

# GUIDELINE FOR MANATEE NECROPSY

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# Manatee Death Codes:

## 1: Watercraft

- Propeller
- Impact
- Both



## 2: Flood Gate / Canal Lock (manatee crushed by structure)



## 3: Human, Other

- Entanglement
- Ingestion of hooks/line, trash
- Net drowning
- Impounded behind structure

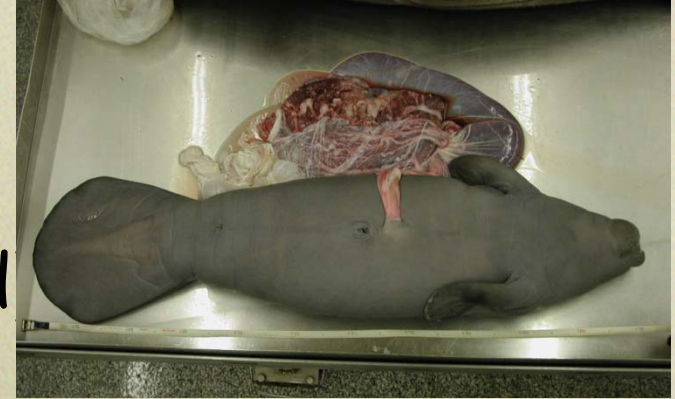




# Death Codes:

## 4: Perinatal ( $\leq 150$ cm)

- Natural
- Undetermined (decomposed)
- Cold stress
- Red tide



## 5: Cold Stress



## 6: Natural, Other

- Red Tide
- Diseases/infections





# Death Codes:

7: Verified; Not Recovered



8: Undetermined;  
Too Decomposed

9: Undetermined; Other

- Unknown cause of death
- Not too decomposed, but human interaction cannot be excluded





# Minimal information needed for verified mortality

- Pictures of carcass
- Detailed location description / map
- Date of verification
- Size estimate





# Basic Necropsy Equipment





# External work-up

## ☐ Photographs

- Use ruler or other measurement tool
- Dorsal, laterals, fluke, ventral

## ☐ PIT tag scan

## ☐ Total body length (straight)

- Measured ventrum up
- See "page 2" handout for additional measurements

## ☐ Genetics sample

- Flipper nail, and cookie from fluke margin (incl. white dermis)
- Store in alcohol (95% EtOH)





# Necropsy report - External exam

## ☐ Epidermis / dermis

- Thickening epidermis (normal 0.1 cm thick)
- Bleaching
- Lesions
- Abscesses

## ☐ Body condition

- Emaciation = peanut head, longitudinal folds ventrum

## ☐ Watercraft-related wounds / scars

## ☐ Epibiota

- Algae, barnacles, etc.

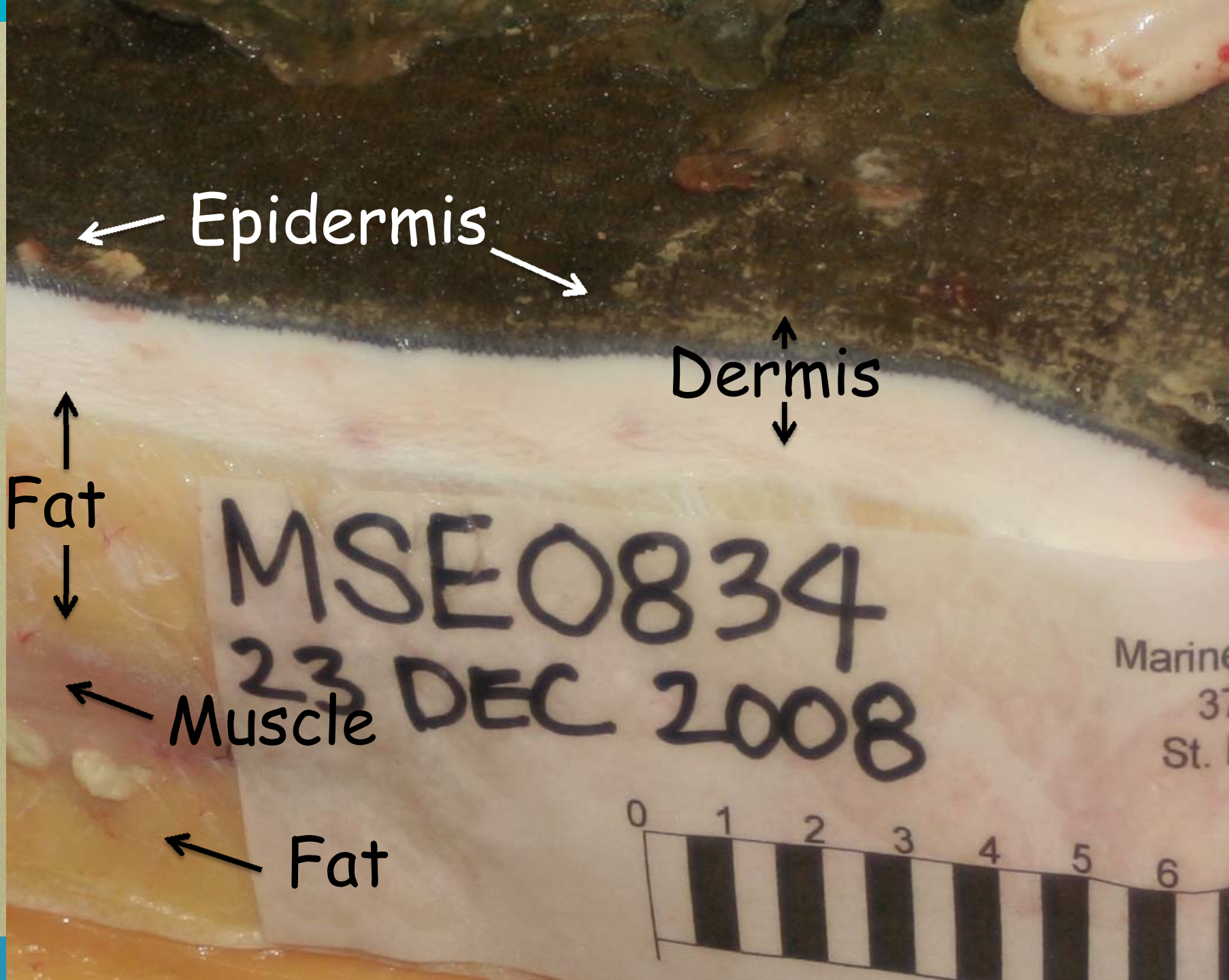




A close-up photograph of a dark, textured surface, likely human skin, showing fine pores and some dry, flaking areas. The text "Normal skin" is overlaid in the upper center.

Normal skin





Epidermis

Dermis

Fat

Muscle

Fat

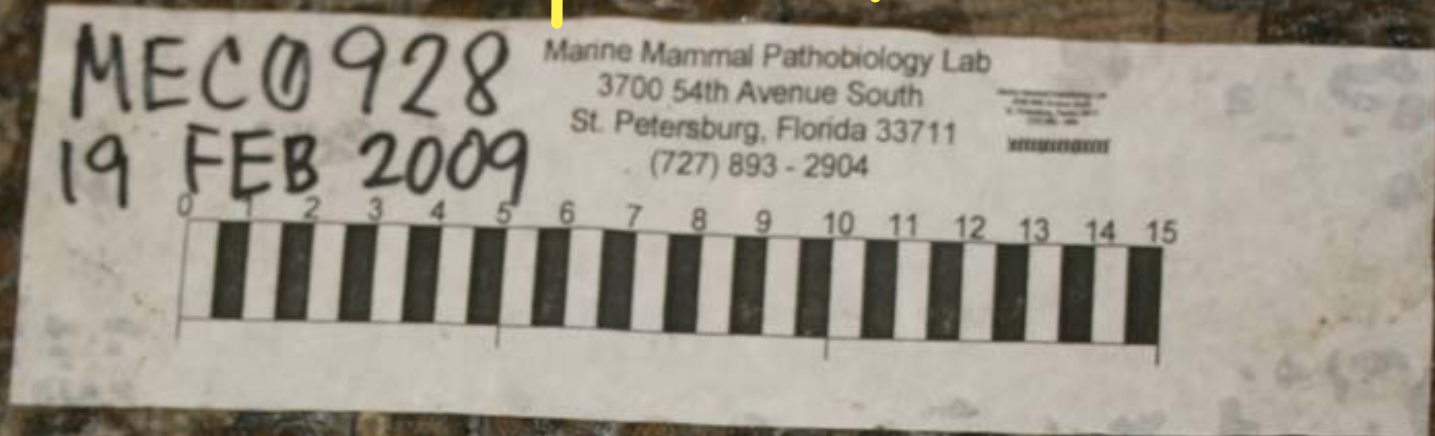
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# Exposure to cold: Cobblestone epidermis





Exposure to cold:  
Thickened epidermis





Exposure to cold:  
Epidermis bleaching

MEC0930

23 Feb 2009

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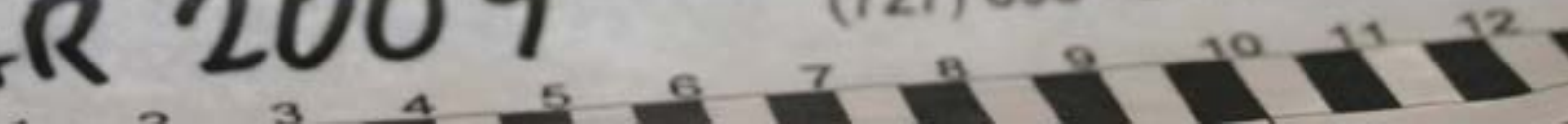


Cold stress lesions - pitted

1SW0940

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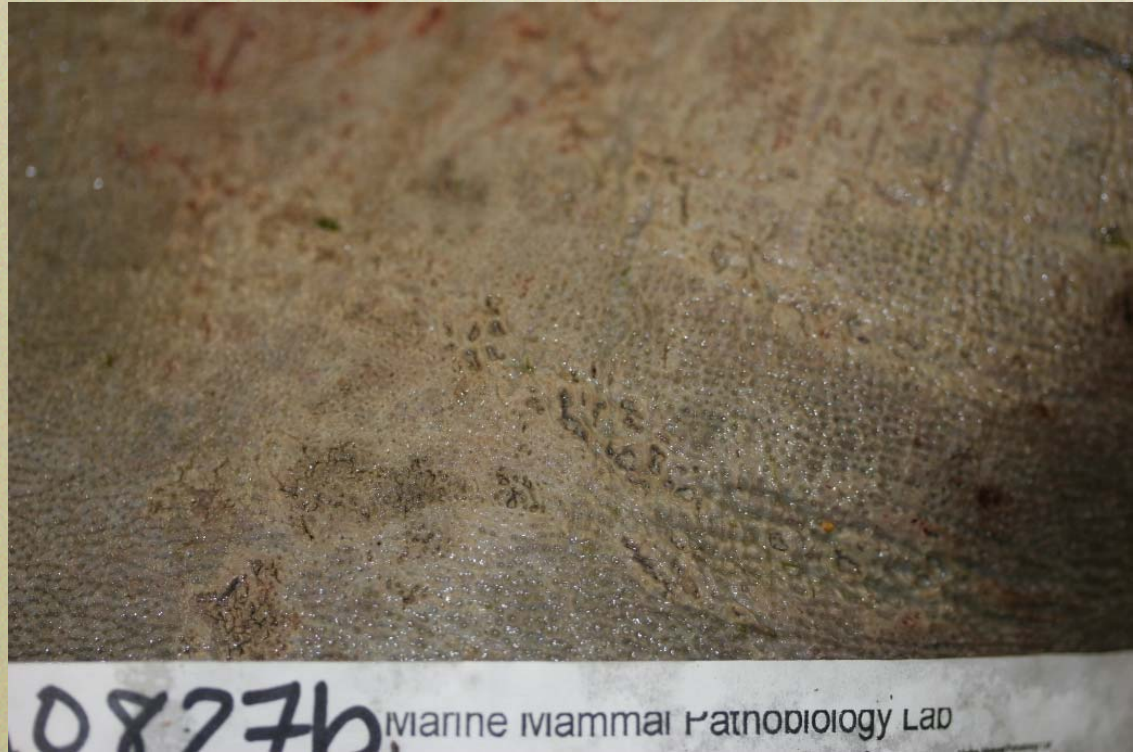
# Cold stress lesions - ulcerating





## Cold stress example from Massachusetts:

Note that minor gross skin changes can be misleading, this manatee had severe skin necrosis and inflammation on histology.







Emaciation



Peanut-head  
(top)  
and  
ventral  
folds  
(left)



# Watercraft-related wounds

Superficial or Penetrating?



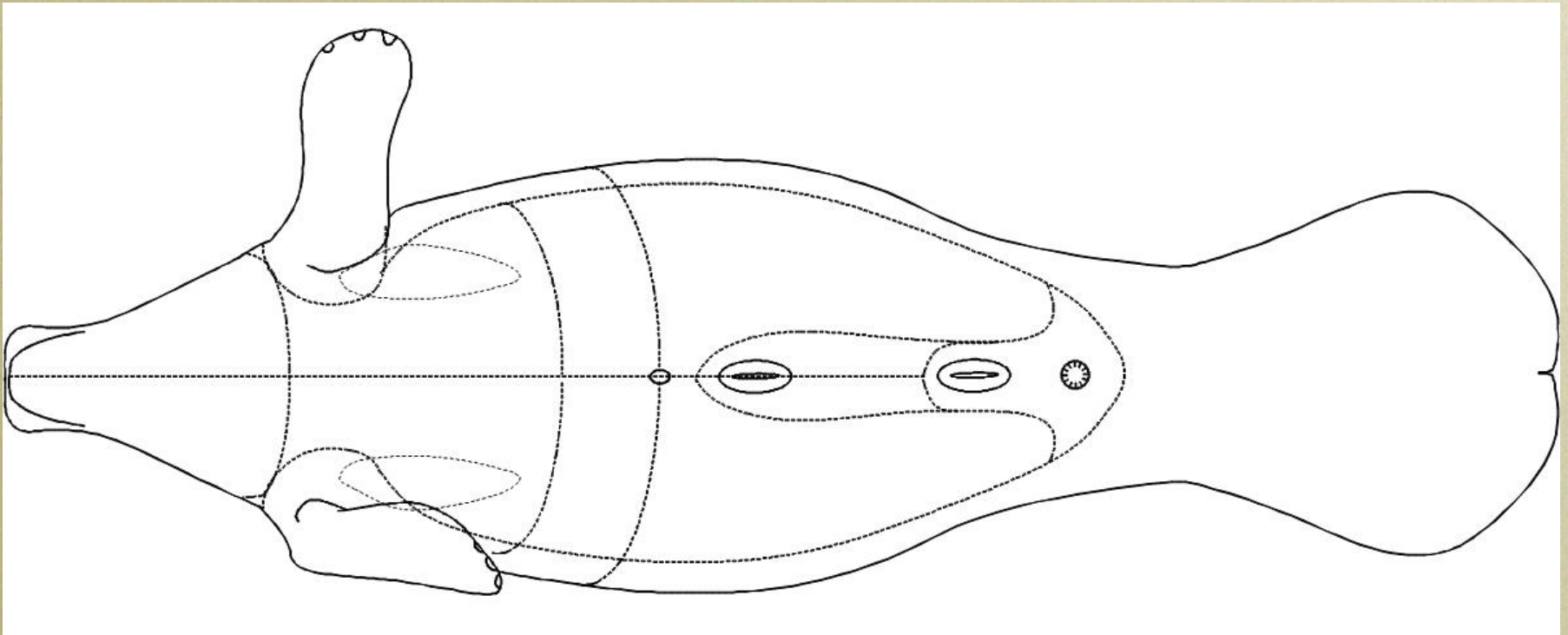
Fresh or Healing?



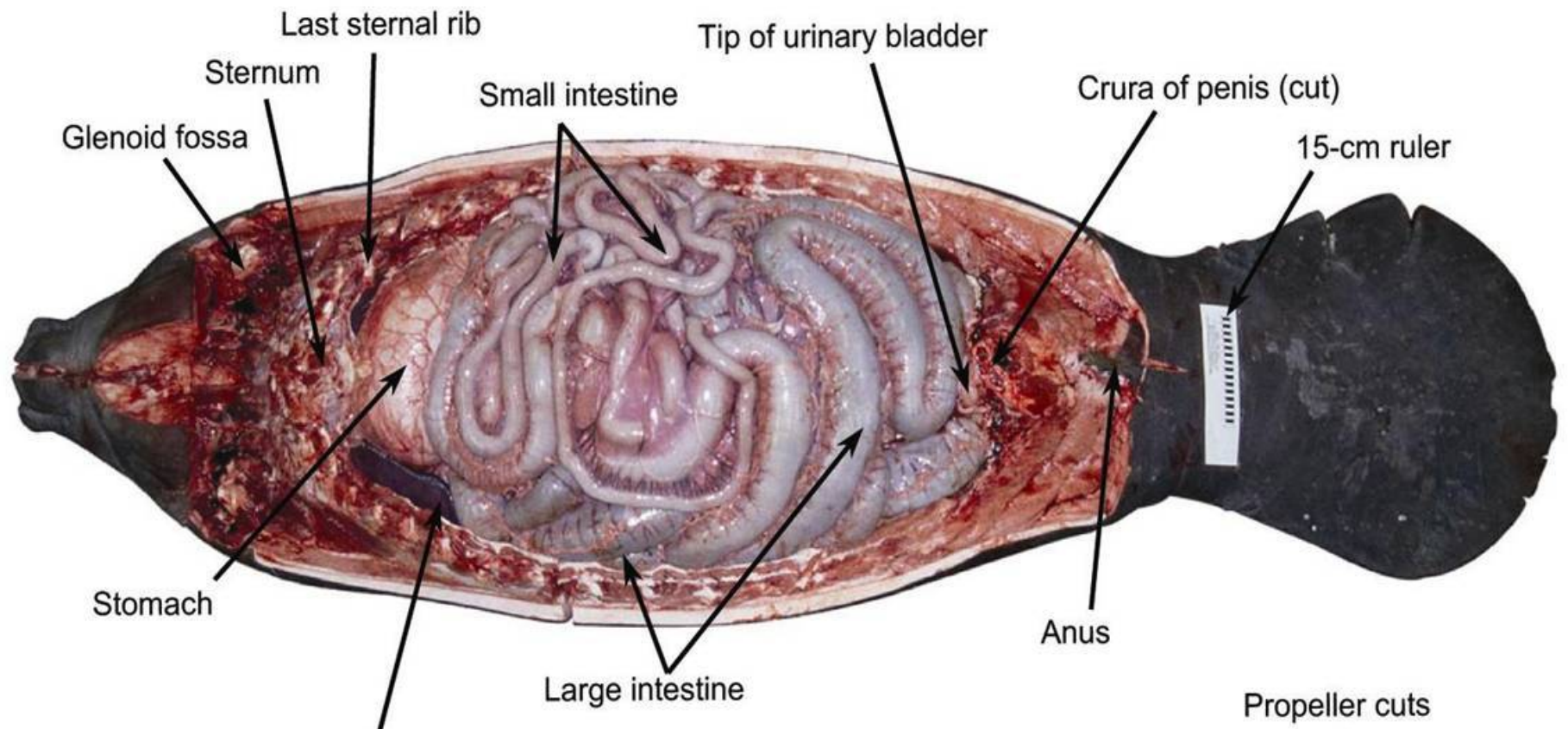


# Incisions

- Necropsy is performed with ventrum up

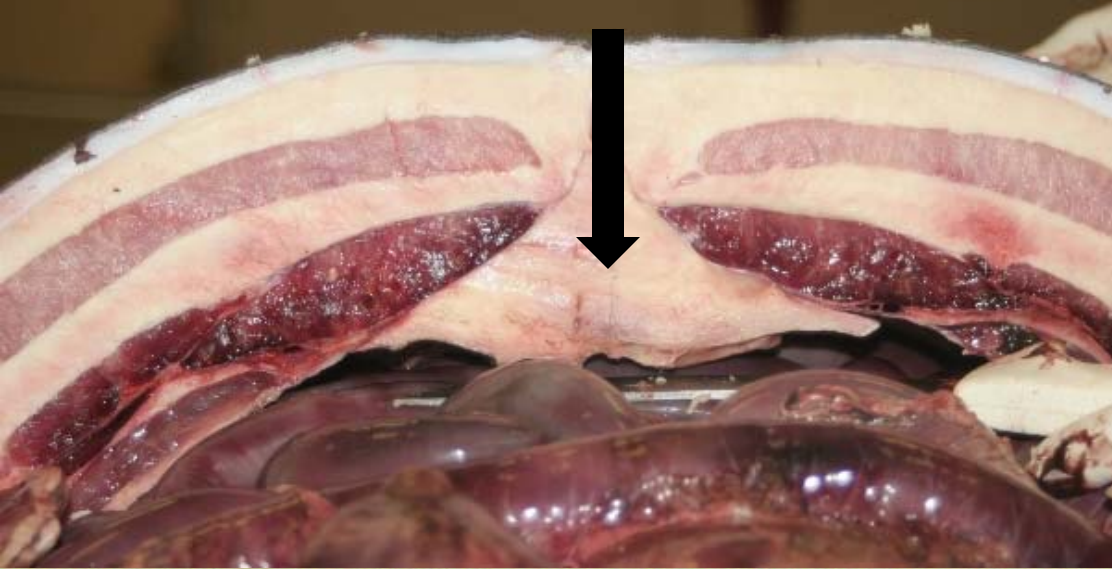






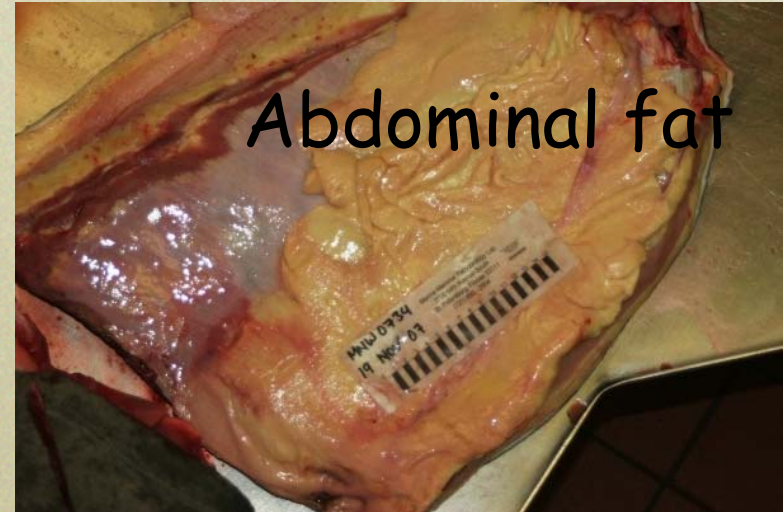


Abdominal fat



# Fats

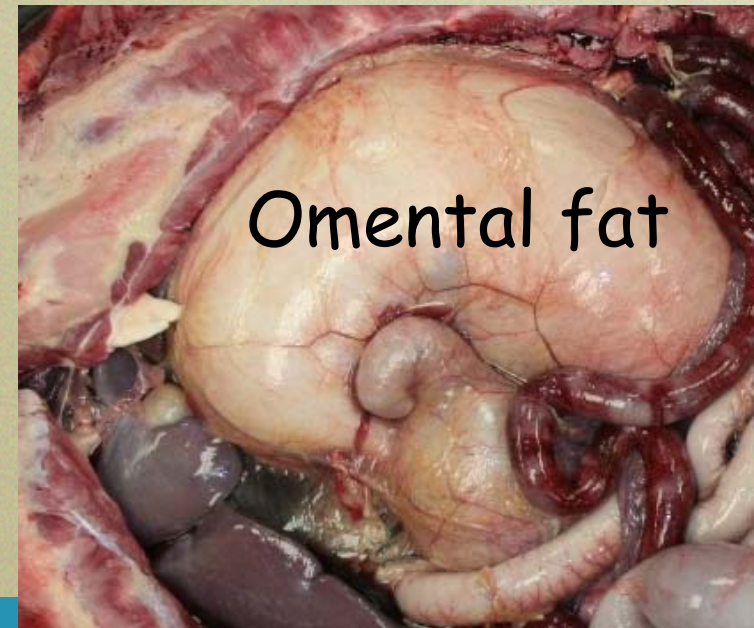
Abdominal fat



Mesenteric fat



Omental fat





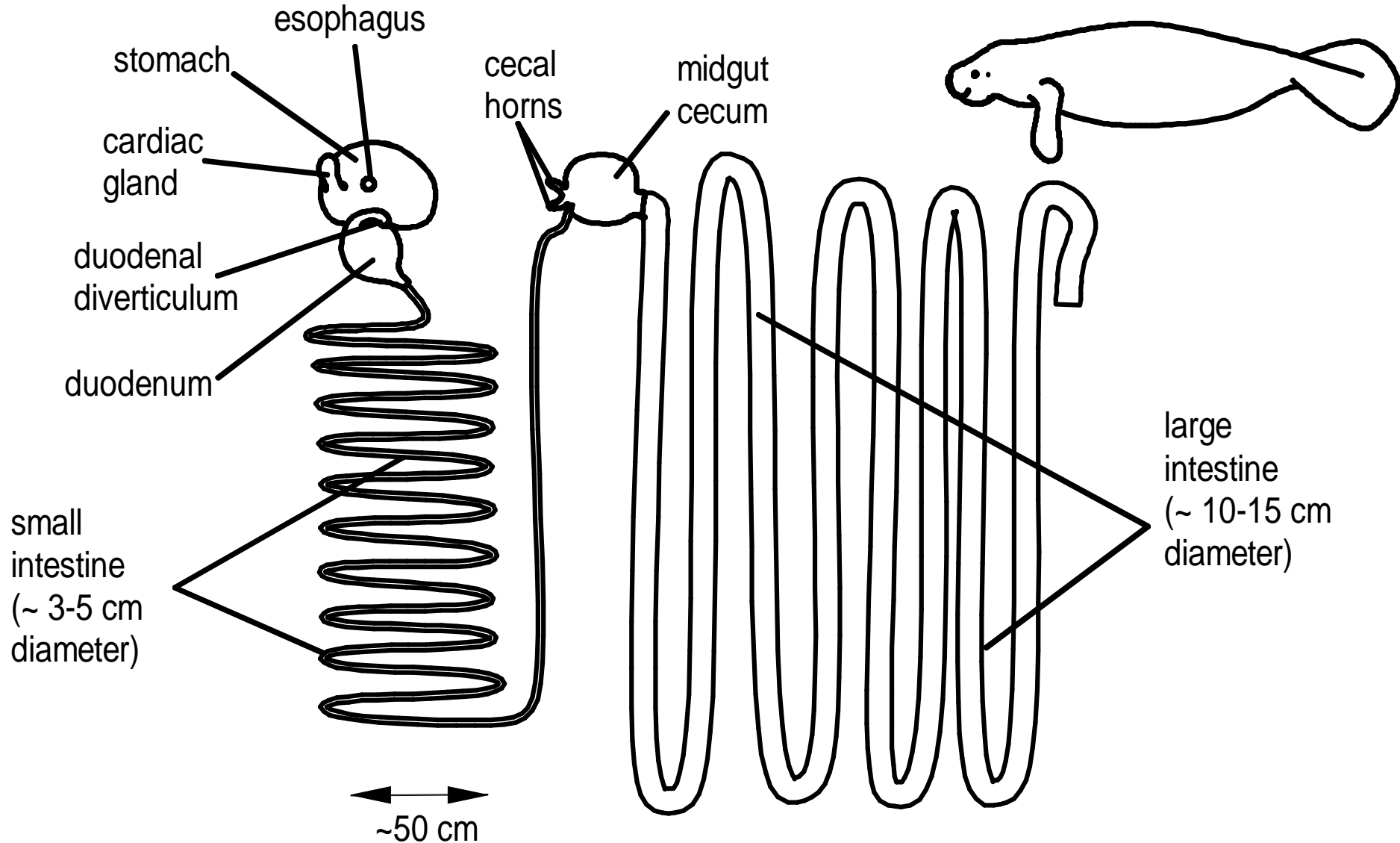
# Examination of GI tract - general

- ☐ Volume of contents for each of stomach, duodenum and cecum
- ☐ Moisture content (for example: dry, hard feces in many chronic cold stress cases)
- ☐ Well-chewed, well-digested?
- ☐ Fibrous, stringy, leafy?
- ☐ Color of contents
- ☐ Parasites
- ☐ Color and aspect of mucosa





adult manatees have approximately  
20 meters each, of small and large  
intestine; each ~ 6-7X TBL





# GI tract specifics

- Stomach and duodenum
  - Very small spleen in omentum at base of cardiac gland
  - Duodenum has two diverticuli
  - Pancreas at duodenum-SI transition
- Small intestine normally relatively empty of contents
- Cecum has characteristic "rabbit-ears"
- Colon should be full of moist feces





# GI Parasites

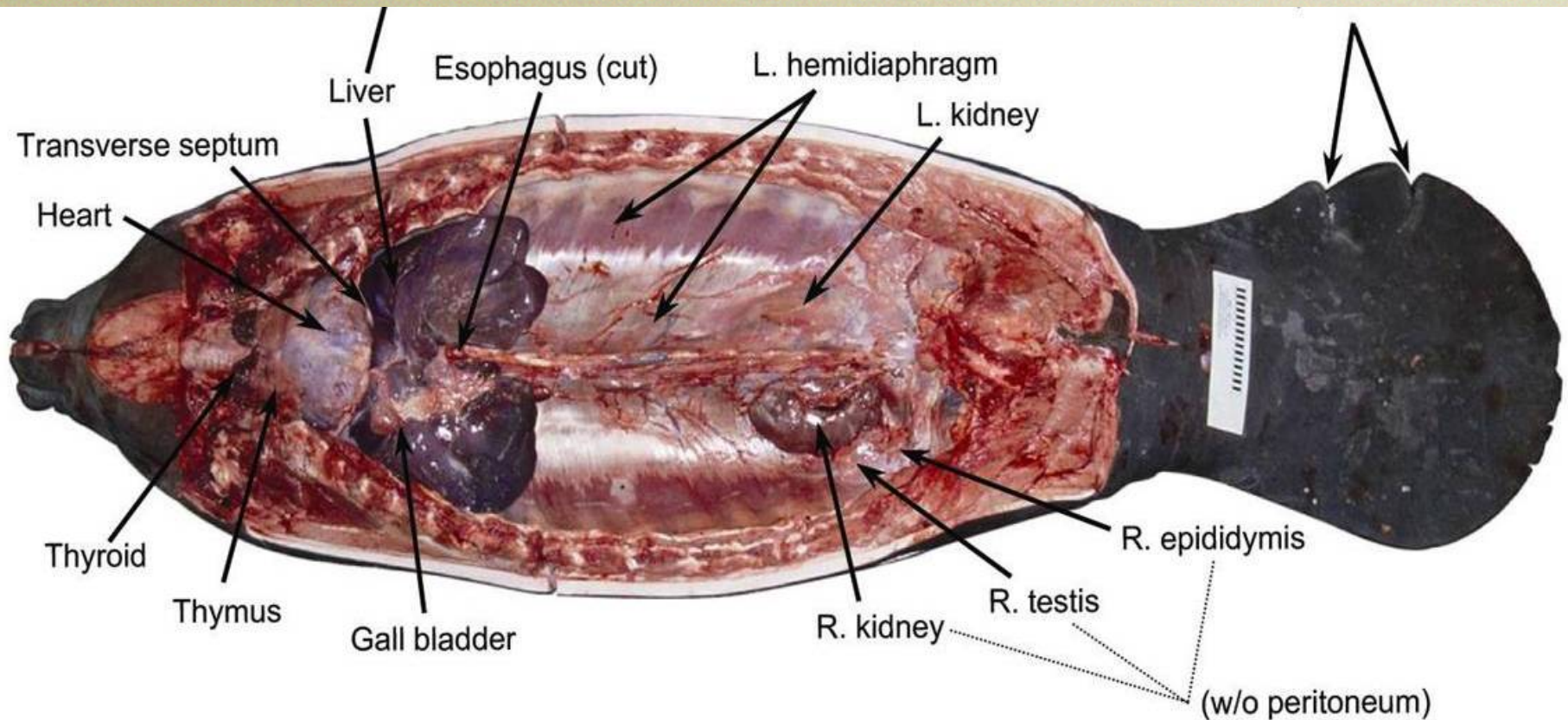


- Trematodes (left) common in cecum, colon
- Nematodes (below) common in stomach, duodenum





# Other abdominal organs and heart





# Descriptions abdominal organs

- ☐ Liver: serosal and cut surfaces
- ☐ Gallbladder: contents and mucosa
- ☐ Reproductive: fat and presence of
  - ✓ Uterine scars and follicles (females)
  - ✓ Semen, size testes (males)
- ☐ Kidneys: fat, serosal and cut surfaces
- ☐ Urinary bladder: contents and mucosa
- ☐ Heart: fat, look at valves and contents chambers





# Open both hemidiaphragms to access pleural cavity





# Exam of lungs

- ❑ Open primary and secondary airways
  - ✓ Should be clear
  - ✓ Describe mucosa
  - ✓ Trematodes are common
- ❑ Describe serosal and cut surfaces of lungs





## ❑ Head and Neck

- ✓ Examine skull for trauma
- ✓ Examine trachea
- ✓ Collect earbone (see separate protocol)



## ❑ Skeleton

- ✓ Examine for trauma





# FWC contact manatee mortality

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