## WF4313/6413-Fisheries Management



## Announcements



Date: Wednesday, Sept. 12, 2018

Place: Thompson Hall, Room 118 5:00 PM

\*\*\*Pizza and Drinks provided at all meetings\*\*\*

> Questions? Bradley Richardson bmr380@msstate.edu

Dedicated to Strengthening the Fisheries Profession, Advancing Fisheries Science, & Conserving Fisheries Resources



AMERICAN FISHERIES Society MISSISSIPPI State UNIVERSITY Student Sub-UNIT



#### **Combining Model Predictions**



# Monitoring: Does the Hurricane Follow the Predicted Paths?



### MANAGEMENT CASE STUDY: STONE CRABS & SPINY LOBSTER

#### Management case study

## FWC tightens rules on use of certain stone crab traps

Saturday, September 5, 2015

BY TIMOTHY O'HARA Citizen Staff tohara@keysnews.com

State fishery managers have removed a loophole that gave some unscrupulous commercial trap fishermen a leg up on fellow fishermen and had serious impact on the lucrative spiny lobster fishery, which is centered in the Florida Keys.

The Florida Fish and Wildlife Conservation Commission (FWC) amended its regulations for stone crab traps used in Collier, Monroe and Miami-Dade counties. The FWC board approved the new rules this week.

http://keysnews.com/print/69399

#### What is the problem?



#### **Species Overlap**



#### Stone Crab & Gear



STONE CRAB: Menippe mercenaria or Menippe adina

#### **Example of standard plastic** Buoy shall be no smaller than 6" Commercial Must have legible **Stone Crab** X123 stone crab endorsement Trap number at least 2" tall Trap size 2' x 2' x 2' or a volume of 8 cubic feet **Degradable Panel** Traps shall be constructed of 51/2" x 31/2" either wood, wire or plastic Cypress or Throat (Entrance) untreated pine slat 51/2" x 31/2" no thicker than 3/4" If the throat is round Stone crab it shall not exceed 5" in diameter trap tag permanently attached

http://myfwc.com/fishing/saltwater/commercial/stone-crab/

#### Spiny Lobster & gear



#### Spiny Lobster: Panulirus argus

#### Example of a wood Commercial Spiny Lobster Trap

C123

Wood Slat Trap size shall be no larger than 3' x 2' x 2' or a volume of 12 cubic feet

These traps shall be constructed with wood slats that are a min. of 1.4" wide with a max. spacing between slats of 2.4"

Spiny lobster trap tag permanently attached Buoy min. 6" in diameter Must have spiny lobster endorsement number permanently affixed in legible figures at least 2" tall

> Throat (Entrance) min.  $6" \times 3\frac{1}{2}"$ Shall be located on the top horizontal section

http://myfwc.com/fishing/saltwater/commercial/spiny-lobster

111

#### Gear comparison



### Proposed rule change

- To prevent this unintended use of stone crab traps in the lobster fishery, industry has requested rule changes to eliminate their use in the primary areas where the lobster fishery and stone crab fishery overlap.
- Large stone crab entrances capture more lobster
- To prevent the use of stone crab traps <u>in the</u> <u>lobster fishery industry</u> has requested rule changes to eliminate the use of atypical stone crab traps in the primary areas where the lobster fishery and stone crab fishery overlap.

#### Gear





### What is bycatch

The definition of bycatch, as stated in the Magnuson-Stevens Fishery Conservation and Management Act, is:

Fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch and release fishery management program.

#### Conceptually



#### Conceptually



#### **Control variables**



#### Management: control

- Management Objective: Minimize Spiny Lobster catch in Stone Crab Gear
- 1. Stone crab effort
- 2. Spiny lobster effort
- 3. Stone Crab catchability in Stone Crab gear
- 4. Spiny Lobster catchability in Spiny Lobster gear
- 5. Spiny Lobster catchability in Stone Crab gear

### Managing control variables

- Objective: Minimize Spiny Lobster catch in Stone Crab Gear
- 1. Stone crab effort
- 2. Spiny lobster effort
- 3. Stone Crab catchability in Stone Crab gear
- Spiny Lobster catchability in Spiny Lobster gear
- 5. Spiny Lobster catchability in Stone Crab gear

#### Gear





#### **Rule Change-Approved by Commission**

Proposed Rule Language: Stone Crab Trap Gear Specifications

> Draft Rule Hearing April 16, 2015

68B-13.008 Gear, Trap Construction, Commercial Trap Marking Requirements, Trap Working Regulations, Trap Transfer.

No change.

(2) TRAP CONSTRUCTION. No person, firm, or corporation shall transport on the water, fish with, or cause to be fished with, set, or placed, in the harvest of stone crabs, any trap which does not meet the following requirements:

(a) Each trap shall be constructed of either wood, plastic, or wire.

(b) Except as described in subsection (c), such Such traps shall have a maximum dimension of 24 inches, by 24 inches, by 24 inches, by 24 inches or a volume of 8 cubic feet.

(c) In Collier, Monroe, and Miami-Dade counties, such traps shall have a maximum dimension of 16 inches, by 20 inches, by 12 inches or a volume of 3,840 cubic inches.

(d) (c)1. The throat or entrance to all wood and plastic traps shall be located on the top horizontal section of the trap.

a. The use of round throats is prohibited in state and federal waters off Collier, Monroe, and Miami-Dade counties. In state and federal waters off Collier, Monroe, and Miami-Dade counties, the inside of the throat in the longer dimension shall not exceed 5 1/2 inches and in the shorter dimension shall not exceed 3 1/8 inches.

b. For traps fished anywhere other than state or federal waters off Collier, Monroe, or Miami-Dade counties, if H the throat is longer in one dimension, the throat size in the longer dimension shall not exceed 5 1/2 inches and in the shorter dimension shall not exceed 3 1/2 inches. If the throat is round, the throat size shall not exceed 5 inches in diameter.

2. through 4.: No change.

(3) – (5): No change.

#### Governance

"The Florida Constitution authorizes the Fish and Wildlife Conservation Commission to enact rules and regulations regarding the state's fish and wildlife resources.



To do this, the seven Commissioners meet five times each year to hear staff reports, consider rule proposals, and conduct other Commission business. Because stakeholder involvement is a crucial part of the process, we conduct Commission meetings in different locations across the state offering citizens the opportunity to address the Commission about issues under consideration."

Year class dynamics drive population age & size structure.

#### Year class dynamics











#### At any given year



#### At any given year



#### Stable age distribution



#### Equilibrium age distribution



Cohort dynamics are governed by mortality and growth. In other words, as fish grow over time there are fewer of them but they are bigger.

#### A cohort of recruits (yr = 2015.0)



#### Growth & survival (yr = 2015.15)



#### Growth & survival (yr = 2015.30)



#### Growth & survival (yr = 2015.45)



#### Growth & survival (yr = 2015.60)



#### Growth & survival (yr = 2015.75)



#### Growth & survival (yr = 2015.90)



#### Growth & survival (yr = 2016.0)



#### Growth & survival (yr = 2016.0)



#### Growth & survival (yr = 2017.0)



#### Growth & survival (yr = 2018.0)



#### Growth & survival (yr = 2019.0)



#### Growth & survival (yr = 2020.0)



In recreational and commercial fisheries fishing mortality depends on size because of length limits and gear restrictions (e.g., mesh size)

# Fishing mortality depends on age & size



#### Effect of fishing



#### Effect of fishing



Managing fisheries for size related objectives is challenging because you have to contend with the interaction of mortality and growth. Additional fishing mortality can change size structure by decreasing abundance of older, larger fish.

Lets look at a population of Black Crappie with a natural mortality rate (*M*) of 0.8 for the following levels of fishing mortalities: 0.0, 0.2, and 0.4, 0.6, 0.8



Abundance

Length (cm)

1



Abundance

Length (cm)



Abundance

Length (cm)





Length (cm)



Abundance