Science, Service, Stewardship

SEDAR 22 YEG RW

I: data inputs

February 14, 2011,

Tampa, FL

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Outline

I. Life history

II. Data inputs

1. Landings
2. Indices

III. Overview of modeling decisions/inputs

IV. Model results

V. Projections/MCMC/Status

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Yellowedge Grouper

SEDAR22-DW-08
SEDAR22-DW-LH

2.3 Stock Definition and Description

- single stock in Gulf of Mexico
- Distribution: US from North Carolina to southern Florida, and through the Gulf of Mexico, Cuba and the West Indies south to Brazil.
- Adults from 90-365 meters.
  - Ontogenetic shifts, verified through ^{14}C signals
  - Smaller, younger fish in 35-125 m
  - Larger (~>400 mm) fish in 125-300 m
- Use a variety of habitats including flat mud/sand bottom, and rocky outcroppings.
  - western Gulf of Mexico, inside burrows cut into soft sediment at depths of ~275 meters (145-159 fm).

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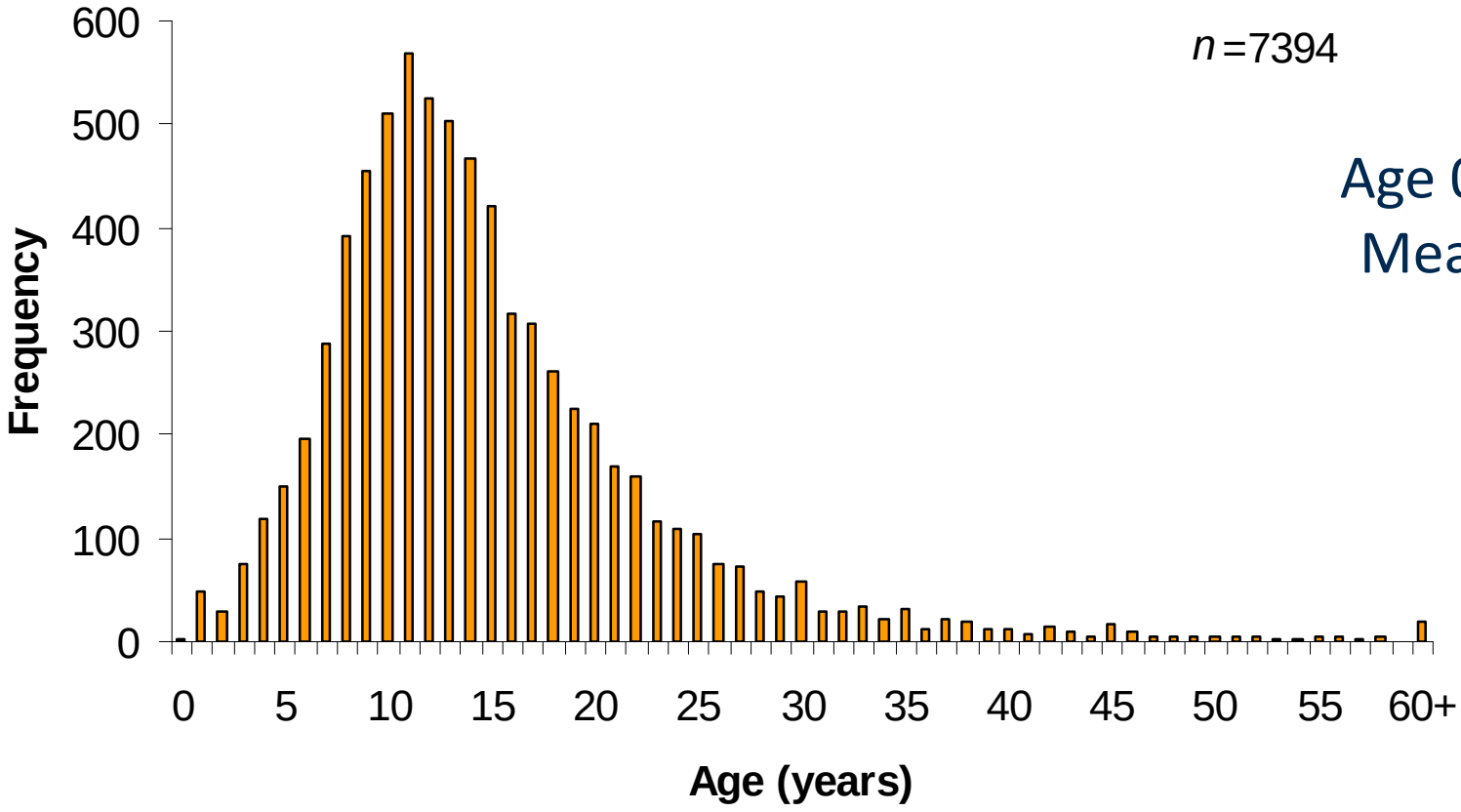
SEDAR22-DW-08
SEDAR22-DW-LH

Life history, age data



Age 0 – 85 yr
Mean 15 yr

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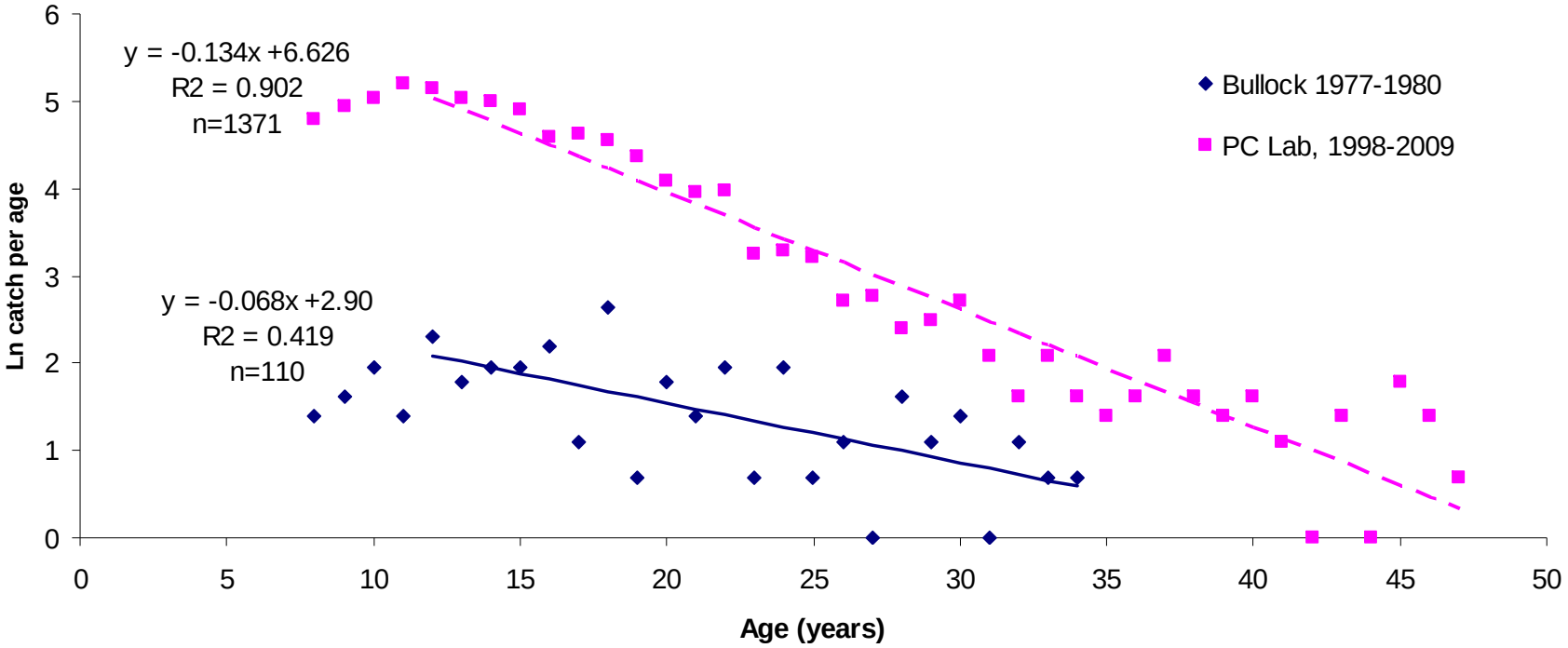
Life history, early and recent catch curves



Grids 4 and 5 for both time periods

Ages 12-34 years (Bullock 1977-80) and 12-41 years (1998-2009)

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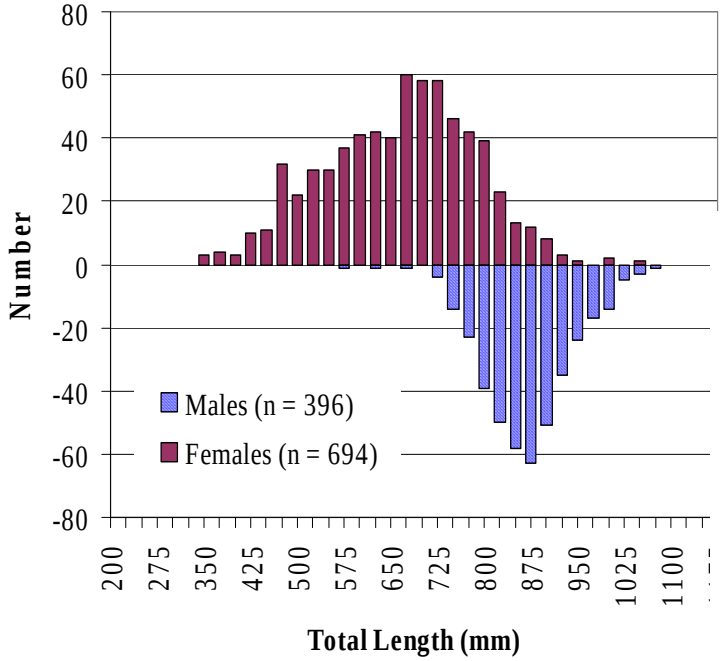
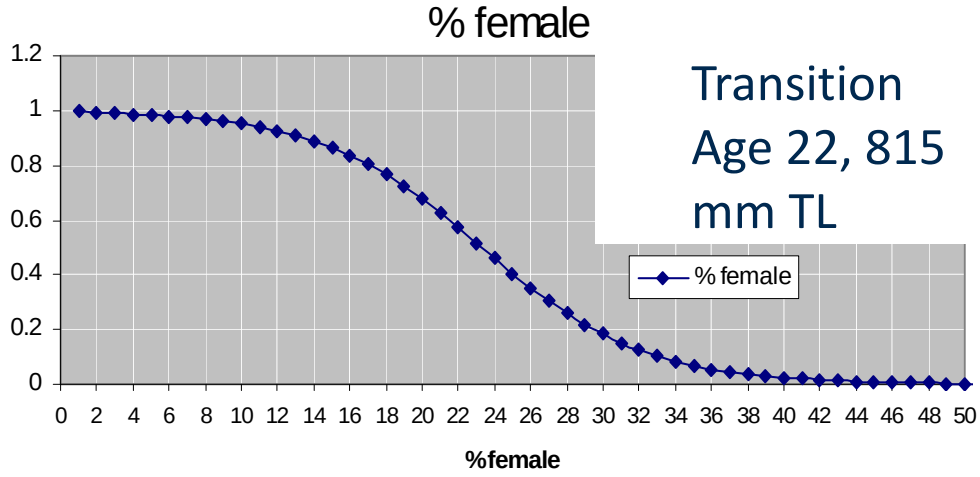
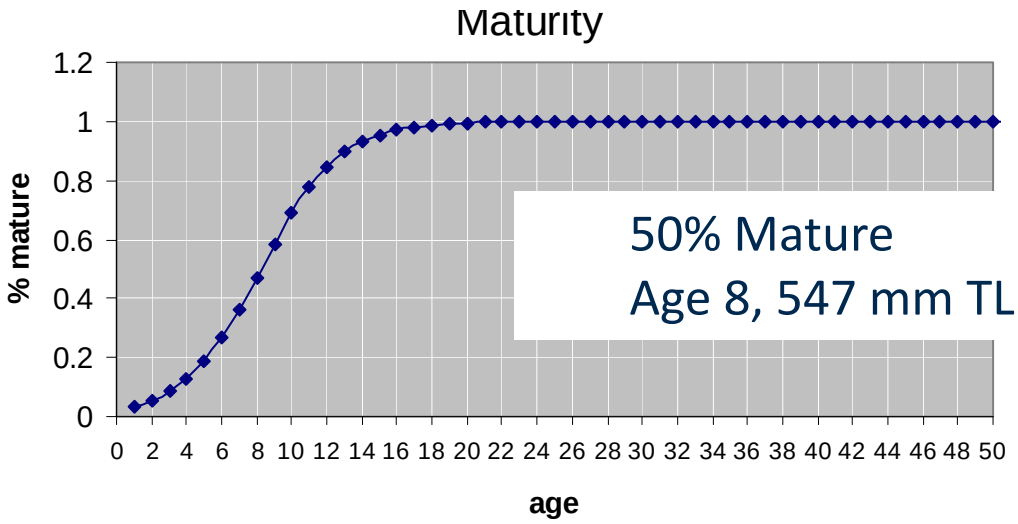
Reproduction

2.8 Reproduction Strategy: protogynous hermaphrodite





Transition Age 22, 815 mm TL



50% Mature Age 8, 547 mm TL

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Reproduction

SEDAR22-DW-08

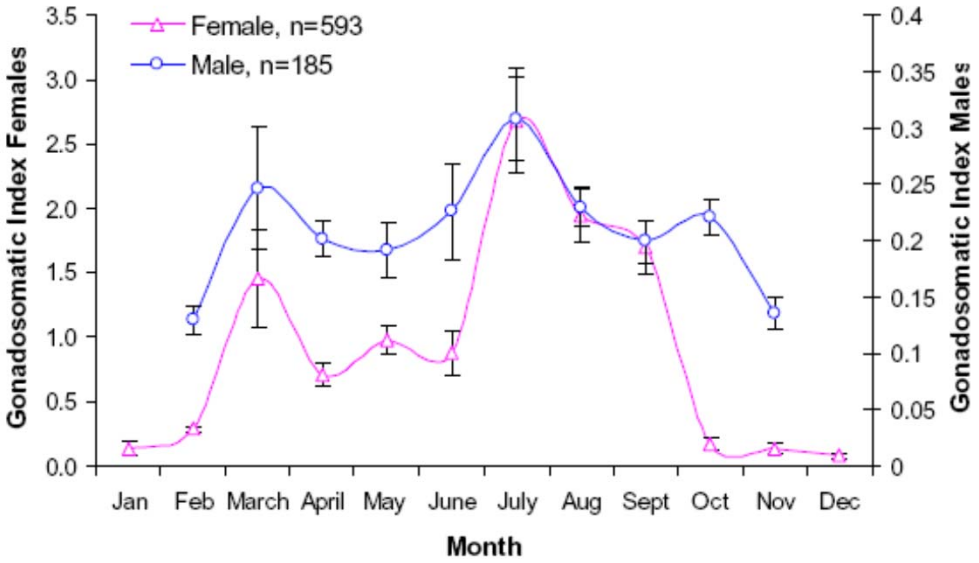
2.8 Reproduction: years 1998-2009

Spawning season

- February - November, peaks March & July
- Indeterminate spawners

Sex Ratio

- 1:3.2 (male to female)



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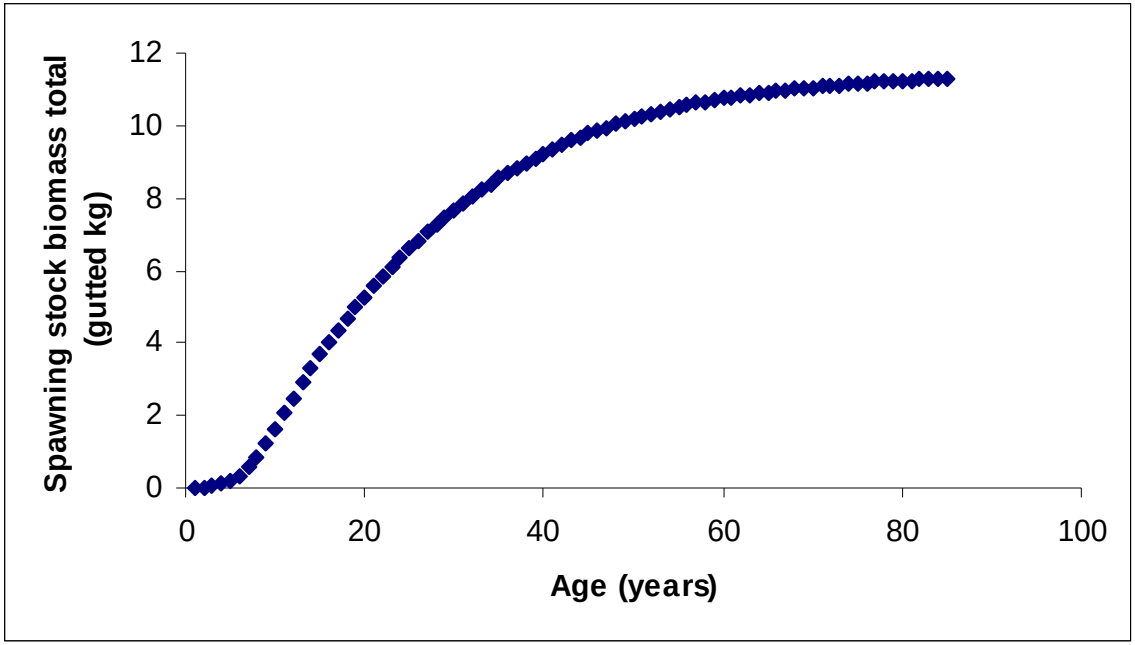
fecundity

SEDAR22-DW-LH

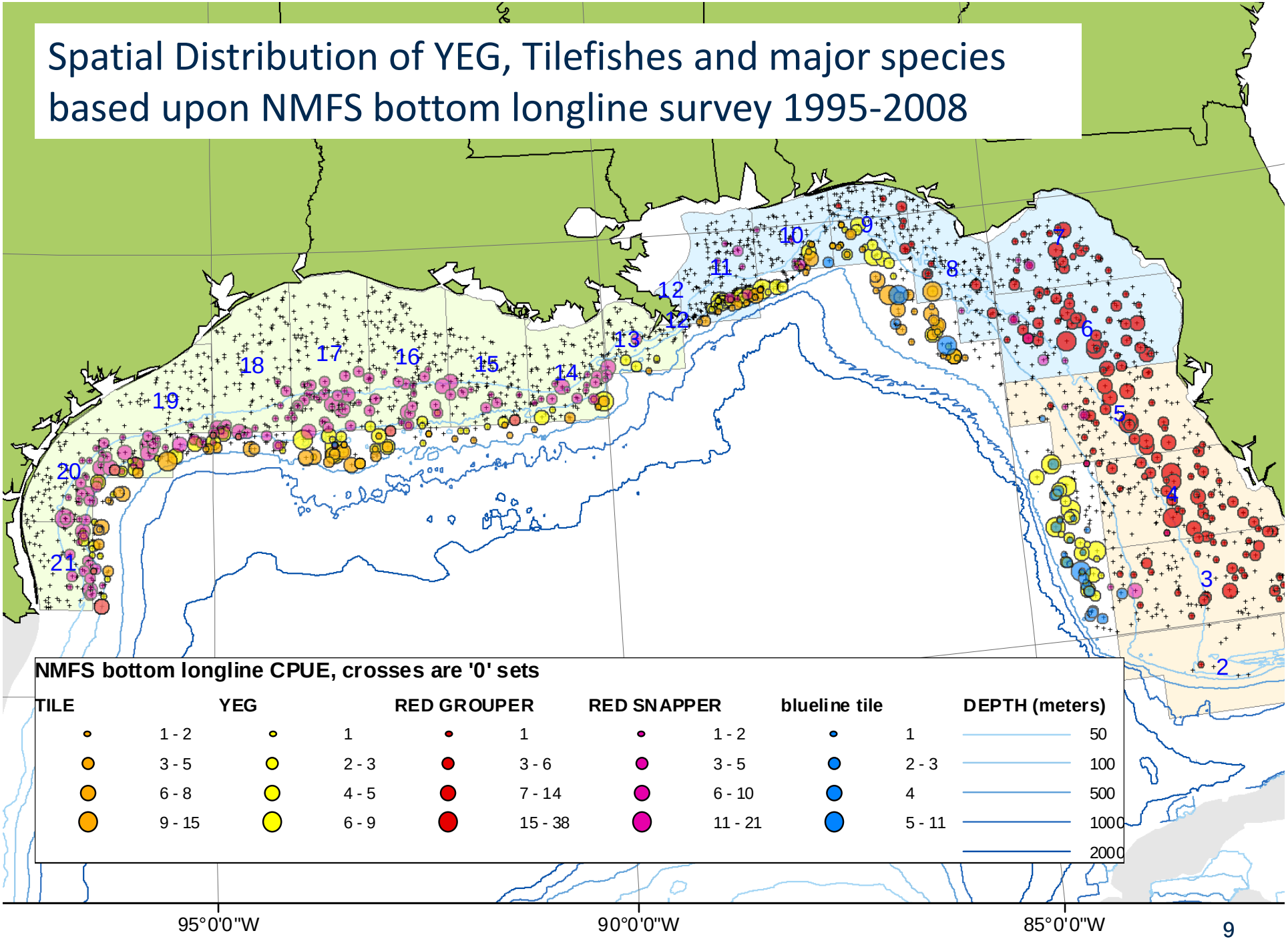
2.8 Recommended fecundity proxy

spawning stock biomass total(weight at age x %mature)

hydrated and vitellogenic ovary weight and somatic weight were fairly proportional → use weight as proxy



Spatial Distribution of YEG, Tilefishes and major species based upon NMFS bottom longline survey 1995-2008

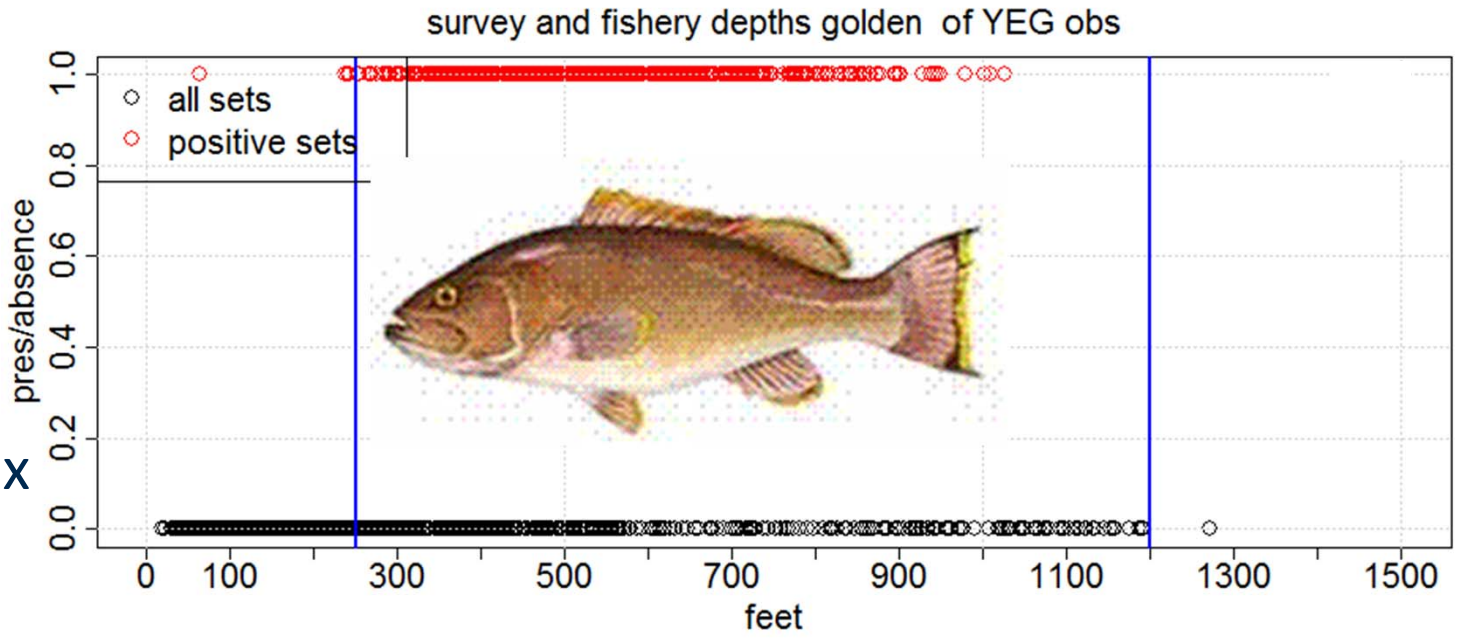


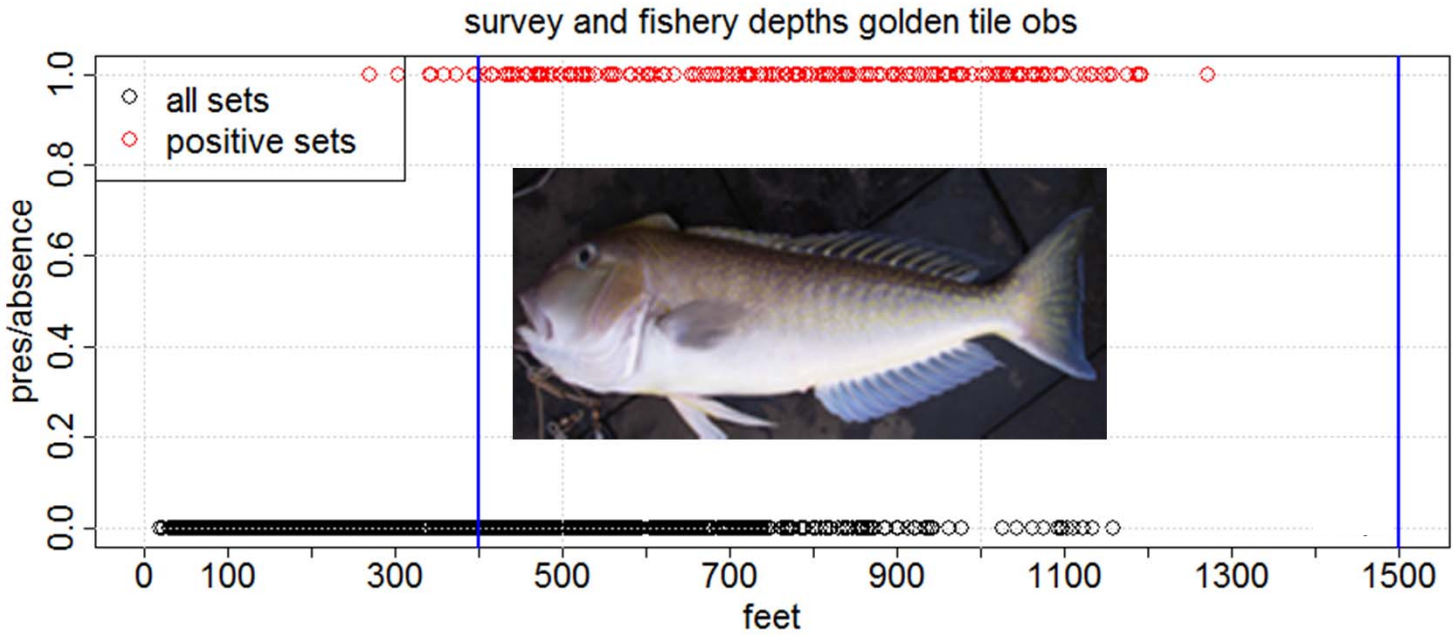
Habitat and yellowedge grouper and tilefish

Estimates of the total portion of the Gulf of Mexico inhabited by tilefish have not been developed, but the optimal areas are limited by depth, temperature, and bottom type (Grimes et al. 1980, 1986; Grossman et al.

Matlock et al. 1991
Grimes et al 1980, 1982, 1986

Min and Max observed depths in GOM





DATA: Gulf of Mexico Sediment Atlas

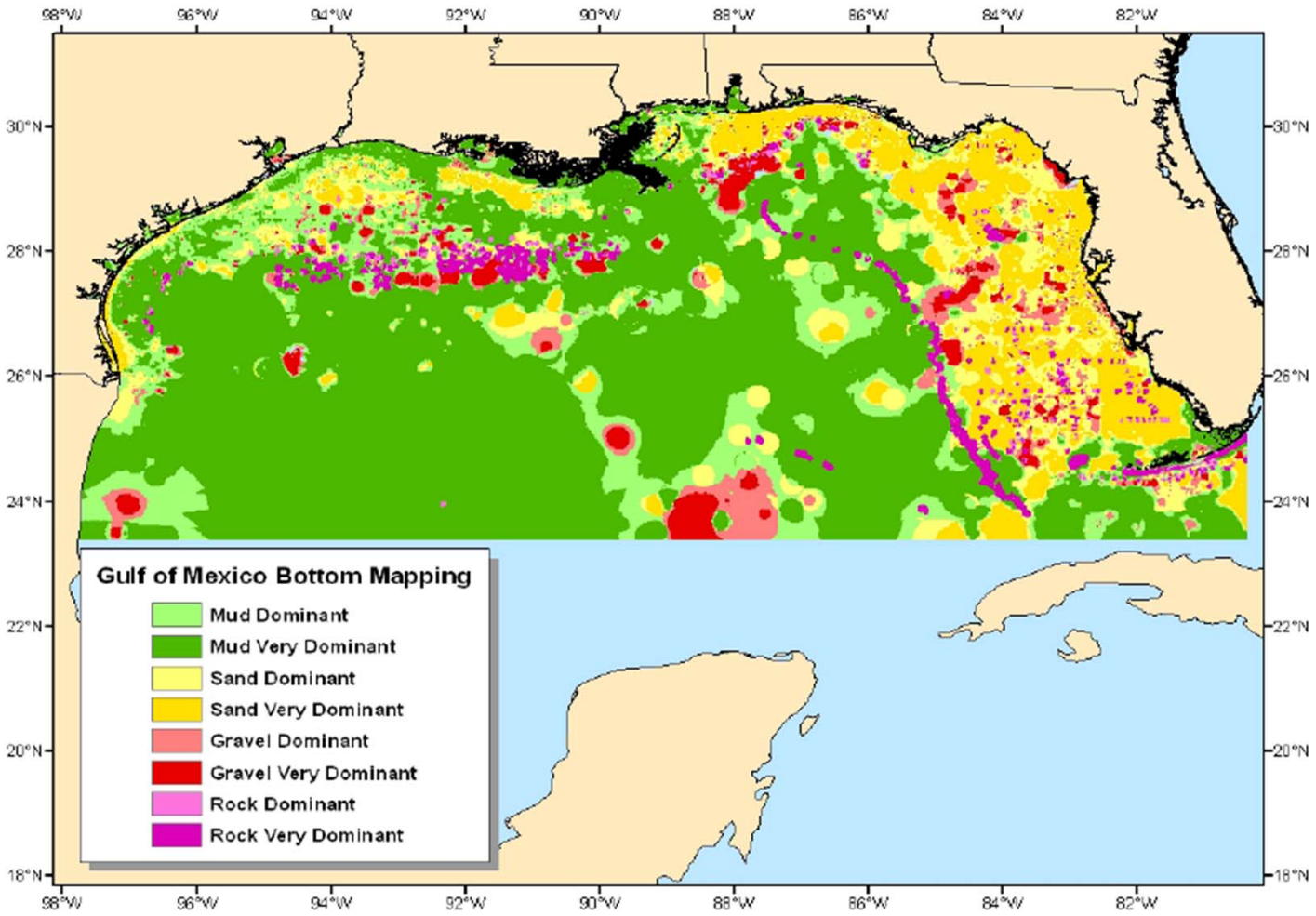
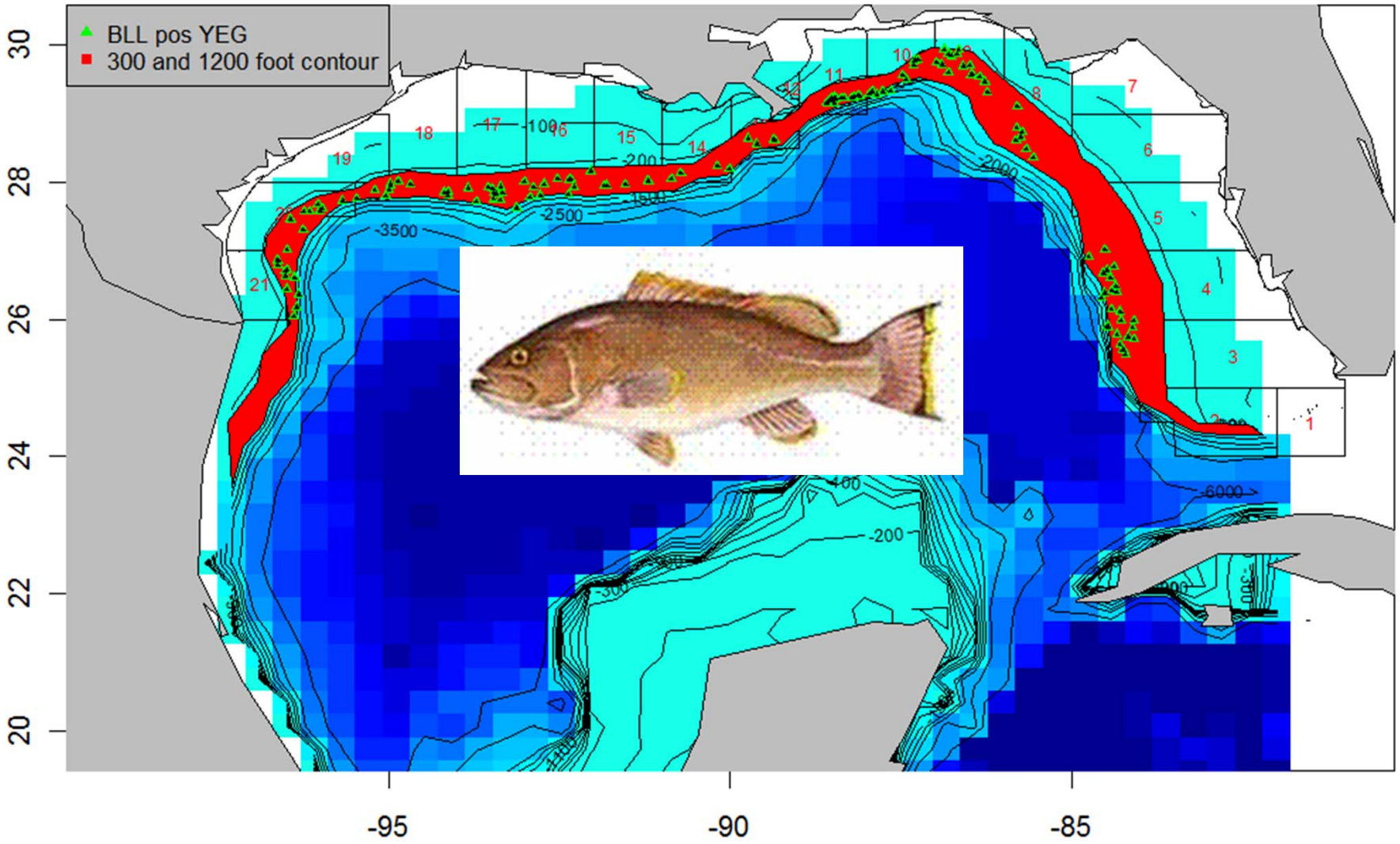


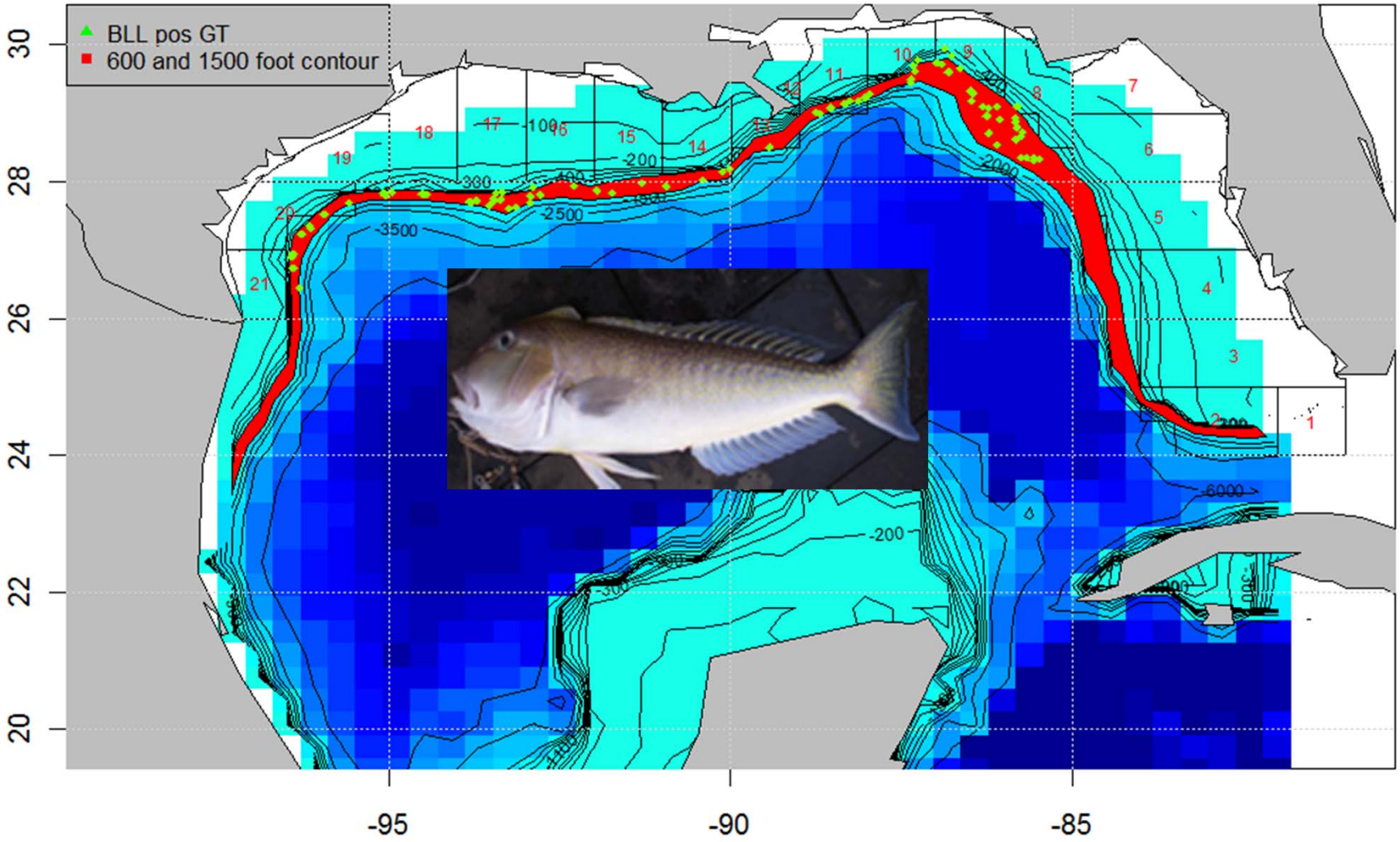
Figure 3. A summary graphic for the major texturally-defined substrates regions in the northern Gulf of Mexico. The dominance map shows which substrate texture is abundant (>30%) or dominant (>66%) through a stack of four grids: rock (purple), gravel (red), sand (yellow), and mud (green) grids. The colored 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

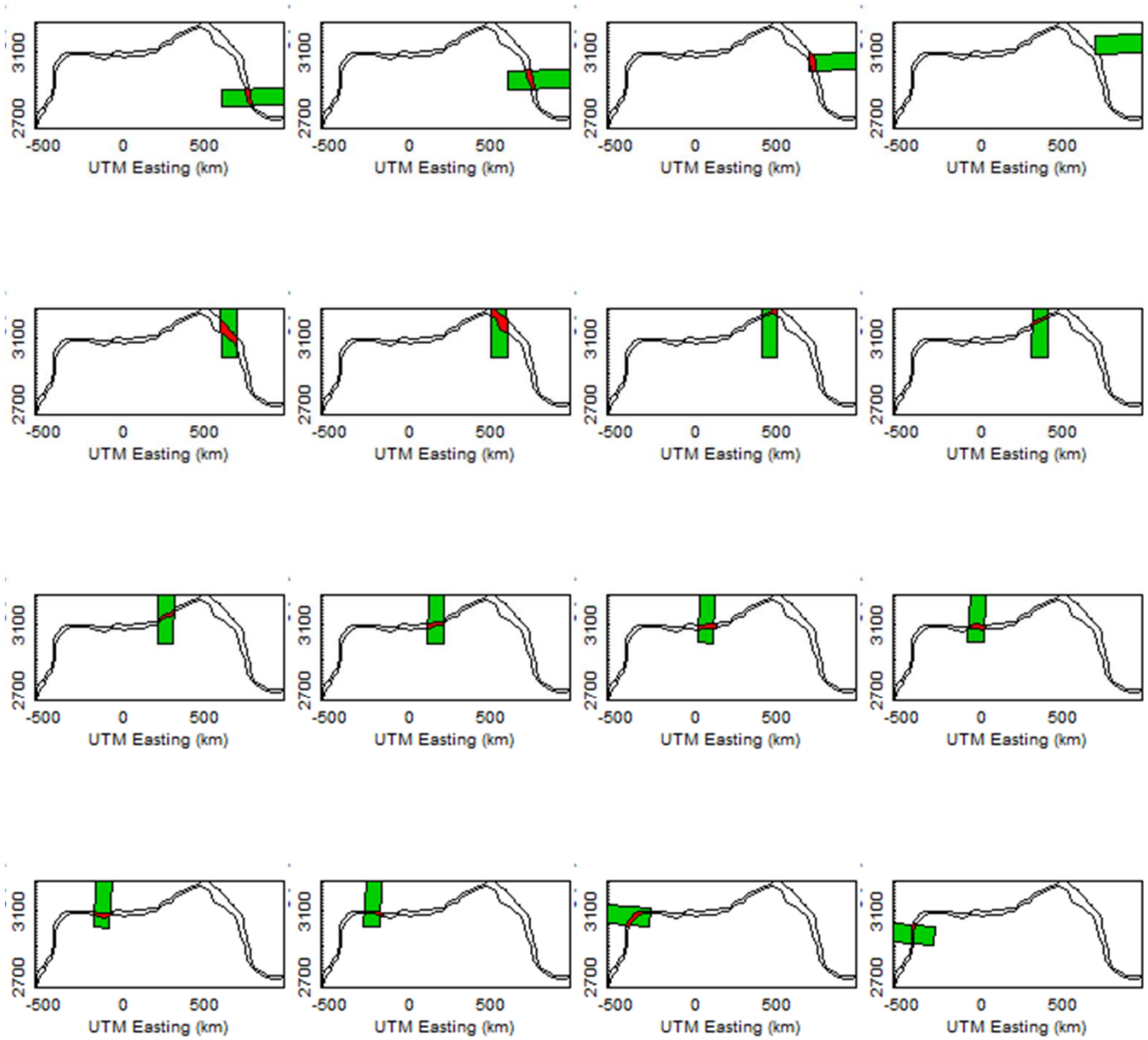
YEG habitat delineation based upon 300 and 1200 ft contours



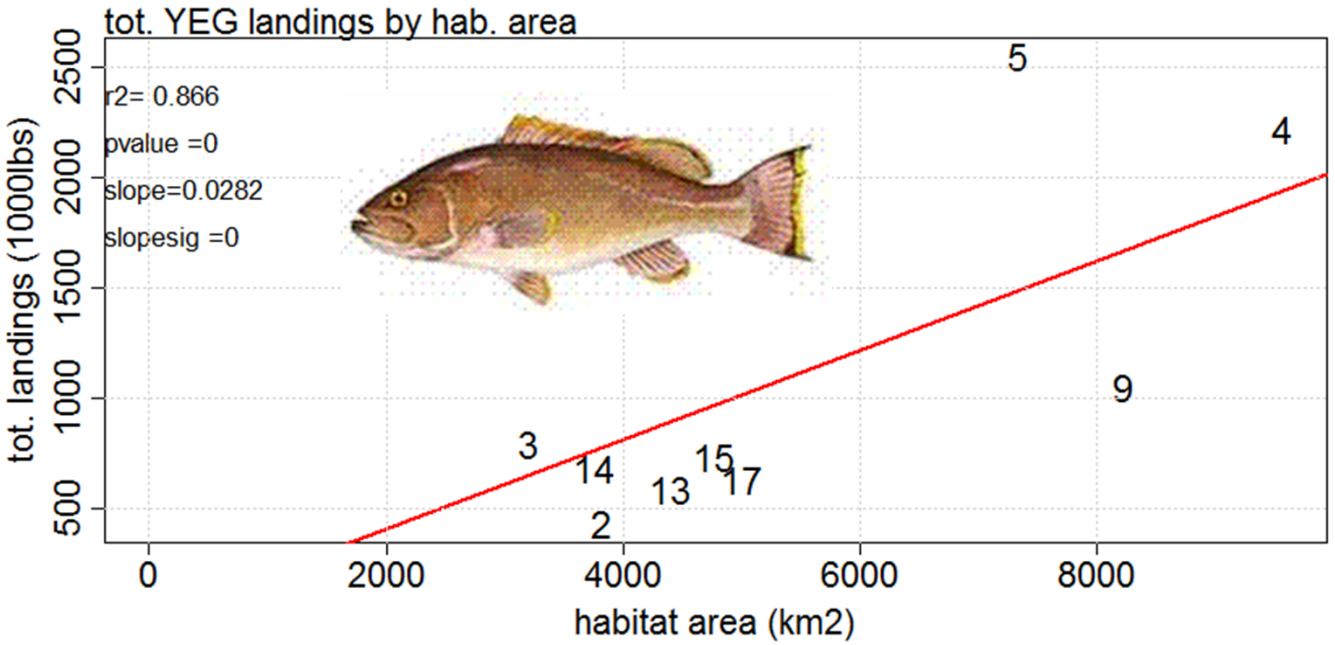
Golden tilefish habitat delineation based upon 300 and 1500 ft contours

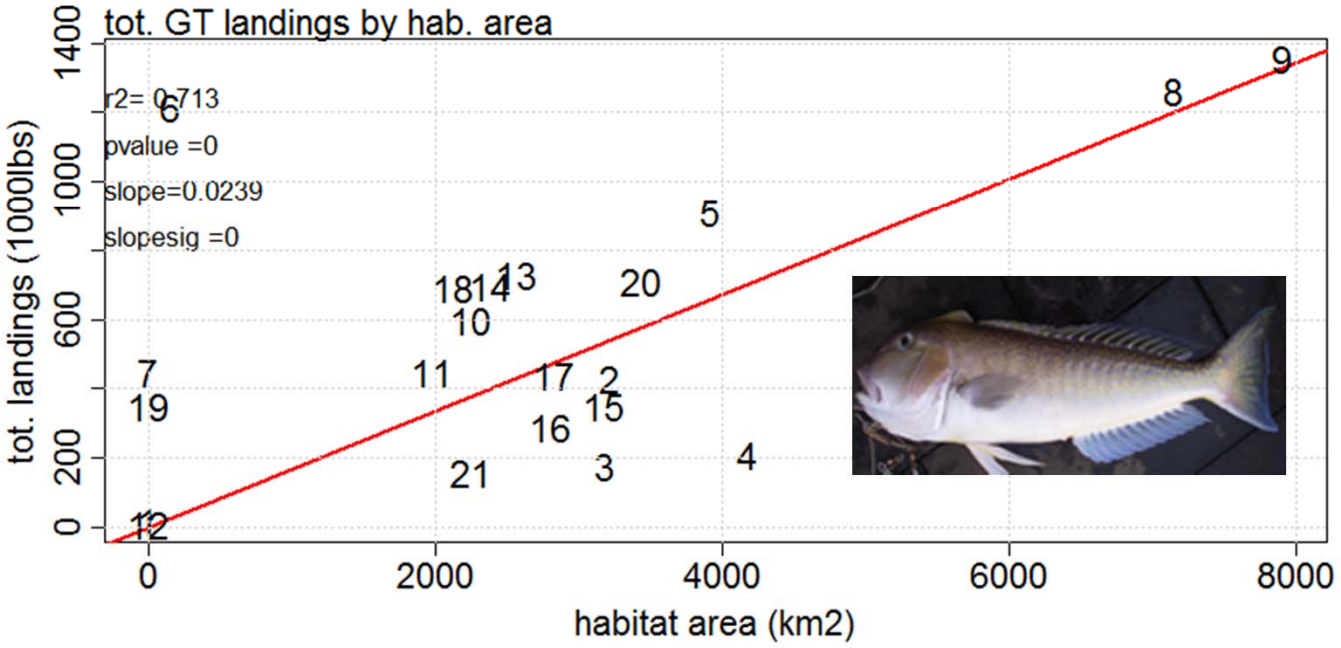


Intersection of depth contours and stat zones.



Average landings by depth-binned area by statistical zone





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tilefish logistic regression

model chosen with stepAIC {MASS}
Data split in 1/2

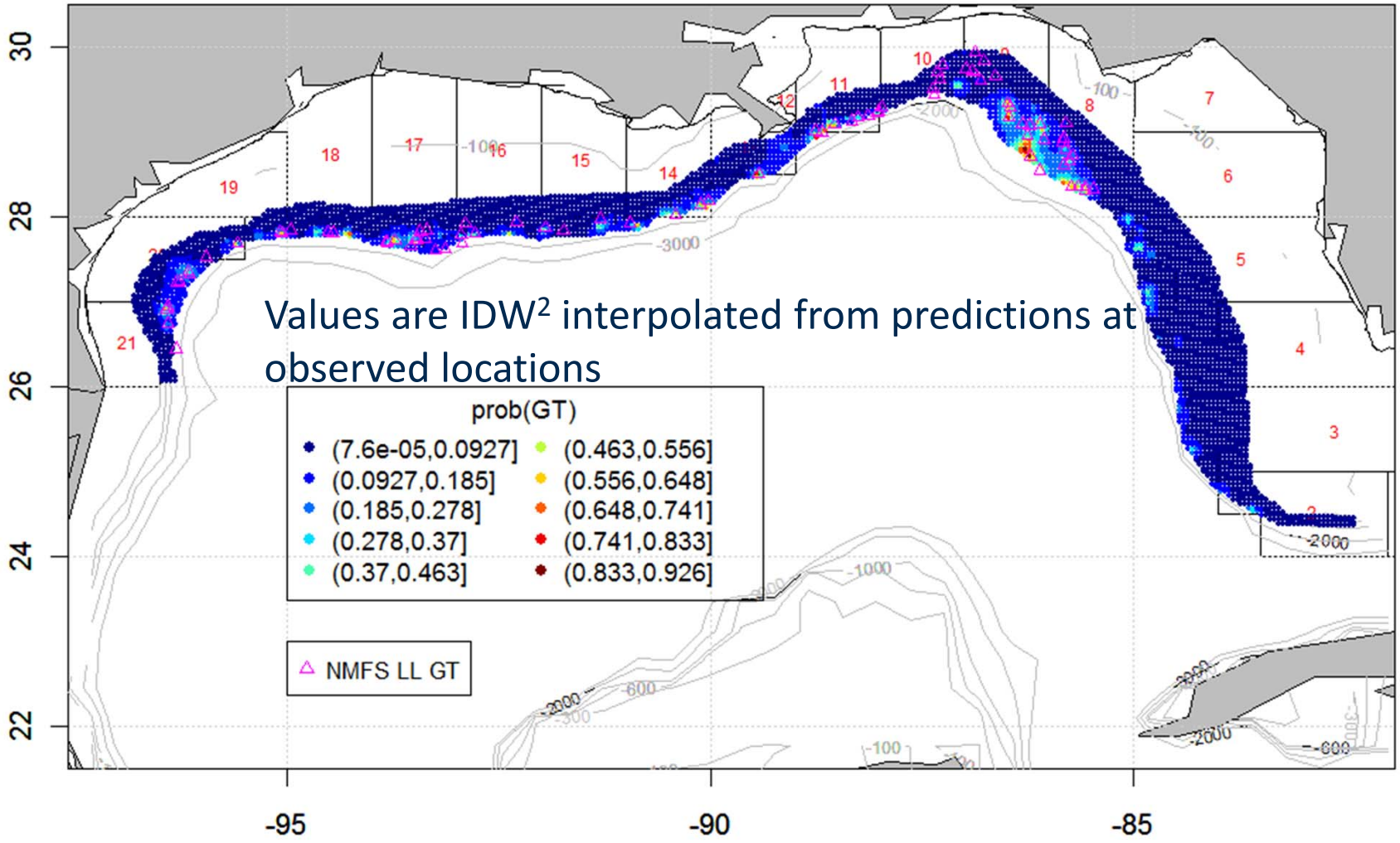
Initial Model: P/A ~ PWAVEVEL + FISHINGDEPTH + GRAVEL + SAND + MUD + CLAY + GRAINSZE + SORTING + CARBONATE + ORGCARBN + LSHEARSTR + POROSITY + ROUGHNESS + LCRITSHSTRS

Final Model: P/A ~ PWAVEVEL + FISHINGDEPTH + SAND + MUD + ORGCARBN

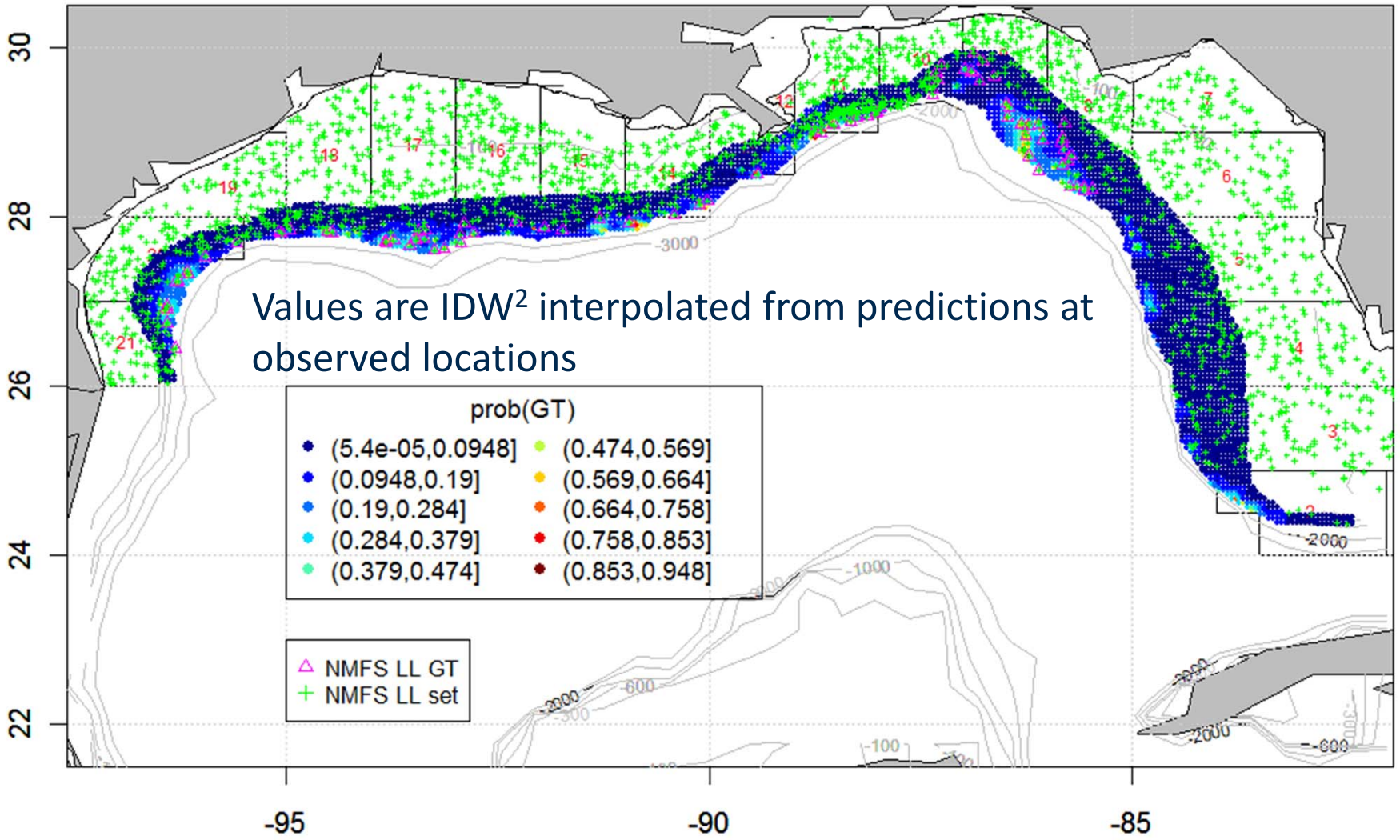
SORTING- Phi grainsize dispersion;
PWAVEVEL- Compressional wave velocity
ROUGHNESS- Vert:Horz. Ratio (rugosity) of the roughness element
LCRITSHSTRS- Critical Shear Stress is a measure of the erodability of materials, the lower the value the more erodible it is.

Null deviance/Residual deviance = 51% unexplained variance

logistic regression predicted prob of golden tilefish



Caveat: not all locations have been sampled



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YEG logistic regression

model chosen with stepAIC {MASS}

Final Model:

YEG.P.A ~ FISHINGDEPTH + GRAVEL + CLAY + GRAINSZE + CARBONATE + LSHEARSTR + LCRITSHSTRS + factor(EW)

SORTING- Phi grainsize dispersion;
PWAVEVEL- Compressional wave velocity
ROUGHNESS- Vert:Horz. Ratio (rugosity) of the roughness element
LCRITSHSTRS- Critical Shear Stress is a measure of the erodability of materials, the lower the value the more erodible it is.
EW- east or west of Miss. River

Null deviance/Residual deviance = 77% unexplained variance

logistic regression predicted prob of YEG