



# 2022 NATIONAL SALTWATER RECREATIONAL FISHERIES SUMMIT



**NOAA**  
**FISHERIES**



March 30, 2022

Session 3: Data Collection and Use



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FISHERIES**

Office of Science  
and Technology

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Marine  
Recreational  
Information  
Program

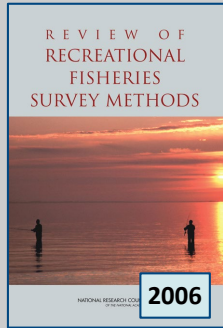
# Understanding recreational fisheries data collection, monitoring, assessments, and uncertainty

National Saltwater Recreational Fisheries Summit  
Arlington, VA  
March 29-30, 2022

Richard Cody  
Office of Science and Technology,  
Fisheries Statistics Division

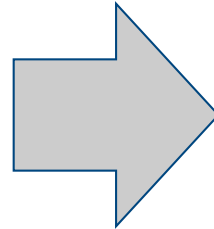
# Founded on Sound Science

## Marine Recreational Fisheries Statistics Survey (1979-2007)



“Both onsite and offsite [MRFSS sampling methods] suffer from **weaknesses** that may lead to **biases** in catch and effort estimation.”

*In 2007, the **Magnuson-Stevens Reauthorization Act** called on us to redesign MRFSS based on these recommendations.*

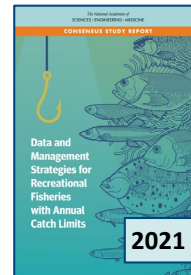


## Marine Recreational Information Program



“[The APAIS methodologies] are a **vast improvement**...and reflect **state-of-the-art methods** in survey sampling.”

“[The FES methodologies] are **major improvements** from the original Coastal Household Telephone Survey.”



“Within their intended scope and design constraints, MRIP data are **critically important for fisheries management**.”

*Today, the **Modern Fish Act** calls on us to respond to these recommendations.*



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# Marine Recreational Information Program (MRIP)

- The **state-regional-federal partnership** developed in 2008, that develops, improves, and implements a **national network of recreational fishing surveys** to estimate **total recreational catch**
- Built on a collaborative approach toward:
  - Implementing **carefully designed surveys**
  - Collecting **high-quality data**
  - Producing **sound statistics** that help scientists and managers maintain sustainable fisheries



# A National Network of Regional Surveys

28

Data collection programs within our partnership

10

Programs administered by NOAA Fisheries

18

Programs administered by states or territories

8

Specialized programs designed to collect data for a target species



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# Saltwater Recreational Fishing Data Collection Programs

NOAA Fisheries' Marine Recreational Information Program works with state and regional partners to develop, implement, and continually improve a national network of recreational fishing surveys used to estimate total recreational catch. These estimates help scientists and managers assess the health of our fish stocks and set rules to keep them sustainable.

[Learn more at countmyfish.noaa.gov](http://countmyfish.noaa.gov)

Saltwater Sport Fish Charter/Guide Logbook Program<sup>6</sup>

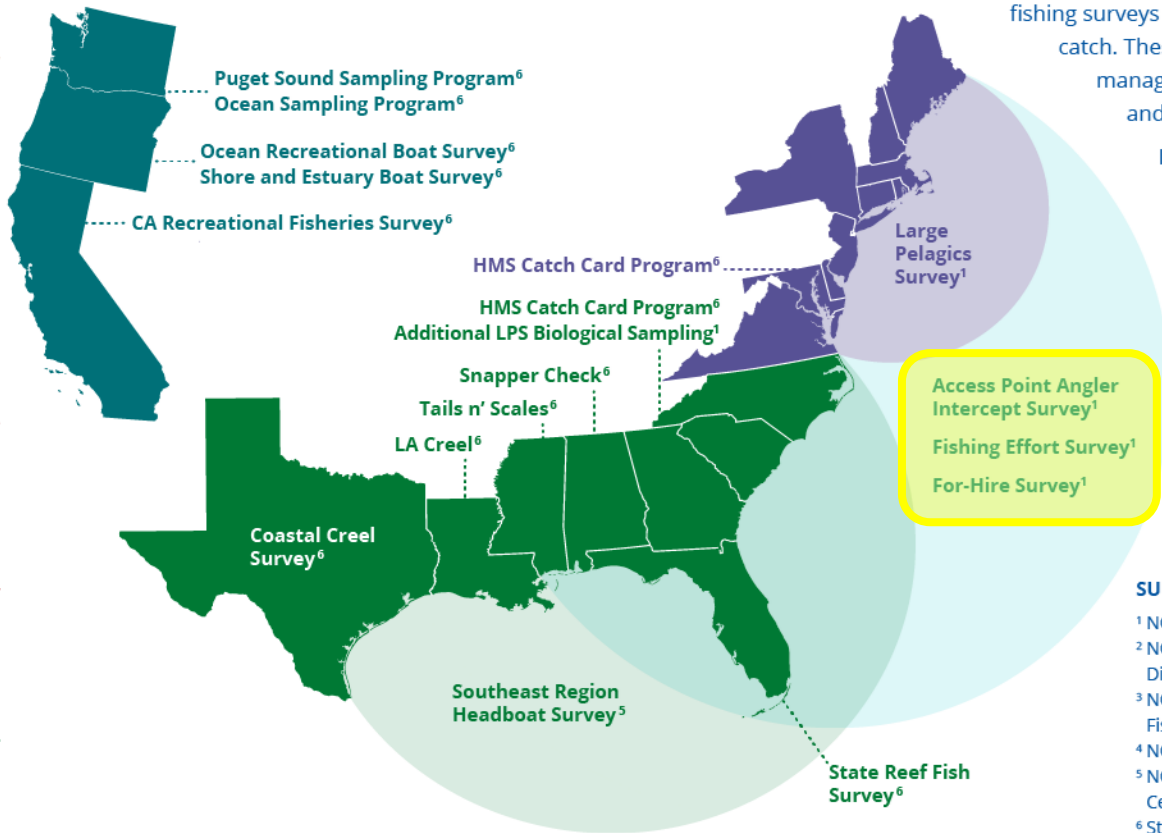
AK Sport Fishing Survey<sup>6</sup>  
Port Sampling Projects<sup>6</sup>

HI Marine Recreational Fishing Survey<sup>1</sup>

Fishing Effort Survey<sup>1</sup>

Guam, CNMI, and American Samoa Creel Surveys<sup>6</sup>

Surveys Pending in Puerto Rico and USVI



## PERMIT-BASED PROGRAMS

Atlantic HMS Landings and Tournament Reports<sup>2</sup>

Greater Atlantic For-Hire Electronic Vessel Trip Reports<sup>3</sup>

Southeast For-Hire Integrated Electronic Reporting Program<sup>4</sup>

## SURVEY ADMINISTRATOR

<sup>1</sup> NOAA Fisheries Office of Science and Technology

<sup>2</sup> NOAA Fisheries Atlantic HMS Management Division

<sup>3</sup> NOAA Fisheries Greater Atlantic Regional Fisheries Office

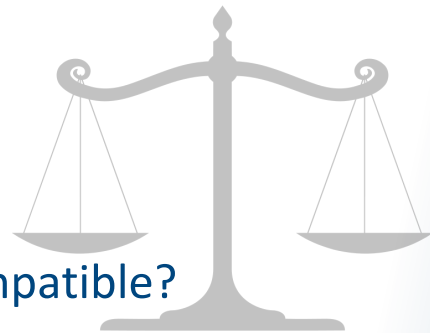
<sup>4</sup> NOAA Fisheries Southeast Regional Office

<sup>5</sup> NOAA Fisheries Southeast Fisheries Science Center

<sup>6</sup> State/Territorial Agency

# Recreational Data challenges: Balance

- **Scale**
  - Census vs Statistical sampling
- **Data Management**
- **Compatibility and comparability**
  - Are the methods used within a region compatible?
  - Are catch estimates comparable?
  - Are the data being used appropriately?
- **Data Standards**
  - MRIP Recreational data standards (2020)
    - Guidance on survey design and implementation, quality assurance, and publication standards
    - Certification of survey designs, survey transitioning



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# Methods of Data Collection

- **Census:** Data are collected from **all members** of a target population
- **Probability Sample:** Data are collected from a **randomly selected sample** of a target population
  - Sample selection probability is known
  - Statistical **weighting helps** ensure each sampled unit is **representative** of the broader population
  - The standard for conducting large-scale government surveys



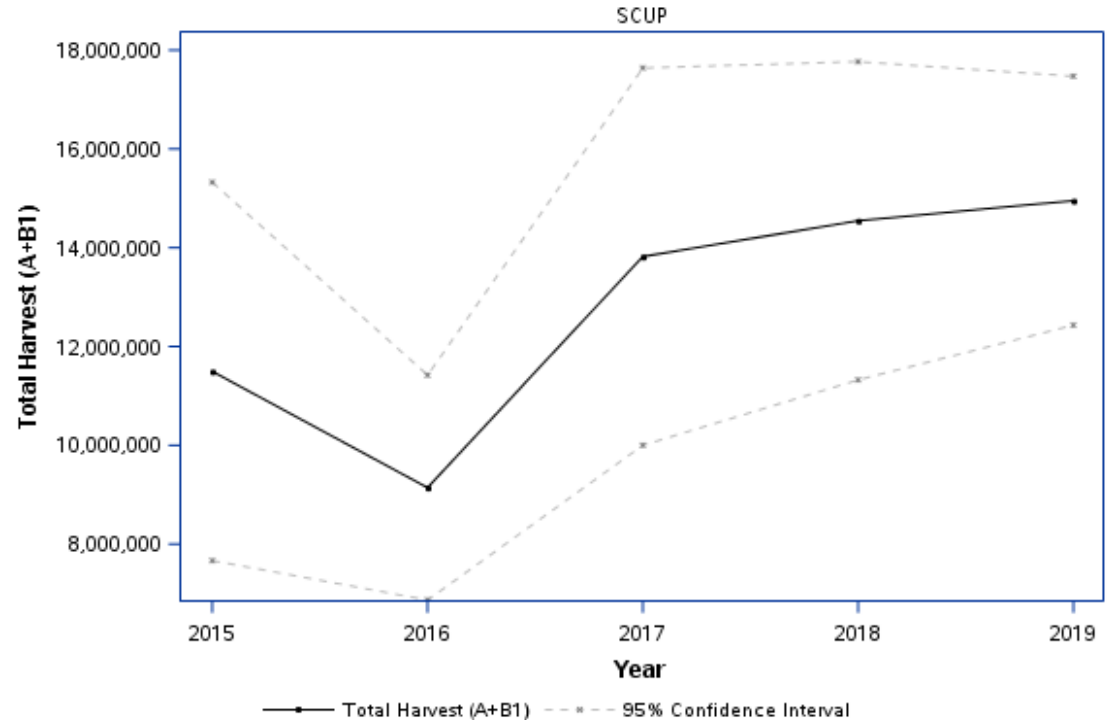
Image: NOAA Fisheries



# Evaluating Uncertainty

For every **point estimate** we produce, we also publish **measures of uncertainty**:

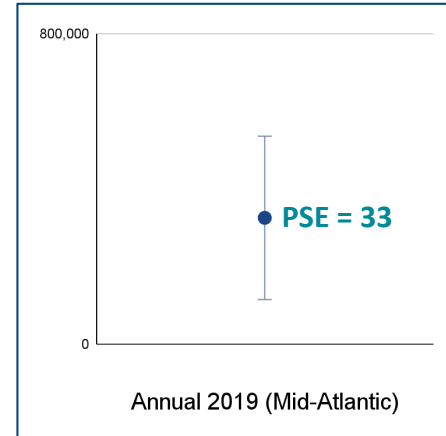
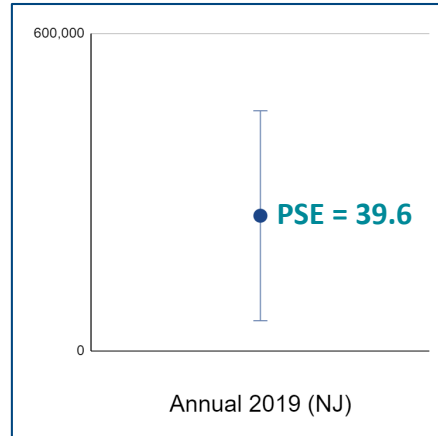
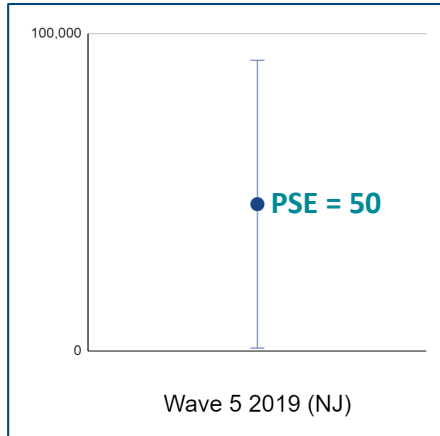
- **Percent standard error** serves as a measure of **precision**
- **Confidence intervals** define the range of values likely to contain the actual population value



# To Improve Precision...

Increase spatial or temporal sample size.

## Summer Flounder (Observed Harvest) Federal EEZ/Private Boat Mode/New Jersey



# To Reduce the Potential for Bias...

Follow best practices in data collection and estimation:

- Pilot test survey designs
- Establish complete sample frames
- Use tools to increase response rates and aid recall
- Weight sampled units to ensure they are representative of the target population
- Establish quality assurance and quality control procedures to reduce potential for data processing error



Image: NOAA Fisheries

# Summary

- Recreational fishery dependent data collection methods vary in scope and scale
- Different census and statistical sampling methods present challenges related to validation, comparability and compatibility
- Challenge to balance stock assessment and monitoring needs related to management
- Recreational fisheries data comprises part of the information used in stock assessments to provide management advice



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# Our Role in Science and Management





# Recreational Data & Stock Assessments

Katie Drew, ASMFC

March 29, 2022

# Outline



- Stock assessments: how do they work??
  - What kind of data goes into them?
  - What information do we get out of them?
- Projections: going from stock assessment output to management changes

# Stock Assessments



- Lots of different types of stock assessments

Data Poor

Data Rich

- 
- Bluefish
  - Black sea bass
  - Cobia
  - Red snapper
  - Striped bass



# Stock Assessments



What kind of data goes into an assessment?

# Two key pieces of information



1. Catch: how many fish did we kill?
  - Harvest: landed fish
  - Discards: fish thrown back dead
  - Release mortalities: fish that are released alive but die because of the injury or stress of being caught
  - Commercial data from dealer reports, trip tickets, VTRs
  - Recreational data from MRIP
2. A index of relative abundance from a survey or a fishery

# Population Index



- Catch goes up and down for a lot of reasons
  - Population goes up and down
  - Regulations change
  - Effort changes (people take more trips for that species, or people get better at fishing for that species)
- We need a way to separate population effects from effort/regulation effects



# Population Index



- Scientists go out and catch fish every year using the exact same methods, in the same areas, at the same time of year
  - We can't count every fish out there every year, but we can measure if the population is going up or down
- Index of relative abundance



# Stock Assessment Data



- **Population index:** provides the **trend** of the population (is it increasing, decreasing, or staying stable?)
- **Catch:** provides the **scale** of the population (how big it is in absolute numbers?)

# Mini Stock Assessment



Super simplified example!

1. Do a survey: 50 fish per tow
2. Season opens: 3,000 pounds of fish caught
3. Do the survey again: 25 fish per tow
4. How large was the population at the beginning of the season?
  - When you removed 3,000 lbs, the index declined by 50%
  - So at the start of the season, the population was 6,000 lbs

# Calibrating Data

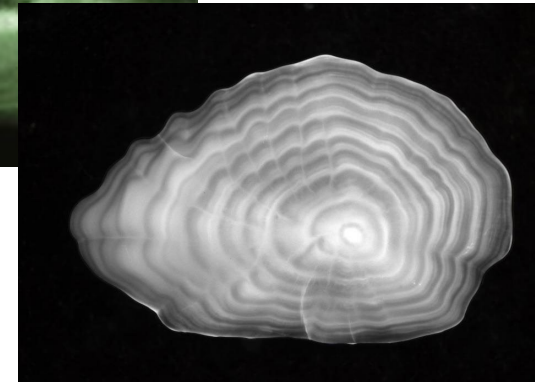
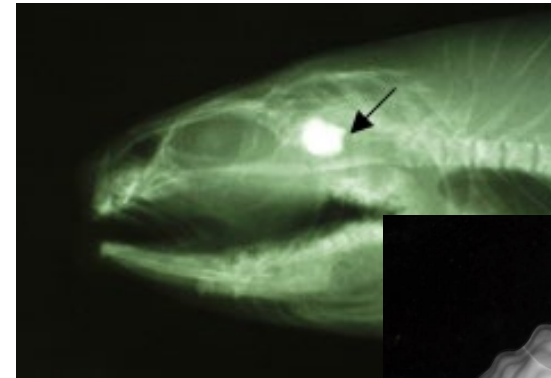


- **Catch:** provides the **scale** of the population (how big it is in absolute numbers?)
  - ➔ If your catch is wrong, the scale of the population from your stock assessment will be wrong!
  - ➔ Higher catches = higher population size
  - ➔ You need more fish in the water to sustain those catches

# Other Input Data



- **Biological information:** what percent of the population dies every year from natural causes, how fast fish grow, when they mature
  - State, federal, and academic research projects and surveys
  - Citizen science: tag reports, rack donations through freezer programs





# Other Input Data



- **Catch-at-age:** how many fish of each age we kill every year
  - Length samples from landed fish (MRIP for recreational data, state & federal port agents)
  - Observer programs for commercial discard lengths
  - Citizen science:
    - volunteer angler
    - logbook programs for recreational release lengths



# Stock Assessments



What information comes out of an assessment?

# Stock Assessment Output



- **Fishing mortality:** what proportion of the population is dying every year due to fishing?
- **Population size:** how many fish are there?
  - **Total abundance:** total number of fish
  - **Spawning stock biomass (SSB):** the biomass of mature fish (i.e., the fish that can spawn and contribute to the next generation of the population)

# Stock Status

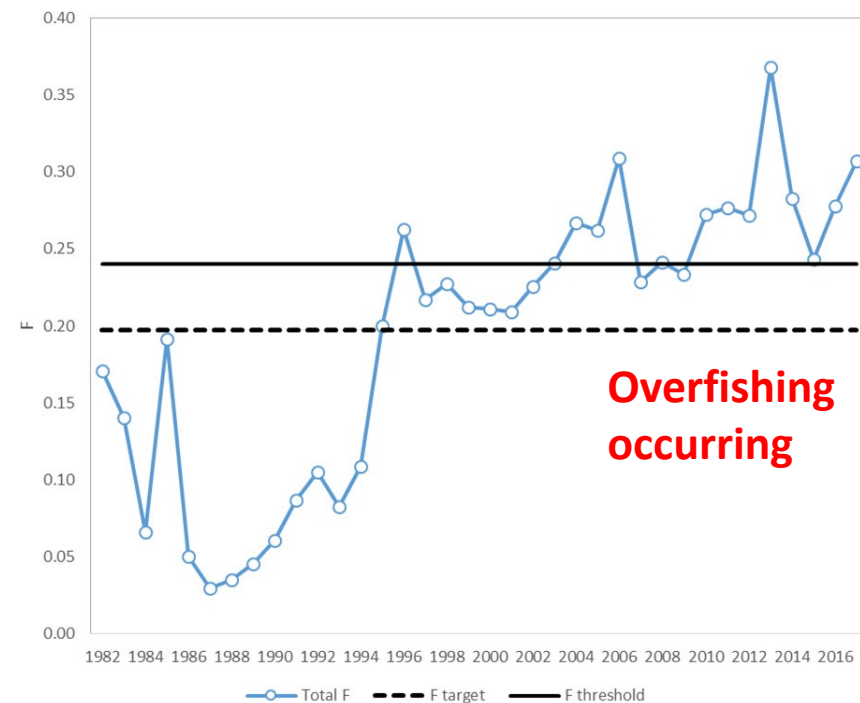
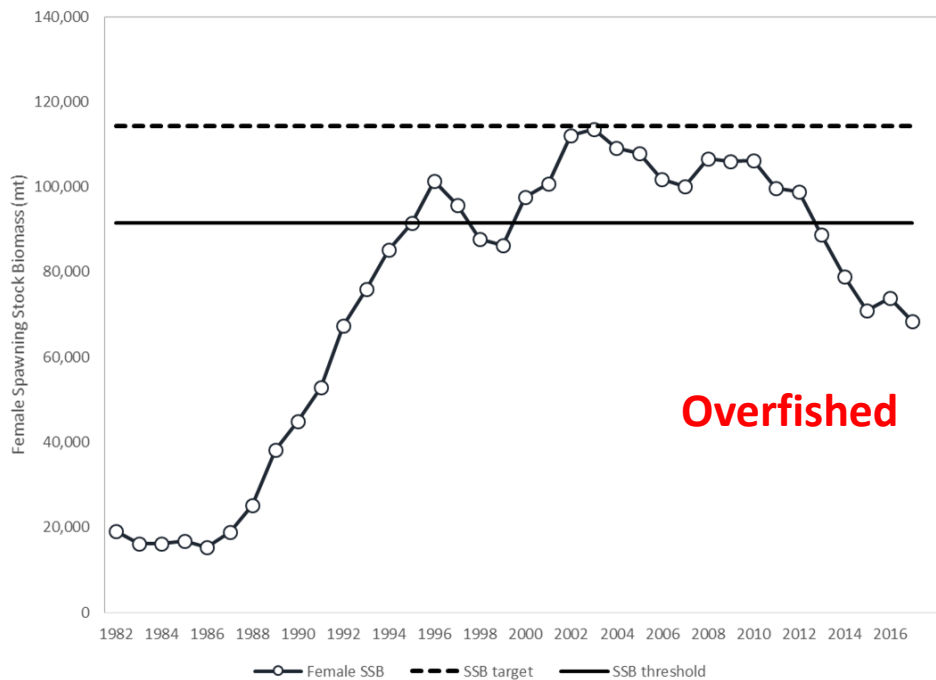


- Are we fishing too much? Are there enough mature fish in the population?
- **Overfishing:**  $F$  is too high and we are removing fish faster than the population can replace them
  - **Overfished:** SSB/abundance is too low and we run the risk of recruitment failure – not having enough eggs produced to sustain the population

# Projections



- We've done the assessment and we know where we are now (stock status) and what happened in the past



**What regulations should managers set for next year?**

# Projections



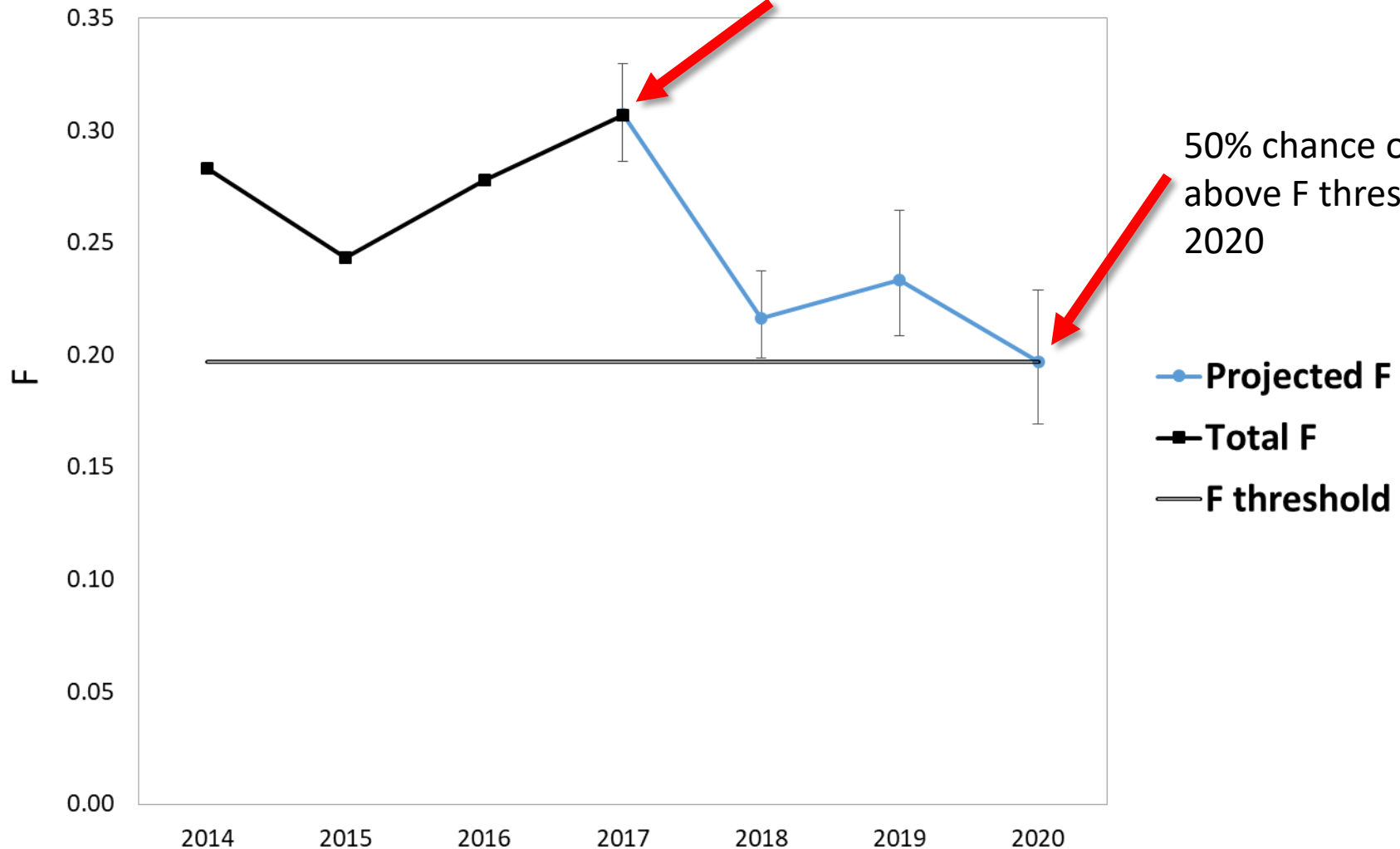
- Run projections: predict what will happen to the population in the future under different levels of catch
- Incorporates uncertainty about:
  - Population size in the most recent year
  - Future recruitment
  - Other factors
- Projections provide the probability of being above or below your reference point under different scenarios

# Projections

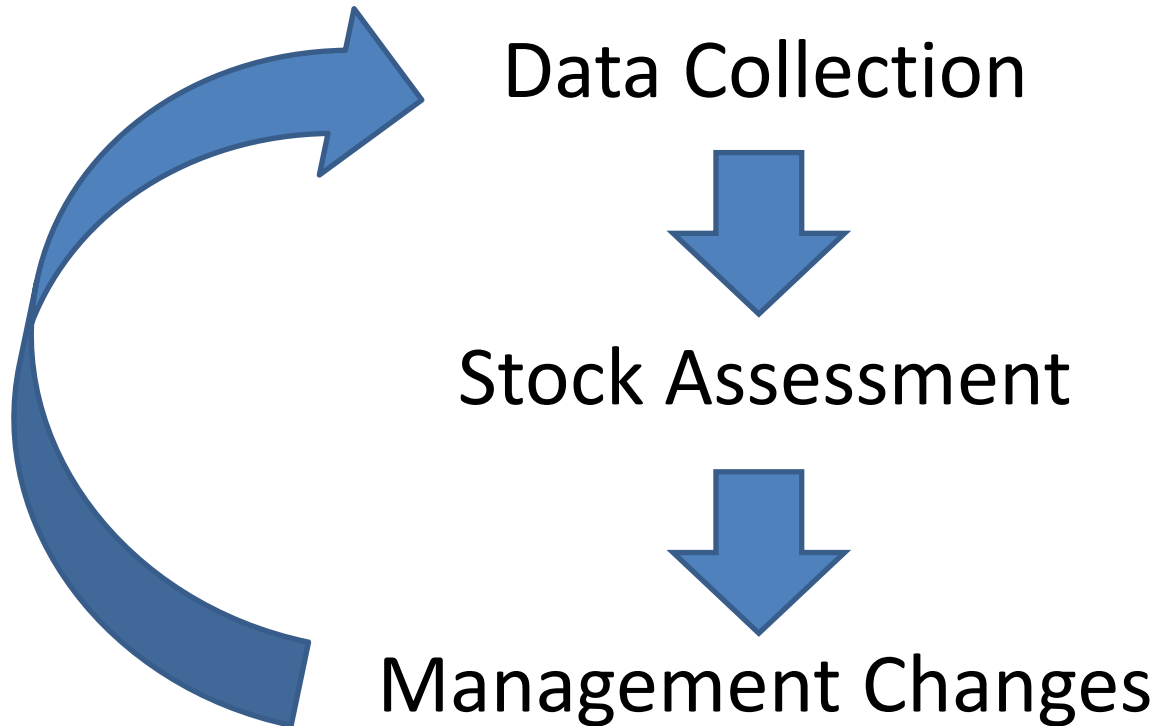


100% chance of being above F threshold in 2017

50% chance of being above F threshold in 2020



# The Cycle Continues







# QUESTIONS



# Recreational Catch Monitoring

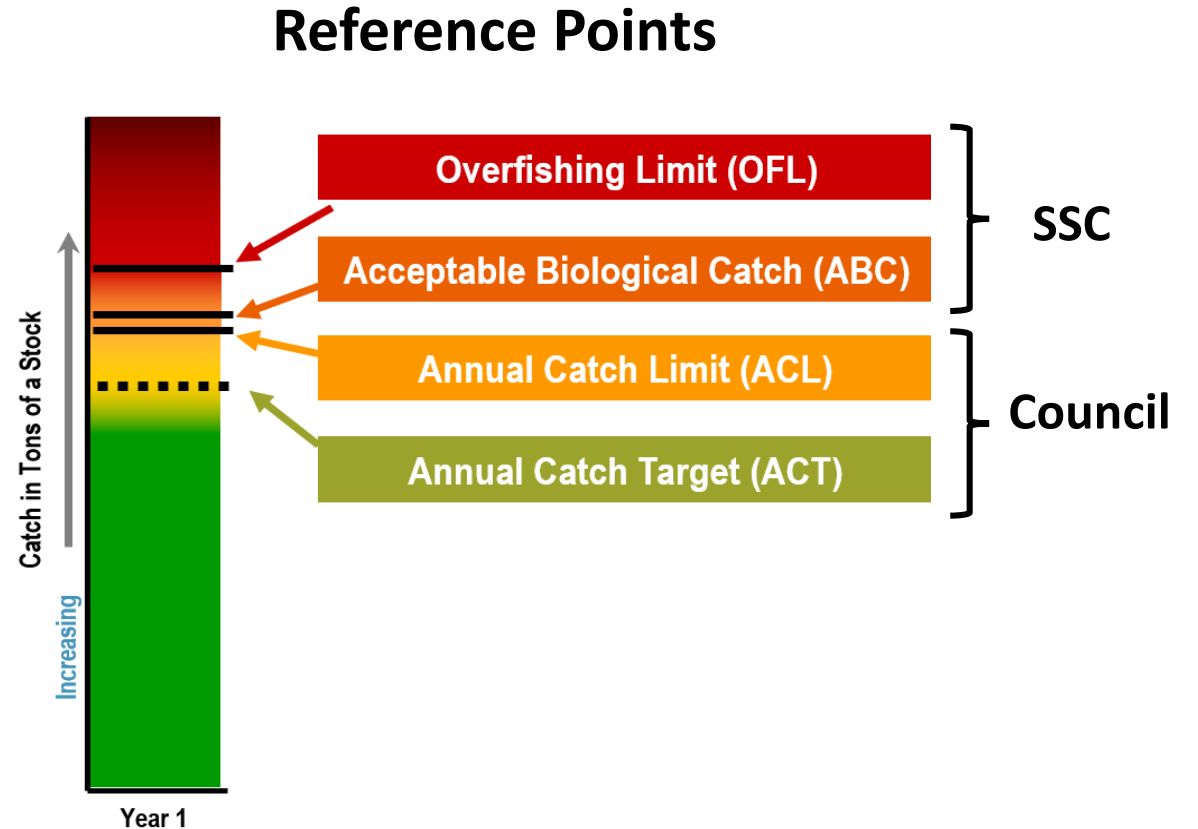
Luiz Barbieri  
Fish and Wildlife Research Institute  
Florida Fish and Wildlife Conservation Commission

March 30, 2022



# IMPORTANCE AND NEED OF CATCH MONITORING

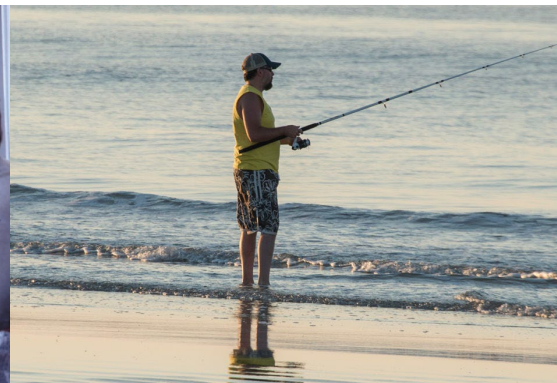
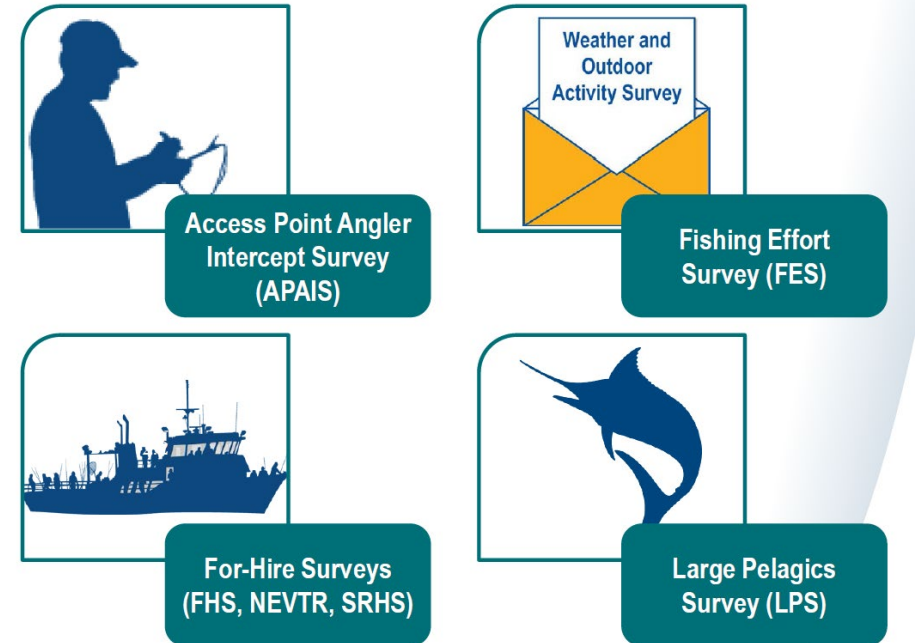
- Our management framework is based on the use of reference points
- SSC provides an OFL and a recommendation for an ABC, which cannot be exceeded by the Council
- Council specifies an ACL and/or ACT



# HOW ARE RECREATIONAL DATA USED FOR MONITORING?

*Conceptually, a simple process...*

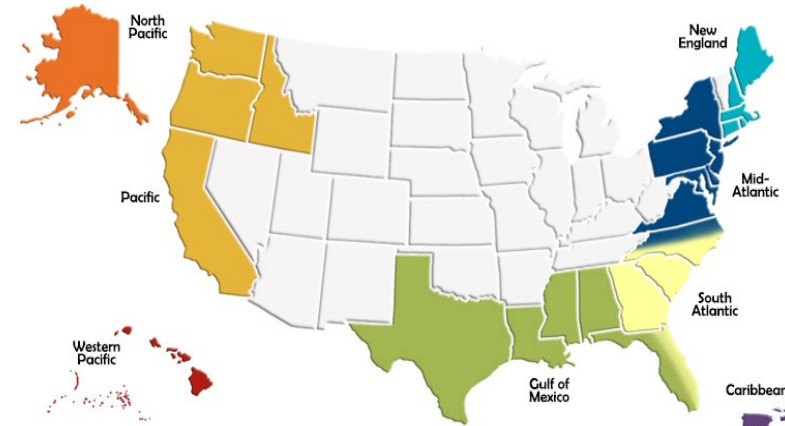
- **Monitor recreational landings for different fishing modes, fleets and fisheries:**
  - **Anglers fishing from shore, private or rental boats, and for-hire vessels (e.g., charter vessels, headboats)**
  - **Inshore and estuarine, reef fish, coastal migratory, large pelagics, etc.**



# HOW ARE RECREATIONAL DATA USED FOR MONITORING?

*But reality is more complex...*

- Council-specific management needs are stretching MRIP's capabilities to provide timely, precise data
  - Short recreational seasons
  - Need for management at smaller spatial scales
  - Problematic situations:
    - Specialized, small-scale fisheries
    - Rare event species
    - Pulse fisheries



**Emerging need: data on recreational catch that are accurate, precise, and timely, and of sufficient resolution to inform in-season management**

# THE CHALLENGE OF MEETING DIVERSE RECREATIONAL FISHERIES DATA NEEDS



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Saltwater Sport Fish  
Charter/Guide Logbook  
Program<sup>6</sup>

AK Sport Fishing Survey<sup>6</sup>

Port Sampling Projects<sup>6</sup>



HI Marine Recreational  
Fishing Survey<sup>1</sup>

Fishing Effort Survey<sup>1</sup>



Guam, CNMI, and American  
Samoa Creel Surveys<sup>6</sup>



Surveys Pending in Puerto Rico  
and USVI



Puget Sound Sampling Program<sup>6</sup>  
Ocean Sampling Program<sup>6</sup>

Ocean Recreational Boat Survey<sup>6</sup>  
Shore and Estuary Boat Survey<sup>6</sup>

CA Recreational Fisheries Survey<sup>6</sup>



Coastal Creel  
Survey<sup>6</sup>

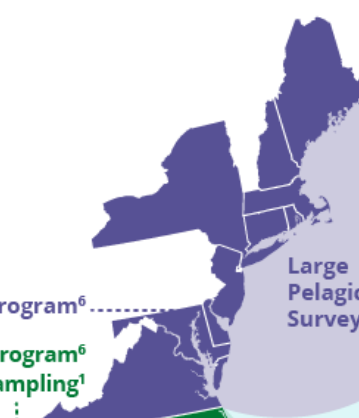
Snapper Check<sup>6</sup>  
Tails n' Scales<sup>6</sup>

LA Creel<sup>6</sup>

Southeast Region  
Headboat Survey<sup>5</sup>

HMS Catch Card Program<sup>6</sup>

HMS Catch Card Program<sup>6</sup>  
Additional LPS Biological Sampling<sup>1</sup>



Large  
Pelagics  
Survey<sup>1</sup>

Access Point Angler  
Intercept Survey<sup>1</sup>

Fishing Effort Survey<sup>1</sup>  
For-Hire Survey<sup>1</sup>

State Reef Fish  
Survey<sup>6</sup>

### PERMIT-BASED PROGRAMS

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Greater Atlantic For-Hire  
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Southeast For-Hire Integrated  
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# THE CHALLENGE OF MEETING DIVERSE RECREATIONAL FISHERIES DATA NEEDS

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Large Pelagics

...te total recreational  
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[countmyfish.noaa.gov](http://countmyfish.noaa.gov)

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Fishing Effort Survey<sup>1</sup>

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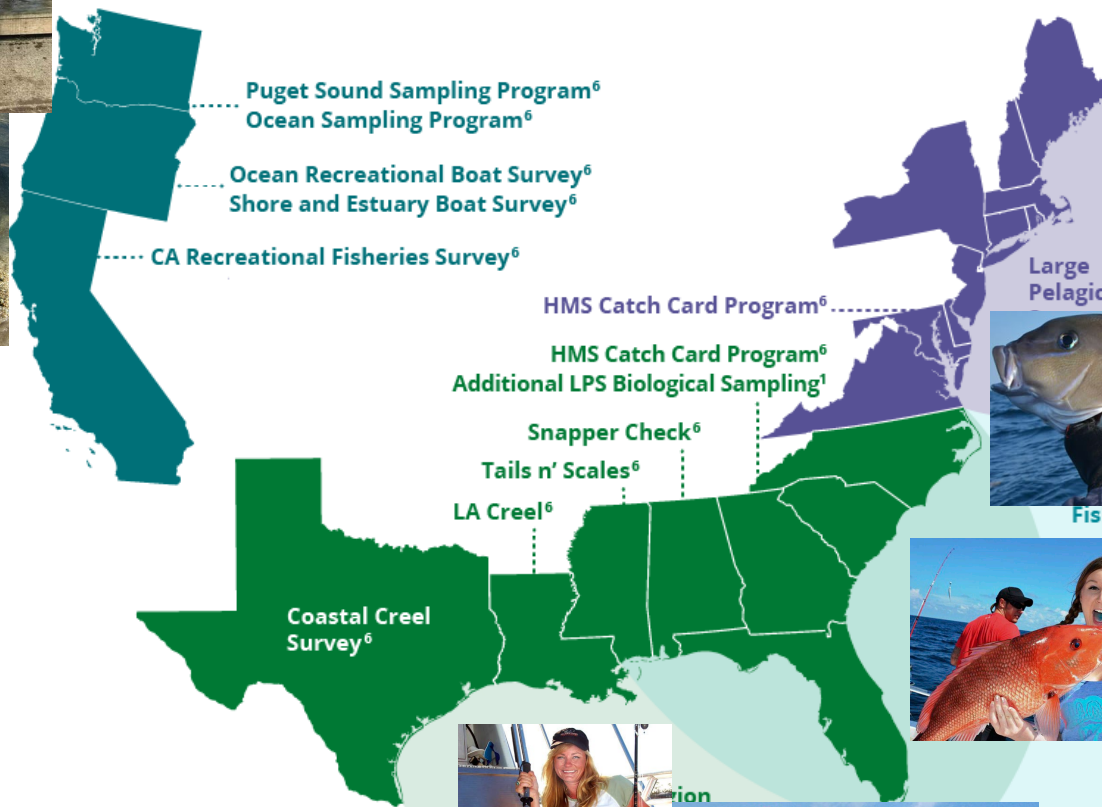
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Tails n' Scales<sup>6</sup>

LA Creel<sup>6</sup>

Coastal Creel Survey<sup>6</sup>



Ref Fish

Saltwater  
Charts



HI Marine Recreational Fishing Survey<sup>1</sup>

Fishing Effort Survey<sup>1</sup>



Guam, CNMI, and American Samoa Creel Surveys<sup>6</sup>



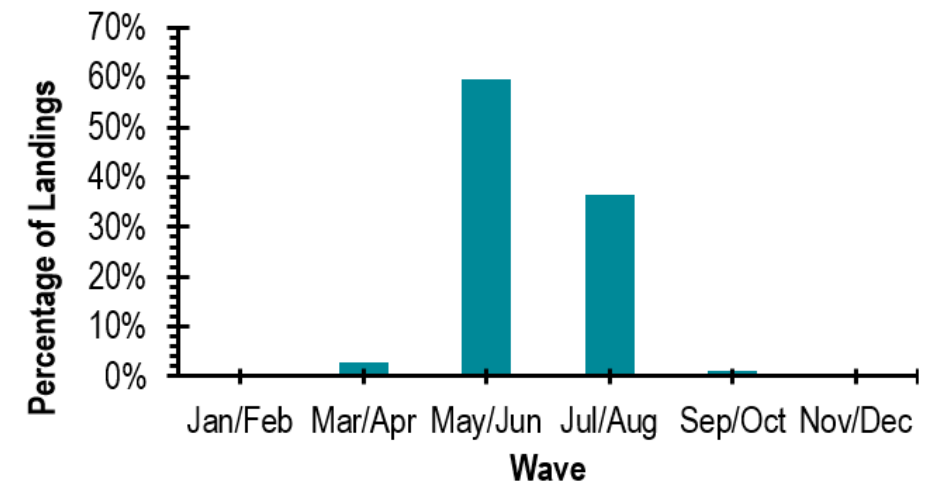
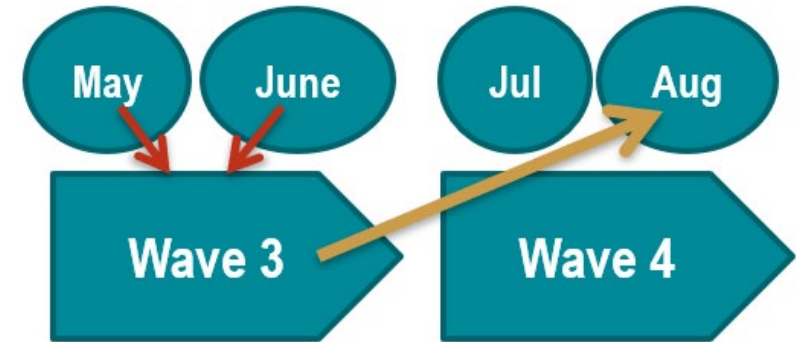
Surveys Pending in Puerto Rico and USVI



# WHEN ARE RECREATIONAL CATCH DATA AVAILABLE?

Different recreational landings datasets are available at different times of the year:

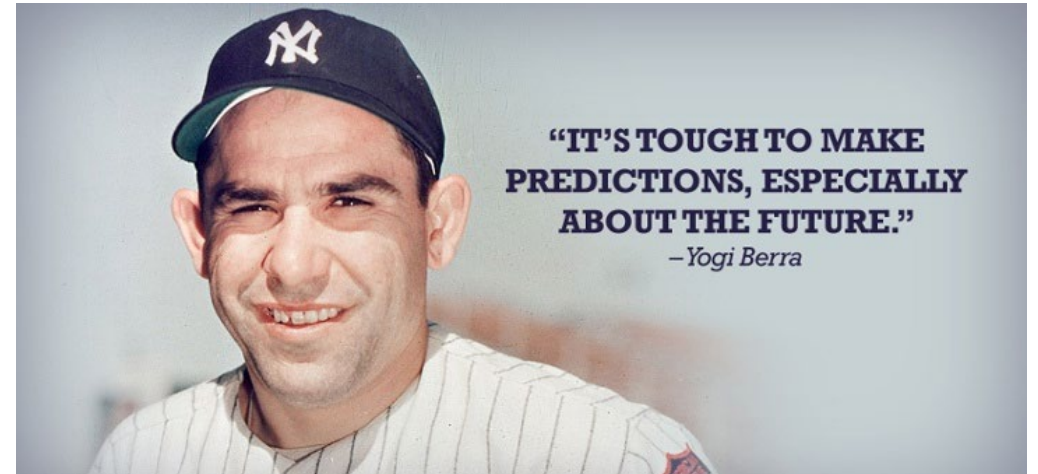
- MRIP landings are generated by two-month waves and are typically provided within 45 days after a wave ends
- Other datasets:
  - Monthly (e.g., Florida's SRFS)
  - Weekly (e.g., Halibut, Gulf Red Snapper)
  - Daily (e.g., Pacific Salmon)





# CATCH PROJECTIONS AND QUOTA MONITORING

- **Projections**: predict what will happen to the population in the future
  - Strongly dependent on future recruitment
  - Subject to high uncertainty
- Potential disconnect between projected catch levels and on-the-water angler experience creates frustration



## **Points for discussion:**

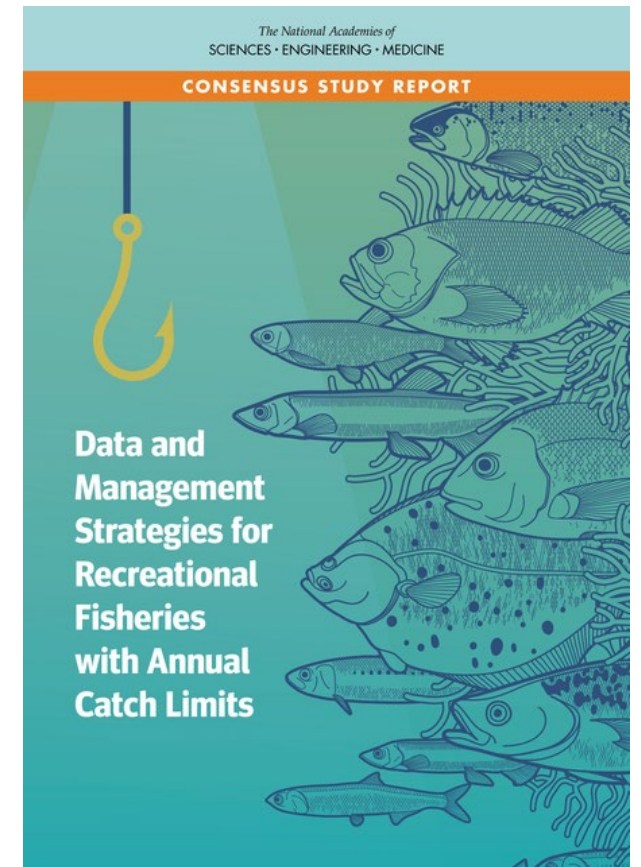
- Need to manage expectations, fish populations are inherently variable
- Expect high uncertainty!
- Consider multi-year, long-term outcomes

# 2021 NATIONAL ACADEMIES STUDY

- **Focused on how well MRIP meets the needs of in-season management of fisheries with ACLs**

## Some relevant topics discussed:

- **Optimizing use of MRIP data and complementary data for in-season management**
- **Recreational reform initiative**
- **Generalized carryover of recreational catches**
- **Modifications to recreational accountability measures**
- **Use of OY framework to identify and prioritize rec fisheries objectives**



The report is available for download at [www.nap.edu](http://www.nap.edu)

# RECREATIONAL CATCH MONITORING

Questions?

