Appendix II

Groundfish Plan Development Team (PDT)

Development of Annual Catch Limits (ACLs)

for

2010 to 2012

I. Document Purpose:

Pursuant to Amendment 16, this PDT document describes pertinent information regarding the development of ACLs for the 2010 to 2012 specification period.

II. Background:

The ACLs were developed based upon the Science and Statistical Committee's (SSC) recommended Acceptable Biological Catch (ABC) for 2010 to 2012, and in accordance with the draft Amendment 16 "Administrative Process for Setting Multispecies ACLs". The focus of this discussion is the consideration of management uncertainty, but is built upon the recommendations of the SSC and the previous work of the PDT (August 7, 2009 Memorandum from PDT to SSC; July 13, 2009 Memorandum from PDT to SSC).

III. Abstract:

From the single recommended ABC values for each stock, ACLs were calculated in a two step process: (1) The division of the ABC into fishery components, and (2) downward adjustment of components to account for management uncertainty. The division of the ABC into subcomponents is based upon Amendment 16 allocation decisions, and percentages assigned by the PDT that reflect anticipated groundfish and non-groundfish fisheries (in order to categorize and account for all sources of fishing mortality). A working concept of management uncertainty was created to facilitate discussions, and qualitative elements with which to evaluate management uncertainty defined. A common default percentage reduction of the ABC subcomponent was set (5 %) to account for management uncertainty, and then particular stocks or stock/subcomponent combinations were identified that should have a higher or lower percentage reduction (based upon the defined elements of management uncertainty).

IV. Details:

Subdivision of ABC into subcomponents.

Amendment 16 contains the percentage splits of the ABC among fishery subcomponents (i.e. commercial and recreational), which are not intended to be subject to modification by the PDT. Other subdivisions of the ABC are recommendations of the PDT, made in conjunction with the development of ACLs, based upon pertinent fishery information and, in consultation with pertinent Council committees. For example, there may be calculations for Canada catch, state "off-the-top" subtraction, non-specified fisheries, herring fishery, scallop fishery, groundfish common pool, groundfish private recreational, groundfish charter/party, and U.S./Canada. Further information on the proposed subcomponents are in the September 14, 2009 memorandum from the PDT to the Groundfish Committee.

Create a simplified working concept of management uncertainty and identify qualitative elements of management uncertainty.

Management uncertainty is the likelihood that management measures will result in a level of catch ≥ catch objective. The *effectiveness* of management measures is a useful term that is related to management uncertainty (lower effectiveness of management measures results in greater management uncertainty, i.e., greater likelihood that measures will result in a catch that exceeds the catch level objective). The national standard guidelines state that two sources of management uncertainty should be accounted for: (1) Uncertainty in the ability of managers to constrain catch so the ACL is not exceeded; and (2) uncertainty in quantifying the true catch amounts (i.e., estimation errors). The purpose of setting an ACL(s) is to prevent catch from exceeding the ABC.

The principal elements relating to management uncertainty that may be considered are the following:

Enforceability - Can the management measures be effectively enforced at sea or on land through the use of uniform and unambiguous criteria that can be easily complied with by fishery participants?
Monitoring Adequacy - Timeliness **–** Are all relevant data collected, recorded, and made available shortly after completion of fishing operations? Completeness **–** Is all information related to all aspects of fishing operations and relevant to management of the fishery (e.g., kept catch, discards, landings, species composition, amount/type/size of gear used, area fished, effort expended, etc.) collected and recorded? Accuracy **–** Does the information collected correctly reflect fishing operations (e.g., area fished, species and amounts kept/discarded, days-at-sea fished, etc.) or is verifiable and/or automated in order to minimize the possibility of data entry errors?]
Precision - Can the management tools be used in a manner that will result in the desired amount of catch, or is there an inherent weakness or imprecision to the tool (complexity of FMP, no mechanism to slow or stop fishing effort, etc). Are there other factors that are pertinent to determining the effectiveness of management measures?
Latent Effort – Is there excessive latent fishing effort in the FMP that could be reactivated and undermine effectiveness of FMP, or is the latent effort eliminated or controlled (e.g., Category C DAS)?
Other Fishery Catch – Can the FMP regulate or limit catch of groundfish by other fisheries, including state, exempted, and recreational fisheries? Is the level of such catch highly variable, stable, or of a deminimus nature?

Set a default percentage reduction of the ABC to account for management uncertainty for most stocks, and identify relative uncertainty among stocks and stock/fishery components.

The PDT discussion focused on two aspects of accounting for management uncertainty: (1) Distinguishing relative amounts of management uncertainty between stocks, and

stock/fishery component combinations, and (2) Determining the appropriate percentage adjustment of the ABC.

Distinguishing relative amounts of management uncertainty between stocks and stock/fishery component combinations:
This evaluation includes determining whether particular stock and fishery segment combination are associated with greater or lesser management uncertainty than others (e.g., sector GOM cod versus common pool GOM cod, versus private recreational vs party/charter). Most stocks and segments of the fishery will be categorized identically with respect to management uncertainty due to the common management measures applied to many stocks and/or a current lack of information to assign management uncertainty with more precision, and be assigned a standard percentage reduction from the ABC. If a particular stock or fishery segment may be subject to notable uncertainty, then an alternate adjustment from the ABC would apply to account for notable uncertainty (relatively high or low management uncertainty).

For this initial development of ACLs, for most stocks and stock/fishery component combinations it is difficult to predict whether there will be meaningful differences in management uncertainty among such components. Management measures for vessels fishing in either the common pool or sectors will be substantially different from the status quo management measures. Furthermore, the number of permits that will actually participate in sectors, and the number that will remain in the common pool, will not be known until just prior to the start of the fishing year. Amendment 16 analysis indicates that for most stocks, measures will achieve the desired fishing mortality goals. Due to the substantive changes in management measures in the future, analysis of historic performance of fishery management measures is of limited use for predicting future management uncertainty at this time.

In most cases there is no strong evidence that justifies a conclusion that different stocks or stock/fishery components have different management uncertainty. For example, evaluating whether the management uncertainty associated with the common pool versus sectors: Although there is the hypothesis that the sector management regime of Amendment 16 will result in the more effect control of catch (as well as more efficient fishing operations, approaching optimal yield, etc), that system will be new, and the level of management uncertainty associated with that system may not be substantively different from the common pool. The success of sectors will depend upon many novel fishing behaviors, organizations, monitoring systems etc. Not-withstanding the limitation of current data, the PDT did evaluate past catch information in order to glean insights into the fishery as a whole.

Comparisons were made between recent catches and target TACs (TTACs), using a calendar year basis since that is how mortality is calculated: since Amendment 13, 87 TTACs have been specified and 9 have been exceeded. Since the amendment was in effect for a full calendar year (e.g. since 2005), the SNE/MA yellowtail flounder TTAC was exceeded three times (2006, 2007, 2008), white hake was exceeded in 2008, and GB yellowtail flounder was exceeded in 2007. While these comparisons suggest the management system generally controlled catches, fishing mortality still exceeded targets,

and measures were designed to achieve mortality targets, not to attain a particular catch. In addition to past management uncertainty (due to various elements of the FMP), scientific uncertainty also was relevant to historic catch levels. It is impossible to parse out the relative roles of scientific and management uncertainty in evaluating past catch levels. For that reason, comparisons of historic catch to TTAC are not particularly useful in providing guidance on estimating management uncertainty.

After various fishery-dependant data from the 2010 fishing year has been compiled and analyzed, it is more likely that evidence of differences in the elements of management uncertainty among components of the fishery could be used to further distinguish management uncertainty. It is anticipated that future ACL specification cycles may be able to better distinguish management certainty among stocks or stock/fishery components. Although it is conceivable that adjustments to ACLs prior to the next specification cycle may be desired, it may be difficult to make such adjustments due to the time required to analyze data and implement modified ACLs.

Determining the appropriate percentage adjustment of the ABC:
The amount of adjustment of the ABC was the second topic. One theoretical method discussed was to base the amount of adjustment down from ABC based upon the consequences of exceeding the ABC. Based upon a particular amount of catch in excess of the ABC, and the resultant impact on future catch levels, the ACL could be determined. This method was not pursued because it would have been based upon an assumed amount of overage for each stock. For the reasons discussed above, it is very difficult to determine the appropriate assumptions. A similar rationale for GB haddock was discussed that would have set management uncertainty to close to zero, based on the fact that it is highly unlikely that catch will approach ABC, given the stock size and multiple aspects of the FMP and fishery that will constrain haddock catch. It was concluded however that this approach, based on stock status and the nature of the fishery, was more of a risk assessment evaluation that would be difficult to apply across all stocks.

A third approach discussed briefly by the PDT was the use of a discard rate or observer coverage rate as a numerical basis upon which to derive management uncertainty, particular for sectors. This approach is rooted in the assumption that management uncertainty for sectors (fishing under hard TACs) will be closely related to the ability of managers to accurately monitor the fishery catch. Specifically, accurate monitoring will relate to both the amount of illegal and/or under-reported discards, and the level of observers or at-sea monitors in the fishery. This method, although logical, would rely heavily upon untested assumptions.

The PDT recommendation of a five percent adjustment for management uncertainty as a default was based upon several factors. The adjustment should be meaningful, and serve the function of a buffer, so that if the management measures and monitoring of the catch result in excessive catch, the catch will not exceed the ABC. Arguably, an adjustment in the ABC of only one or two percent may not serve its purpose, given the FMP uncertainties previously discussed. Secondly, five percent is within the range of

uncertainty attributed to the closed area model (10%), used to analyze the effectiveness of most of the management measures. Notwithstanding the uncertainties of the FMP, a default percentage of greater than five percent is not warranted, given the more restrictive management measures proposed (compared to status quo), the Amendment 16 analysis, and the recent levels of fishing mortality, many of which are at historic lows.

The PDT next considered deviations from the default. Ideally, any deviations should be tailored to the management history of individual stocks, but as already noted there is limited information with which to base such differences. The PDT decided to recommend a standard adjustment for stocks with less uncertainty of 3 percent, setting the ACL at 97 percent of the ABC. Fro stocks with more uncertainty, the PDT originally recommended a standard adjustment of 10 percent, setting the ACL at 90 percent of the ABC. The Council noted, however, that there was no justification presented by the PDT to justify a larger adjustment for stocks with more uncertainty than is used for stocks with less uncertainty and directed the PDT to us an adjustment of 7 percent.

Analyze individual stocks in the context of the FMP for *elements* of management uncertainty to determine if particular stocks will be subject to more or less uncertainty than most.

Georges Bank yellowtail flounder

Georges Bank yellowtail flounder has been managed under a hard TAC in the context of the U.S./Canada Management Area rules since 2004. The Regional Administrator has the authority to modify management measures in-season (including trip limits, closures, days-at-sea, trips, and gear) in order to prevent both over-harvest and under-harvest of the TAC. The incorporation of in-season adjustment capability in the FMP is essentially an in-season accountability measure, and provides a relatively high level of *management precision*. Of the five completed fishing years since 2004, the TAC was only exceeded once (FY 2007, total catch was 9% over TAC). The principal reason for that overage was due to reporting and monitoring delays. Since that time, NMFS implemented changes to the monitoring procedures that will reduce the likelihood that *monitoring adequacy* will contribute to a TAC overage. For these reasons, the management uncertainty for GB yellowtail flounder is less than the fishery-wide uncertainty, and an adjustment of 3% is recommended.

Southern New England (SNE) Yellowtail Flounder

As discussed above, although there are limitations to the utility of historic information in assessing management uncertainty, the PDT considered historical catch patterns for this stock as relevant. That the catch of this stock exceeded the target TAC three times since 2004 is of concern. For fishing years 2006, 2007, and 2008, the catch to TAC ratio was 2.53, 1.86, and 1.62, respectively. The *management precision* of the FMP with respect to SNE yellowtail flounder has been relatively low historically. Secondly, there are higher discard rates of this stock than many other groundfish stocks, including *discards from other fisheries* such as fluke and scallop. For these reasons, the PDT concluded that the stock has greater management uncertainty than the fishery wide level, and an adjustment of 7% is recommended.

Gulf of Maine Haddock and Gulf of Maine Cod (Recreational sub-ACLs)
The proportional standard errors (pse) associated with the recreational data for these stocks is approximately 10%, and there is consensus that the *monitoring adequacy* of the recreational fishery is less than that associated with the commercial fishery. For these reasons, the PDT concluded that the fishery sub-components for these stocks have greater management uncertainty than the fishery wide level, and an adjustment of 7% is recommended.

SNE winter flounder, windowpane north, windowpane south, ocean pout, and Atlantic wolfish: These stocks either need significant reductions in fishing mortality or continued low levels of fishing mortality. Newly proposed management measures such as the restricted gear areas for the common pool, prohibitions on retention, and expanded sector management as well as the difficulty in achieving high *monitoring adequacy* of stocks that are either not targeted and/or encountered in low numbers, combine to create a situation where there is less *management precision* and greater management uncertainty. For these reasons, the PDT concluded that these stocks have greater management uncertainty than the fishery wide level, and an adjustment of 7% is recommended.

Gulf of Maine Haddock and GB Haddock Sub-Components for the Herring Fishery
The herring fishery is allocated .2 percent of the "TAC" for these haddock stocks. Although there is a haddock monitoring system in place in the herring fishery, the system was not designed to distinguish one haddock stock from another. Due to this weakness in the *monitoring adequacy* the PDT concluded that these ACL-subcomponents should be subject to the 7% adjustment.

Yellowtail Flounder Sub-Component for the scallop fishery
For FY 2010, there will be no downward adjustment of the yellowtail founder sub-component for scallop fishery (3 stocks of yellowtail). For future years, the downward adjustment may depend on the specific AMs adopted. Further work is needed on this issue, including whether the adjustment should be determined by the scallop or groundfish FMPs.