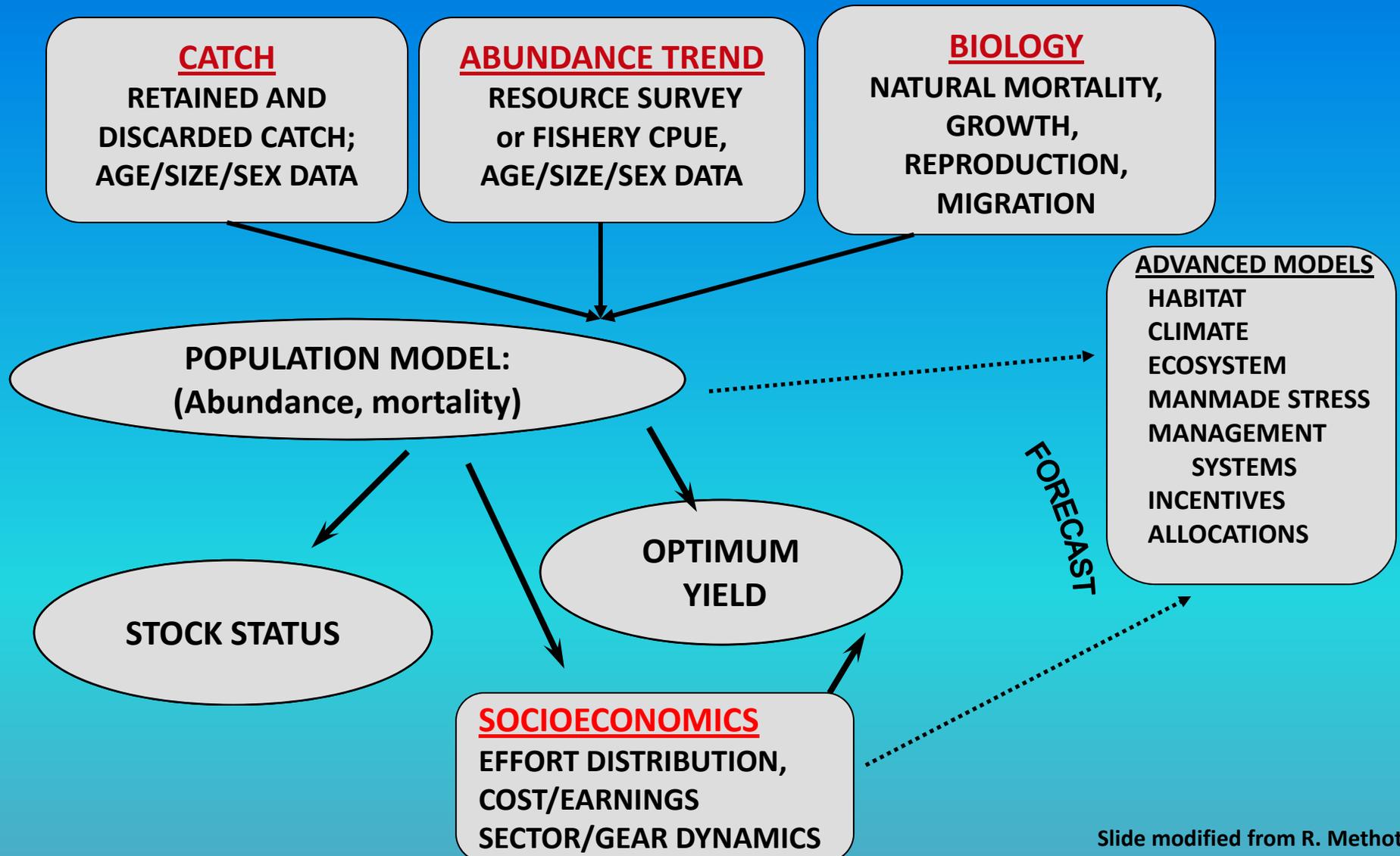


# Data Needs for Stock Assessment and Management

*Joseph E. Powers*  
*Louisiana State University*



# Implementation of appropriate exploitation regulations: the stock assessment/management process



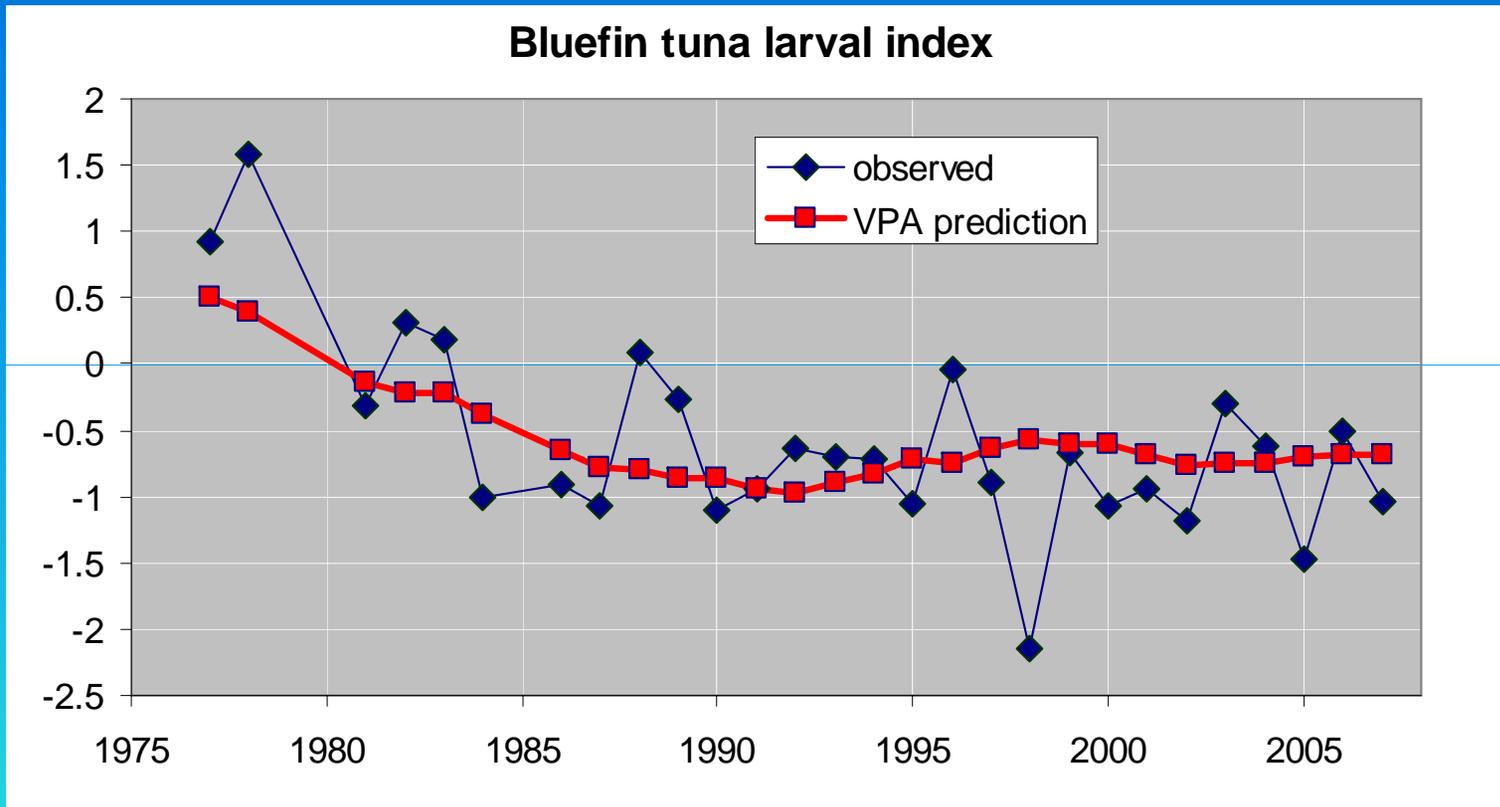
## How Have Management Needs Changed?

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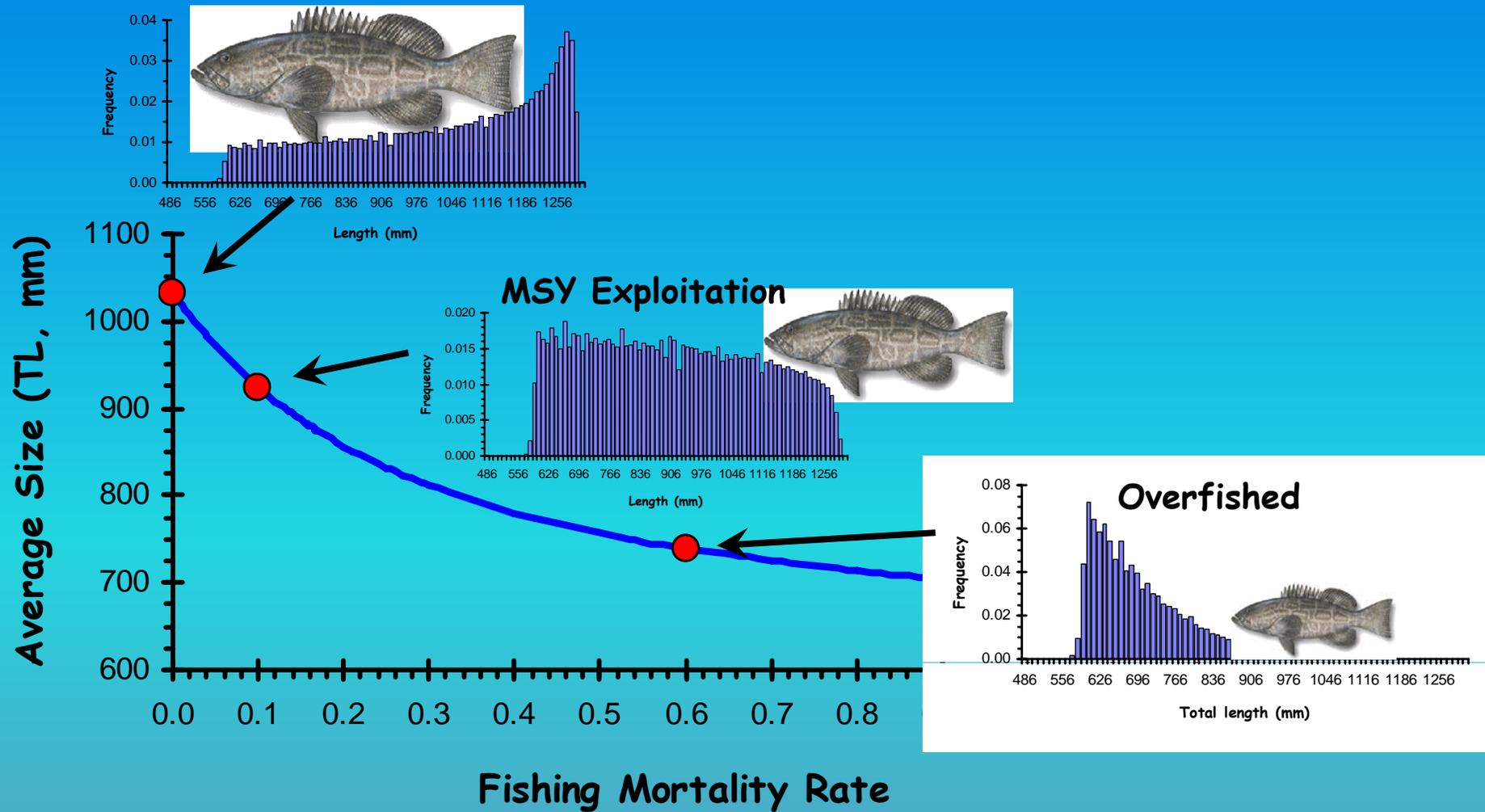
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# INDEX of population, SSB, age 0, 1, etc

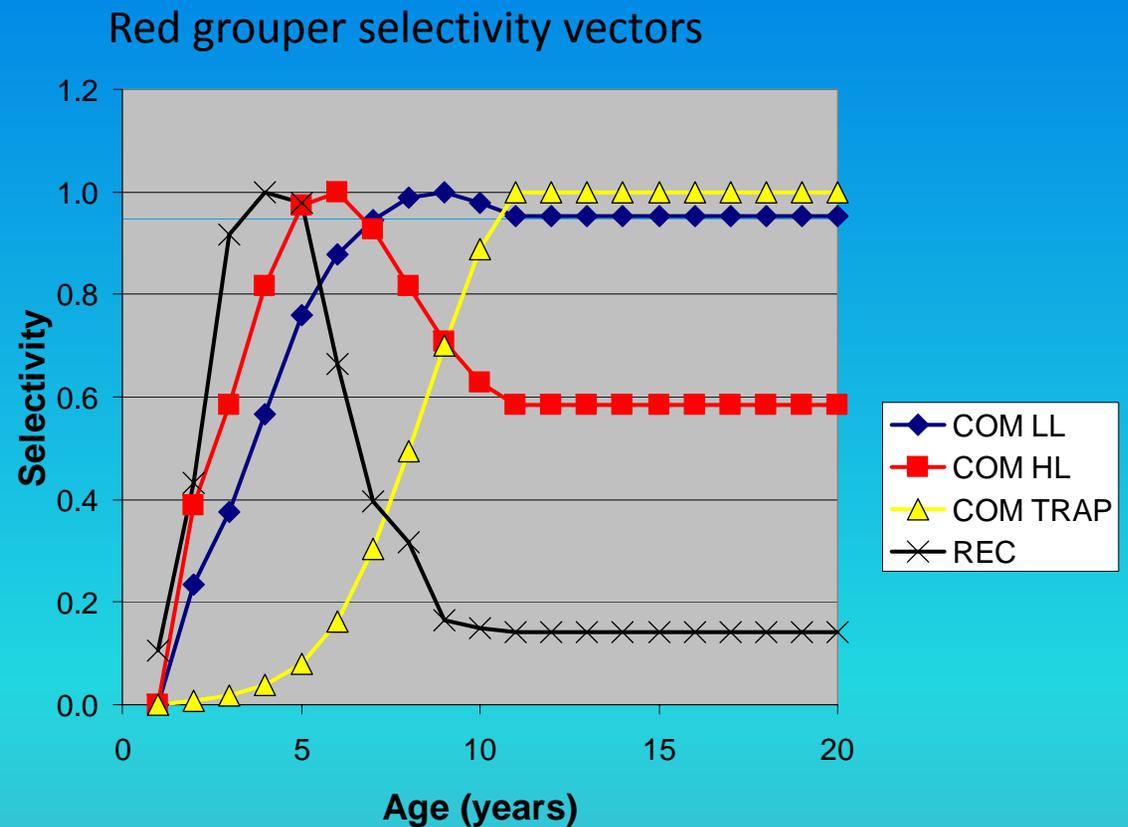


# Contribution of age/size/sex data

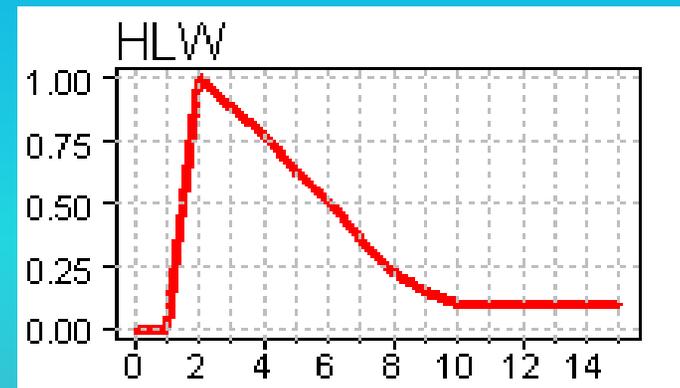
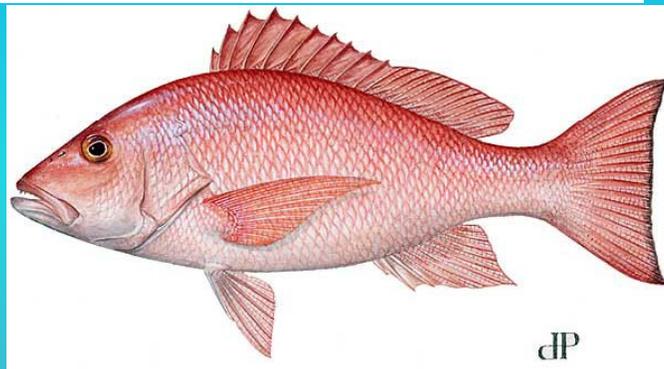
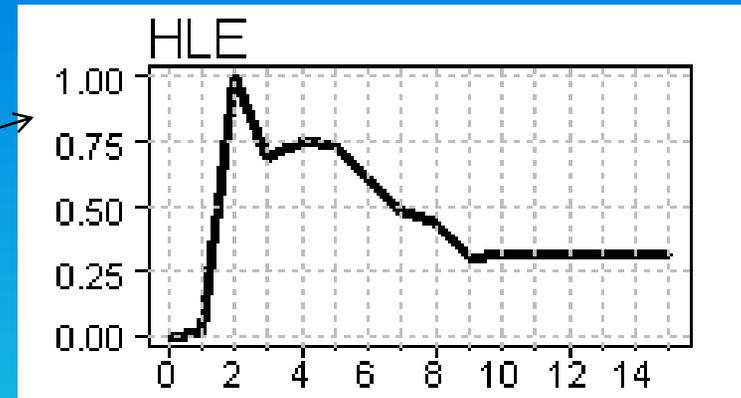
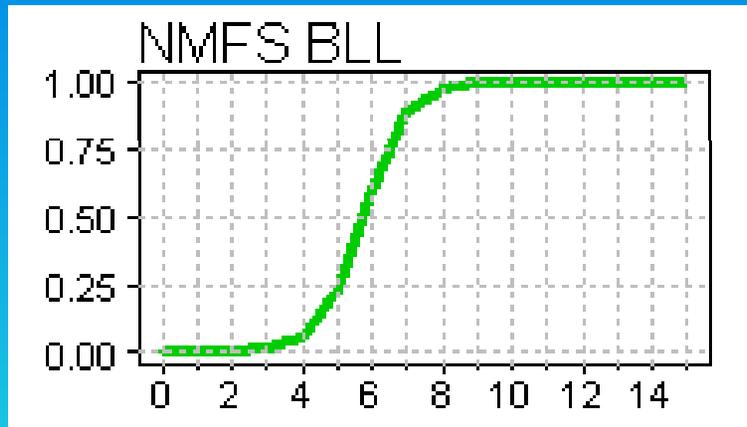


# Age composition from a known selectivity gear

- Dome-shaped selectivity imply a large amount of cryptic or invulnerable biomass
- Fishery-independent gear helps determine the shape of the selectivity functions- critical to status!

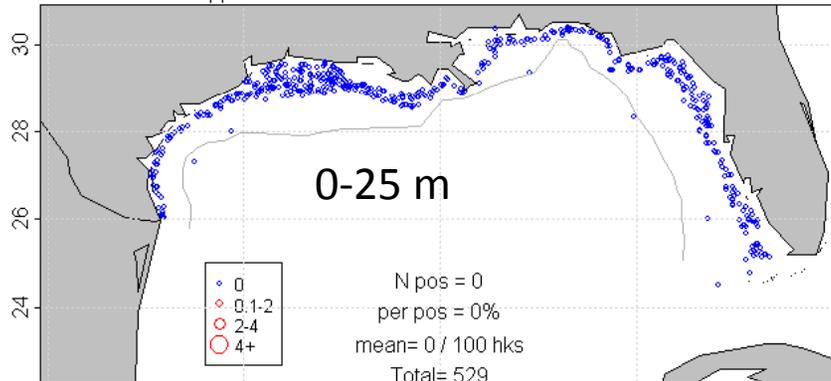


## Gulf of Mexico Red snapper selectivities

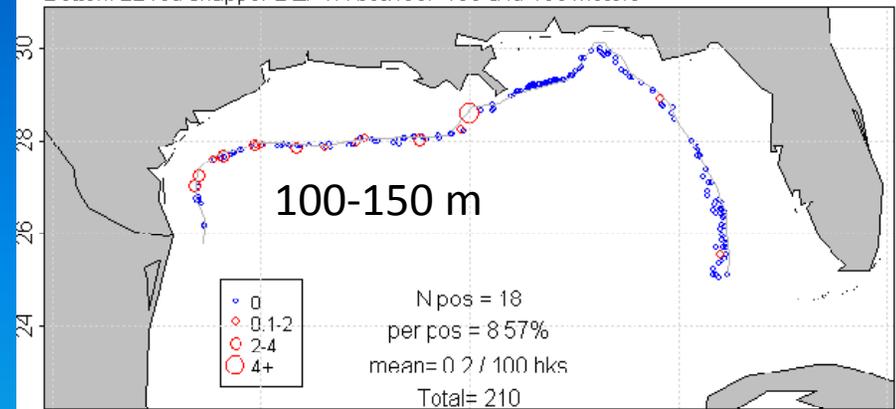


# Spatial distribution- biomass of red snapper

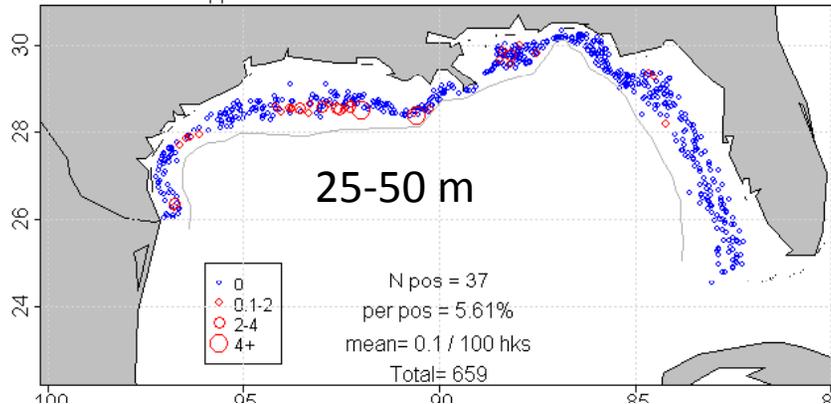
Bottom LL red snapper DEPTH between 0 and 25 meters



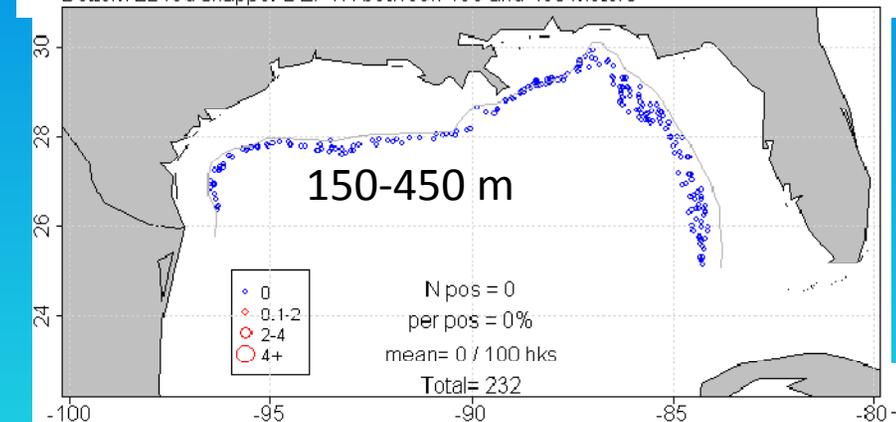
Bottom LL red snapper DEPTH between 100 and 150 meters



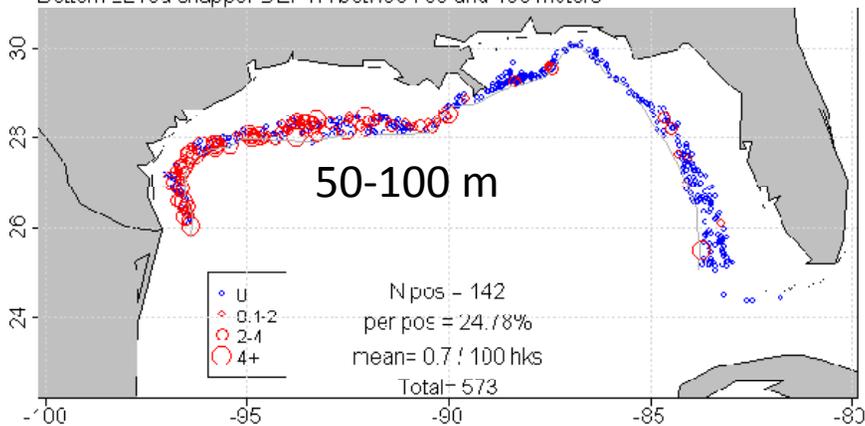
Bottom LL red snapper DEPTH between 25 and 50 meters



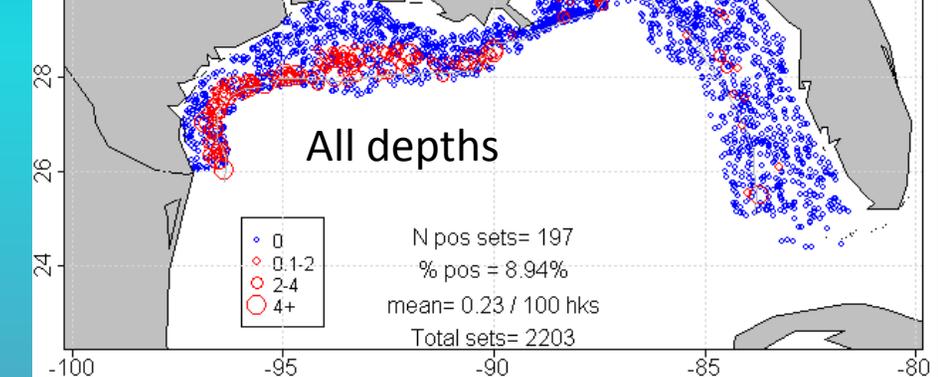
Bottom LL red snapper DEPTH between 150 and 450 meters



Bottom LL red snapper DEPTH between 50 and 100 meters



Bottom LL red snapper DEPTH between 150 and 450 meters



# Gulf of Mexico Sediment Atlas

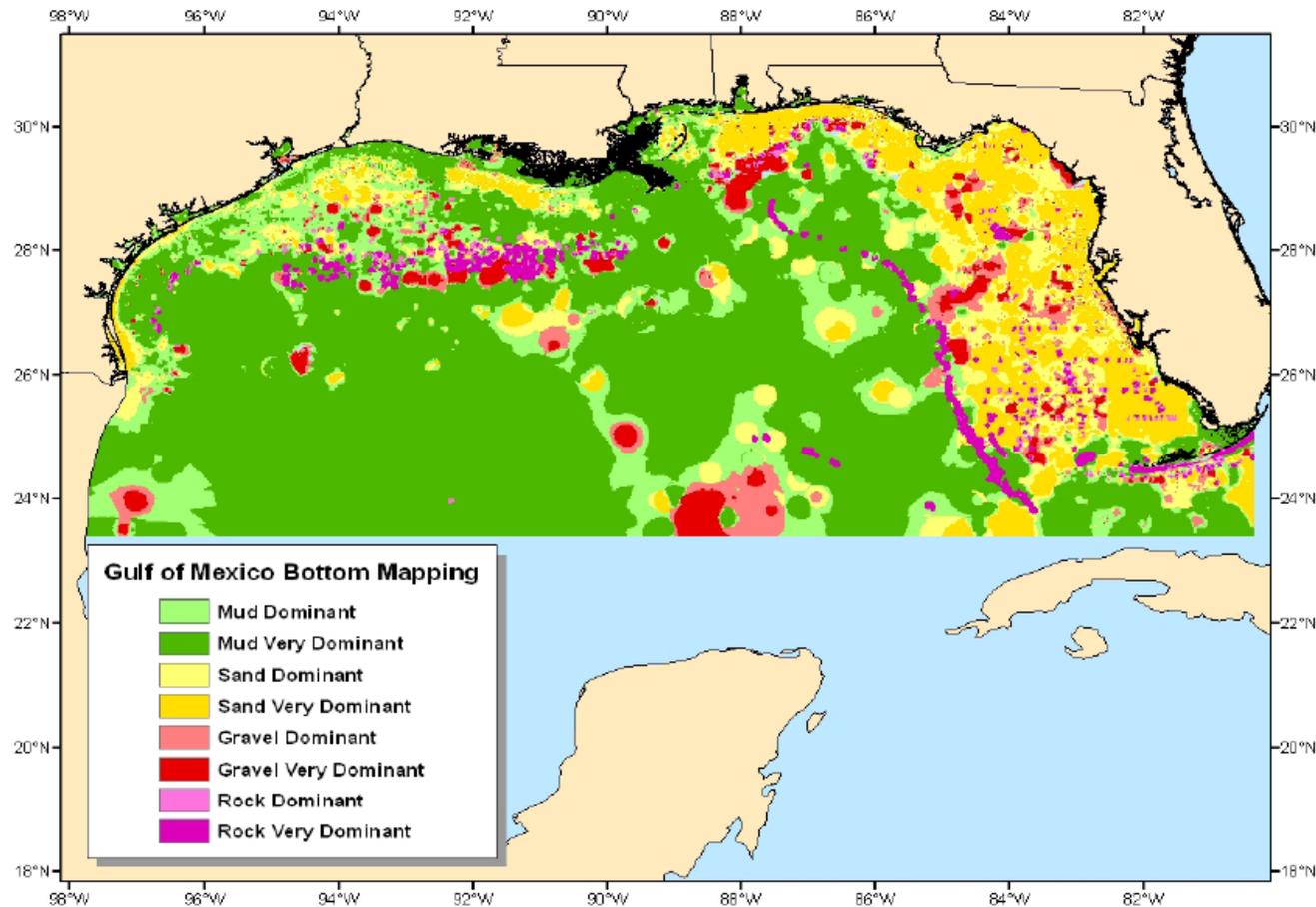
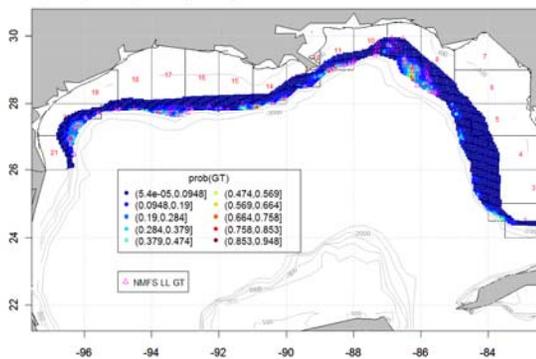


Figure 3. A summary graphic for the major texturally-defined substrates regions in the northern Gulf of Mexico. The dominance map shows which substrate texture is abundant (>30%) or dominant (>66%) through a stack of four grids: rock (purple), gravel (red), sand (yellow), and mud (green) grids. The colored classes are more intense for higher dominance. The display is very effective at dividing the region into substrate subregions. This is an example of the type of display will be able to generate using the geodatabase.

Jenkins et al 2009, Available from Jeff Rester at GSFMC

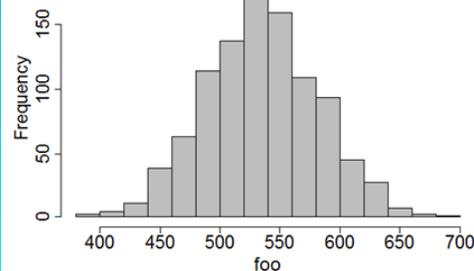
# The concept: deriving Bayesian prior distributions for virgin abundance

1. Prob mapping from logistic regression



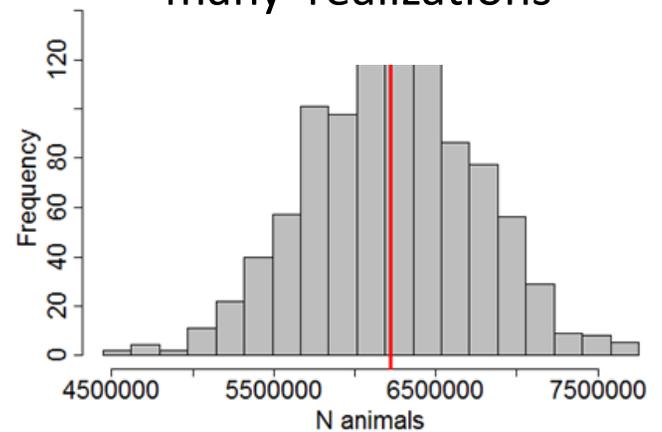
Derived from assigning habitat information to surveys, fishery data

2. Resample ranges of density estimates #/km<sup>2</sup>



Derived from direct observations (ROV, depletion, burrow counts)

3. Generate the distribution of many realizations



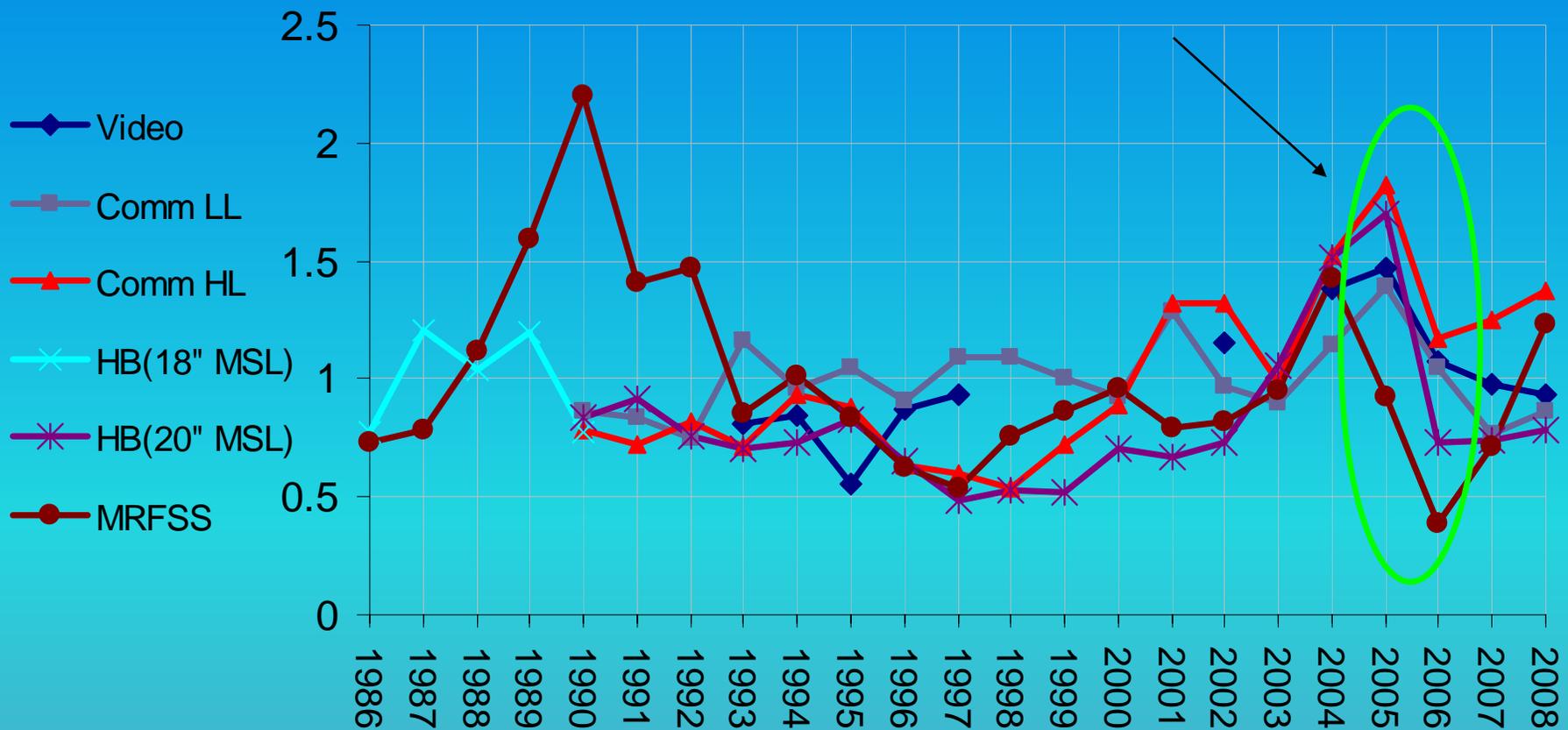
Used in models such as Stock Synthesis

# Natural Environmental Perturbations:

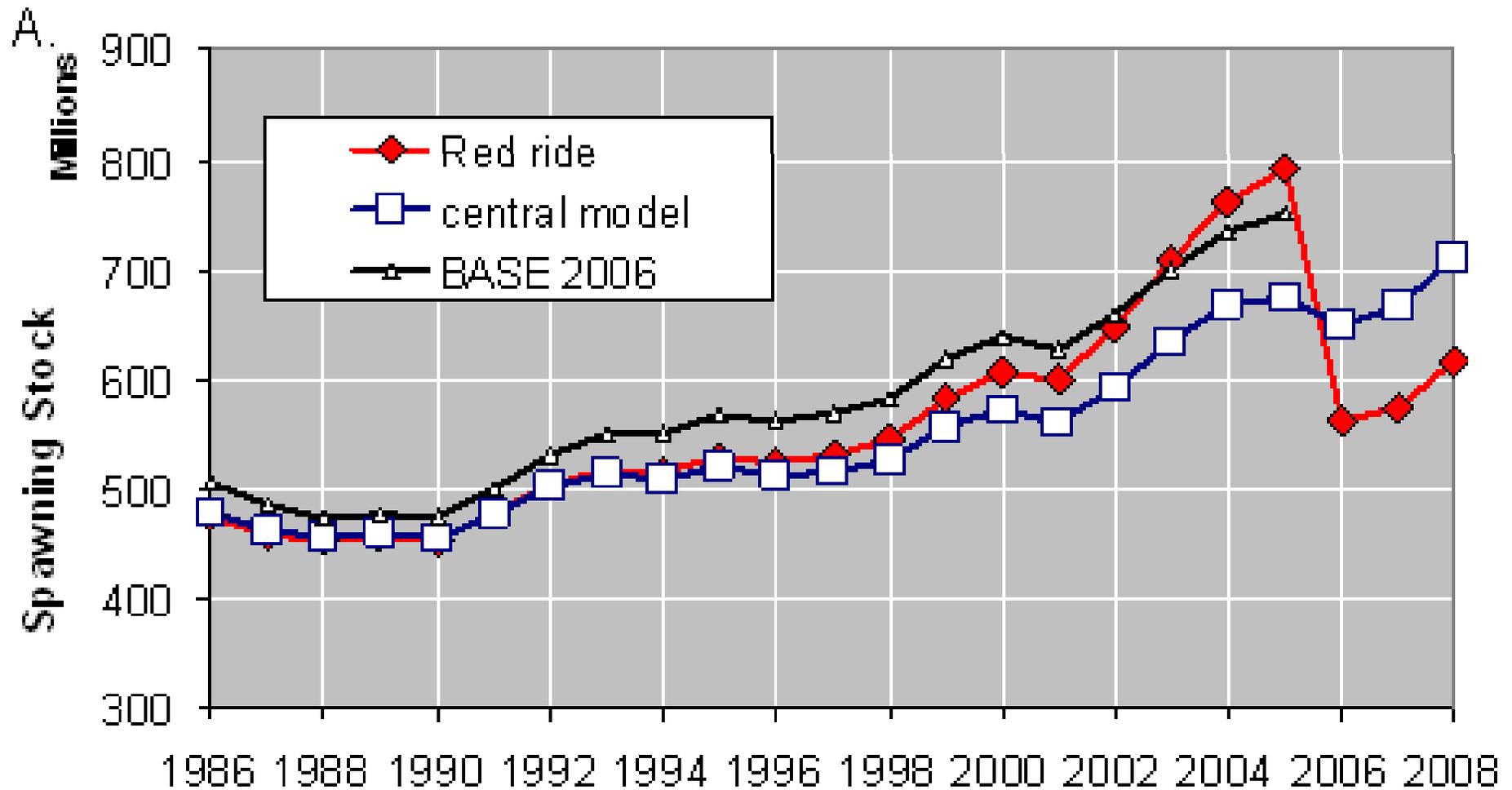
## Red tide and red/gag grouper

> 50% decline in all indices between 2005 and 2006

What happened?

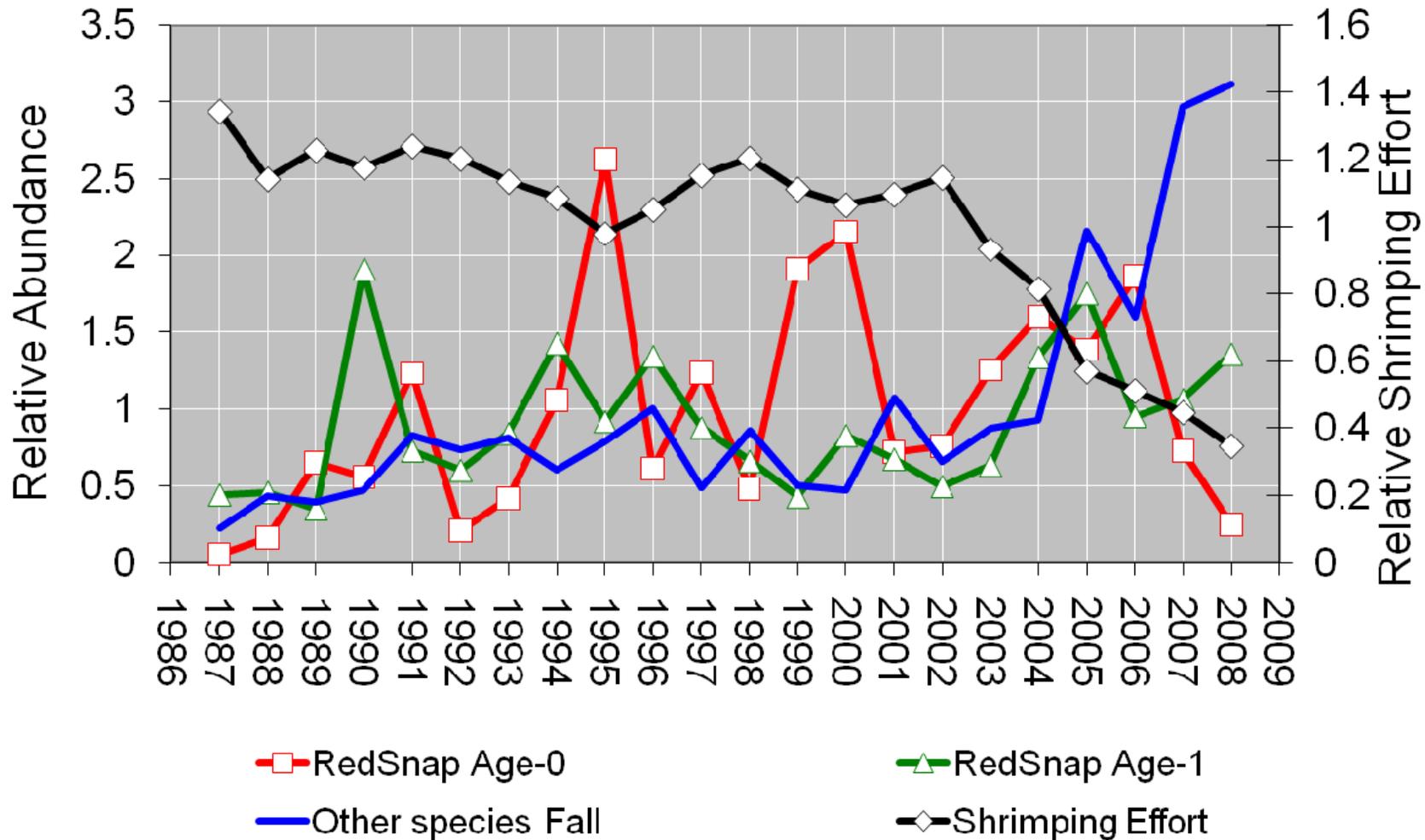


# Red grouper stock biomass



# Ecosystem ramifications

SEAMAP trawl indices



# Data Needs Status

**Indices:**

**Fishery independent AND dependent**

**Absolute abundance estimates for key components (genetic tagging, aerial surveys)**

## Data Needs Status

**Reproduction/Mortality: Need to define the Reproductive Function (Stock-recruitment relationship) WITHOUT observing stock abundance over its entire range**

**Tagging, stomach analyses**

**Fecundity, growth**

## **Data Needs Status**

**Catch, Catch at Size/Sex/Gear**

**Is there technology to “automate” this process?**

**Very different solutions needed for different fisheries, e.g. recreational vs commercial, purse seine vs handline**

## Data Needs Regulatory Implementation

**What will be the response of  
fishers/industries to regulations?**

**Effort redistribution**

**Investment decisions**

**New incentives and strategies**

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If you want to monitor ecosystems, then start doing more assessments of minor fisheries species!

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# 7. Allocation conflicts

**Enters every phase, even the science:**

**For example: Accountability Measures:**

**Imprecise recreational catch estimates were accepted by the recreational community. Now AMs mean Rec community demands better estimates because it affects their allocation**



# Implementation of appropriate exploitation regulations: the stock assessment/management process

