



Exploring the Potential of Citizen Science

“Catch U Later” Smartphone Application

DEPARTMENT OF ENVIRONMENTAL QUALITY

Marine Fisheries

Andrew Cathey | May 20, 2021



Outline

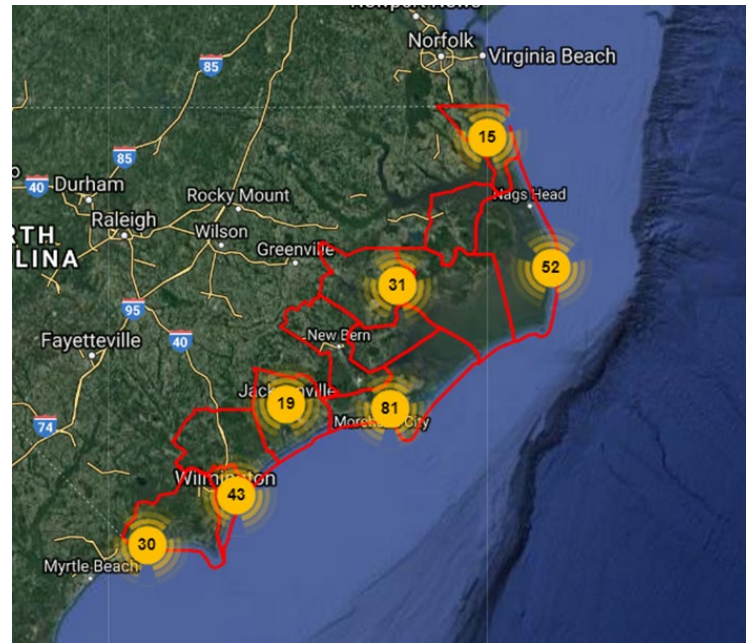
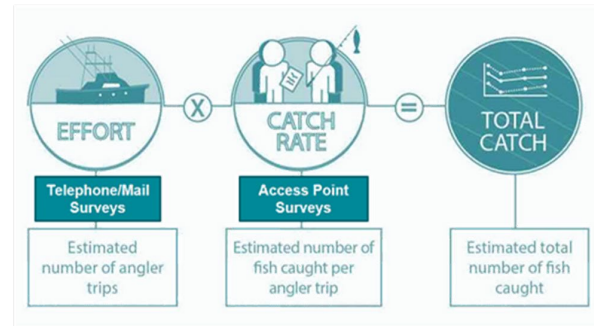
- Background and Research needs
- Approach and Methodology
- Work to Date



MRIP: North Carolina's Primary Data Collection Program



Estimating Total Recreational Catch



MRIP: Better at some things than others



Precision of Estimates

Estimate Status	Year	Common Name	Total Harvest (A+B1)	PSE	Harvest (A+B1)	Total Weight (lb)	PSE
FINAL	2017	DOLPHIN	279,932	20.7		2,223,509	21.1
FINAL	2018	DOLPHIN	495,435	15.6		3,318,532	14.8
FINAL	2019	DOLPHIN	458,086	18.9		3,147,384	20.4



Estimate Status	Year	Common Name	Total Harvest (A+B1)	PSE	Harvest (A+B1)	Total Weight (lb)	PSE
FINAL	2017	COBIA	25,025	46.1		872,861	45.4
FINAL	2018	COBIA	25,331	33.2		685,962	29.1
FINAL	2019	COBIA	10,090	38.6		254,963	36.8



Estimate Status	Year	Common Name	Total Harvest (A+B1)	PSE	Harvest (A+B1)	Total Weight (lb)	PSE
FINAL	2017	RED SNAPPER	0	-		0	-
FINAL	2018	RED SNAPPER	393	68.3		2,342	77.2
FINAL	2019	RED SNAPPER	0	-		0	-



MRIP: Limitations Specific to Southern Flounder



- **Harvest Estimates are precise**

Estimate Status	Year	Common Name	Total Harvest (A+B1)	PSE	Harvest (A+B1) Total Weight (lb)	PSE
FINAL	2017	SOUTHERN FLOUNDER	221,321	18.7	451,126	16.8
FINAL	2018	SOUTHERN FLOUNDER	217,805	19.3	495,289	18.5
FINAL	2019	SOUTHERN FLOUNDER	163,045	19.1	387,203	23.3

- **Discard Estimates are severely limited**

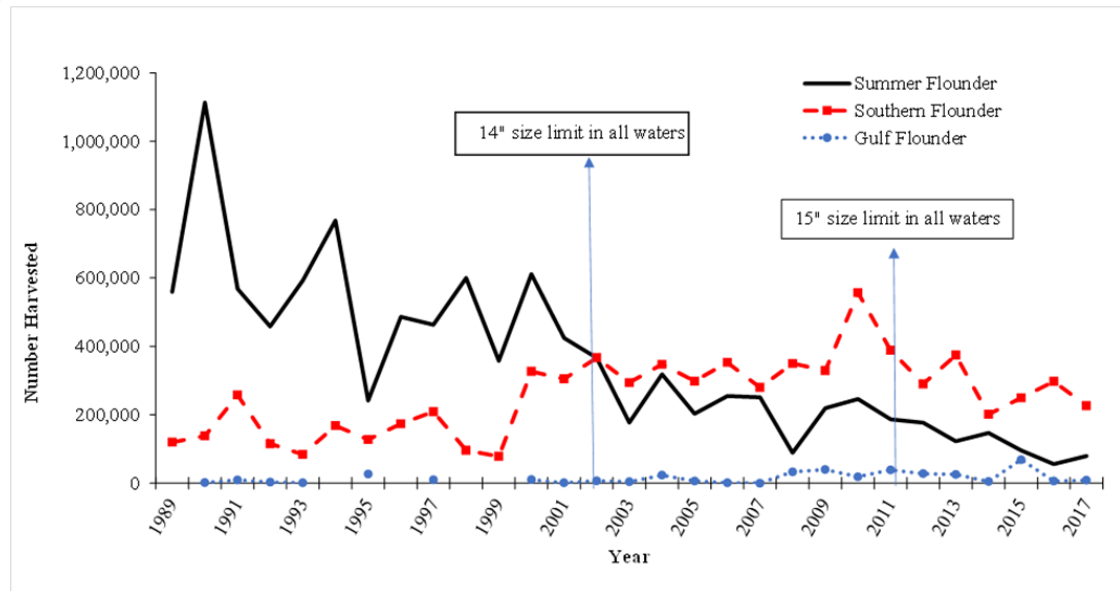
Estimate Status	Year	Common Name	Released Alive (B2)	PSE
FINAL	2017	LEFTEYE FLOUNDER GENUS	2,988,425	15.2
FINAL	2018	LEFTEYE FLOUNDER GENUS	1,497,351	11.4
FINAL	2019	LEFTEYE FLOUNDER GENUS	2,053,642	14.6

- Field Staff do not physically see discarded catch
- Discarded flounder are recorded to the genus level

Accounting for Ambiguous Flounder Discards

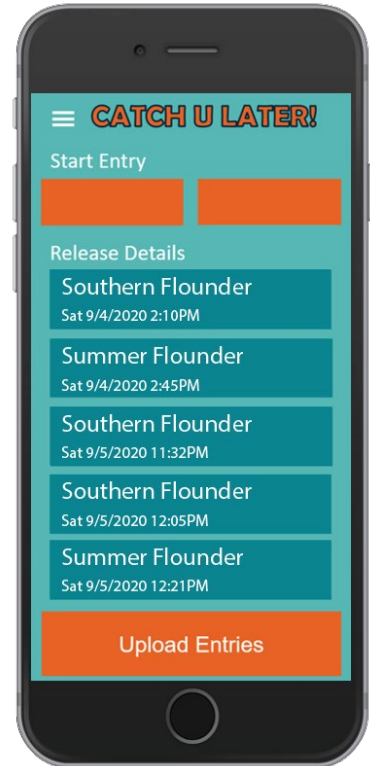


- **Current Methodology:** partitions the ratio of observed harvest (species specific)
- **Increased Size Limits:** have shifted harvest from Summer to Southern Flounder
- **Urgent Data Need:** to identify the species specific contributions to generic discards to better characterize the fishery



Exploring Citizen Science to Address Data Limitations

- Information on discarded flounder **can only** be provided by anglers



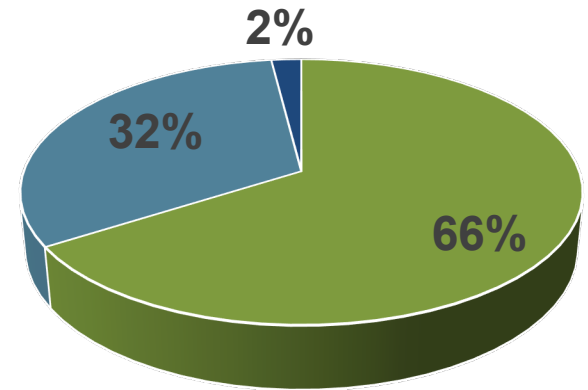
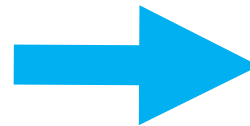
Catch U Later Research Objectives



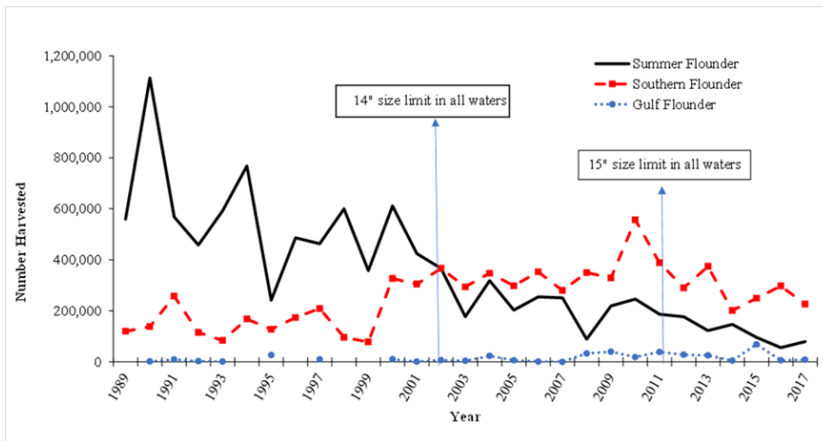
1. What are the species specific contributions to generic flounder discards?

Benefit: Accurately classify generic discards

Year	Common Name	Released Alive (B2)	PSE
2020	LEFTEYE FLOUNDER GENUS	2,528,335	13.5



■ Southern ■ Summer ■ Gulf



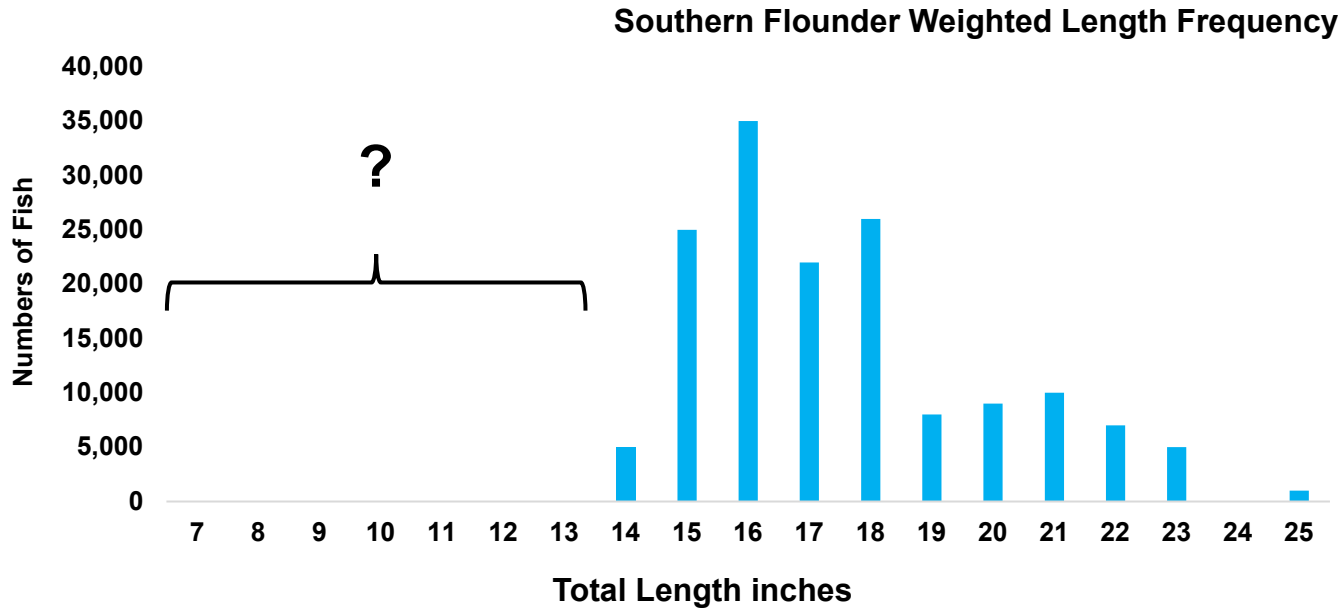
Department of Environmental Quality



Catch U Later Research Objectives

2. What is the species specific length distribution of discarded flounder?

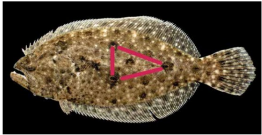
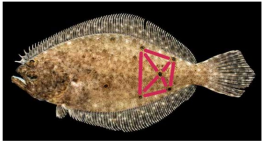
Benefit: Inform the evaluation of lowering size limits or implementing slot limits





3. Can Anglers tell the difference between North Carolina's constituent Flounder Species?

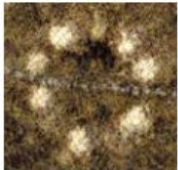
Benefit: Evaluate the applicability of single species management



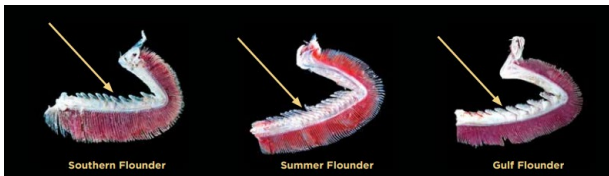
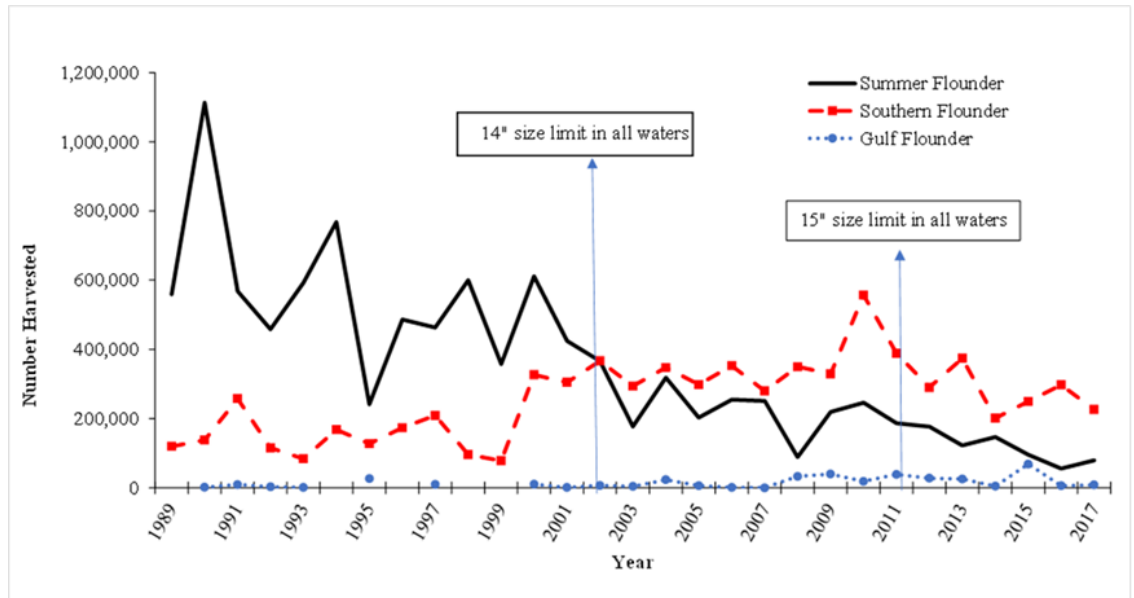
What about spots?



Ocellated or "eye" spot
(Summer & gulf flounder)



Non-ocellated spot
(Southern flounder)



Approach: Panel Survey

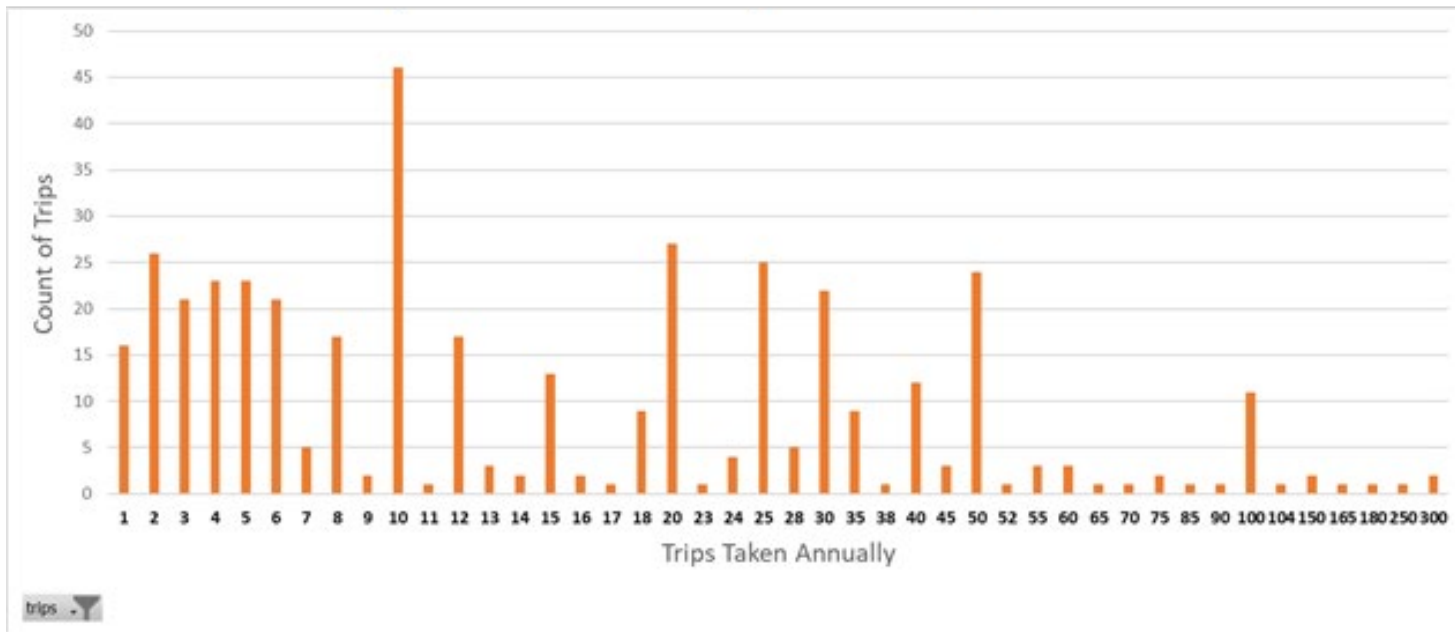
- Randomly select participants from our License Database
- Open access Applications attract more engaged and avid anglers
- Need representation from less avid anglers: Critical for investigating if folks can tell flounder apart

(47.8%) ≤ 10

(73.7%) ≤ 25

(92.4%) ≤ 50

YEARN	Avid	Pounds (A+B1)	PSE (Pound)	% Contribution (lbs)	Average Wt. (lbs)
2019	Low	154,406	4.25	39.9%	2.7
2019	High	232,797	11.7	60.1%	2.2



Approach: Panel Survey

Solicitation Flyer Mailed to 10,000 Licensed Anglers (Annual NC Resident License Only) Contextualize Management Needs for Southern Flounder



The flyer features the ACCSP logo (Chief Data, Chief Decisions) and the North Carolina Marine Fisheries logo. At the top, it says "CATCH U LATER! Coastal Angling Program". The main headline reads "WE WANT YOUR HELP!" with a sub-headline "Citizen Science Opportunity!". The text explains that in 2019, stock assessments determined the Southern Flounder stock is overfished and overfishing is occurring. It mentions that the North Carolina Marine Fisheries Commission adopted Amendment 2 of the Southern Flounder Fishery Management Plan, with some flexibility provided to the Director to determine seasonal openings and closures. It also states that state law requires management actions to be taken to end overfishing within 2 years and recover the stock from an overfished condition within 10 years. To meet these legal requirements, the North Carolina Division of Marine Fisheries determined that significant reductions in harvest were necessary. Adopted management measures included a 62% reduction in total removals in 2019 and a 72% reduction in total removals in 2020 across recreational and commercial fishing sectors. To achieve these reductions no flounder, regardless of species, can be harvested outside of the recreational season. Additional management strategies are currently being examined in Amendment 3, including species-specific flounder management. A call to action says "Join us by participating in a citizen science project called CATCH U LATER and contribute to the management of North Carolina's fisheries!".



The flyer features the ACCSP logo and the North Carolina Marine Fisheries logo. At the top, it says "CATCH U LATER!". The text explains that "CATCH U LATER" is a citizen science research initiative by the North Carolina Division of Marine Fisheries' Coastal Angling Program in partnership with the Atlantic Coastal Cooperative Statistics Program. "Catch U Later" is a smartphone application that allows anglers to record information about their flounder catches. A section titled "Why is this research being conducted?" explains that the purpose of the "Catch U Later" app is to evaluate angler expertise in the identification of flounder species. North Carolina is home to three species of flounder (Southern, Summer, and Gulf), yet the State manages all three flounder species together as one fishery. Data collected using the app will help determine if flounder can be managed as individual species, which could allow harvest of Summer and Gulf Flounder outside of the Southern Flounder season. A section titled "What information is collected?" explains that the app allows anglers to record trip information and fish information including the specific flounder species, length, and a picture of the flounder. A section titled "How is the information used?" explains that information collected using the "Catch U Later" app will provide species-specific discard length data for stock assessments and Fishery Management Plans. The tool will help researchers evaluate self-reported discard data from dockside interviews and help educate the angling public on flounder identification. A section titled "WANT TO HELP?" explains that the North Carolina Division of Marine Fisheries is currently selecting members of the angling public to help test the "Catch U Later" app. If you are interested in participating with this research initiative, please complete the enclosed survey and mail back using the postage-paid envelope. It also states that they will contact participants by email with further instructions after April 1, 2021. For more information about the program, contact Dr. Drew Cathey at 252-948-3876, Andrew.Cathey@ncdenr.gov. A screenshot of the "CATCH U LATER" app is shown, displaying a "Start Entry" button and a list of "Release Details" for Southern Flounder and Summer Flounder. An "Upload Entries" button is at the bottom of the app interface.





Associated Survey to Better Define Population and Minimize Bias



THANK YOU FOR YOUR PARTICIPATION!



Please return this survey by March 1, 2020

200 Old Man River Bath, NC 27808 PIN # 1234567	Please review your contact information. If you need to update your information, please do so in the space provided:	
	Name _____	
	Address _____	
	City _____	
	State _____	Zip _____

If you are interested in participating with CATCH U LATER, please complete the below survey and mail back using the postage-paid envelope provided.

- 1) Do you target flounder on saltwater fishing trips? YES NO
- 2) How many saltwater fishing trips do you take a year on average? _____
- 3) In what county do you primarily fish for flounder? _____
- 4) What is your primary mode of fishing?
 Private Boat Bank/Shore
 Charter Boat Man-made Structure (Pier, private dock, etc.)
- 5) Please provide your preferred e-mail address: _____

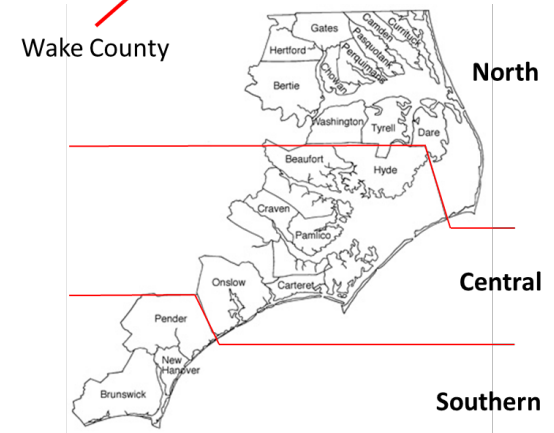
We will contact participants by email with further instructions after April 1, 2021.





Sample Selection: County Contributions to MRIP estimated Trips and Saltwater Fishing License Sales

<u>County of Residence</u>	<u>No Trips MRIP (2019)</u>	<u>County Residence of License Holder</u>	<u>No Licenses Sold (2019)</u>
Beaufort	349,601	Beaufort	5,484
Brunswick	716,952	Brunswick	10,646
Carteret	1,185,985	Carteret	9,811
Craven	701,561	Craven	8,819
Currituck	175,208	Currituck	2,118
Dare	1,392,853	Dare	5,791
Hyde	78,670	Hyde	722
New Hanover	612,412	New Hanover	14,115
Onslow	1,014,881	Onslow	16,782
Pamlico	90,157	Pamlico	1,621
Pender	173,966	Pender	5,696
Pitt	557,812	Pitt	8,668
Tyrrell	33,720	Tyrrell	459
Wake	702,484	Wake	22,700
Frame Total	7,786,262	Total	113,432
Statewide Trips	17,539,840	% of all Licenses Sold	24.7%
% Contribution	44.39%		

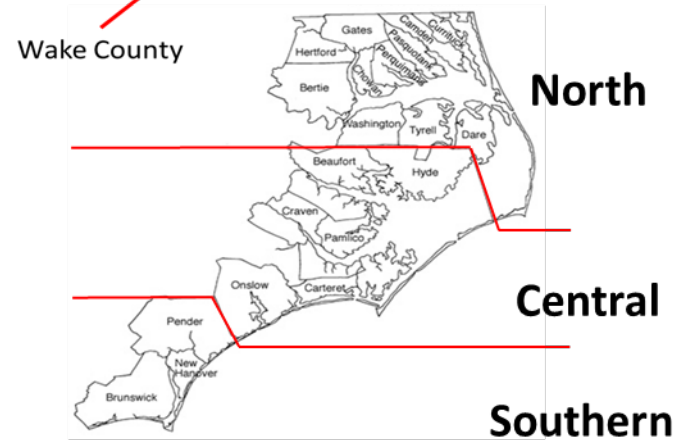
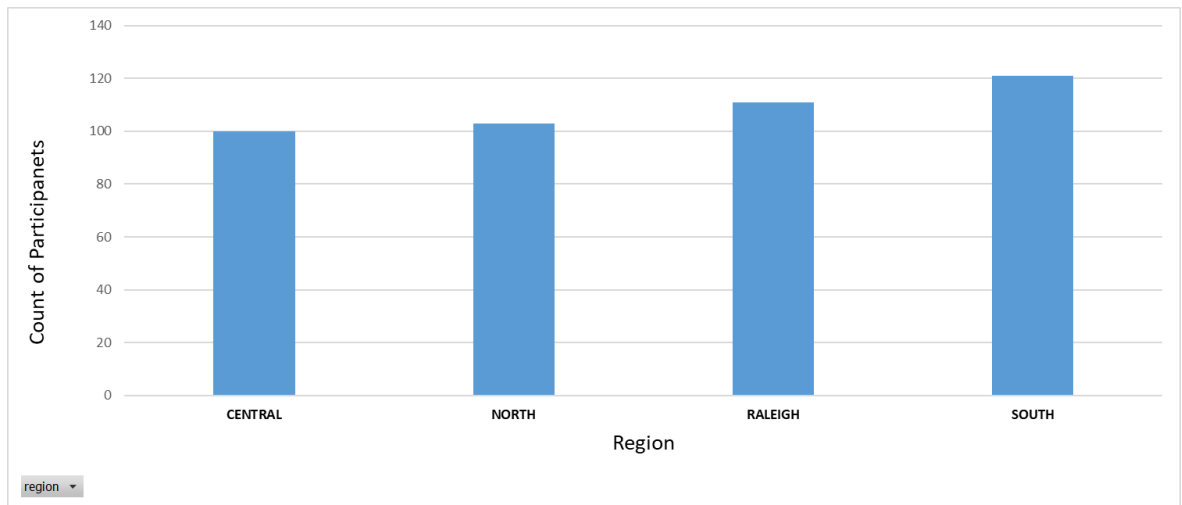


Sampled Coastal Counties with MRIP/APAIS Sampling Sites

- Stratified by geographic region North, Central, Southern
- Wake County was included as a separate strata because it contains the Raleigh Metro area and the largest proportion of saltwater fishing license sales in the state

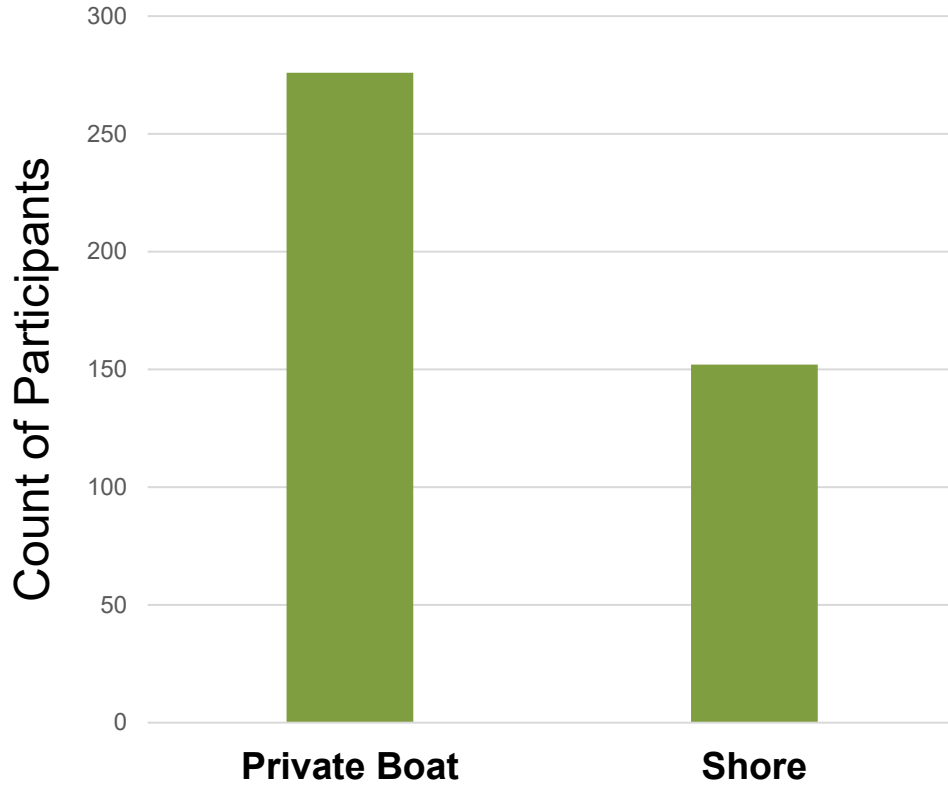


Progress to Date: Soliciting Participants



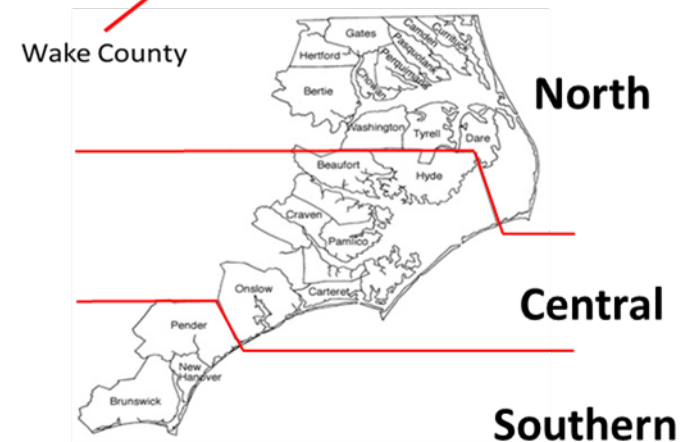
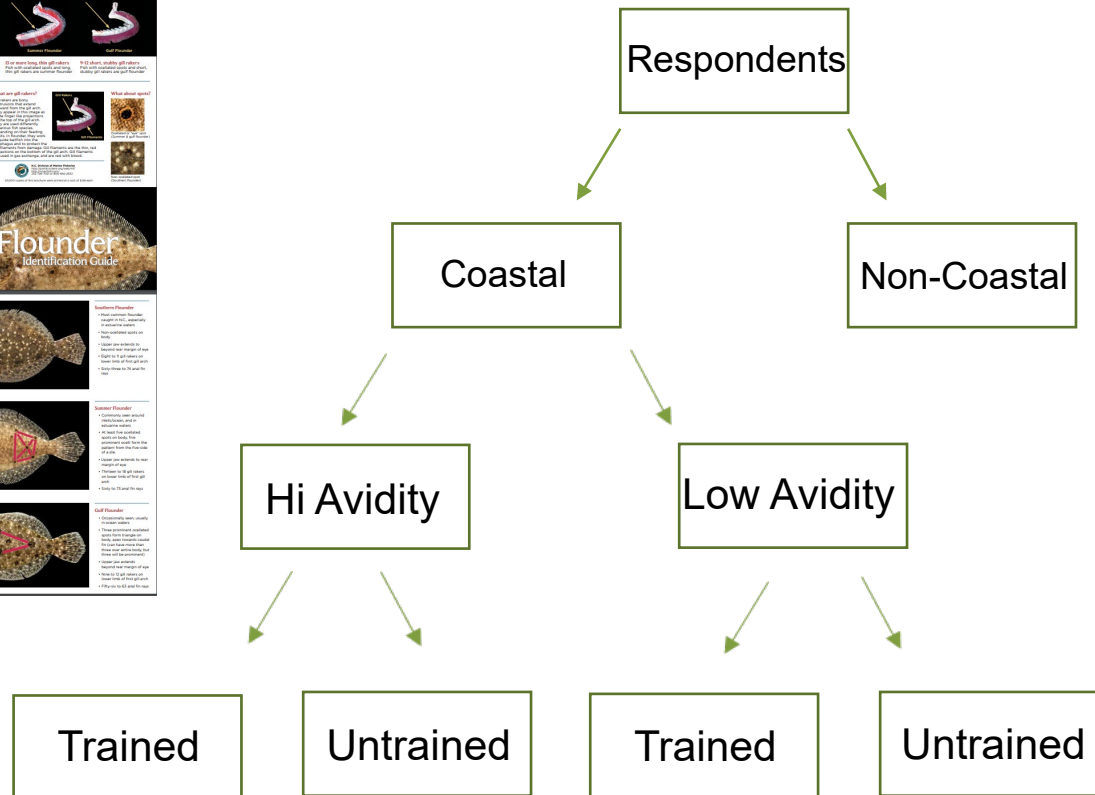


Survey Responses: Participants by Mode of Fishing

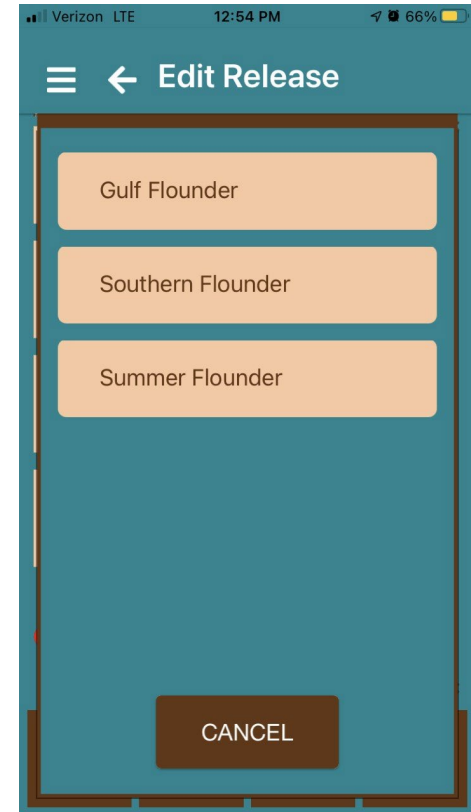
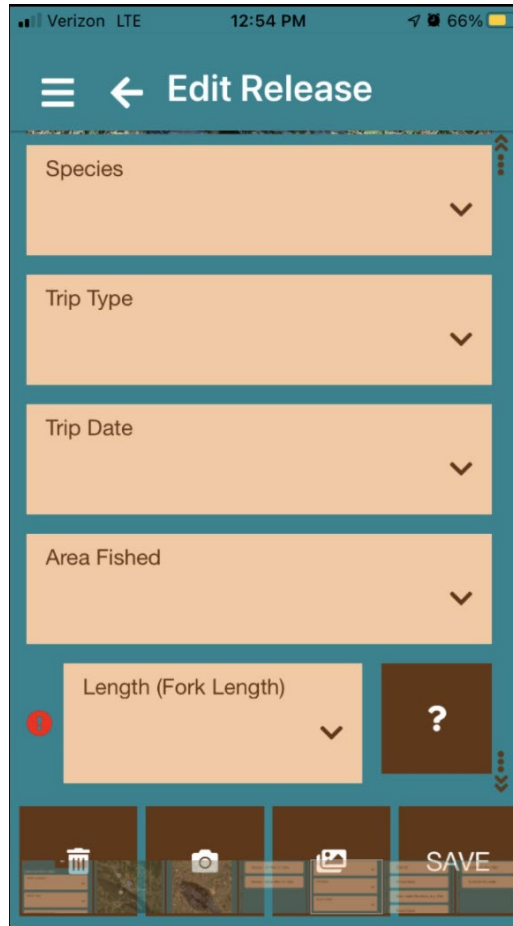
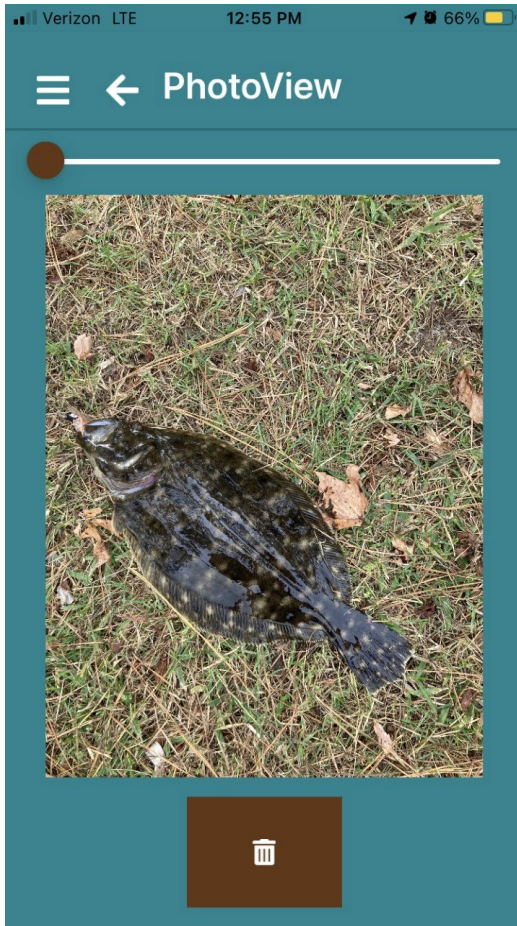


Experimental Design

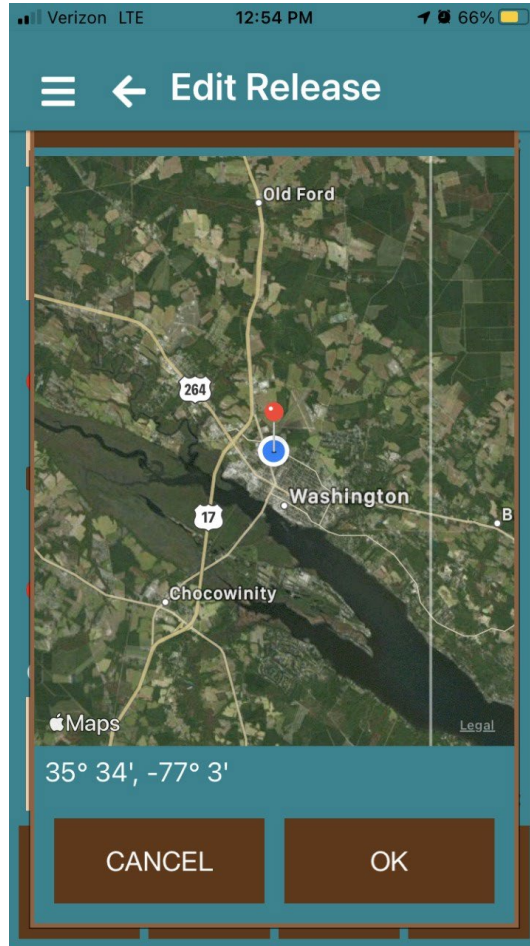
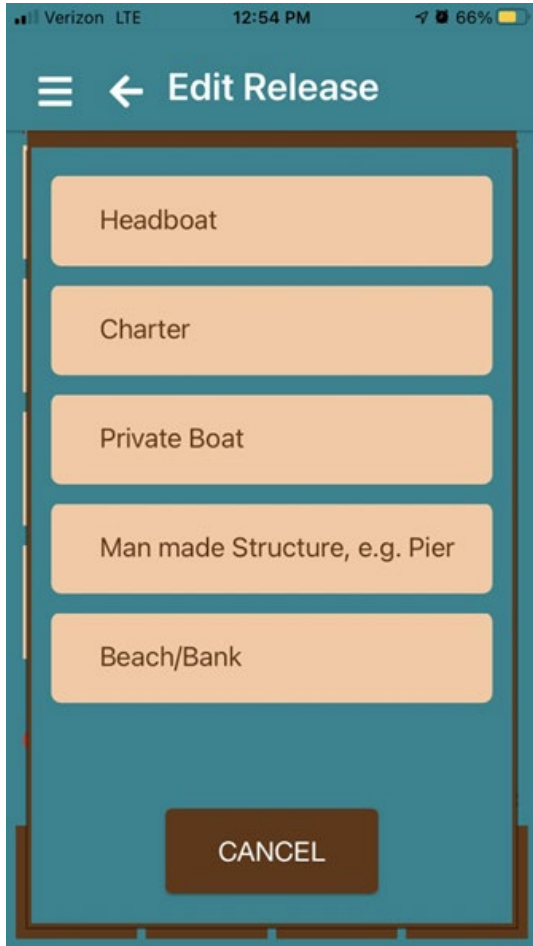
- Sample is stratified based on avidity and location
- Trained vs. Untrained Panels: using flounder ID brochure



Currently Beta testing Application



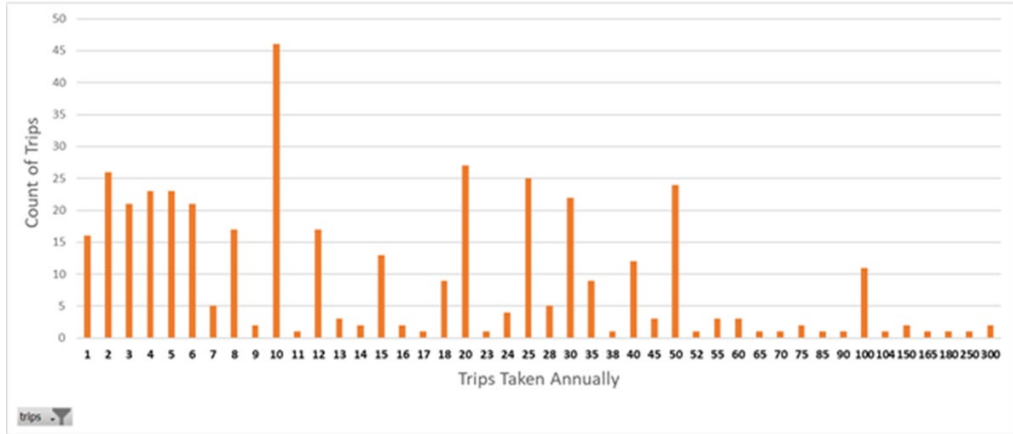
Progress to Date: App Development



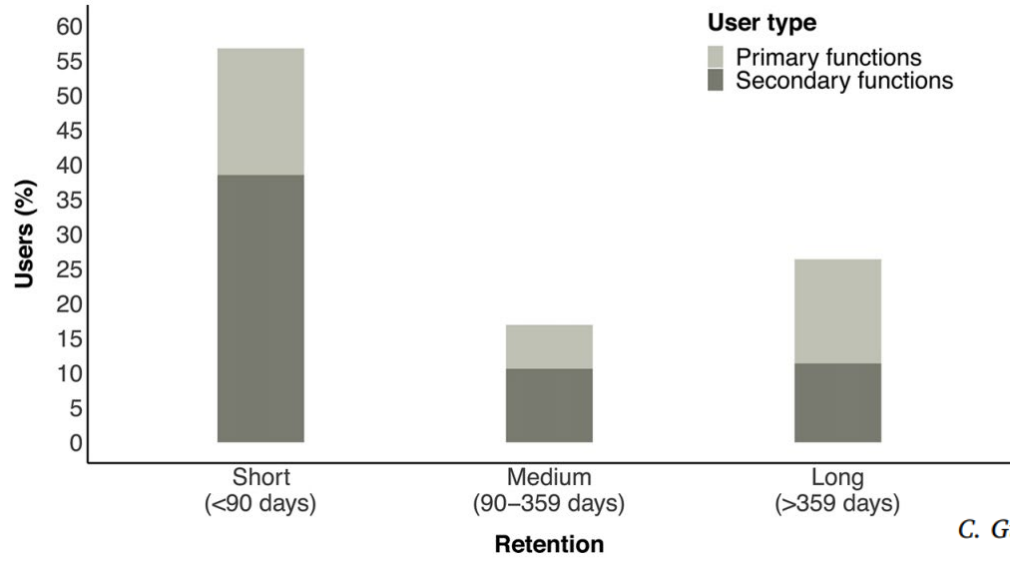
Concerns Moving Forward: Keeping Folks Engaged



(47.8%) ≤ 10 (73.7%) ≤ 25 (92.4%) ≤ 50



- Most folks don't fish very often
- 55% of participants used an equivalent app for less than 3-months
- Email monthly reminder to participants
- Incentivize participants: buffs, koozies, etc.



C. Gundelund, et al. (2020)



Questions, Comments, Concerns

