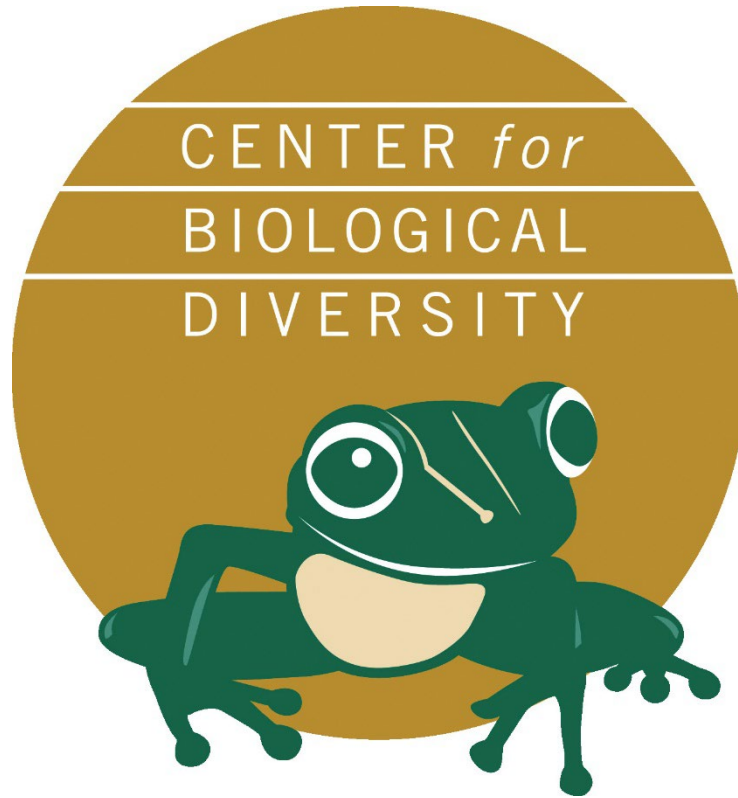


BEFORE THE FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

**PETITION TO AMEND 68D-36.104(2) & 68D-36.107(1) TO REQUIRE BOATING
COURSES APPROVED FOR USE IN FLORIDA TO INCLUDE INFORMATION AND
TESTING ON MANATEE SLOW ZONES, CRITICAL WILDLIFE AREAS, AND
MARINE MAMMALS**



CENTER FOR BIOLOGICAL DIVERSITY

August 11, 2022

Notice of Petition

Eric Sutton
Executive Director
Florida Fish and Wildlife Conservation Commission
620 South Meridian Street
Tallahassee, FL 32399-1600
(850) 487-3796
Eric.Sutton@MyFWC.com

Thomas Eason, Ph.D.
Assistant Executive Director
Florida Fish and Wildlife Conservation Commission
620 South Meridian Street
Tallahassee, FL 32399-1600
(850) 487-3796
Thomas.Eason@MyFWC.com

Petitioners

Ragan Whitlock
Staff Attorney
Center for Biological Diversity
P.O. Box 2155
St. Petersburg, FL 33731
(727) 426-3653
Rwhitlock@biologicaldiversity.org

Ryan Smart
Executive Director
Florida Springs Council
P.O. Box 358191
Gainesville, FL 32635
(561) 358-7191
smart@floridaspringscouncil.org

Abbey Tyrna
Executive Director
Suncoast Waterkeeper
P.O. Box 1028
Sarasota, FL 34230
(239) 222-2443
executivedirector@suncoastwaterkeeper.org

Submitted this **August 11, 2022**

Pursuant to section 120.54(7), Florida Statutes, the Center for Biological Diversity, Florida Springs Council, and Suncoast Waterkeeper hereby petition the Florida Fish and Wildlife Conservation Commission to formally amend its rules regarding the Minimum Standards for Boating Safety Courses, 68D-36.104, and Minimum Training Requirements for Personal Watercraft Rentals, 68D-36.107(1), to require courses to include information and test questions on manatee slow zones, critical wildlife areas, and marine mammals. Motorized boats negatively affect Florida's marine wildlife, and the petitioned action will help protect them from harm caused by motorized boat drivers.

The Center for Biological Diversity (Center) is a non-profit, public interest environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center is supported by more than one million members and online activists throughout the United States, including more than 99,000 members and supporters in Florida. The Center and its members are deeply concerned about the conservation of imperiled wildlife and their essential habitats.

The Florida Springs Council is a coalition of over 50 conservation organizations that have combined their efforts, skills, and expertise to coordinate action for the restoration, preservation, and protection of all of Florida's freshwater springs and the Floridan aquifer.

Suncoast Waterkeeper works to protect and restore the Florida Suncoast's waterways through enforcement, water quality monitoring and environmental education with community engagement.

Table of Contents

I. Introduction5

II. Background5

III. Justification for Rulemaking8

A. Manatee Protection.....8

i. Manatee History and Status8

ii. Manatee Protection Areas and Slow Zones11

iii. Manatee Boat Mortality and Behavioral Impacts.....12

iv. Need for More Information About Manatee Protection Zones in Boating Safety Courses17

B. Critical Wildlife Areas and Rookeries19

i. CWA and Rookery Protection19

ii. Impacts of Boats on CWA Birds and Rookeries.....25

iii. Need for More Information About CWAs and Rookeries in Boating Safety Courses29

C. Marine Mammal and Sea Turtle Protection28

i. Marine Mammal Background and Protection Levels28

ii. Impacts of Boats on Marine Mammals.....32

iii. Sea Turtle Protections and Impacts35

iv. Need for Information About Marine Mammals and Sea Turtle Protections in Boating Safety Courses.....39

IV. Proposed Rule Amendment37

V. Conclusion41

VI. Literature Cited42

I. INTRODUCTION

Florida has more than one million registered boats, with Miami-Dade (74,622), Pinellas (53,867), Lee (50,304), Broward (47,741), and Hillsborough (41,495) counties leading the state with most vessel registrations.¹ With so many boats in Florida’s waters, there is significant interaction between boaters and marine species. Florida Statute section 327.395 requires boating safety education for persons born in 1988 and later. This provision helps keep waters safe for people and wildlife.

Florida’s Constitution tasks the Florida Fish and Wildlife Conservation Commission (FWC) with “exercis[ing] the regulatory and executive powers of the state with respect to wild animal life[,] fresh water aquatic life[,] and . . . marine life” for the purpose of managing, protecting, and conserving them.² To that end, FWC has implemented regulations in the interest of conserving and protecting imperiled wildlife,³ and has created Chapter 68D-36 to establish boating safety course standards. These standards need improvement as they relate to manatee slow zones and marine mammal and sea turtle protection. The standards fail to include critical wildlife areas and rookeries.

In June, the Florida Legislature passed and Governor approved the Florida Boating Safety Act of 2022⁴ to help improve boating safety for people and wildlife. Among other things, the Act amends Florida Statutes section 327.395(4) to require FWC to approve new safety topics for the state’s boating safety education course. Given that FWC already needs to amend the boating safety education course topics pursuant to the amendments set forth in the Florida Boating Safety Act of 2022, the agency should also include more detailed and comprehensive standards for the conservation of wildlife.

Florida’s Administrative Procedure Act provides that “[a]ny person . . . having substantial interest in an agency rule may petition an agency to adopt, amend, or repeal a rule.”⁵ Within 30 days of receiving the petition, the agency must either “initiate rulemaking proceedings . . . , otherwise comply with the request action, or deny the petition with a written statement of its reasons for the denial.”⁶ Under this authority and for the reasons explained below, Petitioners respectfully request FWC grant this petition and initiate rulemaking to amend the Florida boating safety course standards to require information on manatee slow zones, critical wildlife areas and rookeries, and marine mammals and sea turtles.

¹ FWC, *FWC announces benchmark of 1 million registered vessels in Florida*, <https://myfwc.com/news/all-news/million-boats/> (last visited July 29, 2022); Marine Title, *Florida Boat Registration Summary*, <https://www.marinetitle.com/boat-registration/FL-Florida.htm> (last visited July 29, 2022).

² Fla. Const. art. IV, 9.

³ *See, e.g.*, Fla. Admin. Code r. 68A-1002 (stating that “[all] wild animal life within the jurisdiction of the State of Florida . . . is subject to the regulation of the Commission”); *id.* at r. 68A-18.004 (creating wildlife refuges in which it is illegal to take wildlife); *id.* at r. 68A-27.001–27.007 (establishing rules under the Florida Endangered and Threatened Species Act).

⁴ Ch. 22-197, Laws of Fla.

⁵ Fla. Stat. § 120.54(7); *see also* Fla. Stat. § 379.1025 (authorizing the Florida Fish and Wildlife Conservation Commission to adopt rules and regulations pursuant to Chapter 120).

⁶ Fla. Stat. § 120.54(7).

II. BACKGROUND

Florida Statute Chapter 327 details the state’s vessel safety requirements.⁷ The statute gives FWC the authority to ensure the boating safety course meets the statutory requirements of instruction and safety.⁸ Sections 327.395 and 327.731 call for Florida boating safety courses for persons born after January 1, 1988, or convicted of a violation or infraction under section 327.731. FWC has implemented regulations detailing the minimum standards for boating safety courses and minimum training requirements for personal watercraft rentals.⁹ These regulations require that such courses provide information regarding “manatee awareness” and “ecosystem awareness,” but they do not provide any additional detail or require that those topics be tested.¹⁰

The Florida Legislature enacted Florida Statute section 327.395 in the 1996 session and created the requirements for the operation of vessels, specifically, section 327.395 regarding boating safety education. The Legislature amended section 327.395 in 1999, 2000, 2005, 2009 (effective in 2010), 2011, 2014, 2016, 2019, and most recently in 2022¹¹. FWC adopted Florida Administrative Code rule 68D-36.104 in 2005 to fulfill the requirements of sections 327.395 and 327.731, and it will need to amend the rule to conform with the statutory amendments to section 327.395 set forth in the Florida Boating Safety Act of 2022.

Currently, FWC has five classroom and nine online options for a boating safety course on its website.¹² After successfully completing one of these courses, a Florida Boating Safety Education Identification Card is issued.¹³ In 2021, FWC issued 78,343 Boating Safety Education Identification Cards.¹⁴

In 2021, the top ten counties for boating accidents were Okaloosa, Hillsborough, Pinellas, Broward, Brevard, Lee, Collier, Monroe, Miami-Dade, and Palm Beach counties.¹⁵ Overall, the *2021 Boating Accident Statistical Report* indicated 751 reportable boating accidents and 60 boating related fatalities in the calendar year.¹⁶ FWC acknowledged in that report that boating

⁷ Fla. Stat. § 327.02(47) (defining “vessel” as “synonymous with boat as referenced in s. 1(b), Art. VII of the State Constitution and includes every description of watercraft, barge, and airboat, other than a seaplane on the water, used or capable of being used as a means of transportation on water”).

⁸ Fla. Stat. § 327.395; *see also id.* § 327.02(9) (referring to FWC as “the Commission”).

⁹ Fla. Admin. Code r. 68D-36.104, 68D-36.107.

¹⁰ *Id.* at 68D-36.104(2)(h)–(i).

¹¹ Ch. 22-197, Laws of Fla.

¹² FWC, *Boating Safety Course*, <https://myfwc.com/boating/safety-education/courses/> (last visited July 12, 2022).

¹³ FWC, *Boater Education Identification Card*, <https://myfwc.com/boating/safety-education/id/> (last visited July 12, 2022); FWC, *Boating Safety Course*, <https://myfwc.com/boating/safety-education/courses/> (last visited July 20, 2022). The identification card is a certification, not a boating license. *Id.*

¹⁴ FWC, *2021 Boating Accident Statistical Report*, V, <https://myfwc.com/media/29115/2021-basr-booklet.pdf> (last visited July 19, 2022). Florida Statutes define “personal watercraft” as “a vessel less than 16 feet in length which uses an inboard motor powering a water jet pump as its primary source of motive power and which is designed to be operated by a person sitting, standing, or kneeling on the vessel, rather than in the conventional manner of sitting or standing inside the vessel.” Fla. Stat. § 327.02(37).

¹⁵ FWC, *2021 Top Ten For Boating Accidents*, 1, <https://myfwc.com/media/29125/2021-basr-top10.pdf> (last visited July 28, 2022).

¹⁶ FWC, *2021 Boating Accident Statistical Report*, III, <https://myfwc.com/media/29115/2021-basr-booklet.pdf>.

education is critical because the majority of boating accidents are caused by a middle-aged or older males who never took a boating safety course.¹⁷

BOATING SAFETY EDUCATION I.D. CARD DISTRIBUTION BY AGE

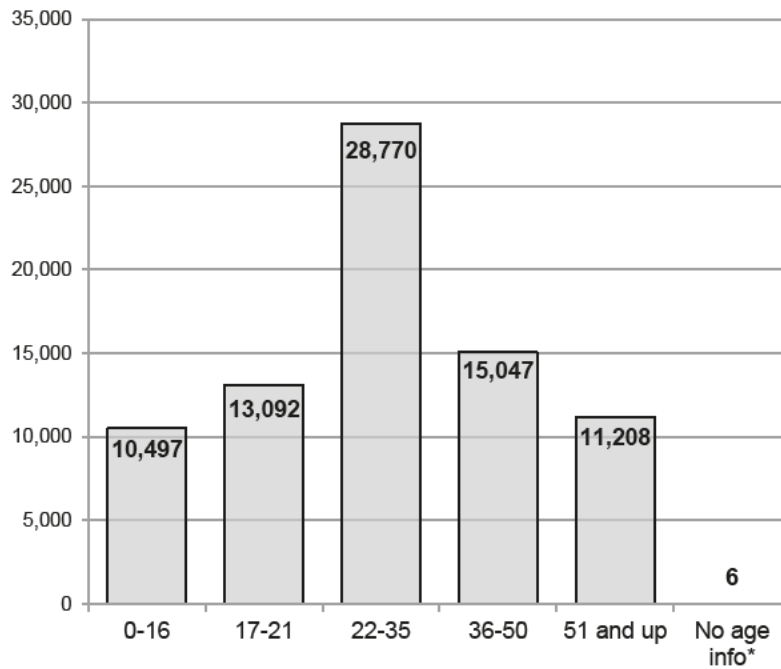


Figure 1 demonstrates the age-span of new card recipients issued for 2021.¹⁸

¹⁷ *Id.* at III. The 2021 report stated 83% of the operators involved in a fatal accident did not have formal boater education. *Id.* at V.

¹⁸ *Id.* at 35.

OPERATORS INVOLVED IN ACCIDENTS-EDUCATION/AGE

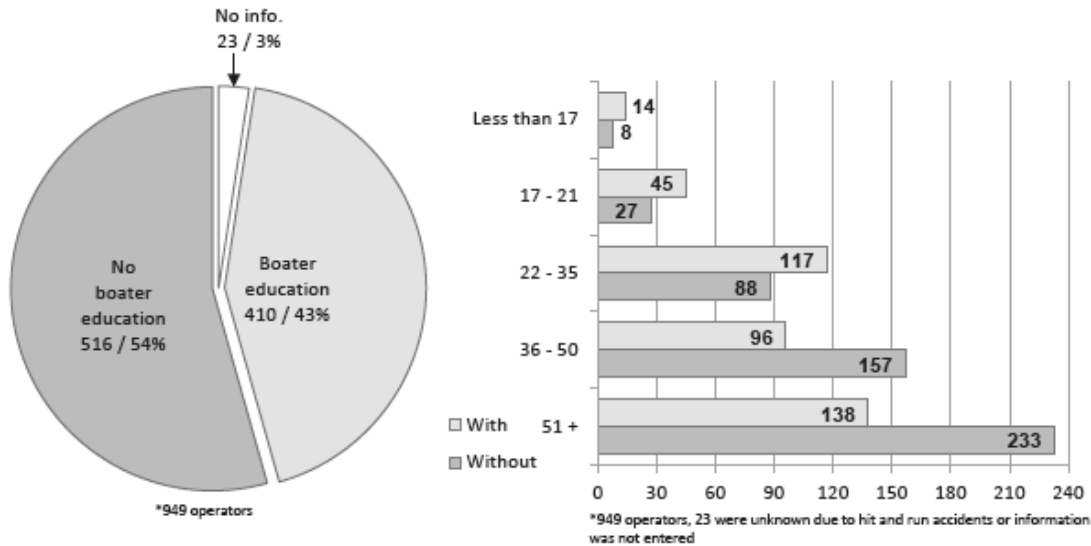


Figure 2 demonstrates the correlation between boater education and accidents for 2021.¹⁹

As demonstrated in Figures 1 and 2 from the *2021 Boating Accident Statistical Report*, FWC’s data indicate a relationship between boating accidents and failure to take a boater safety course. These findings underscore the fact that boating safety courses are an effective means of educating boaters on boater safety.

III. JUSTIFICATION FOR REQUESTING RULEMAKING

While Florida’s current boating safety course regulations require information on “Florida manatee awareness,” there is no detail about manatee slow zones or a requirement for course providers to include manatee awareness exam questions.²⁰ The regulations do not require information about or testing on critical wildlife areas, marine mammals, and sea turtles even though Florida boaters cause significant adverse impacts to each.²¹ The boating safety course minimum requirements should be amended to include exam questions and additional detail on the following topics.

A. Manatee Protection

The Florida manatee (*Trichechus manatus latirostris*) is listed as a threatened species protected under the Endangered Species Act.²² On average, more than 100 manatees are killed by boaters yearly.²³ Manatees also suffer additional impacts of increased boater activity, including

¹⁹ *Id.* at 36.

²⁰ Fla. Admin. Code r. 68D-36.104.

²¹ *Id.*

²² 16 U.S.C. §§ 1531–1544.

²³ FWC, *Manatee Mortality Statistics*, <https://myfwc.com/research/manatee/rescue-mortality-response/statistics/mortality/> (last visited July 19, 2022).

behavioral responses such as modified eating patterns.²⁴ To curb boater impacts, manatees are protected by state Manatee Protection Zones codified through the Florida Manatee Sanctuary Act.²⁵ These protection areas include “motorboat prohibited zones” and “slow speed zones” with a variety of regulated speeds.²⁶ Manatees area also protected through federal Manatee Protection Areas.²⁷ Among these zones are designated manatee refuges, which also carry slow speed restrictions.²⁸ Presenting Florida boaters with information on these protection areas and corresponding slow zones is vital to increasing awareness and decreasing the number of unnecessary manatee deaths.

i. Manatee History and Status

The Florida manatee is located only in the southeastern United States within inland and coastal waters.²⁹ The current population is estimated to be as few as 7,520 manatees.³⁰ Manatees have an expected life span of around 60 years, reach maturity between the ages of four to seven years, and have a calf reproductive rate of one calf every three years.³¹ Manatees live in saline, brackish, and freshwater environments and are found in mangroves, saltmarshes, canal systems, and other coastal environments.³² They forage on marine and freshwater “floating, emergent, and bank vegetation” in addition to shallow grass beds.³³

Aside from unusual mortality events, manatees’ primary population threats are loss of warm-water refuges and watercraft collisions.³⁴ Other threats include “drowning due to canal locks and flood gates, entanglement in fishing gear, cold exposure, red tide outbreaks, and habitat loss.”³⁵

²⁴ FWC, *Florida Manatee Management Plan*, 9 (2007) <https://myfwc.com/media/2038/manatee-mgmt-plan.pdf>.

²⁵ Fla. Admin. Code r. 68C-22.

²⁶ *Id.* 68C-22.002(3), (4).

²⁷ 50 CFR § 17.108.

²⁸ *Id.* § 17.108(a)(1)–(14).

²⁹ Rycyk, A., Deutsch, C., Barlas, M., Hardy, S., Frisch, K., Leone, E., Nowacek, D., 2018, *Manatee behavioral response to boats*, *Marine Mammal Science* 34(4): 924:962; *see also* FWC, *Florida Manatee Management Plan* 8–9 (Dec. 2007), <https://myfwc.com/media/2038/manatee-mgmt-plan.pdf>.

³⁰ Population information is available on the FWC website. FWC, *Florida Manatee Program*, <https://myfwc.com/wildlifehabitats/wildlife/manatee/> (last visited July 12, 2022).

³¹ FWC, *Florida Manatee Management Plan*, 3 (Dec. 2007), <https://myfwc.com/media/2038/manatee-mgmt-plan.pdf> (last visited July 28, 2022).

³² *Id.*; *see also* FWC, *Manatee Habitat*, <https://myfwc.com/wildlifehabitats/wildlife/manatee/habitat/#:~:text=Manatee%20Habitat.%20Manatees%20inhabit%20rivers,%20bays,%20canals,%20estuaries,vegetation%20that%20provide%20the%20manatee%E2%80%99s%20primary%20food%20sources> (last visited July 12, 2022).

³³ FWC, *Florida Manatee Management Plan*, 2 (Dec. 2007), <https://myfwc.com/media/2038/manatee-mgmt-plan.pdf>.

³⁴ Runge, M.C., Sanders-Reed, C.A., Langtimm C.A., Fonnesebeck, C.J., 2007, *A Quantitative Threats Analysis for the Florida Manatee (Trichechus manatus latirostris)*, U.S. Geological Survey Open-File Report 2007–1086, 2 (emphasis added).

³⁵ Ball, R.L., Malmi, M., Zgibor, J., 2020, *Trends of the Florida manatee (Trichechus manatus latirostris) rehabilitation admissions*, *PLoS ONE* 15:7, 2.

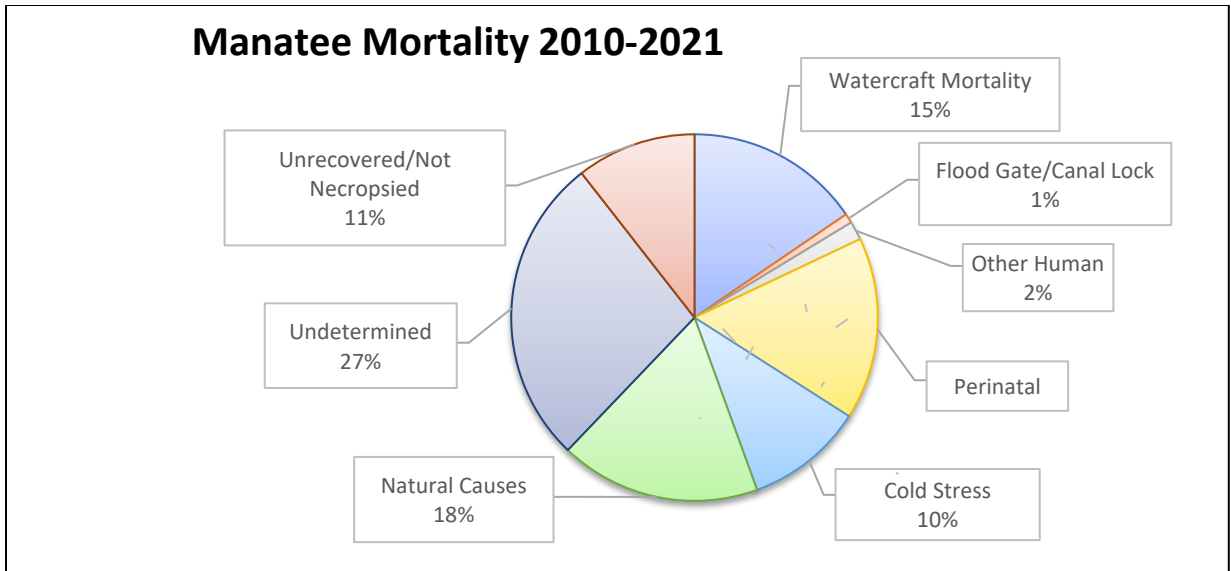


Figure 3 depicts known and unknown manatee mortality factors from 2010 to 2021.³⁶

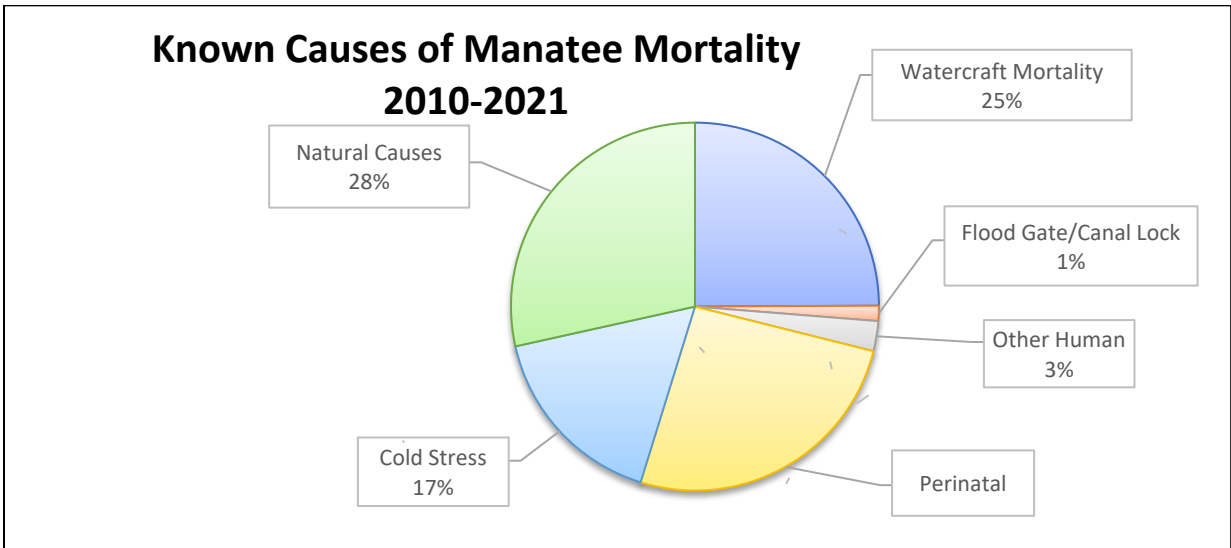


Figure 4 depicts known manatee mortality factors from 2010 to 2021.³⁷

As demonstrated in Figure 3, watercraft caused 15% of total determined manatee deaths between 2010 and 2021. FWC uses the “undetermined” category when the manatee carcass “is too decomposed to diagnose,” “reported but never retrieved,” or “when no specific factor or set of factors can be identified as a cause of death.”³⁸ FWC replaced the “undetermined” category with “not necropsied” in the 2020 mortality statistics.³⁹ Because undetermined, not-necropsied, and

³⁶ Data utilized to make the figure was based on FWC reports found at FWC, *Yearly Mortality Summaries*, <https://myfwc.com/research/manatee/rescue-mortality-response/statistics/mortality/yearly/> (last visited July 24, 2022).

³⁷ *Id.*

³⁸ U.S. Fish & Wildlife Serv., *West Indian Manatee Florida Stock*, 3 (2009), https://www.fws.gov/northflorida/Manatee/SARS/20091230_rpt_Final_Florida_Manatee_SAR.pdf.

³⁹ FWC, *Manatee Mortality Statistics*, <https://myfwc.com/research/manatee/rescue-mortality-response/statistics/mortality/> (last visited July 12, 2022).

unrecovered manatees were not autopsied or the autopsy was inconclusive, it is possible some deaths were related to watercraft collisions. After removing the 39% of manatees unrecovered or undetermined, demonstrated in Figure 3, watercraft accounted for 25% of all known manatee deaths from 2010 to 2021.

The Florida manatee is federally listed as a threatened species under the Endangered Species Act.⁴⁰ Manatees are also federally protected under the Marine Mammal Protection Act (MMPA) of 1972. The MMPA protects all marine mammals within U.S. waters from “take.”⁴¹

The Florida manatee is also protected under the state Endangered and Threatened Species Act.⁴² Florida Statutes section 379.2291 grants FWC the authority under the state Endangered and Threatened Species Act to develop “management plans or work plans” to protect manatees, working in conjunction with the U.S. Fish and Wildlife Service.⁴³ FWC’s Florida manatee program serves to “protect and conserve manatees.”⁴⁴ The current Florida Manatee Management Plan (Plan) was last updated in 2007 and includes information about the species, its threats, and management actions to ensure the survival of the species.⁴⁵ Importantly, the Plan states that “watercraft-related mortality ha[s] the greatest impact on manatee population growth and resilience.”⁴⁶

The Florida manatee is also protected under the Florida Manatee Sanctuary Act, which prohibits actions that “intentionally or negligently annoy, molest, harass, or disturb or attempt to molest, harass, or disturb any manatee; injure or harm or attempt to injure or harm any manatee.”⁴⁷ The act grants FWC the authority to protect manatees from collisions with motorboats by regulating the operation and speed of motorboat traffic “only where manatee sightings are frequent” and the best available information demonstrated manatees regularly inhabit the habitat.⁴⁸

ii. Manatee Protection Areas and Slow Zones

In addition to federal and state protection statutes, there are also federal and state laws that protect manatees by regulating boat speeds in certain areas.

The Florida Manatee Sanctuary Act, Florida Statutes section 379.2431(2), grants FWC the authority to create Manatee Protection Zones, which include prohibited and reduced speed zones

⁴⁰ 16 U.S.C. §§ 1531–1544; U.S. Fish & Wildlife Serv., *ECOS: West Indian Manatee (Trichechus manatus)*, <https://ecos.fws.gov/ecp/species/4469> (last visited July 12, 2022).

⁴¹ U.S. Fish & Wildlife Serv., *Marine Mammal Protection Act*, <https://www.fws.gov/international/laws-treaties-agreements/us-conservation-laws/marine-mammal-protection-act.html> (last visited July 12, 2022); *see also* 16 U.S.C. §§ 1361–1407; *see also* Section (C)(i) of this petition.

⁴² Fla. Stat. § 379.2291; Fla. Admin. Code r. 68A-27.0031(2)(c) (providing a list of marine endangered and threatened species).

⁴³ Fla. Stat. § 379.2291(6).

⁴⁴ FWC, *Florida Manatee Management Plan*, 8–9 (Dec. 2007), <https://myfwc.com/media/2038/manatee-mgmt-plan.pdf>.

⁴⁵ *Id.*

⁴⁶ *Id.* at 7.

⁴⁷ Fla. Stat. § 379.2431(2).

⁴⁸ *Id.* § 379.2431(2)(d).

for boaters.⁴⁹ FWC implements the Florida Manatee Sanctuary Act through Florida Administrative Code Chapter 68,⁵⁰ which establishes “restrictions to protect manatees from harmful collisions with motorboats and from harassment; to protect manatee habitat, such as seagrass beds from destruction by boats or other human activity; and to provide limited safe havens where manatees can rest, feed, reproduce, give birth, or nurse undisturbed by human activity.”⁵¹

FWC can create Manatee Protection Zones and instill boater restrictions if the absence of adequate restrictions will likely result in injury or death to manatees, harassment of manatees, or destruction of essential manatee habitat.⁵² FWC zones include “motorboat prohibited,” “slow speed,” and “idle speed.” FWC’s boater information card describes idle speed as a speed of 2–3mph, and slow speed as between 5–7mph.⁵³

Currently, FWC has established Manatee Protection Zones in eighteen counties in Florida.⁵⁴ Five counties maintain year-round zones: Charlotte, Collier, Duval, Manatee, and Martin.⁵⁵ The remaining counties have protection zones that vary by season.⁵⁶

⁴⁹ FWC, *Manatee Protection Zones* at iii, <https://myfwc.com/wildlifehabitats/wildlife/manatee/protection-zones/> (last visited July 19, 2022).

⁵⁰ Fla. Admin. Code r. 68C-22.

⁵¹ *Id.* 68C-22.001(1).

⁵² Fla. Admin. Code r. 68C-22.001(2)(a)(1)(a)–(c).

⁵³ FWC, *All boat operators must comply with posted signs* (2012), <https://myfwc.com/media/7324/multi-lingual-waterway-information.pdf>; FWC rationale for reducing vessels speeds to reduce risks to manatees is discussed in a peer-reviewed paper FWC staff authored in 2007: Calleson, CS., Frohlich, RK., 2007, *Slower boat speeds reduce risks to manatees*. *Endangered Species Research*. Vol. 3, pp. 295-304. <https://myfwc.com/wildlifehabitats/wildlife/manatee/protection-zones/>.

⁵⁴ FWC, *Data and Maps*, <https://myfwc.com/wildlifehabitats/wildlife/manatee/data-and-maps/> (last visited July 28, 2022).

⁵⁵ *Id.*

⁵⁶ *Id.*

Florida Counties with FWC Manatee Protection Zones

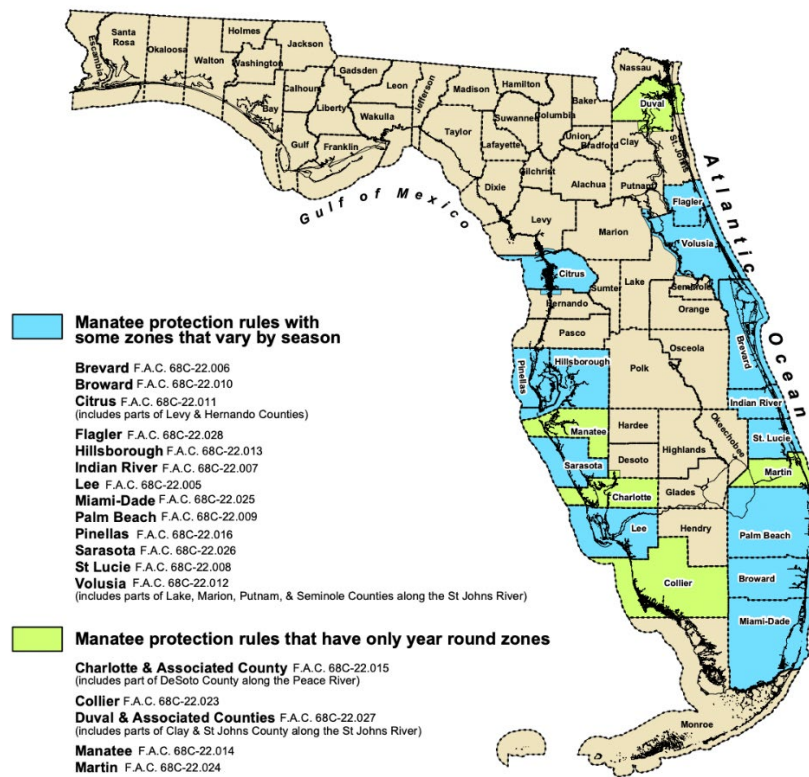


Figure 5 depicts Florida’s Manatee Protection Zones.⁵⁷

Federal regulations also create Manatee Protection Areas.⁵⁸ One of the major restrictions within Manatee Protection Areas is watercraft speed. The different speed zones include “motorboat no entry (year-round); idle speed zones (year-round; Nov. 15-Apr. 30); slow speed zones (year-round; Nov. 15- Apr. 30); maximum 25 mph [miles per hour] / slow speed buffer zones (year-round); and some speed zones that include or exclude channels.”⁵⁹

iii. Manatee Boat Mortality and Behavioral Impacts

From 2010 to 2021, watercraft killed at least 1,153 manatees, with an average of 104.8 manatees killed per year.⁶⁰

⁵⁷ *Id.*

⁵⁸ 50 C.F.R. § 17.108.

⁵⁹ Center for Biological Diversity, *Collision Course: The Government’s Failing System for Protecting Florida Manatees from Deadly Boat Strikes*, 9 (Sept. 2014), https://www.biologicaldiversity.org/species/mammals/Florida_manatee/pdfs/collision_course_web.pdf.

⁶⁰ FWC, *Manatee Mortality Statistics*, <https://myfwc.com/research/manatee/rescue-mortality-response/statistics/mortality/> (last visited March 30, 2022).

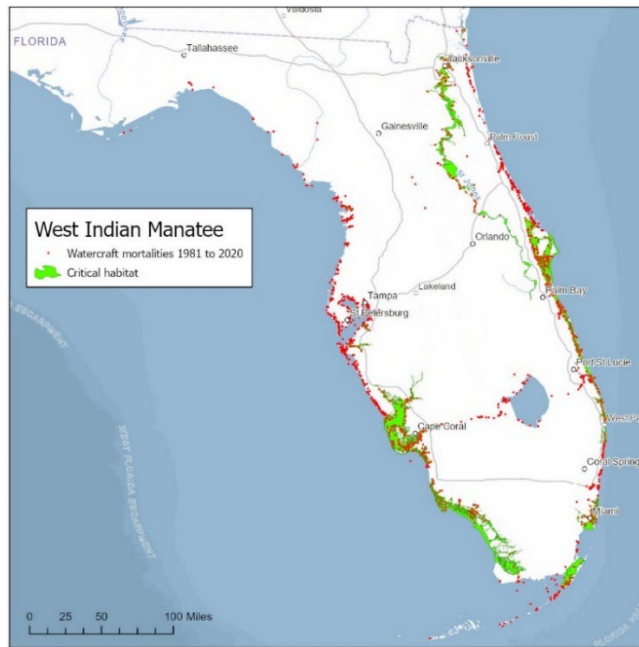


Figure 6 depicts manatee watercraft fatality compared to existing critical habitat.⁶¹

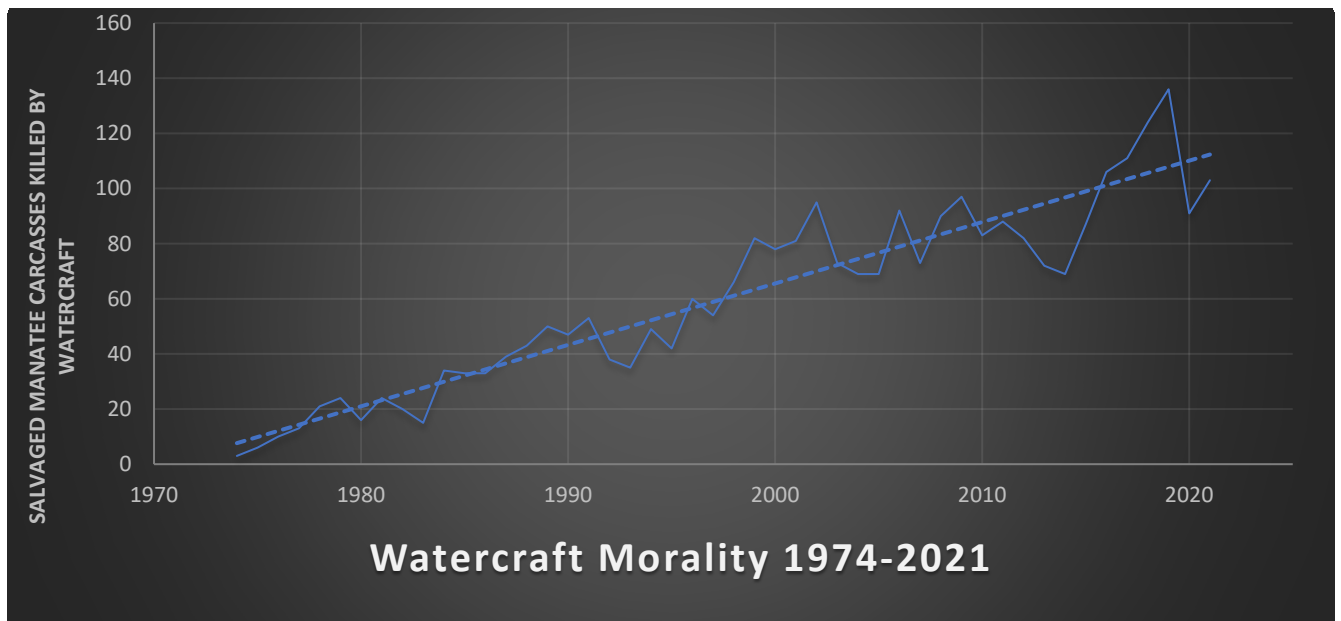


Figure 7 visualizes the increasing number of manatees killed per year by watercraft.⁶²

Human impacts such as “watercraft, water control structures, recreational and commercial fishing gear,” cause manatee mortality.⁶³ However, manatee mortality reports indicate the largest

⁶¹ Curt Bradley, 2021, Center for Biological Diversity. Figure based on FWC, *Manatee Mortality Statistics*, <https://myfwc.com/research/manatee/rescue-mortality-response/statistics/mortality/> (last visited March 20, 2022).

⁶² FWC, *Manatee Mortality Statistics*, <https://myfwc.com/research/manatee/rescue-mortality-response/statistics/mortality/> (last visited July 20, 2022).

⁶³ U.S. Fish & Wildlife Serv., *Stock Assessment Reports for Two Stocks of West Indian Manatee Florida Stock*, 2022, <https://www.govinfo.gov/content/pkg/FR-2022-08-03/pdf/2022-16625.pdf>, (last visited August 4, 2022).

overall human impact is through watercraft collisions.⁶⁴ Figure 6 shows that the number of manatees killed per year has risen. Some factors that may have led to additional manatee deaths include the increase of registered vessels in Florida each year, the many out-of-state boaters who annually visit Florida, and the modifications of vessels that allow for higher speeds within shallow waters, which may increase watercraft collisions with manatees.⁶⁵

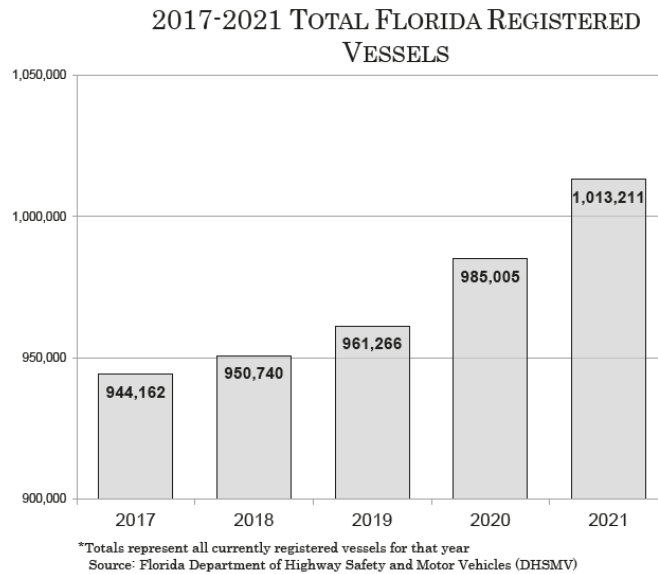


Figure 8 demonstrates the increase in Florida registered vessels from 2017–2021.⁶⁶

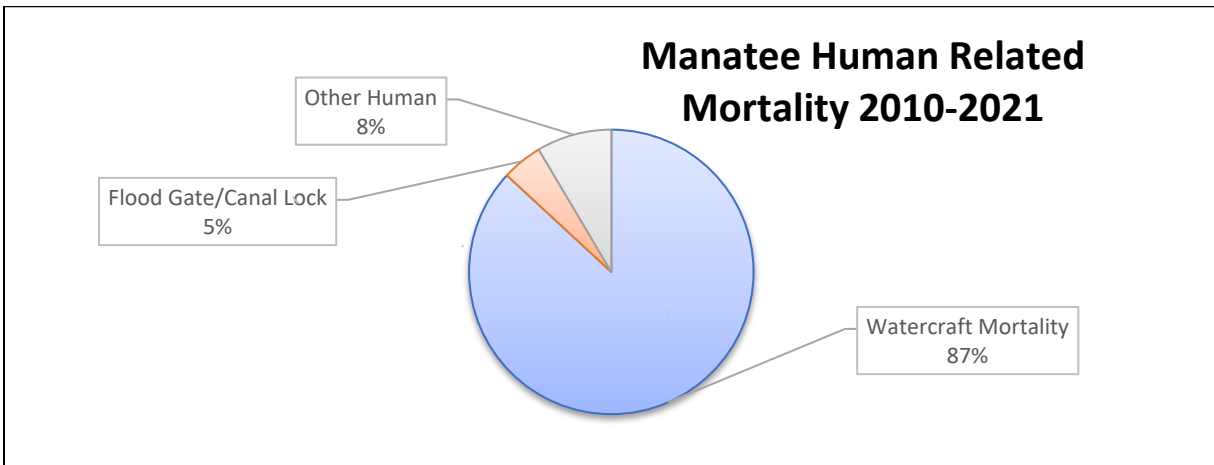


Figure 9 demonstrates the human-related death percentages from 2010–2021.⁶⁷

⁶⁴ FWC, *Manatee Mortality Statistics*, <https://myfwc.com/research/manatee/rescue-mortality-response/statistics/mortality/> (last visited June 30, 2022).

⁶⁵ FWC, *Florida Manatee Management Plan*, 8–9 (Dec. 2007), <https://myfwc.com/media/2038/manatee-mgmt-plan.pdf>.

⁶⁶ FWC, *2021 Boating Accident Statistical Report*, 2, <https://myfwc.com/media/29115/2021-basr-booklet.pdf>.

⁶⁷ FWC, *Manatee Mortality Statistics*, <https://myfwc.com/research/manatee/rescue-mortality-response/statistics/mortality/> (last visited July 19, 2022).

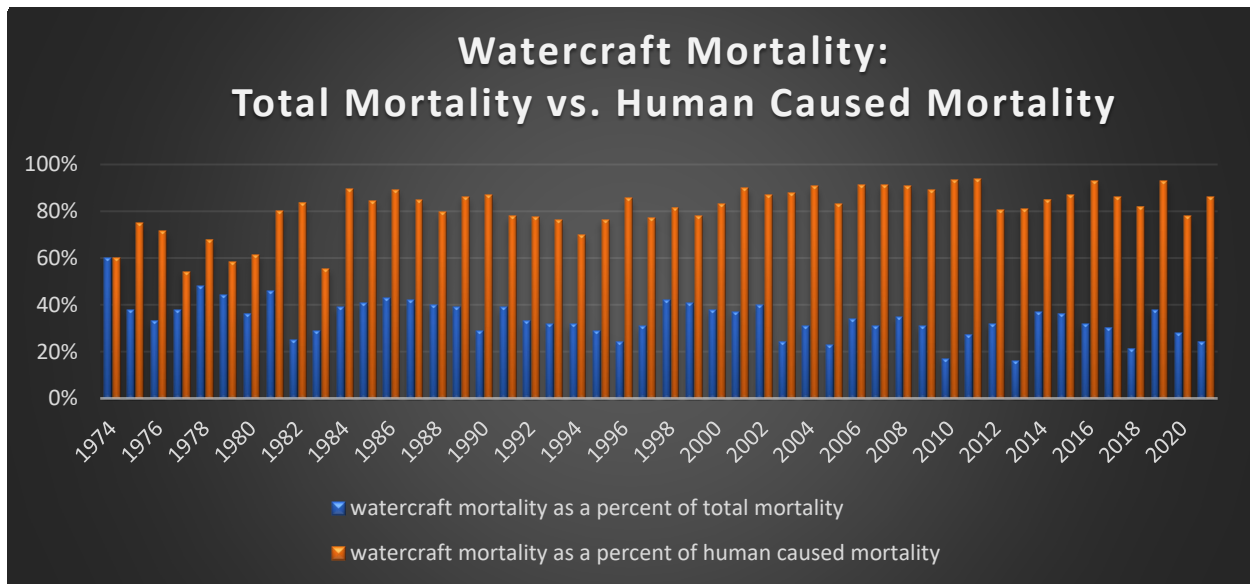


Figure 10 demonstrates the relationship between watercraft mortality as a percent of total mortality (blue) and watercraft mortality as a percent of human caused mortality (orange).⁶⁸

Figure 9 explains that from 2010 to 2021, watercraft accounted for 87% of human-caused manatee deaths. Figure 10 demonstrates watercraft mortality as a percent of total mortality and watercraft mortality as a percent of human caused mortality and shows that watercraft caused the majority of human-caused deaths, and that watercraft are a significant portion of overall manatee deaths.

Manatees hit by watercraft may suffer injuries ranging from propeller wounds to crushing.⁶⁹ Studies found both blunt and sharp forces can cause manatee fatality.⁷⁰ In addition to mortality, many surviving manatees experience life-long scarring and injuries.⁷¹ In a study that examined necropsy records from 2007 through 2016, of 3,786 non-perinatal carcasses, “approximately 96% of adults, approximately 70% of subadults, and approximately 34% of calves had watercraft-related scars.”⁷² The raw data showed that one in four adults had been hit 10 or more times; five adult carcasses bore evidence of 40 or more strikes.”⁷³ The short-term impacts from scarring include “pain, elevated stress responses, and behavioral changes, as well as increased

⁶⁸ *Id.*⁶⁹ Center for Biological Diversity, 2014, *Collision Course: The Government’s Failing System for Protecting Florida Manatees from Deadly Boat Strikes*, 3, https://www.biologicaldiversity.org/species/mammals/Florida_manatee/pdfs/collision_course_web.pdf.

⁶⁹ Center for Biological Diversity, 2014, *Collision Course: The Government’s Failing System for Protecting Florida Manatees from Deadly Boat Strikes*, 3, https://www.biologicaldiversity.org/species/mammals/Florida_manatee/pdfs/collision_course_web.pdf.

⁷⁰ Bassett, B.L., Hostetler, J., Leone, E., Shae, C.P., 2020, *Quantifying sublethal Florida manatee-watercraft interactions by examining scars on manatee carcasses*, *Endang. Species Res.*, Vol. 43: 395–408, 395, <https://www.int-res.com/articles/esr2020/43/n043p395.pdf>.

⁷¹ FWC, *Florida Manatee Management Plan*, 8-9 (2007), <https://myfwc.com/media/2038/manatee-mgmt-plan.pdf>.

⁷² Bassett, B.L., Hostetler, J., Leone, E., Shae, C.P., 2020, *Quantifying sublethal Florida manatee-watercraft interactions by examining scars on manatee carcasses*, *Endang. Species Res.*, Vol. 43: 395–408, 395, <https://www.int-res.com/articles/esr2020/43/n043p395.pdf>.

⁷³ *Id.*

energy expenditure,” while long-term effects of scars are currently unknown.⁷⁴ The long-term impacts from skeletal injuries include “decreased mobility due to skeletal remodeling of fractured bone, decreased swimming efficiency if large portions of the fluke are lost, compromised immune function, and, if reproductive systems are damaged, decreased reproductive output.”⁷⁵ Non-lethal injuries to female manatees may reduce their ability to breed or prevent them from breeding entirely.⁷⁶



Photo by Joyce Kleen, U.S. Fish & Wildlife Service⁷⁷

In addition to the physical effects, boaters change how manatees interact with their environment.⁷⁸ Studies found increased human interference causes manatees to leave their preferred habitats and alters biological behaviors such as resting, feeding, and suckling.⁷⁹ Manatee behavior is influenced by manatee activity, boat distance, and habitat features.⁸⁰ Boat proximity is considered the “most important factor” because “the closer a boat approached a manatee, the more likely the manatee was to change its heading, depth, or fluking behavior and to have more changes in roll, heading, and depth during the pass.”⁸¹ Manatees may head for deeper water before or after a boat pass.⁸²

When manatees are in seagrass beds, boat impacts may be exacerbated. Manatees in seagrass beds (typically shallow environments) are limited in their ability to dive deeper.⁸³ Seagrass beds may impact a manatee’s ability to detect boats due to a “high level of background noise from

⁷⁴ *Id.* at 401–402.

⁷⁵ *Id.* at 402.

⁷⁶ FWC, *Florida Manatee Management Plan*, 8–9 (2007), <https://myfwc.com/media/2038/manatee-mgmt-plan.pdf>.

⁷⁷ Katherine Taylor, *The Stories Told by Manatee Scars*, USFWS, (2016)

<https://www.fws.gov/news/blog/index.cfm/2016/3/30/The-Stories-Told-by-Manatee-Scars>.

⁷⁸ FWC, *Florida Manatee Management Plan*, 8–9 (2007) <https://myfwc.com/media/2038/manatee-mgmt-plan.pdf>.

⁷⁹ *Id.*

⁸⁰ Rycyk, A., Deutsch, C., Barlas, M., Hardy, S., Frisch, K., Leone, E., Nowacek, D., 2018, *Manatee behavioral response to boats*, *Marine Mammal Science* 34(4): 924:962, 952.

⁸¹ *Id.*

⁸² *Id.* at 926.

⁸³ *Id.* at 953.

biological sources and high transmission loss of sound.”⁸⁴ Slow boat speeds give manatees “substantially more time in which to respond” than boats moving at higher speeds.⁸⁵ As a result, boat speed regulations “reduce collision frequency, as well as manatee injuries and death from watercraft strikes.”⁸⁶

iv. Need for More Information about Manatee Identification and Protection Zones in Boating Safety Courses

Currently, boating safety courses must include information about Florida manatee awareness, but FWC regulations do not require education on slow zones specifically. With such high numbers of manatees killed each year from watercraft, additional questions on manatee slow zones would help boaters be more aware of manatee habitats, how to be aware manatees in the water, and help prevent boater trauma and death to manatees. Figures 10 and 11 below display existing FWC images of manatee protection zones across Manatee and Flagler counties. The inclusion of such images in the FWC boater safety course would inform boaters of which protection areas may be close to them.

Additionally, FWC should consider including information about how to identify the presence of manatees in the water, including looking for a manatee's snout, back, tail, or flipper breaking the surface of the water, or a swirl or a flat spot on the surface of the water that indicates a manatee swimming below.

⁸⁴ *Id.*

⁸⁵ *Id.*; see also Martin, J., Sabatier, Q., Gowan, T., Giraud, C., Gurarie, C., Ortega-Ortiz, J., Deutsch, C., Rycyk, A., Koslovsky, S., 2015, *A quantitative framework for investigating risk of deadly collisions between marine wildlife and boats*, *Methods in Ecology and Evolution* 7(1): 42-50.

⁸⁶ Rycyk, A., Deutsch, C., Barlas, M., Hardy, S., Frisch, K., Leone, E., Nowacek, D., 2018, *Manatee behavioral response to boats*, *Marine Mammal Science* 34(4): 924:962, 958.

Manatee County Protection Zones

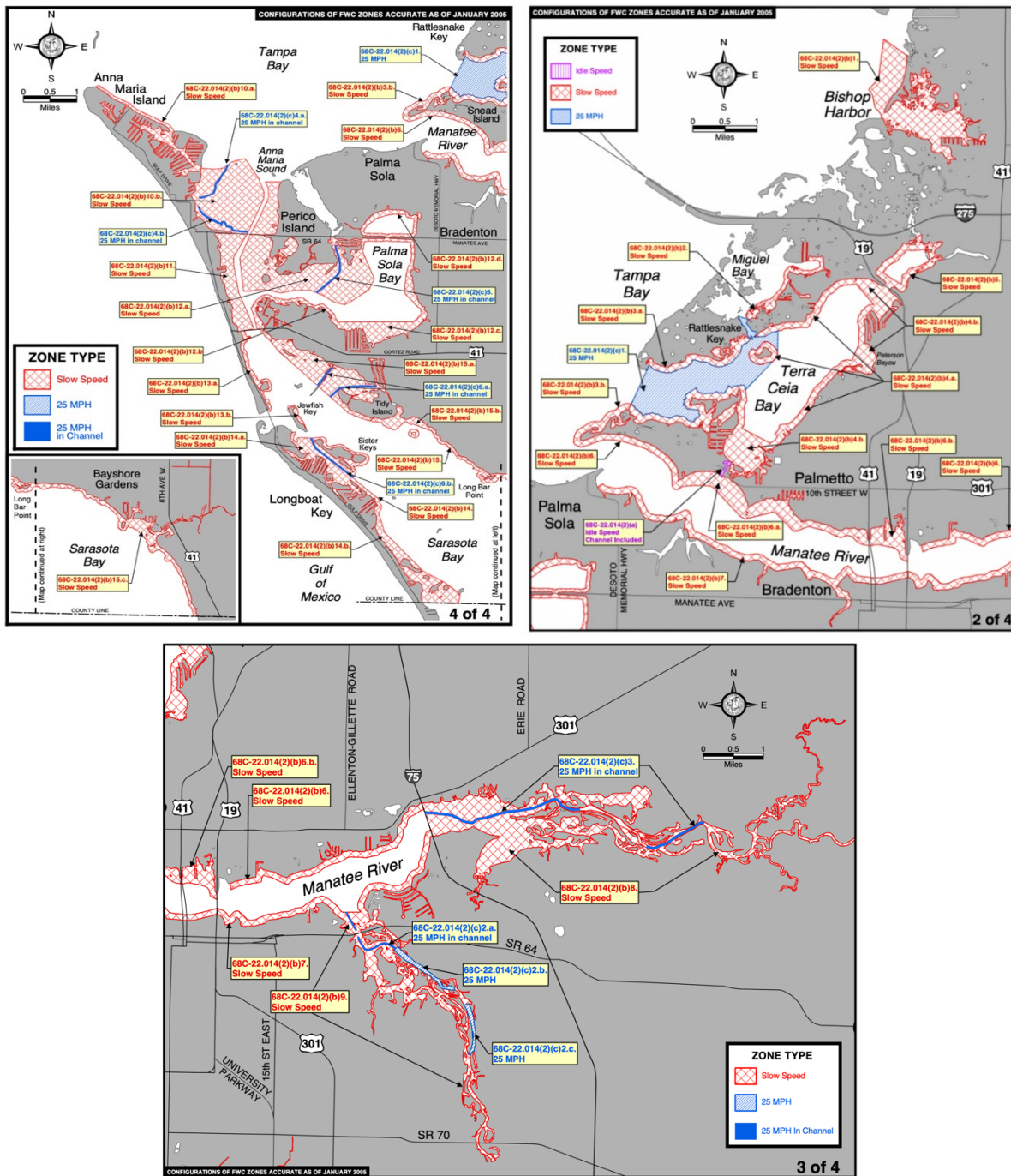


Figure 10 shows Manatee County's Manatee Protection Zones across three images.⁸⁷

⁸⁷ FWC, *Manatee County Protection Zones* (2005), http://manatee.wateratlas.usf.edu/upload/documents/Manatee_manateeMPZ.pdf.

Flagler County Protection Zones

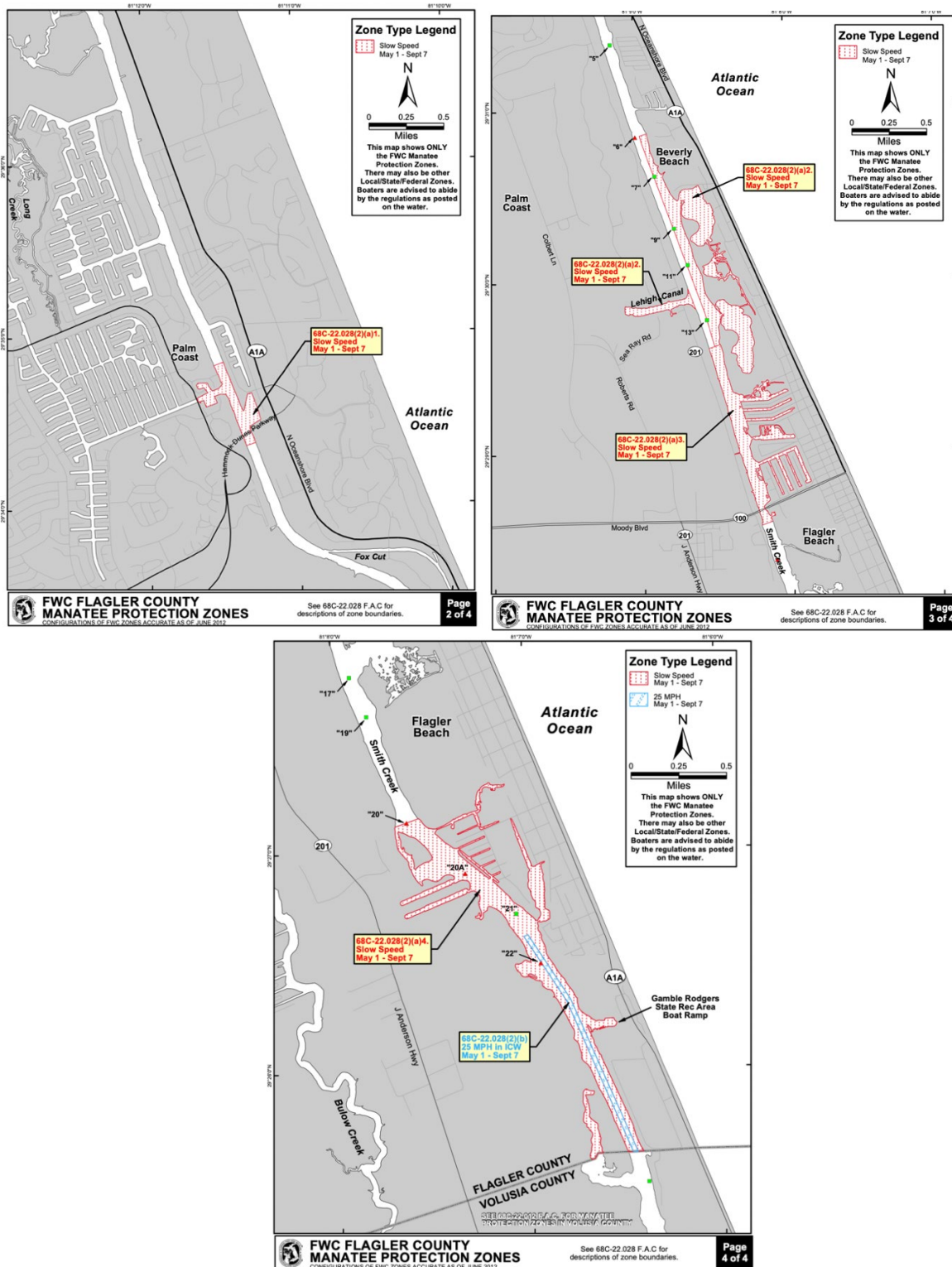


Figure 11 shows Flagler County’s Manatee Protection Zones across three images.⁸⁸

It is vital that Florida boaters understand why state Manatee Protection Zones and federal Manatee Protection Areas are important. Current laws and regulations were created to protect manatees by giving FWC the authority to create and enforce programs and rules to protect the Florida manatee.⁸⁹ In accordance with FWC's role, FWC should require additional boating safety questions and materials to help prevent current and future take of the Florida manatee in manatee slow zones. To achieve this goal, slow zone information and exam questions should be a part of the Florida boating safety course to ensure these boaters understand how to carefully navigate these areas to ensure the protection of manatees.

B. Critical Wildlife Areas and Rookeries

Florida's current boating safety course regulations are completely silent about critical wildlife areas (CWAs) and rookeries. These areas are home to many imperiled bird species, and increasing human disturbances are leading to negative behavioral responses. FWC should add information and exam questions about CWAs and rookeries to the boating safety test to better prepare boaters to interact with CWA buffer zones and be aware of how their actions may impact sensitive rookeries.

i. CWA and Rookery Protection

FWC established CWAs under Florida Administrative Code rule 68A-19.005 to “protect important wildlife concentrations from human disturbance during critical periods of their life cycles, such as breeding, feeding or migration.”⁹⁰ The code prohibits the take of fish or other wildlife and requires posted signs such as “Critical Wildlife Area” and “Closed to Public Access” to prevent public access and takings (e.g., interference from vehicles, vessels, and dogs).⁹¹

Florida has thirty-one CWAs in marine habitats within seventeen different counties.⁹² CWA habitats are typically sandbars or mangrove islands.⁹³ Impacts of particular concern relate to rookeries⁹⁴ within CWAs, which exist for the protection of seabirds,⁹⁵ shorebirds,⁹⁶ and wading birds.⁹⁷

⁸⁸ FWC, *Flagler County Protection Zones* (2005), <https://flaglerlive.com/wp-content/uploads/FlaglerMap.pdf>.

⁸⁹ Fla. Stat. § 379.2431(2)(d).

⁹⁰ Faulhaber, C., Schwarzer, A., Malachowski, K., Rizkalla, C., Cox, A., 2016, *Effects of human disturbance on shorebirds, seabirds, and wading birds: Implications for Critical Wildlife Areas*, IHR 2016-003, 3.

⁹¹ Fla. Admin. Code. r. 68A-19.005.

⁹² FWC, *Explore CWAs by name*, <https://myfwc.com/conservation/terrestrial/cwa/explore-cwas/> (last visited June 30, 2022).

⁹³ *Id.*

Table 1. CWAs in Florida’s Marine Habitats⁹⁸

| CWA Name | County | Focal Species | Length of Closures |
|-----------------------|--------------|---|--------------------|
| ABC Islands | Collier | Hérons (little blue and tricolored), egrets, brown pelicans. (Islands home to a variety of diving and wading birds’ who also roost and nest at location) | Year-round |
| Alafia Banks | Hillsborough | Hérons, egrets, ibis, roseate spoonbill, brown pelican, American oystercatcher | Year-round |
| Alligator Point | Franklin | Snowy plover, Wilson’s plover, American oystercatcher, least tern, willet | Feb 15 – Aug 31 |
| Amelia Island | Nassau | Least tern, Wilson’s plover | March 1 – Sep 1 |
| BC49 | Brevard | Wood storks, roseate spoonbills, brown pelicans, great egrets, great blue heron, tricolored heron and others | Jan 1 – Aug 31 |
| Big Carlos Pass | Lee | Pelicans, cormorants, reddish egret, little blue heron, tricolored heron, snowy egret, great blue heron, great egret, yellow-crowned night heron, black-crowned night heron, green heron, anhinga | Year-round |
| Big Marco Pass | Collier | Least tern, black skimmer, Wilson’s plover, wintering shorebirds | Year-round |
| Bill Sadowski | Dade | Foraging shorebirds, wading birds, marine life Location also manatee protection zone | Year-round |
| Bird Island | Martin | Wood storks, pelicans, roseate spoonbills, American oystercatcher | Year-round |
| Broken Islands | Lee | Pelicans, cormorants, reddish egret, little blue heron, tricolored heron, snowy egret, great blue heron, great egret, white ibis, green heron anhinga | March 1 – Aug 31 |
| Caxambas Pass | Collier | Least tern, black skimmer, Wilson’s plover (Islands nesting for seabirds and shorebirds – important stopover location for wintering and migrating birds) | April 1 – Aug 31 |
| Coconut Point | Lee | Brown pelicans, cormorants, reddish egret, little blue heron, tricolored heron, snowy egret, great blue heron, great egret, yellow-crowned night heron, black-crowned night heron, green heron, anhinga | Year-round |
| Deerfield Island Park | Broward | Gopher tortoise | Year-round |

⁹⁴ *Rookery* is defined as a “nest or breeding place of a colony” and “a breeding ground or haunt especially of gregarious birds.” Merriam-Webster, *Rookery*, <https://www.merriam-webster.com/dictionary/rookery> (last visited March 30, 2022).

⁹⁵ *Seabirds* are a “colonial beach-nesting birds that nest in large groups.” See FWC, Florida Shorebird Database, Glossary, 4, <https://app.myfwc.com/crossdoi/shorebirds/PDF-files/Glossary.pdf>.

⁹⁶ *Shorebirds* are a “solitary beach-nesting birds that nest individually or in loose aggregations.” *Id.* at 4.

⁹⁷ *Wading birds* are “any of an order (*ciconiiformes*) of long-legged birds (such as herons, bitterns, storks, and ibises) that wade in water in search of food. See Merriam-Webster, *wading bird*. <https://www.merriam-webster.com/dictionary/wading%20bird> (last visited July 20, 2022).

⁹⁸ Table 1 was created based on FWC data. FWC, *Explore CWAs by Name*, <https://myfwc.com/conservation/terrestrial/cwa/explore-cwas/> (last visited March 30, 2022).

| | | | |
|----------------------|------------------|---|---|
| Dot Dash Dit | Manatee | Wood storks, roseate spoonbill, tri-colored herons, black-crowned night herons, great blue herons, and anhingas | Jan 1 – Aug 31 |
| Flag Island | Franklin | American oystercatcher, least terns, black skimmers, and a variety of tern species. (Migration/ wintering location: red knots and piping plovers) | Year-round |
| Fort George Inlet | Duval | Royal terns, black skimmers, laughing gulls, gull-billed terns, sandwich terns, brown pelicans and American oystercatchers | May 1 – Aug 31 |
| Hemp Key | Lee | Brown pelican, cormorant, reddish egret, little blue heron, tricolored heron, snowy egret, great blue heron, great egret, night heron, green heron, anhinga | Year-round |
| Lanark Reef | Franklin | Brown pelicans, black skimmers, gull-billed terns, laughing gulls, American oystercatchers, willets, and piping plovers. | Year-round |
| Little Estero Island | Lee | Least tern, snowy plover, Wilson’s plover. | April 1 – Aug 31 |
| Matanzas Inlet | St. John’s | Least tern, Wilson’s plover, willet | April 1 – Aug 15 |
| Matanzas Pass Island | | Brown pelicans, little blue heron, tricolored heron, snowy egrets, great blue herons, great egrets, black-crowned night herons, green herons | Year-round |
| Myakka River | Sarasota | Wood storks, herons, egrets, anhingas | Jan 1 – Aug 31 |
| Nassau Sound Islands | Duval/ Nassau | Royal tern, black skimmer, gull-billed tern, least tern, piping plover, American oystercatcher, and red knot | Year-round |
| Pelican Shoal | Monroe | Roseate Tern | April 1 – Aug 31 |
| Port Orange | Volusia | Brown pelican, snowy egret, little blue heron, tri-colored heron, cormorants, great egret, white ibis, great blue heron, American oystercatcher. | Jan 1 – Aug 31 |
| Roberts Bay | Sarasota | Roseate spoonbills, reddish egrets, tricolored herons, great egrets, great blue herons, brown pelicans and double-crested cormorants | Year-round |
| Rookery Islands | Collier | Herons, egret, brown pelican | Year-round |
| Second Chance | Collier | Least tern, Wilson’s plover, black skimmer | March 1 – Aug 31 |
| St. George Causeway | Franklin | Least terns, laughing gulls, royal terns, sandwich terns, black skimmers, American oystercatchers | March 1 – Sep 30 |
| Stick Marsh | Brevard | Roseate spoonbills, great egret, snowy egret, tricolored herons, anhinga | Islands: year-round Channel: Jan 1 – July 31 |
| Tyndall | Bay | Least tern, black skimmer, snowy plover, Wilson’s plover, American oystercatcher, willet, piping plover | Year-round |

Table 2 Florida Seabirds⁹⁹

| Scientific Name | Common Name | | ESA Listed | Nest in FL |
|----------------------------------|--------------------------|----------------------------|---|------------|
| <i>Pterodroma hasitata</i> | Black-capped petrel | | Proposal to list as federally threatened ¹⁰⁰ | |
| <i>Calonectris diomedea</i> | Cory's shearwater | | | |
| <i>Puffinus gravis</i> | Greater shearwater | | | |
| <i>Puffinus griseus</i> | Sooty shearwater | | | |
| <i>Puffinus lherminieri</i> | Audubon's shearwater | | | |
| <i>Oceanites oceanicus</i> | Wilson's storm-petrel | | | |
| <i>Oceanodroma leucorhoa</i> | Leach's storm-petrel | | | |
| <i>Oceanodroma castro</i> | Band-rumped storm-petrel | | | |
| <i>Phaethon lepturus</i> | White-tailed tropicbird | | | |
| <i>Sula dactylatra</i> | Masked booby | | | Yes |
| <i>Sula leucogaster</i> | Brown booby | | | |
| <i>Morus bassanus</i> | Northern gannet | | | |
| <i>Pelecanus erythrorhynchos</i> | American white pelican | | | |
| <i>Pelecanus occidentalis</i> | Brown pelican | Species of Special Concern | | Yes |
| <i>Phalacrocorax auritus</i> | Double-crested cormorant | | | Yes |
| <i>Fregata magnificens</i> | Magnificent frigatebird | | | Yes |
| <i>Larus philadelphia</i> | Bonaparte's gull | | | |
| <i>Larus atricilla</i> | Laughing gull | | | Yes |
| <i>Larus pipixcan</i> | Franklin's gull | | | Yes |
| <i>Larus delawarensis</i> | Ring-billed gull | | | |
| <i>Larus argentatus</i> | Herring gull | | | |
| <i>Larus fuscus</i> | Lesser black-backed gull | | | |
| <i>Larus hyperboreus</i> | Glaucous gull | | | |
| <i>Larus marinus</i> | Great black-backed gull | | | |
| <i>Anous stolidus</i> | Brown noddy | | | Yes |
| <i>Onychoprion fuscata</i> | Sooty tern | | | Yes |
| <i>Onychoprion anaethetus</i> | Bridled tern | | | Yes |
| <i>Sternula antillarum</i> | Least tern | Threatened | | Yes |
| <i>Geochelidon nilotica</i> | Gull-billed tern | | | Yes |

⁹⁹ Table 2 is based on FWC and U.S. Fish & Wildlife Service data. FWC, *Florida Shorebird Database: Florida's Shorebirds and Seabirds – Species List*, https://public.myfwc.com/CrossDOI/Shorebirds/PDF-files/FSD-Species_List.pdf; FWC, *Florida Shorebird Database: Nesting Seabirds*, https://public.myfwc.com/CrossDOI/Shorebirds/focal_species.aspx (last visited July 19, 2022); U.S. Fish & Wildlife Serv., *ECOS: Listed species believed to or known to occur in Florida*, <https://ecos.fws.gov/ecp/report/species-listings-by-state?stateAbbrev=FL&stateName=Florida&statusCategory=Listed> (last visited July 12, 2022); FWC, *Florida's Endangered and Threatened Species*, (2018) <https://myfwc.com/media/1945/threatend-endangered-species.pdf>.

¹⁰⁰ 83 Fed. Reg. 50,560 (Oct. 9, 2018), available at <https://www.govinfo.gov/content/pkg/FR-2018-10-09/pdf/2018-21793.pdf>.

| | | | | |
|---------------------------------|--------------------|------------|------------|-----|
| <i>Hydroprogne caspia</i> | Caspian tern | | | Yes |
| <i>Chlidonias niger</i> | Black tern | | | Yes |
| <i>Sterna dougallii</i> | Roseate tern | Threatened | Threatened | Yes |
| <i>Sterna hirundo</i> | Common tern | | | |
| <i>Sterna paradisaea</i> | Arctic tern | | | |
| <i>Sterna forsteri</i> | Forster's tern | | | |
| <i>Thalasseus maxima</i> | Royal tern | | | Yes |
| <i>Thalasseus sandvicensis</i> | Sandwich tern | | | Yes |
| <i>Rynchops niger</i> | Black skimmer | Threatened | | Yes |
| <i>Stercorarius pomarinus</i> | Pomarine jaeger | | | |
| <i>Stercorarius parasiticus</i> | Parasitic jaeger | | | |
| <i>Stercorarius longicaudus</i> | Long-tailed jaeger | | | |

Table 3 Florida Shorebirds¹⁰¹

| Scientific Name | Common Name | State Listed | ESA Listed | Nest in FL |
|--------------------------------|------------------------|--------------|------------|------------|
| <i>Pluvialis squatarola</i> | Black-bellied plover | | | |
| <i>Pluvialis dominica</i> | American golden-plover | | | |
| <i>Charadrius alexandrinus</i> | Snowy plover | Threatened | | Yes |
| <i>Charadrius wilsonia</i> | Wilson's plover | | | Yes |
| <i>Charadrius semipalmatus</i> | Semipalmated plover | | | |
| <i>Charadrius melodus</i> | Piping plover | Threatened | Threatened | Yes |
| <i>Charadrius vociferus</i> | Killdeer | | | Yes |
| <i>Haematopus palliatus</i> | American oystercatcher | Threatened | | Yes |
| <i>Himantopus mexicanus</i> | Black-necked stilt | | | Yes |
| <i>Recurvirostra americana</i> | American avocet | | | |
| <i>Actitis macularius</i> | Spotted sandpiper | | | |
| <i>Tringa solitaria</i> | Solitary sandpiper | | | |
| <i>Tringa melanoleuca</i> | Greater yellowlegs | | | |
| <i>Tringa semipalmata</i> | Willet | | | Yes |
| <i>Tringa flavipes</i> | Lesser yellowlegs | | | |
| <i>Bartramia longicauda</i> | Upland sandpiper | | | |
| <i>Numenius phaeopus</i> | Whimbrel | | | |
| <i>Numenius americanus</i> | Long-billed curlew | | | |
| <i>Limosa fedoa</i> | Marbled godwit | | | |
| <i>Arenaria interpres</i> | Ruddy turnstone | | | |
| <i>Calidris canutus</i> | Red knot | | Threatened | |
| <i>Calidris alba</i> | Sanderling | | | |
| <i>Calidris pusilla</i> | Semipalmated sandpiper | | | |
| <i>Calidris mauri</i> | Western sandpiper | | | |
| <i>Calidris minutilla</i> | Least sandpiper | | | |
| <i>Calidris fuscicollis</i> | White-rumped sandpiper | | | |
| <i>Calidris melanotos</i> | Pectoral sandpiper | | | |

¹⁰¹ Table 3 is based on data from FWC and the U.S. Fish & Wildlife Service. FWC, *Florida Shorebird Database: Florida's Shorebirds and Seabirds – Species List*, https://public.myfwc.com/CrossDOI/Shorebirds/PDF-files/FSD-Species_List.pdf (last visited July 28, 2022); Figure updated using the following resources: FWC, *Florida Shorebird Database: Nesting Shorebirds*, https://public.myfwc.com/CrossDOI/Shorebirds/PDF-files/Nesting_Shorebirds.pdf; U.S. Fish & Wildlife Serv., *ECOS: Listed species believed to or known to occur in Florida*, <https://ecos.fws.gov/ecp/report/species-listings-by-state?stateAbbrev=FL&stateName=Florida&statusCategory=Listed> (last visited July 12, 2022); FWC, *Florida's Endangered and Threatened Species* (2018), <https://myfwc.com/media/1945/threatend-endangered-species.pdf>.

| | | | | |
|--------------------------------|-------------------------|--|--|-----|
| <i>Calidris maritima</i> | Purple sandpiper | | | |
| <i>Calidris alpina</i> | Dunlin | | | |
| <i>Calidris himantopus</i> | Stilt sandpiper | | | |
| <i>Tryngites subruficollis</i> | Buff-breasted sandpiper | | | |
| <i>Limnodromus griseus</i> | Short-billed dowitcher | | | |
| <i>Limnodromus scolopaceus</i> | Long-billed dowitcher | | | |
| <i>Gallinago delicata</i> | Wilson's snipe | | | |
| <i>Scolopax minor</i> | American woodcock | | | Yes |
| <i>Phalaropus tricolor</i> | Wilson's phalarope | | | |
| <i>Phalaropus lobatus</i> | Red-necked phalarope | | | |
| <i>Phalaropus fulicarius</i> | Red phalarope | | | |

Table 4. Florida Wading Birds¹⁰²

| Scientific Name | Common Name | State Listed | ESA Listed | Nest in FL |
|---------------------------------|----------------------------|--------------|------------|------------------|
| <i>Ardea alba</i> | Great egret | | | Yes |
| <i>Egretta thula</i> | Snowy egret | | | Yes |
| <i>Egretta rufescens</i> | Reddish egret | Threatened | | Yes |
| <i>Bubulcus ibis</i> | Cattle egret | | | Yes |
| <i>Ardea herodias</i> | Great blue heron | | | Yes |
| <i>Egretta tricolor</i> | Tricolored heron | Threatened | | Yes |
| <i>Egretta caerulea</i> | Little blue heron | Threatened | | Yes |
| <i>Nycticorax nycticorax</i> | Black-crowned night-heron | | | Yes |
| <i>Nyctanassa violacea</i> | Yellow-crowned night-heron | | | Yes |
| <i>Butorides virescens</i> | Green heron | | | Yes |
| <i>Botaurus lentiginosus</i> | American bittern | | | No, winter in FL |
| <i>Ixobrychus exilis</i> | Least bittern | | | Yes |
| <i>Laterallus jamaicensis</i> | Eastern black rail | Threatened | Threatened | Yes |
| <i>Mycteria americana</i> | Wood stork | | Threatened | Yes |
| <i>Platalea ajaja</i> | Roseate spoonbill | Threatened | | Yes |
| <i>Eudocimus albus</i> | White ibis | | | Yes |
| <i>Plegadis falcinellus</i> | Glossy ibis | | | Yes |
| <i>Threskiornis aethiopicus</i> | Sacred ibis [non-native] | | | Yes |

¹⁰² Table 4 is based on data from several sources. See Sizemore, G., Main, M., Pearlstine, E., 2009, *Florida's Wading Birds*, UF IFAS Extension – WEC264, 9; U.S. Fish and Wildlife Serv., *ECOS Environmental Conservation Online System, Listed species believed to or known to occur in Florida*, <https://ecos.fws.gov/ecp/report/species-listings-by-state?stateAbbrev=FL&stateName=Florida&statusCategory=Listed> (last visited July 28, 2022); FWC, *Florida's Endangered and Threatened Species*, (2018) <https://myfwc.com/media/1945/threatend-endangered-species.pdf> (last visited July 28, 2022); Sizemore, G., Cook, M., Baranski, M., 2019, *South Florida Wading Bird Report*, Southwest Florida Water Management District, https://www.sfwmd.gov/sites/default/files/documents/SFWBR_2019.pdf?utm_medium=email&utm_source=govdeli (last visited July 28, 2022); Heron Conservation, *North American Bittern*, <https://www.heronconservation.org/herons-of-the-world/list-of-herons/north-american-bittern/> (last visited July 20, 2022); Heron Conservation, *Least Bittern*, <https://www.heronconservation.org/herons-of-the-world/list-of-herons/least-bittern/> (last visited March 30, 2022); Patten, M., Lasley, G., 2000, *Range Expansion of the Glossy Ibis in North America*, *North American Birds* 54, 241-247, <https://sora.unm.edu/sites/default/files/journals/nab/v054n03/p00241-p00247.pdf>; Herring, G., Call, E., Johnston, M., 2006, *A Non-indigenous Wading Bird Breeding in the Florida Everglades: The Sacred Ibis*, *Florida Field Naturalist* 34(1):4-8, https://sora.unm.edu/sites/default/files/FFN_34-1_p004.pdf.

Tables 2, 3, and 4 list all the seabirds, shorebirds, and wading birds that inhabit Florida seasonally or year-round. The tables also indicate the variety of birds that may use the CWAs and which species are state or federally protected. For example, Florida state law protects the least tern, roseate tern, black skimmer, snowy plover, piping plover, American oystercatcher, reddish egret, tricolored heron, little blue heron, and roseate spoonbill (brown pelican is a species of special concern).¹⁰³ Additionally, the federal Endangered Species Act protects the roseate tern, piping plover, red knot, Eastern black rail, and wood stork.¹⁰⁴ With a large number of birds protected by law that roost and nest in Florida, it is critical to minimize the human disturbance at these CWAs. As FWC acknowledges in its frequently asked questions about CWAs, “the species at these sites were not getting the space they needed to recover, replenish, or reproduce” and human disturbances must decrease to allow the populations to repopulate these CWAs.¹⁰⁵

FWC creates a CWA when a location has a “significant number of sensitive species” and there is documentation of human activities interfering with the wildlife’s critical life activities.¹⁰⁶ Also, FWC requires that the landowner supports the designation, and it is accessible for management personnel.¹⁰⁷

FWC manages the CWA locations through posting buffer zones with “signs and/or symbolic fencing to help prevent people, pets, vehicles, and vessels from getting harmfully close to nests, roosts, or foraging areas.”¹⁰⁸ CWA closures may be year-round or seasonal depending on nesting, feeding, or migration.¹⁰⁹ These closures are enforced by FWC law enforcement officers, and a person may receive a formal warning or citation.¹¹⁰ Violating a CWA is a second-degree misdemeanor and includes a maximum sentence of sixty days in jail and a fine of up to \$500.¹¹¹

To help protect these sensitive habitats, FWC also developed monitoring survey protocols to determine breeding effort and productivity, identify different habitat management to ensure the area remains as needed for the inhabitants, look for best management practices for predator control, identify sites with erosion issues, and seek funding to help with unmanaged state lands.¹¹²

¹⁰³ FWC, *Florida’s Endangered and Threatened Species* (2018), <https://myfwc.com/media/1945/threatend-endangered-species.pdf>.

¹⁰⁴ U.S. Fish & Wildlife Serv., *Listed species believed to or known to occur in Florida*, <https://ecos.fws.gov/ecp/report/specieslistingsbystate?stateAbbrev=FL&stateName=Florida&statusCategory=Listed> (last visited March 30, 2022).

¹⁰⁵ FWC, *Frequently Asked Questions about CWAs*, <https://www.fws.gov/southeast/news/2018/10/us-fish-and-wildlife-service-proposes-endangered-species-act-protection-for-little-devil-caribbean-seabird/> (last visited March 30, 2022).

¹⁰⁶ Faulhaber, C., Schwarzer, A., Malachowski, K., Rizkalla, C., Cox, A., 2016, *Effects of human disturbance on shorebirds, seabirds, and wading birds: Implications for Critical Wildlife Areas*, IHR 2016-003, 3; see also FWC, *Critical Wildlife Areas*, <https://myfwc.com/conservation/terrestrial/cwa/> (last visited March 30, 2022); FWC, *Frequently Asked Questions about CWAs*, <https://myfwc.com/conservation/terrestrial/cwa/faqs/> (last visited March 30, 2022).

¹⁰⁷ FWC, *Management of CWAs*, <https://myfwc.com/conservation/terrestrial/cwa/management/> (last visited March 30, 2022).

¹⁰⁸ *Id.*

¹⁰⁹ *Id.*

¹¹⁰ *Id.*

¹¹¹ *Id.*

ii. Impacts of Boats on CWAs, Birds, and Rookeries

CWAs are designed to help species within the area repopulate and thrive by limiting human disturbances with buffer zones.¹¹³ As seen through Tables 2, 3, and 4, Florida's CWAs may be home to state or federally protected species and other seabirds, wading birds, and shorebird species that may flush (flee) with disturbances.

Human disturbance has proven to “reduce fitness in breeding bird colonies through displacement or increased nest predation.”¹¹⁴ The reduction of fitness may be due to direct flushing responses, which increase energetic demands, alter habitat use, or reduce feeding time.¹¹⁵

In a literature review study of 50 peer-reviewed published studies on shorebird species, diving ducks, wading birds, and other waterfowl, 86% of studies documented a change in avian behavior as a result of human disturbances.¹¹⁶ Overall, human disturbance results in the following reactions: “flushing, increased vigilance behavior, calling, and changes in daily activities.”¹¹⁷ As a result, birds change their behaviors of “foraging or resting to flying or diving” the closer the human is approached.¹¹⁸

Additionally, different species reacted to disturbances differently based on distance of disturbance and type of disturbance.¹¹⁹ With regard to distance, species more likely to flush when disturbances are farther away included species found in Florida: great egret, great blue heron, and snowy egret.¹²⁰ While other species may not flush until the disturbance is closer, they may “be trading the risk of starvation against the risk of predation.”¹²¹ This is because birds in better condition can respond to a disturbance but, birds that may be in poor condition may be foraging for resources as much as possible before flushing.¹²²

Types of disturbances most likely to cause the birds to flush include “*motorized boats at high speed*, all-terrain vehicle use, and activities with rapid movement such as running and [walking] unleashed dogs.”¹²³ Even *non-motorized boat traffic* (such as kayakers) caused birds to flush at

¹¹² *Id.*

¹¹³ *Id.*

¹¹⁴ Peters, P & Otis, D., 2006, *Wading Bird Response to Recreational Boat Traffic: Does Flushing Translate into Avoidance?*, Wildlife Society Bulletin, 1383-1391, 1383.

¹¹⁵ *Id.*

¹¹⁶ Borgmann, K.L., 2011, *A Review of Human Disturbance Impacts on Waterbirds*. Audubon California, at 3, 5.

¹¹⁷ *Id.* at 3.

¹¹⁸ *Id.* at 4.

¹¹⁹ *Id.* at 2.

¹²⁰ *Id.* at 3.

¹²¹ *Id.*

¹²² *Id.*

¹²³ *Id.* (emphasis added).

an average of 99 meters away for waterbird species.¹²⁴ Great egrets and snowy egrets were more likely to flush with “slow moving vehicles that made frequent stops” than a vehicle “passing at a constant speed.”¹²⁵

Shorebirds choose foraging or roosting areas with fewer disturbances and may avoid areas prone to more disturbances.¹²⁶ After a disturbance, a common response throughout all the studies was a “reduction in the number of birds present after a disturbance or in heavily disturbed areas.”¹²⁷ Contemporary boats can travel into shallow water that “are favored by foraging and loafing waterbirds” demonstrating why “buffer zones” are a popular strategy to minimize impacts of human disturbances.¹²⁸

There may be a correlation between a bird’s size and its mean flush distance, with larger species exhibiting “greater average flush distances in response to both [personal watercraft] and outboard-power boats.”¹²⁹ There is a large variation in flush distances “within and among species in response to the approach of both outboard-power vehicles and [personal watercraft] vehicles.”¹³⁰

¹²⁴ *Id.*

¹²⁵ *Id.* at 4.

¹²⁶ *Id.*

¹²⁷ *Id.*

¹²⁸ Rodgers, J. & S. Schwikert, 2002, *Buffer-Zone Distances to Protect Foraging Waterbirds from Disturbance by Personal Watercraft and Outboard-Powered Boats*, *Conservation Biology* 16:1, 216-224, 217.

¹²⁹ *Id.* at 216.

¹³⁰ *Id.* at 219.

Table 2. Minimum recommended buffer-zone distances (m) between waterbirds and fast approach of watercraft directly toward waterbirds to prevent flushing.*

| <i>Species</i> | <i>Type of activity</i> | |
|--------------------------|----------------------------|------------------------------|
| | <i>Personal watercraft</i> | <i>Outboard-powered boat</i> |
| Anhinga | 134 | 149 |
| Brown Pelican | 183 | 147 |
| Double-crested Cormorant | 156 | 132 |
| Great Blue Heron | 145 | 133 |
| Great Egret | 130 | 146 |
| Little Blue Heron | 113 | 144 |
| Snowy Egret | 118 | 110 |
| Tricolored Heron | 132 | 141 |
| Reddish Egret | 115 | |
| White Ibis | 146 | 119 |
| Rosate Spoonbill | 98 | |
| Wood Stork | 118 | |
| Caspian Tern | 98 | |
| Royal Tern | 137 | 109 |
| Forster's Tern | 87 | 83 |
| Least Tern | 86 | |
| Ring-billed Gull | 137 | |
| Laughing Gull | 107 | 92 |
| Black-bellied Plover | 88 | 84 |
| American Oystercatcher | 103 | 96 |
| Willet | 91 | 94 |
| Short-billed Dowitcher | 82 | |
| Osprey | 142 | 149 |

*Minimum recommended set-back (RS) distances calculated by the formula $RS = \exp(\hat{\mu} + 1.6495 \hat{\sigma}) + 40$ m.

Figure 12 from Rogers and Schwikert (2002) shows the study's suggested distance to minimize flush.¹³¹

To address these impacts, the designation of buffer zones and/or prevention of certain human activities around bird habitats are regularly used as mitigation or conservation tools.¹³² Additionally, for non-breeding wading birds, studies suggest buffer zones also aid as a tool to prevent or lessen flushing in response to human disturbance.¹³³

Rodgers and Schwikert (2002) found that in no-wake zones, buffer distances may be shortened if there is limited intrusion, human activity, or physical barrier that minimize noise levels and the bird's ability to see human activities.¹³⁴ However, "an ideal buffer zone prevents human activity from crossing a predetermined disturbance threshold."¹³⁵

iii. Need for More Information About CWAs and Rookeries in Boating Safety Courses

FWC acknowledges on its website that "the general public, especially beach-goers and recreationist, are unaware of nesting and foraging species within CWAs, and that certain

¹³¹ *Id.* at 222.

¹³² *Id.*

¹³³ *Id.*

¹³⁴ *Id.*

¹³⁵ *Id.*

activities may disturb them.”¹³⁶ With the public mostly unaware of CWAs, it is likely the average boater is also unaware of CWAs and may not respect the buffer zones. FWC should require the boating test to include CWA questions to raise awareness of CWAs, provide boaters with information on CWA importance, and ensure boaters proceed with caution to prevent birds from flushing and leaving the CWA.

C. Marine Mammal and Sea Turtle Protection

Florida’s current boating safety course regulations are also completely silent about marine mammal and sea turtle protections. Florida is home to a variety of protected marine mammals and sea turtles that are threatened by increasing human disturbances. In addition to boater mortality, marine mammals are acutely impacted by vessel noise and fishing practices. The boating safety course should include information about Florida’s marine mammal and sea turtle protections and boater conduct that is prohibited to prevent further harm to our dolphins, whales, manatees, and sea turtles.

i. Marine Mammal Background and Protection Levels

A marine mammal includes any mammal that is adapted to the marine environment or that has primary habitat within a marine environment.¹³⁷ This definition includes fully aquatic mammals (like dolphins) and animals that primarily rely on the sea as their food source (like seals). Marine mammals are important to our marine ecosystems because they “feed at a variety of trophic levels” and affect the structure and function of ecosystems through their ability to remove prey, therefore impacting prey population sizes and the balance of ecosystems.¹³⁸

Table 5. Marine Mammals found in or near Florida Waters¹³⁹

| <i>Major Threats Key:</i> | | |
|-----------------------------|---------------------|---|
| E = Entanglement | MD = Marine Debris | HDD = Habitat Destruction and Degradation |
| ON = Ocean Noise | VS = Vessel Strike | IF/H= Illegal Feeding/ Harassment |
| W = Whaling, outside the US | CC = Climate Change | EC = Environmental Contaminants |
| FI = Fishery Interactions | | |

| | Scientific Name | Common Name | CITES Appx | Protected under ESA | MMPA Depleted ¹⁴⁰ | Major Threats |
|--|-----------------|-------------|------------|---------------------|------------------------------|---------------|
|--|-----------------|-------------|------------|---------------------|------------------------------|---------------|

¹³⁶ See FWC, *Frequently Asked Questions about CWAs*, <https://myfwc.com/conservation/terrestrial/cwa/faqs/> (last visited July 28, 2022).

¹³⁷ 16 U.S.C. § 1362.

¹³⁸ Kiszka, J., Heithaus, M., Wirsing, A., 2015, *Behavioral drivers of the ecological roles and importance of marine mammals*, Marine Ecology Progress Series 523: 267–281, 267.

¹³⁹ Table 5 includes information from several sources cited in this footnote. Nat’l Oceanic and Atmospheric Admin., *Species Directory – Marine Mammals*, https://www.fisheries.noaa.gov/species-directory/marine-mammals?title=&species_category=any&species_status=any®ions=1000001121&items_per_page=25&page=1&sort= (last visited July 12, 2022); CITES, Appendices I, II, and III Interpretation, <https://cites.org/sites/default/files/eng/app/2021/E-Appendices-2021-02-14.pdf>; see also Whale and Dolphin Conservation USA, <https://us.whales.org/> (last visited July 12, 2022) (range confirmations); Lowry, L., Laist, D., Taylor, E., 2007, *Endangered, Threatened, and Depleted Marine Mammals in U.S. Waters*, Marine Mammal Commission, <https://www.mmc.gov/wp-content/uploads/etdmarinemammals.pdf>.

¹⁴⁰ The MMPA describes “depleted” as when the species and/or population stock is either below the optimum sustainable population or listed under Endangered Species Act as endangered or threatened. 16 U.S.C. § 1362.

| Dolphins/ Porpoises | | | | | | |
|--------------------------------|--|-----------------------------|----|----------------------------------|-----------------------|--|
| | <i>Stenella frontalis</i> | Atlantic spotted dolphin | II | | | E, ON, IF/H |
| | <i>Stenella clymene</i> | Clymene dolphin | II | | | E, ON, W in Caribbean |
| | <i>Tursiops truncatus</i> | Common bottlenose dolphin | II | | Yes | E, IF/H, Biotoxins, HDD, |
| | <i>Lagenodelphis hosei</i> | Fraser's dolphin | II | | | E, W in Asia |
| | <i>Stenella attenuata</i> | Pantropical spotted dolphin | II | | Pacific NE | E, IF/H, W in Asia/Pacific |
| | <i>Grampus griseus</i> | Risso's dolphin | II | | | E, W in Asia, ON, EC |
| | <i>Steno bredanensis</i> | Rough-toothed dolphin | II | | | E, ON, W throughout |
| | <i>Delphinus delphis</i> | Short-beaked common dolphin | II | | | E, W in Asia and Mediterranean |
| | <i>Stenella longirostris</i> | Spinner dolphin | II | | Eastern Stock | MD, ON, Disease, Tourist interactions/viewing |
| | <i>Stenella coeruleoalba</i> | Striped dolphin | II | | | E, Disease, W in Asia and Caribbean |
| Whales | | | | | | |
| | <i>Mesoplodon densirostris</i> | Blainville's beaked whale | II | | | E, MD, ON |
| | <i>Balaenoptera musculus</i> | Blue whale | II | Endangered | Yes | VS, E |
| | <i>Balaenoptera edeni</i> | Bryde's whale | II | | | VS, ON, W |
| | <i>Ziphius cavirostris</i> | Cuvier's beaked whale | II | | | E, ON, W in Japan |
| | <i>Kogia sima</i> | Dwarf sperm whale | II | | | E, VS, MD, ON |
| | <i>Pseudorca crassidens</i> | False killer whale | II | Only HI Islands Endangered | Only HI Islands | FI, EC, Small Population Size, W in Asia, Fisheries Competition |
| | <i>Balaenoptera physalus</i> | Fin whale | I | Endangered | Yes | VS, E, ON |
| | <i>Mesoplodon europaeus</i> | Gervais' beaked whale | II | | | E, ON, W in Caribbean |
| | <i>Balaenoptera edeni (GoM subspecies)</i> | | II | Endangered | | VS, ON, Oil Spills & Responses, Energy Exploration & Development |
| | <i>Megaptera novaeangliae</i> | Humpback whale | I | Only in West North Pacific in US | Only West Coast in US | VS, E, Vessel – based Harassment (whale watching) |
| | <i>Orcinus orca</i> | Killer whale | II | Only So. Res. DPS | Only AT1 in Pacific | EC, Oil Spill, ON, Lack of Food |

Either the Secretary (through consultation with the Marine Mammal Commission) or the State determines whether the species is below the optimum sustainable population. 16 U.S.C. §§1361–1383(b), 1401–1406, 1411–1421(h).

| | | | | | | |
|-----------------------------|--------------------------------------|----------------------------|----|------------|-----|--|
| | <i>Peponocephala electra</i> | Melon-headed whale | II | | | FI, ON, EC |
| | <i>Balaenoptera acutorostrata</i> | Minke whale | I | | | W in Europe & Asia, E, ON, VS |
| | <i>Eubalaena glacialis</i> | North Atlantic right whale | I | Endangered | Yes | CC, VS, E, ON |
| | <i>Feresa attenuata</i> | Pygmy killer whale | II | | | E, ON |
| | <i>Kogia breviceps</i> | Pygmy sperm whale | II | | | E, W in Asia, VS, MD, ON |
| | <i>Balaenoptera borealis</i> | Sei whales | I | Endangered | Yes | VS, E, ON |
| | <i>Globicephala macrorhynchus</i> | Short-finned pilot whale | II | | | E, H, VS |
| | <i>Physeter macrocephalus</i> | Sperm whale | I | Endangered | Yes | VS, E, ON, MD, CC, Oil spills/contaminants |
| | <i>Mesoplodon mirus</i> | True's beaked whale | II | | | ON |
| Not Whale or Dolphin | | | | | | |
| | <i>Trichebus manatus latirostris</i> | Florida manatee | I | Threatened | Yes | Discussed in previous section |

Florida's waters are home to 10 species of dolphin, 20 species of whale, and the Florida manatee.¹⁴¹ These marine mammals are threatened by ocean noise, fishery interactions, competition with fisheries for the same marine food (such as tuna), marine debris, vessel strikes (not limited to ships), illegal feeding and harassment, biotoxins (such as algal blooms), disease, tourist interactions (dolphin and whale watching), small population size, climate change, and lack of food.¹⁴²

Under Florida Statutes sections 379.2401 through 379.26, marine life including manatees and dolphins are protected from take.¹⁴³ As discussed within section II(a) above, manatees are protected by state law under the Florida Manatee Sanctuary Act.¹⁴⁴ Additionally, Florida's marine animal laws protect dolphins by making it "unlawful to catch, attempt to catch, molest, injure, kill, or annoy, or otherwise interfere with the normal activity and well-being of, mammalian dolphins, except as may be authorized by a federal permit."¹⁴⁵ Whales are not explicitly mentioned within Florida's statutory marine life protection statutes.

¹⁴¹ Nat'l Oceanic and Atmospheric Admin., *Species directory – marine mammals*, https://www.fisheries.noaa.gov/species-directory/marine-mammals?species_category=any&species_status=any®ions=1000001121&items_per_page=25&sort= (last visited March 28, 2022); see Figure 5.

¹⁴² *Id.*

¹⁴³ Fla. Stat. § 379.2431(2), (3). Take is defined as "taking, attempting to take, pursuing, hunting, molesting, capturing, or killing any wildlife or freshwater or saltwater fish, or their nests or eggs, by any means, whether or not such actions result in obtaining possession of such wildlife or freshwater or saltwater fish or their nests or eggs." Fla. Stat. § 379.101(38).

¹⁴⁴ Fla. Stat. § 379.2401(2).

¹⁴⁵ Fla. Stat. § 379.2431(3).

The MMPA also protects marine mammals from take,¹⁴⁶ import, and export within and around the United States' jurisdiction by creating a national policy to prevent diminishing populations and species.¹⁴⁷ Congress enacted the MMPA in response to general public and scientific concern because many marine mammal “species and populations . . . [were] in danger of extinction or depletion as a result of human activities.”¹⁴⁸ The MMPA mandates that marine mammals “should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem,” and not permitted to fall below their “optimum sustainable population.”¹⁴⁹ To ensure recovery, the MMPA states efforts “should be made to protect essential *habitats*, including the rookeries, mating grounds, and areas of significance for each species of marine mammal.”¹⁵⁰

The MMPA prohibits the take of marine mammals found within United States jurisdictional waters or high seas.¹⁵¹ The taking of a species listed under the MMPA can lead to civil penalties, including a fine of not more than \$10,000.¹⁵² However, if a person *knowingly* violates the MMPA (not an accident, but rather intentional taking), the individual may be imprisoned for no more than a year and/or fined not more than \$20,000.¹⁵³

Additionally, the Endangered Species Act protects seven marine mammal species throughout their range and three species in specific areas: Florida manatee, Sperm whales, Sei whales, North Atlantic right whale, Gulf of Mexico Bryde's whale, Fin whale, and Blue whale.

At the international level, the Convention on International Trades of Endangered Species (CITES) protects all marine mammals found within Florida either through Appendix I or II.¹⁵⁴ CITES was created to protect at risk animals and plants from international trade by requiring a license to allow their import, export, re-import, or introduction from the sea.¹⁵⁵ CITES protects the listed marine animals found within the high-seas, an area not under the jurisdiction of a country, when the marine mammal is captured and taken back to the country.¹⁵⁶ Endangered Species Act section 8 was created to help enforce international environmental treaties like CITES within the United States.¹⁵⁷

CITES has three levels of Appendices (I, II, III), to indicate level of protection required from most to least.¹⁵⁸ Appendix I species are actively threatened with extinction and trade is only

¹⁴⁶ The MMPA defines take as “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.” 16 U.S. Code § 1362(1)(13).

¹⁴⁷ 16 U.S.C. § 1372.

¹⁴⁸ See for more information: Marine Mammal Commission, *Marine Mammal Protection Act*,

<https://www.mmc.gov/about-the-commission/our-mission/marine-mammal-protection-act/> (last visited March 28, 2022).

¹⁴⁹ 16 U.S.C. § 1361(2).

¹⁵⁰ *Id.*

¹⁵¹ 16 U.S.C § 1372.

¹⁵² *Id.*

¹⁵³ *Id.*

¹⁵⁴ See CITES, *Appendices*, <https://cites.org/eng/app/appendices.php> (last visited March 28, 2022).

¹⁵⁵ See CITES, *What is CITES*, <https://cites.org/eng/disc/what.php> (last visited March 28, 2022).

¹⁵⁶ See CITES, *Introduction from the Sea*, <https://cites.org/eng/prog/ifs.php> (last visited March 28, 2022).

¹⁵⁷ 16 U.S.C. § 1537.

¹⁵⁸ See CITES, *Introduction from the Sea*, <https://cites.org/eng/prog/ifs.php> (last visited March 28, 2022).

allowed in “exceptional circumstances.”¹⁵⁹ Appendix II species are not actively threatened with extinction; however, international trade regulations are required to ensure their survival.¹⁶⁰

At the federal level, the management of marine mammals is divided between the U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration’s National Marine Fisheries Service, and the Marine Mammal Commission.¹⁶¹ Congress created the Marine Mammal Commission under MMPA section 1401 “to provide independent oversight of the marine mammal conservation policies and programs being carried out by federal regulatory agencies.”¹⁶²

ii. Impacts of Boats on Marine Mammals

The leading threats for dolphins are entanglement with fishing gear, ocean noise, and interactions with illegal feeding and harassment.¹⁶³ The leading threats for whale species are entanglement with fishing gear, ocean noise, and vessel strikes.¹⁶⁴ Relevant to the boating safety course are the impacts of individual watercraft on marine mammals through potential interactions with illegal feeding and harassment, entanglement with fishing gear (commercial and non-commercial), and ocean noise.

Three dolphin species within Florida’s range, common bottlenose, Atlantic spotted, and pantropical spotted, are threatened by illegal feeding and harassment.¹⁶⁵ Illegal feeding is harmful because it reduces the dolphins’ aversive nature towards people and vessels, and they grow to expect an “easy meal” from humans via handouts or by taking bait or catch directly from anglers’ lines.¹⁶⁶ This reduced aversion makes dolphins more vulnerable to “vessel strikes and fishing gear entanglements and ingestion (including small private watercraft—not just commercial).”¹⁶⁷ Dolphins can also be harassed by people shooting them.¹⁶⁸ Additionally, recreational vessels have been known to pursue and/or torment dolphins.¹⁶⁹ Dolphins may become injured or die; or in the long-term, they may show reduced reproduction, compromised health, and avoid specific habitats due to human disturbance.¹⁷⁰

¹⁵⁹ See CITES, *Appendices*, <https://cites.org/eng/app/appendices.php> (last visited March 28, 2022).

¹⁶⁰ See CITES, *How CITES works*, <https://cites.org/eng/disc/how.php> (last visited March 28, 2022).

¹⁶¹ U.S. Fish & Wildlife Serv., *Marine Mammals – Overview*, <https://www.fws.gov/ecological-services/species/marine-mammals.html> (last visited March 28, 2022).

¹⁶² See Marine Mammal Commission, *Marine Mammal Protection Act*, <https://www.mmc.gov/about-the-commission/our-mission/marine-mammal-protection-act/> (last visited March 28, 2022).

¹⁶³ Nat’l Oceanic and Atmospheric Admin., *Species Directory – Marine Mammals*, https://www.fisheries.noaa.gov/species-directory/marine-mammals?title=&species_category=any&species_status=any®ions=1000001121&items_per_page=25&page=1&sort= (last visited March 28, 2022).

¹⁶⁴ *Id.*

¹⁶⁵ *Id.*

¹⁶⁶ Nat’l Oceanic and Atmospheric Admin., *Common Bottlenose Dolphin*, <https://www.fisheries.noaa.gov/species/common-bottlenose-dolphin> (last visited March 28, 2022).

¹⁶⁷ *Id.*

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

¹⁷⁰ *Id.*

The panhandle region has been described as a “hotbed” area due to the large amount of dolphin harassment.¹⁷¹ Throughout the Gulf of Mexico, there is evidence of guns, pipe bombs, and other weapons being used on dolphins.¹⁷² There appears to be a relationship between recreational and commercial fishermen harming dolphins because dolphins take the fishermen’s catch.¹⁷³

Ocean noise is another top threat for dolphins (five species) and whales (14 species) and is considered “an environmental pollutant of global concern.”¹⁷⁴ Ocean noise is a significant threat because cetaceans rely on sound to navigate, communicate with each other (including offspring and parent interactions), and find predators and prey.¹⁷⁵ Noise pollution impacts marine mammals’ “behavioral and acoustic responses, auditory masking, and stress.”¹⁷⁶

Anthropogenic factors (noise pollution, shipping, vessel traffic, military testing) “may affect the behavior, habitat and activity budgets of marine mammals.”¹⁷⁷ Vessel traffic can increase marine mammals’ dive duration and swimming speed, and reduce resting time.¹⁷⁸ Marine mammals’ behavioral response to human disturbances is akin to their responses to their natural predators.¹⁷⁹ These behavioral changes may have consequences for marine mammal population size due to reduced “access to resources and diminished body condition.”¹⁸⁰

Recreational boat traffic adds to noise pollution with source levels measuring 130–160 decibels.¹⁸¹ In shallow water (such as coastal areas), watercraft noise “interacts with the water surface and seafloor, where it is reflected, scattered, and partly absorbed.”¹⁸² Watercraft noise has been described as “the primary source of chronic noise exposures on marine mammals.”¹⁸³ Overall, there is limited research on the relationship between watercraft (recreational boat) noise and whales.¹⁸⁴ However, a study found when small vessels approached bowhead whales (a species not found in Florida waters) at high speed, the whales moved away from the vessel “thereby interrupting foraging, socializing, and playing behavior.”¹⁸⁵ Additionally, studies found individual whales did respond to recreational vessels at their highest levels of 127 decibels.¹⁸⁶

¹⁷¹ Vail, C., 2016, *An Overview of Increasing Incidents of Bottlenose Dolphin Harassment in the Gulf of Mexico and Possible Solutions*, 3:110, 1.

¹⁷² *Id.* at 2–3.

¹⁷³ *Id.* at 2, 4.

¹⁷⁴ Kragh, I., McHugh, K., Wells, R., Sayigh, L., Janik, V., Tyack, P., Jensen, F., 2019, *Signal-specific amplitude adjustment to noise in common bottlenose dolphins (Tursiops Truncatus)*, *Journal of Experimental Biology*, doi:10.1242, 1.

¹⁷⁵ *Id.* at 1.

¹⁷⁶ Erbe, C., Marley, S., Schoeman, R., Smith, J., Trigg, L., Embling, C., 2019, *The Effects of Ship Noise on Marine Mammals – A Review*, *Frontiers in Marine Science*, 6:606, 1.

¹⁷⁷ Kiszka, J., Heithaus, M., Wirsing, A., 2015, *Behavioural drivers of the ecological roles and importance of marine mammals*, *Marine Ecology Progress Series* 523: 267–281, 276.

¹⁷⁸ *Id.* at 276.

¹⁷⁹ *Id.*

¹⁸⁰ *Id.*

¹⁸¹ Erbe, C., Marley, S., Schoeman, R., Smith, J., Trigg, L., Embling, C., 2019, *The Effects of Ship Noise on Marine Mammals – A Review*, *Frontiers in Marine Science*, 6:606, 2.

¹⁸² *Id.* at 3.

¹⁸³ *Id.*

¹⁸⁴ *Id.* at 6.

¹⁸⁵ *Id.*

¹⁸⁶ *Id.*

On the other hand, there is more documentation of dolphins changing behavior away from socializing and resting to more time traveling because of watercraft interference.¹⁸⁷ Researchers found a reduction in the bottlenose dolphin communication range of up to 26% when a small boat travels “at five knots in shallow water” within 50 meters of the dolphin.¹⁸⁸

Dolphins can also “partially compensate for increased noise by adjusting signal amplitude, with higher output level and lower compensation for signature whistles that are associated with group cohesion than for non-signature whistles of unknown function.”¹⁸⁹ In the Sarasota area, dolphins are “exposed to a vessel passing within 100 m every six min on average” during daylight hours.¹⁹⁰

iii. Sea Turtle Protections and Impacts

Florida’s waters and nesting beaches are also home to five species of marine turtles: Loggerhead, Green, Leatherback, Kemp’s Ridley, and Hawksbill.¹⁹¹ Marine turtles are protected under the Endangered Species Act, CITES, and Florida’s Marine Turtle Protection Act.¹⁹² Florida statutes restrict the take, possession, disturbance, mutilation, destruction, selling, transference, molestation, and harassment of marine turtles, nests or eggs.¹⁹³

Boater strikes account for a significant number of sea turtle deaths each year. According to the Sea Turtle Stranding Network in Florida, boat strikes have tripled in the past 40 years.¹⁹⁴ From 2000 to 2014, an estimated yearly average of 142–229 loggerheads, 101–162 green turtles, 16–32 Kemp’s ridleys, 4–6 leatherbacks, and 2–4 Hawksbills were recorded with vessel strike impacts.¹⁹⁵ The overall mortality rate is estimated to be 5–10 times greater than numbers represented by recorded vessel strike impacts.¹⁹⁶

Sea turtles have poor hearing and vision, and often do not notice an approaching boat in time to move to safety.¹⁹⁷ Turtles can be hit when they come to the surface to breathe or when feeding or mating in shallow areas. With more boaters utilizing Florida’s waterways, the number of sea turtle strikes are steadily increasing.

¹⁸⁷ *Id.* at 7.

¹⁸⁸ May-Collado, L., 2014, *Dolphin changes in whistle structure with watercraft activity depends on behavioral state*, The Journal of the Acoustical Society of America, 135(4), 4.

¹⁸⁹ Kragh, I., McHugh, K., Wells, R., Sayigh, L., Janik, V., Tyack, P., Jensen, F., 2019, *Signal-specific amplitude adjustment to noise in common bottlenose dolphins (Tursiops Truncatus)*, Journal of Experimental Biology, doi:10.1242, 2.

¹⁹⁰ *Id.*

¹⁹¹ FWC, *Marine Turtle Protection*, <https://myfwc.com/wildlifehabitats/wildlife/sea-turtle/protection/> (last visited July 14, 2022).

¹⁹² Fla Sta. § 379.2431.

¹⁹³ *Id.* § 379.2431(2)(d).

¹⁹⁴ Krall, K., *How Boat Strikes Are One of a Sea Turtle’s Deadliest Foes*, AwesomeOcean.com, <http://awesomeocean.com/guest-columns/boat-strikes-sea-turtles/>.

¹⁹⁵ Foley, A.M., Stacy, B.A., Hardy, R.F., Shea, C.P., Minch, K.E. and Schroeder, B.A., 2019, *Characterizing watercraft-related mortality of sea turtles in Florida*. Jour. Wild. Mgmt., 83: 1057–1072, 1057.

¹⁹⁶ *Id.* at 1.

¹⁹⁷ *Id.*

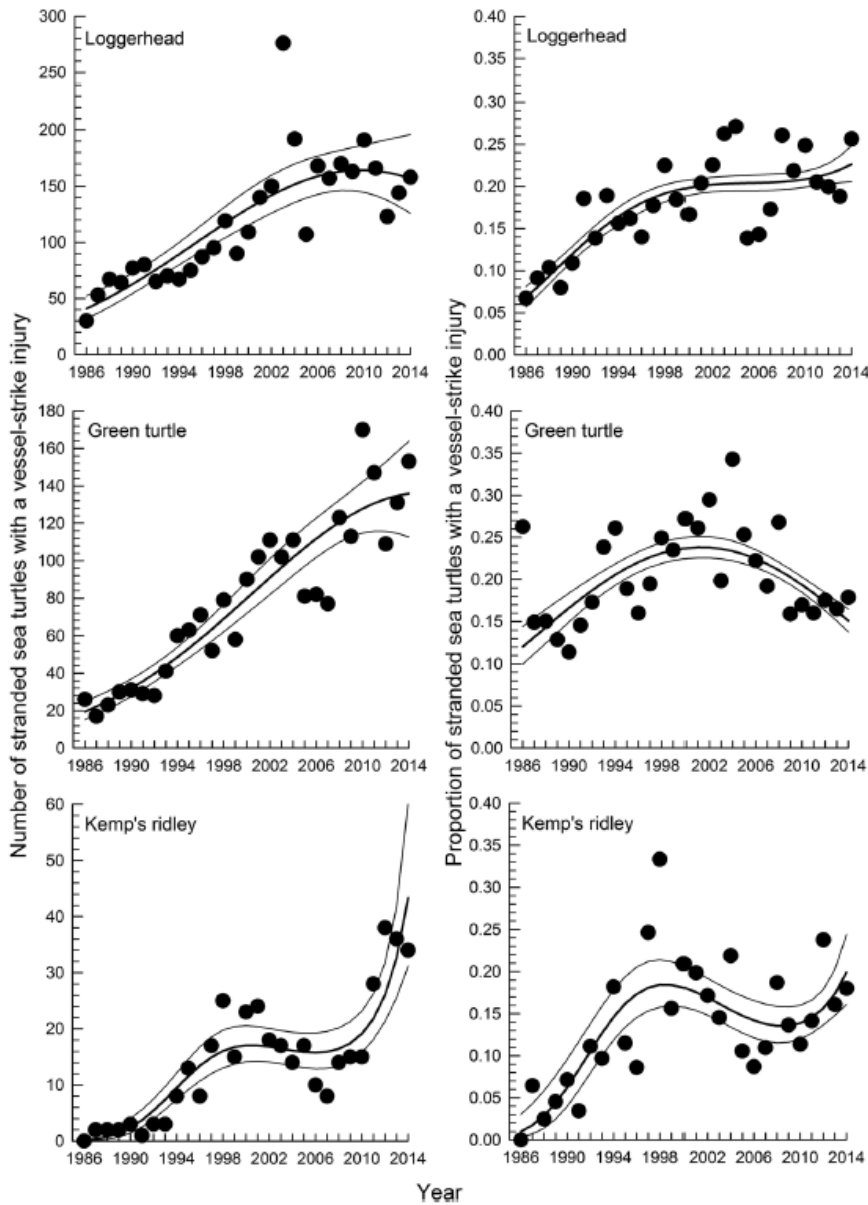


Figure 13 shows the increase in loggerhead, green, and Kemp's ridley vessel injuries from 1986 to 2014.¹⁹⁸

Foley et al. (2019) maintains “reducing water-craft related mortality of sea turtles in Florida could begin through voluntary actions promoted by educational campaigns.”¹⁹⁹ Florida’s boating safety course should be a primary driver of this education.

¹⁹⁸ Foley, A.M., Stacy, B.A., Hardy, R.F., Shea, C.P., Minch, K.E. and Schroeder, B.A., 2019, Characterizing watercraft-related mortality of sea turtles in Florida. *Jour. Wild. Mgmt.*, 83: 1057-1072.

¹⁹⁹ *Id.* at 1072.

iv. Need for Information About Marine Mammals and Sea Turtle Protections in Boating Safety Courses

Florida’s current boating safety course regulations do not contain any information to help boaters better understand their impacts to marine mammals and sea turtles. Given the increasing frequency of vessel strike impacts and mortality, the boating safety course should be amended to include information about Florida’s marine mammals and sea turtles. Course materials and exam questions on marine mammals and sea turtles will help boaters be more mindful of their interactions with marine species and the ramifications of their actions.

The course should include information on boating-related activities that threaten marine mammals, such as ocean noise, illegal feeding and harassment practices, and entanglement with fishing gear to help with adherence to state, federal, and international laws. The course should also include information detailing the height of loggerhead and green turtle mating season (March-July) and educate boaters about the presence of copulating pairs at or near the surface during this time.²⁰⁰ The course should also emphasize the danger to sea turtles posed by motorized watercraft traveling near the major inlets of southeast Florida and encourage boaters to avoid traveling at high speeds <1 km from the shore.²⁰¹

IV. PROPOSED RULE AMENDMENT

Florida’s current boating safety course regulations require information on “Florida manatee awareness,” but not specifically on slow zones. The regulations do not require any information on critical wildlife areas, marine mammals, or sea turtles. To protect these species and habitats, Petitioners request that FWC amend its regulations at Chapter 68D-36 to require that the boating safety course specifically include information and exam questions on Florida manatee slow zones, critical wildlife areas, marine mammals, and sea turtles.

While Petitioners request that FWC amend its regulations to require questions on manatee slow zones, critical wildlife areas, and marine mammals, in the interest of specificity and completeness, Petitioners further provide specific proposed amendments to Chapter 68D-36 of the Florida Administrative Code,²⁰² rules regulating the Minimum Standard for Mandatory Boating Safety Courses. Petitioners also request the opportunity to participate as a stakeholder in any rulemaking process.

In the following proposal, regular typeface denotes the current regulatory language, boldface denotes language to be added, and strike-through language indicates language to be removed.

²⁰⁰ *Id.*

²⁰¹ *Id.*

²⁰² See the rule at <https://www.flrules.org/gateway/RuleNo.asp?id=68D-36.104> (last visited July 28, 2022).

68D-36.104 Minimum Standards for Boating Safety Courses.

(1) Each boating safety course taught pursuant to Section 327.395 or 327.731, F.S., must maintain current approval from the National Association of State Boating Law Administrators and the Florida Fish and Wildlife Conservation Commission.

(a) The National Boating Education Standards established by the National Association of State Boating Law Administrators are hereby adopted by reference.

(b) To ensure continued conformance to the National Boating Education Standards, the Executive Director of the Florida Fish and Wildlife Conservation Commission may approve reenactment of this rule as necessary to incorporate by reference amendments to the National Boating Education Standards.

(2) In addition to minimum course content adopted by the National Association of State Boating Law Administrators, boating courses approved for use in the State of Florida shall contain state-specific information covering the following topics.

(a) Personal Watercraft Requirements.

1. Mandatory wear of personal flotation devices.
2. Age restrictions to operate or rent.
3. Hours of operation restrictions.
4. Wake-jumping concerns and reckless operation.
5. Causes and prevention of personal watercraft accidents.

(b) Boating Safety Identification Cards.

1. Age and engine horsepower requirements.
2. Photographic identification required.

(c) Vessel Safety Regulations.

1. Personal flotation devices for children requirements.
2. Florida's adoption of all federal equipment requirements.

(d) State Divers-Down Flag Requirements.

(e) Water Ski, Parasail, and Aquaplane Regulations.

1. Participants must wear a personal flotation device.
2. Towing vessels must have either an observer or wide-angle rearview mirror.
3. Hours restrictions.

(f) Boating Restricted Areas. Regulatory markers including Idle Speed, Slow Speed, and mile per hour restrictions and **environmental reasons and concerns behind markers.**

(g) Boating Accidents.

1. Requirements for reporting accidents.
2. Remaining on scene/rendering assistance.

(h) Manatee Awareness.

1. Manatee Slow Zones

(i) Ecosystem Awareness.

(j) Critical Wildlife Area Awareness

(k) Marine Mammal Awareness

1. Dolphin and Whale

(l) Sea Turtle Awareness

(3) For each course approved for use in Florida, the training facility must use the following:

- (a) A boating safety workbook or text, or the electronic equivalent.
- (b) A final exam of not less than 50 questions, including a minimum of 10 Florida-specific questions, with a minimum passing score of 75 percent.
- (c) A syllabus or course outline.
- (d) A list of course objectives.

68D-36.107 Minimum Training Requirements for Personal Watercraft Rentals.

(1) Any livery offering personal watercraft for lease, hire, or rent must ensure that all individuals intending to operate the personal watercraft have been properly trained in the following topics prior to operation:

- (a) Operator responsibility (ethics), courtesy and good judgment on the water.
 1. Avoiding careless, reckless, and negligent operation of vessels.
 2. The effects of alcohol, controlled substances, and stressors.
- (b) Navigation Rules.
 1. Maintaining proper lookout.
 2. Safe distance and speed.

- 3. Operating defensively.
- 4. Requirements to give way to other vessels.
- (c) Aids to navigation; buoys and other waterway markers.
- (d) Awareness of changes in weather or water conditions and proper responses to those changes.
- (e) Waterskiing and similar activities, if applicable to the personal watercraft rented.
 - 1. Must wear personal flotation devices.
 - 2. Must have observer or wide-angle rearview mirror.
 - 3. May not ski between 30 minutes past sunset and 30 minutes before sunrise.
- (f) Boating accidents.
 - 1. Causes and prevention of personal watercraft accidents.
 - 2. Legal requirements – remaining on scene; rendering assistance; reporting accidents.
- (g) Propulsion, steering, and stopping characteristics of jet-pump vessels.
- (h) Location and content of manufacturer’s warning labels.
- (i) Boarding, falling off, capsizing, and reboarding.
- (j) Problems seeing other vessels and being seen by them.
- (k) The dangers of wake or surf jumping and other reckless operations.
- (l) Noise, nuisances, and other environmental concerns.
- (m) Specific personal watercraft safety requirements (wearing personal flotation devices, using kill switch lanyard, location of whistle and fire extinguisher, age requirements for personal watercraft operation, and lawful hours of operation).
- (n) Boating safety identification cards; age and engine requirements.
- (o) Photographic identification.
- (p) Florida divers-down flag requirements.
- (q) Manatee awareness (~~if locally applicable~~).

1. Manatee Slow Zones

- (r) Ecosystem awareness based on local issues.
- (s) Critical Wildlife Area Awareness**
- (t) Marine Mammal Awareness**

1. Dolphin and Whale

(u) Sea Turtle Awareness

(2) In addition to the topics listed in subsection (1), any livery offering personal watercraft for lease, hire, or rent for off-site use or for daily or longer time periods must ensure that all individuals intending to operate the personal watercraft have been properly trained in the following topics:

(a) Fueling and ventilation.

(b) Trailering and transporting.

(c) Float plans; how and when to complete a float plan.

(d) Specific local hazards; such as large bodies of water, weather, dams, cold water, commercial vessel traffic, etc.

(3) Persons offering a personal watercraft for lease, hire, or rent shall conduct an on-the-water demonstration and check ride to verify the prospective operator's ability to safely operate the personal watercraft to be leased, hired, or rented.

V. CONCLUSION

Watercraft can harm manatees, critical wildlife areas, marine mammals, and sea turtles. A greater awareness and understanding of manatee slow zones through required boater education courses and exams may prevent harm to manatees. Boater education regarding buffer zones might mitigate seabird, wading bird, and shorebird flushing due to watercraft disturbance in these critical areas. Boater understanding of marine mammal and sea turtle disturbance from anthropogenic factors might reduce impacts on our marine environment.

Florida is well known for scenic beaches, accessible waterways, and unique biodiversity. The conservation of our marine biodiversity depends on boaters being educated about how watercraft can disturb our marine species. Petitioners therefore request that FWC adopt the proposed rule amendment and require information and exam questions on manatee slow zones, critical wildlife areas, marine mammals, and sea turtles on its boater education course.

Please contact Ragan Whitlock at rwhitlock@biologicaldiversity.org or (727) 426-3653 with any questions.

VI. LITERATURE CITED

- Ball, R.L. Malmi, M., Zgibor, J., 2020, *Trends of the Florida manatee (Trichechus manatus latirostris) rehabilitation admissions*, PLoS ONE 15:7.
- Bassett, B.L., Hostetler, J., Leone, E., Shae, C.P., 2020, *Quantifying sublethal Florida manatee-watercraft interactions by examining scars on manatee carcasses*, *Endang. Species Res.*, Vol. 43: 395–408.
- Borgmann, K.L., 2011, *A Review of Human Disturbance Impacts on Waterbirds*. Audubon California.
- Calleson, CS., Frohlich, RK., 2007, *Slower boat speeds reduce risks to manatees*. *Endangered Species Research*. Vol. 3, pp. 295-304. <https://myfwc.com/wildlifehabitats/wildlife/manatee/protection-zones/>.
- Cook, M., Baranski, M., 2020, *South Florida Wading Bird Report*, https://www.sfwmd.gov/sites/default/files/documents/SFWBR_2019.pdf?utm_medium=email&utm_source=govdelivery.
- Curt Bradley, 2021, Center for Biological Diversity. Figure based on FWC Manatee Mortality Data.
- Erbe, C., Marley, S., Schoeman, R., Smith, J., Trigg, L., Embling, C., 2019, *The Effects of Ship Noise on Marine Mammals – A Review*, *Frontiers in Marine Science*, 6:606.
- Faulhaber, C., Schwarzer, A., Malachowski, K., Rizkalla, C., Cox, A., 2016, *Effects of human disturbance on shorebirds, seabirds, and wading birds: Implications for Critical Wildlife Areas*, IHR 2016-003.
- Finklt, Charles W., Charlier, Roger H., 2003, *Sustainability of Subtropical Coastal Zones in Southeastern Florida: Challenges for Urbanized Coastal Environments Threatened by Development, Pollution, Water Supply, and Storm Hazards*, *Journal of Coastal Research* 19:4, 934-943.
- Foley, A.M., Stacy, B.A., Hardy, R.F., Shea, C.P., Minch, K.E, Schroeder, B.A., 2019, *Characterizing watercraft-related mortality of sea turtles in Florida*. *Jour. Wild. Mgmt.*, 83: 1057–1072.
- FWC, *2021 Boating Accident Statistical Report*, <https://myfwc.com/media/29115/2021-basr-booklet.pdf>
- FWC, *2021 Top Ten For Boating Accidents*, <https://myfwc.com/media/29125/2021-basr-top10.pdf>.
- FWC, *All boat operators must comply with posted signs (2012)*, <https://myfwc.com/media/7324/multi-lingual-waterway-information.pdf>

FWC, *Boater Education Identification Card*, <https://myfwc.com/boating/safety-education/id/>.

FWC, *Boating Safety Course*, <https://myfwc.com/boating/safety-education/courses/>.

FWC, *Critical Wildlife Areas*, <https://myfwc.com/conservation/terrestrial/cwa/>.

FWC, *Data and Maps*, <https://myfwc.com/wildlifehabitats/wildlife/manatee/data-and-maps/>

FWC, *Explore CWAs by name*, <https://myfwc.com/conservation/terrestrial/cwa/explore-cwas/>

FWC, *Flagler County Protection Zones (2005)*, <https://flaglerlive.com/wp-content/uploads/FlaglerMap.pdf>

FWC, *Florida's Endangered and Threatened Species (2018)*, <https://myfwc.com/media/1945/threatend-endangered-species.pdf>.

FWC, *Florida Manatee Management Plan (Dec. 2007)*, <https://myfwc.com/media/2038/manatee-mgmt-plan.pdf>.

FWC, *Florida Manatee Program*, <https://myfwc.com/wildlifehabitats/wildlife/manatee/>

FWC, *Frequently Asked Questions about CWAs*, <https://myfwc.com/conservation/terrestrial/cwa/faqs/>

FWC, *FWC announces benchmark of 1 million registered vessels in Florida*, <https://myfwc.com/news/all-news/million-boats/>.

FWC, *Management of CWAs*, <https://myfwc.com/conservation/terrestrial/cwa/management/>

FWC, *Manatee County Protection Zones (2005)*, http://manatee.wateratlas.usf.edu/upload/documents/Manatee_manateeMPZ.pdf.

FWC, *Manatee Habitat*, <https://myfwc.com/wildlifehabitats/wildlife/manatee/habitat/#:~:text=Manatee%20Habitat.%20Manatees%20inhabit%20rivers,%20bays,%20canals,%20estuaries,vegetation%20that%20provide%20the%20manatee%E2%80%99s%20primary%20food%20sources>

FWC, *Manatee Mortality Statistics*, <https://myfwc.com/research/manatee/rescue-mortality-response/statistics/mortality/>

FWC, *Marine Turtle Protection*, <https://myfwc.com/wildlifehabitats/wildlife/sea-turtle/protection/>

FWC, *Yearly Mortality Summaries*, <https://myfwc.com/research/manatee/rescue-mortality-response/statistics/mortality/yearly/>

- Herring, G., Call, E., Johnston, M., 2006, *A Non-indigenous Wading Bird Breeding in the Florida Everglades: The Sacred Ibis*, Florida Field Naturalist 34(1):4-8.
- Katherine Taylor, 2016, *The Stories Told by Manatee Scars*, USFWS, <https://www.fws.gov/news/blog/index.cfm/2016/3/30/The-Stories-Told-by-Manatee-Scars>.
- Kiszka, J., Heithaus, M., Wirsing, A., 2015, *Behavioural drivers of the ecological roles and importance of marine mammals*, Marine Ecology Progress Series 523: 267–281.
- Krall, K., *How Boat Strikes Are One of a Sea Turtle's Deadliest Foes*, AwesomeOcean.com, <http://awesomeocean.com/guest-columns/boat-strikes-sea-turtles/>.
- Kragh, I., McHugh, K., Wells, R., Sayigh, L., Janik, V., Tyack, P., Jensen, F., 2019, *Signal-specific amplitude adjustment to noise in common bottlenose dolphins (Tursiops Truncatus)*, Journal of Experimental Biology, doi:10.1242.
- Lowry, L., Laist, D., Taylor, E., 2007, *Endangered, Threatened, and Depleted Marine Mammals in U.S. Waters*, Marine Mammal Commission, <https://www.mmc.gov/wp-content/uploads/etdmarinemammals.pdf>.
- Marine Mammal Commission, *Marine Mammal Protection Act*, <https://www.mmc.gov/about-the-commission/our-mission/marine-mammal-protection-act/>.
- Marine Title, Florida Boat Registration Summary*, <https://www.marinetitle.com/boat-registration/FL-Florida.htm>.
- Martin, J., Sabatier, Q., Gowan, T., Giraud, C., Gurarie, C., Ortega-Ortiz, J., Deutsch, C., Rycyk, A., Koslovsky, S., 2015, *A quantitative framework for investigating risk of deadly collisions between marine wildlife and boats*, Methods in Ecology and Evolution 7(1): 42-50.
- May-Collado, Laura J., 2014, *Dolphin changes in whistle structure with watercraft activity depends on behavioral state*, The Journal of the Acoustical Society of America, 135(4).
- Nat'l Oceanic and Atmospheric Admin., Common Bottlenose Dolphin, <https://www.fisheries.noaa.gov/species/common-bottlenose-dolphin>
- Nat'l Oceanic and Atmospheric Admin., *Species Directory – Marine Mammals*, https://www.fisheries.noaa.gov/species-directory/marine-mammals?title=&species_category=any&species_status=any®ions=1000001121&items_per_page=25&page=1&sort=
- Patten, M., Lasley, G., 2000, *Range Expansion of the Glossy Ibis in North America*, North American Birds 54, 241-247, <https://sora.unm.edu/sites/default/files/journals/nab/v054n03/p00241-p00247.pdf>.

Peters, K., Otis, D., 2006, *Wading Bird Response to Recreational Boat Traffic: Does Flushing Translate into Avoidance?*, Wildlife Society Bulletin, 1383-1391.

Rodgers, J., Schwikert, S., 2002, *Buffer-Zone Distances to Protect Foraging Waterbirds from Disturbance by Personal Watercraft and Outboard-Powered Boats*, Conservation Biology 16:1, 216-224.

Runge, M.C., Sanders-Reed, C.A., Langtimm C.A., Fonnesebeck, C.J., 2007, *A Quantitative Threats Analysis for the Florida Manatee (Trichechus manatus latirostris)*, U.S. Geological Survey Open-File Report 2007–1086.

Rycyk, A., Deutsch, C., Barlas, M., Hardy, S., Frisch, K., Leone, E., Nowacek, D., 2018, *Manatee behavioral response to boats*, Marine Mammal Science 34(4): 924:962, 958.

Sizemore, G., Main, M., Pearlstine, E., 2009, *Florida's Wading Birds*, UF IFAS Extension – WEC264

U.S. Fish & Wildlife Serv., *Marine Mammal Protection Act*, <https://www.fws.gov/international/laws-treaties-agreements/us-conservation-laws/marine-mammal-protection-act.html>

U.S. Fish & Wildlife Serv., *Stock Assessment Reports for Two Stocks of West Indian Manatee Florida Stock*, 2022, <https://www.govinfo.gov/content/pkg/FR-2022-08-03/pdf/2022-16625.pdf>, (last visited August 4, 2022).

Vail, Courtney S., 2016, *An Overview of Increasing Incidents of Bottlenose Dolphin Harassment in the Gulf of Mexico and Possible Solutions*, 3:110.