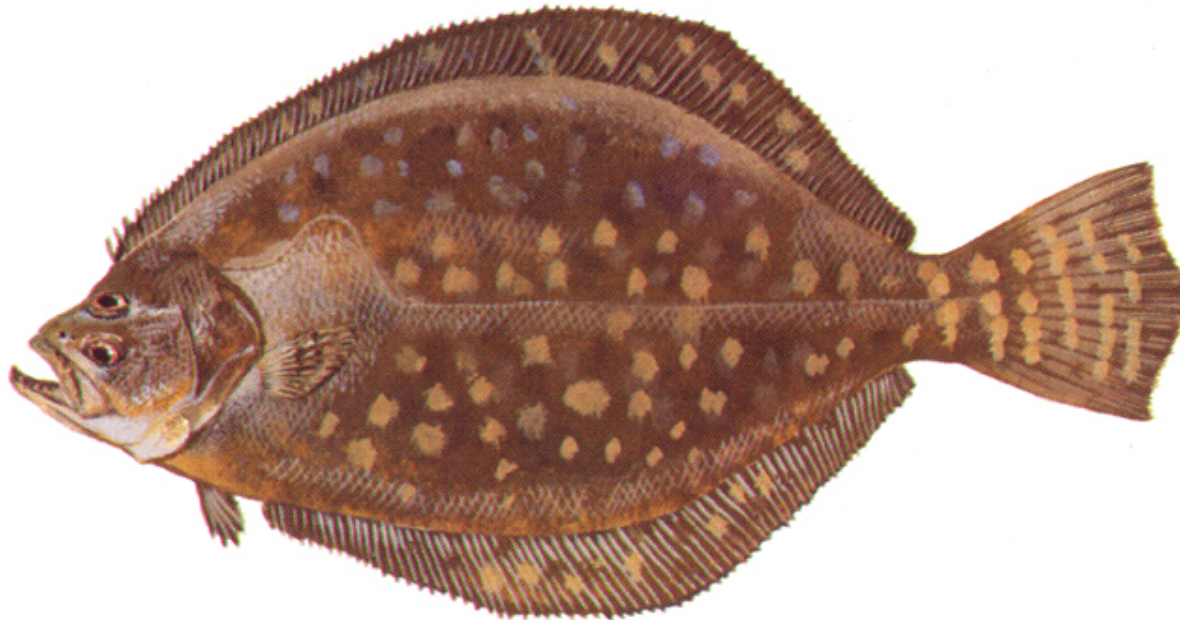


2014 Southern Flounder Draft Stock Assessment



Presented to the Marine Fisheries
Commission

Feb. 19, 2015

Major improvements from 2009 southern flounder stock assessment

- New computer program
 - Stock Synthesis, wider range of data
- Length-based
 - better use of very extensive length data
- Included males and females
- Did not use Beaufort Bridgenet Survey data
 - limited spatial extent (only one place)
- New information
 - size at maturation
 - South Atlantic stock mixing
- Inshore gear selectivity lower for larger fish
 - partial accounting for spawning migration
- Explored model sensitivity to losses of adults

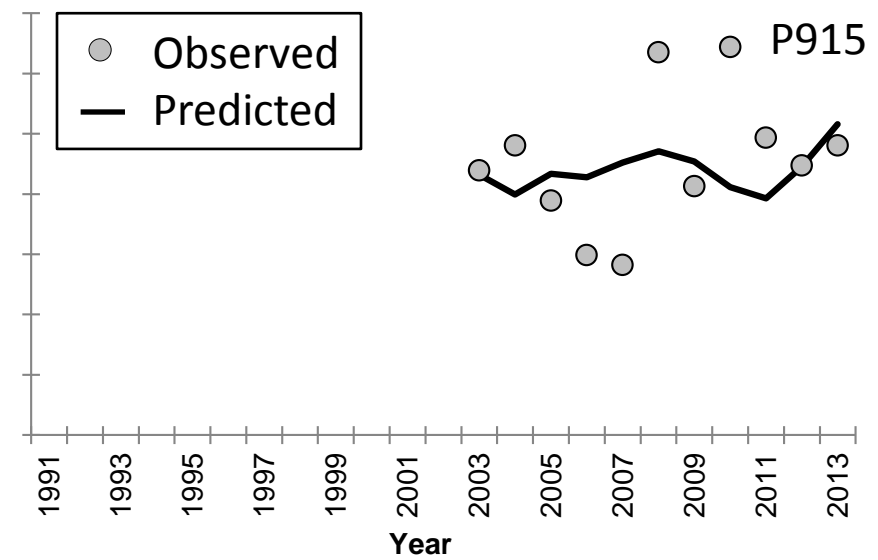
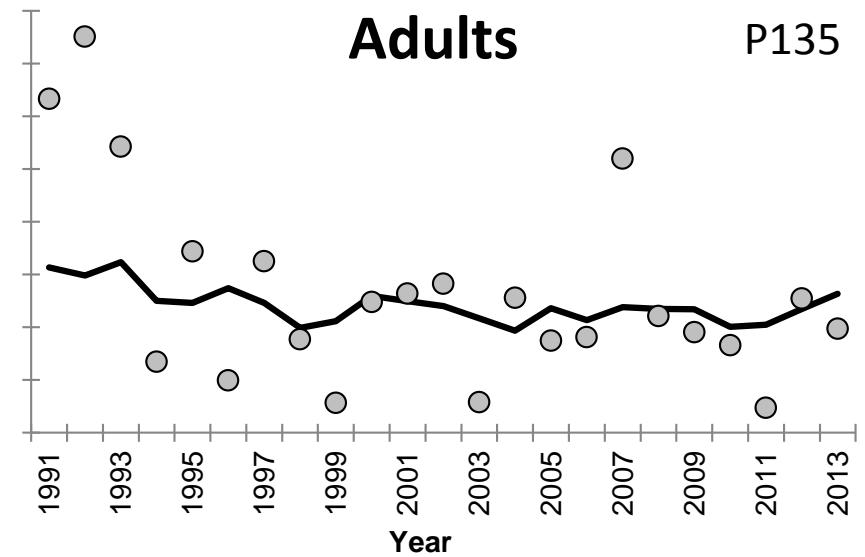
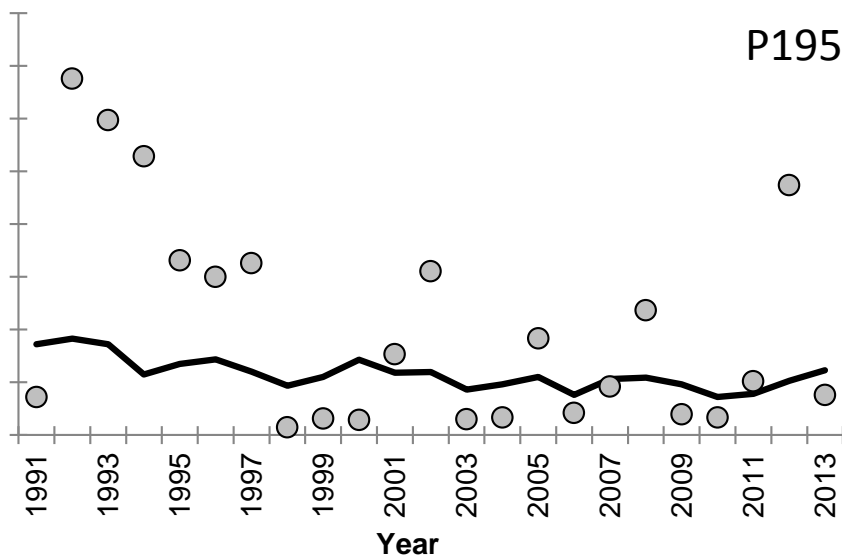
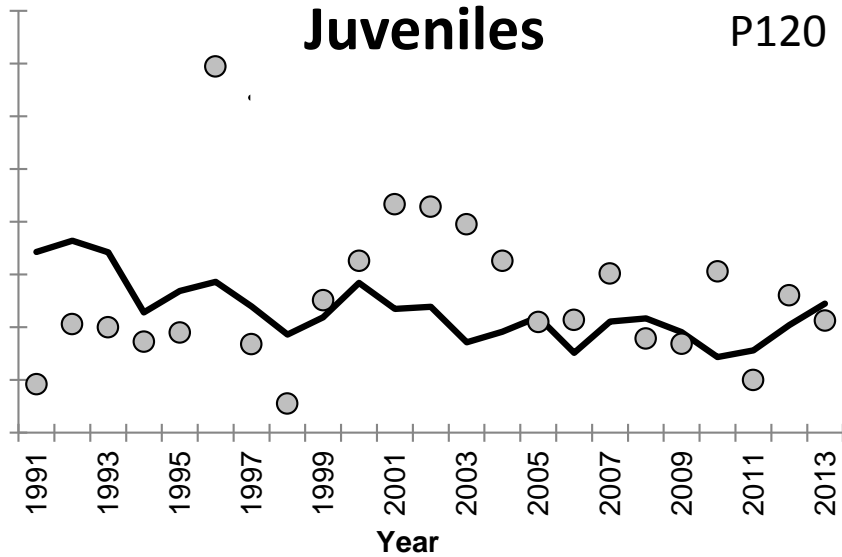
2014 southern flounder stock assessment data

- Five fisheries
 - commercial: gillnets, pound nets, all other commercial
 - recreational: inshore, ocean
 - catch, length frequencies, sex ratios, discards/catch-and-release
- Two seasons (January–June, July–December)
 - account for rapid growth, change in size at age
 - account for seasonal discard/catch-and-release mortality
- Four fishery-independent surveys
 - juveniles: Estuarine Trawl (P120), Pamlico Sound (P195)
 - adults: Albemarle (P135) and Pamlico (P915) SoundIndependent Gill-net Surveys
 - relative abundance, length frequencies, sex ratios

Major problems with 2014 southern flounder stock assessment

- Despite major improvements, insurmountable problems for traditional model
 - identified by two of three reviewers
- Poor model fit to survey data
 - conflicting information
 - source of model “confusion”
- Movement into and out of North Carolina waters
 - how many NC fish were spawned in South Carolina, Georgia, and Florida? UNKNOWN
 - how many NC adults emigrated to South Carolina, Georgia, and Florida? UNKNOWN
 - cannot “balance” our account

Poor model fit to survey data



Southern flounder migration and maturity background

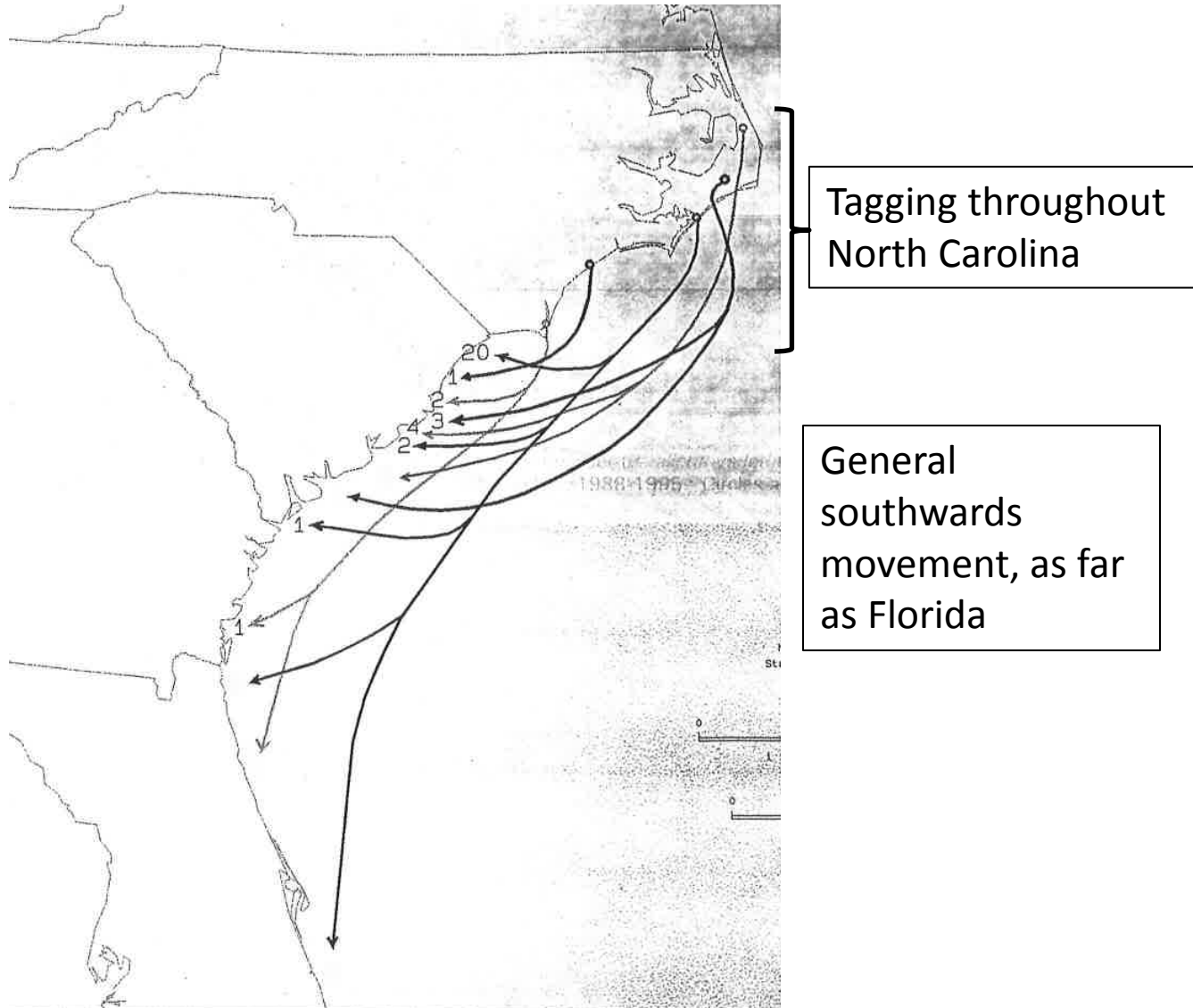
- Offshore spawning, larval ingress to estuaries
- Juveniles remain inshore one to two years
- Maturation by second or third year, offshore spawning migration
- Some return to North Carolina waters, others do not
- Stock mixing from North Carolina to Florida



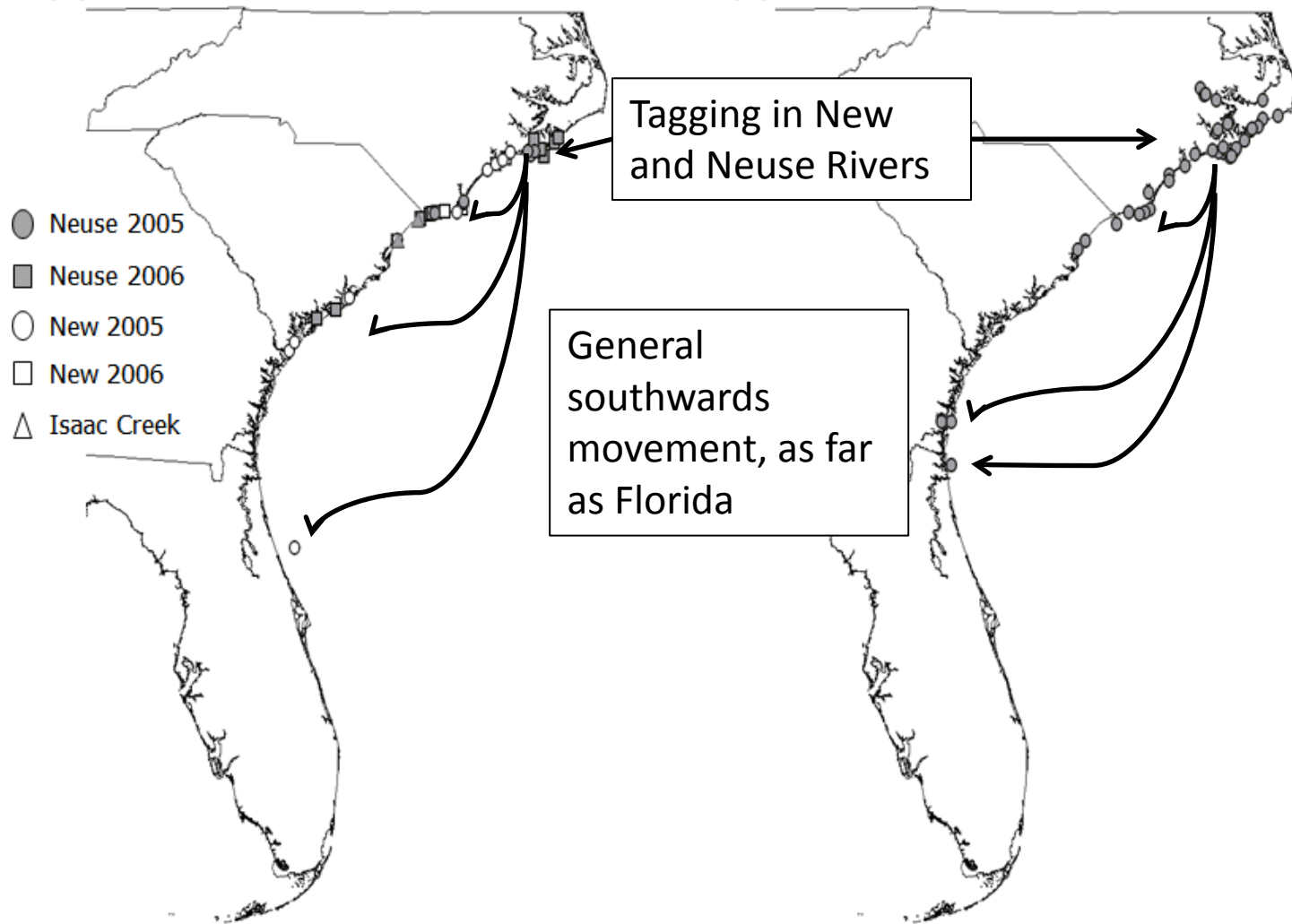
Evidence for significant stock mixing in South Atlantic

- Genetic
 - Anderson and Karel (2012); Anderson et al. (2012); Wang et al. (*In review*)
- Otolith morphometric
 - Midway et al. (2014)
- All genetic and otolith studies show a difference between Gulf and Atlantic basins, but little difference within basins
- Tag-return studies in North Carolina

Tagging: Division studies (1980-90s)



Tagging: Sea Grant studies (2000s)



Peer review details

- Dr. Steve Midway (Coastal Carolina University)
 - "Yes", valid basis for management
 - based on treatment of biology, not the statistical framework that was used
- Dr. Genny Nesslage (University of Maryland)
 - "No", not a valid basis for management
 - based on quantitative/statistical aspects
- Dr. Erik Williams (National Marine Fisheries Service)
 - "Yes", DATA may provide a valid basis for management
 - however, "No", model output (fishing mortality, abundance, spawning stock biomass) does not provide a valid basis for management
 - major problems cannot be corrected with current knowledge

NO ONE thought the statistical results were valid

How are peer reviews used by the Division?

Peer reviews are used as guidance for the Division to evaluate stock assessments.

The Division decides whether a stock assessment can be used as a basis for management.

The Division determined that the 2014 southern flounder stock assessment was not usable for management.

Why was the outcome different in 2014 than in 2009?

- Despite major changes, results were nearly identical
- New information about migration
- Improved peer review process
 - reviewers were asked to describe why or why not the assessment “provides a valid basis for management”

Potential future assessment strategies

1. Trend analysis
-short-term
2. Data-limited assessment models
-short-term
3. Tag-return estimates
-mid-term
4. South Atlantic regional assessment
-long-term

Questions?

Timeline

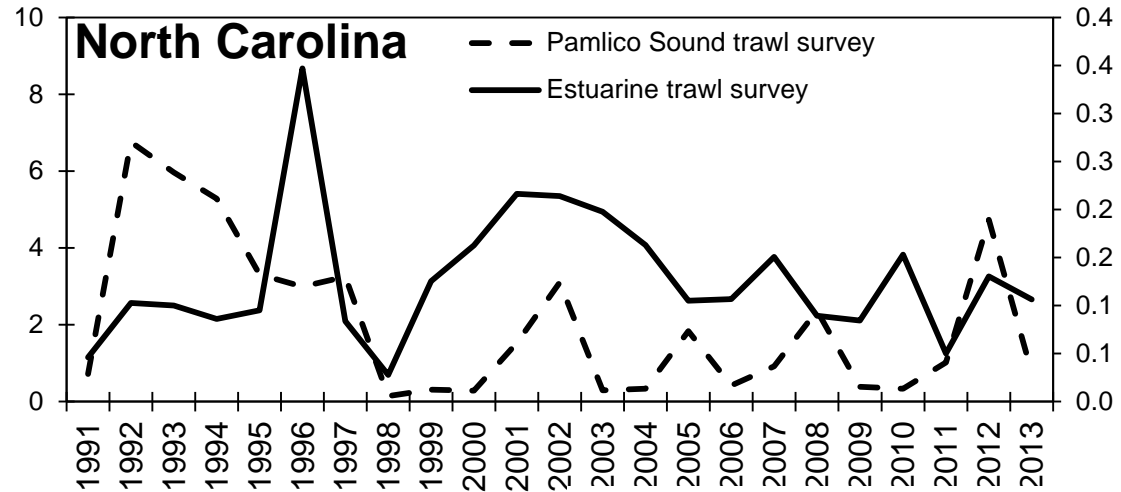
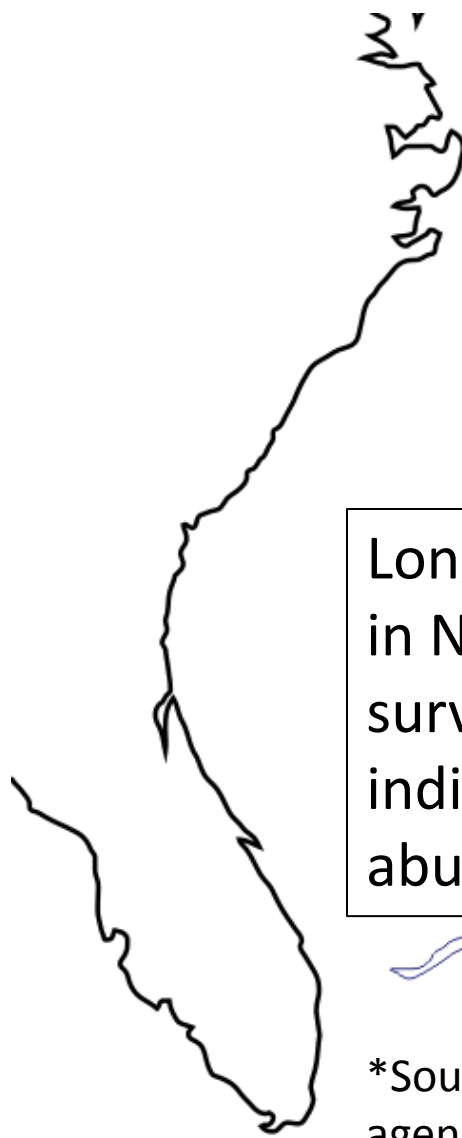
1. Southern Flounder Fishery Management Plan Amendment 1
-approved February 2013
2. Next review of Southern Flounder Fishery Management Plan
-scheduled to begin in 2018

Causes for concern

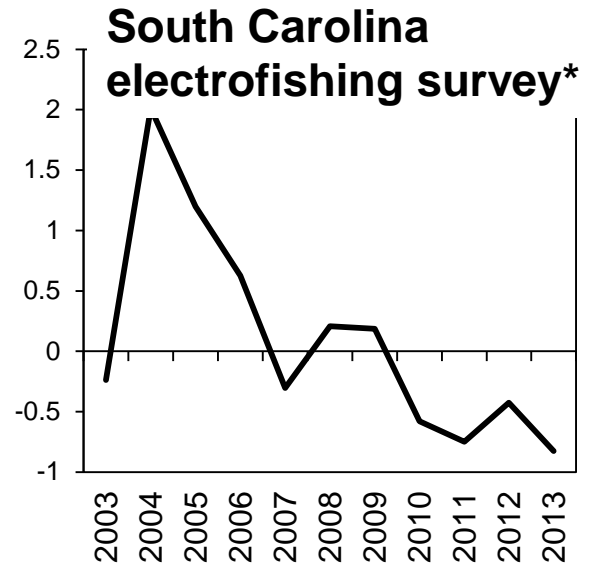
Without an approved stock assessment, the Division has no quantitative basis for management changes; however, we are seeing concerning patterns.

1. Coastwide, decadal decline in indices of abundance
2. Large number of immature fish in the catch

Causes for concern: Juvenile abundance

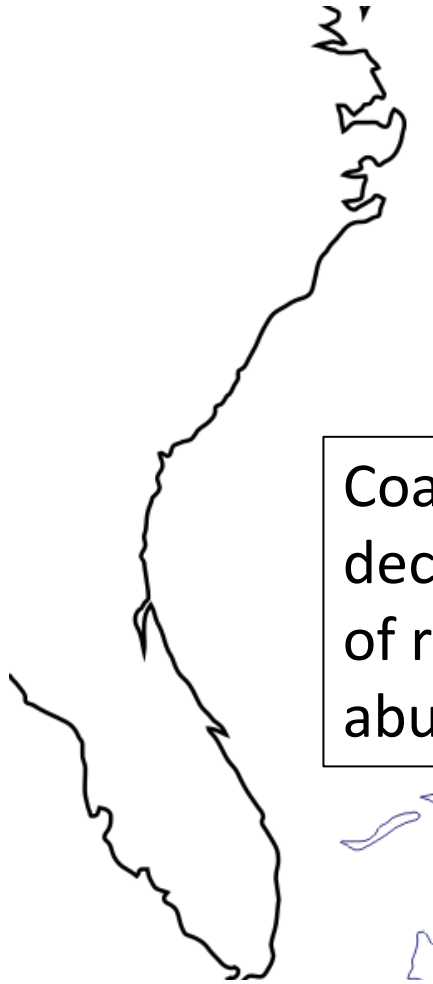


Long-term declines in NC (Pam S. survey) and SC indices of relative abundance

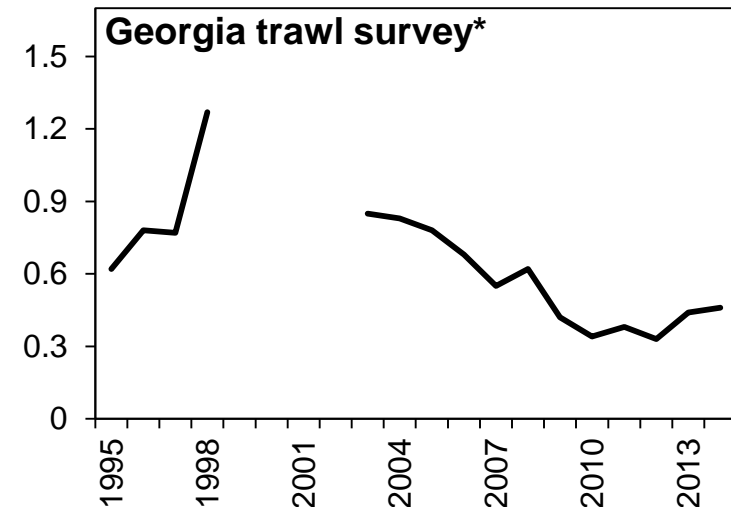
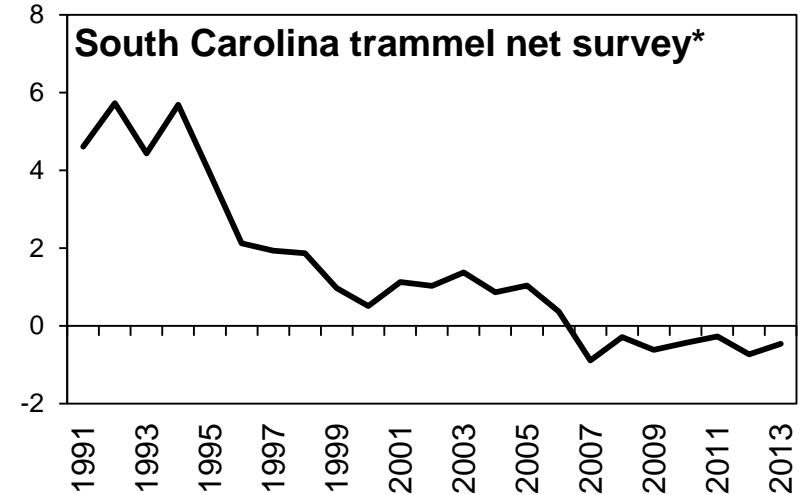
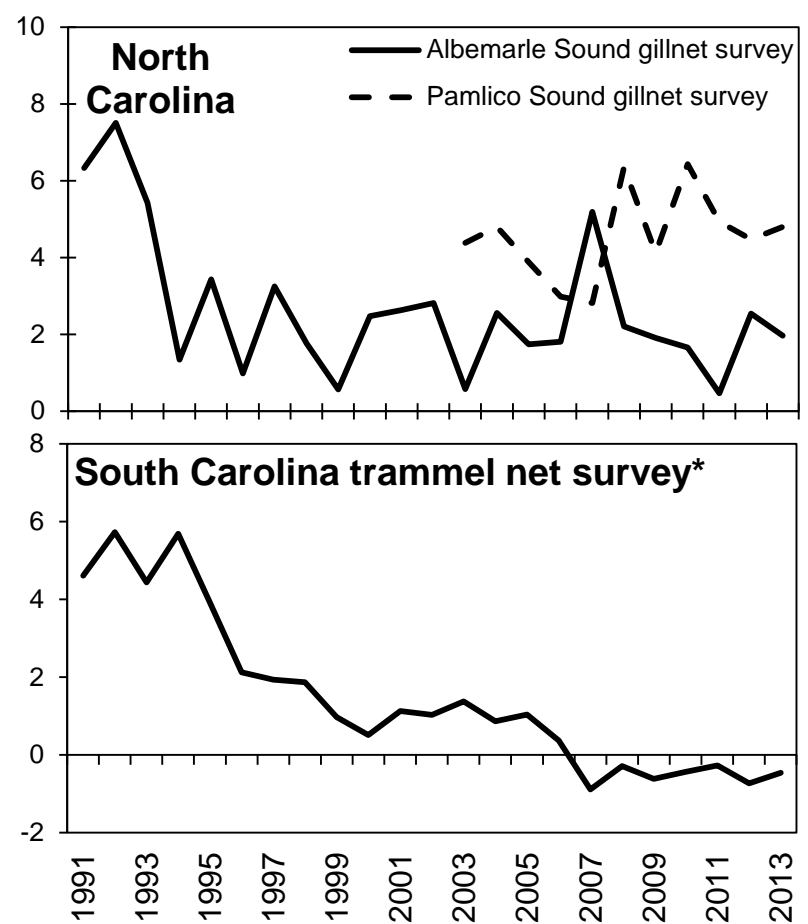


*South Carolina data were prepared by the natural resources agency in that state and do not represent Division analyses.

Causes for concern: General abundance

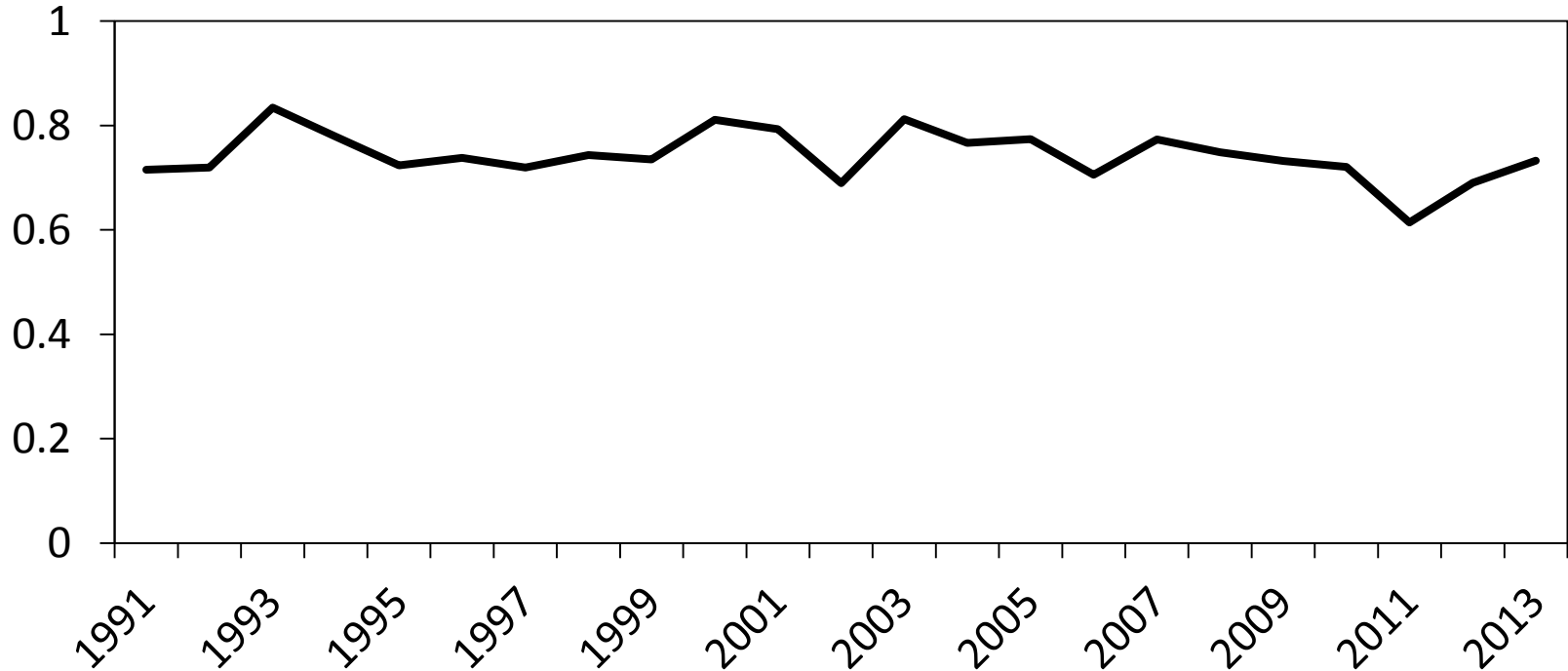


Coast-wide
declines in indices
of relative
abundance



*South Carolina and Georgia data were prepared by the natural resources agencies in those states and do not represent Division analyses.

Fraction of immature fish in the catch



- Little change over time
- Range: 0.62–0.83

Potential future management options

- Reduce immature fish in catch
-15- or 16-inch size limits
- Improve escapement of spawners
- Other options?