

Atlantic States Marine Fisheries Commission

Risk and Uncertainty Policy

Risk and Uncertainty Policy Statement

The Commission recognizes that fishery information is inherently variable, and that successful management requires full consideration of this uncertainty and the associated risks on management decisions. The purpose of the Commission's Risk and Uncertainty Policy is to provide a consistent yet flexible mechanism to account for both scientific and management uncertainty in the Commission's decision-making process in order to protect all Commission-managed stocks from the risk of overfishing, while minimizing any adverse social, economic, or ecosystem effects. This Policy seeks to maximize the long-term benefits across all of our marine fishery resources by providing objective criteria to characterize both scientific and management uncertainty, and to evaluate management risk. Additionally, the Policy improves transparency in the management process, allowing for better communication among managers, industry, and other stakeholders.

Risk and Uncertainty Approach

The Commission's approach consists of a framework, the Risk and Uncertainty Decision Tool, that can be adapted to fit the needs of a particular species, while also providing transparency and consistency across species. The decision tool incorporates diverse information about risk and uncertainty, as well as the relative importance of this information, into a single value – the Commission's risk tolerance level for that species

In the initial version of the risk and uncertainty process, this risk tolerance level is a goal probability of achieving the reference points. The species Technical Committee (TC) uses this goal probability with biomass projections to identify management options that match the Commission's risk tolerance level for that stock. For example, if the decision tool produced a goal probability of 60% for the stock's F threshold, the TC would identify management options that achieved the F threshold (were at or below the F threshold) in 60% of biomass projections. However, the decision tool and process could be adapted to other management questions in the future.

The Risk and Uncertainty Decision Tool consists of a series of questions related to the risk and uncertainty of a species' management. Responses to the questions may be quantitative or qualitative, and may be indices or scores composed of multiple pieces of information. These responses are weighted based on the relative importance of the information to management of risk and uncertainty for the species. The decision tool combines all of this information into a single value, in this case the goal probability of achieving the management objective, through a logistic function.

The template Risk and Uncertainty Decision Tool below provides a starting point for developing a species-specific decision tool. The species Board, in collaboration with the TC, Advisory Panel (AP), and the Committee on Economics and Social Sciences (CESS), may develop a species-specific tool by adding to or adjusting the technical inputs considered, modifying the technical input criteria, or by adjusting the component weightings. However, all decision tools should consider stock status, model uncertainty, management uncertainty, environmental uncertainty, environmental/trophic importance, and socioeconomic considerations.

Template Risk and Uncertainty Decision Tool

The following is a template decision tool with technical inputs and default weightings.

Decision Tool Inputs	Scoring	Default Weight
<i>1. Stock Status</i>		
Stock status: is stock overfished/depleted?	0 to 1	0.10
Stock status: is stock above or below biomass target?	0 to 1	0.10
Stock status: is overfishing occurring?	0 to 1	0.10
Stock status: is fishing mortality above or below the target?	0 to 1	0.10
<i>2. Additional Sources of Uncertainty</i>		
Model uncertainty: how much model uncertainty is there?	0 to 5	0.10
Management uncertainty: how much management uncertainty is there?	0 to 5	0.10
Environmental uncertainty: how much environmental uncertainty is there?	0 to 5	0.10
<i>3. Additional Risk Considerations</i>		
Environmental/trophic importance: how important is the species to the ecosystem/other key species?	0 to 5	0.10
<i>4. Socioeconomic Considerations</i>		
Commercial short-term: what is the short-term socioeconomic effect of the proposed management change on the commercial fishery?	-5 to 5	0.10
Commercial long-term: what is the long-term socioeconomic effect of the proposed management change on the commercial fishery?	-5 to 5	0.10
Recreational short-term: what is the short-term socioeconomic effect of the proposed management change on the recreational fishery?	-5 to 5	0.10
Recreational long-term: what is the long-term socioeconomic effect of the proposed management change on the recreational fishery?	-5 to 5	0.10

Developing Species-Specific Decision Tools

A species Board may either approve the template decision tool for use for the species or adapt the decision tool to meet the specific needs of a species (e.g., by adjusting the weightings for different categories or adding additional information). However, information on stock status, modeling uncertainty, environmental uncertainty, management uncertainty, environmental importance, and socioeconomic considerations should always be incorporated. The Policy Board may develop further guidance for species-specific decision tools.

The species Board will work in collaboration with the TC and the Committee on Economics and Social Sciences (CESS) to develop the decision tool and its supporting documentation. The TC and CESS will also develop a species matrix, a document recording the information relevant to the decision tree questions, for the species.

The species Board will provide guidance on the information to be included in the species decision tool (e.g., new decision tool questions) and the weightings (i.e., relative importance of the information). The species Board may develop the weightings by discussion at a meeting or by another method for determining collective input, such as a survey. This information will then be passed on to the species TC.

The species TC, including a representative from the CESS, will create the species matrix with information relevant to the decision tool. The TC will use this information to assign responses to the decision tool input questions on stock status, modeling uncertainty, environmental uncertainty, management uncertainty, and environmental importance. The TC will produce a preliminary probability of achieving management objectives and provide a draft report on the decision tool responses to the CESS. The CESS will add the socioeconomic components to the species matrix, decision tool, and report. A recommended probability of achieving the management objectives that includes the socioeconomic components will be produced.

The TC will present a report outlining the initial risk and uncertainty input determinations to the species Board. The report will efficiently detail the responses to the decision tool input questions, a concise explanation of the reasoning behind each response, and the preliminary probability of achieving management objectives.

The species Board will review the report, including the TC's responses to the decision tool input questions, in a public setting, allowing for maximum transparency in the process. The species Board may make changes to the question weightings (i.e., the relative importance of the information). In addition, the Board may make changes to the responses to the input questions if warranted, though the stock status, modeling uncertainty, environmental uncertainty, management uncertainty sections should be accepted unless there is a significant reason to change them. The species Board will approve the finalized responses to the decision tool and the final probability of achieving management objectives.

Using the Risk and Uncertainty Decision Tool

When a management action is anticipated for a species, the TC and CESS will review and update the decision tool inputs as needed. The TC will provide a revised report including the revised inputs, a preliminary probability (without the socioeconomic component), and the harvest level associated with that probability to the CESS. The CESS will update the socioeconomic component and score the proposed management change questions based on the preliminary probability and harvest level. A recommended probability of achieving the management objectives that includes the socioeconomic components will be produced. The revised report, highlighting any changes and including the probabilities with and without the socioeconomic component, will be provided to the species Board for review and approval. This revised probability may be approved without revisiting the decision tool weightings.

Once the report is finalized, it will be transferred as guidance to the TC or PDT responsible for developing management action documents. The probability of achieving the management objectives will be used for developing management options that reflect the species Board's risk preferences.

As new information arises, the decision tool may be updated and a new probability of management success produced, following the processes above. The species TC should periodically review the species matrix to ensure that all information is up-to-date. The species Board should revisit weightings every 5 years to ensure that they still reflect the Boards' preferences, unless the Board has already reviewed the weightings during regular updates and use of the decision tool.