Submitted by the Alaska Department of Fish and Game
March 6, 2018

Substitute language for Proposal 88.

Summary

Proposal 88 was taken up by the board during the Southeast Alaska Shellfish meeting in Sitka in January 2018. Proposal 88 was submitted by the Southeast Alaska Regional Dive Fisheries Association (SARDFA) and requested a change to the Southeast Alaska commercial sea cucumber fishery guideline harvest level (GHL) calculation such that it would be based on the mid-point estimated biomass rather than the lower bound of the 90% confidence interval of the biomass estimate, as has been done since the management plan was adopted in 1993. The department was opposed to the proposal, because it would remove one of the most important conservative factors that incorporate uncertainty of biomass estimates. The board voted in favor of the proposal 4-3. Shortly after the vote, the board voted unanimously to reconsider the proposal, since the magnitude of the expected increase in harvest level was not initially clear to the board. The board requested the department to work with SARDFA to develop a compromise that was less conservative than the current management approach, but was not as liberal as what the proposal requested.

Compromise

Since the January 2018 Board meeting, the department and SARDFA have met and discussed potential solutions on several occasions and have found a regulatory solution that is acceptable to both groups. Rather than changing the use of the 90% confidence interval in the GHL equation, this compromise would change the GF correction factor in the GHL equation from GF = 0.5 to GF = 0.6. The GF factor is another element in the GHL equation that incorporates uncertainty, is intended to hedge against errors and incorrect assumptions in the model that is used (e.g. the estimate of natural mortality "M"). A comparative analysis to determine the different effects of changing the GF value versus changing the confidence interval found that very similar adjustments to the overall GHL can be made using either approach. For example, changing the GF to =0.60 would achieve similar overall GHLs as would changing the confidence interval to 80% (Figure 1). However, changing the GF has the added benefit of producing more conservative GHLs for areas where biomass is calculated with low precision, and less conservative GHLs for areas with high precision. This would provide some additional protection to stocks when there is greater uncertainty about the biomass estimate, which is preferable to only changing the confidence interval level, which would have the opposite effect.

Changing the GF to 0.60 would increase the target harvest rate from 19.2% to 23.0% (3-year combined), which would result in approximately an 18% increase in the overall GHL, based on

the three most recent years of survey data (Figure 1). Several GF levels were considered ranging from 0.55 to 0.75, and it was determined that a value of 0.60 represented a meaningful increase in the GHL without exceeding a harvest rate that appears to be sustainable. Based on a preliminary analysis of sea cucumber population response to various rates of actual exploitation, a harvest rate of up to 23.0% appears, on average, to not lead to declines in populations (Figure 2). Although a more in-depth analysis should be done, the results of the preliminary analysis appear to provide reasonable evidence that increasing the harvest rate could be done incrementally without damaging stocks.

Additionally, to provide some flexibility to change GHLs in the event that a higher harvest rate is found to be excessive for stocks that have lower productivity, the department and SARDFA support adding to the sea cucumber management plan language that is found in the red sea urchin management plan under 5 AAC 38.145(p). This language would allow the commissioner to modify GHLs if new information is received about productivity that will contribute to conservation, law enforcement, waste reduction and fishery development. Similar language is also found in the geoduck management plan.

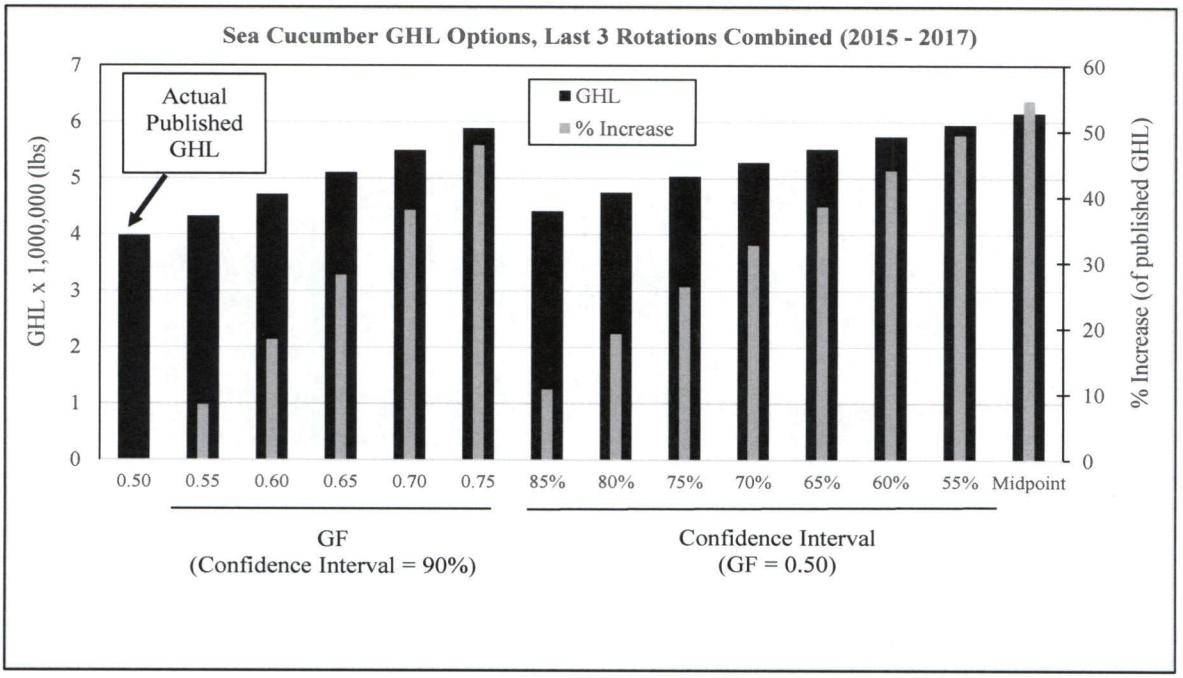

Figure 1. Differences in sea cucumber GHL by varying GF correction factors and confidence intervals.

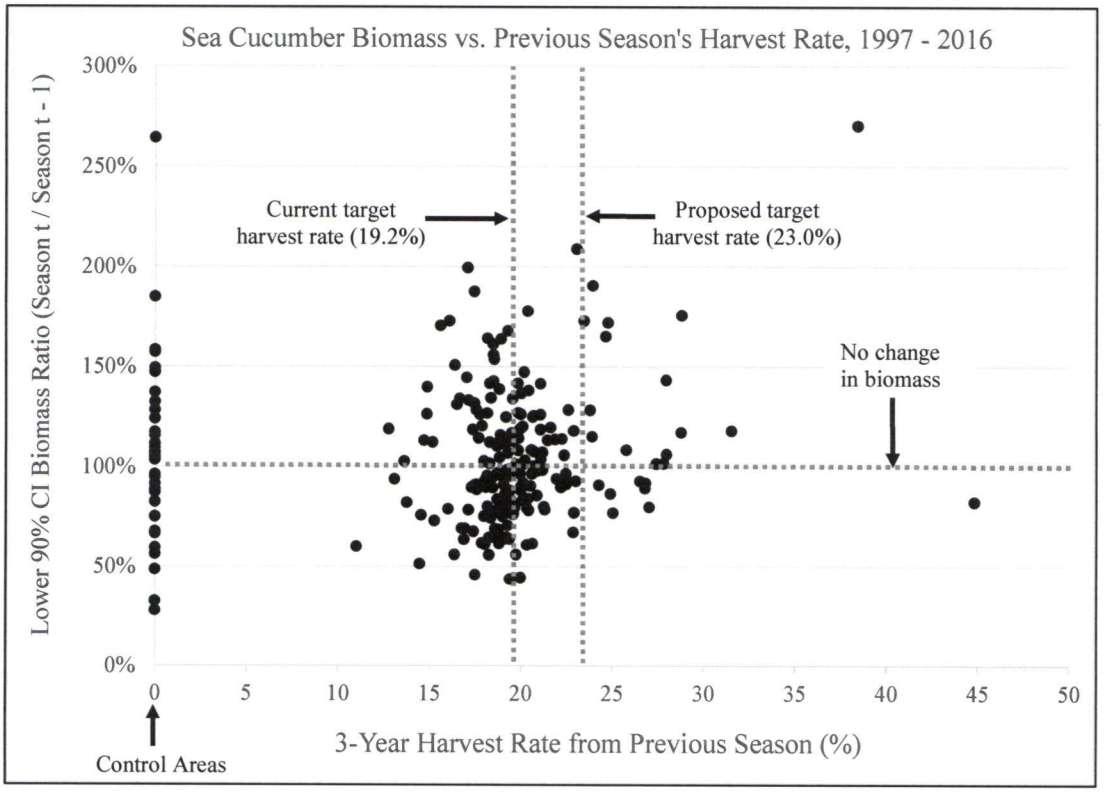

Figure 2. Response of sea cucumber populations to various harvest rates. Data includes only areas that have not been recolonized by sea otters to better isolate the effects of fishery removals.

Proposed regulatory language:

5 AAC 38.140. Southeastern Alaska Sea Cucumber Management Plan.

5 AAC 38.140 (h) is amended to read:

(h) The department shall establish a guideline harvest level for each area open to the harvest of sea cucumbers. The guideline harvest level shall be based on population estimates from the department's biomass assessment, and shall be calculated as the product: Guideline Harvest Level = 3 x CF x GF x M x P, where:

CF = 0.4 scaling factor relating maximum sustainable fishing mortality to unexploited population size;

GF = **0.6** [0.5] correction factor to allow for errors in the assumptions upon which the surplus production model is based;

M = 0.32 estimated instantaneous mortality rate for sea cucumbers;

P = virgin population size, taken as the lower bound of the one-sided 90 percent confidence interval.

The guideline harvest level includes a factor of three to account for a two-year closure under (c) of this section.

5 AAC 38.140 is amended by adding a new subsection to read:

(m) If the commissioner receives new information about sea cucumber productivity or if the commissioner determines that modifying the guideline harvest level will contribute to conservation, law enforcement, waste reduction, or promote development of the fishery, the commissioner may modify the guideline harvest level.