streamer (receivers only)
- Sonobuoys (receivers only) for velocity determinations
- Methane sensing equipment (cavity ring-down spectrometers)
- CTD-type water sampler
- Vibracorer
- GPS navigation

No long-term monitoring instrumentation will be left in the water

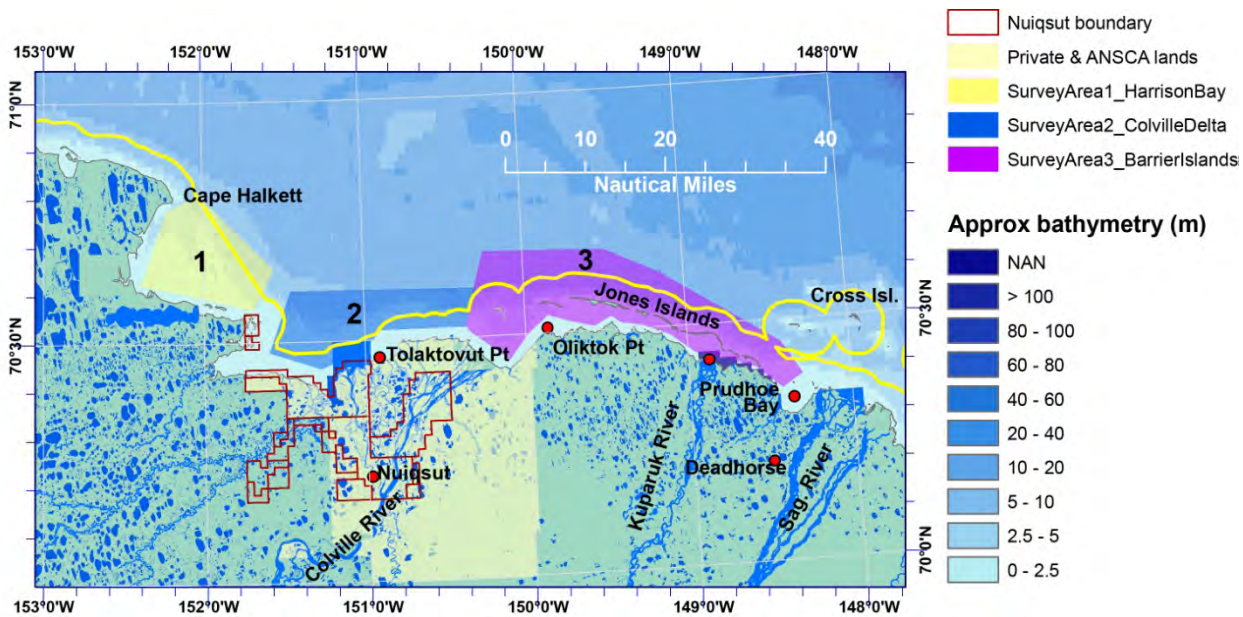
Summary of Activities:

1. Geophysical surveying (low-energy seismic, low-powered sonar imaging)
2. Collection of up to 10 vibracores from the seafloor, with maximum length of 5 meters each
3. Measurement of methane and carbon dioxide concentrations in seawater and at the ocean-atmosphere interface

Permitting/compliance:
USGS will be responsible for permitting, including filing a Letter of Concurrence request with NMFS (filed the week of 16 May, 2011), obtaining necessary FWS consultations and approvals (materials filed in Anchorage and Fairbanks during the week of 16 May, 2011), complying with NEPA regulations, and getting a NSB permit. The USGS will also be responsible for developing a plan of cooperation with village of Nuiqsut. Two USGS scientist who are trained as PSVOs

will be properly equipped to serve in this role on the vessel and will be stagger being on duty when acoustic operations are occurring. The PSVOs will file the appropriate reports after the cruise.

Narrative:
This work will be conducted on the shallow-water (< 30 m water depth) Beaufort Shelf between Pogik Bay on the west and West Prudhoe Bay on the east in earliest August (latest possible date of acoustic activity would be 12 August) for a period not to exceed 12 days (including transits). The map highlights the three areas of focused surveys: The primary target area (labeled "1") is the center of Harrison Bay, where we intend to collect a tightly-spaced grid of data. A secondary target (labeled "2") is the eastern part of Harrison Bay and at distances greater than 1 nautical mile seaward of the Colville River Delta, where we intend to investigate a pockmark and other seafloor and shallow subseafloor features identified in 2010. The third target area (labeled "3") is (a) the backwater area (Simpson Lagoon) between the mainland and the Spy and Jones Islands, where we have identified subsea permafrost from older seismic data; and (b) the area seaward of the barrier island chain, where we will seek continuation of subsea permafrost and seafloor features possibly related to methane expulsion.



Low energy seismic and low powered sonar imaging
The maximum length of any acoustic survey line is ~35 km (~20 nautical miles), but most are likely to be considerable shorter, probably averaging 10 to 15 nautical miles. Since we will be conducting multiple source acoustic operations at approximately 4 knots for a maximum of 12 hours per day and probably for no more than 7 days within the period of 1 August to 12 August, we estimate that, with ideal conditions (perfect weather/sea conditions, perfectly functioning equipment, no shut-downs for marine mammals and not counting transits between lines), we would acquire a maximum of ~340 nautical miles of data. It is more likely that we will acquire only ~200 to 250 nautical miles of data since we do not intend intensive surveys in Areas 2 or 3.

The USGS is voluntarily operating under several restrictions for these surveys, including: 1) no surveys closer than 1 nautical mile from the coast in the area of the Colville River Delta; 2) no surveys within 1 km offshore Nuiqsut/ANSCA lands west of Tolaktovut Point; 3) no coming ashore anywhere other than Oliktok Point or West Prudhoe Bay except in the case of emergency; 4) no surveys closer than 500 m to the barrier islands in Simpson Lagoon.

Surveying will nominally be conducted on lines running subperpendicular to shore (except in Simpson Lagoon), from the shallowest water depths feasible to water depths as great as 25 to 50 m, depending on ice cover and real-time discoveries about the seaward extent of permafrost and the occurrence of features associated with methane emissions. As is always the case with marine surveys, we are flexible and will change our operations plan and survey pattern in real-time to accommodate unforeseen ice cover, ongoing subsistence activities, presence of environmentally sensitive species, poor sea state, prevailing wind patterns, and private sector activities.

Vibracoring

We plan to acquire a limited number (up to 10) of short (up to 5 m long) approximately 3” to 4” (diameter) sediment cores from the seafloor during the cruise. The goal of this coring is to acquire sediment samples needed to reconstruct sea level change over the past 10,000 years, to determine the composition of pore waters, and to correlate lithologic changes with those detected in our seismic data. No chemical or other analysis of the cores will be carried out aboard the vessel or on shore on the North Slope. Instead, cores will be sectioned after recovery, capped, labeled, and stored for shipment back to our home laboratories for analysis. The coring will be conducted with a USGS portable vibracoring rig that will be mounted on the ship and powered by a portable generator. Disturbance to the seafloor will be minimal and consist of a disturbed zone at the location of the core itself. There are no drilling or other fluids involved in vibracoring, and vibracoring should not affect water quality. US FWS has been made aware of our intention to collect a handful of vibracores from the seafloor in the study area and is being consulted for advice about locating these cores in areas that will minimize the impact on fish habitat.

Water/Air sampling

The USGS and its partners on the cruise will measure CO_2 and CH_4 (greenhouse gas) concentrations in seawater and at the ocean-atmosphere interface using CRDS (cavity ring-down spectrometry) technology. This technology is non-destructive. Air or seawater are pumped into the system, analyzed with the addition of no foreign substances, and then ejected. The process does not alter or contaminate the very low volumes of air or water that are pumped through the system. Conventional water samples will also be acquired in a few locations in low volume plastic sampling bottles to check the accuracy of the CRDS measurements with measurements on a gas chromatograph back in Massachusetts.

NEPA CATEGORICAL EXCLUSION REVIEW AND DECISION RECORD

ACOUSTIC SURVEYS, GEOCHEMICAL SAMPLING, AND VIBROCORING FOR SUBSEA PERMAFROST AND METHANE HYDRATE DEGASSING IN THE U.S. BEAUFORT SEA, ALASKA

U.S. GEOLOGICAL SURVEY

Proposed Project: Acoustic surveys, geochemical sampling, and vibracoring for subsea permafrost and methane hydrate degassing in the shallow US Beaufort Sea, AK, between 1 and 12 August aboard the *R/V Ukpik* (~50 foot coastal vessel with berthing for 6)

*Principal Investigator***:** Dr. Carolyn Ruppel, USGS Woods Hole, 617-806-6768; cruppel@usgs.gov

Location of Proposed Project: Transit from Prudhoe Bay, AK west; Survey between Cape Halkett on the west and Prudhoe Bay on the east, including Harrison Bay, seaward of the Colville River Delta, and landward and seaward of Spy and the Jones Islands, US Beaufort shelf, AK, landward of the 20 m isobath.

Description of Proposed Project: See Attachment 1.

Attachments:

1. **Project Brief**
2. **Request for Letter of Concurrence for no-take of marine mammals submitted to NMFS (Candace Nachman), May 2011;** *Nachman has indicated that she was reviewing the LOC request on 7/8/11 and 7/11/11 and would be in touch this week*
3. **Polar Bear Interaction Plan, submitted to FWS (Craig Perham) in May 2011, for compliance with MMPA** *(Perham had made contact several times in late May and early June and indicated he required nothing further from me to issue his finding, but he was away for several weeks preceding 7/7/11. His stand-in and I spoke the week of 6/20/2011, and I expect to hear from Perham this week)*
4. **Informal FWS findings for ESA (Birds), polar bears, etc.** *(received 6/17/2011 from Denise Walther)*
5. **North Slope Borough permit** *(issued on 7/5/2011)*
6. **Modified plan of cooperation submitted to North Slope Borough and NMFS** dated 6/2/11

Categorical Exclusion Review

The proposed project qualifies for the following categorical exclusion under USGS National Environmental Policy Act (NEPA) procedures at Departmental Manual 516, Chapter 9.5:

A. Topographic, land use and land cover, geological, mineralogic, resources evaluation, and hydrologic mapping activities, including aerial topographic surveying, photography, and geophysical surveying.

B. Collation of data and samples for geologic, paleontologic, hydrologic, mineralogic, geochemical and surface or subsurface geophysical investigations, and resource evaluation, including contracts therefore.

Extraordinary Circumstances Review
(43 CFR 46.215, Categorical Exclusions: Extraordinary circumstances)

	Yes	**No**
1. Will the project require construction of an access road or other significant land surface disturbance?		X
2. Will the project potentially result in the release of toxic, hazardous, or radioactive materials to the environment or in the exposure of people to such materials? *Action: If yes, notify the Regional Environmental Program Manager for further guidance.*		X
3. Is the project likely to be inconsistent with any applicable Federal, state, tribal, or local law or regulation designed to protect any aspect of the environment?		X
4. Will the project result in significant impacts on public health or safety? If yes, identify significant impacts.		X
5. Will the project or associated land disturbance have significant impacts to natural resources and/or unique geographic characteristics such as park, recreation, or refuge lands; wilderness areas; wild or scenic rivers; national monuments; national natural landmarks; state or locally recognized cultural and historical resources; sole or principal drinking water aquifers; prime farmlands; wetlands; floodplains; migratory birds; wildlife; marine life; or other ecologically significant or critical areas? *Attach pertinent supporting documentation.*		X Offshore Project

	Yes	No
6. Will the project or associated land disturbance have significant impacts on species listed, or proposed to be listed, on the Federal List of Endangered or Threatened Species or have significant impacts on designated critical habitat for these species? *Attach pertinent supporting documentation.* **Note:** • FWS determination for birds and for ESA for polar bears is attached • FWS determination for polar bears for MMPA is pending but expected from • Craig Perham, who received our polar bear interaction plan in May 2011 and has informally indicated that there is nothing lacking in our documentation—submitted Polar Bear Interaction Plan is attached • Advised by FWS orally that the finding I received in 2010 re. no formal documentation required for fish habitat will hold for 2011; email attached		X (See Note to the left)
7. Will the project limit access to and ceremonial use of tribal sites on lands by tribal religious practitioners or significantly adversely affect the physical integrity of such sacred sites? *Attach pertinent supporting documentation, if applicable.* **NOTE:** Extensive discussion of subsistence activities in LOC request submitted to NMFS.		X Offshore Project (see Note to left)
8. Will the project have significant impacts on properties listed, or eligible for listing, on the National Register of Historic Places? *Attach pertinent supporting documentation.*		X Offshore Project
9. Will the project have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks? *Action: If yes, notify the Regional Environmental Program Manager for further guidance.*		X
10. Will the project establish a precedent for future action or represent a decision in principle about future actions with potentially significant environmental effects.		X
11. Will the project have a direct relation to other actions with individually insignificant but cumulatively significant environmental effects?		X
12, Will the project have highly controversial environmental effects or involve unresolved conflicts concerning alternative uses of available resources?		X
13. Will the project have a disproportionately high and adverse effect on low income or minority populations?		X
14. Will the project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area or actions that may promote the introduction, growth, or expansion of the range of such species?		X

DECISION

If the answers to all the questions are NO, the project requires no further environmental review and qualifies for categorical exclusion under NEPA (516 DM 9.5) (*reference the specific categorical exclusion*). The person conducting the environmental review and the Center Director or Program Manager shall sign and date the checklist, and send the original checklist to the Regional Environmental Program Manager for their review and signature. The signed checklist shall become part of the official project record.

If the answer to any question is YES, the project requires further environmental review and may not qualify for Categorical Exclusion under NEPA. The person conducting the environmental review and the Center Director or Program Manager shall sign and date the checklist, and send the original checklist to the Regional Environmental Program Manager for their review and signature. The signed checklist shall become part of the official project record.

Carolyn D Ruppel — Date: 7/11/11

Evaluator's Name: PI Carolyn Ruppel

Walter Barnhardt — Date: 7/11/2011

Reviewed and approved by: Center Director, Walter Barnhardt

Larry E Herrington — Date: 7/12/2011

Reviewed and approved by:
Regional Environmental Program Manager, Larry E. Herrington

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

JUL 18 2011

Dr. Carolyn Ruppel
Research Geophysicist
U. S. Geological Survey
Coastal and Marine Team
Quissett Campus
384 Woods Hole Road
Woods Hole, Massachusetts 02543-1598

Dear Dr. Ruppel:

The National Marine Fisheries Service (NMFS) has reviewed your request for a Letter of Concurrence (LOC) documenting that the taking of marine mammals is not likely to occur incidental to the low-energy seismic reflection profiling and low-powered side-scan sonar surveying work proposed by the U.S. Geological Survey (USGS) focused in the following areas in Alaska: Harrison Bay; Simpson Lagoon; and seaward of the Colville Delta and the Spy and Jones barrier islands area. These areas are located in the U.S. Beaufort Sea on the Beaufort Shelf between Pogik Bay on the west and extend as far east as West Prudhoe Bay. The primary target area is the center of Harrison Bay, where USGS intends to collect a tightly-spaced grid of data. A secondary target is the eastern part of Harrison Bay and at distances greater than 1.85 km (1 nmi) seaward of the Colville River Delta, where USGS intends to investigate a pockmark and other seafloor and shallow subseafloor features identified in 2010. The third target area is (a) the backwater area (Simpson Lagoon) between the mainland and Spy and Jones Islands, where USGS has identified subsea permafrost from older seismic data and (b) the area seaward of the barrier island chain, where USGS intends to seek continuation of subsea permafrost and seafloor features possibly related to methane expulsion.

Based on the description of the action provided, NMFS concurs with your determination that an Incidental Harassment Authorization (IHA) is not necessary pursuant to the Marine Mammal Protection Act (MMPA), for the USGS' seismic reflection and side-scan sonar surveying work, provided that all USGS' planned monitoring and mitigation measures are implemented. The work is scheduled to occur for a period not to exceed 12 days (including transits) in early August 2011. The absolute last date of acoustic activity would be August 8, 2011. Surveying will occur for approximately 12 hours per day. At this time of year, there are no periods of complete darkness in the Arctic.

According to the request, as one component of research on the impact of Late Pleistocene through contemporary climate change on permafrost-associated methane hydrates, the USGS Hydrates Project will conduct reconnaissance geophysical imaging and methane sensing on the shallow-water (less than 50 m [164 ft] water depth and possibly less than 30 m [98 ft] water depth) Beaufort Shelf. The purpose of the research cruise is to confirm USGS' independent findings about the depth to the top of the permafrost in this

Printed on Recycled Paper

area and to map the seaward extent of permafrost, which presumably corresponds to the onset of methane hydrate degassing. USGS also plans to map shallow gas in the sedimentary section, survey seafloor features associated with ice dynamics and methane emissions, and image possible methane plumes in the water column. The USGS proposes to use four sound sources for the project: (1) the SIG 2mille mini-sparker; (2) SEA (Advanced Products) Ltd. SWATHplus-M system; (3) an EdgeTech SB-424 sub-bottom profiler (SBP); and (4) a Humminbird 798ci fishfinder.

The primary sound source for the seismic reflection profiling will be the SIG 2mille mini-sparker. Source level information from the manufacturer of a comparable system, the Applied Acoustics Engineering, Inc SQUID 2000 sparker system, gives a sound pressure level (SPL) of 208 dB re 1 μPa-m (rms) at 1,500 Joules (J). The frequency of the output pulse for the SIG system using the SIG sparker-electrode ELC820 is between 800 and 850 Hz with a pulse duration of approximately 1 ms. It is likely that the data collection for these projects will be accomplished using 0.25 second or 0.5 second trigger rate with output power between 300 and 500 J. SPLs for the sparker system energy levels other than 1,500 J have been calculated using the energy ratio to dB relationship of dB=10 log (E1/E2). The 160 and 180 dB isopleths were calculated using a center frequency of 825 Hz and absorption calculations (Richardson *et al.*, 1995). The rows shaded in yellow indicate the output power at which USGS plans to operate. This output range proved successful during USGS operations to acquire mini-sparker data in August 2010 in the Harrison Bay area.

Table 1. Mini-sparker system source level summary

Energy (Joules)	DB 208 dB re 1 μPa-m (rms)	160 dB isopleth radius (m)	180 dB isopleth radius (m)
2000	209.2	275	30
1500	208.0	250	25
1000	206.3	200	20
750	205.0	175	17
600	204.0	150	15
500	202.8	135	14
300	201.0	105	12

The second acoustic system that will be used is the SEA (Advanced Products) Ltd. SWATHplus-M system. The SWATHplus series 2000 swath bathymetry system is a side-mounted, high-resolution system operating at a frequency of 234 kHz. The 234 kHz system has a swath width that is usually 7-12 times the water depth, ping rates from 4.5-13.5 pings per second with pulse widths from 8.5-500 μseconds, and a beam width (azimuth) of 1.1 degree. The SPL is 200 dB re 1 μPa-m (rms). The estimated 160 dB (including absorption calculations from Richardson *et al.* (1995)), 180 dB, and 190 dB isopleths are 50 m (164 ft), 10 m (33 ft), and 3 m (10 ft), respectively.

The third acoustic system that will be used is the EdgeTech SB-424 SBP. The system is towed slightly submerged, the actual depth depending on the application and water depth. There is no source level information from the manufacturer for this system except that the estimated source level is less than 198 dB re 1 μPa-m (rms), which is the source level for the EdgeTech SB-0512I, a larger and lower frequency system. The EdgeTech SB-424 operates between 4 and 24 kHz with pulse widths from 5 ms to 50 ms. The beam width is 17 to 24 degrees depending on the center frequency. Using a SPL of 198 dB re 1 μPa-m (rms) for the EdgeTech SB-424, a 10 ms pulse, and a 14 kHz center frequency, the radius to the 160 dB isopleth, including absorption calculations (Richardson *et al.*, 1995), is 75 m (246 ft), and the 180 dB radius is 8 m (26 ft). With a 10 ms pulse width, the lower frequency of 4 kHz has an estimated 160 dB radius, including absorption calculations (Richardson *et al.*, 1995) of 75 m (246 ft), a 180 dB radius of 8 m (26 ft), and a 190 dB radius of 2 m (6.6 ft).

The final sound source is an off-the-shelf Humminbird 798ci fishfinder, which will be used to locate methane plumes within the water column. This is a low power (500 Watts rms), high-frequency (83/200/455 kHZ transducers) side/downward looking sonar system. The manufacturer does not supply SPL for this system, but it is lower power and higher frequency than the EdgeTech 424, so the 160 dB radius is expected to be less than 75 m (246 ft), which will be the adopted safety radius for this piece of equipment.

A number of marine mammal species are expected in the vicinity of the proposed project area. A brief description of each species, along with the likelihood of occurrence in the project area, is provided in the USGS LOC application.

NMFS has established received level threshold criteria to estimate the onset of Level B harassment for multiple sound sources. For impulsive sounds, such as those from a mini-sparker, the Level B harassment threshold is 160 dB re: 1μPa (rms). To receive NMFS' concurrence that take is not likely to occur, the USGS must avoid exposing marine mammals to sound levels at or above this threshold. The USGS has estimated the 160 dB re: 1μPa isopleth from the mini-sparker to be 135 m (443 ft) at 500 J output from the source and 105 m (344.5 ft) at 300 J output from the source. The estimated 160 dB re: 1μPa isopleths for the SWATHplus system is smaller than that of the mini-sparker and is estimated at 50 m (164 ft). The estimated 160 dB re: 1μPa isopleth for both the SBP and fishfinder are smaller than the estimated 160 dB isopleth for the mini-sparker (neither will exceed 75 m [246 ft]).

The Level B harassment zones for the sound sources are small enough that visual detection of marine mammals within the proposed project area is likely. To avoid harassment of marine mammals during the proposed project, a 160 dB re 1 μPa-m (rms) exclusion zone will be established by USGS and monitored by a NMFS-qualified Protected Species Observer (PSO). Work will be done only during daylight hours (as there are no periods of "night" or total darkness in the Arctic in early August) to allow maximum visual detectability, and the ship will be moving at a speed of approximately 4 knots.

To avoid harassment of marine mammals and ensure that no takes of marine mammals occur, the USGS will implement the following mitigation and monitoring measures during the seismic reflection profiling and side-scan sonar surveys:

- The USGS will have two (2) trained, NMFS-qualified PSOs aboard the vessel to monitor the proposed project area for marine mammals. Monitoring will start at least 30 minutes before the start of the sound sources, continue throughout the survey activity, and continue for at least 30 minutes after the sound sources are turned off.

- Whenever a detected marine mammal enters or appears as if it is going to enter the 160 dB exclusion zone (i.e., zone of impact) (either 135 m [443 ft] or 105 m [344.5 ft], depending on the energy output of the sparker, 50 m [164 ft] if only the SWATHplus system is being used, or 75 m [246 ft] if only the SBP or fishfinder are being used), the sound source will be immediately shutdown or will not be started. The sound source(s) will not be turned on until the marine mammal(s) is confirmed to be out of the exclusion zone or 15 minutes after the last sighting of the marine mammal(s) within the exclusion zone, whichever is later.

- The PSOs onboard the USGS survey vessel will have authority to stop survey operations whenever marine mammals enter or are approaching the exclusion zone. The 160-dB exclusion zone will be determined by the type of equipment being used.

- The USGS will use a "soft-starting" practice to start the most energetic sound source being used at that time; that is, when initiating the survey, the sound source shall be turned on at 50 percent of its capacity and gradually increased to full capacity by ramping up 6 dB every five minutes, allowing undetected marine mammals to vacate the area.

- The PSO will record and document the dates, times, locations, species, number, distance, and behavior of marine mammals sighted during monitoring activities, as well as mitigation measures implemented.

Because the USGS' activity will occur in Arctic waters, the USGS must ensure that the activity will not have an unmitigable adverse impact on the availability of marine mammal species or stocks for taking for subsistence uses. Subsistence remains the basis for Alaska Native culture and community. The main species that are hunted include bowhead and beluga whales, ringed, spotted, and bearded seals, walruses, and polar bears. The importance of each of these species varies among the communities and is largely based on availability. The two communities closest to USGS' project are Nuiqsut and Barrow. Nuiqsut is inland, so hunters go to Cross Island each fall to hunt bowhead whales. Cross Island is located at least 161 km (100 mi) from the majority of the proposed project area. However, if activities occur in west Prudhoe Bay, activities could occur within approximately 25-30 km (15.5-18.6 mi) of Cross Island. Barrow is located more than 161 km (100 mi) west of the project area.

Bowhead whales are hunted by Nuiqsut at Cross Island beginning in late August and continuing into early and mid-September. Barrow conducts a spring bowhead hunt in April and May and a fall hunt in September and October. Because the USGS will be conducting its survey in early August (ending by August 12), there will be no interference with bowhead hunts. There has been minimal harvest of beluga whales in Beaufort Sea villages in recent years. Additionally, if belugas are harvested, it is usually in conjunction with the fall bowhead harvest. Therefore, the USGS project will not interfere with any potential beluga hunts.

Ringed seals are available to subsistence users in the Beaufort Sea year-round, but they are primarily hunted in the winter or spring (October-June) due to the rich availability of other mammals in the summer. Bearded seals are primarily hunted during July in the Beaufort Sea; however, in 2007, bearded seals were harvested in the months of August and September at the mouth of the Colville River Delta. An annual bearded seal harvest occurs in the vicinity of Thetis Island in July through August. Approximately 20 bearded seals are harvested annually through this hunt. Spotted seals are harvested by some of the villages in the summer months. Nuiqsut hunters typically hunt spotted seals in the nearshore, fish-rich waters off the Colville River Delta, which is located near USGS' project area. Although there is the potential for some of the Beaufort villages to hunt ice seals during the summer and fall months, the primary sealing months occur outside of the USGS' project time frame. The USGS surveys are not anticipated to affect the availability of seals for subsistence uses because the most intensive surveys will be in central Harrison Bay, with reconnaissance type surveys only near the Colville River outflow, thus minimizing the interaction of the survey vessel and any vessel engaged in subsistence activities in the areas of greatest fish concentrations. Mitigation measures to avoid interference with the hunts are described below.

For its activities in August 2010, the USGS implemented an informal Plan of Cooperation (POC) with the Native Village of Nuiqsut. In May 2011, USGS sent a proposed POC to the Tribal Council in Nuiqsut. After consulting with the Native Village of Nuiqsut and the North Slope Borough, USGS developed a final POC that will be implemented during the proposed surveys. In addition to the mitigation and monitoring measures described previously in this letter, USGS has proposed and NMFS has required the implementation of the following measures to ensure no unmitigable adverse impact on marine mammals taken for subsistence uses:

- All seismic (no airgun) activity will be completed on or before August 8, 2011, at the latest. The cruise will be completely finished by August 13, 2011, at the latest.

- The crew of the survey vessel will attempt VHF radio communication with any vessel that comes within approximately 2 km (1.2 mi) of the *R/V Ugpik* (the vessel used for USGS' project) during the survey activities to establish the vessel's intent and purpose (e.g., subsistence activities) and determine how the USGS can accommodate the other vessel's activities through alteration of survey

design. This open communication will allow the USGS to modify activities (including survey lines) to avoid impacts on seals, as necessary.

- USGS will seek an adult living in Nuiqsut to serve as the communication liaison to the *R/V Ugpik* during the period of August 1-8, 2011, the only time during which low-energy seismic activities are planned. USGS will purchase a new marine radio for use by this individual, who will stay in Nuiqsut for the duration of the cruise. The primary obligation of this individual will be contacting the *R/V Ugpik* one or more times per day from Nuiqsut to describe villagers' subsistence activities (e.g., how many boats are leaving the Delta, what is their planned area of operation and prey) in the shallow water Beaufort.

- The sound sources will be shutdown if a seal is approaching or enters the 160-dB exclusion zone (either 135 m [443 ft] or 105 m [344.5 ft], depending on the energy output of the sparker, or 75 m [246 ft] if only the SBP or fishfinder are being used), thus reducing impacts to these animals being sought for subsistence purposes.

- The vessel will never enter the Colville Delta channels or approach closer than 1.85 km (1 nmi) to the outfall of the Colville River and will not approach Cross Island at any time. USGS will respect private and ANSCA lands along the shore near Harrison Bay and stay at least 0.5 km (0.3 mi) offshore.

- The vessel will not come ashore anywhere but Oliktok Point and West Prudhoe Bay dock, except in the case of emergency.

NMFS believes that if the aforementioned monitoring and mitigation measures are implemented, takes of marine mammals are not likely to occur, and an IHA is not necessary pursuant to the MMPA. If for any reason USGS does not implement these monitoring and mitigation measures, then our concurrence with USGS' determination does not apply, and NMFS would recommend that USGS apply for an IHA under section 101(a)(5)(D) of the MMPA. The same recommendation would apply if USGS subsequently obtains information during the seismic reflection profiling and side-scan sonar surveying work that indicates that marine mammals have been disturbed by the proposed activities. Although NMFS has concurred that take is not likely to occur, USGS remains liable for any unauthorized takes of marine mammals resulting from the use of the low-energy sound sources. For additional information on this action, please contact Candace Nachman at 301-427-8401 or Candace.Nachman@noaa.gov.

Sincerely,

James H. Lecky, Director
Office of Protected Resources

North Slope Borough

PLANNING AND COMMUNITY SERVICES DEPARTMENT

P.O. Box 69
Barrow, AK 99723
☎ (907) 852-0320
Fax: (907) 852-5991
Email: gordon.brower@north-slope.org

Gordon R. Brower, Director

June 24, 2011

USGS Woods Hole Field Center
C/O Dr. Carolyn Ruppel, Research Geophysicist
384 Woods Hole Rd.
Woods Hole, Massachusetts 02543
Email: cruppel@usgs.gov

RE: NSB 11-357, Administrative Approval, Science/Research, Climate Change/Subsea Permafrost/Methane Hydrates. T12N - T18N, R4E – R4E, (See Attached Map for Locations), Conservation and Resource District.

Dear Ms. Ruppel:

We have reviewed your application received June 16, 2011 in which you have requested authorization to conduct a research cruise to be conducted by the USGS using low-energy (no airgun) seismic equipment, vibracoring, and air/water sampling technology. The goal of the cruise is to determine the impact of climate change on subsea permafrost and offshore methane hydrates at water depths from 0 m up to 25 m in an area nominally between Pogik Bay and West Prudhoe Bay along the Alaskan Beaufort coast. The surveys will occur both within and outside the nominal 3-mile state water limit. Details about the survey locations are provided in the "cruise brief" attached to the plan of cooperation and figures.

Purpose of development: Geophysical surveying (low-energy seismic, low-powered sonar imaging).

Purpose of Development: Collection of up to 10 vibracores from the seafloor, with maximum length of 5 meters each. Measurement of methane and carbon dioxide concentrations in seawater and at the ocean-atmosphere interface.

This project is scheduled to commence July 31, 2011 with a completion date of August 13, 2011.

We have preliminarily determined that your proposed development is consistent with Title 19 provided that you comply with the following conditions:

Project Specific Stipulation

- USGS shall contact AEWC, Johnny Aiken, Executive Director at (907) 852-2392 or (907) 852-2393 to notify of this "Climate Change/Subsea Permafrost/Methane Hydrates Program.

GENERAL STIPULATIONS

1. The permittee is reminded to conform to the provisions of NSBMC Chapters 9.08, 9.12 and 9.16 regarding solid and sanitary waste collection/disposal and potable water. The proper and lawful disposal of waste in an environmentally sound manner is a condition of this permit. If the permittee does not anticipate using facilities operated or approved by NSB, the Alaska Department of Environmental Conservation at (907) 269-7500 shall be contacted for an approved sanitary and solid waste disposal plan as well as a plan for potable water for temporary and permanent facilities described in this permit. A copy of the approved plans shall be submitted to the North Slope Borough Permitting and Zoning Division to become a part of this permit file. NSBMC 19.70.050(I)(4)&(5)

2. Should any cultural, archeological or paleontological resource materials (including, but not limited to artifacts, house mounds, grave sites, ice cellars, and fossilized animal remains) be discovered in the course of activities conducted under this permit, the site shall not be disturbed and the North Slope Borough Inupiat History, Language and Culture Commission shall be promptly notified at (907) 852-0422. NSBMC 19.70.050(E) through (G)

3. All oil and other hazardous material spills over 55 gallons shall be reported immediately to the NSB by telephoning (907) 852-0440. The follow-up written report will be faxed to the NSB Permitting and Zoning Division fax (907) 852-5991and the NSB/OSEA office at (907) 852-0327. A report of all spills shall be submitted to our office on a weekly basis. A sufficient amount of absorbent materials shall be on hand at all times in the event of any fuel, oil, or chemical spills. Spills shall be cleaned up as soon as possible. NSBMC 19.50.030(I)

4. The Land Management Administrator may require that his authorized representative be on-site during any operations conducted under this permit. NSBMC 19.30.100

5. Within the constraints of federal, state and local law, the permittee and its agents are encouraged, through a voluntary affirmative action program, to hire and train residents of the North Slope Borough. In order to comply with this stipulation the permittee and its agents shall contact the Mayor or City Manager and the village corporation of any village most affected by this permit. In this case contact the City of Nuiqsut at (907) 480-6928 and Kuukpik Corporation at (907) 480-6220 and Native Village of Nuiqsut (907) 480-3010 to determine if there are qualified people available or people who could be employed for on-the-job training. NSBMC 19.70.030

6. The permittee shall comply with all local, state and federal laws and permits applicable to this project. NSBMC 19.30.100

8. The permittee shall inform and ensure compliance with these stipulations by its agents and employees. This permit shall be posted in a conspicuous place for these individuals to see. NSBMC 19.30.100

This authorization is valid for the duration of the existence of the development and the developer's compliance with the terms and conditions herein. This authorization automatically expires within twelve months of approval if no actual development has commenced. Failure to comply with the conditions of this authorization could result in immediate revocation of this authorization.

If you should have any questions please contact Thomas C. Brower III, Land Management Specialist at (907) 852-0440 ext. 223 or by email at thomas.browerIII@north-slope.org

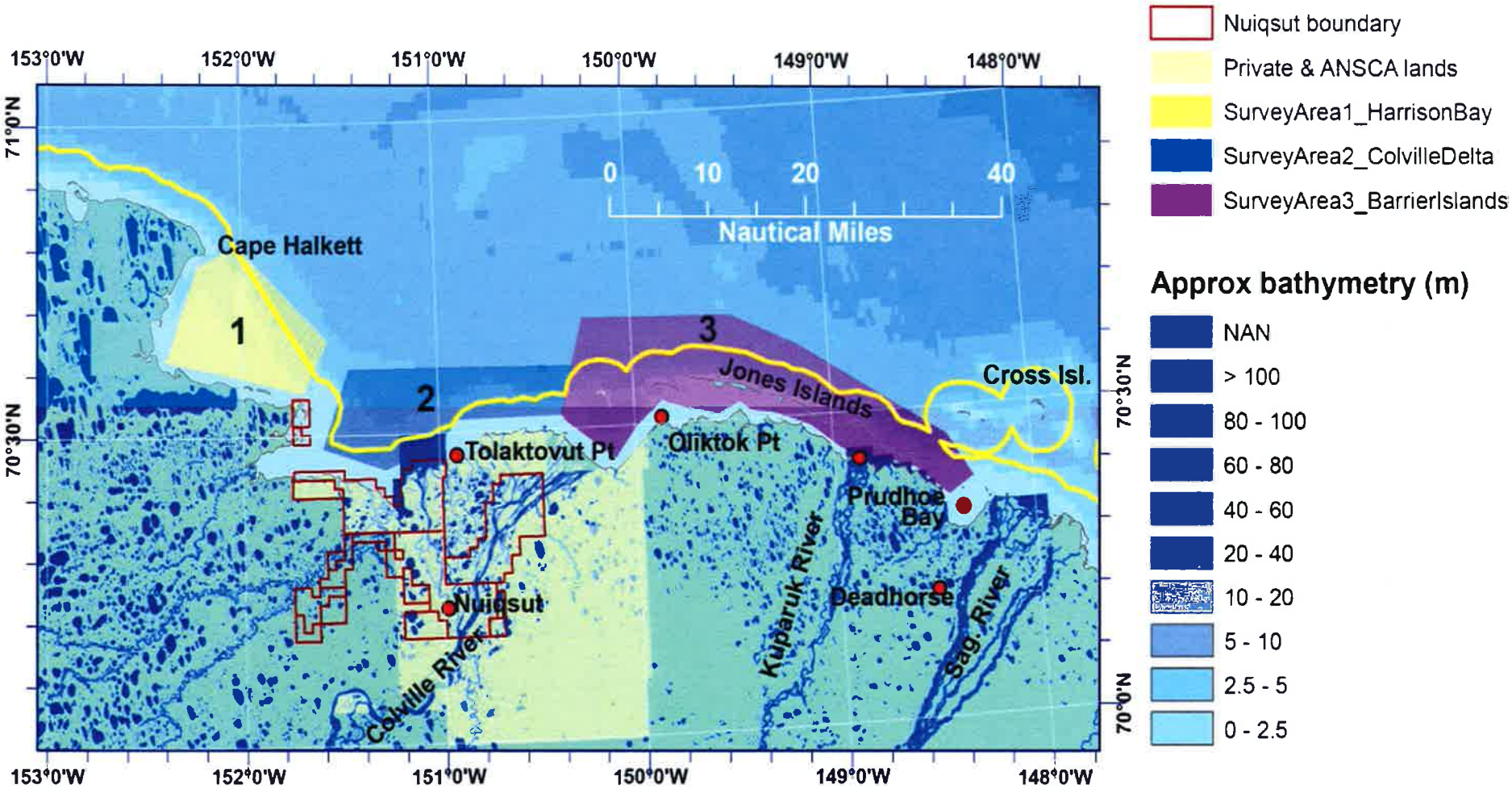
Sincerely,

Gordon R. Brower,
Land Management Administrator

cc: NSB Planning Commission
Craig George, NSB Wildlife
Brian Person, NSB Wildlife
Johnny Aiken, Director, AEWC
Chris Miles, AkDNR, Fairbanks
Dennis Gnath, JPO Liaison, DNR, OHMP, Anchorage
Robert McLean, Area Manager, DNR, OHMP, Fairbanks
Jewel Bennett, Louise Smith, USDI/F&WS, Fairbanks
Jeanne Hanson, USDI/NMFS, Anchorage
Josephina Delgado-Plikat, DCOM, Juneau
Bill Smythe, AkDEC, Fairbanks
Michael Holley, Don Rice, US Army COE
Lily Aveoganna, Clerk, Inupiat Community of the Arctic Slope
Qaiyaan Opie, Dept. of Natural Resource, Inupiat Community of the Arctic Slope
Rex Rock Sr., President, Arctic Slope Regional Corporation
Donna Wixon, USDI/BLM
John Easton, Jeanne Frazier, Adele Lee, AkDNR/DO&G, Anchorage
Isaac Nukapigak, President, Kuukpik Village Corporation
Thomas Napageak, Jr, Mayor, City of Nuiqsut
Bernice Kaigelak, President, Nuiqsut Tribal Council
Gordon Matumeak, Tony Cabinboy, Field Inspector, Nuiqsut
Thomas Simmonds III, Charles Russell, Field Inspector, Barrow
Rhonda Mullen, Nuiqsut Village Corrdinator

Files

NSB11-357/GRB/sm Acting Manager/tbiii


153°0'W
152°0'W
151°0'W
150°0'W
149°0'W
148°0'W
71°0'N
70°30'N
70°0'N
0
10
20
40
Nautical Miles
Cape Halkett
1
2
3
Jones Islands
Cross Isl.
Tolaktovut Pt
Oliktok Pt
Prudhoe Bay
Deadhorse
Nuiqsut
Colville River
Kuparuk River
Sag. River
Nuiqsut boundary
Private & ANSCA lands
SurveyArea1_HarrisonBay
SurveyArea2_ColvilleDelta
SurveyArea3_BarrierIslands
Approx bathymetry (m)
NAN
> 100
80 - 100
60 - 80
40 - 60
20 - 40
10 - 20
5 - 10
2.5 - 5
0 - 2.5

Land Management
Regulations Permit Application

North Slope Borough
Dept. of Planning & Community Services
Permitting & Zoning Division

Permit Number NP-357

Applicant: C. Ruppel, U.S. Geological Survey, Woods Hole Field Center MASSACHUSETTS
Address: U.S. Geological Survey, 384 Woods Hole Rd., Woods Hole, MA 02543
Contact Person: Dr. Carolyn Ruppel: cruppel@usgs.gov
Location (TRS): T: 12N R: 15E Sec.: ____ T: 18N R: 4W Sec.: ____

Permit Type: Science/Research (federal)
Date: June 2, 2011
State ID: Alaska
Phone: 617-806-6768 (Eastern time zone)
Project Name: Climate Change/Subsea Permafrost/Methane Hydrates
Unitized Field Name and Pad Location: Offshore

Zoning District: North Slope Borough/NPRA (OFFSHORE)

Proposed Start Date: July 31, 2011 (will not sail before August 1)
Completion Date: August 13, 2011 (in port by August 12)

Proposed Development: N/A (This is not a development project.)

Purpose of Development: N/A (This is not a development project)

N/A Fill/Dredge — Material: N/A — Acres: N/A

N/A Oil & Gas Wells — Number of New Surface Holes: N/A

N/A Temp. Water Use — Sources: N/A — Access: N/A
Purpose: N/A — Maximum Amount: N/A

N/A Off Road Travel — Period of Travel: N/A — Equipment: N/A
Access to site: N/A

N/A Fuel Storage — Type: N/A — Amount: N/A
Handling: N/A — Amount: N/A

N/A Hazardous Material Storage — Type: N/A — Amount: N/A
Handling: N/A

X Solid Waste — Treatment: waste treatment/disposal is responsibility of Southern Cross LLC (Bill Kopplin), operator of R/V Ugpik

N/A Mining — Mining Habitat: N/A

X Air Emissions — Type: small boat & small generator (< 5 kW) emissions — Amount: max fuel use: 600 gallons diesel; 30 gal unleaded

X Noise/Vibrations — Type: small boat and generator noise, low-energy seismic noise in water — Amount: seismics produce less than 165 dB at distance of 50 to 135 meters from vessel

X Sensitive Habitat — Floodplain: N/A — Shoreline: will come ashore only at West Prudhoe/Oliktok, except in emergency

X Transportation — Type: rental truck driven by US federal employees on existing oilfield roads to move gear between Deadhorse and ~~vessel at West Prudhoe Dock; offshore transport on R/V Ugpik operated by Southern Cross LLC (Bill Kopplin)~~

N/A Marine Tanker Facility — low-energy ~~; NO AIRGUNS~~ Seismic Work — N/A Utility Development — N/A Recreational Development

N/A Causeway Construction — N/A Offshore Drilling — N/A Residential Development — yes CD-ROM Included

N/A Airport or Helicopter Pad — N/A Oil Transportation System — N/A Snow Removal

ATTACHED TO THIS APPLICATION THE FOLLOWING:

- **GENERAL VICINITY MAP**
- **SPECIFIC LOCATIONS MAP, INCLUDING NEARBY EXISTING DEVELOPMENT AND NATURAL FEATURES**
- **SITE SPECIFIC FOOTPRINT (IN ESRI SHAPE FILE FORMAT) ON A CD-ROM.**
- **A DIGITAL GIS SHAPE FILE OR GEODATABASE OF THE PERMIT AREA WITH NO ATTRIBUTES.**
- **THE PROJECTIONS SHOULD BE NAD 1927 ALASKA ALBERS OR GEOGRAPHIC.**
- **DESIGN PLANS (PLOT PLAN), ELEVATIONS, CROSS SECTIONS, PROFILES, AS APPROPRIATE.**
- **SUPPLEMENTAL INFORMATION, AERIAL PHOTOGRAPHS, STUDIES, ETC. (AS NEEDED)**

SEND TO:
NORTH SLOPE BOROUGH, LAND MANAGEMENT ADMINISTRATOR
P.O. BOX 69
BARROW, AK 99723
PHONE: (907) 852-0320 TOLL FREE (IN-STATE): (800) 476-6066 EXT. 320

I HEARBY CERTIFY THAT THE FOREGOING IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

Carolyn D. Ruppel
AUTHORIZED SIGNATURE

May 25, 2011
DATE

Carolyn D. Ruppel
NAME

Research Geophysicist
TITLE

FEE PAID
__ SPECIAL PLANNING COMMISSION MEETING.....$12,000.00
__ DEVELOPMENT PERMIT...$2,000.00 AND $500.00 PER WELL
__ ADMINISTRATIVE APPROVALS.....$1,500.00
__ CONDITIONAL DEVELOPMENT PERMITS....$3,000.00 AMOUNT PAID: Federal Govt, science waiver

---

DECISION

X ADMINISTRATIVELY APPROVED
This is a minor amendment to a development permit or is a use of land listed under administrative approvals for this zoning district

___ REZONING APPROVED
This proposed development substantially complies with the Master Plan, and a use permit is issued, conditioned on compliance with all relevant Master Plan Conditions, lease stipulation, and provisions of state and federal law and permit served thereunder.

___ DEVELOPMENT PERMIT APPROVED
The proposed development meets all applicable mandatory Policies, represents the Developer's best efforts to implement all relevant best efforts and minimization policies, and as long as any conditions set forth in the accompanying letter are complied with, will represent a net public benefit. (see accompanying letter.)

___ CONDITIONAL DEVELOPMENT PERMIT APPROVED
This is a use of land that is listed as a conditional development for this zoning district or has been elevated by the Land Management Administrator to the Planning Commission.

___ PERMIT DENIED
(SEE ACCOMPANYING LETTER)

Land Management Administrator

Date 6/27/11

If you wish to appeal this decision, you must submit written notice to the secretary of the Planning Commission prior to the next regulatory scheduled meeting, stating the policy or policies in question and the reason you believe the decision is incorrect.

Proposed Informal 2011 PLAN OF COOPERATION between the U.S. Geological Survey and the Native Village of Nuiqsut

Contact: Carolyn Ruppel, US Geological Survey, cruppel@usgs.gov; 617-806-6768

This plan of cooperation concerns an early August (approximately 1 August to 13 August, 2011) research cruise to be conducted by the U.S. Geological Survey using low-energy (no airgun) seismic equipment, vibracoring, and air/water sampling technology. The goal of the cruise is to determine the impact of climate change on subsea permafrost and offshore methane hydrates at water depths from 0 m up to 25 m in an area nominally between Pogik Bay and West Prudhoe Bay along the Alaskan Beaufort coast. The surveys will occur both within and outside the nominal 3-mile state water limit. Details about the survey locations are provided in the "cruise brief" attached to this plan of cooperation.

- All seismic (no airguns) activity will be completed on or before 8 August, 2011 at the latest. The cruise will be completely finished by 13 August, 2011 at the latest. We anticipate no interference with bowhead whale migration or the hunt that commences from Cross Island in late August.
- The vessel will work in 3 primary areas: Intensive surveys in the middle of Harrison Bay, reconnaissance (not closely spaced surveys) outside the Colville Delta and never entering the Colville Delta channels, and both landward and seaward of the Spy and Jones barrier islands. The vessel will not approach Cross Island at any time. The USGS will respect private and ANSCA lands along the shore near Harrison Bay and stay at least half a kilometer offshore. The USGS will not come ashore anywhere but Oliktok Point and West Prudhoe Bay dock, except in the case of emergency.
- The USGS will ensure adherence to MMPA, ESA, and other pertinent regulations at all times. Appropriate letters/findings are being sought from NMFS (request for letter of concurrence) and USFWS (ESA findings on fish/birds; MMPA/ESA findings on polar bears; articulation of a polar bear interaction plan). The USGS is applying for a NSB LMR permit, and the USGS will complete NEPA certification. Note that the NMFS Letter of Concurrence request for no-take specifically addresses subsistence activities and the actions that the USGS will take to ensure no interference with subsistence activities or the availability of organisms that are hunted or fished.
- The USGS will have a NMFS-approved PSVO on duty during any survey activities, which are planned to occur for a maximum of 12 hours out of every 24 hours during the survey period. Copies of the required post-cruise PSVO report will be filed with Nuiqsut and the North Slope Bureau, in addition to the necessary federal agencies, within the legally-mandated timeframe post-cruise. Copies of polar bear data compiled under the USGS "Polar Bear Interaction Plan" forged with FWS to comply with MMPA/ESA will also be provided to both Nuiqsut and NSB.
- The USGS will ask the vessel's crew to attempt VHF radio communication with any vessel that comes within ~2 km of the *R/V Ugpik* during the survey activities to establish the vessel's intent and purpose (e.g., subsistence activities) and determine how we can accommodate the other vessel's activities through alteration of our survey design.

- In accordance with the Polar Bear Interaction plan and out of respect for native community activities in the area during early August 2011, the USGS will seek an adult living in Nuiqsut to serve as the communication liaison to *R/V Ugpik* during the period of 1 through 8 August, the only time during which low-energy seismic activities are planned. The USGS will purchase a new marine radio for use by this individual, who will stay in Nuiqsut for the duration of the cruise. The primary obligation of this individual, who will be paid by the USGS for these 8 days, will be contacting the *R/V Ugpik* one or more times per day from Nuiqsut to describe villagers' subsistence activities (e.g., how many boats are leaving the Delta, what is their planned area of operation and prey) in the shallow water Beaufort.
- If the NSB and Tribal Council approve the plan to have a Nuiqsut resident radio the vessel each day between 1 and 8 August with details about subsistence activities and if there is still a remaining berth on the vessel, the USGS will work with the coordinator of the teacher-in-training program at Ilisagvik Community College to identify a North Slope native in the final stages of teacher training and with an expressed interest in science. If mutually agreeable, this teacher-in-training will be invited to participate in the first phase of the cruise, with flight costs, lodging, and food covered by the USGS.
- Lead USGS personnel will attempt to visit Nuiqsut at USGS expense at a mutually agreeable time to share the results of the research in an appropriate format and to conduct an outreach activity if desired by the villagers. At the very least, the USGS will in Fall 2011 provide the Trapper School with educational posters and materials outlining the nature of our research and the results. The USGS looks to the Tribal Council for advice about the most appropriate form of outreach to the community about our research activities.
- All publications and other products will acknowledge the assistance and support of the residents of the Native Village of Nuiqsut. Copies of all scientific products will be provided to parties that you designate in Nuiqsut.

USGS 2011 Cruise Brief: Shallow Beaufort Sea

2011 USGS Survey for Top/Seaward Extent of Permafrost and Degassing Methane Hydrate Front on the Shallow-Water Beaufort Shelf, Central U.S. Beaufort Coast

Contact: Chief Scientist—Dr. Carolyn Ruppel (cruppel@usgs.gov); 617-806-6768; U.S. Geological Survey, Coastal & Marine Geology, Gas Hydrates Project, Woods Hole, MA 02543

Vessel: *R/V Ugpik* (operated by Bill Kopplin, Southern Cross LLC), < 45 ft long
Timing: ~1 to 12 August, 2011
Duration: Nearly all acoustics will be conducted prior to 8 August, maximum of 12 hour per day operations
Port: West Prudhoe Bay Dock

Instrumentation:

- SIG 2mille 300-500 J mini-sparker (center frequency 800-850 Hz): 135 m for 160 dB isopleth for the planned maximum 500 J operation
- Chirp (Edgetech SB-424) 4-24 kHz subbottom imaging: 75 m for 160 db isopleth
- SEA (Advanced Products) Ltd. SWATHplus-M 234 kHz low-powered sonar: 50 m for 160 dB isopleth
- 500 W rms sonar (83/200/455 kHz) [fishfinder]: unknown for 160 dB isopleth, but we will assume 75 m, which is certainly many times too large
- Short (up to 65 ft) streamer (receivers only)
- Sonobuoys (receivers only) for velocity determinations
- Methane sensing equipment (cavity ring-down spectrometers)
- CTD-type water sampler
- Vibracorer
- GPS navigation

No long-term monitoring instrumentation will be left in the water

Summary of Activities:

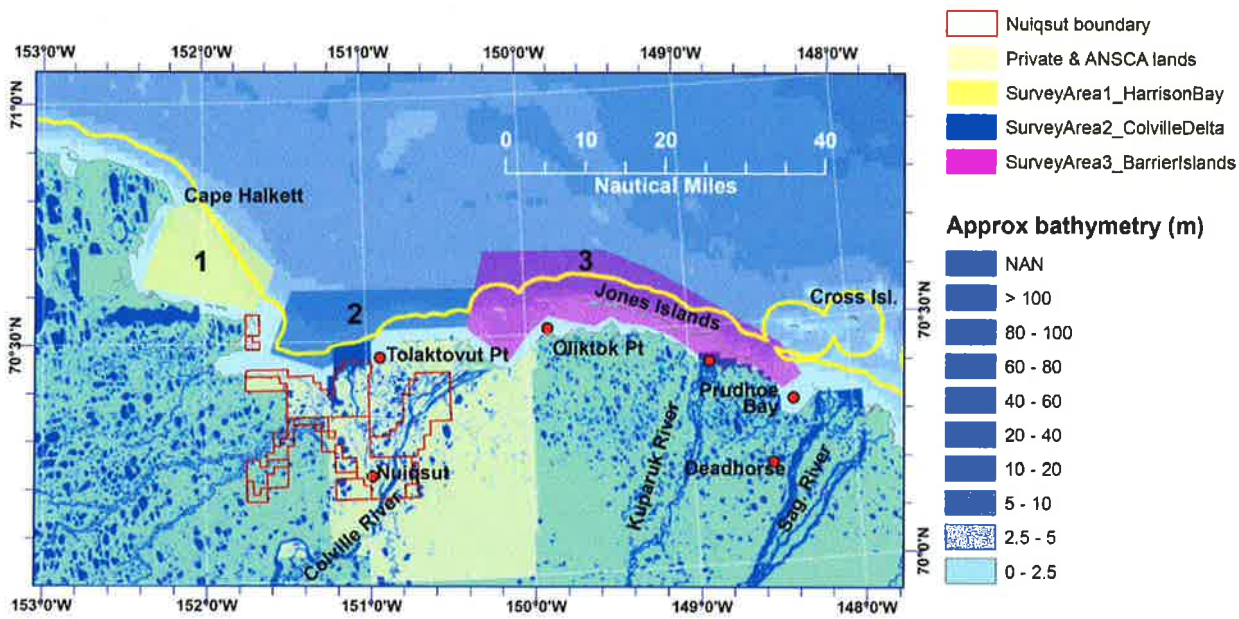
1. Geophysical surveying (low-energy seismic, low-powered sonar imaging)
2. Collection of up to 10 vibracores from the seafloor, with maximum length of 5 meters each
3. Measurement of methane and carbon dioxide concentrations in seawater and at the ocean-atmosphere interface

Permitting/compliance:
USGS will be responsible for permitting, including filing a Letter of Concurrence request with NMFS (filed the week of 16 May, 2011), obtaining necessary FWS consultations and approvals (materials filed in Anchorage and Fairbanks during the week of 16 May, 2011), complying with NEPA regulations, and getting a NSB permit. The USGS will also be responsible for developing a plan of cooperation with village of Nuiqsut. Two USGS scientist who are trained as PSVOs

will be properly equipped to serve in this role on the vessel and will be stagger being on duty when acoustic operations are occurring. The PSVOs will file the appropriate reports after the cruise.

Narrative:

This work will be conducted on the shallow-water (< 30 m water depth) Beaufort Shelf between Pogik Bay on the west and West Prudhoe Bay on the east in earliest August (latest possible date of acoustic activity would be 12 August) for a period not to exceed 12 days (including transits). The map highlights the three areas of focused surveys: The primary target area (labeled "1") is the center of Harrison Bay, where we intend to collect a tightly-spaced grid of data. A secondary target (labeled "2") is the eastern part of Harrison Bay and at distances greater than 1 nautical mile seaward of the Colville River Delta, where we intend to investigate a pockmark and other seafloor and shallow subseafloor features identified in 2010. The third target area (labeled "3") is (a) the backwater area (Simpson Lagoon) between the mainland and the Spy and Jones Islands, where we have identified subsea permafrost from older seismic data; and (b) the area seaward of the barrier island chain, where we will seek continuation of subsea permafrost and seafloor features possibly related to methane expulsion.



Low energy seismic and low powered sonar imaging

The maximum length of any acoustic survey line is ~35 km (~20 nautical miles), but most are likely to be considerable shorter, probably averaging 10 to 15 nautical miles. Since we will be conducting multiple source acoustic operations at approximately 4 knots for a maximum of 12 hours per day and probably for no more than 7 days within the period of 1 August to 12 August, we estimate that, with ideal conditions (perfect weather/sea conditions, perfectly functioning equipment, no shut-downs for marine mammals and not counting transits between lines), we would acquire a maximum of ~340 nautical miles of data. It is more likely that we will acquire only ~200 to 250 nautical miles of data since we do not intend intensive surveys in Areas 2 or 3.

The USGS is voluntarily operating under several restrictions for these surveys, including: 1) no surveys closer than 1 nautical mile from the coast in the area of the Colville River Delta; 2) no surveys within 1 km offshore Nuiqsut/ANSCA lands west of Tolaktovut Point; 3) no coming ashore anywhere other than Oliktok Point or West Prudhoe Bay except in the case of emergency; 4) no surveys closer than 500 m to the barrier islands in Simpson Lagoon.

Surveying will nominally be conducted on lines running subperpendicular to shore (except in Simpson Lagoon), from the shallowest water depths feasible to water depths as great as 25 to 50 m, depending on ice cover and real-time discoveries about the seaward extent of permafrost and the occurrence of features associated with methane emissions. As is always the case with marine surveys, we are flexible and will change our operations plan and survey pattern in real-time to accommodate unforeseen ice cover, ongoing subsistence activities, presence of environmentally sensitive species, poor sea state, prevailing wind patterns, and private sector activities.

Vibracoring

We plan to acquire a limited number (up to 10) of short (up to 5 m long) approximately 3" to 4" (diameter) sediment cores from the seafloor during the cruise. The goal of this coring is to acquire sediment samples needed to reconstruct sea level change over the past 10,000 years, to determine the composition of pore waters, and to correlate lithologic changes with those detected in our seismic data. No chemical or other analysis of the cores will be carried out aboard the vessel or on shore on the North Slope. Instead, cores will be sectioned after recovery, capped, labeled, and stored for shipment back to our home laboratories for analysis. The coring will be conducted with a USGS portable vibracoring rig that will be mounted on the ship and powered by a portable generator. Disturbance to the seafloor will be minimal and consist of a disturbed zone at the location of the core itself. There are no drilling or other fluids involved in vibracoring, and vibracoring should not affect water quality. US FWS has been made aware of our intention to collect a handful of vibracores from the seafloor in the study area and is being consulted for advice about locating these cores in areas that will minimize the impact on fish habitat.

Water/Air sampling

The USGS and its partners on the cruise will measure CO_2 and CH_4 (greenhouse gas) concentrations in seawater and at the ocean-atmosphere interface using CRDS (cavity ring-down spectrometry) technology. This technology is non-destructive. Air or seawater are pumped into the system, analyzed with the addition of no foreign substances, and then ejected. The process does not alter or contaminate the very low volumes of air or water that are pumped through the system. Conventional water samples will also be acquired in a few locations in low volume plastic sampling bottles to check the accuracy of the CRDS measurements with measurements on a gas chromatograph back in Massachusetts.

Copy FYI only

United States Department of the Interior

U. S. GEOLOGICAL SURVEY
384 Woods Hole Road
Woods Hole, MA 02543

Woods Hole Coastal and Marine Science Center
cruppel@usgs.gov
617-806-6768 (USGS mobile) 508-457-2310 (fax)

2 June, 2011

Mr. Joseph Nukapigak or current President
Native Village of Nuiqsut, Tribal Council
P.O. Box 89169/P.O. Box 187
Nuiqsut, AK 99789

Re: 2011 Beaufort Sea research activities and proposed plan of cooperation

Dear Mr. Nukapigak,

I look forward to your response regarding the enclosed informal proposed plan of cooperation for 2011 for a research cruise that the USGS will undertake between Harrison Bay and West Prudhoe Dock between 1 and 13 August, 2011. As I offered last year, I am happy to attend a Tribal Council meeting via teleconference at a time of mutual convenience if there are suggestions or concerns that your Council would like to discuss. My location is 4 hours ahead of Alaskan time.

In June 2010, Ms. Kaigelak and the Nuiqsut Tribal Council kindly provided advice that led to the successful completion of a short research cruise conducted by the climate group within the US Geological Survey's Gas Hydrates Project between 3 and 8 August, 2010 in the Harrison Bay area. Our cruise, conducted aboard a 4-berth vessel, used low energy sound sources (no airguns) to determine the location of subsea permafrost and shallow subseafloor methane gas that may be released as methane hydrates thaw in the Harrison Bay area. In accordance with the informal plan of cooperation from 2010 and the tenets of our NSB permit:

- We obeyed all restrictions to which we had voluntarily agreed. This included restrictions on where equipment would be deployed and where the vessel would operate.
- We completed the cruise long before the start of the Nuiqsut whale hunt.
- We did not come ashore except at Oliktok Point and West Prudhoe Bay dock.
- Mr. Eli Nukapigak participated in the cruise as a USGS-paid observer from the village of Nuiqsut. Based on his radio contacts with Nuiqsut, Mr. E. Nukapigak informed us daily about local weather conditions and villagers' plans to fish or hunt seals outside the Colville Delta area.
- I sent the Native Village office a copy of the Marine Mammal Observer's report (only 2 mammals spotted, both seals distant from the vessel) and the lengthy cruise report in Fall 2010.
- We have acknowledged and will continue to acknowledge the assistance of Nuiqsut villagers as we complete our analysis of last year's data and publish our results. One article written for the lay audience can be found at http://soundwaves.usgs.gov/2010/11/
- I had hoped to visit the Trapper School in Spring 2011 to discuss our 2010 cruise with students and teachers, but the very difficult federal budget situation (including the near-shutdown) and internal management issues at the USGS made the trip impossible. Since the schoolyear has already finished for NSBSD, we will arrange to provide the school with a poster on our work in Fall 2011. I would also appreciate advice from the Village about the sort of outreach that would be most appreciated and helpful.

USGS Cruise: August 1 through 12, 2011
We plan to conduct a research cruise similar to that of 2010 using the *R/V Ugpik*, operating out of West Prudhoe Bay dock and Oliktok Point in August 2011. The *R/V Ugpik* is a sister vessel of the *R/V Annika Marie*. Like the *R/V Annika Marie*, the *Ugpik* will be operated by Bill Kopplin, but under the auspices of Southern Cross LLC. Our work and work area are described in more detail in the **cruise brief** enclosed in this mailing. **All work will be completed by 13 August, 2011 at the latest.**

During the first part of the cruise, lasting until about 8 August, we will conduct low-energy acoustic surveys with the same instrumentation that we used in 2010. The 160 dB marine mammal safety radius for the most energetic source is 135 m, and the distance to the 180 dB safety radius for our most energetic source is < 25 m. We will also recover a limited number of short (< 5 m) vibracores from the seafloor in the operations area, primarily to constrain the history of sea level rise over the past 10,000 years and to extract pore waters and gases. After 8 August, we will be conducting non-destructive water sampling and air sampling to map methane and carbon dioxide concentrations using cavity ring-down spectrometers.

USGS personnel for the seismic part of the cruise will include 2 NMFS-approved PSVOs who will rotate duties during the 12 hours/day of operations. We have submitted the required paperwork to NMFS seeking a Letter of Concurrence that our operation will be "no-take" with respect to marine mammals. We have also submitted appropriate material for MMPA/ESA compliance on eiders, fish, seals, and polar bears to the USFWS offices in Fairbanks and Anchorage. I am today submitting the permit application to Mr. Waska Williams at NSB LMR for our entirely offshore (except in the Deadhorse area) operation. As in 2010, the USGS will complete a NEPA Categorical Exclusion for this no-take situation. At your request, I will immediately provide the Tribal Council with any of this documentation. Note that the NMFS request for Letter of Concurrence includes extensive information about our plans to mitigate any impact on subsistence activities.

The **attachment** details the proposed informal plan of cooperation between our group and the Village of Nuiqsut for summer 2011. The most important components of this plan include:

- Respect for private and ANSCA lands on the edges of Harrison Bay
- Respect for subsistence fishing and seal hunting, with particularly sensitivity to the Colville Delta, whose channels we will not enter.
- Absolute assurance that the activities at sea will not extend beyond 13 August and that we therefore expect to have no impact on the 2011 whale hunt.
- Nuiqsut villager opportunity: Hiring of an adult Nuiqsut villager to communicate with the *R/V Ugpik* at least once daily between 1 and 8 August (seismic part of cruise) to relay information about boats leaving the village for the Arctic Ocean and their planned operations area. We will purchase a new radio for this villager (which s/he may keep) and pay $100 per day. *This plan must be approved by the North Slope Borough.*
- Teacher-at-sea: Only if a berth is still available on the *R/V Ugpik* (pending acceptance of the plan to hire a villager to communicate with the vessel each day), we will work with Ilisagvik Community College's teacher training program to identify a North Slope native teacher-in-training with a strong interest in secondary school science education to participate as a partner in our shipboard research between ~1 and 8 August. We will pay flight costs, lodging, and food expenses for this individual.

Thank you, and I look forward to hearing from you and your colleagues at your earliest convenience about any concerns or suggestions that you may have.

Sincerely,

Carolyn D. Ruppel
Research Geophysicist

From: Carolyn Ruppel/GD/USGS/DOI
To: Thomas.BrowerIII@north-slope.org

Date: Tuesday, July 19, 2011 05:07PM
Subject: USGS offshore program: AEWC stipulation fulfilled for NSB 11-357

Dear Tom,
A stipulation on NSB 11-357 granted to the USGS on 5 July, 2011 for a survey in the shallow water Beaufort Sea between ~1 and 13 August, 2011 was that I contact Mr. Johnny Aiken, AEWC Exec Dir, regarding the activity.

Yesterday, I sent the attached fax to Mr. Aiken after unsuccessfully trying to reach him at his voice line. His response to my fax is forwarded below.

Thank you again to you and others in your office for your fast action on our permit this year.
Carolyn Ruppel

-----Forwarded by Carolyn Ruppel/GD/USGS/DOI on 07/19/2011 05:03PM -----

To: cruppel@usgs.gov
From: Johnny Aiken <aewcdir1@gci.net>
Date: 07/18/2011 03:23PM
Subject: Offshore Geophysical

Dr. Ruppel, I have received your letter dated 18 July 2011 and have determined that there should not be any problems as long as you are out of the Cross Island area by August 15, 2011.

Johnny Aiken, Executive Director

Attachments:

AEWCfax.doc

United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Fairbanks Fish and Wildlife Field Office
101 12th Avenue, Room 110
Fairbanks, Alaska 99701

June 17, 2011

Dr. Carolyn Ruppel
U.S. Geological Survey
Coastal and Marine Team
Quissett Campus, 384 Woods Hole Rd.
Woods Hole, MA 02543-1598

Re: Geophysical survey of the shallow Beaufort Shelf

Dear Dr. Ruppel:

Thank you for your May 18, 2011 e-mail requesting informal consultation pursuant to Section 7 of the Endangered Species Act of 1973, as amended (ESA) for a proposed U.S. Geological Survey (USGS) geophysical survey of the shallow-water Beaufort Shelf.

The Service has reviewed the proposed action in relation to section 7 of the ESA to determine whether it will adversely affect listed species under U.S. Fish and Wildlife Service (USFWS) jurisdiction. Three species listed as threatened under the Act occur in the survey area: spectacled eiders (*Somateria fischeri*), Alaska-breeding Steller's eiders (*Polysticta stelleri*), and polar bears (*Ursus maritimus*); the proposed action will also occur within designated critical habitat for polar bear.

Proposed action
Based on supporting documentation provided with your request, we understand USGS plans to conduct low-energy seismic reflection profiling and low-powered 234 kHz sonar surveying focused on the Harrison Bay, Simpson Lagoon, and seaward of the Colville Delta and the Spy and Jones barrier islands area in the Beaufort Sea. In summer 2010, the USGS collected reconnaissance acoustic data in Harrison Bay[1]. The 2011 study will provide additional data needed to determine the extent of shallow offshore subsea permafrost and methane hydrate degassing.

Surveys will be conducted from the R/V *Ugpik* during the period of 1 to 12 August 2011. The R/V *Ugpik* will leave from and return to Prudhoe Bay, AK. The USGS will use subbottom imaging, seafloor imaging, and water column imaging tools. No airguns will be used. Acoustic operations will be conducted at a speed of ~ 4 knots in ice-free waters within ~30 km of the coast and usually within 10 km of the coast. The USGS will follow the project's 2011 Polar Bear Interaction Plan to manage potential effects to polar bears

[1] consultation reference number 71470-2010-I-0066

during vessel and survey operations. This plan is currently in draft form and under review by USFWS Alaska Region Marine Mammal Management (MMM).

Listed eiders
Spectacled eiders and Steller's eiders breed on the Arctic Coastal Plain from June–September. Individuals of both species migrate westward over marine waters along the Chukchi and Beaufort coasts en route to molting areas throughout the months of June–September. The R/V *Ugpik* may occasionally encounter migrating spectacled eiders in the survey area. The likelihood of encountering Steller's eiders is extremely low because they breed at very low densities on the eastern Arctic Coastal Plain.

We anticipate that any disturbance to listed eiders would be limited to a single flush event as the vessel passes through the area and would not energetically or physiologically impact the individuals at a level where take would occur. Therefore, we conclude that the potential effects of the proposed action are insignificant and the proposed action is *not likely to adversely affect* spectacled eiders or Steller's eiders.

Polar bears
Although the R/V *Ugpik* will be operating in ice-free waters, the vessel may encounter swimming polar bears in the survey area and may disturb bears on land while operating near barrier islands. We anticipate that minimization measures for polar bears that have been incorporated into the proposed action through the draft 2011 Polar Bear Interaction Plan will minimize the effects of survey operations to the extent that take of polar bears will not occur. These measures include voluntary restrictions on the location of the R/V *Ugpik* relative to the coast, barrier islands, and the ice edge; using protected species visual observers during vessel operations; and shutting down acoustic imaging operations when a polar bear is encountered within 500 m of the vessel.

Because the likelihood of encountering a swimming polar bear is low, and measures are in place to minimize effects to polar bears should an encounter occur, we conclude that potential effects to polar bears from the survey are discountable and the proposed action is *not likely to adversely affect* polar bears.

Polar bear critical habitat
Proposed activities will occur within sea ice habitat (Unit 1) and within the no-disturbance zone of barrier island habitat (Unit 3). The no-disturbance zone includes the surrounding land and water within 1 mile (1.6 km; 0.87 nautical miles) of designated barrier island habitat. Please see detailed critical habitat maps or shapefiles provided at the USFWS Alaska Region Marine Mammal Management polar bear critical habitat website[2] for additional information on polar bear critical habitat within the survey area.

Because the proposed action will be conducted entirely in ice-free waters, we do not expect it to compromise the intended conservation role of sea ice for polar bears. Refuge from human disturbance was identified as a function of barrier island habitat (Unit 3;

[2] http://alaska.fws.gov/fisheries/mmm/polarbear/esa.htm#critical_habitat

including a 1.6 km no-disturbance zone) in the designation of polar bear critical habitat (75 FR 76086). While disturbance from vessel operations within the no-disturbance zone could temporarily displace some polar bears from barrier island habitat, we anticipate that disturbance to polar bears will be minimized by following the 2011 Polar Bear Interaction Plan. Based on the inclusion of minimization measures and the small scale of the proposed action, we expect that the proposed action will result in minimal, short-term disturbance to polar bears that will have an insignificant effect on the conservation role of critical habitat. The Service therefore concludes that the proposed action is *not likely to adversely affect* polar bear critical habitat.

Conclusion
The Service has reviewed the proposed project in relation to Section 7 of the ESA and determined the proposed activities are not likely to adversely affect listed species or designated critical habitats.

Preparation of a Biological Assessment or further consultation under section 7 of the Act regarding the proposed action is not necessary. This letter applies only to endangered and threatened species under our jurisdiction. It does not preclude the need to comply with other environmental legislation or regulations such as the Migratory Bird Treaty Act or the Marine Mammal Protection Act (MMPA). Note that the regulatory definition of take under the ESA is different from that of take under the MMPA. We recommend continued coordination with USFWS Alaska Region Marine Mammal Management regarding potential effects to polar bears under the MMPA (contact Craig Perham; 907-786-3810).

Thank you for your cooperation in meeting our joint responsibilities under the Act. If you need further assistance, please contact Denise Walther at (907) 456-0277.

Sincerely,

Denise Walther
Acting Branch Chief
Endangered Species

IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1011 E. Tudor Road
Anchorage, Alaska 99503-6199

AFES/MMM

JUL 14 2011

Dr. Carolyn Ruppel, Ph.D., Research Geophysicist
U.S. Geological Survey
Coastal and Marine Geology/Gas Hydrates Project
384 Woods Hole Road
Woods Hole, Massachusetts 02543

Dear Dr. Ruppel:

This letter responds to your letter dated May 18, 2011, and request that the U.S. Fish and Wildlife Service (Service) review your planned activity (2011 USGS Survey for Top/Seaward Extent of Permafrost and Degassing Methane Hydrate Front on the Shallow-Water Beaufort Shelf, Central U.S. Beaufort Coast) for potential impacts on Pacific walruses and polar bears. The U.S. Geological Survey (USGS) Cruise in shallow water Beaufort Sea will conduct an acoustic imaging survey between 1 and 12 August, 2011, in an area roughly between Pogik Bay on the west and Prudhoe Bay on the east, Beaufort Sea. The shipboard only project will use the small vessel, *R/V Ugpik*.

The purpose of the research cruise is to confirm the depth to the top of permafrost in this area and to map the seaward extent of permafrost, which presumably corresponds to the onset of methane hydrate degassing. Such surveys will not only provide baseline information about the state of subsea permafrost in 2010, but will also track historic changes. Surveying will be conducted on lines running subperpendicular to shore, from the shallowest water depths feasible to water depths as great as 25 to 50 meters (82 to 164 feet), depending on ice cover and real-time discoveries about the seaward extent of permafrost and the occurrence of features associated with methane emissions. The survey pattern will change to accommodate unforeseen ice cover, ongoing subsistence activities, presence of environmentally sensitive species, poor sea state, prevailing wind patterns, and private sector activities.

The Service has reviewed the materials (USGS 2011 Cruise Brief: Shallow Beaufort Sea brief, the Memorandum to James Lecky-National Marine Fisheries Service from Carolyn Ruppel [dated May 16, 2011], the Section 7 letter from the Service Endangered Species office [dated June 17, 2011], and the USGS Polar Bear Interaction Plan [Polar Bear Interaction Plan, USGS Cruise in shallow water Beaufort Sea, *R/V Ugpik*, ~1 through 12 August, 2011]) provided by you during our correspondence (May 6, 2011, and June 20, 2011). Given our understanding of polar bear and walrus distribution, the planned travel routes and locations of the activity we believe that it is unlikely that the proposed project will result in any major disturbances or impacts to individual polar bears or walruses. Walruses are extralimital in this area of the Beaufort Sea and will most likely not be encountered. Polar bears occupying the nearshore environments during the project period will be found mainly along the mainland coast and the barrier islands. Disturbance, if it does occur, will most likely be in the form of noise events. In the event that any bears or walruses are encountered, the most likely response of the animals will be avoidance, including diving and/or swimming away. These typical behaviors would not be expected to have any impact on the fitness of survival of the individual animals and will be limited in scope and short term in duration. The Service feels the probability of Level B Harassment is minimal, given the small, operating

TAKE PRIDE IN AMERICA

size of this project. In addition, interactions between polar bears and/or walruses and the studies will be limited due to the narrow overlap of the location of the activity and the distribution of polar bears and walruses at this time of year.

The *R/V Ugpik* and crew can minimize any potential interactions by following the monitoring and mitigation measures described in your polar bear interaction plan developed by USGS for this cruise ("Polar Bear Interaction Plan, USGS Cruise in shallow water Beaufort Sea, *R/V Ugpik*, ~1 through 12 August, 2011"). A copy of this plan and the included observation forms must be available at all times to *R/V Ugpik* personnel for reference. If any issues, questions or concerns arise Service biologists are available for consultation during the project period at the phone numbers listed below and noted in your interaction plan.

In the event that polar bears or Pacific walrus are observed, the Service requests that the *R/V Ugpik* limit interactions with observed animals by maintaining at least ½ mile (800 m) distance from all observed polar bears and walruses in vessel operations. In the event that the research crew has to access land, such as waiting out a storm, please follow the enclosed Service "Polar Bear and Human Safety Guidelines," which was also sent electronically to you. Furthermore, considering the small likelihood of encountering bears or walruses, along with the limited response that would likely ensue from an encounter with the *R/V Ugpik*, the Service has determined that an incidental take authorization is not necessary for this project.

In an effort to increase our understanding of polar bear and walrus distributions and habitat use, we request that any sightings of bears or walruses be recorded on the enclosed observation sheets by the crew/Marine Mammal Observers and be submitted to the Marine Mammals Management Office in Anchorage via email (craig_perham@fws.gov) or fax (907) 786-3816. We further request that a summary report of polar bear and Pacific walrus sightings be submitted to the Marine Mammals Management Office no later than 90 days after the completion of the expedition.

If you should have any further questions, please contact Mr. Craig Perham, at (907) 786-3810, or Mr. Christopher Putnam, at (907) 786-3844, of our Marine Mammals Management Office.

Sincerely,

Rosa Meehan, Ph.D.
Chief, Marine Mammals Management

Enclosures

cc: Fairbanks Fish and Wildlife Field Office (FFWFO)
Office of Law Enforcement (OLE)

Polar Bear-Human Interactions: Safety Guidelines

Polar bear density in Alaska is highest during fall months when polar bears aggregate along the coastline. During this time many villagers are engaged in subsistence activities, and more people are becoming interested in opportunities to view polar bears. Increasing numbers of visitors to Barrow and Kaktovik to view polar bears increases risk of injury to both humans and polar bears. Polar bears are naturally curious and predatory which are factors that increase risk to humans.

The purpose of these guidelines is to minimize polar bear-human interactions and maximize the safety of both humans and polar bears, so each can continue to live safely together in the Arctic environment.

Federal Law Regarding Polar bear-Human Interactions

Polar bears are protected under the Marine Mammal Protection Act of 1972 which prohibits take of any marine mammal, with few exceptions.

- **Take** is defined as: "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." Take is further defined by regulation to include **feeding or attempting to feed** a marine mammal in the wild.

- **Harassment** is divided into the following two categories: 1) Level A harassment, which is defined as "any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild;" and 2) Level B harassment, which is defined as "any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering."

- **In other words, any change in the animal's natural behavior that is a result of your presence in proximity to the animal can be considered level B harassment and is considered unlawful.**

Some exceptions are:

- Take for **subsistence purposes**, as long as take is not wasteful

- **Authorized harassment** by a Federal, State or local government official or their designee, as long as it is done in a humane manner and is for the purposes of protection or welfare of the mammal, the public, or non-lethal removal of nuisance animals. An example is the North Slope Borough Polar Bear Patrol Program.

- **Defense of life take** is permissible if such taking is imminently necessary in self defense or to save the life of a person in immediate danger, and such taking is reported within 48 hours.

- **Scientific research** such as the polar bear feeding ecology study, population surveys, etc. may be authorized **(a permit is required)**.

- **Photographing** marine mammals in the wild is permissible if no take occurs, or if such activity is for educational or commercial purposes and is limited to Level B harassment **(a permit is required)**.

Guidelines for Living in Polar Bear Country

Most polar bears avoid people and have historically inflicted few human injuries and fatalities. However, the combination of curious and unpredictable behavior and occasional sudden aggressive behavior creates the potential for human injury. Furthermore, polar bears spending extended periods of time on land without an adequate food source may be nutritionally stressed animals and therefore, potentially more dangerous.

Polar bears make their living as predators and should always be treated as dangerous; their behavior includes an element of unpredictability. In general, polar bears will react to humans by avoiding them, exhibiting curious behavior, treating them as another bear, or attempting to prey on them. **The closer that humans are to polar bears, the more dangerous the situation because the more likely the polar bear(s) will feel threatened, which could result in an attack.** Unprovoked predatory attacks on humans are rare but do occur. The following guidelines may help reduce the risk associated with living in polar bear country.

Remain undetected. The best way to avoid detection by a polar bear is to be alert and detect the animal before it detects you. Be particularly alert in areas where bears are likely to occur: near open leads, at whale or other marine mammal carcass sites, along coastal and river bluffs, or in the vicinity of fresh tracks or (seal) kill sites.

- Avoid traveling alone;
- Blend in with the surrounding environment, e.g. wear white clothing to help camouflage presence; and
- Stay down-wind from known polar bear sites to avoid detection.

- **Avoid close interactions.** Viewing animals should be accomplished without the animal's awareness of your presence. Unfortunately, little information is available regarding what constitutes a safe viewing distance to avoid disturbing polar bears. Polar bears are individualistic and react differently to both noise and human presence. **A general rule of thumb is that the closer you are to the animal, the more likely you are to disturb it.**

- Use binoculars and high powered scopes to avoid approaching too closely;
- Avoid conversation and noisy movements;
- Be aware that interactions are most likely to occur during dusk, night, or dawn hours when polar bears are most active.

- **Avoid pursuing polar bears.** Harassment or pursuit of marine mammals is prohibited by law.

  - Never attempt to herd, chase, or separate groups of polar bears;
  - Using motorized vehicles to view bears should be avoided if it results in unnatural behavior by bears.

- **Minimize attractants.** Barrow, Nuiqsut and Kaktovik harvest bowhead whales in the fall; polar bears tend to aggregate near whale remains. Bears can become food-conditioned quite quickly, say, after only a few instances where they successfully obtain people-related food or garbage. **Food conditioning may increase risk of bears injuring people;** this tendency is carried with the animal as it moves through its home range and encounters other people, whether it be in hunting and fishing camps, cars, trucks, snow-machines, private cabins, etc., independent of where the food conditioning first developed. Polar bears are also excessively curious; some scientists believe this is related to the way they search for food - anything out of the ordinary is investigated as a possible food item. Presence of attractants such as garbage, cached carcasses, etc. are likely to increase the chances of having close bear-human interactions. **A polar bear that receives a food reward is very likely to return.**

  - Avoid carrying food with you or smelling like food when observing polar bears;
  - Keep a clean camp, village, etc. and never leave food unattended; and
  - Store food and other odorous items in bear-resistant containers or locations.

- **Be Aware of Bear Behavior.** While viewing marine mammals, ensure that your actions do not cause a change in their behavior. Since individual animal's reactions will vary, carefully observe all animals and leave the vicinity if you see signs of disturbance.

Polar bears that are breathing, nursing, foraging, swimming, playing, resting, or traveling in an uninterrupted manner are probably behaving naturally. However, polar bears that stop what they are doing to turn their head or sniff the air in your direction may have become aware of your presence. These animals may exhibit curious, nervous, threatened, or aggressive predatory behavior.

- **Curious** polar bears typically move slowly, stopping frequently to sniff the air, moving their heads around to catch a scent, or hold their heads high with ears forward or sticking out.
- A **threatened** or agitated polar bear may huff, snap its jaws together, stare at the person (or object of threat) and lower its head to below shoulder level, pressing its ears back and swaying from side to side. These are signals for immediate withdrawal. If ignored, the polar bear may charge. Threatened animals may also retreat, withdraw, or run away. This type of behavior is most likely to be demonstrated by a surprised bear or a female protecting her cubs.
- **Predatory** behavior may involve a polar bear that is sneaking or crawling up on an object it considers prey. Another form of predatory behavior is a bear that is approaching in a straight line at a constant speed without exhibiting curious or threatened behavior. This behavior is indicative of a bear about to attack.

What to do if you have a close encounter with a polar bear

- **If a polar bear detects and approaches you,** get out of the way if you are in the animal's travel corridor, or between a mother and her cubs. If the animal continues to approach and you are near a snow machine (or other vehicle), get on the snow machine and leave the area. If no snow machine is available, do not run; slowly move to a safe shelter. If no safe shelter is available, stand your ground. Gather people together in a group and/or hold a jacket over your head to look bigger. If the bear continues to approach, shout or make noise.

- **If a polar bear attacks** and no safe shelter is available, defend yourself. Drop a pack or item of clothing to distract the animal. If the attack is by a female with cubs, remove yourself as a threat to the cubs; do not fight back.

For More Information

For more information or to report incidences of harassment or injury, please contact:

U.S. Fish and Wildlife Service
Marine Mammals Management Office
1011 East Tudor Road
Anchorage, AK 99503
Tel. 1(800) 362-5148

U.S. Fish and Wildlife Service FAX Sheet

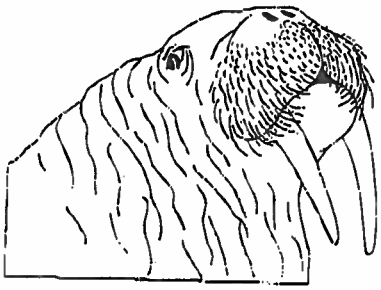
Marine Mammals Management

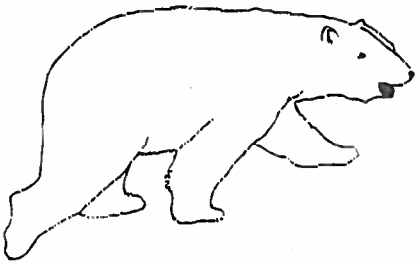
Region 7, Alaska
1011 East Tudor Road
Anchorage, AK 99503

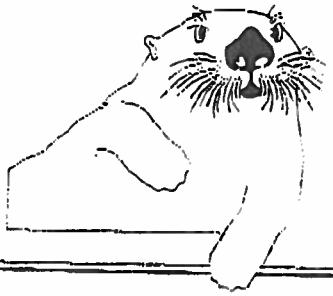
(907)786-3816 FAX
(907)786-3800 To Confirm

To: DR. CAROLYN RUPPEL, PH.D.
From: CRAIG PERHAM

This is page 1 of 7 pages







From: Carolyn Ruppel/GD/USGS/DOI
To: Bob Henszey/R7/FWS/DOI@FWS
cc: Jewel Bennett/R7/FWS/DOI@FWS, Louise Smith/R7/FWS/DOI@FWS, Ted Swem/R7/FWS/DOI@FWS, Denise Walther/R7/FWS/DOI@FWS

Date: Monday, July 11, 2011 08:04AM
Subject: Re: Fish 'consultation' for USGS shallow marine project Harrison Bay to West Prudhoe Dock--AUGUST 2011

Bob,
Last year, you sent me the email below after I contacted Jewel asking for FWS's input on our project in Harrison Bay from 3-9 August, 2010.

Denise Walther, who issued the attached letter for birds, some aspects of polar bears (still awaiting the remaining information from Craig Perham in Anchorage), etc in June 2011 for our August 1-12, 2011 cruise, suggested that I check with your group to make sure that there were no concerns about this year's activities.

This year, we will be doing some acoustics work seaward of the Colville Delta (in addition to work in Harrison Bay and near the barrier islands) and acquiring up to 10 short (~3 m) vibracores.
I am attaching the cruise brief for this year, but not all the copious permitting documentation that might just be overwhelming. If you would like copies of the NMFS Letter of Concurrence request, which has some components relevant to fish, I am happy to supply, although I doubt the information has changed since last year.

If you want to provide some insight about choices we could make to avoid "disturbing fish habitat" when we vibracore (e.g., avoid working in a specific type of area), I would be grateful for the advice.
Thank you for your "sense" on whether we require anything further from you.

Carolyn Ruppel

Dr. Carolyn Ruppel, Research Geophysicist
U.S. Geological Survey
Coastal and Marine Geology/Gas Hydrates Project
384 Woods Hole Rd.
Woods Hole, MA 02543
http://woodshole.er.usgs.gov/staffpages/cruppel/index.html

Visiting Scientist
MIT, Earth Resources Laboratory
77 Mass. Ave., Rm. 54-316
Cambridge, MA 02139

-----Bob Henszey/R7/FWS/DOI wrote: -----

To: Carolyn Ruppel/GD/USGS/DOI

From: Bob Henszey/R7/FWS/DOI
Date: 07/12/2010 01:55PM
cc: Jewel Bennett/R7/FWS/DOI, Louise Smith/R7/FWS/DOI, Ted Swem/R7/FWS/DOI
Subject: Fish 'consultation' for USGS shallow marine project centered on Harrison Bay, 3-9 August, 2010

Dear Dr. Ruppel,

I'm writing on behalf of Jewel Bennett who has returned to help with the oil spill clean-up efforts in the Gulf of Mexico. Jewel and Louise Smith (also at the spill) have discussed your 28 June 2010 email with the above subject line, and they believe the Service has no issues with this project regarding fish or migratory birds. If you have any further questions, please feel free to contact me or Jewel. Thank you for this opportunity to comment.

Bob

_____

Robert J. Henszey, Fish & Wildlife Biologist
Conservation Planning Assistance
US Fish & Wildlife Service
101 12th Avenue, Room 110
Fairbanks, AK 99701
Phone: 907-456-0323, Fax: 907-456-0208
Bob_Henszey@fws.gov
[attachment "Attach4_FWSletterESA.pdf" deleted by Carolyn Ruppel/GD/USGS/DOI]
[attachment "Attach1_USGS 2011 Cruise Brief.pdf" deleted by Carolyn Ruppel/GD/USGS/DOI]

From: Bob Henszey/R7/FWS/DOI
To: Carolyn Ruppel/GD/USGS/DOI
cc: Jewel Bennett/R7/FWS/DOI, Louise Smith/R7/FWS/DOI, Ted Swem/R7/FWS/DOI

Date: Monday, July 12, 2010 01:55PM
Subject: Fish 'consultation' for USGS shallow marine project centered on Harrison Bay, 3-9 August, 2010

History: This message has been replied to and forwarded.

Dear Dr. Ruppel,

I'm writing on behalf of Jewel Bennett who has returned to help with the oil spill clean-up efforts in the Gulf of Mexico. Jewel and Louise Smith (also at the spill) have discussed your 28 June 2010 email with the above subject line, and they believe the Service has no issues with this project regarding fish or migratory birds. If you have any further questions, please feel free to contact me or Jewel. Thank you for this opportunity to comment.

Bob

_____
Robert J. Henszey, Fish & Wildlife Biologist
Conservation Planning Assistance
US Fish & Wildlife Service
101 12th Avenue, Room 110
Fairbanks, AK 99701
Phone: 907-456-0323, Fax: 907-456-0208
Bob_Henszey@fws.gov