Science, Service, Stewardship

MRIP/MRFSS Calibration Workshop #1 Key Findings and Outcomes

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MRIP Calibration Workshop #2

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Background

- NRC review ➔ MRFSS catch estimation not accounting for complex sampling design of Access Point Angler Intercept Survey (APAIS)
- MRIP developed weighted estimation method for APAIS
- New estimation method peer reviewed and approved
- New method used to re-estimate 2004-2011 catches
- Re-estimation resulted in split time series:
  - 1981-2003 MRFSS estimation methodology
  - 2004-2011 MRIP estimation methodology

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Background

- Steering committee formed to organize calibration workshop
  - Chair: John Boreman
  - Representatives from NMFS ST, SF, NEFSC, SEFSC, NERO, SERO, and SEDAR
  - Calibration Workshop held March 2012 in Raleigh NC

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Calibration Workshop #1

Terms of Reference

1. Review studies comparing MRFSS methods to those slated for use in MRIP, and propose additional work needed for calibration.

2. Propose method for calibrating MRFSS statistics to MRIP statistics, based on years with paired estimates available (2004-2011), and show how it would work to hind-cast catch and effort for select data sets (pre-2004).

3. Recommend plan for implementing calibration method into updated and benchmark stock assessments.

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Workshop #1 Agenda Topics

- Background Presentations:
  - Overview of differences between MRFSS-based and MRIP-based estimates 2004-2011
  - Lessons learned from previous examples of survey method changes: 2003 For-hire survey, 2003 Pacific RecFin, Albatross IV to Bigelow trawl survey
  - Anticipated further MRIP design changes

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Workshop #1 Agenda Topics

- Stock assessment ramifications of revised time series
- Approaches for matching MRFSS-MRIP based estimates
- Integration of revised times series into stock assessments
  - Proposed process and identified constraints

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Workshop #1 Key Recommendations

1. Need to re-estimate catch for years prior to 2004

2. Re-estimated catches for 2004-2011 represent “best available” and should be used, to extent available, in stock assessments

3. Updated/benchmark assessments should increase uncertainty measures for revised catches, based on 2004-2011 relationships.

4. Prior to 2004, hind-casted catches should be calibrated using a ratio estimator (MRIP/MRFSS) , either constant or trended throughout the hind-casted time series, based on ancillary information. This approach would not preclude more extensive species-specific approaches

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Workshop #1 Key Recommendations

5. Until new (updated or benchmark) stock assessment available:,
   - — Adjust new MRIP-derived catch numbers to be in same scale as catch numbers used for calculating current recreational ACLs.
   - — When these stocks are re-assessed, landings relative to ACLs would be tracked by using non-adjusted MRIP estimates.

6. For data poor stocks that have developed ACLs on the basis of historical catch:
   - — Same method should be used to recalculate these ACLs, but with MRIP re-estimated numbers where available, and adjusted MRFSS numbers for earlier years

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Workshop #1 Key Recommendations

7. Caution is urged regarding applying MRIP/MRFSS ratios on a scale smaller than the spatial scale of the stock.
   — Uncertainty in the estimates will increase in direct relation to the diminution of scale

8. Integration of new numbers should not require a full benchmark assessment.
   — An update should be sufficient if magnitude of “bias” is relatively small, recreational catches don’t dominate overall catch, and major changes in age composition do not occur.

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Workshop #1 Key Recommendations

9. Implementation of current set of revisions based on APAIS data should not be delayed to wait for possible revisions based on new effort statistics.
   - — Potential effects of revisions to biological data could be important if age or size structure of recreational landings and discards change.

10. A working group should be formed to:
    - — Establish priority list in each region for species assessments to be updated to incorporate new MRIP-derived catch estimates; and
    - — Provide technical approach (or approaches) to hind-casting and forecasting catch estimates, including examples

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Ad-hoc Calibration Working Group Report: Regional Species Prioritization

- Developed metric to rank species based on potential impact the switch from MRFSS to MRIP estimates could have on assessments
- Metric based on 6 quantitative criteria:
  1. Recreational landings (A+B1) in numbers of fish
  2. Mean Percent Difference between MRFSS and MRIP A+B1 landings
  3. Mean Percent Difference between MRFSS and MRIP B2 releases
  4. Fraction of discards to total catch, i.e. relative importance of discards
  5. Correlation (R^2) between annual MRIP landings and MRFSS landings values based on linear regression
  6. Percent of total landings attributed to recreational sector
- Species within each region ranked categorically for each criterion
  - Scaled to 10 pt. scale for comparison across regions
  - Overall priority score equals un-weighted average of 6 rank scores

Regional Species Prioritization Example
Northeast Region

Northeast Region	MRIP AB1 (Number of Fish) Sum 2004-2011		Mean % Difference AB1 Catch		Mean % Difference B2 Catch		Relative Importance of Discards (B2 catch)		R2 Correlation Coefficient MRFSS and MRIP AB1		Avg % Recreational Landings (2004 - 2011)		Overall Priority Rank (higher values indicate greater priority)
Species	Value (1,000s)	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	
tautog	6,508	4.4	0.083	5.6	0.085	6.9	0.092	7.5	0.883	7.5	91%	10.0	**7.0**
scup	28,205	7.5	-0.157	9.4	-0.136	9.4	0.076	3.8	0.818	6.9	32%	4.4	**6.9**
spot	69,387	8.8	0.096	6.9	0.042	5.0	0.043	0.6	0.982	9.4	43%	5.6	**6.0**
spotted seatrout	104,875	10.0	-0.022	2.5	-0.024	3.1	0.080	4.4	0.770	5.0	87%	8.8	**5.6**
striped bass	18,350	5.6	-0.060	4.4	0.011	0.6	0.108	8.8	0.802	6.3	80%	8.1	**5.6**
weakfish	4,268	3.8	0.089	6.3	-0.014	1.9	0.090	6.9	0.991	10.0	41%	5.0	**5.6**
bluefish	52,848	8.1	0.020	1.9	0.011	1.3	0.081	5.0	0.956	8.1	71%	7.5	**5.3**
red drum	26,154	6.9	0.012	1.3	-0.041	4.4	0.089	6.3	0.748	3.8	89%	9.4	**5.3**
atlantic cod	2,908	3.1	0.242	10.0	0.313	10.0	0.086	5.6	0.516	0.6	18%	2.5	**5.3**
summer flounder	482	1.3	0.048	3.8	0.098	7.5	0.119	9.4	0.732	3.1	45%	6.3	**5.2**
atlantic croaker	82,482	9.4	-0.036	3.1	-0.048	5.6	0.074	3.1	0.796	5.6	26%	3.1	**5.0**
spiny dogfish	156	0.6	0.107	7.5	0.103	8.1	0.122	10.0	0.588	1.3	3%	0.6	**4.7**
pollock	1,348	1.9	0.121	8.1	0.064	6.3	0.054	1.3	0.968	8.8	8%	1.9	**4.7**
black sea bass	14,738	5.0	0.008	0.6	0.036	3.8	0.105	8.1	0.595	1.9	51%	6.9	**4.4**
winter flounder	1,736	2.5	0.148	8.8	0.129	8.8	0.055	1.9	0.611	2.5	5%	1.3	**4.3**
spanish mackerel	20,804	6.3	0.077	5.0	0.020	2.5	0.061	2.5	0.757	4.4	30%	3.8	**4.1**

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Ad-hoc Calibration Working Group Report: Ratio Estimator Approach to Calibration

- "Ratio-of-means" approach (across comparison years) recommended rather than a "mean-of-ratios" for individual years
- Used to calculate both calibrated catch estimates and associated variances
- Variances of the adjusted catch estimates should include two components:
  1. Calibrated variance of the catch estimate, and
  2. Variance associated with the ratio estimator used for calibrating the catch estimate.

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Ad-hoc Calibration Working Group Report: Guidelines for Applying Ratio Estimators

- Ratio estimators can be based on either estimated numbers of fish or weights depending on the assessment model
  - If ratios based on weights appear unstable due to small sample sizes of weighed fish, it may be better to calculate a ratio estimator based on numbers and apply it to the weights
- All years for which both MRFSS and MRIP estimates are available should be used to calculate ratios
  - If outlier ratios are found for a few years, a balanced trimmed mean approach is preferred over simply dropping the highest or lowest value

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Ad-hoc Calibration Working Group Report: Guidelines for Applying Ratio Estimators

- Trended ratio estimators are generally not recommended at present since only eight years are available for comparison.
  - As additional years of side-by-side estimates are made available it may be possible to develop trended estimators that better reflect different ratios at different parts of the time series.
- It is recommended that stock assessment scientists conduct sensitivity analyses of the hind-casted recreational catch estimates and length frequencies.
  - If the assessment results are sensitive to changes in the recreational time series there may be justification for developing more sophisticated models for hind-casting estimates

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Discussion Questions

1. Do we still have consensus on the key recommendations?
2. Were any of these key recommendations applied in your particular region?
3. Was the species ranking approach proposed by the ad-hoc working group used in your region?
4. Was the ratio estimator approach recommended by the ad-hoc working group used in your region?
5. Have any other MRFSS-MRIP calibration approaches been used in your region?