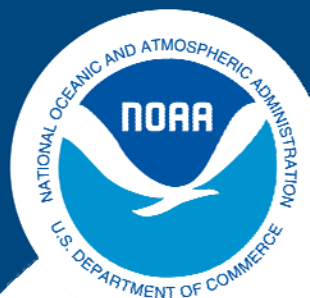


Tab B, No. 14



NOAA
FISHERIES

South East
Fisheries
Science Center

2014 Update Gulf of Mexico Red Snapper

Gulf of Mexico Fishery Management Council Meeting



January 26, 2015

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Jakob Tetzlaff

Terms of reference

1. Update the SEDAR 31 GOM red snapper assessment with data through 2013
2. Document changes or corrections made to model and input datasets...
 - **use methods from the September 2014 MRIP Calibration workshop, if possible**
3. Update estimates of stock status and management benchmarks, and provide probability of overfishing occurring at specified future harvest and exploitation levels
4. Develop a stock assessment update report to address these TORS and fully document the input data and results of the stock assessment update

Review

Model same as SEDAR 31

- 1872-2013
- 2 regions: East and West of the Mississippi River
- Flexible structure allows key parameters to change through time
 - **Recruitment of young fish to the population** – to accommodate and apparent increase in productivity in recent years (1984-2013)
 - **Selectivity** – to account for implementation of IFQ program and circle hooks
 - **Retention** – to account for changes in size limits and IFQ
 - **Discard mortality** – to account for venting

Review

Data same as SEDAR 31 (but updated through 2013)

Fisheries Dependent Data

Catch, Discards, Effort, CPUE, Age

- Com Handline
- Com Longline
- Rec Private Boat + Charter Boat
- Headboat
- Com Closed Season
- Rec Closed Season
- Shrimp Bycatch

Fisheries Independent Data

CPUE, Age composition

- SEAMAP Video
- SEAMAP Plankton
- SEAMAP Summer Trawl
- SEAMAP Fall Trawl
- NFMS bottom longline
- Artificial Reef ROV

Key Changes:

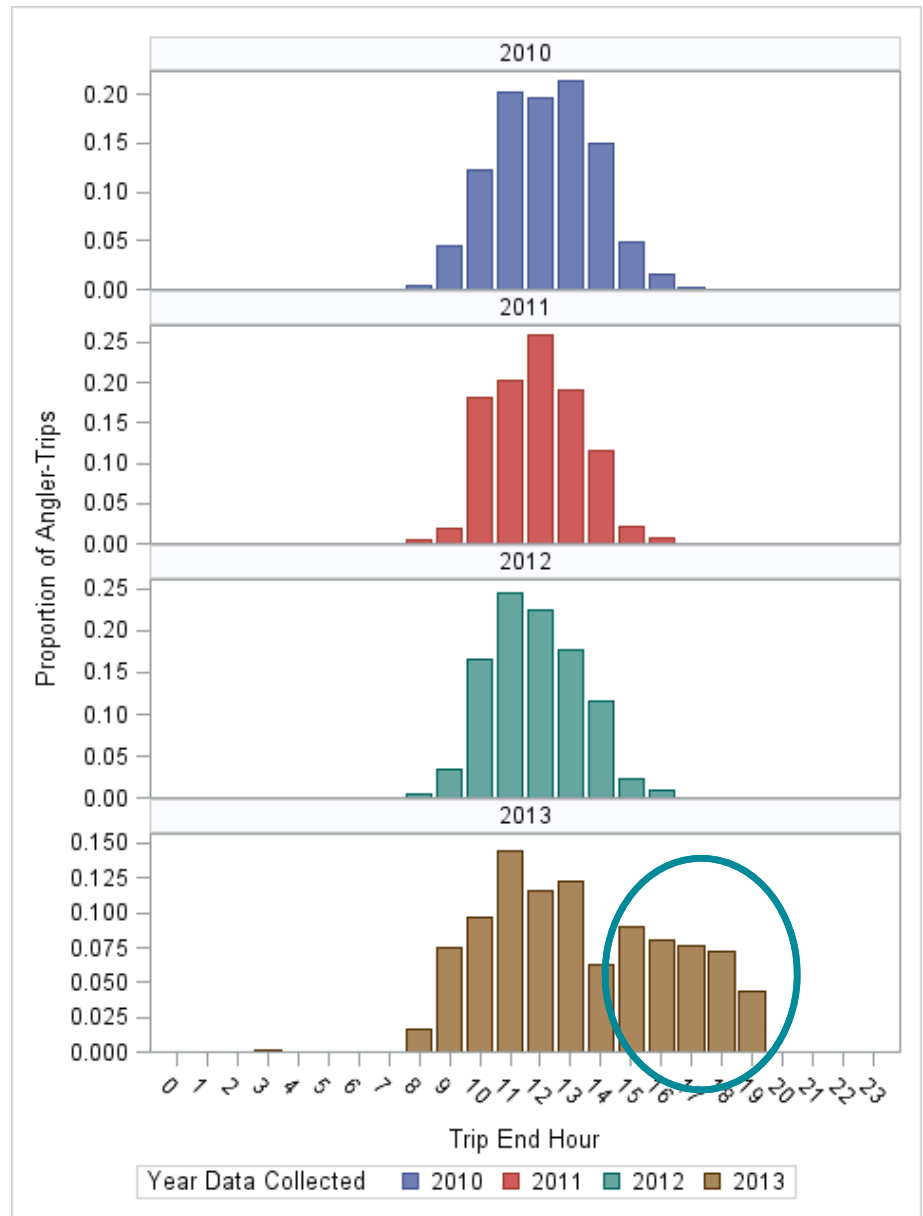
- Used recalibrated MRIP estimates
- Estimated an additional selectivity block (2011-13) for recreational fleets to accommodate recent changes in fishing behavior that appear to have led to a larger average size

“Selectivity” functions are used to model both the vulnerability of fish to the gear as well as the availability of fish. Availability can be related to the spatial distribution of fish by size or age.

MRIP Calibration workshop

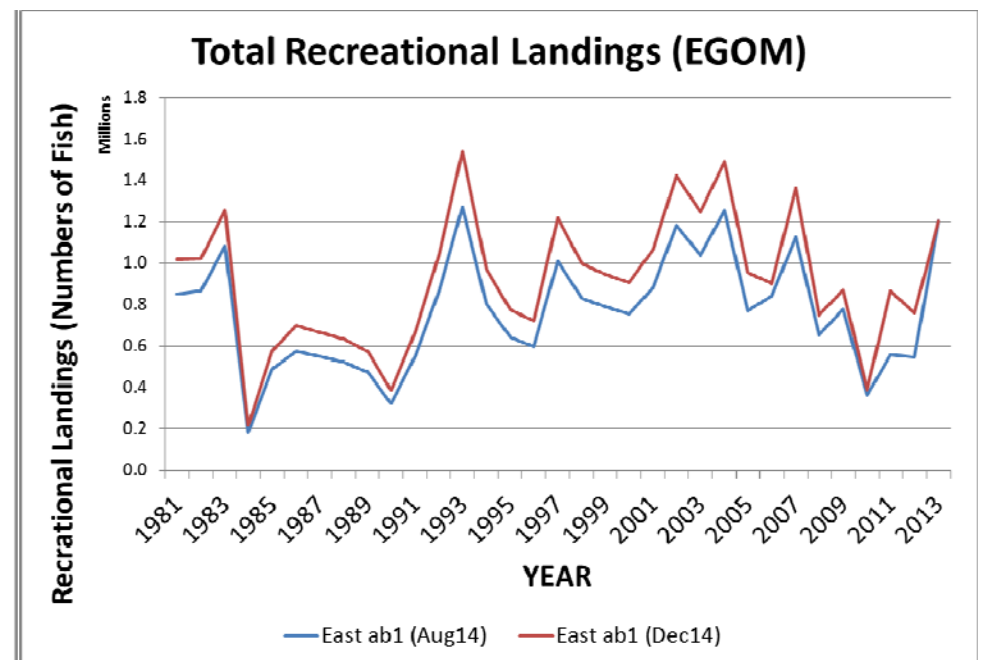
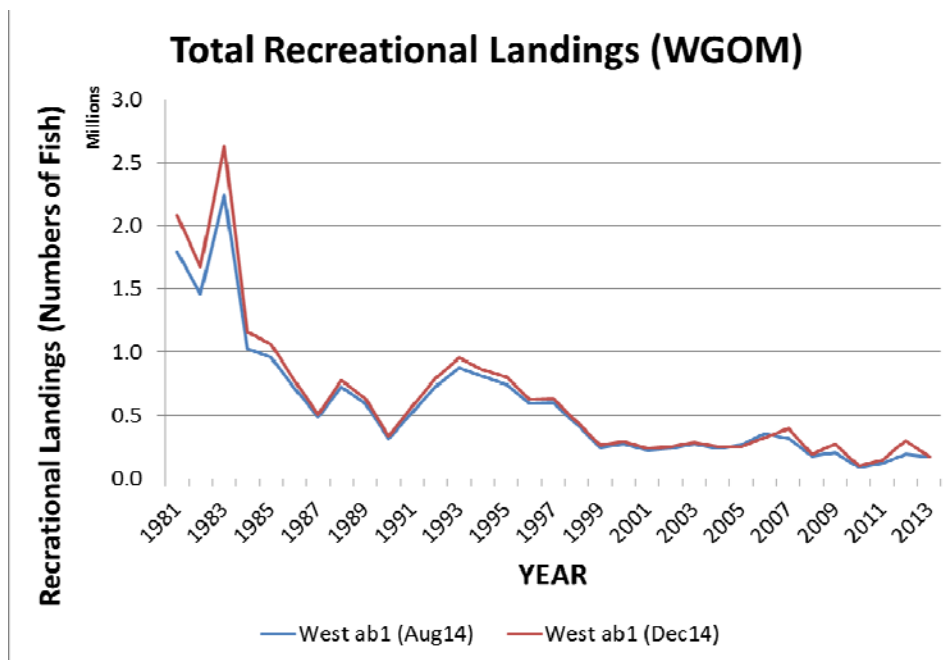
- Changes in design (implemented in 2013) led to changes in proportions of Angler-Trips by Hour
- Estimates were adjusted for possible undersampling of afternoons and evenings

Example: Alabama Private Boat



Effect of Rescaling MRIP Estimates

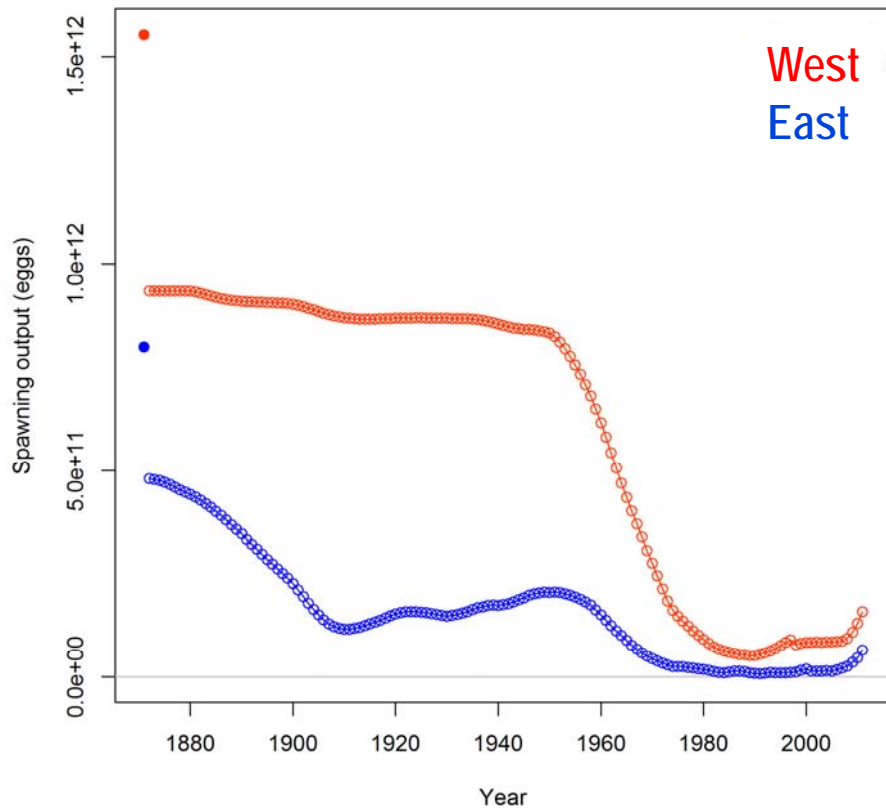
- Recalibrated recreational landings (AB1) are higher throughout time series
- The increase in estimated discards is larger



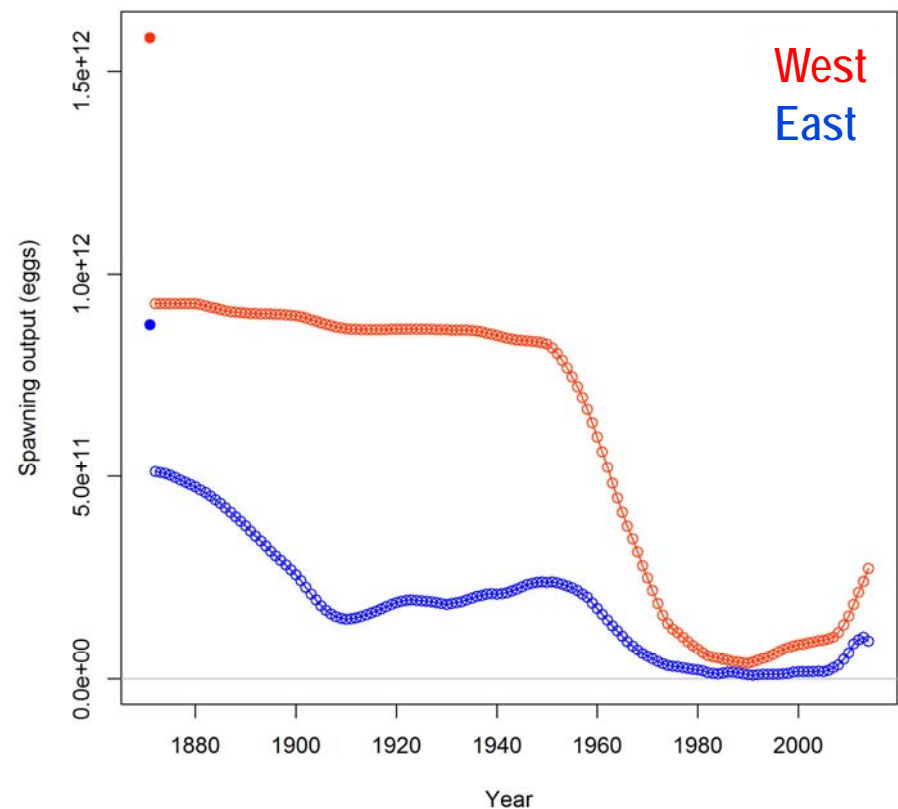
Model Results: Spawning Stock Biomass

- Regional trends in SSB nearly identical to SEDAR 31

SEDAR 31

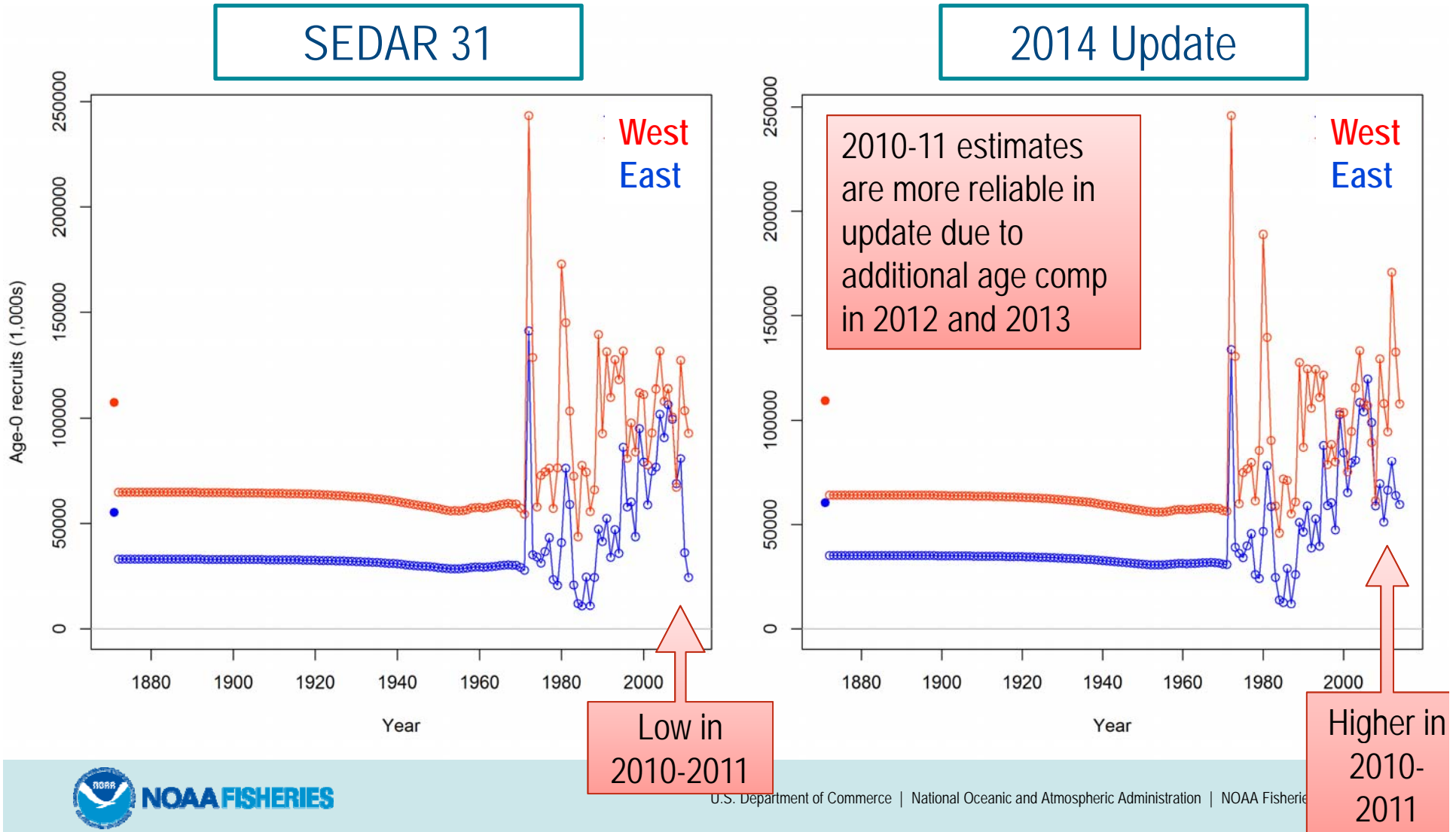


2014 Update



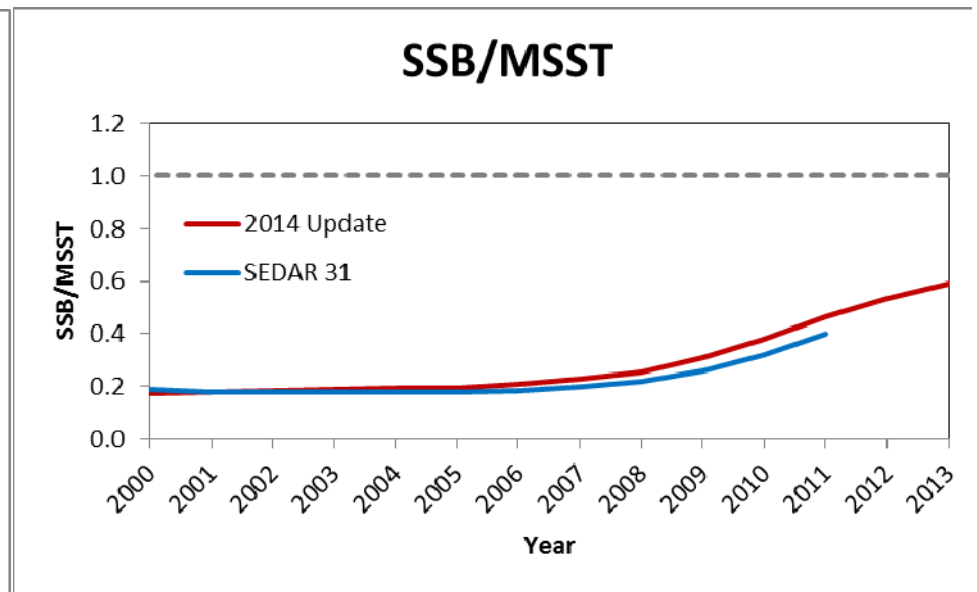
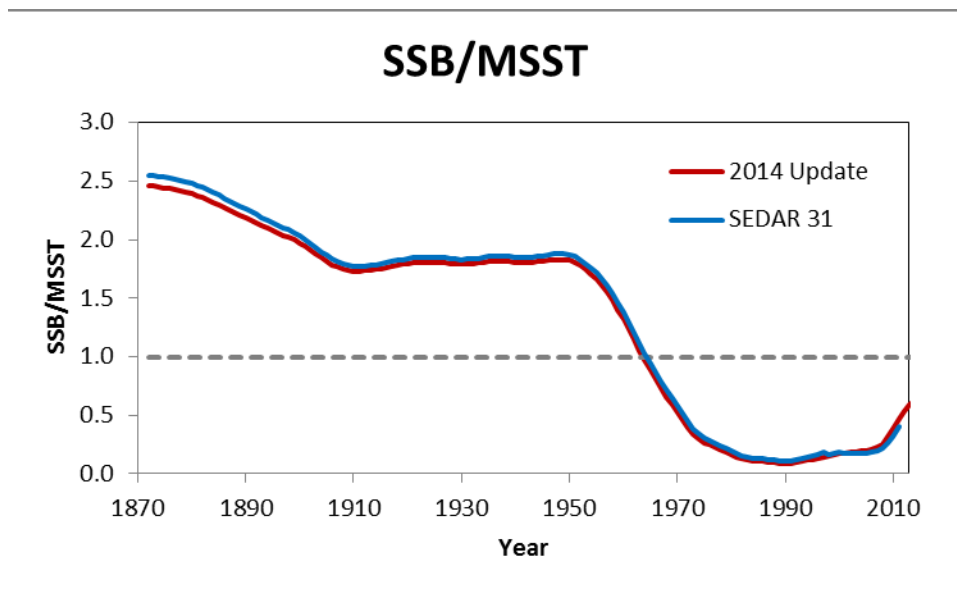
Model Results: Recruitment

- Regional trends in recruitment similar except higher in 2010-11



Spawning Stock Status

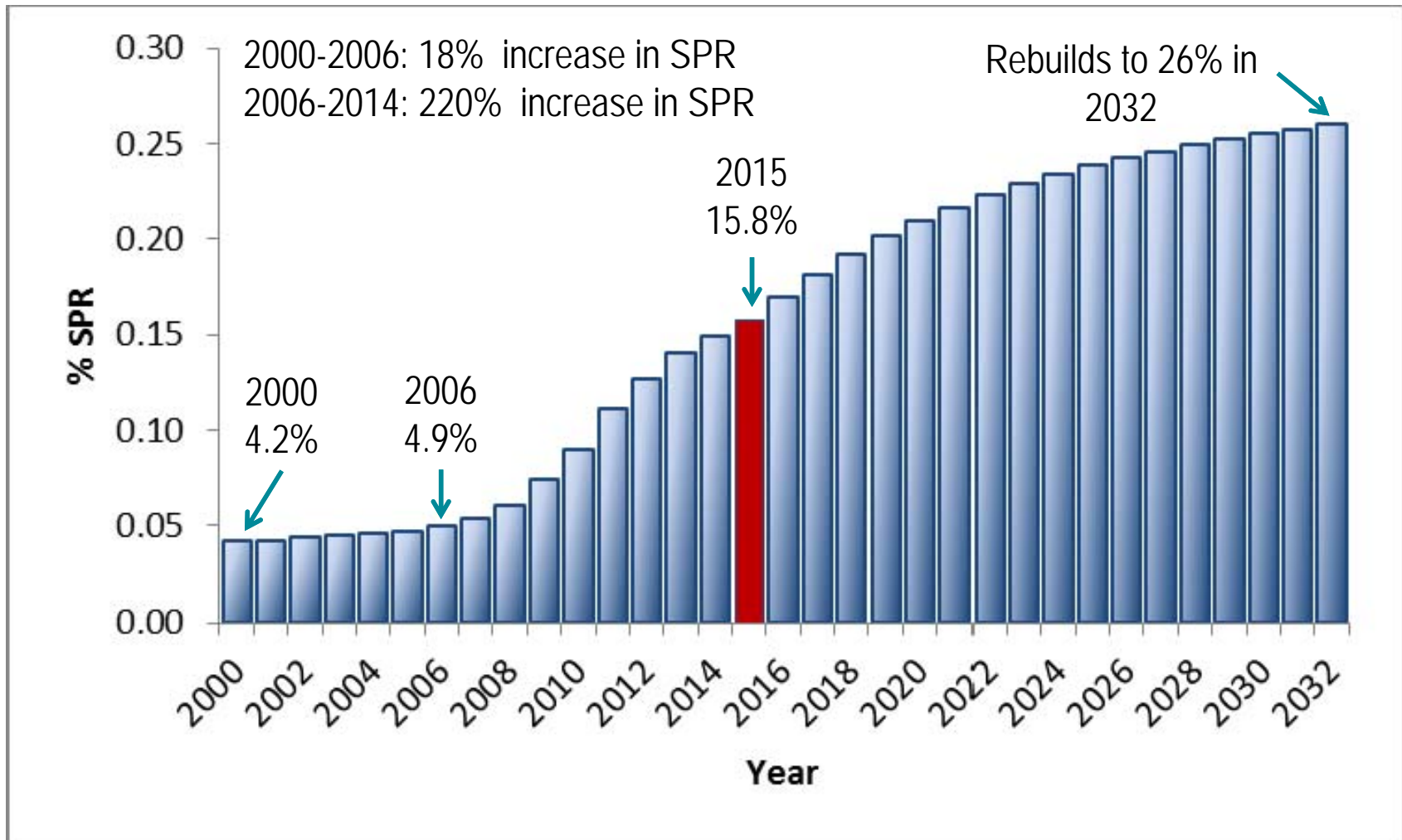
- Nearly identical to SEDAR 31
- $MSST = (1-M) * SSB_SPR26\%$ where $M = 0.086$



Projections

- Projection methods identical to SEDAR 31, except that ***SSC based management advice on base model only***
- Catch allocation between commercial and recreational fleets assumed 51:49 split
- ***2014 directed landings not yet available, therefore assumed identical to 2013 - SSC requested updated projections as soon as possible***

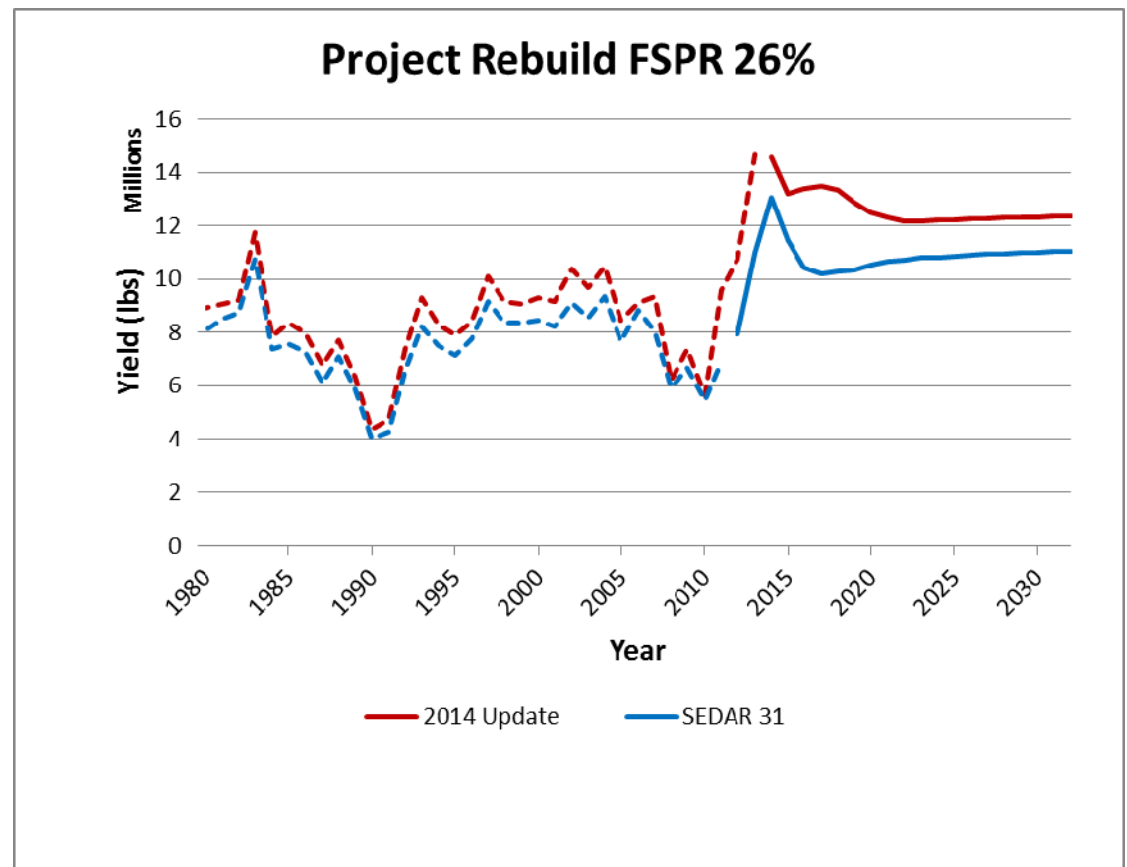
Spawning Potential Ratio: Project F Rebuild



Projected Yield: SEDAR 31 vs. 2014 Update

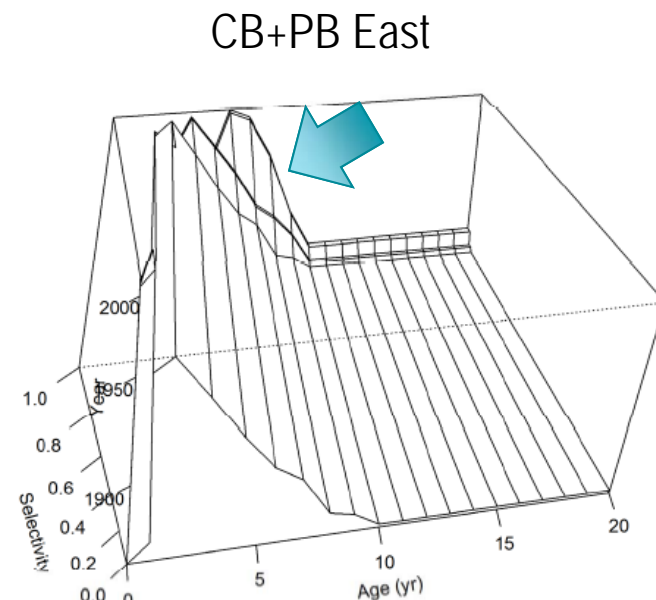
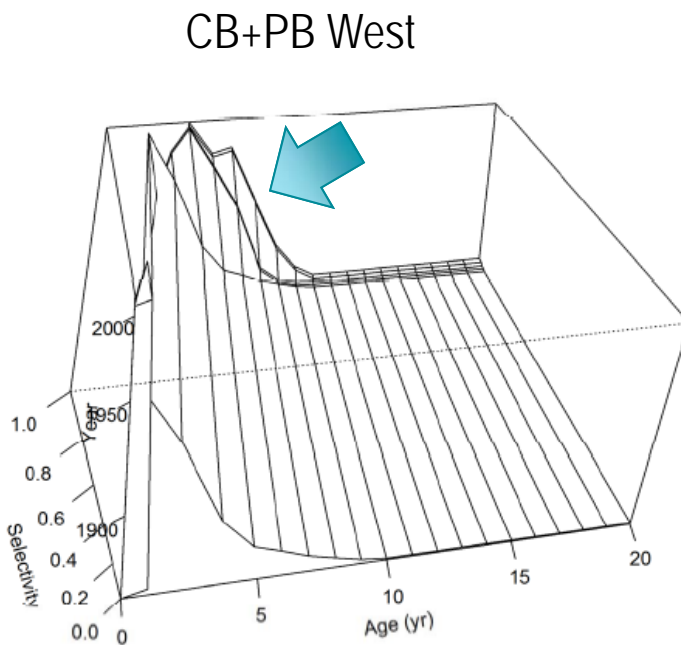
- MSY and retained yield higher for update than for SEDAR 31

Model	MSY
SEDAR 31	11.7
BASE	12.9



Why the increased yield?

- Increase in total removals due to MRIP recalibration
- New selectivity block for recreational fleets indicates that selectivity of those fleets has shifted to older (heavier) fish in recent years
- CB+PB and HB fisheries shows similar changes

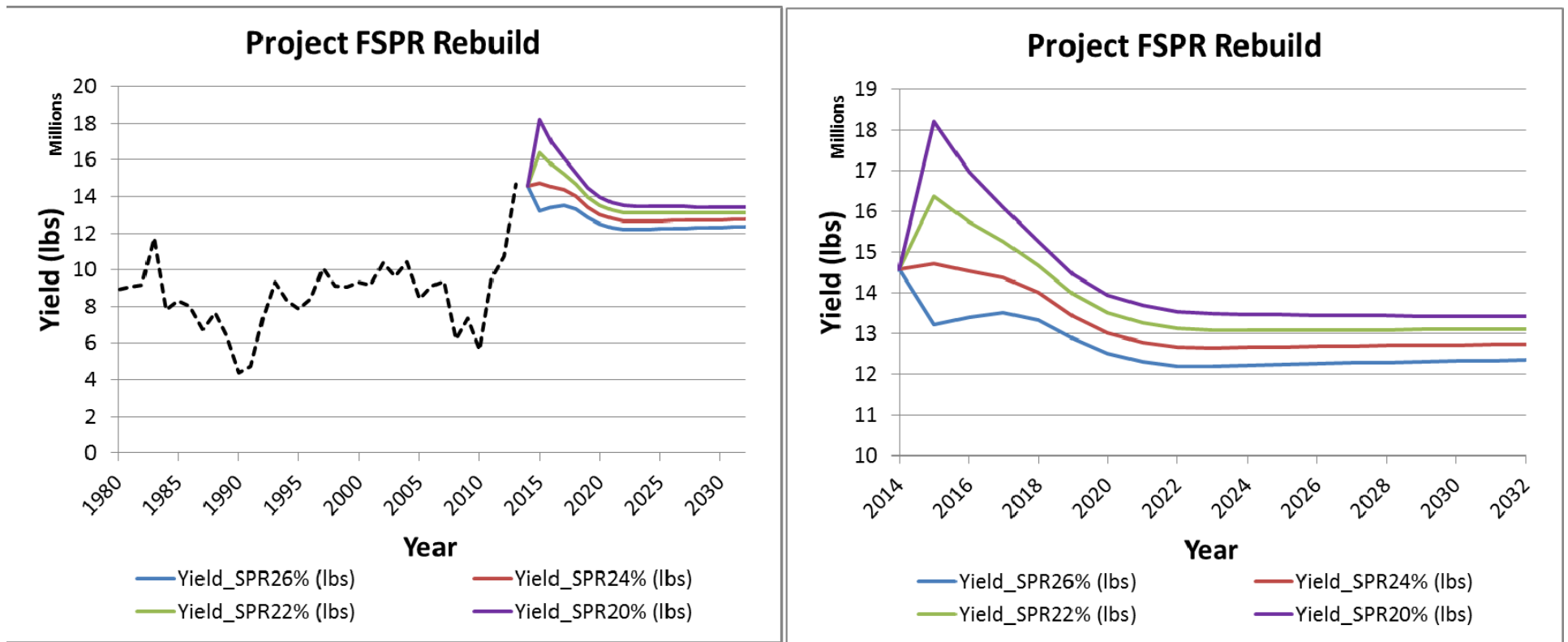


Alternative Reference Points

- At Council request, four proxies for F_{MSY} were considered during projections:
 - $F_{SPR26\%}$
 - $F_{SPR24\%}$
 - $F_{SPR22\%}$
 - F_{MAX} ($\sim F_{SPR20\%}$)

Projected Yield (Retained)

- Projected constant F to achieve Rebuild Target (SSB SPR 26%, 24%, 22%, 20%) in 2032.



OFL at Specified FSPR Reference

YEAR	FSPR 26%	FSPR 24%	FSPR 22%	FMAX (SPR20%)	SEDAR 31 BASE*** (FSPR 26%)
2015	14.73	16.03	17.42	18.94	12.52
2016	14.56	15.50	16.46	17.44	11.25
2017	14.40	15.08	15.75	16.41	10.88
2018	14.02	14.54	15.03	15.49	10.92
2019	13.44	13.86	14.26	14.63	10.94
2020	13.03	13.42	13.78	14.11	11.10
Equil.	12.87	13.13	13.37	13.57	11.69

*** SEDAR 31 management advice developed using constant catch projections

ABC at Specified FSPR Reference ($P^* = 0.427$)

Assumes Rebuild Year = 2032; Will require revision if recovery plan is adjusted.

YEAR	FSPR 26%	FSPR 24%	FSPR 22%	FMAX (SPR20%)	SEDAR 31 BASE*** (FSPR 26%)
2015	13.00	14.47	16.11	17.92	11.28
2016	13.21	14.34	15.52	16.74	10.28
2017	13.32	14.19	15.05	15.89	10.04
2018	13.13	13.80	14.44	15.04	10.14
2019	12.67	13.23	13.75	14.23	10.22
2020	12.33	12.84	13.32	13.77	10.41
Equil.	12.51	12.87	13.20	13.48	10.10
Recovery Year F=0	2018	2017	2017	2017	-

*** SEDAR 31 management advice developed from constant catch projections

Choice of F_{MSY} proxy

- Proxies are used when F_{MSY} cannot be estimated
- If there is TRULY no relationship between spawners and recruits (steepness = 1.0) then $F_{MAX} = F_{MSY}$
- However, at some stock size, recruitment is likely to diminish with decreasing stock size (no spawners = no recruits)
- Many scientists (and some SSC members) have proposed a biologically based FSPR proxy. A review of the literature suggests that red snapper life history characteristics are most consistent with FSPR30-40%
- F26% is a compromise which was adopted by the SSC

Choice of F_{MSY} proxy

- Lower FSPR proxies tend to produce higher yield, and “lower the bar” for recovery.
- An FSPR proxy that is too low will not rebuild the stock to the level that produces MSY in the long term.
- Rebuilding plan may need to be shortened to compensate for a lower SPR benchmark



Summary

- This model used new improved estimates of MRIP landings and discards
- 2014 Update and SEDAR 31 model results are quite similar
- Main Differences: Higher MSY and projected yields for update due to:
 - 2011-2013 recreational selectivity shifted toward larger fish
 - Higher recreational removals due to MRIP recalibration

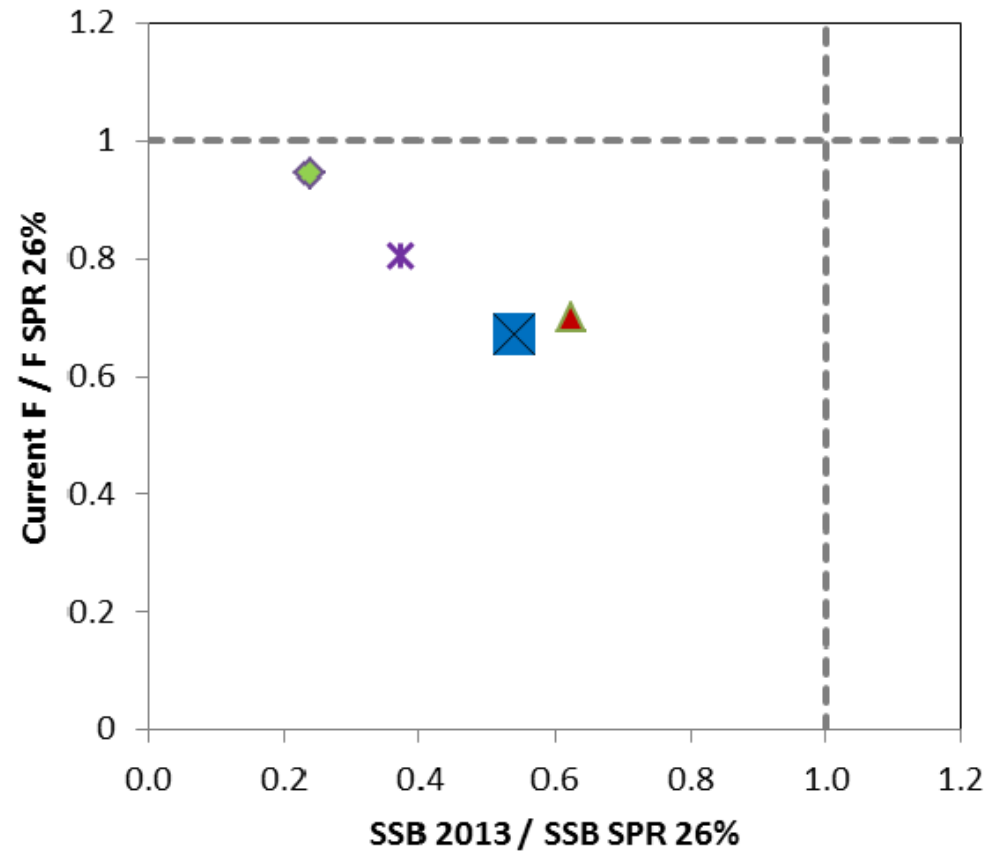
Acknowledgements

- Analytical Team
 - Shannon Cass-Calay
 - Clay Porch
 - Jakob Tetzlaff
 - John Walter
- Data Providers: Too numerous to mention by name:
 - State and Academic Partners
 - NOAA SEFSC: Miami, Panama City, Pascagoula, Galveston
- Thank You!

Supplemental Slides

Control Rule Plot

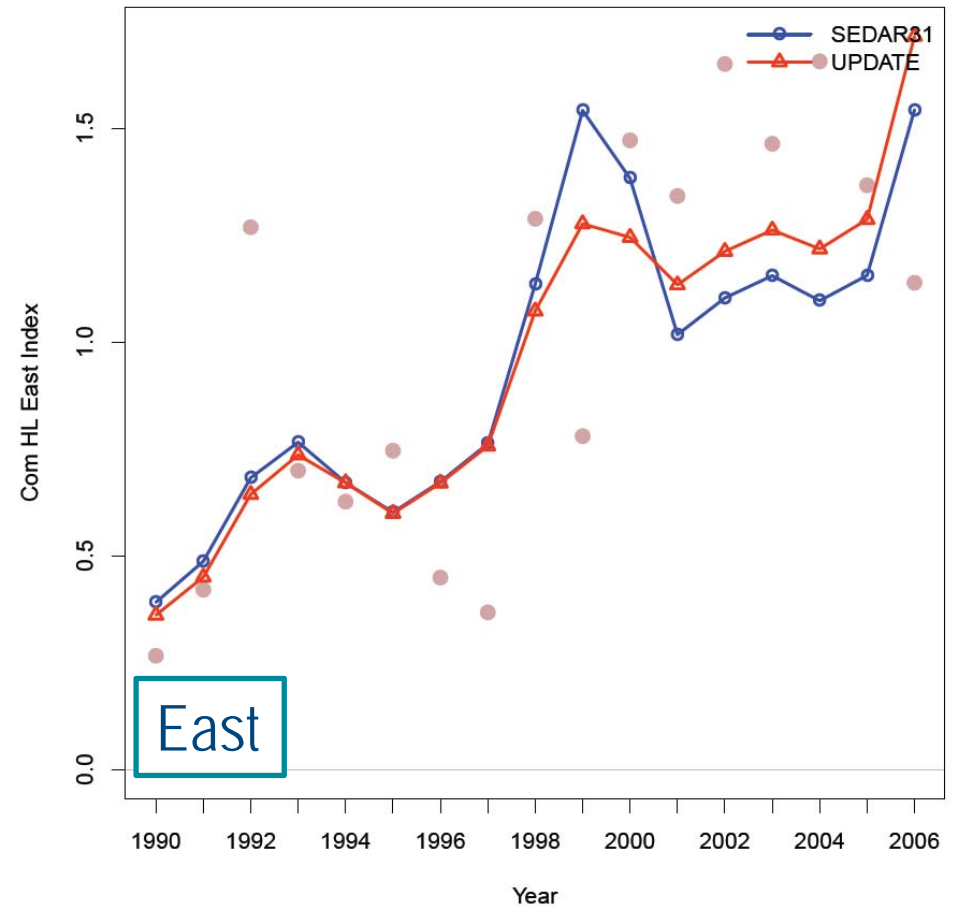
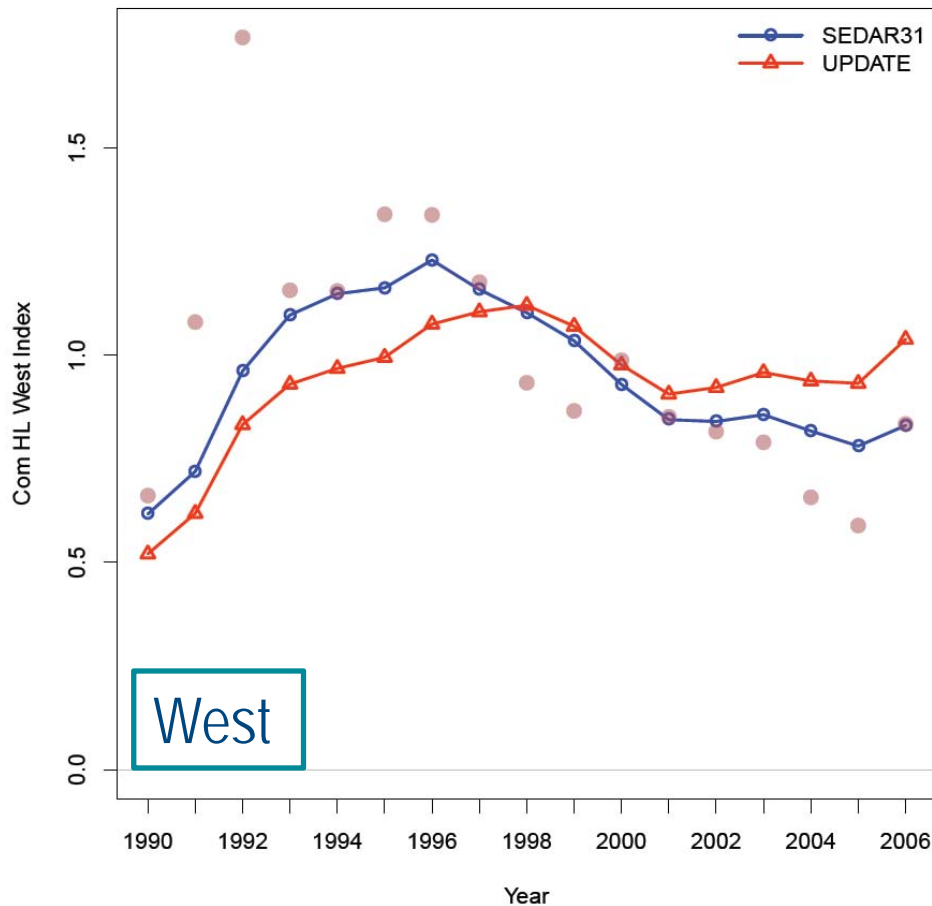
- The base and sensitivity runs examined indicate that the stock remains overfished, but that overfishing is not occurring



■ 2014 Update ▲ HIGH M ◆ LOW M ✖ CV 0.1

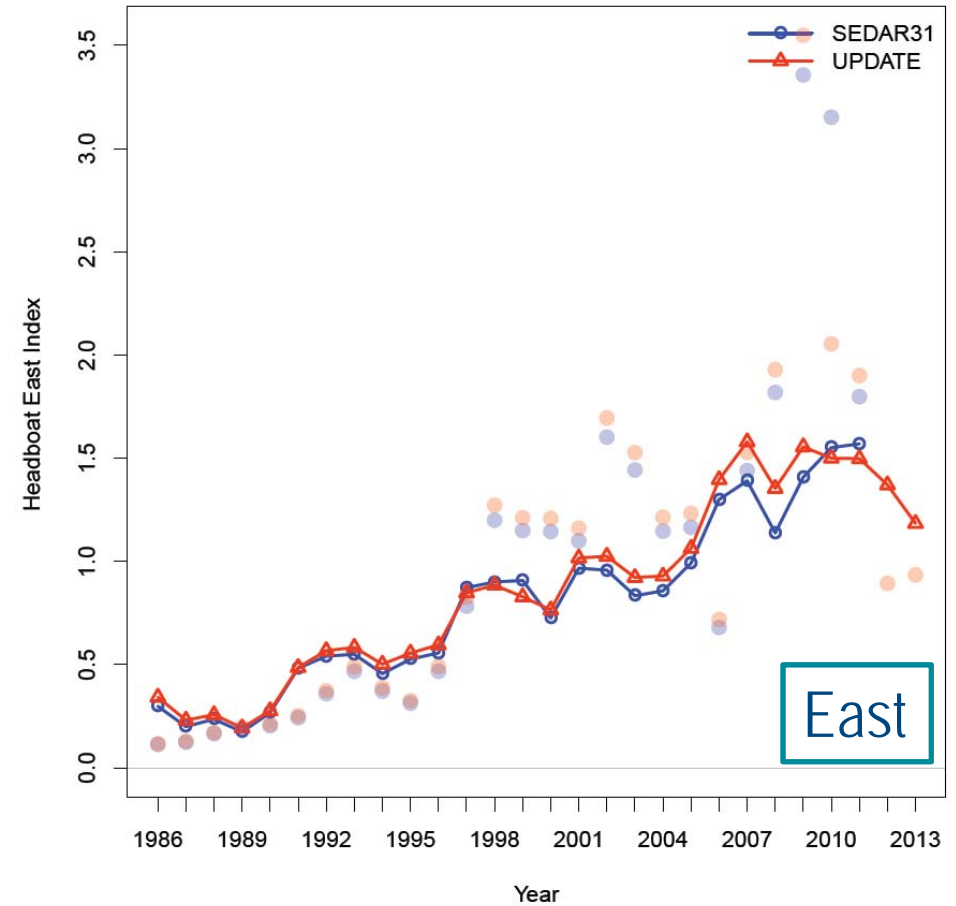
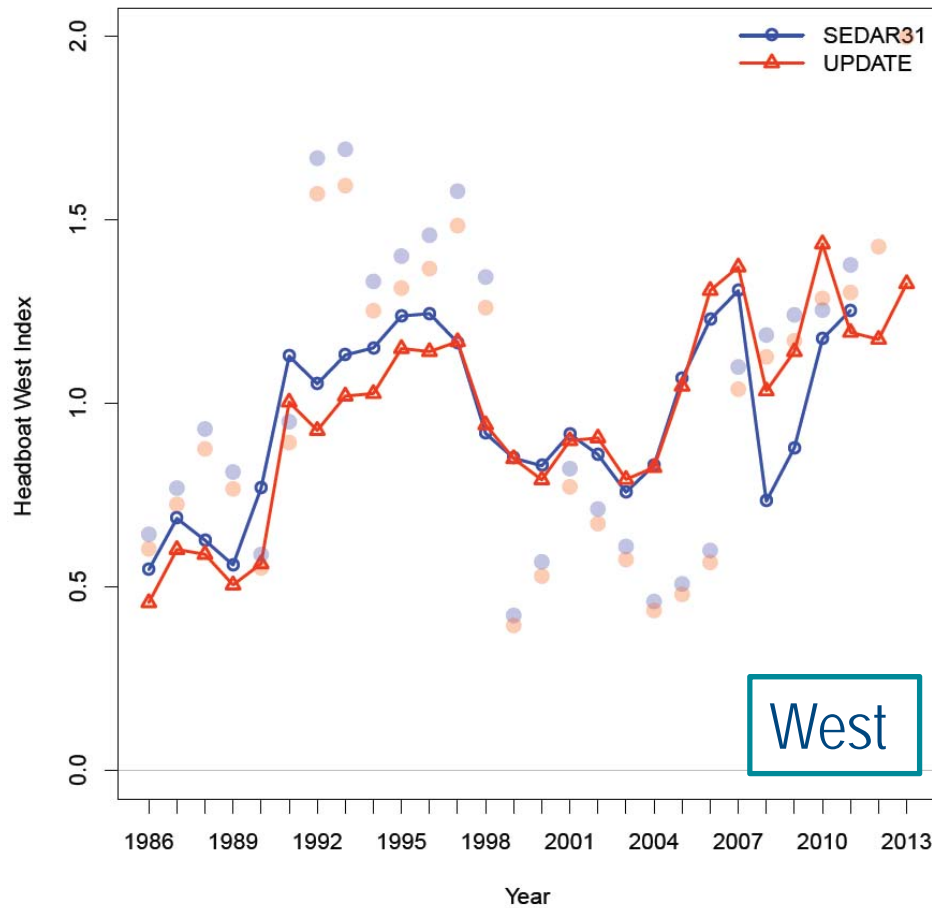
Fishery Dependent Indices of Abundance

- Commercial Handline



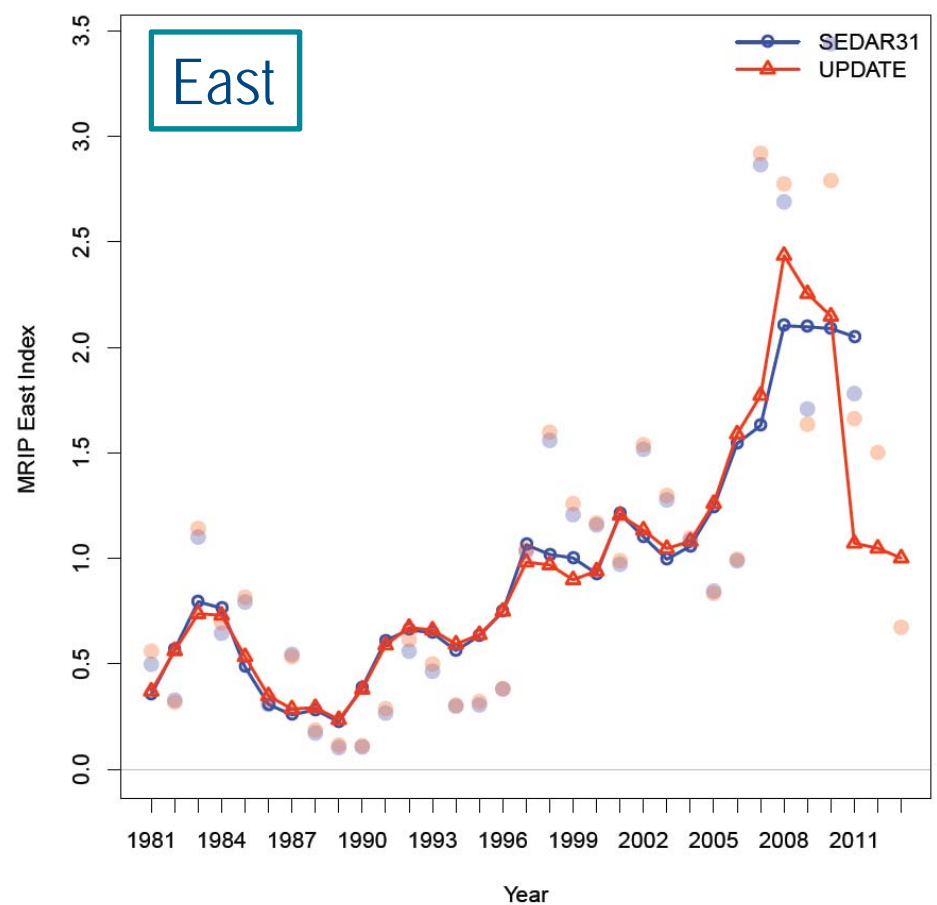
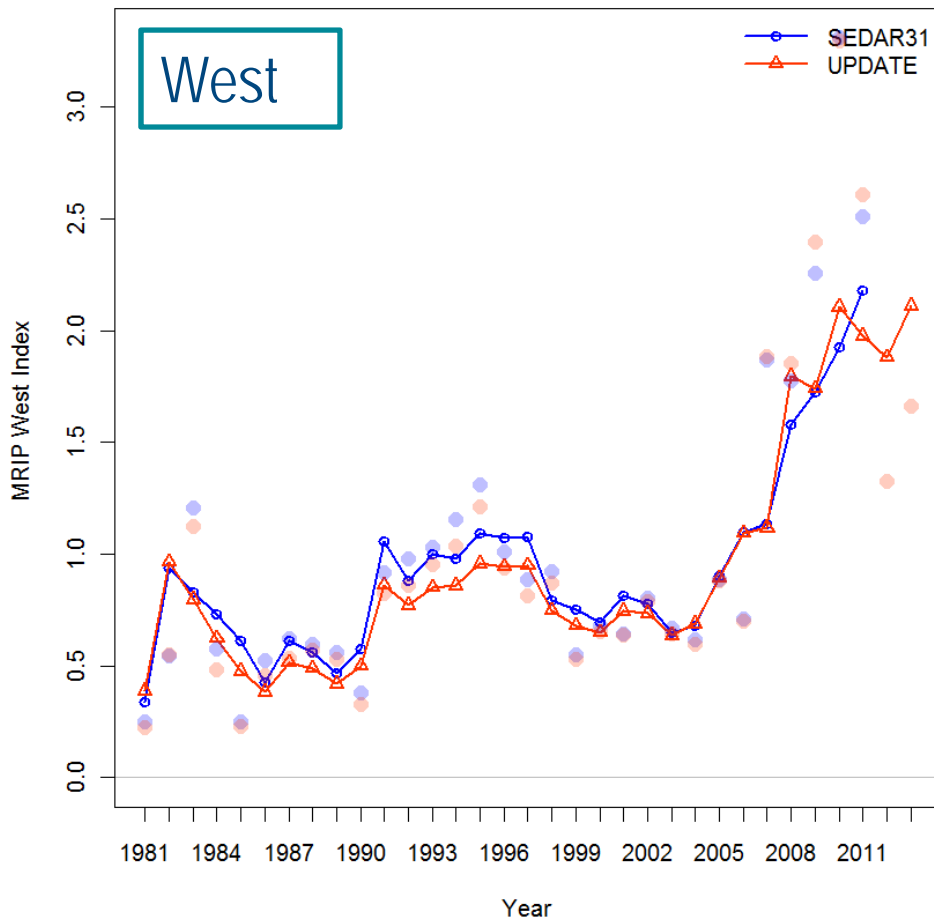
Fishery Dependent Indices of Abundance

- Recreational: Headboat



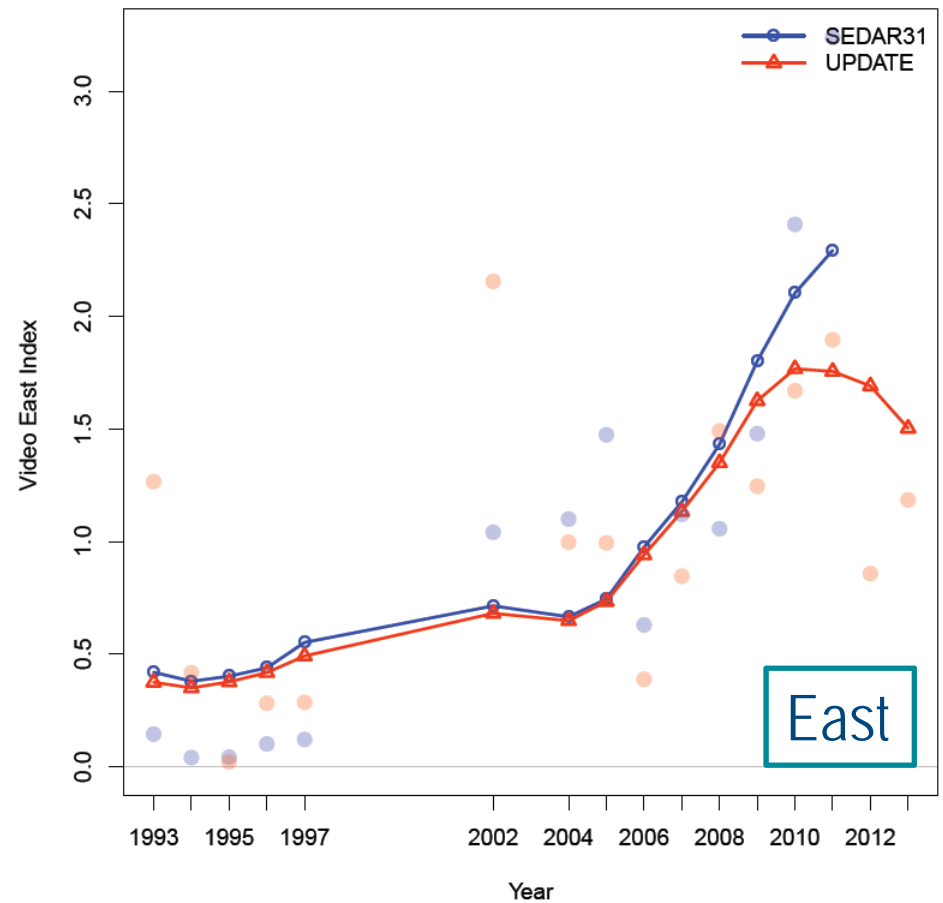
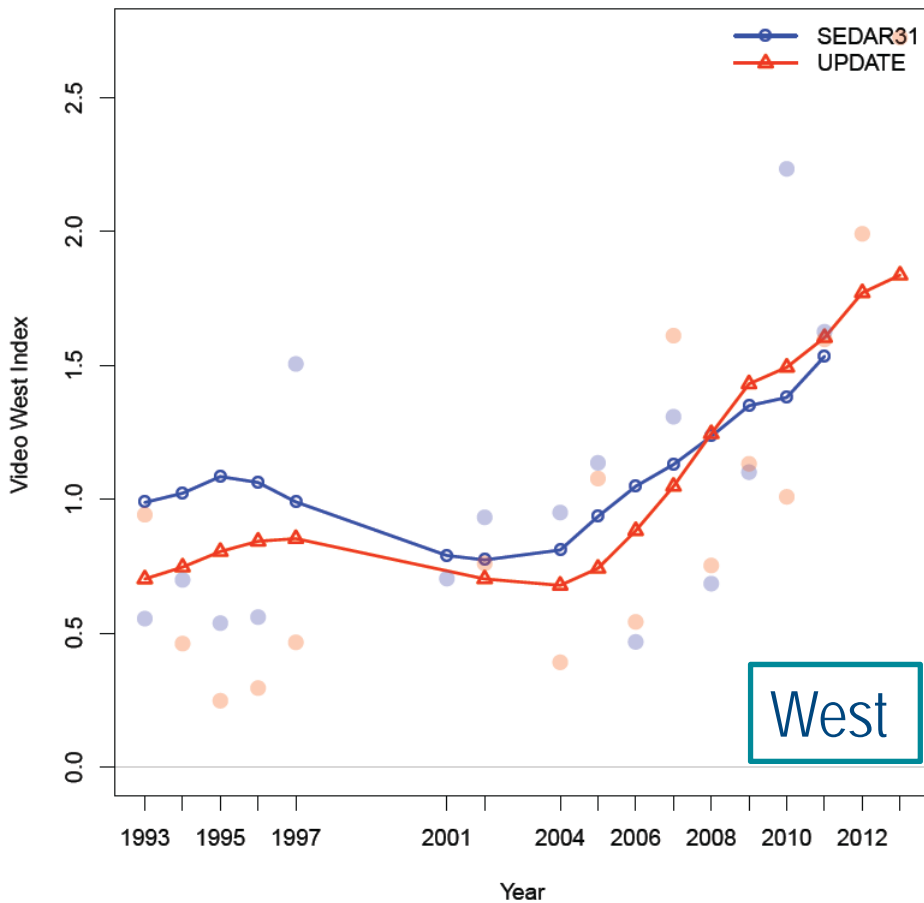
Fishery Dependent Indices of Abundance

- Recreational: MRIP Charter + Private



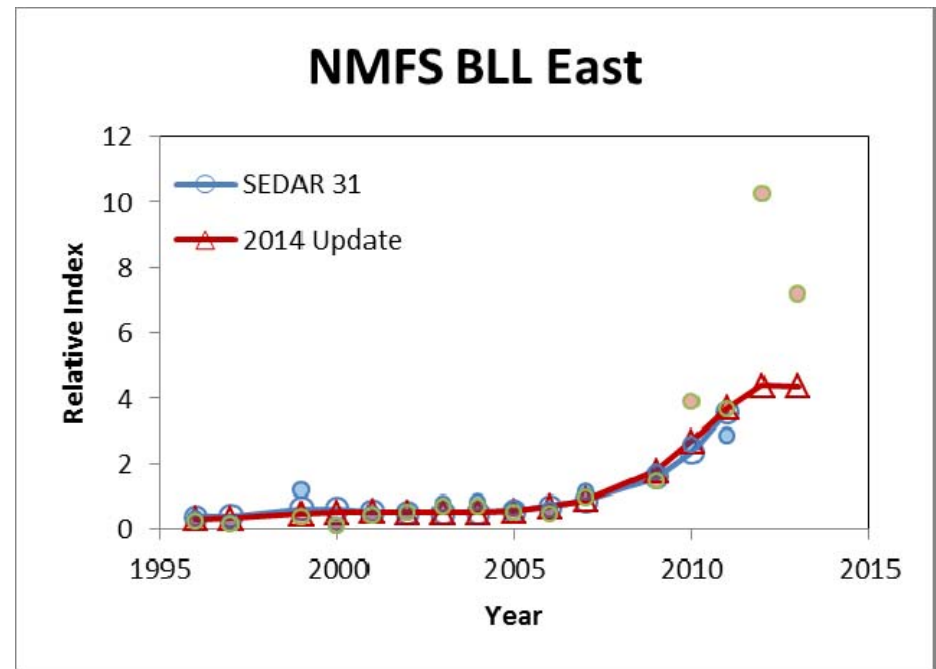
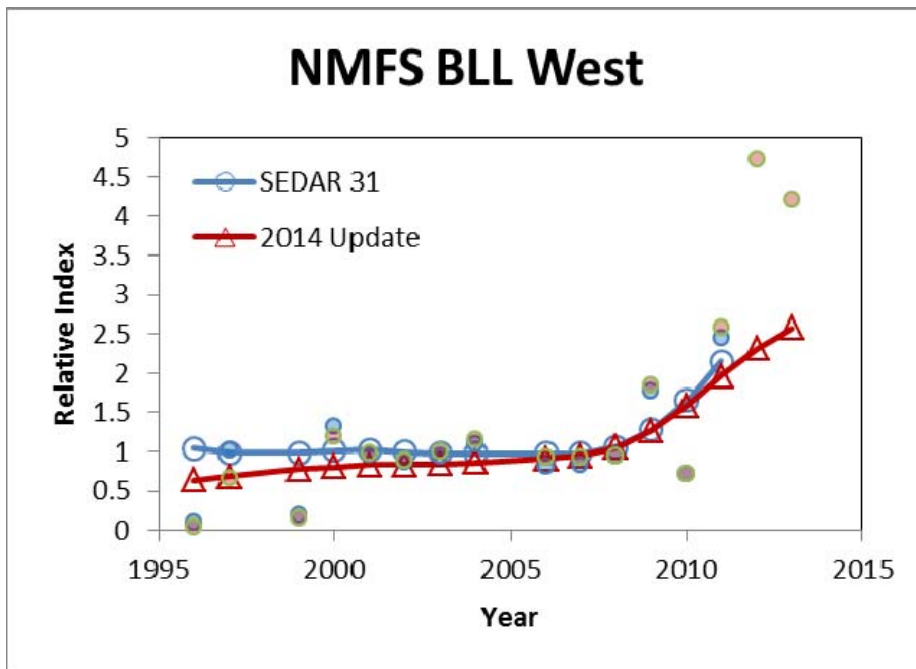
Fishery Independent Indices of Abundance

- SEAMAP Video Survey



Fishery Independent Indices of Abundance

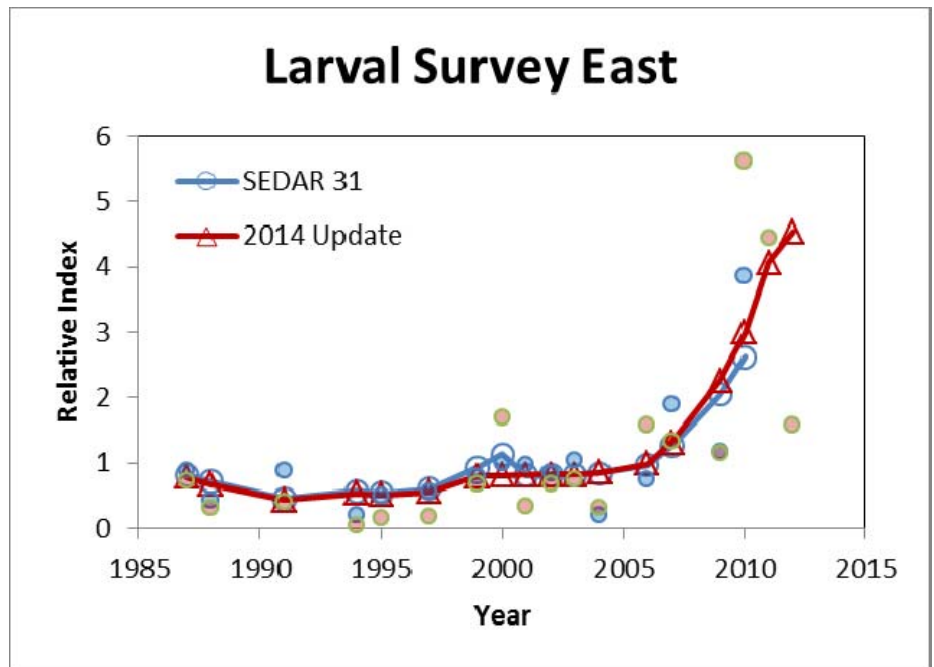
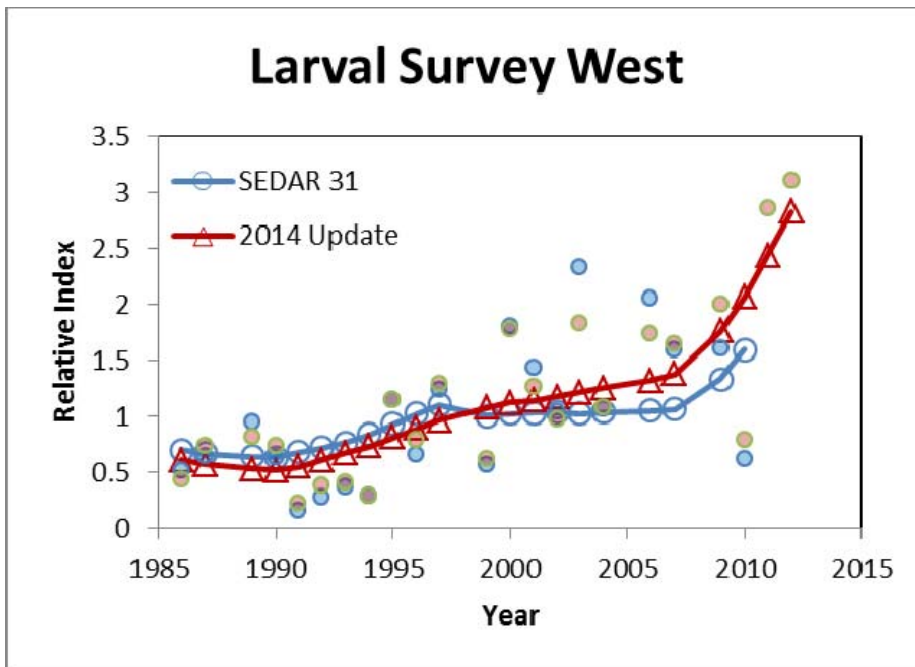
- NMFS Bottom Longline



*Rescaled to mean 1996-2011

Fishery Independent Indices of Abundance

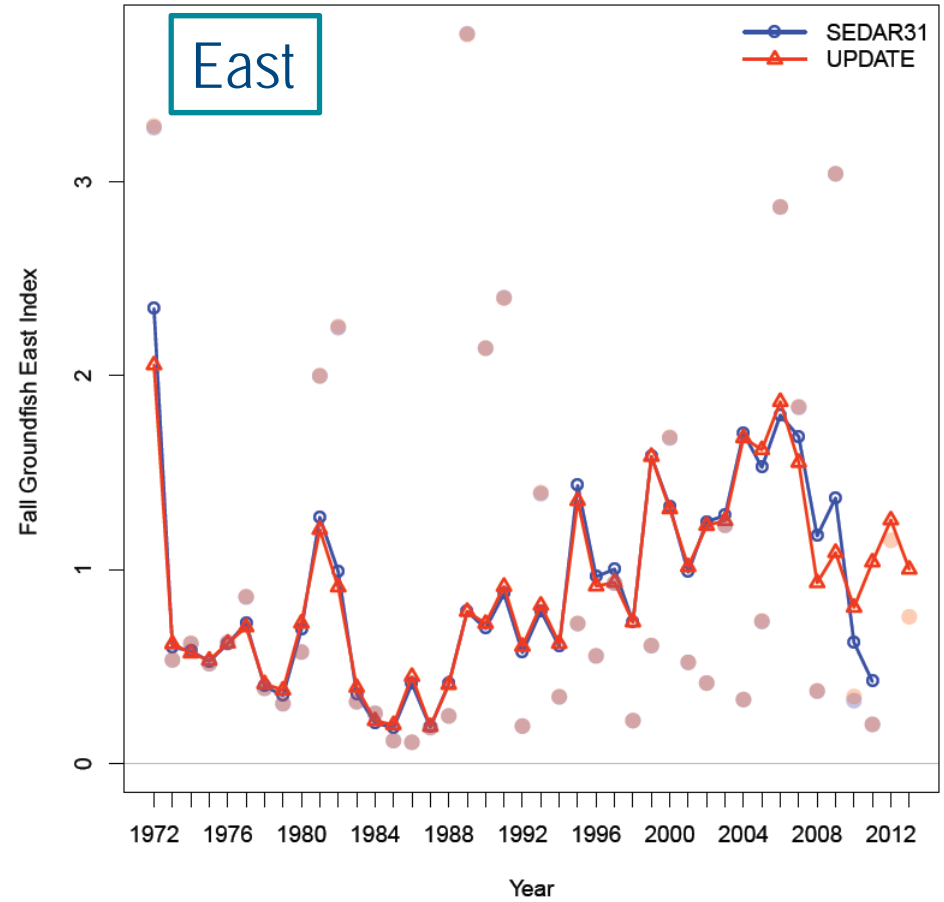
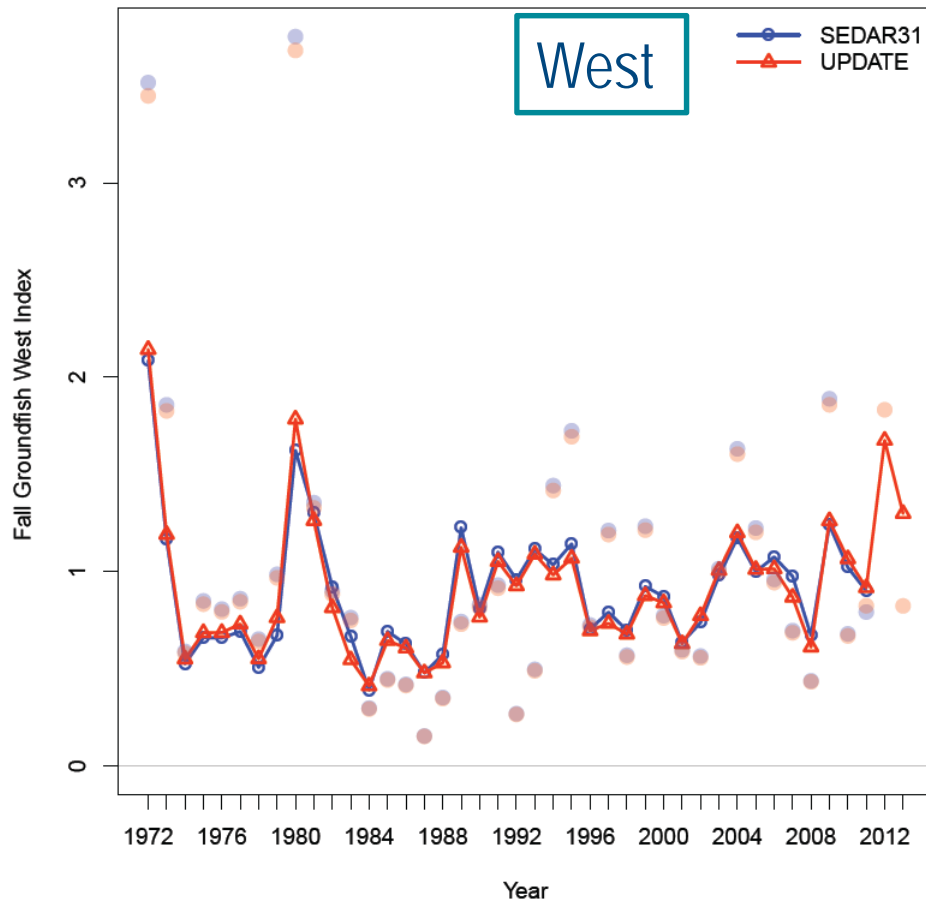
- Larval Survey: Used to Index SSB



*Rescaled to mean 1986-2010

Fishery Independent Indices of Abundance

- Fall Groundfish Survey used to index recruits



Fishery Independent Indices of Abundance

- Summer Groundfish Survey used to index recruits

