

**OIL SPILL RESPONSE PLAN
FOR
POLAR BEARS
IN ALASKA**

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Marine Mammals Management
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OIL SPILL RESPONSE PLAN FOR POLAR BEARS

I. GENERAL CONSIDERATIONS

A. Authorities

When a spill occurs in Alaska, wildlife response activities are conducted in accordance with the *Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges/Releases (Unified Plan)*, *Annex G: Wildlife Protection Guidelines for Alaska*. The Unified Plan and *Wildlife Protection Guidelines (WPG)* are available at: <http://www.akrrt.org/plans.shtml>.

U.S. Fish and Wildlife Service (Service) employees respond as part of the Incident Command System (ICS) structure described in the *Region 7 Spill Response Plan for Oil and Hazardous Substances*, available at https://inside.fws.gov/go/post/r7_spill_response. A field pocket guide is also available at this site.

Polar bear response is conducted under Service oversight and as described in this document, the *Oil Spill Response Plan for Polar Bears in Alaska (Polar Bear Response Plan)*, which is available at www.fws.gov/contaminants. The purpose of the *Polar Bear Response Plan* is to provide guidance to Service employees and their response partners and designees for conducting response activities during an oil spill in Alaska that could affect polar bears (*Ursus maritimus*) or their habitat. Service employees include those that are involved specifically in polar bear response activities; partners and designees are listed in Section III, List of Contacts. Other response personnel that are not directly involved in polar bear response activities, but are operating within polar bear habitat, may also find elements of this plan useful.

General oil spill response procedures are conducted under authority of the Oil Pollution Act, Clean Water Act, and the Comprehensive Environmental Response, Compensation, and Liability Act. Additionally, the Service has responsibility for managing and protecting polar bears under authority of the Marine Mammal Protection Act of 1972 (MMPA) (16 U.S.C. 1361-1407) and the Endangered Species Act of 1973 (ESA) (16 U.S.C.1531 et seq.). In Alaska, the Service's management goals for polar bears are to conserve polar bears and ensure their survival in the arctic ecosystem. Therefore, during an oil spill the Service will respond to minimize loss of polar bears and adverse impacts to their prey and habitat to the extent feasible.

The MMPA provides protection to marine mammals, including polar bears, by prohibiting “take” which is defined as: to harass, hunt, capture, or kill, or attempt to harass, hunt capture, or kill any marine mammal. Several exceptions exist that provide authority to take marine mammals if an oil spill were to occur. For example, the Service, State of Alaska Department of Fish and Game, and North Slope Borough Department of Wildlife Management (NSB DWM) officials may use the authority provided under section 109(h)(1) of the MMPA to take polar bears “in the course of official duties, if done in a humane manner, and if such taking is for the protection or welfare of the mammal, protection of the public health and welfare, or nonlethal removal of nuisance animals.” Additionally, section 112(c) authorizes the Service to “enter into such contracts, leases,

cooperative agreements, or other transactions as may be necessary to carry out the purposes of this title [Title I: Conservation and Protection of Marine Mammals] or [Title IV: Marine Mammal Health and Stranding Response] and on such terms as [t]he [Secretary of the Interior] deems appropriate with any Federal or State agency, public or private institution, or other person.” Thus the Service has the authority to “take” polar bears, e.g., haze them away from oil in the environment, and to transfer this authority to other qualified individuals/organizations. Non-government partners involved in polar bear response should have or obtain section 112(c) authority from the Service’s DMA office (see Section III, Contacts) specific to their polar bear response activity, e.g., short-term holding/animal care.

During oil spill response activities, human safety is the most important factor. In some instances a polar bear may need to be killed if it poses a threat to human life. Section 101(c) of the MMPA allows the taking of a marine mammal “if such taking is imminently necessary in self-defense or to save the life of a person in immediate danger.” Such taking must be reported to the Service within 48 hours.

Since 2008, polar bears have also been protected under the ESA which contains similar take prohibitions for threatened or endangered species as the MMPA. To streamline and clarify how polar bears would be managed under these laws, a final rule (78 FR 11766) under section 4(d) of the ESA was developed and became effective in March 2013. The 4(d) rule states that polar bears will continue to be managed primarily under the provisions set forth in the MMPA and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (27 U.S.T. 1087) (CITES). Activities that are authorized or exempted under the MMPA or CITES will not require additional authorization as a result of the ESA polar bear listing. However, the overlay provisions of the ESA, such as the consultation requirements of section 7, remain unchanged under the 4(d) rule; if a federal nexus exists, then a section 7 consultation with the Service continues to be required. Thus, in the event of an oil spill, a section 7 consultation with the Service will be required for activities that seek to prevent, minimize or mitigate spill impacts on polar bears or their habitat. Section 7 consultation (or “conferencing” on candidate species) would also be required for any other potentially affected listed species, or their designated critical habitat.

B. Current Population, Distribution, and Life History

1. Population Range, Size and Status

Range: Polar bears occur throughout most ice-covered seas in the Northern Hemisphere. For management purposes, polar bears are divided into 19 sub-populations (hereafter referred to as stocks) world-wide (Obbard et al. 2010). Two of these polar bear stocks occur in Alaska: the southern Beaufort Sea (SB) stock and the Chukchi (CS) Sea stock (Figure 1). The SB stock ranges between (approximately) Point Hope, Alaska on the western boundary, and Banks Island, Northwest Territories, Canada on the east (U.S. Fish and Wildlife Service 2010a). The CS stock, also referred to as the Alaska-Chukotka population, occurs in the northern Bering, Chukchi, and eastern Siberian seas and may range into the Beaufort Sea as far as the Colville River Delta (Garner et al. 1990, Amstrup 1995, Amstrup et al. 2005). An area of overlap between the two

stocks occurs in Alaska between the Colville River Delta and Point Hope (Garner et. al. 1990, Garner et al. 1994, Garner et al. 1995, Amstrup 1995, Amstrup et al. 2005).

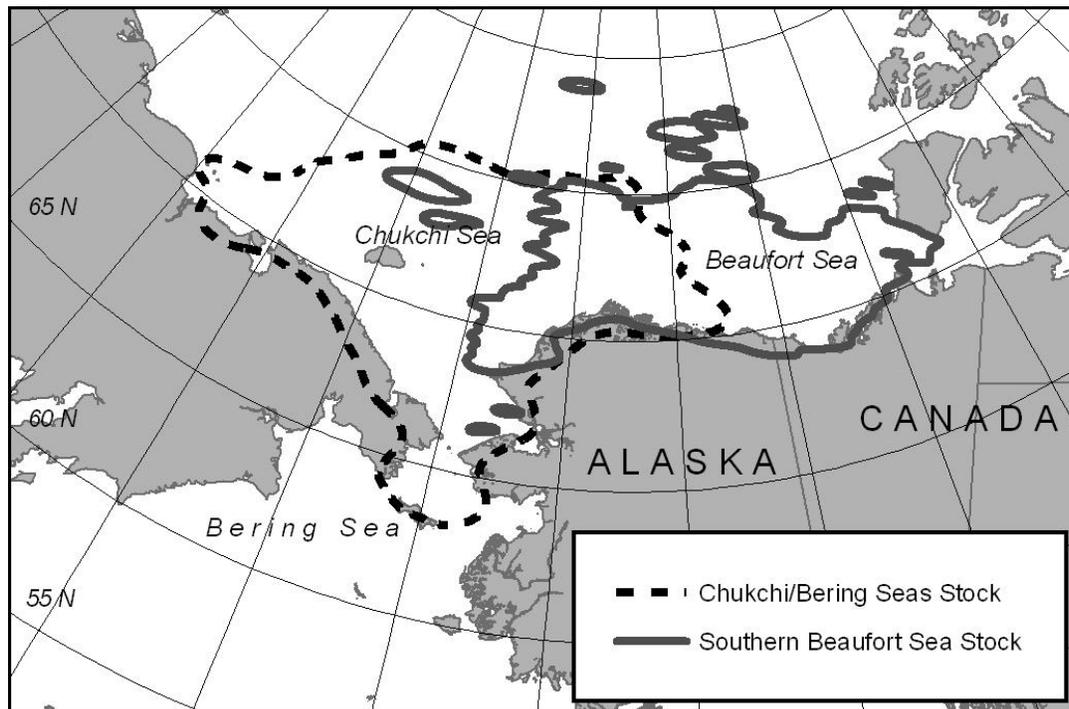


Figure 1. Range of the Southern Beaufort Sea and the Chukchi/Bering Seas polar bear sub-populations.

Population size: The most recent size estimate for the SB stock is 900 animals (Bromaghin et. al. 2015); the stock is believed to be declining (see Polar Bear Specialist Group status table at <http://pbsg.npolar.no/en/status>). A reliable size estimate for the CS stock is currently unavailable (U.S. Fish and Wildlife Service 2010a); sea ice loss and potential unsustainable human removals are population concerns.

Conservation status: In 2008, after conducting an extensive status review (Schliebe et al. 2006) of all polar bear stocks world-wide, the Service listed polar bears as “threatened” under the ESA, due to current and projected sea ice loss. The Service is in the process of identifying actions to manage bears under changing environmental conditions. Current conservation efforts are focused on research, harvest management, and mitigating impacts on polar bears in terrestrial and near-shore areas, including areas that overlap with human settlements and work areas.

2. General Distribution

Polar bears are distributed over large areas in a non-uniform manner, depending on life history requirements such as feeding and reproduction (Mauritzen et al. 2003, Durner et al. 2004). They prey primarily on ringed seals (*Phoca hispida*) whose distribution and availability fluctuates with ice conditions or other factors (Stirling and McEwan 1975; Stirling and Archibald 1977; Stirling and Latour 1978). Therefore, polar bears may be more abundant in localized areas during certain

times of year and may be patchy in their distribution at other times of the year. For example, in spring polar bears may concentrate in areas where ringed seal pups occur.

Beaufort Sea region: In the Beaufort Sea region all sex and age classes of polar bears, except females with cubs-of-the-year, are most often distributed in the transition zone – the active ice zone seaward of shore-fast ice (Stirling et al. 1993). Females with first-year cubs are more frequently located in stable near-shore fast ice areas. Durner et al. (2004) found that in **spring**, bears used ice regions that cover relatively shallow water with ice concentrations of greater than 90% and composed of ice floes 2-10 km in diameter. During the **summer and fall** open water period, most polar bears typically remain with ice as it retreats from shore; however, an increasing use of terrestrial coastal habitat by polar bears has been observed since the 1990s (Amstrup 2000, Monnett and Gleason 2006, Schliebe et al. 2008). Specifically, polar bears aggregate in areas such as Point Barrow, Cross Island, and Barter Island where bowhead whale remains (*Balaena mysticetes*) have been deposited by Alaska Native hunters during fall whaling (Miller et al. 2006, Schliebe et al. 2008). Coastal surveys confirm that the area around Barter Island sustains the highest density of polar bears in this region prior to freeze up (Schliebe et al. 2008). **Winter** habitat use is associated with shallow water areas; 75% of observations in winter occurred in waters less than 130 m deep, correlating with the active ice zone parallel to shore (Durner et al. 2004).

Chukchi/Bering Seas region: In the Chukchi and Bering seas region, bears have been observed by village residents throughout the year along the coast between Barrow and Wales scavenging on marine mammal carcasses (Kalxdorff 1997). Generally, however, they remain off shore from Alaska's coast on drifting pack ice where seals can be found (Lentfer 1972). During **fall and winter** months polar bears generally move from north to south in association with advancing pack ice. Polar bears may be more numerous along the coast when winds are from the north and west (Lentfer 1972). In **spring**, they may be attracted to shore-fast ice during seal pupping; results from studies conducted in 2008-2010 indicate that a relatively large number of bears can be encountered off shore from Point Hope (Rode and Regehr 2010). Recently during **summer** months, polar bears have been observed along Alaska's northwestern coast during years when Pacific walrus haul out on shore, as occurred in 2007 and 2009 (Joel Garlich-Miller, pers. comm. 2009). An increase in coastal use by polar bears related to presence of walrus haul-outs has also been noted in Russia on Wrangel Island and along the Chukotka coast (Kochnev 2006).

3. Denning

Reproductive ecology: Polar bears are long-lived, late maturing carnivores with relatively low reproductive rates (Amstrup and DeMaster 1988). Breeding occurs in spring; pregnant polar bears construct maternity dens in deep snow drifts by late November/December to give birth to their young (Harington 1968, Lentfer and Hensel 1980, Ramsay and Stirling 1990, Amstrup and Gardner 1994). Young are born in late December or early January (Harington 1968, Ramsay and Dunbrack 1986). Females remain in their dens without feeding for at least three months after giving birth and rely on their fat reserves for feeding their cubs. Family groups typically emerge during March and April (Amstrup and Gardner 1994, Smith et al. 2007).

Den distribution: Maternity denning may occur on land, barrier islands, shore-fast ice or on pack ice. During a study conducted in the Beaufort Sea between 1981 and 1991, 53% of dens were located on drifting pack ice; the remaining dens were found on shore-fast ice or terrestrial habitat (Amstrup and Gardner 1994). Researchers noted an increasing trend of dens located on land during the latter half of the study. Similarly, Fischbach et al. (2007) noted an increase in land denning which they attributed to diminishing ice conditions. Continued declines in sea ice and coastal bluff habitat from erosion may increase the importance of inland terrestrial denning habitats in the future (Durner et al. 2006).

Den habitat in the Beaufort Sea region: Terrestrial maternity denning occurs in drifted snow in habitat such as coastal and river bluffs, barrier islands, and other areas of topographical relief (Amstrup and DeMaster 1988, Durner et al. 2004). Specific areas that have been used for terrestrial denning by the SB stock include: barrier islands such as Pingok, Cross, Cottle, Foggy, Howe, Thetis, and Flaxman; the Colville, Sadlerochit, and Niguanak River drainages; Point Barrow, Point Lonely, Oliktok Point, and Atigaru Point; and Smith Bay (U.S. Fish and Wildlife Service 1995, Kalxdorff 1997). The staging pad at Milne has also been used repeatedly for denning (Craig Perham, pers. comm. 2010).

Den habitat in the Chukchi Sea region: Denning by the CS stock of polar bears occurs primarily in Russia on Wrangel Island and the northern coast of Chukotka (Uspenski and Kistchinski 1972, Stishov 1991). In Alaska, traditional ecological knowledge provided by Alaska Native hunters indicates that some denning has occurred on St. Lawrence and Little Diomedede islands, as well as along the Alaskan coast between Wales and Barrow (Kalxdorff 1997, Voorhees et al. 2012). Satellite-telemetry studies conducted in 1985-2005 indicate that denning has occurred north of Point Hope on both ice and land (Fischbach et al. 2007). More recent telemetry results from work conducted in 2008-2010 indicate that polar bears denned primarily in Russian territory or on drift ice (U.S. Fish and Wildlife Service unpublished data 2010).

Additional references: Additional information regarding polar bear life history and habitat use is summarized in the *Final Rule: Determination of Threatened Status for the Polar Bear (Ursus maritimus) Throughout its Range* (U.S. Fish and Wildlife Service 2008); the *Final Rule for Designation of Critical Habitat for the Polar Bear (Ursus maritimus) in the United States* (U.S. Fish and Wildlife Service 2010b), and the *Habitat Conservation Strategy for Polar Bears in Alaska* (U.S. Fish and Wildlife Service 1995). These documents are available at <http://alaska.fws.gov/polarbear>. The U.S. Geological Survey maintains a database of polar bear den locations and has recently published the *Catalogue of Polar Bear (Ursus maritimus) Maternal Den Locations in the Beaufort Sea and Neighboring Regions, Alaska, 1910-2010* (Durner et al. 2010), available at <http://pubs.usgs.gov/ds/568>.

C. Susceptibility to Oil Spills

The SB and CS polar bear range overlaps with both active and planned oil and gas operations. Polar bears may be susceptible to oil spills in both on-shore and off-shore habitat at production facilities, pipelines, or from marine vessel spills. During an oil spill, the environmental sensitivity maps contained in the *Unified Plan* should be used as an initial reference on whether polar bears may be affected; they can be viewed at: <http://www.asgdc.state.ak.us/maps/cplans/subareas.html>. Additionally, the following information may be considered:

Habitat and season: Oil spills occurring in areas where polar bears are concentrated, such as along off-shore leads or polynyas, the pack ice edge, and along terrestrial mainland and barrier island habitat where marine mammal carcasses occur could affect large numbers of bears. Oil accidentally discharged in open water or present along Alaska's Beaufort Sea coast during late summer and autumn months may present the greatest risk to polar bears due to their high densities in near-shore areas (e.g., Barter and Cross islands) during that time of year (Miller et al. 2006, Schliebe et al. 2008). In winter and spring, polar bears may concentrate at leads or polynyas to hunt seals, or search stable fast ice where seals build birth lairs along pressure ridges with deep snowdrifts (Stirling 1990). Spills associated with off-shore, bottom-founded exploration or production structures could affect a relatively large number of bears because these types of structures may create an artificial "lead" down-current, which can attract seals and, in turn, bears (Shideler 1993a).

On-shore activities: To date, some on-shore spills have occurred on the North Slope at production facilities and at pipelines connecting wells to production facilities or to the Trans-Alaska Pipeline System, with no observed or reported exposure of polar bears to oil (Craig Perham, pers. comm. 2012).

Off-shore activities: To date, no major off-shore oil spills have occurred in either the Beaufort or Chukchi seas region. Alaska's off-shore production facilities are presently limited to the Beaufort Sea region and are on artificial gravel islands in relatively shallow (less than 20 m) water. To estimate the probability of polar bears being exposed to a hypothetical spill in the Beaufort Sea, Amstrup et al. (2006) used satellite locations from radio-collared bears overlaid with wind and current data to simulate oil spill scenarios from the Northstar oil production facility and the proposed Liberty Island production facility. Modeling suggested that an estimated 0-27 polar bears in September (open water season) and 0-74 polar bears in October (mixed ice conditions) could be potentially oiled from Northstar, whereas an estimated 0-23 and 0-55 polar bears could be oiled in September and October respectively from Liberty Island. All simulated oil spill trajectories affected smaller numbers of bears far more often than they affected larger numbers of bears. To date, no similar simulation has been done to assess the probability of polar bears being oiled in the Chukchi or Bering seas region. However, in a recent environmental assessment prepared for Oil and Gas Lease Sale 193, the Bureau of Ocean Energy Management (BOEM) found that the probability of a large spill occurring is low; if one were to occur, the potential effects could range from negligible to major for marine mammals (BOEM 2015).

In 2014, World Wildlife Fund Canada produced a report (WWF 2014) that evaluated four types of oil spills most likely to occur in the Beaufort Sea: 1) a **shipping spill** in Amundsen Gulf; 2) **trans-boundary spills** (oil tankers or pipelines) in the waters crossing the Alaska/Canada border; 3) a **shallow water blowout** from an oil well close to shore on the Beaufort shelf; and 4) a **deep water blowout** from an oil well on the Beaufort shelf break, an area potentially subject to exploratory drilling. Results indicate that spilled oil in all scenarios may travel considerable distances to the west and north when trapped and drifting within sea ice, affecting habitat for a wide range of marine species. In other words, modeling indicates that a relatively high chance exists that oil spilled in Canadian waters could reach Alaska's shorelines and affect wildlife and communities, as well as those in Canada.

Shipping: Because of reductions in Arctic sea ice and improved access to shipping lanes, an extended shipping season is expected to occur around the margins of the Arctic Basin (ACIA 2005). Shipping of crude oil or oil products, as well as off-shore oil production, could increase the likelihood of oil spills. The Northern Sea Route, connecting Novaya Zemlya in the west to the Bering Strait in the east, has been open to marine traffic since 1991 (ACIA 2005). Scientists have noted increasing use of the Northern Sea Route as a source of disturbance to polar bears in the Russian Arctic (Wiig et al. 1996, Belikov and Boltunov 1998). Ice-breaking activities may alter habitats used by polar bears by creating ephemeral lead systems and concentrating ringed seals within the leads. This may benefit polar bears by allowing for easier access to ringed seals. Conversely, ice-breaking activities may cause polar bears (and seals) to use areas in which they have a higher likelihood of encountering vessels, and an increased likelihood of exposure to oil, waste products, or food wastes that are intentionally or accidentally released into the marine environment. Other potential impacts of Arctic ships include ship strikes on marine mammals, the introduction of alien species, disruption of migratory patterns of marine mammals, and noise produced from marine shipping activity (Arctic Council 2009).

Effects: Oil spills could potentially result in reduced survival of individual polar bears from: 1) ingestion of oil when grooming or consuming oiled prey; 2) oiling of fur and associated thermoregulatory stresses; 3) disturbance, injury, or death from interactions with humans during oil spill response activities; and 4) a reduction in available prey resources. Polar bears may be particularly vulnerable to disturbance when nutritionally stressed, and during denning. Cleanup operations that disturb an occupied den could result in death of cubs through abandonment, and perhaps death of the female in defense of (human) life situations. In spring, females with cubs of the year that den near or on land and migrate to off-shore areas may encounter oil (Stirling 1990). Oiling of food sources, such as ringed seals, may result in a local reduction in ringed seal numbers or a change to the local distribution of seals.

The effects of oil on polar bears present serious health concerns. Scientists have reported that polar bears will not avoid petroleum products encountered in the wild and may actively investigate oil spills (Amstrup 1989, Derocher and Stirling 1991). However, under experimental conditions in a study conducted by Øritsland et. al. (1981), three polar bears did not voluntarily enter a saltwater pool containing surface oil (~ 1 cm thick) until forced to do so. Once oiled, the bears actively ingested oil through grooming and licking behavior, causing thermoregulatory and

metabolic stresses. Øritsland et al. (1981) reported that ingestion of oil also led to anorexia, tissue damage from uremia, dehydration, anemia, and renal failure, eventually leading to death in two of three animals. In addition, skin damage and hair loss was noted after contact with oil in both experimental and natural conditions (Øritsland et al. 1981, Derocher and Stirling 1991). Residual oil on the animal's fur may persist if the animal is not cleaned completely.

A more thorough review of potential effects of oil and gas development can be found in the Final Rules for incidental take of polar bears at:

http://alaska.fws.gov/fisheries/mmm/Beaufort_Sea/76FR47010.pdf and

http://alaska.fws.gov/fisheries/mmm/Chukchi_Sea/73FR33212.pdf.

D. Response Plan Training Requirements

During an oil spill event, all field response personnel working in polar bear habitat should have or receive bear awareness safety training (as well as whatever additional training is required by their agency or company). Additional training requirements for Service personnel are described in the *Region 7 Spill Response Plan for Oil and Hazardous Substances*. Service field personnel responding on behalf of polar bears should have the following:

- Knowledge of the contents and use of the Alaska Regional Response Team's *Alaska Federal and State Preparedness Plan for Response to Oil and Hazardous Substance Discharges and Releases (Unified Plan)*, including *Annex G, Wildlife Protection Guidelines*
- Knowledge of the contents and use of the *Region 7 Spill Response Plan for Oil and Hazardous Substances*
- Incident Command System training (on-line training is available at <http://training.fema.gov/emiweb/is>)
- Knowledge of the laws and regulations that apply to handling and "taking" of marine mammals
- Knowledge of polar bear life history and distribution
- The Service's Bear Awareness and Firearm Safety training
- Basic aviation safety training (if using aircraft for response operations)
- HAZWOPER (Hazardous Waste Operations and Emergency Response) training (includes initial 40- or 24-hour course and 8-hour annual refresher training)
- Wilderness first aid training
- Arctic survival training.

During an oil spill, Service personnel who conduct bear deterrence as a response activity (for protection of the bear(s) or public safety) must also have bear deterrence training/experience, or be accompanied by a polar bear expert(s) who does. Non-government Service designees must also have specialized deterrence training and Service authorization for intentional take. Service personnel involved in capture and handling of polar bears must have bear capture, immobilization, handling, and transport training/experience and authorization, or be working under the direction of a polar bear expert(s) who does. If oil spill response efforts involve

veterinary care (e.g., for temporary holding, de-oiling/cleaning, or removal of polar bears from the wild and placement in zoos or aquaria), responding veterinarians, zookeepers, or their designees must have experience handling polar bears and have prior authorization from the Service.

II. RESPONSE STRATEGIES

The response strategies used for dealing with polar bears during an oil spill will depend on numerous factors, including: the number, age, and sex of polar bears in the area, weather conditions and season, ice conditions and presence or absence of open water, and the resources and staff available for response efforts. In the event of an oil spill, an Incident Command System (ICS) will provide the on-scene management structure that guides response efforts. This structure includes a Unified Command including designation of a Federal On-Scene Coordinator (FOSC) who will be appointed to lead response actions by the U.S. Coast Guard for spills occurring in marine waters, or by the Environmental Protection Agency (EPA) for spills occurring on land and inland navigable waters. The ICS typically also includes four sections:

- **Planning section:** responsible for developing plans for each operational period (typically 24-hour) to accomplish response objectives, including collection and evaluation of information and prioritizing Resources at Risk
- **Operations section:** conducts tactical operations to carry out an action plan; directs resources
- **Logistics section:** provides the resources, support and services to meet plan needs
- **Financial section:** monitors costs related to the incident.

Wildlife agencies provide recommendations to the Unified Command if their trust resources may be affected, and inform the Unified Command when permits or other legal obligations, e.g. ESA consultations, are required. Depending on the size and nature of the spill, these recommendations may be provided directly to the Unified Command, and/or through environmental units within the Planning section. Recommendations to conduct wildlife response activities must have the approval of all appropriate wildlife agencies and the FOSC before being initiated.

During a spill incident, the first point of contact for the Service is the Regional Spill Response Coordinator (RSRC) (see Section III, List of Contacts) who will provide wildlife response guidance to the Unified Command. When polar bears, walrus, or sea otters are potentially affected, the RSRC will contact the Service's Marine Mammals Management Office (MMM) for technical expertise. The RSRC may designate a Marine Mammal Representative (or polar bear expert) to manage and implement spill response activities for polar bears. The Marine Mammal Representative will contact Service partners, e.g., the U.S. Geological Survey (if assistance with capture is required), State of Alaska, or local entities with polar bear expertise, e.g., the North Slope Borough, Alaska Nanuuq Commission, or village leaders, to coordinate a response for polar bears. The MMM Representative will also contact the Service's DMA office to obtain any authorizations necessary under the MMPA for capture/handling, transport, or holding activities.

All polar bear response activities must be conducted in coordination with the Service's RSRC, who will ensure coordination with the FOSC. An emergency consultation with the Service's Endangered Species Program (Fairbanks Fish and Wildlife Field Office) should also be initiated by the FOSC in coordination with the Service's RSRC (see section III, List of Contacts) .

The Service will consider the following factors when responding to a spill involving polar bears:

- location of spill
- magnitude of spill
- physical properties of oil
- general logistics and accessibility to spill site
- spill trajectory
- time of year
- weather conditions (e.g., wind, temperature, precipitation)
- environmental conditions (e.g., presence and thickness of ice)
- number, age, and sex of polar bears that are (or likely to be) affected
- degree of polar bears' physical contact with oil
- importance of affected habitat
- clean-up recommendations
- likelihood of human-bear interactions.

Depending on these factors, the RSRC and polar bear expert(s) shall determine the potential risk to polar bear populations and recommend appropriate response action to the FOSC for approval. Recommendations will focus on minimizing the exposure of polar bears to oil because cleaning bears and/or removing them from the field may not be feasible, especially if multiple bears are involved. Service response efforts will be conducted using a three-tier approach: 1) **primary response** – identifying bear use areas and making recommendations to the ICS on where to focus containment, dispersion, burning, or clean-up of oil so they minimize impacts to polar bears; 2) **secondary response** – using hazing, herding, preventative capture/relocation, or additional methods to remove un-oiled polar bears from affected or potentially-affected areas; and 3) **tertiary response** – capture, cleaning, treatment, and release of oiled polar bears.

If the decision were made to conduct response activities, primary and secondary response options should be vigorously applied prior to implementation of tertiary methods, due to limited knowledge and experience regarding methods and effectiveness of cleaning oiled polar bears. Secondary and tertiary polar bear response activities will be conducted only by Service personnel or their designees who have MMPA section 112 (c) authorization.

During all response operations, female polar bears occupying maternity dens warrant special consideration because of their reproductive importance to the population. Maternity denning occurs on land, barrier islands and ice habitat during October-April; known den sites should be avoided by all personnel to minimize disturbance. Den detection methods such as the use of Forward Looking Infra-red technology (FLIR) may be used to identify den locations and avoid disturbance to denning bears. Monitoring may be necessary to determine if den abandonment occurs. If disturbance results in abandonment of cubs by a denning female, the Service will

consider capturing the cubs and attempt to reunite them with their mother; if this is not feasible, the Service would coordinate with the American Zoological Association (AZA) polar bear Species Survival Plan Coordinator for placement of the cub(s) at an appropriate zoo or aquaria for long-term care and maintenance.

To identify whether den habitat is present in a spill zone, maps are available from U.S. Geological Survey at http://www.absc.usgs.gov/science/biology/polar_bears/denning/html. Additionally, maps of sensitive areas are available in the *Unified Plan* at <http://www.akrrt.org/UnifiedPlan/index.shtml> (see sub-area contingency plans).

A. Primary Response

1. General Considerations

Primary response strategies should always be emphasized for this species. Primary response for protecting polar bears from an oil spill is to prevent the oil from reaching sensitive areas such as the barrier islands and shoreline, den sites, feeding sites, or areas where animals are concentrated or likely to congregate. The first steps are to: 1) identify whether polar bears or their habitat are at risk; 2) conduct aerial or ground surveys to determine if polar bears are present or near the spill zone, including review of locations/movements of collared bears; 3) provide input to the FOSC regarding potential protection measures and priorities; and 4) conduct oiled carcass collection as outlined in the *Region 7 Spill Response Plan for Oil and Hazardous Substances*.

Service response personnel operating in bear habitat should adhere to the agency's bear and firearm safety policy which can be found at: http://region7.fws.gov/admin/safety/bear_firearms.htm. Service policy calls for each member of a field party working in bear habitat to carry a firearm and be certified as a Firearm Carrier, or work in a party with at least one Designated Shooter. Field parties should consist of two or more people; each party shall carry at least two types of bear deterrents, one of which shall be non-shotgun based. Field party members not carrying firearms must carry non-lethal deterrents; the recommendation is EPA-approved bear pepper spray.

When working with other agency or response personnel, all Service response personnel should receive a safety orientation from the team leader and, when operating in polar bear habitat, be advised what to do if a polar bear is encountered. Each camp/work area should have a designated safe area where response personnel go if a bear approaches. If a spill occurs during the open water season, response vessels should include an on-board marine mammal observer(s).

2. Wildlife surveys

Early detection of polar bears can be accomplished using aerial, boat, or vehicle surveys and can be combined with surveys for other wildlife species, as directed by the RSRC. Specialized aerial or ground surveys to identify potential maternal den sites may include the use of FLIR and/or scent-trained dogs. Specialized polar bear surveys will be conducted only by the MMM polar

bear expert(s) or their designee(s). Specialized polar bear survey areas and routes will be determined by the MMM polar bear expert(s) and the airplane or vehicle operator(s), in consultation with the RSRC, as authorized by the FOSC.

3. Carcass Collection

Service personnel, as directed by the Service's RSRC, may collect oiled wildlife carcasses to minimize the potential for polar bears (or other animals) to contact or ingest oil through scavenging. Carcasses will be collected following incident-specific guidance provided by appropriate wildlife resource agencies and in accordance with the carcass collection protocols found in the *Unified Plan, Annex G: Wildlife Protection Guidelines, Appendices 11A, 11B, and 11C* (<http://www.akrrt.org/UnifiedPlan/G-annex.pdf>). Marine mammal carcasses, including polar bears, should be collected only by a federal or state agency official or their authorized designee. If a polar bear carcass is found by a person not authorized to collect carcasses, that person should contact the Service at 1-800-362-5148 (Marine Mammals Management Office) or 1-800-858-7621 (Office of Law Enforcement), or the North Slope Borough DWM at 907-852-0350 for retrieval instructions. If unable to make contact, the finder should photograph the carcass and note its GPS location, and contact the Service as soon as possible. If feasible, a Service representative will be sent to collect the carcass, obtain samples (Appendix 2) from the carcass, or provide instructions to the finder on how to proceed.

During transport, carcasses should be kept as cool as possible to prevent decomposition, but not frozen (to prevent tissue damage prior to necropsy, if possible) and delivered to the nearest collection or morgue site. Carcasses should be wrapped in butcher paper, foil, burlap, or other non-plastic material; handlers should wear nitrile gloves. Each carcass should be accompanied by a form (Appendix 1) containing the date and location where the carcass was found and the name of the person who found it. All Service personnel handling marine mammal carcasses or samples must maintain chain-of-custody records for collected specimens. Additional carcass collection protocols and chain of custody forms are available from the Service's RSRC and in the *Region 7 Spill Response Plan for Oil and Hazardous Substances*. Carcass and sample collection equipment is available from the Service's MMM Office in Anchorage (call 1-800-362-5148) or from Alaska Clean Seas (ACS) in Deadhorse (call 907-659-3249).

Carcass collection, necropsies, and sample analyses will be done by Service-approved personnel and labs, as determined by the RSRC in consultation with the Service's Law Enforcement division and Natural Resource Damage Assessment (NRDA) coordinator. While initial spill response is focused on removing oil from the environment and minimizing future damage, the goal of NRDA is to assess injury to trust resources and seek the compensation necessary to return them to their pre-spill condition. Therefore, Service employees that respond on behalf of polar bears (and other trust resources) must carefully coordinate with NRDA staff to ensure that methods used for carcass and sample collection and data analyses are conducted in a manner that satisfies NRDA requirements. Specific NRDA guidelines are currently being developed for Alaska and will be included in Appendix 11 of this document when available.

4. Skimming

One response option for recovering spilled oil in water is to mechanically collect it with skimming devices. Skimming systems will typically consist of two vessels with a skimmer either built in or alongside of the vessel, towing a boom to contain oil. Skimming systems can be positioned to recover oil before it reaches sensitive areas such as barrier islands or polar bear den habitat. If possible, skimming activities should be conducted in a manner that avoids disturbance to polar bears.

Ice coverage and ice type may affect mechanical cleanup. For example, skimming vessels may need to deflect ice to allow access to oil. Specialized brush and brush-drum skimmers are currently being developed for use in ice-covered waters and are expected to enhance the future ability to recover oil in mixed ice conditions (Sørstrøm et al. 2010). If spilled under winter ice, oil may accumulate at the ice edge, in leads, polynyas, and seal breathing holes. In addition, some oil may become trapped and move with the underside of the ice (Neff 1990); therefore, oil should be prevented from moving under the pack ice. Research is currently underway to test an Airborne Ground Penetrating Radar system for detecting oil in and under ice (Alaska Clean Seas 2012). To recover oil that has been spilled under ice, slots may be cut in the ice to concentrate oil, which, in turn, can be recovered by skimming or suction techniques (Alaska Clean Seas 2010). Ice thickness must be adequate to support the weight of vehicles and equipment.

5. Booms

Protective booms and sorbents may be used as containment measures to minimize contamination or to protect shorelines and ice edges where polar bears and their prey may be found. Booms should be placed in a manner that minimize disturbance to polar bears. Polar bear sensitive areas such as barrier islands may be boomed by anchoring one or more lengths of boom between two or more stationary points to prevent oil from entering an area occupied by polar bears, or by diverting oil to a less sensitive area such as toward open water. Effectiveness of booms will be limited during stormy weather in open water conditions due to increased wind/wave action. Booms may also be difficult to use along shore-fast ice or other ice edges if the ice shifts and moves. Vessels with ice moving capability may be needed to manage ice and allow equipment such as booms and skimming devices to be used. If disturbed, polar bears may move out of an un-oiled area into an oiled area.

6. Dikes/Berms

For on-land or on-ice spills, snow or earthen berms may be constructed to contain oil around the leak, if terrain permits. Dikes filled with excelsior or sorbents may be used on spills in smaller streams.

7. *In-situ* Burning

In-situ burning is the combustion of spilled oil, a technique that can potentially remove large quantities of oil from the water's surface in a short period of time. The key to effectiveness is the thickness of the oil slick; less ice coverage can allow spills to spread and become too thin to ignite. In heavy ice (70-90% coverage), boom and chemical surface agents known as *herders* can minimize oil spread and allow oil to be more effectively ignited and burned (Sørstrøm et al. 2010). To be effective, burning must be initiated before highly volatile (flammable) hydrocarbons vaporize. Oil weathering models may help predict the window of opportunity for using *in-situ* burning of spilled oil (Sørstrøm et al. 2010). Use of *in-situ* burning and chemical herders must be approved by the FOSC and will be decided on a case-by-case basis.

In-situ burning can assist in the removal of oil from the water, thus reducing the time that polar bears and other wildlife would come into contact with the spilled oil. However, burning causes by-products such as carbon particles and gases to be released into the environment. The main concern with *in-situ* burning is that the by-products (primarily smoke) generated may have environmental and human health impacts from breathing air in the vicinity of the spill (Potter et al. 2012). *In-situ* burning can be considered as a response strategy if impacts from burning are less harmful to humans and wildlife than impacts of the non-burned oil. Short-term effects associated with burning may be preferable to long-term effects associated with oiled polar bears and additional wildlife, and persistence of oil in the environment. All wildlife in the proposed burn area should be identified as quickly as possible to inform the FOSC prior to initiating *in-situ* burning. The Service's RSRC and MMM polar bear expert(s) shall determine the potential risk to polar bears specific to the spill zone. Bear monitors/guards may be needed in the burn area.

8. Dispersants

Dispersants are water surface-active chemicals that enable oil to mix with water and move from the surface into the water column. In the Deepwater Horizon spill, dispersants were also used at the sea floor by injecting them directly into the plume at the source of the spill (Sammarco et al. 2013). The use of dispersants can reduce potential contamination of shoreline but may expose a larger volume of sea water and its associated flora and fauna, as well as sea floor biota, to oil. In addition to an increased volume of water containing oil, the oil consists of tinier droplets which become more bioavailable for internal uptake (Schein et al. 2009).

To be effective during an open water oil spill, the dispersant must be able to reach the oil slick, mix with the oil, and cause the oil to disperse into small droplets. Dispersants work best when a moderate amount of mixing energy exists. Since ice dampens the mixing energy of ocean waves, vessel propellers or high pressure water systems can be used as an additional source of energy (Sørstrøm et al. 2010). New studies show that dispersants may be used effectively in a broken ice environment with the development of improved delivery systems and introduction of extra mixing energy (Sørstrøm et al. 2010). Dispersants may be used in deep, off-shore marine waters where water depth and currents are sufficient to disperse and dilute oil rapidly to low concentrations. Dispersants are toxic in varying degrees to marine biota; toxicity may be lessened if the dispersant is diluted quickly in an open water environment. The window of opportunity to use dispersants is typically within hours to 1-2 days after a spill; thereafter, the oil

may become weathered and difficult to disperse (National Research Council 2010).

The effects of dispersant use on polar bears are unknown. In general, the Service supports dispersant use as a response strategy if associated impacts are less harmful to humans and wildlife than impacts of the non-dispersed oil. More research is needed to determine the potential benefits or adverse impacts of dispersant use in response to an oil spill (National Research Council 2010). The *Dispersant Use Guidelines* (Alaska Regional Response Team 2010, available at <http://www.akrrt.org/UnifiedPlan/F-annex.pdf>) have been developed to ensure that dispersants, if used, are applied with the least potential for negative environmental effects as possible. Dispersant use is not recommended immediately in or around sensitive areas where trust species or their critical habitat occur, e.g., lagoons, wetlands, or other nesting spawning, breeding, and nursery areas (Alaska Regional Response Team 2010). The dispersants themselves must be approved by the Environmental Protection Agency. The request for a dispersant use permit is approved by the FOSC pending review of the *Dispersant Use Checklist* (also available at <http://www.akrrt.org/UnifiedPlan/F-annex.pdf>). All wildlife in the proposed use area should be identified prior to dispersant use. The decision of whether or not to use dispersants will be made on a case-by-case basis by the FOSC. The Service's MMM polar bear expert(s) should ensure that concerns for polar bears or their habitat are passed on to the FOSC through the RSRC.

B. Secondary Response

1. General Considerations

Secondary response is to deter, or haze, polar bears from contacting the oil slick area; this response may be incorporated with primary response activities. An aerial or ground survey should be conducted to locate potentially affected animals. Pre-emptive capture and relocation of polar bears may be considered as a secondary response strategy but may not be feasible if large numbers of bears are involved, or the spill area is extensive. The degree of risk associated with the animal actually contacting oil before secondary response strategies are initiated should be carefully considered.

2. Detection

Whether at large response facilities, small, temporary response field camps, or in the field conducting response activities, the best deterrent success requires early detection of polar bears (see Section II. A, Primary Response). For temporary camps or permanent facilities, early detection is best achieved by having adequate lighting to illuminate the area outside the facility perimeter. Another useful detection method is use of (human) bear monitors whose specific responsibility is to watch for bears and bear signs and warn others of approaching bears. **Bear monitors** may include response personnel, oil field security personnel, North Slope Borough or Service personnel, or Native hunters. Bears may be difficult to see in Arctic Alaska, due to fog, darkness, or blowing snow. Trained dogs may also be used to signal approaching bears. Additionally, in small, temporary or portable camps established for response activities, trip wires

and **electric fencing** may be used to detect approaching polar bears (Hechtel 1993). Additional information on use of electric fences is provided in Appendix 3.

Motion sensors include microwave intrusion detection systems that create an “invisible fence” around a camp, as well as small-scale, passive infrared systems similar to domestic burglar alarms. An alarm is sounded when an object passes through the microwave beam between the transmitter and the receiver (BP Exploration 1993). The number of transmitters and receivers necessary to protect a camp is dependent on the size of the camp. Motion sensors are also tripped by people, vehicles, or non-target species but are automatically reset. Microwave systems may be better suited to larger, semi-permanent facilities (Hechtel 1993).

Spill response camps as well as larger response facilities in polar bear habitat should have a specific, designated **warning alarm** that notifies personnel of a bear in the area. If polar bears are detected near a spill area or response operation, all personnel in the area should move to a designated safe area. Procedures for retreating to a **designated safe area** should be established as soon as the response operation is initiated. Safe areas may be a vehicle, boat, caged area, or hard-sided structure that prevents access by bears.

3. Deterrents

Passive and preventative deterrents: A deterrent is any method or device used to keep bears away from a particular location. Passive and preventative deterrents may be used by all field responders without having to obtain prior authorization from the Service. Passive and preventative deterrence activities include use of the following:

- rigid fencing and other fixed barriers designed to prevent bears from gaining access to property or people
- bear exclusion cages or structures which provide protective shelter for people
- bear-resistant food and garbage containers
- non-firearm based acoustic devices that create auditory disturbance such as a car horn, engine, or siren
- use of vehicles or boats to deter bears by patrolling the periphery of an area such as a spill zone.

Passive and preventative deterrents must be used in a manner that avoids seriously injuring or causing death to the animal(s) and are defined by regulation in the *Deterrence Guidelines* (U.S. Fish and Wildlife Service 2010c) which can be found at:
http://alaska.fws.gov/fisheries/mmm/polarbear/det_guidelines.htm.

Personal protection: Bear pepper spray has proven effective in deterring brown bears and black bears and has also been effectively used to deter polar bears exhibiting curious behavior in a limited number of cases (U.S. Fish and Wildlife Service unpublished data, 2009, Dick Shideler, pers. comm. 2010). Service personnel should carry bear pepper spray for personal protection during response activities but it must be kept above freezing temperatures to be effective. Because its spray distance is limited to close range (less than 9 m) which can be further reduced

during windy conditions, it should not be relied on as a sole deterrent. Bear pepper spray should be EPA-approved; a list of EPA-approved sprays is available at: <http://www.epa.gov/region8/toxics/pests/beardeter.html>.

Active deterrence measures: More active deterrence as described in the following paragraphs require specialized training and/or authorization and must be conducted under direction of the Service with prior approval from the FOSC. Service employees using the deterrents described below in protection of human life should have received the Service's bear safety and firearms training prior to conducting field work. Non-government personnel using deterrents for protection or welfare of humans or to deal with nuisance bears must have prior MMPA section 112 (c) authorization from the Service (to obtain deterrence authorization and training, contact MMM Polar Bear Project Leader listed in section III., List of Contacts).

If active deterrent measures are warranted, the following information based on the Service's Bear Awareness Safety Training curriculum and the *Guidelines for Oil and Gas Operations in Polar Bear Habitats* (Shideler 1993b) is provided. The reader is referred to Appendix 4 of this document for additional information on deterrent methods.

When using active deterrents, responders should first **identify an appropriate escape route** to direct the bear(s), preferably one that is in the direction from which it came, or towards the sea ice. Deterrents should be used starting with the **least intensive method that is effective** in moving the bear(s) away from a particular location, and using more intensive methods only as necessary.

Auditory deterrents: Auditory deterrents such as starting and **revving a vehicle/snowmobile engine**, or use of **sirens** and **horns** are often effective in deterring approaching bears. **Projectiles** such as **cracker shells** and **screamers** are designed to produce a loud noise and may be used as a deterrent if passive measures are unsuccessful in stopping approaching bears. Cracker shells are launched using a 12-gauge shotgun and have an effective range of approximately 60-100 m; these deterrents have been used effectively on the North Slope in both villages and industrial work areas. Screamers are deterrents used with a .15 mm pistol launcher that make a screaming noise and have an effective range of approximately 20-100 m.

Adverse weather such as high winds or cold temperatures may minimize the effectiveness of auditory deterrents. Additionally, training on effective use of auditory deterrents is necessary because improper use may result in habituation of some bears to the deterrent, especially if used repeatedly without an accompanying physical deterrent. Improper use of projectiles can also result in injury or death if the projectile physically contacts a bear. Response personnel should not rely solely on auditory deterrents for personal protection.

Firing warning shots with lethal rounds such as rifle and shotgun slugs is discouraged because of: 1) the potential to accidentally harm the bear or humans in the area, 2) its lack of effectiveness, and 3) because the ammunition used may be needed for self-defense. Response personnel should not fire lethal rounds at a bear unless they intend to kill the bear in defense of life.

Physical deterrents: If auditory deterrents are ineffective, physical deterrents may be necessary. Actively **herding polar bears** (vs. passive perimeter patrol, as mentioned in the passive deterrence section above) using vehicles such as trucks, ATVs, snowmobiles, boats, and aircraft has been successful in moving bears out of human use areas. During an oil spill, these methods may be effective when oil is confined to a small area that can be regularly patrolled. Individuals conducting herding techniques must avoid putting wildlife at additional risk when moving an animal away from or toward a specific site. Vehicles should not be used to chase a bear unless people or the bear(s) are in immediate danger. If a bear(s) is herded, attempts should be made to minimize stress to the animal e.g., to avoid the possibility of injury or overheating. Often, bears can be maneuvered away from an area at a walk or slow shuffle which reduces overheating and stress. Mobile vehicles such as ATVs, snowmobiles, and helicopters are especially effective because they allow access and can maneuver easily to off-road areas such as ice habitat. Broken ice conditions may limit herding attempts using ATVs or snowmobiles. The Service has developed protocols for hazing with helicopters (see Appendix 4); however, this action warrants special consideration since it may place increased risk and stress on both bears and humans.

Impact projectiles such as bean bags fired from a 12-gauge shotgun are intended to hit the bear and have been successfully used to deter polar bears. Depending on the type of projectile, the range is 10 – 40 meters. Impact projectiles used in combination with auditory deterrents such as cracker shells enhance the effectiveness of deterrent action. Non-penetrating dye-marker darts for the CapChur™ drug delivery system can also be used as a projectile deterrent; bears may be marked with dye so returning bears can be identified.

The decision to use auditory or physical deterrents to haze bears should include several considerations: 1) **safety:** projectiles are potentially dangerous--even lethal--to bears and humans; 2) **attractants:** it is important to haze a bear BEFORE it obtains garbage or human food; and 3) **feasibility:** both auditory and physical projectiles have a limited range for accurate and effective use and are easily deflected by wind and brush (see Appendix 4 for additional information).

4. Pre-emptive Capture, Handling, and Transport

Pre-emptive capture should only be initiated if all other methods under the secondary response strategy are ineffective in deterring bears from a spill site. Human safety is a priority during polar bear capture, transport, holding and release operations. Capture and release operations will not be conducted when weather, ocean, or other conditions jeopardize human safety. Pre-emptive capture of polar bears may only be done by qualified Service staff or their designees; section 112 (c) authorization from the Service is required. Additionally, approval from the FOSC is required before capture can be initiated.

The main factors affecting the feasibility of polar bear capture operations are safety and logistical constraints. Pre-emptive capture and relocation of polar bears is only feasible if small numbers of animals are in danger of being oiled and suitable relocation sites are available. When relocated,

bears must be monitored to ensure that they are not bothered by people or predators such as other polar bears while they recover and regain mobility, especially in the case of females with dependent cubs. The potential for polar bears to be oiled should be high before this technique is initiated. The Service will determine on a case-by-case basis whether preemptive capture is appropriate.

Ground-based methods and equipment: Use of baited **culvert traps** may be used to capture polar bears but has some application limitations. Equipment for ground-based capture is located at Deadhorse as well as in Anchorage at the MMM warehouse (see Appendix 7). At present, five culvert traps are available for oil spill response:

- Two Service traps located at the MMM warehouse in Anchorage (collapsible style which can be flown as cargo to a spill area, then assembled on site);
- An Alaska Department of Fish and Game (ADFG) bear culvert trap located in the Western Operating Area (WOA) under ACS inventory at the Spill Response Team building in Kuparuk;
- An ADFG bear culvert trap located in the Eastern Operating Area (EOA) managed by BP Exploration, behind the Spill Response Team's office at MCC;
- A culvert trap constructed by Arctic Slope Regional Corporation for Shell Oil that is specifically designed for large polar bears and is made of aluminum for ease of slinging; it can be made available by contacting Shell (see section III. List of Contacts).

Flatbed trailers to transport the culvert traps are available from ACS (tel. 907-659-2045). Culvert traps can also be slung by helicopter (Bell 412 or 212).

If ground-based capture involves use of immobilizing drugs to transport or re-locate a bear(s), only authorized Service personnel or their designees will conduct capture operations.

Aerial methods and equipment: Pre-emptive capture of polar bears can also be accomplished using helicopters. For aerial capture methods, capture equipment such as immobilizing drugs, firearms and sampling equipment will be transported to the site with authorized capture personnel. The Department of the Interior's National Business Center Aviation Management Division maintains a current list of licensed aircraft operators that can assist in polar bear capture/transport (see Section III, List of Contacts). Capture operations should only be conducted by qualified personnel, as designated by the MMM representative. Helicopter capture operations will follow procedures outlined in the *Standard Operating Procedures for Polar Bear Capture in the Chukchi and Bering Seas* (U.S. Fish and Wildlife Service 2010d), and in accordance with the permit holder's Institutional Animal Care and Use Committee permit conditions.

Data collection and animal handling: For each capture event, capture personnel should note the following general information:

- location of capture
- estimated amount of oil in capture area (to help assess animal exposure to oil)
- technique used to capture the animal
- behavior of the bear during capture, e.g., aggressive, lethargic, comatose.

Upon capture, the (immobilized) bear should immediately be examined by capture personnel. If multiple animals need to be moved, or limited time is available, capture personnel should perform only a cursory field exam, including:

- check for the presence of tags/tattoos; affix as necessary
- determine age and sex class and general body condition
- apply fur dye number so the bear can be visually monitored from the ground or air
- apply a glue-on or ear-mounted radio tag so the bear's movements can be tracked for the next few months.

If time is not a limiting factor, or it is deemed useful, then standard field sampling protocol can be used to collect the following additional information, using the data form provided in Appendix 5:

- a pre-molar tooth used for aging (if not previously captured)
- skull width and length
- axillary girth (at chest) and straight-line length (tip of nose to tip of bony part of tail)
- weight
- blood samples
- biopsy (fat) sample
- hair sample.

Relocation and release: Transport of bears for relocation from a spill site can be accomplished using aircraft, vehicles, or boats, depending on distance to the release site. For ground transport, it is preferable to use culvert traps or transport cages that have remotely-operated doors so bears can be safely released without additional immobilization. Polar bears should not be transported in the same enclosure with other bears except mothers with cubs, or possibly siblings. If polar bears are drugged and transported by helicopter sling-load, they should be transported on a backboard and insulated from the cold.

Bears that have been temporarily held in culvert traps or cages in the field (when determining suitable re-location sites) must be released as soon as possible in areas where they have the best chance of survival, as determined by the Service on a case-by-case basis. Every attempt will be made to release polar bears where they were originally captured or in the near vicinity, but this will depend on the degree of contamination risk present at the release site. Any indication of infectious disease or the animal's inability to sustain itself precludes release into the wild. If the bear(s) was immobilized during capture and holding, a collar or glue on radio ear tag can be affixed to monitor movements after release.

5. Other

The possibility of conducting pre-emptive capture of non-oiled animals and moving them to a temporary holding facility either in an existing warehouse or similar structure (e.g., at Deadhorse), or to a facility outside of their population range (e.g., to Anchorage Zoo or Alaska SeaLife Center) has been recently raised. This option would not be feasible for a large number of

bears because of the limited availability of holding cages and trained animal care staff available to care for them. Additionally, the Service's co-management partners, the Alaska Nanuuq Commission and the North Slope Borough DWM (see Section III, List of Contacts), have expressed concern that animals taken into captivity might transmit disease to wild bears if released back into the wild. The risk of disease transmission from captive-held to wild polar bears is unknown; proper quarantine procedures while in captivity would likely reduce transmission risk. In Manitoba, Canada, nuisance polar bears are routinely captured and held in isolation for months in an effort to reduce human-bear conflicts, with no reported cases of disease transmission to wild counterparts upon release. To address this concern and improve response capability, the Service constructed a polar bear holding module in 2014 that can be used to temporarily hold a single or small family group of bears. Two smaller attachable cages have also been constructed and can be used to transport bears to/from the holding module. The collapsible module and transport cages are stored in a conex at ACS's base of operations in Deadhorse. This mobile unit could also be deployed to a spill site elsewhere in Alaska and used if a temporary holding facility (e.g., access-controlled building) was available.

The decision to move a non-oiled polar bear to a temporary holding facility will be made by the MMM polar bear expert(s) in consultation with its co-management partners on a case-by-case basis.

C. Tertiary Response

1. General Considerations

Tertiary response is the treatment of polar bears contaminated with oil. The components of tertiary response are the capture, handling, transport, treatment, holding, and release of polar bears. Tertiary response should only be performed under Service leadership and by people with experience in capture and handling polar bears. Little is known about the potential effects of capturing or cleaning oiled polar bears; therefore it should be carefully considered before being attempted. A combination of capture techniques may be necessary, such as use of air or ground darting and use of culvert traps. The length of time required to immobilize an animal for treatment, cleaning, drying, etc. may pose further risk to polar bears and should be considered in relation to the animal's chances of survival prior to the animal's capture. Each transported animal should be accompanied by capture personnel and a capture data form (Appendix 5) until its release. Logistical and monetary constraints and availability of suitable release sites may further limit the feasibility of this response.

2. Capture

Decision to capture: the decision to capture will be made by the MMM polar bear expert(s), in consultation with the MMM Polar Bear Project Leader, a veterinarian, and other response partners, based on the following factors:

- Safety: risks involved in capture operation to both bear(s) and staff must be identified

- discuss risk factors such as weather and ice conditions with the entire capture crew, including pilots, boat captains, etc.
- does not capturing the bear(s) pose a safety risk to humans, e.g., village residents?
- Biological importance: priority should be given to family groups and single adult females, followed by sub-adult females, sub-adult males, and adult males respectively.
- Likelihood of survival: using best professional judgment, select bears with highest likelihood of survival, in consideration of the following parameters:
 - percent of body covered in oil (heavily oiled animals are likely to have more serious thermo-regulatory and medical problems vs. animals that are so lightly oiled that the stress of capture/cleaning may not be warranted)
 - depth of oil penetration into the fur (skin-deep oiling could be more difficult to remove and therefore increase sedation and holding times; penetration may be difficult to determine without capturing the bear)
 - was oil inhaled (was the bear observed swimming in a fresh slick which may require specialized medical treatment and lengthen holding time)
 - was oil ingested (was the bear observed feeding or grooming, or is oil present in mouth or throat - may require specialized medical treatment and lengthen holding time)
 - body condition (does the bear appear otherwise healthy, vs. a malnourished bear that may be less likely to withstand treatment, or require longer holding time)
 - Length of time that the animal has been oiled (if known from collar data etc., bears that have been oiled for a long period of time may be less likely to survive)
- Availability of holding and release sites
 - identify potential holding and release sites before capture is initiated
 - is the treated bear a suitable candidate for release into the wild (higher priority if “yes”)
 - if bear is taken out of its population range, is a holding facility available for permanent placement?

If the animal is deemed to be in such compromised health that it must be cleaned and rehabilitated for an extended period of time at a facility outside of its home range, it should not be returned to the wild and can be considered a suitable candidate for permanent placement in a zoo. Written authorization from the Service’s DMA office (see Section III, List of Contacts) will be needed to remove a polar bear(s) permanently from the wild for placement in a long-term holding facility such as a zoo or aquarium. Polar bears under the age of two years have fewer problems making the transition from a free-ranging life to a long-term captive environment (Pat Lampi, pers. comm. 2010). If the number of oiled bears exceeds the availability of facilities to clean and care for oiled bears, the MMM polar bear expert(s) will consult with the MMM Polar Bear Project Leader and other bear experts to determine the best course of action, including euthanasia.

3. Handling

Aerial capture will be performed by the Service, U.S. Geological Survey, or others with MMPA section 112 (c) authorization, as determined by the MMM polar bear expert(s). Ground capture may involve Service, ADFG, North Slope Borough DWM or other staff with culvert trapping experience. Medical treatment and handling of polar bears should be conducted by qualified personnel only, as determined by the MMM polar bear expert(s). Washing and cleaning will be conducted under supervision of the attending veterinarian in consultation with the MMM polar bear expert(s).

4. Transport

Transport must be conducted by qualified personnel only, as determined by the MMM polar bear expert(s). If polar bears are shipped via aircraft to a treatment facility outside of their home range, all cages must meet, at minimum, U.S. Department of Agriculture marine mammal transport requirements (AWA 2005). Transport cages meeting International Air Transport Association (IATA) requirements are recommended (see Appendix 6). A veterinarian or qualified expert should accompany bear(s) en route to the treatment facility to address issues such as overheating.

A forklift may be necessary to move caged bears to the transport vehicles/aircraft. Polar bears should not be transported in the same enclosure with another bear except cubs with mothers, or cub siblings. At present, the Service houses one transport cage suitable for transporting one cub less than 150 lbs. at the MMM warehouse in Anchorage, and two adult bear cages at Deadhorse at the ACS base of operations. Additional cub transport cages are available from the Alaska Zoo. Zoos outside of Alaska that house polar bears may be able to provide additional transport cages which can be obtained by contacting the Chair of the American Zoological Association (AZA) Bear Taxon Advisory Group (see Section III, List of Contacts).

5. Treatment

Once polar bears are captured and moved to a treatment facility, the Service will work with the Polar Bear Response Team to treat and handle bears. The Polar Bear Response Team is an Alaska-based ad-hoc group that has been working together since 2010 to improve tertiary response capabilities for polar bears, and to help rescue polar bears that are orphaned in the wild. Members include experts in oil spill response (ACS), polar bear biology, management, and capture (the Service, U.S. Geological Survey, North Slope Borough) and captive treatment and handling (Alaska Zoo and Pet Stop). To date, the Polar Bear Response Team has worked together to identify methods to effectively remove oil from polar bear fur, as well as to identify, list, and stage the appropriate medical equipment and supplies needed for cleaning oiled polar bears. Depending on the number of bears being treated, additional staff may be needed to clean and treat bears.

Treatment facilities: Treatment facilities for rehabilitating oiled polar bears should include: 1) portable bear cages of a minimum size that equals twice the length of the animal (and the mechanics/trailers to move them); 2) areas for triage/sedation; 3) areas for

cleaning/rinsing/drying; 4) areas for recovery/holding (in quarantine) with access to heat, shade and water; 5) a veterinary laboratory and equipment storage area; and 5) staffing accommodations, including restrooms, sleeping, and dining areas. The treatment facility should be in an area where large quantities of water are available. A health and safety plan (including MSDS information for all hazardous chemicals) should be developed. Consideration must be given to disposal of cleanup waste. If necessary, wastewater permits must be obtained from federal and state authorities.

Currently the best option for cleaning oiled polar bears within their home range is in **Prudhoe Bay at facilities maintained by ACS**, the primary oil spill response organization for oil and gas operators in the Prudhoe Bay area. The facilities are currently capable of treating up to three oiled polar bears at a time; more bears could be treated if additional holding cages were brought to the site. Facilities and on-site equipment for bear cleaning, treatment and necropsy are described in Appendices 6 and 7, respectively.

If polar bears are taken outside of their population range, the next closest facility is the **Alaska Sea Life Center in Seward** which has the facilities capable of washing, treating and holding up to six small bears (no adults). Additionally, up to six non-oiled orphaned cubs-of-the-year can be taken to the **Alaska Zoo** for stabilization and holding; the zoo does not have the waste-water management capabilities necessary for washing/de-oiling bears. If additional washing facilities are needed, the MMM polar bear expert(s) will contact the AZA for assistance from zoos or aquaria outside of Alaska.

Only authorized personnel shall be admitted into treatment facilities. Service personnel and others involved in treatment of polar bears shall carry identification when in proximity of housed bears. Public media relations should minimize disturbance to polar bears; no cameras with flashes will be permitted in the facility, and press conferences should be held outside and away from captured bears. The MMM Polar Bear Project Leader or designee will be responsible for selecting, coordinating with, and providing oversight to these facilities if treatment is initiated.

Treatment methods: There are presently no veterinary standards available for treating oiled polar bears; however in 2012 the Polar Bear Response Team drafted guidelines for treatment and de-oiling, based on experimental fur-cleaning results and other available scientific information. These guidelines are provided in Appendix 6 and summarized briefly below.

Medical treatment: Once a polar bear is brought into a treatment facility, a qualified veterinarian will perform **assessment and triage** (Appendix 8) and oversee the animal's care and recovery in consultation with the MMM polar bear expert(s). Treatment will require immobilizing the animal; a veterinarian and at least one additional qualified person should be available to **monitor depth of anesthesia and other health parameters during cleaning**.

Cleaning: For cleaning oiled polar bears, warm fresh or salt water, liquid detergent and sawdust are the only known non-toxic agents proven effective in cleaning oiled fur but may not be sufficient to remove deeper oil next to the skin (Øritsland et al. 1981). Recent efforts to

experimentally clean polar bear fur pieces under laboratory conditions suggest that use of **warm fresh water and a 10% Dawn soap solution** yielded the best results for removing both fresh and weathered light and heavy crude oils from polar bear fur (Jensen et al. in prep.). Cleaning involves working the solution into the fur, rinsing, and drying, and should involve several people so the animal can be washed as quickly as possible and reduce the need for extended anesthesia. Cleaning methods should follow the guidelines included in Appendix 6.

After washing, bears should be provided **clean drinking water** or snow/ice at all times. Due to the risk of food conditioning (association of humans as a source of food), polar bears should not be fed if holding and treatment is short term and the bear is able to be returned to the wild. Orphaned cubs that are not considered candidates for return to the wild may be fed as deemed necessary by the attending veterinarian.

In extreme cases it may be necessary to **euthanize** severely oiled bears. Polar bears should be euthanized when the attending veterinarian decides that the damage to the bear is irreversible and the animal is not likely to recover. Euthanasia procedures should follow the American Veterinary Medical Association's *Guidelines on Euthanasia* (AVMA 2007). A post-mortem necropsy should be performed by the veterinarian or other qualified person to increase knowledge on the effects of oil on polar bears and for NRDA purposes.

6. Holding

Clinical parameters should be monitored and risks of **disease transmission and stress minimized** when holding polar bears. Holding cages made from steel tubing may be used while animals are in captivity. **Holding cages** should be comfortable for the bear. A cage with two compartments that can be chain-locked together is recommended so animals can be shifted back and forth for cage cleaning. With the exception of family groups, animals should be held in separate cages to avoid contact and unnecessary stress or aggressive encounters. Currently, one Service-owned holding module capable of holding a family group, siblings, or a single bear is stored at the ACS Annex in Deadhorse. The holding module has ports that allow attachment of two smaller transport cages. Although the cages are designed for transporting adult polar bears, each is large enough that it could be used for short-term holding of non-adult bears.

Polar bears that are brought into a treatment facility may be susceptible to disease transmission and should be held in **quarantine**. Quarantine procedures are described in Appendix 6. Throughout holding, detailed **monitoring records** should be kept for each bear, and copies should travel with the animal wherever it is moved. For each bear, regardless of final placement, a copy of the completed documents must be submitted to the Service's MMM Office. A treatment monitoring form is provided in Appendix 9.

7. Release

To date, polar bear-specific release criteria have not been developed; therefore, the Service will determine on a case-by-case basis whether bears that have been cleaned or held short-term within

their population range (Beaufort, Chukchi or Bering seas region) can be released into the wild. A release plan must be prepared and authorized by the FOSC prior to release.

Prior to release, polar bears should display normal behavior, adequate body weight, clean fur, and have no signs of infections, disease, or injury. If released into the wild, bear(s) may be fitted with a tracking device (ear tag or collar) for post-treatment monitoring. Oiled polar bears that have been transported to a treatment facility in Anchorage or other location outside polar bears' range should not be released into the wild without consultation with co-management partners and wildlife health experts to determine risks associated with disease transmission.

Animals that the Service determines will not be re-released into the wild will be placed in zoos, aquaria, or research facilities. The Service will consult with the AZA Bear Taxon Advisory Group to determine the most suitable facility available for the continued care and maintenance of these polar bears (see Section III, List of Contacts). Long-term holding facilities that receive polar bears must provide: 1) staff, funding, and equipment to accompany polar bears during transport from the field or short-term holding facility; and 2) a list of qualified personnel that will be treating/monitoring the animal's recovery. The receiving institution must also obtain a Letter of Authorization from the Service's DMA office (see Section III, List of Contacts). Because polar bears are listed as a "threatened" species under the ESA, they remain under authority of the Service (rather than belonging to the receiving zoo).

A draft decision matrix summarizing response strategies has been included in Appendix 10. This Plan will be updated periodically by the MMM Office to include new information as it becomes available.

III. LIST OF CONTACTS

The internal, complete version of this Plan contains personal contact information for many response partners. This public web version has been redacted to exclude personal contact information, in order to protect the privacy of our response partners. Interested individuals may contact one of the U.S. Fish and Wildlife Service employees listed below if they have information needs related to preparedness or response activities.

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Appendix 1. Polar Bear Carcass Collection Form (Use to collect polar bear carcasses)

Carcass Collection Form				INV:		Activity Code:	
				Evidence seizure tag:			
Date:		Collector's Names:					
Location:		Shoreline segment:			Search Width (est):		
Time start:		GPS start:		Time Stop:		GPS stop:	
Shoreline type:				Shoreline back:			
General notes:							
Species	ID #	Photo #	Oil	Condition	Emaciation	Scavenging	Comments

INV: Incident-specific assigned number	Evidence Seizure Tag: Number imprinted on white evidence seizure tag
Activity Code: 1= carcass collection 2= wildlife capture team 3= operations task force (protection, cleanup) 4= LE activity	5= RAT survey 6= SCAT survey 7= NRDA activity 8= other (define)
ATTENTION: RECORDING THE START/STOP TIMES AND GPS AND ESTIMATING SEARCH WIDTH IS CRITICAL IN FUTURE ANALYSIS OF SEARCH EFFORT	
Shoreline type: wave-cut platform in bedrock, rock shore, large rock/cobble beach, riprap, gravel beach, mixed sand/gravel beach, sand beach, tidal/mudflat, marsh.	
Shoreline back: habitat type, e.g., bluff/cliff, hillside, sand dune, marsh, upland meadow, forest, urban	
General notes: Weather and ocean conditions, including ice conditions; other wildlife sightings in your search area; observations of actual predation, note tracks or other evidence of mammalian predators on beaches (fox, mink, bears, etc.); note number of live birds or mammals seen on near shore waters; how many of those appear to be lethargic, sickly, or obviously oiled; note evidence of other unusual mortality (e.g., fish, urchins or bivalves) or ocean conditions (plankton bloom, water temperatures, etc.)	
Condition codes: A= fresh specimen (possibly still damp, eyes still intact, dead less than a day) B = dead less than a week (somewhat desiccated, eyeballs present but sunken, perhaps partially buried by sand/debris, but body still limp and flexible) C= week to a month old (body desiccated, rigid, eyeballs gone or sunken and completely hardened, parts missing) D= very old (more than a month, completely desiccated, brittle, may be incomplete e.g., just limbs, bones)	
Degree of oiling codes: 0= no obvious oil on body 1= light spots of oil 2= moderate patches over body 3= heavily oiled all over	Degree of scavenging codes: 0= no evidence of scavenging 1= light scavenging (skin broken, some guts removed) 2= heavy scavenging (guts completely eviscerated, meat consumed)
Emaciation codes: 1 = Skinny (emaciated appearance; vertebrae, ribs, and hip bones externally visible without palpation, no fat palpable between skin and muscle over the dorsal body, hips, or lower rump) 2 = Thin (vertebrae and hip bones [but not ribs] partially visible, easily palpable under the skin; little/no fat between skin and muscle over the back, small amounts of fat detectable on lower rump) 3 = Average (normal healthy appearance; vertebrae/hip bones not visible; upper 1/3 to 1/2 of the spinal column can be felt under the skin; detectable layer of fat between skin and muscle over rear half of body, thickening slightly but detectably over lower rump) 4 = Fat (vertebrae/hip bones not visible, palpation reveals fat deposited over upper vertebrae, hip bones difficult to feel through fat; fat thick over rump; a hand rubbed above the rump will initiate ripples in the skin over the fat layer. 5 = Obese (vertebrae/hip bones undetectable by palpation, thick layer of fat is apparent between skin and muscle 2/3 of the way up the back & over rump, a hand rubbed on lower back above rump sets off waves of rolling fat, possibly jiggling).	
ID#: Item No. on blue Evidence Identification Tag	Photo #: digital photo number

Appendix 2. Polar Bear Field Sample Collection Form

(Use when it is not possible to retrieve entire carcass)

Bear ID (Identify tags, tattoos, collars or assign bear ID) _____

Collector(s) Name: _____

Collection Date: _____ **Time:** _____

Collection Location (specify locality, island name, bay name, include GPS coordinates if possible): _____

Photos taken? (describe) _____

Overall Physical Assessment

Age: Adult (>4y) Sub-adult (2½-4y) Yearling (1-2½ y) COY (< 1y)

Sex of Animal: Male Female

If female: **Lactating?** Yes/No **Pregnant?** Yes/No **Fetus present?** Yes/No

Body Condition: Emaciated Thin Normal Fat

Hide Quality: Normal Slipping Other _____

Nose Scars: Present No scars

Tooth Wear: Heavy Moderate Light None

Tooth loss (if so, specify): _____

Tooth Abscesses/Lesions (if any, describe and measure): _____

Body Measurements

Heart Girth: _____ **Neck at shoulder:** _____ **Neck at axial:** _____

Skull Width: _____ **Skull Length:** _____

Standard length: _____ **Tail length:** _____ **Total length:** _____

Weight: _____ (lbs / kg) **Scale** ___ **Estimate** ___

Additional comments of physical condition:

Appendix 3. Guidelines for Use of Electric Fence for Polar Bear Detection and Deterrence

Electric fences can be used to detect and deter bears at temporary camps or equipment caches established as part of oil spill response. Alarms can be purchased to affix to electric wire fences that are placed at a sufficient distance (10-35 m) from the camp's perimeter so that when a bear walks through the wire, an alarm is tripped. This notifies and allows personnel time to retreat to a safe location or prepare deterrents, depending on the situation.

Electric fences require care to make them effective; for example, wires should be situated so that a bear is unable to crawl under, through, or over the fence. Additionally, adequate grounding is an important factor to ensuring the effectiveness of a fence. Electric fence systems should be checked regularly, especially if using a solar-powered fence; low light conditions and drifting snow may reduce voltage (McMullen 2000). North Slope Borough biologists report that electric fences can be used on sea ice if properly maintained; the fence needs to be a minimum of four feet high (Jason Herreman, pers. comm.2012).

McMullen (2008) recommends use of the following heavy-duty electric fence system to deter polar bears during snow-free seasons from temporary camps:

- six strands of braided stranded wire supported on fiberglass posts
- alternating positive and negative wires
- first positive wire spaced 8" from the ground
- 7/8" fiberglass corner posts and gate openings with back braces securely anchored into ground
- 1/2" fiberglass line posts spaced about 15' apart with snap-max clips to maintain wire spacing
- specialized connectors to connect and tighten the fence wires
- ground rods wired to energizer/charger (which provides electricity to fence).

The energizer can be powered by either a 110 volt AC source, or a solar-charged 12 v DC battery; the energizer converts the power to high voltage (5,000-10,000 volts).

For additional information regarding electric fence please contact MMM Polar Bear Program at (907) 786-3800.

Appendix 4. Deterrence Guidelines

Prepared by Dick Shideler, ADFG, Oilfield Grizzly Project and Craig Perham, USFWS, Marine Mammals Management

USE OF PROJECTILES TO DETER BEARS. Bear deterrent projectiles fired from a 12 gauge shotgun are potentially effective methods to haze bears. Projectiles, as used here, include **rubber bullets, beanbags, cracker shells, and screamers or whistlecrackers.** The first two are used to actually hit the bear. The cracker shell is a noisemaker designed to provide a loud bang coupled with a flash. The screamer is also a noisemaker that makes a siren-like sound and smoke trail as it flies through the air, and if it has an explosive bang at the end it's called a whistlecracker.

RESPONSE OF BEARS TO DETERRENTS. The response of individual bears to various types of deterrents will vary. Some bears do not appear to react to sharp noises (e.g., rifle shot), but may react to the screamers. Most respond to painful contact. The bear's previous experience, especially with people and with garbage or other human-related food, may affect its response. Generally, the easiest bears to deter are those with no previous experience with people. Bears that have had many neutral encounters with people (called "habituated" bears) may be more difficult to deter at first, tending to ignore many noises and activity (such as vehicle movement) because they've had no negative experience with them. However, these bears can usually be "trained" to avoid people within one or two encounters. The most difficult bears to deter will be those that have obtained garbage or human food (called "food-conditioned" bears). They can endure considerable pain or disturbance to stay around such a nutritious food source, and may require numerous "lessons" to convince them to leave.

There has been some concern that hitting a bear with a projectile may cause it to subsequently become aggressive toward people. In reported cases where projectiles have been used to "train" bears to avoid people, no bears have turned aggressive. In fact, the opposite is usually the case—bears become more wary and try to avoid people.

WHEN TO USE PROJECTILES. The decision to use a projectile to haze bears should be governed by several considerations.

1. **Safety: Projectiles are potentially dangerous--even lethal--to bears and humans!** Misplaced shots could put out an eye, or kill if they hit soft tissue such as the flank or stomach where peritonitis could cause a lingering death. A wounded bear could be a serious safety hazard for personnel in the area. Missed shots could injure bystanders. Cracker shells and screamers can injure bears or humans if they explode too close, and can also ignite fires or explosions. Projectiles should only be used when there is a clear line of sight with no potential for bystanders to wander into the line of fire, and no flammable materials or explosive atmosphere nearby. Therefore, other hazing methods that do not require projectiles should be tried first. These could include vehicle engine noise, sirens, boat horns, short chases with a vehicle (including 4-wheelers or snow

machines in some cases), firecrackers, or banging on the side of a vehicle. If these are ineffective or unfeasible, projectiles should then be considered.

2. **Attractants: It is important to haze a bear BEFORE it obtains garbage or human food!** Once a bear has obtained human food or garbage hazing is less likely to be effective in the short term and may decrease the bear's response to hazing in the future. Some bears will endure considerable pain and noise to persist around a strong attractant with which they've had previous experience. **If there is no immediate threat to human safety, removal of the attractant--e.g., garbage --should be the first priority.** If the attractant cannot be removed immediately, hazing should commence as soon as possible if the bear is not already food-conditioned, but can be delayed if the bear has already had considerable experience obtaining garbage.
3. **Feasibility:** Projectiles have a limited range for accurate and effective use: less than 50 yards for rubber bullets and beanbags, and less than 100 yards for cracker shells and screamers. They are also easily deflected by brush, and highly susceptible to deflection by wind.

HOW TO USE PROJECTILES.

Target area: Only the beanbag and rubber bullet are used to directly hit the bear. The safest target areas are the large muscle masses, such as shoulder and rump or hip. Avoid shots at the bear's head, ribs, or flank. Note that rubber bullets and beanbags are "accurate" only to within 12-18" of the point of aim (see **Range** below).

Range: The safe and effective range for projectiles varies with the type.

- **Beanbags** (e.g., MK Ballistics "Deerbuster," All-Purpose "Slapjack," or DefTech "Mod. 23BR"): 10-40 yards. Beanbags can be fired at the bear's rump or shoulder at ranges as close as 10 yards, but accuracy drops off dramatically at 40 yards.
- **Rubber bullets** (Margo Supplies "Strike Two"): 20-50 yards. Closer than 20 yards risks penetrating the hide; farther than 50 yards and accuracy declines dramatically. At this time, we do not recommend other brands of "rubber" or plastic bullets due to several recent cases of bear injury or death caused by their use.
- **Cracker shells** (e.g., Stoneco "Shellcracker") and **screamers** (e.g., Stoneco "Screamer") or **shell whistlecrackers**: 75-100 yards. The main concern is to keep the noise **between** you and the bear. These are light loads so shooting into the wind will decrease the range, and shooting with the wind will increase it. Occasionally these rounds explode in or shortly out of the barrel, so **wear suitable ear and eye protection**. These rounds are not designed for accuracy, so shouldering the gun to aim is unnecessary, and can result in blowback into the shooter's face from the breech if a shell goes off in the barrel. Firing from the hip is safer and just as effective.

Shotgun use: These rounds will not work in auto-loading shotguns, only pump or break actions. Use only cylinder bore or improved cylinder chokes so that the wads do not stick in the barrel.

When ready to shoot, **get the bear's attention:** either shout yourself or have someone else shout just before you shoot so that the bear will learn to associate a common signal (person shouting) with a painful stimulus, and thereby learn to subsequently avoid people who shout at it.

Especially after shooting cracker shells or screamers, inspect the barrel to make sure the wad has been expelled. It is advisable to have two shotguns available—one a break-action for checking the barrel after a deterrent round, and one a conventional pump loaded with lethal rounds for emergencies. If only the pump action is available, load individual deterrent rounds directly into the chamber and keep lethal rounds as back-up in the magazine.

NOTIFICATION. For **grizzly bears**, fill out the Oilfield Grizzly Observation Form, noting particularly the range at which the bear was shot and the bear's reaction, and fax to Dick Shideler at 907-456-3091 at Fairbanks ADFG. If you have questions contact Dick Shideler at the grizzly project office (659-0120) in the North Slope Borough SA10 camp, or call 907-459-7283 in Fairbanks.

For **polar bears**, fill out the Polar Bear Sighting Report, and fax to Craig Perham at Anchorage USFWS, 907-786-3816. If you have questions contact Craig at 907-786-3810.

PROTOCOL FOR HAZING POLAR BEARS BY HELICOPTER

Helicopter hazing can be conducted by authorized personnel to move polar bears away from facilities or field personnel in order to maintain human safety and bear safety.

- Keep a distance of approximately ¼ mile between the bear(s) and helicopter, moving the bear(s) in a direction away from people and facilities. You may need to initially approach within the ¼ mile distance (but not aggressively) to get the bear moving, especially if it's resting, and then back off to the ¼ mile distance.
- Push the bear at a steady walk. A running bear, especially large bears, can rapidly overheat.
- Don't haze a bear with a helicopter when ambient temperature is over 70° F (20° C).
- Don't aggressively push a bear. Bears may hunker down and not move if pushed or chased too aggressively. A slow approach is usually all it takes, especially if hovering near the ground creates a snow cloud from the helicopter's propeller wash.
- Move the bear at least 2-3 miles from the point of initiation or occupied facilities, as a rule of thumb. This will depend on the situation: location of facilities, bear behavior, weather, and geographic features. The key element is to keep the bear moving on its own.
- Monitor the bear, if possible, to ensure the bear does not return.

Please note: The criteria above are to be used for Bell 212 and 206 helicopters or larger. If a small helicopter, such as an R-44 helicopter is to be used, it may have to move in much closer to initiate the hazing because these machines are quieter than the 212s and 206s.

Appendix 5. Pre-emptive Capture Data Form (for pre-emptive capture of non-oiled bears)

Bear ID: _____ **Date and Time:** _____ **Known Sex:** F M
Known age class: COY C1 C2 Sub Ad

Markings

Tattoo		Applied	Confirmed	
R ear tag		Applied	Confirmed	
L ear tag		Applied	Confirmed	
Paint		Applied	Confirmed	

Collars/Radio tags

ID	Action (circle one)	Freq.	Pulse (bpm)	Circ. (in.)	Notes
	Applied Removed				
	Applied Removed				

Measurements and Indices

Heart Girth		Neck at axial		Skull L		Stand L		Weight(lb)
Neck at shoulder		Skull W		Total L		Tail L		Circle one Scale Est.

Physical Observation Notes:

Samples (circle for single sample or indicate quantity)

Blood	Feces	Tooth
Fat	Hair	UL UR
Ear punch	Pedal	LL LR
Milk	Nose	

Drug Delivery (all volumes are in cc)

Dose	Time	Method	Load Vol.	Inj. Vol.	Inj. side	Inj. Site	Needle size	Notes (record miss or other drug loss)
1		G H			L T R			
2		G H			L T R			
3		G H			L T R			
4		G H			L T R			

Drug Response and Vital Rates

Time	Temp (°F)	Resp. (bpm)	Notes
First ataxia			
Bear down			

Appendix 6. Guidelines for De-oiling, Handling, Treatment, and Release of Oiled Polar Bears

Purpose: the purpose of Appendix 6 is to expedite assessment and care of an oiled polar bear(s) once it has been captured and delivered to a facility for de-oiling and treatment.

Primary Contacts:

Contact information redacted from public version (see page 29)

Capture: Capture and delivery of oiled polar bears to the treatment facility will be conducted by the Service, U.S. Geological Survey, or their authorized designees only. The decision to capture and the capture operation itself is discussed in the Section III of this Plan. The decision on where the bear(s) will be cleaned and held should be made before the bear is captured so that it can be transferred directly to the cleaning/holding facility and minimize the immobilization and transport time. The holding cage should also be moved to the cleaning facility prior to capture. Veterinary care should be en-route or already on site before capture is initiated. If possible, a veterinarian should accompany USFWS on the capture flight/mission.

Facilities and equipment: The decision on where to wash and hold polar bears once they arrive at Prudhoe Bay will be made by ACS based on space availability and recommendations provided by the Service and veterinary staff. Below is a description of the primary options and available equipment (Lee Majors, ACS, pers. comm. 2012).

ACS base: holding and cleaning could not be done at this building but totes containing equipment for cleaning and medical treatment are located on the top shelf of the warehouse/garage area. Deterrents are located on the second floor of warehouse (locked) and can be obtained through ACS staff only.

Totes contain cleaning equipment as noted in Appendix 7. Medical supplies such as antibiotics and sedation drugs (and anything with an expiration date) are stored at the Pet Stop in Anchorage and should be brought up with the attending veterinarian.

U-8: this large building is located adjacent to MCC in the East Operation Area (EOA) and is also the building dedicated to bird treatment. If birds are also being treated, an area at the far end of the building can be sectioned off for polar bears, as long as noise and traffic is kept to a minimum. This building contains a conex unit that is supplied with laboratory equipment intended for bird response. It also includes electricity, running (pressurized) water, and a 120 gallon water heater. It has a dirt floor and some windows that can provide outside light. It would be a good, quiet option if no other animals are being treated. Staff could be housed at MCC camp which is located within easy walking distance of the facility.

ACS EOA Spill Response Team (SRT) building at MCC: this is a second smaller building near U-8 in the EOA that is designed to serve as a primary headquarters for spill

response; however it could be converted to an exclusive “bear area” if necessary. It also has electricity, bathrooms, pressurized water and a hot water heater. It has a concrete floor. Staff could stay at MCC camp. One culvert trap is located here (in front of garage doors 14-27).

Santa Fe Pad (A4W1): this is a BP pad in the Western Operating Area (WOA) located about 15 miles from Deadhorse. It serves as a boat maintenance building in the winter but is largely empty by June. It has a concrete floor, no running water but water could be brought in by truck. It has electricity. It is located about 1 mile from BOC camp where staff could stay but vehicle transport would be needed.

All of the above buildings can be secured to restrict access; human activity will be reduced to minimize noise and stress to bears.

ACS WOA SRT building: this building is similar to the EOA SRT building and also has a concrete floor and good drainage. It has running water but no reliable hot water; heated water or a water heater would need to be trucked in. It is attached to a camp which would be convenient for staff but may also be a concern in terms of noise.

Arrival at cleaning facility: Once delivered to the cleaning facility, the attending veterinarian will be the lead for all aspects of handling polar bear(s). Only USFWS personnel or their authorized designees will assist the veterinarian in handling and cleaning procedures.

If not immediately washing: transfer the bear(s) to the holding cage and monitor the bear until the attending veterinarian decides to initiate immobilization procedures.

- While waiting, visually note and record degree of oiling, behavior, and estimated weight and condition, as noted on the Assessment Form provided in Appendix 8
- Provide straw bedding
- Provide access to drinking water
- Limit as much human activity in the area as possible.

Chemical immobilization and restraint: drugging will be supervised by the attending veterinarian and his/her designees.

- Use of Isoflourane gas can be used if deemed appropriate by the attending veterinarian.
- Hoist the bear onto a cleaning platform or table if possible
- Station one person to monitor head (breathing, heart rate, respiration) and an additional person to rump (rectal body temperature) throughout cleaning and treatment. Monitor vital rates every 5-10 minutes
- Prepare a 10% Dawn solution for cleaning; if using a 5 gallon bucket, 8 cups of Dawn detergent will be needed (water should be around 90° F when applied to the bear)
- Record information on the monitoring form provided in Appendix 9 (or similar form).

If bear is sufficiently immobilized: initiate stabilization procedures (primary needs will likely be to address thermoregulation and dehydration). Record all information on Assessment form provided in Appendix 8.

- Conduct physical exam; determine extent of oil contamination, other injuries, age class, body condition, etc.
- Check oral cavity, eyes and ears for evidence of oil, bloody/mucous discharge (signs of disease or illness)
- Check for gurgling respiratory sounds, watery or bloody diarrhea
- Take blood samples to check for anemia or hemolysis (break down of red blood cells) as well as for presence of hydrocarbons, disease, etc. (one purple top tube and one red top tube at minimum; refrigerate samples)
- Evaluate feces as an indicator for need of gastrointestinal protectant (Pepto Bismol or activated charcoal)
- Clean mouth, ears with swabs to remove oil
- Clean eyes and apply eye ointment on cornea to prevent irritation
- Treat dehydration with IV fluids as determined by veterinarian
- Regulate temperature as needed
- Address other injuries or signs of illness as necessary
- Assign a bear ID number
- Take photos of bear and oil on body, in mouth, etc.
- Take sample of oil
- Fill out chain-of-custody forms for any samples taken
- Record all treatment provided
- Start cleaning procedures once bear is medically stabilized.

Cleaning and Handling Procedures: The cleaning operation will require a total of at least six people for an adult bear: two to monitor vital rates and four people to wash the bear. The goal is to wash, rinse, and dry the animal as fast and as thoroughly as possible to minimize the amount of time the animal is sedated. The facility should be at 60-70 ° F and have access to plenty of water. Water can be fresh or salt (preferably fresh) and should be at minimum 60 °F and preferably 90 °F (the warmer the better) before washing is initiated. Water hardness has not been assessed when cleaning polar bears, but generally, the softer the better.

- All staff involved in cleaning should wear personal protective equipment (eye protection, rubber gloves, aprons and boots)
- The bear's eyes should be covered for protection
- Apply a 10% Dawn solution; if mixing in a 5 gallon bucket, this will require 8 cups Dawn per 5 gallons of water (= 80 cups) and massage into fur
- Rinse bear with warm water (~90°F) to remove soap residue using a pressurized hose
- Once rinsed, dry the bear using a hair dryer
- The hair can be clipped or shaved if the bear's condition is worsening, e.g., if it becomes necessary to reverse the drug or undergo emergency treatment; however, the risks of this technique (e.g., effects on the ability of bear to subsequently thermo-regulate) have not been determined; therefore, shaving should only be considered as a last priority.

Holding: The bear should be moved to holding cage containing a straw or sawdust bed located away from other animals and human activity. To avoid any chance of food-conditioning (the association of humans as a food source), bears should not be fed while in captivity unless deemed necessary for their survival. If feeding during holding and treatment is deemed necessary for the survival of the bear(s), polar bears should be fed seal meat or blubber obtained from nearby village communities, when available. If such meat is not available, polar bears should be fed in accordance with the *Polar Bear Nutritional Guidelines* (Lintzenich et al. 2006) and the *Standardized Care Guidelines for Polar Bears* (AZA 2007). Additional guidance is available in the CRC Handbook of Marine Mammal Medicine: Health, Disease, and Rehabilitation (Dierauf 1990).

- Provide clean drinking water or snow/ice at all times
- Clean cage at least once per day
- Monitor bear.

Quarantine: To prevent disease transmission and minimize disturbance during recovery, bears should be quarantined. Quarantine practices include:

- prevent direct contact between the general public and polar bears
- prevent direct contact between polar bears and other animals
- use of a dedicated quarantine area including dedicated tools, transport equipment, medical and food preparation equipment (if applicable)
- use of dedicated protective clothing for personnel, including eye shields or safety glasses and gloves
- use of foot baths, glove baths, and other methods to disinfect clothing between handling animals
- provide fresh air exchange
- thoroughly clean and disinfect buckets, hoses, scales, transport equipment, and cleaning equipment that is moved between animals
- ensure appropriate fencing and placement of holding pens to prevent direct contact between polar bears and foxes or other animals
- remove animal and food waste daily.

Euthanasia: In extreme cases it may be necessary to euthanize severely oiled bears. Polar bears should be euthanized when the attending veterinarian decides that the damage to the bear is irreversible and the animal will not recover. Euthanasia procedures should follow the American Veterinary Medical Association's *Guidelines on Euthanasia* (AVMA 2007). This decision should be made by a qualified veterinarian in consultation with the Service. A post-mortem necropsy should be performed by the veterinarian to increase knowledge on the effects of oil on polar bears. A necropsy form is available in Appendix G of the *Standardized Care Guidelines for Polar Bears* (AZA 2007). Carcasses of bears euthanized with euthanasia solution must be buried in an approved landfill or incinerated to prevent secondary poisoning of scavengers.

Transport/release: Each polar bear will be examined and considered in stable condition by a qualified veterinarian to determine health status of the animal prior to transport/release.

Release to the wild: If release to the wild is an option, the bear should be released within its population range if possible.

- Develop a release plan and obtain FOOSC approval
- Collect CBC/serum chemistry samples, fecal samples for parasites prior to release; any signs of infectious disease precludes release into wild.
- Affix a monitoring device to track bear after release.

Transport and placement in a zoo/aquarium: If placed at a zoo or aquarium, the AZA should be contacted to determine an appropriate location and DMA should be contacted for authorization prior to transport. For air transport outside of Alaska, IATA regulations require cages with the following:

- constructed of heavy, durable materials such as hardwood, metal, aluminum, or welded mesh
- adequate ventilation
- sliding or guillotine doors of welded mesh or strong iron bars that do not allow claws/limbs to penetrate
- secure fasteners on doors to prevent accidental opening
- interior siding lined with sheet iron or hard metal with ventilation holes and access port for pole syringe
- wooden or other shutters with vents to reduce disturbance
- large enough size to allow bear to stand on all fours with head extended, and to lie down
- watering containers affixed off floor and accessible from outside
- slatted floor with trays for excrement, or leak-proof floor with sorbent materials
- transport temperature between -4 to 21 ° C (25-70 ° F)
- located in a manner that minimizes light and noise during transport
- label and Transport Plan affixed to cage, approved by the attending veterinarian.

Appendix 7: Equipment and supplies available for capture and treatment of polar bears.

Capture/transport equipment	Amount	Storage Location
Backboard	1	ACS warehouse Deadhorse
Culvert trap #1 (Shell)	1	contact Shell
Culvert trap #2 (ADFG)	1	ACS spill response team building at MCC (Eastern Operating Area)
Culvert trap #3 (ADFG)	1	ACS spill response team building at Kuparuk (Western Operating Area)
Culvert trap #4 (USFWS)	2	MMM warehouse Anchorage
Holding cage (12' x 12' module) with 2 detachable transport cages (USFWS)	1	USFWS conex at ACS Annex in Deadhorse
Leather gloves	5	ACS warehouse Deadhorse tote # 372
Sling (for aerial transport)	1	ACS warehouse Deadhorse tote # 372
Transport cage #1 (cub)	1	MMM warehouse Anchorage
Transport cage #2 (cub)	1	Alaska Zoo Anchorage
Transport cage # 3 (up to sub-adult size)	1	ACS Deadhorse
Weighing tripod	1	MMM warehouse Anchorage
Weighing tripod	1	ACS warehouse Deadhorse tote # 372
Cleaning and handling supplies	Amount	Location
AA batteries (for headlamps)	32	ACS warehouse Deadhorse tote # 370
Bleach (chlorine)	1 gallon	ACS warehouse Deadhorse tote # 371
Buckets	5	ACS warehouse Deadhorse tote # 372
Chest freezer (sample storage)	1	ACS MCC – U-8 building Deadhorse
Chlorohexidine solution (antiseptic scrub)	1 gallon	ACS warehouse Deadhorse tote # 371
Clipboards	10	ACS warehouse Deadhorse tote # 371
Come-a-long	1	ACS warehouse Deadhorse tote # 372
Coolers (94 qt.)	2	ACS warehouse Deadhorse tote # 370

Dawn detergent (96 oz)	15 bottles	ACS warehouse Deadhorse tote # 371
Disinfectant (Novalsan solution)	1 gallon	ACS warehouse Deadhorse tote # 371
Duct tape	5 rolls	ACS warehouse Deadhorse tote # 371
Dry erase board	1	ACS warehouse Deadhorse tote # 371
Extension cord (50')	2	ACS warehouse Deadhorse tote # 370
First aid kit	1	ACS warehouse Deadhorse Tote # 370
Funnel set	1	ACS warehouse Deadhorse tote # 370
Hair rakes	4	MMM warehouse Anchorage
Hair clippers/scissors/clipper lube	1	ACS warehouse Deadhorse tote # 370
Hair dryer	1	ACS warehouse Deadhorse tote # 372
Headlamps	2	ACS warehouse Deadhorse tote # 371
Hose nozzles	3	ACS warehouse Deadhorse tote # 370
Hoses (50')	3	ACS warehouse Deadhorse tote # 372
Notebooks	5 notebooks	MMM warehouse Anchorage
Paper	1 ream	MMM warehouse Anchorage
Permanent pens	12	ACS warehouse Deadhorse tote # 370
Pliers	2	ACS warehouse Deadhorse tote # 372
Power strip	1	ACS warehouse Deadhorse tote # 371
Reference: Drug dosages	2	MMM warehouse Anchorage
Reference: AZA Husbandry guidelines	2	MMM warehouse Anchorage
Reference: AZA Nutrition guidelines	2	MMM warehouse Anchorage
Reference: USFWS polar bear oil spill response plan	2	MMM warehouse Anchorage
Rubber aprons	2	ACS warehouse Deadhorse tote # 370
Rubber boots	Need to bring your own	Each responder

Rubber gloves	5 XL and 3 L	ACS warehouse Deadhorse tote # 371
Rubber pants (L)	3	ACS warehouse Deadhorse tote # 371
Safety glasses	10	ACS warehouse Deadhorse tote # 371
Sawdust or hay	1-2 bales	Alaska Zoo
Scrub brushes	13	ACS warehouse Deadhorse totes # 371 and 372
Sorbent pads (18" x 18")	1 bag	ACS warehouse Deadhorse tote # 371
Sponges	4	ACS warehouse Deadhorse tote # 372
Storage containers (plastic Rubbermaid)	3	ACS warehouse Deadhorse tote # 371
Storage totes	1	ACS warehouse Deadhorse tote # 372
Tool kit (yellow)	1	ACS warehouse Deadhorse tote # 371
Towels	5	ACS warehouse Deadhorse tote # 372
Trash bags (33 gallon)	1 box	ACS warehouse Deadhorse tote # 370
Medicines	Amount	Location
Aminophylline 25mg/ml, 10 ml (IV broncho-dilator)	1	ACS warehouse Deadhorse tote # 370
Antibiotic (oral) 200 mg (100 count) (Cefpodoxime/Simplicef)	1	Pet Stop Anchorage
Antibiotic (oral) - Cephalexin 500mg (500 count)	1	Pet Stop Anchorage
Antiseptic solution (Betadine)	2 bottles	MMM warehouse Anchorage
Antiseptic topical ointment	2 tubes	MMM warehouse Anchorage
Atropine sulfate 1/120 grain, 100 ml (reversal)	1	ACS warehouse Deadhorse tote # 370
Cod liver oil	5 gallons	Pet Stop Anchorage
Dexamethazone 4mg/ml, 30 ml vial (cortico-steroid IV)	1	ACS warehouse Deadhorse tote # 370
Dextrose 50%, 500 ml (IV glucose supplement)	1	ACS Deadhorse warehouse tote # 370
Diazepam injectable	2 boxes of 10 vials each	Pet Stop Anchorage

(respiratory stimulant)		
Epinephrine 1:10000, 10 ml (increase heart rate, dilate airway)	1	ACS warehouse Deadhorse tote # 370
Eye ointment (plain), artificial tears (lubrication)	6	Pet Stop Anchorage
Eye ointment (antibiotic) (treat ulcers etc.)	2 tubes	ACS warehouse Deadhorse tote # 370
Eye ointment – Neopolydex suspension (antibiotic and steroid) (treat conjunctivitis etc.)	6 tubes	Pet Stop Anchorage
Eye wash (cleaning dirt)	12	Pet Stop Anchorage
Famotidine (GI tract protector)	2 bottles	Pet Stop Anchorage
Fatal Plus 250 ml (euthanasia solution)	1 bottle	Pet Stop Anchorage
Fluorescein strips (50 count) (detect eye scratches)	1 box	ACS warehouse Deadhorse tote # 370
Furosimide 10 mg/10 ml (diuretic)	1	ACS warehouse Deadhorse tote # 370
Isoflurane gas (anesthesia)	2 bottles	Pet Stop Anchorage
Ivermectin 250 ml (parasites)	1 bottle	Pet Stop Anchorage
Ketamine (immobilization)	8 bottles	Pet Stop Anchorage
Lactated ringers solution 1 liter (IV hydration)	12	ACS warehouse Deadhorse tote # 370
Lock box (drug transport)	1	Pet Stop Anchorage
Mannitol 20% 100 ml (diuretic in case of renal failure)	1	ACS warehouse Deadhorse tote # 370
Metacloprimide injectable (Reglan) (intestinal protectant)	2 bottles	Pet Stop Anchorage
Metronidazole 500 mg (500 count) (de-worming)	1 bottle	Pet Stop Anchorage
Mineral supplements	1 bottle	Pet Stop Anchorage
Multi-vitamins (Hivite drops)	12 bottles	Pet Stop Anchorage
Panacur suspension, 1 liter (parasites)	1	Pet Stop Anchorage
Posatex (ear treatment)	1 bottle	Pet Stop Anchorage
Prednisolone 20 mg (500	1 bottle	Pet Stop Anchorage

count) (anti-inflammatory)		
Saline solution, .9% (12 count) (IV fluids)	1 case	Pet Stop Anchorage
Sodium bicarbonate 8.4%, 50 ml (GI tract)	1	ACS warehouse Deadhorse tote # 370
Sulcralfate 1 g (100 count) (digestion)	1 bottle	ACS warehouse Deadhorse tote # 370
Telazol (immobilization)	8 bottles	Pet Stop Anchorage
Toxiban granules (toxin adsorption)	1 lb. bag	ACS warehouse Deadhorse tote # 370
Vitamin B12 250 ml, 3000 mcg	1 bottle	Pet Stop Anchorage
Vitamin B Complex	1 bottle	Pet Stop Anchorage
Xylazine (immobilization)	1 bottle	Pet Stop Anchorage
Medical exam/treatment equipment and supplies	Amount	Location
Agar gel (for microscope plates) (50 count)	1 bag	ACS warehouse Deadhorse tote # 370
Anesthesia machine	1	Alaska Zoo
Anesthesia mask	1	Pet Stop Anchorage
Anesthesia vaporizer	1	Pet Stop Anchorage
Azostix (test urine)	25	ACS warehouse Deadhorse tote # 370
Blood collection tubes (50 count)	1 bag	ACS warehouse Deadhorse tote # 370
Catheter, 18 gauge	12	Pet Stop Anchorage
Catheter, 20 gauge	12	Pet Stop Anchorage
Centrifuge (spin blood – separate whole blood into serum)	1	Pet Stop Anchorage
Chemical booties	12	ACS warehouse Deadhorse tote # 370
Cotton balls/swabs	6 bags/2 pkg.	ACS warehouse Deadhorse tote # 370
Culture swabs (test for infection)	3	ACS warehouse Deadhorse tote # 370
Dart gun, DanInject	1	ACS warehouse Deadhorse tote # 372
Dental kit (Jorgensen elevator, winged elevator, extractor)	1 each	Pet Stop Anchorage
Dremmel tool (drilling)	1	Pet Stop Anchorage

Endo-tube, red rubber (trach tube)	Various sizes	Pet Stop Anchorage
Footbaths	2	ACS warehouse Deadhorse tote # 370
Gauze (3"x 3")	1	ACS warehouse Deadhorse tote # 370
Gloves, exam (L, M, S)	1 box each	ACS warehouse Deadhorse tote # 370
Gloves, latex (L)	1 box	ACS warehouse Deadhorse tote # 370
Glucometer	1	ACS warehouse Deadhorse tote # 370
Hematocrit tubes, 75 mm x 1.2 mm (200 count)	1	ACS warehouse Deadhorse tote # 370
Hydrogen peroxide	1 bottle	ACS warehouse Deadhorse tote # 370
Isopropyl alcohol, 70%	1 bottle	ACS warehouse Deadhorse tote # 370
IV drip sets, 15 drops/ml	12	ACS warehouse Deadhorse tote # 370
IV catheters, 16 gauge and 22 gauge	10 each	ACS warehouse Deadhorse tote # 370
IV fluid stand	1	Pet Stop Anchorage
Jabstick	1	Alaska Zoo Anchorage
Needles, 18, 20, 22 gauge x 1½"	1 box each	ACS warehouse Deadhorse tote # 370
Needles, blood collection 20 gauge x 1 ½", 100 count	1 box	ACS warehouse Deadhorse tote # 370
Needles, spinal 18 gauge x 3 ½"	2	ACS warehouse Deadhorse tote # 370
Ophthalmoscope (eyes)	1	Pet Stop Anchorage
Otoscope (ears)	1	Pet Stop Anchorage
Oxygen tank	1	Alaska Zoo
Pipettes (50 count)	1 bag	ACS warehouse Deadhorse tote # 370
Scalpel/blades	1	Pet Stop Anchorage
Scissors	1 each	ACS warehouse Deadhorse tote # 370 and Pet Stop Anchorage
Sharps container (biohazard disposal)	1	ACS warehouse Deadhorse tote # 370
Sterile water for injection (25 count)	1	ACS warehouse Deadhorse tote # 370
Stethoscope	1	ACS warehouse Deadhorse tote # 370

Stomach tube (large)	3	ACS warehouse Deadhorse tote # 370
Stomach tube (medium)	1	ACS warehouse Deadhorse tote # 370
Stomach tube (small)	1	ACS warehouse Deadhorse tote # 370
Surgical blades (100 count)	1 box	ACS warehouse Deadhorse tote # 370
Surgery forceps, adson brown – thumb	1	Pet Stop Anchorage
Surgery forceps, kelly clamps	1	Pet Stop Anchorage
Surgery forceps, mosquito clamps	1	Pet Stop Anchorage
Surgery forceps, tissue – thumb	4	ACS warehouse Deadhorse tote # 370
Surgical cap	12	Pet Stop Anchorage
Surgical drapes	1 box	Pet Stop Anchorage
Surgical mask	1 box	Pet Stop Anchorage
Surgical sponges	12	Pet Stop Anchorage
Surgical sterilizing (huck) towels	12	Pet Stop Anchorage
Suture kit	4	ACS warehouse Deadhorse tote # 370
Syringes, 1 ml	1 box	ACS warehouse Deadhorse tote # 370
Syringes, 3 ml (100 count)	1	ACS warehouse Deadhorse tote # 370
Syringes, 6 ml	1 box	ACS warehouse Deadhorse tote # 370
Syringes, 12 ml (50 count)	2	ACS warehouse Deadhorse tote # 370
Syringes, 20 ml (25 count)	4	ACS warehouse Deadhorse tote # 370
Syringes, 60 ml (20 count)	3	ACS warehouse Deadhorse tote # 370
Tape measure (120’)	1	ACS warehouse Deadhorse tote # 370
Tape, medical	1 box	Pet Stop Anchorage
Test tube rack	1	ACS warehouse Deadhorse tote # 370
Thermometers	4	ACS warehouse Deadhorse tote # 370
Urinalysis reagent sticks	1 bottle	ACS warehouse Deadhorse tote #

		370
Vacutainers, lavender, 3 ml	1 lot	ACS warehouse Deadhorse tote # 370
Vacutainers, red and gray, 8.5 ml	1 lot	ACS warehouse Deadhorse tote # 370
Vacutainers, red top, 7 ml	1 lot	ACS warehouse Deadhorse tote # 370
Vet test purple tube, 1.3 ml (100 count)	1 bag	ACS warehouse Deadhorse tote # 370
Vet wrap, 2"	1 box	ACS warehouse Deadhorse tote # 370
Wash table	2	Alaska Zoo
Necropsy equipment and supplies	Amount	Location
Aluminum foil (150 sq. ft.)	2	ACS warehouse Deadhorse tote # 371
Body bags	23	ACS warehouse Deadhorse tote # 518
Coolers (small size for samples)	4	MMM warehouse Anchorage
Cryotubes (tissue/blood archive storage in ultra-cold freezer)	1 bag	MMM warehouse Anchorage
Cutting boards	2	ACS warehouse Deadhorse tote # 372
Digital scale	1	ACS warehouse Deadhorse tote # 372
Food scale (hanging type)	1	ACS warehouse Deadhorse tote # 372
Forceps (Brown adson)	4	MMM warehouse Anchorage
Formalin (buffered)	1 gallon	ACS warehouse Deadhorse tote # 371
Formalin spill kit	1	ACS warehouse Deadhorse tote # 518
Hazmat bags, 33" x 60"	24	ACS warehouse Deadhorse tote # 518
Gigle wire (sawing bone)	1	Pet Stop Anchorage
Gigle wire handles	2	Pet Stop Anchorage
Hazmat bags, 6" x 9" (500 count)	1 box	ACS warehouse Deadhorse tote # 518
Hemostats	5	ACS warehouse Deadhorse tote # 370
Knives	1 set	ACS warehouse Deadhorse tote #

		370
Sample bags, 18 oz. (500 count)	1	ACS warehouse Deadhorse tote # 370
Sample jars, plastic, 16 oz	6	ACS warehouse Deadhorse tote # 370
Sample jars, plastic, 60 ml	4	ACS warehouse Deadhorse tote # 370
Sample jars, clear, 500 ml (12 count)	2	ACS warehouse Deadhorse tote # 370
Sample jars, I-CHEM	24	MMM warehouse Anchorage
Scalpel handle and blades	7 handles, 1 box blades	ACS warehouse Deadhorse tote # 370
Scissors, 7 3/4" (post mortem)	2	ACS warehouse Deadhorse tote # 370
Scrub care, Exidine	1 bottle	ACS warehouse Deadhorse tote # 370
Slides, microscope, cover slips, holders	3 boxes	ACS warehouse Deadhorse tote # 370
Stainless steel bowls	5	ACS warehouse Deadhorse tote # 371
Whirlypacs	1 bag	MMM warehouse Anchorage
Ziplock bags, quart and gallon size	1 box each	ACS warehouse Deadhorse tote # 370

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Appendix 8. Assessment Record for Oiled/Orphaned Polar Bears

Bear ID _____ Ear tag # _____ Collar # _____ Tatoo # _____

Date _____ Capture location (GPS/map) _____ Capture Time _____

Capture staff: _____

Sex: M ___ F ___ UNK ___ Age: _____ How determined _____

Weight _____ Actual or Estimate? (circle one)

Immobilized? (check one) No ___ Yes ___ (see Capture Form for drug delivery doses and times)

Method of transport _____ Transport duration: _____

Degree of body oiling: (circle one) Heavy (>60%) Moderate (30-60%) Light (<30%)

Behavior at arrival: (circle one) Agitated Aggressive Comatose Lethargic Panting Shivering Other _____

Ingestion of oil? Observed ___ Suspected ___ Why? _____

Inhalation of oil? Observed ___ Suspected ___ Why? _____

Body Condition Score (1-5) _____

Condition: This is a subjective determination of bear's body condition based on assessment of body fat as follows:

1	2	3	4	5
				
				
POOR	FAIR	GOOD	EXCELLENT	OBESE
Appears emaciated, pelvis and scapulae protruding, ribs easily palpated. A deep hollow will be noted between the pelvis and last rib showing virtually no fat.	Bear obviously thin, pelvis easily palpated, ribs also felt on palpation, but having some muscle covering them. The hollow between the pelvis and last rib obvious, but softer.	Body is fully fleshed out. Obvious fat is present over pelvis and shoulders, ribs less obvious. The hollow between the pelvis and last rib absent.	Bear has a rounded or blocky appearance, very well fleshed over all bony areas, obvious fat over rump and shoulders.	Bear is strikingly obese, legs appear too short for the body, rolls of fat on neck and lower shoulders.

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PHYSICAL EXAM

SYSTEM	NORMAL	ABNORMAL	COMMENTS
Integumentary (skin)			
Circulatory			Heart rate = Time:
Respiratory			Respiratory rate = Time:
Ophthalmic			
Otic			
Gastrointestinal			Stool quality: hard or liquid Blood present?
Reproductive			Lactating ?
Urinary			
Musculoskeletal			
Other			Temperature = Time:

DIAGNOSTICS/SAMPLE COLLECTION

Blood: _____

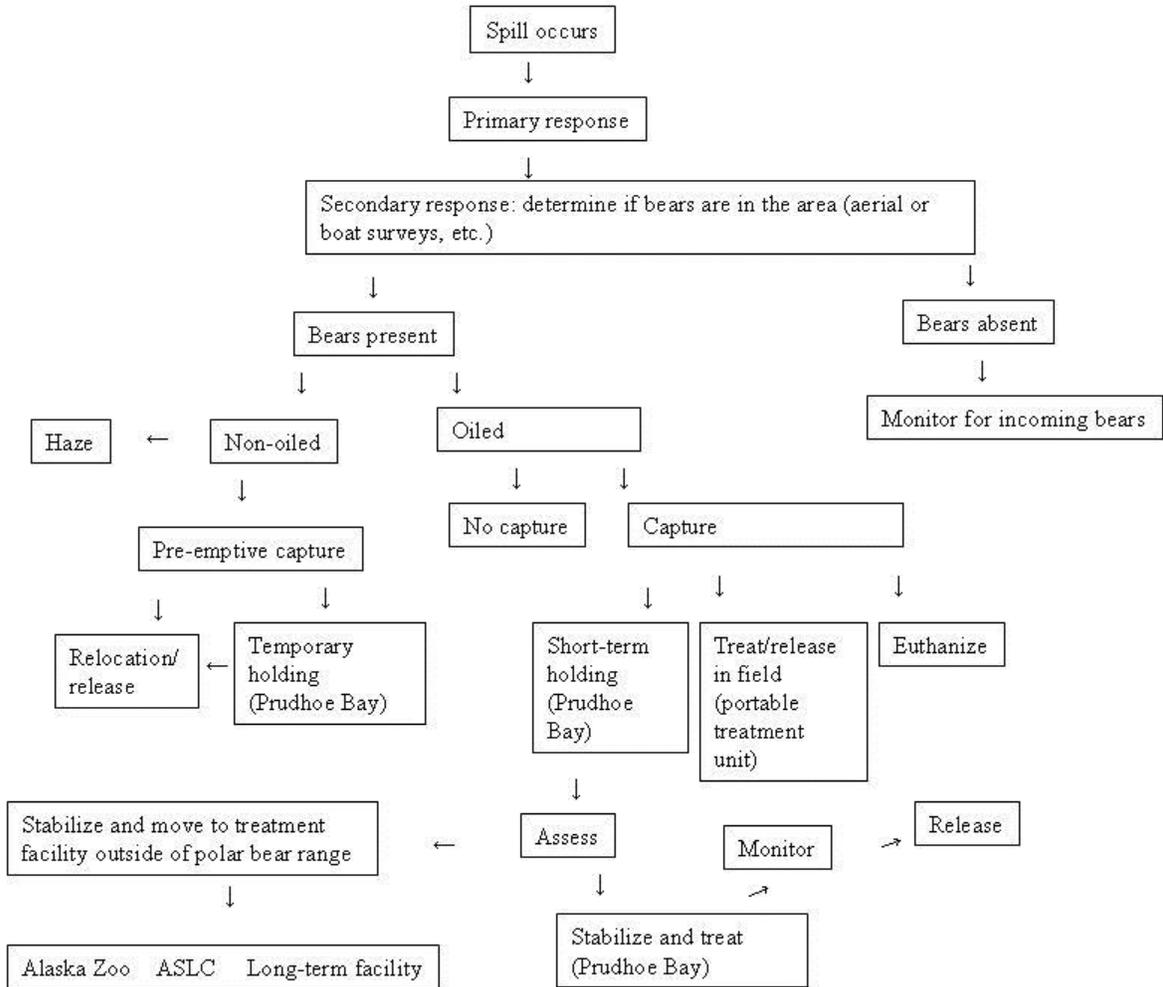
Feces: Parasite exam _____

Cultures: Rectal ____ Other Lesions (describe)_____

Other samples collected:

Veterinary Signature _____ Date _____

Appendix 10. DRAFT Decision Matrix for Polar Bear Management during an Oil Spill



Appendix 11. Natural Resources Damage Assessment Guidelines for Alaska

(to be included when they become available)