Science, Service, Stewardship

Impacts of re-estimates on SEFSC stock assessments

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SEFSC
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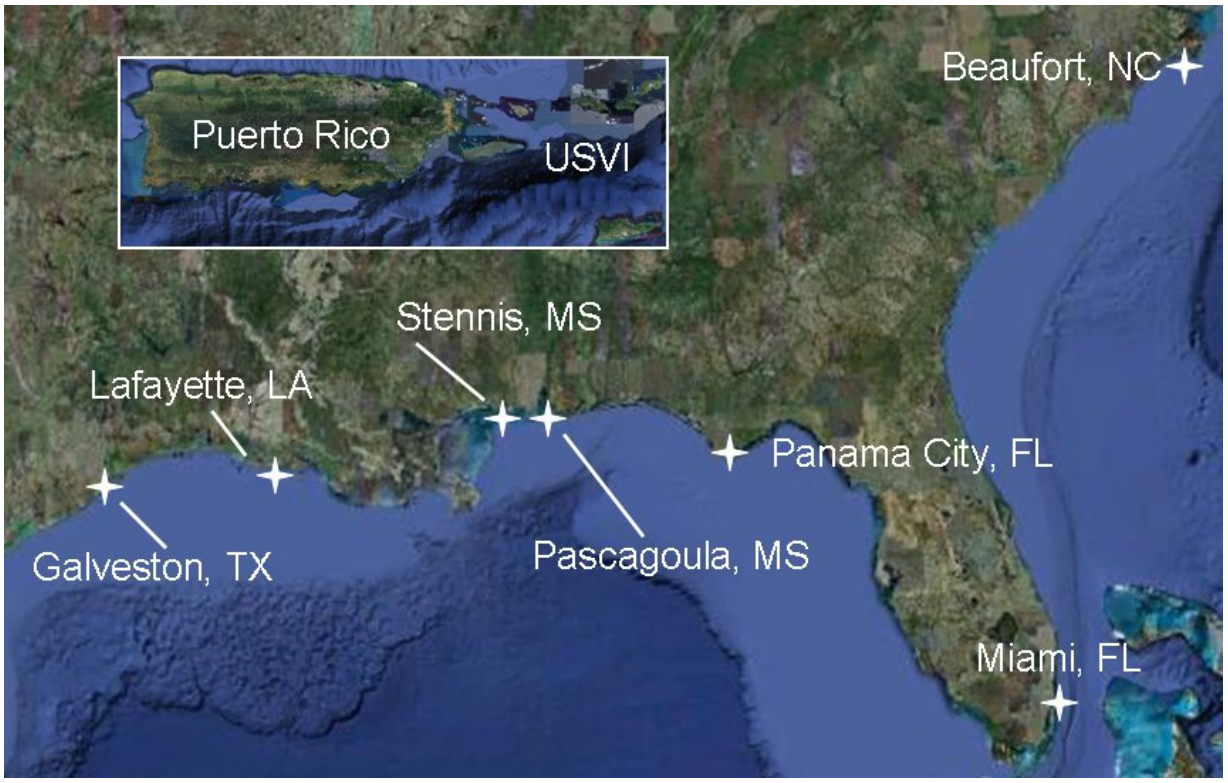
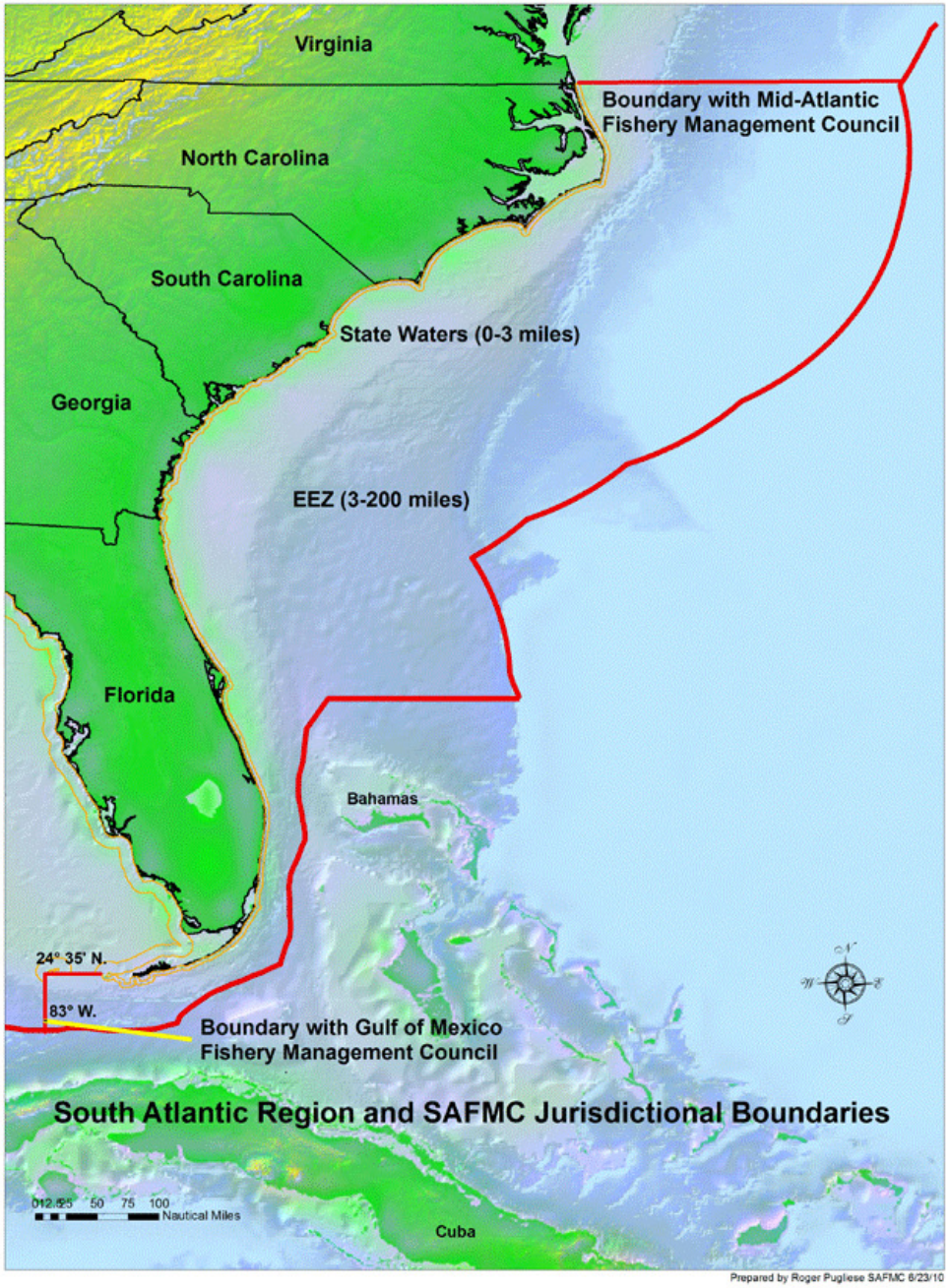
SEFSC provides stock assessment analyses for:

- South Atlantic Fisheries Management Council (**SAFMC**)
- Caribbean Fisheries Management Council (**CFMC**)
- Gulf of Mexico Fisheries Management Council (**GMFMC**)
- International Commission for the Conservation of Atlantic Tunas (**ICCAT**)
- Highly Migratory Species (**HMS**) - sharks



<u>Species in FMPs</u>

SAFMC has 93
CFMC has 85
GMFMC has 70
ICCAT has 12
HMS has 11 sharks



SAFMC Assessed Species

Spanish Mackerel - Atlantic Group
Cobia
Tilefish
Black Sea Bass
Red Snapper
Red Grouper
Black Grouper
Vermilion Snapper
Greater Amberjack
King Mackerel - Atlantic Group
Mutton Snapper
Gag
Red Porgy
Snowy Grouper
Hogfish
Yellowtail Snapper
Wreckfish
Speckled Hind
Warsaw Grouper
White Grunt
Gray Triggerfish
Dolphin
Wahoo

**Stocks listed in order of time since last stock assessment*
***Shading indicates assessments are 10+ years old*

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SAFMC Assessed Species

Stock	Recreational
Spanish Mackerel - Atlantic Group	48%
Cobia	95%
Tilefish	32%
Black Sea Bass	57%
Red Snapper	72%
Red Grouper	55%
Black Grouper	64%
Vermilion Snapper	44%
Greater Amberjack	59%
King Mackerel - Atlantic Group	52%
Mutton Snapper	64%
Gag	49%
Red Porgy	58%
Snowy Grouper	11%
Hogfish	74%
Yellowtail Snapper	60%

** Rough estimates, computed for different years and different metrics (e.g. numbers or weight)*

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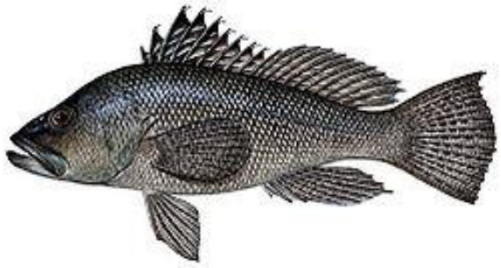
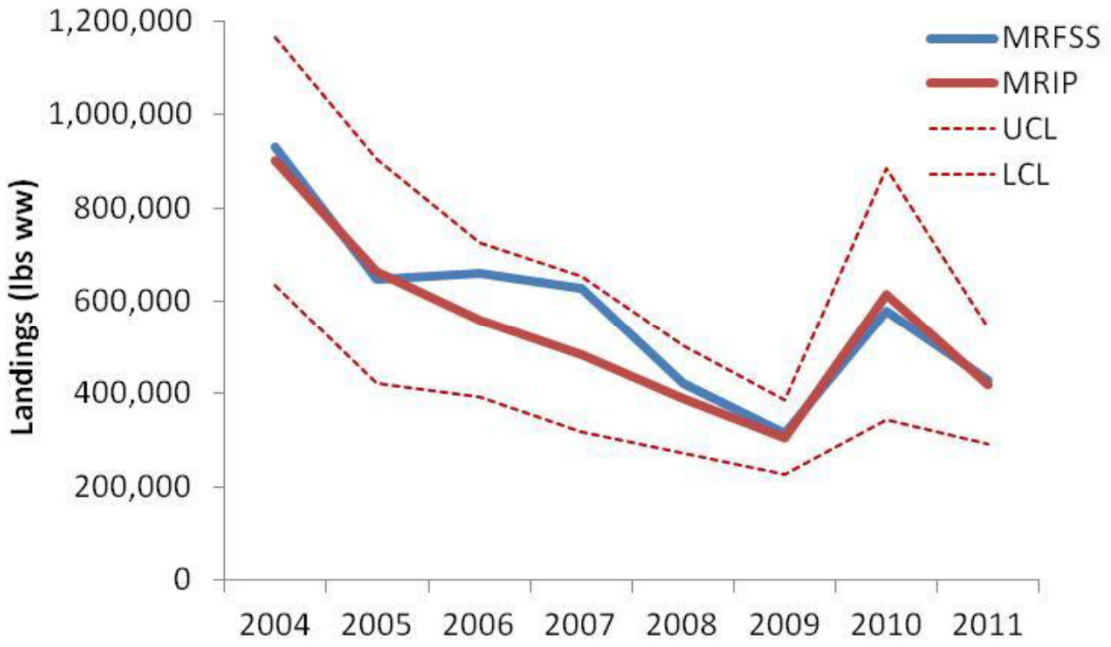
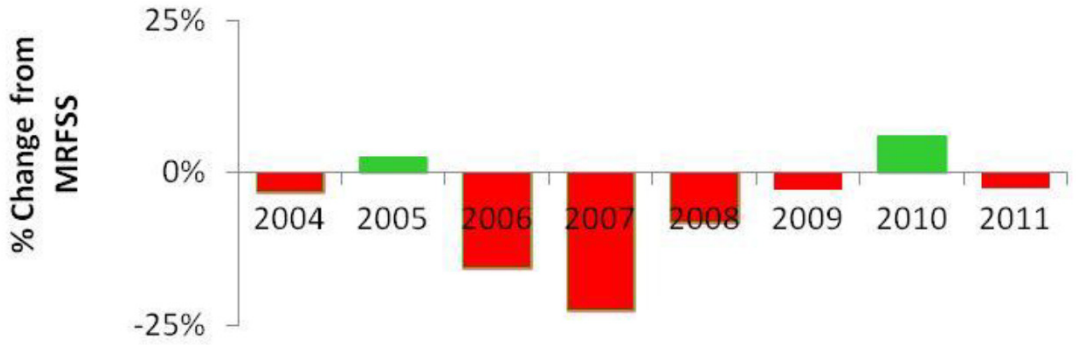


Black Sea Bass





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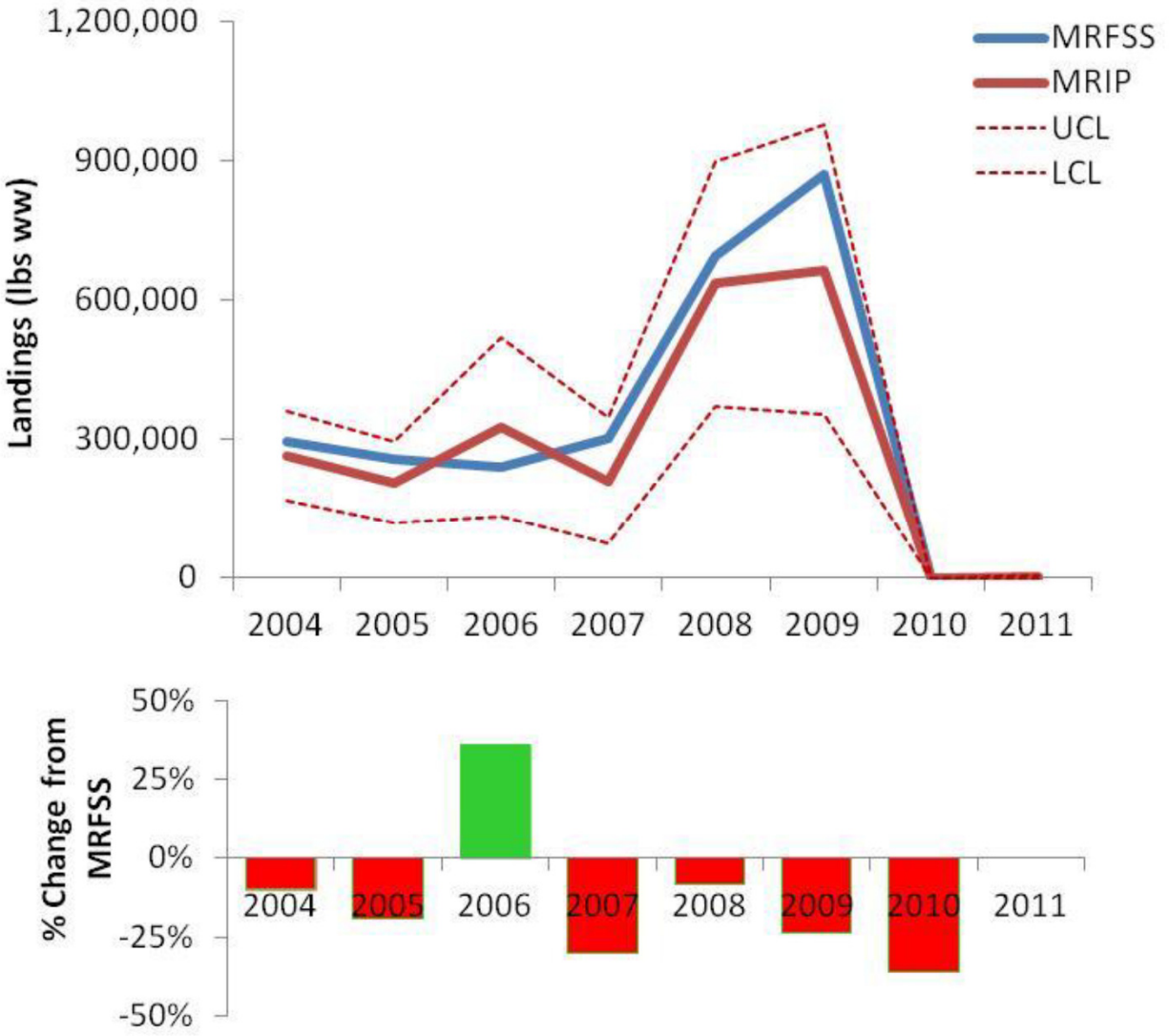
Red Snapper



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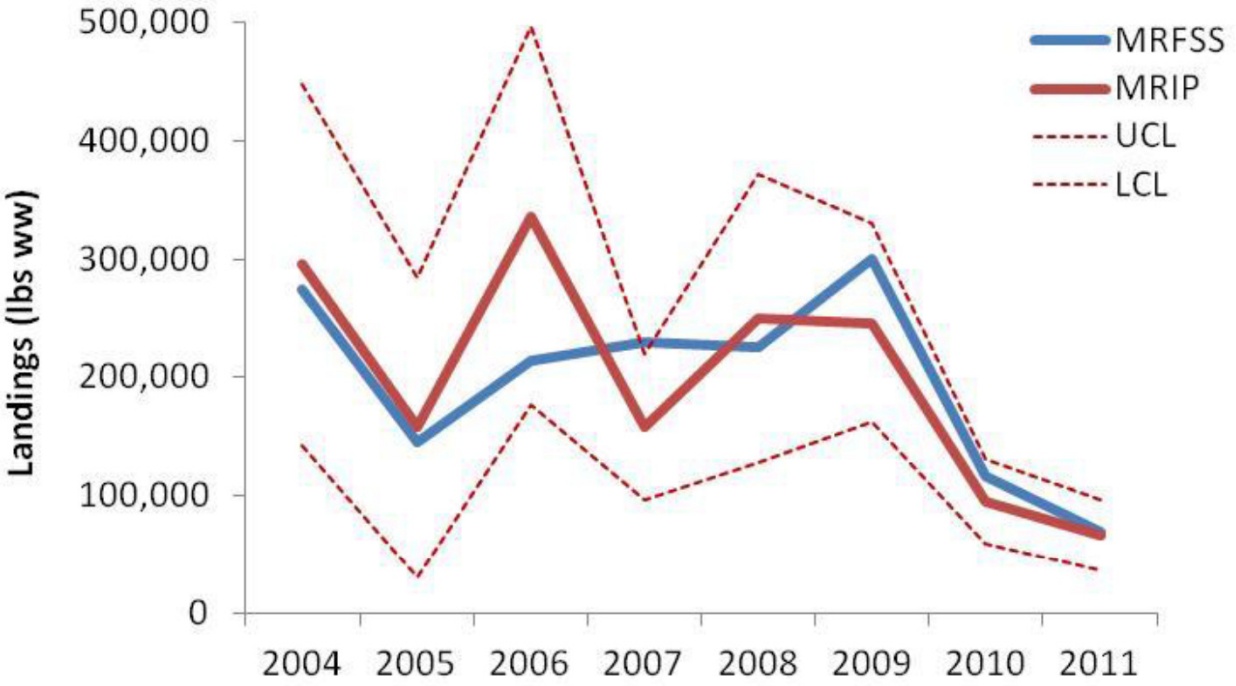
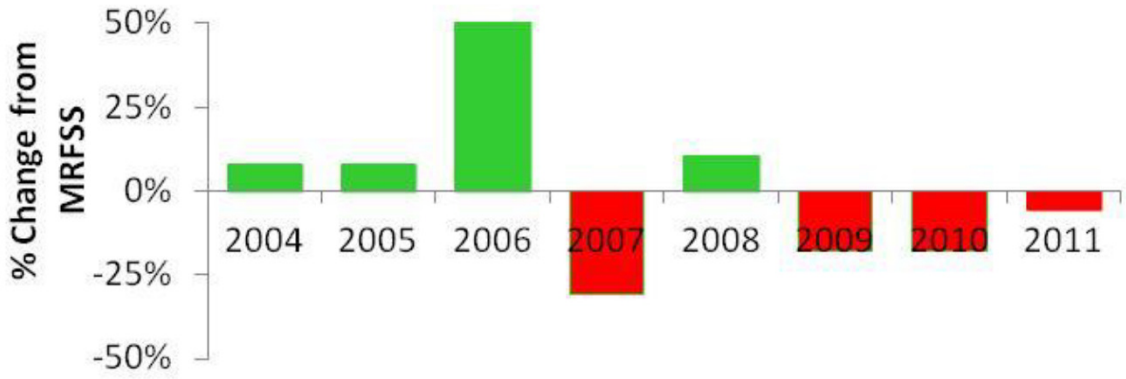
Vermilion Snapper





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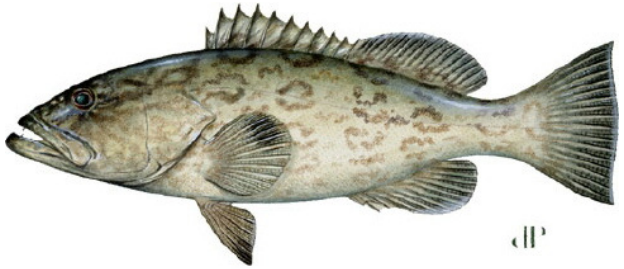
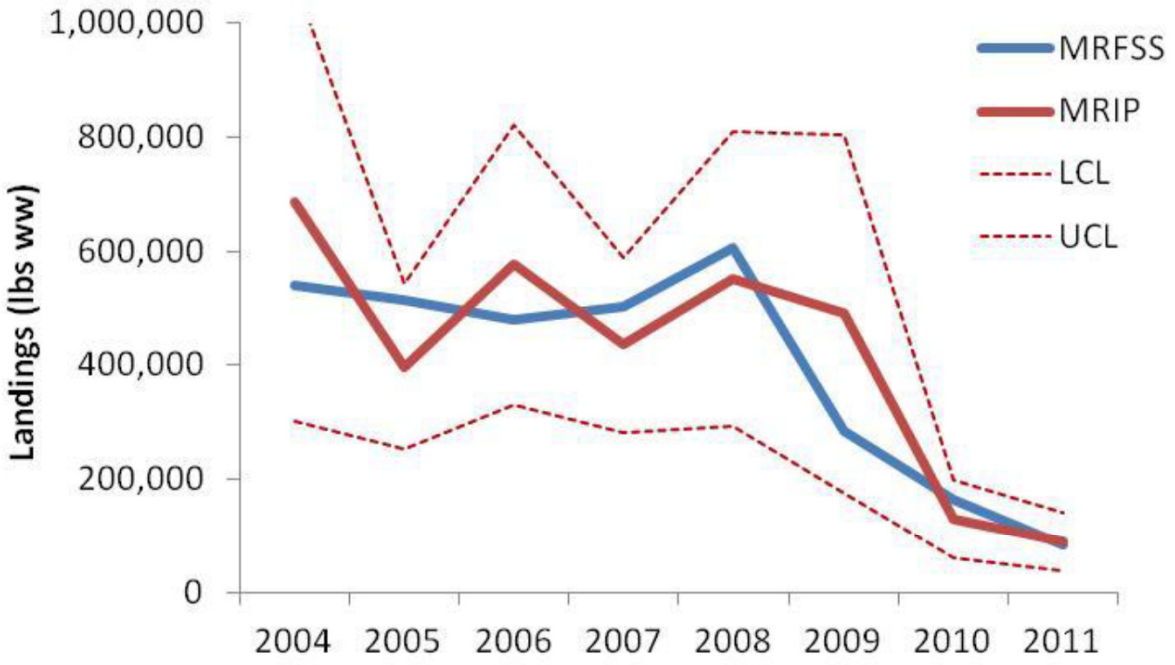
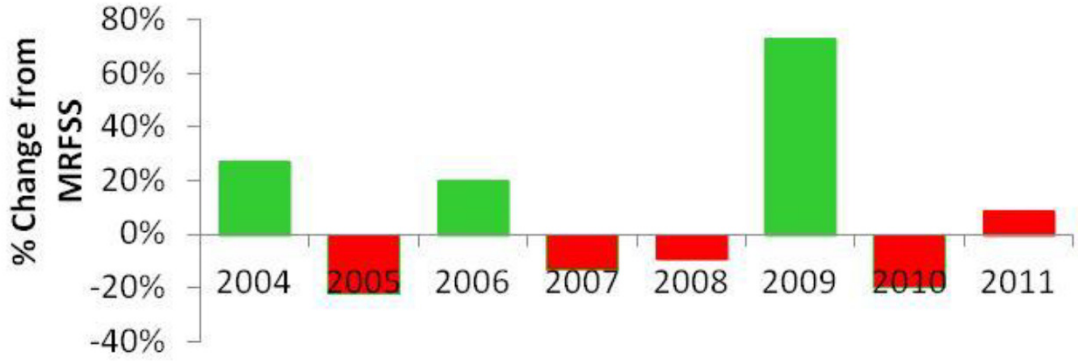


Gag





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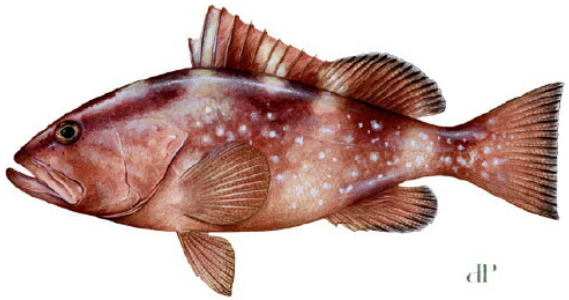
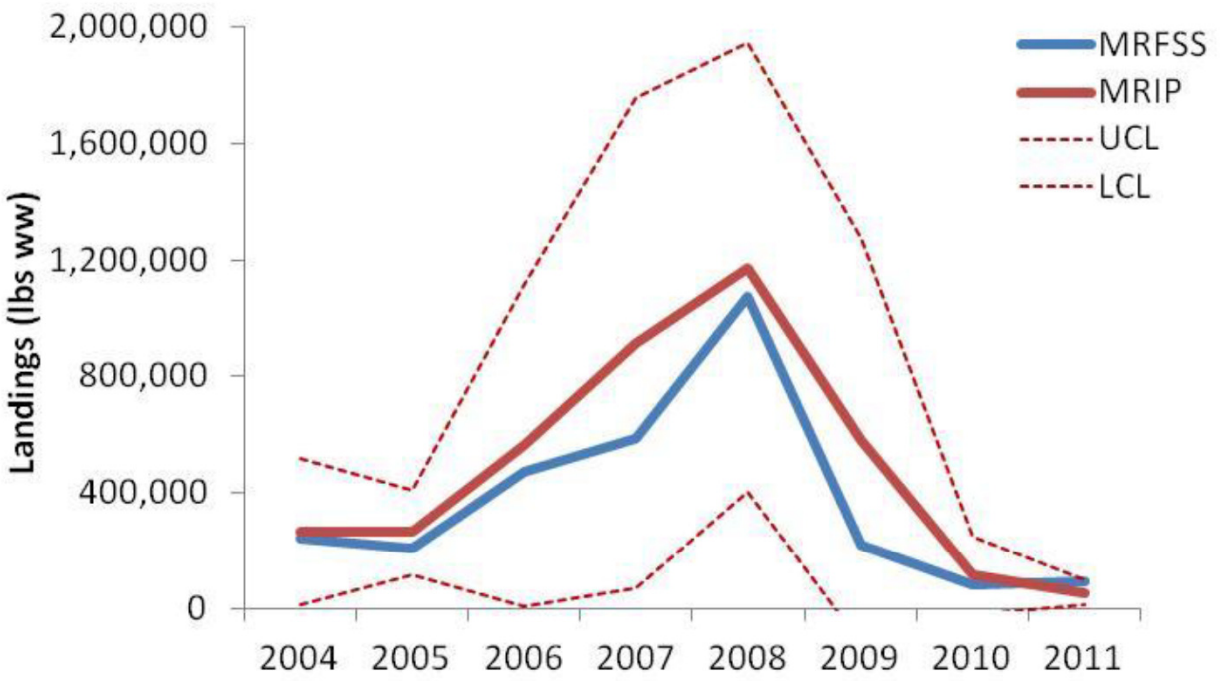
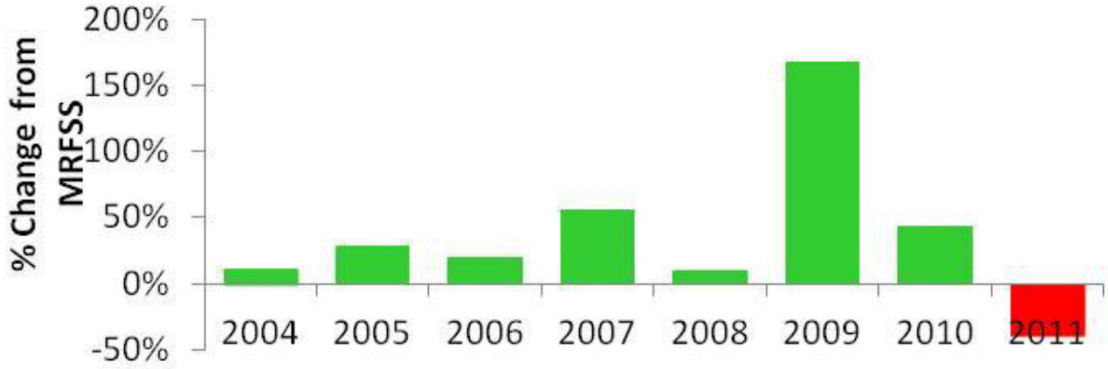


Red Grouper





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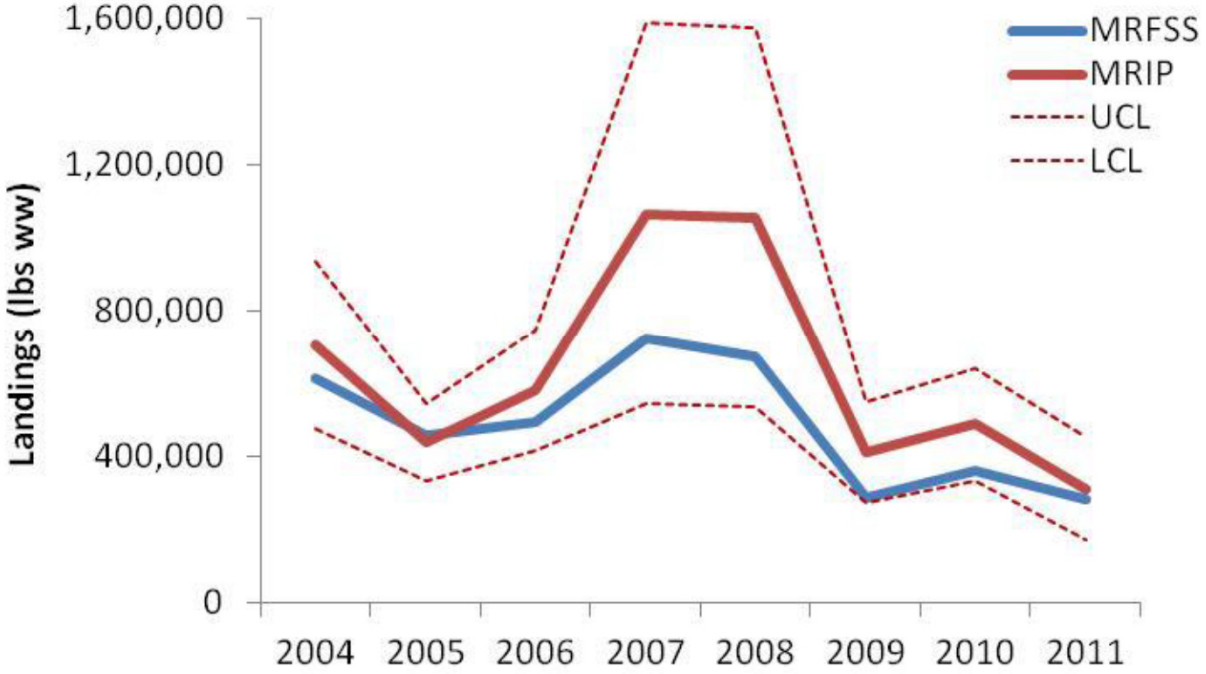
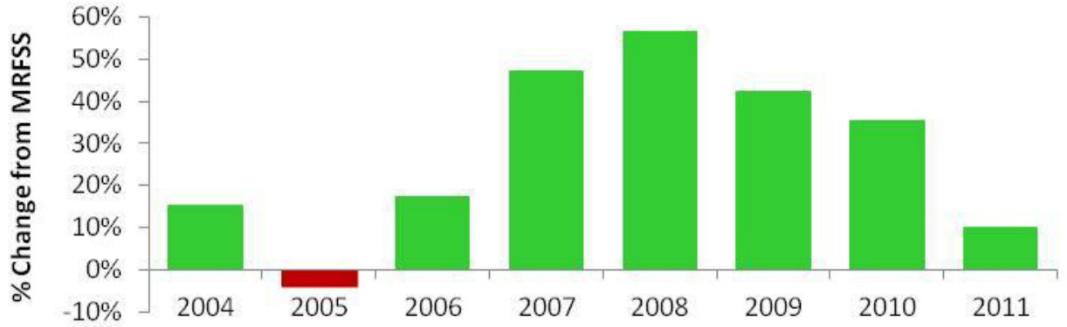
Yellowtail Snapper





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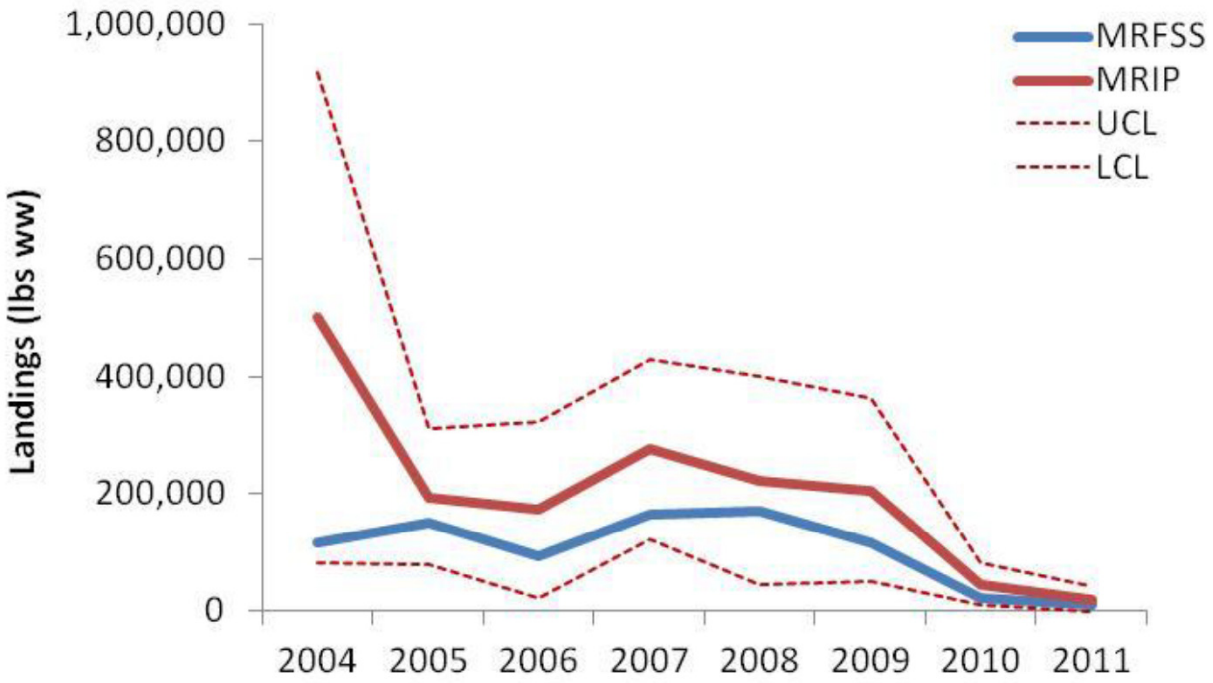
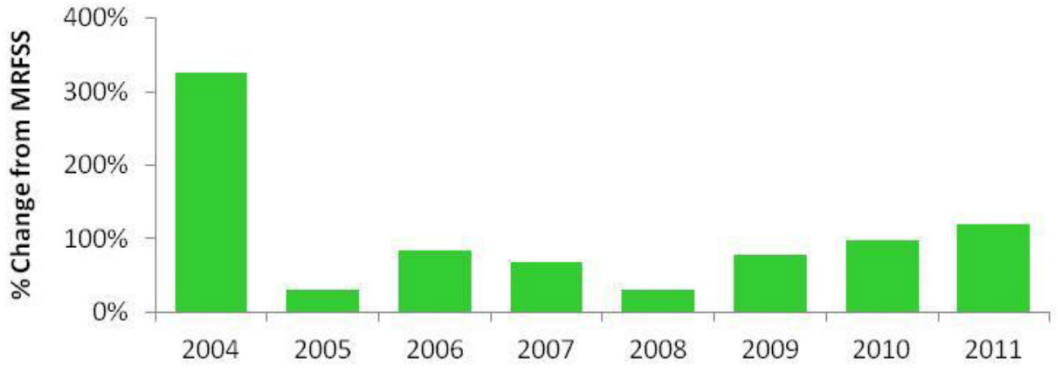
Black Grouper





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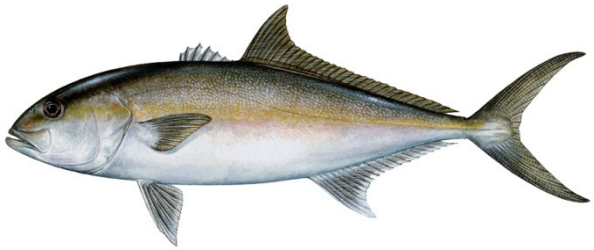
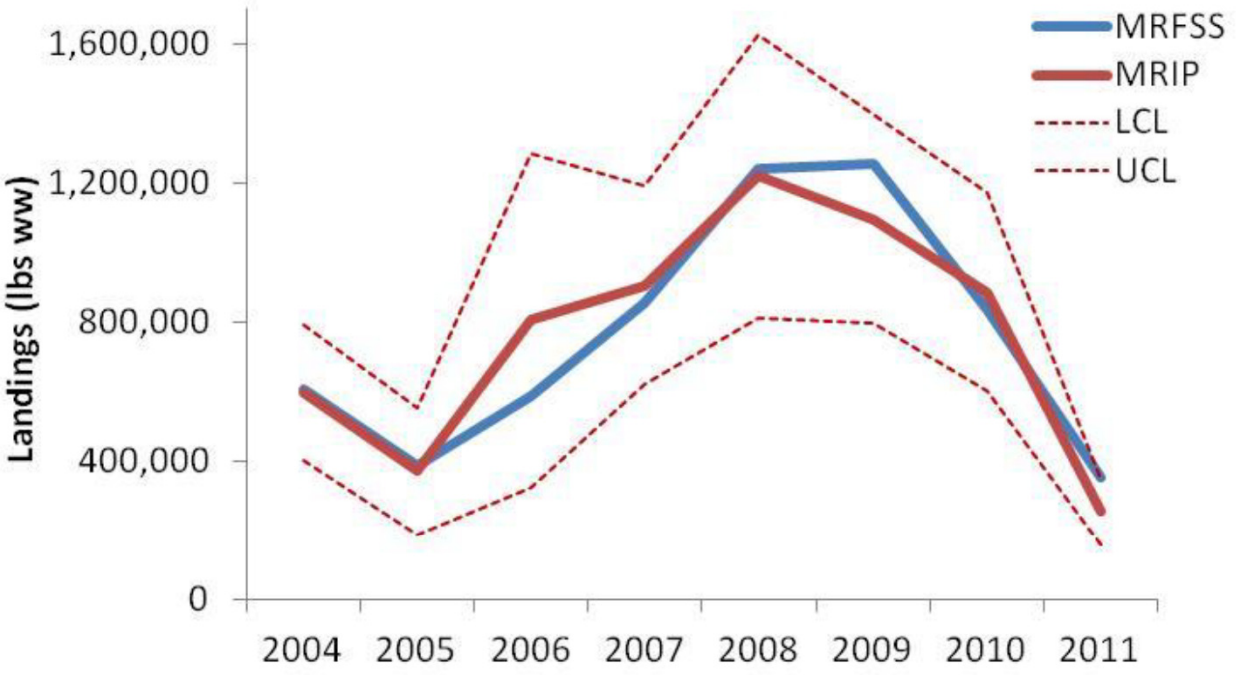
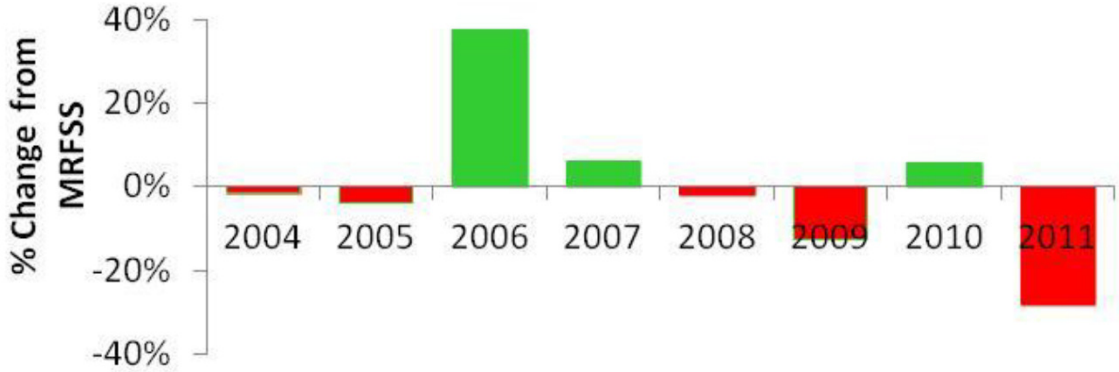


Greater Amberjack





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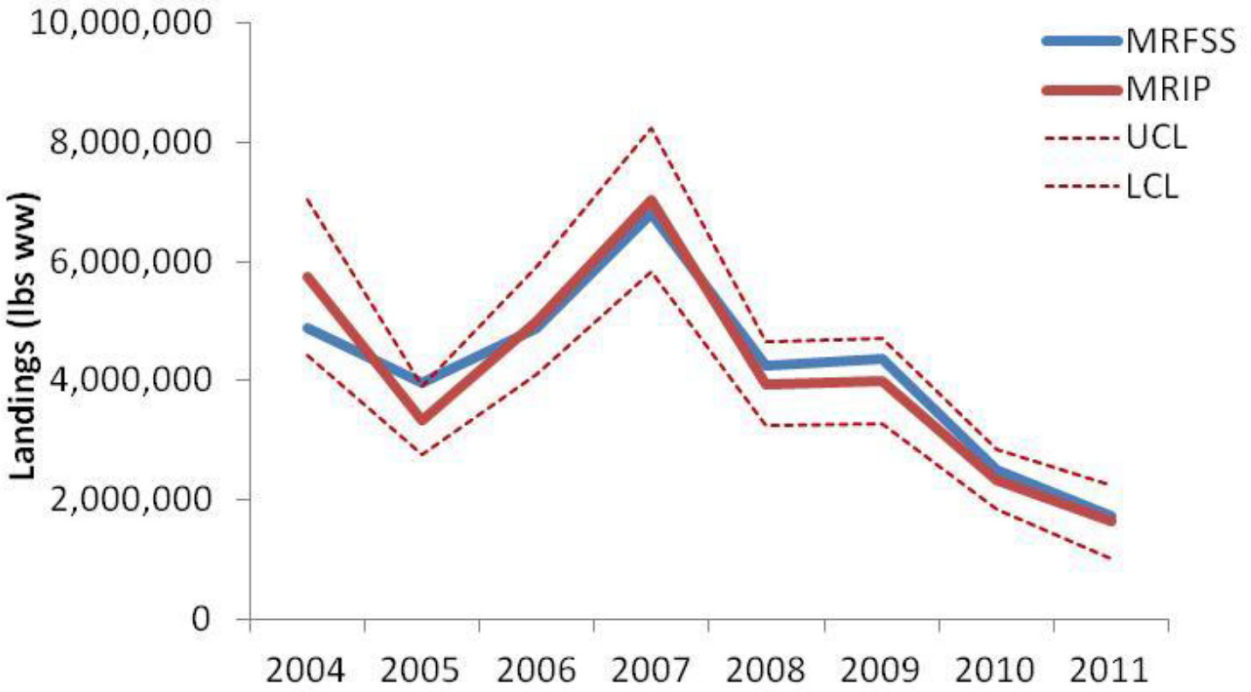
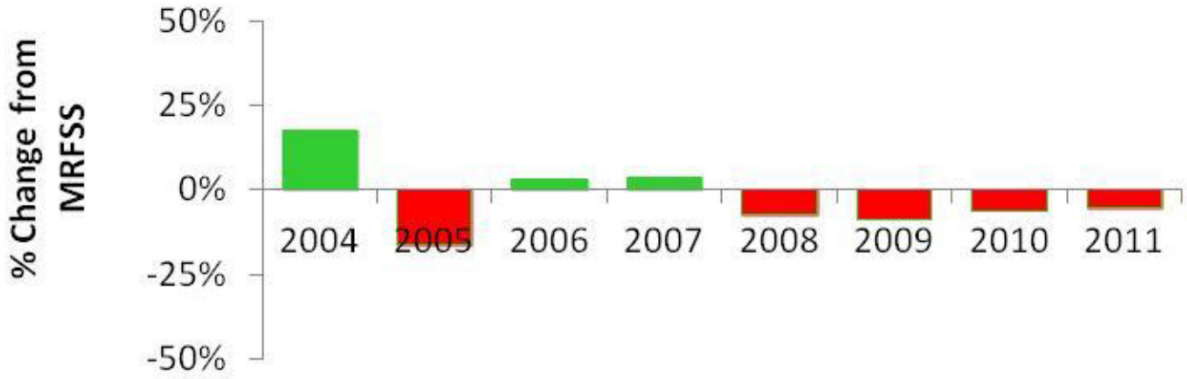
King Mackerel





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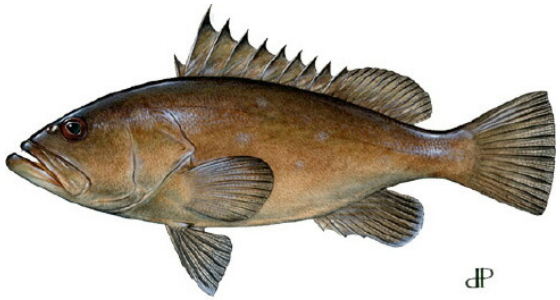
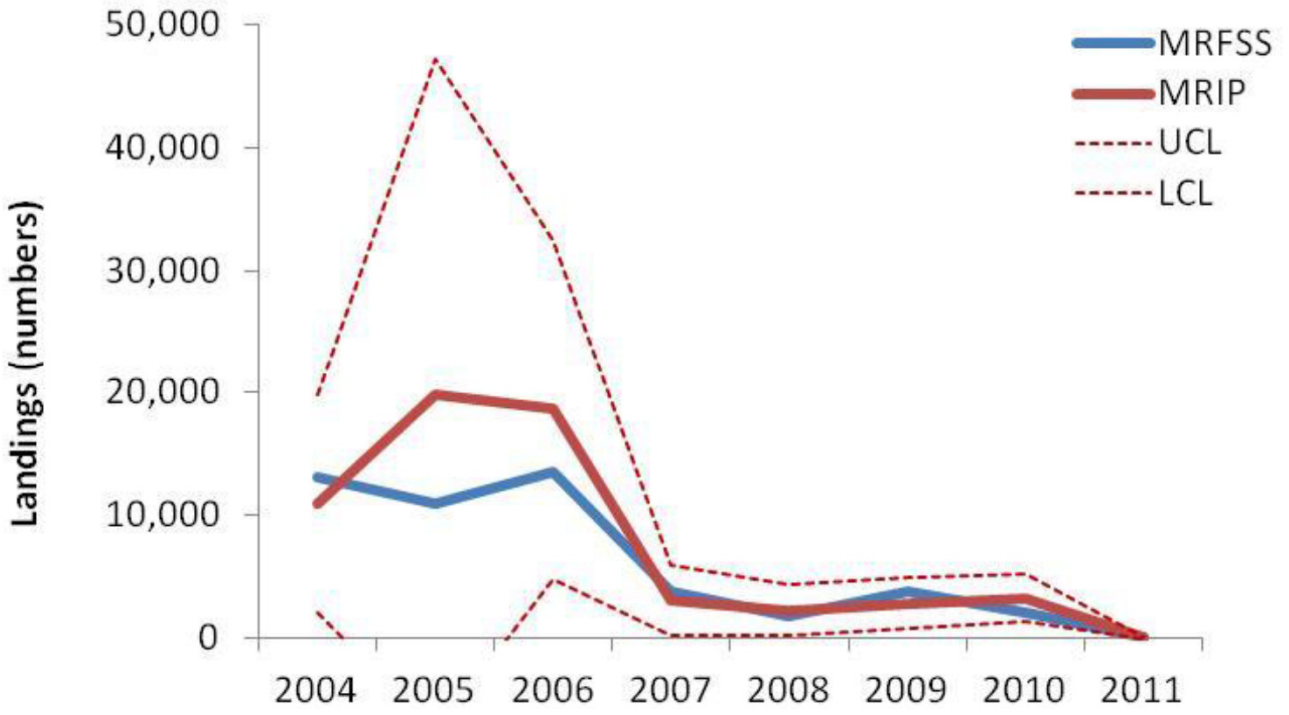
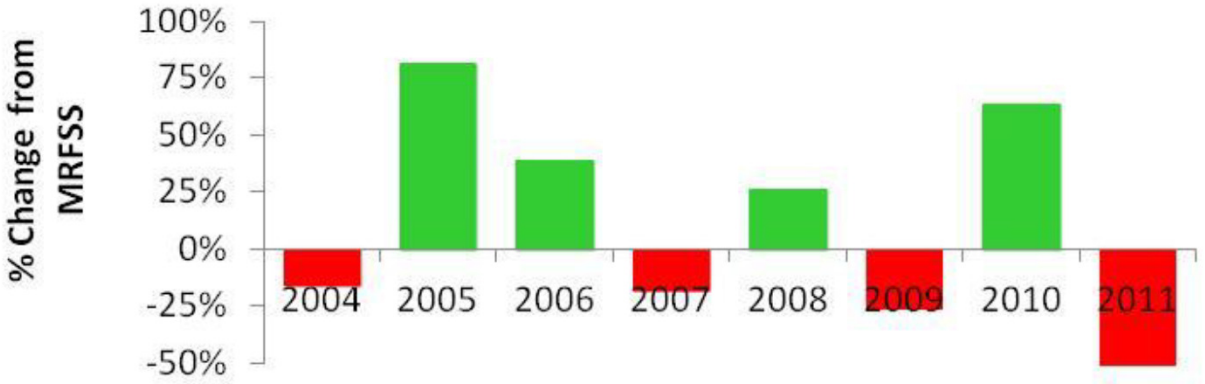


Snowy Grouper





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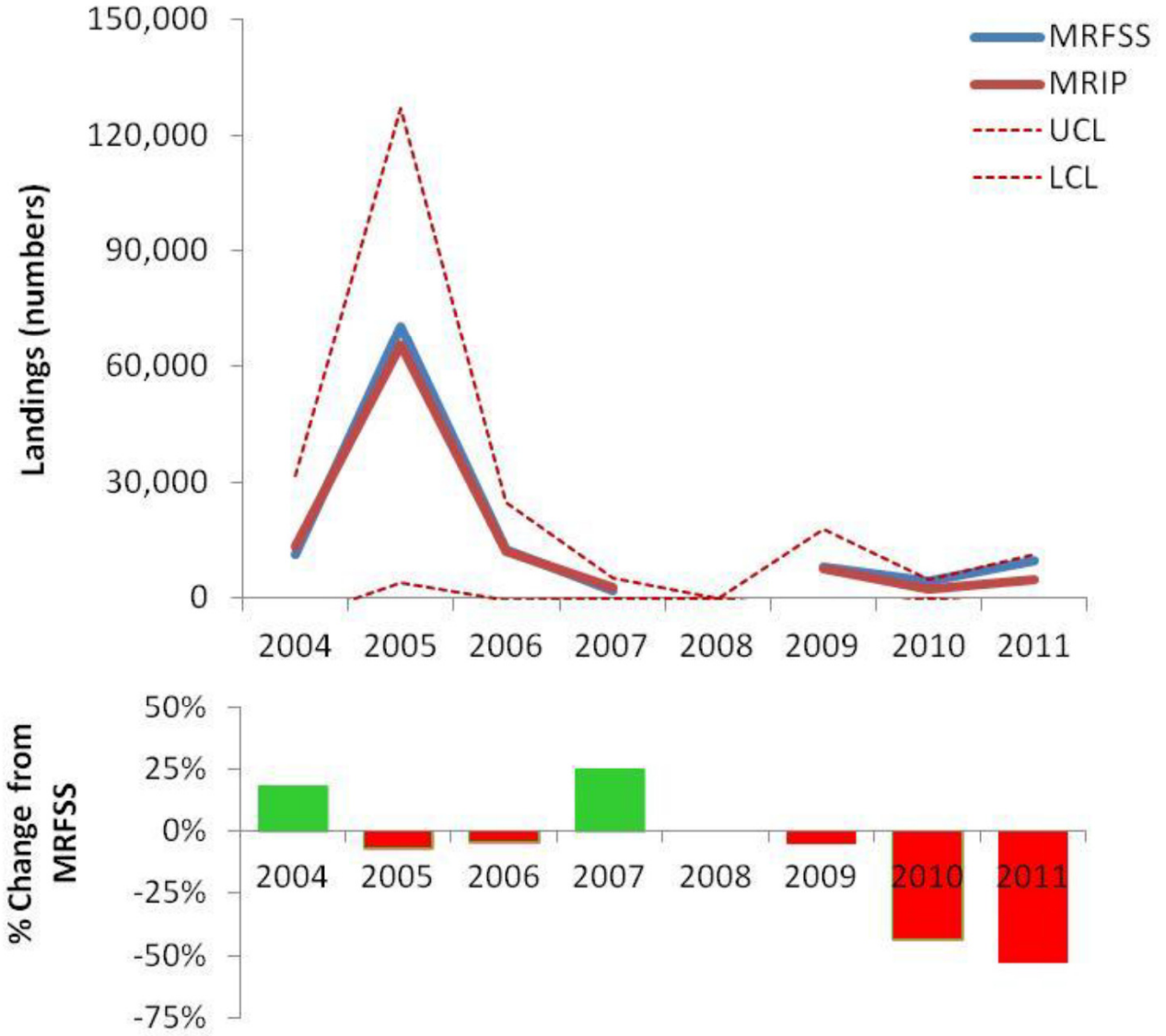
Tilefish



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SAFMC Assessed Species

MRFSS indices of abundance

Methods used:
- Nominal catch/effort
- Standardized with GLM

Generally not the most influential index in the stock assessment model.

Stock	MRFSS Index
Spanish Mackerel - Atlantic Group	Yes
Cobia	Yes
Tilefish	No
Black Sea Bass	Yes
Red Snapper	No
Red Grouper	Yes
Black Grouper	Yes
Vermilion Snapper	Yes
Greater Amberjack	No
King Mackerel - Atlantic Group	Yes
Mutton Snapper	Yes
Gag	Yes
Red Porgy	No
Snowy Grouper	No
Hogfish	Yes
Yellowtail Snapper	Yes

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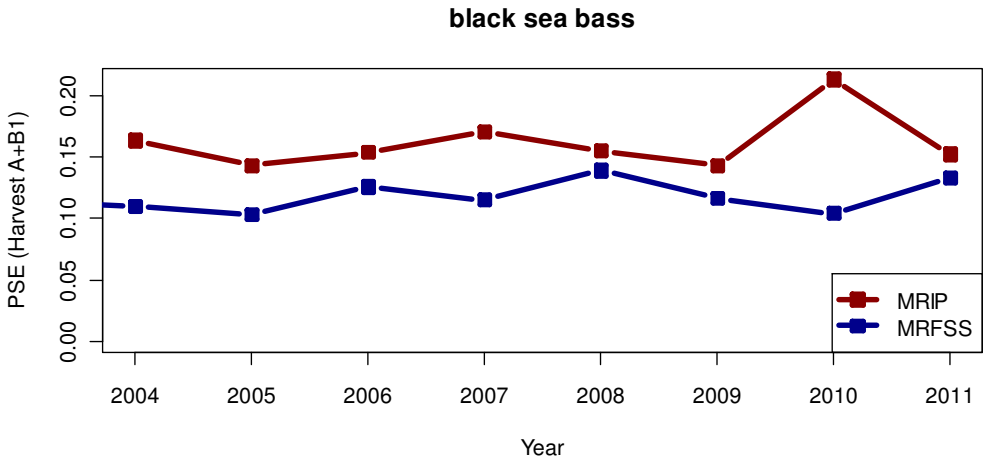
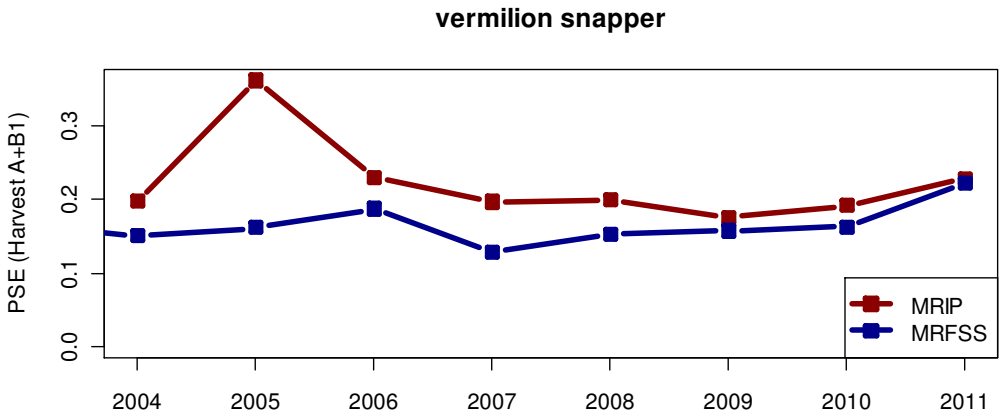
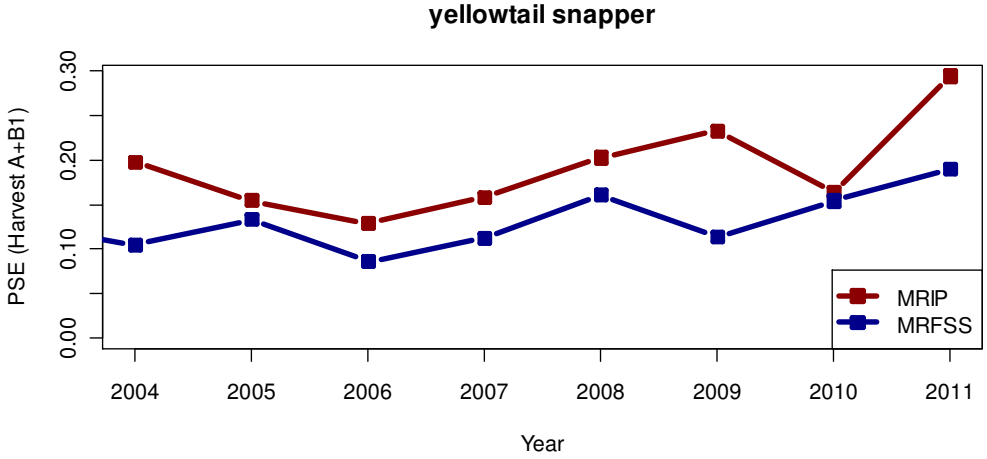
Changes in PSE estimates for SAFMC species







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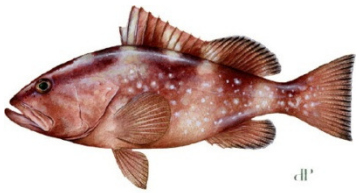
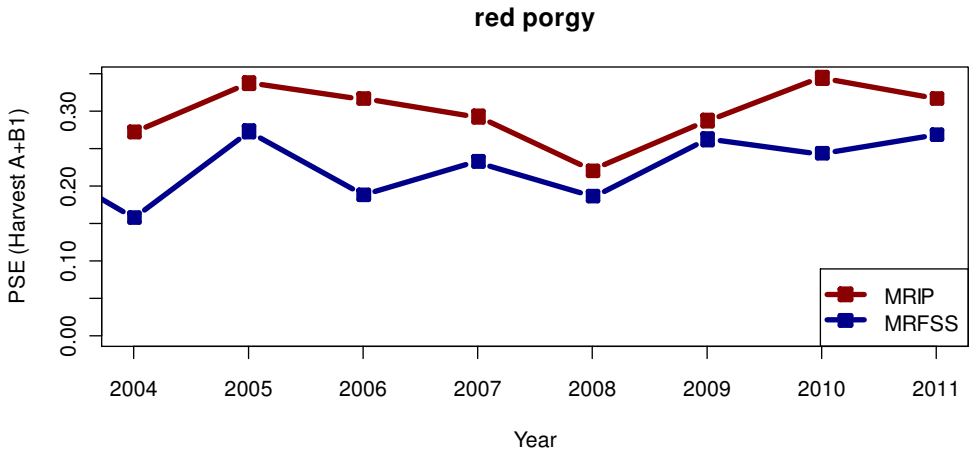
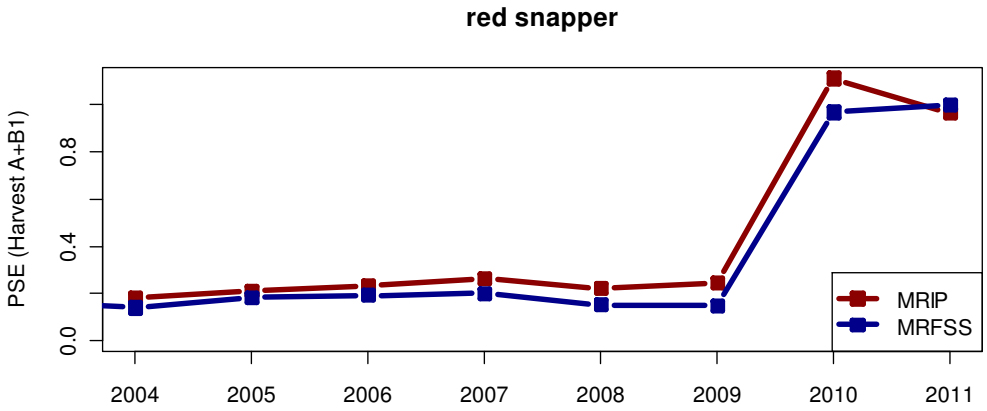
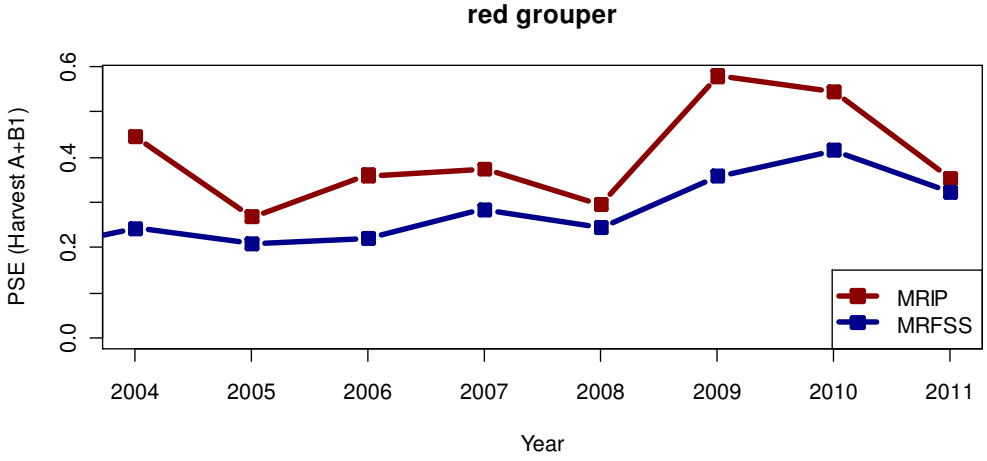
Changes in PSE estimates for SAFMC species

The Red Species









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SAFMC Stock Assessment Uncertainty

For characterizing uncertainty in SAFMC stock assessments we use a **Monte Carlo-Bootstrap (MCB)** procedure

Use a parametric bootstrap assuming lognormal error for:

- Landings time series
- Discard time series
- Indices of abundance

The error is obtained from assumed or measured values of CV for each time series

The Monte Carlo part comes in for other sources of uncertainty including, natural mortality, steepness, and likelihood weights

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Summary of effects on SAFMC stock assessments

Landings changes appear largely random

- no consistent bias or change (S. Florida species may be exception)
- degree of effects may depend on timing and magnitude of changes (e.g. increase in last year could result in $F_{endyr} > F_{MSY}$)

Index standardizations

- unclear what effects might be
- likely minimal effects to the overall assessment outcomes because of more dominant influence by other abundance indices

Increase in PSEs

- likely to increase uncertainty in assessment results, probably a small amount relative to the rest of the sources of uncertainty


TAG

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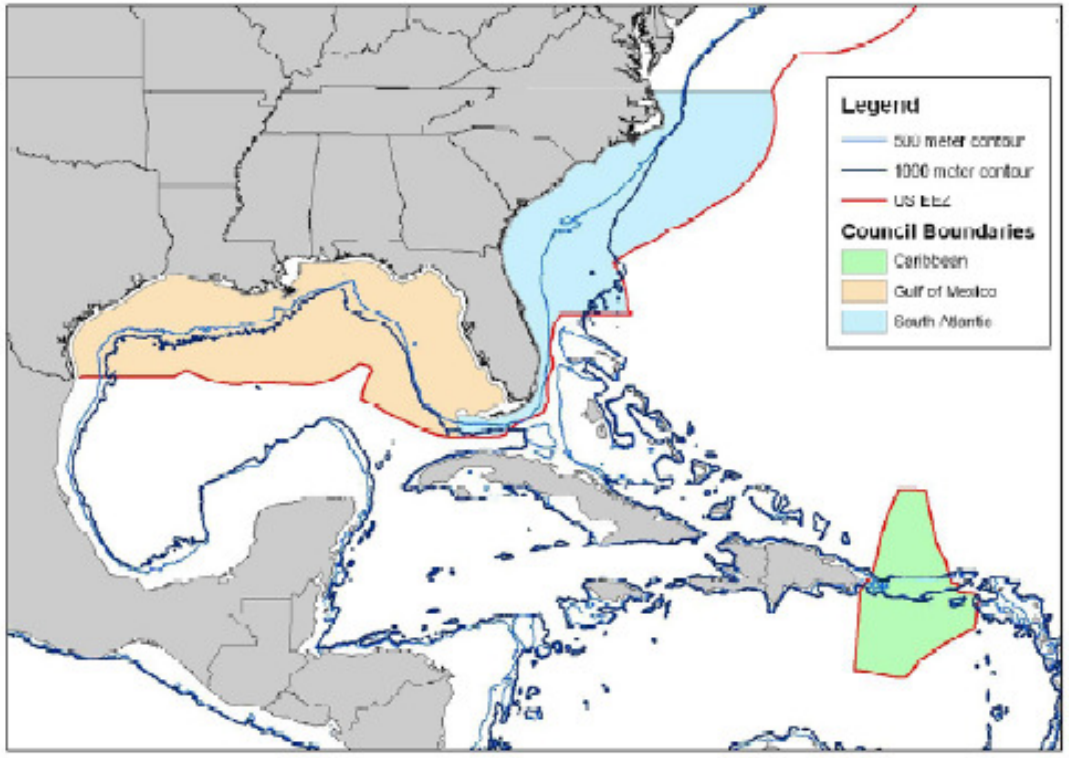
Use of MRFSS, now MRIP data in Gulf of Mexico, Caribbean and HMS assessments at SEFSC

1. Landings >50% rec

2. Discards> landings, *often*

3. Indices
   - *Few scientific surveys*
   - *heavy reliance on MRFSS, headboat survey, large pelagics survey, commercial CPUE data*



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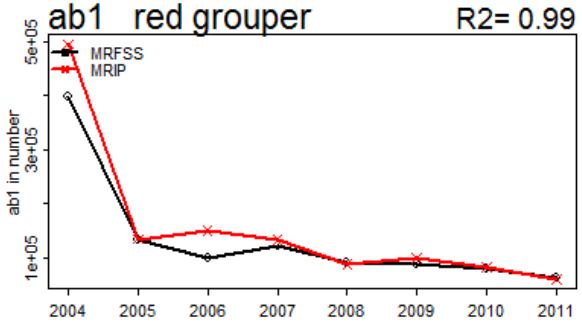
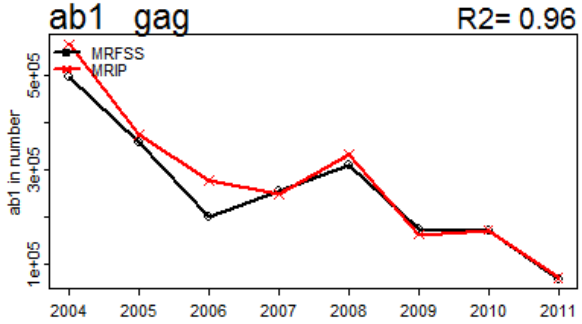
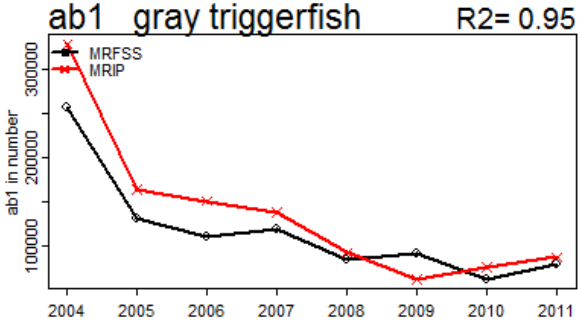
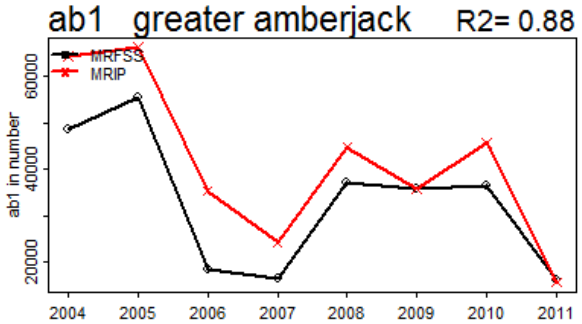
How big of an issue for Gulf of Mexico assessments?

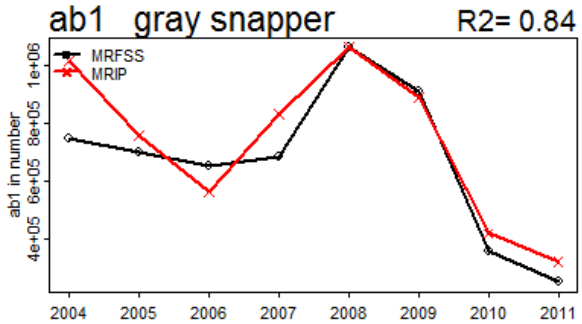
Gulf of Mexico stock	Rec %	Discard ratio priv rec B2/AB1	rec index	tot index	annual R^2 MRFSS vs MRIP priv AB1	% error priv AB1 (MRIP-MRFSS)	MRIP PRIV AB1 (mils)
red grouper	21%	17.72	1	5	0.99	11.82	1.24
gag	71%	9.27	1	6	0.96	7.34	2.20
gray triggerfish	67%	0.94	1	8	0.95	14.49	1.10
amberjack	70%	4.30	1	4	0.88	28.88	0.33
gray snapper	likely >50%	3.09	NA	NA	0.84	11.87	5.85
red snapper	45%	3.32	2	12	0.79	7.44	3.84
king mackerel	55%	0.62	0	0	0.74	7.31	1.28
cobia	89%	2.17	1	TBD	0.61	-2.01	0.23
spanish mackerel	68%	1.24	1	TBD	0.32	4.09	5.57
verm. snapper	16%	0.40	1	5	0.25	10.31	1.14

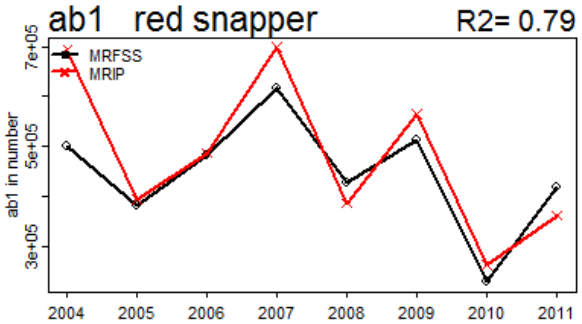


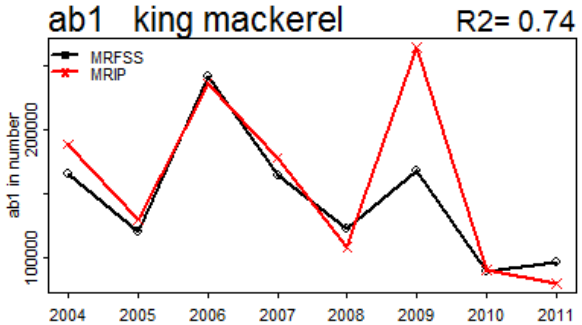


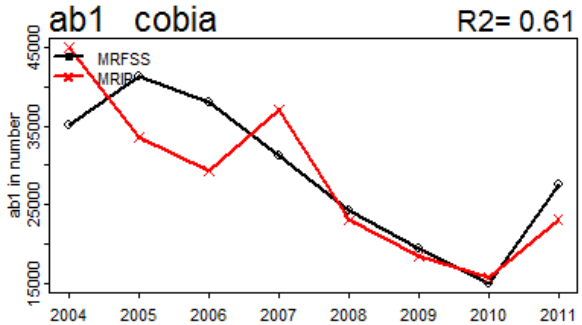


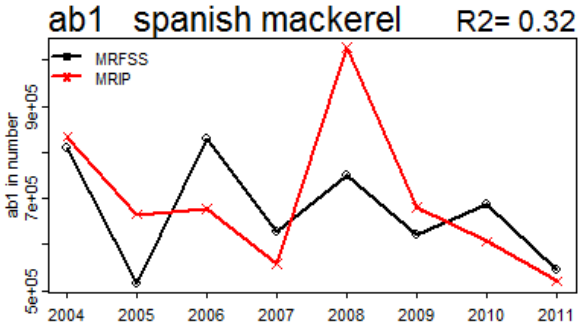


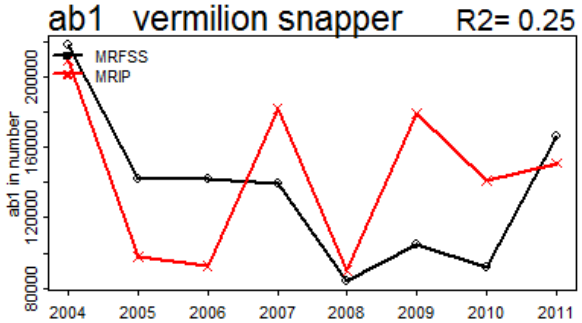




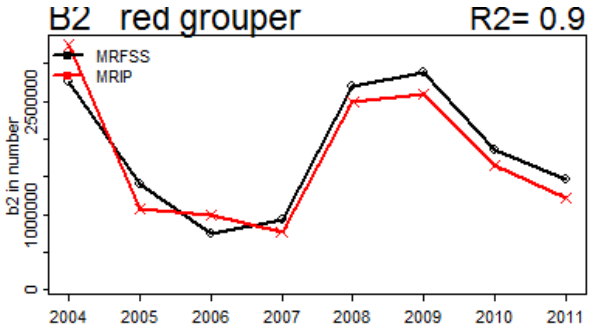


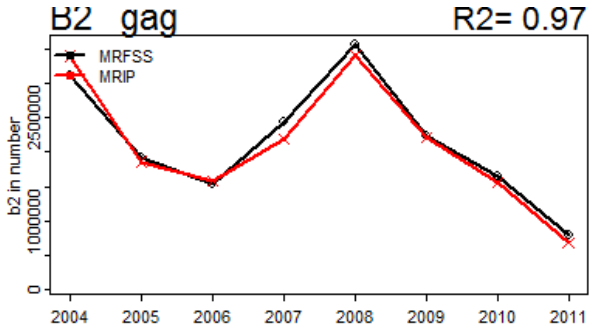


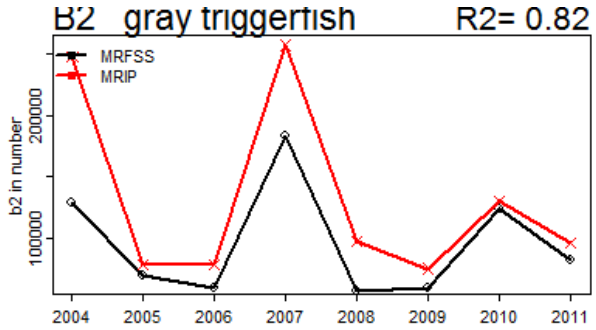


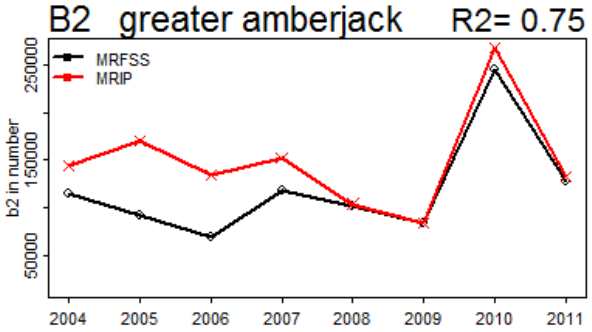


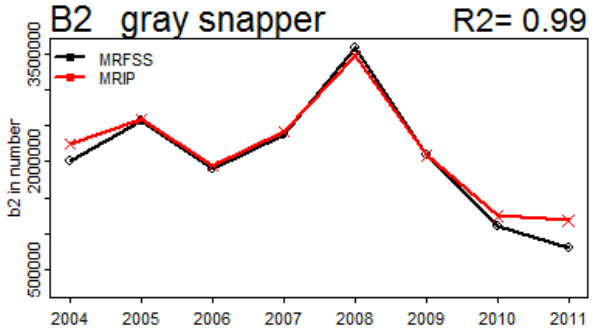
GOM private AB1 comparisons between Federally assessed species, MRIP vs MRFSS

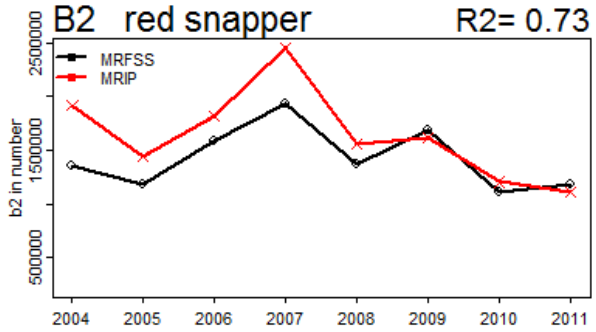


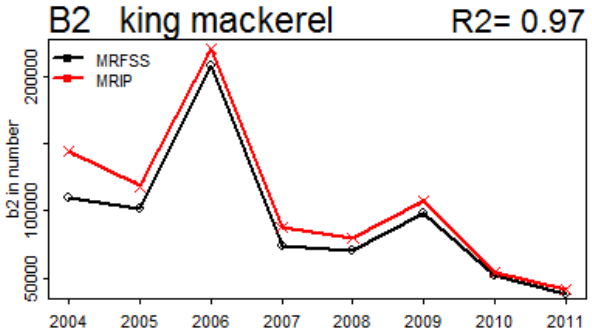


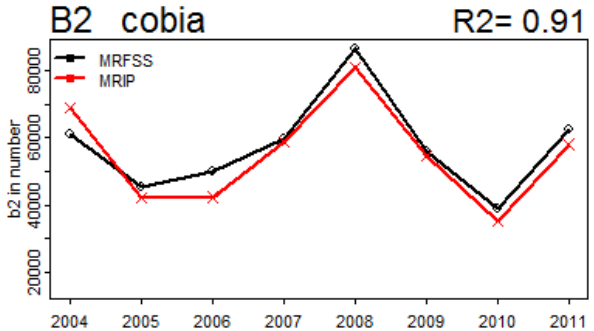


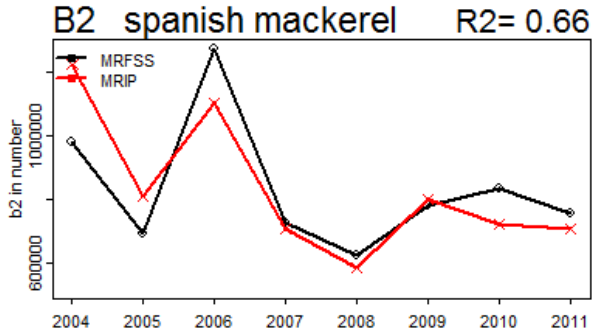


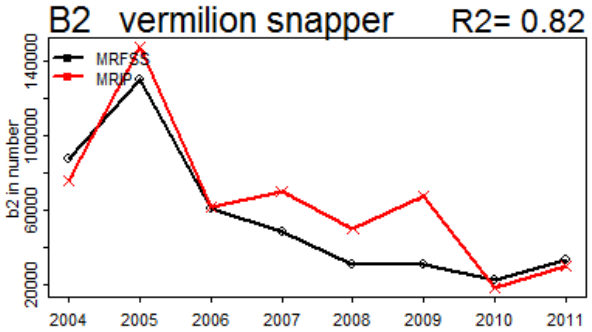




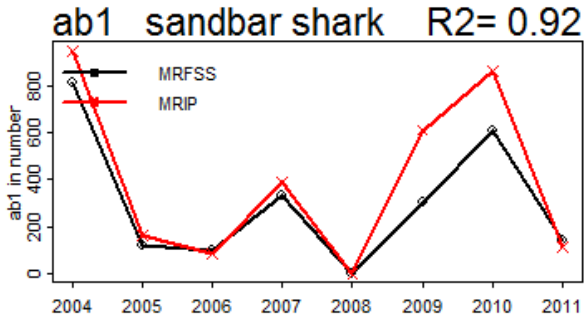


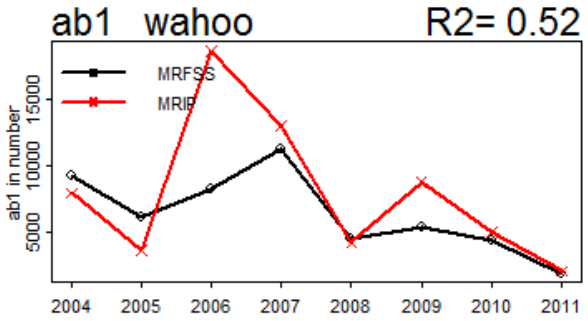


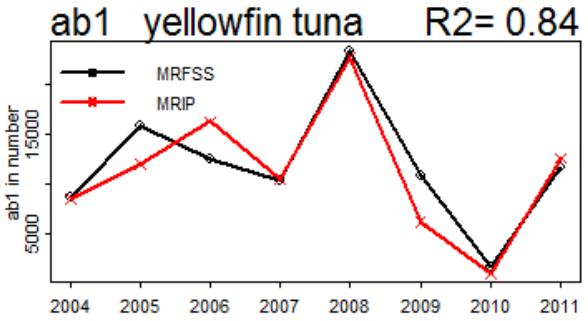


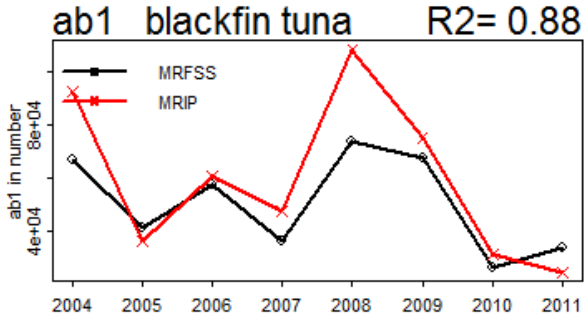


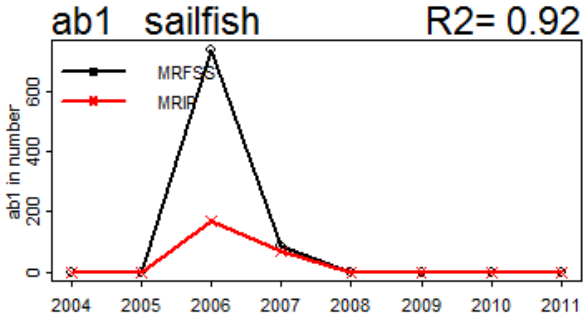
GOM private B2 Discard comparisons between federally assessed species, MRIP vs MRFSS

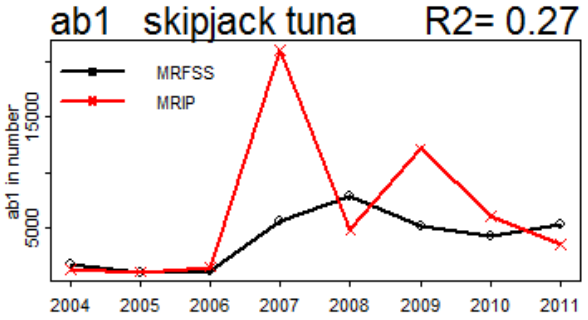








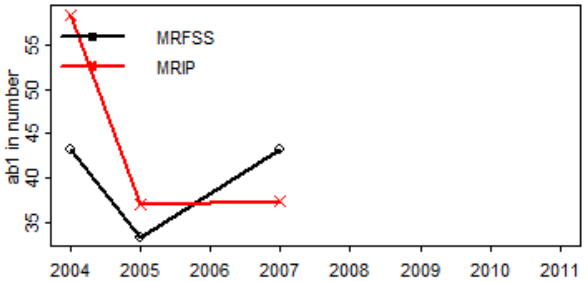


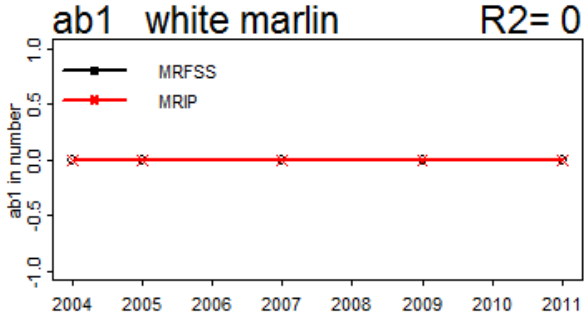


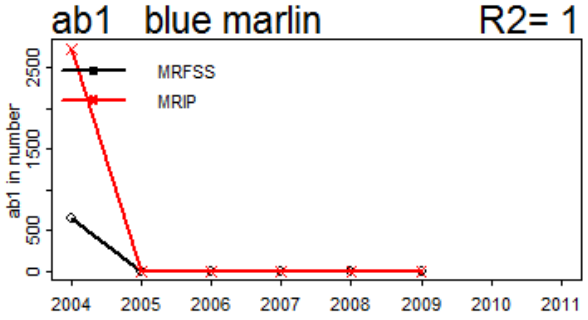
ab1 bluefin tuna less then 5 obs

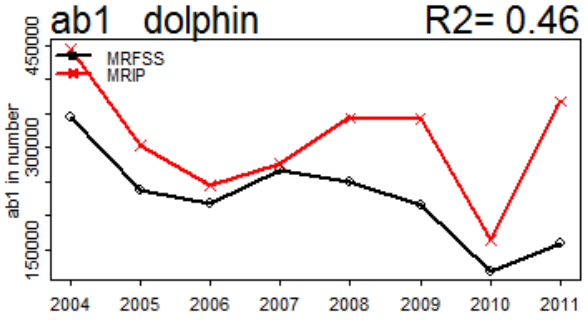
ab1 blue shark less then 5 obs

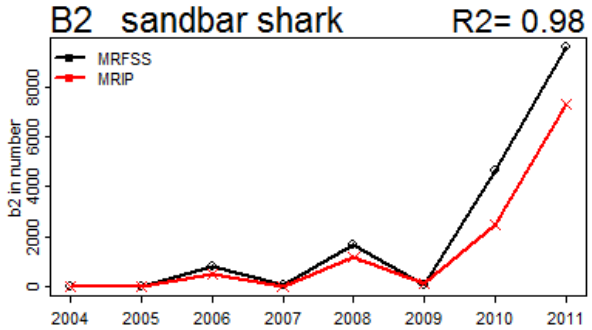
GOM HMS and related species, MRIP vs MRFSS, private, CBT AB1

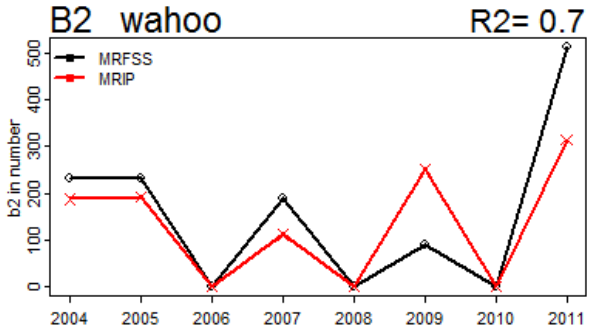


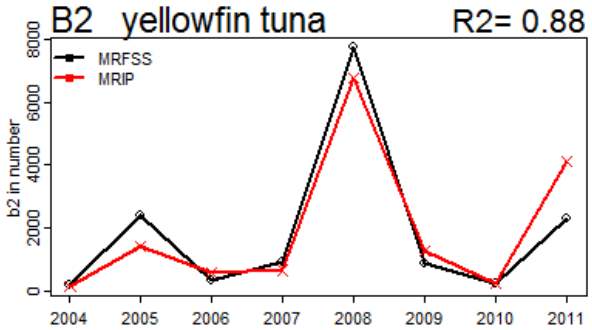


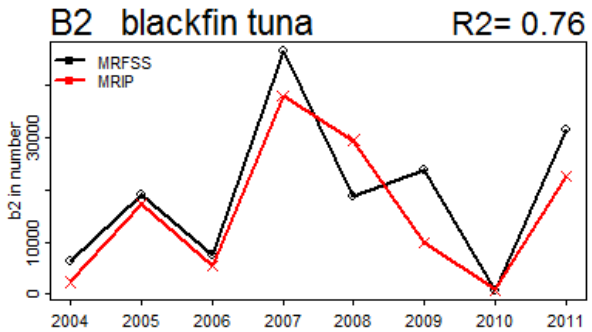


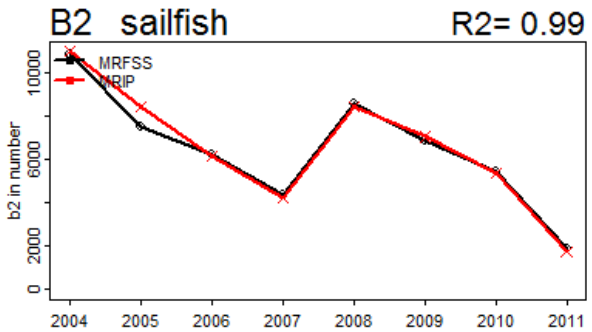


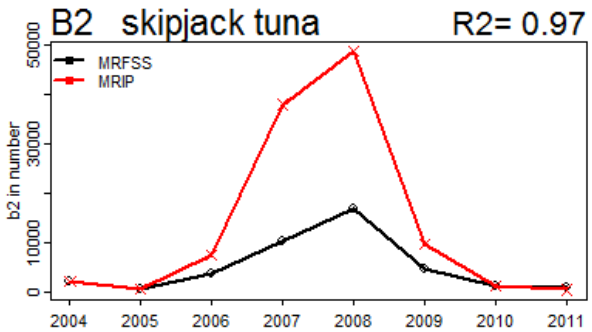






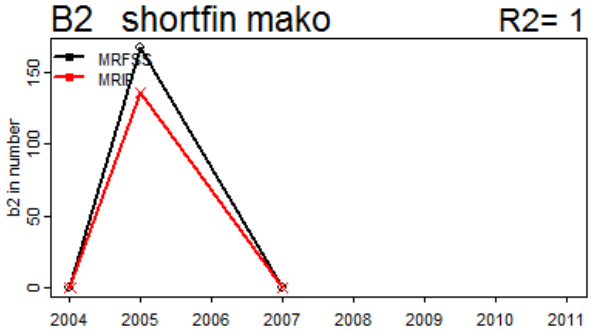




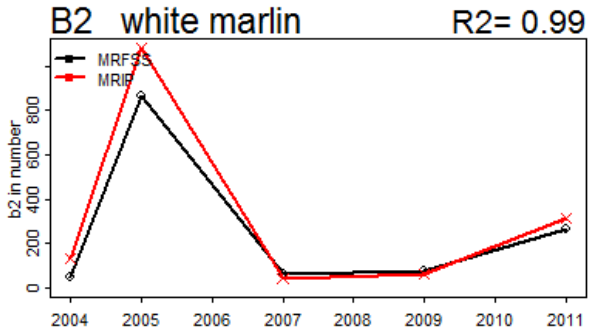


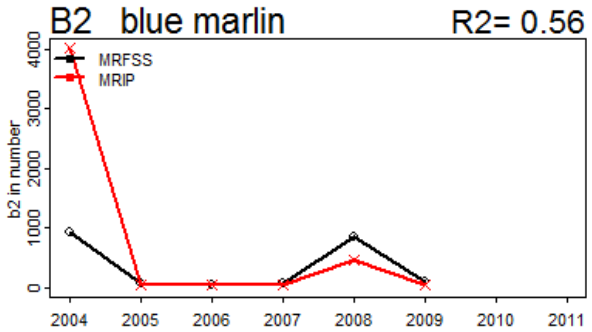
B2 bluefin tuna less then 5 obs

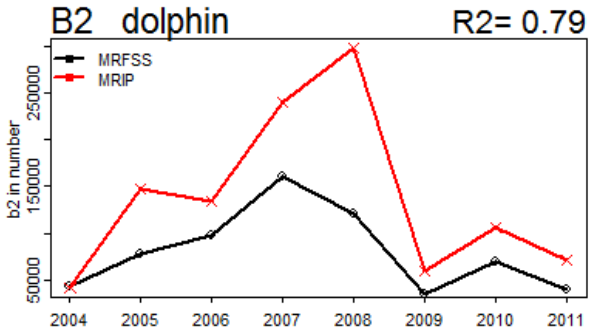
B2 blue shark less then 5 obs

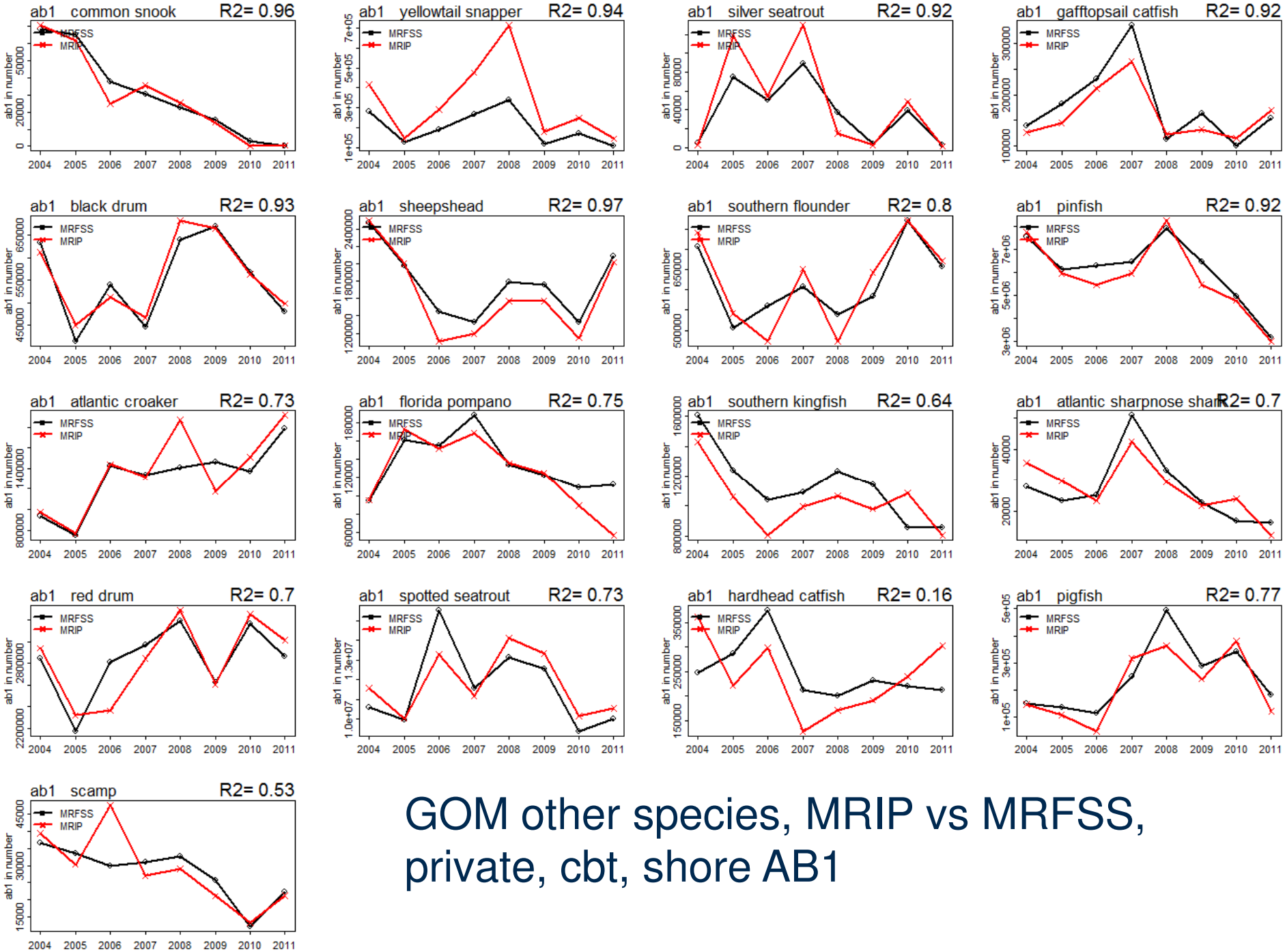


GOM HMS and related species, MRIP vs MRFSS, private, CBT B2

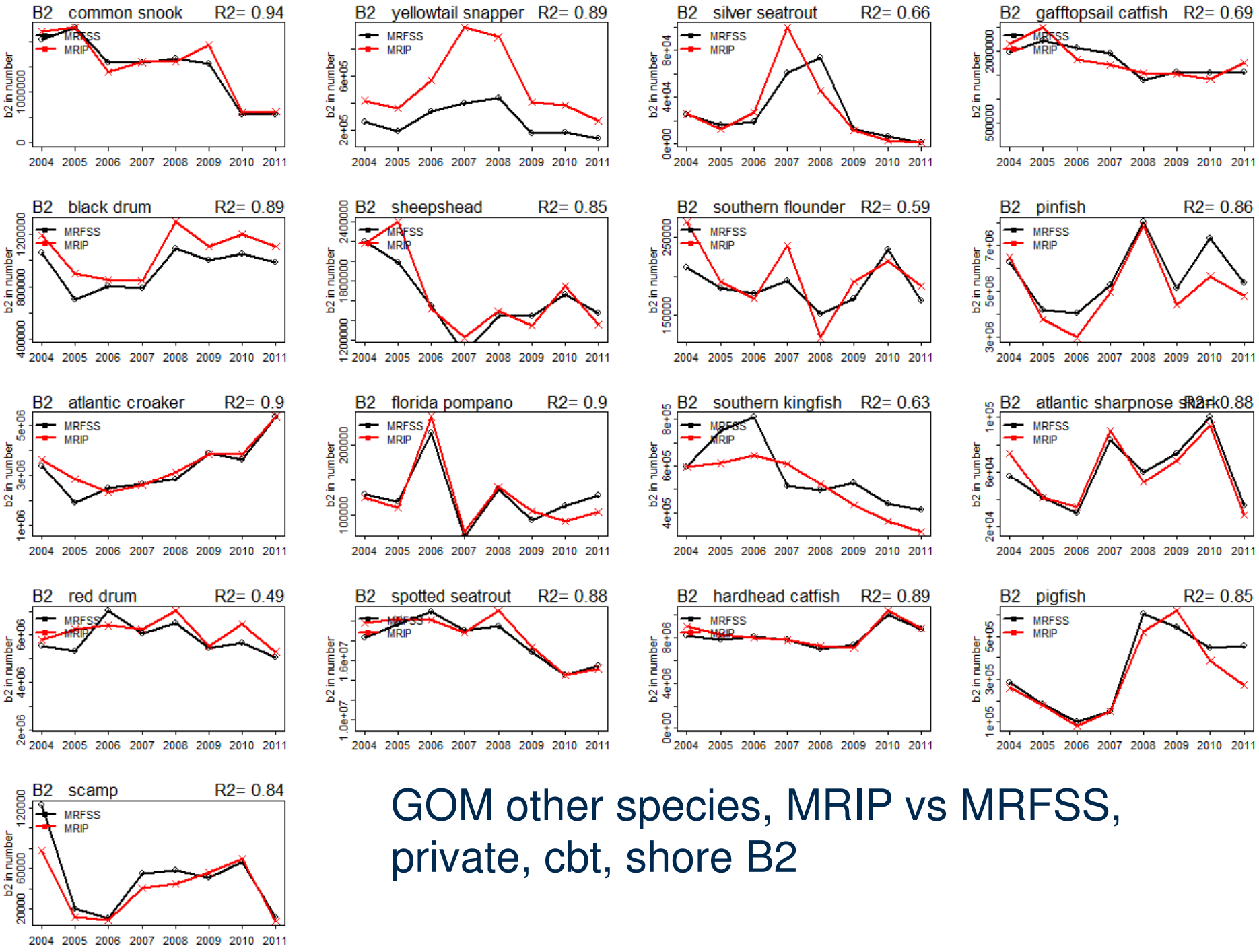








GOM other species, MRIP vs MRFSS, private, cbt, shore AB1



GOM other species, MRIP vs MRFSS, private, cbt, shore B2

GOM MRFSS/MRIP CPUE indices

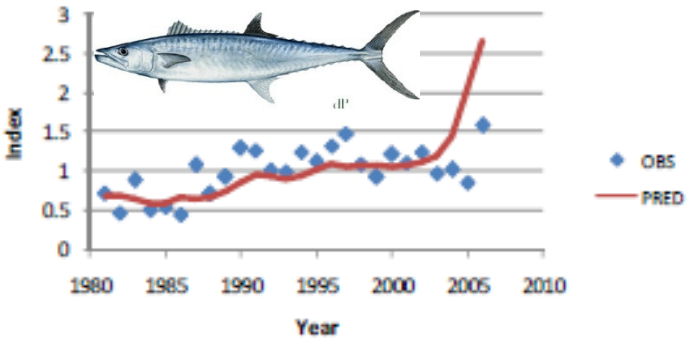
index construction

- use intercept data, *unweighted***
- trip selection criterion (Stephens and MacCall)
- Delta lognormal/poisson GLMs with year, area, season common factors

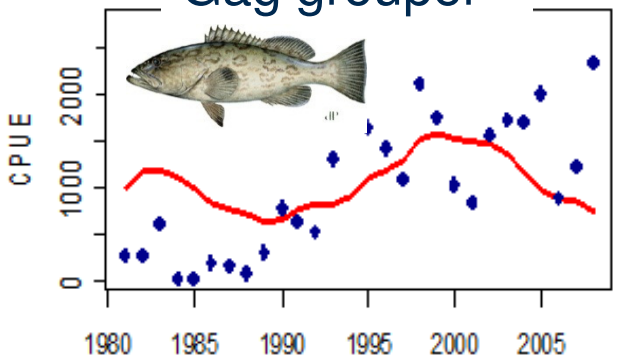
15-25% of the total indices in Gulf of Mexico

Usually have high CVs

Gulf King mackerel



Gag grouper



Yellowfin tuna

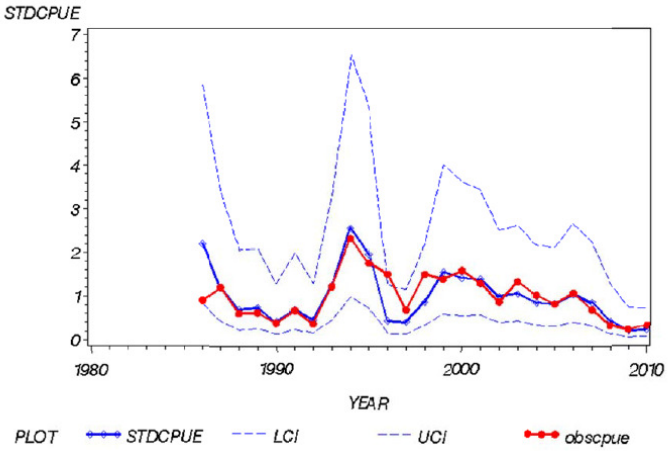
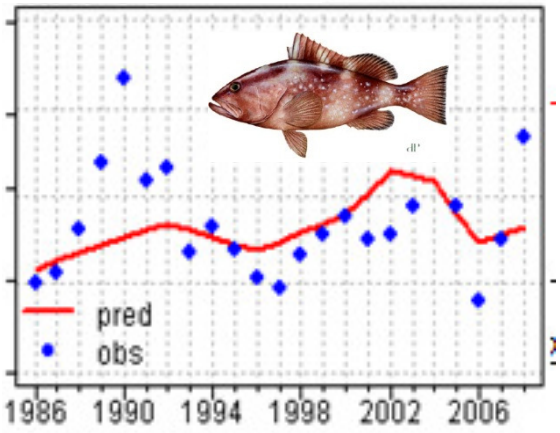
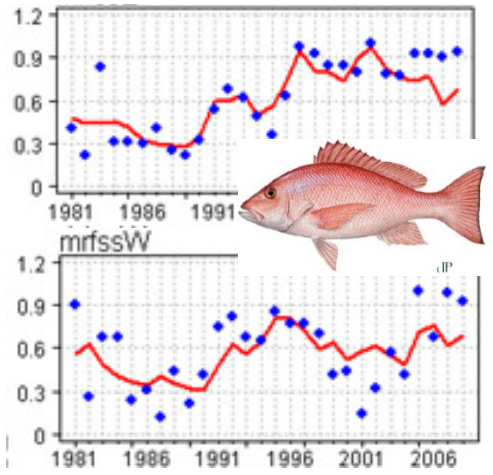


Figure 8. Nominal CPUE (blue line) and the delta-lognormal index (red line) with 95% confidence intervals (dashed lines). Both series are scaled to a mean of 1.0 to facilitate comparison.

Red grouper



Red snapper (E and W)



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Summary for Gulf of Mexico

Landings changes appear generally unbiased for 2004-2011

Discards show some biases

Index standardizations

- unclear what affects might be
- may only need to use weighting factors for intercepts

Increase in PSEs

- Some GOM assessment models do not explicitly incorporate error in catch or discards
- likely to increase uncertainty in assessment results