Tab D, No. 5(a)

Protected Resources Bycatch in Shrimp Trawls: A Summary Review of Data Assembled for Reinitiation of Section 7 Consultation on Southeast U.S. Shrimp Fisheries

August 27, 2025

Jennifer Lee
Fisheries Biologist, Fisheries Management Council Liaison for the Southeast Regional Office (SERO) Protected Resources Division (PRD)

Presentation Goal and Objectives

Goal:

- Facilitate Council engagement in the ESA Section 7 consultation for Southeast U.S. shrimp fisheries to reduce their effects on smalltooth sawfish and giant manta ray.

Objectives:

- Review Section 7 requirements.
- Summarize “reinitiation package” to date and our preliminary assessment of the effects of the action under status quo operation and management of the fishery.
- Share ways the Council can engage in the Section 7 process per the ESA MSA integration policy directive.

Presentation Outline

- Reinitiation Background (Slides 4)
- Section 7 Consultations and Biological Opinions: What, Why, and How (Slides 5-8)
- Reinitiation Data/Preliminary Assessment for Smalltooth Sawfish (SS) and Giant Manta Ray (GMR)
    - Status and Threats and New Information (SS 9-11, GMR 12-14)
    - Trawl Effects, Shrimp Observer Data, and Updated Bycatch Estimates (Slides 15-21)
    - Sawfish Mortality Event Considerations (Slide 22)
    - Population Viability Analyses and Overarching Preliminary Conclusions (Slides 23-26)
- Additional Section 7 Considerations (new sea turtle bycatch estimates) (Slide 27)
- What is Required Already and What Can Possibly Be Done (Slides 28-30)
- Where Do We Go From Here: ESA MSA Integration Policy Directive and Council Engagement (Slides 31-34)

Reinitiation Background

- April 2021: SERO issued ESA biological opinion and incidental take statement on the implementation of the sea turtle conservation regulations (TED regs) under the ESA and the authorization of the southeast U.S. shrimp fisheries in federal waters under the Magnuson Stevens Fishery Management and Conservation Act.

- June 2023: SERO, Sustainable Fisheries Division (SFD) requested SERO Protected Resources Division (PRD) reinitiate Section 7 consultation on southeast U.S. shrimp fisheries to address **unanticipated observed lethal incidental take of giant manta rays and new information** revealing effects of these fisheries on **smalltooth sawfish and giant manta rays** not considered in the 2021 Shrimp Opinion.

- Since identifying the need to reinitiate, SERO, in collaboration with the SEFSC, has been working to develop the information needed to formally reinitiate consultation (see § 402.14(c) and (d)).

What is a Biological Opinion?

- An analytical document that:
  - summarizes the effects of a Federal **action** on ESA-listed species and/or designated critical habitat.
  - identifies whether or not the **action** is likely to **jeopardize** the continued existence of a listed species or result in the destruction or adverse modification of critical habitat.
  - represents the opinion of NOAA Fisheries and considers technical, legal, and policy issues relative to the proposed action.
  - is the product of the **formal consultation** process.

- For MSA-managed fisheries, the action is defined as:
    - Authorization of a fishery (or fisheries) through approval of an FMP (or FMPs) and promulgation of regulations implementing the plan (or plans), as amended to date and any new proposal (e.g., approval of and promulgation of regulations implementing an Amendment)].

Why Do We Do One?

- Required under the ESA
  - **Section 7(a)(1) Affirmative Conservation Mandate**: All Federal agencies shall use their authorities to carry out their programs for the conservation of endangered & threatened species.
  - **Section 7(a)(2) Duty to Avoid Jeopardy**: Each federal agency must insure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of any T/E species or destroy or adversely modify critical habitat.
  - **Section 7(b)(3)**: At the **conclusion of formal consultation**, a **written statement** detailing how the action will affect T/E species must be issued

Effects/Jeopardy Analyses

- Jeopardize the continued existence of means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.

  —Adds the effects of a federal action *on top* of the effects of other human activities and natural phenomena on the species' status and trend in a particular action area and the species' global status and trend.

What Happens if Jeopardy is Concluded?

- If jeopardy is concluded, the consulting agency proposes "**Reasonable and Prudent Alternatives**" (RPAs) to avoid jeopardy
- The action agency must then modify the proposed action to comply with the ESA or not take the action.
- **The consulting agency and action agency should work together to avoid jeopardy conclusions and, when this is not possible, work together to develop RPAs.**
- Opinions also include an "**incidental take statement**" (ITS) that specifies the number of individuals, or extent of a population, of a listed species that will be "taken" incidental to the planned action, and exempts take from any ESA section 9 prohibitions on take so long as **reasonable and prudent measures** and their implementing terms and conditions are complied with.

Smalltooth Sawfish Status and Threats

Status: Listed as Endangered Under the ESA in 2003.

Threats: Bycatch (shrimp trawls, bottom longlines, and recreational hook-and-line gear) and loss of habitat; losses due to South Florida spinning fish events.

Life History Limiting Factors: Small population, slow growing, late maturing, few yong born.

NOAA FISHERIES

Smalltooth Sawfish Recovery Plan Objectives

- Minimize human interactions and associated injury and mortality
- Protect and restore smalltooth sawfish habitats
- Ensure smalltooth sawfish abundance and distribution increase.

*Currently updating the Smalltooth Sawfish Recovery Plan.

New Sawfish Data Since 2021 Opinion

- Six research publications and 1 pending publication since 2021
  - Smith et. al 2021: Replicates the Feldheim et al. 2017 analysis using samples from Ten Thousand Islands/Everglades; together the papers indicate a small number of adult females contributing to the population and fidelity to specific nurseries.
  - Graham et al. (2022): Identifies areas of overlap between federal fisheries and sawfish habitat use; female smalltooth sawfish at a higher risk from shrimp trawl bycatch than males due to use of deeper habitats where shrimping occurs.
  - Carlson 2023: Updated population viability model with new life history information and population size informs the degree of extinction risk under different scenarios.
  - Carlson and Farmer 2025: Updated population viability model incorporating (1) improved estimates of bycatch for the southeast shrimp trawl fishery and (2) mortality from the 2024 large-scale mortality event in South Florida.
  - Kroetz et al. 2025: Emphasizes the significance of shallow, mangrove-fringed inshore areas for juvenile smalltooth sawfish and the importance of models in identifying these habitats.
  - Kroetz et al.2025: Refines life history information using necropsied sawfish collected over the last decade; no significant changes in metrics but stronger confidence in results given the larger sample size.
  - Farmer et al. *In Press:* Documents Significant declining trend in relative abundance of small juveniles.

Giant Manta Ray Status and Threats

Status: Listed as Threatened Under the ESA in 2018

Threats:

- Bycatch (domestic & foreign)
- Directed fishing for gill plates and meat (foreign only)
- Vessel strike (domestic & foreign)
- Entanglement (domestic & foreign)
- Pollution / marine debris (domestic & foreign)

Life History Limiting Factors: late maturing (8-12 yrs /females), may have 1 pup every two to three years, 12-13 gestation.


Credit: Manta Trust


Credit: Manta Trust

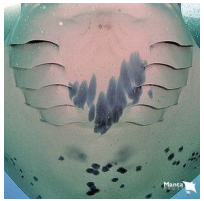

Credit: MMF


Credit: NOAA

NOAA FISHERIES

New Giant Manta Ray Data Since 2021 Opinion

- Observer Program Species ID & Reporting Improvements



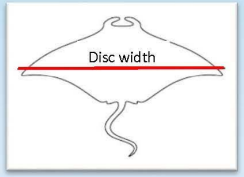
NOAA FISHERIES

Mobula Ray Identification Guide For Fisheries Observers

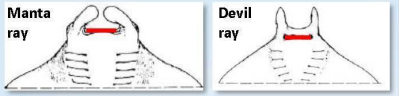
Purpose: This guide is intended to assist fishery observers in the visual identification of the giant manta ray and several devil ray species that occur in the Southeast and Mid-Atlantic.

General Observations: The size, coloring patterns, and a few morphological differences can be used to distinguish between species.

- Giant manta rays are larger than devil rays. Measurements should be taken by estimating the distance over their wingspan ["Disc Width" (DW)].



- Giant manta rays have a terminal mouth (i.e., mouth points straight forward, in front of the head); Devil rays have a sub-terminal mouth (i.e., mouth beneath the head).



Manta birostris

Common Names: Giant Manta Ray, Oceanic Manta Ray

Status: U.S.: Listed as *Threatened* under Endangered Species Act.

Size: Up to 700 cm DW; appx. 200 cm DW at birth.

Dorsal Coloration: Black with distinct white patches creating a T-shaped shoulder pattern.

Ventral Coloration: White with dark spots; spots rarely found between gill slits. Dark shading along the posterior edges of the pectoral fins.

NOAA Fisheries, Southeast Region, Protected Resources Division

SAWFISH, STURGEON, GIANT MANTA RAY and BIRDS
PROTECTED RESOURCES CAPTURE REPORT
REPORT WITH IN 24 HOURS OF CAPTURE
7_19

Trip Number MO DY YR / / Set/Tow Station Captured Specimen # By Trip
Non-Station Sighted

Check type of specimen captured and reference species (if known) in space provided:
Sawfish Sturgeon Birds Giant Manta Ray

Vessel Observer State Time (24 hr) Water Depth (ft.) Photos Y/N Number
LATITUDE deg min sec LONGITUDE deg min sec

TARGET SPECIES: List all targeted species for this set using genus species format.

Gear Type: Longline Gill Net Trawl Bandit Reel Handline Fish Trap Other
Gear Depth: Surface Midwater Bottom Whole Water Column Other

Net Position Net Type Animal Captured In: Net Modifications:
Try Net Standard Net TED TED/BRD BRD None Unknown

IF GEAR IS A FORM OF HOOK AND LINE, COMPLETE THIS SECTION, AS APPLICABLE:
Hook Type: "J" Circle other (describe) SIZE /0
Manufacturer/Style No. DEGREE OFFSET
Bait: Squid Mackerel Sardine Unknown Other (describe)

Was hook removed from this animal? Y / N / Unknown / Not Applicable
Was animal entangled in gear? At capture? Y / N / Unknown At Release? Y / N / Unknown
How much gear (linear feet) was left on the animal when released? ft. (estimated/measured)

DIMENSIONS (cm): Est. total length: ft. Est. Length of Rostrum (Saw): ft. Sex (M,F,U):
Precaudal Length: cm Fork Length: cm Stretch Total Length: cm
Rostrum Length: cm Rostral Teeth: Left Right Estimated disc width: ft.

TAG INFORMATION: Was this animal PIT scanned for PIT tags? (Y/N) Tag ID Numbers:
PIT Tag #:

RELEASE INFORMATION: TIME (24hr) DATE Mm / Dy / Yr
LATITUDE deg min sec LONGITUDE deg min sec

FINAL DISPOSITION: Discarded Dead/Unresponsive Carcass Released Alive Unknown (explain)

BIOLOGICAL SAMPLES:
Vertebrae Gonad Stomach Fin Clip/Tissue Fin Ray Pectoral Fin Rostrum

ADDITIONAL COMMENTS: (list all biological samples collected):

5-21

NOAA FISHERIES

New Giant Manta Ray Data Since 2021 Opinion

- **Five more years of improved bycatch data (2020-2024)**
- **Pate et al. (2024)**
  - Evidence of reproductive and feeding habitat for manta rays off Florida's Atlantic coast
- **Farmer et al. (2022)**
  - Integrated decades of sightings and survey effort data into distribution modeling
  - Predicted the highest occurrence around the Mississippi River Delta April - June and Oct - Nov.
  - Predicted highest occurrence during April off Northeastern Florida, leading north to North Carolina from June - Oct, then south to Georgia from Nov - March with cooling temps.
- **October 2024 Draft Recovery Plan**
  - Comprised of 3 separate documents (Recovery status review, plan, and implementation strategy).
  - Outlines path and tasks required to restore and secure self-sustaining wild populations.
  - 3 main objectives: 1) ensure resiliency and geographic representation by increasing overall abundance to achieve viable populations in all ocean basins; 2) increase resiliency by managing or eliminating threats, and 3) ensure viability through development and effective implementation of regulations for long-term protection of the species.

Smalltooth Sawfish & Trawl Effects

Injury/Stress and Mortality resulting from capture:

- Breakage and damage to rostrum in the net.
- Compacted against netting or TED by weight of catch.
- Weight of animal outside of the water.
- Handling of animal to remove from net.

Credit: NOAA Fisheries Shrimp Observer Program

NOAA FISHERIES

Giant Manta Ray & Trawl Effects

Mortality resulting from asphyxiation:

- Obligate ram-ventilation requires constant movement to pass water over gills.
- Capture in trawls severely restricts movement and respiration resulting in asphyxiation.

Injury/Stress/Mortality from capture:

- Compacted against netting or TED by weight of catch, coupled with impaired respiration decreases likelihood of survival post release.

Credit: NOAA Fisheries Shrimp Observer Program

NOAA FISHERIES

Smalltooth Sawfish Bycatch - Observer Data & Mortality Considerations

Observer Coverage= <2%

Observed Takes (Since 2008)

- 16 Alive; 3 Mortalities; 7 Unknown
  =Total: 26 (GOM =21; SA =5)

Mortality Estimate

- 2021 Shrimp Opinion assumed 50% mortality overall.
- 38% at-release mortality rate based observed mortalities and assigned unknowns based on observer descriptions.
- Post-release mortality for small rays ranges 9%–60%*
- Sawfish difficult to release; overall mortality likely >50%

Observation Characteristics:

- Majority of takes off **Southwest Florida**.
- Location in trawl varies, but at or in TED most common.
- Rostrum damage from release activities.
- All large juveniles and adults
- Only 35% of records with sex IDs.

Year	Alive	Dead	Unknown	Total
2008	0	1	0	1
2009	3	1	0	4
2010	1	0	1	2
2011	0	0	0	0
2012	0	0	0	0
2013	2	1	0	3
2014	0	0	0	0
2015	0	0	1	1
2016	0	0	1	1
2017	0	0	2	2
2018	1	0	0	1
2019	2	0	0	2
2020	1	0	0	1
2021	1	0	0	1
2022	4	0	2	6
2023	0	0	0	0
2024	0	0	0	0
2025	1	0	0	1

*Dapp et al. (2015)

NOAA FISHERIES

Giant Manta Ray Bycatch - Observer Data & Mortality Considerations

Observer Coverage = < 2%

Observed Takes (Since 2019)

- 31 Alive; 6 Mortalities; 9 Unknown
  =**Total:** 46 (GOM = 38; SA =8)

Mortality Estimate

- 2021 Shrimp Opinion assumed no mortality.
- 33% at-release mortality rate (observed mortalities + unknowns)
- Mean total discard mortality for obligate ram-ventilating species in trawls = 84.2% (Dapp et al. 2015)

Observation Characteristics

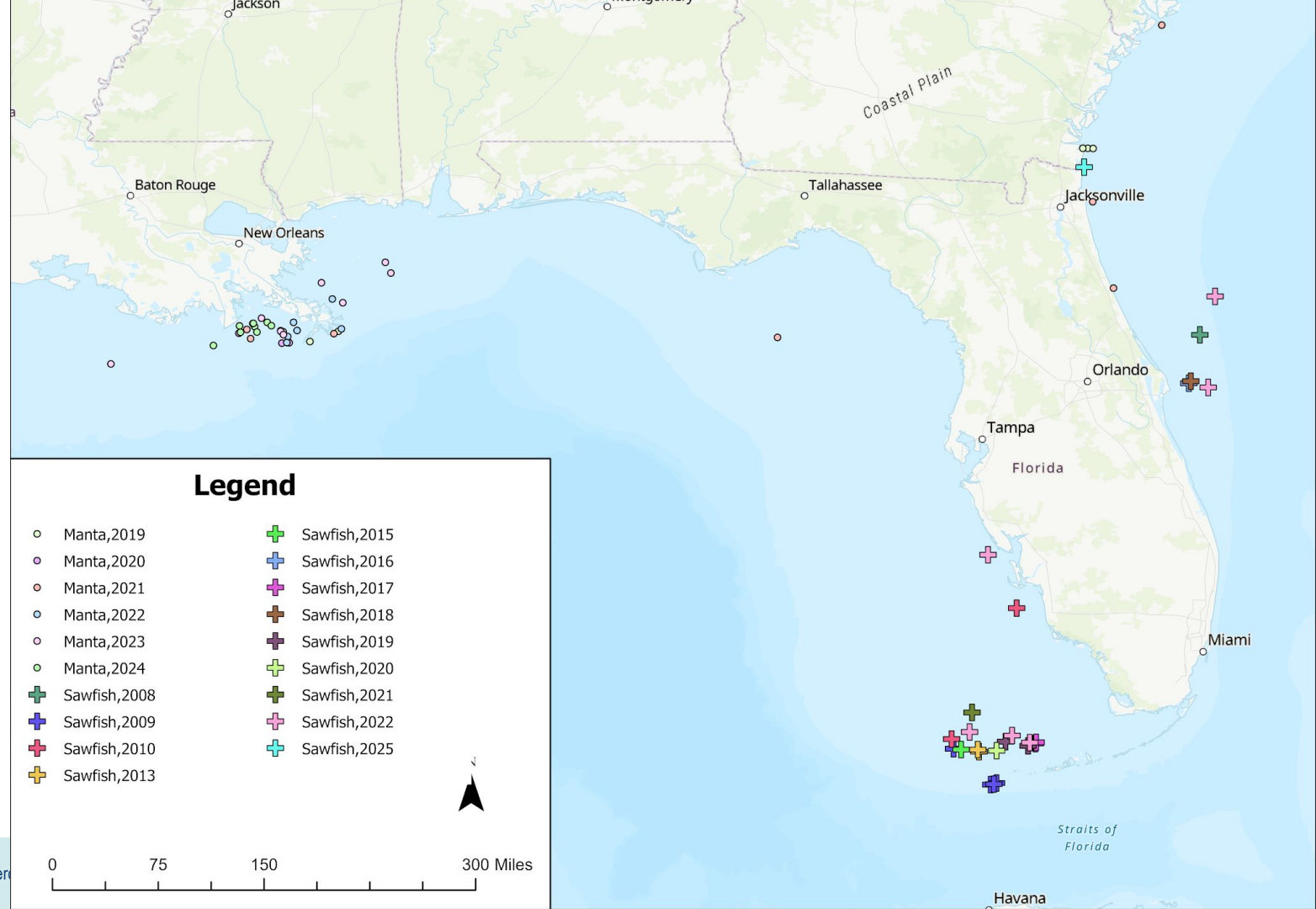
- Most interactions occurring offshore **Louisiana (n=34)**, followed by **Georgia (n=6), Alabama (n=3), Florida (n=2), Mississippi (n=1).**
- Most interactions occurring in **Spring and Fall.**
- Multiple interaction occurring on single trips.
  - 33% of all trips (8 of 24) had multiple interactions.
  - Trips with multiple interactions accounted for 30/46 takes.
- Majority of interactions at **depths <100 ft**.

Year	Disposition	Total
2019	Alive	4
	Unknown	4
2020	Alive	3
2021	Alive	5
	Mortalities	2
2022	Alive	8
	Unknown	2
2023	Alive	6
	Unknown	1
	Mortalities	2
2024	Alive	5
	Unknown	2
	Mortalities	2

NOAA Fisheries Shrimp Observer Program Observations:

Smalltooth Sawfish (2008+) and Giant Manta Ray (2019+)

*2025 Incomplete= Data entered to date.



Updated Total Bycatch Estimates

- Estimated total annual bycatch with uncertainty of smalltooth sawfish and giant manta rays in the federal shrimp trawl fishery in the Gulf & SE Atlantic using both design- and model-based estimation methods.

	Smalltooth Sawfish			Giant Manta Ray		
Year	Gulf	SA	Total	Gulf	SA	Total
2008	82 (28 – 185)		**82 (28 – 185)**			
2009	91 (33 – 185)	40 (7 – 113)	**131 (40 – 298)**			
2010	47 (18 – 95)	48 (9 – 129)	**96 (27 – 224)**			
2011	21 (19 – 101)	53 (10 – 151)	**74 (29 – 252)**			
2012	37 (19 – 157)	33 (3 – 119)	**70 (22 – 276)**			
2013	17 (6 – 74)	22 (1 – 77)	**39 (7 – 151)**			
2014	94 (29 – 202)	26 (1 – 90)	**120 (30 – 292)**			
2015	85 (25 – 181)	22 (1 – 81)	**107 (26 – 262)**			
2016	76 (23 – 154)	58 (8 – 190)	**134 (31 – 344)**			
2017	93 (32 – 196)	51 (7 – 164)	**144 (39 – 360)**			
2018	100 (31 – 215)	43 (6 – 133)	**143 (37 – 348)**			
2019	93 (28 – 191)	51 (7 – 166)	**144 (35 – 357)**	406 (163 – 844)	1245 (205 – 4611)	**1651 (368 – 5455)**
2020	123 (47 – 258)	65 (7 – 209)	**188 (54 – 467)**	443 (107 – 1034)	1195 (197 – 4407)	**2438 (304 – 5441)**
2021	109 (44 – 208)	54 (6 – 182)	**163 (50 – 390)**	385 (144 – 781)	1636 (89 – 2253)	**2021 (233 – 3034)**
2022	85 (33 – 165)	39 (4 – 125)	**124 (37 – 290)**	461 (202 – 807)	1244 (67 – 1707)	**1705 (269 – 2514)**
2023	48 (19 – 96)		**48 (19 – 96)**	863 (357 – 1643)		**863 (357 – 1643)**

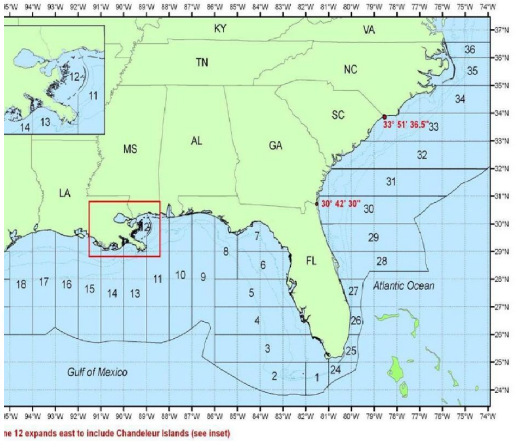
Estimates of shrimp trawl bycatch of smalltooth sawfish and giant manta ray in the Southeast USA

Cheston Peterson[1], Elizabeth A. Babcock[2], Daniel Woods[2]

[1]Assistant Scientist
CIMAS, University of Miami
ctp2849@miami.edu

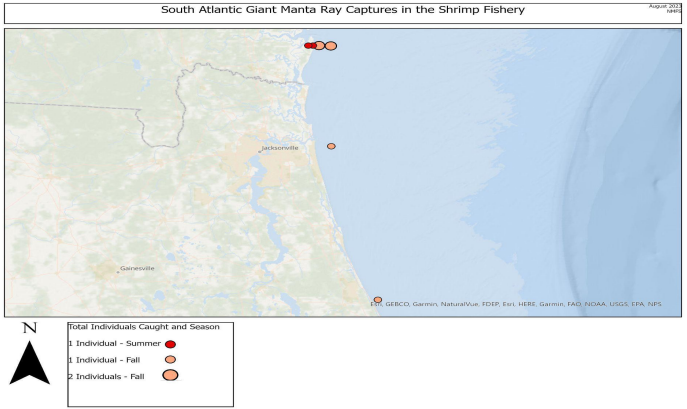
[2]Rosenstiel School of Marine Atmospheric & Earth Science
University of Miami

NMFS Statistical Zones of the Southeast Region



What About Shrimp Effort Impacts in the South Atlantic Region?

- Limited by low observer coverage
- Effort off Florida East Coast concentrated in Zones 28-30; greater overlap with giant manta ray than with sawfish.
- Effort data more uncertain in the SA.
- Need improved data in areas of high overlap to avoid conservative assumptions.



Sawfish Mortality Event Considerations

- Major Mortality Event in 2024 (January - August):
  - 230 affected (spinning, thrashing, beaching) sawfish reported
  - 56 confirmed mortalities (total mortality likely higher)
  - Nearly all were large juvenile or adults (9-16 ft)
  - Most reports came from the Keys, Jan through June

- Smaller mortality event in 2025 (January - June):
  - ~60 affected sawfish reports
  - 9 mortalities
  - Reports were more geographically isolated but still within the lower Keys

- Cause is still under investigation but likely linked to a benthic harmful algal bloom

- Uncertainty about the frequency and scale of future mortality events

Population Viability Analyses (PVAs)

- What is a PVA?
  - A modeling tool that estimates the future size and risk of extinction for populations of organisms in light of life history characteristics, threats facing the species, and management actions.
    - Predicts the probability of the population persisting into the future.
    - Explores consequences of management actions in the light of uncertain data and an ambiguous future.

- A wide range of modeling approaches are used in PVA, from simple models based on abundance trends to complex individual-based habitat models.

- PVAs are one tool that NOAA Fisheries can use in evaluating jeopardy for a species, and the likelihood of recovery under different scenarios.

Smalltooth Sawfish Population PVAs

- PVAs suggest that ongoing shrimp trawl bycatch, particularly in combination with mortality events, leads to increased extinction risk for endangered sawfish.
- NMFS staff are working to address suggestions from the Gulf SSC and hope to present a revised PVA to the SSC at a subsequent meeting.


Global Ecology and Conservation 48 (2023) e02745

Contents lists available at ScienceDirect

Global Ecology and Conservation

journal homepage: www.elsevier.com/locate/gecco

Trouble in the trawls: Is bycatch in trawl fisheries preventing the recovery of sawfish? A case study using the US population of smalltooth sawfish, *Pristis pectinata*

John K. Carlson

NOAA Fisheries Service, Southeast Fisheries Science Center, Highly Migratory Species Branch, 3500 Delwood Beach Road, Panama City, FL 32408, USA

ARTICLE INFO

Keywords:
Endangered
Sawfishes
Population viability model
Population size
Fishing mortality

ABSTRACT

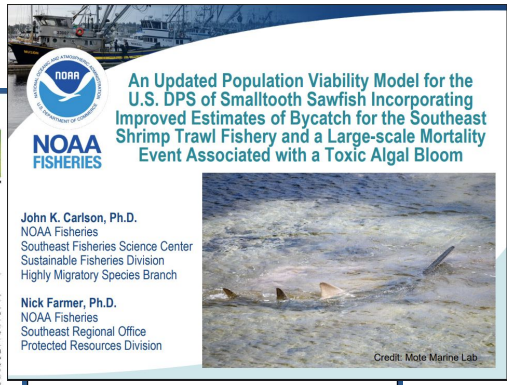
All five species of sawfish (Family Pristidae), are among the most threatened families of elasmobranchs, and face significant threats from fishing, in particular trawl fisheries, and habitat loss. Unfortunately, there is little data on the level of sawfish taken in trawl fisheries outside Australia and the United States and case studies from these areas can provide a "risk analysis" for populations elsewhere. In the United States, bycatch risk for smalltooth sawfish is significantly higher for the southeast shrimp trawl fishery than all other fisheries assessed. Using new estimates of life history and population size, an updated population viability model was developed and trajectories using different scenarios of initial population sizes, fishery catches and post-release mortality were projected for 100 years. The simulated population trajectories for the assessed initial population sizes and fishing mortality ranged between population extinction, quasi-extinction, to a slight reduction in population size and in some cases the population continuing to recover. The most pessimistic scenarios were when the initial population was lowest and post-release mortality in the shrimp trawl fishery was highest. Quasi-extinction for some scenarios was between 6.9 and 11.1 years. Even when the initial population was relatively large, and the fishery had a low potential for shrimp trawl fishing mortality, key input variables for three optimistic scenarios in the initial population size and the true level of fishing mortality. This uncertainty highlights the importance of improving our understanding of sawfish life history, captures in fisheries and their associated post-release mortality.

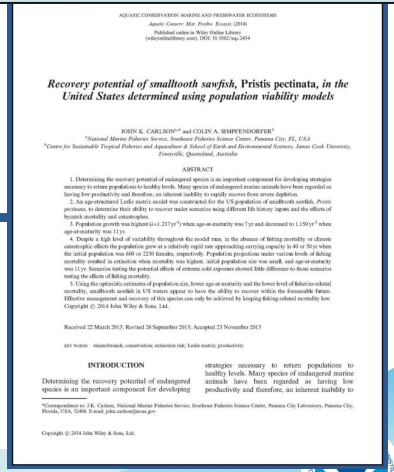
1. Introduction

The incidental capture or bycatch of non-targeted species in fishing gear is widely recognized as an important threat to the conservation status of many animal populations (Dayal et al., 2008; Gilman et al., 2010; Reeves et al., 2013). Bottom trawling is a relatively non-selective fishing method, and in many cases, bycatch often comprises a much higher proportion of the total catch than the target species (Saila, 1983; Andrew and Pepperell, 1992). Bottom trawl impacts on elasmobranchs have been widely documented globally in various fisheries and areas (see review in Molina and Cooke, 2012; Oliver et al., 2015). For example, elasmobranch bycatch in the shrimp trawl fishery in Pacific waters of Costa Rica comprised 25 species and 13 families (Clarke et al., 2016). In Australia's Northern Prawn Fishery, 56 species of elasmobranchs have been documented in this fishery and these species comprise around 4 % of the bycatch by weight (Stobutzki et al., 2001).

Globally, all five species of sawfish populations face significant threats from fishing and habitat loss. Sawfish are among the most threatened families of elasmobranchs (Dulvy et al., 2014, 2016). All species in the Family are now listed as Critically Endangered under

https://doi.org/10.1016/j.gecco.2023.e02745
Received 14 April 2023; Received in revised form 28 November 2023; Accepted 21 November 2023
Available online 29 November 2023
2351-9894/Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).




AQUATIC CONSERVATION: MARINE AND FRESHWATER ECOSYSTEMS
Aquatic Conserv: Mar. Freshw. Ecosyst. (2014)
Published online in Wiley Online Library
(wileyonlinelibrary.com). DOI: 10.1002/aqc.2454

Recovery potential of smalltooth sawfish, Pristis pectinata, *in the United States determined using population viability models*

JOHN K. CARLSON[a]* and COLIN A. SIMPENDORFER[b]
[a]*National Marine Fisheries Service, Southeast Fisheries Science Center, Panama City, FL, USA*
[b]*Centre for Sustainable Tropical Fisheries and Aquaculture & School of Earth and Environmental Sciences, James Cook University, Townsville, Queensland, Australia*

ABSTRACT

1. Determining the recovery potential of endangered species is an important component for developing strategies necessary to return populations to healthy levels. Many species of endangered marine animals have been regarded as having low productivity and therefore, an inherent inability to rapidly recover from severe depletion.
2. An age-structured Leslie matrix model was constructed for the US population of smalltooth sawfish, *Pristis pectinata*, to determine their ability to recover under scenarios using different life history inputs and the effects of bycatch mortality and catastrophes.
3. Population growth was highest (λ=1.237 yr^{-1}) when age-at-maturity was 7 yr and decreased to 1.150 yr^{-1} when age-at-maturity was 11 yr.
4. Despite a high level of variability throughout the model runs, in the absence of fishing mortality or climate catastrophic effects the population grew at a relatively rapid rate approaching carrying capacity in 40 or 50 yr when the initial population was 600 or 2250 females, respectively. Population projections under various levels of fishing mortality resulted in extinction when mortality was highest, initial population size was small, and age-at-maturity was 11 yr. Scenarios testing the potential effects of extreme cold exposure showed little difference to those scenarios lacking the effects of fishing mortality.
5. Using the optimistic estimates of population size, lower age-at-maturity and the lower level of fisheries-related mortality, smalltooth sawfish in US waters appear to have the ability to recover within the foreseeable future. Effective management and recovery of this species can only be achieved by keeping fishing-related mortality low.
Copyright © 2014 John Wiley & Sons, Ltd.

Received 22 March 2013; Revised 28 September 2013; Accepted 23 November 2013

KEY WORDS: elasmobranch; conservation; extinction risk; Leslie matrix; productivity

INTRODUCTION

Determining the recovery potential of endangered species is an important component for developing strategies necessary to return populations to healthy levels. Many species of endangered marine animals have been regarded as having low productivity and therefore, an inherent inability to

*Correspondence to: J.K. Carlson, National Marine Fisheries Service, Southeast Fisheries Science Center, Panama City Laboratory, Panama City, Florida, USA, 32408. E-mail: john.carlson@noaa.gov

Copyright © 2014 John Wiley & Sons, Ltd.

NOAA FISHERIES

Additional PVA Work To Be Completed

- A giant manta ray PVA, with outputs of probability of extinction similar to those provided for smalltooth sawfish , and including the following additional scenarios:
  - No future shrimp bycatch
  - Future shrimp bycatch does not exceed 2023 shrimp bycatch
- Additional PVA runs for smalltooth sawfish based on Gulf Council SSC feedback and also considering how shrimp fisheries may impact the species under the following scenarios:
  - No future shrimp bycatch
  - Future shrimp bycatch does not exceed 2023 shrimp bycatch
  - Incorporation of 2025 mortality event data and consideration of periodic mortality events

Overarching Preliminary Conclusions Based on Data

- Smalltooth sawfish population abundance data and trends.
  - Growing evidence the population is small
  - Evidence of declining abundance trend in juvenile smalltooth sawfish
- The 2024/25 sawfish mortality events had a major impact on the population.
- Shrimp trawl bycatch is the largest ongoing long-term source of mortality for large juveniles and adult mortalities.
- Giant manta ray bycatch is observed annually off Louisiana despite less than 2% observer coverage and appears to be increasing in the Gulf.
- More actions may be needed to minimize shrimping impacts in light of above conclusions

2021 Incidental Take Statement (ITS): Take Monitoring & Additional Section 7 Considerations

- Updated (2016-2020) sea turtle bycatch and at-vessel mortality estimates:
  - Green, loggerhead, Kemp's ridley, and hawksbill sea turtles bycatch estimates below ITS levels.
  - Revised methods for leatherback analyses resulting in higher estimates than in the 2021 Opinion and ITS, but no increasing trend.
  - Reinitiation required to amend leatherback analyses and revise ITS.

2021 ITS Requirements

- 2021 ITS Reasonable and Prudent Measures and Implementing Terms and Conditions
  - **Monitoring**: Fishing effort and observer data must be collected to produce take estimates over 5-year periods.
  - **Sampling**: Collection and tagging activities of bycaught ESA species via observers following established protocols.
  - Ecological Studies: **Review and analyze available temporal and spatial data for "Hot Spots"**
  - **Handling**: Ensure fishers (via outreach and education efforts) handle species in a manner that **prevents injury and ensures survivability**.
    - Disseminate Sea Turtle Handling and Resuscitation Guidelines, Giant Manta Ray Release Guidelines; and Smalltooth Sawfish Handling, Release, and Reporting Procedures to fishers/shrimp vessels

What Else Can We Do for Sawfish and Giant Manta Ray?

- How can we address current data limitations?
  - How can we improve bycatch monitoring in primary bycatch areas?
- How can sawfish and giant manta ray bycatch and mortality be reduced in the fishery?
- How can we improve and raise awareness of and compliance with safe handling and release guidance?

What Else Can Possibly Be Done?

- Protected species bycatch reduction strategies previously or currently used in other fisheries:
  - Cap overall effort and/or take
  - Fish in areas or in a manner resulting in a lower sea turtle catch per unit effort (CPUE)
  - Minimize (reduce) mortality and mortality rates
- Examples of bycatch reduction measures:
  - Effort and/or take “caps”
  - Seasonal or area closures in “hotspot” areas
  - Gear modifications
  - Improved handling/release techniques and required training
  - Overnight soak prohibitions

Council Engagement in the Section 7 Process

- ESA MSA Integration Policy Directive (PD):
  - Outlines how Councils can participate in the Section 7 process,
  - Emphasizes the importance of early collaboration by NMFS (SF and PR) and the Councils **prior to initiation of consultation for** reducing the likelihood that a preferred fishery management alternative will result in a jeopardy or "DAM" finding.

- Ways that Councils can be involved in Section 7 consultations:
  - Describing the proposed action for purposes of initiating Consultation
  - Identifying feasible alternatives to status quo
  - Providing Council views as to the "**best scientific information available" on fisheries management practices** and potential effects of the proposed action on listed or proposed listings of species and designated or proposed designations of critical habitat
  - Assisting in preparing draft biological assessments, biological evaluations, and other ESA section 7 consultation initiation documents

Council Engagement in the Section 7 Process

- **Mechanisms for Fostering Council Involvement in the Section 7 Consultations**
  - PRD Council liaisons and involvement in Council Committee and Advisory Panels
  - Engaging PRD in reviewing and providing appropriate information for sections of MSA- and NEPA-related analyses via the IPT process on fishery management actions.
  - Forming **IPTs** For Considering ESA actions (e.g. Gulf Reef Fish Amendment 31 IPT)
  - Establishing an **Ad hoc committee or working group** to review ESA data and explore alternative for changes to the FMP to address ESA-related concerns (e.g. Groundfish ESA Working Group).

Where Do We Go From Here?

- Timing of formal shrimp reinitiation depends on:
  - What the proposed action is: status quo or consideration of new measures?
  - Council engagement process
  - Internal and/or external factors

- Once reinitiated, the default total time between initiation of formal consultation and completion of the final opinion is 135 days, but this time can be extended through mutual agreement.

Where Can I Get More Information?

- Information posted on our website:
  - 2021 Shrimp Biological Opinion
  - Smalltooth Sawfish and Giant Manta Ray Species Profiles
    - Species Overview, Conservation and Management, Science, and Resources (e.g. listing rules and recovery documents
  - ESA Section 7 Consultation Species Frameworks
    - Guidance on evaluating effects from federal action for each listed species

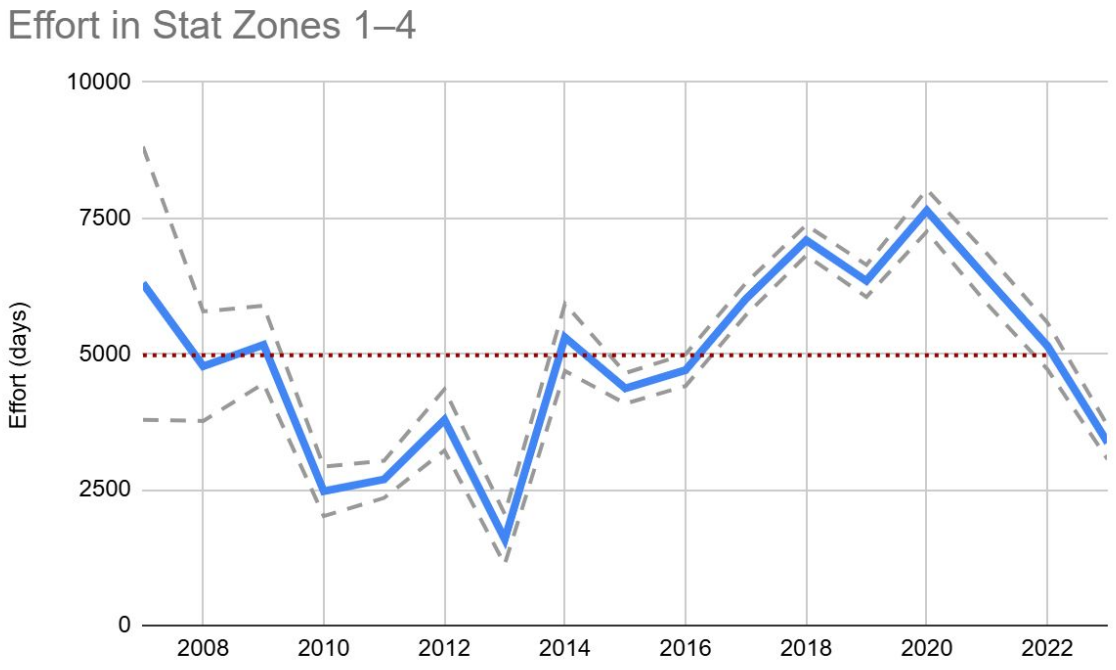
- **Information YOU Want to Share? Questions? Other Needs?**
  - Reach out to me (info below): I'll listen, help or connect you to a Protected Resources specialist who can!
    - Office phone: (727) 551-5778
    - Email: Jennifer.Lee@noaa.gov

Additional Background/Reference Slides

Annual Shrimp Trawl Effort in Primary Sawfish Bycatch Area

- Total effort in Stat Zones 1 to 4, by year, with 95% CIs, relative to average 2007–2021 (pre-Ian) effort.

- Observations: Effort in Zones 1 to 4 has not been consistently declining, and in fact was increasing 2016 to 2020. It declined substantially following Hurricane Ian, but not to all-time lows.



Annual Shrimp Trawl Effort in Primary Giant Manta Ray Bycatch Area

- Total effort in Stat Zones 11 to 14, by year, with 95% CIs, relative to average 2007–2021 (pre-Ian) effort.

- Observations: Effort in Zones 11 to 14 has not been consistently declining, and in fact was steady 2014 to 2020. It declined substantially from 2021 to 2023, nearing the all-time DWH low in 2010.