

PROTOCOL FOR EXAMINING MARINE MAMMALS FOR SIGNS OF HUMAN INTERACTION

Exam Information (fill in or circle most appropriate)

1 Field #: _____ Species: _____
 2 Examiner: _____ Recorder: _____
 3 Date of exam: _____ Condition code (at exam): 1 2 3 4 5 CBD
 4 Preservation: alive fresh frozen frozen/thawed Body condition: emaciated not emaciated CBD
 5 Documentation: digital print slide video Image disposition: _____
 6 Integument: normal abnormal decomposed % Skin missing: <10% 10-25% 25-50% >50%

7 Explanation of terms:
 YES = I have examined the area and found signs of human interaction
 NO = I have examined the area did not find signs of human interaction
 CBD = I have examined the area and could not determine whether there were signs of human interaction (i.e. the part was missing, degraded, or signs were ambiguous)
 NE = I did not examine the area
 NA = this animal doesn't normally have that part (i.e. seals have no dorsal, dolphins have no rear flippers)

	WHOLE BODY EXAM	YES	NO	CBD	NE	NA	Image taken
8	Appendage(s) removed / Mutilation (with instrument)						
9	Pelt removed / Mutilation (with instrument)						
10	Body sliced / Mutilation (with instrument)						
11	Gear / Debris present on animal (including tags)						
12	Gear / Debris retained (name & contact info in Comments)						
13	External pathology (pox, tattoo lesion, abscess)						
14	Natural markings (scars, tooth rakes, unusual pigmentation)						
15	HI lesions (fishery, gunshot, propeller, healed HI scar, brand)						

16 Predation / scavenger damage (circle all anatomical areas where damage hinders evaluation; numbers coincide with anatomical areas below): 17 18 19 20 21 22 23 24 25 26 27 28 29 NONE

FILL IN TABLE FOR ALL POSSIBLE FINDINGS OF HI

Do not use for natural markings/pathology.

	DETAILED EXAM OF ANATOMICAL AREAS	Type of Lesion										Origin of Lesion							Image taken?		
		YES	NO	CBD	NE/NA	Impression/Laceration	Penetrating wound	Healed HI scar	Abrasion	Other / CBD	Gear - Twine Type					Other					
											Twine / line	Net	other / CBD	Monofilament	Multifilament	CBD	Propeller	Gunshot		Other / CBD	
17	Rostrum/snout																				
18	Mandible																				
19	Head																				
20	L Front appendage																				
21	R Front appendage																				
22	Body R L																				
23	Dorsum/dorsal fin																				
24	Ventrum																				
25	Peduncle																				
26	L Rear appendage																				
27	R Rear appendage																				
28	Flukes/tail																				
29																					



PROTOCOL FOR EVALUATING MARINE MAMMALS FOR SIGNS OF HUMAN INTERACTION



Introduction

Evaluating marine mammals for signs of human interaction requires consistent, objective examination by trained personnel. This document is meant to accompany formal training by experienced stranding network participants. This protocol is divided into an objective data collection section and a more subjective initial human interaction diagnosis. The primary goal of this protocol is to determine whether evidence of human interaction is present on the animal. The secondary, and more difficult, goal is to determine whether human activities contributed to the stranding event. A positive score for Findings of Human Interaction results from an objective evaluation of an animal or carcass. This evaluation does not attempt to determine whether the signs of human interaction occurred before, during, or after a stranding event and does not attempt to qualify the severity of the interaction.

The subjective Initial Human Interaction Evaluation takes into account the circumstances of the stranding event and the animal's physical condition. A high score indicates that human activities most likely caused the stranding. A low score indicates that although signs of human interaction are present, the likelihood that the interaction caused the stranding is very low. For example, old, healed propeller scars on a known whale are unlikely to have caused a stranding during a domoic acid event and a dead dolphin calf covered by debris on a beach following a hurricane is unlikely to have died due to entanglement.

Determining the cause of death is not an objective of this protocol. Without further evaluation, such as histopathology, and review by veterinarians, pathologists and/or other experts, the exact reason for stranding and cause of death cannot be definitively determined.

Human interaction (HI) data illustrate where problems between marine mammals and humans occur. When collected carefully and consistently, these data can be used to describe the types of interaction taking place (e.g. monofilament net, multifilament net, small or large vessel interaction, ingestion of debris, etc.), thus providing a sound scientific basis for policy and management decisions. The nature of strandings makes it inadvisable to use human interaction data to estimate mortality or changes in the mortality rate due to human interaction.

In addition, there are categories of human interaction that are difficult, if not impossible, to evaluate such as strandings that result from persistent harassment, those that result in detrimental behaviors such as surfacing too quickly from a dive after exposure to sub-lethal sound, as well as long-term effects of man-made products that may result in lowered immunity, disease, or reduced reproduction. There are new activities such as renewable energy and aquaculture operations that are just beginning to be exploited in the US. We cannot point to a mark or a diagnostic test that can tell us whether a stranded whale has been exposed to active sonar or to sound generated by a wind farm. We cannot guarantee that a seal pup was never exposed to humans or their activities. Finally, we must acknowledge that we do not understand the effects of multiple human interaction stressors on marine mammals.

We must acknowledge that, in some way, human activities have affected the lives of every marine mammal, but for our purposes using this form, we are trying to document those human activities that are consistently observable and can be documented by stranding responders.

Definitions

In order to effectively evaluate marine mammals for signs of human interaction, you must understand what you are looking for. Below are terms and explanations of data sheet sections:

For most of the sections, you must choose among the following answers:

- YES you have examined the area (*i.e.* left front appendage, snout) and you found signs of human interaction
- NO you have examined the area (*i.e.* left front appendage, snout) and you found NO signs of human interaction
- CBD (Could not Be Determined) which means either: (1) you have examined the area and could not determine whether the marks you saw were signs of human interaction, (2) you could not properly examine the area because it was degraded (scavenged, skin/pelt missing, mangled, *etc.*), or (3) you could not examine the area because it was missing (removed, decomposed)
- NE you did not examine the area (an explanation as to why is often helpful – *e.g.* it was too dark; the animal was too large to roll over, *etc.*)
- NA this question is not applicable to this animal (*e.g.* it is a seal and doesn't have a dorsal fin, or it is a dolphin and doesn't have rear appendages)

Strategy for filling out the human interaction data sheet

Each line on the data sheet is numbered in the left hand margin. These numbers serve two purposes: (1) each number corresponds to a section within these instructions with details about how to complete that line; (2) the line numbers should be entered in the comments section on the second page of the data sheet to indicate to which item the comment refers.

Page 1:

EXAM INFORMATION: Fill in or circle the most appropriate answer for each of the fields.

- 1 Field #: unique identifying number originally assigned to the animal by response personnel. Note: the field number NEVER changes. If other filing numbers are added or accession numbers from other institutions are added, they should be noted as "additional identifiers".
Species: note the genus and species or common name of the animal.
- 2 Examiner: the person evaluating the animal.
Recorder: the person recording the information on the data sheet.
- 3 Date of exam: the date that you are conducting the human interaction evaluation.
condition code (at exam): the condition code of the animal at the time of the human interaction evaluation. Use Smithsonian Institution condition codes (Geraci and Lounsbury 2005).
- 4 Preservation: circle one of following - ALIVE, FRESH (not previously frozen), FROZEN (completely or partially frozen while exam was conducted), or FROZEN/THAWED (previously frozen, but completely thawed before exam).
Body condition: circle one of following - EMACIATED (clearly thin, concave epaxial muscle, obvious neck, ribs, scapulae, hip bones, and/or vertebral processes), NOT EMACIATED (robust or slightly thin, but not fitting the description of emaciated above) or CBD could not be determined (bloated, decomposed, not examined, *etc.*).
- 5 Documentation: circle all forms of photo/video documentation that apply.
Image disposition: indicate which camera, disk, tape, *etc.* that images were taken or stored on and the acronym of the organization that is maintaining them.
- 6 Integument: (skin, fur, hide) circle one of following - NORMAL (as if it were healthy and alive), ABNORMAL (conditions not associated with decomposition such as: alopecia, skin lesions, sloughing, abrasions, *etc.*) or DECOMPOSED/SCAVENGED (post-mortem changes such as peeling, sunburn, or scavenger damage).
% Skin missing: Circle the most appropriate number. Note that this does not apply to alopecia (fur loss) but to SKIN loss.
- 7 Explanation of terms: definitions of common terms used throughout the data sheet.

WHOLE BODY EXAM: Before beginning a detailed exam, take a look at the whole animal. If possible, look at all angles and surfaces. Following your whole animal exam, check the most appropriate choice for each category. If you check YES or CBD, describe what you see in the *Comments* section on the

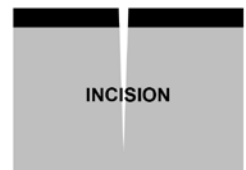
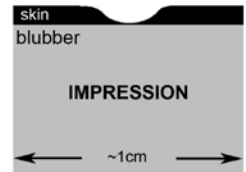
next page, noting the appropriate line number. Indicate whether you collected an image of an area with a Y (Yes) or N (No) in the *Image taken* section. If you are unable to examine any areas, note the details in the *Comments* section.

- 8 *Appendages removed (with instrument)*: Check YES if the head or any appendages (limbs, dorsal fin, fluke, *etc.*) appear to have been removed from the animal with an instrument (*e.g.* if there are obvious straight line cuts or straight nicks to the bone). In the lower 48 states of the US, this would be consistent with mutilation. In other areas, such as AK, this may be evidence of the legal harvest of a marine mammal. It is essential to work with local communities and agencies to interpret your findings in these cases. Check NO if all appendages are intact. Check CBD if you are unsure why an appendage is missing or if you cannot examine all appendages. If it appears an appendage was completely removed by scavenging or predation (*e.g.* shark bite removed entire dorsal fin) you should check CBD.
- 9 *Pelt removed (with instrument)*: Check YES if the pelt appears to have been removed with an instrument (knife, scraper). Check NO if the pelt is intact (even if the animal's skin is intact but the hair/fur is missing). Check CBD if you are unsure (due to decomposition, *etc.*) of whether the animal's pelt was removed. Again, removal of the pelt in most regions of the US would be considered mutilation; however, in areas where harvesting is permitted, care must be taken in interpreting and documenting the interaction. If legal harvest is suspected, contact your Regional Coordinator for guidance on documentation and reporting. Check NA if the animal has no pelt (cetacean or manatee).
- 10 *Body sliced (with instrument)*: Check YES if the carcass appears to be sliced with one or more cuts (from a knife or other blade), consistent with either legal harvest or mutilation (as above, dependent on the region). Multiple parallel cuts are often indicative of propeller wounds and should be noted under the *HI Lesions* category. Check NO if the body is intact or open body cavity is obviously due to natural causes (*e.g.* scavenging, predation). Check CBD if the body cavity has been penetrated and you are unsure of the cause.
- 11 *Gear/debris present on animal*: Check YES if the animal is entangled in gear (net, line, pot, buoy, line with hook, *etc.*) or debris (anything else). Check NO if there is no gear/debris on the animal. Check CBD if you are unsure for any reason (*e.g.* gear/debris is found on, but not wrapped around the animal, or gear/debris was reported on the animal but apparently removed before you responded). Note *gear/debris present on animal* = YES if tags (roto, satellite, *etc.*) are present on the animal.
- 12 *Gear/debris retained*: Check YES if the gear was retained by a stranding network or NOAA enforcement official. Note the name and contact information if the gear was retained by anyone other than your organization. Check NO if the gear was not retained. Check NA if there was no gear/debris present on the animal.
- 13 *External pathology*: If the animal has any lesions that appear to be disease-related such as pox lesions, tattoo lesions, abscesses, or other unexplained lumps, bumps, or sores, check YES. Check NO if the animal has no disease-related lesions. Check CBD if you observe lesions and are unsure of their origin or if the integument is too degraded to assess.
- 14 *Natural markings*: If the animal has any natural markings (*e.g.* tooth rakes, unusual pigmentation, any non-HI scars) check YES. If the natural marks hamper your examination, please note in the COMMENTS section. If there are no natural markings, check NO. If you cannot tell if there are any marks or are unsure of the origin of marks/scars check CBD.
- 15 *HI lesions*: Note lesions that may be associated with human interaction (fresh or healed entanglement or propeller scars, gaff marks, gunshot, healed HI scars, brands, *etc.*). Check YES if any human interaction lesions are observed. Check NO if no other lesions are observed. Check CBD if you observe lesions and are unsure of their origin or if the integument is too degraded to assess. A detailed exam of these lesions will occur in the next section.
- 16 *Predation/scavenger damage*: If there is evidence of predation or scavenger damage, circle the number(s) that correspond to the anatomical areas where evidence is seen. If the area affected is not numbered, circle #29, and note the area in the table below (*e.g.* genital slit, umbilicus, tongue) and note details of the damage in *Comments*.

17-29 DETAILED EXAM OF ANATOMICAL AREAS– Use this table to record findings of all suspected or possible evidence of human interaction. This means that any mark that the observer believes is consistent with some type of HI should be noted here. In addition, any marks for which the source Could not Be Determined, but that do not appear natural, should also be recorded in this table. **DO NOT RECORD INFORMATION ON NATURAL MARKINGS OR OTHER LESIONS IN THIS SPACE.** Examine the animal carefully starting at the head and working caudally down the right, then left, side, finishing with the tail or flukes. For this section, indicate whether you observe any **SIGNS OF HUMAN INTERACTION** in each *anatomical area* by checking the YES, NO, or CBD column. If you were not able to examine an area, check NE, or if it does not apply to your animal, check NA. Be consistent; examine anatomical areas in the same order each time you do an exam.

TYPE OF LESION- If you checked YES or CBD in any area, proceed to the *Type of Lesion* section and check all columns that apply.

- An **IMPRESSION** is a compression wound that occurs when an object leaves an indentation but does not lacerate or abrade the skin/pelt. Impressions left by net or line usually wrap around the leading and/or trailing edges of a fin, flipper, or fluke. Impressions on the leading edge of an appendage may line up with a similar mark on the trailing edge.
- A **LACERATION** occurs when the skin/pelt is penetrated from tight constriction or prolonged compression. The skin tears resulting in a lesion. Net and line usually leave linear lacerations. These lacerations may be evenly spaced along an appendage, or bunched near the proximal end of appendages (indicating net) and may be accompanied by impressions. A laceration is different from an incision which is made by a sharp instrument such as a knife. In cross section, a laceration or impression has rounded or jagged edges indicating surface tissue damage.
- An **INCISION** has clean edges and results in little surface tissue damage (see image at right).
- A **PENETRATING WOUND** occurs when a foreign object punctures or deeply penetrates the body, and is generally characterized by a small external wound and a wound tract that extends deep into the tissue and often into the body cavity. Sources of penetrating wounds include gaff, knife stab, spear, arrow, gunshot (especially bullet), *etc.*
- A **HEALED HI SCAR** is similar to a natural scar in pigmentation, but exhibits similar characteristics to the other types of lesions described here (*e.g.* linear scars on leading edges of appendages consistent with entanglement, parallel scars consistent with prop strike, *etc.*). **Only check this column if the lesion is completely healed with no open tissue.** Healed scars may be pigmented and may feel different than surrounding tissue, but there should be no exposed flesh, discharge, or soft swelling if the wound is healed. Treat healing lesions the same as fresh lesions. Evidence of HI, even if healed and not likely associated with the stranding event, should still be scored positive (YES) for HI. It can be difficult to determine the origin of healed scars. If you are unsure of the origin, check CBD instead of YES in the first set of columns.
- An **ABRASION** occurs when gear or debris rubs an area and scrapes the skin/pelt without forming an obvious laceration or distinct impression. This often occurs with heavy line or twine entanglement or when loose or trailing ends of gear/debris rub (abrade) parts of the body.
- Choose **OTHER / CBD** for any other types of lesions and describe in the comments section.



ORIGIN OF LESION - Once you determine the type of lesion, move to the *Origin of Lesion* section and check all that apply.

LINE is made up of many individual strands (multifilament) and is large in diameter. It is used for moorings, towing, forms the float and lead line of nets, and attaches buoys and anchors.

TWINE is a small diameter line and can be multi- or mono- filament. Twine is constructed of various materials and is combined in different ways:

MONOFILAMENT twine – a single strand of nylon twine that leaves a single, straight, narrow impression or laceration (Figure 1, A).

MULTIFILAMENT – line or twine made up of multiple strands of material that are twisted or braided together and can leave a distinctive impression as a series of parallel, angled lines or ovals (Figure 1, B and C). If heavier twisted or braided line rubs on a body part or becomes tightly wrapped, it can cause an abrasion.

NET – nets can be made of either monofilament or multifilament twine and have various characteristics: twine diameter, square mesh size (knot to knot), and stretch mesh size (diagonal between opposite knots of a mesh with one knot between; Figure 2). Net impressions are often characterized by either a criss-cross pattern or a bunching of impressions with or without knot marks evident where lines intersect.

There are two parts to this section. First, we ask you to indicate what created the lesion, and if the lesion was related to gear, such as net, twine, or line. Second, we ask if you can determine whether the gear was monofilament or multifilament. Based on the descriptions above, indicate the origin of the lesion:

- *Twine/Line* - select TWINE/LINE if the impression, laceration, or abrasion is consistent with the descriptions above, but is not indicative of interaction with a net.
- *Net* - select NET if the marks are consistent with the descriptions above. Nets made of monofilament may leave multiple impressions or lacerations, but each lesion is a straight furrow.
- *Other/CBD* - select this column if the marks appear consistent with entanglement or interaction with some type of gear, but you cannot determine which type.

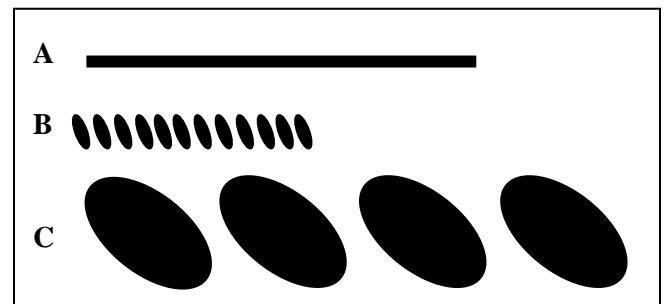


Figure 1. Impressions left by (A) monofilament, (B) twisted twine and (C) twisted line. Impressions are most visible on cetaceans.

If you checked *Twine/Line*, *Net*, or *Other/CBD*, indicate whether lesions were caused by *monofilament* or *multifilament* gear. Select *CBD* if you observe linear marks, but you are unsure of the origin.

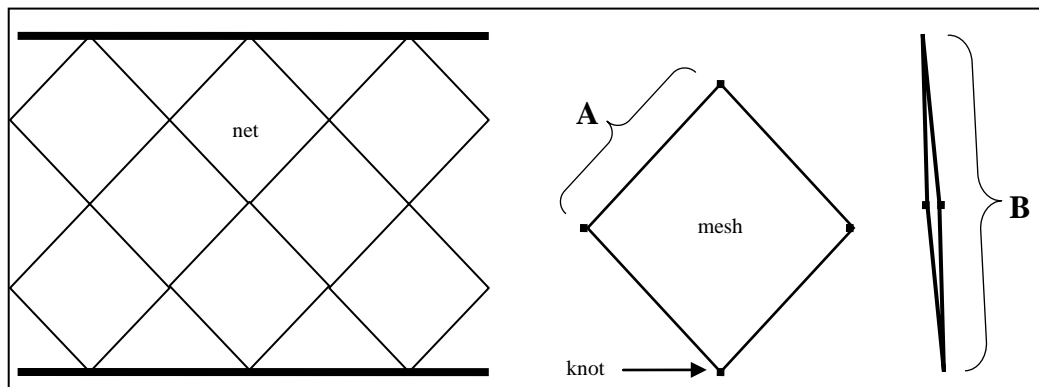


Figure 2. Typical net design. Nets are measured by the depth and length of the meshes hung between the top and bottom lines (float line and lead line on gill nets) and the horizontal length of the meshes. The mesh size can be measured from knot to knot (A) which is called the square or bar mesh size or (B) at its maximum diagonal width which is called a stretch mesh size. Twine size is the diameter of the twine the makes up the mesh.

If the lesion you noted was not made by gear (line, net/twine), check the appropriate box to indicate the source:

- *Propellers* usually leave deep, roughly parallel lacerations (Figure 3). Lesions can be straight (A), Z or S-shaped (B), curved (C), or open in the middle with thin trails (not illustrated). Large propellers may bisect an animal.
- *Gunshot* wounds vary based on the weapon used (shotgun, rifle, hand gun) and the distance an animal is from the weapon. Gunshot wounds can be very difficult to identify through gross exam, but can be characterized by single (bullet) or multiple (pellet) puncture/penetrating wounds. Radiographs are often necessary to confirm the findings.
- *Other/CBD* - select this column for lesions with other origins including, gaff, arrow, and debris entanglement, *etc.* or if you are unsure of the origin of the lesion(s).

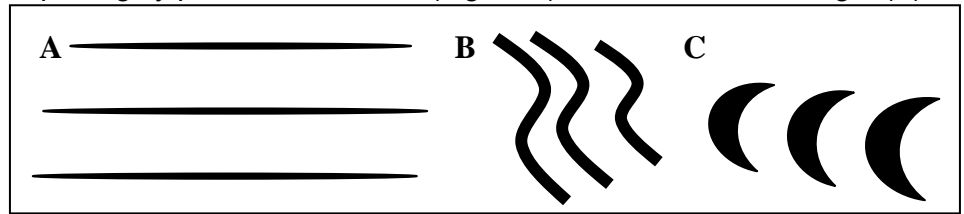


Figure 3. Types of propeller lesions left by different styles and sizes of propeller. The length, depth, and spacing between lesions can provide information as to the type of propeller and, thus, type of vessel.

Every area that scores YES or CBD should have an IMAGE TAKEN that includes a label with identifying information (field number, date of stranding, species, examiner, subject of image, *etc.*) and a scale (small ruler or something of known size). If film or disk space is not limited, take pictures of all areas. Note Y (Yes) or N (No) in the IMAGE TAKEN column.

Every area that scores YES or CBD should have a comment associated with it. Number each COMMENT with the corresponding line number for that anatomical area.

If you find lesions in an area not listed in the Detailed Exam table, add it on line 29 and reference in the COMMENTS section.

Page 2:

FIELD # - Be sure to fill out the field number on both sides of all pages associated with this animal.

INTERNAL EXAM - An evaluation of a dead animal is not complete without a thorough necropsy (internal examination). Some forms of interaction are only evident through internal exam (*e.g.* ingestion of debris or gear) and a final interpretation may change if an animal with external evidence of HI is found to be suffering from disease, pregnancy complications, injuries, *etc.* Some observations support a diagnosis of HI (*e.g.* for fishery interactions - full stomach, froth in lungs) and others provide evidence for HI although nothing was noted externally (*e.g.* stomach full of man-made debris). Be sure to note the DATE of the internal exam in the INTERNAL EXAM box.

- 30 Internal examination conducted – If you were able to examine the entire animal, check YES. If you did not examine the animal internally, check NO. Check PARTIAL if you only examined part of the animal (*e.g.* abdominal cavity only), then describe in the *Comments* section what was examined.
- 31 Bruising/blunt trauma – Indicate if you see any focal area of bruising (discrete area, not diffuse along an entire body region). Note whether the area is associated with an external lesion. If it is not associated with a penetrating lesion or wound, it should be considered blunt trauma. If you check YES or CBD, note the size of the area and the tissue depth (*e.g.* sub-dermal to blubber, into muscle, through muscle and into mesenteries and organs) in the *Comments* section (do not confuse diffuse post-mortem blood pooling with bruising).
- 32 Skeleton examined – Check YES if the entire skeleton was examined. Check NO if no bones were examined. Check PARTIAL if only some of the skeletal elements were examined. If you check

- PARTIAL, note in *Comments* section what was examined (e.g. examined skull, head, left ribs, and flipper, but not right side or vertebral column).
- 33 *Broken bones present* - Note whether you observed any broken bones.
Associated tissue reaction - Examine the tissue around the break(s) and circle whether any tissue reaction has occurred (hemorrhage, fibrous tissue, swelling at bone ends, etc.). If you are unsure, check CBD.
- 34 *Mouth/GI tract examined* - Check YES if the entire GI tract was examined. Check NO if none of the GI tract was examined. Check PARTIAL if only some elements of the GI tract were examined and note which areas were examined in the *Comments* section (e.g. stomach, but not intestines). Note in the *Detailed Info* column the predominant condition of the contents. Circle *debris/gear* if non-prey items (plastic, line, hooks, etc.) are found. Use the comments section to describe the region of the GI tract (e.g. esophagus, stomach chamber, intestine, or colon) and its contents (e.g. fish, squid, crabs, mussels, milk, plastic bag, unknown). Stranded animals with full stomachs are often suspect cases. Ingestion of gear or debris is considered a human interaction.
- 35 *Lungs/bronchi examined* - Check YES if both lungs were thoroughly examined. Check NO if the lungs were not examined. Check PARTIAL if you performed a partial examination and record in *Comments* section.
- 36 *Lungs/bronchi contents* - Circle all that apply in the *Detailed Info* column and describe the contents of each lung, including content volume, in the *Comments* section.
- 37 *Bullet/projectile found* - Check YES if you discovered any type of projectile (e.g. bullets, pellets, arrow heads, etc.) during the internal exam. Check NO if no projectiles were found. Check CBD if you are unsure of an object you have found. Indicate how the item was discovered in the *Detailed Info* section (CT scan, X-Ray, dissection) and indicate whether the object was collected. Note: it is important to follow Chain of Custody procedures when collecting this evidence. Provide details in the *Comments* section.
- 38 *Other lesions noted* - Note whether any other pathologies were observed, describe in *Comments* section.
- 39 **COMMENTS** – The details of what you observe are required in the section. Provide comments for each item for which you checked YES or CBD. When describing lesions, include measurements (e.g. length, width and depth, distance between lesions), location (e.g. measurement from nearest landmark – 20cm caudal of the right flipper), color, shape, and texture. Note the characteristics of the edges (e.g. jagged, straight, rounded) and the direction of linear lesions (e.g. wraps from leading edge of dorsal fin to trailing edge on left side). Number each set of comments using the corresponding line number for that row on the data sheet. Use extra pages if needed and be sure to note the animal's field number in the upper right margin. If this information is provided in the necropsy report or other data sheet, reference that material here.
- 40 **FINDINGS OF HUMAN INTERACTION** – Review your exam notes and check YES if you observed any signs of human interaction on the animal. Check NO if you thoroughly examined the animal and did not find any signs of human interaction. Check CBD if: (1) you did not examine the animal thoroughly, (2) decomposition or scavenger damage hampered the exam, or (3) you are unsure whether marks on the animal were caused by human interaction. This is an objective analysis. It does not take into account the animal's physical condition, the timing of the human interaction with respect to the stranding, or the circumstances surrounding the stranding. After determining the objective Findings of HI, select the EXAM TYPE you conducted. If you ONLY conducted an external exam, check EXTERNAL. If you conducted only an internal exam, check INTERNAL (although we are not sure when this would ever be the case, it is currently on the NOAA Level A form). If you conducted both external and internal exams, check BOTH. Note, even an external exam that is scored CBD due to decomposition or other factors is still considered an exam. In some cases, there may be a finding of CBD during the external exam, but YES during an internal exam (e.g. if the carcass lacked skin or pelt due to decomposition but the animal had ingested plastic).

TRANSFER THE ABOVE INFORMATION TO THE FINDINGS OF HUMAN INTERACTION SECTION ON THE LEVEL A DATA SHEET.

41 **Type of HI** - If you circle YES in line 40, indicate to the type(s) of human interaction that you observed.

Entanglement - occurs when there are lesions (such as linear impressions, lacerations, or circumferential lesions), or material on the animal consistent with entanglement.

- Choose gear as the type of entanglement if the lesions and/or gear removed strongly suggest fishing gear. Note that you cannot make assumptions about whether gear was actively fished, discarded, or 'ghost gear.' All should be checked as gear. Likewise, line alone, while used in fishing operations, is also used for many other applications and cannot be assumed to be fishing gear unless it has specific markings or attachments indicating it was used in a fishery. Examples of the latter include buoys, lead core line, and pots. Line of unknown origin should be marked as CBD, line obviously used for anchoring, mooring, or towing should be considered debris.
- Choose debris if the entangling material is not related to fishing gear. This includes material such as plastic bags or sheets, textiles such as clothing, rubber or latex, and metal. Line of unknown origin should be marked as CBD, and line obviously used for anchoring, mooring, or towing is considered debris.
- Choose CBD if you are unsure of the origin of the entangling material.

Hooking – occurs when a fishing hook (or lure) is imbedded on the body or in the mouth of an animal. If the hook or lure is in the throat or GI tract, it should be considered *ingested* gear.

- Choose recreational if the hook or lure is of a size or design that indicates it is strictly recreational gear (local tackle shops are often helpful for this).
- Choose commercial if the hook or gear is of a size or type, or is configured in such a way (such as a longline gangion) that indicates it is strictly commercial gear.
- Choose CBD if you cannot determine the origin of the gear or if it is used in both commercial and recreational fisheries.

Ingestion – occurs when an animal ingests a foreign object. Ingestion occurs if the object travels past the mouth and into the throat. If the object is a hook or lure, and it is in the mouth, the HI is *hooking*. If the object is line, twine or debris and it is tangled in mouth it is *entanglement*. Gear or debris must be ingested to fit this category.

- Choose gear if fishing gear such as a hook, lure, fishing twine, or net was ingested.
- Choose debris if plastic, metal, or other man-made debris was ingested.
- Choose CBD if you cannot determine the origin of the ingesta, but it is clearly man-made.

Gunshot - occurs when an animal is shot with a gun (handgun, shotgun, or rifle). Presence of one or more ballistic projectiles is the best way to diagnose a gunshot interaction. Wounds from other projectiles should be categorized under *CBD/Other*.

Vessel trauma - occurs when an animal is impacted by a vessel, usually through impact with the hull or propulsion system. The trauma can be 'sharp' trauma, such as that from a propeller, or 'blunt' trauma such as that from the bow of a ship, or a combination of the two.

- Choose sharp trauma if the external injury appears to be one or more roughly linear wounds with internal tissue damage associated with the chop or slice wounds.
- Choose blunt trauma if wounds, particularly broken bones and soft tissue damage, are more internal than external and are consistent with impact from a large object such as a vessel.
- Choose both if the wounds appear to be a combination of sharp and blunt trauma.

Mutilation – occurs when an animal or carcass is intentionally cut or sliced. Mutilation generally involves the use of some type of knife or blade and can result in several common types of wounds and amputations including body sliced, stabbed, or gutted or appendages removed.

Harassment – occurs when human activity changes the behavior of an animal. In this context, harassment occurs if the animal is harassed while it is in the process of stranding, is already stranded, or if the harassment results in a stranding. It is important to note that harassment is

common especially with hauled out pinnipeds and that not all harassment is associated with a stranding (e.g. feeding free-swimming animals is a form of HI, but not a stranding).

CBD/Other – occurs EITHER when non-natural lesions are on the animal, but it is unclear what type of human activity caused them OR when the type of HI is known, but is not specifically listed above such as vehicular trauma, a projectile other than gunshot (arrow or dart), oil or chemical spill, stabbing or clubbing, etc. Describe *Other HI* in the space provided.

- 42 **STRANDING EVENT HISTORY/CIRCUMSTANCES** – provide any information about the stranding event or circumstances surrounding the event that would be helpful in supporting the HI diagnosis (i.e. fishing, drilling, or other activities, oil spill, unusual mortality events, previous sightings of animal, unusual behavior prior to stranding, etc.). Note any objective details provided by the initial reporter, these may be answers to questions you have asked (i.e. Was there any blood in the water next to the animal? What did it look or smell like when you first observed it? How was the animal positioned (belly up, on its side) when you first observed it?).

If there is no physical evidence but harassment is suspected, objectively describe events in this section including names and contact numbers for witnesses and any authorities that were contacted.

- 43 **INITIAL HUMAN INTERACTION EVALUATION** – This section should be completed if you circled YES under *Findings of Human Interaction* (line #40). It should be completed after filling out the entire data sheet. This section is **subjective** and takes into account the animal's physical condition, gross necropsy findings, the timing of the human interaction with respect to the stranding, and the circumstances surrounding the stranding. **Most importantly, it takes into account the evaluator's level of experience. If you have not conducted many evaluations or are not familiar with the region, you may be unable to make an accurate evaluation and should conservatively circle CBD.** This section does not take into account results of level B and C analyses or review by veterinary pathologist which is why it is considered an **INITIAL** evaluation.

For this section, you are estimating how likely you think it is that the documented human interaction contributed to the stranding event. This opinion is expressed as a confidence interval on a scale of 0-3, as described below. Circle the most appropriate number. The higher the number, the more likely it is that the interaction contributed to the stranding. If you do not feel that you can provide an evaluation, circle 0 – Uncertain (CBD). [Note: We do not say that the human activity *caused* the stranding because the human interaction could have indirectly contributed to the event without being the direct cause of the stranding.]

0. Uncertain (CBD) - You cannot provide an evaluation of the likelihood that human interaction contributed to the stranding (e.g. a Code 4 carcass is found with propeller marks; it is too decomposed to determine whether the interaction was pre- or post-mortem).
1. Improbable - It is unlikely that the observed human interaction contributed to the stranding or there are other gross findings that suggest an alternative cause for the stranding (e.g. there are healed entanglement scars on the flukes of a known humpback whale that died with a full-term fetus; it is unlikely that the past entanglement contributed to the stranding).
2. Suspect – It is possible that human interaction contributed to the stranding, but the findings of HI are weak and/or there are other findings that may have caused the stranding (e.g. there is a small amount of plastic found in an animal's stomach, but you are unsure of its effect and the animal is very thin with a high parasite level. Did the plastic ingestion cause the animal's decline or was a declining animal eating anything it could get?).
3. Probable - It is very likely that human interaction contributed to the stranding (e.g. a robust animal with a full stomach, froth in the lungs, and marks that are consistent with entanglement and underwater entrapment).

- 44 **JUSTIFICATION** – Provide a brief justification of your answer for the *Initial Human Interaction Evaluation* score. Include information from all sources available to you.