# Management Uncertainty and the Mid-Atlantic

# Things To Consider

**1. What is management uncertainty?** In the annual catch limit (ACL) and accountability measure (AM) context, management uncertainty is comprised of two parts: the ability of managers to control catch such that the ACL is not exceeded and uncertainty in quantifying the true catch (i.e., estimation errors). Simply put, it is how much control management measures have on the fishery catch and how informative the catch data are. Management uncertainty can occur because of a lack of sufficient information about the catch (e.g. due to late reporting, underreporting, and/or misreporting of landings or bycatch), or because of a lack of management precision (i.e., the ability to constrain catch to desired levels) in many fisheries (e.g. due to limited, unavailable, or untimely landings and/or data, or lack of inseason closure authority).

**2. Why is it important to consider management uncertainty when setting catch limits?** Catch limits, along with other conservation and management measures, are set to meet the objectives of the specific fishery management plans (FMPs) and the National Standards of the Magnuson Stevens Fishery Conservation and Management Act (MSA). Exceeding those catch limits routinely could conflict with those objectives and standards. In addition, any time an ACL is determined to have been exceeded, AM measures are required to be enacted. AMs are intended to prevent, as much as is practicable, the ACL from being exceeded or to mitigate that overage and/or prevent it from occurring in the subsequent year.

**3. How could management uncertainty be considered and addressed?** Relevant sources of management uncertainty could be addressed by reducing the catch limits when specifying either the ACL or annual catch target (ACT). Methods would need to be developed to calculate what adjustment (i.e., reduction in catch) is needed to account for the management uncertainty and result in catch levels that achieve, but so not exceed the catch limits and targets. The adjustment should not be greater than needed, such that it prevents optimum yield (OY) from being achieved, and could be based on a variety of methods depending on the cause of the management uncertainty. Alternatively, or in conjunction with an adjustment, managers could consider implementing measures which reduce management uncertainty by improving the control management measures have on the fishery catch (e.g. more effective, timely measures) and how informative the catch data are; thus reducing or eliminating the need for an adjustment. Clearly addressing management uncertainty does not occur in a vacuum, and interplay between the management measures applied and the level of uncertainty will occur and change over time.

**4. Will addressing management uncertainty be an adaptive process?** Yes. After a few years of implementation, annual catches can be compared to the ACL, or ACT if utilized, to determine how the fishery performed relative to those catch limits. If the fishery catches rarely or never exceeds the catch limits that are set, catch limits could be increased relative to the ABC, but cannot exceed the ABC. Most fishery's will have some amount of management uncertainty so that the ACL should remain less than a stock's ABC, or if an ACT is used in part to account for management uncertainty then the ACT should usually be less than a stock's ACL. If the annual catch limits are exceeded more than 25 percent of the time, managers should re-evaluate a stock's ACLs and AMs to determine if catch limits and targets should be adjusted, or if management uncertainty can be addressed through other types of measures such as in inseason adjustments or more accurate data to improve the ability of managers to control catches relative to catch limits.

**5. Definitions of management uncertainty are helpful, but what about examples of management uncertainty in the Mid-Atlantic fisheries and how that uncertainty might be accounted for?**

**Example: Scup Recreational Fishery**

Overages have occurred frequently in the scup recreational fishery (i.e., more than 25 percent of the time). In order to set measures for the upcoming fishing year, management measures are developed such that it is assumed that effort and availability will be the same in the upcoming fishing year. This is an assumption which is frequently violated because it is difficult to predict angler behavior and when and how many fish will be available to recreational anglers each year. If effort and/or availability are greater than predicted resulting in higher catch and landings rates, the ability to control catch to the desired levels may be limited by both the timeliness of the recreational landings data (typically available 6 to 8 weeks lagged) and the inability to effectively implement inseason management measures (i.e., such as fishery closures). Managers may not know catches and landings are higher than predicted and will result in substantial overages until later in the fishing season, when it may not be possible to slow or stop the accrual of catch and landings. An additional complication for this stock is the interplay between state and Federal measures, and actions in Federal waters may have limited effectiveness if states do not take similar action. For example, to account for this source of uncertainty, managers could consider reducing the catch limits when specifying either the recreational ACT for this fishery by the proportional amount of the overage from the prior three years (i.e., 3 year rolling average). In addition, improvements in the timing of data availability in the future, perhaps available real-time or lagged 2 weeks, could reduce uncertainty and enable more effectively deployed inseason recreational management measures thus improving the fishery control and resulting in a smaller reduction in catch to account for management uncertainty in future years.

**Example: Summer Flounder Commercial Fishery**

The summer flounder commercial fishery is primarily prosecuted with bottom otter trawls and is part of a mixed species fishery. While targeting summer flounder, other species such as scup, black sea bass, and bluefish are encountered. If, for example, the summer flounder catch limits are increased and corresponding commercial trip limits are increased, fishermen may direct their effort more heavily on summer flounder. If commercial trip limits remain the same in other fisheries that are part of that mixed species fishery, such as scup, black sea bass, and bluefish, this could potentially result in changes in the retention and discarding of those species. It is difficult to predict the impact that regulations in one fishery (e.g. summer flounder) have on the catch (i.e., landings and discards) in other commercial fisheries (e.g. scup, black sea bass, bluefish), particularly for mixed species fisheries. Furthermore, market factors may also influence a fishermen's decision to either retain or discard different species. These factors may contribute to unpredictable variability in catch for some commercial fisheries and potential overages. One way to account for these types of management uncertainty, and prevent the ACL from being exceeded, may be to examine the standard deviation of the catch (i.e., how much variation there is from the "average" (mean)) commercial catch for that fishery), and then reduce the commercial catch limits by that amount. There is an interplay with other factors that affect management uncertainty such as fishery control. For many commercial fisheries, there are management measures such as reduced trip limits inseason to slow the accrual of landings and fishery closure inseason which prevent landings limits from being exceeded even if landings rates increase. As such, an adjustment to address catch variability may not be necessary for these fisheries. Each fishery should be evaluated on the sources of management uncertainty and if and how it should be addressed.