



# ***Dolphin Wahoo Participatory Workshops: Results and Implications for Management***

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**SAFMC Council Meeting**

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# Workshop Overview

**GOAL:** Increase communication between scientists/ managers and fishermen to better understand the dolphin wahoo fishery in the South Atlantic.

**Main method:** Participatory conceptual modeling of the Dolphin Wahoo fishery in NC/VA & FL Keys

- *Map system of key factors (socioeconomic, physical, biological) that affect the fishery*
- *Identify major concerns, values and preferred objectives related to the fishery and related ecosystem*
- *Develop hypotheses - how changes in system affect fishery, businesses & communities*
- *Identify key questions and information gaps*

## Collaborators

- *SEFSC (lead): Mandy Karnauskas & Matt McPherson*
- *SAFMC (Julia and John)*
- *MREP & Gulf of Maine Research Institute*
- *All of the fishermen & community participants!*

# Methods & Participants

## NC/VA Workshops - 2020

**Beaufort, NC – March 9**

7 participants (for-hire, private)

**Wanchese, NC – March 10**

14 participants (commercial, for-hire)

**Virginia Beach, VA – March 11**

4 participants (for-hire, private)



## Florida Workshops - 2021

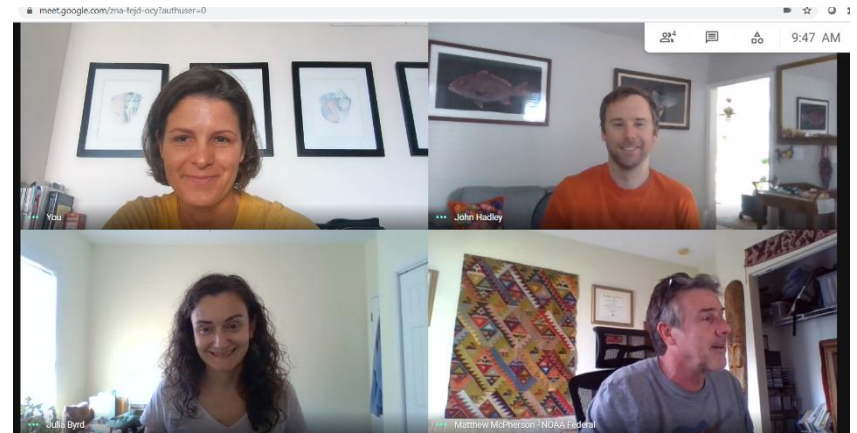
Scheduled for summer 2020; postponed due to COVID; decision to go virtual

**One-on-one phone calls - March 2021**

12 participants (for-hire, private)

**Group webinar – April 12**

9 participants (for hire, private)



# Summary of NC/VA findings

- Sub-regional variations in access to coast and Gulf Stream, local demand for species, shark populations
- Can impact local abundance of dolphin, even if overall effort or catch has not increased
- “Meat fishery”
- Charter demand driven by tuna and dolphin
- Concerns about accountability, particularly with recreational effort
- Overall, relatively little discussion of wahoo



# Summary of S. FL findings

- Dolphin has become a symbol of S FL with important economic role (rec. fishing, marketing)
- Dolphin size, abundance markedly decreasing (~last 5 yrs)
- Effort and cost to catch dolphin increasing
- Growing number, power and efficiency of private anglers
- Relatively little discussion of wahoo; spearfishing a concern
- Concerns about international fisheries
- Some concern regarding loss of bag limit sales





# How S FL differed from NC/VA

- Bigger emphasis on physical/biological drivers of dolphin distribution and local abundance
- Major concern about local and Atlantic-wide depletion; more support for stricter regulations on dolphin
- Atlantic-wide abundance thought to be impacted by non-local commercial longlining and recreational fishing pressure.
- Sport/leisure vs. meat fishery
- Less variation in drivers of recreational effort (distance from shore, coastal development)



# Perceptions of regulatory impacts

	South Florida / Keys	North Carolina / Virginia
Bag limits on dolphin	Individual bag limit OK, could live with reduction. Tend to support much smaller trip limit.	Reductions in bag/trip limit linked to reduced customer satisfaction and decrease in charter demand (Wanchese / Beaufort)
Size limits on dolphin	Widespread support to increase size limit to increase spawning biomass (but some individuals thought size limits would have no impact)	Size limits could shorten season because of availability of size classes and effort would shift to trigger and beeliners (Beaufort); no impacts noted in Wanchese or Virginia Beach
Level of regulation	Generally low regulation levels has allowed increasing effort in private, charter, and (non-local) commercial sectors	Lack of data and few regulations have led to unconstrained effort increases in private and commercial sectors
Effort shifts – commercial	Decrease in local commercial sales of dolphin due to regulations restricting sales by charters.	Increase in pressure on dolphin due to blueline tilefish regulations and tuna availability
Effort shifts – recreational	Effort may be shifting to snappers, porgies, etc. due to declines in dolphin population, not regulations.	Reduction in season length for yellowfin tuna has increased pressure on dolphin and wahoo (Beaufort); availability of tunas reduces effort on dolphin (Wanchese / Virginia Beach)

# Major hypotheses/questions

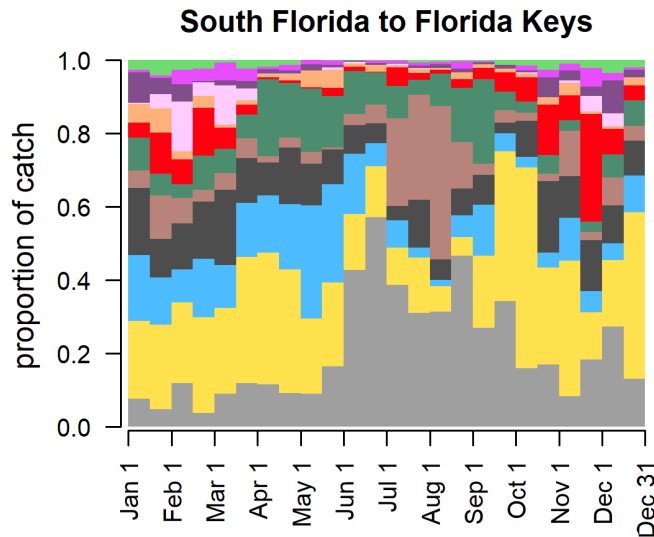
- H1: Role of species in fisheries is variable across region → how does species usage differ?
- H2: Dolphin populations drastically changed in S Florida in last 5 years → what is going on?
- H3: Economic forces have caused an increase in commercial activity → localized depletion?
- H4: Power and scope of private recreational fleet/effort is expanding rapidly





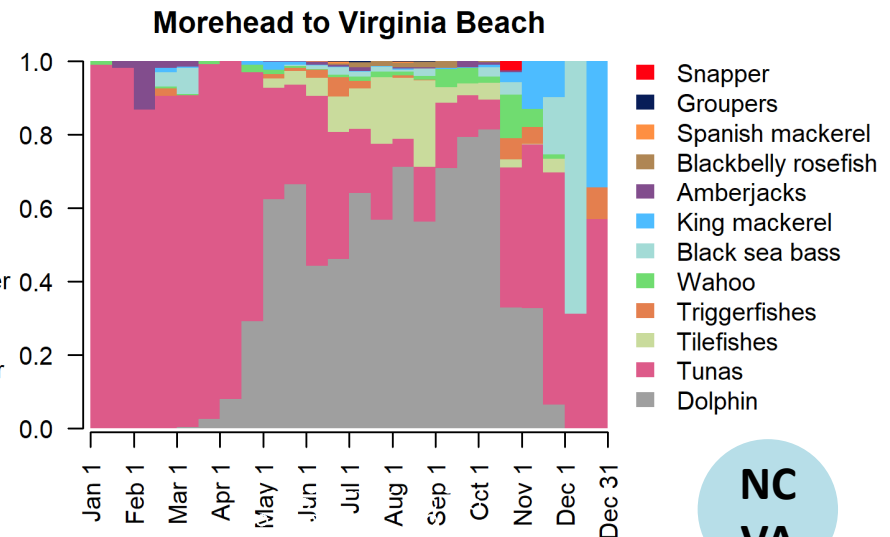
# H1: Role of species in fisheries is highly variable across region

Social media photo analysis – summary of top 12 species in each region



S FL

- Opportunistic fishery with more species diversity
- Dolphin year-round but dominates June – Oct
- Yellowtail primary “fallback”
- Wahoo 12<sup>th</sup> most abundant



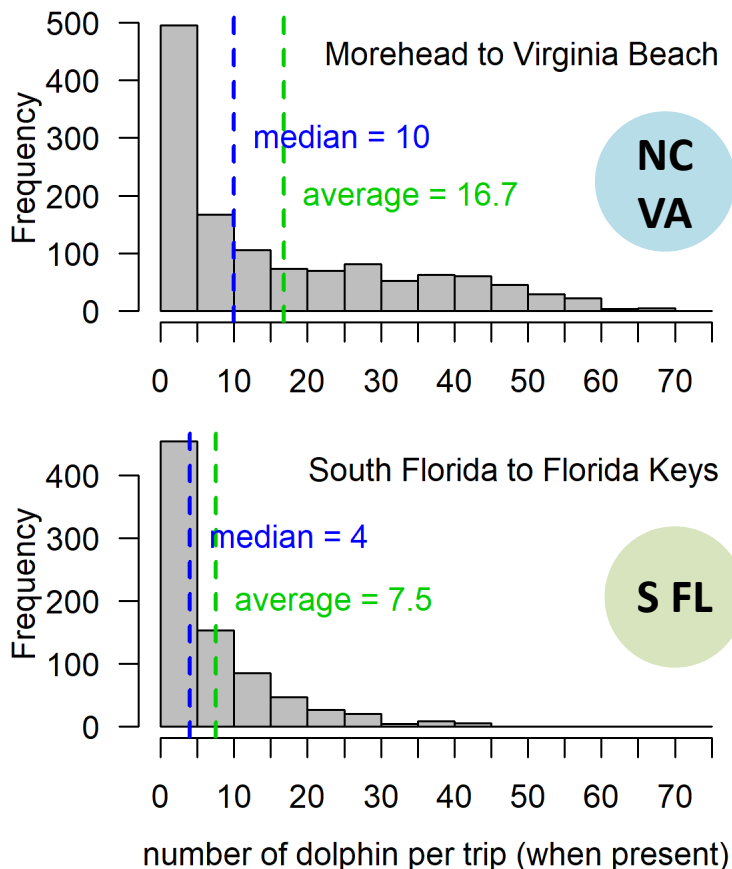
NC  
VA

- Dominated by tunas Dec-Apr, shifts largely to dolphin May - Oct
- Wahoo 5<sup>th</sup> most abundant in catch
- King mackerel winter fishery

SOURCE: SEFSC social media analysis

# H1: Role of species in fisheries is highly variable across region

## Social media photo analysis



SOURCE: SEFSC social media analysis

## MRIP intercept surveys

### NC dolphin target trips:

Average charter trip duration: 10.26 hrs

Average hours fished: **6.7 hrs**

Average % trips >3mi offshore: **99%**

*"the opportunity to catch a lot is important"*

*"meat fishery"*

### FL dolphin target trips:

Average charter trip duration: N/A

Average hours fished: **4.7 hrs**

Average % trips >3mi offshore: **78%**

*"on a good day we can catch 4-5 dolphin"*

*"sport/leisure fishery"*

SOURCE: MRIP intercept surveys (2015 – 2019)

# H2: Dolphin populations drastically changed in S Florida in last 5 years

**Chlorophyll-a**

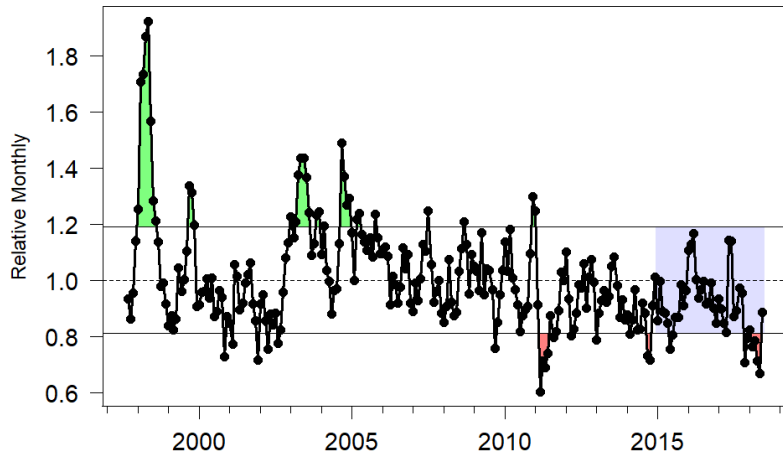


Figure 6.1. Mean monthly chlorophyll-a anomalies on the U.S. South Atlantic continental shelf.

South Atlantic Ecosystem Status Report shows a number of physical oceanographic changes in last 5-10 years, consistent with many fishermen's observations

**Bottom Temperature**

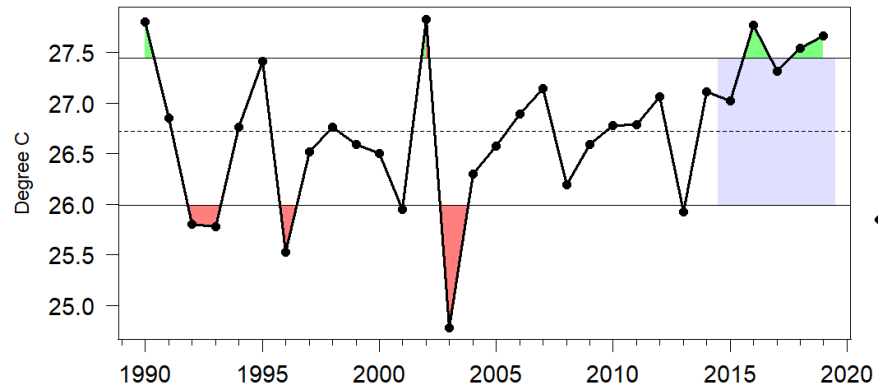


Figure 4.2. Mean annual (April to September) bottom temperature from SERFS surveys in the South Atlantic Bight.

**Upwelling Index**

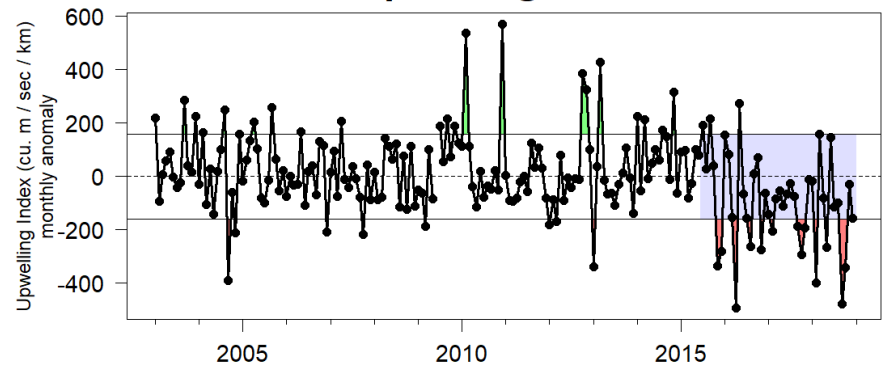


Figure 4.6. Monthly upwelling index calculated from buoy wind data (Grays Reef station 41008).

# H2: Dolphin populations drastically changed in S Florida in last 5 years

Dolphin have specific temperature preferences

## Remote Predictions of Mahi-Mahi (*Coryphaena hippurus*) Spawning in the Open Ocean Using Summarized Accelerometry Data

Lela S. Schlenker<sup>1\*†</sup>, Robin Faillietaz<sup>2†</sup>, John D. Stieglitz<sup>3</sup>, Chi Hin Lam<sup>4</sup>, Ronald H. Hoenig<sup>3</sup>, Georgina K. Cox<sup>1</sup>, Rachael M. Heuer<sup>1</sup>, Christina Pasparakis<sup>1†</sup>, Daniel D. Benetti<sup>3</sup>, Claire B. Paris<sup>2</sup> and Martin Grosell<sup>1</sup>

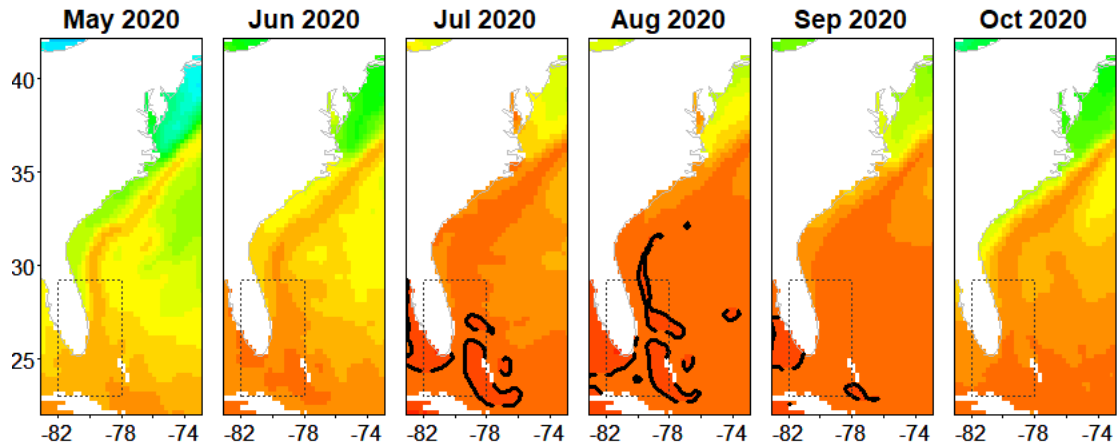
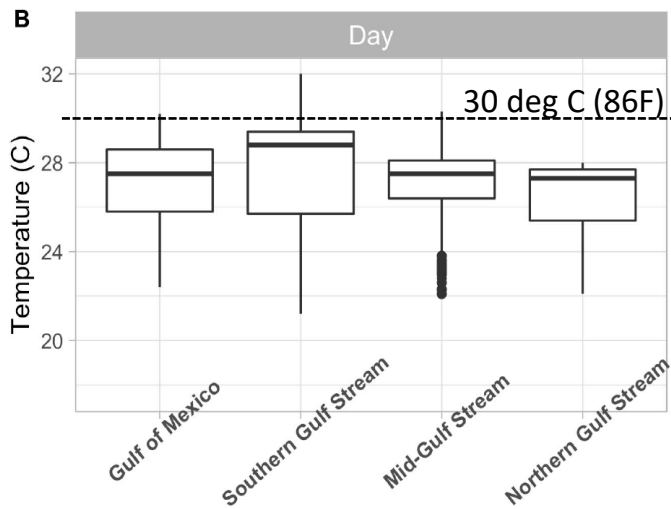
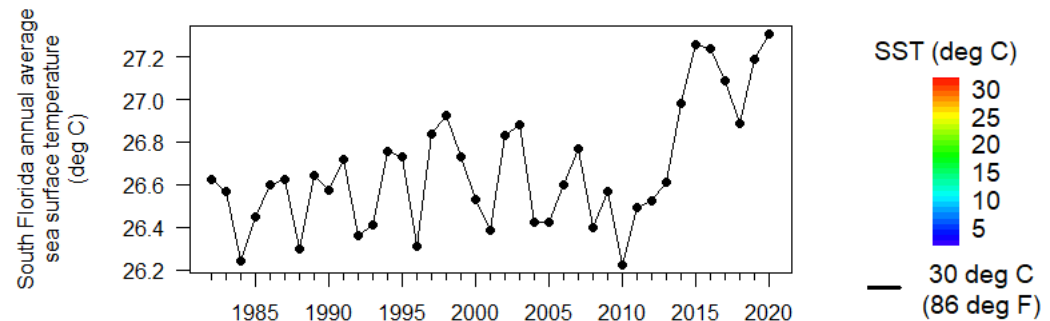
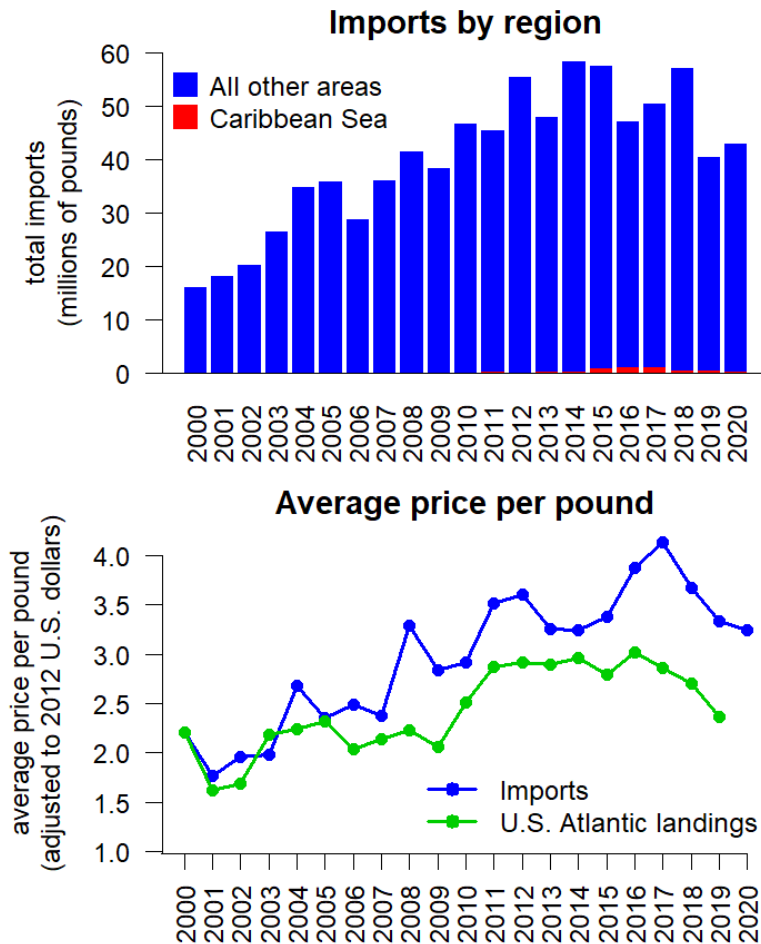


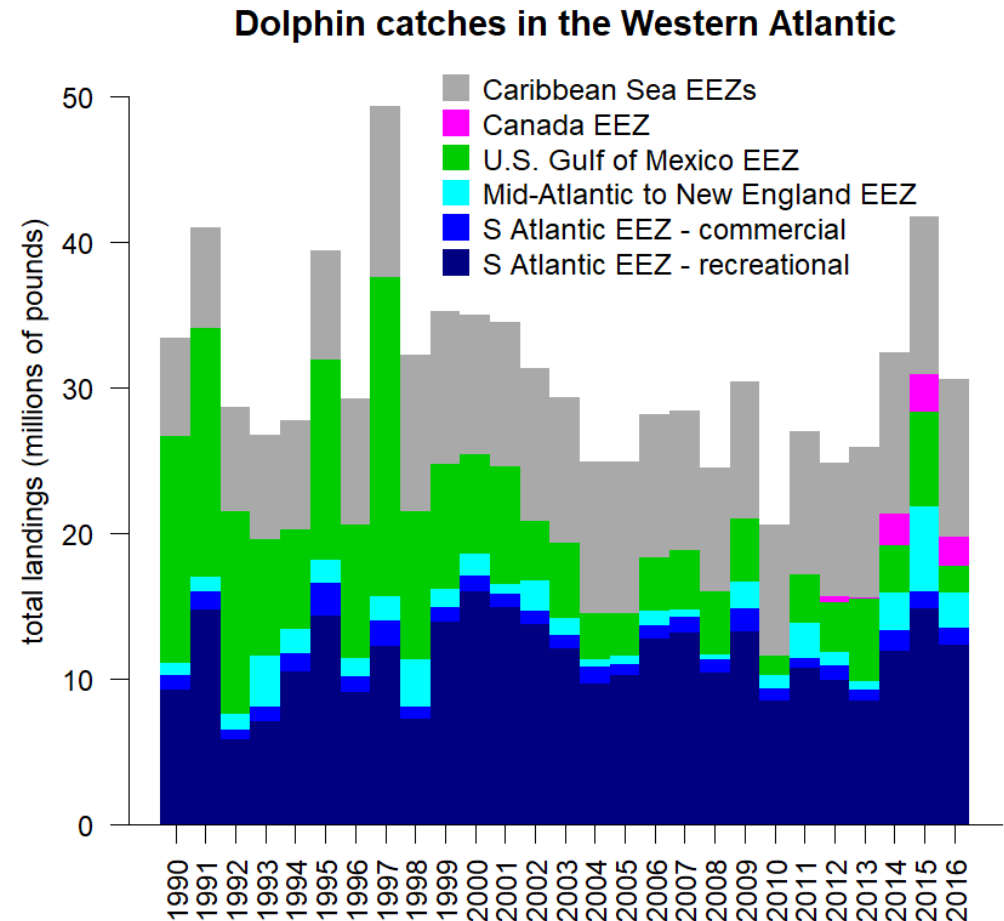
FIGURE 8 | Temperature distributions of tagged mahi-mahi by region.

SOURCE: NOAA/National Centers for Environmental Information  
1/4 Degree Daily Optimum Interpolation Sea Surface  
Temperature (OISST) Analysis, Version 2.1 - Final

# H3: Economic forces have caused an increase in commercial activity



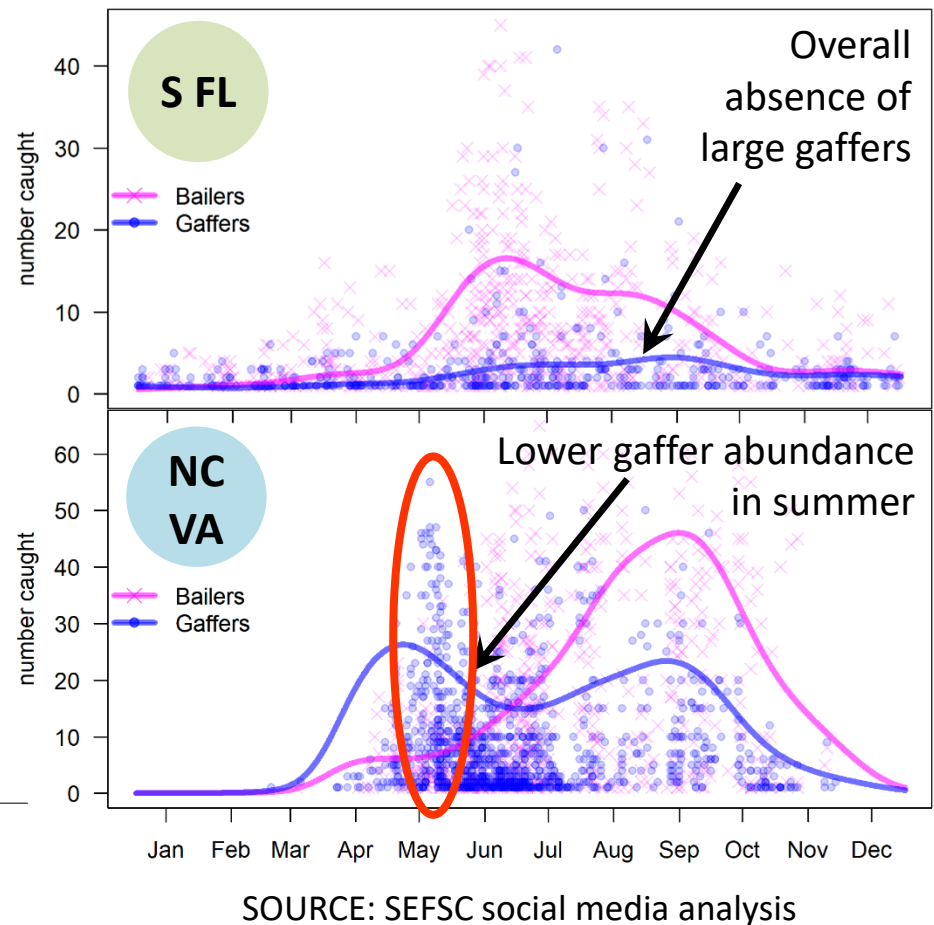
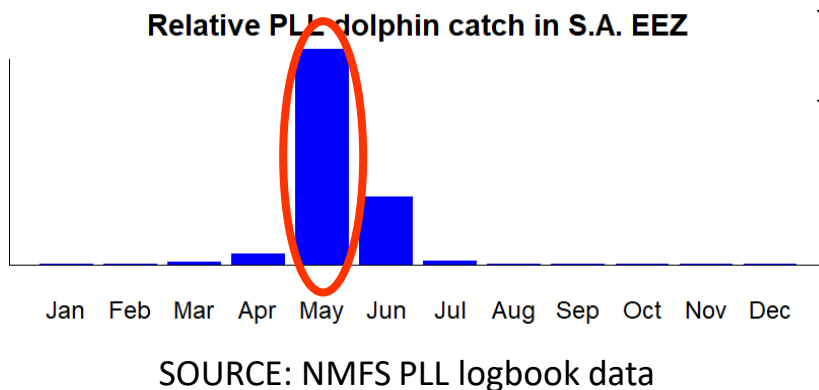
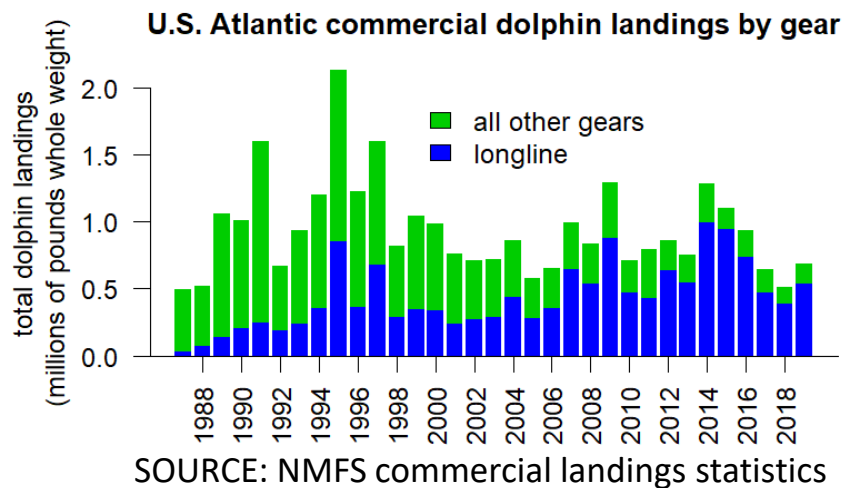
SOURCE: NMFS foreign trade data,  
NMFS commercial landings statistics



SOURCE: NMFS commercial landings statistics;  
Zeller and Pauly, 2015 ([www.seaaroundus.org](http://www.seaaroundus.org))

# H3: Economic forces have caused an increase in commercial activity

Concern of increased longlining impacting for-hire sector





# H4: Power and scope of private recreational fleet expanding rapidly

SOURCE: South Atlantic Ecosystem Status Report

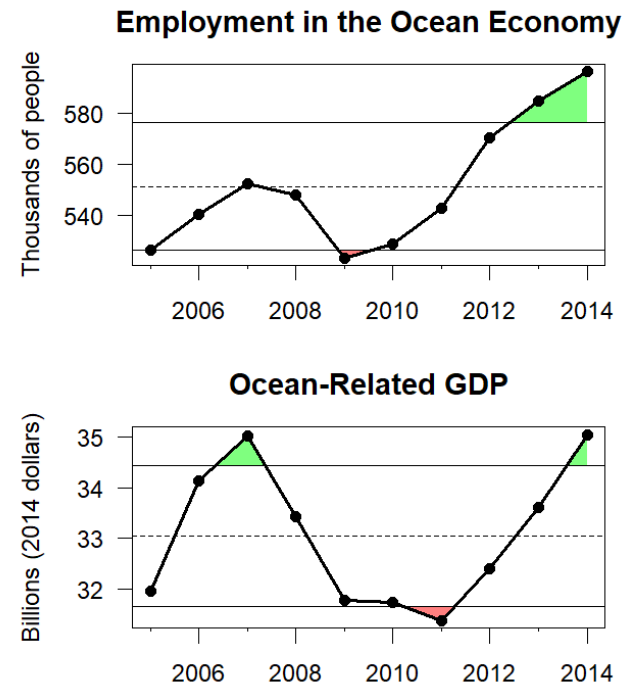
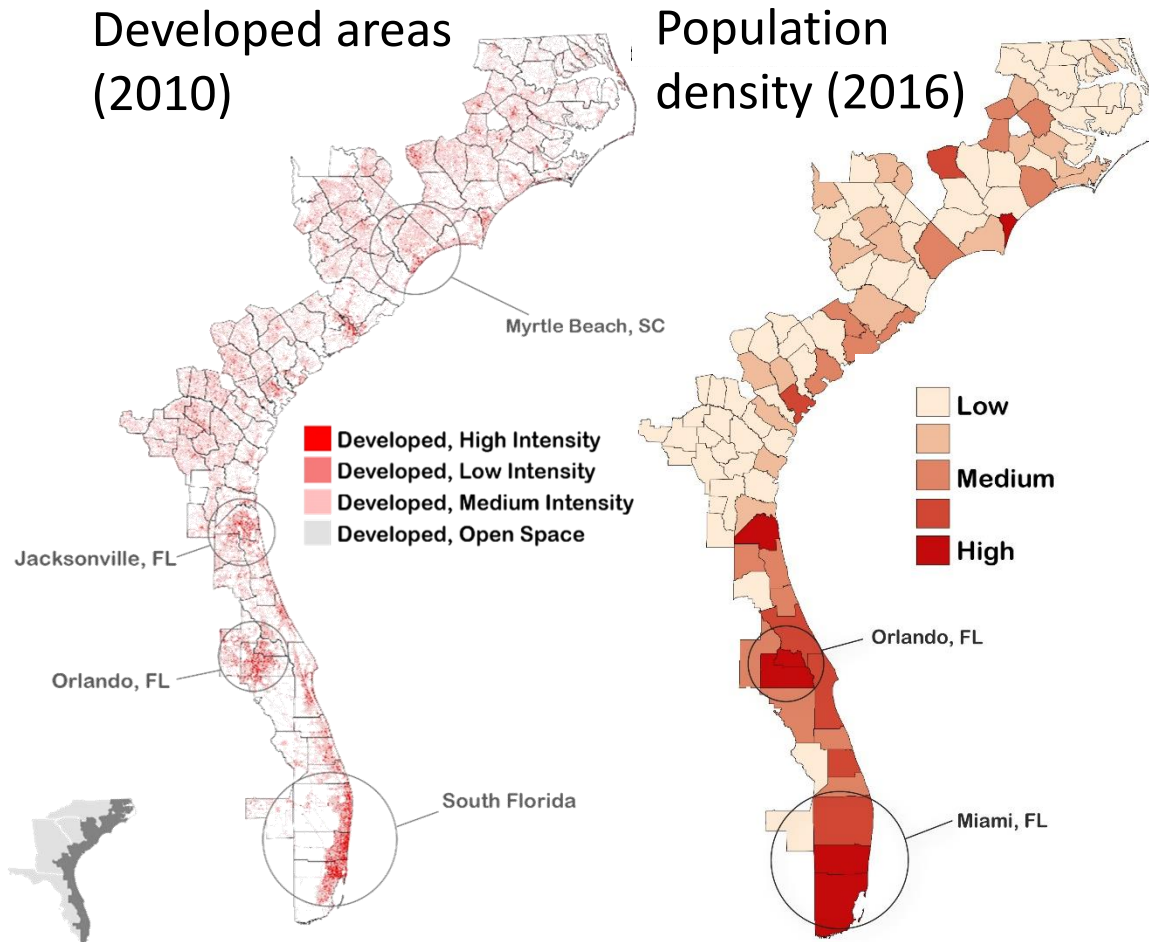
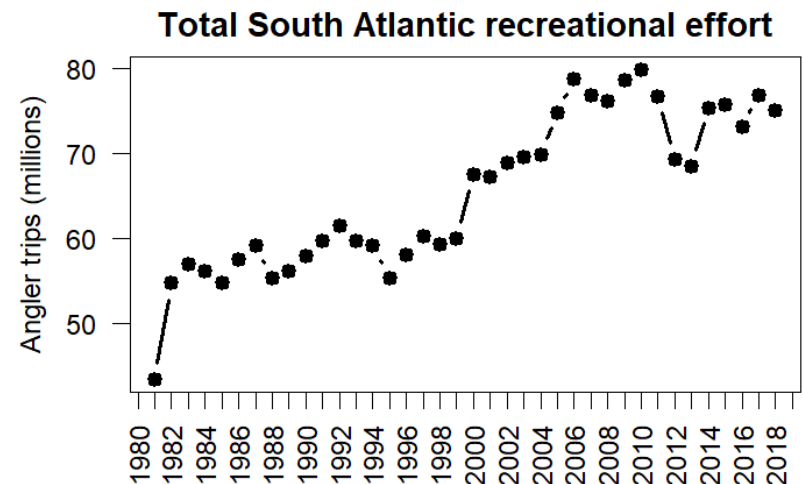
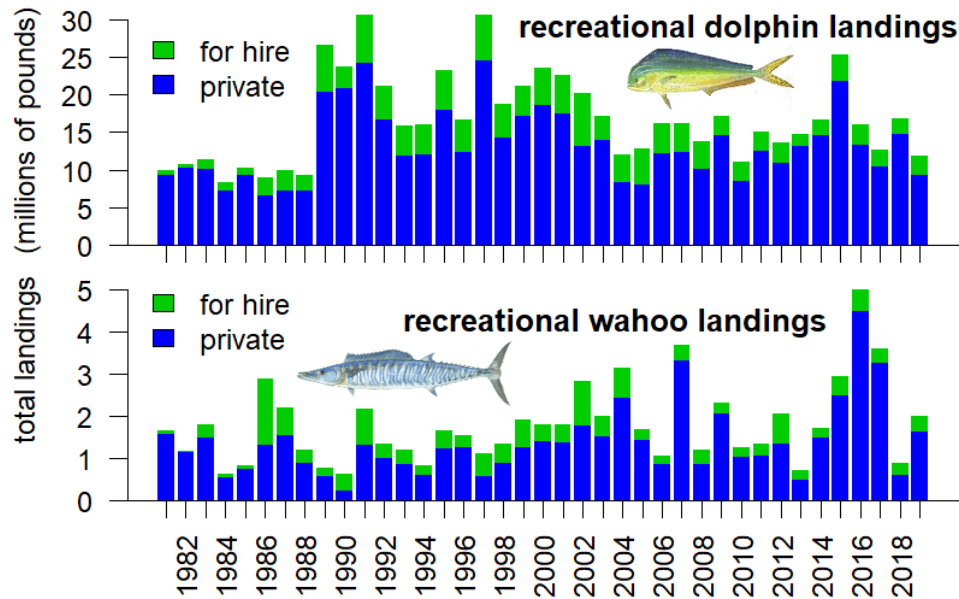


Figure 9.6. Ocean-related employment (top) and gross domestic product (bottom, adjusted to 2014 dollars) across the South Atlantic region.

**Access to coast + human population growth + strong economy**

# H4: Power and scope of private recreational fleet expanding rapidly



SOURCE: MRIP FES

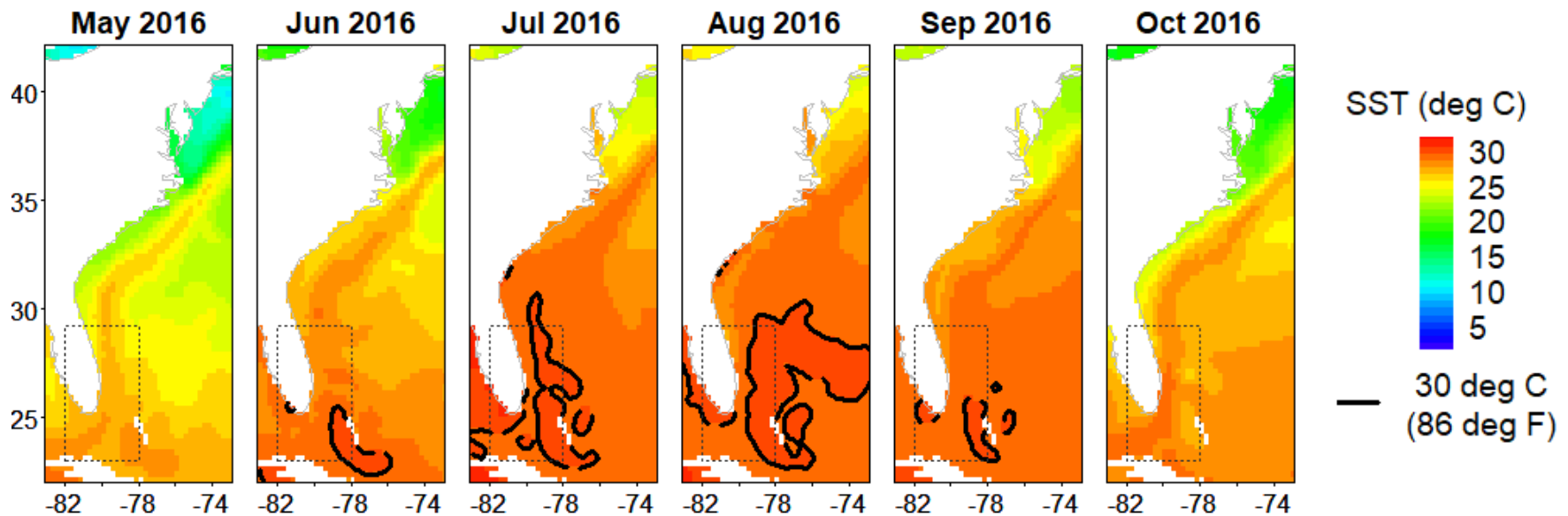
# Conclusions

C1: Highly variable drivers of resource use at sub-regional level → different values related to management of stock



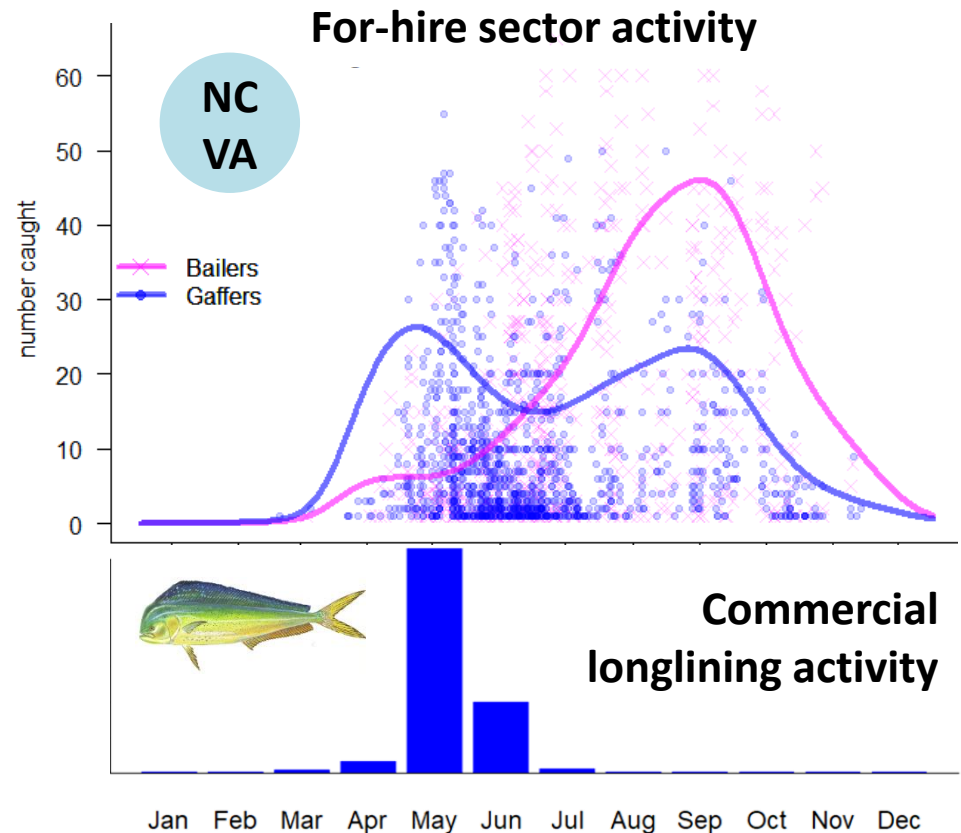
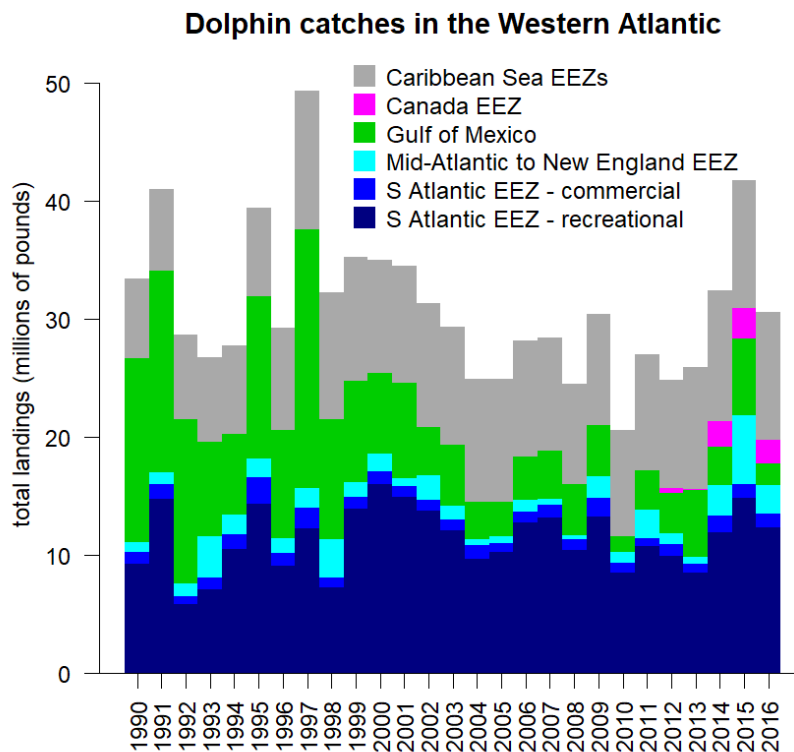
# Conclusions

C2: Environmental signal → implications for efficacy of management



# Conclusions

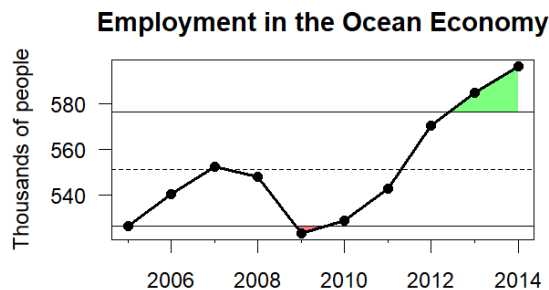
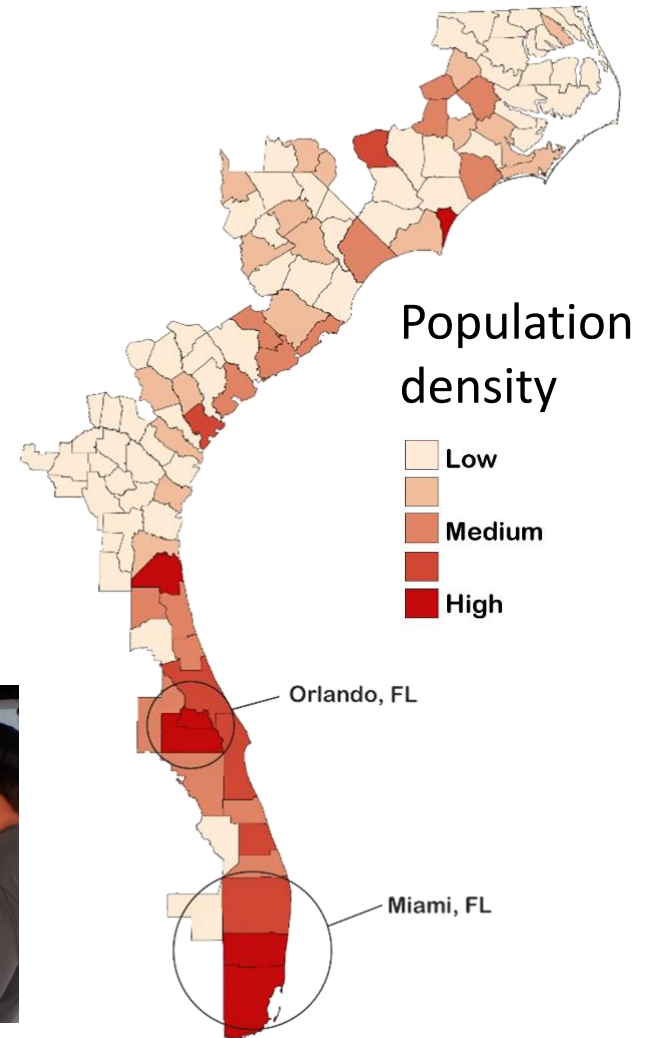
C3: Ensuring sustainable harvest vs. addressing usage patterns and localized conflict





# Conclusions

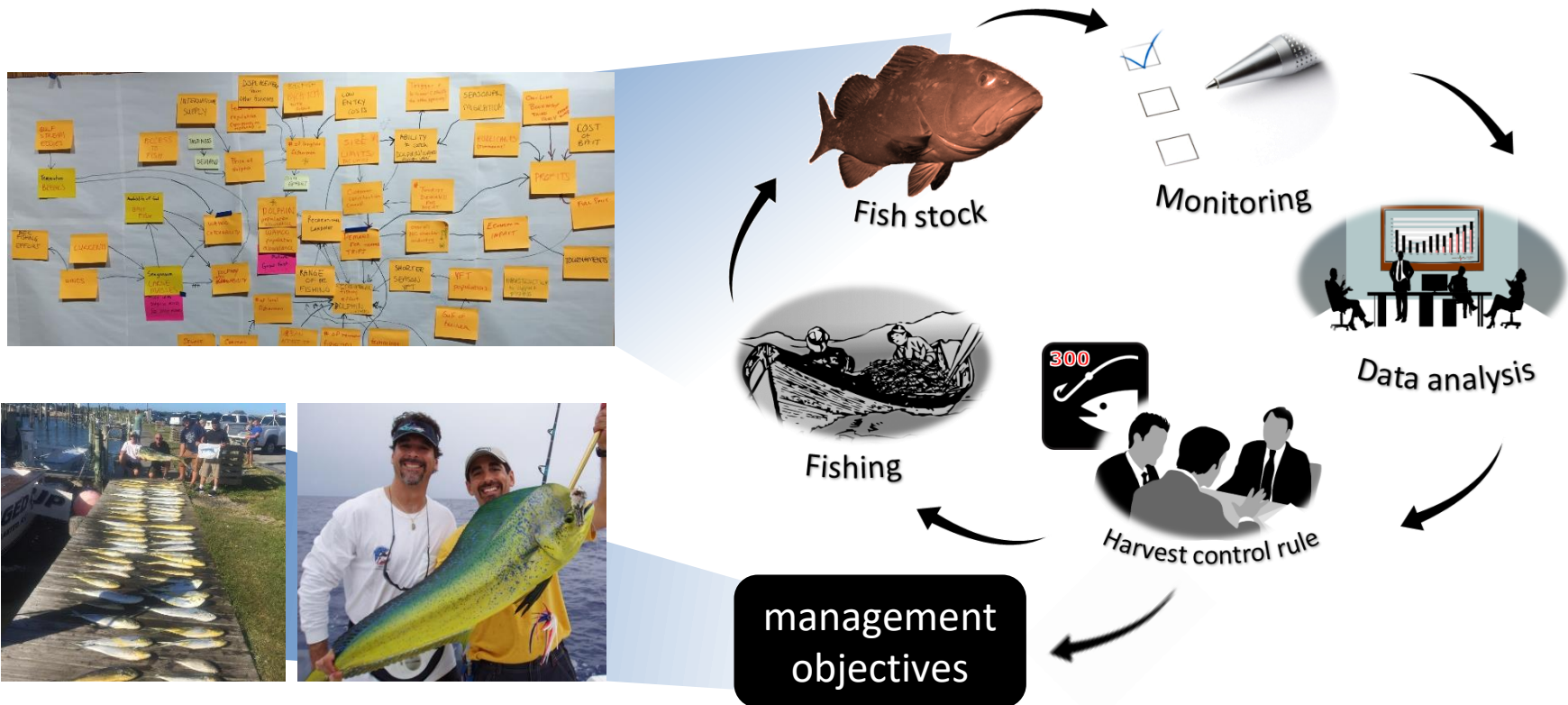
C4: Private recreational effort is a pervasive concern





# Next steps

- Report for the Council
- Management Strategy Evaluation?



# Questions for SAFMC

- Are the interactive conceptual models useful for conveying the information gained?
- Which hypotheses are priority for further investigation?
- Are there any other major questions/hypotheses for further investigation?



# Acknowledgements

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