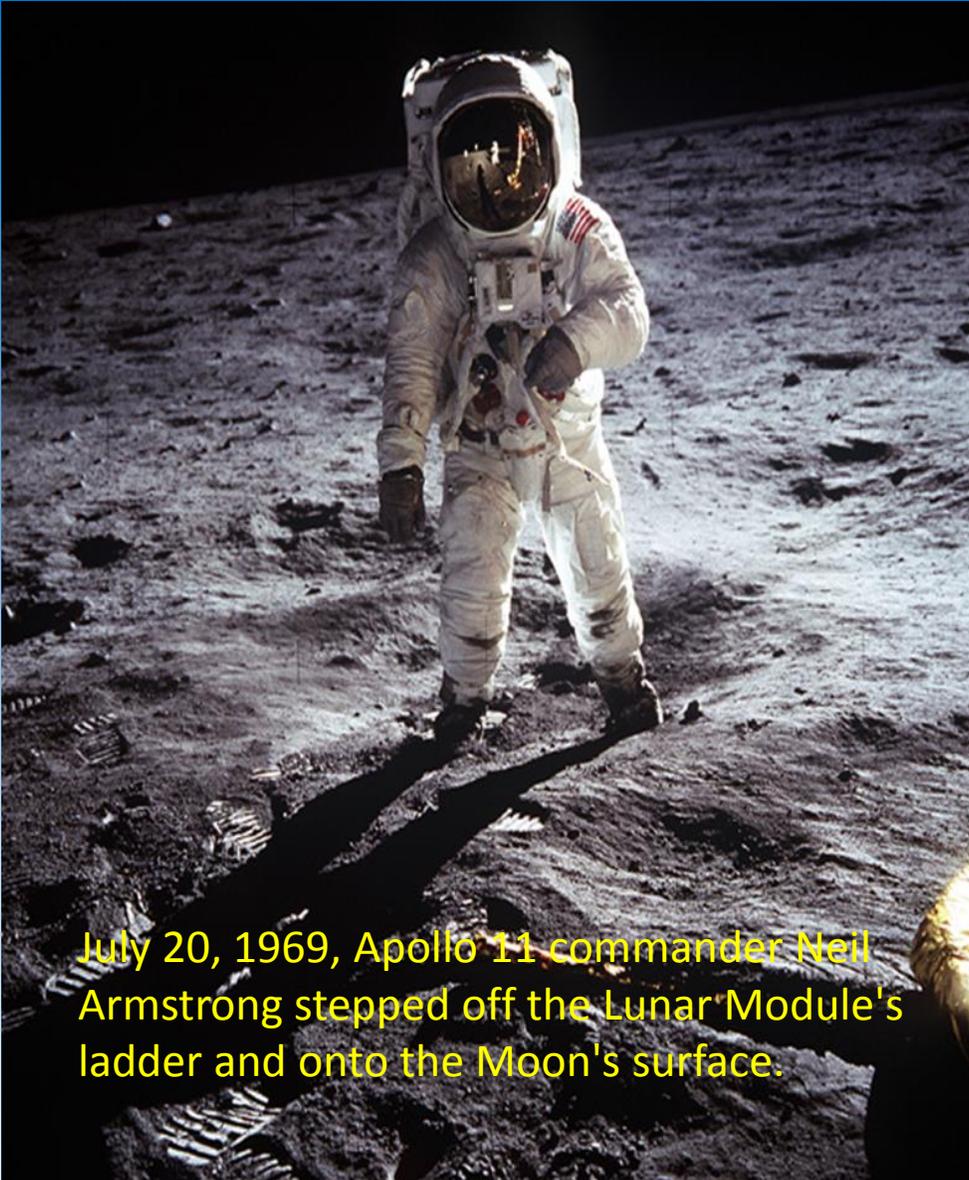


# Natural Resources at Kennedy Space Center

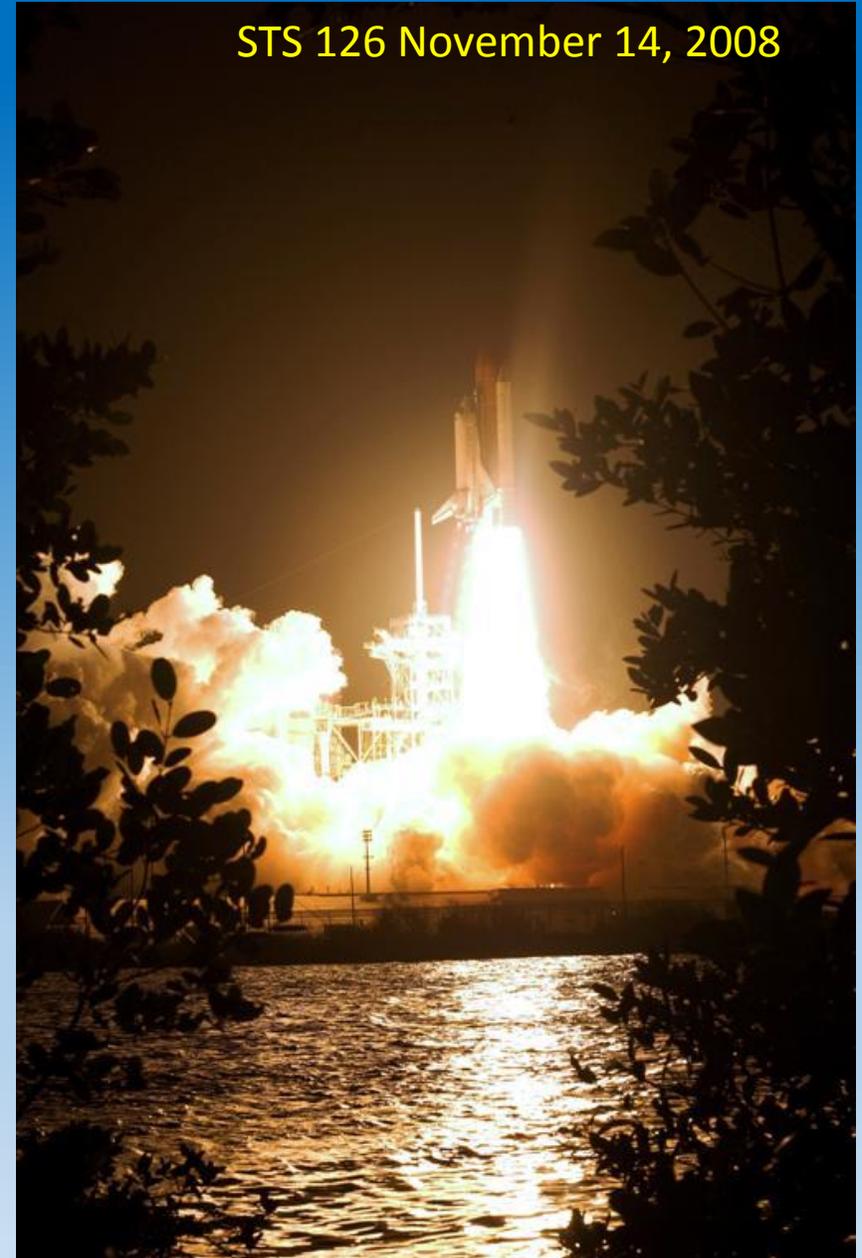


Presented by Lynne Phillips  
Environmental Planning Group  
NASA Kennedy Space Center  
September 2015

NASA is and has always been the organization that, **imagines the impossible and sets out and achieves it.**” –NASA Deputy Administrator Lori Garver

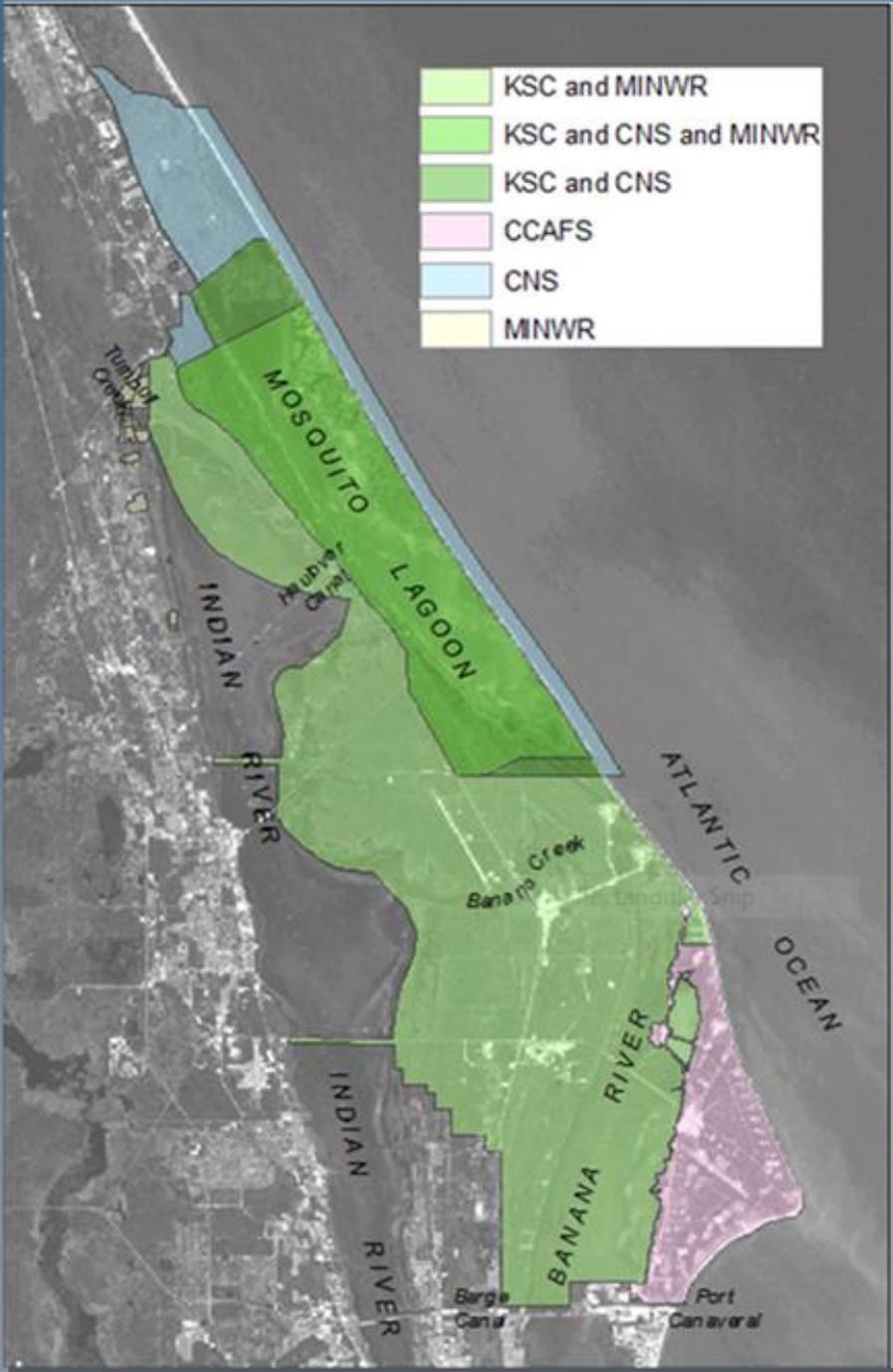


July 20, 1969, Apollo 11 commander Neil Armstrong stepped off the Lunar Module's ladder and onto the Moon's surface.



STS 126 November 14, 2008

Kennedy Space Center  
Merritt Island National Wildlife Refuge  
Canaveral National Seashore



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# Environmental Management Branch

- Sustainability
  - KSC Sustainable Environmental Systems
  - Recycling
  - Sustainable Acquisition
- Energy
  - Energy management
- **Environmental Planning**
  - NEPA
  - Historical/Cultural Resources
  - Natural Resources

# Environmental Planning

The environmental planning staff works diligently to ensure that environmental benefits and consequences of our actions are assessed and considered in the decision-making process.



# National Environmental Policy Act – NEPA

NEPA is good planning and decision making that appropriately considers the potential physical, biological, economic, social, and human environment.



# NEPA and Natural Resource Protection





# Historical/Cultural Resources



Cultural resources management program identifies, evaluates, and preserves cultural and historic resources encountered at planned construction projects or existing facilities.



# Natural Resources

- Habitat Management
  - Department of Interior
  - NASA Environmental Stewardship
  - Endangered Species Act – ESA
- NASA Procedural Requirements
- Executive Orders
- Natural Resource permitting
  - US Army Corps of Engineers
  - Environmental Resource Permitting



# Ecological Program

- Program activities are designed to develop information and knowledge necessary to support science-based management decisions and compliance with environmental laws and regulations related to natural resources, with a focus on the current and future issues for KSC.

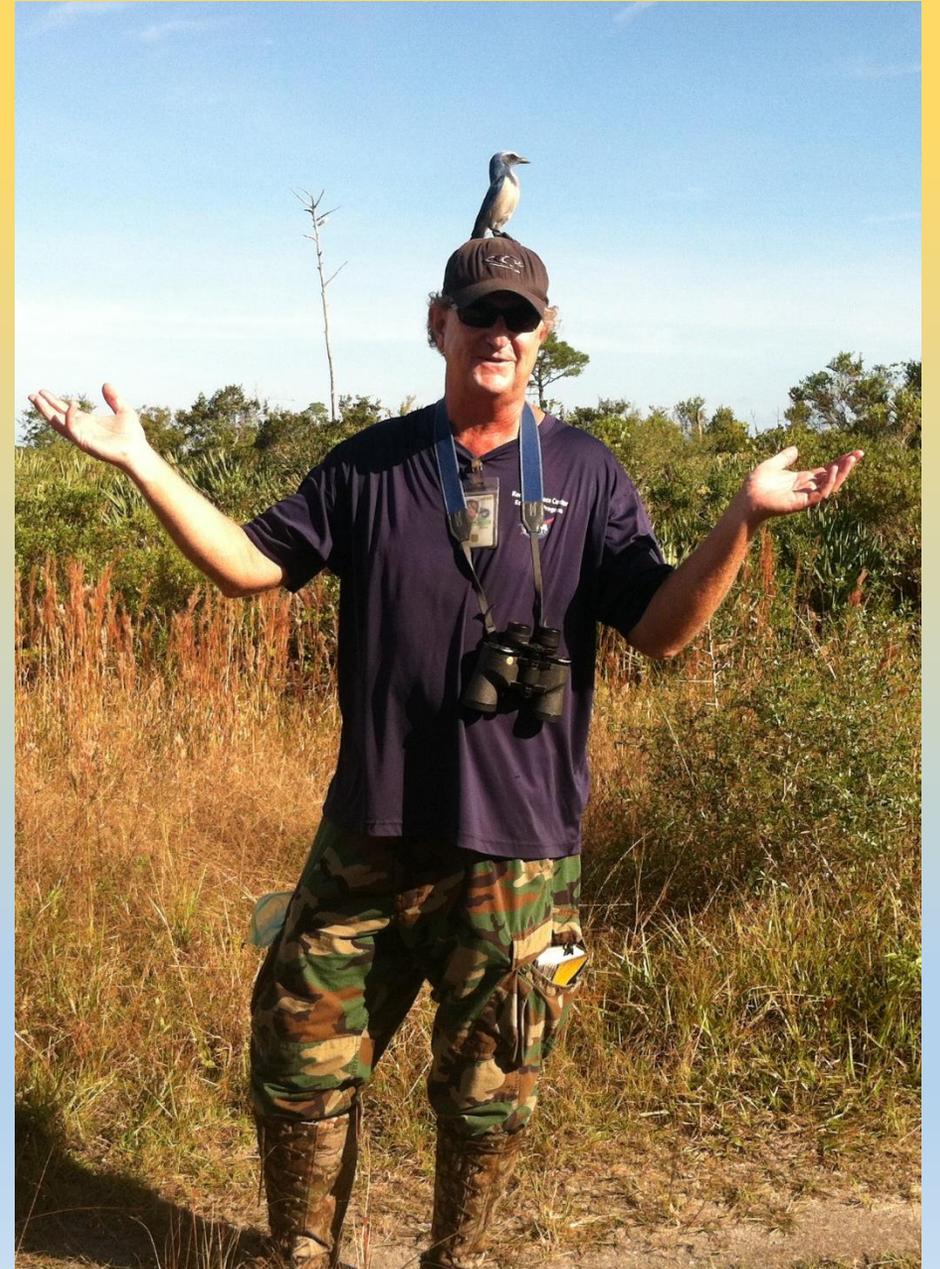


Protecting those that are now common species so they do not become uncommon



KSC workforce sees wildlife daily during commute or visiting facilities

# Protected Species





Disoriented nesting female sea turtle rescued and returned to ocean tired but healthy.



# Translocation of Gulf of Mexico Sea Turtle Nests & Hatchling Release on the Florida Atlantic Coast

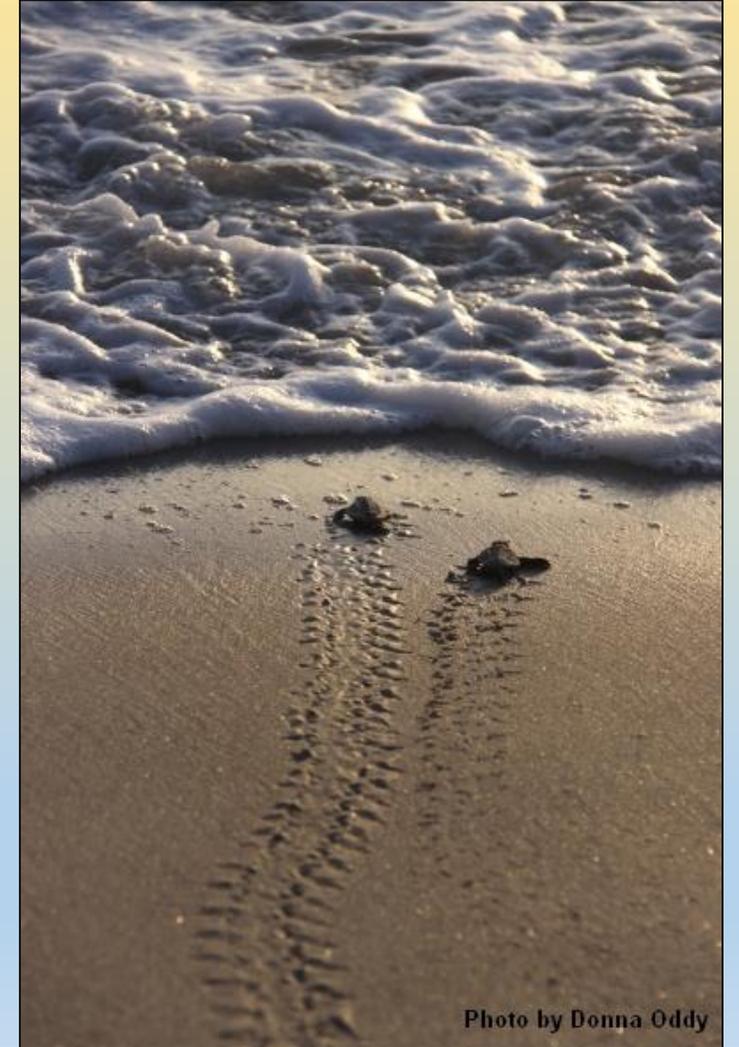


Photo by Donna Oddy



The Florida mouse is a state protected species that is scrub habitat dependant.



The Eastern Indigo snake, a threatened species, is the largest native non-venomous snake in North America.



# Ecosystem Health

- Florida Scrub Jay and Prescribed Fire
- American Alligator and Emerging Contaminants
- Fisheries Migration Patterns and Fecundity



Florida Scrub Jay listed as Threatened by USFWS in 1985 due to habitat loss and poor habitat management. KSC is one of three major areas in Florida with remaining populations.



Small, frequent prescribed fires in the beginning of rainy season to mimic natural ignition



Prescribed burning conducted by USFWS is the major tool for habitat management



Effects of controlled burn on scrub vegetation



High rainfall and long sunny days encourage rapid regrowth of the scrub community.



Mechanical tools such as roller choppers and bulldozers are used to augment the burn program.



The gopher tortoise, a state protected species, is a common occupant of scrub. Preserving, protecting, and enhancing scrub habitat also improves habitat quality for other protected species.



Scrub Jays mate for life, nest in low vegetation, and share responsibility for raising young.



Breeding females lay 2-4 eggs each season.



Nesting season is between February and June  
Young are susceptible to predation by snakes, skunks, and other birds.



Juvenile production and survival of Scrub Jays is directly dependant on habitat quality. Juveniles can be recognized by the lack of color on the head.



Optimal habitat is low shrub, few trees and open sandy patches

# ALLIGATOR STUDY

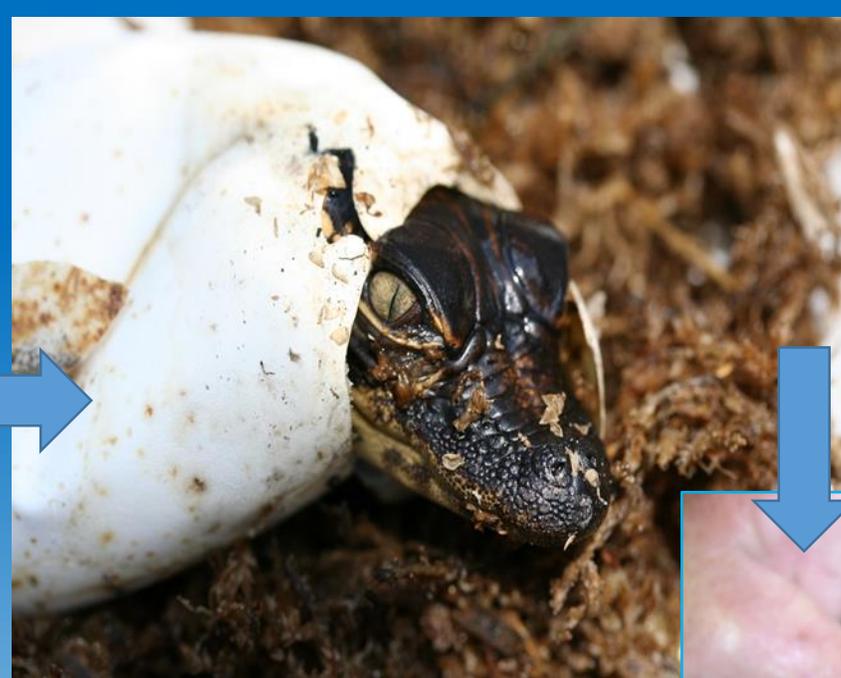


# ALLIGATOR STUDY – EMERGING CONTAMINANTS



- High nesting success on KSC/MINWR
- Use all types of aquatic environments
- Home range KSC/MINWR 182 ha (122 ha)
- Most common size class 6 - <10 ft
- Male to female ratio for captures is 2:1





Overall hatch rates

- KSC/MINWR 79%
- Lake Woodruff 80%

Average clutch size

- KSC/MINWR 35 eggs
- Lake Woodruff 40 eggs



17 11:30 AM

# Florida Atlantic Coast Telemetry (FACT) Array



# Current FACT Partners:



- **Bimini Biological Field Station**
- Cape Eleuthera Institute
- **Florida Fish & Wildlife Conservation Commission**
- Florida Institute of Technology
- **Florida International University**
- **Florida Program for Shark Research**
- Florida State University
- Georgia Department of Natural Resources
- **Kennedy Space Center Ecological Program**
- Mote Marine Laboratory
- Naval Undersea Warfare Center
- Savannah State University
- **Stony Brook University**
- University of North Florida
- USGS Miami

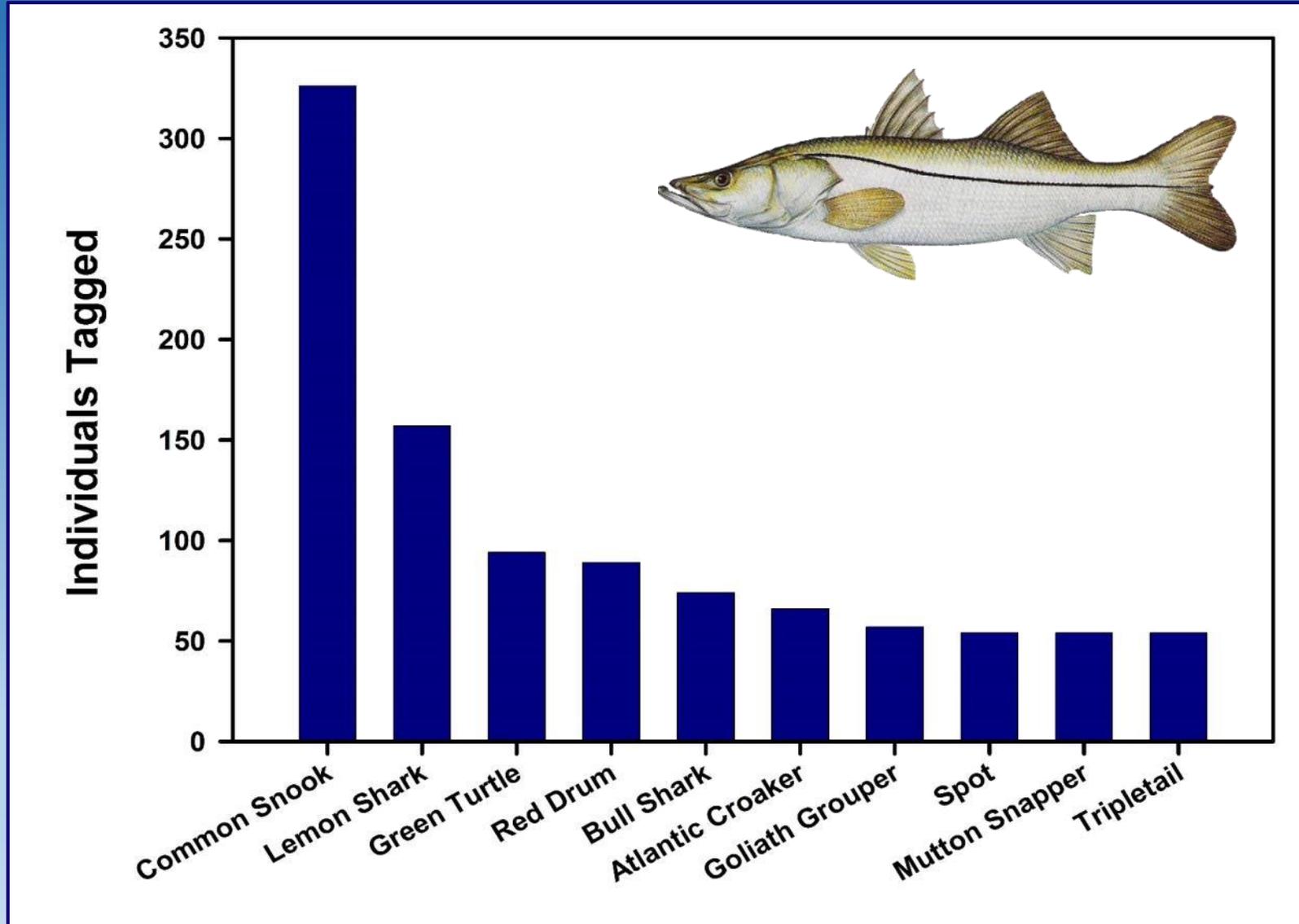




# Current FACT Coverage

- 377 Receiver From Georgia to Dry Tortugas as of January 2014
- Monitors Multiple Habitats. In Core Area:
  - 35 Riverine Stations
  - 60 Estuarine Stations
  - 35 Tidal Inlet Stations
  - 30 Nearshore/Beach Stations
  - 41 Offshore Reef/Wreck Stations
- Covers All Tidal Inlets and Canaveral Lock
- Covers All Major Freshwater Tributaries
- Covers All Powerplant Discharges

# Species of Interest



# SUMMARY

- ENVIRONMENTAL PLANNING-NATURAL RESOURCE SUPPORT
  - COORDINATION WITH PARTNERS
  - PERMITTING
  - ECOLOGICAL PROGRAM OVERSIGHT
- ECOLOGICAL PROGRAM RESPONSIBILITIES
  - LAND MANAGEMENT
  - ENDANGERED SPECIES MONITORING
  - ECOSYSTEM ASSESSMENTS
  - MISSION SUPPORT
  - DAILY ACTIVITIES SUPPORT

ALL ACTIVITIES OF THE ECOLOGICAL PROGRAM SUPPORT  
THE NASA SPACE FLIGHT MISSION  
AND  
DAILY OPERATIONS AT THE KENNEDY SPACE CENTER



# QUESTIONS?

“The only way of discovering  
the **limits of the impossible**  
is to venture a little way past them  
into the impossible.”  
-Arthur C. Clarke

-Arthur C. Clarke

into the impossible”

<http://environmental.ksc.nasa.gov/>

[http://www.nasa.gov/multimedia/podcasting/twan\\_index.html](http://www.nasa.gov/multimedia/podcasting/twan_index.html)

<http://spotthestation.nasa.gov/sightings/>

