

# Cook Inlet Beluga Whale Stranding Response Plan

August 2009



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## Definitions and Acronyms

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- AKMMSN - Alaska Marine Mammal Stranding Network; members of the stranding network have either received a stranding agreement from NMFS to respond to marine mammal strandings, or have volunteered to help with stranding response activities
- AMD - Aviation Management Directorate; the federal agency that provides air transportation for NMFS stranding responses
- ASLC - Alaska SeaLife Center; a member of the stranding network that has a stranding agreement from NMFS to respond to marine mammal strandings
- ESA - Endangered Species Act; federal law defining protections and prohibited acts against threatened or endangered species
- MMPA - Marine Mammal Protection Act; federal law defining protections and prohibited acts against marine mammals or marine mammal parts
- NMFS - NOAA Fisheries/National Marine Fisheries Service; the federal agency that has management responsibility for cetaceans and pinnipeds (with the exception of walrus)
- NOAA - National Oceanographic and Atmospheric Administration; the parent organization of NMFS
- OLE - NOAA's Office of Law Enforcement; the federal agency responsible for investigating and prosecuting violations of the MMPA and the ESA
- Stranding - for the purposes of this document, a term used to describe when a beluga whale is alive but is in distress and cannot return to its natural habitat on its own (e.g., stuck in the mudflats at low tide), or is found dead either on the shore or floating in the water

## Background

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The National Marine Fisheries Service (NMFS) has management responsibility for all cetaceans and pinnipeds, with the exception of the walrus. This Stranding Plan serves as the guiding document for the NMFS Alaska Region, Protected Resources Division when responding to stranded Cook Inlet beluga whales (*Delphinapterus leucas*). NMFS will take every reasonable action to appropriately respond to strandings, while acting in the best interest of the live stranded beluga(s) to prevent mortality and limit stress, but human safety will always take precedence. If NMFS is unable to respond to a stranding in a timely manner, NMFS may appoint a member of the Alaska Marine Mammal Stranding Network (AKMMSN), who has a stranding authorization from NMFS to respond to marine mammal strandings, to act as primary responder. This plan replaces the 1993 Turnagain Arm Marine Mammal Stranding Response Plan for beluga response and is intended for internal use, but sections may be made available to the public upon approval.

Many species of marine mammals are residents or visitors to Cook Inlet. As such, strandings are regularly reported in Cook Inlet. Marine mammals observed in Cook Inlet include beluga whales, harbor seals, killer whales, harbor porpoise, humpback whales, minke whales, Steller sea lions, and sea otters. Except for beluga whales, harbor seals and sea otters, these other marine mammals are thought to be seasonal visitors, journeying into the upper Inlet to feed. The most common strandings of a NMFS species<sup>1</sup> involve beluga whales, hence this plan focuses only on beluga whale stranding response. Live beluga strandings in the upper Inlet tend to occur during the ice-free months (May through October) as a result of the extreme tidal ranges, extensive tidal flats, and treacherous currents. Unlike stranding events in other parts of the country, where whales may show a deliberate purpose in coming ashore, the belugas in upper Cook Inlet are believed to live strand accidentally on low tides, thus their chances for survival are often very good. Given this, our primary emphasis in these live stranding events is to minimize stress or injury to the belugas until they can re-enter the waters with the incoming tide. Under extreme circumstances, smaller belugas could be transported to another location suitable for immediate release, or if deemed necessary, to a rehabilitation facility for release at a later date.

The beluga whale is a small, toothed whale in the family Monodontidae. Belugas are also known as “white whales” because of the white coloration of the adults. Calves are born in the summer and remain with their mothers for about 24 months. Calves are born dark gray to brownish gray and become lighter with age. Adults generally become white to yellow-white at sexual maturity. Belugas may live 60 or more years. Some Cook Inlet beluga whales may reach 20 feet in length, although the average adult size is 12-14 feet. Male belugas are larger than females of the same age; males weigh up to 3,300 pounds and females about 3,000 pounds. Belugas feed on a wide variety of organisms, but salmon and eulachon make up the bulk of their spring and summer diets. From satellite tagging data, we know that beluga whales remain in the upper Inlet, including Knik and Turnagain Arms, throughout the year. Population abundance surveys conducted in June 2008 resulted in an estimate of 375 beluga whales in Cook Inlet. In 2008, there were two reported live mass strandings (involving approximately 30 and 20 whales, respectively), and 11 confirmed dead strandings (one of which was attributed to killer whale predation).

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<sup>1</sup> Sea otters strand frequently in lower Cook Inlet, but are under the jurisdiction of the US Fish and Wildlife Service. As such, they will not be referenced further in this document.

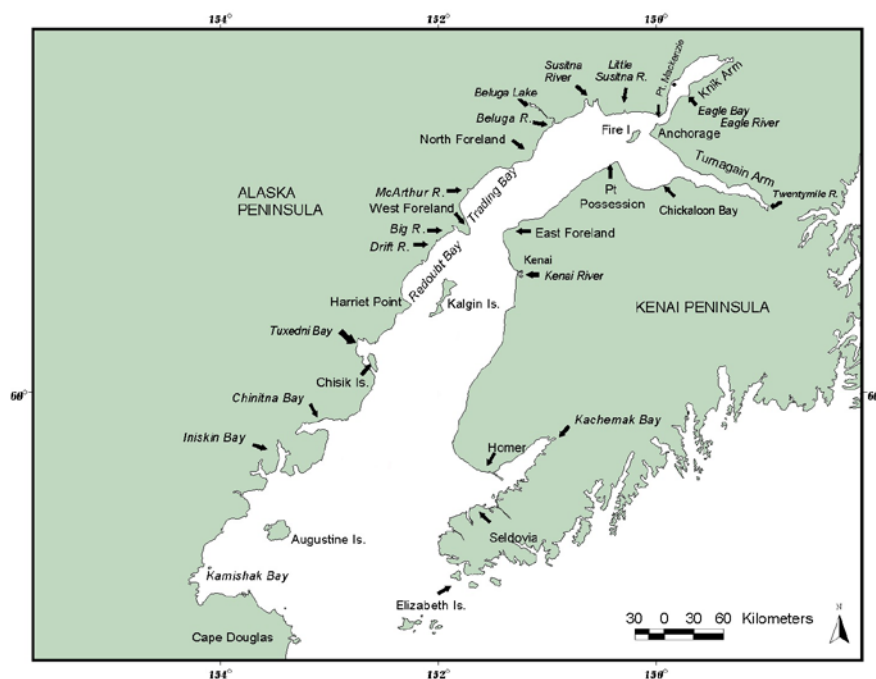
## Description of Cook Inlet

Cook Inlet is a semi-enclosed tidal estuary located in southcentral Alaska. The Inlet is approximately 370 km in length and extends in a northeast/southwest orientation from Knik and Turnagain Arms in the north to the southernmost reaches of Kamishak Bay in the south (Figure 1). Cook Inlet is roughly 20,000 km<sup>2</sup>, has 1350 km of coastline and is generally divided into upper and lower regions by the East and West Forelands. For the purposes of this Stranding Plan, the southern boundary of Cook Inlet extends from Cape Douglas across to Elizabeth Island.

The bathymetry of Cook Inlet is varied and consists of shoals, canyons and mudflats. Cook Inlet is generally shallow, with most waters less than 73 m (240 ft) deep, however deeper waters exist along the channels and at the entrance to the Inlet near the Barren Islands, where depths range from 183-366 m (600-1200 ft). During low tides, mudflats constitute large areas of shoreline in Knik and Turnagain Arms, Chickaloon Bay, the Susitna River Delta (encompassing the Little Susitna River across to the Beluga River), Trading Bay, and Redoubt Bay.

Cook Inlet experiences some of the greatest tidal fluctuations in the world, with differentials between high and low tides reaching as much as 12 m (39 ft) in extreme cases. These large tidal ranges combined with broad tidal flats can result in currents reaching 6.2 m/s, with significant changes to shorelines. In the summer, a large volume of freshwater enters Cook Inlet from numerous major river drainages and glacial outflows, including the Knik, Matanuska, and Susitna rivers, as well as from smaller coastal streams. These sources all deposit considerable amounts of sediment into Cook Inlet. The strong tidal currents suspend these sediments in the water and carry them throughout the Inlet. Coupled with the tidal effects and shoreline erosion, Cook Inlet waters are a highly turbid, low visibility environment.

In winter months ice fills much of upper Cook Inlet. Rivers begin to freeze in October and November and the waters of upper Cook Inlet generally freeze early in December. The large amounts of freshwater entering the Knik and Turnagain Arms contribute to the relatively higher concentrations of ice in the upper Inlet. Ice breakup in the Inlet typically begins between March and May.



## **Overview of Causes and Effects of Strandings on Cook Inlet Belugas**

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The term stranding in regards to belugas refers to whales that are found in waters too shallow to permit them to swim, belugas that are found out of their natural habitats, or dead belugas floating or beached. Belugas generally live strand either accidentally (e.g., they come into shallow water to avoid killer whale predation or while chasing prey and strand as the tide recedes), or as a result of injury, disease, illness, or other natural causes. For the purposes of this discussion, “strandings” will refer to whales that are found alive, and “dead strandings” will refer to whales that are found dead.

Typically, there are several reasons that a cetacean may strand. The most commonly attributed reasons are as a result of illness or injury, navigational confusion, and following a pod-leader that strands. However, while these are valid causes of strandings for most cetaceans elsewhere, they are not considered primary causes of strandings in Cook Inlet. The extreme tidal fluctuations in upper Cook Inlet and the belugas’ preferences for shallow coastal waters can predispose belugas to strandings. Belugas in Cook Inlet may also strand purposely or accidentally to avoid predation by killer whales. Two stranding events in the upper Inlet have coincided with killer whale sightings (1999 and 2008), and NMFS has examined stranded Cook Inlet beluga whales that had evidence of killer whale predation. In addition, belugas whales in Canada are known to intentionally strand themselves during the molting process, while rubbing their skin against rocky bottoms.

It is generally accepted that coastal cetaceans are familiar with their near-shore environment, and thus usually strand only when ill or perhaps orphaned, although they may be occasional victims of an outgoing tide. Unless it’s a simple case of refloating, their only reasonable chance for survival is in a care facility. Even then, such efforts may simply postpone the animal’s death while depleting the facility’s resources and unduly risking the safety of the responders and rehabilitators.

Once a beluga whale strands, death may result from stress or hyperthermia from prolonged exposure out of water, or as a result from drowning during the incoming tide. Whales stranded as a result of receding tides may be exposed for ten hours or more. Without the buoyancy provided by the water, the whale’s weight places additional pressure on internal organs which can make breathing difficult.

Unless caught in an overflow channel or tidal pond, the whales may have difficulty regulating body heat. An extensive network of blood vessels within the flukes and flippers allows beluga whales to lose excess body heat to the cold water. If the flukes and flippers are out of the water, this network cannot function properly and internal body heat rises resulting in hyperthermia. It is possible that there are other psychological and physiological stress associated with strandings. These effects may all compromise the ability of a whale to survive even if it is released with the high tide.

In areas with extreme tides and extensive mudflats, such as in Turnagain Arm, struggling animals may become bogged down and trapped in the mud, which may eventually “fix” them in place. If they cannot refloat and orient themselves with the returning tide, they may drown. In these situations, it is nearly impossible to rescue them because of the difficulties and hazards to humans posed by working in soft sediments.

## Cook Inlet Beluga Stranding Response Key

**NMFS is the lead point of contact and will coordinate all response activities. All stranding network members MUST notify and respond through NMFS.**

1	NMFS receives a call regarding a live beluga stranding	Go to 2
	NMFS receives a call regarding a dead beluga stranding	Go to 5
2	NMFS AKR Stranding Coordinator determines the environmental conditions are SAFE FOR HUMANS to respond (considering tides, weather, and location of whales, etc.)	Go to 3
	NMFS AKR Stranding Coordinator determines the environmental conditions are UNSAFE FOR HUMANS to respond (considering tides, weather, and location of whales, etc.)	Go to 9
3	The number of Responders available is less than 2	Go to 9
	The number of Responders available is at least 2	Go to 4
4	The time available to spend <i>with the whales</i> is < 45 minutes	Go to 9
	The time available to spend <i>with the whales</i> is 45-60 minutes	Go to 6
	The time available to spend <i>with the whales</i> is > 60 minutes	Go to 7
5	NMFS AKR Stranding Coordinator determines the environmental conditions are SAFE FOR HUMANS to respond (considering tides, weather, and location of carcass, etc.)	Go to 8
	NMFS AKR Stranding Coordinator determines the environmental conditions are UNSAFE FOR HUMANS to respond (considering tides, weather, and location of carcass, etc.)	Go to 9
6	A response may be authorized. If so, provide supportive care first. Collect basic data on all belugas and then intermediate level data if time allows.	Go to page 7 "Live Stranding Response"
7	A response may be authorized. If so, provide supportive care first and then collect basic and intermediate level data on all belugas. If a veterinarian is in attendance, also collect advanced data and apply tags (if authorized) to select individuals if time allows.	Go to page 7 "Live Stranding Response"
8	A response may be authorized. If so, collect data as detailed in Appendix A "Dead Beluga Sampling Protocols".	Go to page 11 "Dead Stranding Response"
9	No response is authorized. Monitoring from a safe distance and aerial photographs (from no less than 1000 feet for live strandings) are allowed.	

### BASIC DATA

- \* each animal uniquely marked with a grease pencil/meat marker
- \* photos of each whale, both sides, with measurements
- \* group photos
- \* skin samples for each whale
- \* Level A form

### INTERMEDIATE DATA

- \* blowhole/lesion swabs
- \* regurgitant samples
- \* fecal samples

### ADVANCED DATA

- (if have NMFS permits)
- \* complete health assessment on select whales
- \* tags on select whales

## Live Cook Inlet Beluga Stranding Response

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### STRANDING RESPONSE AUTHORIZATION

- NMFS is the response coordinator/Incident Commander
- AUTHORIZATION FOR ANY RESPONSE TO A COOK INLET BELUGA WHALE MUST BE APPROVED BY A NMFS ALASKA REGIONAL OR HQ STRANDING COORDINATOR (ESA requirement)
  - if contact with a NMFS AKR/HQ stranding coordinator cannot be made, the only actions allowed are photographs and monitoring
    - attempt to photograph the beluga(s) from a safe location or during a flyover no lower than 1000 feet (designated NMFS personnel may use AMD flight funds; Alaska Seal Life Center (ASLC) has own funding)
    - count the number of belugas involved and fill out basic information as available on a Level A report form
    - monitor the situation from a safe distance until
      - the beluga(s) refloats and swims away
      - the beluga(s) dies and carcass is left onsite or floats away
    - provide details to an AKR stranding coordinator as soon as possible

### PRE-RESPONSE ACTIVITIES

- NMFS will attempt to verify the report (via flyover or driveby)
  - if NMFS is unable to verify due to logistical reasons, NMFS will contact NOAA Fisheries Office of Law Enforcement (NOAA OLE) or a member of the AKMMSN to attempt a verification as soon as possible
  - if no reliable verification is made, NMFS may document the report but may not count the report in the mortality total, depending on the reliability of the report and the level of effort made (an explanation of why the report wasn't included in the mortality total will be included in the documentation)
- upon verification:
  - NMFS will notify NOAA OLE
    - NOAA OLE will notify other local authorities as necessary (e.g., local law enforcement if beluga's presence may draw a crowd and disrupt traffic; Alaska Railroad if beluga is near railroad tracks)
  - NMFS will notify an experienced veterinarian to assist in response if the beluga(s) is beached in an accessible and safe location
  - NMFS will coordinate travel to the stranding site (i.e., contact AMD for helicopter use if location is not road accessible in a reasonable amount of time)

### ON-SITE ACTIVITIES

- NMFS staff will be on-site to coordinate response efforts, but may assign an AKMMSN member to supervise until NMFS can arrive at the stranding location
- NMFS may delegate AKMMSN members or competent members of the public to assist in varying roles
- see Stranding Response Key for general response guidelines
- if the beluga is beached in an inaccessible or unsafe area, NMFS (or an assigned AKMMSN member) will
  - attempt to photograph the cetacean(s) from a safe location or during a flyover
  - count the number of belugas involved and fill out information as available and requested on a Level A report form



- monitor the situation from a safe distance until
  - the beluga(s) refloats and swims away
  - the beluga(s) dies and carcass is left onsite or floats away
- if the beluga is beached in an accessible area safe for human intervention:
  - NMFS will work with the veterinarian to ascertain the cause of the stranding (e.g., tides, predation, entanglement, oil spill, shooting, boat strike) and determine actions (e.g., do nothing; attend to whale; attempt to remove gear; euthanasia...)
    - if no veterinarian is available, then NMFS will ascertain the cause of the stranding and determine actions
    - if beluga is entangled see Appendix B: Entanglement Information
    - if beluga is involved in an oil spill see Appendix C: Oil Spill Information
  - NMFS, the veterinarian and the AKMMSN (if available) will collect basic measurements and biological samples, and provide supportive care (see SUPPORTIVE CARE and DATA COLLECTION below), while minimizing unnecessary harassment
    - for mass strandings - the status of each beluga will be assessed individually; depending on the number of belugas stranded, separate teams may be formed to expedite the assessment and biological sampling process (if personnel available)
  - decision to euthanize will be made by a NMFS AKR Stranding Coordinator in consultation with experienced veterinarian(s) after an assessment of the beluga's health has been completed
    - see also Appendix D: Euthanasia Considerations
    - only experienced veterinarians may perform the euthanasia
    - under extreme, rare cases, and upon NMFS recommendation, a beluga may be transported to the ALSC for rehabilitation
  - if beluga dies or is euthanized, necropsy or sample collection should be performed as described in Appendix A: Dead Beluga Sampling Protocols; the carcass should be disposed of as described in the Dead Beluga Stranding Response section below
  - NMFS or veterinarian will complete a Level A stranding form and disperse samples as necessary
- NMFS will document and report any signs of human interaction (e.g., entanglement; gun shot; propeller wounds) to NOAA OLE

## **SUPPORTIVE CARE**

- all live animals should be given supportive care IF a response is warranted and authorized
- upon approval by AKR Stranding Coordinator, specific members of the AKMMSN may monitor respiratory rates and behavior until NMFS arrives
  - no other activities should be attempted by volunteers unless NMFS is onsite and approves other activities
  - volunteers should never approach or attempt to move a beluga
  - NOAA OLE should be contacted to assist with prevention of bystanders approaching the whales
- when approaching a whale,
  - advance slowly, calmly, and cautiously from the front or side
  - avoid loud sounds, abrupt movements, or bright lights
  - avoid approaching from behind the dorsal ridge - this region is the danger zone and you may get hurt by the flukes if the animal thrashes suddenly
  - avoid unnecessary touching and keep voices quiet

- if an AKR Stranding Coordinator is onsite, the following supportive care may be provided:
  - “right” any whales on their sides, paying close attention to the location and position of their flippers so as to not damage them
    - dig holes around the flippers and fluke to allow for a more natural position
  - protect against the elements
    - gently rinse eyes with water if there is sand in them
    - sunburn and hyperthermia are issues on hot sunny days
      - cover with a damp, light colored sheet - don’t cover the blowhole, head, fluke or flippers
      - apply zinc oxide - keep away from eyes and blowhole
      - keep whale moist
        - apply water slowly and gently to avoid startling the whale
        - apply water after a breath to avoid getting water in the blowhole
        - fill holes around fluke and flippers with water to help keep whale cool
    - hypothermia is an issue on cold windy days
      - create a barrier to the wind if possible
      - dig holes in the sand around the flukes and flippers and cover with cloth soaked in vegetable or mineral oil (do not put water in the holes)

## DATA COLLECTION

- NMFS will assign people to complete the following tasks as time and conditions allow
  - Basic Data
    - draw a quick map of the stranded group with clusters of whales indicated by circles or boxes. Choose a start point and begin working through the group from one edge.
    - mark each individual on the back near the dorsal ridge with a unique number using a meat marker or grease pencil; identify all samples with this number, indicate location of number on map.
    - photograph the group(s) and each individual whales for photo-id if possible
      - for individual photos, take a straight-on photo of each side of the whale; include a measurement guide in each photo
      - also photograph scars, injuries, lesions, or parasites
    - note and photograph any human related injuries
      - gear entanglement or fresh net wounds
      - propeller wounds
      - gunshot
    - collect a skin sample from every whale (if possible) via punch biopsy (avoid head, tail and flukes)
  - Baseline Data (every 10-15 minutes)
    - From the Basic data collected above select a sub sample of the group for monitoring. Choose 3 or 4 whales of different sizes per available monitor. The monitor should then rotate among these whales collecting the following data on each in turn.
    - behavior
      - alert (aware and responsive to environmental stimuli)
      - weakly responsive (responsive only after much stimulation)

- non-responsive (not responding to noise or touch; e.g., no blink reflex)
- test
  - blink reflex - gently tapping next to the eye should elicit a blink
  - muscle control - attempts to pry open jaw, pull the tongue, or pulling the flipper forward should be met with resistance
  - capillary refill - pressing on the gums should briefly turn them pale; normal color should return in less than 2 seconds
- arching of back (head and fluke up) is a sign of poor health
  - note the frequency and degree of arches; do they change over time
- respiration
  - count respirations for two minutes
    - 2-6 breathes per minute is normal for a stressed beluga
    - more than 6 breathes per minutes is questionable
  - note the rate of breathing
    - rhythm should be even, short and crisp
    - long and drawn out breaths are signs of a fatigued animal
  - note characteristics
    - chuffs may be an aggressive warning
    - not normal - harsh; gurgling; sputtering; leaking of air
    - blood or froth from the blowhole are signs of poor health
  - note odor of breath
    - fishy is normal
    - very sweet or very foul are not normal
- heart rate
  - feel area under pectoral fin for pulse
  - count for 1 min, or 15 seconds and multiply by 4
  - note rhythm (regular vs. erratic)
- temperature
  - feel the edge of the pectoral flippers or flukes and get a qualitative assessment (hot, warm, cool, cold)
  - note how temperature changes over time
- Intermediate Data
  - swab blowholes and lesions for bacterial and viral studies
  - collect fecal samples for domoic acid tests and any regurgitant
- Advanced Data (if authorized with appropriate NMFS permits)
  - a veterinarian may draw blood and conduct health assessments on select whales
  - tag whales for follow-up/survival surveys
    - NMFS authorization/permit required
    - only experienced or trained personnel may participate
    - NMFS and veterinarian will determine which whale(s) to tag and the type of tag used

## **Dead Cook Inlet Beluga Stranding Response**

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### **STRANDING RESPONSE AUTHORIZATION**

- NMFS is the response coordinator/Incident Commander
- AUTHORIZATION FOR ANY RESPONSE TO A COOK INLET BELUGA WHALE MUST BE APPROVED BY A NMFS ALASKA REGIONAL OR HQ STRANDING COORDINATOR (ESA requirement)
  - if contact with a NMFS AKR/HQ stranding coordinator cannot be made, the only actions allowed are photographs
    - attempt to photograph the beluga(s) from a safe location or during a flyover no lower than 1000 feet (designated NMFS personnel may use AMD flight funds; ASLC has own funding)
    - count the number of belugas involved and fill out basic information as available on a Level A report form

### **PRE-RESPONSE ACTIVITIES**

- NMFS will attempt to verify the report (via flyover or driveby)
  - if NMFS is unable to verify due to logistical reasons, NMFS will contact NOAA OLE or the AKMMSN to attempt a verification as soon as possible
  - if no reliable verification is made, NMFS may document the report but may not count the report in the mortality total, depending on the reliability of the report and the level of effort made (an explanation of why the report wasn't included in the mortality total will be included in the documentation)
- upon verification:
  - NMFS will notify NOAA OLE
    - NOAA OLE will notify other local authorities as necessary (e.g., local law enforcement if beluga's presence may draw a crowd and disrupt traffic; Alaska Railroad if beluga is near railroad tracks)
  - NMFS will notify an experienced veterinarian to lead the necropsy if the beluga(s) is beached in an accessible and safe location
  - NMFS will coordinate travel to the stranding site (i.e., contact AMD for helicopter use if location is not road accessible in a reasonable amount of time)

### **ON-SITE ACTIVITIES**

- NMFS staff will be on-site to coordinate response efforts, but may assign an AKMMSN member to supervise until NMFS can arrive at the stranding location
- NMFS may delegate AKMMSN members or competent members of the public to assist in varying roles
- if the beluga is beached in an inaccessible or unsafe area, NMFS will
  - attempt to photograph the beluga(s) from a safe location or during a flyover
  - count the number of belugas involved, assuming multiple dead belugas
  - fill out basic information as available and requested on a Level A report form
  - leave the beluga(s) where it was found
- if the belugas is beached in an accessible and safe area
  - NMFS may assign NOAA OLE or an AKMMSN member to supervise until NMFS can arrive at the stranding location,
  - NMFS may assign NOAA OLE, AKMMSN, or reporting party to secure the beluga to the shore to prevent it floating away
  - NMFS will coordinate safe travel to the stranding location
  - NMFS will contact an experienced veterinarian to conduct a necropsy

- if an experienced veterinarian is not available and will not be available in a reasonable timeframe, NMFS staff will attend to the carcass and collect appropriate samples (see Appendix A: Dead Beluga Sampling Protocols)
- for mass strandings, separate teams may be formed to expedite the necropsy and biological sampling process
- NMFS or the veterinarian will complete a Level A report form and disperse samples as appropriate
- if the dead beluga is floating, and it is safe to do so, NMFS may tow the dead beluga by boat to a safe beach and coordinate the aforementioned activities
- NMFS will document and report any signs of human interaction (e.g., entanglement; gun shot; propeller wounds) to NOAA OLE

### **CARCASS DISPOSAL OPTIONS**

- Always remove the skull to prevent ESA violations by the general public
  - the University of Alaska's Museum of the North in Fairbanks is authorized by NMFS to collect marine mammal hard parts for scientific and educational purposes; skulls may be sent to the museum for use in their collections
- Option 1: Leave carcass where it is
  - the most often employed solution in Cook Inlet
  - allows weather, tide, and scavengers to decompose the remains
    - ensure the abdomen and thorax have been opened to allow for quicker decay and increase the likelihood of sinking if it is picked up by the tide
  - the best option in remote or uninhabited areas where human health hazards are not a concern
    - in highly populated areas a fresh specimen may draw bears to the area and present a human health hazard - if this is a concern, towing out to sea may be a better alternative
  - not an option if the whale was chemically euthanized as scavengers and humans may be poisoned as well
- Option 2: Tow carcass out to sea
  - should be relatively certain the carcass will sink before utilizing this option
  - carcass must be released far enough offshore so currents and wind will not bring it back to shore
  - must be released away from shipping lanes
- Option 3: Bury carcass
  - not a likely option
  - the carcass should be buried well above the high tide line and deep enough to prevent scavengers from digging it up or from erosion uncovering it (generally one to two meters of earth); typically requires use large equipment
  - the body cavity should be opened up to facilitate decay
- Carcasses which are a health hazard to humans or other animals should be properly buried, taken to a sanitary landfill, or destroyed by incineration.

## APPENDIX A: Dead Beluga Sampling Protocols

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### Classification of Carcass Condition and Samples to Collect from Dead Belugas

**CARCASS CODE 2** - Freshly dead, “edible” - good condition; fresh odor; no bloating; minimal drying and wrinkling of skin, eyes or mucous membranes; muscles firm; blubber firm and white or yellow; internal organs intact and can be removed easily; very little scavenger damage



**CARCASS CODE 3** - Moderate Decomposition - fair condition; mild odor; carcass intact; slight bloating; tongue or penis may protrude; some skin sloughing and cracking; eyes sunken or missing; blubber may be blood-tinged; muscles soft or poorly defined; gut distended by gas; all internal organs including liver still have gross integrity but are soft

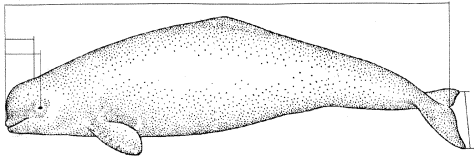


**CARCASS CODE 4** - Advanced Decomposition - poor condition; often strong odor; bloated; missing patches of skin; muscles nearly liquefied or easily torn, falling off bones; blood thin and black; internal organs show lack of integrity and are mushy; blubber with gas pockets and pooled oil; often severe scavenger damage; gut gas filled

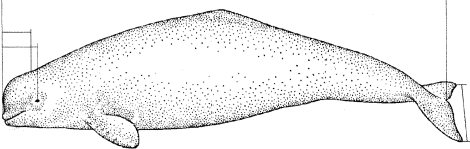


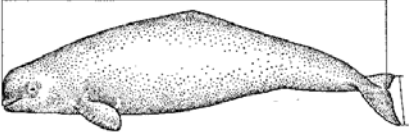
**CARCASS CODE 5** - Severe Decomposition - mummified; skeletal; skin may be draped over remains



√	<b>Carcass CODE 2 or CODE 3 - Samples to Collect (if possible)</b>	
<b>Photos (with ruler and animal ID in every shot)</b>		
	<ul style="list-style-type: none"> <li>• general body condition</li> <li>• signs of human interaction</li> <li>• visible lesions</li> <li>• blubber condition</li> </ul>	<ul style="list-style-type: none"> <li>• internal structures</li> <li>• teeth and mouth</li> <li>• anything unusual, parasites, hemorrhages, etc</li> <li>• lateral shots for photo-id (like Code 2 photo)</li> </ul>
<b>Measurements (cm)</b>		
	<ul style="list-style-type: none"> <li>• snout to center of blowhole _____ cm</li> <li>• snout to center of eye _____ cm</li> <li>• snout to fluke notch _____ cm</li> <li>• width of fluke _____ cm</li> <li>• thickness of blubber (w/o skin) at: <ul style="list-style-type: none"> <li>▶ dorsal ridge _____ cm</li> <li>▶ side of body _____ cm</li> <li>▶ ventral surface _____ cm</li> </ul> </li> </ul>	
<b>Swabs (HIGH priority)</b>		
	<ul style="list-style-type: none"> <li>• 3 each - blowhole, anus, lesions</li> </ul>	FREEZER
<b>Skin (HIGH priority)</b>		
	<ul style="list-style-type: none"> <li>• 2 samples - ½ cm<sup>2</sup> size piece; place in separate DMSO vials</li> </ul>	
<b>Blubber</b>		
	<ul style="list-style-type: none"> <li>• 1" wide strip; dorsal ridge to ventral surface; skin to muscle; in plastic bag (<b>HIGH priority</b>)</li> <li>• 3x3 cm; ½ cm thick; labeled individually and placed in the formalin jar</li> <li>• 5x5" piece; if Code 2 = in ziploc; if Code 3 = wrapped in foil</li> </ul>	FREEZER
<b>Stomach (HIGH priority)</b>		
	<ul style="list-style-type: none"> <li>• keep stomach intact and place whole stomach in a large plastic bag</li> </ul>	FREEZER
<b>Intestine</b>		
	<ul style="list-style-type: none"> <li>• 3x3 cm; ½ cm thick; labeled individually and placed in the formalin jar</li> </ul>	
<b>Kidney</b>		
	<ul style="list-style-type: none"> <li>• whole kidney; in plastic bag</li> <li>• 3x3 cm; ½ cm thick; labeled individually and placed in the formalin jar</li> <li>• 5x5" piece; if Code 2 = in ziploc; if Code 3 = wrapped in foil</li> <li>• sample in cryovial - ¾ full</li> </ul>	FREEZER
<b>Liver</b>		
	<ul style="list-style-type: none"> <li>• 3x3 cm; ½ cm thick; labeled individually and placed in the formalin jar</li> <li>• 5x5" piece; if Code 2 = in ziploc; if Code 3 = wrapped in foil</li> <li>• sample in cryovial - ¾ full</li> </ul>	FREEZER
<b>Reproductive Organs</b>		
	<ul style="list-style-type: none"> <li>• female reproductive organs; large plastic bag (DO NOT FREEZE - ON ICE OK)</li> <li>• sample in cryovial - uterus or testes - ¾ full</li> </ul>	REFRIG
<b>Heart</b>		
	<ul style="list-style-type: none"> <li>• 3x3 cm; ½ cm thick; labeled individually and placed in the formalin jar</li> <li>• sample in cryovial - ¾ full</li> </ul>	FREEZER
<b>Muscle</b>		
	<ul style="list-style-type: none"> <li>• 3x3 cm; ½ cm thick; labeled individually and placed in the formalin jar</li> <li>• sample in cryovial - ¾ full</li> </ul>	FREEZER
<b>Eye</b>		
	<ul style="list-style-type: none"> <li>• place entire eye in sterile whirlpack</li> </ul>	FREEZER
<b>Tongue</b>		
	<ul style="list-style-type: none"> <li>• place a softball size piece in a Ziploc</li> </ul>	FREEZER
<b>Lung</b>		
	<ul style="list-style-type: none"> <li>• 3x3 cm; ½ cm thick; labeled individually and placed in the formalin jar</li> <li>• whole lung; plastic bag</li> </ul>	FREEZER
<b>Feces/Urine</b>		
	<ul style="list-style-type: none"> <li>• feces - 4 mL in plastic screw top vial</li> <li>• urine - 4 mL in plastic screw top vial</li> </ul>	FREEZER
<b>Miscellaneous Lesions/Oddities</b>		
	<ul style="list-style-type: none"> <li>• 3x3 cm; ½ cm thick; labeled individually and placed in the formalin jar</li> </ul>	
<b>Lower jaw (HIGH priority)</b>		
	<ul style="list-style-type: none"> <li>• entire lower jaw; keep teeth intact; large plastic bag</li> </ul>	FREEZER



√	<b>Carcass CODE 4 - Samples to Collect (if possible)</b>	
Photos (with ruler and animal ID in every shot)		
	<ul style="list-style-type: none"> <li>• general body condition</li> <li>• signs of human interaction</li> <li>• visible lesions</li> <li>• blubber condition</li> </ul>	<ul style="list-style-type: none"> <li>• internal structures</li> <li>• teeth and mouth</li> <li>• anything unusual, parasites, hemorrhages, etc</li> <li>• lateral shots for photo-id (like Code 2 photo)</li> </ul>
Measurements (cm)		
	• snout to center of blowhole _____ cm	
	• snout to center of eye _____ cm	
	• snout to fluke notch _____ cm	
	• width of fluke _____ cm	
Skin ( <b>HIGH priority</b> )		
	• 2 samples - 1/2 cm <sup>2</sup> size piece; place in separate DMSO vials	
Stomach ( <b>HIGH priority</b> )		
	• keep stomach intact and place whole stomach in a large plastic bag	FREEZER
Kidney		
	• whole kidney; in plastic bag	FREEZER
	• sample in cryovial - 3/4 full	FREEZER
Liver		
	• sample in cryovial - 3/4 full	FREEZER
Reproductive Organs		
	• sample in cryovial - uterus or testes - 3/4 full	FREEZER
Heart		
	• sample in cryovial - 3/4 full	FREEZER
Muscle		
	• sample in cryovial - 3/4 full	FREEZER
Eye		
	• place entire eye in sterile whirlpack	FREEZER
Lung		
	• whole lung; plastic bag	FREEZER
Lower jaw ( <b>HIGH priority</b> )		
	• entire lower jaw; keep teeth intact; large plastic bag	FREEZER

√	<b>Carcass CODE 5 - Samples to Collect (if possible)</b>	
Photos (with ruler and animal ID in every shot)		
	<ul style="list-style-type: none"> <li>• general body condition</li> <li>• signs of human interaction</li> <li>• anything unusual, parasites, hemorrhages, etc</li> </ul>	
Measurements (cm)		
	• snout to fluke notch _____ cm	
	• width of fluke _____ cm	
Skin ( <b>HIGH priority</b> )		
	• 2 samples - 1/2 cm <sup>2</sup> size piece; place in separate DMSO vials	
Lower jaw ( <b>HIGH priority</b> )		
	• entire lower jaw; keep teeth intact; large plastic bag	FREEZER

**SHIPPING INFO FOR SAMPLES**

**▶▶ CALL RECIPIENT PRIOR TO SHIPPING TO CONFIRM INFORMATION ◀◀**

Work with Carrie Williams for scheduling of and payment for shipping.

**DMSO Vial/Skin**

Kelly Robertson, NOAA Fisheries, SWFSC  
3333 N. Torrey Pines Ct  
La Jolla, CA 92037  
(858) 546-7182

Greg O'Corry-Crowe  
Harbor Branch Oceanographic Institute  
Molecular and Behavioral Ecology  
5600 U.S. 1 North  
Ft. Pierce, FL 34946  
772-465-2400 x 628

**Cryovials and Skull**

Link Olson, UAF Museum  
PO Box 756960  
907 Yukon Dr  
Fairbanks, AK 99775-6960  
907-474-6946

**Blubber Strip**

David Herman, NOAA Fisheries, NWFSC  
2725 Monk Lake Blvd. East  
Seattle, WA 98112  
206-860-3300

**Plastic Vials of Feces/Urine\***

Elizabeth Frame, NOAA Fisheries  
EC Division  
2725 Montlake Blvd. East  
Seattle, WA 98112  
(206) 302-2402  
*\*mark on box "Freeze Immediately upon arrival"*

**5x5" samples in Ziploc/Teflon**

Paul Becker - AMMTAP/NIST  
Hollings Marine Laboratory  
331 Fort Johnson Rd  
Charleston, SC 29412  
843-762-8861

**Stomach**

Lori Quakenbush, ADFG  
1300 College Rd  
Fairbanks, AK 99701-1599  
907-456-7214

**Tongue**

Lara Dehn, UAF  
School of Fisheries and Ocean Sciences  
905 N. Koyukuk Dr.  
Fairbanks, AK 99775-7220  
907-474-7724  
*can ship with stomach to Lori for Lara to pickup*

**Eye**

John Reynolds  
Mote Marine Laboratory  
1600 Ken Thompson Pkwy  
Sarasota, FL 34236  
941-388-4441 x 472

**5x5" samples in foil**

David Herman (or Gina Ylitalo)  
NOAA Fisheries, NWFSC  
2725 Monk Lake Blvd. East  
Seattle, WA 98112  
206-860-3300

**STORE IN NMFS WAREHOUSE:**

Hold for Dr. Kathy Burek (call her at 696-3704 to schedule pickup)

- Female Reproductive Tract - DO NOT FREEZE; store in refrigerator or on ice
- Formalin Jar - DO NOT FREEZE; keep at room temperature
- Whole Kidney - store in freezer
- Whole Lung - store in freezer
- Swabs - store in freezer

Keep for NMFS

- Lower Jaw - store in freezer

**APPENDIX B: Entanglement Information**

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**It is ILLEGAL to attempt to disentangle a free-swimming whale without a special permit issued by NMFS.** All materials recovered from entangled animals should be labeled with the animal's field number and submitted to a AKR Stranding Coordinator along with the corresponding Level A form.

*Excerpt from*  
**Conservation Plan for the Cook Inlet Beluga Whale**  
**October 2008**

The term incidental take or by-catch in regards to commercial fishing refers to the catch or entanglement of animals that were not the intended target of the fishing activity. Reports of marine mammal injuries or mortalities incidental to commercial fishing operations have been obtained from fisheries reporting programs (self-reporting or logbooks), observer programs, and reports in the literature. The only reports of fatal takes of beluga whales incidental to commercial salmon gillnet fishing in Cook Inlet are from the literature. Murray and Fay (1979) stated that salmon gillnet fisheries in Cook Inlet caught five beluga whales in 1979. Incidental take rates by commercial salmon gillnet fisheries in the Inlet were estimated at three to six beluga whales per year during 1981-1983 (Burns and Seaman 1986). Neither report, however, differentiated between the set gillnet and drift gillnet fisheries. There have been sporadic reports over the years of single beluga whales becoming entangled in fishing nets, however, mortalities could not be confirmed.

Another source of information on the number of beluga whales killed or injured incidental to commercial fishery operations is the self-reported fisheries information required of vessel operators by the MMPA. Logbook data are available for part of 1989-1994. During 1990-1993, certain fisheries were required to participate in a logbook reporting program, which provided information regarding fishing effort, interactions with marine mammals, and the outcome (deterred, entangled, injured, killed). Based on a lack of reported mortalities from the logbook program, the estimated minimum mortality rate of Cook Inlet belugas incidental to commercial fisheries is zero whales per year. Furthermore, during the period between 1990 and 2000, fishermen's voluntary self-reports indicated no mortalities of beluga whales from interactions with commercial fishing operations.

Due to a heightened concern in Cook Inlet that fisheries may cause incidental mortalities of beluga whales, NMFS placed observers in the Cook Inlet salmon drift net and upper and lower Inlet set gillnet fisheries in 1999 and 2000 (Angliss and Lodge 2002). During the two years of observations, an estimated total of 384 net-days were observed for the drift gillnet fishery, and an estimated 614 net days were observed for the set net fishery. Only three sightings of beluga whales were made at set gillnet locations in the upper Cook Inlet (Moore et al. 2000; NMFS unpubl. data). Although a few other marine mammals were entangled and released, beluga whales were never observed within 10 m of a net (i.e., within a distance categorized as an interaction) in the drift or set net fisheries; therefore no beluga whale injuries or mortalities resulted from drift gillnets or set nets in either year. In consideration of the above, the current rate of direct mortality from commercial fisheries in Cook Inlet appears to be insignificant and should not delay recovery of these whales.

**Taken from NMFS Alaska Region Website**  
**<http://www.alaskafisheries/noaa.gov/protectedresources/entanglement/htm>**

**The Threat**

The primary cause of anthropogenic mortality in humpback whales and many marine animals is entanglement in active fishing gear, derelict gear, and other types of marine debris. The International Whaling Commission recently listed by-catch as a primary concern, and it has been estimated that over 300,000 cetaceans die each year in US waters as a result of entanglements (Reid et al. 2006). The sources of these entanglements are extensive and diverse. Actively fished gear, marine debris, constituting lost or abandoned fishing gear, and non-fishery-related gear have been implicated in marine animal entanglements. Since 1998, NOAA Fisheries' Alaska Protected Resources Division has received at least 139 confirmed reports of entangled marine mammals. However, the number of entanglements is certainly much greater since many entanglements go unreported. Scar analysis done on humpback whales in northern Southeast Alaska indicated that 78% (maximal estimate) of the population have scars indicating that the animal had been recently entangled (Neilson, 2007).

**The Impact**

For many pinnipeds and small cetaceans, drowning in the gear is typically the cause of death. For large whales whose great size allows them to pull gear towards the surface and even break away from all or parts of the entangling gear to return to the surface for air, this is generally not the case. However, the risk of death still exists if the animal remains entangled. The animal may starve to death, experience physical trauma from the gear, develop infections resulting from wounds, and be susceptible to other threats like ship strikes. In addition, the impacts of entanglement may be non-lethal, as in the reduction of reproductive success.

**Disentanglement**

Since the threat of entanglement to large whales is not typically immediate, there is time to cut the animal free. However, disentangling a 45-foot, 40-ton, and typically free-swimming animal is not easy, and involves a modification of an old whaling technique called "kegging" to make the animal more approachable. Historically, kegging involved attaching barrels or kegs to whales by harpooning them. The extra drag and buoyancy of the kegs would tire the whale out and keep it at the surface where it could eventually be lanced to death. For disentanglement purposes, rescuers throw grapples or use hooks on the end of poles to attach to the gear entangling the animal. Instead of barrels, rescuers use large polyballs (buoy floats) for buoyancy and drag to keep the whale at the surface, slow it down and generally tire it out. The desired result is a whale that is more approachable, allowing rescuers to safely assess the animal and entanglement, and attempt to free the animal. Specially designed hooked knives on the end of poles are then used to cut the animal free of entangling gear.

**Technology**

In addition to specially designed tools that help responders get hold of an cut free large entangled whales, there are transmitters and receivers that allow NMFS to automatically and remotely track an entangled animal over time. The science is called telemetry and it is an important tool in helping us rescue whales. The Alaska Response Network uses telemetry to track and relocate entangled whales that cannot be disentangled during the initial response due to limited resources (experience of personnel, proper equipment), and/or condition restraints (weather, sea state, time of day, remoteness of location). In addition, telemetry is useful in those cases where an effort has been initiated, but terminated early when condition considerations or the behavior of the animal makes it dangerous for the rescue team to proceed. Thus in all regards, telemetry increases the safety of disentanglement operations, and may assist in its overall success.

The Network uses a pair of transmitters - an Argos/GPS-based transmitter along with a VHF radio transmitter. Both transmitters complement each other and are placed together on a telemetry buoy that is specially designed to hold the tags and be attached to the entangling gear trailing behind the animal. Telemetry buoys, like the disentanglement tools, are strategically placed throughout the state with trained personnel.

In August 2006, Network members tagged an entangled humpback in lower Stephens Passage in Southeast Alaska. The next day the Network was able to respond, re-locate the animal using the transmitters, and cut all wraps of gear from the animal. Unfortunately, lines remained embedded in wounds and thus attached to the animal. The telemetry buoy had to be reattached to track the animal. Over the next 9 days and 215 nautical miles, the animal was tracked as it swam southwest along Frederick Sound, south down Chatham Straits, and out of Coronation Island. However, on the 10<sup>th</sup> day the animal moved back into the sheltered waters of Chatham Strait and conditions cooperated to mount another rescue operation. This time the Network was able to finish the job and completely free the animal from the large mass of trailing gill net gear.

### **Network and Authorization**

Response to disentanglements is coordinated by NOAA Fisheries' Alaska Region Protected Resources Division, and receives authorization under the agency's national Marine Mammal Health and Stranding Response Program (MMHSRP) permit (#932-1489). Disentanglement network response is dependent upon the commitment of many state and federal agencies (e.g., NOAA Fisheries Office of Law Enforcement, the US Coast Guard, the Alaska Department of Fish and Game), private non-governmental organizations, fishermen, and other individuals working together. Whale rescue is complex and dangerous for the whale rescuers as well as the animal. Network response to entangled whales may only be attempted by authorized persons who are experienced, trained, knowledgeable, and have proper support and equipment, working under NOAA Fisheries' MMHSRP permit.

### **Response and Outcome**

The Alaska network available to respond to entangled whales has grown since its inception in 1998, and now comprises over 100 participants who have received different levels of training in order to support disentanglement efforts statewide. The network now has 8 caches of specialized equipment strategically distributed throughout the state. Since 1998, the network has mobilized several dozen responses, many of which successfully released animals from life threatening entanglements. While disentanglement may help save some of these animals, it is not the long-term answer. The value of disentanglement is that it provides information that might help managers, fishermen, and other ocean users with the ultimate goal of lowering, or at least mitigating, the entanglement risk to large whale.

## **APPENDIX C: Oil Spill Information**

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In the US, the US Coast Guard (USCG) is the lead federal response agency for spills in marine waters. Animal rescue begins after the spill is contained, and all activities are conducted under the authority of a federal on-scene coordinator and in cooperation with other federal and state agencies, as well as private organizations and individuals.

*Excerpt from*  
**Oiled Wildlife Response Plan**  
**Alaska Region, National Marine Fisheries Service**

The Alaska Region has developed this plan to provide for the organization, objectives, and actions to be undertaken by NMFS staff in the event of an oil spill in Alaskan marine waters.

It is through the actions specified in the Alaska Regional Response Plan and our responsibilities as the Federal Trustee for cetaceans and pinnipeds that the necessity for this plan derives. When an oil spill occurs in Marine waters, the USCG is designated as the Federal On-Scene Coordinator (FOSC). It is the FOSC's responsibility to ensure the spill is stopped, contained, and cleaned up: either by the responsible party or by the Federal Government. Under the Oil Pollution Act of 1990, the FOSC may request that NMFS direct the actions of the responsible party to ensure that appropriate wildlife protection strategies are used. Additionally, if the FOSC finds the response actions of the responsible party are not sufficient, or if the responsible party is unknown, he will direct the USCG with the support of the Trustee agencies, to undertake response actions. In each of these three scenarios, NMFS could be tasked to respond to oiled trust resources. The purpose of the NMFS Alaska Wildlife Plan is to provide planning and guidance for agency response for a variety of possible spill situations. It may be used by the designated NMFS oil spill response coordinator (Coordinator) in establishing a response strategy appropriate to the particular event, in identifying resources to assist our response, and in identifying NMFS dedicated response personnel having expertise with the wildlife affected by the spill. This plan represents only one element (i.e., marine mammal protection) of several roles NMFS may be called upon during a spill event. For example, it does not address our response activities for fishery resources or marine habitat. A major oil spill would require additional NMFS personnel on-site and additional technical support from the laboratories, and are beyond the scope of this plan.

The NOAA Regional Response Team (RRT) Representative, Doug Helton, and the Scientific Support Coordinator (SSC), John Whitney, will notify either Kaja Brix in the Regional office or Brad Smith in the Anchorage office of an oil spill. Any other NMFS personnel learning of a spill should forward the report to these contacts.

Kaja Brix, Assistant Regional Administrator, Protected Resources Division (PRD), will designate a Regional oil spill response coordinator for the spill. The Coordinator should first contact the NOAA RRT representative and the SSC to determine the status and potential of the spill event. He should at this time request the SSC provide him with all Coast guard Situation Reports of the incident. Because the SSC may require NMFS recommendations for immediate response actions to protect wildlife, the Coordinator's first actions should be to determine if marine mammals or habitat are in or near the spill site. NMFS recommendations may end here, with no actions necessary, or may be more or less continuous as events occur and additional data is available. All recommendations should be made through the SSC. The NOAA RRT representative may also be informed of these recommendations.

**IMPORTANT:** NMFS may request the RRT representative recommend convening the regional response team for any spill event. NMFS trustee responsibilities must be prioritized in our response. If NMFS recommendations are not effectively administered through the SSC or the RRT representative at any time, the FOSC should be contacted directly by the NMFS Regional Director.

Upon initial assessment and after making any immediate recommendations to the SSC, the Coordinator should categorize the event into one of the following:

- Category 1: No marine mammals present or no likely effects from the spill.
- Category 2: Event involves threat, injury, or death to individual marine mammals; or haul out sites oiled or potentially affected.
- Category 3: Event involves threat, injury, or death to local or coastal populations of marine mammals; or major haul outs or rookeries oiled or potentially affected; or threatened or endangered species or designated critical habitat affected by the spill.

A Category 1 event may not require the RRT to be alerted, in which case all NMFS contact should be to the SSC. A Category 2 event may be significant, involving injury or death to individual marine mammals, but would not be likely to affect local populations. Normally, a Category 2 event would not require collection and treatment of NMFS trust resources, although this would be determined by the Coordinator. A Category 3 event would likely be associated with a major spill, and might place local or large-scale populations, T&E species, or important habitats at risk. Examples of Category 3 events would be a large oil spill hitting the Pribilof rookeries or a blow-out entering the spring lead system of the Chukchi Sea.

NMFS response actions are developed for each of these categories. The Coordinator will use this guidance in directing NMFS wildlife response activities. It is important the SSC be kept informed of these actions and that any recommendations concerning the actions of the responsible party or regarding the removal of oil be made through the SSC and/or NOAA RRT representative. In addition to the contacts and information sources described, the Coordinator should review the Alaska Region Response Team Unified Plan, which includes the “Alaska Region Oil and Hazardous Substances Pollution Contingency Plan” and the “Wildlife Protection Guidelines”, the “Dispersant Guidelines for Alaska” with specific guidelines for us in Cook Inlet, and the “In-situ Burning Guidelines” so as to make informed recommendations to the SSC (<http://www.akrrt.org/UnifiedPlan>). The Wildlife Protection Guidelines are particularly important, as they contain extensive information necessary for the Coordinator’s actions in regards to marine mammals. The Wildlife Protection Guidelines are, in fact, the parent document to the NMFS Plan. Most information within the Wildlife Protection Guidelines does not appear in the NMFS Plan, but is incorporated by reference.

***Excerpts from***  
**Alaska Federal/State Preparedness Plan for Response to Oil and**  
**Hazardous Substance Discharges/Releases (UNIFIED PLAN, VOLUME I) -**

**WILDLIFE PROTECTION GUIDELINES FOR ALASKA**

**101. Background.**

The coastline of Alaska and its offshore areas provide seasonal feeding, breeding, reproducing, and staging grounds for large numbers of migratory birds and marine and terrestrial mammals. In some cases, the major portion of the world’s population of a particular species may be present. Moreover, these wildlife populations represent important subsistence resources.

Because of their interdependence with the marine environment, it is possible that wildlife may -- during an oil spill that affects offshore or coastal areas -- contact oil on the water surface and/or along shorelines, marshes, or tide lands. The number of individuals and species affected will depend on several variables, such as the location and size of the spill, the characteristics of the oil, weather and water conditions, types of habitats affected, and the time of year the spill occurs.

The Alaska Regional Response Team (RRT) recognized that guidance for dealing with oiled wildlife was not specifically provided in either the *National Contingency Plan (NCP)* or the *Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges/Releases (Unified Plan, Volume 1)*. In September 1987, at the request of the Co-Chairs of the Alaska RRT, a working group was established to develop appropriate Guidelines that Federal On-Scene Coordinators (OSC) could use during a federally-funded response to an oil spill.

### **102. Objectives.**

Initially, the objectives of the working group focused on developing guidelines for capturing and treating oiled wildlife. As information relative to the guidelines was collected, these objectives were expanded to encompass a broader definition of wildlife protection. This new definition more clearly described all the steps that could be taken to protect wildlife during an oil spill. The primary response strategy for wildlife protection emphasizes controlling the release and spread of spilled oil at the source to prevent or reduce contamination of potentially-affected species and/or their habitat. Primary response strategies may include mechanical cleanup, protective booming, *in situ* burning, and dispersant use. In addition, the primary response strategy includes the removal of oiled debris, particularly contaminated food sources (such as dead wildlife carcasses) both in water and on land. Decisions regarding the use of dispersants are made by the Federal OSC in accordance with procedures described in the "Alaska RRT Dispersant Use Guidelines for Alaska" (see Annex F, Appendix I of the *Unified Plan, Volume 1*). Decisions regarding the use of *in situ* burning are made by the Federal OSC in accordance with the Alaska RRT-approved "In-Situ Burning Guidelines for Alaska" (see Annex F, Appendix II of the *Unified Plan, Volume 1*).

The secondary response strategy emphasizes keeping potentially affected wildlife away from oiled areas through the use of deterrent techniques. These techniques may include visual methods (e.g., placing floating or stationary human effigies or helium-filled balloons on or near beaches), auditory methods (e.g., firing propane cannons and AV-alarms), and other methods (e.g., capture and relocation).

The tertiary response strategy, which is a last-resort strategy, addresses the potential capture and treatment of oiled wildlife. Typically only a small percentage of wildlife that are highly sensitive to the effects of oiling (e.g., birds and sea otters) and are oiled will be captured. Of those, only a portion will survive the treatment process. Decisions to capture and treat oiled wildlife involve consideration of factors identified in Appendix 1.

Response activities should also be conducted in a manner that minimizes adverse effects to wildlife. For example, techniques need to be identified that prevent: (1) unnecessary or illegal disturbance to sensitive species and habitats such as nesting raptors, seabird rookeries, and marine mammals haulouts and pupping areas; (2) potential injury and/or disturbance of bears by spill-related response personnel; (3) illegal collection of wildlife parts by spill-response personnel; and (4) wildlife contacts with cleaning agents and/or bioremediation substances used for shoreline treatment. Sections 301.B.1 and 302.B.1 contain general suggestions to minimize adverse effects to wildlife from response activities. The precise techniques need to be identified on a spill-specific basis.



### **300. Response Procedures.**

Following an oil spill, the Federal OSC will determine if the responsible party is taking appropriate action (i.e., a responsible party response), or if a federally-funded response is required. If migratory birds, marine mammals, and/or terrestrial mammals are either potentially affected or affected by an oil spill, the Federal OSC may receive a request (via the checklists in Appendices 24 and/or 25) to conduct a wildlife protection/response program.

### **301. Federally-Funded Response.**

#### 301.A. Federal OSC.

Following an oil spill, the Federal OSC will consider the response strategies necessary to control the release and spread of spilled oil through mechanical cleanup, protective booming, dispersant use, and/or *in situ* burning. The Federal OSC will also consider the removal of oiled debris, particularly contaminated food sources (such as dead wildlife carcasses) both in the water and on land. The Guidelines recognize that, in terms of reducing or eliminating potential effects on wildlife, such strategies should constitute the primary response effort. The Federal OSC will receive input from representatives of appropriate wildlife resource agencies on important habitat and wildlife concentration areas where response actions should be centered. Since wildlife concentration areas may change with weather and seasons, this input may require direct observations by trained biologists. The *Unified Plan, Volume 1* outlines the Federal OSC's decision making process for obtaining Alaska RRT approval for selecting dispersant use and/or *in situ* burning as response options (see Annex F, Appendix 1 and Annex F, Appendix 2, respectively). It is also possible that based on the recommendation of representatives of appropriate wildlife resource agencies, the Federal OSC will determine that secondary response strategies, namely, keeping wildlife away from oiled areas through the use of deterrents, are necessary. Options for deterrents are listed by species in Appendices 6-8.

In the event that wildlife are oiled, the Federal OSC, based on the recommendation of representatives of appropriate wildlife resource agencies, may decide to initiate a capture and treatment program under the leadership of appropriate federal agencies. A decision to initiate a wildlife capture and treatment program will be made by appropriate wildlife resource agencies and the Federal OSC following consideration of factors listed in Appendix 1. It is possible that based on the recommendation of representatives of appropriate wildlife resource agencies, the Federal OSC may determine that no response to protect wildlife resources will be taken.

#### 301.B. Wildlife Resource Agencies.

During a federally-funded response to an oil spill, federal and state wildlife resource agencies assume lead roles for wildlife protection.

##### 301.B.1. Wildlife Protection during Response Activities.

Additional direct and indirect wildlife impacts, including injury and death, may occur in conjunction with response activities. Incident-specific techniques will be identified by appropriate FWS, NMFS, and ADF&G representatives and utilized with Federal OSC concurrence to prevent (1) unnecessary or illegal disturbance to sensitive species and habitats, such as nesting raptors, seabird rookeries, and marine mammals haulouts and pupping areas; (2) potential injury and/or disturbance to bears by spill-related response personnel; (3) collection of wildlife parts by spill-response personnel for personal use; and (4) wildlife exposure to cleaning agents and/or bioremediation substances used for shoreline treatment.

##### 301.B.1.a. Prevention of Unnecessary or Illegal Disturbance to Sensitive Species and Habitats.

Field activities associated with oil spills, particularly those using helicopters and on-site work crews, have the potential for causing unnecessary and illegal disturbance to sensitive species and habitats. This disturbance may affect the survival of young wildlife and/or may result in wildlife becoming oiled.

The Marine Mammal Protection Act prohibits the taking of sea otters, seals, sea lions, walrus, whales, dolphins, and porpoises. Taking includes harassing or disturbing these animals as well as actual harming or killing. Section 109(h) of this act allows a taking by a federal or state governmental official during their official duties, provided the taking is for the welfare and protection of the animal. Accordingly, the Federal OSC is authorized to take marine mammals during an oil-spill response.

The Endangered Species Act, as amended, provides protective measures for species listed as threatened or endangered and their designated critical habitats. The Endangered Species Act prohibits federal agencies from jeopardizing the continued existence of listed species and, unless otherwise authorized, prohibits all parties from taking listed species. According to the Endangered Species Act, the term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such manner.

Section 7 of the Endangered Species Act requires any federal agency that authorizes, funds, or carries out activities that may affect listed species or critical habitat to consult with DOI (through FWS) and/or DOC (through NMFS). Therefore, the Federal OSC must immediately consult with FWS or NMFS whenever a response may affect these resources. The Endangered Species Act and its implementing regulations provide special provisions for consultations during emergencies such as oil spills. FWS and/or NMFS may make recommendations to the Federal OSC to avoid the taking of listed species or to otherwise reduce response-related impacts. Formal consultation between the Federal OSC and FWS and/or NMFS (as appropriate) should occur immediately after the incident if adverse effects, including incidental take, of response activities on listed species are not eliminated through implementing informal consultation recommendations.

To reduce disturbance and improve the chances for wildlife survival, FWS, NMFS, and/or ADF&G representatives (as appropriate) should provide, through the Federal Aviation Administration and USCG, notices to aircraft and/or notices to mariners for areas affected by an oil spill (see Appendix 9 for an example). These advisories may request pilots and vessel operators to remain a certain distance from wildlife concentration areas and critical habitats. Such areas include, but are not limited to, marine mammal haulouts and pupping areas, migratory bird concentration areas, seabird rookeries, and raptor nests. Copies of any advisories should be sent by the Federal OSC to all federal and state agency and agency-contracted on-site personnel. In addition, a news release should be prepared by FWS, NMFS, and/or ADF&G representatives (as appropriate) on this subject for distribution by the Federal OSC to appropriate news media representatives (see Appendix 9).

During a response to an oil spill, appropriate wildlife resource agencies will evaluate the potential for response activities to negatively affect sensitive wildlife species and/or their habitats. As a result, wildlife resource agencies may recommend to the Federal OSC that response activities in or adjacent to sensitive species or areas be completed prior to or following critical biological periods. If that is not possible, wildlife resource agencies may further recommend to the Federal OSC that agency on-site monitors accompany near-shore and/or shore-based activities to help minimize or eliminate unacceptable levels of disturbance.

#### 301.B.1.c. Prevention of the Collection of Wildlife Parts for Personal Use

Policies for response-related personnel should include prohibitions on the collection of whole or partial remains of wildlife for personal use. Wildlife remains include, but are not limited to, bones, feathers, teeth, ivory, and pelts. FWS and/or NMFS (as appropriate) will provide information on prohibitions on the collection of whole or partial wildlife remains for personal use to the Federal OSC (see Appendix 10 for an example). The Federal OSC will then provide this information to all response parties, and federal and state agency and agency-contracted on-site personnel.

## **APPENDIX 7 - WILDLIFE PROTECTION INFORMATION: MARINE MAMMALS**

### **GENERAL CONSIDERATIONS**

In contrast to a spill response for birds, the response to potentially affected marine mammals must recognize that capturing and cleaning oiled marine mammals generally will not be feasible. While procedures for dealing with oiled birds have been developed, no such procedures have been developed for marine mammals except sea otters and, to a more limited extent, polar bears.

It may be possible to adapt some of the procedures that have been developed for sea otters to other small species of marine mammals, such as smaller pinnipeds. However, one must also consider that such procedures involve capturing, treating, and releasing the animal, and that each of these steps places stress on the animal that may be a greater risk to its well being than contacting oil. Furthermore, the predictability of the animal's response is complicated by factors such as its age, sex, season, general health, and nutritional state.

The sensitivity of marine mammals to spilled oil is highly variable. It appears to be most directly related to the relative importance of fur and blubber to thermoregulation. Direct exposure to oil also can result in reversible conjunctivitis; ingestion of oil can result in digestive tract bleeding, and in liver and kidney damage. Ingestion of oil is of greater concern for species that groom themselves with their mouth, such as polar bears and sea otters. Inhalation of hydrocarbon volatiles can result in nerve damage and behavioral abnormalities.

### **RESPONSE STRATEGIES**

The above considerations emphasize the importance of early response strategies that involve either removing the oil threat from the animal or its habitat or removing the animal from the threat. Accordingly, the following response strategies are listed in order of priority.

**Primary Response.** The primary response strategy for all marine mammals should emphasize controlling the release and spread of spilled oil at the source to prevent or reduce contamination of the species or its habitats. Priority should be placed on protecting pinniped haulout and rookery beaches, particularly for those species that form male-harem bonds and strong territorial attachment to specific rookery sites (i.e., fur seals and northern sea lions). For those species, applying secondary or tertiary response strategies is probably not feasible during periods -- such as the breeding season -- when territorial bonding is strong. In addition, the primary response should also include removal of oiled carrion from the environment to prevent marine mammals, such as polar bears, from ingesting oil as they scavenge for food.

Species of pinnipeds that do not form male-harem bonds often haul out in more protected, lower energy shoreline areas, which could be more susceptible to oiling and less likely to be cleaned by natural forces. Areas where large numbers of these species are known to haul out should be protected from oiling, if possible. If oil does contact shorelines in important haul out areas, those shorelines should be afforded a high priority for cleaning with due regard to pupping and molting schedules.

All response activities should be conducted as far from marine mammals as possible to prevent disturbance, especially at pinniped haulout and rookery beaches. Disturbance of haulout and rookery beaches can result in mass stampedes of the animals into the ocean, followed by abandonment of the beaches. This disturbance can result in severe effects, including direct physical injury to newborn, small, or weak animals; separation of mothers and pups; disturbance of established social hierarchies; and movement to less-favorable areas. The distance at which disturbance occurs is variable and depends on the level of response activities, local conditions of visibility, and the species in question.

**Secondary Response.** The secondary response strategy is to herd animals away from an oil spill site or away from a near-shore or beach area affected by oil. This is most feasible for

pinnipeds at haulout and rookery areas during the period when territorial bonding is weakest (i.e., before pupping and after weaning). It also may be possible to deter polar bears when they are swimming. A problem with deterrent techniques for marine mammals, particularly sea otters, is that they habituate very easily to noise or other distractions. Auditory or auditory and visual deterrent techniques have shown some limited success with marine mammals. Capturing and relocating marine mammals and herding them by scare sounds have proven to be the most effective methods. The primary factor to be considered before applying these techniques is the risk of the animal contacting oil. The danger of extreme shock and stress to an animal from being captured and relocated may far outweigh an animal's potential for being oiled. Use of any secondary response activities must have the approval of the appropriate wildlife resource agency and the Federal On-Scene Coordinator (OSC) via the checklist in Appendix 24.

**Tertiary Response.** The tertiary response strategy is to attempt to capture and treat oiled animals. For most marine mammals, this would be hazardous and should be performed only by people with experience in capturing and handling the subject species. Any tertiary response activities must have the approval of the appropriate wildlife resource agency and the Federal OSC via the checklist in Appendix 25. For species and groups of species discussed in this appendix, information is also provided on age classes that are most sensitive to oiling, special considerations relative to response procedures during a spill, and statements about the feasibility of the type of response that could be used.

### **CETACEANS (BALEEN AND TOOTHED WHALES) GENERAL CONSIDERATIONS**

Of all the marine mammals, cetaceans are probably the least sensitive to spilled oil. They rely on a thick blubber layer for insulation. No documented effects on whales or dolphins from oil spills have been reported. Research on the susceptibility and sensitivity of small, warm-water cetaceans to oil indicates that if directly exposed to oil for short periods of time, transient effects to the skin will occur. In addition, short-term effects on feeding by baleen whales may occur but would be reversed within a few days after the whales moved into clean waters. Furthermore, bioaccumulation of petroleum hydrocarbons may occur, but its long-term effects are unknown. The above considerations would apply in areas of open ocean where exposure would be relatively short-term. However, if oil is trapped within an ice lead, the duration of exposure and associated effects might be increased for whales (such as bowheads or belugas) that use the ice lead as a migration pathway.

### **RESPONSE STRATEGIES**

Primary and secondary response strategies are the only feasible response strategies for this group of marine mammals. Some species, particularly large whales (such as bowheads), will avoid areas of intensive human activity and could possibly be steered away from a spill site. Likewise, harbor porpoise generally avoid ships and human activity. Other species, such as Dall's porpoise, are attracted to ship traffic and human activity and might be attracted to a spill. Use of any secondary response activities must have the approval of NMFS and the Federal OSC via the checklist in Appendix 24.

### **MANUALS: DETERRENTS AND CAPTURING**

Norris, Kenneth S. and Roger L. Gentry. 1974. Capture and Harnessing of Young California Gray Whales, *Eschrichtius robustus*. Marine Fisheries Review 36(4):58-64.

Mate, Bruce R. and James T. Harvey, eds. 1987. Acoustical Deterrents in Marine Mammal Conflicts with Fisheries. Proceedings of a February 17-18, 1986, Workshop in Newport, Oregon. Oregon State University Sea Grant College Program, Corvallis, Oregon.

## **APPENDIX D: Euthanasia Considerations**

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### ***Excerpt from NMFS Stranding Agreements***

In the context of euthanasia, “humane” as defined by the MMPA means “that method of taking which involves the least possible degree of pain and suffering practicable to the mammal involved.”

- 1) For ESA-listed species, the NMFS National Stranding Coordinator(s) must be consulted and provide approval (verbal or written), in advance, of euthanasia for humane or medical purposes; and
- 2) For both MMPA and ESA-listed species, euthanasia must only be performed by an attending, experienced, and licensed veterinarian or other qualified individual according to applicable laws governing state veterinary practices.

### ***Excerpts from CRC Handbook of Marine Mammal Medicine and Guidelines on Euthanasia of Nondomestic Animals***

The realistic options facing a stranding response team must include the possibility of euthanasia. This procedure should never be implemented unless all other possibilities have been investigated and eliminated.

A humane death is described as one that obtains rapid unconsciousness followed by cardiac or respiratory arrest (Andrews et al., 1993). This can be problematic in exceptionally large mammals such as whales. Due to their excessive size, administration of acceptable pharmaceuticals can be prohibitive due to cost, volume, and muscular or venous access. Additionally, due to the size of the head and skull, physical means of inducing unconsciousness including gunshot to the head are unlikely to consistently render a whale unconscious, unless specific weapons and sites are used. Therefore, any methods that do not create unconsciousness (e.g., paralytics, KCl, MgCl, hypothermia, cyanide, strychnine, inappropriate gunshot wound) are not considered humane to use alone in a conscious animal. Where it is practical, if an animal is deeply anesthetized, most acceptable methods of euthanasia in other species are considered humane.

#### **PHYSICAL METHODS OF EUTHANASIA**

Several physical methods of euthanasia have been employed in marine mammals. For a physical method of euthanasia to be considered humane, it must fulfill the requirement of rapidly inducing relatively painless unconsciousness before death. Only methods that quickly and relatively painlessly destroy the brain or brainstem are considered humane methods of euthanasia. All other physical methods of euthanasia (e.g., exsanguination, suffocation, bilateral thoracotomy, gunshot to heart) are considered humane only if used in a heavily sedated, unconscious, or moribund animal or as a secondary confirmation of euthanasia. There may be adverse public reaction to the use of some physical methods of euthanasia.

#### **Ballistics**

Ballistics have been evaluated for euthanasia of cetaceans. When using gunshot for euthanizing cetaceans, three main components must be evaluated: the size and anatomy of the animal, the firearm and projectile to be used, and the skill of the marksman. If any of these variables are less than ideal, then this method should not be used. In RSPCA *Stranded*

*Cetaceans Guidelines for Veterinary Surgeons* (1997), the authors suggest that it may be more humane to leave the animal to die on its own rather than applying any substandard method of euthanasia, especially in larger whales like sperm or baleen whales. The gravitational weight on the internal organs will likely induce a more humane death than repeated rounds of projectiles fired inaccurately, but may take a prolonged time (RSPCA, 1997).

### **Explosives**

Explosives have been used in attempts to euthanize larger whales that are difficult to euthanize by other methods (Obendorf and Arundel, 1986). These methods are usually considered less acceptable, due to the tremendous soft tissue damage, excessive noise, and required expertise in the application of explosives. Human safety is a concern when using explosives. In addition, the noise and visual disturbance is especially unacceptable in mass strandings when other conscious animals, stranding network volunteers, and the public are present.

### **Exsanguination**

Exsanguination can ensure death in marine mammals euthanized by other means. It can also serve as a primary means of euthanasia in animals that are deeply anesthetized or otherwise insensible to pain.

### **VERIFICATION OF DEATH**

It is imperative that death be verified. The absence of a heartbeat is the only reliable confirmation of death in mammals; however, in field situations involving marine mammals, it may not always be possible to detect a heartbeat. If there is any doubt about confirmation of death, a secondary physical means of euthanasia should be performed to ensure death (Close et al., 1996). Physical methods include bilateral thoracotomy, exsanguination, and gunshot through the heart or brain.

### **CARCASS DISPOSAL**

Commercial trade in marine mammal parts is prohibited under the Endangered Species Act and the Marine Mammal Protection Act. Therefore carcasses or parts of carcasses cannot be sold (Dierauf, 1990) or kept for personal use. Further concerns of carcass disposal, such as preventing secondary toxicity due to scavenging and human safety when moving such large carcasses, is addressed in the literature (Geraci and Lounsbury, 1991; Greer, et al., 2001).

**APPENDIX E: Level A Data Form and Instructions**

**MARINE MAMMAL STRANDING REPORT - LEVEL A DATA**

FIELD #: \_\_\_\_\_ NMFS REGIONAL #: \_\_\_\_\_ NATIONAL DATABASE#: \_\_\_\_\_  
 (NMFS USE) (NMFS USE)

COMMON NAME: \_\_\_\_\_ GENUS: \_\_\_\_\_ SPECIES: \_\_\_\_\_

EXAMINER Name: \_\_\_\_\_ Affiliation: \_\_\_\_\_

Address: \_\_\_\_\_ Phone: \_\_\_\_\_

Stranding Agreement or Authority: \_\_\_\_\_

<p><b>LOCATION OF INITIAL OBSERVATION</b></p> <p>State: _____ County: _____</p> <p>City: _____</p> <p>Body of Water: _____</p> <p>Locality Details: _____</p> <p>Lat (DD): _____ N                  Long (DD): _____ W</p> <p><input type="checkbox"/> Actual <input type="checkbox"/> Estimated</p> <p>How Determined: (check ONE)</p> <p><input type="checkbox"/> GPS <input type="checkbox"/> Map <input type="checkbox"/> Internet/Software</p>	<p><b>OCCURENCE DETAILS</b> <input type="checkbox"/> Restrand <span style="float: right;">GE# _____</span></p> <p>Group Event: <input type="checkbox"/> YES <input type="checkbox"/> NO (NMFS Use)</p> <p>If Yes, Type: <input type="checkbox"/> Cow/Calf Pair <input type="checkbox"/> Mass Stranding # Animals: _____ <input type="checkbox"/> Actual <input type="checkbox"/> Estimated</p> <p><b>Findings of Human Interaction:</b> <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Could Not Be Determined (CBD)</p> <p>If Yes, Choose one or more: <input type="checkbox"/> 1. Boat Collision <input type="checkbox"/> 2. Shot <input type="checkbox"/> 3. Fishery Interaction</p> <p><input type="checkbox"/> 4. Other Human Interaction: _____</p> <p>How Determined (Check one or more): <input type="checkbox"/> External Exam <input type="checkbox"/> Internal Exam <input type="checkbox"/> Necropsy</p> <p><input type="checkbox"/> Other: _____</p> <p>Gear Collected? <input type="checkbox"/> YES <input type="checkbox"/> NO Gear Disposition: _____</p> <p><b>Other Findings Upon Level A:</b> <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Could Not Be Determined (CBD)</p> <p>If Yes, Choose one or more: <input type="checkbox"/> 1. Illness <input type="checkbox"/> 2. Injury <input type="checkbox"/> 3. Pregnant <input type="checkbox"/> 4. Other: _____</p> <p>How Determined (Check one or more): <input type="checkbox"/> External Exam <input type="checkbox"/> Internal Exam <input type="checkbox"/> Necropsy</p> <p><input type="checkbox"/> Other: _____</p>
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<p><b>INITIAL OBSERVATION</b></p> <p>Date: Year: _____ Month: _____ Day: _____</p> <p>First Observed: <input type="checkbox"/> Beach or Land <input type="checkbox"/> Floating <input type="checkbox"/> Swimming</p> <p><b>CONDITION AT INITIAL OBSERVATION (Check ONE)</b></p> <p><input type="checkbox"/> 1. Alive <input type="checkbox"/> 4. Advanced Decomposition  <input type="checkbox"/> 2. Fresh dead <input type="checkbox"/> 5. Mummified/Skeletal  <input type="checkbox"/> 3. Moderate decomposition <input type="checkbox"/> 6. Condition Unknown</p>	<p><b>LEVEL A EXAMINATION</b> <input type="checkbox"/> Not Able to Examine</p> <p>Date: Year: _____ Month: _____ Day: _____</p> <p><b>CONDITION AT EXAMINATION (Check ONE)</b></p> <p><input type="checkbox"/> 1. Alive <input type="checkbox"/> 4. Advanced Decomposition  <input type="checkbox"/> 2. Fresh dead <input type="checkbox"/> 5. Mummified/Skeletal  <input type="checkbox"/> 3. Moderate decomposition <input type="checkbox"/> 6. Unknown</p>
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<p><b>INITIAL LIVE ANIMAL DISPOSITION (Check one or more)</b></p> <p><input type="checkbox"/> 1. Left at Site <input type="checkbox"/> 6. Euthanized at Site  <input type="checkbox"/> 2. Immediate Release at Site <input type="checkbox"/> 7. Transferred to Rehabilitation:                  Date: Year: _____ Month: _____ Day: _____                  Facility: _____</p> <p><input type="checkbox"/> 3. Relocated <input type="checkbox"/> 8. Died during Transport  <input type="checkbox"/> 4. Disentangled <input type="checkbox"/> 9. Euthanized during Transport  <input type="checkbox"/> 5. Died at Site <input type="checkbox"/> 10. Other: _____</p> <p><b>CONDITION/DETERMINATION (Check one or more)</b></p> <p><input type="checkbox"/> 1. Sick <input type="checkbox"/> 7. Location Hazardous  <input type="checkbox"/> 2. Injured <input type="checkbox"/> a. To animal  <input type="checkbox"/> 3. Out of Habitat <input type="checkbox"/> b. To public  <input type="checkbox"/> 4. Deemed Releasable <input type="checkbox"/> 8. Unknown/CBD  <input type="checkbox"/> 5. Abandoned/Orphaned <input type="checkbox"/> 9. Other: _____  <input type="checkbox"/> 6. Inaccessible</p>	<p><b>MORPHOLOGICAL DATA</b></p> <p><b>SEX (Check ONE)</b> <input type="checkbox"/> 1. Male <input type="checkbox"/> 2. Female <input type="checkbox"/> 3. Unknown</p> <p><b>AGE CLASS (Check ONE)</b> <input type="checkbox"/> 1. Adult <input type="checkbox"/> 4. Pup/Calf  <input type="checkbox"/> 2. Subadult <input type="checkbox"/> 5. Unknown  <input type="checkbox"/> 3. Yearling</p> <p><input type="checkbox"/> Whole Carcass <input type="checkbox"/> Partial Carcass</p> <p>Straight length: _____ <input type="checkbox"/> cm <input type="checkbox"/> in <input type="checkbox"/> actual <input type="checkbox"/> estimated                  Weight: _____ <input type="checkbox"/> kg <input type="checkbox"/> lbs <input type="checkbox"/> actual <input type="checkbox"/> estimated</p> <p><b>PHOTOS/VIDEOS TAKEN:</b> <input type="checkbox"/> YES <input type="checkbox"/> NO                  Photo/Video Disposition: _____</p>
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<p><b>TAG DATA</b> Tags Were:</p> <p>Present at Time of Stranding (Pre-existing): <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>Applied during Stranding Response: <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <table border="1"> <thead> <tr> <th>ID#</th> <th>Color</th> <th>Type</th> <th>Placement* (Circle ONE)</th> <th>Applied</th> <th>Present</th> </tr> </thead> <tbody> <tr> <td>_____</td> <td>_____</td> <td>_____</td> <td>D DF L LF LR RF RR</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> <td>D DF L LF LR RF RR</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> <td>D DF L LF LR RF RR</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table> <p>* D= Dorsal; DF= Dorsal Fin; L= Lateral Body                  LF= Left Front; LR= Left Rear; RF= Right Front; RR= Right Rear</p>	ID#	Color	Type	Placement* (Circle ONE)	Applied	Present	_____	_____	_____	D DF L LF LR RF RR	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	D DF L LF LR RF RR	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	D DF L LF LR RF RR	<input type="checkbox"/>	<input type="checkbox"/>	<p><b>CARCASS STATUS (Check one or more)</b></p> <p><input type="checkbox"/> 1. Left at Site <input type="checkbox"/> 4. Towed: Lat _____ Long _____ <input type="checkbox"/> 7. Landfill  <input type="checkbox"/> 2. Buried <input type="checkbox"/> 5. Sunk: Lat _____ Long _____ <input type="checkbox"/> 8. Unknown  <input type="checkbox"/> 3. Rendered <input type="checkbox"/> 6. Frozen for Later Examination <input type="checkbox"/> 9. Other: _____</p> <p><b>SPECIMEN DISPOSITION (Check one or more)</b></p> <p><input type="checkbox"/> 1. Scientific collection <input type="checkbox"/> 2. Educational collection  <input type="checkbox"/> 3. Other: _____</p> <p>Comments: _____</p> <p><b>NECROPSIED</b> <input type="checkbox"/> NO <input type="checkbox"/> YES <input type="checkbox"/> Limited <input type="checkbox"/> Complete  <input type="checkbox"/> Carcass Fresh <input type="checkbox"/> Carcass Frozen/Thawed</p> <p><b>NECROPSIED BY:</b> _____                  Date: Year: _____ Month: _____ Day: _____</p>
ID#	Color	Type	Placement* (Circle ONE)	Applied	Present																				
_____	_____	_____	D DF L LF LR RF RR	<input type="checkbox"/>	<input type="checkbox"/>																				
_____	_____	_____	D DF L LF LR RF RR	<input type="checkbox"/>	<input type="checkbox"/>																				
_____	_____	_____	D DF L LF LR RF RR	<input type="checkbox"/>	<input type="checkbox"/>																				

**ADDITIONAL REMARKS**

ADDITIONAL IDENTIFIER: \_\_\_\_\_ (if animal is restranded, please indicate any previous field numbers here)

DISCLAIMER

THESE DATA SHOULD NOT BE USED OUT OF CONTEXT OR WITHOUT VERIFICATION. THIS SHOULD BE STRICTLY ENFORCED WHEN REPORTING SIGNS OF HUMAN INTERACTION DATA.

DATA ACCESS FOR LEVEL A DATA

UPON WRITTEN REQUEST, CERTAIN FIELDS OF THE LEVEL A DATA SHEET WILL BE RELEASED TO THE REQUESTOR PROVIDED THAT THE REQUESTOR CREDIT THE STRANDING NETWORK AND THE NATIONAL MARINE FISHERIES SERVICE. THE NATIONAL MARINE FISHERIES SERVICE WILL NOTIFY THE CONTRIBUTING STRANDING NETWORK MEMBERS THAT THESE DATA HAVE BEEN REQUESTED AND THE INTENT OF USE. ALL OTHER DATA WILL BE RELEASED TO THE REQUESTOR PROVIDED THAT THE REQUESTOR OBTAIN PERMISSION FROM THE CONTRIBUTING STRANDING NETWORK AND THE NATIONAL MARINE FISHERIES SERVICE.

PAPERWORK REDUCTION ACT INFORMATION

PUBLIC REPORTING BURDEN FOR THE COLLECTION OF INFORMATION IS ESTIMATED TO AVERAGE 90 MINUTES PER RESPONSE, INCLUDING THE TIME FOR REVIEWING INSTRUCTIONS, SEARCHING EXISTING DATA SOURCES, GATHERING AND MAINTAINING THE DATA NEEDED, AND COMPLETING AND REVIEWING THE COLLECTION OF INFORMATION. SEND COMMENTS REGARDING THIS BURDEN ESTIMATE OR ANY OTHER ASPECT OF THE COLLECTION INFORMATION, INCLUDING SUGGESTIONS FOR REDUCING THE BURDEN TO: CHIEF, MARINE MAMMAL AND SEA TURTLE CONSERVATION DIVISION, OFFICE OF PROTECTED RESOURCES, NOAA FISHERIES, 1316 EAST-WEST HIGHWAY, SILVER SPRING, MARYLAND 20910. NOT WITHSTANDING ANY OTHER PROVISION OF THE LAW, NO PERSON IS REQUIRED TO RESPOND, NOR SHALL ANY PERSON BE SUBJECT TO A PENALTY FOR FAILURE TO COMPLY WITH, A COLLECTION OF INFORMATION SUBJECT TO THE REQUIREMENTS OF THE PAPERWORK REDUCTION ACT, UNLESS THE COLLECTION OF INFORMATION DISPLAYS A CURRENTLY VALID OFFICE OF MANAGEMENT AND BUDGET (OMB) CONTROL NUMBER.





***Excerpts from***  
**2007 Revision EXAMINERS GUIDE**  
**MARINE MAMMAL STRANDING REPORT – LEVEL A**  
**(NOAA Form 89-864, OMB No. 0648-0178)**  
**AND**  
**MARINE MAMMAL REHABILITATION DISPOSITION REPORT**  
**(NOAA Form 89-878, OMB No. 0648-0178)**

## **I. Introduction**

The purpose of this document is to clarify protocol for completing the Marine Mammal Stranding Report - Level A (NOAA Form 89-864) in response to marine mammal stranding events in the United States. This protocol will provide guidance to standardize the data sent to National Marine Fisheries Service (NMFS) from participants of the Marine Mammal Stranding Network.

## **II. Background**

Under Title IV (16 U.S.C. 1421 ) of the Marine Mammal Protection Act (MMPA), the Secretary of Commerce (Secretary), who has delegated responsibility under this Act to the NOAA Assistant Administrator for Fisheries, is responsible for collecting, compiling, and analyzing information on marine mammal strandings, by region, to monitor species, numbers, conditions, and causes of illnesses and deaths of stranded marine mammals. The Secretary is also responsible for collection of information on other life history and reference level data, including marine mammal tissue analyses, that would allow comparison of the causes of illness and deaths in stranded marine mammals with physical, chemical, and biological environmental parameters.

The collection of this information is authorized and mandated under three provisions of the MMPA. Under the MMPA, the Secretary is charged with the protection and management of marine mammals. This includes making determinations on the sustainability of population stocks, on the impact of fisheries and other human activities on marine mammals, and on the health of marine mammals and relative environmental considerations. NMFS has the responsibility to carry out these mandates and these include the following:

- Section 402(b) of the MMPA (16 U.S.C. 1421a) requires the Secretary to collect and update information on strandings. It further provides that the Secretary shall compile and analyze, by region, the species, numbers, conditions, and causes of illnesses and deaths in stranded marine mammals.

- Section 404 (a) of the MMPA (16 U.S.C. 1421c) mandates that the Secretary respond to unusual marine mammal mortality events. Without a historical baseline provided by marine mammal information collected from strandings, detection of such events could be difficult and the investigation could be impeded.

- Section 401 (b) of the MMPA (16 U.S.C. 1421) requires NMFS to facilitate the collection and dissemination of reference data on the health of marine mammal populations in the wild and to correlate health with physical, chemical, and biological environmental parameters. In order to perform this function, NMFS must standardize data collection protocols for health and environmental data correlations.

The Marine Mammal Stranding Network (Network) is made up of individuals authorized by NOAA Fisheries (via Stranding Agreement or another official agreement under §112(c) of the MMPA) which allows the Secretary to enter into agreements in order to fulfill the general purposes of the Act to collect scientific data and specimens, record information on stranding events and assist local and Federal authorities in the response to stranded marine mammals under §109(h) of the MMPA. The Network is also authorized to assist with detection and investigation of marine mammal unusual mortality events. The majority of Network members are affiliated with academic institutions, aquaria, rehabilitation centers, or state, federal, and local agencies. Members are requested to submit basic Level A data on all strandings including date and location, species, condition of animal, sex of animal, length, disposition of the animal and tissues or specimens, and any personal observations. The Network members will complete the Marine Mammal Stranding Report – Level A Form as part of their immediate response and forward the form to the NMFS regional stranding coordinators in a timely manner, as specified in the Stranding Agreement.

Data from the **Marine Mammal Stranding Report – Level A (see Definitions of Terms for the Level A Report starting on page 7 )** data forms provide NMFS with information on the morphology, life history, biology, general health, health and stranding trends, causes of mortality, and distribution of marine mammal species. These data provide reference information necessary to detect epizootic diseases such as the morbillivirus outbreak which caused a massive die off of bottlenose dolphins in 1987-88, the leptospirosis outbreak in California sea lions in 1984, and the morbillivirus epizootic in bottlenose dolphins in the Gulf of Mexico in 1994. These data also provide information which may help in making assessments on the status of population stocks. Recording data on gross mortalities may serve as an indicator that a particular population is impacted, threatened or at increased risk, and when provided in a timely manner, may aid in dynamic management practices. Changes in sex ratios, age composition, or age at sexual maturity may also indicate stressed populations and can be detected with stranding data. Stranding data also provide an important baseline for detecting and monitoring the impacts of environmental phenomena, such as El Niño, seen in California sea lions and gray whales in 1998, and harmful algal blooms (HABs) such as domoic acid that is repeatedly detected in California and brevetoxin or red tide seen most recently in the 2005 bottlenose dolphin die-off along the Florida Panhandle.

Stranding records can be a tool for alerting management personnel to changes in incidence of marine mammal mortalities due to human activities such as fisheries bycatch. Evidence of significant harbor porpoise mortalities due to gill net fisheries off the mid-Atlantic coast was detected by the Stranding Network in early 1993. This provided fishery managers with clues to seasonal and geographical information on fishery impact. Information obtained from strandings can also provide indications of enforcement problems. As an example, in March 1993, large numbers of dead pinnipeds stranded on the central Washington coast. Stranding Network information provided proof that over half of the animals had been shot.

Registration of marine mammal tissues and parts retained from strandings is mandatory under 50 CFR 216.22(c). With limited exceptions, the MMPA prohibits the purchase or sale of marine mammals or marine mammal parts. It also prohibits the possession of marine mammals or marine mammal parts taken in violation of the Act. In order to provide adequate enforcement of the Act while still allowing legitimate activities, it is necessary to document the inventory of tissues that are legally held. The Level A form provides information which may be used for

registration of marine mammal parts taken under stranding authority and for tracking of such legally obtained samples. The use of these forms assists us in standardizing this procedure.

### III. Reporting

Public reporting burden for this collection of information is estimated to average 30 minutes per response for each form, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Response time to the stranded marine mammal is not included in this time, as a universal estimate is impossible to make. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to National Marine Fisheries Service, Office of Protected Resources, Marine Mammal Conservation Division, 1315 East-West Highway, Silver Spring, MD 20910.

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

Under the MMPA Section 410(3), a stranding is defined as an event in the wild where:

- (A) A marine mammal is dead and is -
  - (i) on a beach or shore of the United States; or
  - (ii) in waters under the jurisdiction of the United States (including any navigable waters); or
- (B) a marine mammal is alive and is -
  - (i) on a beach or shore of the United States and unable to return to the water;
  - (ii) on a beach or shore of the United States and, although able to return to the water, is in apparent need of medical attention; or
  - (iii) in the waters under the jurisdiction of the United States (including any navigable waters), but is unable to return to its natural habitat under its own power or without assistance.

Level A data: Basic minimum data to be collected; corresponds to the information required on these stranding forms. Collection of Level A data is mandatory for all members of the Network. This information is not considered proprietary and will be available to the public upon written request to the NMFS regional stranding coordinator. These data will be released provided that the requestor describes the intent of use of these data and credit the stranding network and NMFS in any publications.

Level B data: Supplemental or intermediate data to the Level A data that includes additional information about the stranding event and life history data. Examples of these types of data include: weather and tide conditions, offshore human/predator/prey activity, morphometrics, pre-stranding/stranding/rehabilitation behavior, stranding/rehabilitation health assessments, and life history samples (teeth, jaw, status of reproductive organs, stomach and intestinal contents, etc.).

Level C data: Detailed data and results from tissues collected for histopathology, toxicology, microbiology, virology, parasitology, etc.

Level B and C data are proprietary and distribution of such information is under the discretion of the respondent or on-site coordinator in the case of an official unusual marine mammal mortality event. This Examiner's Guide provides instructions for the completion of the Level A data form

and the Rehab Disposition form; no standardized forms for Level B or C data have been developed.

For additional comments related to the Level A data, use the back of the Level A Data form, under “Additional Remarks”. The Level A form should be completed and sent to the NMFS Regional Stranding Coordinator promptly following the examination of the animal (or as stated according to the Stranding Agreement) to ensure that the data will be available in near real time, facilitating the efficient and appropriate management of marine mammal populations in accordance with the MMPA. If information regarding a stranding event is obtained after the Level A form or Rehab Disposition form has been submitted to NMFS, please forward such information in a separate communication to the NMFS Regional Stranding Coordinator, referring to the specific field number.

#### **IV. DEFINITIONS OF TERMS FOR LEVEL A - VERSION 2007**

##### **ADMINISTRATIVE INFORMATION**

**Field #:** Assign each stranding event a unique identifier. Format is open to each agency’s requirements; however, please remain consistent within your agency.

**NMFS Regional #:** Leave this blank. NMFS will assign a regional number consistent with the National Marine Mammal Stranding Database.

**National Database #:** Leave this blank. NMFS will assign a national database number consistent with the National Marine Mammal Stranding Database.

**Common Name:** The common name of the stranded animal. If identity is not determined to species, describe the level to which the remains can be identified. (Example: unknown, pinniped/cetacean, otariid/phocid, or odontocete/mysticete, delphinid/phocoenid, etc.)

**Genus/Species:** This is the Latin name for the animal in standard binomial nomenclature. If either genus or species is not identifiable, fill in the appropriate blank with “UNKNOWN.”

**Examiner:** Name of the examiner who is submitting the report. This should be the individual who is responsible for preparing the entire level A stranding report, not necessarily the note taker or a public citizen who first reported the animal

**Affiliation:** Affiliation of the examiner who is submitting the report. This could be the same organization as listed below under “Stranding Agreement or Authority”, a Designee organization (designee of a Stranding Agreement holder), the agency of a federal, state, or local government official authorized under MMPA Section 109(h), public, citizen or none.

**Address:** Mailing address of the examiners Stranding Agreement organization or government agency office.

**Phone:** Daytime (Work) phone number where the examiner may be reached for further comment. NOTE: Please include only business addresses and phone numbers, to prevent the release of personal information to the public.

**Stranding Agreement or Authority:** Stranding Agreement holder or agency through which the examiner has been authorized to take marine mammals or marine mammal parts. If the examiner is the member of a “Designee Organization” record the name of the Stranding Agreement holder under whom the examiners organization is designated. If the examiner is operating under 109(h) authority, include the name of the government organization.

### **LOCATION OF INITIAL OBSERVATION**

**State, County, and City:** The standard state, county, and city names for the stranding location. For floating carcasses (U.S. waters between 3 and 200 miles offshore), fill State with “EEZ” and closest state. This should include boroughs, parishes, provinces, islands, commonwealths, and territories.

**Body of Water:** The major ocean basin closest to the site where the animal was observed stranded (e.g., Atlantic Ocean, Gulf of Mexico, Pacific Ocean, Gulf of Alaska) and describe the specific location in “Locality Details”.

**Locality Details:** Using known landmarks (access point, mile markers, street addresses etc), describe the precise locality where the animal was found. Compass bearings and relative distances are useful but GPS coordinates are preferred. For animals swimming or floating, this should include the referencing the associated ocean, sea, gulf, bay, inlet, estuary, or river.

**GPS Coordinates:** Documentation in decimal degrees is **required**. NOTE: Negative longitude represents the Western Hemisphere, positive longitude represents the Eastern Hemisphere, negative latitude represents the Southern Hemisphere, and positive latitude represents the Northern Hemisphere. Note that most GPS units can be set to display latitude and longitude in the decimal degree format and there are many lat/long conversion websites on the internet.

**Actual or Estimated:** Indicate if the latitude/longitude coordinates are exact (from a GPS unit) or an estimate (based on a map, website, previous strandings, known lat/longs for landmarks, etc.).

**How Determined:** Indicate how the latitude/longitude coordinates were obtained. Check the box that represents method of data collection:

- Global Positioning System (GPS)**
- Map**
- Software program/Internet website**

**OCCURRENCE DETAILS** - The occurrence details help define the reason for the response and details associated with the stranding event.

**Restrand** - Check this box if the animal has previously stranded, either responded to by your organization or another. The animal may have tags from a rehabilitation facility, or may have recognizable and distinctive features. If this box is checked, you should indicate the previous field numbers assigned to this animal (by your facility or others), if known, on the back of the form in the space marked “Additional Identifiers.”

**GE #** - Leave this blank. NMFS will assign a regional designation to represent the “Group Event Number”.

**Group Event** - A group event is a stranding event which involves two or more animals, either simultaneously or over a period of time.

**If Yes** - identify the type of group event. These designations are not exclusive, more than one option may be selected:

**Cow/Calf Pair** – this would be two animals stranding where one is the mother and the other is the offspring (a mom/pup pair would also qualify).

**Mass Stranding** - this is 2 or more cetaceans that simultaneously strand, other than cow/calf pairs.

- Number of Animals** - Indicate the number of cetaceans involved in the mass stranding, and whether this count is an “Actual” or “Estimate” count.

NOTE: Animals may be involved in other types of group events that will be determined after the Level A data sheet is filled out and submitted. These animals will be assigned a “**Group Event Number (GE#)**” and the group event fields will be incorporated into a separate database in the National Database by the Regional Stranding Coordinator or by the Onsite Coordinator if the case of Unusual Mortality Event. Examples of these types of events include:

- “*hazmat or oil spill*” - any animal affected by a spill of oil or another hazardous material;
- “*pre-event investigation*” - animals sampled after a group event is suspected, but before it has been officially designated as an Unusual Mortality Event by the Working Group on Marine Mammal Unusual Mortality Events (WGMMUME);
- “*unusual mortality event*” - any animal part of a die-off that has been officially designated as a UME by the WGMMUME; and
- “*repeat event*” - animals stranding during a die-off that has been designated as a repeat event by the WGMMUME.

If you wish, you may update your Level A datasheet for your records to reflect the Group Event number that will be listed in the National Database after the Regional Stranding Coordinator has verified the entry.

**Findings of Human Interaction** - This field does not represent cause of stranding or cause of death. These data should not be used out of context or without verification.

**Check “Yes”** if there are any signs or evidence of human interaction (HI), whether or not you believe they were the cause of death. If you check “Yes,” use the back of this form in ADDITIONAL REMARKS to further explain the nature of the injury (or evidence) and how it was assessed and determined to be human related. If possible, document injuries or marks with photographs or sketches/drawings. Describe the injury or mark, the type of fishing gear recovered the location of any wounds (gunshot, fishing gaff, knife incision, line or net entanglement, etc.). Note any external markings or color patterns and if the injury or mark could be determined as antemortem or postmortem (i.e., if animal seen with injury when alive or by histological confirmation). Also, describe any relevant circumstances regarding the interaction (e.g., whether the interaction was witnessed). Please indicate if you used the Protocol developed by the Virginia Aquarium and Cape Cod Stranding Network entitled “2006 *Protocol for Examining Marine Mammal for Signs of Human Interaction*” and attach a copy of the completed Form to the Level A Data sheet. Also indicate if you have attended training on this protocol.

**Check “No”** if the animal was examined and there was no indication of human interaction.

**Check “Could not Be Determined (CBD)”** if there is insufficient evidence to indicate an interaction, the animal was not thoroughly examined, the animal was too decomposed for a thorough examination, there may have been signs of something that may have been a human interaction but you can’t tell for sure, or the observer does not feel competent to determine this type of injury (do not guess).

**If you checked “Yes”**, check the box that most accurately details the type of human interaction:

**Boat Collision** - Check if there are any signs of boat or ship collision such as propeller wounds or blunt trauma from a boat hull.

**Shot** - Check if there are any signs of gunshots. Add in the comments how this was determined (metal detector, bullet found, etc.)

**Fishery Interaction** - Check if there are any signs of fishery interaction such as wounds related to fishing gear, or fishing gear attached to the animal.

**Other Human Interaction** - If you checked “Yes” and there were signs of human interactions other than those listed, please describe in this blank. This could include signs of as ingested plastic, debris entanglement, wounds from other weapons besides firearms (arrows, harpoons, etc.), non-boat vessel related injuries (car or train collision, etc.), mutilation, etc. Use the back of this form under “ADDITIONAL REMARKS” to continue your description, if necessary.

**How Determined** - If you checked “Yes” or “No”, describe how the signs of human interaction were determined:

**External Exam** – The entire external surface of animal is visually assessed for signs of HI. If the entire surface could not be examined, please state why and which parts were looked at (e.g., large whale could not be turned over, only dorsal surface examined)

**Internal Exam** - The response included an examination of some or all of the body cavity. However, the condition of the animal or other factors precluded the collection and analysis of samples from internal organs. Please indicate in the **ADDITIONAL REMARKS** section the systems examined and not examined as well as examination findings.

**Necropsy** – a necropsy was done, detailed information was documented, and internal tissues were collected for analysis. Please refer to the definitions and check whether the necropsy was limited or complete in the section below entitled “SPECIMEN DISPOSITION.”

**Other** – other obvious signs of HI including presence of gear, and eye witness account of a human interaction.

**Gear Collected** - Check “Yes” if you collected fishery gear from the animal (hook, line, net, etc.). Check “No” if you did not collect any gear, or if there was no gear to collect.

**Gear Disposition** - If you checked “Yes”, use this line to indicate what was done with that gear (i.e. sent to NMFS Enforcement or Regional Stranding Coordinator), or where the gear is housed.

**Other Findings Upon Level A** - Check “Yes” if there are any signs or evidence of other (non-human related interaction) findings related to the stranding, whether or not you believe they were the cause of death; check “No” if there was no indication of other factors; check “CBD” if there is insufficient evidence to indicate. Non-human related injuries or disease may include signs of infectious or parasitic disease and signs of trauma from beaching, conspecific interactions/aggression, interspecific interactions, scavengers and predators, etc. See above definition of external and internal exam for more description. Also, document if the animal was pregnant and in other findings – include comments.

**If Yes, choose one or more** – check the box that most accurately details the other factors:

- Illness**
- Injury**
- Pregnant**
- Other** (indicate what was found)

**How Determined (check one or more)** – if you noted other findings than HI signs, check how this was determined (please use the back of this form in ADDITIONAL REMARKS section to include more detail):

- External Exam** (see above for definition)
- Internal Exam** (see above for definition)
- Necropsy** (see above for definition)
- Other** – document the process

## **INITIAL OBSERVATION**

**Date** - Enter the date the stranded animal was first observed by any witness. This is the earliest known date of observation of the stranded animal.

**First Observed** - Check the appropriate box that indicates the how the animal was initially observed:

- Beach or Land**
- Floating (in the water)**
- Swimming.**

**Condition at Initial Observation** - Check the appropriate box that indicates the physical state of the animal or carcass and the date of the initial observation:

- Alive (Code 1)**: Check this box if the animal was alive at the initial observation.
- Fresh Dead (Code 2)**: Check this box if the carcass was in good condition (fresh/edible). Normal appearance, usually with little scavenger damage; fresh smell; minimal drying and wrinkling of skin, eyes and mucous membranes; eyes clear; carcass not bloated, tongue and penis not protruded; blubber firm and white; muscles firm, dark red, well-defined; blood cells intact, able to settle in a sample tube; serum unhemolyzed; viscera intact and well-defined, gut contains little or no gas; brain firm with no discoloration, surface features distinct, easily removed intact.



- Moderate Decomposition (Code 3)**: Check this box if the carcass was in fair condition (decomposed, but organs basically intact). Carcass intact, bloating evident (tongue and penis protruded) and skin cracked and sloughing; possible scavenger damage; characteristic mild odor; mucous membranes dry, eyes sunken or missing; blubber blood-tinged and oily; muscles soft and poorly defined; blood hemolyzed, uniformly dark red; viscera soft, friable, mottled, but still intact; gut dilated by gas; brain soft, surface features distinct, dark reddish cast, fragile but can usually be moved intact.
- Advanced Decomposition (Code 4)**: Check this box if the carcass was in poor condition (advanced decomposition). Carcass may be intact, but collapsed; skin sloughing; epidermis of cetaceans may be entirely missing; often severe scavenger damage; strong odor; blubber soft, often with pockets of gas and pooled oil; muscles nearly liquefied and easily torn, falling easily off bones; blood thin and black; viscera often identifiable but friable, easily torn, and difficult to dissect; gut gas-filled; brain soft, dark red, containing gas pockets, pudding-like
- Mummified/Skeletal (Code 5)**: Check this box if mummified or skeletal remains. Skin may be draped over skeletal remains; any remaining tissues are desiccated.
- Unknown**: Check this box if the stranded animal was dead at the time of initial observation but information on the condition of the carcass is unavailable.

### **LEVEL A EXAMINATION**

**Date** – Enter the date of examination that the animal was responded to and examined by your organization to collect Level A data (location, condition, signs of human interaction, species, sex, age class, length, weight, and any other visual observations). Complete morphometrics and necropsy could be taken later.

**Not Able to Examine** - Check this box if you were unable to examine the animal. Some examples would be: the animal was inaccessible (at the bottom of a cliff, on an island, floating, etc.); the animal washed out with the tide before you responded; manpower/time constraints made a response impossible; etc.

**Condition at Examination** - Check the appropriate box that indicates the physical state of the animal or carcass on the date of the Level A examination:

- Alive (Code 1)**: Check this box if the animal was alive at the initial observation.
- Fresh Dead (Code 2)**: Check this box if the carcass was in good condition (fresh/edible). Normal appearance, usually with little scavenger damage; fresh smell; minimal drying and wrinkling of skin, eyes and mucous membranes; eyes clear; carcass not bloated, tongue and penis not protruded; blubber firm and hite; muscles firm, dark red, well-defined; blood cells intact, able to settle in a sample tube; serum unhemolyzed; viscera intact and well-defined, gut contains little or no gas; brain firm with no discoloration, surface features distinct, easily removed intact.
- Moderate Decomposition (Code 3)**: Check this box if the carcass was in fair condition (decomposed, but organs basically intact). Carcass intact, bloating evident (tongue and penis protruded) and skin cracked and sloughing; possible scavenger damage; characteristic mild odor; mucous membranes dry, eyes sunken or missing; blubber blood-tinged and oily; muscles soft and poorly defined; blood hemolyzed, uniformly dark red; viscera soft, friable, mottled, but still intact; gut dilated by gas; brain soft, surface features distinct, dark reddish cast, fragile but can usually be moved intact.

- Advanced Decomposition (Code 4):** Check this box if the carcass was in poor condition (advanced decomposition). Carcass may be intact, but collapsed; skin sloughing; epidermis of cetaceans may be entirely missing; often severe scavenger damage; strong odor; blubber soft, often with pockets of gas and pooled oil; muscles nearly liquefied and easily torn, falling easily off bones; blood thin and black; viscera often identifiable but friable, easily torn, and difficult to dissect; gut gas-filled; brain soft, dark red, containing gas pockets, pudding-like consistency.
- Mummified/Skeletal (Code 5):** Check this box if mummified or skeletal remains. Skin may be draped over skeletal remains; any remaining tissues are desiccated.
- Unknown:** Check this box if the stranded animal was dead at the time of initial observation but information on the condition of the carcass is unavailable.

**INITIAL LIVE ANIMAL DISPOSITION** - Indicate what action(s) was/were taken to handle a live animal (NOTE: check all that apply at the time of completing the Level A examination):

- Left at Site:** Check if the animal was reported, and was confirmed stranded by a reliable source and acknowledged by the Regional Coordinator, but no response was made; or the animal was observed by the response team, but no other actions were taken.
- Immediate Release at Site:** Check if the animal was reported and treated or evaluated, but was not removed from the site.
- Relocated:** Check if the animal was evaluated or treated, was removed from the site of stranding, and was transported and released at another site without being admitted to an authorized rehabilitation facility.
- Disentangled:** Check if the animal had entangling gear removed and was released/swam away.
- Euthanized at Site:** Check if the animal was found alive but was euthanized by an authorized entity.
- Died at Site:** Check if the animal was found alive and died before transport to an authorized rehabilitation facility or relocation.
- Transferred to Rehabilitation:** Check if the animal was transported to an authorized rehabilitation facility.
  - Date** - Fill in the date of the transfer
  - Facility** - Fill in the name of the authorized rehabilitation facility to which the animal was transferred.
- Died during Transport:** Check if the animal was found alive and died during transport to a care facility.
- Euthanized during Transport:** Check if the animal was found alive and was euthanized during transport to an authorized rehabilitation facility by an authorized entity.
- Other:** Check if the disposition of the live animal differs from the options listed above and document here.

**CONDITION/DETERMINATION** - Indicate the condition of the animal at the time of the response. This question should help provide your reasoning for the disposition that was selected. (NOTE: Check all that apply).

- Sick:** Check if the animal appears sick or is behaving oddly, with no external signs of injury.

- Injured:** Check if the animal shows evidence of physical injury.
- Out of Habitat:** Check if the animal was found in area not typical for its species. This could include atypical location and time of year for its known life history. Generally an out of habitat case involves a free swimming animal that is reported in an area outside it's normal habitat, tends to remain there for a period of time, and may need intervention to return to it's normal habitat (e.g. a bottlenose dolphin in a freshwater river that doesn't leave on its own accord, an ice seal in Florida, or a humpback whale in an embayment). This does not include a typical live stranding of an offshore species close to the beach.
- Deemed Releasable:** Check if the animal shows no outward signs of illness or injury.
- Abandoned/Orphaned:** Check if the animal is a cetacean calf found stranded on the beach without an adult female, or a pup/calf that has been monitored and determined to be abandoned. The length of time that the animal should be observed without intervention may be up to 48 hours and varies by region; check with your Regional Stranding Coordinator for your regional policy.
- Inaccessible:** Check if the animal is in an inaccessible location and therefore was not closely examined (condition could not be determined). Examples of inaccessible locations include: at the base of a cliff, areas with dangerous surf conditions, mudflats, islands, ice, etc.
- Location Hazardous**
  - **To Animal** - Check if the animal is in a location that is deemed hazardous to its health and welfare (i.e. up a freshwater river, pinnipeds found inland, etc.)
  - **To Public** - Check if the animal is in a location that is deemed hazardous to the public (i.e. a crowded public beach, a marina, etc.)
- Unknown/CBD:** Check if the animal could not be examined or if the condition could not be determined.
- Other:** Describe any other situation not addressed above.

### **MORPHOLOGICAL DATA**

**SEX (Check One):** Check the box indicating the animal's sex, or check "Unknown" if unable to determine.

**AGE CLASS (check One):** Check the box indicating the animal's age class. If possible, use information based on reproductive organs, teeth or accepted length/age data:

- Adult:** This age class would be used for an animal that is judged or found upon necropsy to be sexually mature.
- Subadult:** This age class would be used for a animal that is judged to be greater than one year old, but not yet mature.
- Yearling:** This age class would be used for an animal that is judged to be approximately one year old, using length or time of year.
- Pup/Calf:** This age class would be used for a stranded animal that is smaller than yearling size, or in a population where it would be younger than one year old.
- Unknown:** This age class would be used for an animal if you are unable to determine its age.

**Whole Carcass:** Check the box if the carcass is sufficiently intact for the Level A morphometric data (straight length, weight) to be collected.

**Partial Carcass:** Check the box if the carcass is **not** sufficiently intact for the Level A morphometric data (straight length, weight) to be collected. If you measure the remains of the carcass, the metric (weight or length) must be entered as “estimated”. Also record what part is missing in the ADDITIONAL REMARKS section on the back of this form. If neither length nor weight is measured, enter **zero “0”** in the respective blanks.

**Straight Length** - Record the straight length (not contoured) of the animal on the date of initial examination.

- cm** = centimeters (preferred)
- in** = inches
  - actual** = Check if this was an actual measurement (physical measurement)
  - estimated** = Check if this was an estimated measurement (visual measurement). For example, if the carcass is not intact (e.g. flukes degraded or severed, head missing, etc.) and record what part is missing in the ADDITIONAL REMARKS section on the back of this form.
- Weight** - Record the weight of the animal on the date of initial examination. Please check if this was an actual or estimated measurement.
  - kg** = kilograms (preferred)
  - lb** = pounds
  - actual** = Check if this was an actual measurement (physical measurement)
  - estimated** = Check if this was an estimated measurement (visual measurement) or if the carcass was not intact. Record what part is missing in the ADDITIONAL REMARKS section on the back of this form.

**PHOTOS/VIDEO Taken** - Check “Yes” or “No” to indicate whether visual media was taken of this stranding event.

- Photo/Video Disposition** - If photos or video were taken of the event, use this line to indicate where these photos/videos are housed.

### **TAG DATA**

**Present at Time of Stranding (Pre-existing)** - Mark “YES” if tags or identification markings were pre-existing (present on the animal at the time of stranding).

**Applied During Stranding Response** - Mark “YES” if tags or identification markings were applied by the stranding response organization (i.e. prior to release at stranding or relocation site, to prevent a carcass from being double-counted, etc.).

**NOTE:** If no tags were present or applied, the responder should check “NO” for both boxes and skip the rest of the section.

**Document details about the type, color, and placement of identification tags, brands, or markings:**

**ID#** - Write the number(s) of the identifying tag(s), brand(s), or other applied marking(s), if applicable.

**Color** - Using basic color-names, indicate the identifying color of tags where applicable.

**Type** - List the type of tag, brand, or other applied marking. For example, radio, PIT, plastic, roto, spaghetti, satellite, freeze brand, bleach mark, paint, etc.

**Placement** - Circle (ONE) the location of each applied/present marking:

**D** = dorsal body

**DF** = dorsal fin

**L** = lateral body

**LF** = left front flipper/appendage

**LR** = left rear flipper/appendage

**RF** = right front flipper/appendage

**RR** = right rear flipper/appendage

**Applied** = Check “Applied” for each of the tags, brands, or other markings that were applied after the animal stranded, as part of the stranding or rescue response. If the animal was rehabilitated and released with tags or markings, you may update this part of the Level A form after they are applied.

**Present** = Check “Present” for each of the tags, brands, or other markings that were already present when the animal stranded.

### **CARCASS/SPECIMEN DISPOSITION**

**CARCASS STATUS** (Check all that apply) - Check the following boxes to indicate how the carcass was disposed:

- Left at site** - Check this box if the carcass, including skeleton, was left where it was found to decompose.
- Buried** - Check this box if most of the carcass, including skeleton, was buried.
- Rendered** - Check this box if the carcass, including skeleton, was rendered.
- Towed** - Check this box if the carcass, including skeleton, was towed to sea. Fill in the latitude and longitude of the position where the carcass was left.
- Sunk** - Check this box if the carcass, including skeleton, was sunk. Fill in the latitude and longitude of the position where the carcass was sunk..
- Frozen for later examination** - Check this box if all or most of the carcass and/or skeleton was retained and frozen for later examination.
- Landfill** - Check this box if the carcass, including skeleton, was sent to a landfill or other waste facility.
- Unknown** - Check this box if the fate of the carcass is unknown or if the carcass was lost.
- Other** – Check this box if the fate of the carcass is other than what is listed above and document here.

**SPECIMEN DISPOSITION** (Check all that apply) – Check the following boxes to indicate if nondiagnostic specimens were collected for scientific, educational, or other purposes (i.e., skin for genetics, blubber for contaminants, bones for collection, etc.). The disposition (both transitory and final) of these specimens should be recorded on the back of the form under “ADDITIONAL REMARKS.” Please check with your NMFS regional stranding coordinator regarding marine mammal parts authorizations prior to retention and transfer.

- Scientific collection** - check this box if specimens from the live animal or carcass, including skeletal parts, were retained for scientific research.
- Educational collection** - check this box if specimens from the live animal or carcass, including skeletal parts, were retained for educational purposes.
- Other** - check this box if the fate of specimens from the live animal or carcass, including skeletal parts, was other than that above and briefly indicate the disposition.

- Comments** - List comments regarding disposition of the specimen (i.e., identifying which tissues were collected and retained, differentiating where tissues were sent, etc.).

**NECROPSY** - Indicate “YES” if a necropsy was completed to obtain Level-C data.

- Limited Necropsy** - A partial necropsy includes a detailed exam of the carcass in which some of the organs or systems are examined, collected, and analyzed according to established protocols, but either the condition of the animal or other factors limits a complete necropsy. Please indicate in the **ADDITIONAL REMARKS** section the systems examined and not examination as well as examination findings.
- Complete necropsy** - A complete necropsy consists of a detailed exam where the majority of organs are examined, collected (i.e., if feasible, this could include tissues for histopathology) and analyzed according to established protocols. This will include documenting any internal lesions, bruising, or broken/fractured bones, and examining the entire GI tract for lesions, foreign material, gear, and other natural contents (e.g. food), and the lungs/bronchi. A necropsy report is generated and disseminated to the pathologist on record.
- Carcass Fresh** - Check if the necropsy was conducted on a fresh carcass (not frozen before examination).
- Carcass Frozen/Thawed** - Check if the necropsy was conducted on a carcass that was frozen and thawed.

**NECROSPIED BY** - List the name and contact information of the primary person/facility who conducted the necropsy.

**Date** – List the date when the necropsy was done.

## **BACK OF FORM**

**ADDITIONAL IDENTIFIERS:** Include any additional information related to the Field ID number or identification of the stranding event. Examples include: previous Field ID numbers if this animal previously stranded; ID numbers assigned by other organizations (including authorized rehabilitation facilities to which the animal is transferred), former identification numbers from scientific research projects, etc.

**ADDITIONAL REMARKS:** Include comments, and list other data sheets that may have been completed such as human interaction, morphometrics, necropsy, rehabilitation disposition, etc. Include further details or comments on any of the Level A data fields from the front of the sheet.

**APPENDIX F: Marine Mammal Stranding Network Members - NMFS Alaska Region**

<b>Organization/Individual</b>	<b>Location</b>	<b>Authority</b>	<b>Rehabilitation (NMFS Species)</b>
Alaska SeaLife Center	Seward, AK	SA	Pinnipeds, Small Cetaceans
Aleut Community of St. Paul Island Tribal Government	St. Paul Island, AK	SA	N/A
Alaska Sea Otter and Stellar Sea Lion Commission	Anchorage, AK	SA	N/A
Alaska Whale Foundation	Petersburg, AK	SA	N/A
University of Alaska Fairbanks-Museum of the North	Fairbanks, AK	SA	N/A
Mr. Andy Aderman, Togiak National Wildlife Refuge	Dillingham, AK	109(h)	N/A
Ms. Kimberly Beckman, AK Dept of Fish and Game	Fairbanks, AK	109(h)	N/A
Mr. Jamie King, AK Dept of Fish and Game	Haines, AK	109(h)	N/A
Mr. Reid Brewer, University of Alaska, Fairbanks/Sea Grant	Dutch Harbor, AK	Affiliate with Kate Wynne's SA	N/A
Dr. Kathy Burek	Eagle River, AK	SA	N/A
Mr. Gary Frietag, Southern Southeast Regional Aquaculture Association	Ketchikan, AK	SA	N/A
Chris Gabriele, National Park Service, Glacier Bay National Park	Glacier Bay, AK	109(h)/SA	N/A
Ms. Lauri Jemison, AK Dept of Fish and Game	Juneau, AK	109(h)	N/A
North Gulf Oceanic Society	Homer, AK	SA	N/A
Ms. Lori Quakenbush, AK Dept of Fish and Game	Fairbanks, AK	109(h)	N/A
Ms. Cheryl Rosa, North Slope Borough, Dept of Wildlife Management	Barrow, AK	SA	N/A
Gay Sheffield, AK Dept of Fish and Game	Nome, AK	109(h)	N/A
Ms. Jan Straley, University of Alaska Southeast, Sitka Campus	Sitka, AK	SA	N/A
Dr. Rachel Dziuba, Bridge Veterinary Services	Juneau, AK	SA	N/A
Jamie Womble, National Park Service, Glacier Bay National Park	Juneau, AK Glacier Bay, AK	109(h)	N/A
Ms. Kate Wynne, University of Alaska, Fairbanks/Sea Grant	Kodiak, AK	SA	N/A

- SA = stranding authorization to respond to non-ESA marine mammal strandings
- 109(h) = government employee therefore can respond to non-ESA marine mammal strandings without authorization
- ESA species strandings evaluated on a case by case situation.

**APPENDIX G: Information for Doctors if Injured by a Marine Mammal or during Necropsy**

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**Taken from the Veterinary Medicine website for UC Davis -  
<http://www.vetmed.ucdavis.edu>**

Many species of marine mammals can be infected with, or be healthy carriers of, bacterial, fungal and viral organisms which are known zoonotic pathogens. The risk of acquiring diseases from marine mammals differs as humans interact with marine mammals under different circumstances, such as commercial fishing, subsistence harvesting, scientific activities, wildlife rehabilitation, and animal training. Epidemics of food-borne illnesses such as salmonellosis, trichinellosis and toxoplasmosis have been reported in native peoples of arctic and Australasian regions who harvest marine mammals as part of a traditional diet; however, the risk of acquiring diseases by scientists, wildlife rehabilitators, and animal trainers is not well understood.

Zoonotic disease transmission as a result of occupational contact between marine mammals and humans has been infrequently reported in the scientific literature. The most commonly reported disease is "seal finger". Hundreds of cases of this ailment have been reported in the scientific literature from fishermen and whalers, but there are few case reports of the disease occurring in scientists and rehabilitators. This syndrome was once thought to be caused by the bacteria *Erysipelothrix rhusiopathiae* but is now thought to be caused by *Mycoplasma* spp. This bacteria-like organism is carried in the mouth and on the skin of marine mammals (primarily seals and sea lions) and can infect humans by entering the body through breaks in the skin. The resulting infection causes a painful dermal abscess.

Other reports of marine mammal workers acquiring diseases from marine mammals include:

- Calicivirus (San Miguel Seal Lion virus) from northern fur seals (*Callorhinus ursinus*).
- *Blastomyces dermatitidis* from a bottlenose dolphin (*Tursiops truncatus*).
- *Erysipelothrix rhusiopathiae* from a beached pilot whale (*Globicephala melaena*).
- Influenza A virus from harbor seals (*Phoca vitulina*)
- *Leptospira* spp. from California sea lion (*Zalophus californianus*) carcasses.
- *Mycobacterium bovis* from a New Zealand fur seal (*Arctocephalus forsteri*).
- *Mycobacterium marinum* from a bottlenose dolphin (*Tursiops truncatus*).
- Sealpox virus from gray seals (*Halichoerus grypus*).



**INFORMATION FOR PHYSICIANS****Documented Cases of Zoonotic Pathogens Acquired from Marine Mammals**

<b><u>Bacterial</u></b>	<b><u>Viral</u></b>	<b><u>Fungal</u></b>
<i>Brucella</i>	San Miguel Seal Lion virus (calicivirus)	<i>Blastomyces</i>
<i>Erysipelotrix</i>	Influenza A (orthomyxovirus)	
<i>Leptospira</i>	Sealpox (parapoxvirus)	
<i>Mycobacterium</i>		
<i>Mycoplasma</i>		

**Marine Mammal Pathogens with Zoonotic Potential  
but no documented cases of transmission to humans**

<b><u>Bacterial</u></b>	<b><u>Viral</u></b>	<b><u>Fungal</u></b>
<i>Aeromonas</i>	Influenza B	<i>Aspergillus</i>
<i>Burkholderia</i> (formerly <i>Pseudomonas</i> )	Rabies	<i>Candida</i>
<i>Clostridium</i>		<i>Coccidioides</i>
<i>Edwardsiella</i>		<i>Histoplasma</i>
<i>Staphylococcus</i>		
<i>Streptococcus</i>		
<i>Vibrio</i>		

**NOTE:** A NMFS biologist was necropsying a Cook Inlet beluga whale in 2008 and cut her finger with a necropsy knife. Her finger swelled up and discolored that evening. She had been diagnosed and treated for “beluga finger” in the past and noted the onset of symptoms was much faster the second time. While the infecting organism was not identified, she was successfully treated with a 10 day course of penicillin.

**Brucella**

In 1999, a researcher suffered headaches, lassitude and a severe sinusitis after exposure to marine mammal strains of *Brucella* with which the worker was in contact. The symptoms resolved in one week after treatment with doxycycline and rifampin. The researcher had a positive titer for *Brucella*, and the organism was cultured from blood samples. PCR-RFLP was

used to positively identify the isolates as being comparable to marine mammal *Brucella* (Brew and Staunton 1999).

*Brucella* spp. are gram-negative intracellular bacteria and are a major source of zoonoses worldwide. *B. melitensis*, *B. abortus*, and *B. suis* are some species commonly recognized to play a role in human and animal health. Nomenclature for marine mammal strains of *Brucella* has not yet been fully developed, but *B. maris* and *B. pinnipedia* have so far been named. Transmission occurs primarily through contact with aborted fetal material, and consumption of contaminated milk.

The bacteria have been isolated from multiple species of marine mammals, including pinnipeds, cetaceans and otters. Abortion and meningoencephalitis have been reported in dolphins from which the bacteria was isolated, but in the majority of cases, the animals did not demonstrate clinical disease (Godfroid 2002).

Symptoms can vary depending on the chronicity of the infection, ranging from acute "flu-like" symptoms (headaches, fever, myalgia, and malaise) to more chronic symptoms (arthritis, orchiepididymitis, and fatigue). Neurological symptoms are rare, being seen in less than 5% of cases. Serologic tests for *Brucella* are available, but culture is the most definitive test for diagnosis (Centers for Disease Control 2001).

#### Treatment

Doxycycline and rifampin are the recommended therapies. Other treatment has been associated with recurrence.

### **Erysipelothrix**

In 1975, four students from the Laboratoire de l'Institut Scientifique et Technique des Pêches Maritimes (Scientific and Technical Institute of Maritime Fishing) acquired a cutaneous *Erysipelothrix rhusiopathiae* infection from a beached pilot whale. The organism was isolated from both the whale and the affected students (Chastel, Measure et al. 1975).

*Erysipelothrix rhusiopathiae* is a gram-positive, facultative anaerobic rod, and is recognized as the causative agent of swine erysipelas.

Cetacea appear to be more susceptible than pinnipeds and can develop septicemia, endocarditis, and chronic skin abscessation (Couch, Fournie et al. 1993; Kinsel, Boehm et al. 1997). The characteristic rhomboid cutaneous lesions, which are caused by thrombosis of peripheral arteries and local tissue infarction, can also be seen (Sweeney and Ridgway 1975).

Infection in humans is usually associated with occupational and recreational exposure. The bacteria enter through breaks in the skin and infection can present in three clinical forms:

1. Erysipeloid form: localized, self-limiting cellulitis that develops around site of inoculation.
2. Cutaneous form: a more severe and diffuse infection.
3. Septicemic form: most severe and rare form with or without cutaneous lesions. Associated with arthritis and/or endocarditis with valvular destruction (Artz, Szabo et al. 2001).

#### Treatment

*Erysipelothrix* is susceptible to penicillins and cephalosporins.

### Leptospira

During the course of a 5 year study (1972-1977), three researchers became ill after exposure to California sea lions that were infected with *Leptospira*. The two workers with more severe illness became infected after necropsying a sea lion. All three developed serum agglutinating antibody titers to *Leptospira interrogans* serovar *pomona* (Smith, Vedros et al. 1978).

*Leptospira interrogans* serovar *pomona*, is one of 200 serovars within this species of spirochete bacteria. For this and other potentially zoonotic serovars, transmission occurs directly between mammalian hosts and indirectly through exposure to contaminated water and soil.

Renal disease has been observed in harbor seals, and more commonly in California sea lions and fur seals (Gulland, Koski et al. 1996; Stamper, Gulland et al. 1998). The disease causes tubular necrosis consistent with interstitial nephritis. Clinical signs include anorexia, dehydration and polydipsia. Cytology and serum chemistry reveals a leukocytosis and high serum phosphorus, urea nitrogen and creatinine levels.

In the largest outbreak of environmentally-acquired leptospirosis, the most common symptoms reported were chills, headache, myalgia, eye pain, reddened eyes and diarrhea. Clinical signs included those consistent with acute hepatitis and renal failure. Diagnostics revealed elevated liver enzymes, bilirubinemia, thrombocytopenia, proteinuria, hematuria, and elevated creatinine (Morgan, Bornstein et al. 2002).

#### Treatment

*Leptospira* are susceptible to penicillins.

### Mycobacterium

There is one reported case of an animal handler acquiring skin lesions similar to the cutaneous mycobacteriosis lesions seen on a manatee which the handler was working (Howard 1983). In 1968, a dolphin trainer working with a bottle-nosed dolphin was bitten and subsequently developed dermal abscesses. *Mycobacterium marinum* was cultured from aspirates taken from the lesions on the trainer's hands (Flowers 1970). In 1988, a seal trainer from western Australia was diagnosed with *Mycobacterium bovis* tuberculosis. Diagnosis was made after the trainer developed a dry productive cough, exercise intolerance, and weight loss. Bacterial isolates from the trainer and the seals with which he worked were identical based on gel electrophoresis (Thompson, Cousins et al. 1993).

*Mycobacterium* spp. are gram-positive acid-fast rods. *Mycobacterium marinum* is more commonly regarded as a salt- and fresh-water fish pathogen, while *M. bovis* primarily affects cattle and is an important zoonotic agent worldwide.

*Mycobacterium marinum*: In marine mammals, the organism causes dermal abscesses when infection is local, and pulmonary tuberculosis or generalized abscessation with spreading infection (Tryland 2000). In humans, this disease may also be called fish handler's disease or swimming pool granuloma. The organism usually enters through breaks in the skin after host contact with contaminated water. Local infection results in a nodular lymphangitis with or without lymphadenitis. Skin lesions can ulcerate, and spreading infection can cause tenosynovitis, arthritis, and osteitis (Ryncarz 1999).

*Mycobacterium bovis*: Pathological findings in pinnipeds include pulmonary granulomas, lesions in the liver, draining lymph nodes, and tuberculous meningitis (Forshaw and Phelps 1991).

Animals may also have subclinical infections. Humans are usually infected with *M. bovis* from drinking contaminated cows milk. Infection can cause pulmonary tuberculosis, cervical lymphadenopathy, and *Lupus vulgaris* (chronic skin tuberculosis). Urogenital infections have also been reported (Cosivi, Grange et al. 1998).

### Treatment

Common treatment for mycobacteriosis is long-term streptomycin and rifampin.

## **Mycoplasma (Seal Finger)**

While studying seal behavior at the New England Aquarium in 1979, a psychologist was bitten by a harbor seal. Treatment with penicillin and oxacillin resulted in the resolution of symptoms, but the infection reappeared weeks later. The patient was then successfully treated with a 3 week course of tetracycline (Markham and Polk 1979).

In 1980, a graduate student was stabbed with a necropsy knife while working on a sea lion carcass. Clinical symptoms worsened after treatment with dicloxacillin. Radiographs showed periosteal reaction indicative of an osteitis underlying the cutaneous infection. Finally, treatment with tetracycline resolved the infection (Sargent 1980).

In 1990, a wildlife ranger was bitten while returning a seal to the ocean; he subsequently developed a skin infection. A two-week course of treatment with amoxicillin led to a persistent infection, and symptoms continued to persist after a change in antibiotics to flucloxacillin. Radiographs taken of the affected digit showed demineralization of phalanx 2 of the thumb suggestive of an osteitis. Finally a four-week course of treatment with tetracycline cured the infection (Eadie, Lee et al. 1990).

In 1998, a trainer working at the New England Aquarium was bitten by a harbor seal. Treatment was with tetracycline. Cultures taken from the trainer's infected digit and the oral cavity of the seal isolated the same strain of *Mycoplasma* (Baker, Ruoff et al. 1998).

Mycoplasmas are gram-negative coccobacilli that lack a cell wall.

*M. phocacerebrale*, *M. phocidae*, and *M. phocarhinis* were isolated from harbor seals during an epidemic in New England (1980) and in the Baltic Sea (1989) (Baker, Ruoff et al. 1998). Mass mortality due to mycoplasmal pneumonia has been documented; however, pinnipeds likely carry these organisms as part of their normal flora.

The local infection in humans with *M. phocacerebrale* (possibly other *Mycoplasma* species as well) isolated from marine mammals is commonly referred to as "seal finger". The organism enters through breaks in the skin, and infection can occur after contact with pinniped skin and commonly after a bite from seals and sea lions.

Infection causes local erythema and nodules at the site of inoculation, with progressive swelling that can be severely painful. If left untreated (or treated with inappropriate antibiotics), the infection can progress to cellulitis, tenosynovitis, and/or arthritis (Hartley, Pitcher 2002).

### Treatment

Mycoplasmas are susceptible to tetracyclines and are resistant to penicillins and erythromycins. Treatment of severe cases may include arthrodesis or amputation.