

**Southeast Fisheries Science Center  
Mississippi Laboratories  
Reef Fish Video Survey  
Program Review**

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**Using as context, two-three or more typical and important stock assessments conducted by the Center, reviewers should address:**

*1. To what extent do fishery independent survey data quality, statistical precision, and timeliness issues impact overall assessment accuracy, precision and timeliness?*

Reef fish survey station, environmental, and vertical line catch data go through a qa/qc process within days of survey end and are generally available to analysts within a couple of weeks of the completion of a cruise. Video and still images taken at each station however go through a read, review, entry, and qa/qc process that in a normal year, takes approximately a year to complete. From each station only one video is read and to expedite the process further tapes are only read for FMP species. In years where the reef fish unit is also responsible for an MPA, and a Caribbean survey the process to read everything takes longer than a year however Gulf of Mexico SEAMAP cruises always take precedent and finish on time. Through time, data storage systems and data fields collected have changed, therefore during 2011-present a “gold-copy” of the entire data set over the history of the survey has been built and is currently in the process of being uploaded for storage in Oracle. Having this “gold-copy” of the data set will prevent confusion in the future as data requests are made and as unit-leadership changes. In concert with the Oracle effort a complementary metadata set encompassing the history of the survey has also been built and will be made available for future data requests. Statistical precision is measurable as a coefficient of variation (CV) and is a time series, species specific, component that is dependent on sampling size. The reef survey has steadily increased both the sampling universe (blocks sampled) and the number of stations sampled through the years and precision as measured by CV reflects those changes for most of the FMP species for which the survey can construct an index. For example, as sample sizes increased (1993:  $n=159$ , 1997:  $n=297$ , and 2012:  $n=440$ ) CV for the red snapper index decreased (1993: CV=38%, 1997: CV= 16%, and 2012: CV=11%) which indicates increasing precision. NMFS-Mississippi Laboratories (MS-Labs), NMFS-Panama City Laboratories, and FWRI participate in an annual west Florida shelf coordination meeting. These three groups all conduct video surveys in the west Florida shelf region and are all concerned with qa/qc and ensuring maximum spatial coverage for that region. These groups have developed qa/qc procedures in which video reads are shared amongst laboratories to compare how each entity interprets the information and to fine tune efforts (very similar to the otolith training set model). These groups share technological developments and assist in problem solving. The west Florida shelf has been extremely useful in regards to data and survey quality and as other groups develop similar surveys it is highly recommended that similar groups are built or expanded upon.

*2. What are the major fishery independent survey successes and how should they be supported?*

The primary reason that the reef fish trap/video survey was started was because the traditional fishery gears (i.e. trawls and longlines) used at MS-Labs could not be employed on high relief reef habitats. Gear either gets torn up or does not come back to the boat altogether. It is extremely important that fishery resources from critical reef habitats are evaluated and therefore the development and continued support of a reef fish survey should be considered a major success. Over the history of the survey the improvements that have been achieved reflect the level of understanding about sampling in these areas as well as the continued improvement of the gears and techniques used in the survey. For instance the original gear that was deployed was a fish trap which had very low catch rates, and because of that fact MS-Labs scientists decided to mount a camera on the trap and evaluate what was occurring. What they found was that fish were all over the trap and the trap was ineffective at trapping. From that point forward camera arrays have been deployed. Over that time techniques and technology has increased the quality of video (e.g. high definition cameras), eased collection of video data (e.g. digital media), and has enabled length measurements to be taken from subjects observed (e.g. lasers, stereo cameras, and vision measurement systems). Improvements continue to be made to acoustic data collection technology and analysis that are allowing for refined mapping and habitat classification. All of the improvements as a collective make for a flexible, multi-platform survey that is relatively non-invasive, well suited for evaluation of traditional fishery gear performance (i.e. selectivity), community analysis, single species assessments, and ecosystem based assessments of the future.

*3. What are the major fishery independent survey limitations/weaknesses and how could they be resolved? Define potential improvements and priorities for recommended improvements.*

The main limitation associated with the reef fish video survey has for many years been incomplete spatial coverage and lack of mapping information. Data sources that could solve the issue in an immediate sense are not made available because they are proprietary (e.g. BOEM – oil and gas industry mapping of the Gulf of Mexico) and so the process of mapping is undertaken piece meal during the regular survey. In spite of the slow pace of mapping the discovery of new reef habitats and expansion of the reef fish sampling universe has continued through time. With the addition of the NOAA ship Pisces, and its subsequent use during the reef fish survey, a nightly mapping component has been added to the survey which should help speed up the mapping process. In addition, collaborators at the MS-Labs Stennis facility have recently acquired an AUV that could enable 24-hour mapping during regular surveys. Should the technology work as it is designed it would greatly speed up the rate at which mapping of high priority targets takes place and improve the spatial coverage of the sampling frame. In addition all of the acoustic data being gathered can be scaled up for use to estimate acoustic biomass for possible use in ecosystem-based assessments, however improvements to post-processing the ME70 multi-beam data are required and are ongoing. Other improvements to the survey will include development of low-light cameras and DIDSON technologies that perhaps will allow for evaluation of fish populations associated with deep water corals and turbid environments.

*4. To what extent do fishery dependent data quality, statistical precision, and timeliness issues impact overall assessment accuracy, precision and timeliness?*

N/A – fishery dependent survey question.

*5. What are the major fishery dependent data sources successes and how should they be supported?*

N/A – fishery dependent survey question.

6. What are the major fishery dependent data limitations/weaknesses and how could they be resolved? Define potential improvements and priorities for recommended improvements.

N/A – fishery dependent survey question.

*7. What recommendations do you have for prioritizing fishery-independent and fishery-dependent data collection improvements?*

Regardless of SEFSC survey, a major effort should be made in regards to bathymetry, mapping and habitat classification. If there is serious development in terms of ecosystem-based modeling (EBM) then surveys should be made aware of what types of data are going to be most valuable and therefore collected during independent surveys if they are not already being collected. Furthermore because the independent surveys are long-term data sets there should be a significant effort made in regards to how the historic sets could be used in an EBM approach. Finally significant attention needs to be paid to gear performance (e.g. selectivity) within the SEFSC independent surveys, such that biases are better known and accounted for so that those surveys as well as the assessment scientists have a better understanding of the associated limitations.

*8. To what extent are fishery independent and fishery dependent data readily accessible to Center stock assessment scientists and to various external researchers who may wish to replicate NMFS stock assessments?*

Reef fish survey data takes approximately a year to bring completely online for use in assessments. Those data are always made available as soon as possible following qa/qc to SEFSC staff for use in the SEDAR process, model development and assessments. External scientists are typically given access to data following a 1 year restriction on release. The main purpose for allowing a year prior to data release is to allow NMFS scientists first shot at analysis and publication on those findings.

Reef fish survey data SEDAR support:

SEDAR 7 (2004) red snapper.

SEDAR 7 (2004) SEAMAP Reef Fish Survey of Offshore Banks

SEDAR 9 (2005) gray triggerfish.

SEDAR 9 (2005) amberjack.

SEDAR 9 (2005) vermillion snapper.

SEDAR 10 (2006) gag grouper

SEDAR 12 (2006) red grouper.

Report to Gulf Council (2008) update assessment of gag grouper

SEDAR 19 (2010) black grouper.  
SEDAR 31 (2012) red snapper  
SEDAR 33 (2012) gag grouper  
SEDAR 33 (2012) amberjack

*9. Identify the highest priority needs for improving fishery dependent and fishery independent data. Define potential improvements.*

From the reef fish survey perspective the major component that is missing is a complete map of bathymetry and habitats contained in the Gulf of Mexico. Indices could potentially improve in precision with improved targeting of all reef habitats and inclusion of habitat characteristics in estimation of relative indices of abundance. All of the SEFSC independent surveys are constrained to a single season and therefore a single point estimate is deemed to be representative for the entire year. If resources could be obtained these surveys should be expanded to quarterly sampling efforts so that both time and space are more representative of population trends. This is particularly important for migratory species that may or may not be picked up given the current scheduling of various surveys.