



SeaWorld®



# Manatee Entanglement

Claire Erlacher-Reid, DVM, Dipl. ACZM  
Veterinarian, SeaWorld Orlando

# Marine Debris

- Any persistent solid material that is manufactured or processed and disposed of or abandoned into the marine environment or Great Lakes.
- Most common types include:
  - Plastics
  - Microplastics (<5mm)
  - Derelict Fishing Gear
  - Abandoned & Derelict Vessels



# Marine Debris

- **Negative Impacts:**
  - **Economic Loss**
  - **Vessel Damage & Navigational Hazards**
  - **Habitat Damage**
  - **Invasive Species Transport**
  - **Animal Ingestion**
  - **Ghostfishing**
  - **Animal Entanglement**



<https://marinedebris.noaa.gov/discover-issue/impacts>

# Marine Debris

- **Negative Impacts:**
  - **Economic Loss**
  - **Vessel Damage & Navigational Hazards**
  - **Habitat Damage**
  - **Invasive Species Transport**
  - **Animal Ingestion**
  - **Ghostfishing**
  - **Animal Entanglement**



# Marine Debris

- **Negative Impacts:**
  - **Economic Loss**
  - **Vessel Damage & Navigational Hazards**
  - **Habitat Damage**
  - **Invasive Species Transport**
  - **Animal Ingestion**
  - **Ghostfishing**
  - **Animal Entanglement**



<http://pelicanharbor.org/blog/fishing-line-and-tackle-injuries/>

Photo by Jay Holcomb

# Marine Debris

- **Negative Impacts:**
  - **Economic Loss**
  - **Vessel Damage & Navigational Hazards**
  - **Habitat Damage**
  - **Invasive Species Transport**
  - **Animal Ingestion**
  - **Ghostfishing**
  - **Animal Entanglement**



<https://marinedebris.noaa.gov/discover-issue/impacts>

# Marine Debris

- **Negative Impacts:**
  - **Economic Loss**
  - **Vessel Damage & Navigational Hazards**
  - **Habitat Damage**
  - **Invasive Species Transport**
  - **Animal Ingestion**
  - **Ghostfishing**
  - **Animal Entanglement**



<https://marinedebris.noaa.gov/discover-issue/impacts>

# Manatees & Marine Debris

- Manatees likely serve as a sentinel species for marine debris issues in the coastal and estuarine environment
- Mortality & rescue records maintained by FWC provide direct & indirect evidence of interaction with marine debris
- These stats are available at MYFWC.com:
  - <http://myfwc.com/research/manatee/rescue-mortality-response>





# Manatees & Marine Debris

- Manatees likely serve as a sentinel species for marine debris issues in the coastal and estuarine environment
- Mortality & rescue records maintained by FWC provide direct & indirect evidence of interaction with marine debris
- These stats are available at MYFWC.com:
  - <http://myfwc.com/research/manatee/rescue-mortality-response>

FLORIDA FISH and WILDLIFE CONSERVATION COMMISSION  
FISH and WILDLIFE RESEARCH INSTITUTE  
MARINE MAMMAL PATHOBIOLOGY LABORATORY  
MANATEE RECOVERY PROGRAM

3700 54<sup>th</sup> Avenue South  
St. Petersburg, Florida 33711  
(727) 893-2904

**MANATEE RESCUE TABLE  
Florida 2014**

CIRCUMSTANCE	RESCUED	RELEASED	DIED
WATERCRAFT COLLISION	16	5	11
ENTANGLEMENT			
Crab Trap	7	7	
Monofilament			
Other	1	1	
ENTRAPMENT-HUMAN STRUCTURE	4	4	
HUMAN-OTHER	2	2	
CALF OF RESCUED MOTHER	1	1	
MOTHER OF RESCUED CALF	1	1	
CALF BY ITSELF	8	4	3
NATURAL	24	21	3
UNDETERMINED	2		2
<b>TOTAL</b>	<b>66</b>	<b>46</b>	<b>19</b>



# Manatees & Marine Debris

Analyzing this data allowed researchers to conclude:

Entanglement was documented as the leading anthropogenic reason for rescue of manatees in Florida between 1993-2012.

Vol. 32: 415–427, 2017  
<https://doi.org/10.3354/esr00816>

ENDANGERED SPECIES RESEARCH  
Endang Species Res

Published May 18



## Entanglement in and ingestion of fishing gear and other marine debris by Florida manatees, 1993 to 2012

Thomas R. Reinert<sup>1,\*</sup>, Ann C. Spellman<sup>2</sup>, Brandon L. Bassett<sup>3</sup>

<sup>1</sup>Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute, Tequesta Field Laboratory, Tequesta, FL 33460, USA

<sup>2</sup>Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute, Indian River Field Laboratory, Melbourne, FL 32901, USA

<sup>3</sup>Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute, Marine Mammal Pathobiology Laboratory, St. Petersburg, FL 33711, USA

**ABSTRACT:** Entanglement in and ingestion of marine debris by marine life has become a recognized threat worldwide, and the endangered Florida manatee is no exception. Manatees are known to become entangled in various types of fishing gear and other marine debris, and foreign objects are often found in the gastrointestinal tract of dead manatees. We examined a 20 yr dataset (1993 to 2012) of manatee rescue and necropsy records for evidence of entanglement in or ingestion of marine debris. In over 6500 manatee necropsy reports, over 11% either had ingested or showed evidence of entanglement in marine debris (or both). Fifty manatees died as a direct result of either entanglement in or, most commonly, ingestion of marine debris; fishery-related gear was involved in over 70% of these cases. With respect to live manatee rescues (n = 1244), over 25% were related to entanglement in or ingestion of fishery gear or marine debris, making entanglement the top anthropogenic reason for rescue during this time. Fishing gear, primarily trap lines and monofilament fishing lines, was a factor in over 85% of these rescues. Female manatees in particular were disproportionately affected by marine debris. The Florida manatee represents an example of estuarine fauna that is subject to harm from marine debris, and continued efforts to reduce and remove marine debris from estuarine environments will benefit manatees and other estuarine species.

# Manatee Rescues: 1993-2012

- **Live Rescues (1,244 manatees):**
  - **>25% demonstrated evidence of interaction with marine debris**
  - **Trap lines and monofilament were most common materials**
  - **Adult females > Males**
  - **Brevard & Monroe counties accounted for the most entanglement rescues in FL**



# Manatee Mortalities: 1993-2012

- **Necropsy Reports (6,500 deceased)**
  - **11% demonstrated evidence of interaction with marine debris**
  - **<1% died as a direct result of marine debris (mostly ingestion)**
  - **Monofilament was the most commonly found foreign object within the digestive tract**
  - **Adult females > Males**
  - **Ingestion & entanglement reports were most prevalent in Brevard & Lee Counties in FL**



# Manatees & Marine Debris

- Manatees may be at increased risk due to their “curious & inquisitive nature”
  - Observed manipulating novel objects in their environment with their flippers & mouths
- Interaction with monofilament line is most likely to be accidental & passive due to its transparency
- Researchers theorize females are at increased risk because they may rub against objects in the environment to relieve milk engorged teats



# Anatomical Location of Entanglement

- **Most common location is around one or both pectoral flippers**
- **Body wraps are the second most common**
- **Other locations include:**
  - **Peduncle/Paddle**
  - **Head & Mouth**
  - **Fouled Manatee tracking gear**



# Anatomical Location of Entanglement

- **Most common location is around one or both pectoral flippers**
- **Body wraps are the second most common**
- **Other locations include:**
  - **Peduncle/Paddle**
  - **Head & Mouth**
  - **Fouled Manatee tracking gear**



# Anatomical Location of Entanglement

- **Most common location is around one or both pectoral flippers**
- **Body wraps are the second most common**
- **Other locations include:**
  - **Peduncle/Paddle**
  - **Head & Mouth**
  - **Fouled tracking gear**





# Consequences to Manatees

- **Debris may negatively impact:**
  - **Reproduction & Nursing**
  - **Energy Expenditure**
  - **Mobility & Foraging**
  - **Loss of tissues or flippers**
  - **Predispose to secondary infections or additional entanglements**
  - **Death**
- **Irregularities or deformities, as a result of entanglement, may make the animal more susceptible to future entanglements**



# Rescue & Rehabilitation

- **Intervention & rescue efforts coordinated by FWC**
- **Disentanglement in the field may be possible**
  - **Best for acute entanglement**
- **When damage is severe, chronic, & life threatening, transport to a rehab facility may be necessary for continued medical care**



# Rescue & Rehabilitation

- Examination
- Blood Sampling
- Radiographs
- Disentanglement
- Wound Care
- Supportive Care
- Systemic Meds
- Anesthesia & Surgery if necessary



# Rescue & Rehabilitation

- Examination
- Blood Sampling
- Radiographs
- Disentanglement
- Wound Care
- Supportive Care
- Systemic Meds
- Anesthesia & Surgery if necessary



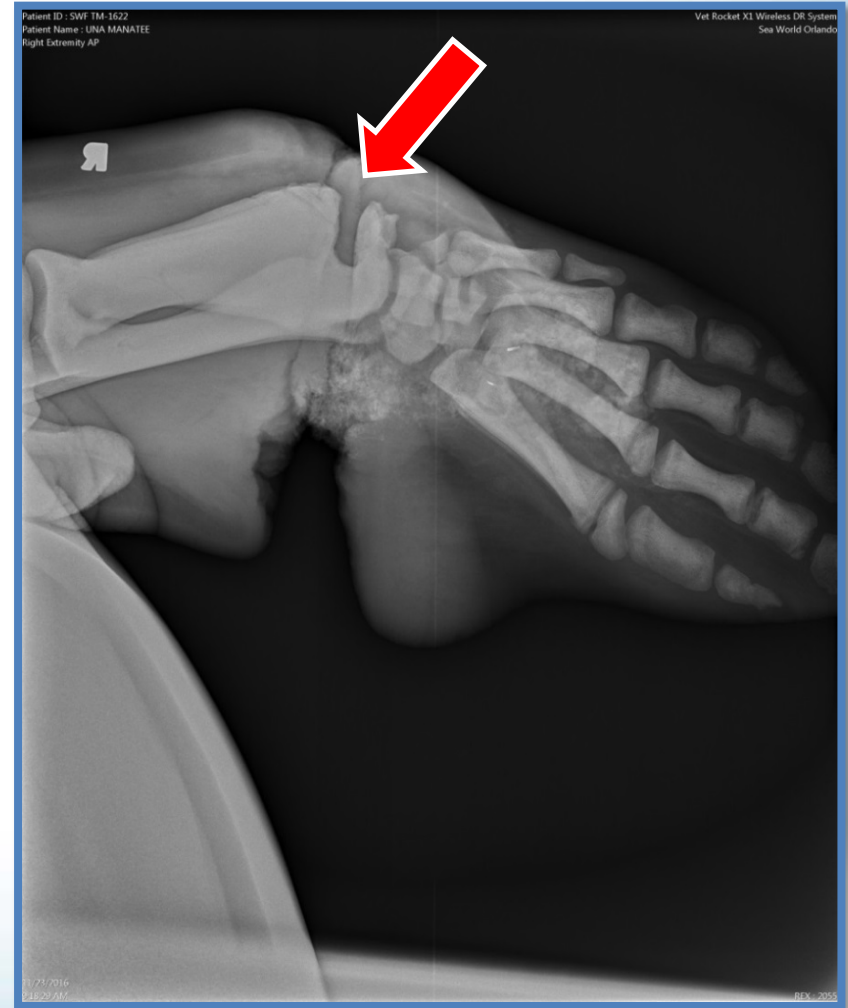
# Rescue & Rehabilitation

- Examination
- Blood Sampling
- Radiographs
- Disentanglement
- Wound Care
- Supportive Care
- Systemic Meds
- Anesthesia & Surgery if necessary



# Rescue & Rehabilitation

- Examination
- Blood Sampling
- Radiographs
- Disentanglement
- Wound Care
- Supportive Care
- Systemic Meds
- Anesthesia & Surgery if necessary



**Osteolysis & Osteomyelitis are common complications**

# Rescue & Rehabilitation

- Examination
- Blood Sampling
- Radiographs
- Disentanglement
- Wound Care
- Supportive Care
- Systemic Meds
- Anesthesia & Surgery if necessary



# Wound Care

- **Lavage with dilute chlorohexidine, betadine, or sterile saline**
- **Raw honey or other topical treatments**
- **Cold Laser**





# Rescue & Rehabilitation

- Examination
- Blood Sampling
- Radiographs
- Disentanglement
- Wound Care
- Supportive Care
- Systemic Meds
- Anesthesia & Surgery if necessary



# Rescue & Rehabilitation

- Examination
- Blood Sampling
- Radiographs
- Disentanglement
- Wound Care
- Supportive Care
- Systemic Meds
- Anesthesia & Surgery if necessary



# Rescue & Rehabilitation



# Rescue & Rehabilitation

- Examination
- Blood Sampling
- Radiographs
- Disentanglement
- Wound Care
- Supportive Care
- Systemic Meds
- Anesthesia & Surgery if necessary



# Rescue & Rehabilitation

- Examination
- Blood Sampling
- Radiographs
- Disentanglement
- Wound Care
- Supportive Care
- Systemic Meds
- Anesthesia & Surgery if necessary



# Rescue & Rehabilitation

**Ultimate Goal =  
Return to the Wild as  
Fast as Possible !!**



# Education & Prevention

- Continued efforts to rescue entangled manatees & remove debris from aquatic environments are paramount !
- Education & outreach efforts raise awareness & encourage the public to:
  - Stop littering & recycle
  - Collect marine debris when it is seen
  - Secure items on vessels
  - Support conservation efforts
  - Report injured wildlife



# Education & Prevention

- Boating facilities are typically required by state law to provide manatee awareness education as a condition of permit or lease
  - Signs, Videos, Brochures, Coloring Books, etc.



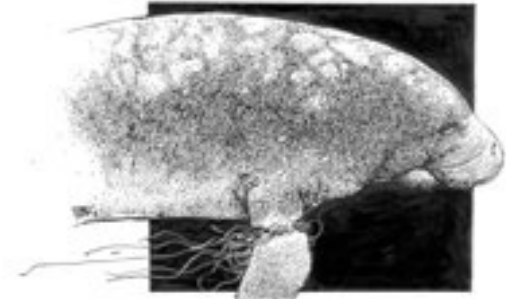


# Reporting Entangled Manatees

Call: **1-888-404-FWCC (3922)**

- 24hr Wildlife Alert Hotline
- Report injured, orphaned, entangled, distressed, or deceased manatees
- Early intervention increases chances of a successful outcome!

Recycle your line or discard it in trash containers.



**Help protect Florida's manatees.**

Manatees and other wildlife can easily become entangled in or ingest discarded monofilament fishing line and hooks, which can lead to serious injury or death.

Wildlife Alert:  
**1-888-404-FWCC(3922)**

cell \*FWC or #FWC

Report collisions, sick, dead or injured manatees and any wildlife or boating law violations.

# Tag vs Trap

- **Crap Trap:**
  - Small round styrofoam float
  - Braided polyethylene line/rope typically has numerous knots and is often attached to a crab trap
- **Research Tags:**
  - Small rigid antenna on a structured housing unit
  - Attached to flexible tether secured around the peduncle



# Tag vs Trap

- **Crap Trap:**
  - Small round styrofoam float
  - Braided polyethylene line/rope typically has numerous knots and is often attached to a crab trap
- **Research Tags:**
  - Small rigid antenna on a structured housing unit
  - Attached to flexible tether secured around the peduncle



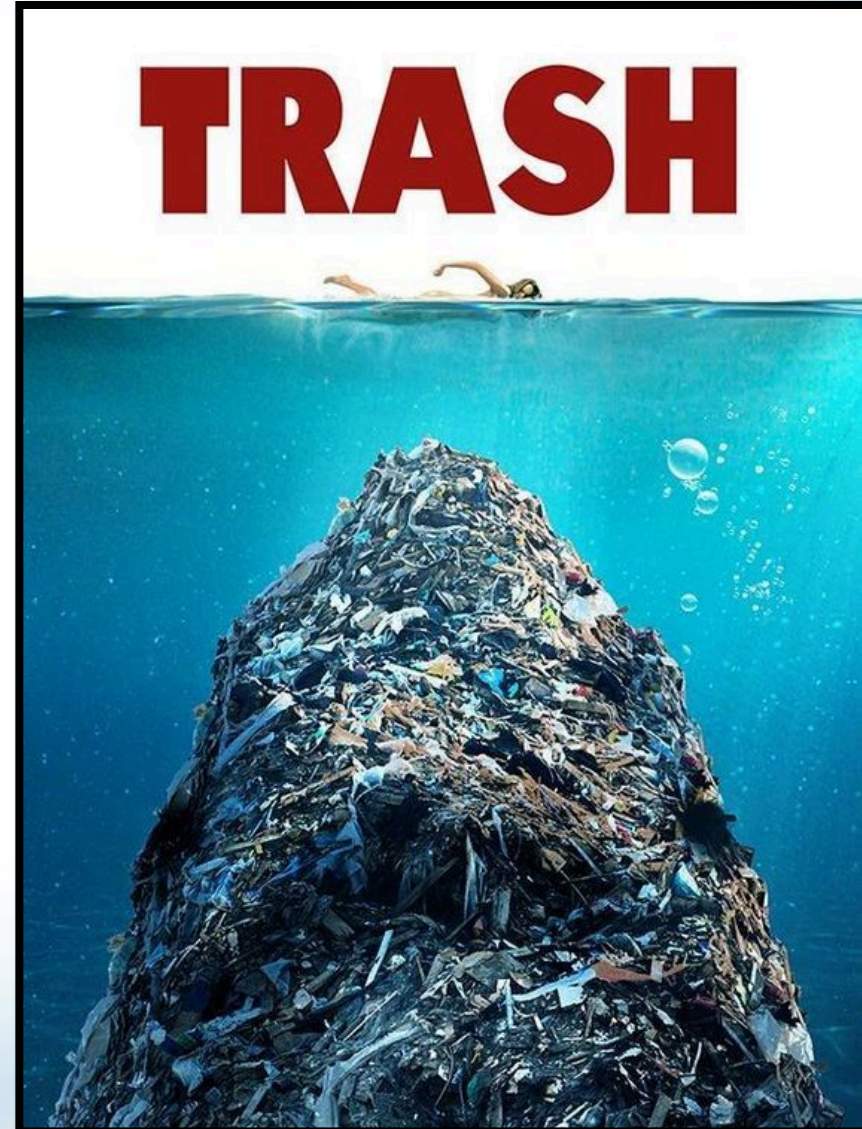
# Conservation Efforts

- **Manatee License Plate**
  - Purchase provides funds to conservation efforts
  - Plate is seen by other drivers, facilitating awareness
- **Manatee Decals**
  - Available for \$5 at Florida County Tax Offices
  - Provides funds and awareness
- **Save the Manatee Club**
  - [Savethemanatee.org](http://Savethemanatee.org)
  - Membership, adopt, donate, volunteer, contact policy makers, obtain educational materials, etc.



# Marine Debris Act

- Signed into law in 2006
- Empowers the NOAA Marine Debris Program to identify, determine sources, assess, prevent, reduce, & remove marine debris & address the adverse impacts on the economy, marine environment, & navigation safety.
- Has supported over 100 marine debris removal projects and removed more than 5,500 metric tons of marine debris from our coasts and oceans.
- <https://marinedebris.noaa.gov>



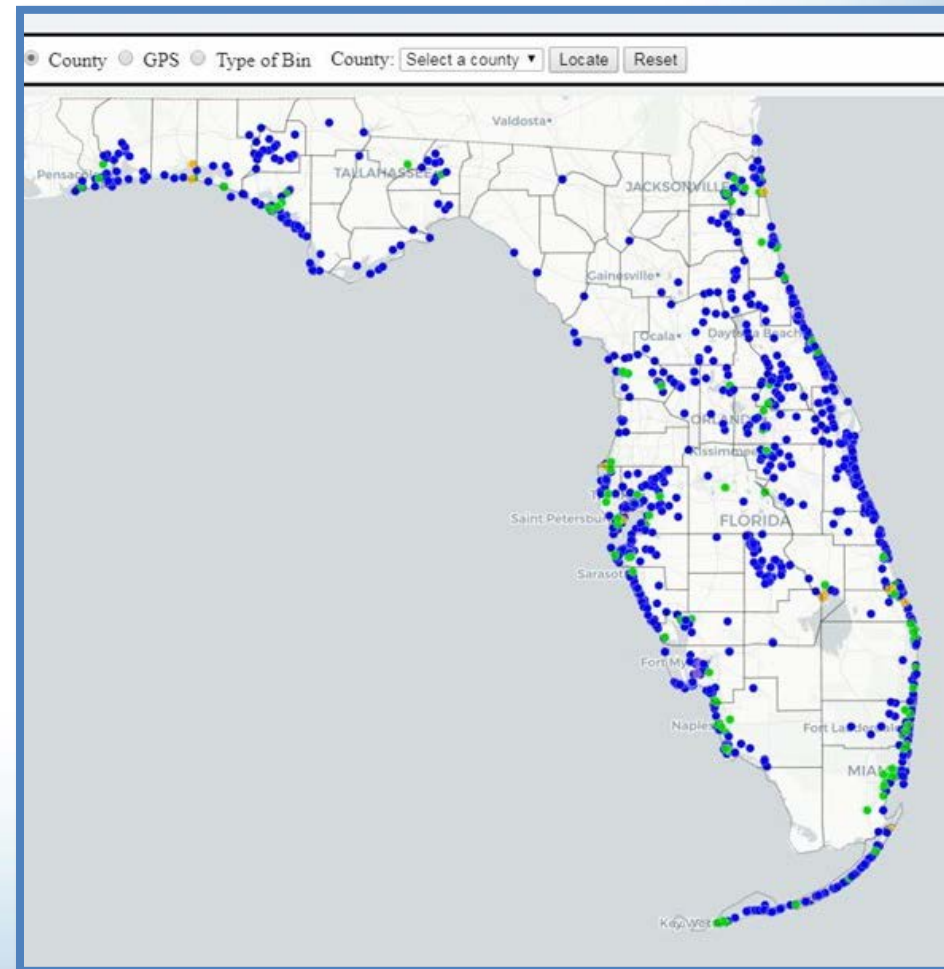
# Monofilament Recovery & Recycling Program (MRRRP)

- Statewide effort to educate the public, encourage recycling, & promote volunteer cleanup events.
- Over 1600 monofilament recycling bins around the state
- <http://mrrp.myfwc.com>



# Monofilament Recovery & Recycling Program (MRRP)

- Statewide effort to educate the public, encourage recycling, & promote volunteer cleanup events.
- Over 1600 monofilament recycling bins around the state
- <http://mrrp.myfwc.com>



# Other Programs

- **Florida Marine Debris Reduction Guidance Plan**
  - Strategies to reduce marine debris coordinated by Florida Coastal Management Program & NOAA
  - <https://floridadep.gov/fco/fcmp>
- **Derelict Trap Retrieval & Debris Removal Programs**
  - Authorizes volunteer groups to collect derelict gear
- **Spiny Lobster, Stone Crab, & Blue Crab Trap Retrieval Programs**
  - Fishery participant organizations are contracted and payment is made based on the number of traps retrieved
  - <http://myfwc.com/fishing/saltwater/trap-debris/>





# Thank you!

Any  
Questions?



# References & Websites

- Reinert TR, et al. 2017. Entanglement in and ingestion of fishing gear and other marine debris by Florida manatees, 1993 to 2012. *Endang Species Res* 32: 415-427.
- Adimey NM, et al. 2014. Fishery gear interactions from stranded bottlenose dolphins, Florida manatees, and sea turtles in Florida. *Marine Pollution Bulletin* 81: 103-115.
- NOAA Marine Debris Program: <https://marinedebris.noaa.gov/>
- Monofilament Recovery & Recycling Program: <http://mrrp.myfwc.com/>
- Florida Coastal Management Program: <https://floridadep.gov/fco/fcmp>
- FWC Derelict Trap Retrieval & Debris Removal Program:  
<http://myfwc.com/fishing/saltwater/trap-debris/>
- Save the Manatee Club: <https://www.savethemanatee.org/>
- FWC Manatee Program: <http://myfwc.com/wildlifehabitats/managed/manatee/>
- FWC Manatee Decals: <http://myfwc.com/wildlifehabitats/managed/manatee/decals/>
- Manatee License Plate: <http://www.buyaplate.com/Save%20The%20Manatee>
- SeaWorld Manatee Info: <https://seaworld.org/en/animal-info/animal-infobooks/manatee>

