

Marine Mammal Necropsy Protocols



NMFS 932-1905-01 / MA-009526-1 Photo C. Cano



Kathy A. Burek, DVM, MS, DACVP
Alaska Veterinary Pathology Services

The "level A"

- Initial information
- **REQUEST A NMFS ID!**
- Filled out by "first responders"
- Initiates the question of human interaction
- Required to be submitted to NMFS / NOAA
- Location

MARINE MAMMAL STRANDING REPORT - LEVEL A DATA

FIELD # _____ NMFS REGIONAL # _____ NATIONAL DATABASE # _____ (NMF'S USE) _____ (NMF'S USE) _____

COMMON NAME _____ GENUS _____ SPECIES _____

EXAMINER Name: Kelly Bunk Institution: Marine Veterinary Pathology Services

Address: 2884 The Claring Drive / Eagle River, AK Phone: 907-6256

Stranding Agreement is Authority: _____ Stranding agreement _____

CONFIDENCE: CGUE (Check ONE) ☐ Unconfirmed - Low ☐ Confirmed - Minimum ☐ Confirmed - Medium ☐ Confirmed - High

INITIAL OBSERVATION ☒ Same Information to Level A Examination UA 1b. Year _____ Month _____ Day _____ First Observed: ☐ Beach/Land Ice ☐ Floating ☐ Swimming LOCATION: State _____ County _____ City _____ Body of Water: _____ Locality Details: _____ Lat (DD) _____ N _____ S _____ Long (DD) _____ W _____ E _____ ☐ Actual ☐ Estimated How Determined: (check ONE) ☐ GPS ☐ Map ☐ Internal Software ☐ Other _____ CONFIDENCE AT INITIAL OBSERVATION (Check ONE) ☐ 1. Alive ☐ 4. Advanced Decomposition ☐ 2. Fresh Dead ☐ 5. Mummified Skeletal ☐ 3. Moderate Decomposition ☐ 6. Condition Unknown	LEVEL A EXAMINATION Examined? ☐ YES ☐ NO UA 1b. Year _____ Month _____ Day _____ First Examined: ☐ Beach/Land Ice ☐ Floating ☐ Swimming LOCATION: State _____ County _____ City _____ Body of Water: _____ Locality Details: _____ Lat (DD) _____ N _____ S _____ Long (DD) _____ W _____ E _____ ☐ Actual ☐ Estimated How Determined: (check ONE) ☐ GPS ☐ Map ☐ Internal Software ☐ Other _____ CONFIDENCE AT EXAMINATION (Check ONE) ☐ 1. Alive ☐ 4. Advanced Decomposition ☐ 2. Fresh Dead ☐ 5. Mummified Skeletal ☐ 3. Moderate Decomposition
LIVE ANIMAL INFORMATION INITIAL LIVE ANIMAL DISPOSITION (Check one or more) ☐ 1. Left at Site ☐ 5. Dead at Site ☐ 2. Immediate Release at Site ☐ 6. Dead During Transport ☐ 3. Released and Released ☐ 7. Euthanized ☐ 4. Disemboweled ☐ 8. Transferred to Rehabilitation ☐ a. Partially Date: Year _____ Month _____ Day _____ ☐ b. Completely Facility _____ ☐ 9. Other _____ CONFIDENCE AT EXAMINATION (Check one or more) ☐ 1. Sick ☐ 7. Location Hazardous ☐ 2. Injured ☐ 8. To Animal ☐ 3. Out of Habitat ☐ 9. To Public ☐ 4. Deemed Releaseable ☐ 10. Unknown/CRD ☐ 5. Abandoned/Orphaned ☐ 11. No Rehabilitation Options ☐ 6. Inaccessible ☐ 12. Other _____	DEAD ANIMAL INFORMATION CARCASS STATUS (Check one or more) ☐ 1. Flown for Later Examination/Recovery Pending ☐ 2. Left at Site ☐ 5. Landfill ☐ 8. Fossilized ☐ 3. Buried ☐ 6. Incinerated ☐ 9. Sunk, Lat _____ Long _____ ☐ 4. Rinsed ☐ 7. Composted ☐ 10. Unknown/Other _____ RECOVERED? ☐ YES ☐ NO ☐ Limited ☐ Complete ☐ Carcass Fresh ☐ Carcass Frozen/Thawed CARCASS CODE AT RECOVERY ☐ Code 2 ☐ Code 3 ☐ Code 4 RECOVERED BY _____ Date: Year _____ Month _____ Day _____ PHOTOGRAPHIC DOCUMENTATION ☐ YES ☐ NO Photo/Video Description: _____
MORPHOLOGICAL INFORMATION SEX (Check ONE) ☐ 1. Male ☐ 2. Female ☐ 3. Unknown ESTIMATED AGE CLASS (Check ONE) ☐ 1. Adult ☐ 2. Pup/Cal ☐ 3. Unknown ☐ 4. Subadult ☐ 5. Youngling ☐ Whole Animal ☐ Partial Animal Weight Length _____ cm _____ in ☐ Actual ☐ Estimated ☐ Not Measured Weight _____ kg _____ lb ☐ Actual ☐ Estimated ☐ Not Weighed SAMPLES COLLECTED (Check one or more) ☐ 1. Histology ☐ 2. Other Diagnostics ☐ 3. Life History ☐ 4. Skeletal ☐ 5. Other _____ PARTS TRACKING (Check one or more) ☐ 1. Scientific Collection ☐ 2. Educational Collection ☐ 3. Other _____	OCCURRENCE DETAIL B ☐ Pastoral ☐ GEP _____ (NMF'S USE) Group Event: ☐ YES ☐ NO ☐ Yes, Type: ☐ Cow/Cal Pair ☐ Males Standing ☐ JUNE ☐ P Animals _____ ☐ Actual ☐ Estimated Was the Marine Mammal Human Interaction Report completed? ☐ YES ☐ NO Findings re: Human Interaction: ☐ YES ☐ NO ☐ Could Not Be Determined (CRD) ☐ YES evidence of: 1. Visual Interaction ☐ YES ☐ NO ☐ CRD 2. Shot ☐ YES ☐ NO ☐ CRD 3. Fishery Interaction ☐ YES ☐ NO ☐ CRD 4. Other Human Interaction: _____ If YES, what was the likelihood that the human interaction contributed to the stranding event? ☐ Uncertain (CRD) ☐ Inevitable ☐ Suspect ☐ Probable Gear/H Items Collected? ☐ YES ☐ NO ☐ Gear Deposition Other Findings Upon Level A: ☐ YES ☐ NO ☐ Could Not Be Determined (CRD) ☐ Yes, Choose one or more: ☐ 1. Inuse ☐ 2. Injury ☐ 3. Pregnant ☐ 4. Other _____ How Determined (Check one or more) ☐ External Exam ☐ Internal Exam ☐ Necropsy ☐ Other: _____

NOAA Form 25-204, OMB Control No 0645-0173, Expiration Date 09/01/2020

Background, confidence, location, carcass code

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: _____

CONFIDENCE CODE (Check ONE): ☐ Unconfirmed - Low ☐ Confirmed - Minimum ☐ Confirmed - Medium ☐ Confirmed - High

INITIAL OBSERVATION ☐ Same Information for Level A Examination

DATE: Year: _____ Month: _____ Day: _____

First Observed: ☐ Beach/Land/Ice ☐ Floating ☐ Swimming

LOCATION: State: _____ County: _____ City: _____

Body of Water: _____

Locality Details: _____

Lat (DD): _____ N

Long (DD): _____ W

☐ Actual ☐ Estimated

How Determined: (check ONE)

☐ GPS ☐ Map ☐ Internet/Software ☐ Other _____

CONDITION AT INITIAL OBSERVATION (Check ONE)

☐ 1. Alive ☐ 4. Advanced Decomposition

☐ 2. Fresh Dead ☐ 5. Mummified/Skeletal

☐ 3. Moderate Decomposition ☐ 6. Condition Unknown

LEVEL A EXAMINATION Examined? ☐ YES ☐ NO

DATE: Year: _____ Month: _____ Day: _____

First Examined: ☐ Beach/Land/Ice ☐ Floating ☐ Swimming

LOCATION: State: _____ County: _____ City: _____

Body of Water: _____

Locality Details: _____

Lat (DD): _____ N

Long (DD): _____ W

☐ Actual ☐ Estimated

How Determined: (check ONE)

☐ GPS ☐ Map ☐ Internet/Software ☐ Other _____

CONDITION AT EXAMINATION (Check ONE)

☐ 1. Alive ☐ 4. Advanced Decomposition

☐ 2. Fresh Dead ☐ 5. Mummified/Skeletal

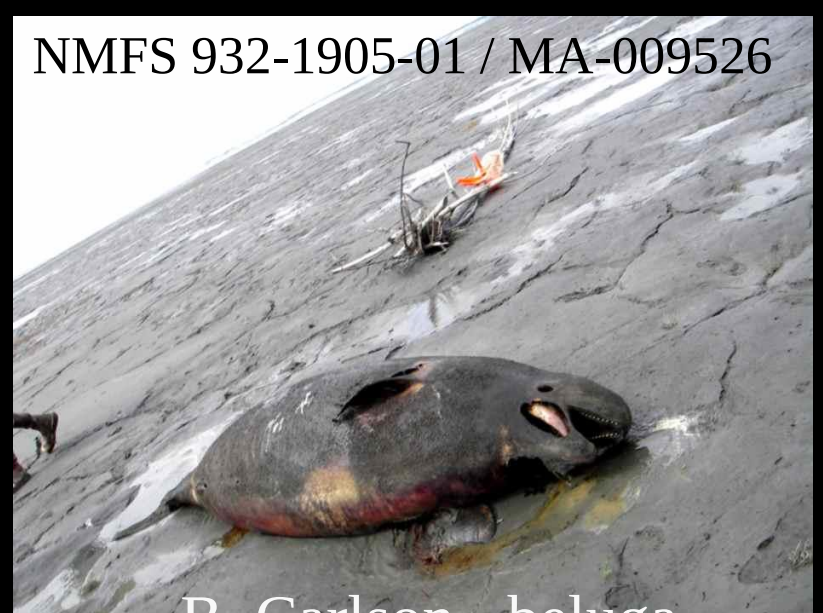
☐ 3. Moderate Decomposition

Carcass condition

- Autolytic (rotting) changes
 - **Smell**
 - **Skin slough**
 - **Exposure of bones**
 - **Loss of detail and firmness of the organs**
- Scavenger damage
- Maggots
- Classify the carcass (2-5)



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B. Carlson - beluga

Carcass condition code helps determine what samples can be taken

Code	Definition	Gross Appearance	Specimen collection
2	Freshly dead "edible"	No bloating; minimal drying and wrinkling of epidermis; minimal wrinkling and change of eyes and mucous membranes; muscles firm; blubber firm and white or yellow; internal organs intact; liver still with physical integrity	All types of specimens should be collected
3	Moderate decomposition	Slight bloating with tongue and penis protruding; some skin sloughing and cracking; eyes sunken; blubber may be blood tinged; muscles soft; all internal organs including liver still have gross integrity but are soft and friable	Morphometrics, gross pathology, parasitology, genetics, life history, +/- histology on lesions.
4	Advanced decomposition	Very bloated; missing patches of epidermis and hair; internal organs show lack of integrity and are extremely friable; blubber with gas pockets and pooled oil	Morphometrics, gross path, parasitology, genetics, life history
5	Severe decomposition	Mummified; skeletal	Limited morphometrics, age, skeletal pathology, genetics

Scavenger damage



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932-1489-08

True ante mortem changes

- Evidence of **hemorrhage**
- Inflammation
 - **visible purulent material**
 - **Histologic**
- Other tissue reaction
nodules or thickenings
indicating fibrosis /
inflammation



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Code 2 – no scavenging; no slip;
very little odor



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Code 2:
SUPER fresh –
would you eat
it?



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Code 3: Some slip, smell, minor scavenging; internal organs intact

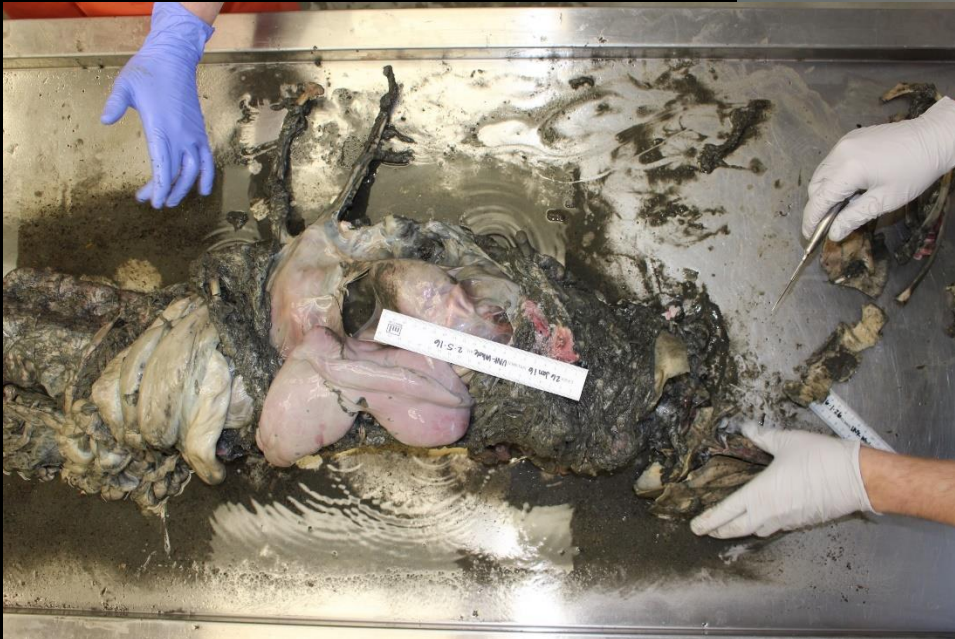


Code 4 – skin sloughing; internal organs lose integrity



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Code 5 – Skeletal / mummified



Code 5 – bones and maggots
Can you figure out the cause of the
UME?!!@!



Code 5 mummified



What happened then; Fresh or Frozen? PHOTOS

LIVE ANIMAL INFORMATION

INITIAL LIVE ANIMAL DISPOSITION (Check one or more)

- | | |
|---|--|
| ☐ 1. Left at Site | ☐ 5. Died at Site |
| ☐ 2. Immediate Release at Site | ☐ 6. Died During Transport |
| ☐ 3. Relocated and Released | ☐ 7. Euthanized |
| ☐ 4. Disentangled | ☐ 8. Transferred to Rehabilitation: |

- ☐ a. Partially
☐ b. Completely

Date: Year: _____ Month: _____ Day: _____
Facility: _____

☐ 9. Other: _____

CONDITION/DETERMINATION (Check one or more)

- | | |
|--|---|
| ☐ 1. Sick | ☐ 7. Location Hazardous |
| ☐ 2. Injured | ☐ a. To animal |
| ☐ 3. Out of Habitat | ☐ b. To public |
| ☐ 4. Deemed Releasable | ☐ 8. Unknown/CBD |
| ☐ 5. Abandoned/Orphaned | ☐ 9. No Rehabilitation Options |
| ☐ 6. Inaccessible | ☐ 10. Other: _____ |

DEAD ANIMAL INFORMATION

CARCASS STATUS (Check one or more)

- | | | |
|---|---|---|
| ☐ 1. Frozen for Later Examination/Necropsy Pending | | |
| ☐ 2. Left at Site | ☐ 5. Landfill | ☐ 8. Towed: Lat _____ Long _____ |
| ☐ 3. Buried | ☐ 6. Incinerated | ☐ 9. Sunk: Lat _____ Long _____ |
| ☐ 4. Rendered | ☐ 7. Composted | ☐ 10. Unknown/Other: _____ |

NECROPSIED ☐ YES ☐ NO ☐ Limited ☐ Complete
☐ Carcass Fresh ☐ Carcass Frozen/Thawed

CARCASS CODE AT NECROPSY ☐ Code 2 ☐ Code 3 ☐ Code 4

NECROPSIED BY: _____
Date: Year: _____ Month: _____ Day: _____

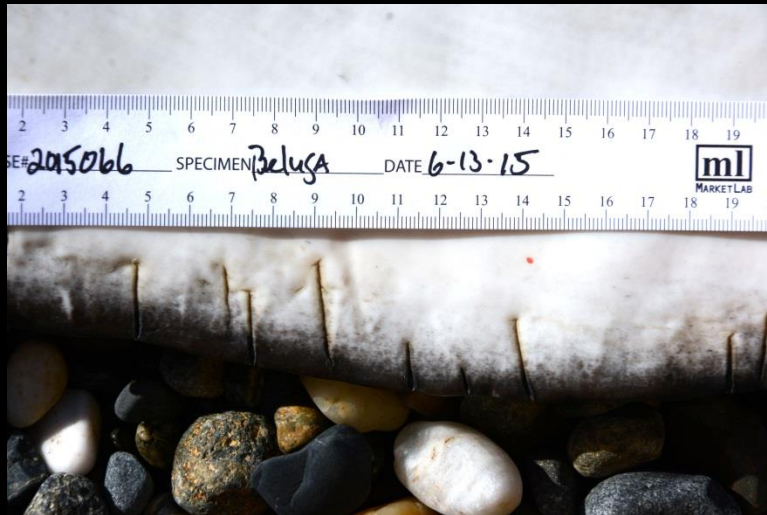
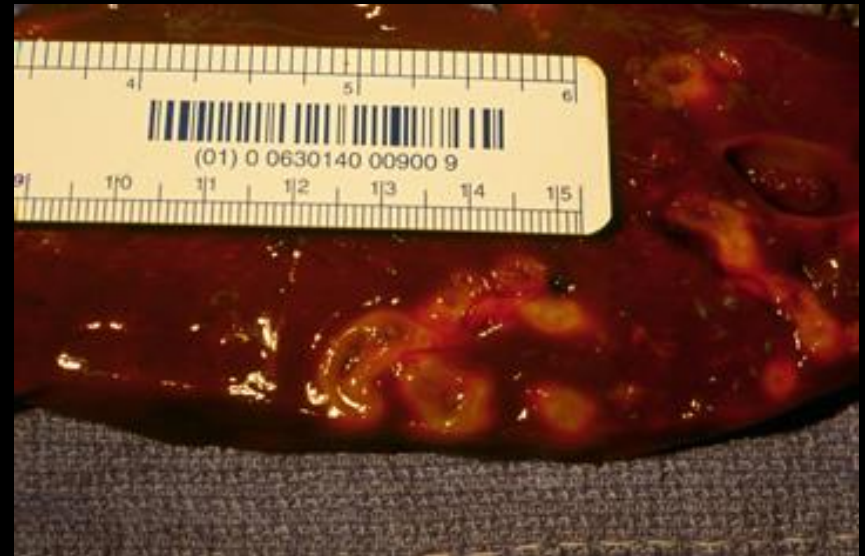
PHOTOS/VIDEO TAKEN: ☐ YES ☐ NO

Photo/Video Disposition: _____

Photos!!!

- Always! With an ID and scale)

Right angles



- Start far away and work in for scale





- Always! With an ID and scale)
- Start far away and work in for scale
- +/- Take one without a scale and ID for publications



Basic animal info

MORPHOLOGICAL INFORMATION

SEX (Check ONE)

☐ 1. Male

☐ 2. Female

☐ 3. Unknown

ESTIMATED AGE CLASS (Check ONE)

☐ 1. Adult

☐ 2. Subadult

☐ 3. Yearling

☐ 4. Pup/Calf

☐ 5. Unknown

☐ Whole Animal

☐ Partial Animal

Straight Length: _____ ☐ cm ☐ in

☐ Actual ☐ Estimated ☐ Not Measured

Weight: _____ ☐ kg ☐ lb

☐ Actual ☐ Estimated ☐ Not Weighed

SAMPLES COLLECTED (Check one or more)

☐ 1. Histology

☐ 2. Other Diagnostics

☐ 3. Life History

☐ 4. Skeletal

☐ 5. Other _____

PARTS TRACKING (Check one or more)

☐ 1. Scientific Collection

☐ 2. Educational Collection

☐ 3. Other: _____



Sex

Cetacean

Figure 4-7. Female delphinid

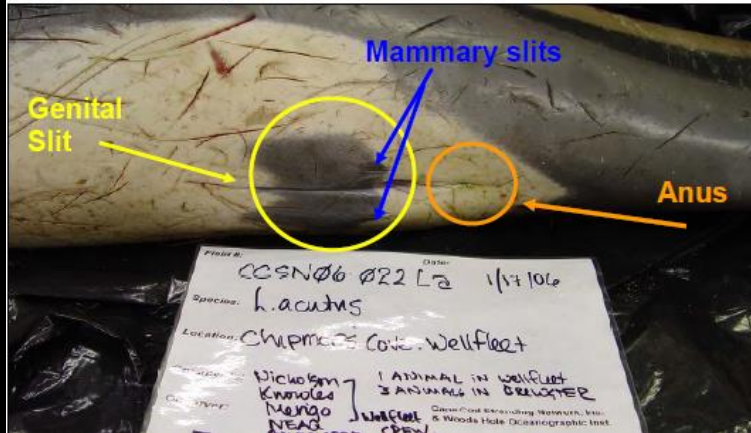
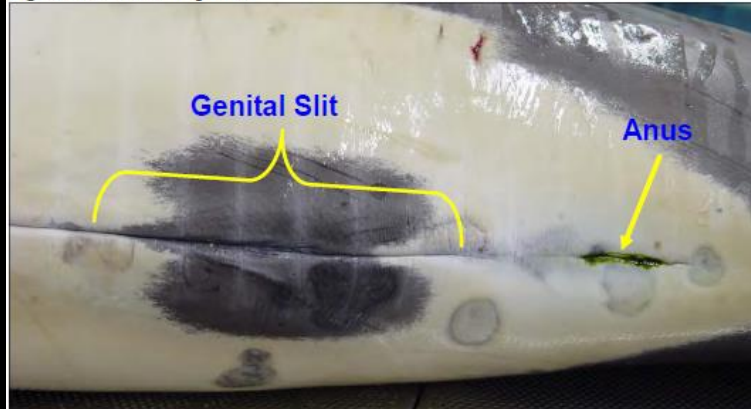


Figure 4-8. Male delphinid



Pinniped

Figure 3-7. Male pinniped.

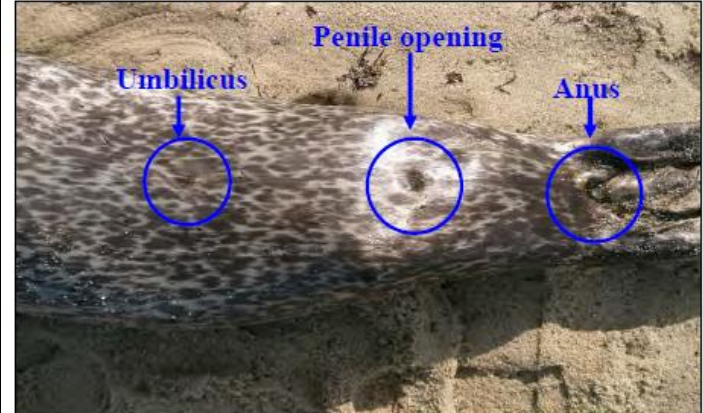
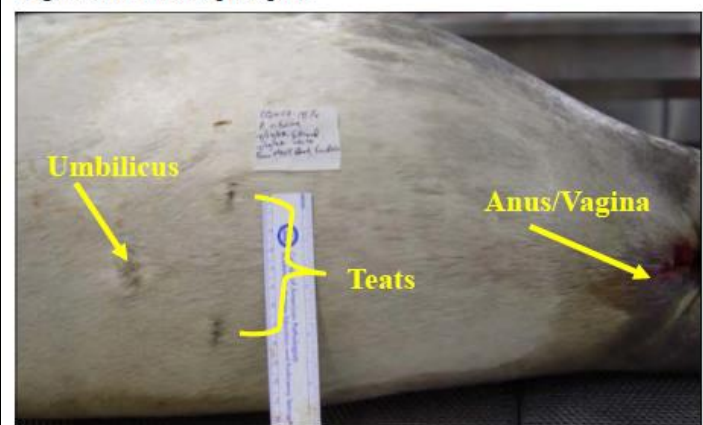


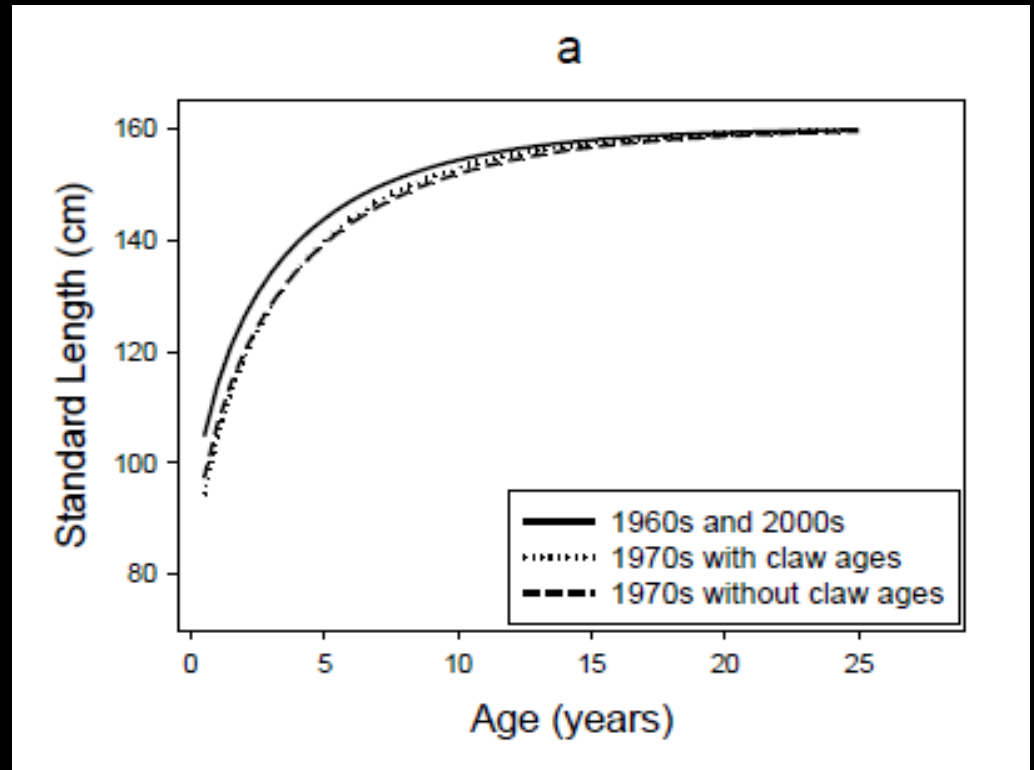
Figure 3-8. Female pinniped.



Age Class

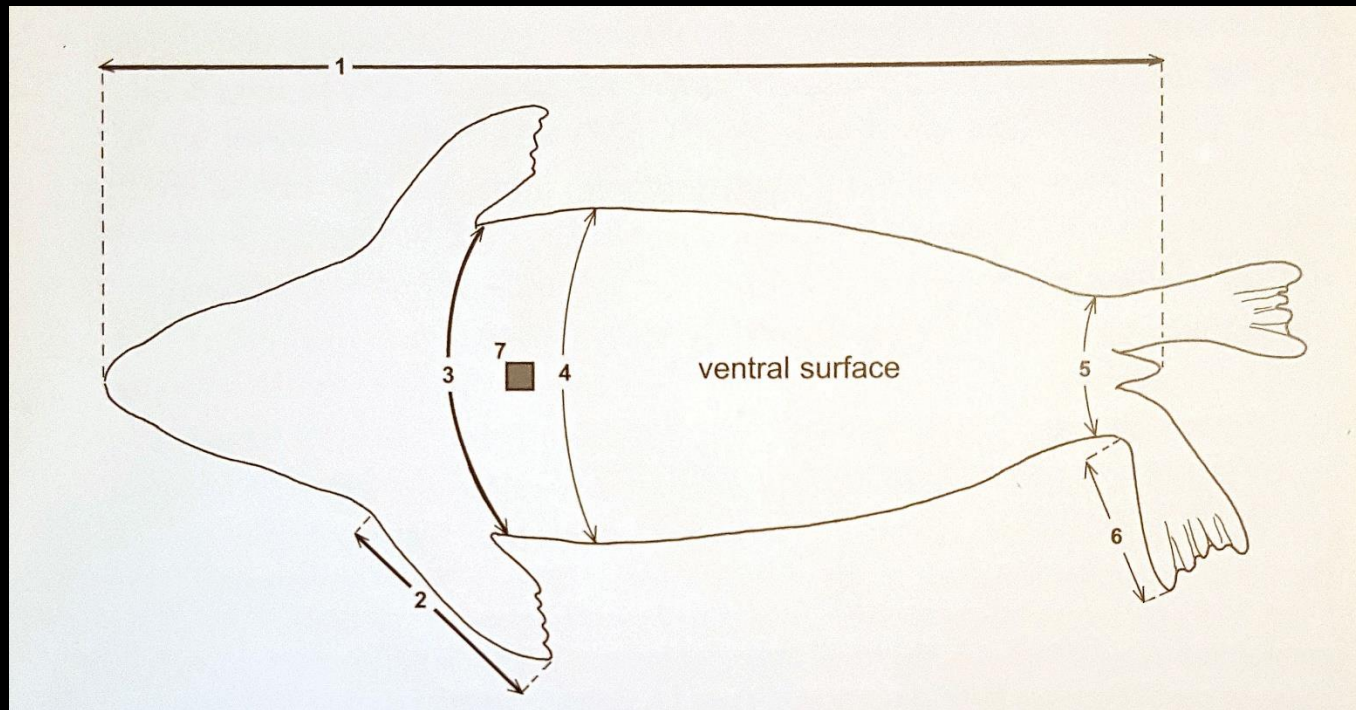
Choices

- Adult
- Subadult
- Yearling
- Pup/Calf
- Unknown
- Generally Based on length



Spotted seals (*Phoca largha*)
(from Quakenbush 2009)

MEASUREMENTS: Straight length and Mass for level A



(Geraci and Lounsbury 2005 Marine Mammals Ashore)

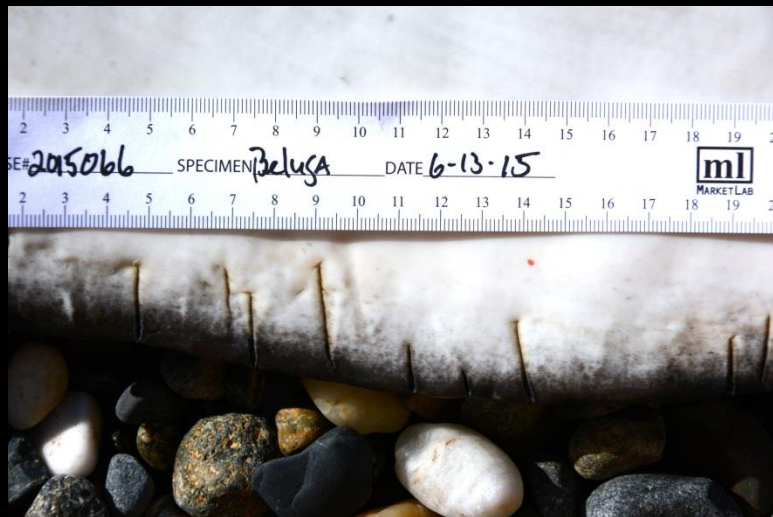


Human Interaction – Very important for management

- Topic of a whole Lab
- Systematic
- Thorough
- Conservative
- Legal Collection of evidence
- Whole section in the Examiners guide

OCCURRENCE DETAILS		☐ Restrand	GE # _____ (NMFS Use)
Group Event: ☐ YES ☐ NO			
If Yes, Type: ☐ Cow/Calf Pair ☐ Mass Stranding ☐ LME		# Animals: _____	☐ Actual ☐ Estimated
Was the Marine Mammal Human Interaction Report completed? ☐ YES ☐ NO			
Findings of Human Interaction: ☐ YES ☐ NO ☐ Could Not Be Determined (CBD)			
If YES evidence of 1. Vessel Interaction ☐ YES ☐ NO ☐ CBD			
2. Shot ☐ YES ☐ NO ☐ CBD			
3. Fishery Interaction ☐ YES ☐ NO ☐ CBD			
4. Other Human Interaction: _____			
If YES, what was the likelihood that the human interaction contributed to the stranding event?			
☐ Uncertain (CBD) ☐ Improbable ☐ Suspect ☐ Probable			
Gear/Hi Items Collected? ☐ YES ☐ NO Gear Disposition: _____			
Other Findings Upon Level A: ☐ YES ☐ NO ☐ Could Not Be Determined (CBD)			
If Yes, Choose one or more: ☐ 1. Illness ☐ 2. Injury ☐ 3. Pregnant ☐ 4. Other: _____			
How Determined (Check one or more): ☐ External Exam ☐ Internal Exam ☐ Necropsy			
☐ Other: _____			

Monofilament net



Fishing gear



Gunshot wounds



Packing bands



Ship strike

Blunt trauma



Lacerations



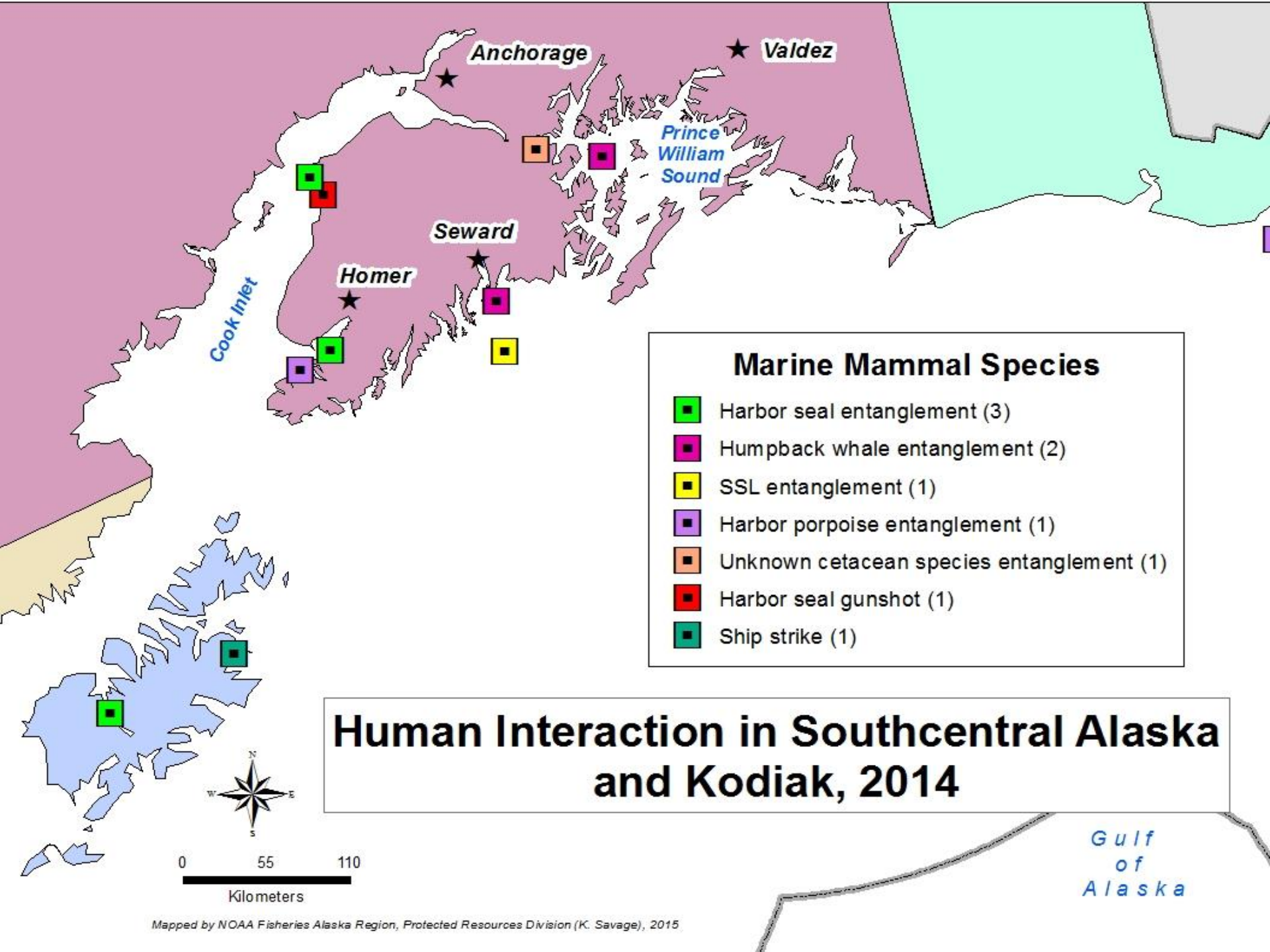
The question is whether the animal was alive when struck

V16-047
2016053
BP1601
May 29, 2016



- Topic of a whole Lab
- Officially – every necropsy
- Systematic
- Thorough
- Conservative
- Legal Collection of evidence

[illegible]



Don't forget the Level A back side!

[illegible]

Intermission

NOAA MMHSRP PERMIT - 18786



Goals of necropsies

- Determine cause of death
- Management tool
 - assessment
 - Human interaction issues
- Look for Disease
 - Direct mortality/morbidity
 - Reduced productivity
 - Zoonoses (sentinels)
 - Emerging disease (sentinels)
 - Baselines
- Samples for various studies – life history, feeding ecology, toxicants, biotoxins
- Relate these factors to “health”



HISTORY

WHAT
HAPPENED

PHOTOS!!

GROSS

WHAT'S IT
LOOK LIKE

PHOTOS!!

PHOTOS!!

SAMPLES

FORMALIN

FROZEN
SAMPLES

HISTORY

- Describe the location of the mortality event
 - PHOTOS**
 - Lat;Longs are NEEDED
 - Decimal degrees
- Unusual environmental factors
- Estimate disease onset (fresh vs rotten)
- Any UME's ongoing?



Assessment of Body condition



Figure 3-5. Robust pinniped.



Figure 3-6. Emaciated pinniped.



From Pugliares 2007, WHOI Necropsy manual

External assessment of Body condition

Figure 4-5. Robust cetacean



Figure 4-6. Emaciated cetacean



Pugliares 2007 WHOI Necropsy manual

Body condition estimate



J. Richmond – Steller sea lion

External examination

- Sex
- Age
- Palpate for fractures, other trauma
- Anything different?

TAKE A PHOTO!!



USFWS -Verena Gill

Take the basic samples

- Aging - Teeth or skull
- Genetics - Skin
 - DMSO
 - ETOH
 - Or Frozen
- Contaminants - Blubber
 - In Foil or Teflon
- HABs – Stomach contents and feces
- Prey ID –Stomach

Figure 3-13. Removal of lower left jaw.



Figure 4-18. Removal of lower left teeth.



From Pugliares 2007, WHOI Necropsy manual

Initial moves

- Blubber removal
- Varies by species
- Open up cavities

Figure 4-19. Animal in lateral recumbency with numerous transverse, full blubber thickness incisions.



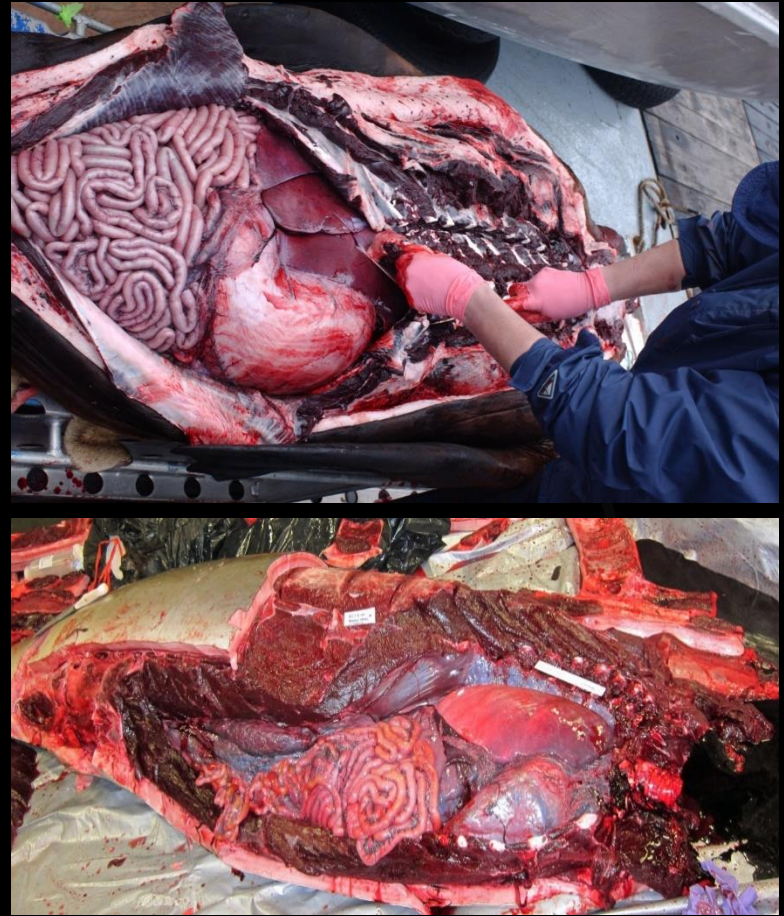
From Pugliares 2007, WHOI Necropsy manual



Systematic examination of internal organ systems



Do the magic combo
TEST: What is that?



From Pugliares 2007, WHOI Necropsy manual



Some samples
are harder than
others!

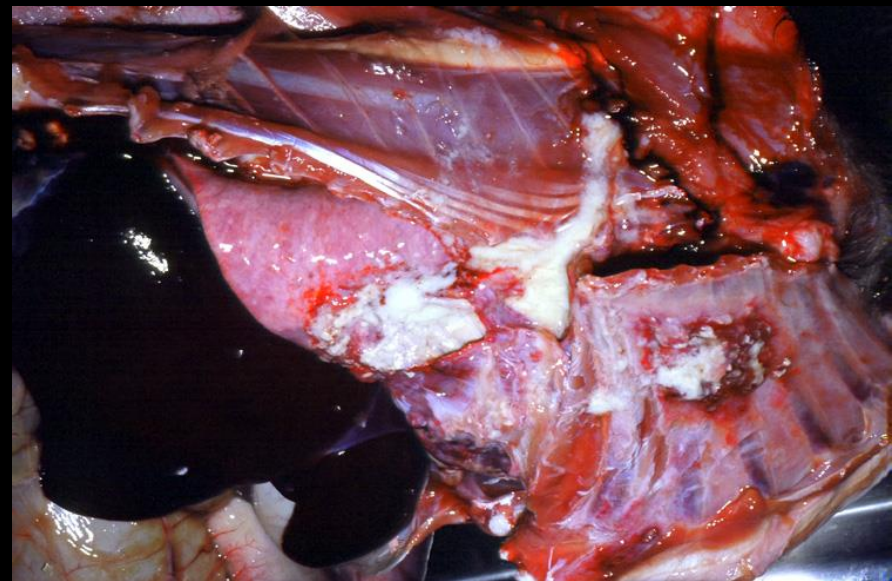


What do I do if I see something weird?

- Do the magic combo:
- **FACTS**
(Species, sex, age)
PHOTO!!
FREEZE
FIX (don't freeze)

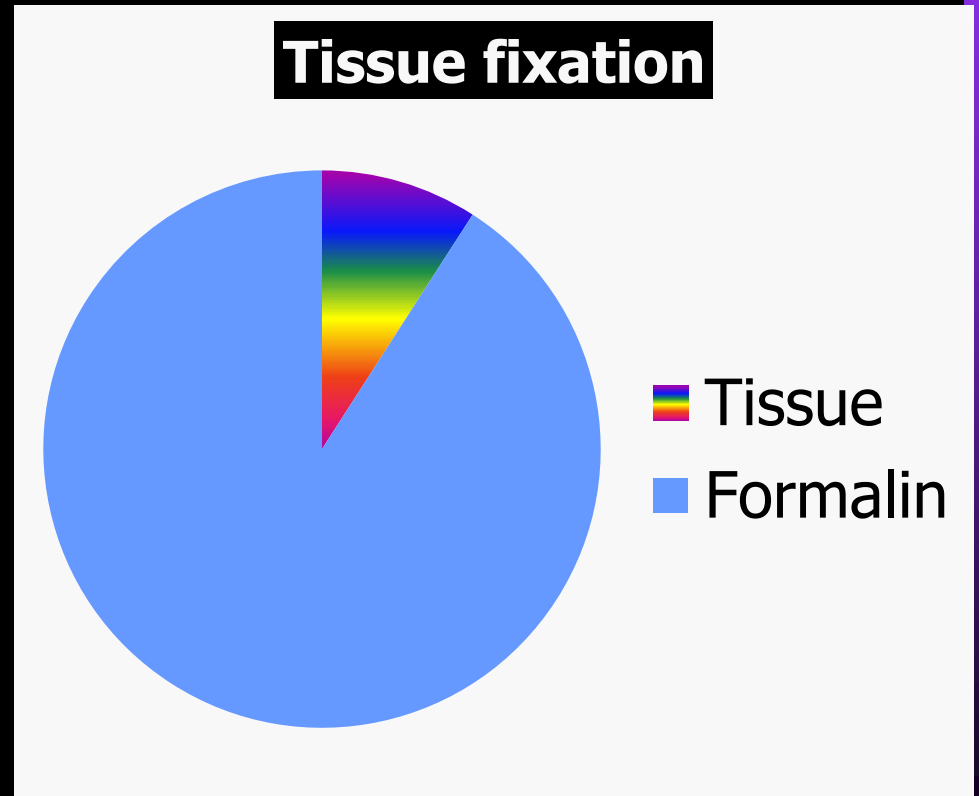


NSB 17350-00



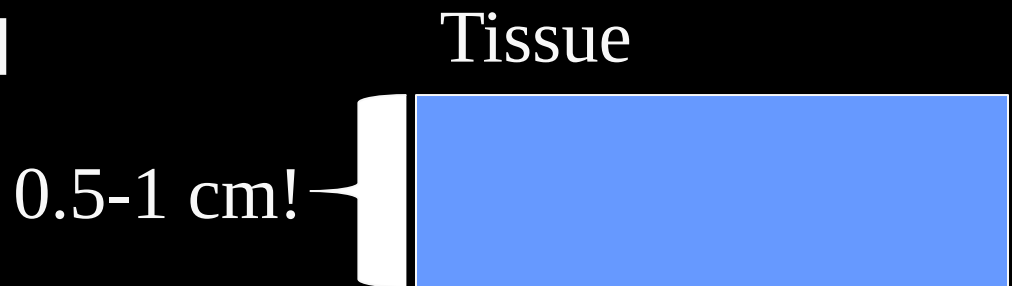
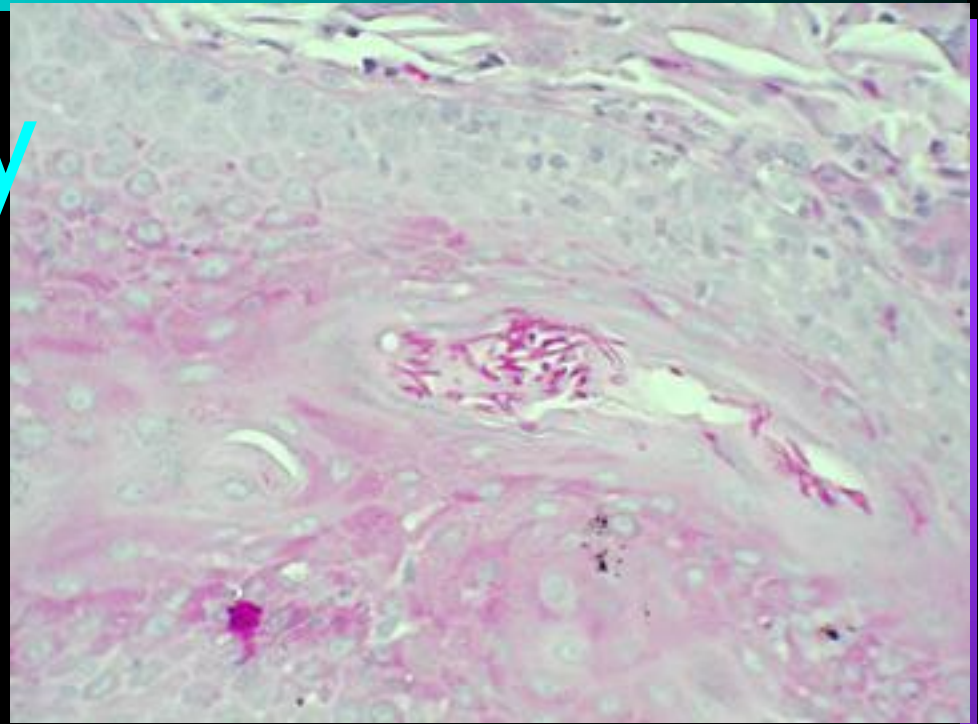
Histopathology

**Formalin:Tissue
at least 10:1
– (10% NBF)**



Histopathology

- **Formalin:Tissue at least 10:1**
 - (10% NBF)
- **0.5 - 1.0 cm thick**
- **Major organs and lesions**
- **Protect from freezing**



Above and beyond: Museum of the North (University of AK museum)

- At over 95,000 mammal specimens
- UAM Collection is among the largest in the Western Hemisphere
- Houses a world-class collection of marine mammals.
- Alaska Frozen Tissue Collection (AFTC)
 - samples from over 49,950 animals
 - the largest tissue collection specializing in northern regions
 - among the largest such collections worldwide.
- Samples since the 1950s.

Sampling – Frozen tissues, whiskers and bones.



Remarks: _____

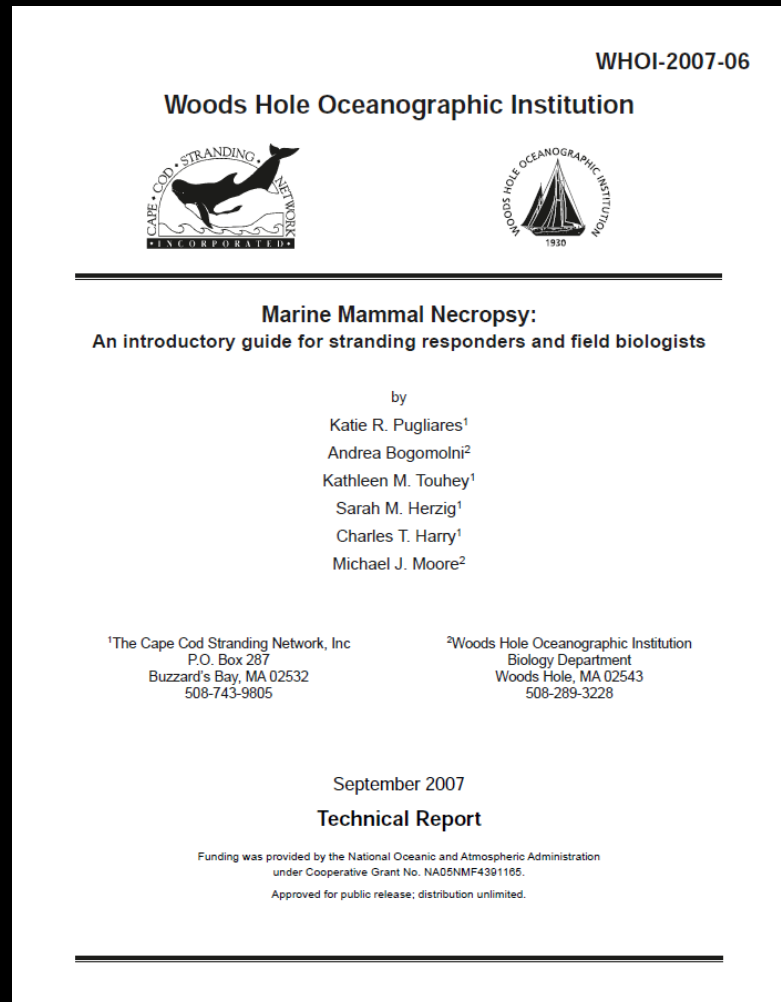
University of Alaska Museum 102846 M	University of Alaska Museum 102848 K	University of Alaska Museum 102849 S
University of Alaska Museum 102847 H	University of Alaska Museum 102849 L	

Museum user: _____ Collection: _____ UAM# _____ Accession # _____

PERMANENT ARCHIVAL RECORD - Please use permanent ink and return to
University of Alaska Museum, Fairbanks, AK 99775-6960

Please note down the bar code number for each tissue on the form

Excellent reference!



Pugliares, K.R., et al
2007. *Marine mammal
necropsy: an
introductory guide for
stranding responders
and field biologists.*
Woods Hole Oceanog.
Inst. Tech. Report.
WHOI-2007-06

FORMS and REFERENCES:

<https://sites.google.com/site/akvetpath/>



**NMFS Stranding Hotline:
(877) 925-7773 or (877)
9-AKR-PRD**

**Alaska SeaLife Center
Stranding Hotline:
(888) 774-7325**

Questions?

- AVPS
 - Kathy Burek (907) 242-2566 (C), Avps.kbh@gmail.com
 - Natalie Rouse (402) 499-9515 (C) avps.natalie.rouse@gmail.com
- NOAA -
 - Mandy Keough (907) 459-7367 (W) (907) 209-0637 (C)
 - Barbara (907) 271-3448 (W), (907) 331-8528 (C), barbara.mahoney@noaa.gov
 - Kate Savage (907) 957-2230 (C), kate.savage@noaa.gov
- ASLC
 - Stranding Hotline: **(888) 774-7325**, rehab@alaskasealife.org
 - Carrie Goertz (907) 224-6326 (W), (907) 362-2267(C), carrie_goertz@alaskasealife.org