Sustainable Fisheries Committee (Tab E)

SSC Recommendations on using Field Experiments to Assess Alternative Mechanisms for Distributing Fish to the Recreational Sector

- Dr. Gordan (SEFSC)

- Recreational fishing quotas typically managed using season lengths, bag limits, and size limits.

- One-size-fits-all approach could be improved.

- Alternative management could account for differences in how anglers fish.

- Dr. Gordan described a proposed pilot program that would allow private anglers to fish outside the regular fishing season in exchange for participation in a data collection program.

- A draft exempted fishing permit (EFP) application is in development.

- Data collected from EFP project would include catch, location, and discards.

- SEFSC plans to fund the pilot program.

- Gag, red grouper, and red snapper are being considered.

- SSC members recommended an experiment limited to small portions of the Gulf of Mexico.

- SEFSC would benefit from reviewing the many discussions had to date on fish tags, day passes, and other forms of individual recreational fishing rights.

Reef Fish Committee (Tab B)

Presentation on SEDAR 70: Greater Amberjack Stock Assessment Report

Calibrated Catch Presentation and SSC Recommendations

- Dr. Katie Siegfried (SEFSC) presented a decision tree for determining projection settings.
- Example using greater amberjack demonstrated new statistical code:
  - Supplements Stock Synthesis forecasting capabilities
  - Allows consideration of differing allocation scenarios
- Projections require several decisions to be made:
  - Years for averaging fishing mortality, selectivity, and recruitment
  - Retention parameters
  - Treatment of interim landings
  - Sector allocation ratio(s), if applicable

- Dr. Nathan Vaughan (Vaughan Analytics) presented new R statistical code for determining yield projections for stocks with sector allocations.

- Several assumptions are critical to forecasting for greater amberjack:
  - Future recruitment defines stock productivity and variability
  - Fleet selectivity and retention functions
  - Fishing sector allocations
  - Benchmark targets

- Fishing to $SSB_{30\%SPR}$ under different recruitment scenarios for GAJ results in different estimates of forecasted recruitment, SPR, and allowable future fishing mortality.

- A time period to inform recruitment is needed for projections.
- Problematic if recent recruitment varies from historical recruitment.
  - Could infer a variety of stock states (e.g., overfishing, regime shift)
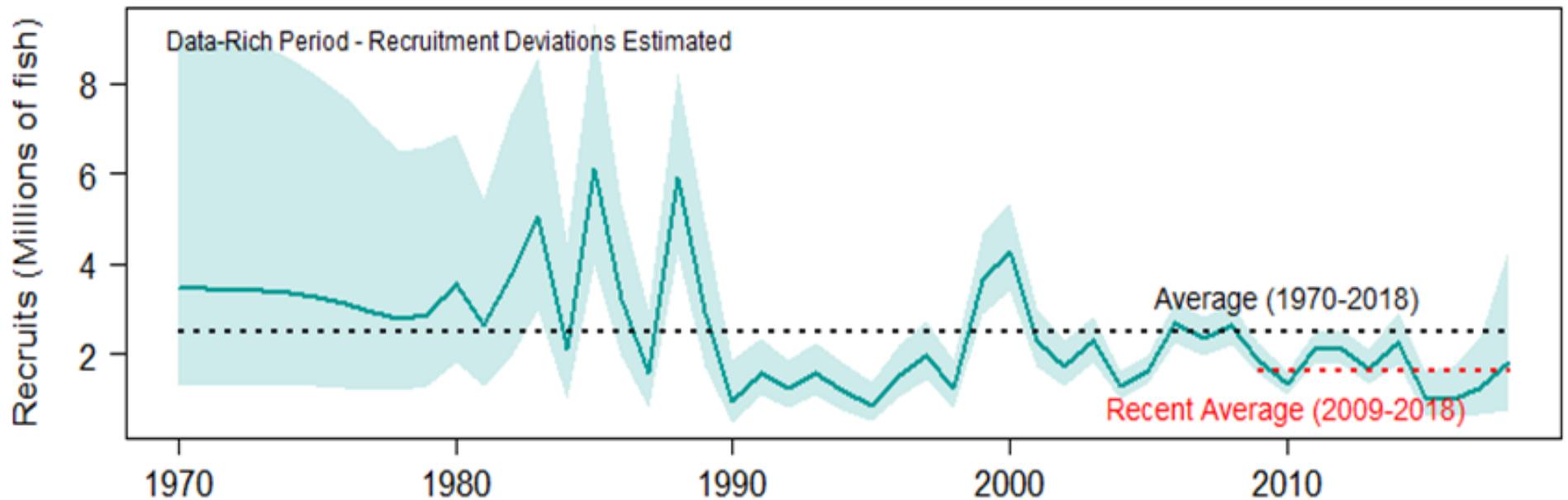
- Recruitment (in millions of fish) varies based on the time series used:
  - Most recent 10 years (2009 – 2018): the stock is now less productive than in the past, and recruitment is estimated at 1,650.66 million fish.
  - Long-term average (1970 – 2018): recruitment is estimated at 2,805.57 million fish.
  - "Data rich" time period (1984 – 2018): recruitment is estimated at 2,156.04 million fish.
  - High uncertainty in annual recruitment estimates pre-1984 and from 2016 – 2018.
- Inappropriate to assume a fixed level of recruitment from a longer-term average.
  - May be too optimistic or pessimistic, depending on the data, in the short term

- For GAJ, this may mean that a lower equilibrium yield must be accepted in the short-term.
- Best reflects the current state of nature (low recruitment).
- SSC will continually re-evaluate recruitment through time.
- The SSC noted that using this approach with a stock experiencing a regime shift presents a special case.
- Could use a long-term time series to inform recruitment for OFL.
- Could use more contemporary years for forecasting recruitment within a regime shift period to calculate ABC.
- Recommended OFL may be substantially higher than ABC.

- SSC should provide input on how to set up the projections for greater amberjack.
  - Specifically, the treatment of recruitment in the future.
- SSC was cautious about assuming optimistic recruitment (i.e., long-term average).
- SSC specified its preferred projection settings for SEDAR 70.
- SSC did not want to set overly optimistic catch advice based on possibly implausible higher average recruitment.

- Longer-term average recruitment represents the rebuilding goal.
- Setting ABC using a more recent recruitment level better reflects contemporary stock and fishery dynamics.
- Ultimately, the SSC decided to use the recruitment period of 2009 – 2018 to inform projections of OFL.
- SSC maintained setting the ABC equivalent to 75% of $SSB_{SPR30\%}$
  - As was done when the SSC last revised greater amberjack catch limits following its initial review of SEDAR 70

- OFL and ABC projections based on the sector allocation options requested by the Council were compared.

- ABC projections performed to rebuild the stock under each scenario by 2027.

- Generally, as additional fish are allocated to the recreational sector, the overall predicted yields are reduced.

- Combined with reduced recruitment and stock size, this is expected to result in lower long-term yields.

- The SSB for greater amberjack has oscillated, but remained generally consistent, since the 1990s.

- Defining conditions of a regime shift is difficult. Changing assumptions about recruitment affects decisions regarding how to define ABC.

- SSC thought it most appropriate to continue using the current F_{MSY} proxy of $F_{SPR30\%}$, while also using the current SRR curve.
- SSC recognized the yield reductions necessary for greater amberjack, and thought that careful consideration would be needed in determining future management of catch and effort.

Motion: To continue with the 30% SPR reference point rebuilding projections using the spawner curve recruitments and ABC based on the low recruitment scenario (2009-2018) for greater amberjack.

 Motion carried 14-8, with three abstentions.

Motion: the SSC determined that the SEDAR 70 operational assessment of GOM greater amberjack represents the best scientific information available and based on assessment results, as of 2018, the stock is undergoing overfishing and is overfished.

 Motion carried 17-5 with three abstentions

Reef Fish Committee (Tab B)

Presentation on SEDAR 72: Gag Grouper Stock Assessment Report

Presentation, Projections, and SSC Recommendations

- Gulf gag grouper last assessed in SEDAR 33 Update (2016; SEDAR 33U) using female-only spawning stock biomass.
  - Determined to be sustainably managed at that time
- Several data inputs used in SEDAR 33U were modified in SEDAR 72.
  - Conversion from MRIP-CHTS to MRIP-FES
- Gag is vulnerable to episodic red tide events.
  - Accounted for directly in SEDAR 72
- Improvements made to retention and the recreational fleets' selectivities.
- Improved differentiation in commercial discards between black grouper and gag.
- Updated information on the maturity schedule, sex transition timing and these influences on the observed sex ratio.

- Dr. Ailloud reviewed the stepwise progression from SEDAR33U to SEDAR 72, including the updated data inclusions, adjustments to selectivities, red tide analyses, and model variability.
    - Critical for comparing the influence of model parameters on resulting outputs
- Some SSC members contended that data estimated prior to the MRIP time period (pre-1981) should be excluded due to their lack of precision and plausibility.
- The SEFSC replied that removing the pre-1981 recreational catch and effort data does not have a substantial effect on the stock status, but does help with tuning the model to the initial estimates of exploitation rates.
- Commercial data pre-1981 are thought to be plausible.

- A sensitivity run was conducted to examine the recreational catch and effort data generated by the FWC Gulf Reef Fish Survey (now the State Reef Fish Survey; SRFS).

- Hindcasting for the data (calibrated to MRIP FES) available back to 1981. Prior to 1981, mean catch per unit effort (CPUE) for 1981 – 1985 was used to estimate the historical CPUE.

- Trends in model outputs are commensurate using SRFS; however, the lower level of landings reported through SRFS compared to MRIP-FES does result in a lower estimate of SSB, exploitation rate, and age-0 recruits.

- The SSC discussed the merits and feasibility of using SRFS for monitoring recreational catch and effort for gag grouper in the future.

- SRFS has increased precision and reporting frequency compared to MRIP.
- SRFS may be more appropriate for monitoring gag private angler landings.
  - Gag is a Florida-centric stock, and almost all harvest is recorded by SRFS
- SSC recommended that the SRFS sensitivity run receive the full suite of model performance and diagnostics, just like MRIP-FES.
- SEFSC instead recommended using a scalar to convert the recreational portion of the recommended catch limits into SRFS currency.
  - SEFSC preferred such a modeling effort occur within SEDAR
- SSC requested that the scalar approach be described by the SEFSC for review by the SSC.

- SSB can be characterized by **female-only** mature biomass or **combined** male and female mature biomass.
- **Female-only SSB** provides best estimates of biological reference points **if the potential for decreased fertilization is weak.**
- **Combined SSB** is best **when the potential for decreased fertility is moderate or unknown.**
- Increasingly skewed sex ratios may result in reduced fertilization rates and, as a consequence, reduced population growth.
- Recent research estimates that males account for ~1% in the fished stock and ~5% in the Madison-Swanson Marine Protected Area.
- The last strong year class was in 2006/2007, and the relationship between sex ratio and fertilization success is poorly understood.

- Under both the females-only and sexes-combined scenarios for SSB, gag grouper has been overfished since 2006, with overfishing occurring since 2001.

- SSC discussed using sexes-combined estimate for SSB, considering the currently skewed sex ratio and recruitment since 2006/2007.

Motion: The SSC determined that the SEDAR 72 operational assessment of Gulf of Mexico Gag (based on the combined sexes SSB) represents the best scientific information available.

Motion carried with one opposed and one absent.

- Dr. Ailloud reviewed the previously parameterized projections using the sexes-combined estimate of SSB.

- Three red tide scenarios were developed:
  - 10% of the intensity of the 2005 red tide (low)
  - 30% (medium)
  - 72% (high)
  - Assumes the 2021 red tide dissipates in mid-November 2021, based on historical patterns and Ecospace modeling.

- All scenarios predict that gag grouper is still overfished and undergoing overfishing; however, at $F_{SPR30\%}$, the degree to which the stock is overfished is much greater than at $F_{MAX.}$

- Closing the fishery would result in the loss of critical fishery-dependent and biological information needed to monitor rebuilding.
  - Age and length composition data would not be collected from the fleets
- The current F_{MSY} proxy is F_{MAX}; changing that proxy would require a plan amendment.
- SSC supported using the medium severity red tide scenario (30%) based on the Ecospace model.
  - Viewed as more precautionary than the low severity value (10%)
- Due to time constraints, the SSC will revisit gag projections at its November 2021 meeting.

Reef Fish Committee (Tab B)

Discussion: SSC Recommendation on LDWF Red Snapper Abundance Studies
and Final GRSC Report

- Dr. Gallaway (LGL) presented an overview of a project commissioned by LDWF to estimate absolute abundance of red snapper off Louisiana.

- The draft GRSC report imputed data for waters off Louisiana from Texas data.

- The Louisiana Red Snapper Management Area (study area) was divided into three regions (West, Central, and East) and each zone was divided into four depth zones (10 – 25 m, 25 – 45 m, 45 – 100 m, and 100 – 150 m).

- Sampling of 106 sites (37 sites on the West, 33 on the Central, and 36 on the East Region) occurred during the summer and fall months of 2020.

- Hydroacoustics used to identify red snapper and estimate abundance.

- Submersible rotating video sampling (SRV) was deployed at discrete sites near structure and paired with hydroacoustic sampling.

- A generalized additive model (GAM) was used to quantify total fish density, while a generalized additive mixed model (GAMM) was constructed to quantify the proportional density of red snapper.

- LGL study estimates an absolute abundance of 6,027,890 red snapper in Louisiana offshore waters (95% CI: 4,665,675 – 7,787,825 red snapper).

- The standard error for this estimate was 13.1%

- Most red snapper are thought to occur over the UCB (approximately 63%), followed by standing platforms (22%), natural banks (10%), pipeline crossings (3%), and lastly, artificial reefs (2%).

- Red snapper abundance and biomass estimates from the LGL study were markedly less than the GRSC for Louisiana.

- Several SSC members commented that the difference could be heavily influenced by the catch rates observed between the two studies.

- SSC discussed the limitations of interpreting the LGL study results without more information on the sampling design.

- The SSC requested a written document from LDWF detailing the sampling design.

- Next steps: Evaluate LGL study sampling design; determine if the LGL study can supplement the GRSC for Louisiana; and, compare these independent study abundance estimates with the NMFS bottom longline survey.
    - Would require a future dedicated meeting

- Dr. Greg Stunz reviewed the final results of the GRSC and the response to reviewer comments received in April 2021.
- A stratified random sampling design was used in place of the original random forest approach.
- Additional variability captured (including adding a 'variance buffer')
- Estimators and calibrations were refined, and modification of post-strata based on suggestions.
- The contribution of the UCB was re-evaluated.
- Alternate estimator of variance to capture additional uncertainty, and another to reduce bias, were developed.
- Final results: 118 million Gulf red snapper (age-2+), with a CV of 15%.

- The SSC discussed how to get from an estimate of absolute abundance to a point where a catch level could be recommended.
- SSC members thought that having the GRSC move through the SEDAR process for thorough consideration was most appropriate.
- The SSC was clear that the GRSC and LGL studies should be treated completely separately, and not be directly compared.

Motion: SSC recommends the design and data from the GRSC are suitable for consideration in the SEDAR 74 process. SSC also recommends further evaluation of the estimates of absolute abundance and the methods and analysis used for estimation of the red snapper population.

Motion carried with no opposition.