

A photograph of two manatees swimming underwater. They are facing each other, with their heads and flippers visible. The water is a clear, light blue-green color. The manatee on the left is slightly closer to the camera than the one on the right.

Analysis of Florida Manatee Collision Records and Protection Zones

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Introduction

- Florida Manatee (*Trichechus manatus latirostris*), known as Sea Cows, are large aquatic mammal.
- Native to Florida, United States.
- Keystone Species:
 - Behavior can alert researchers to the environmental and habitat changes
 - Feed on seagrass.
 - By limiting vegetation growth they control mosquitoes population and overgrowth.
- Hence, their conservation is of great concern.
- Since 1973, manatees have been protected under the Endangered Species Act.



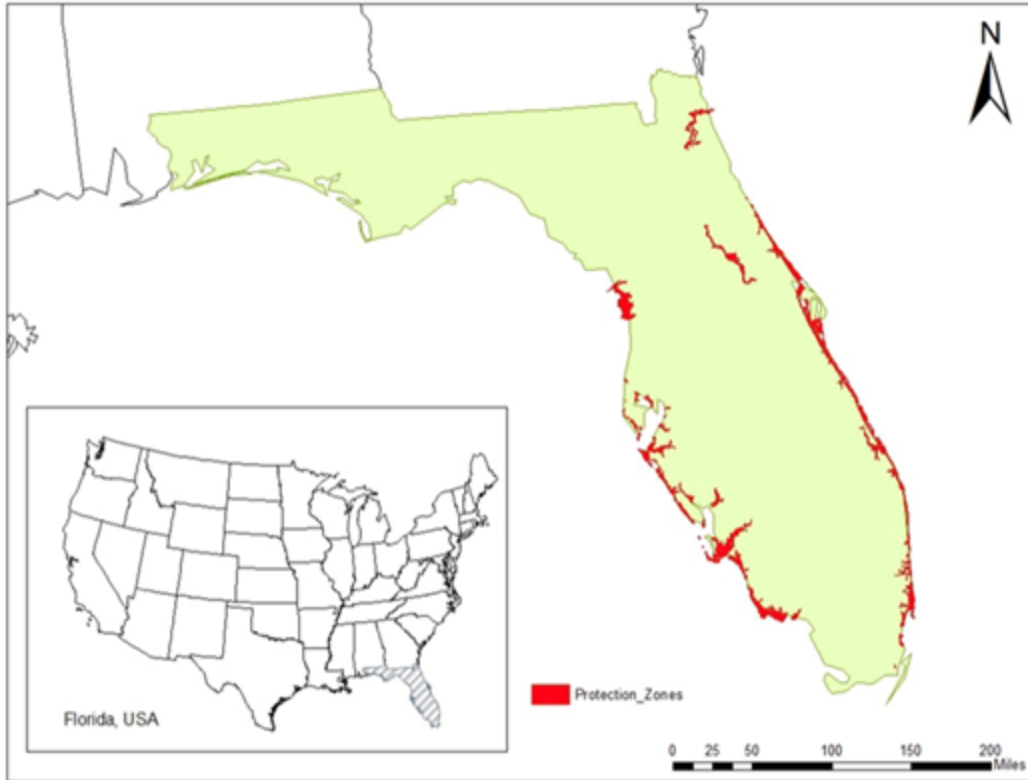
Protection Action

- Policies
 - Florida State Law (1893)
 - The Florida Manatee Sanctuary Act (1978)
- Primary body
 - The Florida Fish and Wildlife Conservation Commission (1999)
- In order to reduce the boat-manatee collision, protection zone was established in 1990.
- Protection zone prohibits boat access or restricts speed
- Slower passes give the manatee more time to respond and react when the boats approach near to them.



Protection Action– Protection Zones

Manatee Protecting Zone in Florida, USA



Study area

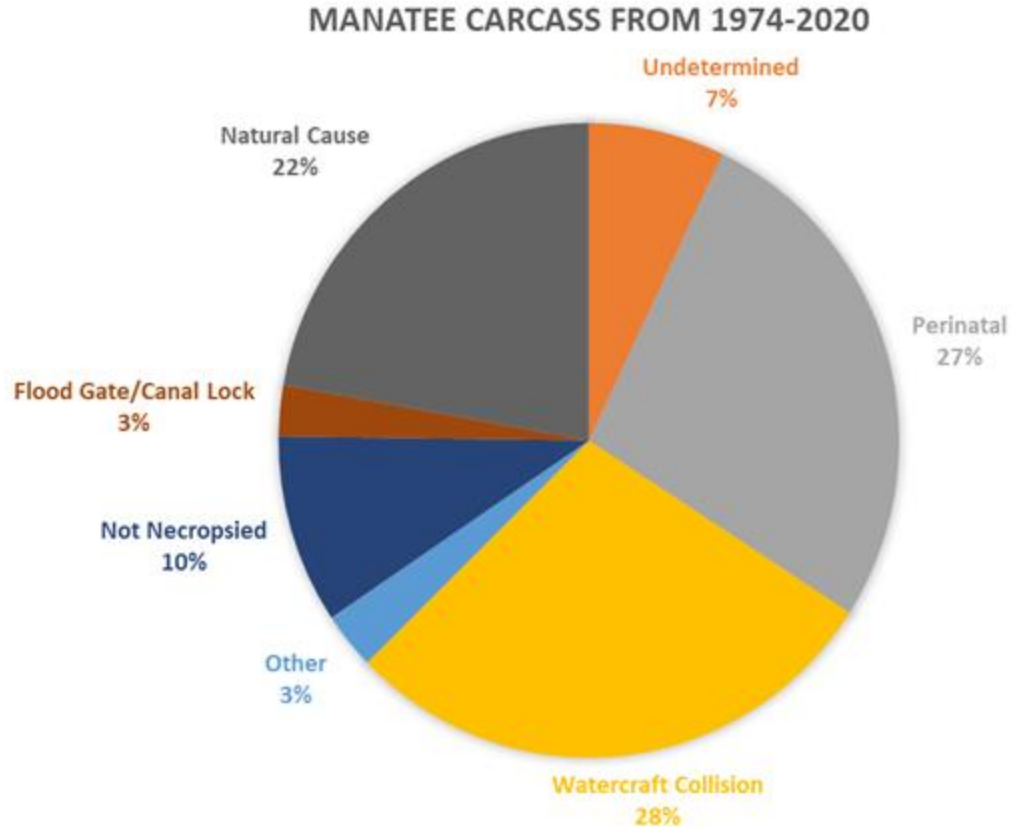
Protection Zone Type:

1. Speed Limitation Whole Year
2. Speed Limitation varies by season
(Slow Speed and No Entry)
4. No Entry

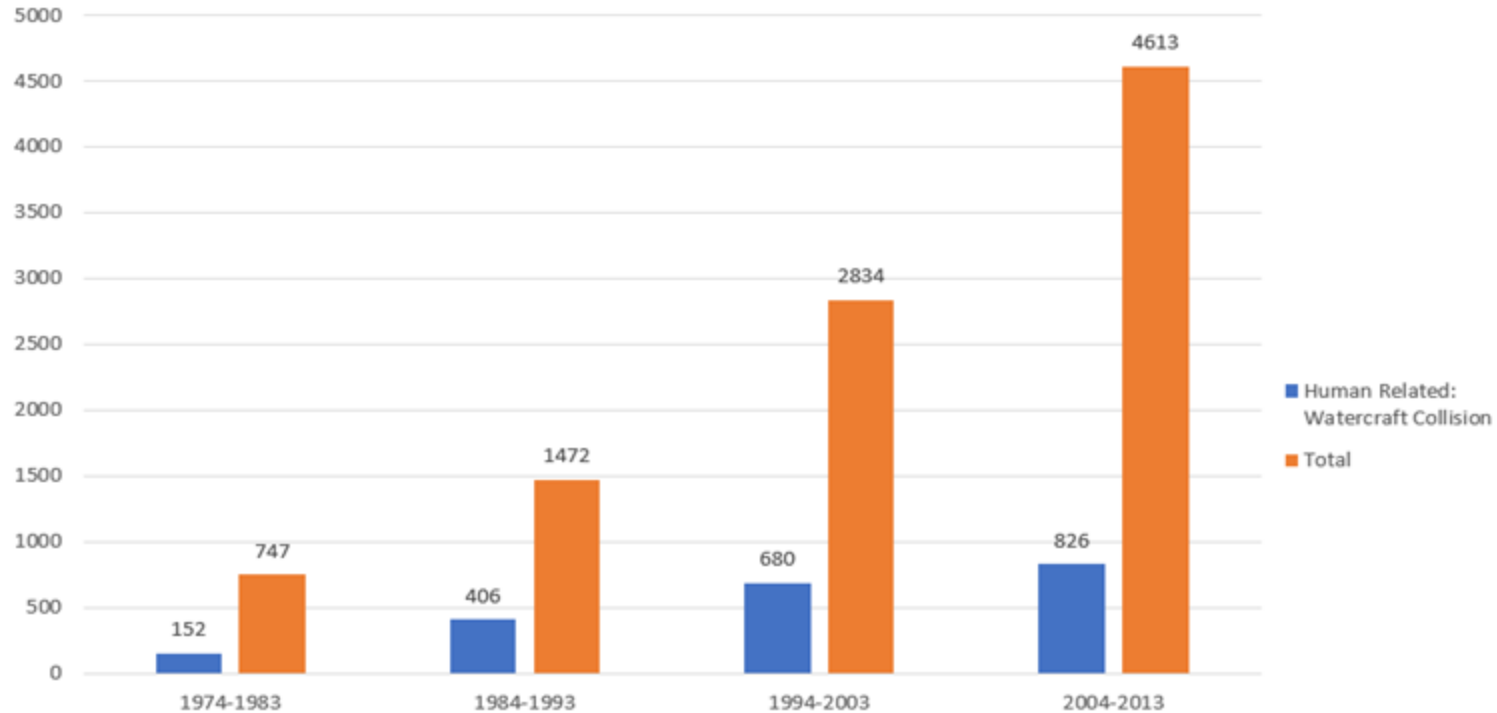


Causes of Manatee Carcass Record

Major reason: Watercraft collision



Watercraft collision



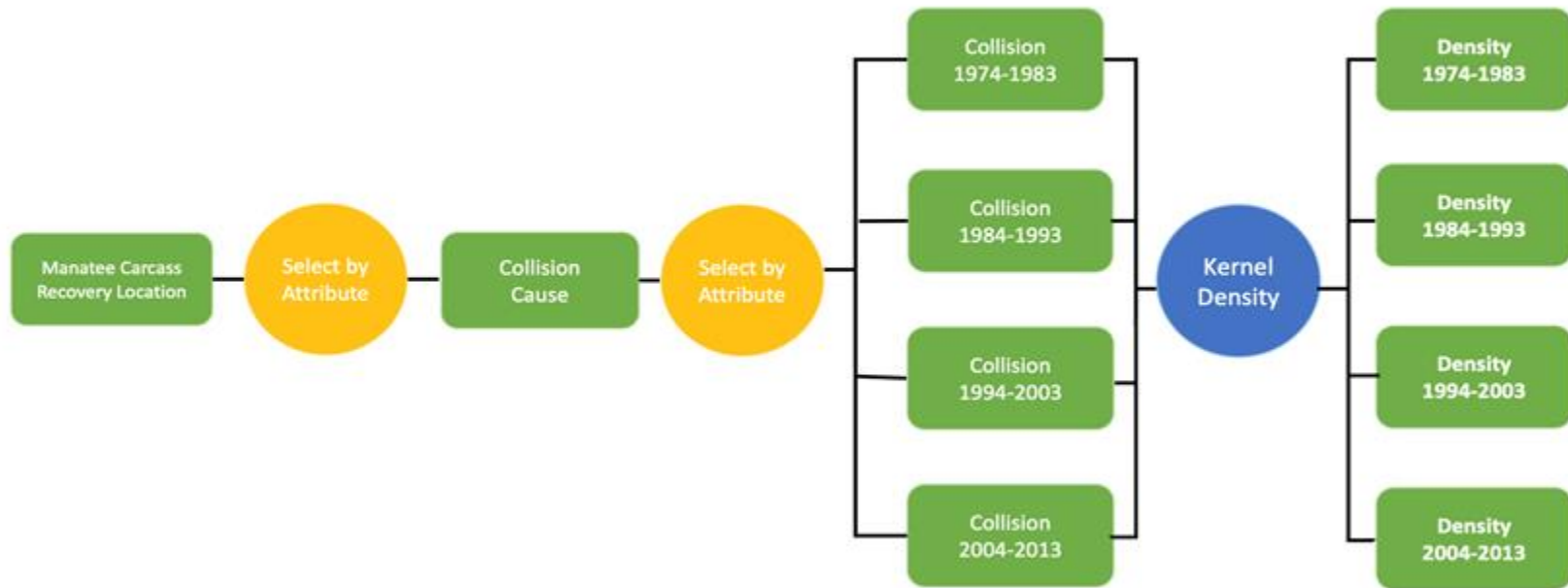
Despite the establishment of protection zones, the mortality of Manatee is increasing. Why?



Florida Manatee Carcass Recovery Location 1974-2020

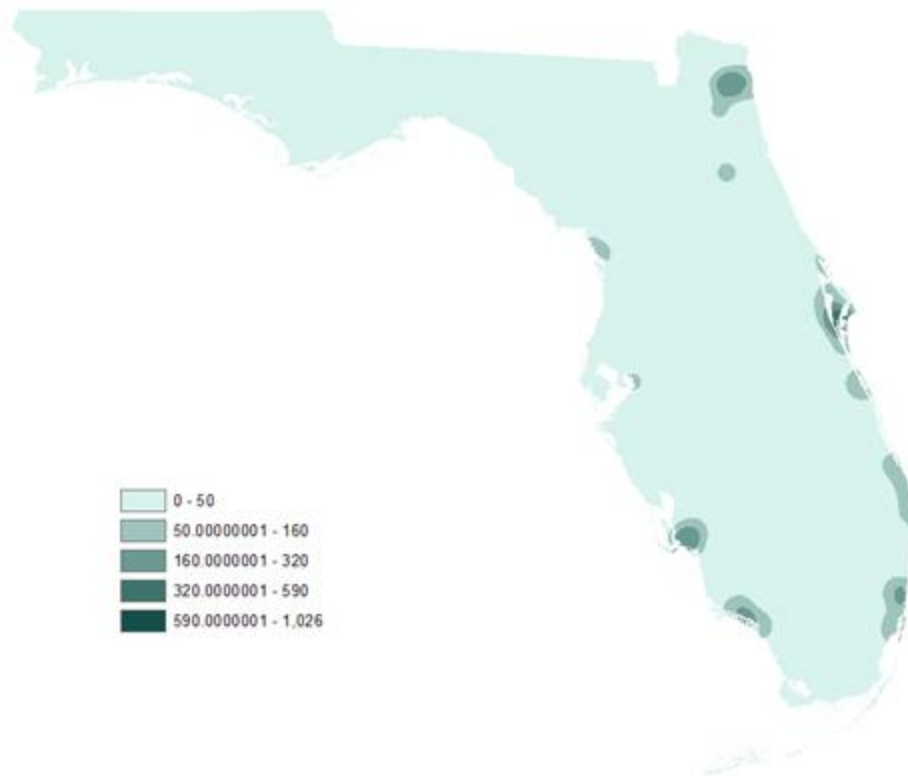


Methods

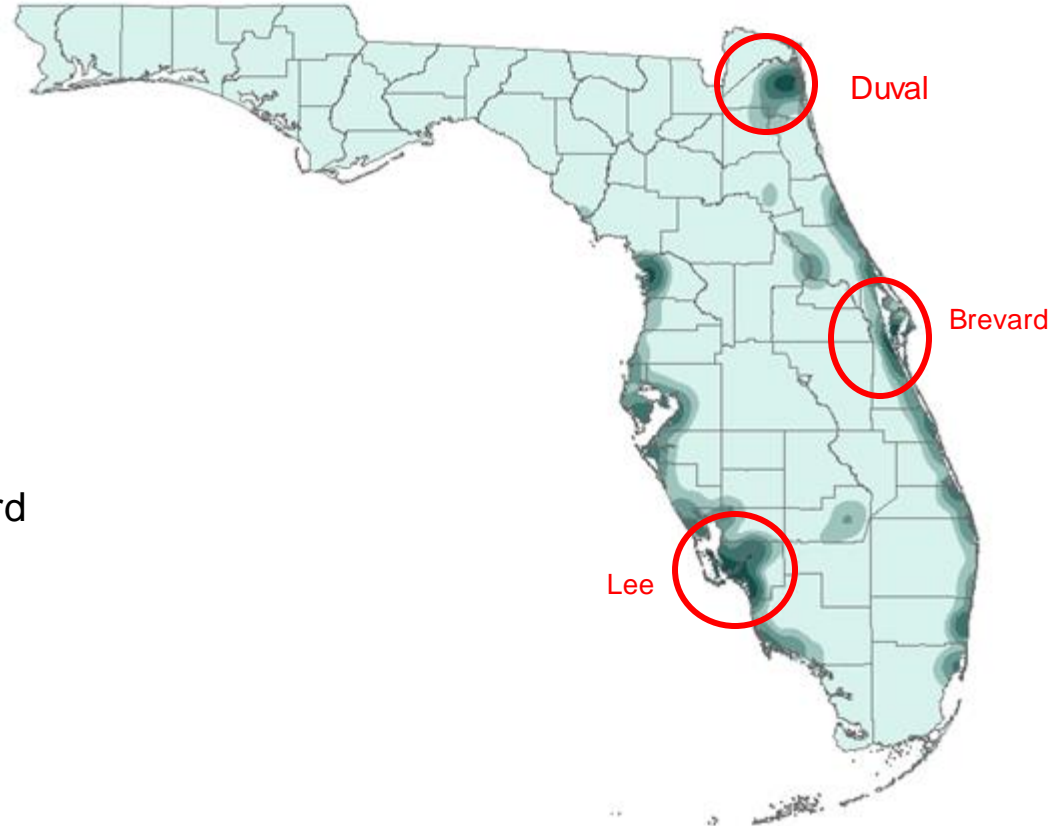


Florida Manatee Collision Carcass Record Density

1974-1983

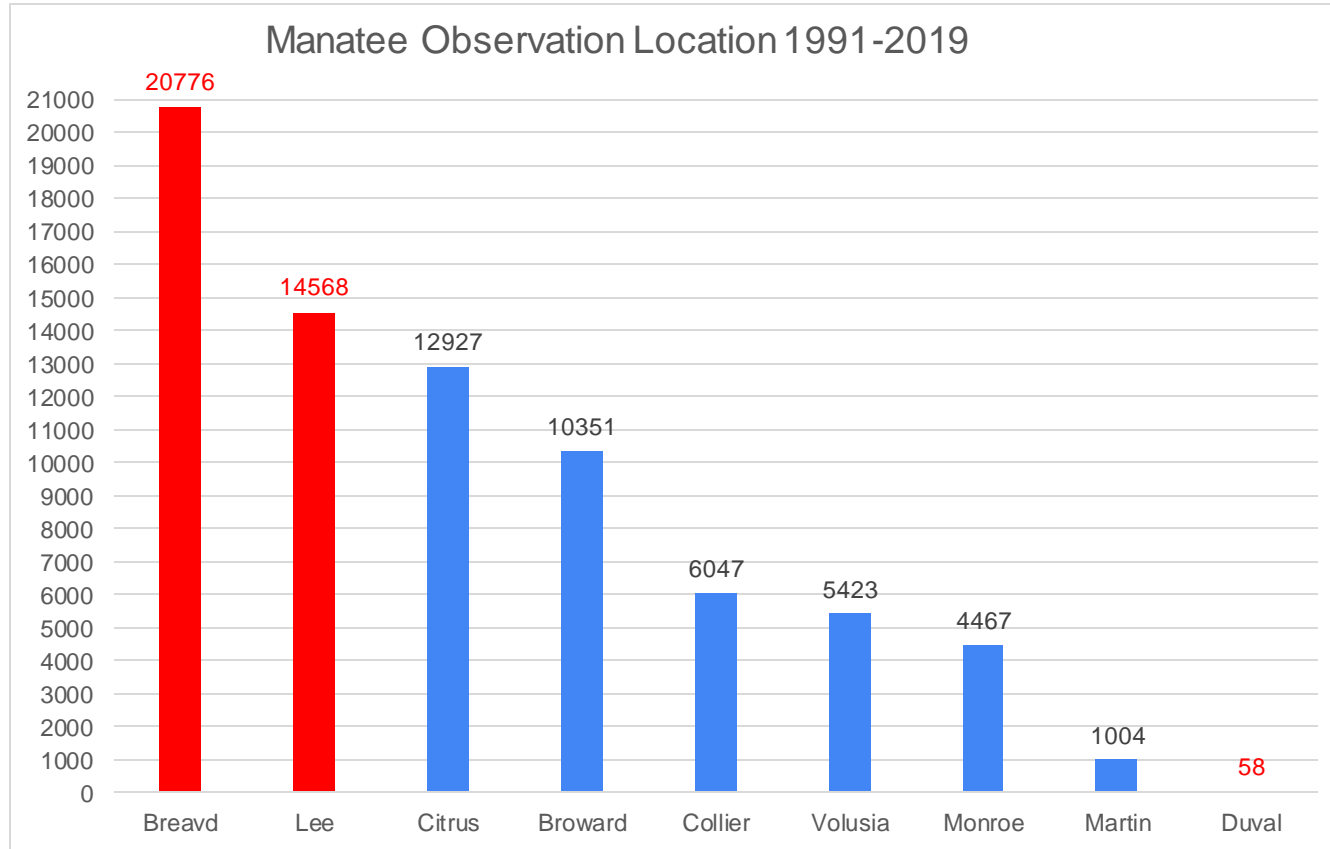


2004-2013



1. Manatee Observation Record
2. Human Population
3. Protecting Zone Policy

Observation Location

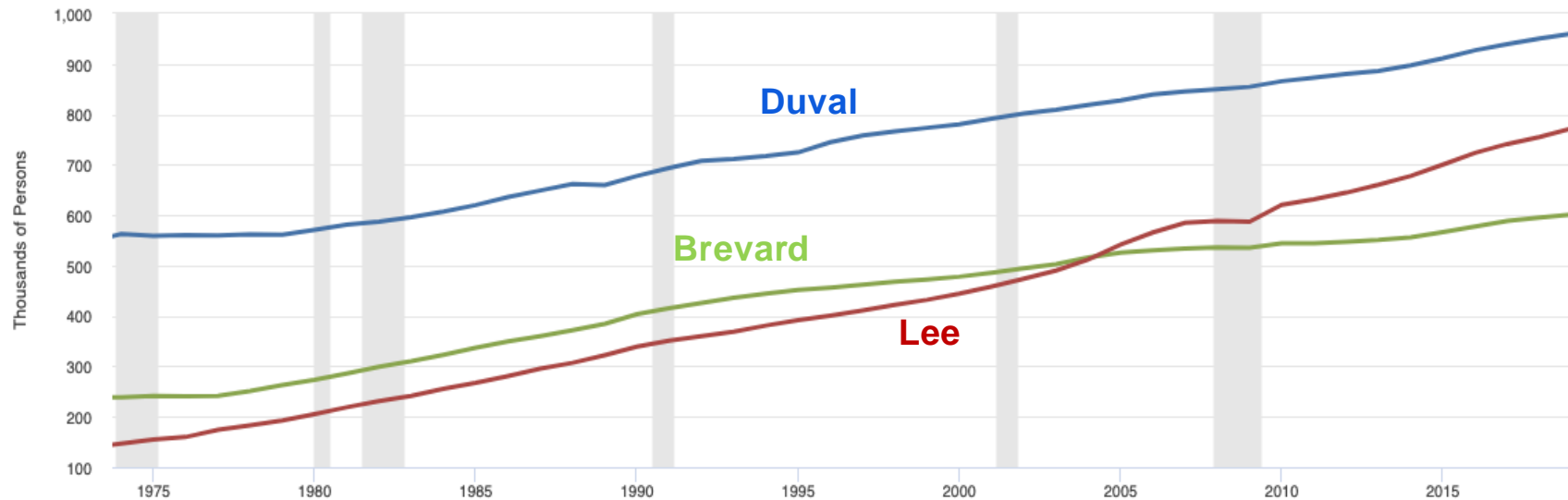


Data Source: [Florida Fish and Wildlife Conservation Commission](#)

Human Population

FRED

— Resident Population in Duval County, FL
— Resident Population in Brevard County, FL
— Resident Population in Lee County, FL



Population of Lee, Brevard, and Duval county from 1974-2019



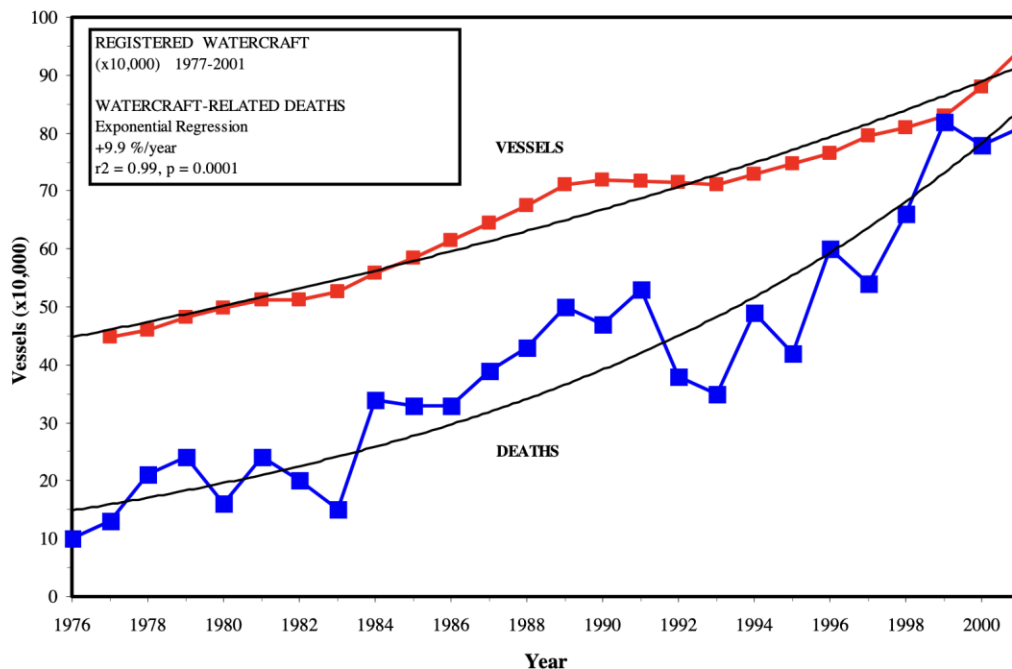
Source: U.S. Census Bureau

Human Population

As the population grows, so does the number of vessels registered, which leads to an increase in manatee watercraft mortality.

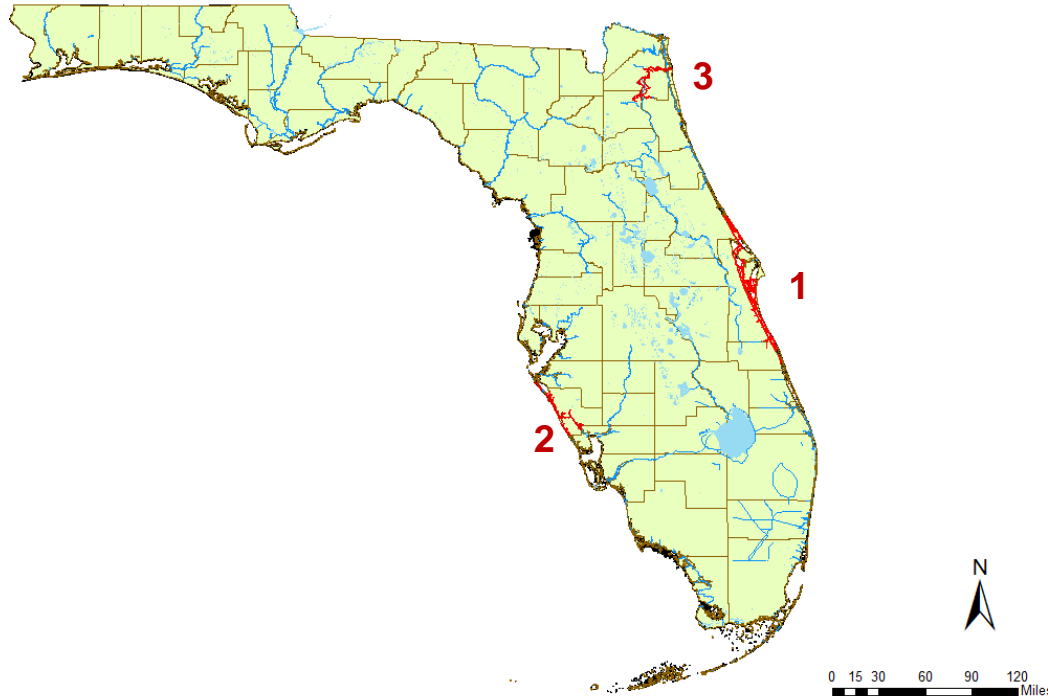
In 2021, Florida had over 1 million vessel registrations, with 33,943 in Brevard County, 49,009 in Lee County, 26,220 in Duval County, and Lee is the third-highest county in Florida.

Figure 8. Trend Analysis of Manatee Mortality in Florida 1976-2001
Watercraft Mortality vs. Vessel Registration



Protection Zone Type

Protection Zones in Lee County, Brevard County, and Duval County



1. Brevard County:

96% Speed Limitation Whole Year

4% Speed Limitation varies by season

2. Lee County:

96% Speed Limitation Whole Year

2% Speed Limitation varies by season

2% No Entry (Residents Only)

3. Duval County:

100% Speed Limitation Whole Year

Discussion & Suggestion

- The protection zones were established with speed limitations to give manatees enough time to avoid boats. However, as the population rose and vessels increased, the protection zone conservation efforts for manatees were ineffective.
- Collision's records continue to increase, especially in Brevard County and Lee County, where manatee populations are likely high.

Suggestion

In regions where there is a high density of watercraft, the protection zone type should be updated as the population and number of boats grow.

1. Add more No-Entry zones
2. Restrict the number of boat in high-activity regions.



Future Research

Duval County has a high watercraft density that is increasing; however, observation records are rare. If there are continuous observation records, it will be helpful for future research on relationship between manatee numbers and boats.

Conclusion

- The mortality rate is increasing.
- Indicator of the overall health of their marine ecosystems
- Conservation of Manatee should be focused to maintain the ecosystem.



Save me!

A photograph of two manatees underwater, facing each other and holding their flippers. The water is a clear, vibrant blue. The manatees have grey, wrinkled skin and large, rounded snouts. The text "Thank You For Listening !" is overlaid in the center in a white, bold, sans-serif font.

Thank You For Listening !