Gulf of Mexico Fishery Management Council
Scientific and Statistical Committee
Review of SEDAR 49: Data-limited Species

Part 1: January 10-11, 2017

Dr. Sagarese reviewed the current (status quo) methods used to set OFL and ABC for data-limited species under ABC Control Rule Tier 3a and 3b, and the data-limited approaches used in SEDAR 49. The status quo method was based on using a reference period of landing such as 1999-2008. OFL and ABC were set at the mean of the reference period landings plus or minus some multiple of the standard deviation. However, this method did not identify MSY, just some level of recent catch that may or may not be sustainable. SEDAR 49 evaluated a range of peer-reviewed methods collected into a Data-Limited Methods Toolkit (DLMtool), available at http://www.datalimitedtoolkit.org/. The DLMtool has been used by other agencies including the Mid-Atlantic Fishery Management Council, New England Fishery Management Council, California Department of Fish and Wildlife, and Southeast Fisheries Science Center for Caribbean Data-limited Species (SEDAR 46).

SEDAR 49 evaluated lane snapper, wenchman, yellowmouth grouper, snowy grouper, speckled hind, lesser amberjack, and almaco jack. Red drum was also evaluated, but did not have a reference period of federal landings. Yellowmouth grouper was later removed from consideration due to low catch levels and concerns about misidentification and data confidentiality.

Requirements for the status quo method include that the reference period removals (landings plus discards) have no trend and are relatively small relative to the stock biomass. Based on a trend line analysis, for the status quo method, the assumption of no trend during the reference period may need to be reevaluated for some stocks. In addition, red drum shows an increasing trend, but no reference period has been defined for the stock. Among the limitations of the status quo method, OFL and ABC are fixed values and will not change unless revisited by SSC. In addition, Catch-only methods perform poorly in simulation analyses.

Methods in the DLMtool can use information in addition to catch data, such as indices of relative abundance or indices of mean length. Management strategy evaluation (MSE) is used to determine the most appropriate data-limited approaches. This is not a one size fits all, but needs to be evaluated for each species. MSE consisted of several steps. First, the methods were evaluated to determine which were feasible given the available data. Methods that performed poorly (i.e., resulted in a high probability of overfishing) were then eliminated. MSE allowed the selected methods to be compared to the status quo methods. From this, a subset of methods could be selected to provide management advice. Several methods from the DLMtool were described.

The SSC was asked for guidance on a number of issues. One of the issues to address is whether the results should be considered OFL or ABC, which will depend upon the assumed stock status during the reference period. Another issue is how does catch advice derived from methods in DLMtool fit into the Gulf of Mexico ABC Control Rule? Finally, how should the SEFSC proceed, i.e., should it form a group to evaluate multiple species or focus on a single species for an in-depth evaluation? Several SSC members supported an in-depth evaluation of a single stock.

Part 2: March 25-27, 2017

Dr. Skylar Sagarese continued an evaluation on the evaluation on the use of data limited methods to set catch levels. The data-limited methods were selected from a collection of methods known as the Data Limited Methods Toolkit (DLMToolkit version 3.2.2). Eight species were previously selected for initial evaluation based on data availability and quality. After further evaluation, the following species could potentially be evaluated, but would require tuning to complete assessment: lane snapper, wenchman, almaco jack, and lesser amberjack.

The following species could not be further evaluated using the data limited methods due to issues with the available data:

- Red drum – Lack of a reference period limited analyses which could be implemented.
- Speckled hind – Shifts in the fishery prevented analyses using index of abundance or length.
- Snowy grouper – Shifts in the fishery prevented analyses using index of abundance or length.
- Yellowmouth grouper – Were not evaluated further due to limitation of available data and mis-identification issues.

Dr. Sagarese conducted a detailed analyses of lane snapper, and briefly discussed attempts to evaluate wenchman, almaco jack, and lesser amberjack. The analysis of land snapper was divided into three parts.

Part 1 – Feasibility

A catch reference period of 1999-2008 was previously selected by the SSC for use in calculating OFL and ABC using Tier 3a of the ABC control rule. This was a period when there was no significant trend in landings. The mean of the landings during this period could be considered sustainable, but does not guarantee maximum sustainable yield. The headboat survey was considered to provide a good index of relative abundance. A reliability score for length data from private recreational vessels and headboats was scored as good. Overall, 4 data-limited methods were scored as having reliable data for analyses; 2 index-based methods (Isolde, Itarget), and 2 length-based methods (Lstep CC, Ltarget).

One consideration is whether the catch levels produced by data-limited methods should be considered OFL or ABC. NMFS provides the following guidance in making this determination. If the stock is considered to be overexploited or near MSY, the resulting catch level recommendation should be OFL. If the stock is considered to be underexploited, the resulting catch level recommendation should be ABC. Lane snapper was assumed to be at or near MSY during the reference period.

Part 2 – Management Strategy Evaluation (MSE)

This step reviewed data inputs for use in evaluating performance metrics and tuning of the analysis. The application of MSE can help to eliminate methods that respond to the data inappropriately, or that are highly sensitive to differing stock conditions. A depletion range was determined from catch-at-size reduction analysis and recent mean length. Natural mortality

estimate was reevaluated using several established methods. Several other performance metrics were evaluated, including probability of not undergoing overfishing, long-term yield, and short-term yield. Based on these metrics, scalers were selected specific to each of the four data limited methods being applied.

Part 3 – Catch recommendations for Management Advice

All of the methods considered can produce some historical target level, but not necessarily the MSY level. A probability density function (PDF) can be produced from 10,000 runs using random draws of data inputs. The catch associated with the median (50% probability level) can then be considered OFL, and ABC can be set at the desired probability level less than 50%. The catch level results in pounds whole weight from each of the four methods are shown below (Table 3). Of the four methods evaluated, NMFS recommended using the Ltarget approach (in bold in the table below). This method was robust to assumptions and provided a greater chance of higher yields.

Table 3. Lane snapper catch levels (pounds whole weight) at 30%, 40% and 50% probabilities of exceeding OFL for four data-limited methods.

Method	ABC		OFL	SE	CV
	30%	40%	50%		
Islope_0.4_10yr	263,079	265,419	267,651	88	0.033
Itarget0.5_0.7_1.0	**355,501**	**360,059**	**364,082**	**170**	**0.047**
Ltarget0.5_0.8_1.0	314,122	318,052	321,792	149	0.046
LstepCC_0.05_0.96_0.98_1.05	302,427	306,173	309,837	141	0.045

Following the presentation, the SSC agreed that the data limited approach provided the best scientific information available, and that the Itarget method provided the best management advice for lane snapper.

> **Motion: The SSC moves that the SEDAR 49 data limited assessment results for lane snapper are the best scientific information available and the results of the Itarget data limited method are suitable for management advice.**
> *Motion carried with one opposition.*

The SSC agreed that the catch results from the Itarget method for the 50th percentile of the PDF provided the best estimate of OFL. For ABC, some SSC members expressed concern that the most conservative catch level (30% probability) was only 2.5% below the OFL. A suggestion was made to set the ABC at 75% of the OFL, but a review of the PDF distribution curve indicated that this catch level was far below the catch at which there was a 0% probability of overfishing. The SSC decided to stay with the 30% probability level for the ABC recommendation, with OFL and ABC recommendations rounded to the nearest 100 pounds. SSC members also felt that there should be specific time period set for the OFL/ABC recommendations in order to assure that the recommendations are reevaluated periodically. Dr. Sagarese noted that once the initial analysis is completed and the scalars are set, a reanalysis can be conducted quickly.

> **Motion: The SSC moves that the Lane Snapper OFL be set at the catch recommendation result of the Itarget Lane Snapper data limited assessment which is 364.1 thousand**

pounds. The SSC also moves that the ABC be set at 355.5 thousand pounds which is the 30th percentile of the PDF produced by the Itarget method based on the CV on landings estimates among years in the evaluation time series. The estimates of ABC and OFL should be recomputed at a frequency of no greater than every 3 years.
Motion carried with one opposition.

Following the evaluation of the lane snapper analysis, Dr. Sagarese reviewed her analysis of wenchman, almaco, and lesser amberjack stocks. For wenchman, only the Islope method met the performance metrics. Although catch levels can be derived using Islope, they would be less than current catch levels. Also, the wenchman index of abundance was based on the NMFS Small Pelagics survey which is no longer operational. Therefore, an alternative index of abundance would need to be developed. For almaco jack and lesser amberjack, the Islope and Itarget methods meet the performance metrics. Although catch level advice can be developed, there is very limited data available for these stocks, and misidentification could be a problem. For these stocks, a possible suggestion was to combine them for an aggregate analysis. The SSC felt that, because of the data issues with these stocks, the data limited methods used in SEDAR 49 do not provide an improvement over the Tier 3a method used in the current ABC control rule

Motion: The SSC moves that SEDAR 49 represents best available science for Wenchman, Almaco Jack, and Lesser Amberjack. However, the SSC feels the catch recommendation results from SEDAR 49 analyses for these species do not represent an improvement over the current approach utilized to estimate OFL and ABC based on mean landings.
Motion carried unanimously.

The SSC discussed the 4 species that NMFS determined could not be further evaluated using the data limited methods due to issues with the available data

Motion: The SSC moves to accept the SEDAR 49 assessment review recommendations that data limitations precluded the utility of the applied Data Limited Methods (DLM Toolkit 3.2.2) to estimate OFL and ABC for Red Drum, Yellowmouth Grouper, Snowy Grouper, and Speckled Hind.
Motion carried unanimously.

Dr. Sagarese suggested that the ABC control rule be modified to incorporate use of the data limited analysis methods where appropriate, possibly by revising Tier 2.

Gulf of Mexico Data Triage

Dr. Sagarese reviewed the data triage methodology applied to the remaining 11 unassessed reef fish species to determine the feasibility of applying the data limited methodology. She constructed spreadsheets reviewing all of the data sources available for each species and which data limited method those data could potentially be applied to. She emphasized that the data had not been vetted, and further analysis of the data would be needed before the data limited methods could be applied. Based on the review of available data she made the following recommendations for each species as to whether an alternative data limited method cold be used, or whether a catch-only method (i.e., Tier 2) should continue to be used (Table 4).

Table 4. Ranking by total removals and feasibility for using alternative data limited assessment methods for 11 remaining unassessed reef fish species.

Rank in Total Removals	Species	Assessment Feasibility
1	Gray Snapper	Alternative
2	Scamp	Alternative
3	Warsaw Grouper	Alternative
4	Silk Snapper	Alternative
5	Banded Rudderfish	Alternative
6	Blueline Tilefish	Alternative
9	Queen Snapper	Alternative
11	Blackfin Snapper	Alternative
7	Cubera Snapper	Catch-only
8	Yellowfin Grouper	Catch-only
10	Goldface Tilefish	Catch-only