

# Oil Spill Effects on Sea Turtles, Marine Mammals and Birds

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# NC Species at Risk - Mammals



# NC Species at Risk - Reptiles



# NC Species at Risk - Birds



Many species

Seasonally-dependent

Likely the most visible animals in an oil spill



# Toxicity/Physical Impact Variables

- Crude oil source and composition
- Weathering
- Weather
- Species
- Life stage (egg, hatchling, juvenile, adult)
- Route of exposure
- Duration of exposure
- Dispersants



# Crude oil components

- Alkanes
- Cycloalkanes
- Benzene
- Hydrogen sulfide
- Ethyl benzene
- Toluene
- Xylene
- Naphthalene

# Immediate Effects

- Fur/Feather Contamination
- Loss of waterproofing
- Hyper/Hypothermia (oil slick temperatures in Gulf of Mexico reaching 120 - 130 °F)
- Skin irritation/sloughing
- Corneal damage
- Dizziness, nausea, neurological symptoms
- Ingestion - diarrhea, maldigestion, hemorrhagic gastroenteritis
- Inhalation - respiratory irritation, pneumonia, emphysema

# Intermediate and delayed effects

- Liver, kidney, adrenal gland, salt gland damage/dysfunction
- GI foreign bodies (tar balls)
- Baleen fouling
- Anemia
- Carcinogenesis
- Immunomodulation
- Chronic inflammation
- Reproductive disorders, embryonic death



# Indirect Mortality

- Dead sea turtles with evidence of drowning, including sediment in tracheas, coincident with increased fishery effort in advance of closures due to oil
- Food web impacts/malnutrition - e.g., pyrosome (pelagic colonial tunicate) mortalities, part of leatherback and pelagic juvenile sea turtle diets

# Current Response Capacity in NC

- **Marine Mammal Stranding Network** - UNC-W, NCSU-CVM-CMAST, NC-WRC, NPS, Virginia Aquarium Stranding Program, Duke University Marine Laboratory, NC Aquariums, NC Maritime Museum, NC DMF, NOAA NMFS, US Coast Guard
- **Sea Turtle Beach Monitoring** - NC WRC coordinating numerous local groups
- **Sea Turtle Rehabilitation** - Karen Beasley Sea Turtle Rescue & Rehabilitation Center (KBSRRC), Network for Endangered Sea Turtles (NEST), NC Aquariums, NCSU-CVM-CMAST
- **Wildlife Rehabilitation Facilities** (e.g. Outer Banks Wildlife Shelter OWLS)
- **Unified Command**
- **Veterinary Medical Assistance Teams (VMAT)/NCSU Mobile Unit**



# Recent Counts from Gulf (25 July 2010)

- Mammals
  - Live visibly oiled - 1
  - Dead visibly oiled - 3
- Sea Turtles
  - Live visibly oiled - 172
  - Dead visibly oiled - 17
- Birds
  - Live visibly oiled - 1467
  - Dead visibly oiled - 1261

# Experience from the Gulf of Mexico - Sea Turtles

- Audubon Nature Institute, New Orleans
- Primary sea turtle intake and stabilization facility
- 21 – 29 June 2010
- Additional rotations by Dr. Greg Lewbart and Shane Christian (with some pictures borrowed from them)
- Most turtles at facility captured at sea in directed searches and clearing areas prior to burns
- Smaller pelagic life stages predominantly (1 – 3 kg)

# Red Zone, Yellow Zone, Green Zone



# Chain of Custody



# Lightly and Severely Oiled



# Intake Records, Photos, Weights, Measures



# Intake Procedures



Cloacal temperature



Heart rate



Sample collection

# Intake Scrub - Dawn®



# Waste-water Receptacle



# Eye cleaning - mayonnaise



# Oral Exam



# Oral and Pharyngeal Cleaning - more mayonnaise



# Mayonnaise & Cod Liver Oil Gavage



# Subcutaneous Fluids, Antibiotics, Iron Dextran, B-Vitamins



Yellow- Zone

Ingested/Excreted Plastic



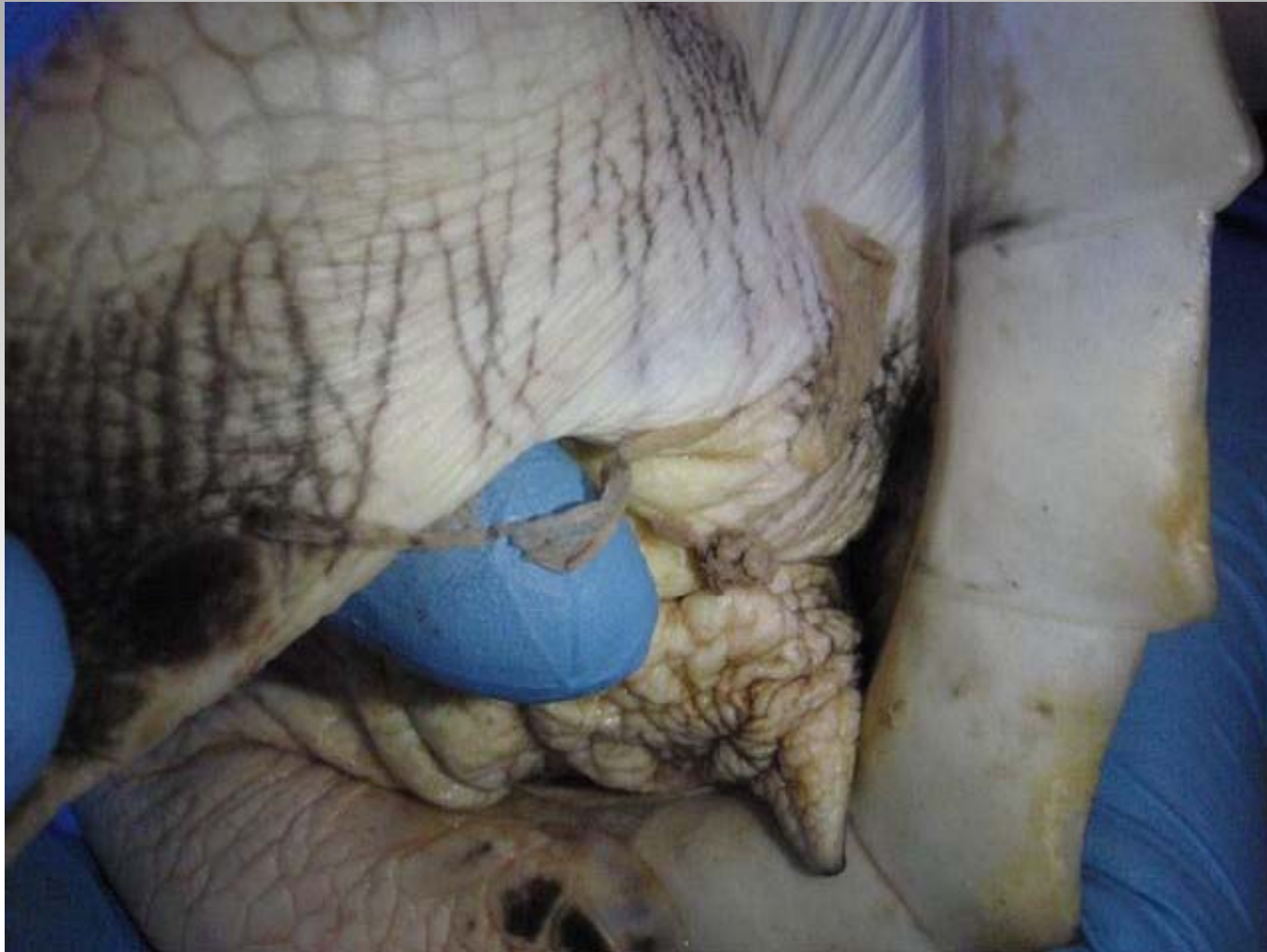
# Keeping Track



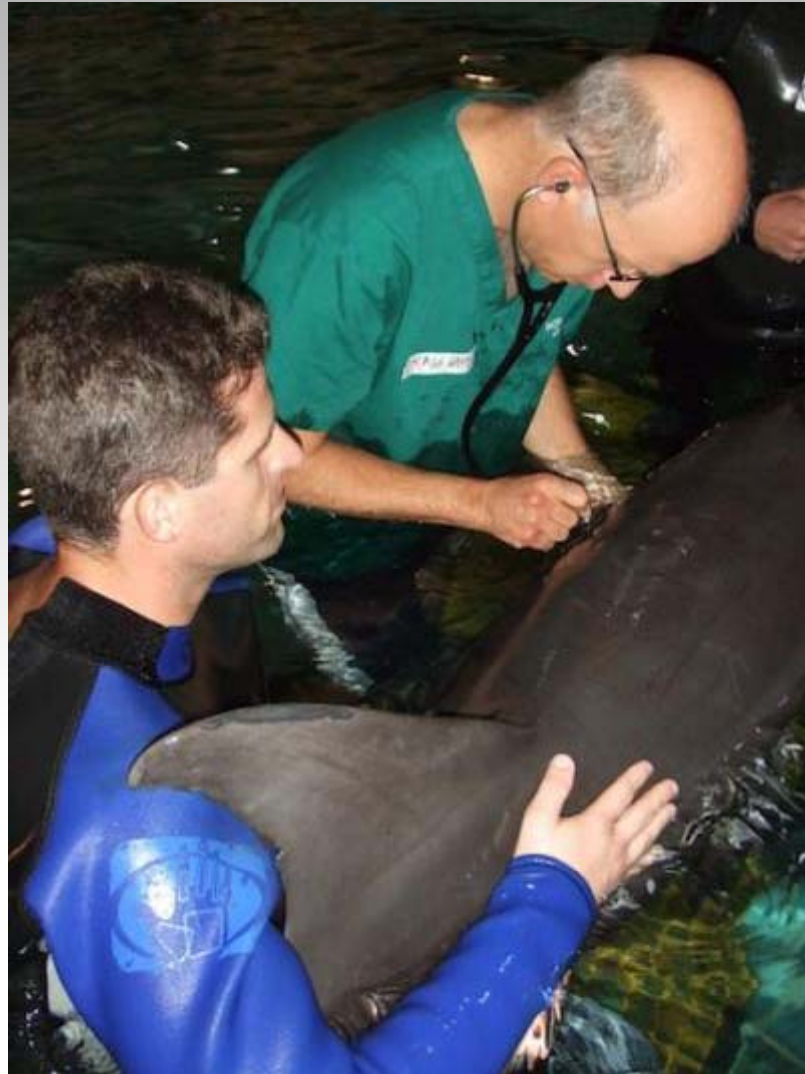
# Problems identified

- Large majority do very well following cleaning
- Several arrive with acidosis that resolves in 1 – 7 days
- Few cases of hypoglycemia, transient
- Occasional diarrhea, transient
- Weight loss for 1 – 3 days
- Anemia uncommon (one rapid and severe enough for blood transfusion; from hemorrhagic enteritis)
- Occasional skin sloughing
- Rare pneumonia
- Incidental problems (e.g., fractures, propeller wounds)

# Sloughing Skin



# Dolphin



# Quick Lessons

- It takes a lot of coordination and communication
- Legal issues add inefficiencies to primary clinical response and to research
- Have diagnostic and research laboratories that can meet evidentiary requirements identified ahead of time
- Utilize and upfit existing facilities, organizations, institutions
- Managing access is a challenge
- Contract guidelines might be helpful
- Sea turtles are easier than dolphins
- It takes a lot of medical supplies
- It takes a lot of mayonnaise