

Tab B, No. 4(b)

Further Exploration of Fishery-Dependent Indices of Abundance for Gulf of Mexico Gray Triggerfish (*Balistes capriscus*)

by

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Fishery-dependent indices of abundance were reexamined for the Gulf of Mexico gray triggerfish (*Balistes capriscus*) stock (see SEDAR9-AW-07 for additional details on the original methodology). The reexamination was in response to a concern raised within the Council process regarding the catchability of gray triggerfish. The concern was that targeting of gray triggerfish by hook and line involves a distinctive gear configuration. As a result, it was recommended that the indices be rerun including only trips on which gray triggerfish were caught.

Four indices were compared from each of five datasets. One was the original index from the assessment, and relied on a species-association approach to identify both positive trips (those that caught gray triggerfish) and non-positive trips (those that did not catch gray triggerfish). A second used the same species-association approach but only examined positive trips. The third and fourth indices used the full dataset (no filtering based on species association), one with all trips and another with only positive trips. It is hoped that this range of indices will satisfy the Council as to the implications of including or excluding non-positive trips.

The five datasets were as follows: Marine Recreational Fisheries Statistical Survey (MRFSS)—Eastern Gulf; Headboat Survey—Eastern and Western Gulf; and Commercial Logbook entries for handline gear—Eastern and Western Gulf. They were standardized using the same approach as previously except where noted above. Factors included in the standardization of the full dataset are shown in Table 1. Factors for the dataset filtered using species associations are presented in SEDAR9-AW-07.

Figures 1-5 show the four versions of each index. Generally, the versions that only included positive gray trigger trips were flatter than those that contained positive and non-positive trips.

Table 1—Significant Factors in Standardizing Indices of Abundance Using All Data.

| Index | Binomial Portion | Log-Normal Portion |
|--------------|--|-----------------------|
| MRFSS E | Mode, State | Nominal (year only) |
| Headboat E | State (Vessel removed due to convergence problems) | Vessel, Year X Vessel |
| Headboat W | Nominal (Vessel and Year X Vessel removed due to convergence problems) | Vessel, Year X Vessel |
| Commercial E | Hooks per line | Nominal |
| Commercial W | Hooks per line | Nominal |

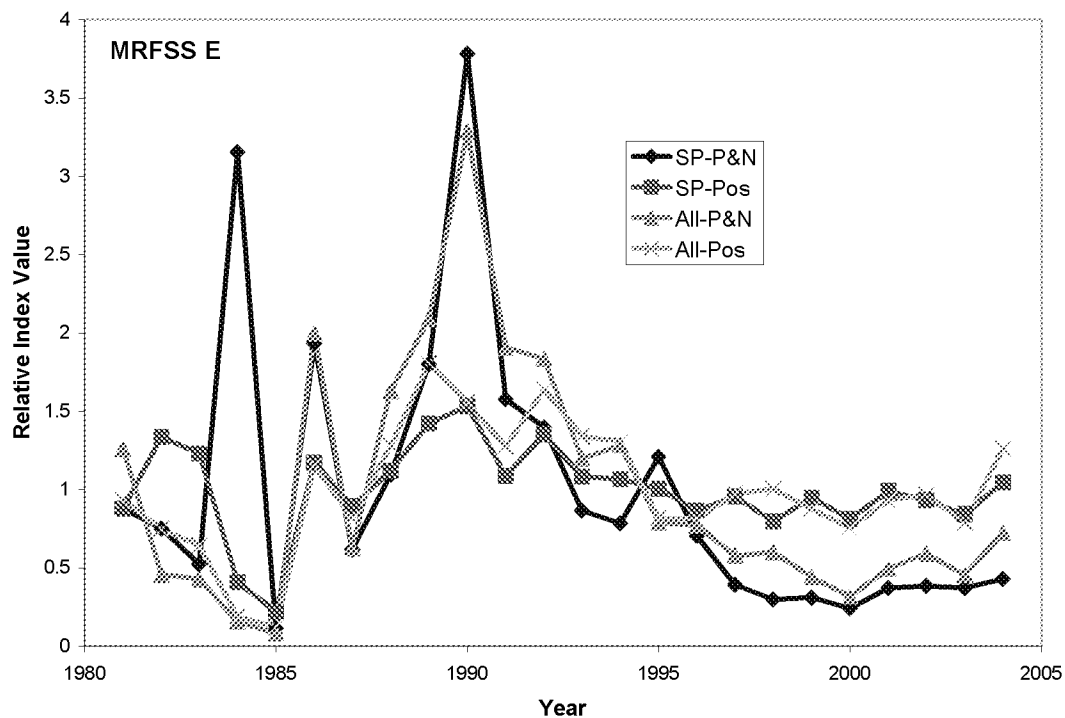


Fig. 1—MRFSS E Index Values. SP = filtered dataset using species associations; All = unfiltered dataset; P&N = positive and non-positive trips included; Pos = positive trips only.

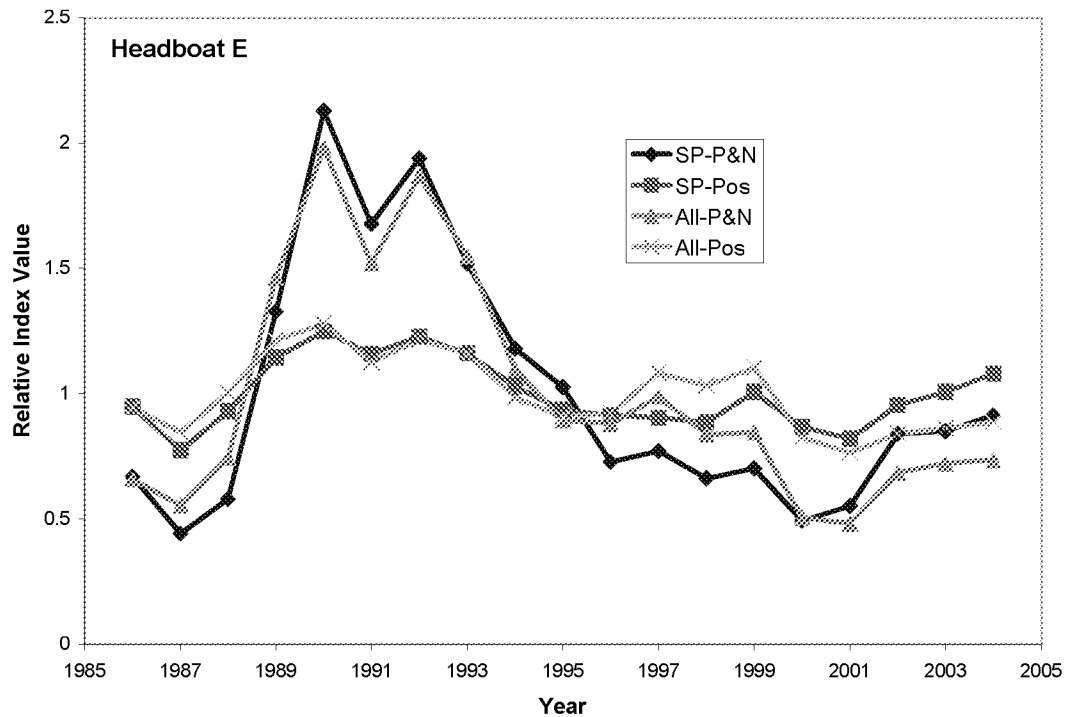


Fig. 2—Headboat E Index Values. SP = filtered dataset using species associations; All = unfiltered dataset; P&N = positive and non-positive trips included; Pos = positive trips only.

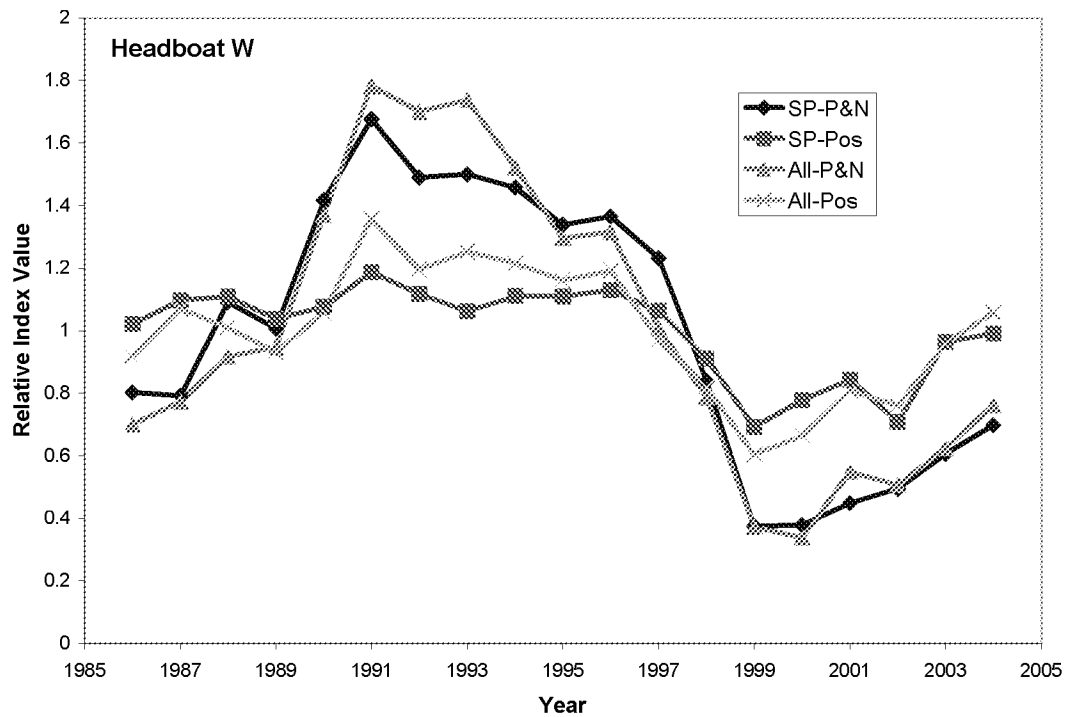


Fig. 3—Headboat W Index Values. SP = filtered dataset using species associations; All = unfiltered dataset; P&N = positive and non-positive trips included; Pos = positive trips only.

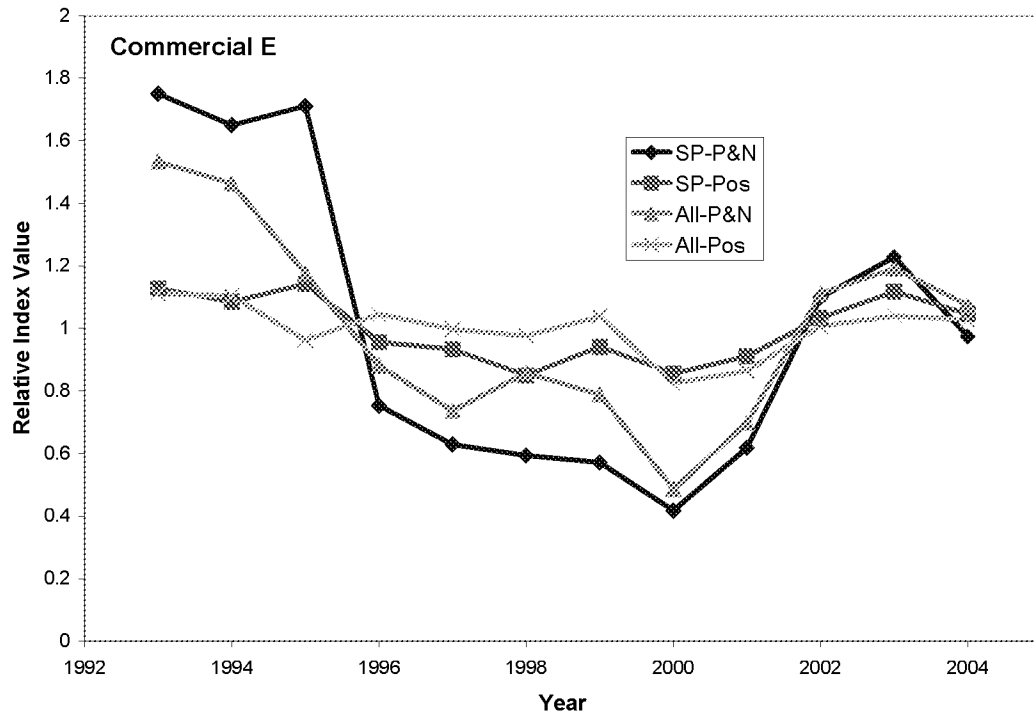


Fig. 4—Commercial E Index Values. SP = filtered dataset using species associations; All = unfiltered dataset; P&N = positive and non-positive trips included; Pos = positive trips only.

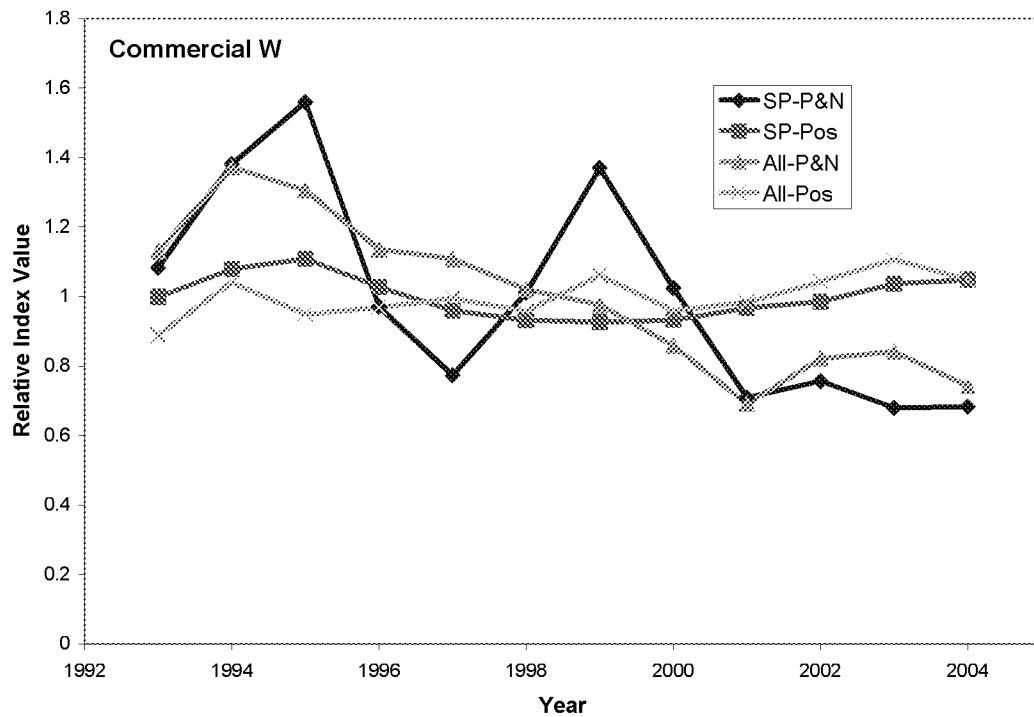


Fig. 5—Commercial W Index Values. SP = filtered dataset using species associations; All = unfiltered dataset; P&N = positive and non-positive trips included; Pos = positive trips only.

To explore any possible implications of the effect of alternate versions of the fishery-dependent indices of abundance, we reran the base version of the age-structured population model (SSASPM, see SEDAR9-AW2-09 and SEDAR9-SAR1 for more details). This time, though, we used alternate fishery-dependent index values, specifically those that relied only on positive trips but did also employ the species-association filtering.

The results were quite similar to the original base run (Table 2, Fig. 6). The model fit the positive-only index values somewhat worse, an indication that these index values were less consistent with other data in the model. The estimated values for stock recruitment parameters and spawning stock biomass (SSB) and fishing mortality rate (F) reference points were all a very small amount lower with the positive-only indices. The current estimate of SSB was slightly higher, resulting in a slightly more favorable ratio of current SSB to SSB20, the overfished threshold. The current estimate of F was slightly lower, resulting in a slightly more favorable ratio of current F to F30, the overfishing threshold.

Table 2—Comparison of Model Runs. Results on the left are from the original run using the fishery-dependent indices as developed in the SEDAR process. Those on the right are from a new model run using indices that relied only on trips that caught gray triggerfish.

| FIT | SEDAR | Pos Trips Only |
|-----------------------|-------|----------------|
| Data pts | 292 | 292 |
| Est params | 170 | 170 |
| Obj Func | -78.5 | -65.5 |
| AIC | 183 | 209 |
| BENCHMARKS | | |
| | SEDAR | Pos Trips Only |
| Alpha | 32.8 | 32.7 |
| Steepness | 0.89 | 0.89 |
| Max Recr (m) | 2.146 | 2.133 |
| SSBvirgin (m) | 7.513 | 7.465 |
| SSBmsy (m) | 1.21 | 1.206 |
| SSB20% (m) | 1.316 | 1.306 |
| SSB30% (m) | 2.094 | 2.081 |
| SSB40% (m) | 2.868 | 2.85 |
| SSB50% (m) | 3.648 | 3.622 |
| Fmsy | 0.45 | 0.423 |
| F20% | 0.419 | 0.396 |
| F30% | 0.269 | 0.256 |
| F40% | 0.186 | 0.178 |
| F50% | 0.131 | 0.126 |
| MSY (m) | 1.638 | 1.621 |
| CURRENT STATUS | | |
| | SEDAR | Pos Trips Only |
| SSB2004 (m) | 1.345 | 1.393 |
| SSB/msy | 1.11 | 1.15 |
| SSB/SSB20 | 1.02 | 1.07 |
| SSB/SSB30 | 0.64 | 0.67 |
| F2004 | 0.435 | 0.391 |
| F/msy | 0.97 | 0.92 |
| F/F30 | 1.62 | 1.53 |

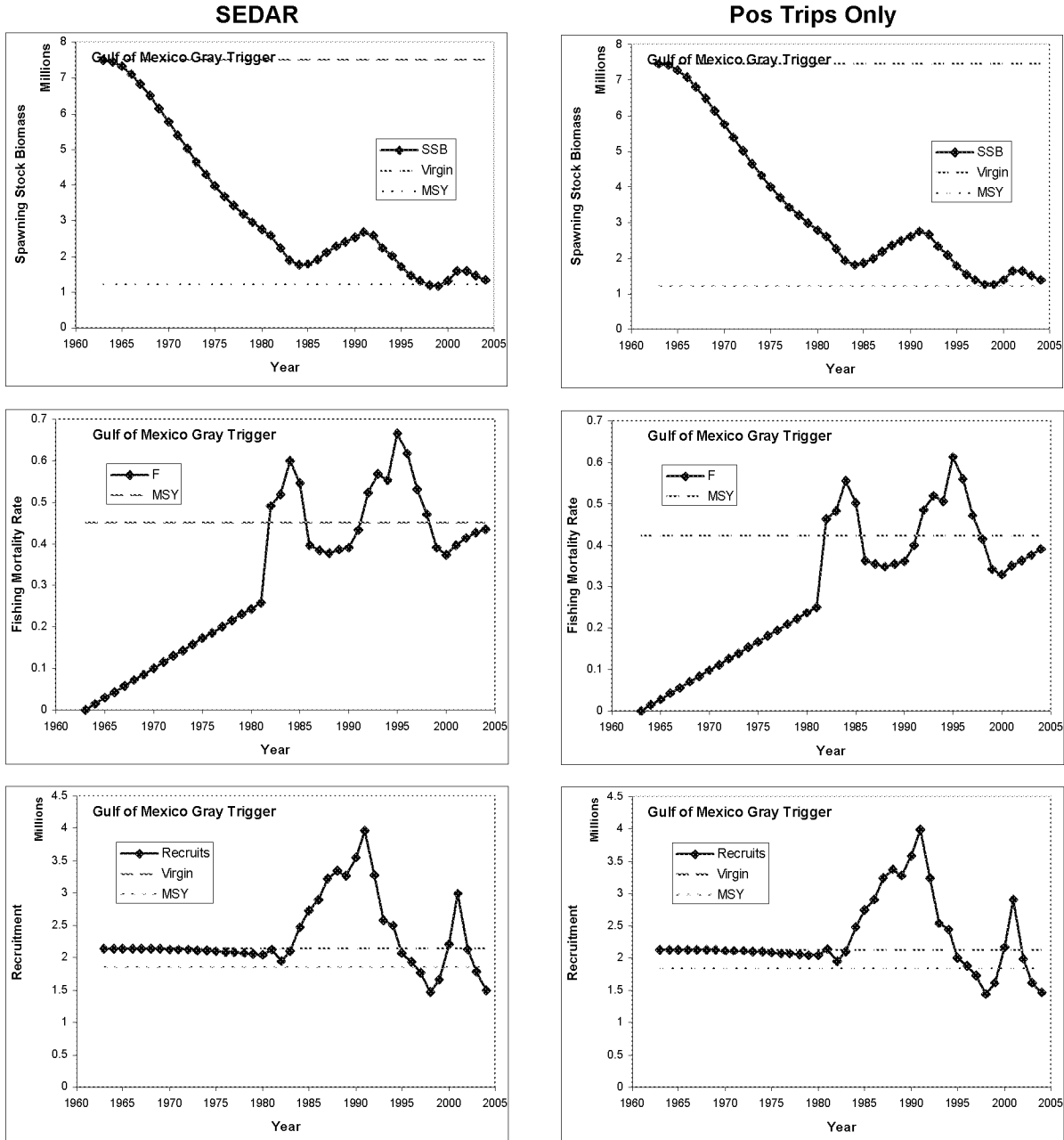


Fig. 6—Comparison of Model Runs. Results on the left are from the original run using the fishery-dependent indices as developed in the SEDAR process. Those on the right are from a new model run using indices that relied only on trips that caught gray triggerfish.

DISCUSSION

Generally, the new runs demonstrated that there was little influence from including zero-trips (those that did not catch gray triggerfish) in the fishery-dependent indices of abundance. Their inclusion did flatten out all of the indices but did not change their overall trends. The revised indices resulted in a model run that was slightly more optimistic about gray triggerfish status

than the SEDAR-generated runs, but would not influence the status of gray triggerfish as experiencing overfishing and approaching an overfished condition.

Despite the small influence of inclusion of the zero trips, it is advisable that we do so. From a scientific perspective, removal of the zero trips is not justified by the concern that was originally raised. The rationale for including non-positive trips is that there will be times when people go fishing in a method that is capable of catching a certain species but fail to do so. The rate at which people are unsuccessful even when trying to catch a species can provide important information about its abundance. In the case of gray triggerfish, there may well be trips where people fished using a gray triggerfish gear configuration but failed to catch them. The best way to identify these trips would be to use a method, such as species associations, to distinguish these trips from others. Thus, even after these additional analyses, the original indices may best capture the concerns raised by the Council.

From a process perspective, this analyst would also be apprehensive about giving too much weight to the concern that specialized gear is necessary for catching gray triggerfish. Conversations during the SEDAR process and recently would suggest gray triggerfish are caught with many gear configurations targeting other species. There may be reasons to believe that specialized gear is important in the gray triggerfish fishery and should be considered when generating indices. However, doing so would require the development of nuanced understanding through open debate within a SEDAR workshop. It is hoped that any concerns about gear configurations and catchability of gray triggerfish are brought up during the SEDAR process the next time this species is assessed.