NOAA FISHERIES

Office of Science and Technology

Marine Recreational Information Program

Update on NOAA Fisheries' Survey and Data Standards; and Fishing Effort Survey Pilot Study and Next Steps

October 24, 2023

Richard Cody
NOAA Fisheries Office of Science and Technology
Fisheries Statistics Division

SAFMC Request for information

Two part presentation

Data Standards

1. Change to reporting cumulative estimates instead of 2-month waves

FES Pilot Studies Report

2. One-month fishing activity questions (one-month waves)
3. Question order changes to the 2-month and 12-month fishing activity questions

Survey and Data Standards: Key Points

- NOAA Fisheries established survey and data standards back in 2020 and has been implementing them in phases working closely with state and regional partners.
- The standards are intended to: **improve survey transparency, data quality and use; and standardize data access** across all MRIP and MRIP-supported surveys.
- The current phase of implementation (the shift to cumulative estimates and the precision standard).


Image: L Church/Flickr

Why Were the Standards Developed?

- Full implementation will **align NOAA with OMB requirements, best practices** of **other federal agencies** that depend on statistics to make informed decisions.
- To **promote transparent, quality data** and **sound science**.
- To meet recommendations from National Academies of Sciences, Engineering, and Medicine to **establish performance standards**.

NOAA FISHERIES

Seven Standards/Focus Areas

- Survey concepts and justification
- Survey design
- Data quality
- Transition planning
- Review procedures
- Process improvement (part of regional implementation plans)
- Access and information management

Standards 1 - 5 are related to NOAA Fisheries' certification, transition policies, and procedural directives.

We are here in implementation.

https://www.fisheries.noaa.gov/recreational-fishing-data/recreational-fishing-survey-and-data-standards

NOAA FISHERIES

Implementation Timeline

2020

Phased Implementation Begins in Late 2020

- Phased implementation helps provide adequate adaptation time for fisheries stock assessors and managers.

2021 2022

Implementation Continues

- Delivered presentations to regional FINs.
- Published MRIP Data User Handbook.
- Added preview query to Query Tool to support data users.
- Hosted Data User Seminar Series.

2023+

Final Phase (Access and Information Management)

Completed:

- Shift from producing estimates in 2-month waves to cumulative estimates, still produced every two months.
- New fishing-year options added.
- Delivered presentations to fisheries management councils and the Northeast Region Coordinating Council, among others.

Planned:

- Continue working with data users.

Precision Standard

- Intent of standard is to **identify a precision threshold** for which MRIP supports estimates
    - Will not affect public access to survey respondent data (used to produce estimates).
- Estimates with a percent standard error exceeding 50 are typically not statistically different from zero.
- **Implementation of estimate masking been postponed** to allow additional time to work with data users on options for the presentation of estimates.

What Does the Precision Standard Do?

- **Conforms to OMB's requirement** for statistical programs to establish criteria for determining when an estimate is too unreliable to publicly release.
- **Highlights gaps** in the availability of sufficiently precise estimates.
- Provides analysts with **more flexibility** to determine appropriate methods for filling data gaps, rather than needing to rely on highly imprecise estimates.
- **Reduces risk of using highly imprecise estimates** to inform fisheries management decisions.
- **Aligns NOAA with standards and best practices of other federal statistical agencies** and programs that produce statistics for decision-making.

NOAA FISHERIES

How Was the Precision Standard Developed?

- With **collaborative feedback** from partners who explored effects of **imprecise estimates on stock assessment results.**
- Partners determined estimates above 40 PSE should be used with caution.
- The U.S. Census Bureau does not provide estimates with a PSE above 30.
- Atlantic Coastal Cooperative Statistics Program continues to set goal of achieving PSEs below 30.
- In 2019, prior to implementation, we solicited feedback from partners on all of the standards through leveraging our partnerships with fisheries commissions and FINs.

NOAA FISHERIES

New fields (added April 2023) include:

- Does Estimate meet precision standard
- Is estimate significantly different from zero (using standard 95% confidence interval)
- Upper and Lower confidence limits (for users that may not be familiar with PSEs)

Estimate Status	Year	Fishing Year	State	Common Name	Cumulative Through	PSE Total Catch (A+B1+B2)	Does Total Catch (A+B1+B2) Meet MRIP Standard	Is Total Catch (A+B1+B2) Significantly Different From 0	Total Catch (A+B1+B2)	Total Catch (A+B1+B2) Lower 95% Confidence Limit	Total Catch (A+B1+B2) Upper 95% Confidence Limit
FINAL	2021	Calendar Year (Jan 1 - Dec 31)	FLORIDA	BLACK SEA BASS	ANNUAL	25.6	YES	YES	613,571	305,706	921,437
FINAL	2021	Calendar Year (Jan 1 - Dec 31)	GEORGIA	BLACK SEA BASS	ANNUAL	23.6	YES	YES	1,148,696	617,355	1,680,037
FINAL	2021	Calendar Year (Jan 1 - Dec 31)	NORTH CAROLINA	BLACK SEA BASS	ANNUAL	10.7	YES	YES	2,223,514	1,757,198	2,689,829
FINAL	2021	Calendar Year (Jan 1 - Dec 31)	SOUTH CAROLINA	BLACK SEA BASS	ANNUAL	16.9	YES	YES	2,096,656	1,402,159	2,791,152
FINAL	2022	Calendar Year (Jan 1 - Dec 31)	FLORIDA	BLACK SEA BASS	ANNUAL	52.6	NO	NO	1,928,096	0	3,915,886
FINAL	2022	Calendar Year (Jan 1 - Dec 31)	GEORGIA	BLACK SEA BASS	ANNUAL	45.1	CAUTION	YES	1,350,462	156,708	2,544,216
FINAL	2022	Calendar Year (Jan 1 - Dec 31)	NORTH CAROLINA	BLACK SEA BASS	ANNUAL	16.8	YES	YES	4,827,420	3,237,847	6,416,993
FINAL	2022	Calendar Year (Jan 1 - Dec 31)	SOUTH CAROLINA	BLACK SEA BASS	ANNUAL	16.6	YES	YES	1,939,804	1,308,669	2,570,938

Estimate Status	Year	Fishing Year	State	Common Name	Cumulative Through	PSE Total Catch (A+B1+B2)	Does Total Catch (A+B1+B2) Meet MRIP Standard	Is Total Catch (A+B1+B2) Significantly Different From 0	Total Catch (A+B1+B2)	Total Catch (A+B1+B2) Lower 95% Confidence Limit	Total Catch (A+B1+B2) Upper 95% Confidence Limit
FINAL	202	Calendar Year (Jan 1 - Dec 31)	LORIDA	BLACK SEA BASS	WAVE 3	29.1	YES	YES	330,896	142,166	519,626
FINAL	2021	Calendar Year (Jan 1 - Dec 31)	GEORGIA	BLACK SEA BASS	WAVE 3	34.7	CAUTION	YES	685,516	219,283	1,151,750
FINAL	2021	Calendar Year (Jan 1 - Dec 31)	NORTH CAROLINA	BLACK SEA BASS	WAVE 3	18.7	YES	YES	865,841	548,493	1,183,189
FINAL	2021	Calendar Year (Jan 1 - Dec 31)	SOUTH CAROLINA	BLACK SEA BASS	WAVE 3	32.8	CAUTION	YES	687,869	245,652	1,130,087
FINAL	2022	Calendar Year (Jan 1 - Dec 31)	FLORIDA	BLACK SEA BASS	WAVE 3	60.9	NO	NO	1,661,705	0	3,645,184
FINAL	2022	Calendar Year (Jan 1 - Dec 31)	GEORGIA	BLACK SEA BASS	WAVE 3	61.3	NO	NO	965,600	0	2,125,749
FINAL	2022	Calendar Year (Jan 1 - Dec 31)	NORTH CAROLINA	BLACK SEA BASS	WAVE 3	17.2	YES	YES	1,498,629	993,411	2,003,847
FINAL	2022	Calendar Year (Jan 1 - Dec 31)	SOUTH CAROLINA	BLACK SEA BASS	WAVE 3	20.5	YES	YES	675,697	404,202	947,192
PRELIMINARY	2023	Calendar Year (Jan 1 - Dec 31)	FLORIDA	BLACK SEA BASS	WAVE 3	35.8	CAUTION	YES	421,121	125,629	716,614
PRELIMINARY	2023	Calendar Year (Jan 1 - Dec 31)	GEORGIA	BLACK SEA BASS	WAVE 3	31.9	CAUTION	YES	175,793	65,880	285,706
PRELIMINARY	2023	Calendar Year (Jan 1 - Dec 31)	NORTH CAROLINA	BLACK SEA BASS	WAVE 3	21.4	YES	YES	1,733,068	1,006,150	2,459,987
PRELIMINARY	2023	Calendar Year (Jan 1 - Dec 31)	SOUTH CAROLINA	BLACK SEA BASS	WAVE 3	29.1	YES	YES	857,377	368,363	1,346,390

NOAA FISHERIES

FROM (Earliest Year):	2017 ▾ Glossary
TO (Latest Year):	2020 ▾
SUMMARIZE BY:	CUMULATIVE ▾ ** The **CUMULATIVE** option will provide estimates by year, cumulative through the most recent wave of the current year. ** The **ANNUAL** option will provide annual estimates by year except for the current year which will be cumulative through the most recent wave.
FISHING YEAR:	CALENDAR YEAR (Standard Annual) ▾ CALENDAR YEAR (Standard Annual) MARCH FISHING YEAR (March 1 - February 28) MAY FISHING YEAR (May 1 - April 30) JULY FISHING YEAR (July 1 - June 30) SEPTEMBER FISHING YEAR (Sept 1 - Aug 31) NOVEMBER FISHING YEAR (Nov 1 - Oct 31)
GEOGRAPHICAL AREA STATE/AREA:	
SPECIES: For species not in the drop-down list please click the 'Other Species' button to the right.	Species
TYPE OF FISHING:	ALL MODES COMBINED ▾
FISHING AREA :	ALL AREAS COMBINED ▾
TYPE OF CATCH:	TOTAL CATCH (TYPE A + B1 + B2) ▾ * For weight or length estimates, select HARVEST (TYPE A + B1) above These estimates are only available for HARVEST (TYPE A + B1)
INCLUDE MISSING FOR COMPLETE TIMESERIES :	☐ Check to include rows with missing values. ** This option will fill in rows with missing values for estimates where no estimate exists, providing a complete timeseries.
OUTPUT FORM:	TABLE ▾

Submit Query | Clear Entries

Return to Query Index

NOAA FISHERIES

Shift to Cumulative Estimates

Estimates prior to 2023

	2-month "wave" estimates	Preliminary Data Available (Approx. Date)
Wave 1	January-February	April 15
Wave 2	March-April	June 15
Wave 3	May-June	August 15
Wave 4	July-August	October 15
Wave 5	September-October	December 15
Wave 6	November-December	February 15

New Estimates

	Cumulative Estimates	Preliminary Data Available (Approx. Date)
Wave 1	January-February	April 15
Wave 2	January-April	June 15
Wave 3	January-June	August 15
Wave 4	January-August	October 15
Wave 5	January-October	December 15
Wave 6	January-December	February 15

Cumulative estimates are still produced every two months.

Why are we now producing estimates Cumulatively?

- To make **better use of existing data** to best inform fisheries management.
- Aggregating data is a **common statistical approach** to increase sample sizes and smooth spikes/anomalies in data.
- **More data** feeding into the estimates means there is a better chance of the **sample being representative** of the recreational fishing community's activities.
- To produce **more reliable estimates** that improve in precision throughout year as a result of increased sample sizes.
- Survey respondent raw data still publicly available, as needed, to customize estimates.

NOAA FISHERIES

New Fishing Year Options

Cumulative estimates for:

- **March** fishing year (March 1 - Feb. 28)
- **May** fishing year (May 1 - April 30)
- **July** fishing year (July 1 - June 30)
- **September** fishing year (Sept. 1 - Aug. 31)
- **November** fishing year (Nov. 1 - Oct. 31)

*New fishing year options **reduce need for data users to produce their own custom estimates** for fisheries that don't align with the traditional calendar year. These were added based on customer feedback.*

NOAA FISHERIES

Key Takeaways

Estimates are provided cumulatively by wave (every 2 months).

Imprecise estimates (PSE ≥ 30%) are flagged, and those that do not meet our precision standard (PSE ≥ 50%) identified.

Microdata and tools remain available to produce custom domain-level estimates, as necessary.

OST remains committed to supporting data users.

Interpretation of custom domain estimates will continue to rely on analytical justifications and assumptions outside of survey design constraints on estimation.

NOAA FISHERIES

Next Steps

Working with the Science Centers to develop a decision framework for handling highly imprecise estimates in stock assessments.

- Continues efforts to develop methods to address “rare-event” species

Preliminary meeting on July 10 (OST, SEFSC):

- Examined southeast assessment scenarios impacted by highly imprecise estimates, potential aggregation protocols, alternative estimation options, and custom domain estimation (tools and methods) options
- Prioritized analyses and summary statistics to be reviewed during a second workshop

NOAA FISHERIES

FES Testing

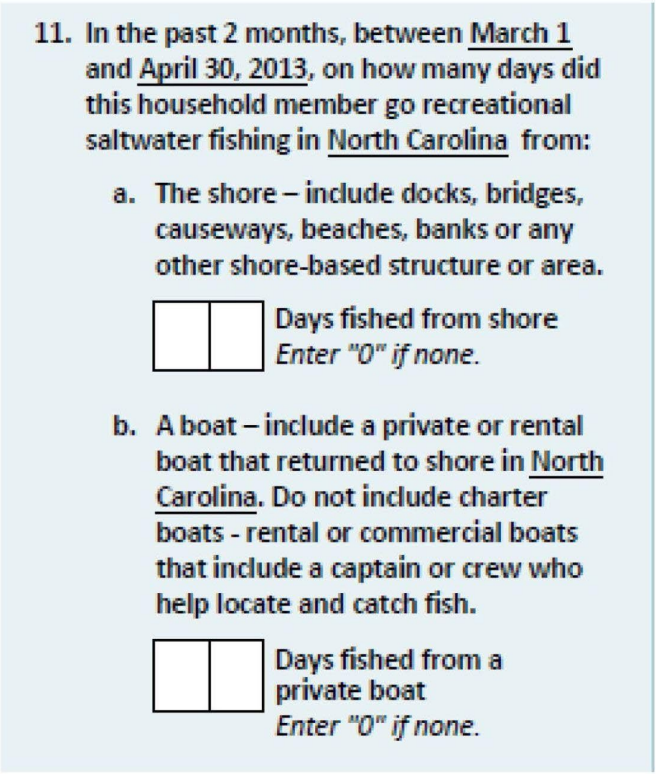
- NOAA Fisheries OST is continually evaluating the performance of its surveys
  - https://www.fisheries.noaa.gov/recreational-fishing-data/marine-recreational-information-program-research
- A number of pilot studies have been completed or are planned.
- Focus has largely been on systematic non-sampling error
  - Non-response
  - Measurement
  - Administrator/Interviewer
  - Adjustment
  - Processing

Evaluation of Measurement Error

- Report describes studies that evaluated the Fishing Effort Survey for possible measurement errors and resulting bias:
  - Questionnaire development
  - Evaluation of one-month waves
  - Question order effects

Questionnaire Development

- Tested several questionnaire versions that differed in number of reference periods
- Single 2-month period (unbounded) versus multiple discrete periods (bounded)
- Conducted “cognitive interviews”



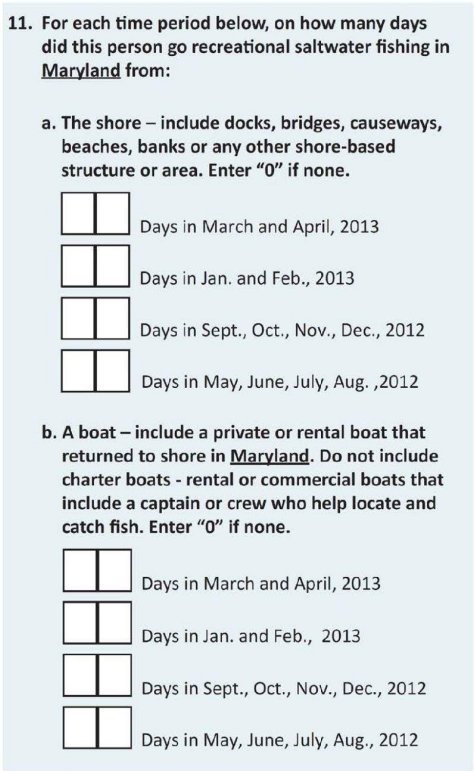
11. In the past 2 months, between March 1 and April 30, 2013, on how many days did this household member go recreational saltwater fishing in North Carolina from:

a. The shore – include docks, bridges, causeways, beaches, banks or any other shore-based structure or area.

☐☐ Days fished from shore
Enter "0" if none.

b. A boat – include a private or rental boat that returned to shore in North Carolina. Do not include charter boats - rental or commercial boats that include a captain or crew who help locate and catch fish.

☐☐ Days fished from a private boat
Enter "0" if none.



11. For each time period below, on how many days did this person go recreational saltwater fishing in Maryland from:

a. The shore – include docks, bridges, causeways, beaches, banks or any other shore-based structure or area. Enter “0” if none.

☐☐ Days in March and April, 2013
☐☐ Days in Jan. and Feb., 2013
☐☐ Days in Sept., Oct., Nov., Dec., 2012
☐☐ Days in May, June, July, Aug. ,2012

b. A boat – include a private or rental boat that returned to shore in Maryland. Do not include charter boats - rental or commercial boats that include a captain or crew who help locate and catch fish. Enter “0” if none.

☐☐ Days in March and April, 2013
☐☐ Days in Jan. and Feb., 2013
☐☐ Days in Sept., Oct., Nov., Dec., 2012
☐☐ Days in May, June, July, Aug., 2012

Questionnaire Development

- Bounded design resulted in lower prevalence estimates in 9 of 10 comparisons

Measure	Q1 (unbounded) % (SE)	Q2 (bounded) % (SE)	Relative difference	*p*-value
Shore prevalence				
Overall	9.42 (0.62)	9.27 (0.62)	1.59	0.8659
FL	16.20 (1.31)	19.34 (1.43)	-19.40	0.105
MA	6.61 (1.15)	3.40 (0.81)	48.65	0.022
NY	4.76 (0.87)	3.13 (0.77)	34.20	0.1602
NC	7.37 (1.35)	5.86 (1.19)	20.50	0.402
Boat prevalence				
Overall	7.54 (0.55)	4.92 (0.43)	34.75	0.0002
FL	13.39 (1.18)	11.62 (1.12)	13.27	0.2731
MA	4.17 (0.81)	1.38 (0.51)	67.00	0.0035
NY	4.89 (0.91)	0.64 (0.37)	86.94	<0.0001
NC	3.71 (0.92)	2.77 (0.60)	25.39	0.3911

Questionnaire Development

- Bounded design implemented for several successive waves
- Provided independent estimates for a fixed reference period
- Varied in recall length and question order
- Collective effect of recall length and question order on estimates

11. For each time period below, on how many days did this person go recreational saltwater fishing in Maryland from:

a. The shore – include docks, bridges, causeways, beaches, banks or any other shore-based structure or area. Enter "0" if none.

☐☐ Days in March and April, 2013

☐☐ Days in Jan. and Feb., 2013

☐☐ Days in Sept., Oct., Nov., Dec., 2012

☐☐ Days in May, June, July, Aug. ,2012

Year	2012						2013												2014							
Month	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
Survey Waves	Wave 4 - Wave 5				Wave 6 - Wave 1				Wave 2		Wave 3															
			Wave 5 - Wave 6				Wave 1 - Wave 2				Wave 3		Wave 4													
					Wave 6 - Wave 1				Wave 2 - Wave 3				Wave 4		Wave 5											
							Wave 1 - Wave 2				Wave 3 - Wave 4				Wave 5		Wave 6									
									Wave 2 - Wave 3				Wave 4 - Wave 5				Wave 6		Wave 1							
											Wave 3 - Wave 4				Wave 5 - Wave 6				Wave 1		Wave 2					
													Wave 4 - Wave 5				Wave 6 - Wave 1				Wave 2		Wave 3			

NOAA FISHERIES

Questionnaire Development

		Shore				Boat			
State	Wave	2-mo recall % (SE)	4-mo recall % (SE)	Relative difference	*p*-value	2-mo recall % (SE)	4-mo recall % (SE)	Relative difference	*p*-value
FL	May/Jun	21.63 (1.11)	18.73 (1.32)	13.42	0.0929	11.6 (0.81)	11.04 (0.99)	4.84	0.6605
FL	Jul/Aug	20.47 (1.38)	21.86 (1.62)	-6.75	0.5161	10.98 (0.99)	14.50 (1.34)	-32.04	0.0345
FL	Sep/Oct	19.21 (1.55)	16.51 (1.33)	14.03	0.1874	12.04 (1.25)	9.71 (1.00)	19.40	0.1442
MA	May/Jun	10.83 (0.91)	9.94 (1.19)	8.23	0.5513	6.03 (0.65)	5.80 (0.94)	3.83	0.8402
MA	Jul/Aug	15.86 (1.50)	15.58 (1.62)	1.71	0.9024	9.39 (1.13)	11.07 (1.30)	-17.85	0.3295
MA	Sep/Oct	7.33 (1.17)	8.72 (1.23)	-19.05	0.4101	5.15 (0.89)	5.37 (1.03)	-4.24	0.8726
NY	May/Jun	8.86 (0.77)	7.35 (1.11)	17.10	0.2617	5.81 (0.64)	4.64 (0.88)	20.22	0.2802
NY	Jul/Aug	12.93 (1.46)	12.62 (1.51)	2.41	0.8823	8.25 (1.18)	10.87 (1.47)	-31.81	0.1639
NY	Sep/Oct	7.06 (1.13)	6.21 (0.89)	12.10	0.5528	6.70 (1.16)	4.93 (0.82)	26.43	0.2140
NC	May/Jun	11.5 (0.91)	11.32 (1.21)	1.54	0.9075	5.87 (0.61)	4.89 (0.71)	16.80	0.2926
NC	Jul/Aug	13.38 (1.28)	12.43 (1.21)	7.07	0.5907	5.93 (0.77)	7.82 (1.04)	-31.80	0.1436
NC	Sep/Oct	10.71 (1.19)	11.19 (1.45)	-4.50	0.7973	6.13 (0.93)	5.18 (0.90)	15.49	0.4627
NC	Nov/Dec	6.42 (1.09)	4.57 (1.12)	28.84	0.2354	2.69 (0.61)	2.86 (0.92)	-6.47	0.8750
NC	Jan/Feb	3.06 (1.08)	3.59 (1.30)	-17.28	0.7549	1.14 (0.26)	0.84 (0.18)	26.95	0.3279
NC	Mar/Apr	8.77 (1.88)	5.30 (0.83)	39.59	0.0913	3.20 (1.09)	2.36 (0.54)	26.30	0.4872
Overall		13.1 (0.34)	12.04 (0.36)	8.09	0.0338	7.53 (0.25)	7.57 (0.29)	-0.53	0.9054

- Estimates are generally larger when the recall period is shorter and the reference period is presented first in the question sequence

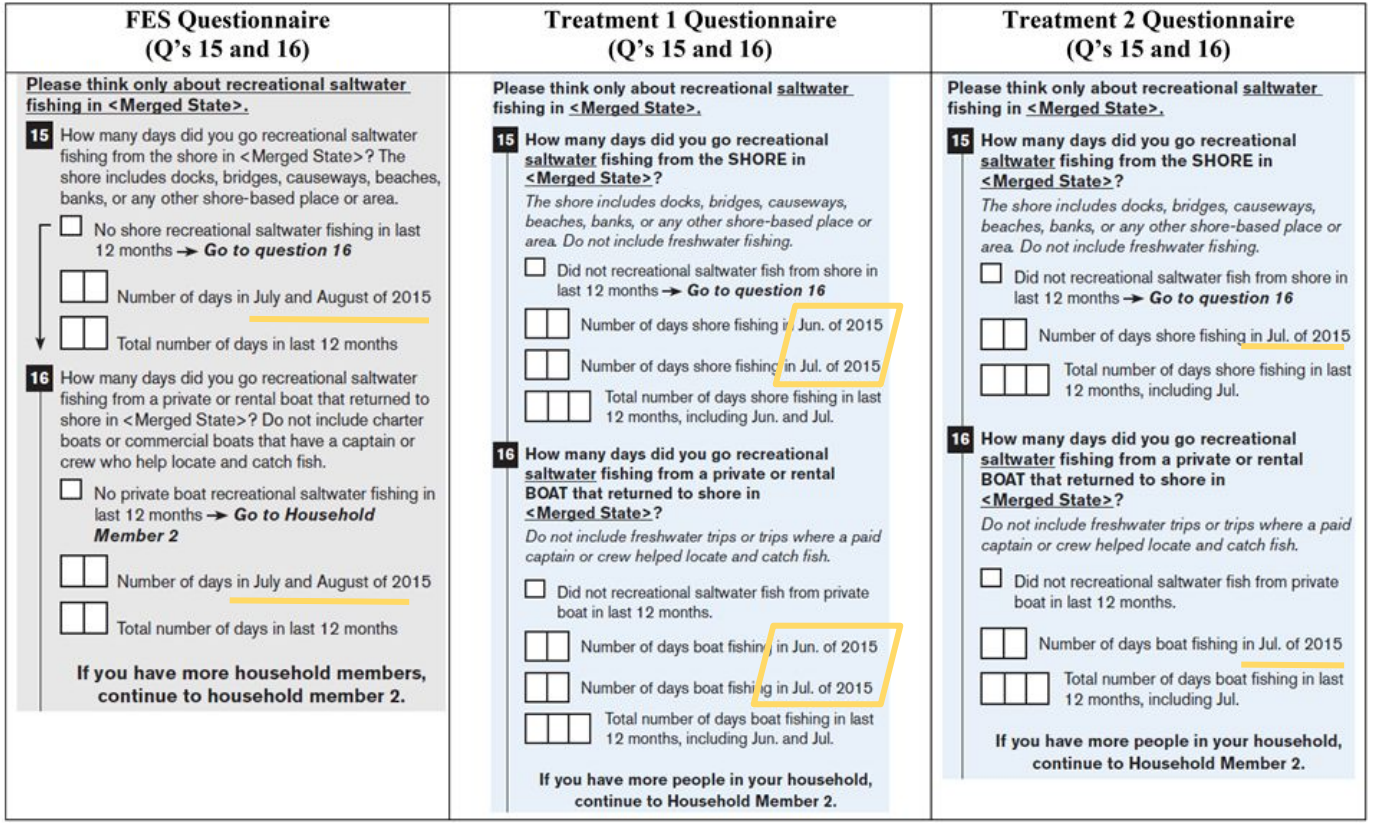
NOAA FISHERIES

Questionnaire Development Key Points

- "Bounding" of the desired reference period against other time periods resulted in lower estimates than an unbounded design
- Estimates were higher when the length of the recall period was shorter and when the reference period was presented first in the question sequence
  - Forgetting trips (omission error) or reporting trips at the first opportunity (telescoping error)
  - Analysis can't disentangle effects
- Cognitive interviews suggest that anglers want to be identified as such and are eager to report fishing activity
- Questionnaire testing and angler feedback resulted in current design of FES questionnaire, which included a 2-month recall period followed by a 12-month bounding period

One-Month Wave Questionnaires

- Tested questionnaires with shorter reference periods
- Questionnaires differed in presentation of reference periods
- Additional evaluation of question order and recall period length



FES Questionnaire (Q's 15 and 16)

Please think only about recreational saltwater fishing in <Merged State>.

15 How many days did you go recreational saltwater fishing from the shore in <Merged State>? The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area.

- ☐ No shore recreational saltwater fishing in last 12 months ➔ *Go to question 16*
- ☐☐ Number of days in July and August of 2015
- ☐☐ Total number of days in last 12 months

16 How many days did you go recreational saltwater fishing from a private or rental boat that returned to shore in <Merged State>? Do not include charter boats or commercial boats that have a captain or crew who help locate and catch fish.

- ☐ No private boat recreational saltwater fishing in last 12 months ➔ *Go to Household Member 2*
- ☐☐ Number of days in July and August of 2015
- ☐☐ Total number of days in last 12 months

If you have more household members, continue to household member 2.

Treatment 1 Questionnaire (Q's 15 and 16)

Please think only about recreational saltwater fishing in <Merged State>.

15 **How many days did you go recreational saltwater fishing from the SHORE in <Merged State>?**

The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.

- ☐ Did not recreational saltwater fish from shore in last 12 months ➔ *Go to question 16*
- ☐☐ Number of days shore fishing in Jun. of 2015
- ☐☐ Number of days shore fishing in Jul. of 2015
- ☐☐☐ Total number of days shore fishing in last 12 months, including Jun. and Jul.

16 **How many days did you go recreational saltwater fishing from a private or rental BOAT that returned to shore in <Merged State>?**

Do not include freshwater trips or trips where a paid captain or crew helped locate and catch fish.

- ☐ Did not recreational saltwater fish from private boat in last 12 months.
- ☐☐ Number of days boat fishing in Jun. of 2015
- ☐☐ Number of days boat fishing in Jul. of 2015
- ☐☐☐ Total number of days boat fishing in last 12 months, including Jun. and Jul.

If you have more people in your household, continue to Household Member 2.

Treatment 2 Questionnaire (Q's 15 and 16)

Please think only about recreational saltwater fishing in <Merged State>.

15 **How many days did you go recreational saltwater fishing from the SHORE in <Merged State>?**

The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.

- ☐ Did not recreational saltwater fish from shore in last 12 months ➔ *Go to question 16*
- ☐☐ Number of days shore fishing in Jul. of 2015
- ☐☐☐ Total number of days shore fishing in last 12 months, including Jul.

16 **How many days did you go recreational saltwater fishing from a private or rental BOAT that returned to shore in <Merged State>?**

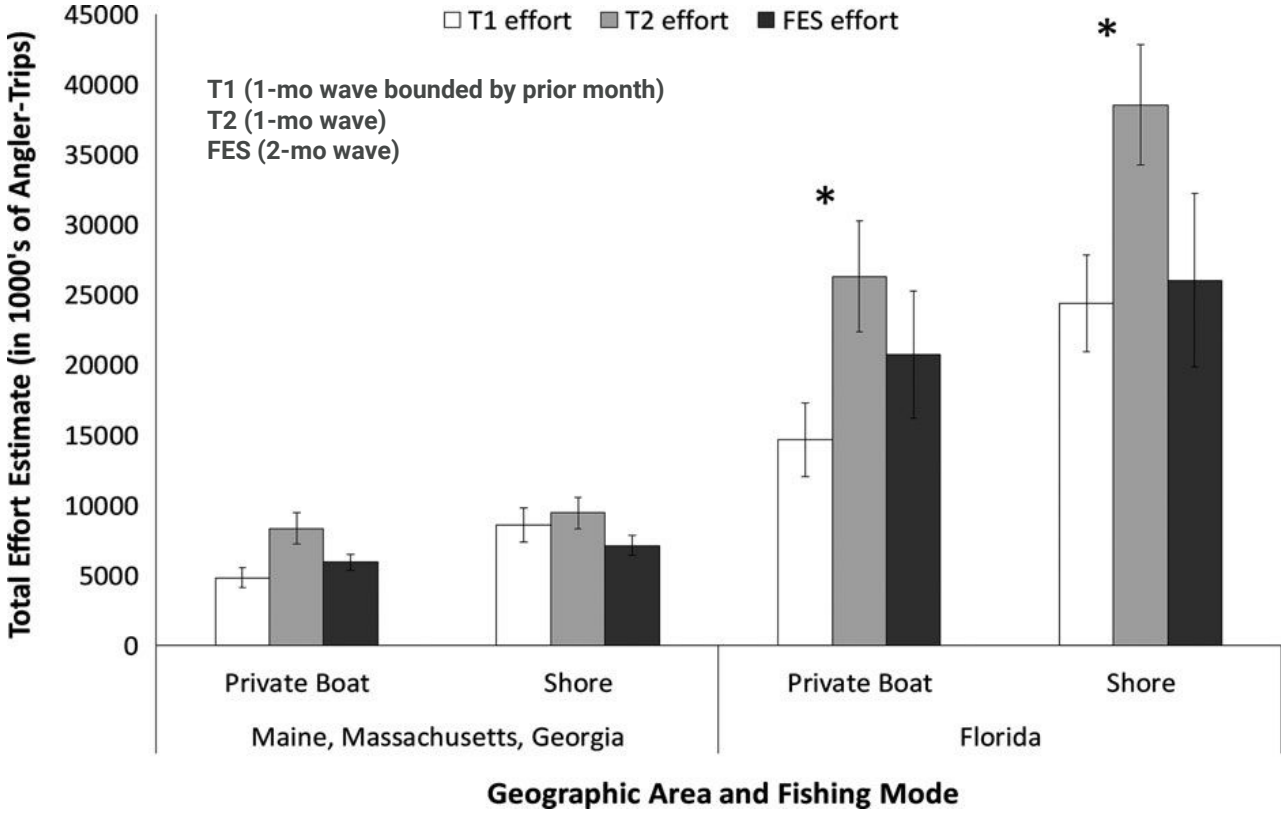
Do not include freshwater trips or trips where a paid captain or crew helped locate and catch fish.

- ☐ Did not recreational saltwater fish from private boat in last 12 months.
- ☐☐ Number of days boat fishing in Jul. of 2015
- ☐☐☐ Total number of days boat fishing in last 12 months, including Jul.

If you have more people in your household, continue to Household Member 2.

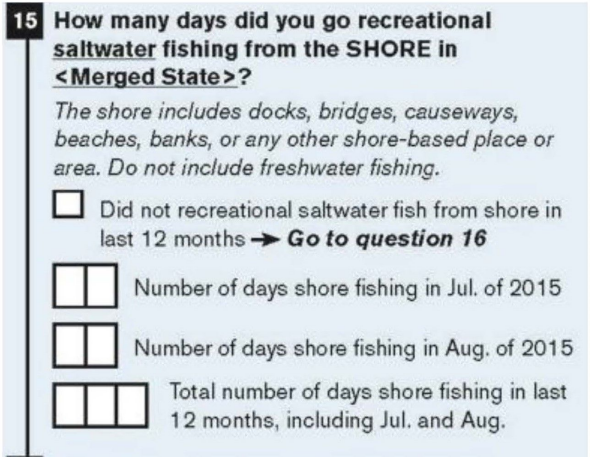
One-Month Wave Questionnaires

- FES estimates were lower than T2 estimates
- FES estimates similar to T1 estimates
- T1 estimates systematically lower than T2 estimates



One-Month Wave Questionnaires

- Study implemented for several successive months
- Provided independent estimates for a fixed month
- Reference periods presented in chronological order
- Allowed us to evaluate effects of recall length and question order on estimates



15 **How many days did you go recreational saltwater fishing from the SHORE in <Merged State>?**

The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.

☐ Did not recreational saltwater fish from shore in last 12 months ➔ ***Go to question 16***

☐☐ Number of days shore fishing in Jul. of 2015

☐☐ Number of days shore fishing in Aug. of 2015

☐☐☐ Total number of days shore fishing in last 12 months, including Jul. and Aug.

Month	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb
	1	2							
Question Order		1	2						
			1	2					
				1	2				
					1	2			
						1	2		

NOAA FISHERIES

One-Month Wave Questionnaires

- Longer recall period (presented first) resulted in larger estimates
- Question order is primary effect rather than the length of recall period
- Suggests telescoping is predominant form of error

Measure	Month 1 % (SE)	Month 2 % (SE)	Relative Difference	*p*-value
Shore prevalence				
Overall	9.26 (0.69)	5.97 (0.53)	35.53	0.0002
July	7.82 (1.23)	7.25 (1.29)	7.30	0.7508
August	12.05 (1.77)	6.16 (1.08)	49.68	0.0041
September	10.66 (1.86)	7.0 (1.30)	34.33	0.1121
October	7.01 (1.36)	4.97 (1.10)	29.15	0.2494
November	8.75 (1.44)	4.6 (1.11)	47.48	0.0246
Boat prevalence				
Overall	6.35 (0.54)	3.85 (0.40)	39.37	0.0003
July	6.46 (1.10)	3.44 (0.78)	46.73	0.0275
August	7.62 (1.30)	4.43 (0.88)	41.92	0.0499
September	6.06 (1.28)	4.2 (0.96)	30.69	0.2521
October	4.67 (1.13)	3.51 (0.90)	24.89	0.4242
November	6.95 (1.24)	3.66 (0.95)	47.39	0.0386

One-Month Waves Key Points

- Bounding reduces estimates and is likely more effective at reducing telescoping error when bounding questions precede reference period
- 2-month FES reference period may mitigate some telescoping error relative to shorter reference periods
- Estimates were higher when the recall period was longer and when the reference period was presented first in the question order
    - Suggests that question order has a greater effect than recall length
    - Telescoping error likely to be the predominant source of measurement error rather than omission error

Question Order Effects

FES: SH:PR/2:12

15 How many days did you go recreational saltwater fishing from the SHORE in North Carolina?

The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.

☐ Did not recreational saltwater fish from shore in last 12 months → ***Go to question 16***

☐☐ Number of days saltwater shore fishing in January and February of 2018

☐☐☐ Number of days saltwater shore fishing in last 12 months, including January and February

16 How many days did you go recreational saltwater fishing from a private or rental BOAT that returned to shore in North Carolina?

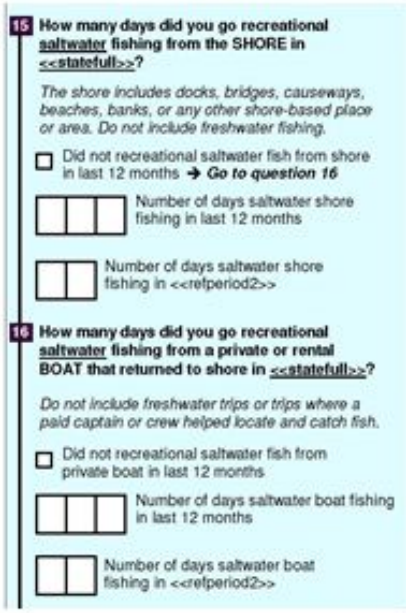
Do not include freshwater trips or trips where a paid captain or crew helped locate and catch fish.

☐ Did not recreational saltwater fish from private boat in last 12 months

☐☐ Number of days saltwater boat fishing in January and February of 2018

☐☐☐ Number of days saltwater boat fishing in last 12 months, including January and February

EXP1: SH:PR/12:2



15 How many days did you go recreational saltwater fishing from the SHORE in <<statefull>>?

The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.

☐ Did not recreational saltwater fish from shore in last 12 months → ***Go to question 16***

☐☐☐ Number of days saltwater shore fishing in last 12 months

☐☐ Number of days saltwater shore fishing in <<refperiod2>>

16 How many days did you go recreational saltwater fishing from a private or rental BOAT that returned to shore in <<statefull>>?

Do not include freshwater trips or trips where a paid captain or crew helped locate and catch fish.

☐ Did not recreational saltwater fish from private boat in last 12 months

☐☐☐ Number of days saltwater boat fishing in last 12 months

☐☐ Number of days saltwater boat fishing in <<refperiod2>>

EXP2: PR:SH/2:12

15 How many days did this person go recreational saltwater fishing from a private or rental BOAT that returned to shore in North Carolina?

Do not include freshwater trips or trips where a paid captain or crew helped locate and catch fish.

☐ Did not recreational saltwater fish from private boat in last 12 months → **Go to question 16**

☐☐ Number of days saltwater boat fishing in November and December of 2019

☐☐☐ Number of days saltwater boat fishing in last 12 months, including November and December

16 How many days did this person go recreational saltwater fishing from the SHORE in North Carolina?

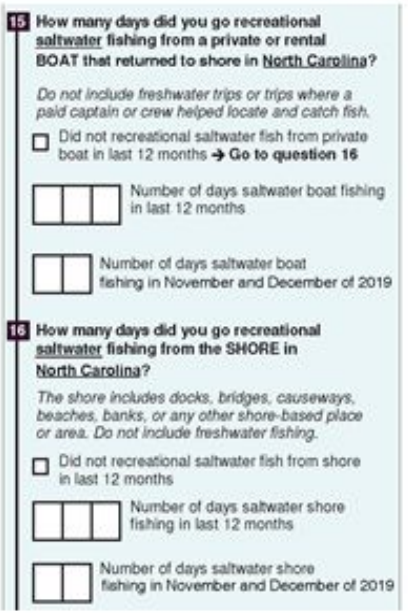
The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.

☐ Did not recreational saltwater fish from shore in last 12 months

☐☐ Number of days saltwater shore fishing in November and December of 2019

☐☐☐ Number of days saltwater shore fishing in last 12 months, including November and December

EXP3: PR:SH/12:2



15 How many days did you go recreational saltwater fishing from a private or rental BOAT that returned to shore in North Carolina?

Do not include freshwater trips or trips where a paid captain or crew helped locate and catch fish.

☐ Did not recreational saltwater fish from private boat in last 12 months → **Go to question 16**

☐☐☐ Number of days saltwater boat fishing in last 12 months

☐☐ Number of days saltwater boat fishing in November and December of 2019

16 How many days did you go recreational saltwater fishing from the SHORE in North Carolina?

The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.

☐ Did not recreational saltwater fish from shore in last 12 months

☐☐☐ Number of days saltwater shore fishing in last 12 months

☐☐ Number of days saltwater shore fishing in November and December of 2019

NOAA FISHERIES

Question Order Effects

	SH:PR/2:12 (FES)	SH:PR/12:2	PR:SH/2:12	PR:SH/12:2
	% (SE)	% (SE)	% (SE)	% (SE)
Shore Prevalence	6.01 (0.20)	4.61 (0.61)	4.82 (0.28)	3.95 (0.27)
Boat Prevalence	4.61 (0.18)	3.37 (0.23)	5.19 (0.31)	3.16 (0.21)

- Estimates were highest for the mode that was presented first and the 2-month question preceded the 12-month question
- Within the 2-month/12-month order, estimates were significantly lower when the mode was presented second
- Mode order was not significant when 12-month question preceded 2-month question

Question Order Change Key Points

- The order of the 2-month/12-month questions has a stronger effect than the mode order
- Presenting the 12-month trip question prior to the 2-month trip question resulted in lower estimates
- Asking the 12-month question before the 2-month question appears to reduce telescoping error, resulting in more accurate estimates than the current FES design.

Overall Key Points

- Telescoping error is likely the predominant form of measurement error in the FES
- “Bounding” is likely to reduce telescoping error
- Bounding is most effective when the bounding period precedes the reference period
- Implementing a more effective questionnaire design will likely result in lower estimates

Why do we think pilot study estimates are more accurate?

- Anglers want to report fishing activity
- Approach is consistent with studies examining measurement error for other data collection modes
- Fewer illogical responses

NOAA FISHERIES

Why didn’t we implement the new questionnaire in the first place?

- FES questionnaire is based upon a standard practice of asking easier questions first and then proceeding to more difficult questions
- FES questionnaire was informed by cognitive interviews and tested through a series of pilot studies
- The design was informed by survey methodologists and peer reviewed by NASEM and ASA

Follow-up Study & Next Steps

- Revised design administered concurrently with current FES over full course of 2024 (**larger sample size over longer duration**).
- New study design is informed by results of two previous pilot studies (one month waves, question order) and additional cognitive interviewing.
- Revised design includes **both questionnaire changes and increasing the administration of the survey** from every two months to monthly.
    - Study will determine **combined effects,** which allows for a more efficient transition/calibration process.
    - **Monthly sampling** is a priority of our partners and will produce **more frequent estimates and a shorter respondent recall** period that may also improve reporting error.

NOAA FISHERIES

Follow-up Study & Next Steps

- Existing FES **calibration will be updated** to account for new design changes

- Calibration update work has started and will continue as needed into 2024 and 2025 pending results from the 2024 follow-up study

- Full implementation of an improved FES design would occur **no earlier than 2026** and would be dependent on
  - Successful completion of the follow-up study and calibration updates
  - Favorable technical peer review and updated FES Transition Plan developed in coordination with partners on the MRIP Transition Team
  - Fully calibrated historic time series of catch and effort estimates

NOAA FISHERIES

Additional Information

FES and APAIS related Research:

https://www.fisheries.noaa.gov/recreational-fishing-data/marine-recreational-information-program-research

Database of MRIP Reports:

https://www.st.nmfs.noaa.gov/recreational-fisheries/MRIP/mrip-project

Data Collection:

https://www.fisheries.noaa.gov/topic/recreational-fishing-data/collecting-data

Estimation:

https://www.fisheries.noaa.gov/topic/recreational-fishing-data/producing-estimates

NOAA FISHERIES