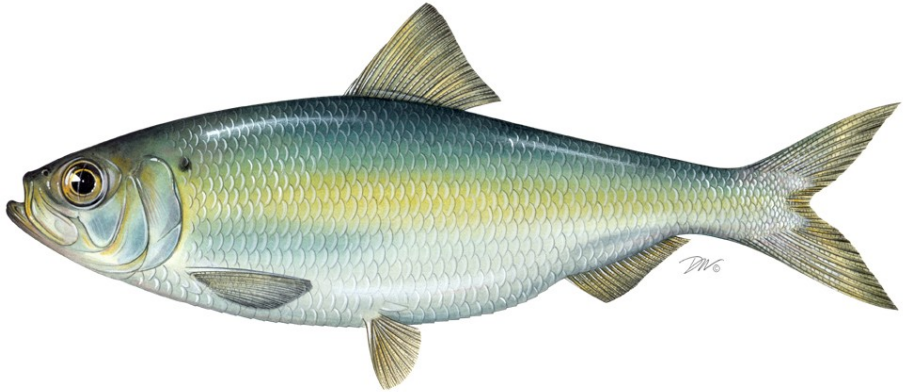
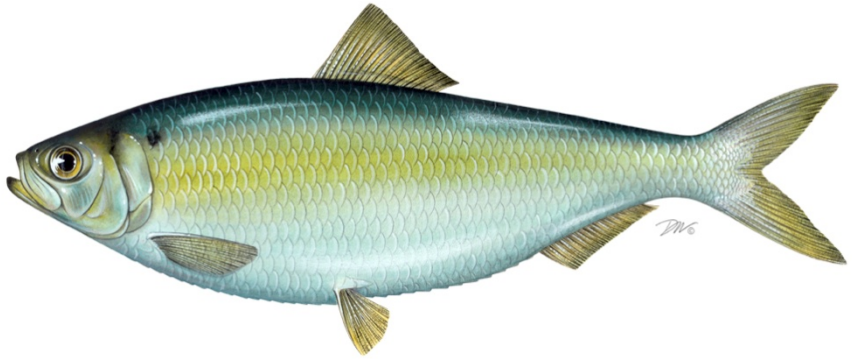
River Herring Stock Assessment Update





Shad and River Herring Fisheries Management Board

August 2nd 2017

Outline

- Background and data
- Data trends
  - Abundance data
  - Biological data
  - Total mortality estimates
- Conclusions

Update Recommendation

- SAS recommended an update of trend analyses 5 years after the 2012 benchmark assessment and a new benchmark assessment after 10 years (i.e., 2022)

- *"Due to the high variability of fisheries independent surveys, a benchmark assessment at a shorter timeframe (e.g. 5 years) will likely not show any significant changes in indices of abundance."*

- *"Any population changes resulting from closures of fisheries in 2012; improved access to historic spawning grounds; and additional beneficial management measures, such as SFMPs and action by the federal councils, cannot be expected to result in any population change until at least one cohort of river herring has grown to maturity"*

Background

- River herring management
  - Ideal: manage stock(s) by individual river system
    - Difficult due to mixing in the marine environment
- Complex life history complicates a coastwide scale assessment
  - Data quantity & quality varies among systems
  - Limited information on mixed-stock ocean bycatch

Assessment Approaches

- Trend analyses (Mann-Kendall, ARIMA, cluster analysis)
- Total mortality estimates and reference points
- Population models for the Monument River (MA) and Chowan River (NC)
- Depletion-Based Stock Reduction Analysis not endorsed by the Peer Review Panel and was not updated

Benchmark Data Overview

- Evaluated 57 river systems on Atlantic coast
- Only 26% had complete or usable data
- Nine categories of FI and FD data: by species, Harvest, Age, Length ,Weight, Repeat Spawner ratio, Adult FI, JAI FI, and CPUE FD
- Most monitored runs occurred in NE states

Update Data Overview

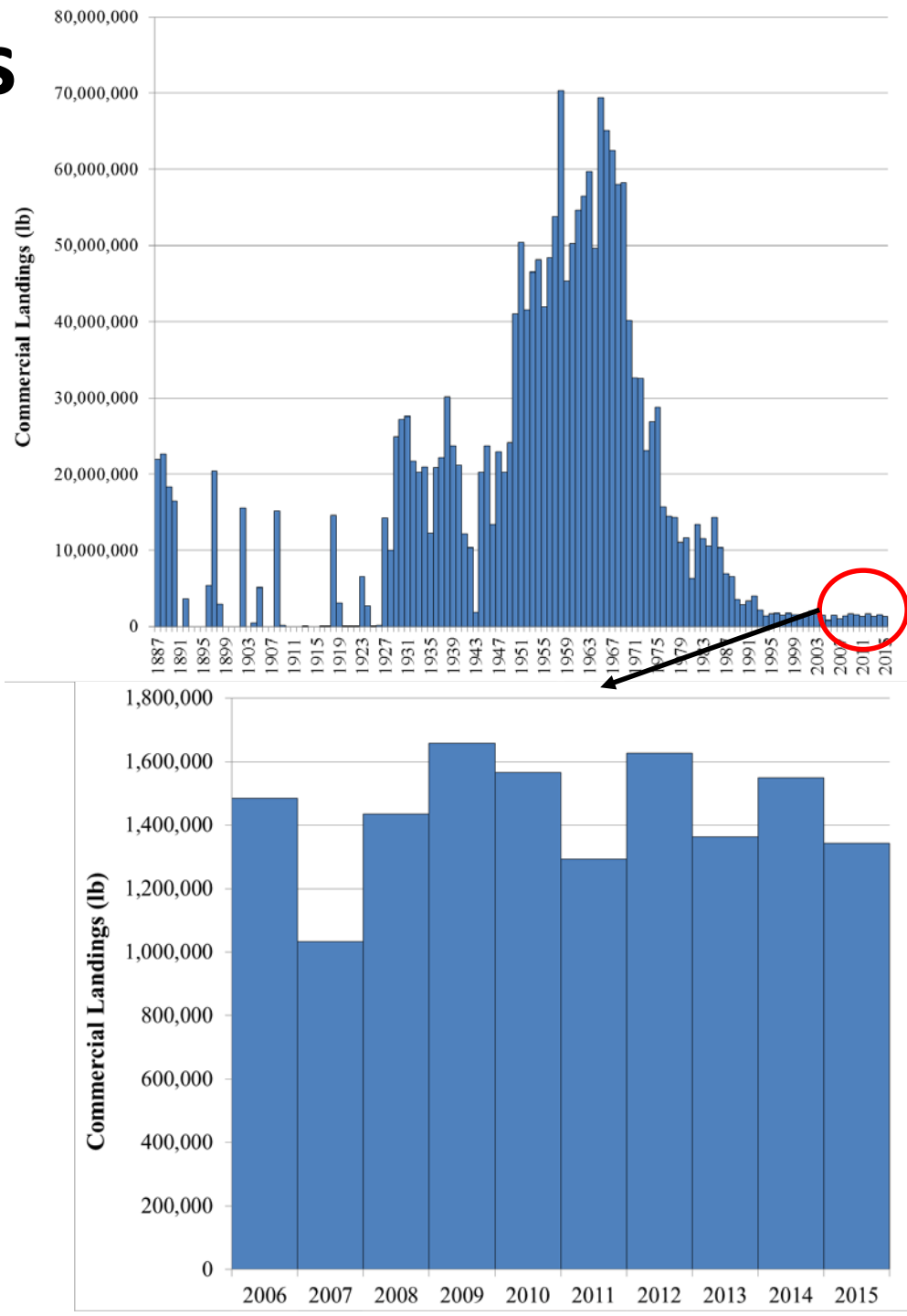
- Benchmark data updated through 2015

- Data sets identified during the benchmark as being too short for analyses that were ≥ 10 years by 2015 were included

- Several data sets discontinued following the benchmark assessment due to management actions, unreliability, or lack of returning fish

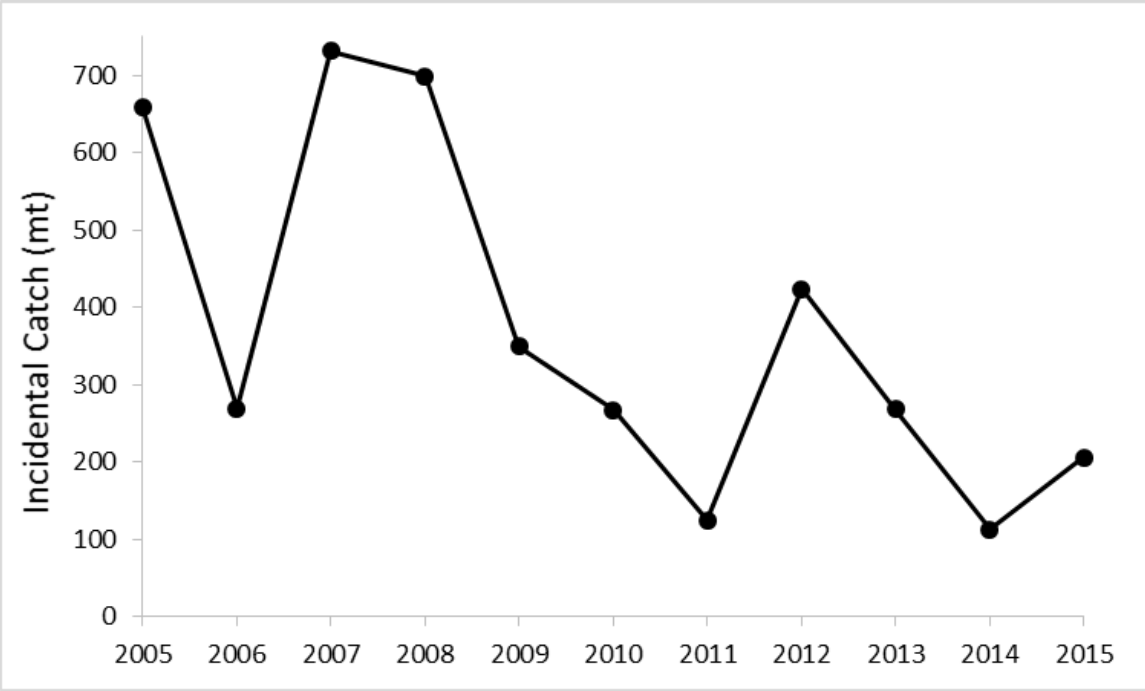
Commercial Landings

- Coastwide commercial landings have remained relatively stable since the benchmark stock assessment.
- The landings data may have reduced utility since harvest moratoria. Although, no evidence of major changes since the benchmark stock assessment.



Incidental Ocean Catch

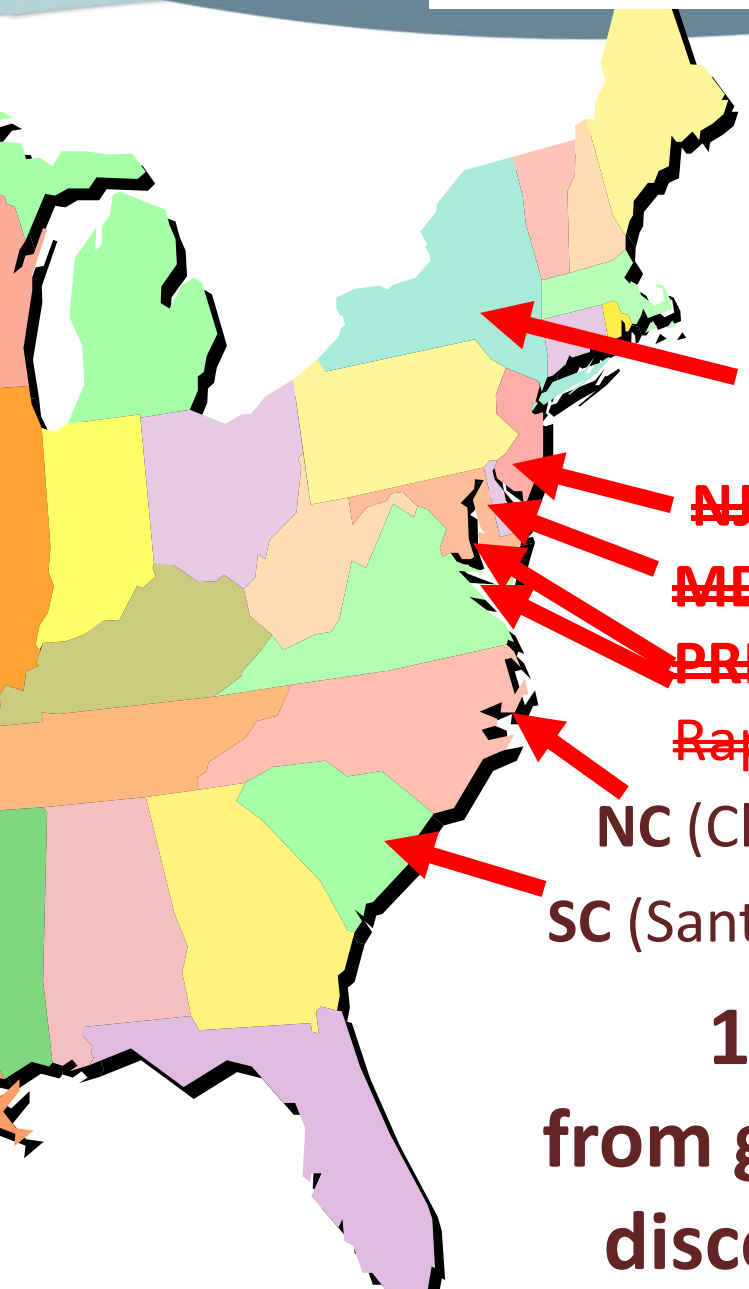
- Average incidental catch since the benchmark stock assessment (227 mt) was less than 50% of the 2005-2010 average (496 mt).
- The impact of this catch upon stock status remains largely unknown.



Recent Trends

- Following the framework established in the benchmark assessment, recent trends were determined for abundance and total mortality
  - Terminal 5-year trends determined during the benchmark were updated and evaluated over the final 10 years of the data time series
  - Trends of biological data for the complete time series are provided
  - Trends summarized in Table 1 of the assessment update report

Commercial CPUE Data



NY (Hudson)

~~**NJ** (Del Bay)~~

~~**MD** (Nanticoke)~~

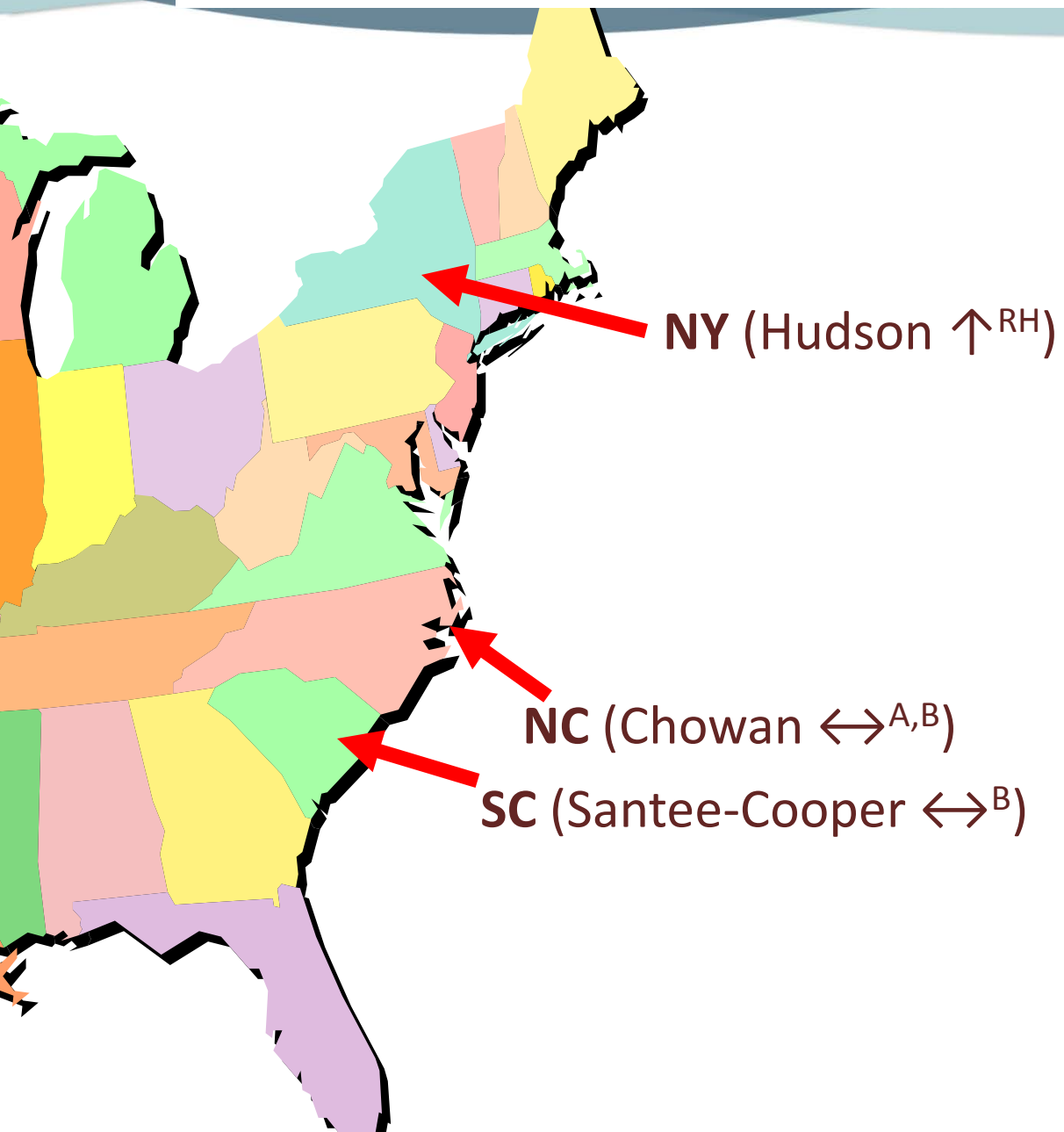
~~**PRFC** (Potomac),**VA** (Chesapeake Bay, James, Rappahannock, York)~~

NC (Chowan)

SC (Santee-Cooper)

10 rivers/estuaries with data from gillnets and pound nets; all but 3 discontinued following benchmark

Commercial CPUE Recent Trends

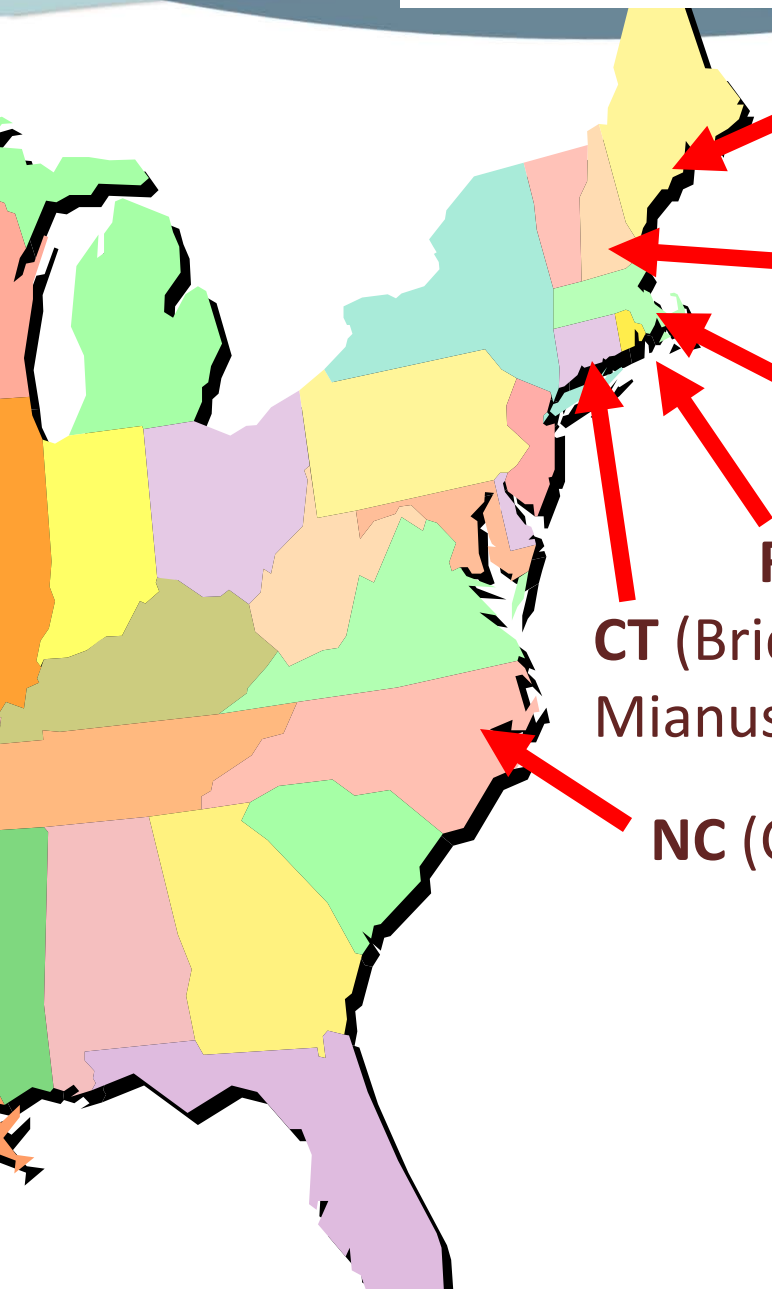


NY (Hudson $\uparrow^{RH}$)

NC (Chowan $\leftrightarrow^{A,B}$)

SC (Santee-Cooper $\leftrightarrow^{B}$)

Run Size Data



ME (Androscoggin, Kennebeck, Sebasticook, Damariscotta, Union)

NH (Cocheco, Exeter, Lamprey, Oyster, ~~Taylor~~, ~~Winnicut~~)

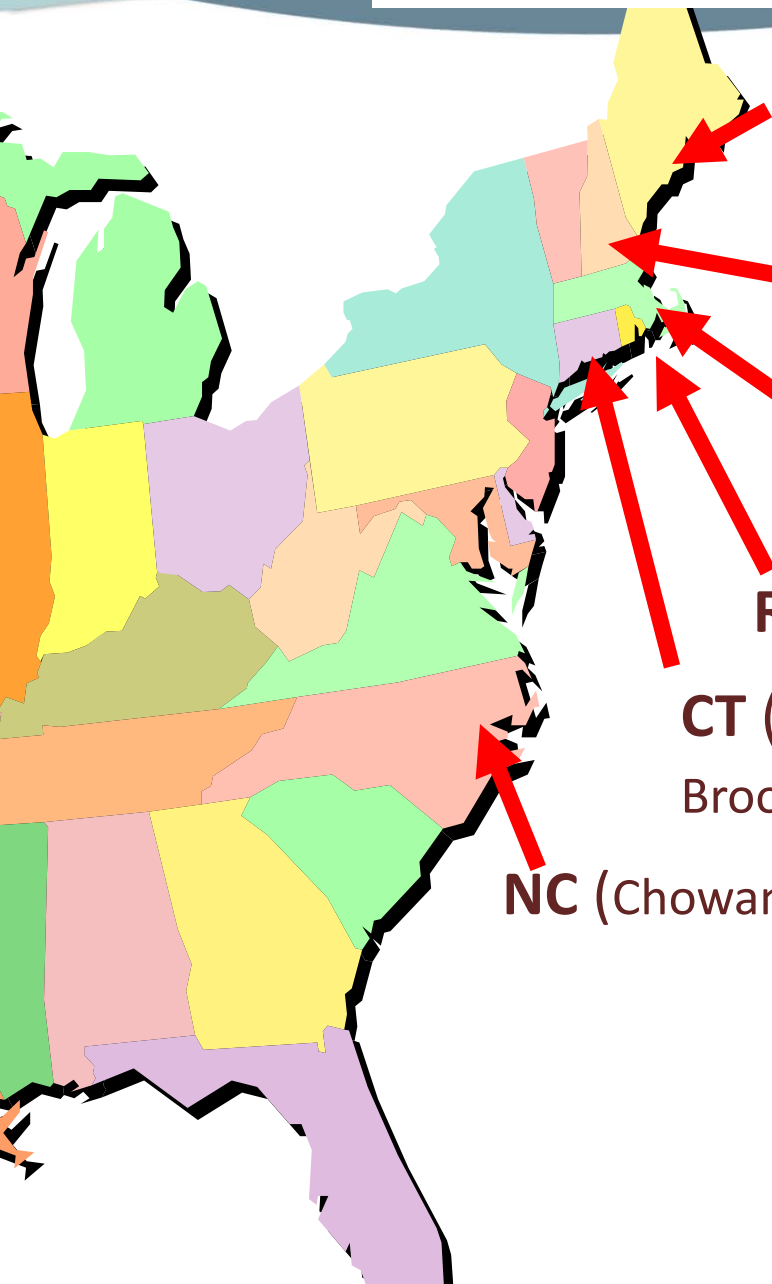
MA (Mattapoisett, Monument, Nemasket, Parker)

RI (Buckeye, Gilbert, Nonquit)

CT (Bride Brook, Connecticut, ~~Farmington~~, Mianus, Mill Brook, ~~Naugatuck~~, Shetucket)

NC (Chowan)

Run Size Recent Trends



ME (Androscoggin ↑[A], Kennebeck ↑[RH], Sebasticook ↑[RH], Damariscotta ↑[A], Union ↔[A])

NH (Cocheco ↑[RH], Exeter ↔[RH], Lamprey ↑[RH], Oyster ↔[RH])

MA (Mattapoisett ↑[A], Monument ↑[A,B], Nemasket ↑[A], Parker ↔[A])

RI (Buckeye ↔[A], Gilbert ↔[A], Nonquit ↔[A])

CT (Bride Brook ↑[A], Connecticut ↔[B], Mianus ↔[A,B], Mill Brook ↔[A], Shetucket ↔[A,B])

NC (Chowan ↔[B])

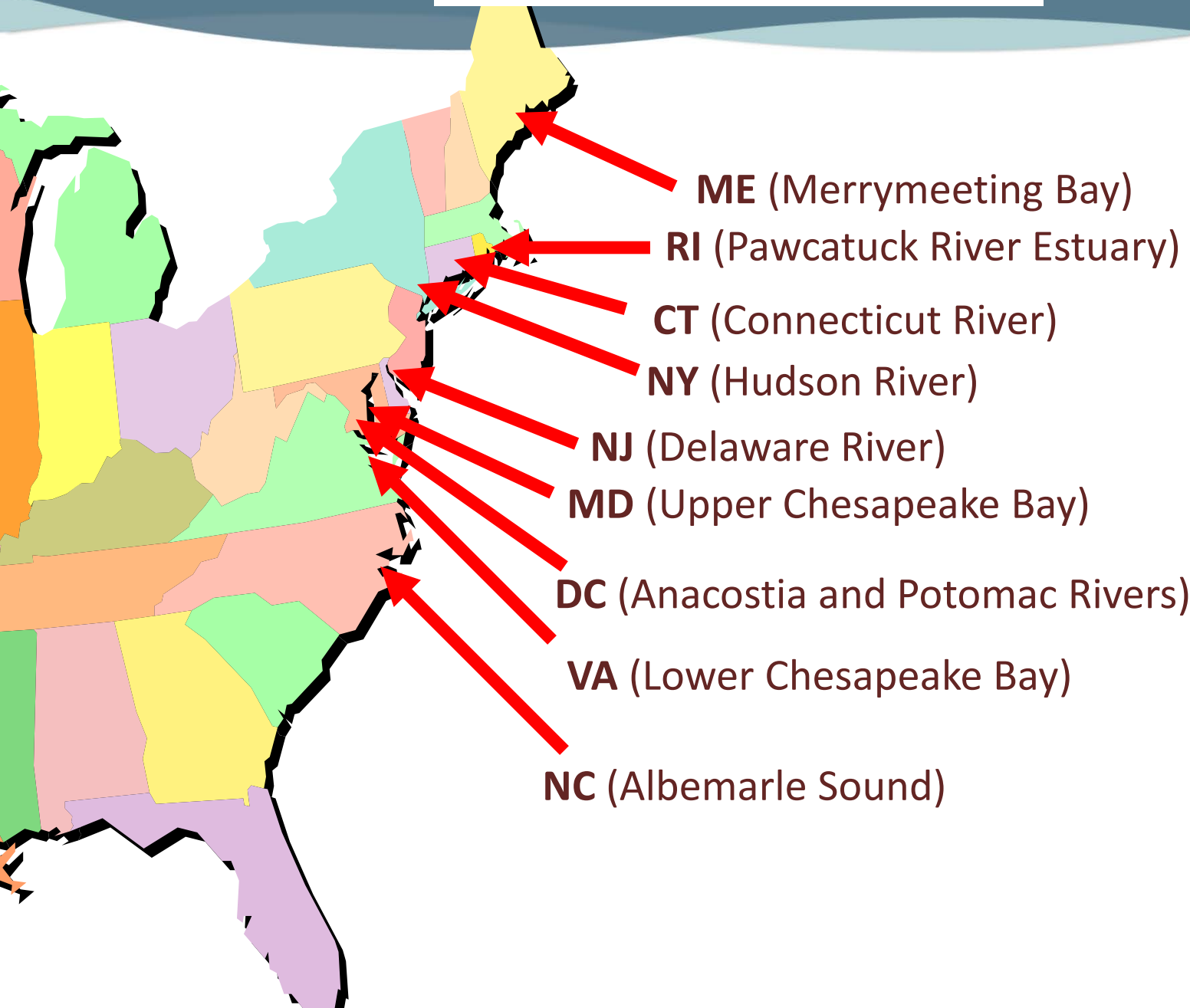
<u>By species</u>

Blueback: 1 increasing, 4 no trend

Alewife: 6 increasing, 8 no trend

Combined: 4 increasing, 2 stable

YOY FI Survey Data



ME (Merrymeeting Bay)

RI (Pawcatuck River Estuary)

CT (Connecticut River)

NY (Hudson River)

NJ (Delaware River)

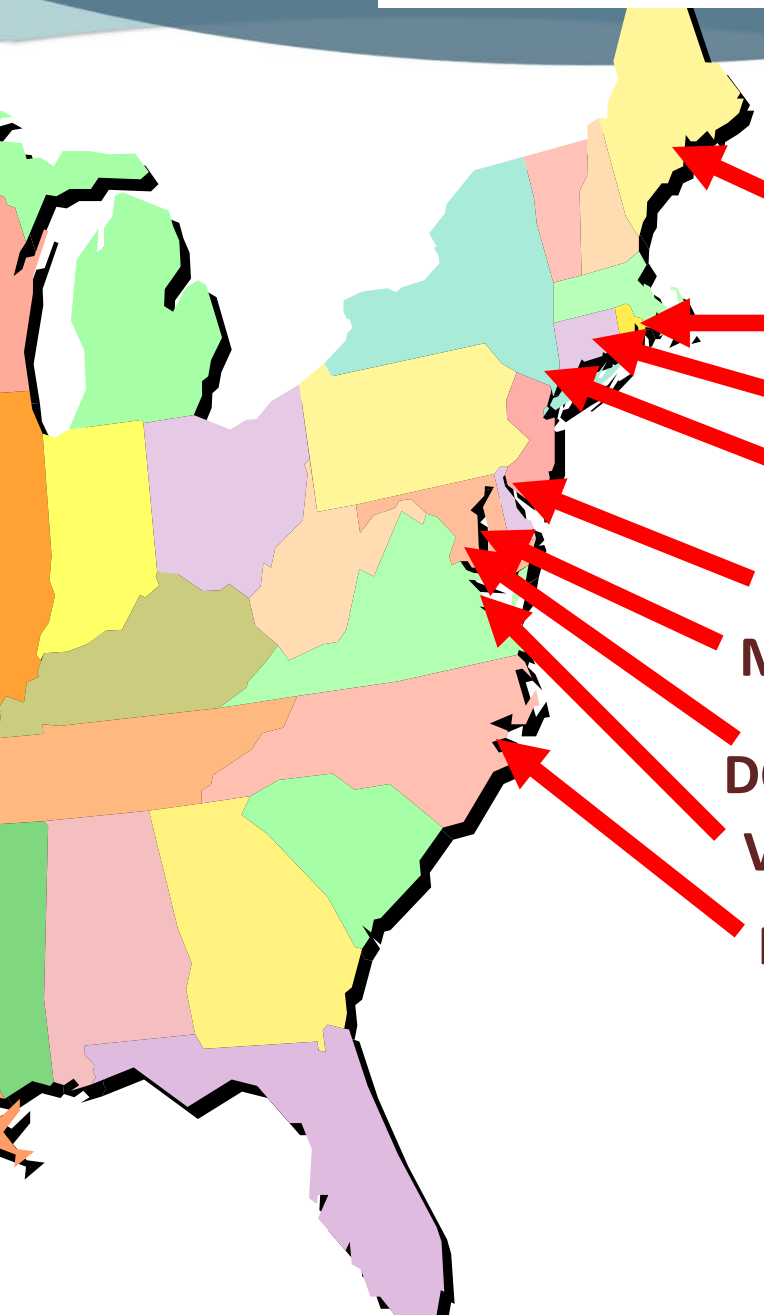
MD (Upper Chesapeake Bay)

DC (Anacostia and Potomac Rivers)

VA (Lower Chesapeake Bay)

NC (Albemarle Sound)

YOY FI Survey Recent Trends



ME (Merrymeeting Bay $\leftrightarrow^{A,B}$)

RI (Pawcatuck River Estuary $\leftrightarrow^{RH}$)

CT (Connecticut River $\leftrightarrow^{B}$)

NY (Hudson River $\downarrow^{A}$, $\leftrightarrow^{B}$)

NJ (Delaware River $\leftrightarrow^{A,B}$)

MD (Upper Chesapeake Bay $\leftrightarrow^{A,B}$)

DC (Anacostia and Potomac Rivers $\leftrightarrow^{A}$, $\uparrow^{B}$)

VA (Lower Chesapeake Bay $\leftrightarrow^{A}$, $\uparrow^{B}$)

NC (Albemarle Sound $\leftrightarrow^{A,B}$)

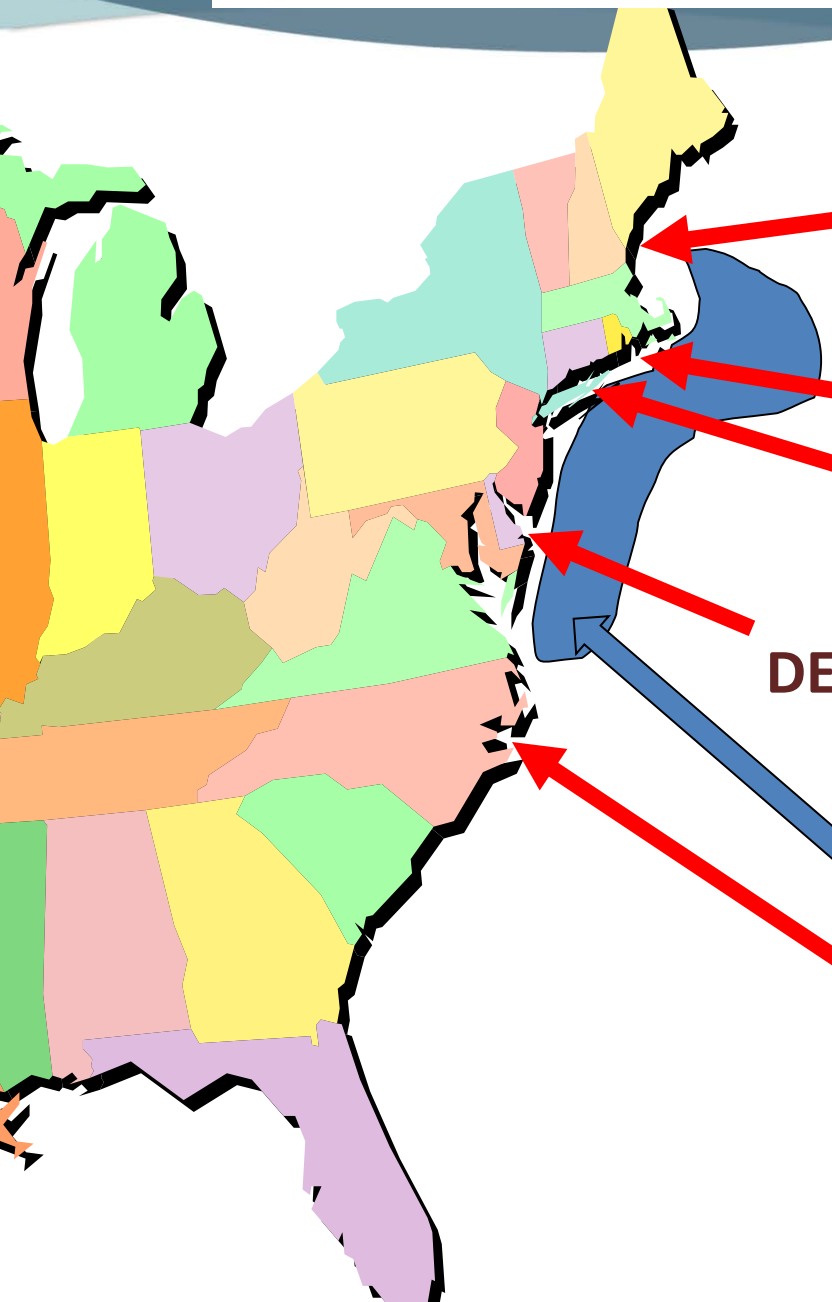
<u>By species</u>

Blueback: 2 increasing, 6 no trend

Alewife: 1 decreasing, 6 no trend

Combined: 1 no trend

FI Trawl Survey Data



ME-NH Inshore Trawl Survey

RI Coastal Trawl Survey

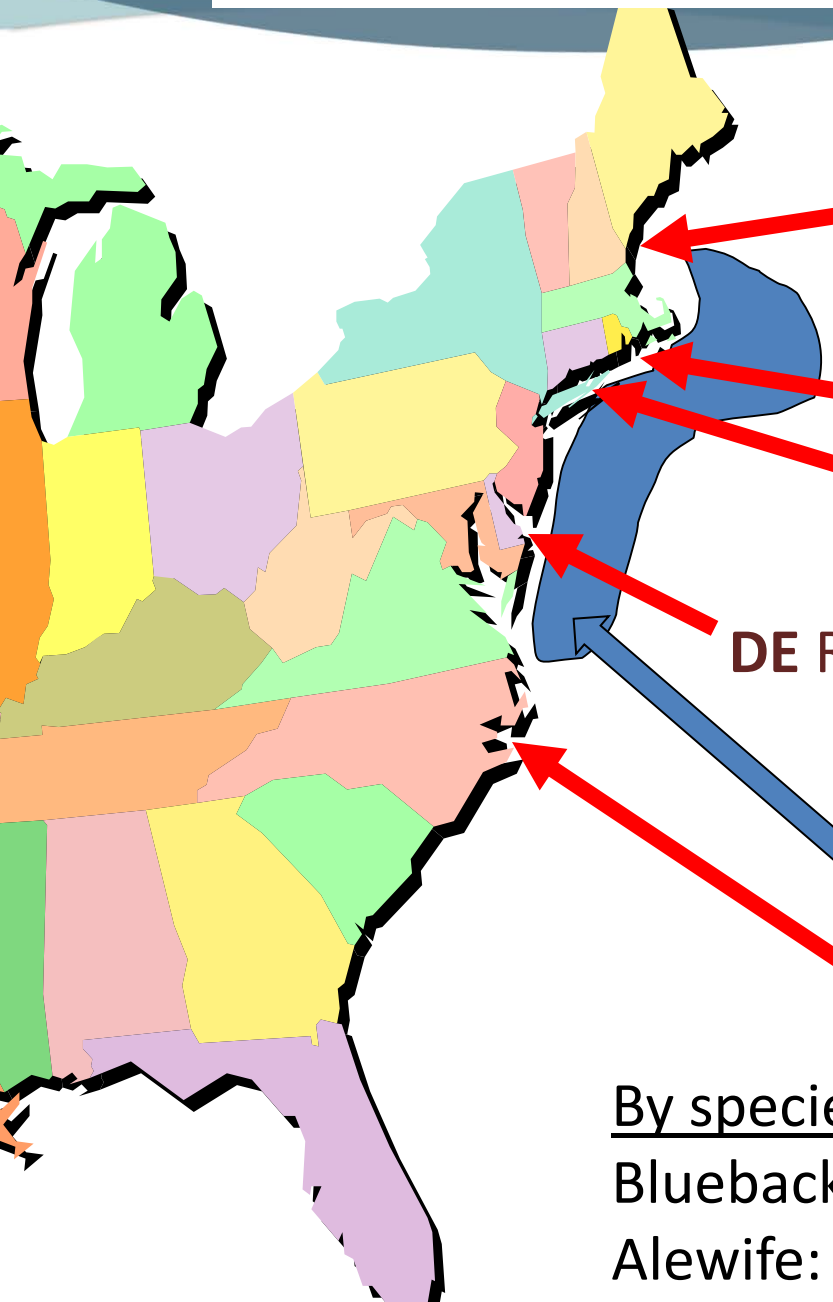
CT Long Island Trawl Survey
Spring & Fall

DE River & Bay Adult Trawl Survey

NEFSC Bottom Trawl Survey

NC Northern Sound Survey

FI Trawl Survey Recent Trends



ME-NH Inshore Trawl Survey ($\uparrow^{A}$, $\leftrightarrow^{B}$)

RI Coastal Trawl Survey ($\leftrightarrow^{A}$, $\downarrow^{B}$)

CT Long Island Trawl Survey
Spring & Fall ($\leftrightarrow^{A,B}$)

DE River & Bay Adult Trawl Survey ($\uparrow^{A}$, $\leftrightarrow^{B}$)

NEFSC Bottom Trawl Survey ($\uparrow^{A,B}$)

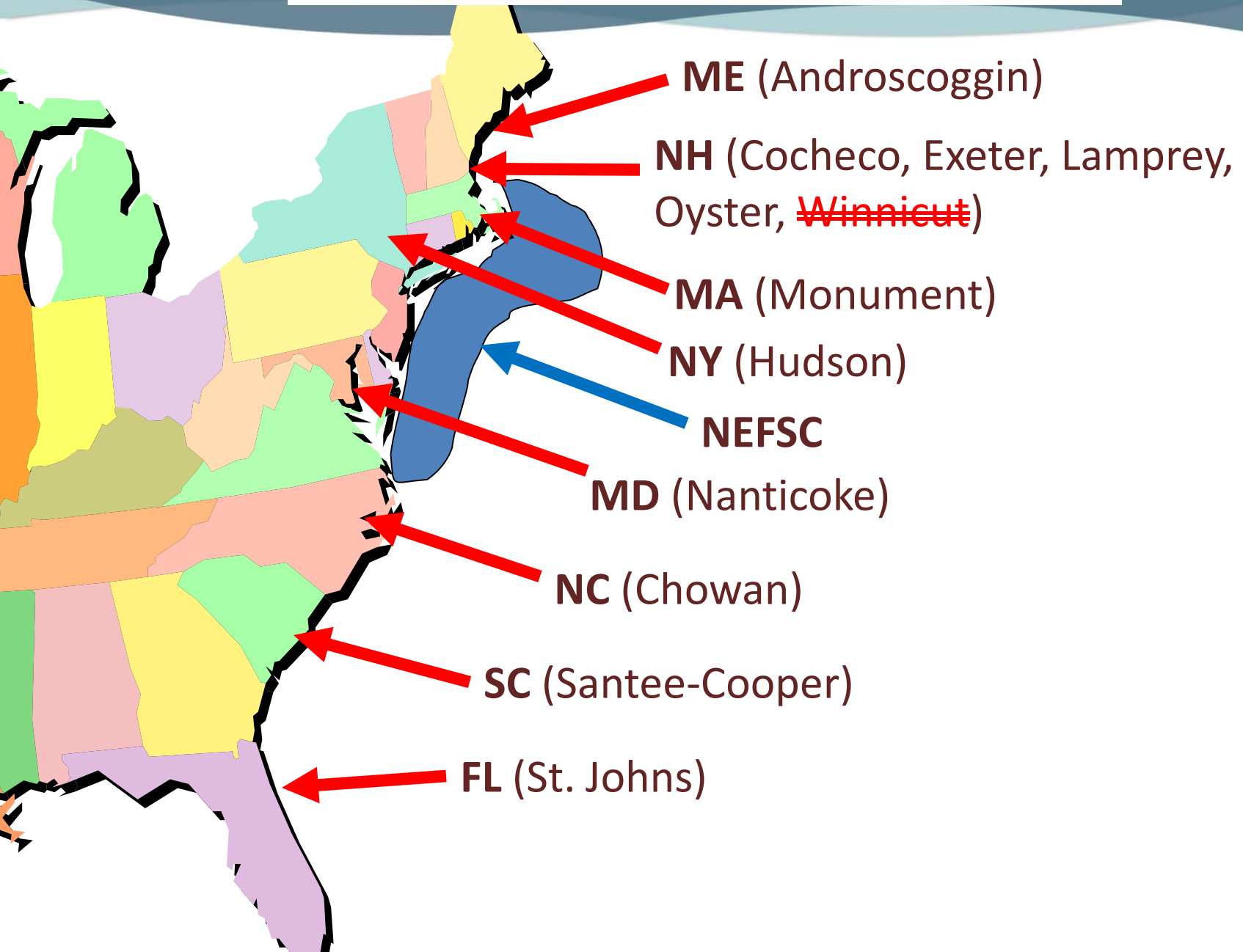
NC Northern Sound Survey ($\leftrightarrow^{A,B}$)

<u>By species</u>

Blueback: 1 decreasing, 1 increasing, 4 no trend

Alewife: 3 increasing, 3 no trend

FI & FD Length Data



ME (Androscoggin)

NH (Cocheco, Exeter, Lamprey, Oyster, ~~Winnicut~~)

MA (Monument)

NY (Hudson)

NEFSC

MD (Nanticoke)

NC (Chowan)

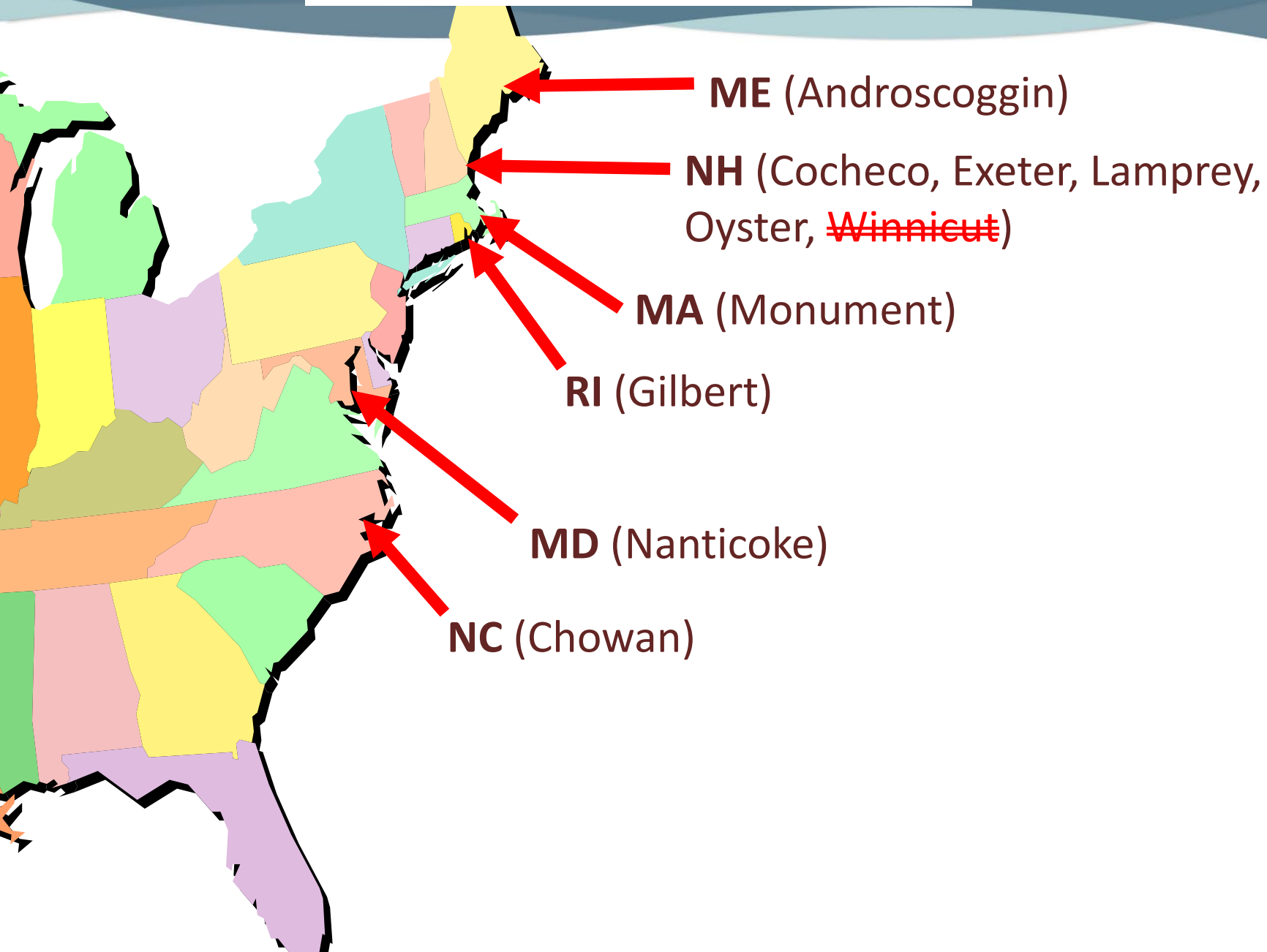
SC (Santee-Cooper)

FL (St. Johns)

Mean Length Trends

- Mean length either declined or showed no significant trend in all rivers examined
- Significant declines for alewives, by sex, in 4 of the 9 river systems examined and the NEFSC trawl survey
- Significant declines for blueback herring, by sex, in 6 of the 9 river systems examined
- These results are similar to the benchmark assessment

FI & FD Age Data



ME (Androscoggin)

NH (Cocheco, Exeter, Lamprey, Oyster, ~~Winnicut~~)

MA (Monument)

RI (Gilbert)

MD (Nanticoke)

NC (Chowan)

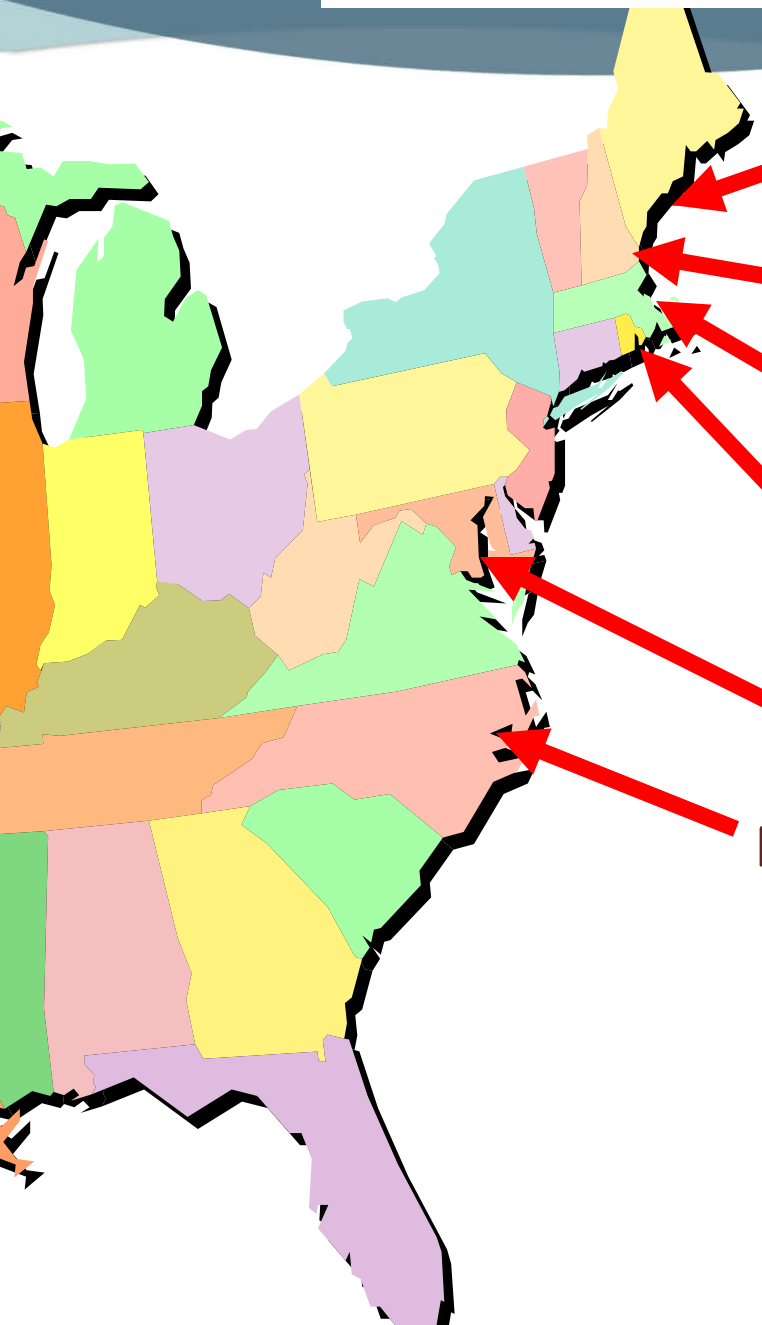
Length-at-Age Trends

- Of the 112 Rivers-Species-Age combinations updated, 26 have reversed in terms of their significance when compared to the analysis performed in the benchmark assessment.

- Declines in mean length of at least one age were observed in most rivers examined.

- However, there is little indication of a general pattern of size changes along the Atlantic coast.

FI & FD Repeat Spawner Data



ME (Androscoggin)

NH (Cocheco, Exeter, Lamprey, Oyster, ~~Taylor~~, ~~Winnicut~~)

MA (Monument, Nemasket)

RI (Nonquit, Glibert)

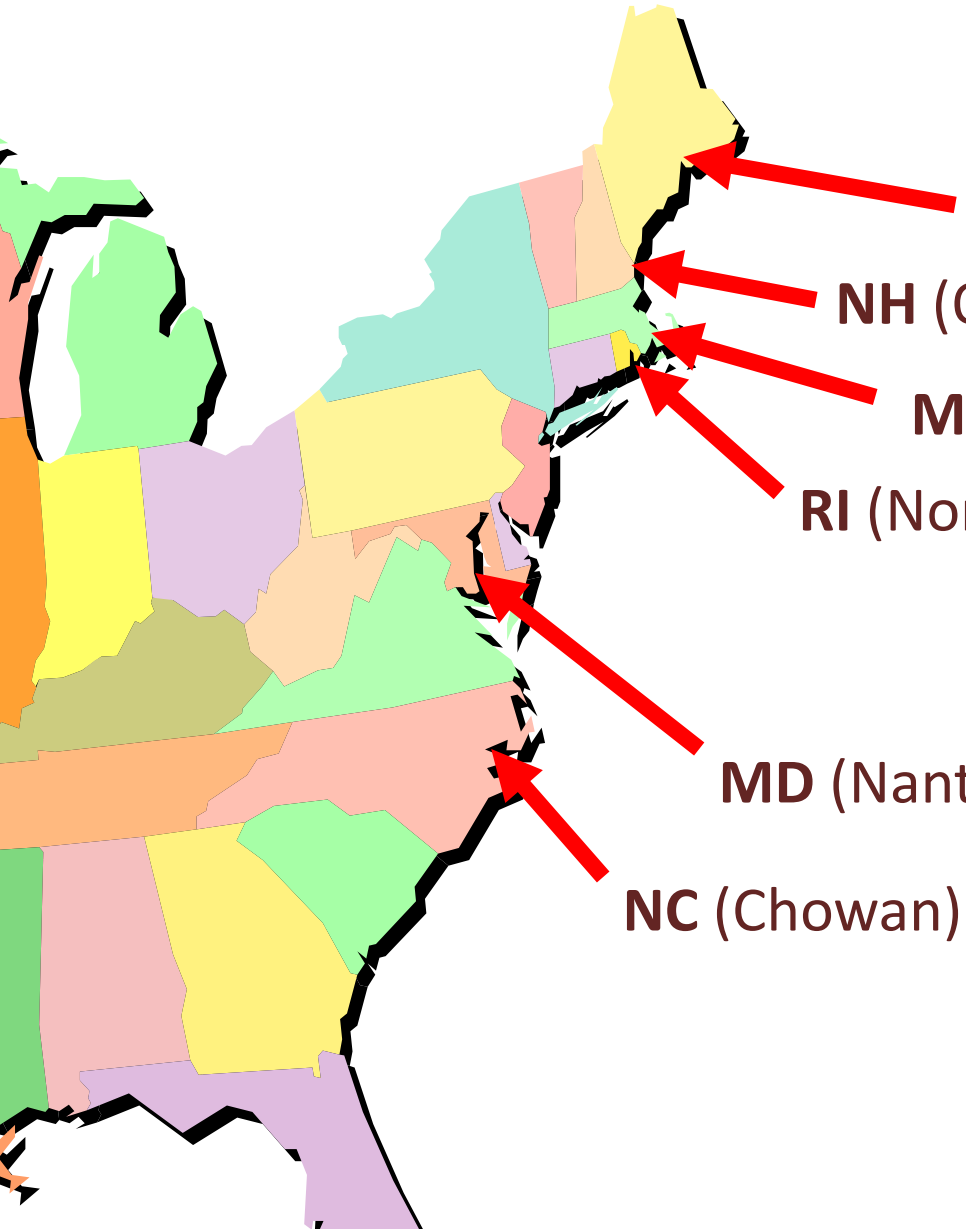
MD (Nanticoke)

NC (Chowan)

Percent Repeat Spawner Trends

- Percent repeat spawners either declined or showed no significant trend in all rivers examined
- Significant declines for alewives, by sex, in 4 of the 10 river systems examined
- Significant declines for blueback herring, by sex, in 2 of the 5 river systems examined
- These results are similar to the benchmark assessment

Total Mortality Estimates



ME (Androscoggin, Sebasticook)

NH (Oyster, ~~Winnicut~~, Cocheco, Lamprey)

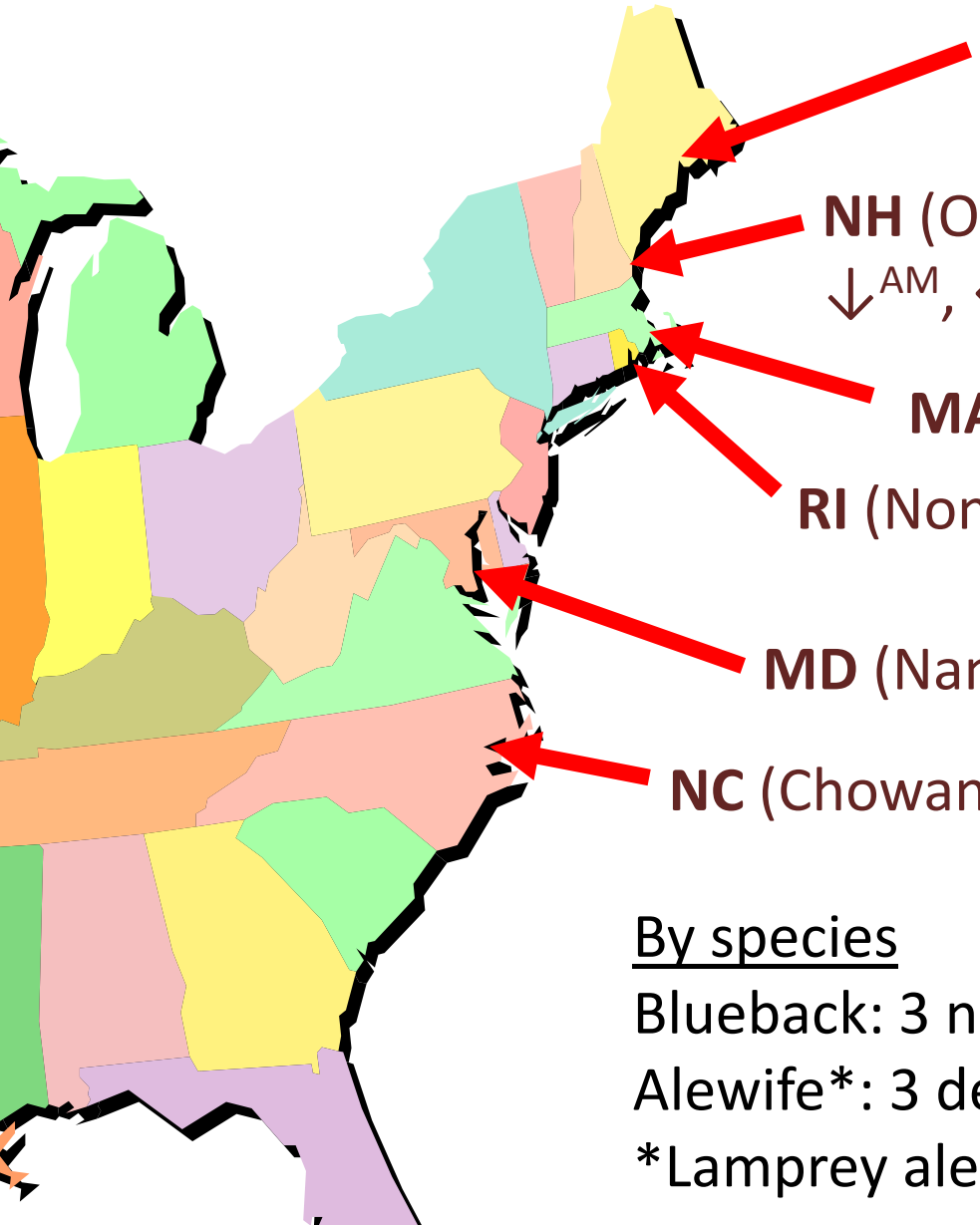
MA (Monument, Nemasket)

RI (Nonquit, Glibert)

MD (Nanticoke)

NC (Chowan)

Total Mortality Recent Trends



ME (Androscoggin $\leftrightarrow^{A}$, Sebasticook $\leftrightarrow^{A}$)

NH (Oyster $\leftrightarrow^{B}$, Cocheco $\downarrow^{A}$, Lamprey $\downarrow^{AM}$, $\leftrightarrow^{AF}$)

MA (Monument $\leftrightarrow^{A}$, Nemasket $\leftrightarrow^{A}$)

RI (Nonquit $\downarrow^{A}$, Glibert $\leftrightarrow^{A}$)

MD (Nanticoke $\leftrightarrow^{A,B}$)

NC (Chowan $\leftrightarrow^{B}$)

<u>By species</u>

Blueback: 3 no trend

Alewife*: 3 decreasing, 7 no trend

*Lamprey alewife differed by sex

Z Benchmarks

- Spawning Potential Ratio (SPR)
- The total mortality rate that reduces the spawning stock biomass to a specified % of the virgin (unfished) SSB
  - Estimates of $Z_{20\%SPR}$ and $Z_{40\%SPR}$ developed during benchmark
- Sensitive to estimate of natural mortality (M)
  - Considered both low (0.3) and high (0.7) values for M
- Peer Review recommended M=0.7 and $Z_{\%SPR}$=40

Z Benchmarks

- Z continued to be high for most stocks examined
- The terminal three year average of observed Z values were above the $Z_{40\%SPR}$ benchmark for 12 of the 14 stocks with available data
  - During the benchmark, the three year average Z values were above the $Z_{40\%SPR}$ benchmark for all 18 of the stocks with available data
- Recent Z values were not available for 3 stocks due to lack of returning fish and 1 stock due to ageing error

Conclusions

- Most data evaluated reflect conditions similar to recent years of the benchmark stock assessment
- Most of the fishery-independent indices indicate interannual variation at low stock sizes and more time is needed to reflect large scale changes in abundance
- However, the number of increasing trends in abundance improved with the update, particularly in the northeast
- Trends in total mortality estimates and biological indicators of mortality were often in conflict
- Given the conflicting results from mortality estimates, conclusions about mortality remain uncertain. However, in comparison to reference points, some rivers have total mortality in recent years that may be unsustainable

Recent Trends in Abundance

- River-Specific Stocks (2006-2015)
  - 16 increasing
  - 2 decreasing
  - 8 stable
  - 10 experienced no discernible trend (high variability)
  - 18 did not have enough data to assess recent trends

Coastwide Status

- Although positive signs were apparent in the update, the information indicates that the status of the river herring meta-population being depleted to near historic lows remains unchanged since the benchmark stock assessment.

- “Depleted” status indicates that there was evidence for declines in abundance due to a number of factors, but the relative importance of these factors in reducing river herring stocks could not be determined.

States with approved SFMPs

1. Maine - 20 river fisheries
2. New Hampshire - Great Bay Indicator Stock
3. Massachusetts - Nemasket River
4. New York - Hudson River
5. South Carolina - Santee-Cooper and Pee-Dee River

Questions?

American Shad Stock Assessment Update

Shad and River Herring Management Board

August 2, 2017

2018 American Shad Stock Assessment

- TC initially recommended an update of the 2007 Benchmark Stock Assessment
- Short time series of new monitoring efforts due to Amendment 3
- Need to develop robust stock-specific ocean bycatch estimates
- Proposed timeline is completion of assessment for 2018 August Meeting

Challenges to an Update

- Committee turnover
- Discontinuation of data sets
- Reliability of ageing techniques and data
  - Duffy et al. 2012
  - Elzey et al. 2015

Next Steps

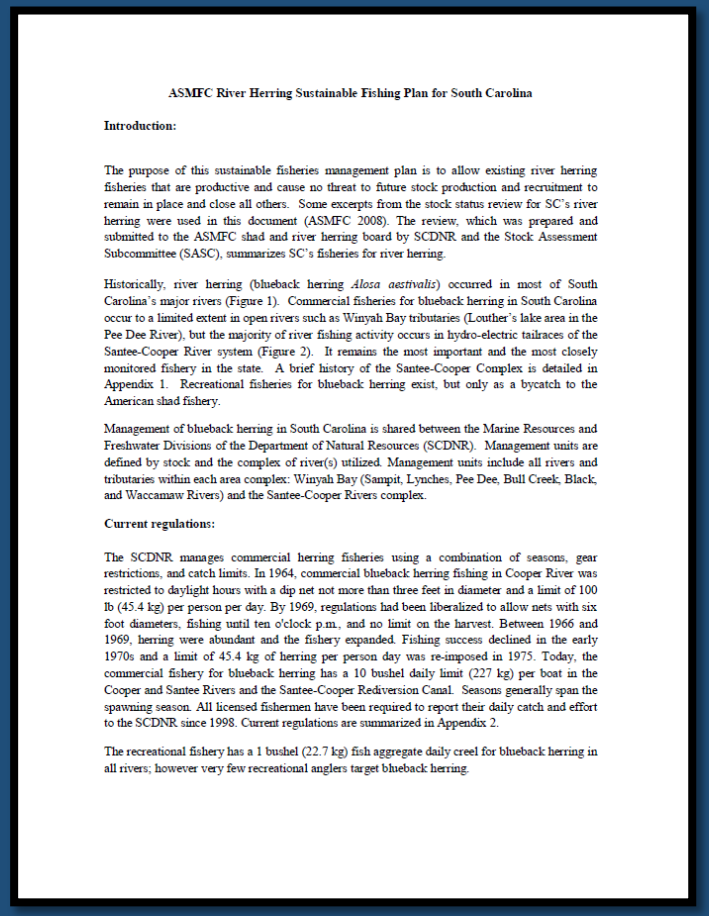
- Given challenges experienced updating river herring stock assessment and anticipated challenges unique to American shad, TC and SAS will need to revisit recommendation for assessment update

Blueback Herring Sustainable Fishing Plan Update for South Carolina

Prepared by
Bill Post and Chad Holbrook
March 23, 2017

South Carolina Dept. of Natural Resources
Wildlife and Freshwater Fisheries and Office of Fisheries Management

2011-SFMP for river herring approved by S&RH TC and S&RH Management Board



ASMFC River Herring Sustainable Fishing Plan for South Carolina

Introduction:

The purpose of this sustainable fisheries management plan is to allow existing river herring fisheries that are productive and cause no threat to future stock production and recruitment to remain in place and close all others. Some excerpts from the stock status review for SC's river herring were used in this document (ASMFC 2008). The review, which was prepared and submitted to the ASMFC shad and river herring board by SCDNR and the Stock Assessment Subcommittee (SASC), summarizes SC's fisheries for river herring.

Historically, river herring (blueback herring *Alosa aestivalis*) occurred in most of South Carolina's major rivers (Figure 1). Commercial fisheries for blueback herring in South Carolina occur to a limited extent in open rivers such as Winyah Bay tributaries (Louther's lake area in the Pee Dee River), but the majority of river fishing activity occurs in hydro-electric tailraces of the Santee-Cooper River system (Figure 2). It remains the most important and the most closely monitored fishery in the state. A brief history of the Santee-Cooper Complex is detailed in Appendix 1. Recreational fisheries for blueback herring exist, but only as a bycatch to the American shad fishery.

Management of blueback herring in South Carolina is shared between the Marine Resources and Freshwater Divisions of the Department of Natural Resources (SCDNR). Management units are defined by stock and the complex of river(s) utilized. Management units include all rivers and tributaries within each area complex: Winyah Bay (Sampit, Lynches, Pee Dee, Bull Creek, Black, and Waccamaw Rivers) and the Santee-Cooper Rivers complex.

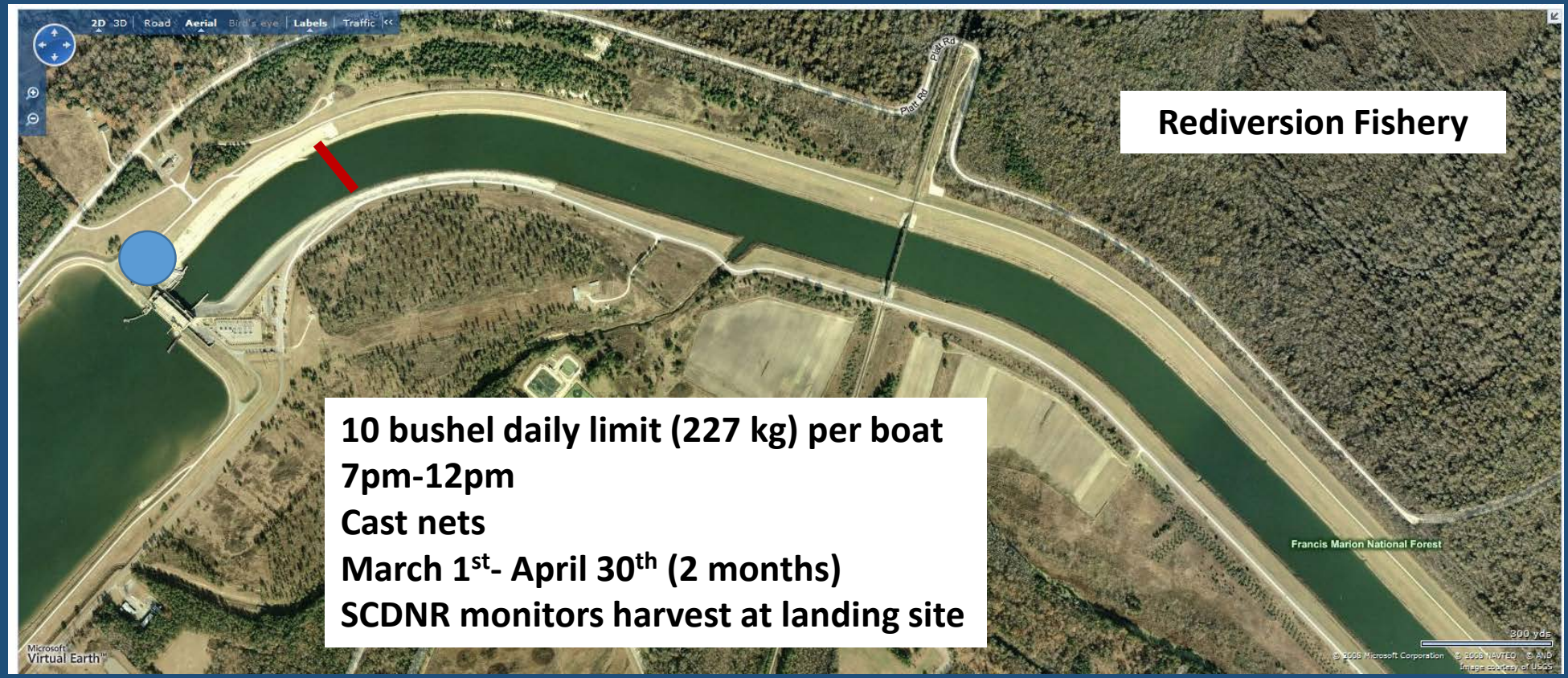
Current regulations:

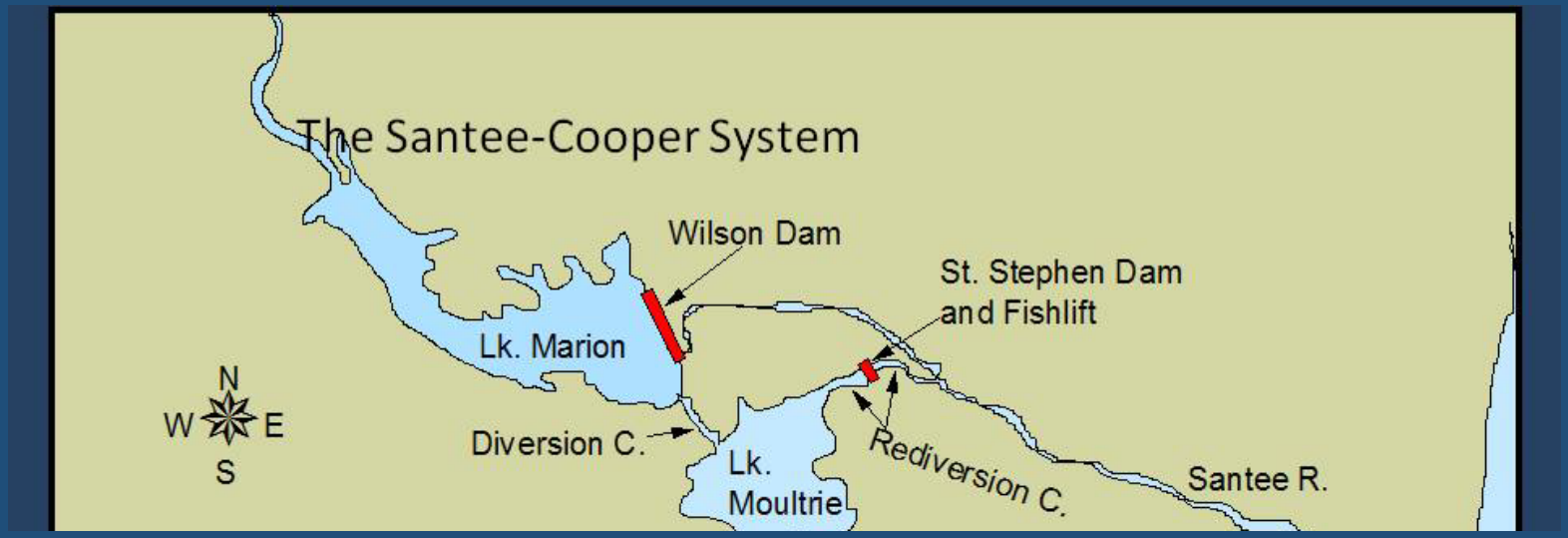
The SCDNR manages commercial herring fisheries using a combination of seasons, gear restrictions, and catch limits. In 1964, commercial blueback herring fishing in Cooper River was restricted to daylight hours with a dip net not more than three feet in diameter and a limit of 100 lb (45.4 kg) per person per day. By 1969, regulations had been liberalized to allow nets with six foot diameters, fishing until ten o'clock p.m., and no limit on the harvest. Between 1966 and 1969, herring were abundant and the fishery expanded. Fishing success declined in the early 1970s and a limit of 45.4 kg of herring per person day was re-imposed in 1975. Today, the commercial fishery for blueback herring has a 10 bushel daily limit (227 kg) per boat in the Cooper and Santee Rivers and the Santee-Cooper Rediversion Canal. Seasons generally span the spawning season. All licensed fishermen have been required to report their daily catch and effort to the SCDNR since 1998. Current regulations are summarized in Appendix 2.

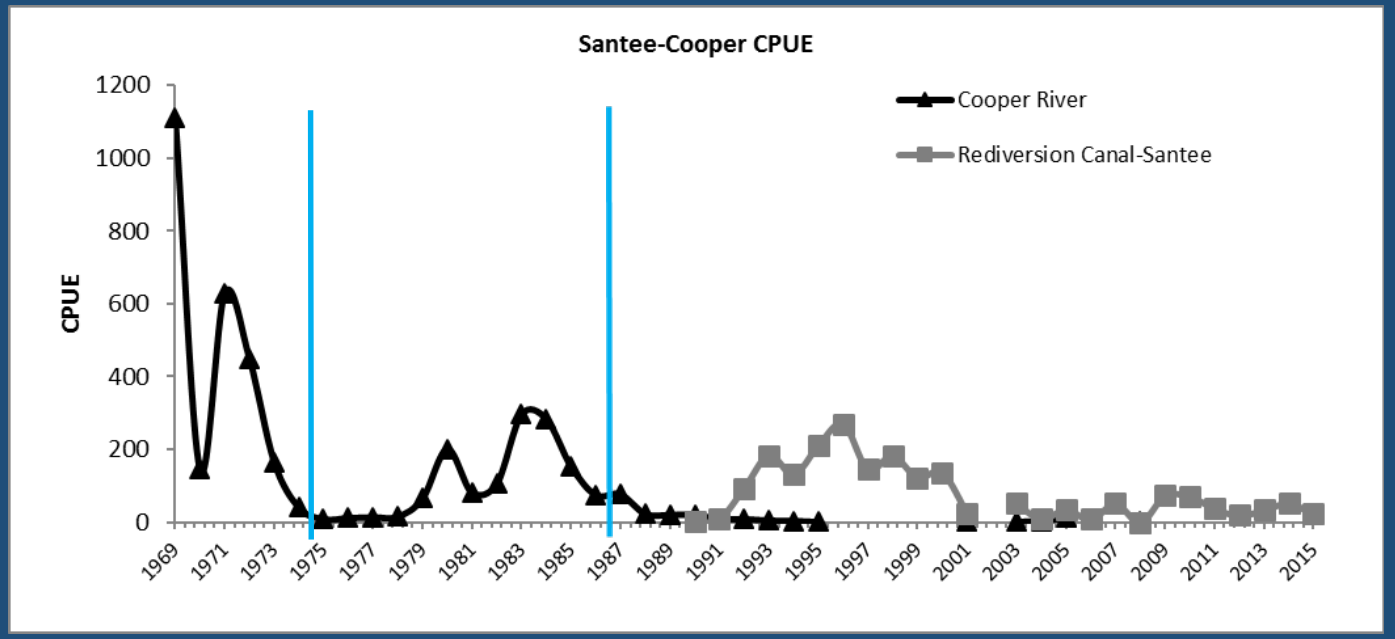
The recreational fishery has a 1 bushel (22.7 kg) fish aggregate daily creel for blueback herring in all rivers; however very few recreational anglers target blueback herring.

Management Actions in the 2011 plan

- Close all ocean run herring fisheries in SC except the Santee Cooper Complex and the Pee Dee River.
- Closed: Winyah Bay (Sampit, Lynches, Pee Dee, Bull Creek, Black, Waccamaw Rivers), Ashepoo River, Combahee River, Edisto River, and Savannah River.
- Developed sustainability targets for those fisheries to remain open.
- Implemented for 2012 fishing season


Rediversion Fishery
10 bushel daily limit (227 kg) per boat
7pm-12pm
Cast nets
March 1st- April 30th (2 months)
SCDNR monitors harvest at landing site
Francis Marion National Forest
Piatt Rd
Virtual Earth


The Santee-Cooper System
Wilson Dam
St. Stephen Dam
and Fishlift
Lk. Marion
N
W
E
S
Diversion C.
Lk.
Moultrie
Rediversion C.
Santee R.


Santee-Cooper CPUE
Cooper River
Rediversion Canal-Santee
CPUE
1200
1000
800
600
400
200
0
1969
1971
1973
1975
1977
1979
1981
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1985
1987
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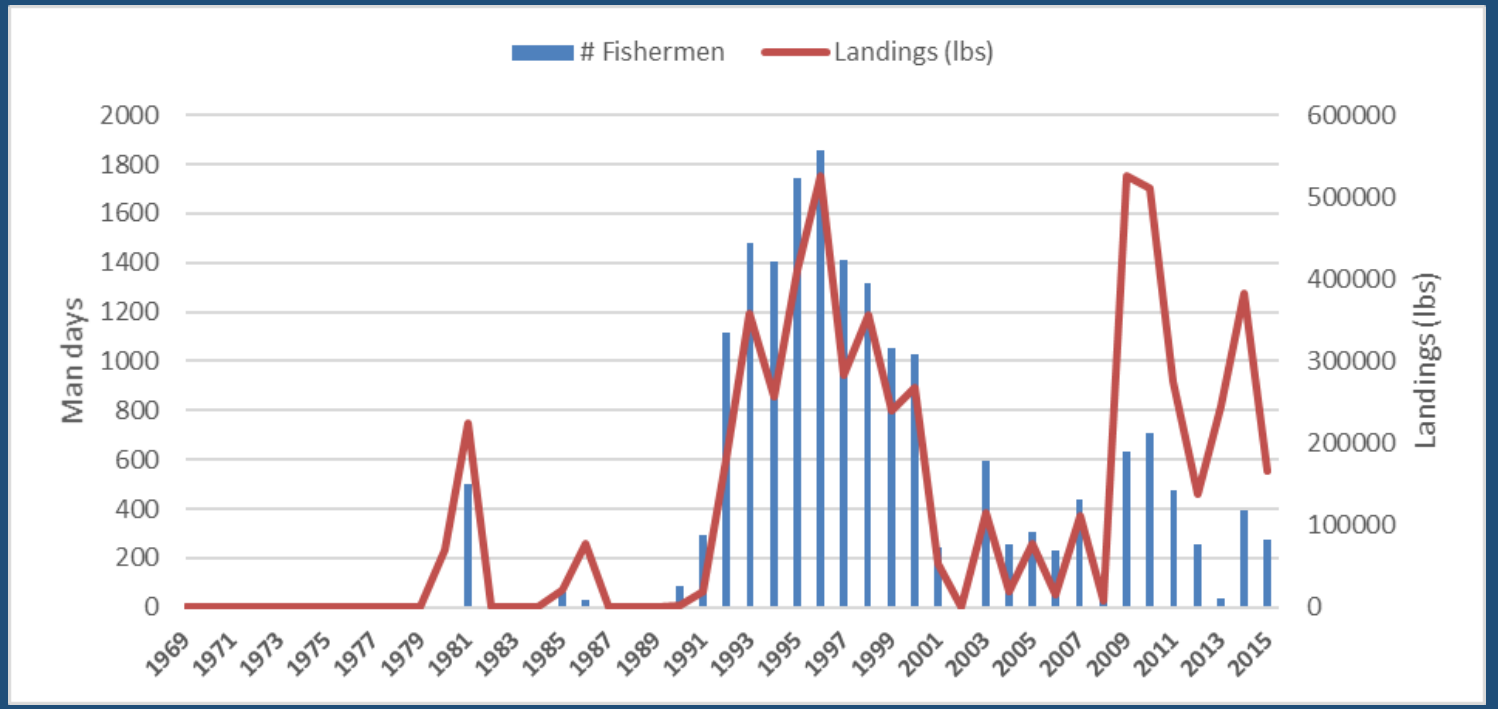
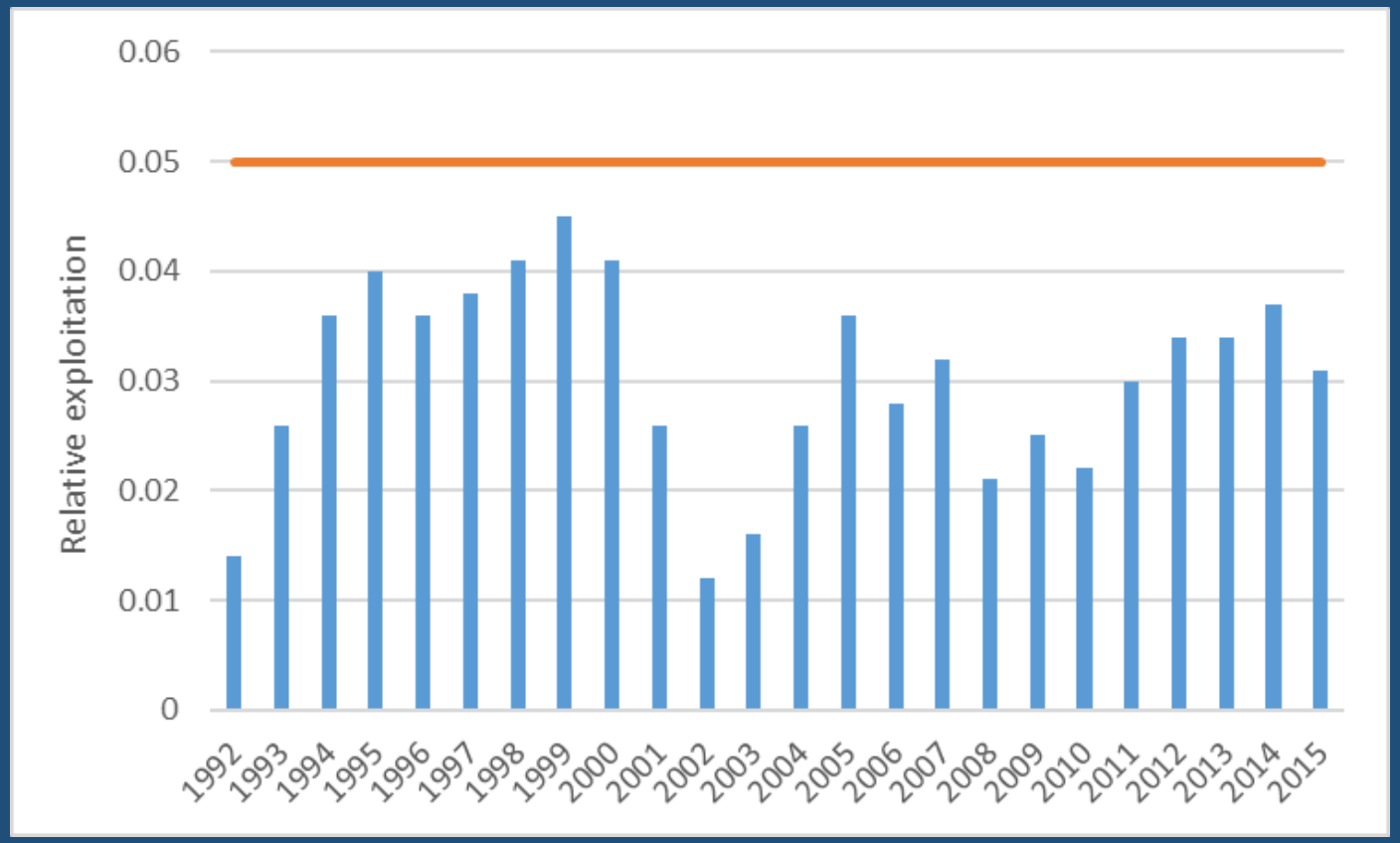
2011
2013
2015


Fishermen
Landings (lbs)
Man days
Landings (lbs)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
600000
500000
400000
300000
200000
100000
0
1969
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015

Year	Metric Tons	Harvest Data (Kg)	Number caught (Lbs/.3)	Passage	Minimum Population	Relative Exploitation	Adj. exploitation 0.052	3-yr running avg.
2012	18.9	18900	138,915	37,117	176,032	0.79	0.041	0.034
2013	33.5	33500	246,225	113,860	360,085	0.68	0.036	0.033
2014	52.1	52120	383,082	171,200	554,282	0.69	0.036	0.037
2015	22.5	22500	165,375	244,631	410,006	0.40	0.021	0.031



2011 Plan
Approved Sustainability Benchmark

u = 0.050

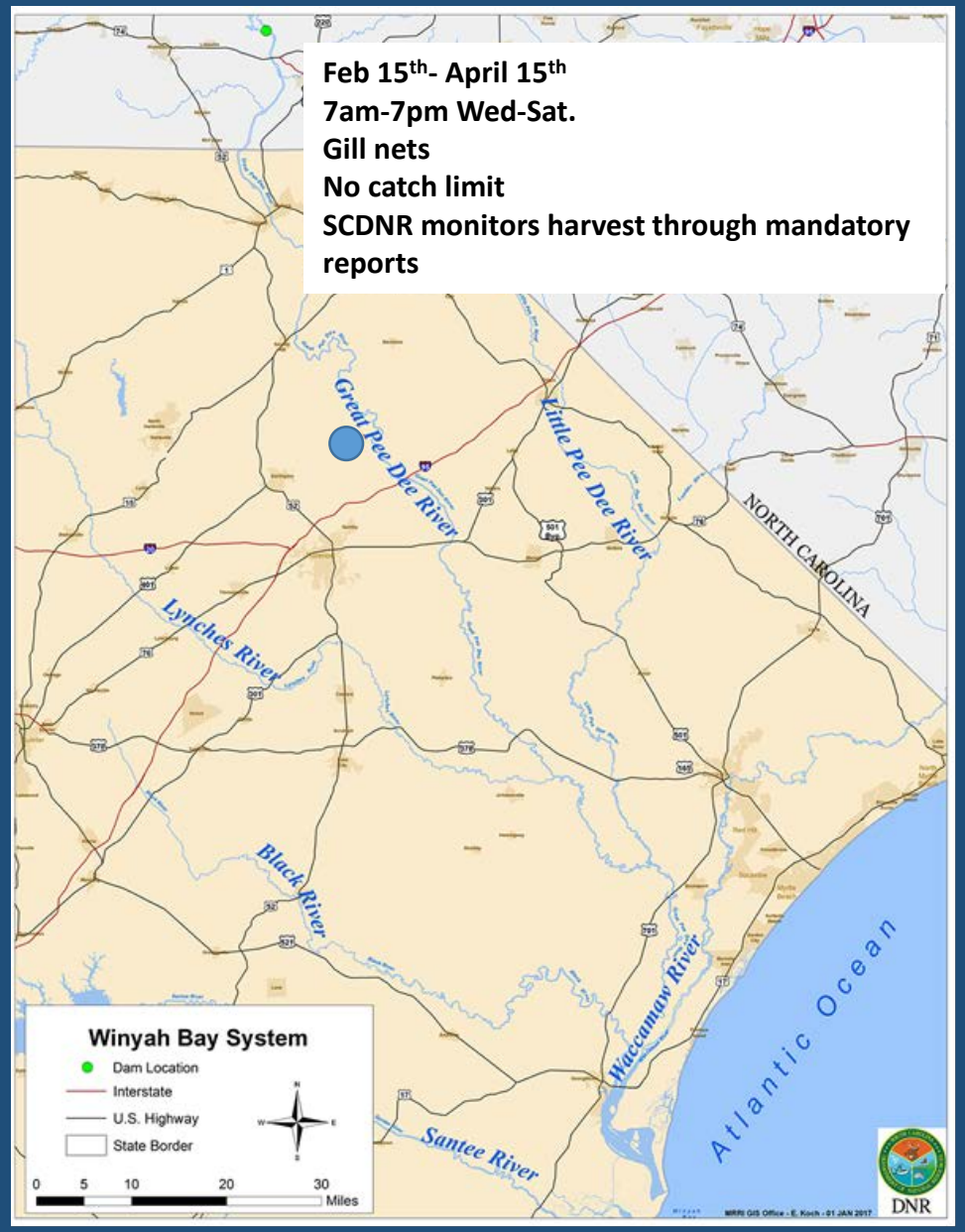
- Based on a 3-yr running average.
- Not to exceed the benchmark.
- If benchmark is exceeded, management action will be taken.

2017 Plan
Proposed Sustainability Benchmark

u = 0.050

- Based on a 3-yr running average.
- Not to exceed the benchmark.
- If benchmark is exceeded, management action will be taken.

Pee Dee River Fishery



- The Great Pee Dee River flows unimpeded for its entire length (~302 km) in SC.
- Small subsistence fishery exists near Darlington, SC.
- Takes place in an old oxbow lake off the mainstem of the Pee Dee River.
- In recent years, landings have not exceeded 1000 kg.
- This amount is equivalent to ~4 days allowable catch for one person in the commercial fishery.

2011 Plan
Approved Sustainability Benchmark

Catch limit of 500kg.

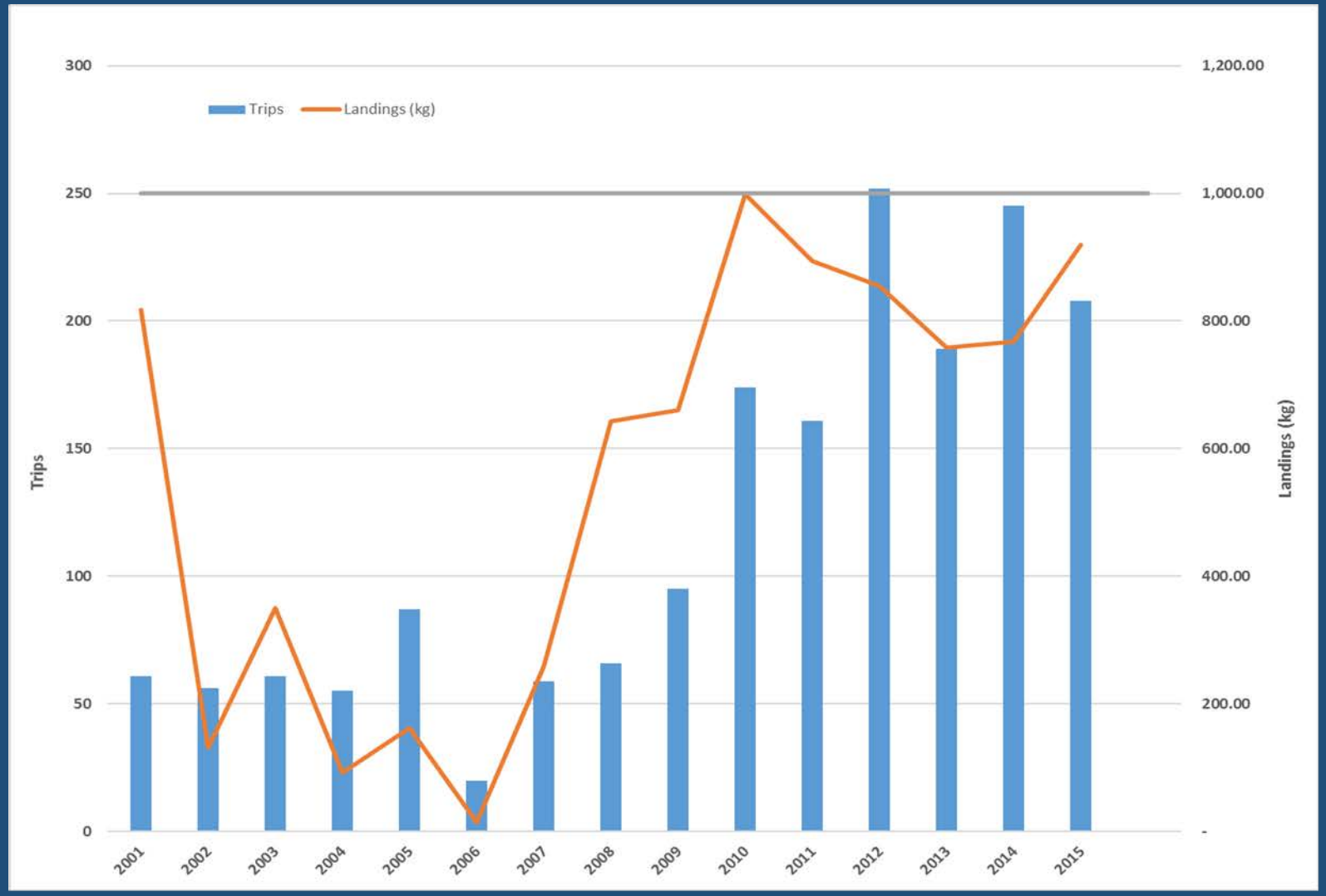
- Based on a 3-yr running average.
- Not to exceed the benchmark.
- If benchmark is exceeded, management action will be taken.
- Reassess benchmark after 3 years.
- SCDNR will collect fishery-dependent biological data to monitor overall health of the stock.

2011 plan

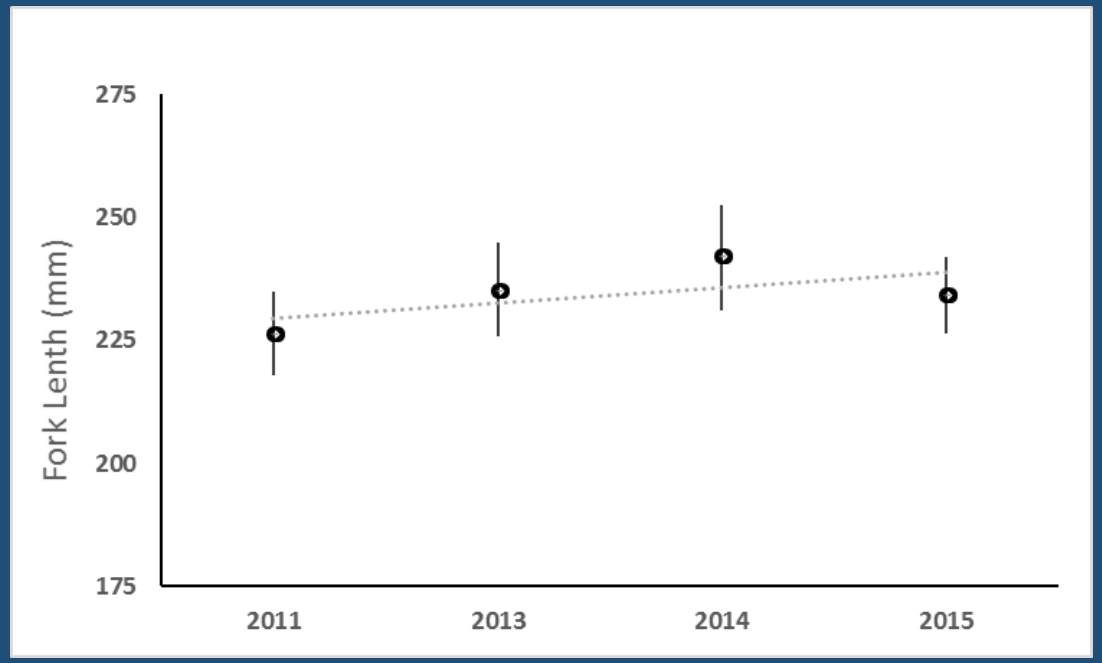
Year	Kg.	3 yr. running average
1998	2	
1999	15	
2000	323	113
2001	432	257
2002	140	298
2003	244	272
2004	1	128
2005	193	146
2006	19	71
2007	267	160
2008	600	295
2009	465	444
2010	386	484
2011	343	398
2012	622	450
2013	553	506
2014	486	554
2015	663	567

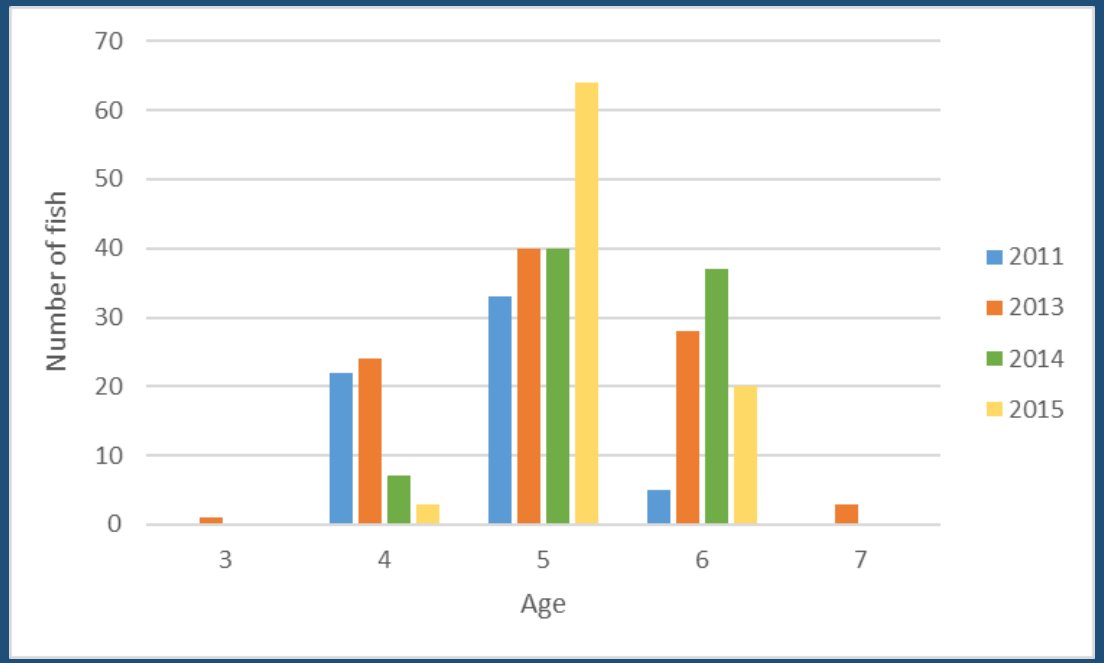
Actual

Year	Kg.	3 yr. running average
1998	2	
1999	15	
2000	323	113
2001	817	385
2002	131	424
2003	350	433
2004	93	191
2005	162	202
2006	14	90
2007	259	145
2008	643	305
2009	660	521
2010	999	767
2011	894	851
2012	855	916
2013	758	836
2014	767	793
2015	919	815



Collected fishery dependent biological data





- Fish are collected with a gillnet with one size mesh panel, therefore size bias in the catch must be considered.
- It is most likely that the gear excludes the largest and smallest herring, and in turn possibly the youngest and oldest herring.

	2011	2013	2014	2015
% with one spawning mark	33	28	25	15
% with two spawning marks	5	11	1	2
% repeat spawners	38	41	26	17

2011 Plan
Approved Sustainability Benchmark

Catch limit of 500kg or ~3,667 fish.

- Based on a 3-yr running average.
- Not to exceed the benchmark.
- If benchmark is exceeded, management action will be taken.
- Reassess benchmark after 3 years.
- SCDNR will collect fishery-dependent biological data to monitor overall health of the stock.

2017 Plan
Approved Sustainability Benchmark

Catch limit of 1000kg or ~7,333 fish.

- Based on a 3-yr running average.
- Not to exceed the benchmark.
- If benchmark is exceeded, management action will be taken.
- SCDNR will continue to collect fishery-dependent biological data to monitor overall health of the stock.

SC believes this is a reasonable request for the small Pee Dee River herring fishery for the following reasons:

- This fishery is prosecuted in a remote area off the mainstem river.
- The available river habitat consists of over 300 km.
- Documented landings and effort is very low (1,000 kg. is equivalent to < 4 days' allowable catch for a single individual in the commercial fishery).
- Results of fishery dependent biological data suggests overall sustainable stock.

ASMFC Shad and River Herring TC
South Carolina SFMP review

1. The relative exploitation rate of 0.052 was derived from a 1986-1990 “scaler” from the estimated harvest divided by minimum population estimate from MR study. The average (4 years) of the lower CI estimate in that period is used as the relative exploitation rate (U).

    -- The TC had questions on the data quality of the 1986-1990 scaler and the applicability to present conditions. SC responded that it is the best available proxy for U and is quite low and therefore conservative.

2. TC expressed concerns for the absence of biological metrics , secondary sustainability benchmark, and detail on management responses. This was recommended to be developed and included in the next SFMP update.

3. The TC recommends that the Board approves the SFMP with inclusion of recommendation #2.

American Shad Sustainable Fishing Plan Update for Florida, St. Johns River

FL American Shad SFMP Update

FWC requests to maintain the recreational fishery on the St. Johns River as is. The fishery independent benchmark has not triggered a management action at this time and new time series have facilitated the establishment of a JAI benchmark.

- 2011 SFMP:
  - 2007 assessment suggested a benchmark from recreational angler CPUE based on a 1993 through 2005 time series but the fishery had changed by 2011 and this was not adopted
  - A fishery independent benchmark based on spawning stock relative abundance was introduced
  - JAI monitoring was ongoing with the intention to establish a benchmark
- Available Monitoring Data for the 2017 SFMP Update:
  - Spawning stock relative abundance from electrofishing
    - 2003 - present
  - Juvenile abundance index 2007-present
  - Recreational angler survey
    - 1993-2005 and 2011 - present

Present Fishery

- No commercial harvest
  - Pound nets and haul seines are prohibited in the St. Johns River
  - Gill nets are prohibited in all state waters (1995)
  - 0 landings reported since 2000

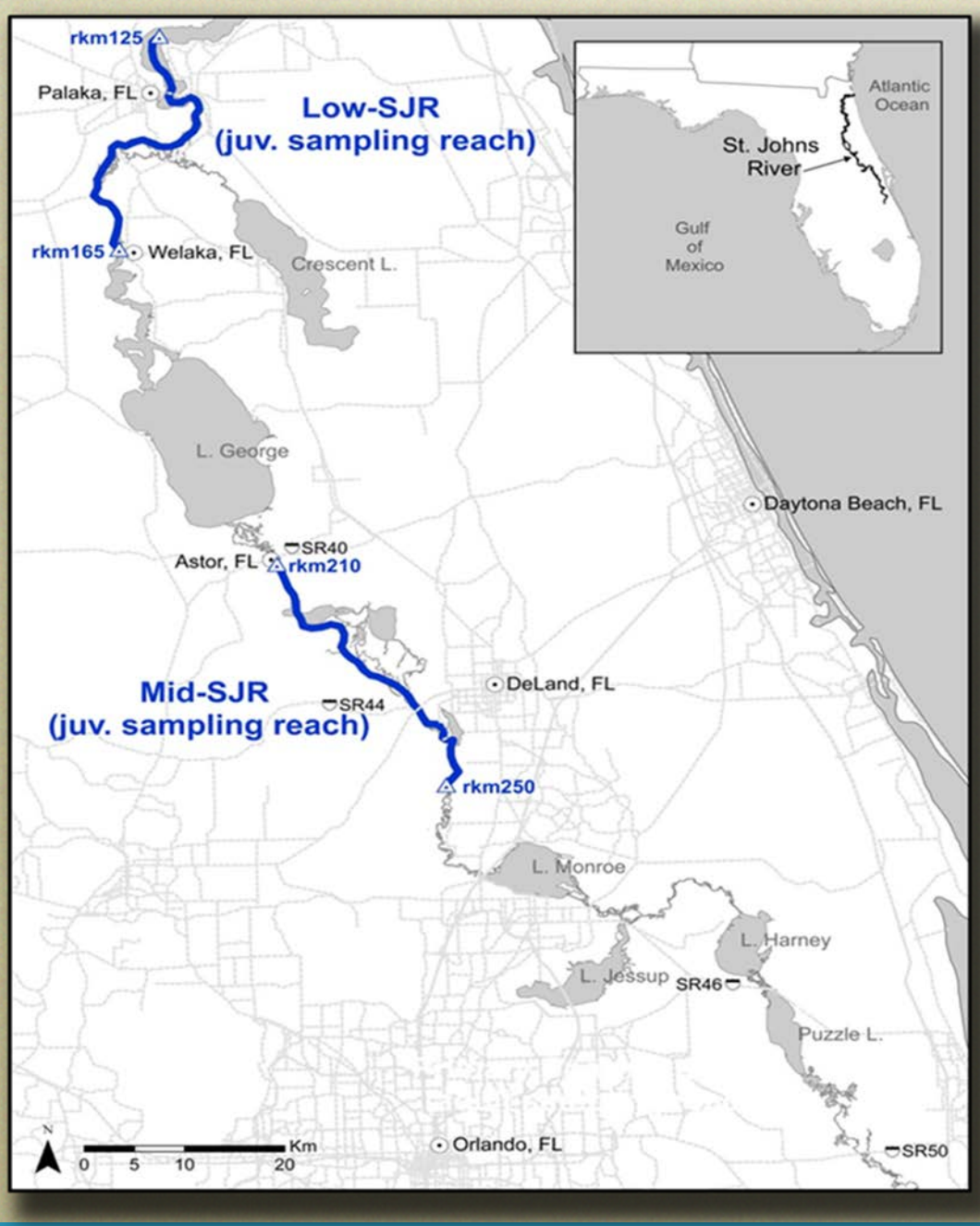
Present Fishery

- Hook and line recreational fishery
  - Must possess a saltwater recreational fishing license in order to harvest
  - Bag: 10 *Alosa spp*. in aggregate person per day
  - Voluntary catch/release predominates

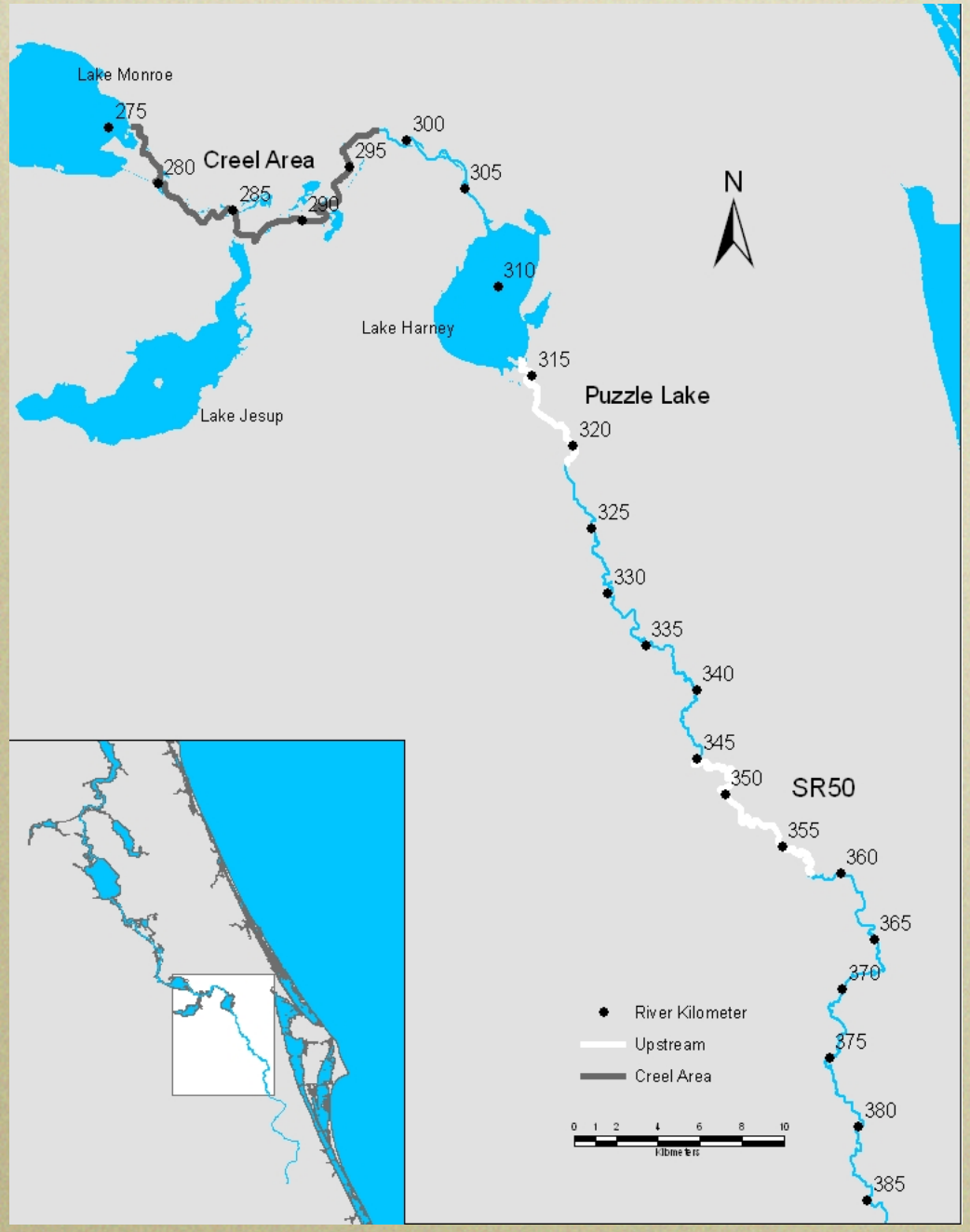
Stock Monitoring

- Fishery Independent
  - JAI: Bow-mounted pushnet – since 2007
    - Sample bi-weekly from April through July in the river between river kilometer 210 and 250 and in tidal freshwater between river kilometer 125 and 165
  - Spawning stock relative abundance: electrofishing survey – since 2003
    - Provides CPUE index and biological samples for length, sex ratio, and aging (aging began in 2011)

JAI monitoring for American Shad occurs in the non-tidal river immediately below the spawning grounds and in a portion of the tidal freshwater estuary from the end of the spawning season until the mean CPUE drops below 10% of the seasonal peak



Spawning stock monitoring occurs by electrofishing in three river sections on the spawning grounds



Stock Monitoring

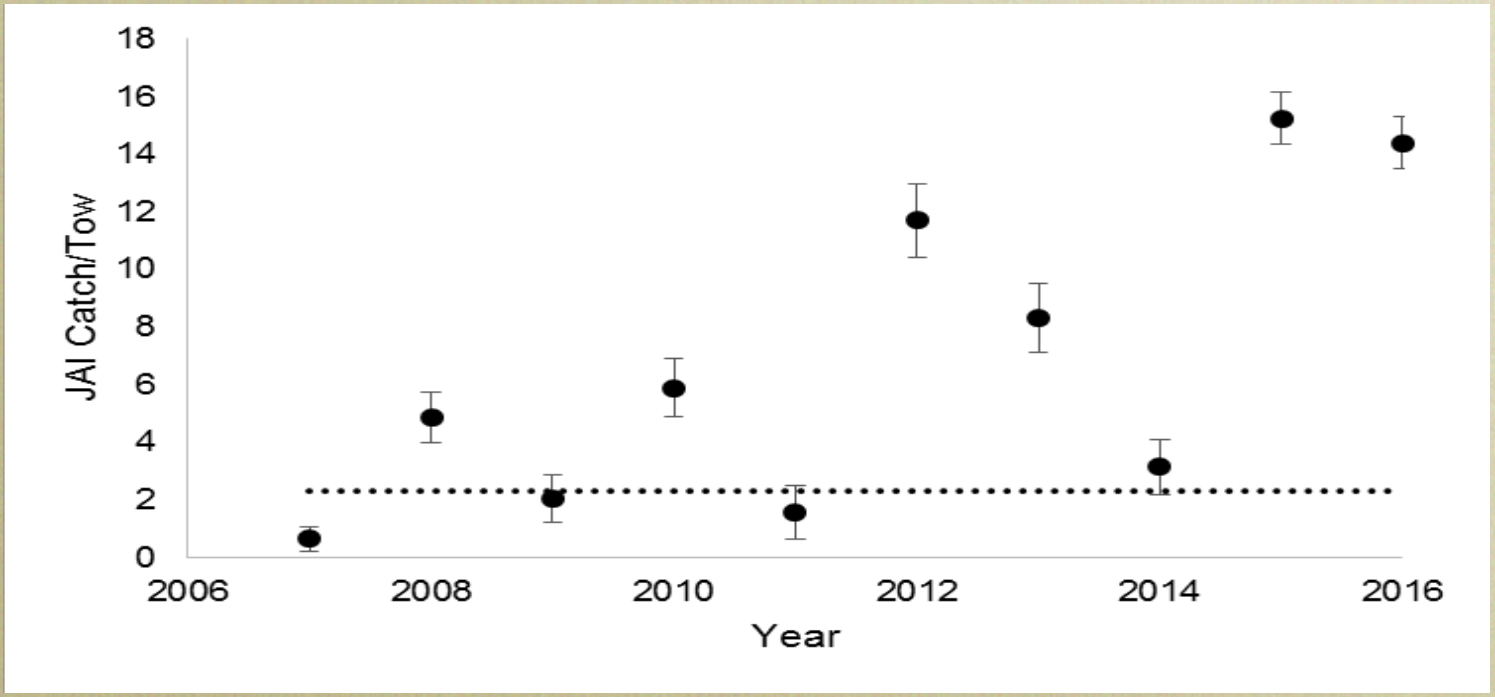
- Fishery dependent: recreational creel survey
  - 1993-2005
    - Roving creel rkm 285-298
  - 2011
    - Access point creel rkm 278-305 and rkm 314-326
    - This creel encompasses the entire area that the previous roving creel covered plus an additional area where fishing effort has shifted.

Benchmarks

- **Florida St. Johns River American Shad Management Benchmarks and Triggers**

River System	Index	Index Years	Benchmark Value	Benchmark Level	Management Trigger
St. Johns River	Spawning Stock Electrofishing CPUE	2003-2016	4.04 shad/standard sample	25th percentile	3 consecutive years below the benchmark
St. Johns River	Pushnet Juvenile Abundance Index	2007-2016	2.33 shad/standard sample	25th percentile	3 consecutive year below the benchmark

JAI Benchmark



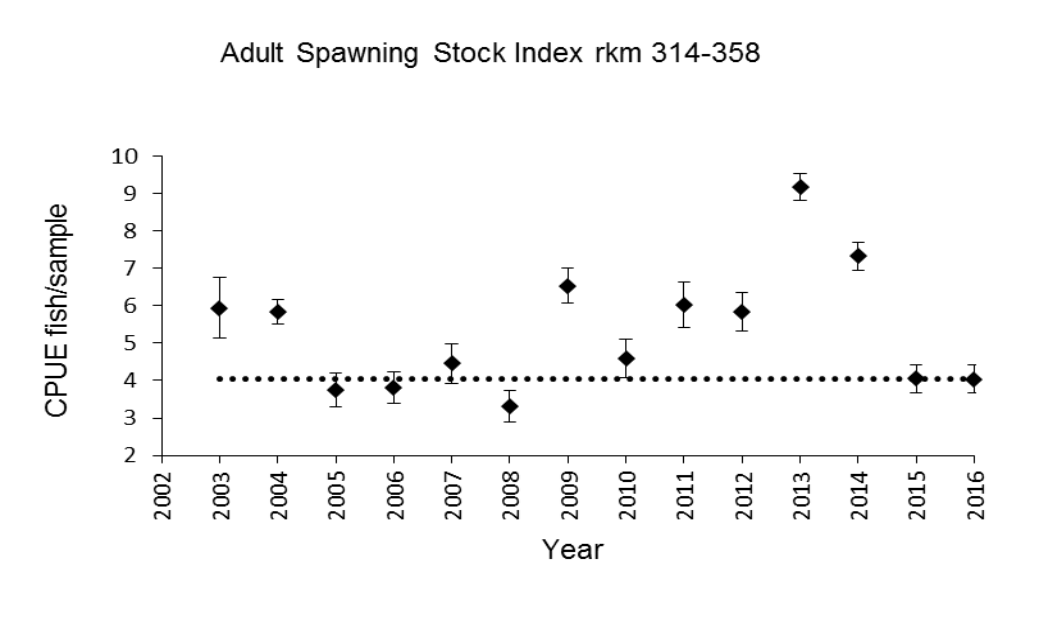
The summer juvenile abundance index, calculated as Geometric Mean, of American Shad from the tidal freshwater sampling area of the St. Johns River, Florida from 2007 to 2016. The proposed benchmark is the 25th percentile of the 2007-2016.

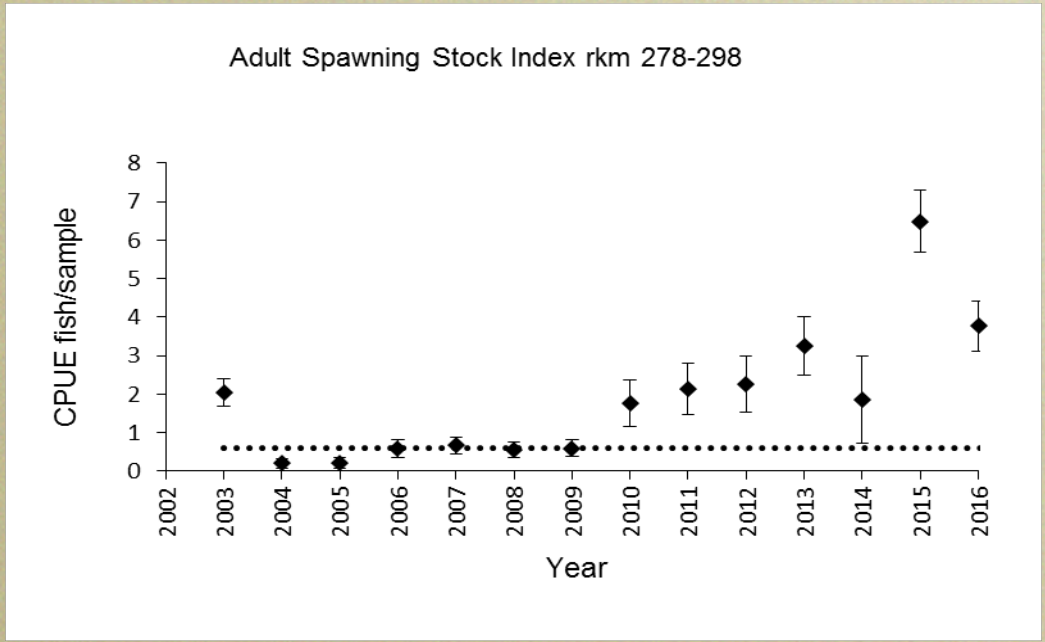
Spawning Stock CPUE Benchmark

The proposed benchmark (25th percentile) is based on the 2003-2016 index in the top panel from rkm 314-358.

High water (>90th percentile of record) in 2015 and 2016 seems to have altered the fish distribution with CPUE being low in the upstream area and high in the downstream area.

FWC intends to continue monitoring in both areas with the possibility that a GLM procedure will be used to combine the indices to better account for environmental effects on catchability





Water Level Fluctuation Probably Affects Fish Distribution and Catchability

Low Water January 2009

High Water January 2015

Recreational Fishery

Top Panel:

Effort in the original creel area continues to decline with fishing shifting to another area

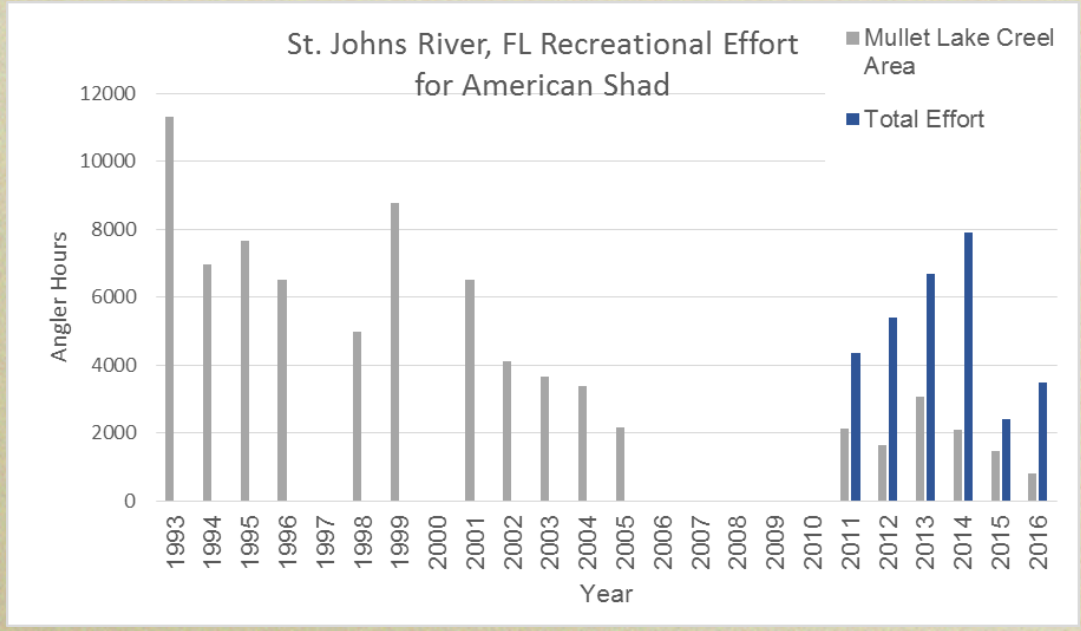
Total effort is not increasing

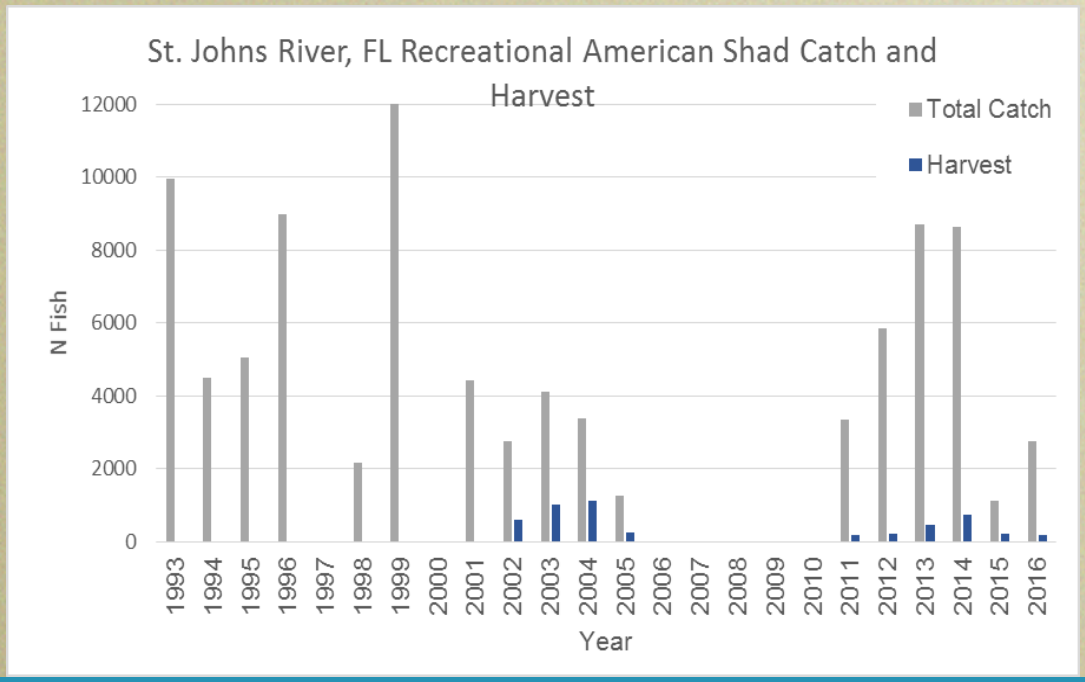
Bottom Panel:

Harvest is a small component of total catch. Neither is increasing.

Overall:

Monitoring will continue in current form with consideration for benchmarks and/or targets held until the time series reaches 10 years in length





ASMFC Shad and River Herring TC
Florida - American Shad SFMP review

1. TC discussed the influence of river discharge and location factors on the spawning stock surveys. The TC recommended the use of GLMs for the next update to explore discharge and location influences and index standardization.

2. TC requested more detail on management responses that would follow exceedances of sustainability benchmarks.

3.) The TC recommends that the Board approves the SFMP with considerations of the improvements discussed in #1 and #2 for the next update.

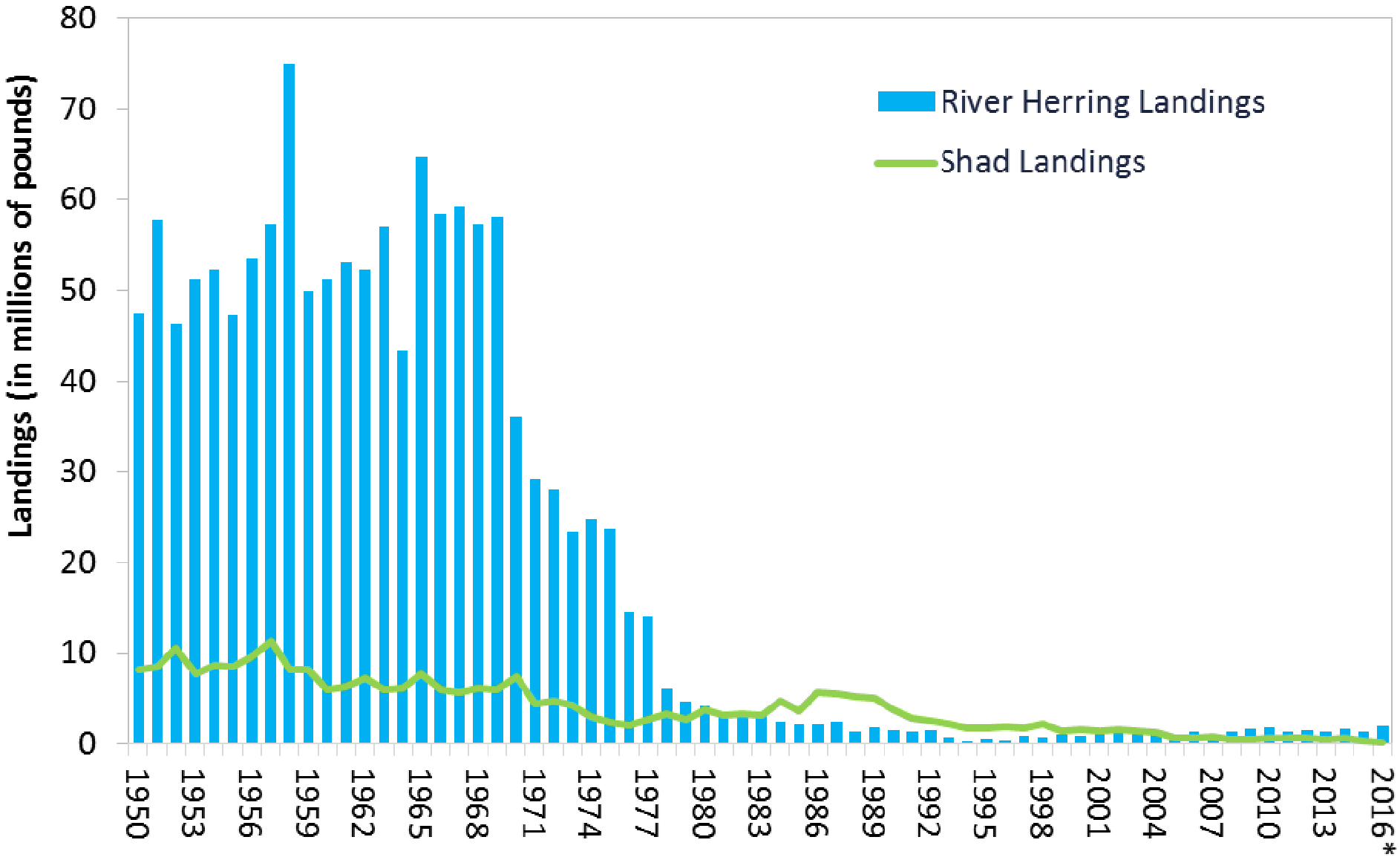
2016 Shad and River Herring FMP Review and Compliance

Presented to Shad and River Herring Management Board

August 2, 2017

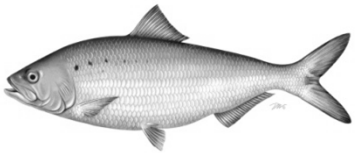
American Shad and River Herring Commercial Landings

ACCSP Data Warehouse and State Complaince Reports, 2017



River Herring Passage Counts

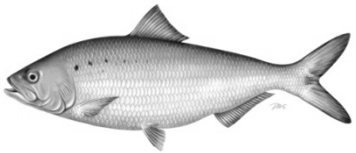
- ME, NH, MA, RI, CT, PA, MD, and SC
- Coastwide: 3.82 million river herring
- Coastwide: 611,368 shad



Coastwide Stocking

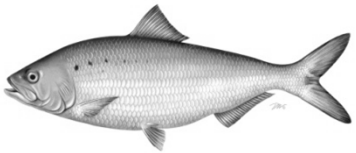
- Occurring in ME, MA, RI, PA, MD, DC, VA, NC, SC

- American shad: 21.03 million



SFMP Timeline

- Feb 2017 Board Meeting
  - Maine (RH)
  - Delaware River Basin Co-op (Shad)
  - New York (RH)
- August 2017 Board Meeting
  - South Carolina (RH)
  - Florida (Shad)
- **Annual 2017 Meeting**
  - NC (Shad)
  - South Carolina (Shad)
  - Virginia Shad bycatch Plan
  - Georgia (Shad)
  - PRFC (Shad)

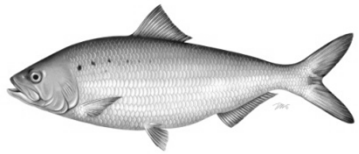


Sturgeon Interactions

- **196 interactions were reported**
  - **176 Atlantic Sturgeon**
  - **20 Shortnose Sturgeon**

- **RI, CT, NJ*, VA, NC, SC, GA**

- **All released alive, with the exception of 15 fatalities (NC).**



De minimis

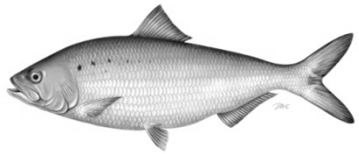
Shad

- **ME, NH, MA, FL**

River herring

- **NH, FL**

- **All of these states meet the requirements for *de minimis*.**



Questions?