



**NOAA  
FISHERIES**

**Sustainable Fisheries Branch**

**NMFS Beaufort Laboratory,  
Beaufort, NC**

June 3, 2013

# **Fishery-Dependent and Fishery-Independent Data Collection for the Menhaden Fisheries and Their Use in Stock Assessments**



# Atlantic and Gulf Menhaden (Family Clupeidae)

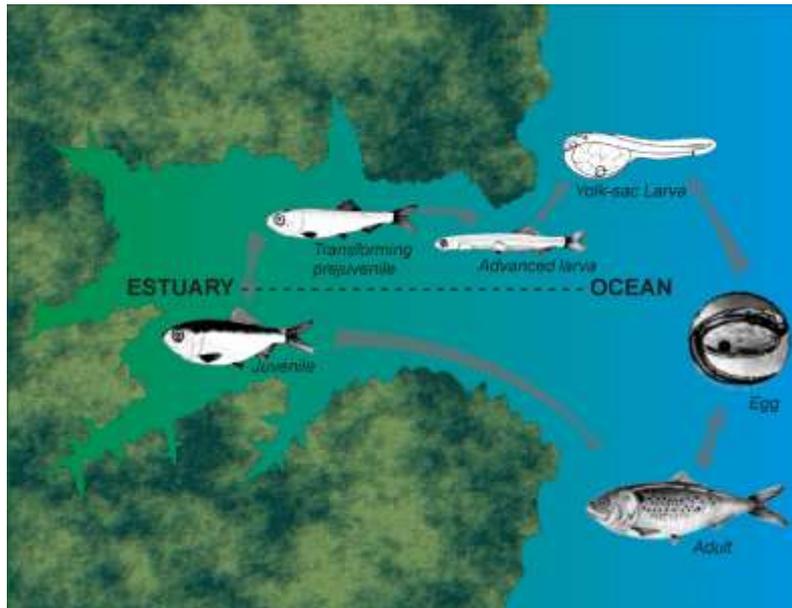


Atlantic menhaden, *Brevoortia tyrannus*



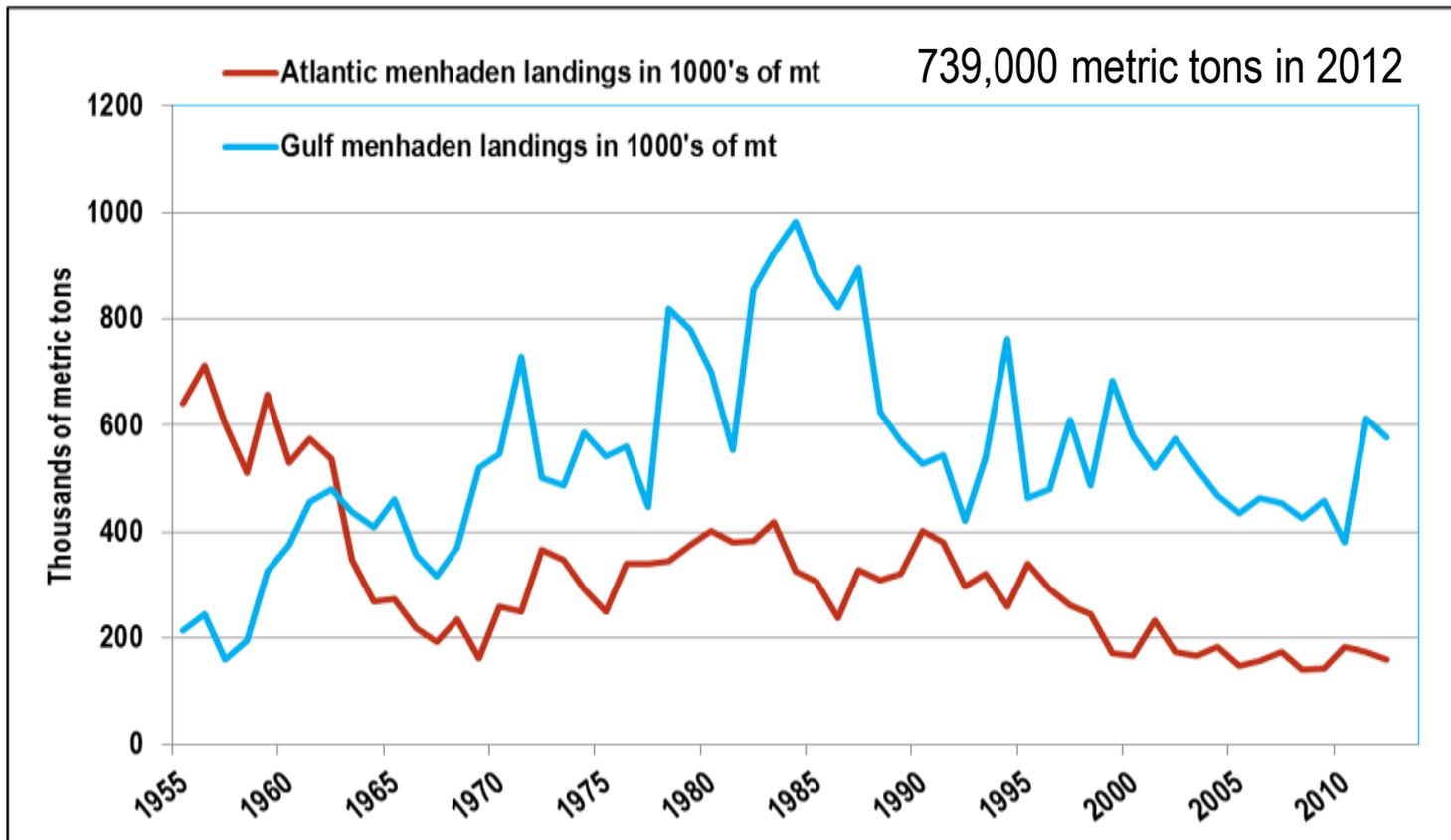
Gulf menhaden, *B. patronus*

- Schooling Behavior: form dense, near-surface schools
- Life History: Obligate filter-feeder, estuarine-dependent, marine migratory
- Prey Species: For numerous coastal fishes, sea birds, and marine mammals
- Schools are targets of a large, industrial purse-seine fishery



# Combined Atlantic and Gulf Menhaden Landings

- Second largest fishery in the US in terms of volume
- Five “menhaden ports” ranked among top eight US ports in terms of pounds landed in 2011
- Chief processed products > Fish meal, fish oil (Omega-3s), and fish solubles





# Menhaden Vessel Unloads Reported Daily to NMFS Beaufort

- Daily vessel-specific catch/effort data available:
  - 1955 to present on Atlantic
  - 1964 to present on Gulf



Menhaden catch being "counted" in factory volumetric hopper device

1 of 2

Month: May RECORD OF DAILY MENHADEN PURSE SEINE CATCH  
 Year: 1985 Location: Cameron La Plant: Cam Menhaden No. 64

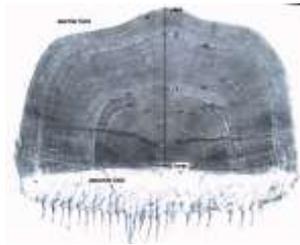
Date	VESSEL NUMBER								Aggregate from Previous Months	Daily Plant Total	Aggregate Total
	687	745	613	688	637	742	749	664			
	VESSEL NAME										
	Franklin	Francis T. Canbas	Selbert Man	Sea Raider	Sea Renate	Sea Strike	Sea Wolf	SURPRISE			
1.	70	1084	-	-	-	254	-	192	2624	27,566	
2.	685	1031	-	-	739	-	-	653	4313	31,899	
3.	783	1030	998	1096	490	1140	1579	666	8756	40,655	
4.											
5.											
6.	816	-	485	635	578	1453	-	849	4816	45,477	
7.	950	1,389	-	-	-	-	1500	-	5343	50,814	
8.	-	-	965	865	695	1165	-	817	4507	55,321	
9.	923	1278	-	-	-	-	1216	-	4591	59,912	
10.	592	764	978	844	666	1343	843	955	7915	67,827	
11.											
12.											
13.											
14.											
15.											
16.	308	982	542	411	472	708	1000	523	5849	73,676	
17.											
18.											
19.											
20.	-	-	422	526	340	-	-	733	2221	75,697	
21.	718	1019	-	-	-	1352	1281	-	5385	81,082	
22.	194	188	592	1141	637	-	208	831	4096	85,178	
23.	958	1498	-	-	-	-	1461	-	5290	90,468	
24.	-	-	1186	878	795	1272	-	854	4982	95,453	
25.											
26.											
27.	768	-	-	970	-	710	1357	-	3805	99,258	
28.	928	1535	1044	-	822	-	-	907	6496	105,754	
29.	-	-	-	484	-	-	-	-	480	106,238	
30.	-	778	278	-	216	117	1490	579	5400	111,638	
31.											
Month Total	8,393	12,626	7,490	7,850	6,440	10,514	11,875	8,559	86,476		
Season Total	11,282	15,796	9,589	10,669	8,734	12,660	15,904	10,222		111,638	

Remarks: OK OK GWS on/over  
 Checked by E. J. [Signature] Date 4/27/85  
 Recorded by [Signature] Date 4/15/85 by phone        at Plant Other  
 (Check one)  VESSEL OPERATOR  #1

May 1985 vessel catch records from Cameron, LA

# Port Sampling

- Two-stage cluster design, relatively unchanged since 1955
  - First-stage: Sample obtained from top of fish hold with a bucket or a dip net
    - Top of fish hold assumed to be last set of the trip
  - Second-stage: 10 fish randomly chosen from sample for size and age composition

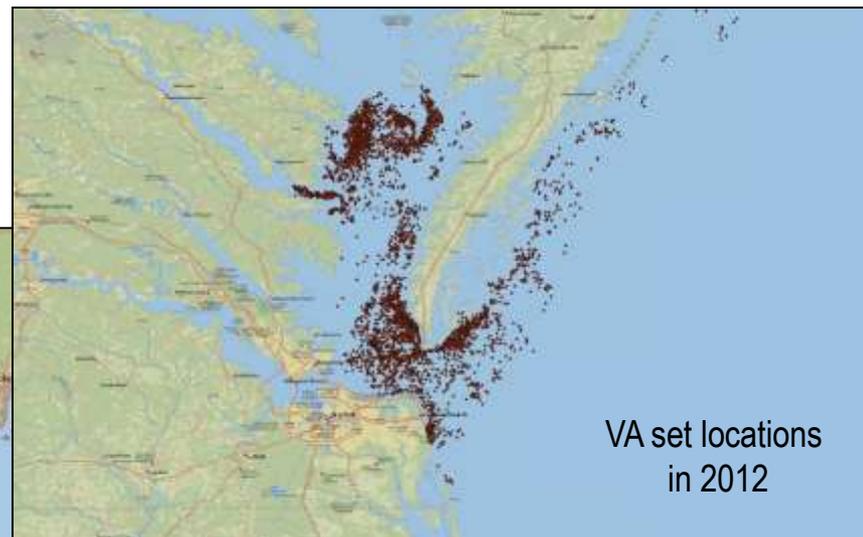


- Specimens processed for fork length (mm), weight (g), and a scale patch removed for ageing
  - Note: Same scale reader technician at Beaufort since early 1970s (E.A. Hall)

Coast	Trips	Trips sampled	% of trips sampled
Atlantic, mean of 2010-12	742	304	41
Gulf, mean of 2010-12	2,193	748	34

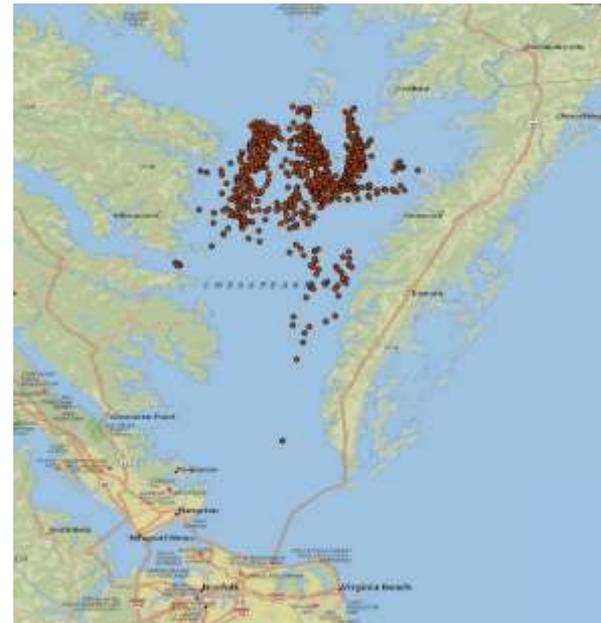
# Captains Daily Fishing Reports (CDFRs), or logbooks

- CDFRs itemize for each purse-seine set:
  - Set location (GPS), set time, estimated catch, set duration, distance from shore, and weather variables
- 100% compliance for both fleets
- Atlantic: 4,726 sets in 2012
- Gulf: 21,188 sets in 2011



# Atlantic Menhaden Bait Fishery

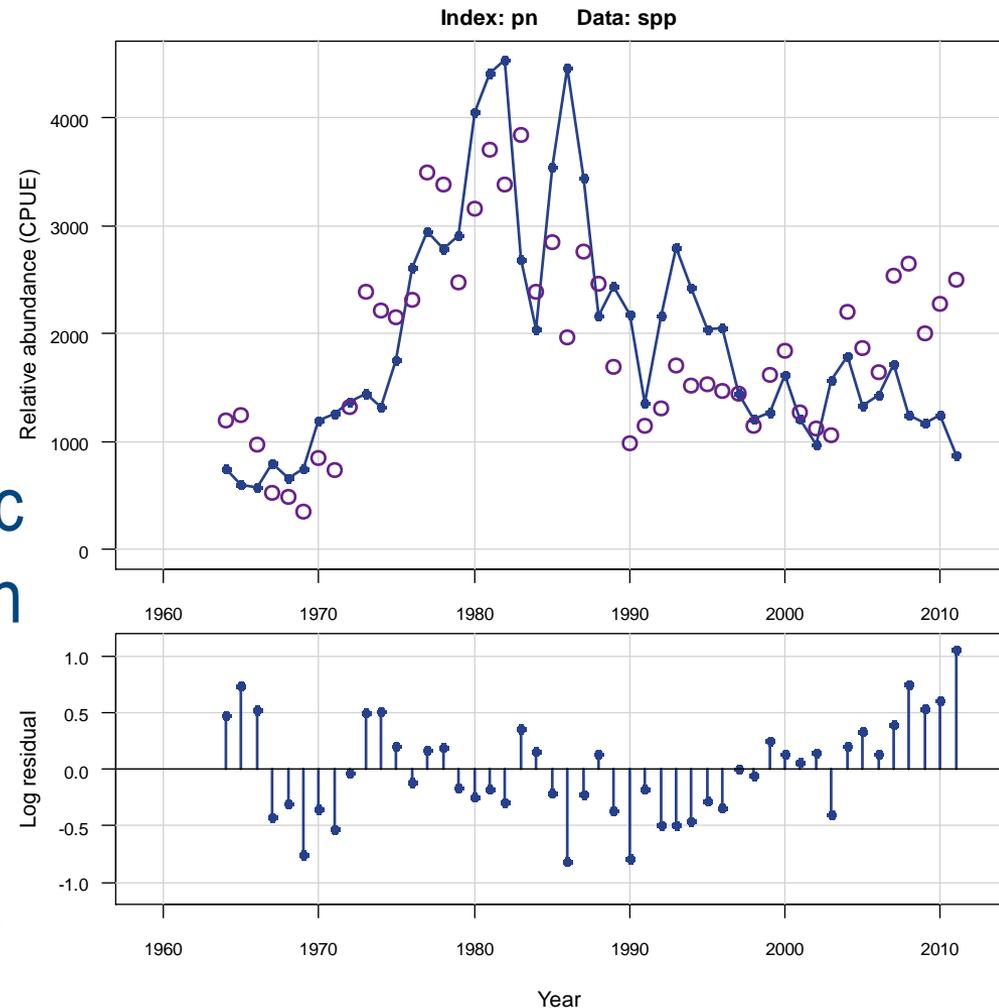
- Bait landings in 2011 were ~54,800 mt, or 24% of coastwide menhaden landings
- Bait segment of the fishery growing, especially for lobster bait in New England
- Small bait purse-seiners in VA and NJ account for ~80% of bait landings
  - well-described and sampled for age/size of catch since mid-1990s
  - catch-at-age (CAA) developed for these and incorporated into assessment
- Limited or no data for pound net and gill net fisheries for bait



VA set locations  
for bait in 2012

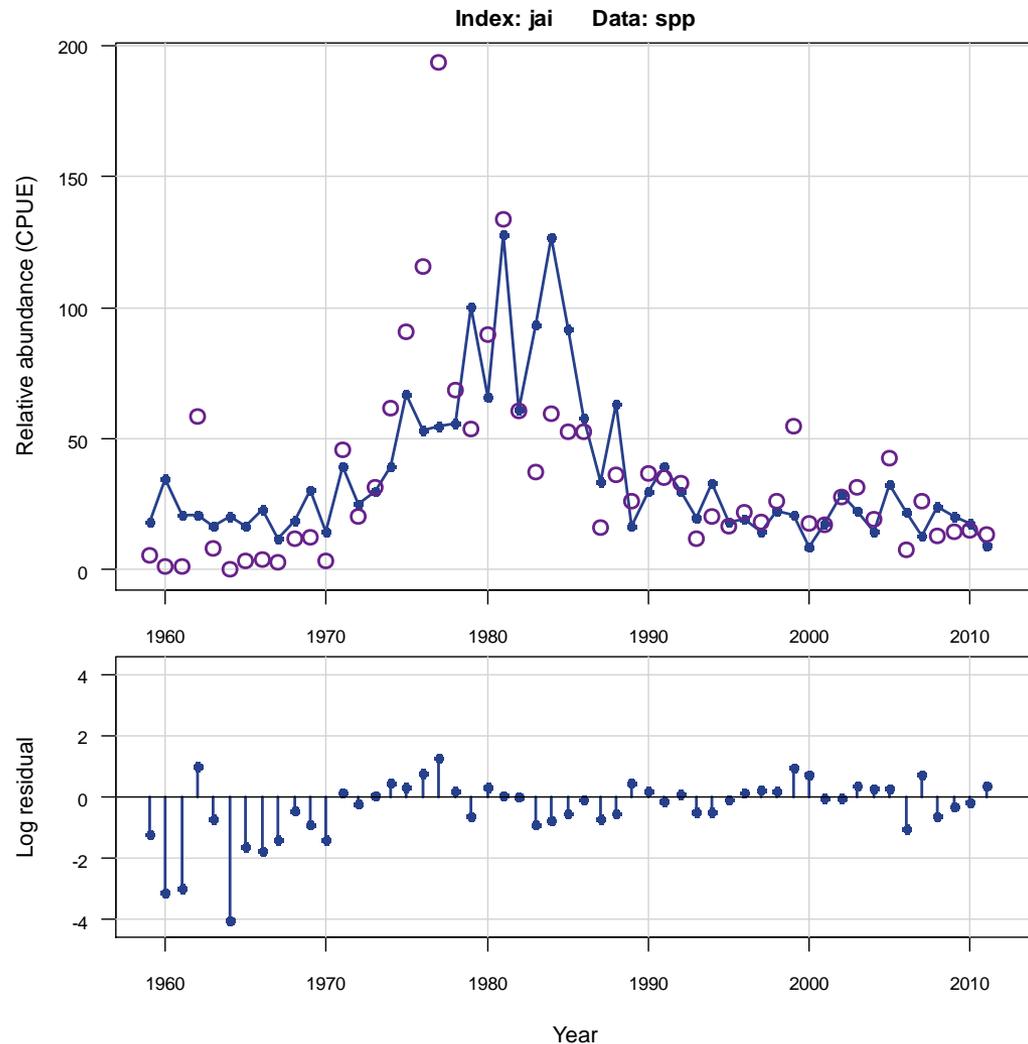
# Fishery-Dependent Data for Index Creation

- Atlantic menhaden
  - Pound net index
  - Does not target menhaden
  - Data supplied by Potomac River Fishery Commission
  - Trip ticket-based
  - Selectivity assumed
    - Limited/no length or age information



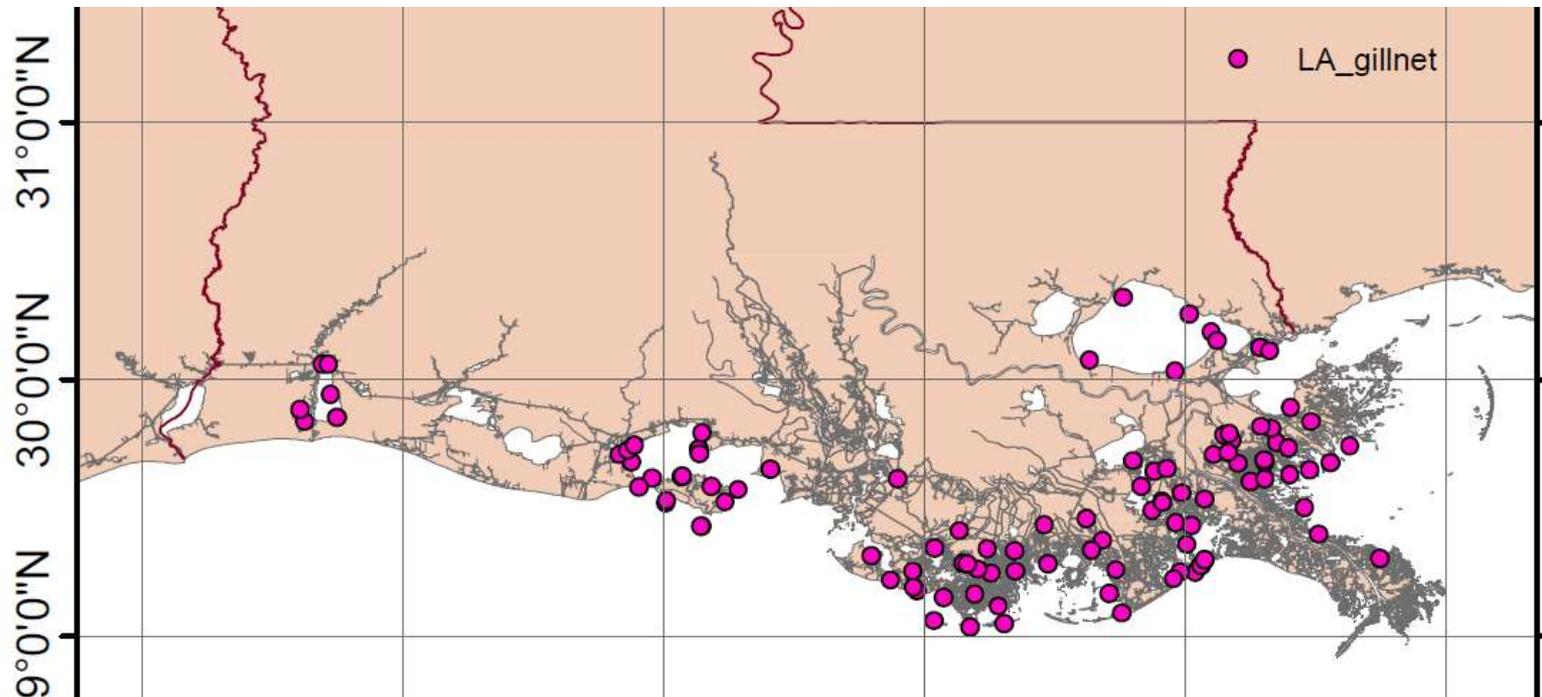
# Fishery-Independent Data for Index Creation

- Atlantic and gulf menhaden
  - State seine surveys
  - Do not target menhaden
  - Age-0 Recruitment index
  - Each state has own sampling design
    - Most are fixed stations



# Fishery-Independent Data for Index Creation

- Gulf menhaden
  - State gill net survey
  - Does not target menhaden
  - Index for age-1+
- No age information collected
- LA samples at fixed stations



# Stock assessments

- Atlantic menhaden
  - ASMFC
    - [www.asmfc.org](http://www.asmfc.org)
  - Statistical catch at age
    - BAM
  - Data:
    - Landings (bait and reduction)
    - CAA (bait and reduction)
    - PRFC index
    - Seine index
- Gulf menhaden
  - GSMFC
    - [www.gsmfc.org](http://www.gsmfc.org)
  - Statistical catch at age
    - BAM
  - Data:
    - Landings (reduction)
    - CAA (reduction)
    - Seine index
    - LA gill net index
    - Gill net length compositions from LA

# Take home points

## ISSUE

## SOLUTION



- Reduction fishery landings and characteristics well-sampled



Keep up the good work!



- Little/NO information on selectivity for pound net index



Collect menhaden samples from pound net fisheries

# Take home points

## ISSUE



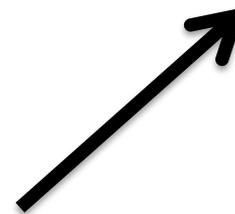
- NO coast-wide fishery-independent survey for either coast



- Little/NO non-fishery age and length data



- Selectivity for reduction fisheries on both coasts uncertain



## SOLUTION

Design and implement coast-wide fishery independent surveys for menhaden in the GOM and SA

# Take home points

## ISSUE

## SOLUTION



- Dated life history information (e.g. fecundity and maturity)



FI survey or directed studies to collect information



- State data difficult to obtain, quality check, and get questions answered



Better communications and support for menhaden work from states



- Bait fishery: landings difficult to track accurately and age data limited



Collect more samples from bait fishery

# The most important take home point

- A well designed coast-wide fishery independent survey could provide an index, provide age and length information, provide updated life history information, inform selectivity, and inform spatial extent and movement for the stock assessment.
- Other data needs for the stock assessment are important, but pale in comparison to the need for a good FI survey