

Chapter 9

MISCELLANEOUS TOPICS

Rare Species/Pulse Events

The analysis of catch and effort data for rare species and pulse events is difficult due to the problems associated with collection of accurate and precise data for these fisheries. Rare species are those species only occasionally sampled in the MRFSS intercept survey, while pulse events are caused by highly migratory species or short fishing seasons. The definition of a rare species or pulse event will vary for different regions, states, and areas, and must be defined by each individual user of the MRFSS data prior to initiation of any analysis or stock assessment. The definition may be based on apriori knowledge of the fish species and fishery within the region of study, or can be based on the examination of the variance estimates about the MRFSS catch and effort estimates.

Variances about catch and effort estimates will be extremely high for rare species and pulse event fisheries due to small sample sizes, lack of intensity of MRFSS sampling, or rapid changes in the fishery so that the event would not be detected by any reasonable amount of sampling. There are two major solutions for detection of these fisheries and for possibly decreasing the variances associated with catch and effort estimates. An increase in the level of funding for the MRFSS survey could be used to increase sampling effort to a level that would detect these fisheries. This solution could be implemented through increases to the NMFS budget for MRFSS sampling, through state add-ons to the MRFSS, or by state supplemented sampling. An increase in sampling effort would allow better detection of these fisheries, as well as decrease the variances about catch and effort estimates.

The use of smoothing techniques on the data may also improve detection of these fisheries and also decrease the variances of catch and effort estimates. Moving averages can be applied to the MRFSS data either over time (ie., years, waves) or in space (ie., subregion level data). Disadvantages of applying smoothing techniques include a trade-off between bias and variance, difficulties in data interpretation, and the masking of real fluctuations or trends within the data. The decrease in estimate variances is a beneficial consequence of the application of smoothing techniques, however, consideration must be given to the evaluation of possible biases in the estimates.

Smoothing of the data may also have practical and political implications for fisheries management. Management strategies should be consistent with the level of smoothing. For example, estimates based on subregion smoothing of state level data may no longer be applicable for state management purposes or applying a 3-year running average of yearly data may result in this data being no longer suited for annual management strategies. Smoothing of data may also cause political complications in the management process for the above reasons, as well as due to difficulties in explaining the smoothing technique to the fishing public.

Directed Effort

Several data analyses, including bag limit analyses, require a measure of directed effort for a given species as the measure of fishing effort. Directed effort must be defined prior to performing these analyses. There are various definitions of directed effort that can be applied to the MRFSS data:

1. Inclusion of all anglers who catch a given species. This definition of directed effort ignores all zero catches.
2. Inclusion of all anglers who claim to have targeted a given species. The MRFSS data include the species of fish targeted by the angler. If the target species is used as the definition of directed effort, the analysis will ignore all anglers who reported that they were fishing for no specific species. This definition of directed effort may be influenced by "prestige bias" since the question is asked after the completion of a fishing trip. The angler may have begun the fishing trip targeting for a particular species other than the one caught, but may later report that he was targeting the species caught.
3. Inclusion of all anglers in an area where one angler caught a given species. This definition of directed effort may be used for a species that is known to have a well-defined schooling pattern.
4. Inclusion of any angler who fished in a manner that might have led to a given species being caught. For example, directed effort for summer flounder may be defined as all anglers who were bottom fishing. At the present time, the MRFSS survey is not designed to provide the variables to subset the data on the basis of this definition. Specific fishing techniques for a given species would need to be defined and included in the MRFSS survey questionnaire to identify anglers who were fishing for that particular species.
5. Directed effort could also be defined as any combination of the above definitions.

Various problems may be encountered when attempting to define directed effort for a particular species and also in subsetting the MRFSS data on the basis of these definitions. The MRFSS data may not include the appropriate variable for subsetting data due to the lack of specific questions being asked of anglers during the interview process. Variables contained within the MRFSS datasets should be reviewed to verify that the data can be subsetted appropriately for the definition of directed effort.

Each of the above definitions of directed effort has its own possible measurement method and associated problems. The definition of directed effort should be driven by the overall management objectives for that particular fishery. When defining directed effort for a fishery it may be necessary to consider the importance of zero catches, with zero catches being necessary for socio-economic studies, but of little importance in bag limit analyses. The consideration of ancillary data, such as a special fishing license, may also assist in defining directed fishing effort.