ANECDOTAL OBSERVATIONS MEET SCIENCE

Capt. Marcos Hanke / B.A Marine Biology

Charter operator/ Fisherman

787fishing Research Project

SPECIAL THANKS

- Capt. Juan Morales, BA (Dive instructor and fishing captain)
- Edgardo Ortiz, PhD
- Virginia Shervette, PhD
- Richard Appeldoorn, PhD
- Diana Beltrán, PhD
- Aida Rosario, MS

*Recognition to industry experts consulted:

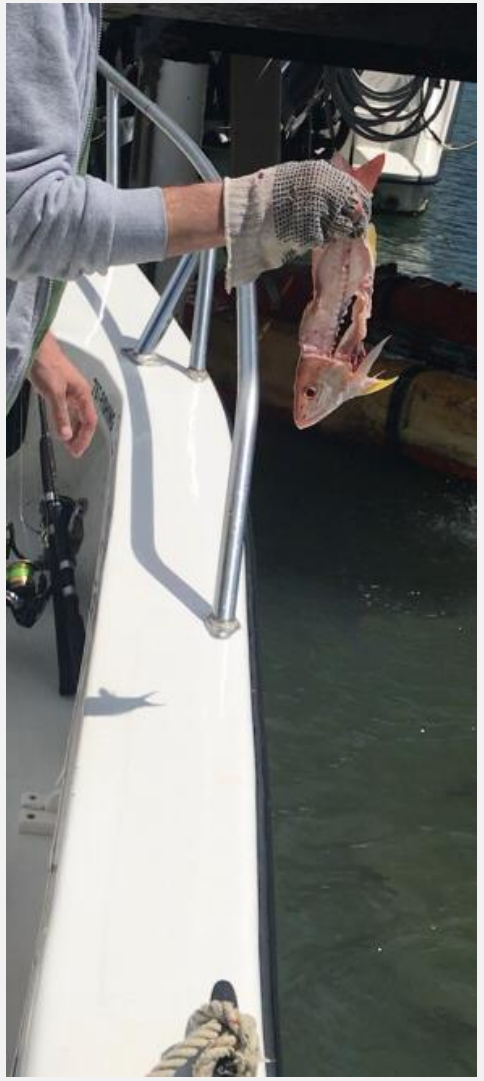
Nelson Crespo (PR-West), Roberto Silva (PR-East) and Tommy Forte (PR-North, Dealer)

*Recognition academic experts for the information and guidance shared:

Cedar Garcia, PhD; Evan Tuohy, MS; Graciela García Moliner, PhD; Juan Cruz Motta, PhD; Martha Prada, PhD; Megan Davis, PhD; Michelle Scharer, PhD; Jim Franks, PhD; Jesus Rivera-Hernández, MS

CHARTER OBSERVATION BACKGROUND

- Home port is Pto. Chico, Fajardo; fishing area is East Coast of Puerto Rico
- Pioneer inshore light tackle guide for Tarpon and others (aprox. 30 years)
- Collaborator on multiple research data collections
- Due to recent interest in documenting lane snapper age, growth, and reproductive biology across the U.S. Caribbean, racks (carcasses) are saved after filleting and donated to Dr. Shervette's research team. Usually, fish carcasses are fed to tarpon at the cleaning station, but since we started donating lane snapper carcasses for research, we developed filleting techniques that maintain gonad integrity for later preservation; after carefully filleting, samples are labeled, measured, then kept on ice until processed for life history research
- As a consequence of this more careful treatment of lane snapper scientific donations: 28 Aug 2021, I first observed one small conch in the stomach of a lane snapper from AREA 1
- Lane snapper is very abundant and a preferred target fish for consumption by my clients
- Lane snapper availability has been stable, and abundance has increased overtime (charter info.)
- On PR east coast no direct fishery for lane snapper exists nowadays; commercially this species is mostly landed by nonselective gears, like nets and traps



GENERAL FISHING GROUND

To protect the fishing grounds and resources, the specific areas will not be revealed at this time.

SCIENCE TALKS TO FISHERMAN

- **Randall (1967),** one of the most definitive, broadscale studies of Caribbean fish feeding, only specifically mentions queen conch *S. gigas* documented in stomachs of the following snapper species:

Mutton snapper *L. analis*
Gray snapper *L. griseus*
Dog snapper *L jocu*
Yellowtail snapper *O. chrysurus*

- Estimated conch sizes were 70-80 mm
- *S. gigas* also found in the stomachs of two grunt species:

White grunt *H. plumierii*
Bluestriped grunt *H. sciurus*

Overall, conch was not common in stomach contents of fish samples examined and only tissue was noted

Randall (1967) hypothesized that these instances were opportunistic feeding on some other organism, such as an octopus or hermit crab, that had initially removed the conch from its shell

Speculated that these fishes did not have the jaw strength to crush the shells (and no shells were found in the guts), unlike other fish species such as permit, queen triggerfish, and porcupine fish

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Lane snapper *L. synagris* not observed to consume queen conch

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LANE SNAPPER, *Lutjanus synagris*

- **Charter observation:** Lane Snapper is one of the most common snapper species along the east coast of PR and very abundant in inshore waters all year-round. Occurs across a diversity of depths and habitats.

- *Peña-Alvarado and Torres-Ruiz (2012) investigated reproductive biology of lane snapper in PR waters*
- *Lane snapper can cover migrate over 700 m in a day in one direction before returning (Friedlander and Monaco 2007)*

LANE SNAPPER, *Lutjanus synagris*

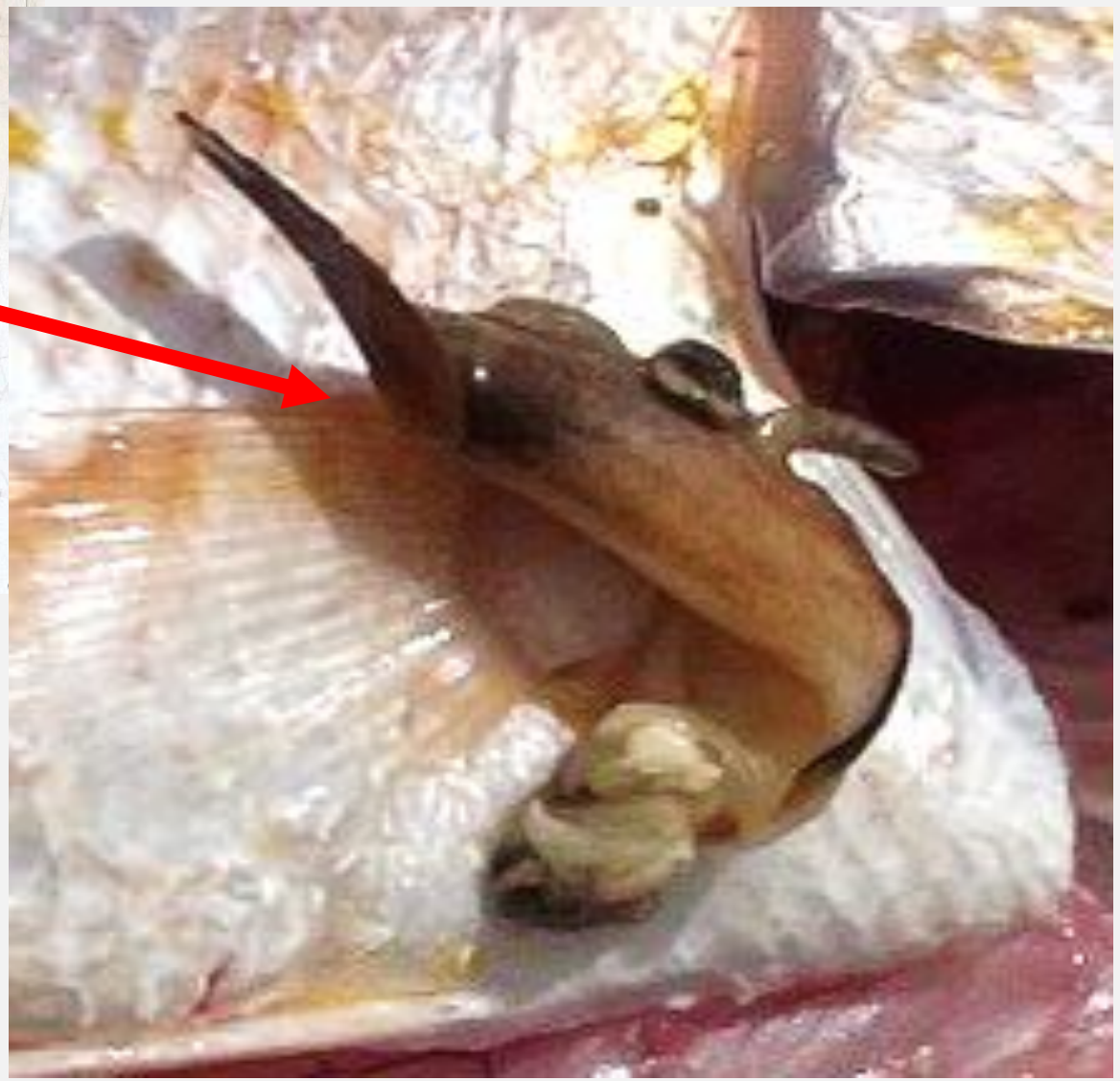
Charter observation: 15-years of observations from fishing efforts on lane snapper presence and abundance in **Area-1** and **Area-3** of off PR east coast

AREA-1 lane snapper presence/abundance **appears to be related to tidal period, color of the water, wind speed, and wind direction**

AREA-3 lane snapper presence/abundance is consistent and continuous year-round, does not seem to correlated with time of the day, moon phase, tide stage, or season.

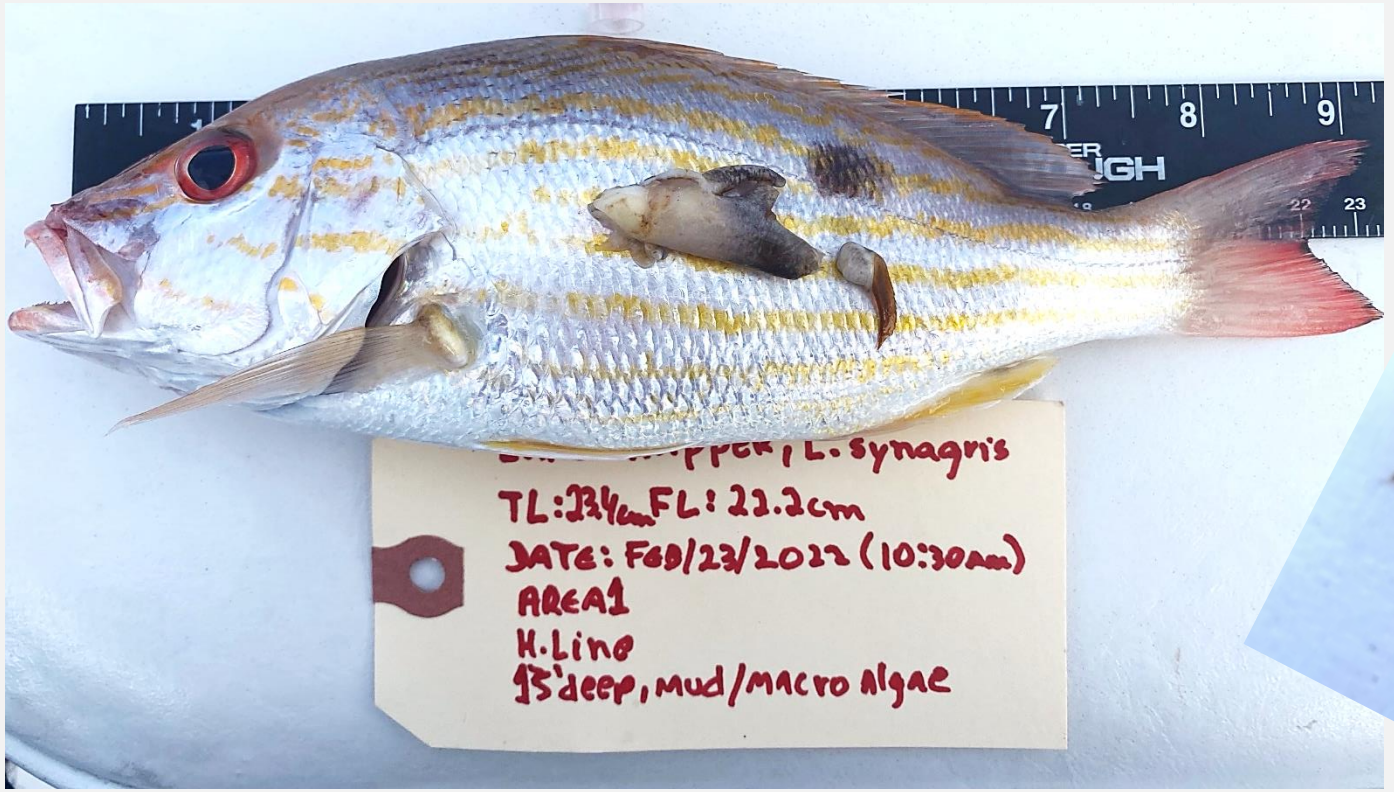
- *Lane snapper size at 50% sexual maturity (Figuerola, Matos-Caraballo and Torres,1998):*
  Males: 147 mm FL
  Females: l85 mm FL
- *Lane snapper has an average length of 14 inches (36 cm), with a maximum length of 20 inches (50 cm). An individual lane snapper usually weighs less than a pound. Sexual maturity is reached at lengths of 3-9 inches (10-23 cm). The estimated maximum age of lane snapper is 10 years (Discover fishes-Florida Museum of Natural History 2017).*

First OBSERVATION 28 Aug 2021 AREA-1

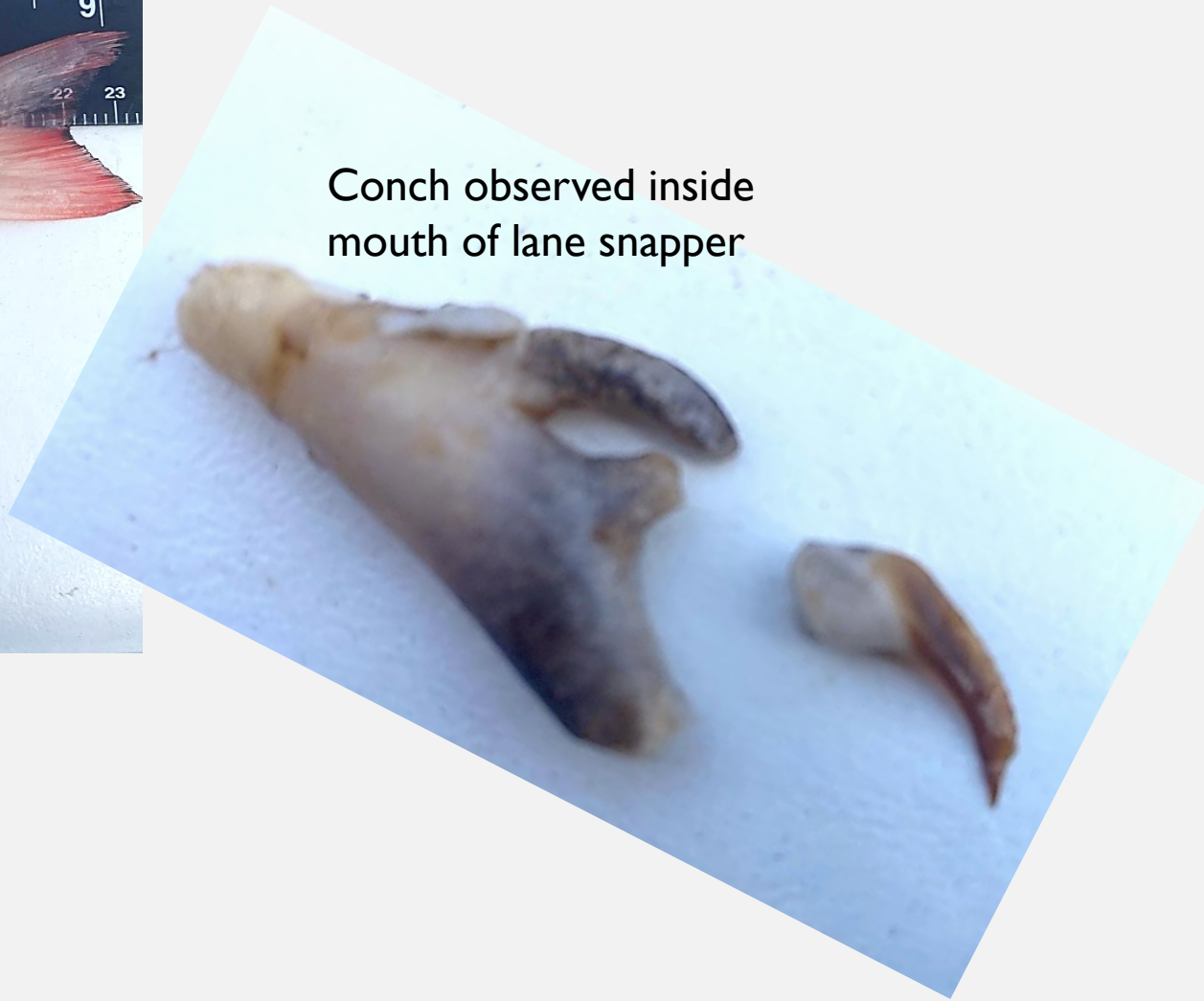


CONCH PROBABLY CONSUMED DURING DAYTIME

Second OBSERVATION 23 Feb 2022 AREA-1

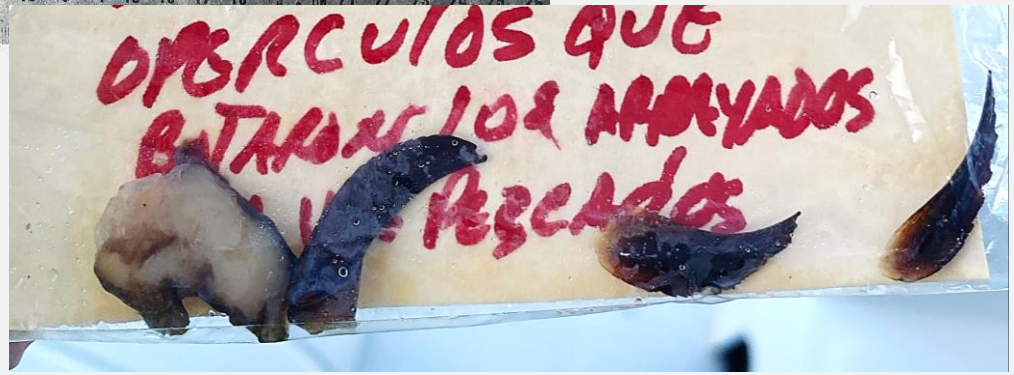


Conch observed inside mouth of lane snapper



OBSERVATIONS AREA-3

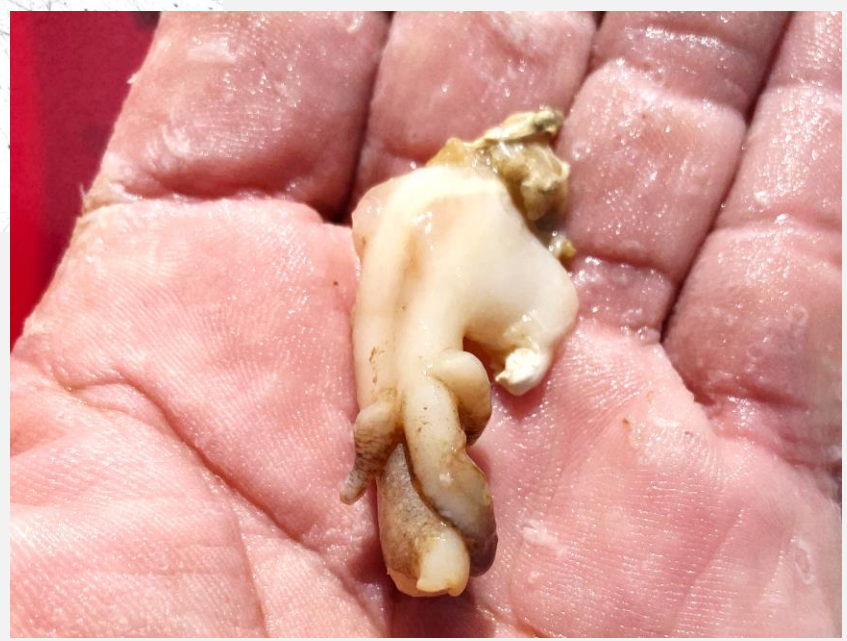
- From 16 Jan to 25 Feb 2022: 5 out of 8 fishing trips included lane snapper with remains of conch present in the stomach or regurgitated on the boat
- Images: Operculum from conch species regurgitated on the boat or found in the stomach



Regurgitated once landed

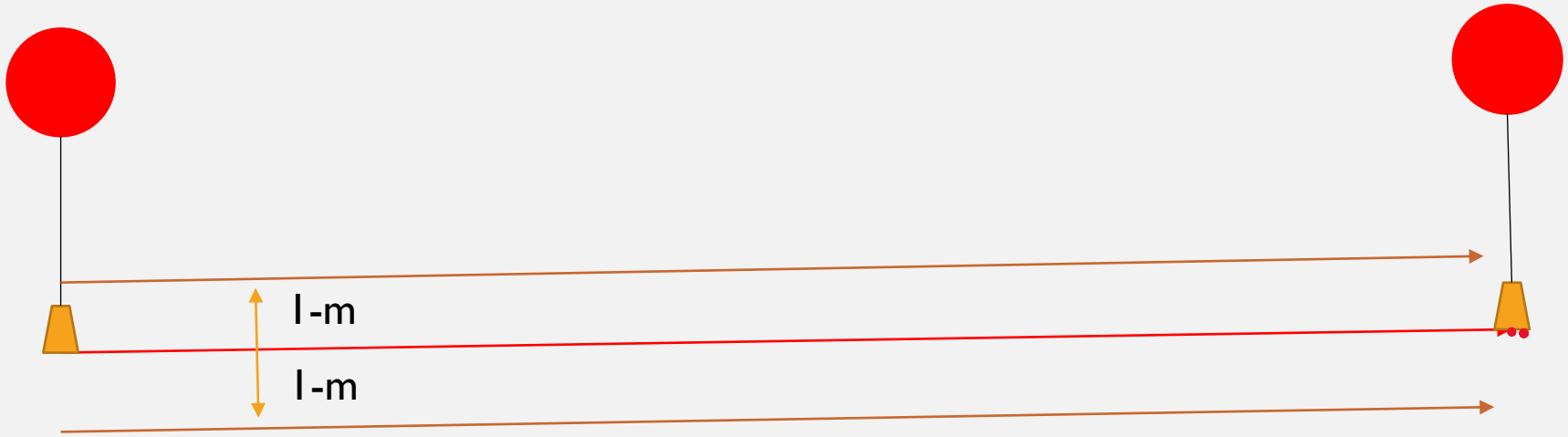
OBSERVATIONS AREA-3

- Lane snapper with conch parts in stomachs or regurgitated on the boat; observed that light barotrauma aided in expelling stomach contents via regurgitation
- During the ascent (fight) we observed that some lane snapper end up expelling stomach content in the water column



TRANSECT DESCRIPTION
AREA-3

- Diving transects
- GPS coordinate from point A(start) to point B(end) of each transect, to record transect length
- Diver made sure there was no slack on the buoy line
- Conch count was made 1 m each side of the transect
- Transect 1: Visual and video observation(*Test). 2 m^2 of the end of the transect was used to determine how many conch were alive and how many conch shells were empty (T13/11L/2E)
- Transects 2 and 3: Visual count of conch from point A to point B



REMARKABLE DENSITY OBSERVATION

- 3 Diving Transects: 208 small conch / 172.8 m^2 of sampled area = 1.2 conch/ m^2

- Transect 1: In 2 m^2 observed 13 small conch total; 11 live and 2 empty shells w/ no evident scars

- **If conch density is evenly distributed**, **Area-3 (**411,635 m^2) **could contain** ~343,029 conch

BUT: Sanders (1988) in Lucarillo Bay off La Parguera, reported that *S. pugilis* population extended over a broad area of 9,280 m^2. Surveying within a surrounding extra 5,000 m^2 area, no additional conch noted. The full area of the bay is ~84,360 m^2. Thus, the *S. pugilis* population occupied no more than 11% of the bay. In the 2-year tagging study, documented that abundance varied seasonally (most likely due to burial behavior, Percharde 1970) with maximum numbers occurring in November as temperatures declined but still not cold. Maximum population size was 1,334 yielding a density of 0.14 conch/m^2 over the survey area.

REMARKABLE DENSITY (CONT.)

- **Area-3**: Lane snapper charter fishing ground sampled with 3 transects: this section correspond to 2.5% of the total area or 10,360 m^2. This area potentially could contain 12,432 small conch if density are extrapolated from transect findings
- Assuming a potential density of 1.2/m^2 – approximately 11% of the bay area of Area-3 would contain 45,280 conch
- More research is needed!

RELEVANT OBSERVATIONS

- Lane Snapper with evidence of conch species consumption: **23.0 – 32.7 cm TL (all adult sizes)**
- Density of small conch species from transects in Area-3: **1.2/m^2**
- Conch parts from lane snapper mainly consisted of the soft tissue close to the operculum + operculum; this part of conch extends out of the shell and are **potentially** vulnerable to nipping
- Double and triple conch clusters observed during transect dives
- **No conch shells or fragments were observed inside lane snapper stomachs**
- **No signs of crush shells or shells with scars from bigger predators were observed during transect dives**
- Most of the conch individuals observed in Area-3 were *S. pugilis* (indentified to species using conch shell diagnostics then released specimens live)
- 1-2 additional conch species may occur in Area-3 because morphological differences were observed for the operculum of live small conch during transects dives

AREA-1 VS. AREA-3 (AUG/28/2021 TO FEB/25/2022)

- **Area-1**: In 62 fishing trips, I observed during 2 trips conch piece(s) regurgitated at the boat or in the stomach (3.2% probability to find conch parts per trip, opportunistically)

- **Area-3**: In 8 fishing trips, I observed during 5 trips, multiple conch pieces regurgitated at the boat or in the stomach (62.5% probability to find conch parts per trip, opportunistically)

- Observations of conch parts (regurgitated or in stomach) was 19.3% times more likely in Area-3 versus Area-1

QUESTIONS ANSWERED

- Lane snapper *L. synagris* directly feed on conch species in waters of east PR?

  YES

- Documenting lane snapper predation on conch species provides important information about ecosystem interactions?

  YES

- The main species of conch observed so far in Area-3 is *Strombus pugilis*

  CONFIRMED (Thanks to the experts for the support)

QUESTIONS TO BE ANSWERED

- How/in what manner does lane snapper feed on conch species?
- Which conch species are consumed by lane snapper?
- Which species of conch occur in Area-3?
- What factors drive the relatively high density of conch in this area?
- Trophic relation relevance?
- Are there temporal/seasonal shifts in density of conch species in Area-3?
- What are the habitat characteristics of Area-3?

HISTORICAL DILEMMA
ANECDOTAL VS SCIENTIFIC INFORMATION

ANECDOTAL: Not necessarily true or reliable, because it is based on personal accounts rather than facts or research (Oxford lenguajes, online)

TOO OFTEN WE HEAR FROM FISHERMEN: "Can you help me to document, record, or corroborate my observations? I've seen this happening for more than 30 years!"

ECOSYSTEM BASED FISHERY MANAGEMENT(EBFM)

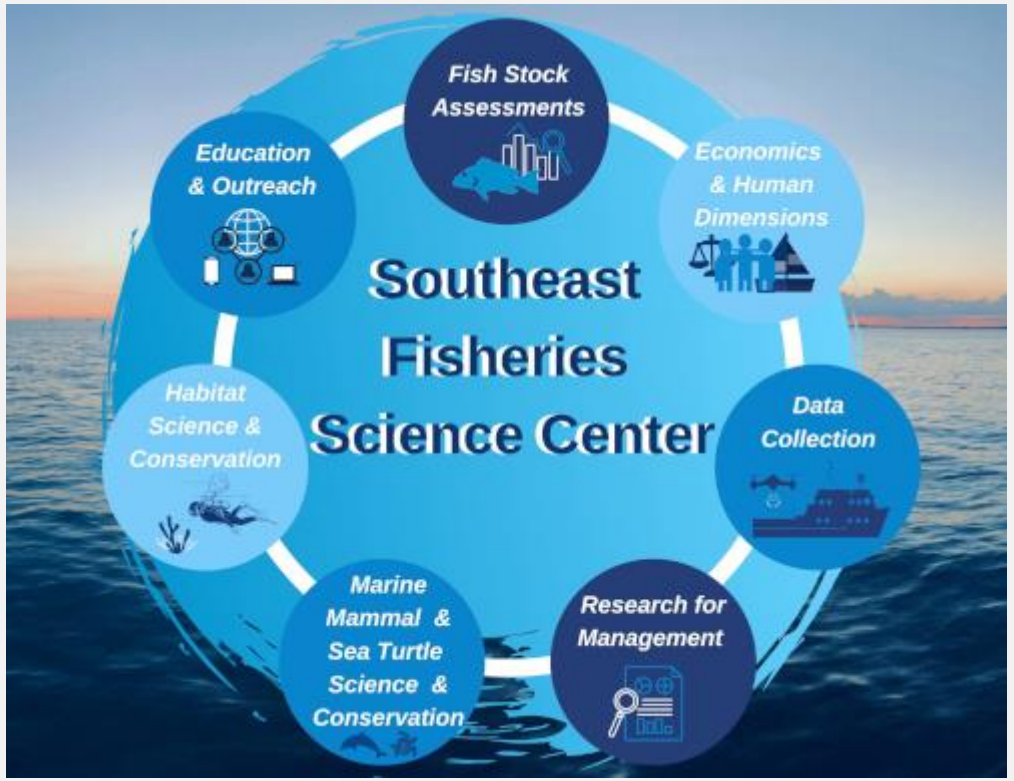
HOW CAN ECOSYSTEM BASED MANAGEMENT WORK BETTER?

- Must include the best scientific information, tools, models, and data development
- Create NEW mechanisms to corroborate industry expert observations utilizing rigorous scientific-based methods
- Pursue NEW scientific input from all stakeholders for model development and in the decision-making process. This means that industry contributions should not only be limited to anecdotal information

HOPE AND WAYS TO DO IT!

- Find a scientist that truly recognizes that your knowledge and experience are valuable
- Discuss with a scientist how to move forward on starting the data collection process
- Make your self available to collaborate in scientific studies
- Continue to request support and industry engagement; participate in formal scientific data collections, especially the ones you recognize are important
- New momentum currently related to establishment of the NOAA SEFSC Caribbean Fisheries Branch – current interest expressed in support of fisheries data collection improvement and engagement with the stakeholders

Priorities of the NOAA NMFS Southeast Fisheries Science Center



MAKE YOUR <u>EXPERT</u> <u>OBSERVATIONS</u> COUNT AND BE PART OF THE SCIENTIFIC PROCESS! THIS IS THE ONLY WAY TO ENSURE RIGOROUS AND MEANINGFUL ECOSYSTEM BASED MANAGEMENT IN THE U.S. CARIBBEAN!

RECOMMENDATIONS

- Create a task force and allocate resources at local and national level to guide fisherman on how to collect/document/record and store initial relevant information from fishermen's perspectives.
- Support fishers in the design pf forms and other digital tools to collect initial data
- To facilitate the engagement of fishermen with researchers, cut costs, and speed up research tasks, propose establishing a list of future potential fishermen scientific collaborators (industry task force) – the list would potentially include information provided by each fisherman on their boats, licenses, target species, areas of expertise, and specialized skills
- Must report the research results to industry collaborators
- Include fishers on future studies in all developmental steps of fisheries-related scientific investigations – for example, include fishing associations, independent fishers, fishing villages and others

LESS ANEDOTAL AND MORE MEANINGFUL INFORMATION SUPPORTED BY ALL

PRESENTER MESSAGE

ANECDOTAL observations just waiting to be verified and proven true/reliable; these are based on **many years** of personal observations and generations of knowledge rather than hard facts or research that also change and evolve over time

Both complement each other and are essential to build the best information available for ecosystem-based fisheries management

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787FISHING RESEARCH PROJECT

787FISHING RESEARCH PROJECT is a private initiative from 787fishing charter. Our mission is to opportunistically collect preliminary data from day-to-day on the water. Making observations available to researchers, graduate students, and agencies for future research projects.

INITIATIVES IN PROGRESS:

1. Barotrauma (post released conditions on reef fish species)
2. Deep water Squid datasets and industry support to new fishing opportunities
3. Baitfish (Impacts of sargassum influx on baitfish availability and impacts on catch compositions)
4. Lane Snapper and *Strombus* sp. field observation (Presented today)

NOTE: These initiatives are grassroot, private donation of time and effort to support science development; follow-up formal research efforts are conducted in collaboration with researcher and agencies resource managers

QUESTIONS?