AGENDA D-1(a)
OCTOBER 2002

MEMORANDUM

TO: Council, SSC and AP Members

FROM: Chris Oliver
Executive Director

ESTIMATED TIME
2 HOURS

DATE: September 23, 2002

SUBJECT: F_{40} Independent Review

ACTION REQUIRED

Receive report from independent scientific review panel.

BACKGROUND

In October, in conjunction with the actions taken to address Steller sea lion issues, the Council also approved a motion to conduct an independent review of our basic F_{40} harvest policy relative to National Standards. The intent of this review was to determine whether changes need to be made to account for individual species needs or ecosystem needs.

A Terms of Reference for this review was developed by the SSC (attached as Item D-1(a)(1)), and a team of eight independent reviewers was assembled. The F_{40} review panel included Dr. Terry Quinn (UAF), Dr. Grant Thompson (AFSC), Dr. Marc Mangel (University of California Santa Cruz), Dr. Tony Smith (CSIRO, Australia), Dr. Dan Goodman (Montana State University), Dr. Graeme Parks (Marine Resource Assessment Group, Florida), Dr. Victor Restrepo (ICCAT, Spain), and Dr. Kevin Stokes (New Zealand). The F_{40} review panel met in person at the Alaska Fisheries Science Center on June 17-19, and continued their work by email.

Dr. Dan Goodman served as chairman of the panel, and he will be on hand to report their findings. The panel is in the process of editing their written report, which will be distributed after it has been finalized.

Scientific Review of the Harvest Strategy Currently Used In the BSAI and GOA Groundfish Fishery Management Plans

Terms of Reference

At its October 2001 meeting, the North Pacific Fishery Management Council passed a "final motion on Steller sea lions" (Council Newsletter, October 2001, Attachment 1). As part of this action, the Council moved "to seek an independent scientific review of the F40 harvest policy relative to national standards."

At its December 2001 meeting, the Scientific and Statistical Committee interpreted the subject of the review to be "the current groundfish harvesting strategy" and requested that terms of reference be developed, to include the following features: 1) a description of the issue, 2) the purpose of the review, and 3) a list of charges to be addressed. These features are provided sequentially below.

1) Description of the Issue

Harvests in the BSAI and GOA groundfish fisheries are governed by the respective fishery management plans (FMPs). Identification of an explicit "harvest strategy" in these FMPs is somewhat problematic. In a broad sense, the FMPs themselves *are* the harvest strategy. However, the FMPs allow for a wide range of possible harvests for any given stock in any given year, meaning that, in a narrower sense, the plans are consistent with a large number of particular harvest strategies. Of course, any harvest allowed by the FMPs is required to be consistent with the National Standards described in the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). Of particular relevance in this regard is National Standard 1, which states, "Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry" (Title III, Section 301(a)(1)). Optimum yield, in turn, is defined as follows (Section 3(28)):

> The term "optimum", with respect to the yield from a fishery, means the amount of fish which—
>
> (A) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems;
>
> (B) is prescribed as such on the basis of the maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or ecological factor; and
>
> (C) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.

In recent months, concern has been expressed regarding the extent to which harvests allowed under the FMPs are consistent with protection of marine ecosystems, as required implicitly by National Standard 1.

2) Purpose of the Review

The purpose of the independent scientific review is as follows: to critically review the current harvest strategy as applied to our FMP fisheries, and determine whether changes need to be made to account for particular species, or ecosystem needs.

3) Charges to be Addressed

The independent scientific review shall address the following:

a) Define and explain the harvest strategy currently used in the management of the BSAI and GOA groundfish fisheries; i.e., develop an educational primer on the Council's current procedure.
b) Determine if the current quota setting approach (tier ABC determination, OFL derivation, and TAC specification) is consistent with the Magnuson-Stevens Act. Determine if F40 is an appropriate MSY substitute for all species? If not, what are the alternative(s) and are data available to determine the value(s) of the substitute?
c) Is the approach considerate of ecosystem needs in the BSAI and GOA?
   i. If not, how should it be changed?
   ii. Are sufficient data available to allow implementation of the alternative approach?
   iii. How would the transition from the current approach to the proposed revised one be handled?

In addressing the above questions, the reviewers shall:

a) use whatever scientific information or methodology is appropriate and practicable within the time allotted for the review;
b) describe the role played by the $F_{40\%}$ reference point in their findings; and
c) relate their findings to the MSFCMA's National Standards, particularly National Standard 1.

Scientific Review of the Harvest Strategy Currently Used in the BSAI and GOA Groundfish Fishery Management Plans

D. Goodman, M. Mangel, G. Parkes, T. Quinn, V. Restrepo, T. Smith, and K. Stokes

TASKS

1. Define and explain the harvest strategy
2. Determine if consistent with MSFCMA
3. Determine if
   "considerate of ecosystem needs"

GLOSSARY

- MSFCMA Magnuson Stevens Fishery Act
- OY Optimum Yield
- MSY Maximum Sustained Yield
- F_{MSY} Fishing mortality rate for MSY
- B_{MSY} Biomass at MSY
- OFL OverFishing Level
- ABC Acceptable Biological Catch
- TAC Total Allowable Catch

GLOSSARY

- $F_{40\%}$ Fishing mortality rate that reduces the equilibrium spawning biomass per recruit to 40% of its value in the unfished population
- $B_{40\%}$ Biomass at equilibrium when the fishing mortality rate is $F_{40\%}$

MSFCMA National Standard 1

- Prevent overfishing and achieve OY
- OY
  - maximizes "benefit...taking into account the protection of marine ecosystems"
  - MSY reduced by "relevant...ecological factor"
  - provides for rebuilding, if overfished

MSFCMA National Standard 1

- Prevent overfishing and achieve OY
- OY
  - maximizes "benefit...taking into account the protection of marine ecosystems"
    - --little regulatory guidance
    - --diverse literature
  - MSY reduced by "relevant...ecological factor"
  - provides for rebuilding, if overfished

STEPS IN IMPLEMENTATION

1. Define OY as a range for groundfish complex
2. Assign stock to Tier based on information availability
3. Determine OFL (limit), ABC (target), and status relative to overfishing
4. Set TAC

STEPS IN IMPLEMENTATION

1. Define OY as a range for groundfish complex--FMP, Council;
   burdensome to revise
2. Assign stock to Tier based on information availability--SAFE, Plan Team, SSC
3. Determine OFL (limit), ABC (target), and status relative to overfishing--
   SAFE, Plan Team, SSC
4. Set TAC--AP, Council

STEPS IN IMPLEMENTATION

1. Define OY as a range for groundfish complex--historical
2. Assign stock to Tier based on information availability--explicit formula
3. Determine OFL (limit), ABC (target), and status relative to overfishing-- explicit formula
4. Set TAC--case specific

STEPS IN IMPLEMENTATION

1. Define OY as a range for groundfish complex

Council action 1984: BSAI 1.4-2.0 mmt
(85% of summed MSY estimates at time)

Council action 1987: GOA 116-800 kmt
(less than summed MSY estimates at time)

Stock recruitment relationship established for only one stock: BSAI pollock

STEPS IN IMPLEMENTATION

2. Assign stock to Tier based on information availability
   - Tier 1: pdf of F_{MSY}, point estimates of B_{MSY}, B
   - Tier 2: point estimates of F_{MSY}, B_{MSY}, B
   - Tier 3: point estimates of $F_{X\%}$, $B_{X\%}$, B
   - Tier 4: point estimates of $F_{X\%}$, B
   - Tier 5: point estimates of M and B
   - Tier 6: catch history

STEPS IN IMPLEMENTATION

3. Determine

	F_{OFL}	F_{ABC}	status
Tier 1:	av(F_{MSY})	h(F_{MSY})	B/B_{MSY}
Tier 2:	F_{MSY}	$F_{MSY}(F_{40}/F_{35})$	B/B_{MSY}
Tier 3:	$F_{35\%}$	$F_{40\%}$	$B/B_{40\%}$
Tier 4:	$F_{35\%}$	$F_{40\%}$	
Tier 5:	M	0.75*M	
Tier 6:	av(catch)	0.75*av(catch)	

STEPS IN IMPLEMENTATION

4. Set TAC
   * Sum of TACs must not exceed OY
     --this has limited TACs in BSAI
   * TAC must satisfy other mandates
     (ESA, MMPA)
   * TAC adjusted for other considerations
     (social, economic, ecological)
   * NPFMC does not raise TAC above ABC

The BSAI/GOA Harvest Strategy

- Relatively conservative from single-species target-species perspective
  --successful track record for most stocks, but not all
- F_{OFL} is based on MSY
  --$F_{35\%}$ surrogate is adequate for many groundfish stocks, but not all
  (adequacy depends on productivity)

The BSAI/GOA Harvest Strategy

- F_{ABC} provides some margin of safety not to exceed MSY
  - --$F_{40\%}$ surrogate is adequate for many groundfish stocks, but not all (adequacy depends on productivity)
- Within-Tier margin of safety does not adjust for uncertainty
  - --does not provide constant confidence of attainment

The BSAI/GOA Harvest Strategy

- Between- Tier, margin of safety does not increase in response to uncertainty
  - --Tier system does not provide incentive to improve information
- Management Strategy Evaluation is warranted to examine performance in context
  - --actual data sources
  - --assessment model
  - --implementation uncertainty
  - --possible regime shift

The BSAI/GOA Harvest Strategy

- Allowance for constant per capita natural mortality rate M in single species models does not provide constant resource supply for predators
  - --M is applied to smaller biomass when target species is fished down to B_{MSY}

The BSAI/GOA Harvest Strategy

- Effect of fishing on predators of target species may not be in proportion to reduction of biomass ($B_{MSY}/B_{pristine}$)
  - --density threshold for foraging energetics
  - --spatial and temporal redistribution
  - --truncation of age and size distribution
  - --cascading food web effects

The BSAI/GOA Harvest Strategy

- Rationale for OY could be updated
  - --newer data
  - --more explicit standards
- Ecosystem standard for management system
  - --explicit escapement allowance for ecosystem needs
  - --other ecosystem rules, indicators
  - --modeling limitations
  - --management experiments
  - --monitoring