New England Fishery Management Council
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MEMORANDUM

DATE: July 27, 2012

TO: Groundfish Oversight Committee

FROM: Groundfish Plan Development Team

SUBJECT: **PDT Conference Call, July 25, 2012**

1. The PDT held a conference call to discuss at-sea monitoring issues, sub-ACLs for SNE/MA windowpane flounder, changes to the sector ACE carry-over provisions, and ABCs for FY 2013 – 2015. Staff participating in the call were Tom Nies and Fiona Hogan (NEFMC), Steve Correia (Mass DMF), Michael Ruccio and Dan Caless (NMFS NERO), Chad Demarest, Paul Nitschke, and Evan Bing-Sawyer (NMFS NEFSC), Sally Roman (SMAST), and Sally Sherman (Maine DMR). Michael Palmer (NMFS NEFSC) and J. Michael Lanning (NMFS NERO) also participated in the call, as did Jenny Sun and Jessica Joyce (GMRI).

2. The PDT referred to several draft documents during the call: a draft report on discard length frequencies, a report on landings and discards proportional monitoring, a summary of realized stock and sector specific CVs for FY 2010 and 2011, a report on how CV affects catch estimates for sectors, a May 25, 2012 NERO letter to the Council on carry-over, and a straw man revision to carry-over provisions.

At –Sea Monitoring Issues

3. There were three sub-topics discussed: discard length frequencies, FY 2010 observer coverage in relation to the concept of allocating coverage by landings or discards, and determining the appropriate standard to use to determine the appropriate level of observer coverage.

Discard Length-Frequencies (l-f)

4. The Committee asked the PDT to investigate the l-f of discards. This request was to support a possible alternative that would reduce minimum sizes, as an alternative to the option that would

require full retention and would eliminate minimum size requirements. A report was prepared that summarizes the discarded l-f of groundfish stocks in several ways: by year, quarter, trawl mesh shape, trawl mesh size, statistical area, and depth (see enclosure (1), a separate document). The report will be incorporated into the analysis of a full retention policy since many of the issues overlap (the full retention report is enclosure (5), provided as a separate document).

5. The overall conclusion is that minor (e.g. 1 inch) reductions in minimum size would likely convert discards to landings for most, but not all, groundfish stocks. Table 1 lists each species and qualitatively summarizes the likely effects. The table also shows the minimum size that would be needed to reduce almost all of the current sub-legal discards.

6. The PDT considered whether there was a clear advantage to either eliminating the minimum size or making a change. The issues associated with each are similar, and the impacts largely on whether there are behavioral changes in the fishery that result from a change or elimination in minimum sizes. The paper explores these issues, but in brief:

- Changes to minimum size could lead to changes in behavior that result in changes in the size of fish captured. If the selectivity pattern of a species shifts to smaller fish, there are likely to be changes in the F_{MSY} (or its proxy), reductions in MSY values, and reductions in yields.
- For many groundfish stocks, smaller fish are less fecund, have lower egg survival, and are not as successful at spawning. These factors are not explicitly evaluated in the attached paper but need to be considered, as they could further affect long-term yields.
- There could be short-term delays in rebuilding programs for some stocks.
- If fishermen are required to land small fish that are not marketable, there could be issues related to the handling and reporting of these fish. For example, there have reportedly been some problems with dealers not reporting hagfish that cannot be sold.
- As noted previously, full retention is sometimes claimed to increase the efficacy of electronic monitoring (EM). Any exemption from this requirement (such as requiring fish to be discarded that are not allocated) will reduce the strength of this argument.

7. The PDT notes that there are tradeoffs that need to be considered between these two approaches, but does not have a recommendation for one over the other.

Distribution of Observer Coverage/Catch Proportional Monitoring

8. The PDT reviewed a draft paper prepared by Jenny Sun of GMRI that analyzed observer coverage for FY 2010 in order to determine if observer coverage is assigned equally to all categories. Trips were categorized as day trips (less than or equal to 24 hours) or multi-day trips (greater than 24 hours), and were binned according to vessel size in three size categories. The coverage was summarized based on number of trips, and then based on number of trips weighted

by groundfish landings or groundfish discards. A hypothesis test was used to test for equality of proportions.

9. The analyses will help address the question of whether observer coverage is distributed evenly. This may help in the evaluation of whether discard estimates may be biased. The draft results indicated that the conclusions may depend on which metric is used to measure coverage rates: trips, trips weighted by landings, or trips weighted by discards. This may complicate interpretation.

10. The PDT suggested expanding or modifying the analysis in several ways before finalizing it, and the GMRI representatives agreed to do so. The suggestions were:

- The distribution of trip lengths for fixed gear vessels suggests that a more appropriate break point for "day" (or short) and multi-day (or long) trips is 48 hours. Almost all fixed gear trips are less than 26 hours; a trip of just over one day would seem to be better binned with other day trips, rather than multi-day trips.
- The PDT requested an explanation of the weighting method and the hypothesis test.
- The PDT suggested that there may be difference between stocks that are important. One way to explore this would be to run the analyses for three stocks (GOM cod, GB haddock, and pollock were suggested).
- When FY 2011 data is available, the analysis should be repeated for 2011.

11. There was some discussion about how this information could be used. It is not clear that the ASM program should be designed to have equal coverage rates in all categories. While the language in Amendment 16 is not specific, it does state that sectors are responsible for designing an ASM program that at least meets the CV standard. It is conceivable that a homogenous sector might need fewer trips to meet such a standard, which would argue for difference coverage rates (however measured) between sectors. There was some discussion about using the information on different coverage rates to select trips at different rates within the categories.

12. Next the PDT reviewed the results of a simulation study that assigned different observer coverage rates to day and multi-day trips. Using a simulation tool developed to investigate the best way to estimate sector discards, the effects of targeting coverage on one trip length category over the other was investigated at different levels of observer coverage. These categories were not defined as a new stratum. When there are differences in discard rates between the two categories, allocating observer coverage in this way (without stratification) results in a bias in the discard estimate. The magnitude of the bias increases with higher levels of observer coverage. This suggests that if coverage is shifted to target specific categories, then it may be necessary to impose additional levels of stratification on the discard estimation process. Increased stratification usually requires higher overall observer coverage rates in order to meet a level of precision for each stratum.

Coefficient of Variation (CV) – What is the Correct Level of Observer Coverage? What is the Correct Standard?

13. Amendment 16 specifies that sector at sea monitoring will at least meet the CV requirement specified in the SBRM (30% CV). The amendment is not clear how this standard is to be applied, which has caused some confusion, and there is also some question about whether this is the correct standard to use to determine coverage levels. The PDT explored the implications of using CV as a standard for sector monitoring coverage by reviewing two documents: realized CVs by sector and stock for FY 2010 and FY 2011 (enclosure (2), separate document provided by NERO), and an exploration of the effects of CV and discard estimate bias on catch estimates (enclosure (3), separate document).

14. A review of other catch share monitoring programs uncovered surprisingly little analytic support for the levels of observer coverage that were adopted. In some cases the level of coverage was selected in order to have a high certainty of capturing rare, but important, takes of valuable (protected r endangered) species. Table 2 below gives an overview of the priorities of several at-sea monitoring programs that require 100 percent observer coverage.

15. Two of the objectives of the sector monitoring program are:

- Determine total catch and effort, for each sector and common pool, of target or regulated species
- Achieve coverage level sufficient to minimize effects of potential monitoring bias while maintaining as much flexibility as possible to enhance fleet viability

A question that needs to be answered is what level of observer coverage is needed to meet these two goals?

16. Enclosure (2) summarizes the sector and stock-specific CVs that were realized in FY 2010 and FY 2011. Solely on a stock basis, all CVs were lower than the 30% standard. On a sector and stock basis, however, there were many instances where the realized CV exceeded the standard. As noted before, Amendment 16 is not clear on how the standard should be applied. At the stock level, it would seem there was more coverage than needed to meet the standard; at the sector-stock level, it appears there was not enough. But there is another question that needs to be considered – is CV the correct standard for determining the coverage needed?

17. CV is nothing more than a measure of variability around an estimate of discards. A fixed CV standard implies that it is just as important to have a precise estimate of a small number as it is to have a precise estimate of a large number. If the concern is accurate estimates of sector catches for each stock (as suggested by the monitoring objective shown above), this may not be the case. This can be illustrated with actual results from the FY 2010 tables. A few examples are summarized in the table below (Table 3). They show that in order to achieve the target CV, many more trips would have to be observed to get a precise estimate of a small amount of discards. This would not be cost effective.

18. If the objective is to be certain that a sector has not exceeded its ACE, then there are three factors that interact: the amount of landings, the amount of discards and the uncertainty around both. It is generally assumed landings are known without error (or with very small errors) and so the uncertainty around the discard estimate is more important. Enclosure xxx explores the interaction between these factors.

19. If the nominal catch (landings plus the discard estimate) is less than the total ACE, the amount of the discards and the amount of the uncertainty in that discard estimate can be used to determine the probability that true catch (the landings plus the true discards) exceeds ACE. This is explored by determining the maximum nominal catch that will have a very low probability (2.5 pct. in the paper) that true catch exceeds the ACE. At low levels of discards and without any bias in the discard estimate, the CV has little influence on this maximum ACE. At least for a single stock, the increase in maximum ACE that results from a better CV may not be worth the cost of the additional observer coverage.

20. The presence of observer bias, however, has a large influence on the maximum ACE, and if observer bias is present then CV has more importance. This was explored by assuming that the true discards were two or three times the nominal discards. The effect is to reduce the maximum ACE by a considerable amount. For a discard rate of 10 percent, and different CVs, the influence of the bias on the maximum ACE is compared to the no bias case in Figure 1.

21. If the true discards are larger than the nominal estimate, it means that the discard rate on unobserved trips must be higher than the discard rate on observed trips. How much higher is a function of the observer coverage level and the bias. Higher levels of observer coverage mean that for a given bias the discard rate on observed trips must be much higher than on unobserved trips.

22. The implications of these analyses are:

- CV, by itself, may not be the appropriate standard for determining observer coverage levels needed to monitor sector catch quotas.
- A biased discard estimate will have more influence on the accuracy of sector catches than the CV standard. It is therefore critical to have enough coverage that the presence of bias can be detected; ideally coverage should provide a way to estimate the amount of bias.
- If CV is used as a standard, in whole or in part, it should be clarified how it is to be applied.

23. Next steps: the PDT is continuing to analyze data to determine if bias is present, and to attempt to quantify that bias. The goal is to link these analyses to together to create an ASM monitoring standard for sectors.

Additional Sub-ACLs for SNE/MA Windowpane Flounder

24. In August the Committee will discuss adopting additional sub-ACLs for SNE/MA windowpane flounder for the fluke, scup, and squid fisheries. The PDT reviewed estimates of catch by these fisheries provided by NERO. There are only two years of data, and unlike the scallop fishery which is primarily a dredge fishery, there is some question about the binning of catches to various FMPs. NERO representatives urged caution in using the data to specify and monitor sub-ACLs for these fisheries.

25. In light if the NERO comments, the PDT suggests that an alternative way to address the issue is to make the area-based accountability measures applicable across all trawl fisheries. This would remove the necessity to track catches by FMP, which can be difficult when trips are not declared into a specific fishery. NERO agreed to develop catch estimates by different trawl mesh categories in order to explore this concept. NOAA GC will be contacted to determine if this approach would meet legal requirements.

Carry-Over

26. Recent guidance on carry-over from NERO was reviewed and discussed by the PDT. The PDT summarized the key elements of the guidance as follows:

- When is carry-over allowed?
    - No change in biomass expected due to under-harvest:
        - Small amount may be allowed as long it does not result in exceeding the ACL or ABC in the fishing year the carryover applies. Analysis would need to show this small amount would likely be offset by other under – harvests such that it would not increase the likelihood total catch would not exceed thee ACL or ABC in year 2. Could be accounted for in management uncertainty.
    - Under harvest leads to appreciable increase over original projection in biomass in year 2
        - Impact of under harvest needs to be evaluated and year 2 ABC and ACL updated. Change could be result of an assessment update, or rerunning projection model with new catch and applying the ABC control rule to get a new value for ABC and ACL. Might be possible to do this formulaically. Another alternative – redistribute ABC that relies on regular under-harvest by other fishery components.

- Carry-over cannot result in authorizing a catch amount that exceeds the ABC set by the SSC.

27. Based on the guidance, the PDT outlined a carry-over approach that would comply with the legal and policy guidance (enclosure (4), attached). There could be three options that might be considered for the framework:

- No action: Carry-over limited to 10 percent of a sector's ACE. Justification would need to be provided to show this complies with legal requirements.

- Modified no action: Carry-over would be limited to some small amount (perhaps 10 percent, perhaps another value), but provisions would be added to restrict carry-over should stock conditions require it.

- Flexible carry-over approach: Based on the straw man, this approach would calculate the amount of carry-over that would be permitted each year, based on the under-harvest.

28. There are several questions that need to be addressed to fully develop the straw man approach:

- What is the purpose of carry-over? Is it to accommodate minor year-end shortfalls in catch, or is intended to serve as an ACE "savings bank"?
- How will it be administered?
- Should there be a minimum amount?
- What if stock conditions differ dramatically from what is expected?

29. The straw man approach is likely to create an annual large administrative burden that will detract from the time available to address other management issues. It should be clearly understood that in most cases, because of the requirement that allocations not exceed the ABC and that overfishing not occur in any given year, each pound not harvested in year 1 will not be available for harvest in year 2. Two examples are shown below (Table 4). One example is for a stock without a stock-recruit relationship (GOM cod), and the second is for a stock with a stock-recruit relationship (GB winter flounder). In both examples the increase in ABC in year two is not equal to the under-harvest in year 1. This raises a question of why any sector would choose to carry-over fish into the next year. It is likely that a large under-harvest will more likely be the result of an inability to catch a quota rather than a rationale decision to delay harvest for future benefits. This implies the under harvest is due to an over-allocation – the quota was set too high due to errors in the assessment. In such a situation, carry-over could adversely affect the stock. Another interesting observation is that in the GOM cod example, the increase in catch in year 3 is larger than the increase in catch in year 2, but the benefits of this higher catch would accrue to the entire fishery and not be limited to the sectors that reduced their catch in year 1.

ABCs

30. Because of a lack of time little progress was made on ABC issues. The PDT will schedule another call or meeting to address these issues.

Enclosures:

(1) Discard length-frequencies (separate document)
(2) FY 2010 and FY 2011 realized stock and stock/sector specific CVs for discard estimates (separate document)
(3) Effect of CV and bias on catch estimates (separate document)
(4) Strawman ACE carry-over concept (attached)
(5) Analysis of full retention (separate document)

Table 1 - Qualitative summary of impact on discards of changes in minimum size of one inch

Species	Discards affected by 1 inch reduction	Size (inches)	Minimum Size to reduce most discards
Cod	Yes	22 (55.9 cm)	18.9 in. (48 cm)
Haddock	Yes	18 (45.7 cm)	15.7 in (40 cm)
Pollock	No	19 (48.3 cm)	14.2 in. (36 cm)
Witch Flounder (gray sole)	Yes	14 (35.6 cm)	10.6 in. (27 cm)
Yellowtail Flounder	Yes	13 (33.0 cm)	11.8 in (30 cm)
American Plaice (dab)	Yes	14 (35.6 cm)	5.5 in. (25 cm)
Atlantic Halibut	No	41 (104.1 cm)	
Winter Flounder (blackback)	Yes	12 (30.5 cm)	7.5 in. (19 cm)
Redfish	No	9 (22.9 cm)	7.1 in. (18 cm)

Table 2 – Comparison of observer program priorities Extracted from "Comparison of At-Sea Catch Monitoring Programs with Full Observer Coverage to the Directed Atlantic herring Fishery – New England"; June 2012; a report prepared by MRAG Americas, Inc.

	NE Herring	HI Swordfish Longline	AK Pollock	WC At-Sea Hake	WC Trawl IFQ
Issues and Priority of Data collection (if applicable) *Data collection priority ranked in order or importance (1 is top priority);* *where lesser priority data would not be collected if time and conditions would not permit.*					
Federal Obs	No	No	No	No	No
Obs Primary Concern	Bycatch - River Herring, Tuna, MMs, seabirds	Bycatch - Turtles, MM, sharks	Bycatch - salmon	Bycatch - rebuilding stocks	Discard analysis
Obs Secondary Concern	Discard Analysis	Biological Sampling	Species Composition	Species Composition	Bycatch - critical stocks
Compliance Monitoring	4	4	6	6	5
MM Collection	5	4	4	5	6
Seabird Collection	5	4	4	5	6
Biological Samples	5	2	3	3	4
Length Frequencies	5	3	3	3	4
Observer Training Center Determination	6	3	5	4	3
Discard Weights	2	No	5	4	1
Species Composition Sampling	3	5	2	2	3
Prohibited Species Monitoring	1	1	1	1	2
Fishing Effort Data	4	5	6	6	5
Gear Measurements	4	No	No	6	No
Processor Recovery Rates	7	No	No	No	No
Shore Side Sampling	No	No	100%	100%	100%

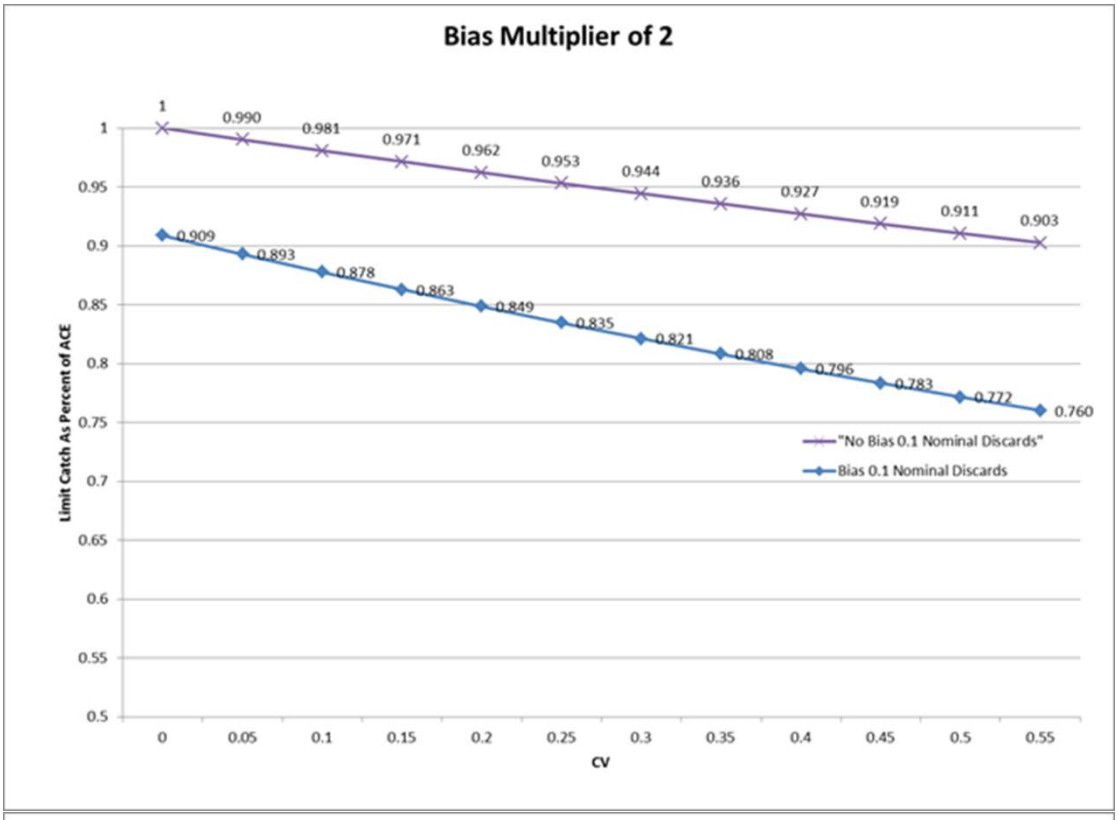
Table 3 – Examples of cost to achieve a stock- sector specific CV of 30 percent in FY 2010. Marginal cost calculated as $750 per additional trip; this estimate will be in error if trip length differs from one day.

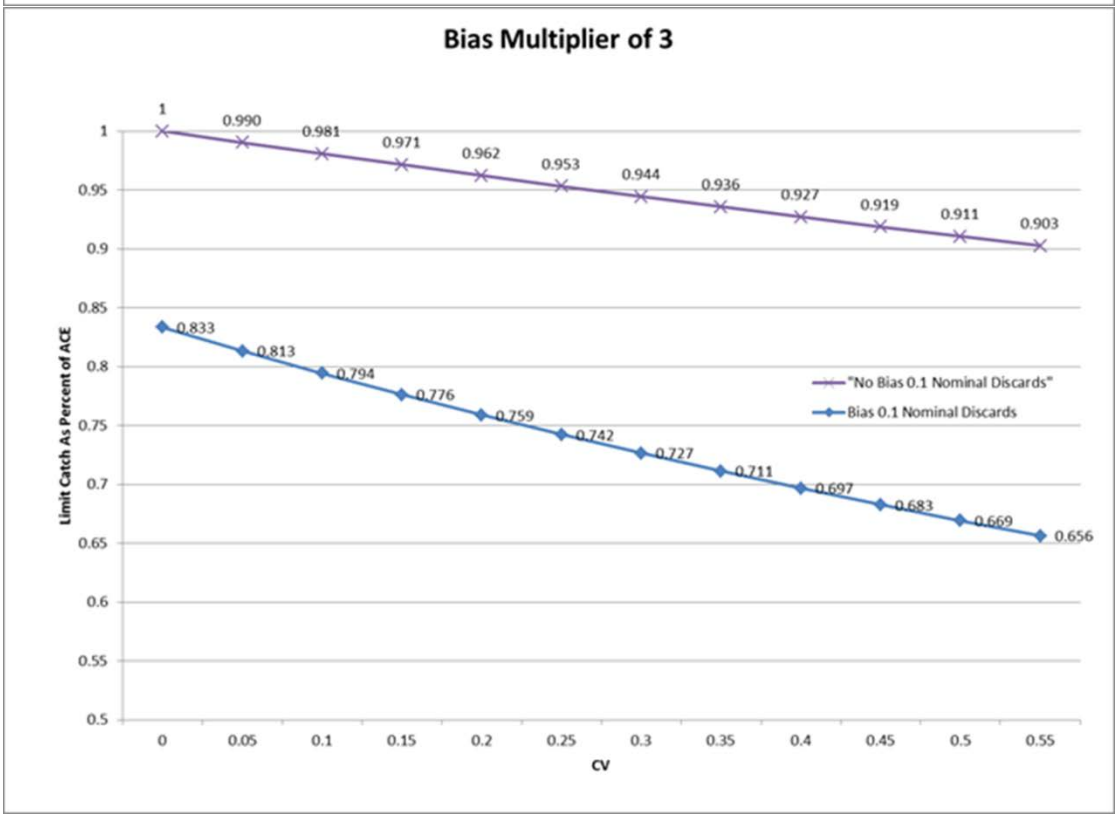
Sector	Stock	Discards (lbs.)	Number of strata sub-trips	Number observed sub-trips	Percent sub-trips observed	Realized stock CV	Percent observer coverage required for CV30	Catch	Percent of ACE Caught	Marginal Cost to Achieve CV30 in FY 2010
SUST HARV 1	GB Winter Flounder	1,707	417	104	24.94	43.73	41.49	256,853	70.6	$ 51,760
NEFS 7	CC/GOM Yellowtail Flounder	618	73	20	27.4	66.57	65.75	38,544	60.1	$ 20,998
NEFS 9	GOM Haddock	59	50	14	28	44.61	48	13,285	63.8	$ 7,500

Table 4 – Example of effect of reduced catch in 2013 on catches in 2014 and 2015 at 75% of FMSY

GOM Cod (no s-r example)								
Year	Catch				Year	SSB		
2012	6,700	6,700	6,700		2012	8,618	8,618	8,618
2013	1,496	1,296	1,096		2013	10,323	10,360	10,396
2014	2,524	2,554	2,582		2014	16,754	16,967	17,144
2015	3,572	3,615	3,643		2015	23,692	23,959	24,142
GB Winter Flounder (s-r example)								
Year	Catch				Year	SSB		
2012	3,753	3,753	3,743		2012	14,173	14,173	14,173
2013	3,750	3,250	2,750		2013	12,909	13,055	13,192
2014	3,598	3,729	3,851		2014	12,904	13,361	13,799
2015	3,720	3,797	3,880		2015	13,313	13,569	13,859

Figure 1 – Maximum nominal catch that has a very low probability that actual catch exceeds ACE. Shown for a discard rate of 10 percent, two discard bias multipliers, and various CVs.





Enclosure (4)

Strawman Carry-over Approach

Determine total sector under-harvest in year 1 *(should total under-harvest be used, rather than sector under-harvest?*)

Determine impact of under-harvest on year 2 ABC (calculate new ABC/ACL)

Evaluate impact of new ABC/ACL on rebuilding program

Determine difference between new year 2 ABC and old Year 2 ABC (ACL?)

Compare under-harvest to difference

Carryover amount allowed each sector is:
Sector under-harvest * (difference/total sector under harvest)

Confirm carry-over will not adversely affect stock conditions

Increase ACL and ABC – but don't change fishery component values except for increased groundfish sub-ACL due to sector carry-over

Modify sector ACE to reflect carry-over

Should there be a minimum carry-over amount?

Advantages:

- Carry-over will always be equal to the increase in catch that results from the under-harvest; so it will not affect management uncertainty buffers
- Benefits of carry-over accrue directly to those that under harvest
- Approach will work whether stock increases or decreases (I think)
- Larger under harvest leads to larger carry-over

Disadvantages:

- Carry-over amount varies from year to year, and won't be known until catch info is available
- Lots of calculations need to be done quickly to distribute carry-over
- Always possible NERO may have to play the trump card due to poor stock conditions
- Can we change ABC/ACL without an actual Council action? Can we modify how the ABC/ACL is distributed without an amendment?
- ABCs and ACLs will constantly change if there is an under harvest