Review of Key Species in the Gulf of Mexico and their Suitability for Management Via Interim Assessment

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NOAA FISHERIES

- Southeast Fisheries Science Center

- Gulf of Mexico SSC Meeting
- September 17 – 18, 2019
- Tampa, FL

Interim Assessment

- Method for adjusting ACL between stock assessments using current data.

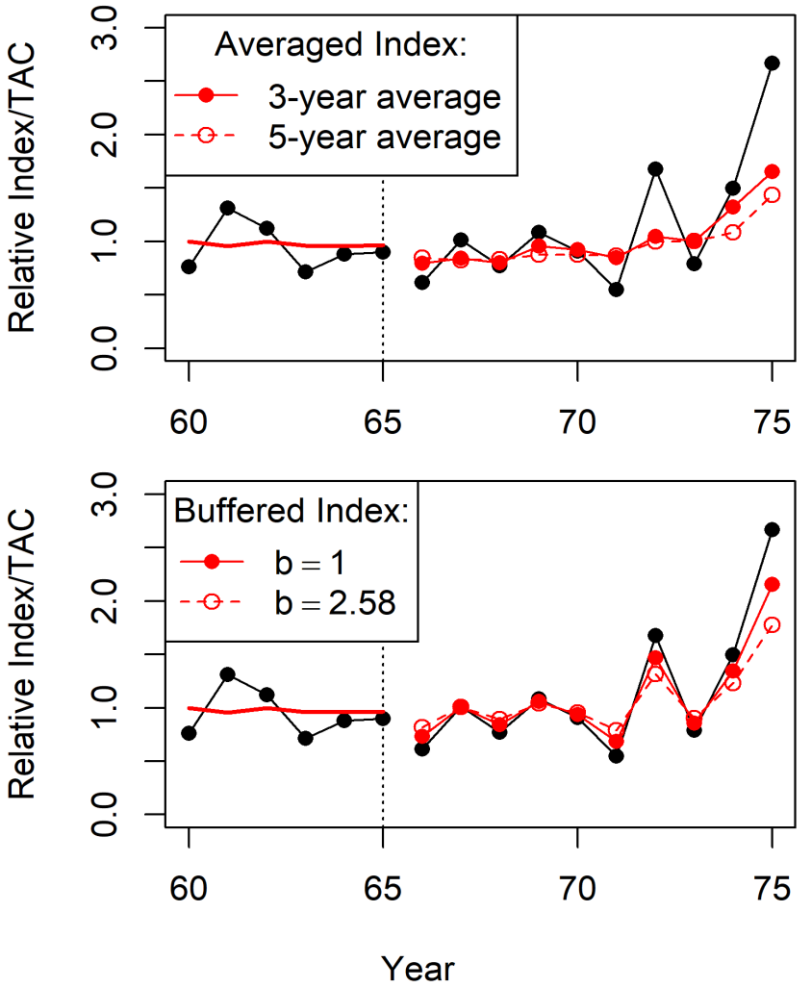
- Requires data, (Index or composition) that tracks trends in abundance.

- Requires management procedures (MP's) that adjust ACL while accounting for uncertainty.

Interim Assessment MP's

- Simple rules that adjust ACL while buffering against uncertainty.

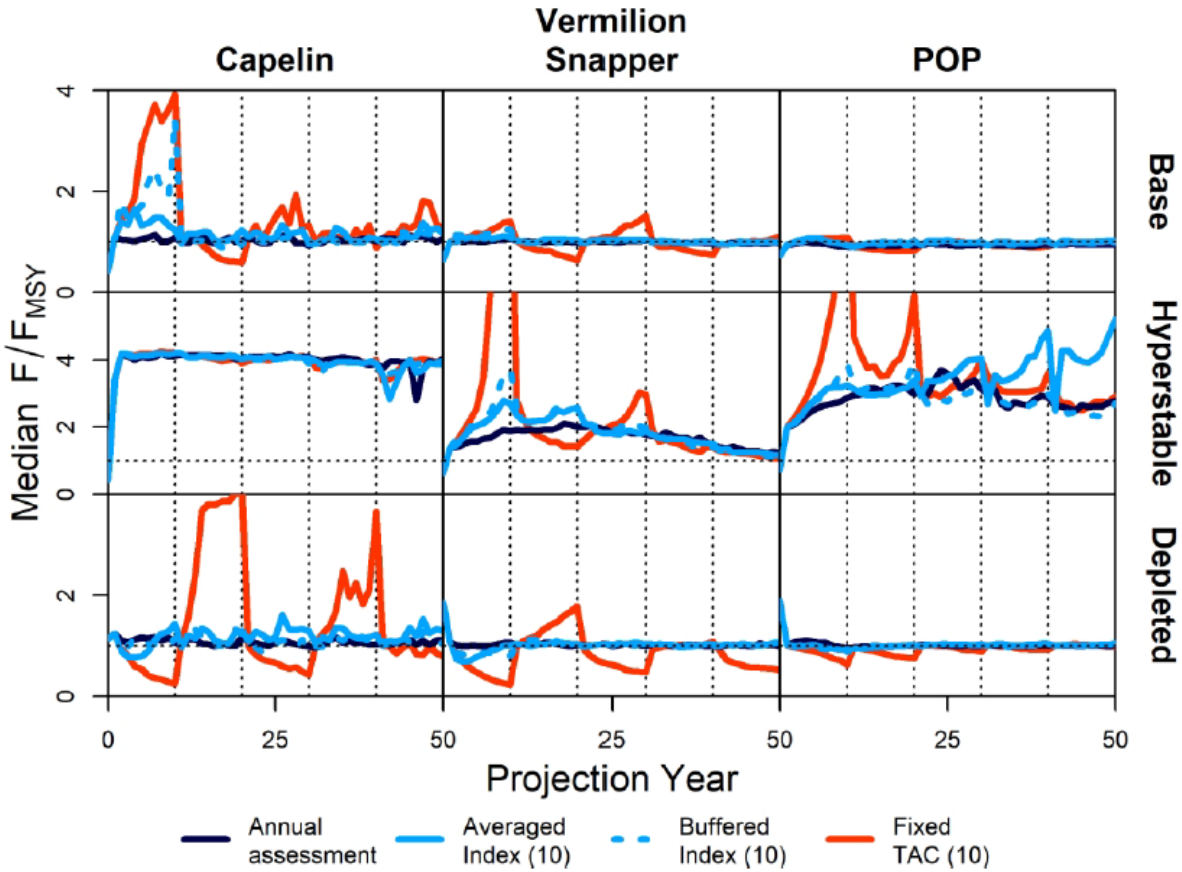
$$TAC_{y+1} = \begin{cases} C_{\text{ref}}, & \text{if } y \text{ is an assessment year} \\ C_{\text{ref}} \dfrac{I_y + b\sigma}{I_{\text{ref}} + b\sigma}, & \text{otherwise} \end{cases}$$



Huynh, Q.C., et al. (under review). The interim management procedure approach for assessed stocks: responsive management advice and lower assessment frequency. Fish and Fisheries.

Interim Assessment MP's

- Many possible MP's.
- Relative performance of MP's must be evaluated on stock by stock basis.
- What matters most? Overfishing, overfished, rebuilding, Yield stability, …



Huynh, Q.C., et al. (under review). The interim management procedure approach for assessed stocks: responsive management advice and lower assessment frequency. Fish and Fisheries.

Timeline for IA Implementation

- 3 phases of development
  - 1) Identify species suitable for interim assessment. (ongoing)
  - 2) Use suboptimal, but available MSE capabilities to do initial simulation testing of select index/MP options. (Spring 2020)
  - 3) Develop SS3 MSE capabilities and begin thorough simulation testing. (2021/2022)

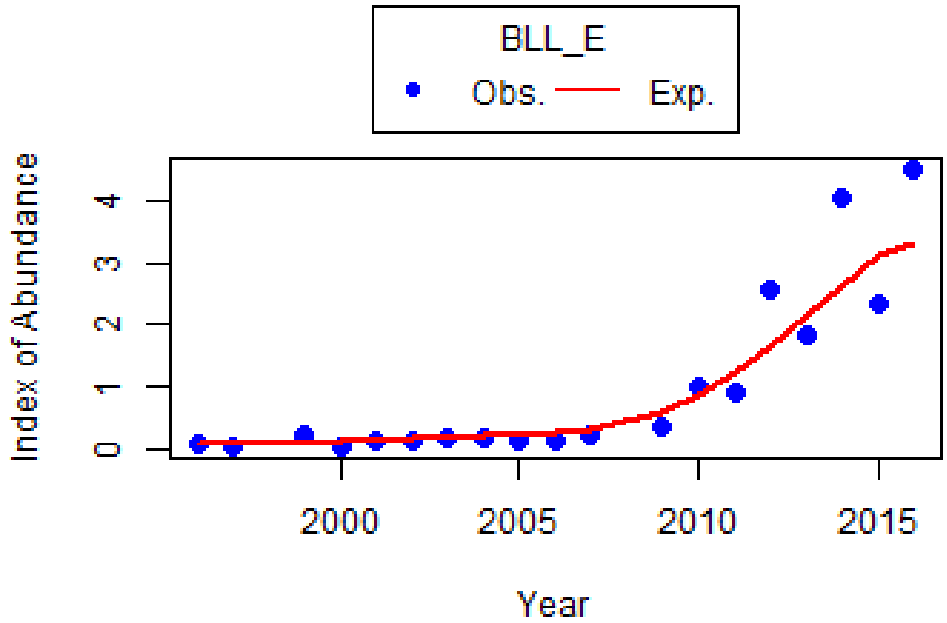
Phase 1 – Candidate Index ID

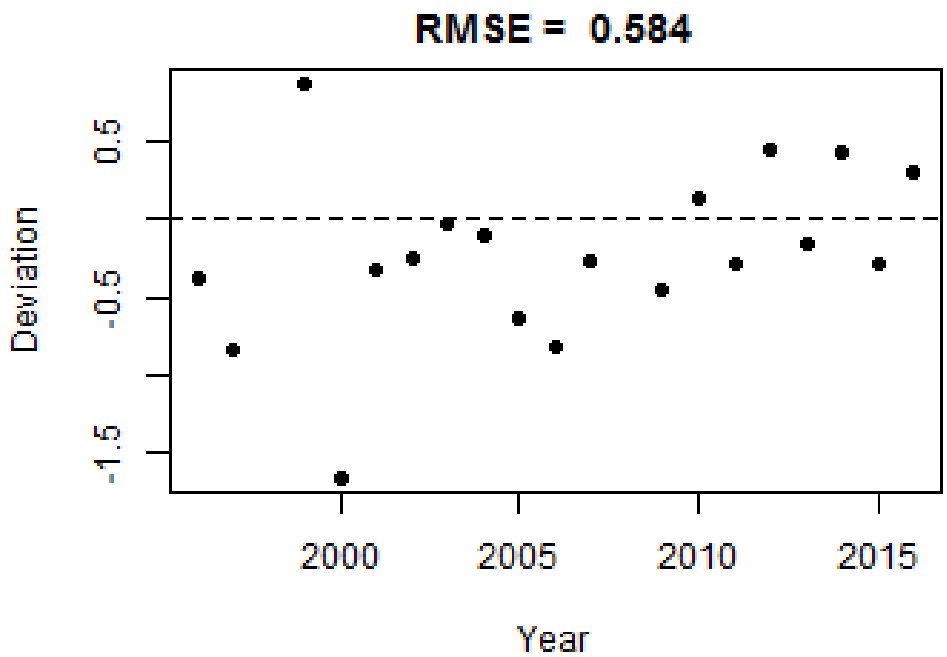
- Red Snapper (SEDAR 52, 2016)
- Vermilion Snapper (SEDAR 45, 2014)
- Gray Snapper (SEDAR 51, 2015)
- Red Grouper (SEDAR 61, 2017)
- Gag Grouper (SEDAR 33, 2015)
- Gray Trigger (SEDAR 43, 2013)
- King Mackerel (SEDAR 38, 2012)
- Greater Amberjack (SEDAR 33 update, 2015)

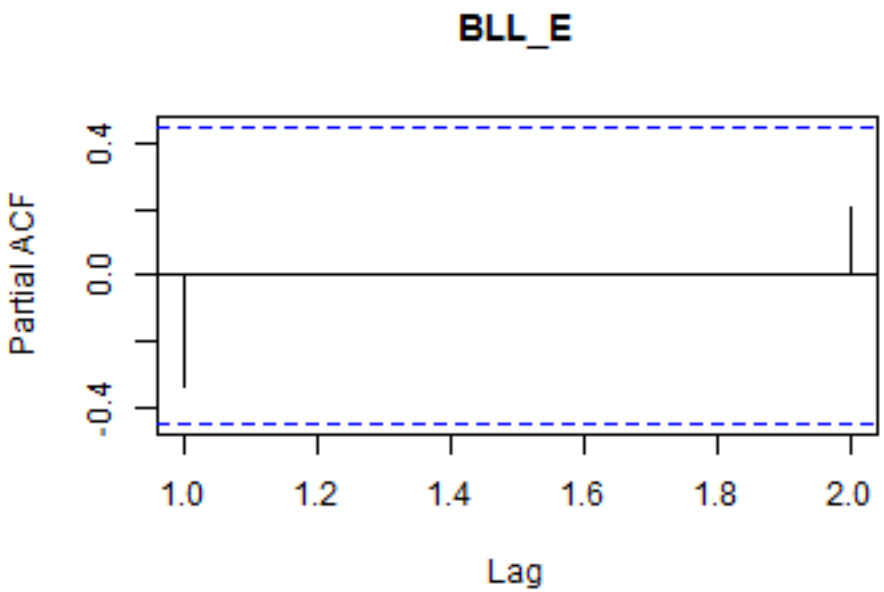
- Fisheries independent index preferred.
- Fisheries dependent index considered if no or few FI indices available
- Variability and auto-correlation quantified to aid selection.
- Final index or index combination can only be determined through MSE simulation testing

Red Snapper

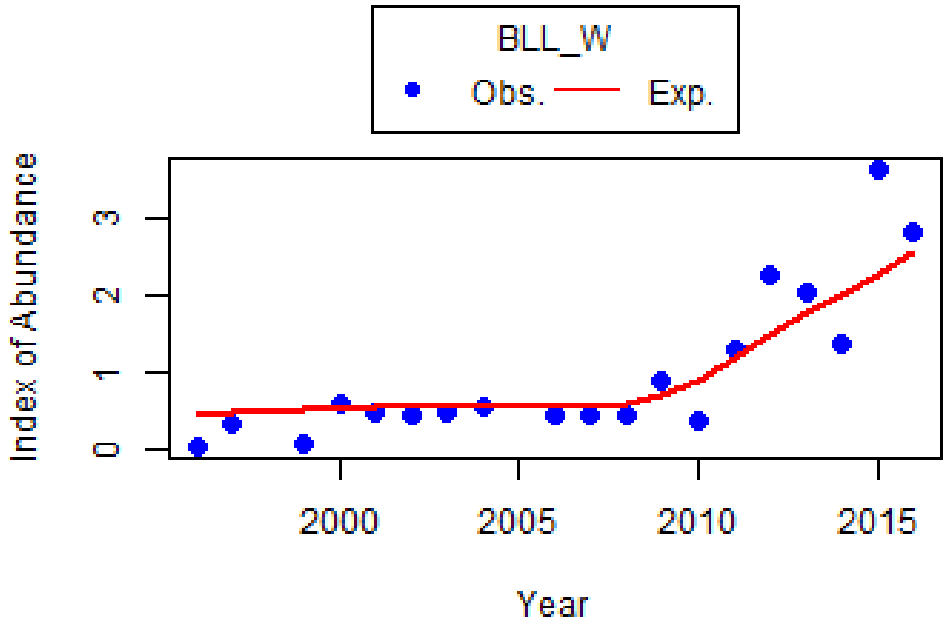
- Red Snapper
- East Gulf Bottom Longline Survey

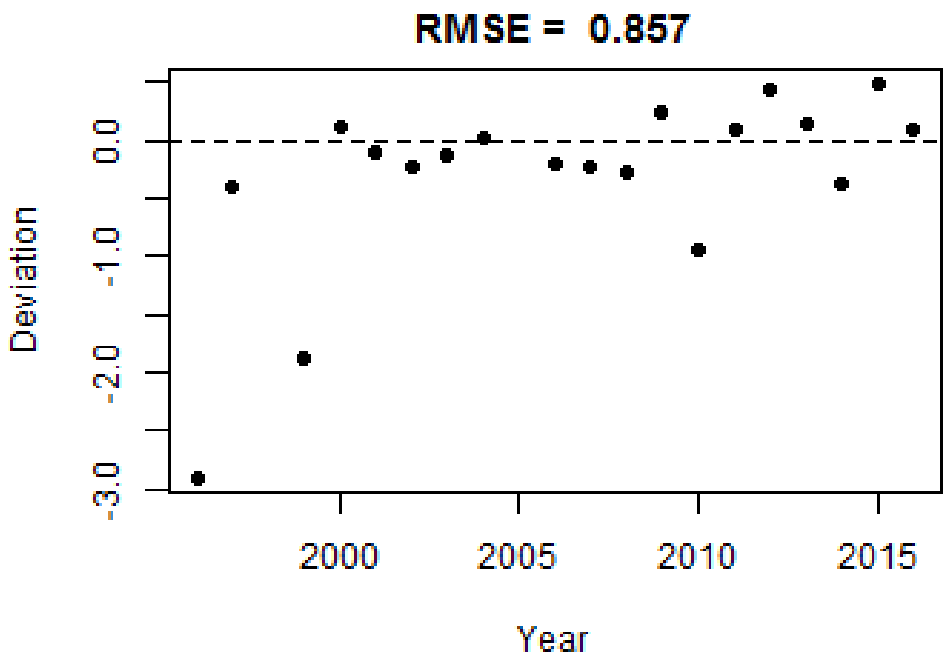


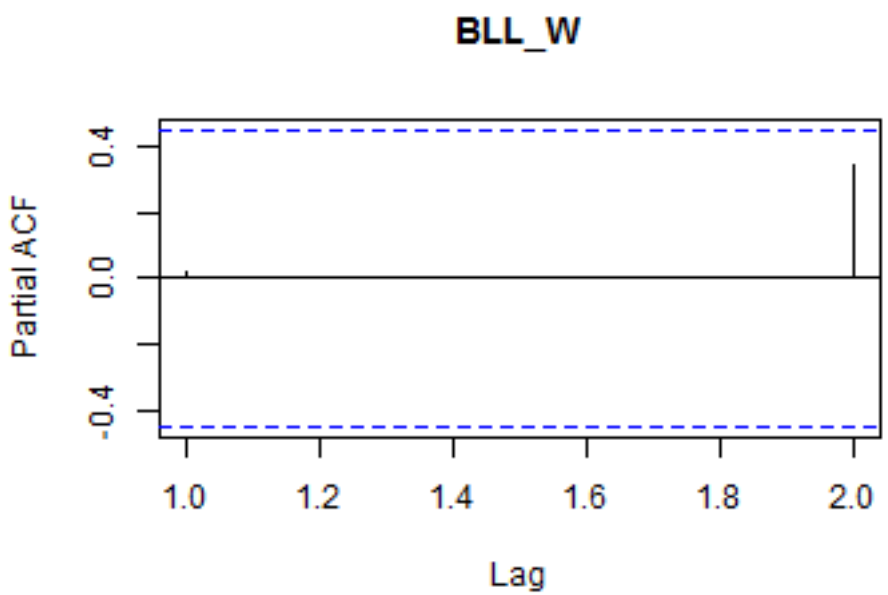




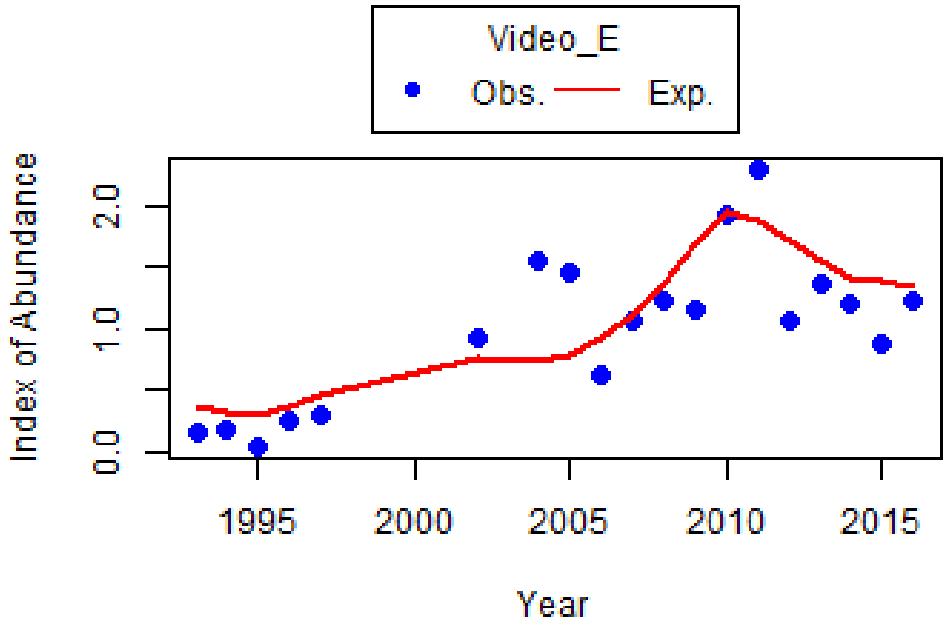
- Red Snapper
- West Gulf Bottom Longline Survey

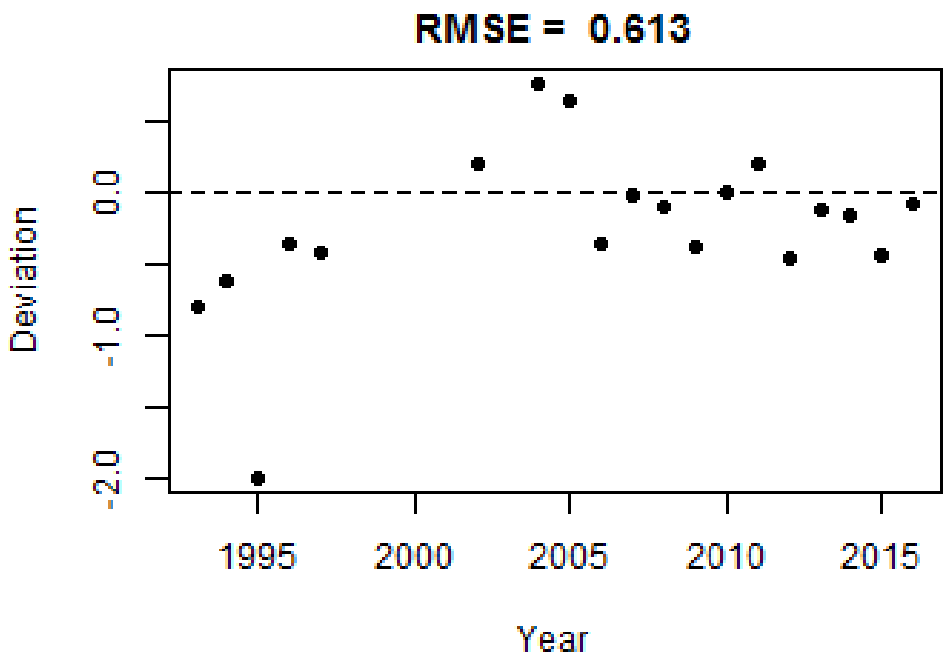


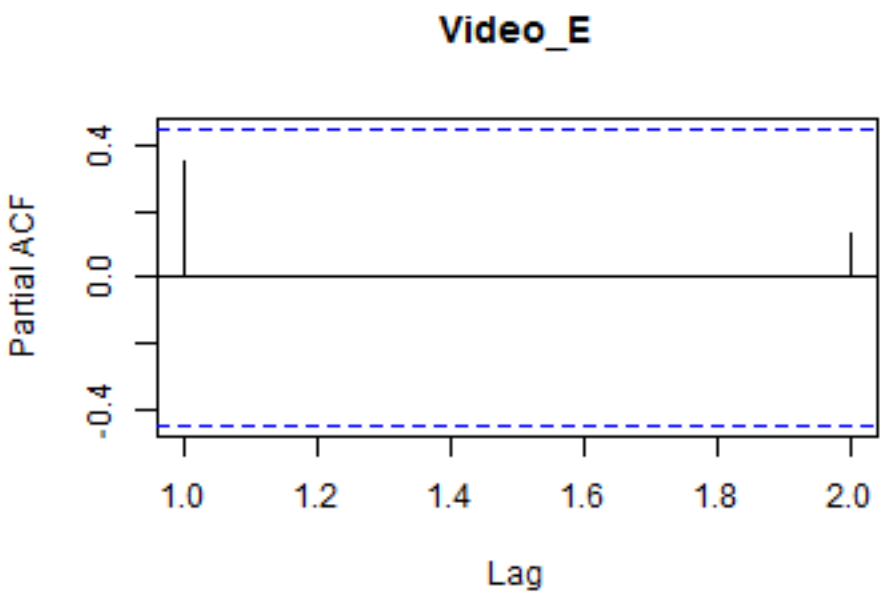




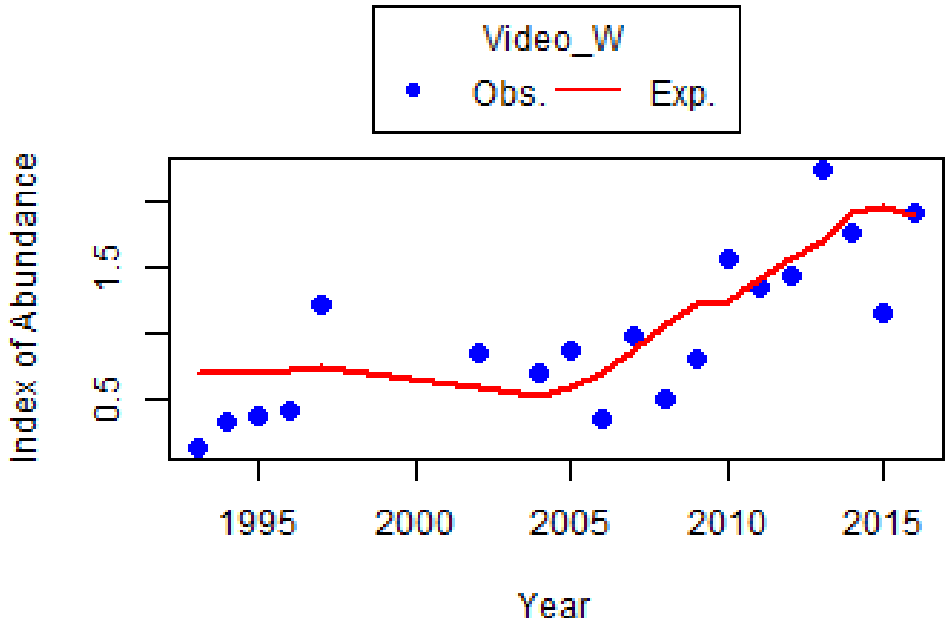
- Red Snapper
- East Gulf Video Survey

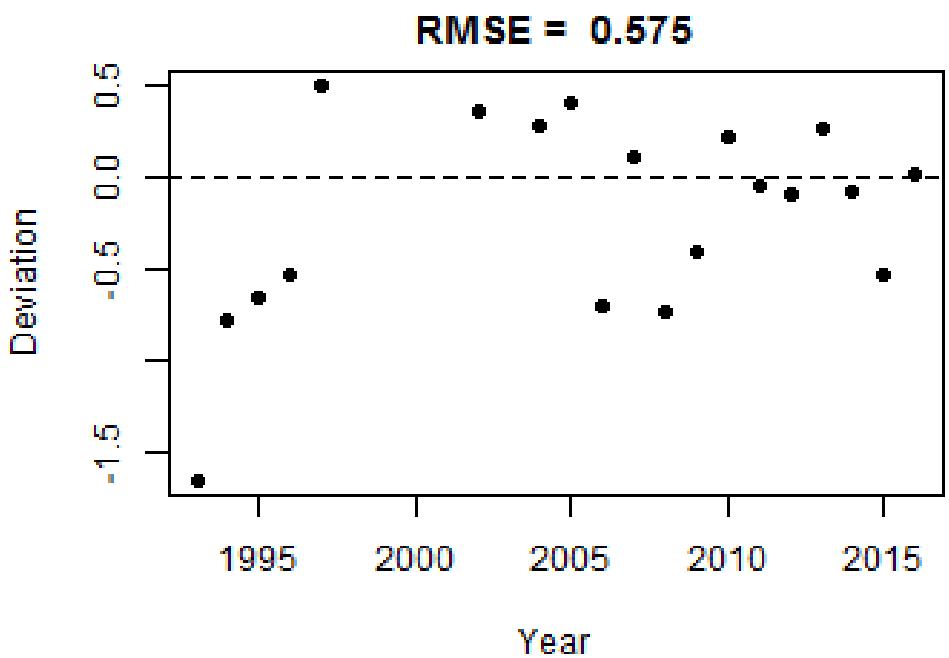


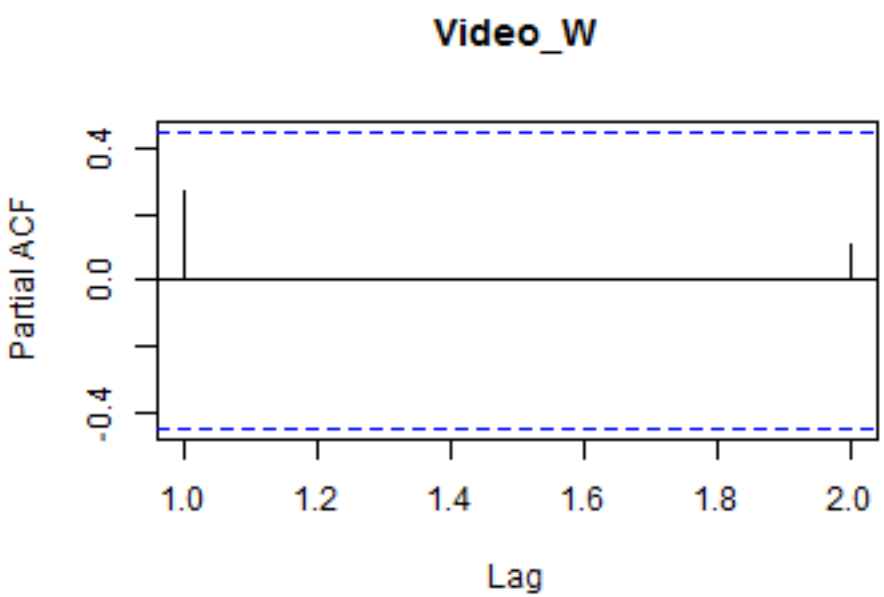




- Red Snapper
- Western Gulf Video Survey

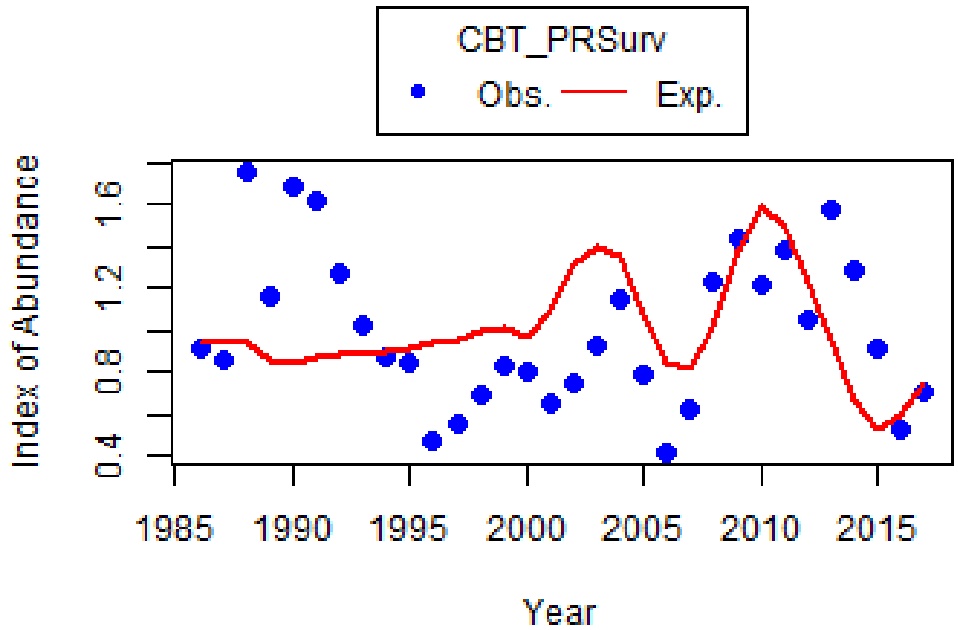


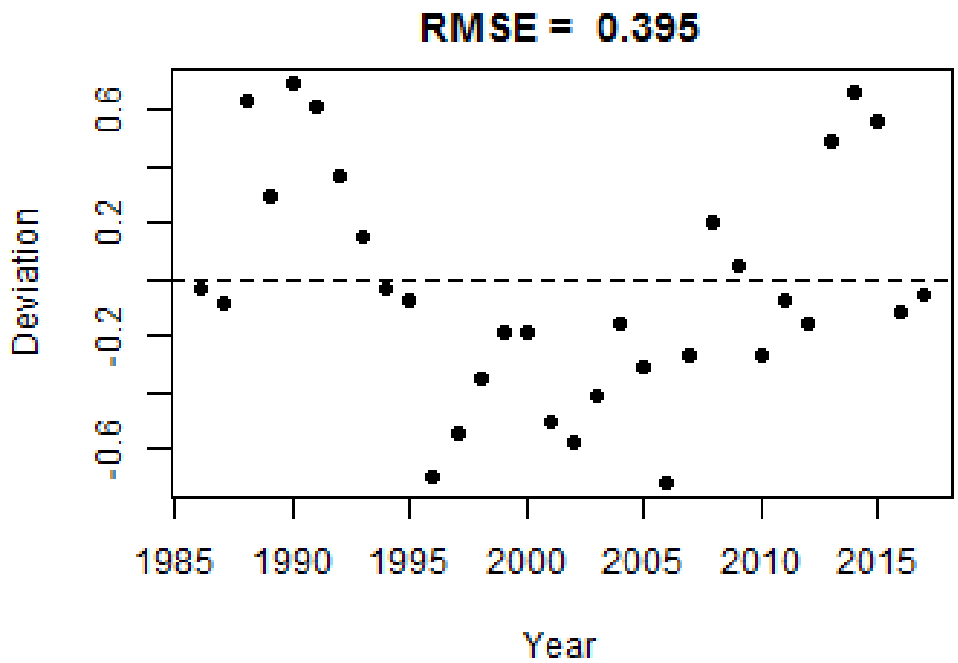


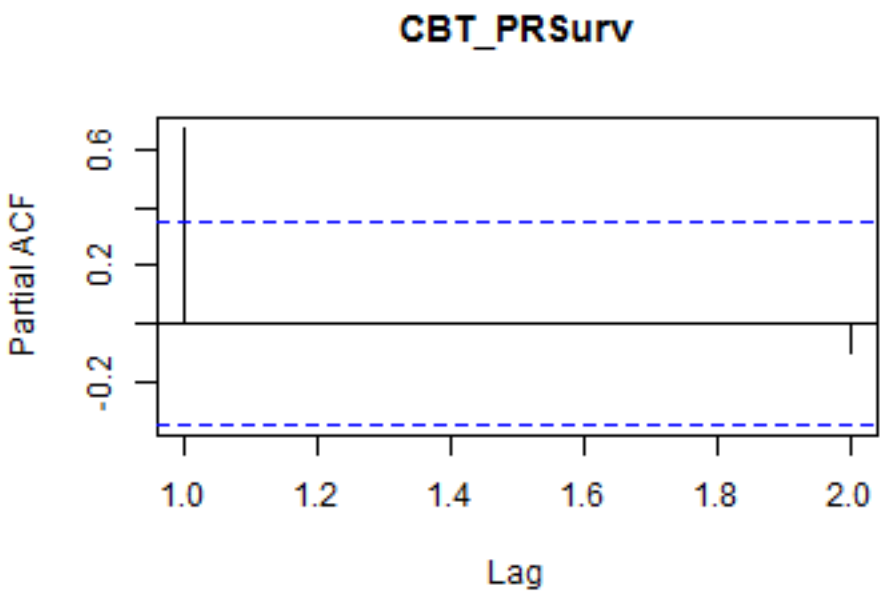


Red Grouper

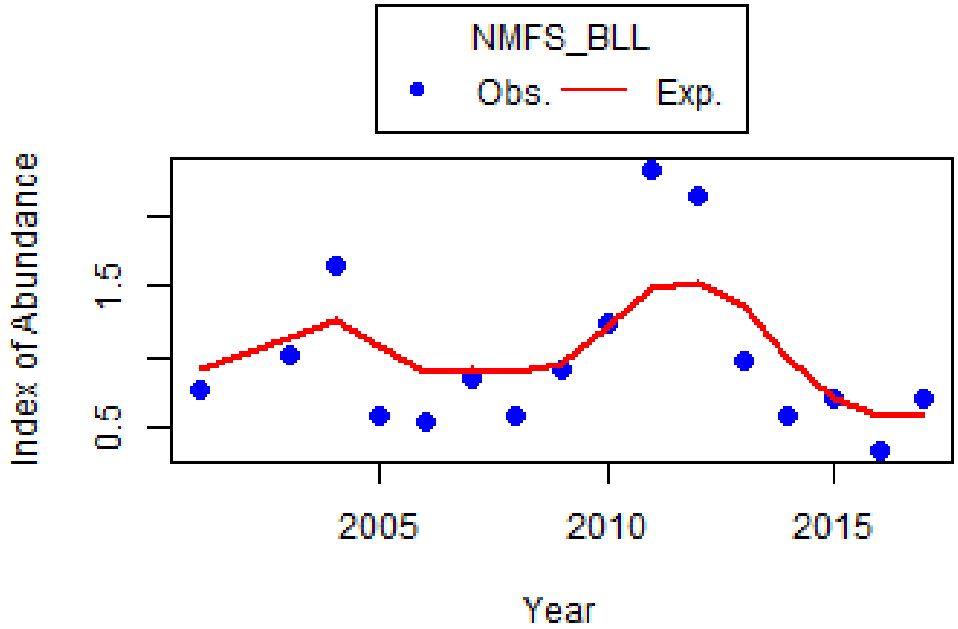
- Red Grouper
- MRIP survey

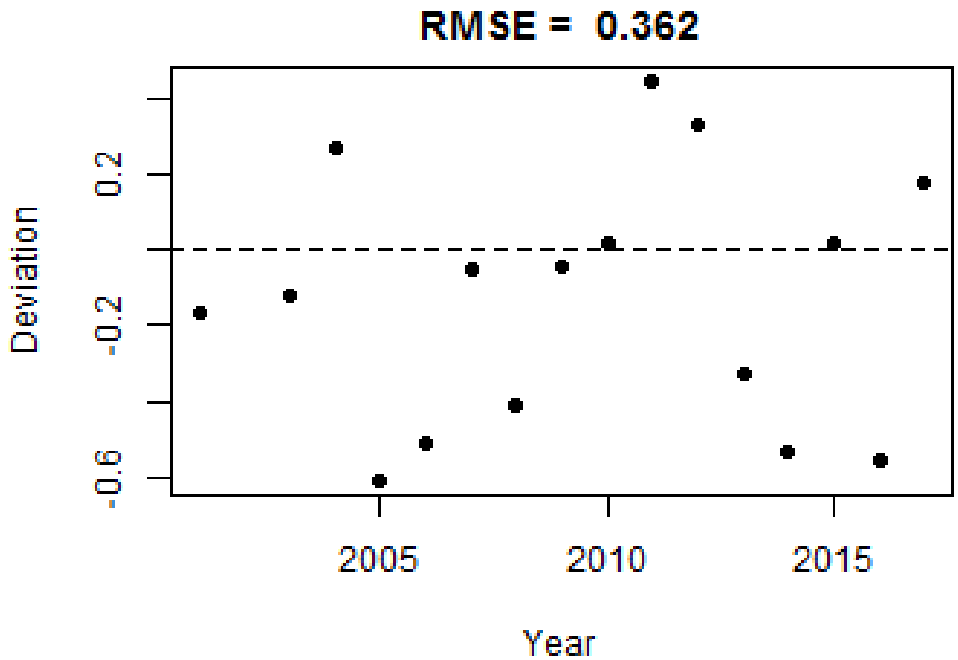


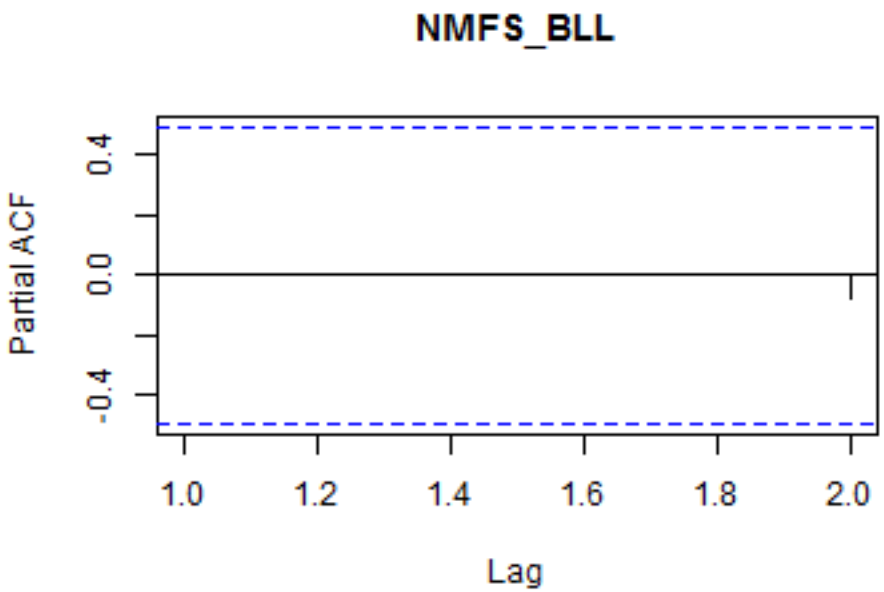




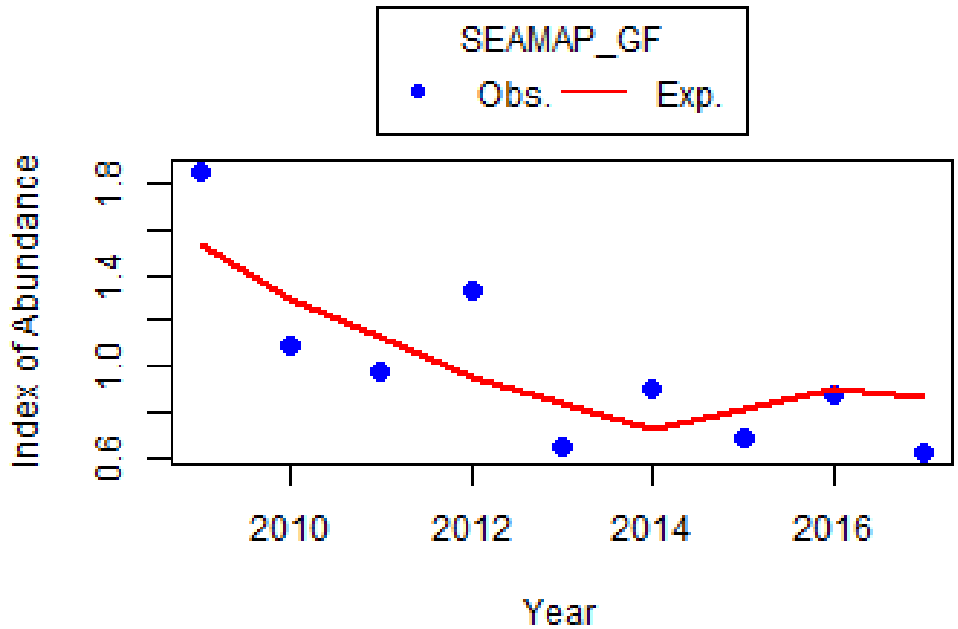
- Red Grouper
- Bottom Longline survey

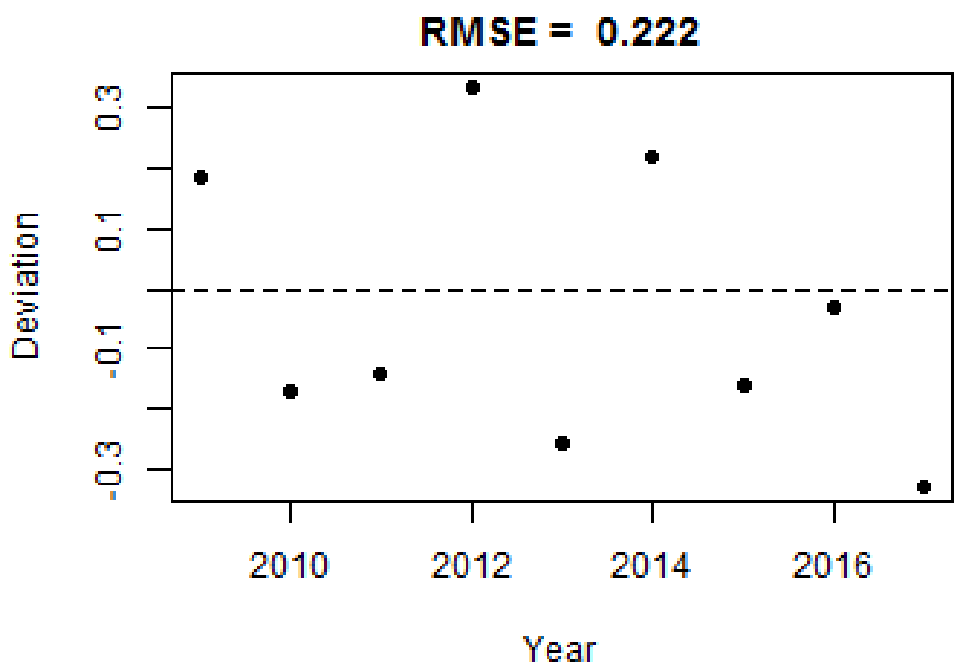


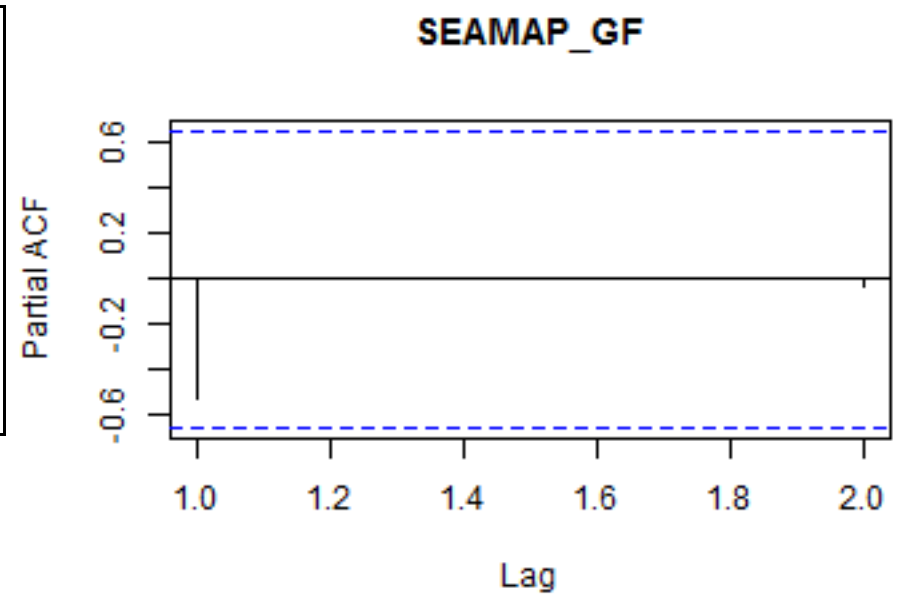




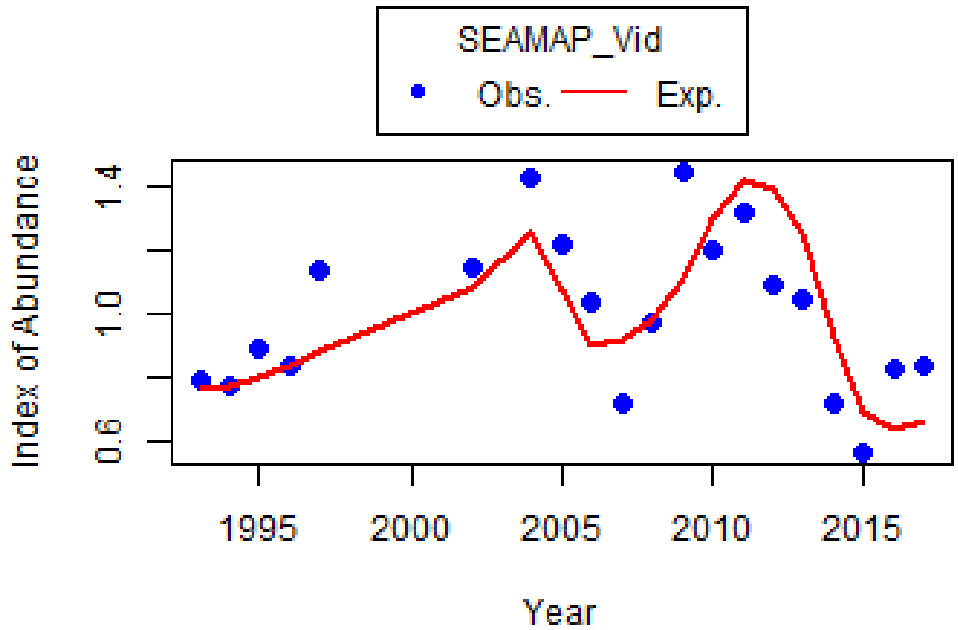
- Red Grouper
- SEAMAP Groundfish

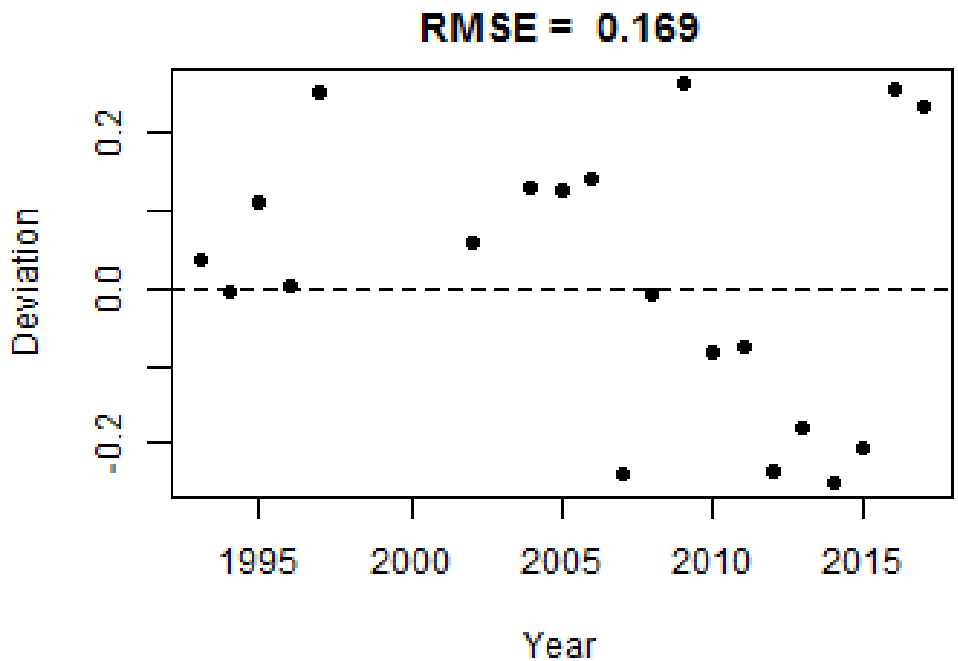


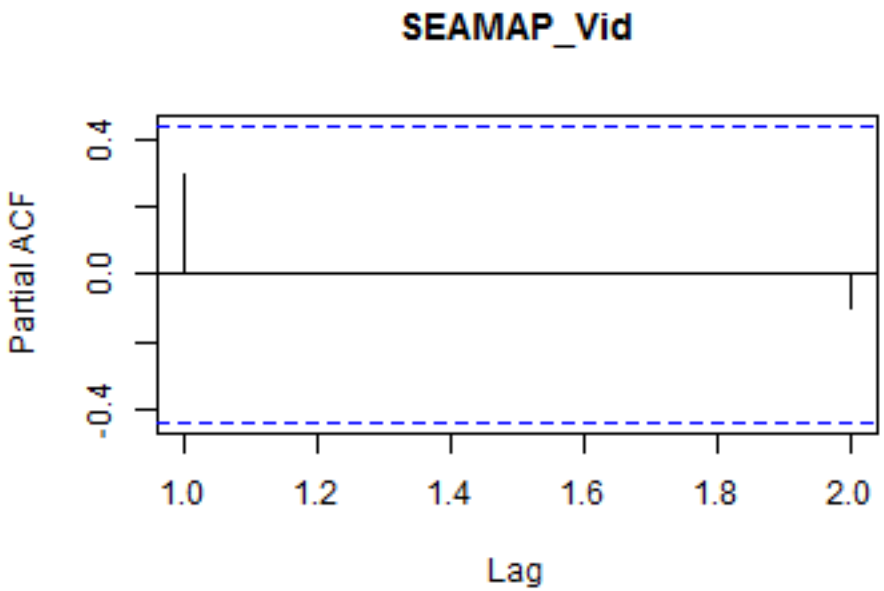




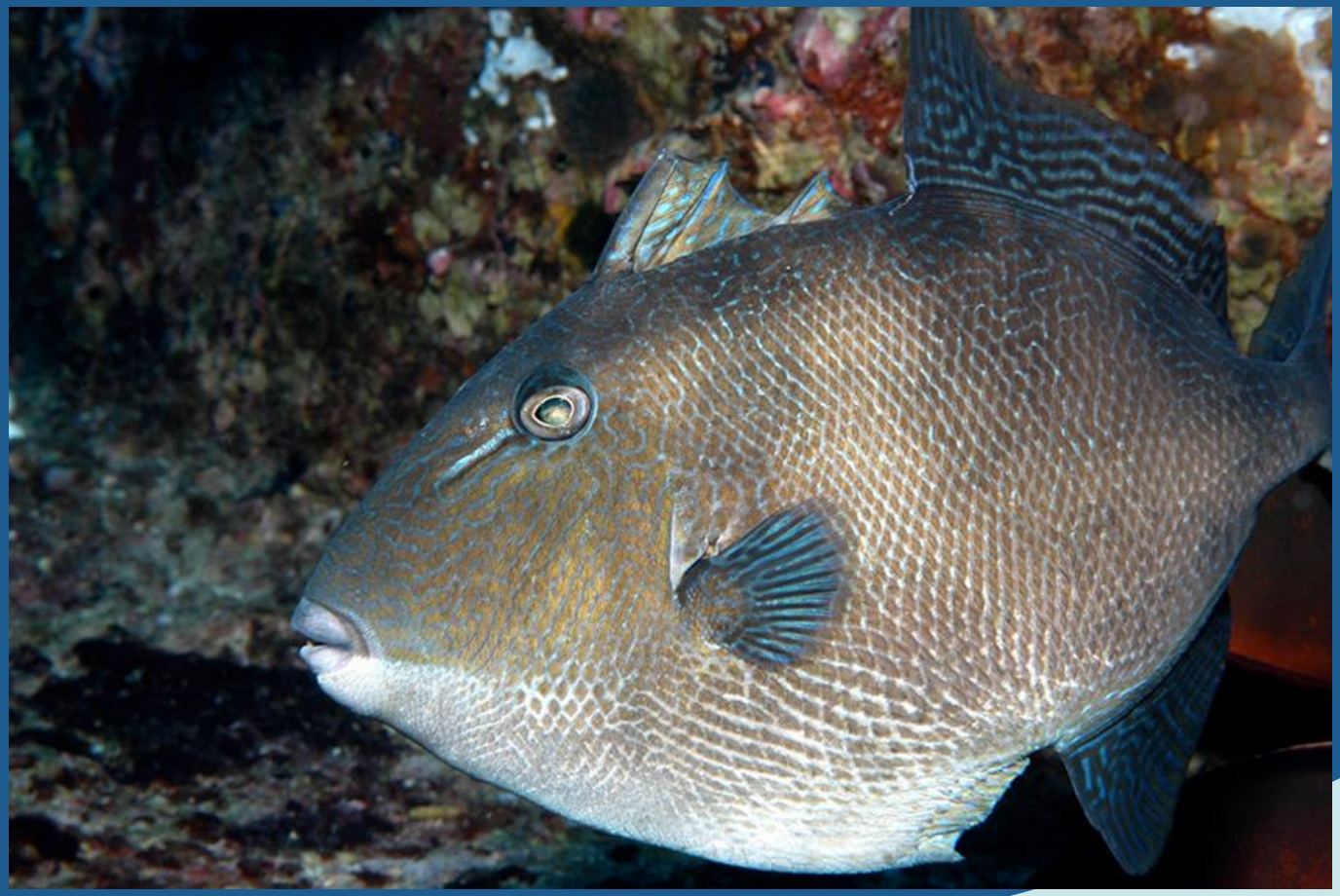
- Red Grouper
- SEAMAP Video



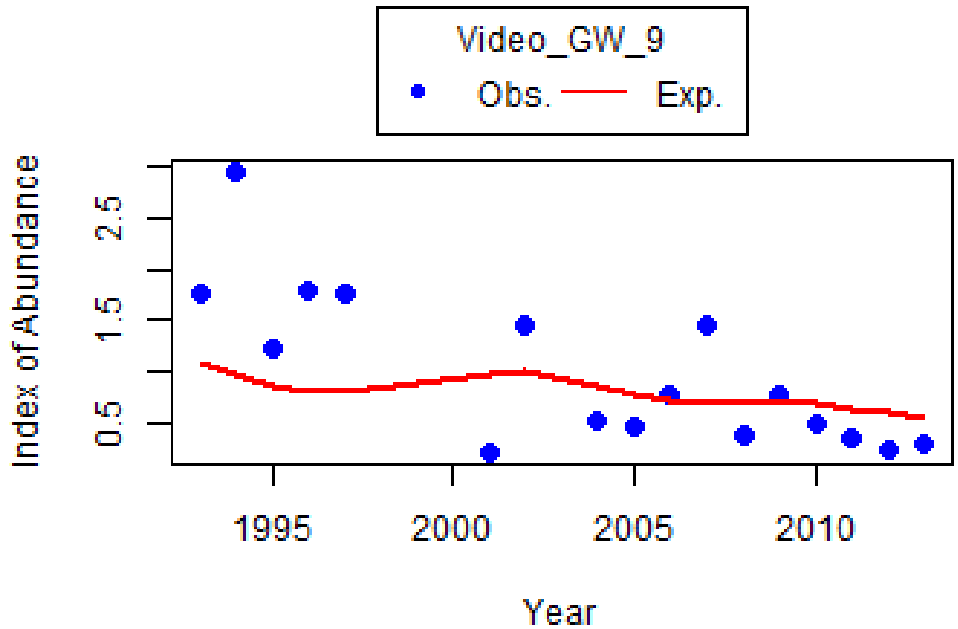


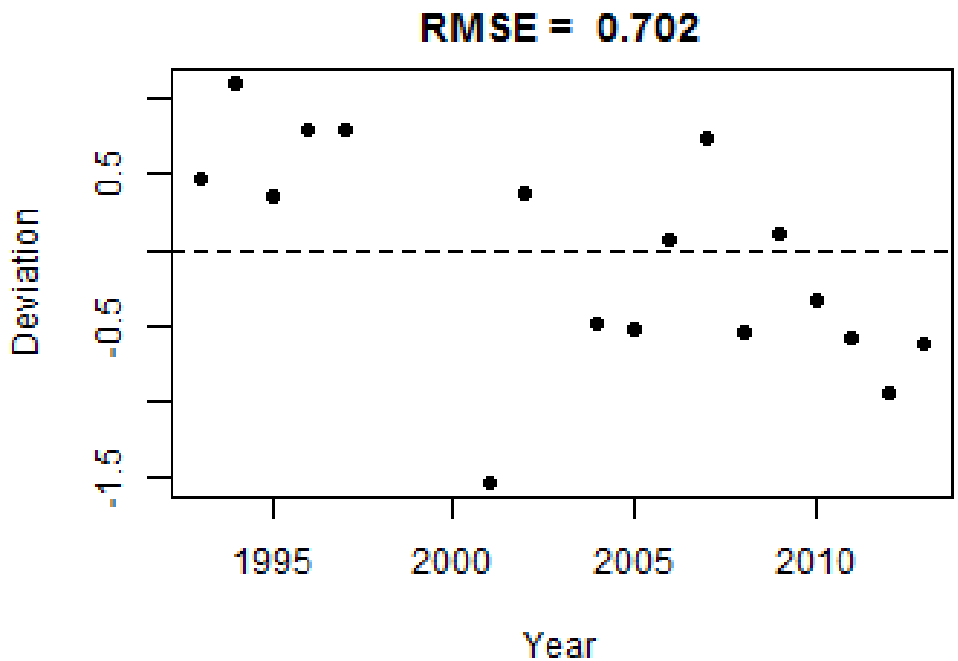


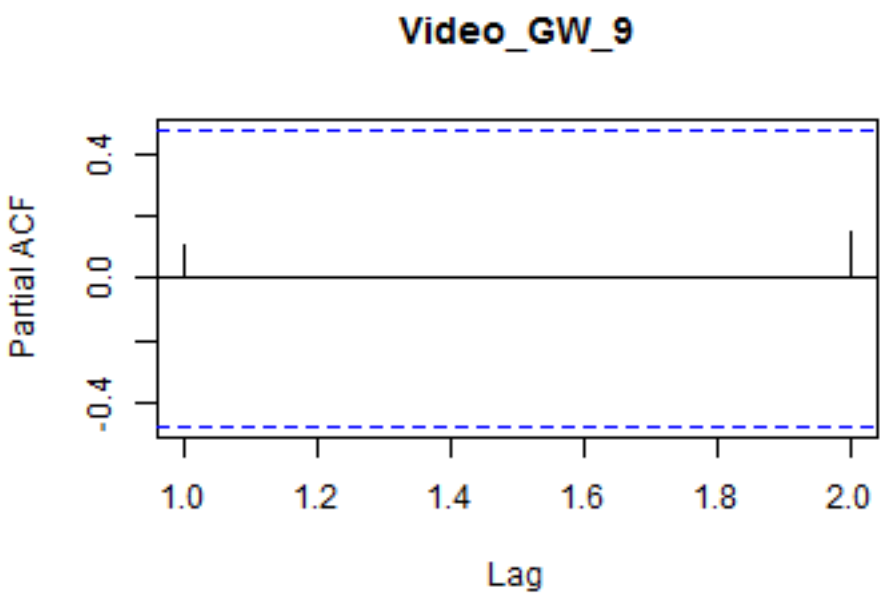
Gray Triggerfish



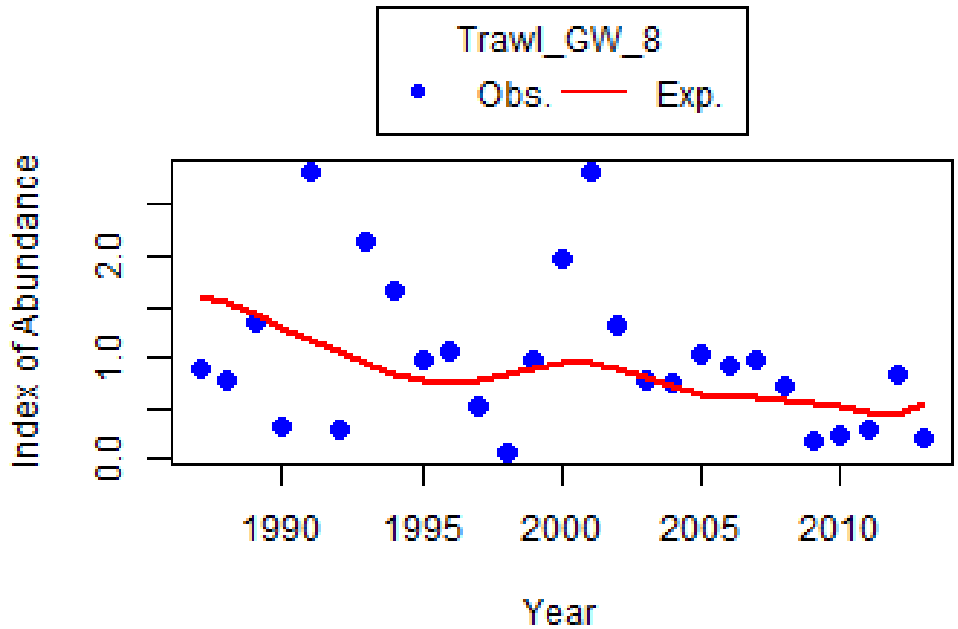
- Gray Triggerfish
- Video Survey

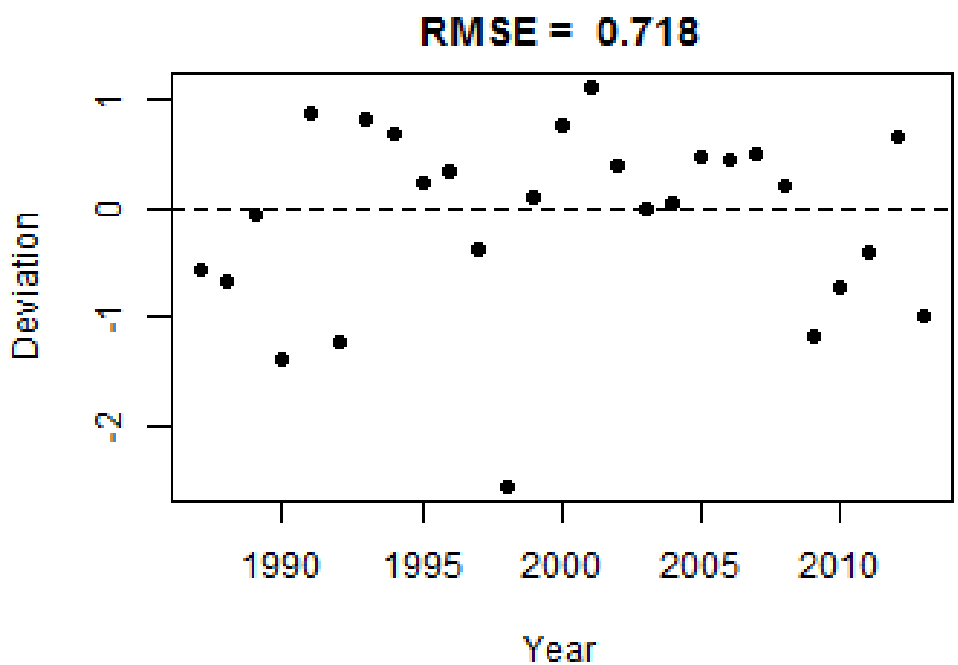


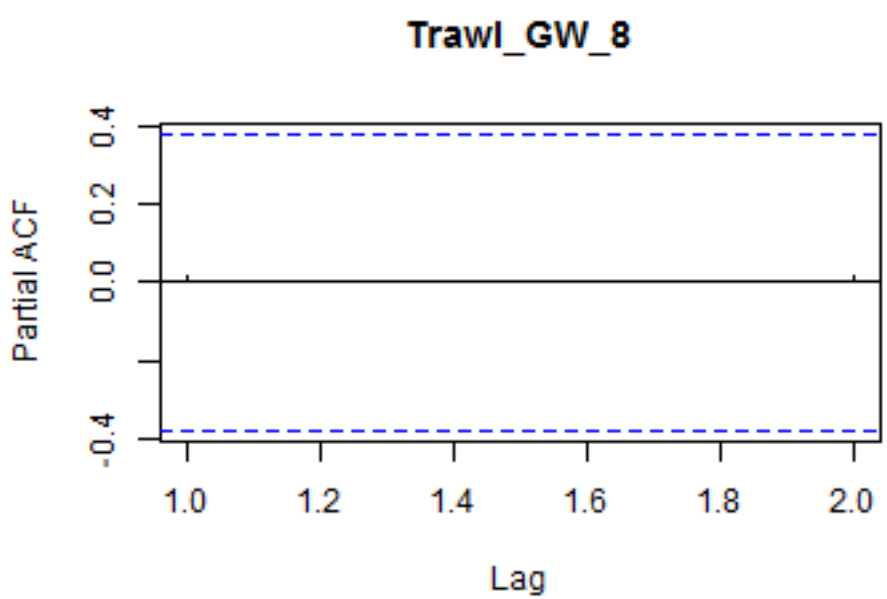




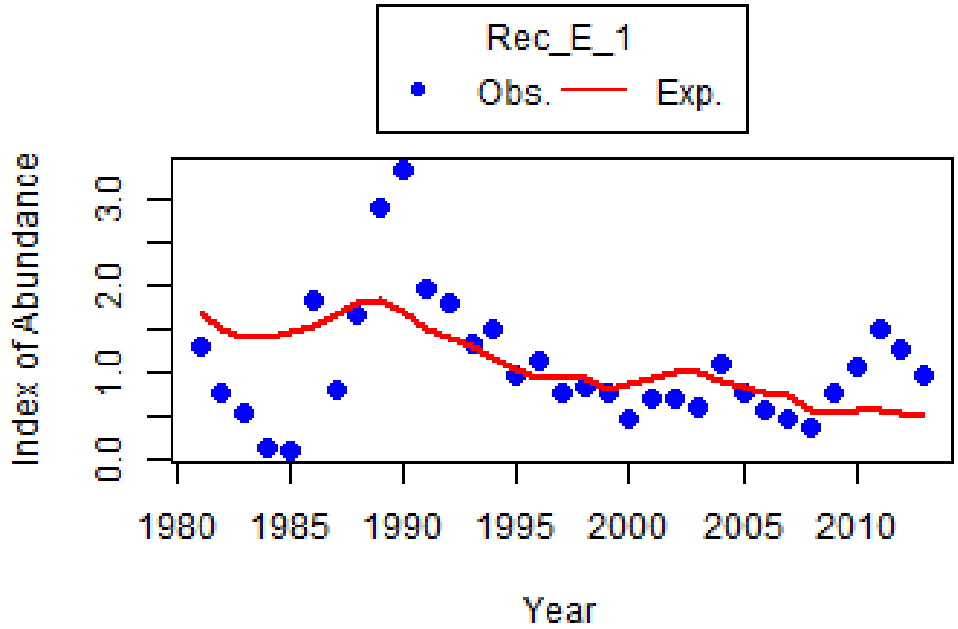
- Gray Triggerfish
- Trawl Survey

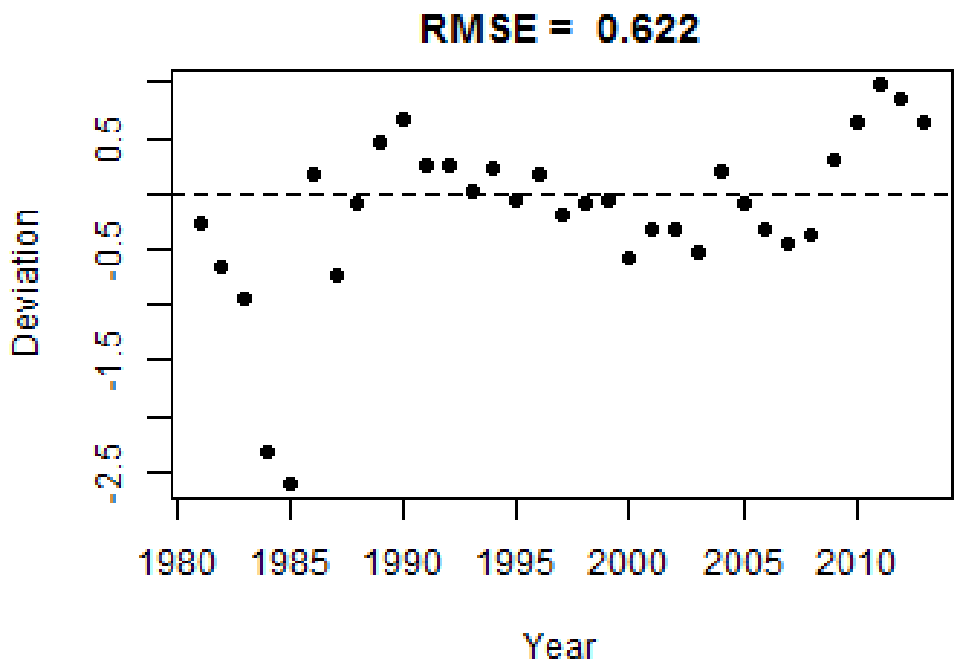


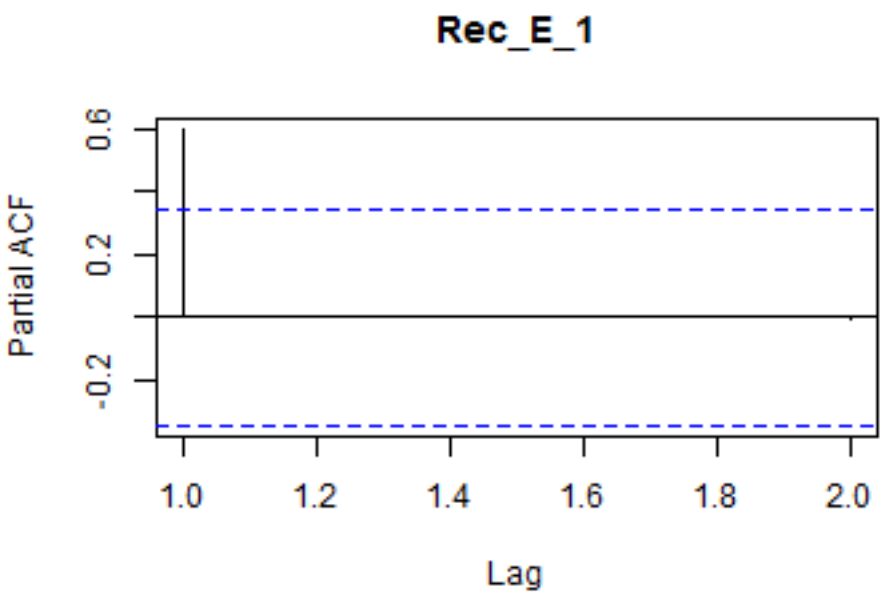




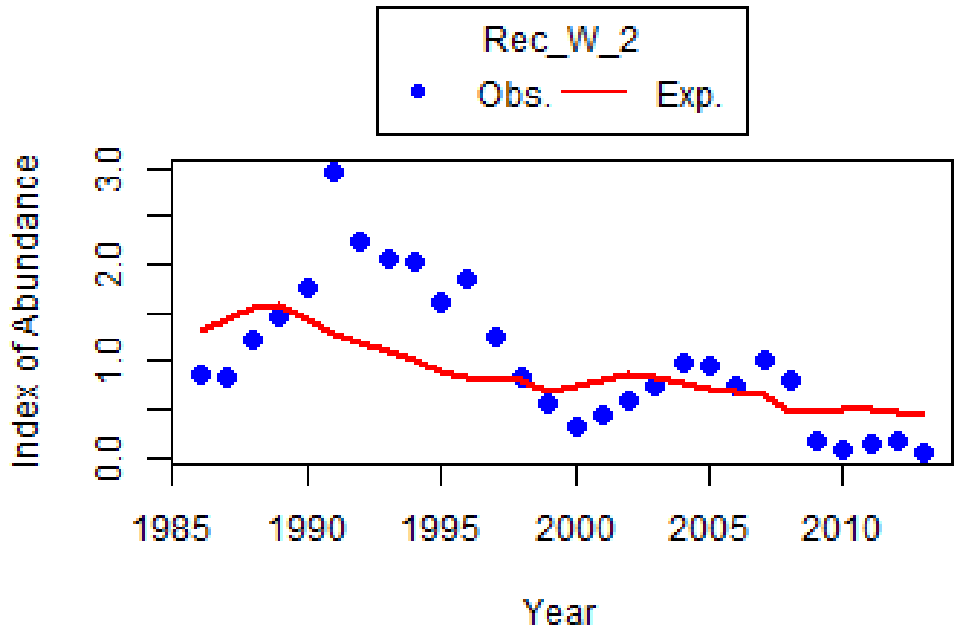
- Gray Triggerfish
- East Gulf MRIP survey

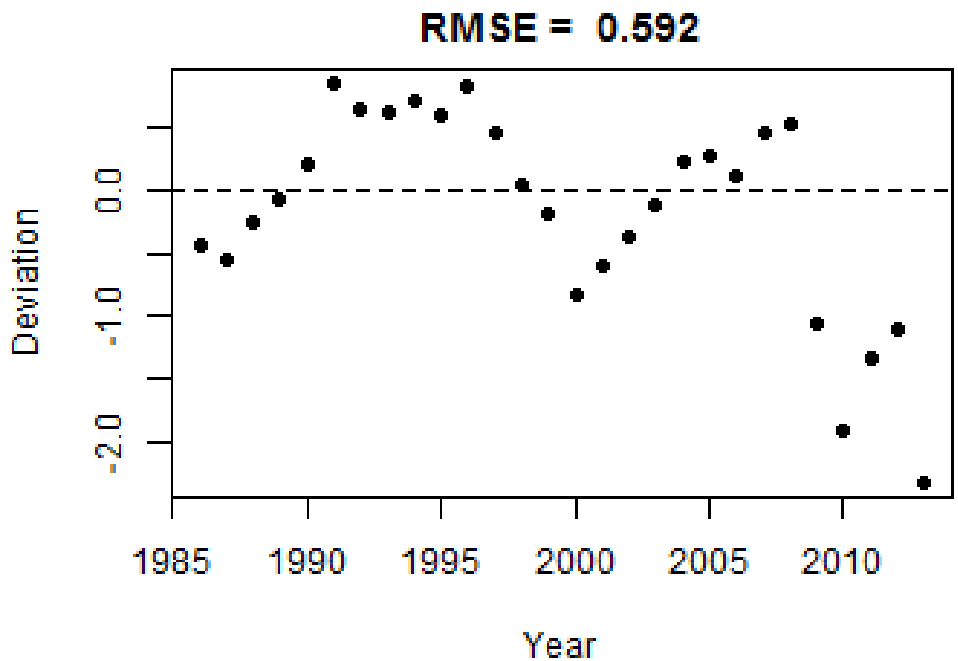


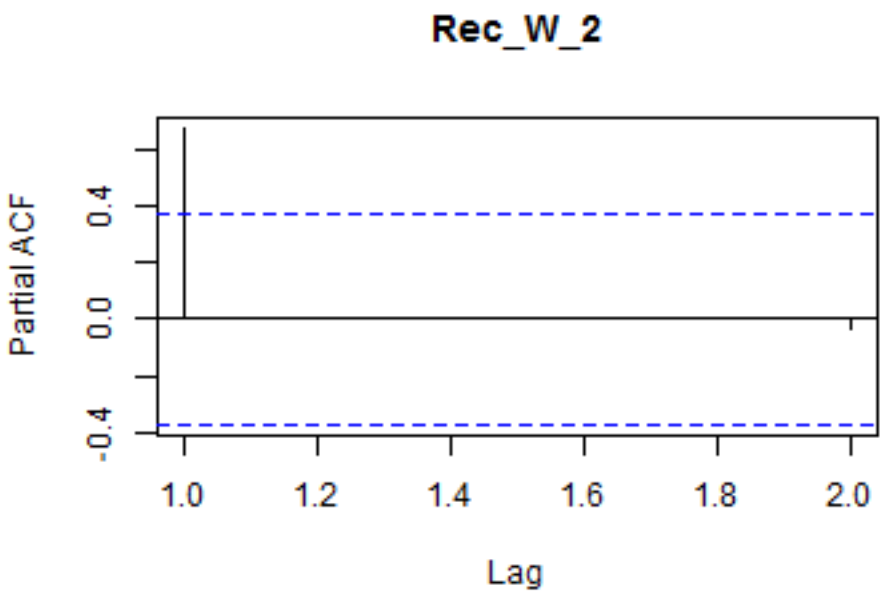




- Gray Triggerfish
- West Gulf MRIP survey







Summary

Species	Available for MSE FD	Available for MSE FI	Qualitative recommendation
Red Snapper	1	10	BLL, Video
Vermilion Snapper	3	2	Trawl, Video
Gray Snapper	3	5	Video, Visual
Red Grouper	2	4	BLL, Video
Gag Grouper	2	3	SEAMAP Video
Gray Trigger	5	2	None
King Mackerel	3	2	None
Greater Amberjack	4	2	SEAMAP Video

Conclusions

- Selecting an index(s) is complicated
  - Can’t be too noisy
  - Can’t have strong residual patterns
  - Should ideally track biomass vulnerable to the fishery or be appropriately time-referenced (e.g. a YOY index might forecast the fishery)
- Selection of MP is based, in part, on selection of index and needs to be made on a stock by stock basis.

Basic MSE Layout

From:
Punt et al. 2014.
Management strategy evaluation: best practices.
Fish and Fisheries.
DOI:10.1111/faf.12104

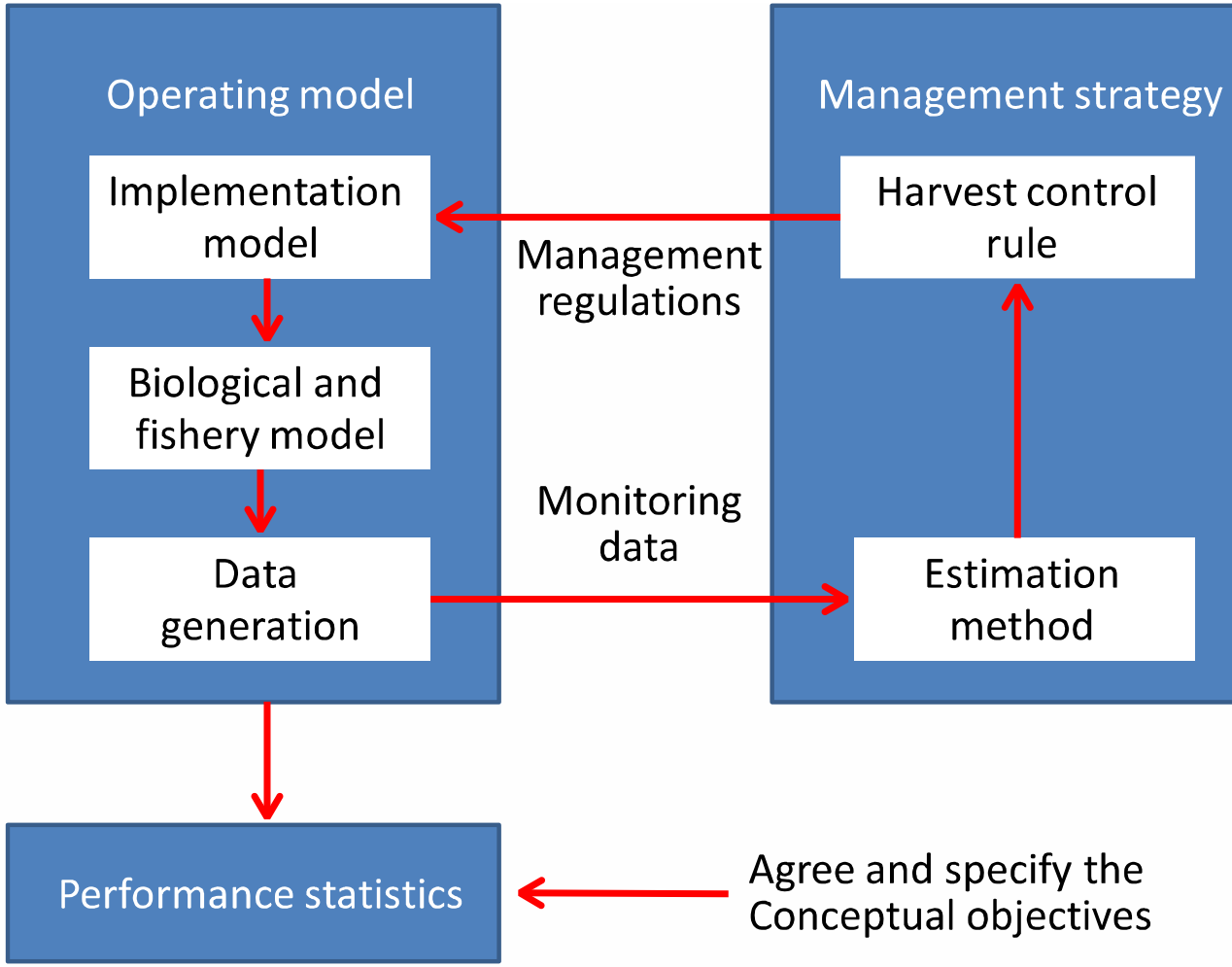


Figure 1 Conceptual overview of the management strategy evaluation modelling process.

Conclusions

- Selection of an index and MP needs to be done based on performance data obtained in MSE simulation.
- MP and index(s) selection will need to be re-evaluated with a new assessment.
- SEFSC is acutely aware of the desire to implement interim assessments (IA); however, we can not make quantitative recommendations until the simulation testing results are available to support those recommendations.
- But qualitatively…

Conclusions

- For select species, some indices appear to be informative.
- MP's exist and have been tested under simplified simulation conditions and shown to perform well. Huynh, Q.C., et al. (under review)
- In the near term, IA could be used to inform ACL/ACT decisions in limited situations.
- Long term (once MSE complete), IA can be used annually for stocks with a viable index.

Discussion/Questions