AMENDMENT 16-1

TO THE PACIFIC COAST GROUNDFISH FISHERY MANAGEMENT PLAN

PROCESS AND STANDARDS FOR REBUILDING PLANS

INCLUDING ENVIRONMENTAL ASSESSMENT AND REGULATORY ANALYSES

Prepared by
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COVER SHEET
AMENDMENT 16-1 ENVIRONMENTAL ASSESSMENT

Proposed Action:	This amendment to the Pacific Coast Groundfish Fishery Management Plan (FMP) addresses National Standard 1 in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) by establishing procedures for adopting and periodically reviewing rebuilding plans for overfished groundfish stocks. It also specifies what elements of rebuilding plans will be incorporated into the FMP and federal groundfish regulations.
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Abstract:

National Standard 1 in the Magnuson-Stevens Act requires conservation and management measures that prevent overfishing. Preventing overfishing also means returning stocks to a size capable of achieving maximum sustainable yield. In order to satisfy this mandate, rebuilding plans must be adopted for the nine Pacific Coast groundfish stocks that have been declared overfished by the U.S. Secretary of Commerce (Secretary).

Although the Council approved Amendment 12 in April 2000, which also specified a process for implementing rebuilding plans, it was subsequently challenged in Federal District Court. The judge found the rebuilding plans created in accordance with Amendment 12 did not comply with the Magnuson-Stevens Act because the plans did not take the form of an FMP, FMP amendment, or regulation. Therefore, the Council must specify rebuilding plans as an FMP or regulatory amendment. (Development of a new FMP covering overfished groundfish species is not considered.)

Alternatives to satisfy the purpose and need of the proposed action are considered under four issues:

1. The form and content of rebuilding plans: Whether rebuilding plan elements should be incorporated into the FMP, federal groundfish regulations, or both, and what elements should be so incorporated.

2. The schedule for periodically reviewing rebuilding plans: Whether the Council or the Secretary should be responsible for periodic review, and under Council review, the timing and elements reviewed.

3. Standards for determining if stock rebuilding is making adequate progress: Thresholds for determining when a rebuilding plan should be revised due to changed circumstances.

4. Endangered Species Act provisions: Whether or not provisions should be written into the FMP specifying the relationship between measures pursuant to an Endangered Species Act listing and rebuilding plan measures pursuant to the Magnuson-Stevens Act.

The Council chose the following preferred alternative:

- Option 1d: Numerically specify T_{TARGET} and the harvest control rule in federal groundfish regulations. In addition, describe the methodology for computing rebuilding parameters and the numerical values for these parameters at the time of rebuilding plan adoption in the FMP.

- Option 2b: The Council reviews rebuilding plan goals every two years except for stock size and structure, which is evaluated only with new stock assessments.

- Option 3e: A procedure for evaluating when rebuilding progress has been adequate is established for each rebuilding plan.

- Option 4b: Endangered Species Act recovery plans or "no jeopardy" standards in biological opinions take precedence over rebuilding targets if they establish a higher standard. If the species is de-listed but has not reached the target biomass identified in the rebuilding plan, then rebuilding plan standards again apply until the target is reached.

The proposed action is procedural and, therefore, does not directly affect the human environment. The direct impacts affecting the management regime are evaluated in terms of administrative capacity, adaptive management, public participation, and rebuilding strategy. The preferred alternative would increase administrative workload moderately in comparison to the status quo. If regulations need to be amended to change targets this could be accomplished as part of the harvest specifications process. Depending on the nature of the change, the level of analysis required to support such a change would not differ substantially from the environmental impact assessments conducted to support harvest specifications in recent years. The preferred alternative is adaptive because it establishes fixed targets but allows managers to use the current periodic harvest specification process to develop management measures consistent with the framework in the FMP to achieve the targets. Opportunities for the public to participate in and/or comment on decisions relating to stock rebuilding would be similar to current conditions. In addition to opportunities to comment at Pacific Fishery Management Council meetings, any changes to targets published in federal regulations would require a full rulemaking process during which the public may comment on the proposed rule. Managing to achieve stock rebuilding by an identified target year is emphasized in the preferred alternative. This implies that the harvest control rule will be periodically adjusted to achieve the target biomass by that year with a likelihood identified with the target year. However, the harvest control rule would not have to be adjusted if new information suggested the stock would rebuild by an earlier date than the target year.

Two types of cumulative effects are identified. First, adoption of rebuilding plans under the framework proposed in this amendment represent connected actions. The effect of rebuilding plan adoption will depend on the specific targets chosen in each plan and how they differ from interim targets. In addition, in fisheries where two or more overfished groundfish species co-occur, one species may act as a "binding constraint." Management measures must be tailored to limit mortality on this constraining stock such that harvest limits for other overfished stocks, and healthy stocks, are not reached. Second, the rebuilding framework will cumulative affect components of the human environment to the degree that the administrative costs (primarily in terms of staff time) precludes the Council and NMFS from initiating other management actions having a potentially beneficial environmental impact.

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ABBREVIATIONS AND ACRONYMS, GLOSSARY

ABC	acceptable biological catch. The ABC is a scientific calculation of the sustainable harvest level of a fishery, and is used to set the upper limit of the annual total allowable catch. It is calculated by applying the estimated (or proxy) harvest rate that produces maximum sustainable yield to the estimated exploitable stock biomass (the portion of the fish population that can be harvested).
B_{MSY}	The biomass that allows maximum sustainable yield to be taken.
B_o	Unfished biomass; the estimated size of a fish stock in the absence of fishing.
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations. A codification of the regulations published in the *Federal Register* by the executive departments and agencies of the federal government. The CFR is divided into 50 titles that represent broad areas subject to federal regulation Title 50 contains wildlife and fisheries regulations.
CMC	Center for Marine Conservation
Council	Pacific Fishery Management Council
CPS	coastal pelagic species. Coastal pelagic species are schooling fish, not associated with the ocean bottom, that migrate in coastal waters. They usually eat plankton and are the main food source for higher level predators such as tuna, salmon, most groundfish, and humans. Examples are herring, squid, anchovy, sardine, and mackerel.
DAP	domestic annual processing
DTS	Dover sole, thornyhead(s), and trawl-caught sablefish complex
EA	environmental assessment. As part of the National Environmental Policy Act (NEPA) process, an EA is a concise public document that provides evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact.
EEZ	Exclusive Economic Zone. A zone under national jurisdiction (up to 200 nautical miles wide) declared in line with the provisions of the 1982 United Nations Convention of the Law of the Sea, within which the coastal state has the right to explore and exploit, and the responsibility to conserve and manage, the living and non-living resources.
EFH	essential fish habitat. Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.
EIS	environmental impact statement. As part of the National Environmental Policy Act (NEPA) process, an EIS is an analysis of the expected impacts resulting from the implementation of a fisheries management or development plan (or some other proposed action) on the environment. EISs are required for all fishery management plans as well as significant amendments to existing plans.
EO	Executive Order

ESA	Endangered Species Act. An act of federal law that provides for the conservation of endangered and threatened species of fish, wildlife, and plants. When preparing fishery management plans, councils are required to consult with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service to determine whether the fishing under a fishery management plan is likely to jeopardize the continued existence of an ESA-listed species, or to result in harm to its critical habitat.
F	The instantaneous rate of fishing mortality. The term "fishing mortality rate" is a technical fishery science term that is often misunderstood. It refers to the rate at which animals are removed from the stock by fishing. The fishing mortality rate can be confusing because it is an "instantaneous" rate that is useful in mathematical calculations, but is not easily translated into the more easily understood concept of "percent annual removal."
fecundity	The potential to produce offspring.
FMP	Fishery management plan. A plan, and its amendments, that contains measures for conserving and managing specific fisheries and fish stocks.
FONSI	Finding of No Significant Impact. As part of the National Environmental Policy Act (NEPA) process, a finding of no significant impact (FONSI) is a document that explains why an action that is not otherwise excluded from the NEPA process, and for which an environmental impact statement (EIS) will not be prepared, will not have a significant effect on the human environment.
FRFA	Final Regulatory Flexibility Analysis. the FRFA includes all the information from the initial regulatory flexibility analysis. Additionally, it provides a summary of significant issues raised by the public, a statement of any changes made in the proposed rule as a result of such comments, and a description of steps taken to minimize the significant adverse economic impact on small entities consistent with stated objectives.
GAP	Groundfish Advisory Subpanel. The Council established the GAP to obtain the input of the people most affected by, or interested in, the management of the groundfish fishery. This advisory body is made up of representatives with recreational, trawl, fixed gear, open access, tribal, environmental, and processor interests. Their advice is solicited when preparing fishery management plans, reviewing plans before sending them to the Secretary, reviewing the effectiveness of plans once they are in operation, and developing annual and inseason management.
GMT	Groundfish Management Team. Groundfish management plans and annual and inseason management recommendations are prepared by the Council's GMT, which consists of scientists and managers with specific technical knowledge of the groundfish fishery.
IPHC	International Pacific Halibut Commission. A commission responsible for studying Pacific halibut stocks and the halibut fishery. The IPHC makes proposals to the U.S. and Canada concerning the regulation of the halibut fishery.

IRFA	Initial Regulatory Flexibility Analysis. Anytime an agency publishes a notice of proposed rule making and the rule may have a significant impact on a substantial number of small entities, an IRFA is required. It describes the impact of the proposed rule on small entities and includes a description of the action, why it is necessary, the objectives and legal basis for the action, the small entities that will be impacted by the action, and the projected reporting, record-keeping, and other compliance requirements of the proposed rule. Rules that duplicate, overlap, or conflict with the proposed rule are also identified.
JVP	joint venture processing
kg	kilogram
m	meter
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act. The MSA, sometimes known as the "Magnuson-Stevens Act," established the 200-mile fishery conservation zone, the regional fishery management council system, and other provisions of U.S. marine fishery law.
MBTA	Migratory Bird Treaty Act
mean generation time	A measure of the time required for a female to produce a reproductively-active female offspring.
MFMT	maximum fishing mortality threshold. A limit identified in the National Standard Guidelines. A fishing mortality rate above this threshold constitutes overfishing.
mixed stock exception	In "mixed-stock complexes," many species of fish swim together and are caught together. This becomes a problem when some of these stocks are healthy and some are overfished, because even a sustainable harvest of the healthy stocks can harm the depleted stock. In order to avoid having to shut down all fisheries to protect one particular overfished stock, the national standard guidelines allow a "mixed-stock" exception to the "overfished" definition. This would allow higher catches of some overfished species than ordinarily allowed in order to avoid severe hardship to fishing communities.
MMPA	Marine Mammal Protection Act. The MMPA prohibits the harvest or harassment of marine mammals, although permits for incidental take of marine mammals while commercial fishing may be issued subject to regulation. (See "incidental take" for a definition of "take".)
MSA	Magnuson-Stevens Fishery Conservation and Management Act (see Magnuson-Stevens Act, above).
MSST	minimum stock size threshold. A threshold biomass used to determine if a stock is overfished. The Council proxy for MSST is $B_{25\%}$.
MSY	maximum sustainable yield. An estimate of the largest average annual catch or yield that can be continuously taken over a long period from a stock under prevailing ecological and environmental conditions. Since MSY is a long-term average, it need not be specified annually, but may be reassessed periodically based on the best scientific information available.

mt	metric ton. 1,000 kilos or 2,204.62 pounds.
NAO	NOAA Administrative Order
NMFS	National Marine Fisheries Service. A division of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA). NMFS is responsible for conservation and management of offshore fisheries (and inland salmon). The NMFS Regional Director is a voting member of the Council.
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NRDC	Natural Resources Defense Council
NWR	Northwest Region
overfished	Any stock or stock complex whose size is sufficiently small that a change in management practices is required to achieve an appropriate level and rate of rebuilding. The term generally describes any stock or stock complex determined to be below its overfished/rebuilding threshold. The default proxy is generally 25% of its estimated unfished biomass; however, other scientifically valid values are also authorized.
overfishing	Fishing at a rate or level that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis. More specifically, overfishing is defined as exceeding a maximum allowable fishing mortality rate. For any groundfish stock or stock complex, the maximum allowable mortality rate will be set at a level not to exceed the corresponding MSY rate (B_{MSY}) or its proxy.
OY	optimum yield. The amount of fish that 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. The OY is developed on the basis of the MSY from the fishery, taking into account relevant economic, social, and ecological factors. In the case of overfished fisheries, the OY provides for rebuilding to a level that is consistent with producing the MSY for the fishery.
P_{MAX}	The estimated probability of reaching T_{MAX}. May not be less than 50%.
PMCC	Pacific Marine Conservation Council
Rebuilding	Implementing management measures that increase a fish stock to its target size.
RFA	Regulatory Flexibility Act (see IRFA and FRFA above). The Regulatory Flexibility Act (5 U.S.C. 601-612) requires federal agencies to consider the effects of their regulatory actions on small businesses and other small entities and to minimize any undue disproportionate burden.
RIR	Regulatory Impact Review. RIRs are prepared to determine whether a proposed regulatory action is "major." The RIR examines alternative management measures and their economic impacts.

SAFE	Stock Assessment and Fishery Evaluation. A SAFE document is a document prepared by the Council that provides a summary of the most recent biological condition of species in the fishery management unit, and the social and economic condition of the recreational and commercial fishing industries, including the fish processing sector. It summarizes, on a periodic basis, the best available information concerning the past, present, and possible future condition of the stocks and fisheries managed in the FMP.
Secretary	U.S. Secretary of Commerce
SFA	Sustainable Fisheries Act (see Magnuson-Stevens Act, above).
SSC	Scientific and Statistical Committee. An advisory committee of the Council made up of scientists and economists. The Magnuson-Stevens Act requires that each council maintain an SSC to assist in gathering and analyzing statistical, biological, ecological, economic, social, and other scientific information that is relevant to the management of Council fisheries.
STAR	Stock Assessment Review Panel. A panel set up to review stock assessments for particular fisheries. In the past there have been STAR panels for sablefish, rockfish, squid, and other species.
STAT	Stock Assessment Team. Stock assessment authors from the National Marine Fisheries Service fisheries science centers.
TALFF	total allowable level of foreign fishing
T_{MAX}	The maximum time period to rebuild an overfished stock, according to National Standard Guidelines. Depends on biological, environmental, and legal/policy factors.
T_{TARGET}	The target year, set by policy, for a fish stock to be completely rebuilt.
T_{MIN}	The minimum time period to rebuild an overfished stock, according to National Standard Guidelines. Technically, this is the minimum amount of time in which a fish stock will have a 50% chance of rebuilding if no fishing occurs (depends on biological and environmental factors).
U and A	usual and accustomed
USFWS	U.S. Fish and Wildlife Service
WOC	Washington/Oregon/California

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1.0 Introduction

1.1 How This Amendment is Organized

This document provides background information about and analysis of changes to the Pacific Coast Groundfish Fishery Management Plan (FMP) incorporated as Amendment 16-1. The actual changes, or amended parts of the plan, appear in appendix A.

This document is one of a series of amendments numbered Amendments 16-1, 16-2, and 16-3. This amendment establishes a framework for the adoption of rebuilding plans for overfished species. Amendment 16-2 will adopt four rebuilding plans: darkblotched rockfish, Pacific ocean perch, lingcod, and canary rockfish. Amendment 16-3 will adopt rebuilding plans for the remaining five overfished species. (If additional species are declared overfished, amendments to adopt rebuilding plans for them will continue this numbering system.)

FMPs and any amendments to them, must conform to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act, or MSA), the principal legislation governing fishery management within the Exclusive Economic Zone (EEZ), which extends from the outer boundary of the territorial sea to a distance of 200 miles from shore. In addition to addressing Magnuson-Stevens Act mandates, this document is an environmental assessment (EA), pursuant to the National Environmental Policy Act (NEPA). According to Council on Environmental Quality (CEQ) regulations, an EA provides "sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact" and helps the agency compliance if an Environmental Impact Statement (EIS) is necessary (40 CFR 1509.9). A separate Finding of No Significant Impact (FONSI) has been prepared, based on the analyses in this EA. The document also contains information and analyses relevant to the Regulatory Flexibility Act (RFA) and Executive Order (EO) 12866 (Regulatory Impact Review [RIR]). These mandates require agencies to evaluate the economic impact of regulatory actions, especially on small entities.

The rest of this chapter discusses the reasons for changing the FMP. This description of purpose and need defines the scope of the subsequent analysis. Chapter 2 outlines different alternatives that have been considered to address the purpose and need. One of these alternatives is the Pacific Fishery Management Council's (hereafter, the Council) preferred alternative, which is recommended to National Marine Fisheries Service (NMFS) for adoption as a plan amendment. Chapter 3 describes the affected environment. This information provides the basis for the analysis contained in Chapter 4, which assesses the potential environmental and socioeconomic impacts of the alternatives outlined in Chapter 2. Chapter 5 details how this amendment meets ten National Standards set forth in the Magnuson-Stevens Act (§301(a)) and groundfish FMP goals and objectives. Chapter 6 provides information on those laws and EOs, in addition to the Magnuson-Stevens Act and NEPA, that an amendment must be consistent with, and how this amendment has satisfied those mandates.

1.2 Purpose and Need

1.2.1 Need (Problems for Resolution)

As of February 2002 the U.S. Secretary of Commerce (Secretary) had declared nine groundfish stocks overfished. These are: bocaccio (*Sebastes paucispinis*), canary rockfish (*S. pinneger*), cowcod (*S. levis*), darkblotched rockfish (*S. crameri*), lingcod (*Ophiodon elongatus*), Pacific ocean perch (*S. alutus*), widow rockfish (*S. entomelas*), yelloweye rockfish (*S. ruberrimus*), and Pacific whiting (*Merluccius productus*). These declarations, stemming from Magnuson-Stevens Act requirements, are based on overfishing criteria adopted by the Council under Amendment 11 to the Pacific Coast Groundfish FMP. The Magnuson-Stevens Act (§304(e)(3)) also requires councils to "prepare a fishery management plan, plan amendment, or proposed regulations" in order to prevent overfishing and implement a plan to rebuild the overfished stocks. The Council developed Amendment 12 to specify an effective process for implementing rebuilding plans. This amendment was approved by the Council in April 2000 and approved by NMFS on December 7, 2000. However, in Federal Court the Natural Resources Defense Council (NRDC), an environmental organization, challenged

the legality of the provisions in Amendment 12 related to rebuilding plans,[1/] based on the Magnuson-Stevens Act and the NEPA. The judge found the rebuilding plans created in accordance with Amendment 12 did not comply with the Magnuson-Stevens Act, because the plans did not take the form of an FMP, FMP amendment, or regulation. Therefore, the Council must specify rebuilding plans as an FMP or regulatory amendment. (Development of new FMP covering overfished groundfish species is not considered.)

Rebuilding plans are mandated when the size of a stock or stock complex falls below a level described in the FMP as the Minimum Stock Size Threshold (MSST). Diminished stock size may be caused or exacerbated by fishing. Regardless of the cause of the decline, fishing mortality needs to be controlled to prevent further deterioration in the condition of the stock, and if the stock has been overfished, to allow it to rebuild.[2/] Amendment 11 to the groundfish FMP established the "status determination criteria" (including MSST) that are used to determine whether overfishing is occurring and whether a stock has reached an overfished state. Rebuilding plans specify how an overfished stock will be rebuilt.

The proposed action is needed because National Standard 1 in the Magnuson-Stevens Act requires conservation and management measures that prevent overfishing. Preventing overfishing also means returning stocks to a size capable of achieving maximum sustainable yield (MSY). In order to satisfy this mandate rebuilding plans must be adopted for stocks that have been declared overfished by the Secretary. First, a framework describing how rebuilding plans will be adopted and the contents of the plan that will be incorporated into the FMP or regulations must be established. This framework is needed to guide the development and adoption of subsequent rebuilding plans.

1.2.2 Purpose of the Proposed Action

The purpose of this amendment is to establish the process and standards by which the Council will specify rebuilding plans for groundfish stocks declared overfished by the Secretary. Both the procedural provisions and the standards established for rebuilding plans must meet the requirements of the Magnuson-Stevens Act (and, in particular, National Standard 1 and §304(e), covering overfishing) and should be consistent with FMP goals and objectives.

1.3 Background

1.3.1 Requirements for Rebuilding Plans

National standard guidelines specify how rebuilding should occur and, in particular, establish constraints on council action (50 CFR660.310(e)). Rebuilding should bring stocks back to a population size that can support MSY (B_{MSY}). A rebuilding plan must specify a target year (T_{TARGET}) based on the time required for the stock to reach B_{MSY}. This target is bounded by a lower limit (T_{MIN}) defined as the time needed for rebuilding in the absence of fishing (i.e., F = 0). Rebuilding plans for stocks with a T_{MIN} less than ten years must have a target less than or equal to ten years. If, as is the case with most of the groundfish stocks considered in this amendment, the biology of a particular species dictates a T_{MIN} of ten years or greater, then the maximum allowable rebuilding time, T_{MAX}, is the rebuilding time in the absence of fishing (T_{MIN}) plus "one mean generation time." Mean generation time is a measure of the time required for a female to produce a reproductively-active female offspring (Pielou 1977; and especially Restrepo *et al.* 1998) calculated as the mean age of the net maternity function (product of survivorship and fecundity at age). The Magnuson-Steven Act states the rebuilding time should be as short as possible, taking into account the status and biology of the overfished stocks and the needs of fishing communities (Sec. 304(e)(A)(i)). In most cases, because of the biology of the stocks and the needs of fishing communities, the rebuilding time, or the target year, will be greater than the minimum rebuilding time (T_{MIN}).

1/ The amendment also removed FMP provisions that allowed foreign fishing on groundfish stocks. This part of the amendment was not challenged, and these changes to the FMP stand.

2/ But when environmental changes affect the long-term productive capacity of the stock, one or more components of the status determination criteria may be respecified and the need for a reduction in fishing mortality reevaluated (50 CFR Section 600.310).

Because of the uncertainty surrounding stock assessments and future population trends (due, for example, to variable recruitment), these limits and the target need to be expressed probabilistically. At the outset of the rebuilding period T_{TARGET} should be set so there is at least a 50% probability of achieving it within the specified time period.[3/] (The nature of probabilities associated with T_{MIN}, T_{TARGET}, and T_{MAX} are discussed in Section 3.1.2.2.)

National standard guidelines identify a "mixed-stock complex" exception to the definition of overfishing (50 CFR 660.310(d)(6)), which is applicable to some overfished groundfish species. Different fish assemblages—some with healthy stocks and some with overfished stocks—can co-occur in a mixed-stock complex, and thus, both can be caught simultaneously. An optimum yield (OY) harvest for the healthy stock can result in overfishing the depleted stock. The guidelines allow councils to authorize this type of overfishing if three conditions are met. First, analysis must demonstrate that invoking the mixed-stock exception will result in long-term net benefits to the Nation. This analysis is part of a more general evaluation of the OY specification described in an FMP (or plan amendment); if the mixed-stock exception is invoked, the resulting social, economic, and ecological benefits must be compared to the values resulting from the use of other measures, such as reducing the OY for healthy stocks in the mixed-stock complex (50 CFR 600.210(f)(6)). Second, councils must consider mitigating measures that reduce overfishing by, for example, modifying fishing strategy or gear configuration. The benefits of mitigation must be compared to those determined in the preceding assessment; the measures would only be implemented if they will result in greater benefits. Finally, permitted overfishing cannot result in eventual listing of the species (or evolutionarily significant unit thereof) under the Endangered Species Act (ESA). This mixed-stock exception may be considered in formulating rebuilding plans and could allow some modification in the recovery trajectory of overfished stocks.

National standard guidelines also distinguish the activity of "overfishing" from the status of a stock characterized as "overfished." Overfishing is defined by the maximum fishing mortality threshold (MFMT); harvest mortality above this limit constitutes overfishing. A stock is considered overfished when its biomass falls below the MSST, which is defined as 25% of the unfished biomass for stocks managed under the groundfish FMP. Although sometimes causing confusion, this distinction is an important one. It can be seen that any combination of these two features may apply to a stock. For example a stock above the MSST may experience overfishing (because the MFMT is being exceeded). Conversely, an overfished stock (biomass below the MSST) may not be experiencing overfishing. In fact, stock rebuilding characterizes this second condition where historical overfishing has caused the stock to become overfished. Although overfishing is no longer occurring and the stock is rebuilding, the stock is considered overfished until it returns to the target biomass.

1.3.2 Summary of the Current Management Regime

Interim rebuilding plans and rebuilding analyses have been used since 2000 to guide the Council in deciding management measures for overfished groundfish stocks. Provisions in Amendments 11 and 12 of the FMP established a framework for their development and implementation, in a way thought to be consistent with the Sustainable Fisheries Act ([SFA], which re-authorized the Magnuson-Stevens Act and added new provisions). As specified in these draft rebuilding plans, rebuilding management measures would be adopted through the Council's annual process of setting harvest specifications for the groundfish fishery. In addition to the draft rebuilding plans, rebuilding analyses (which are written by the stock assessment authors) and the EA or EIS for each year's harvest specifications (used in the Council/NMFS decision making process) take into account the scientific and legal constraints on harvests imposed by the need to rebuild overfished groundfish fisheries. Although the Council has respected these constraints in its decisions to date, NMFS has the authority to reject these decisions because in the regulatory context they only represent recommendations to the Secretary.

The Council has typically chosen a risk-averse strategy when deciding on harvest levels for overfished stocks, based on recommendations contained in rebuilding analyses and given by the Council's advisory bodies. Total mortality has been controlled by reducing trip and landing limits for co-occurring species in select target

3/ The use of a low bound 50% probability is not specified in regulations; it is the result of litigation (*Natural Resources Defense Council v. Daley, April 25, 2000, U.S. Court of Appeals for the District of Columbia Circuit*).

fisheries, gear restrictions (e.g., the small footrope specification for landing shelf rockfish), seasonal closures (e.g., the recreational groundfish fishery seasons adopted in California), and area closures (e.g., the Rockfish Conservation Area).

The actual discard rate (or bycatch) of fish species that are overfished, which may differ among the various groundfish fishery sectors, is a critical uncertainty that must be addressed if effective measures to control total mortality and thus achieve rebuilding objectives are to be adopted. Until recently only landed catch was accurately monitored; logbooks maintained by the vessel operator provided imprecise estimates of total catch. As a result, fishery managers have found it difficult to accurately assess discards, and thus, total mortality. Bycatch and discard rate assumptions have become contentious and the focus of some recent legal challenges. However, NMFS implemented an observer program in August 2001, which allows direct observation of commercial bycatch and discard. Data from this program will promote more informed management decisions and allow managers to more effectively control total mortality of overfished groundfish stocks. Bycatch rate estimates based on observer data were first used as part of inseason management in mid-2003. As more observer data become available, different rates can be applied based on fishing location, season, and strategy. Thus far, bycatch has been formally modeled only for the limited entry trawl fishery. In the future, as the data set grows, limited entry fixed gear and open access sectors may be similarly modeled.

1.3.3 Summary of Litigation over Amendment 12

In January 2000, NRDC along with other conservation organizations challenged the adequacy of Amendment 12 (*Natural Resources Defense Council* v*. Evans*) in Federal District Court. They claimed that rebuilding plans submitted pursuant to Amendment 12 were inadequate for two reasons. First, they did not take the form of FMPs, plan amendments, or regulations as required by the Magnuson-Stevens Act. Second, rebuilding plans could allow overfishing under the "mixed-stock exception." The NRDC argued the overfished species provisions in the SFA demonstrate Congress's intent to eliminate this exception, so rebuilding plans should not entertain this exception. The Plaintiffs also argued the EA accompanying Amendment 12 failed to consider a reasonable range of alternatives as required by NEPA. The Court found for the Plaintiffs on the claim that rebuilding measures must conform to the Magnuson-Stevens Act-mandated format of an FMP amendment or regulation, and the NEPA-related claim of an inadequate range of alternatives. The Court decided the second Magnuson-Stevens Act-related claim, on the validity of the mixed-stock exception, was not ripe for judicial review because the exception had not yet been applied to Pacific groundfish management. In response to its findings, the Court ordered NMFS to revise Amendment 12 so the rebuilding plan implementation process accords with Magnuson-Stevens Act and NEPA requirements.

1.3.4 Development of Rebuilding Plan Adoption Strategy

Because of the litigation described above, in late 2001 work began on a new FMP amendment for the rebuilding plan adoption process that would be consistent with the Court's findings. The Council and NMFS published a Notice of Intent (NOI) to prepare an EIS on April 16, 2002 (67 FR 18576). According to this Notice, the EIS would evaluate two sets of alternatives: one set addressing the framework for rebuilding plan adoption (or the "process and standards") and a second set evaluating different rebuilding strategies that could be adopted as a rebuilding plan. (These strategies are described in terms of targets and limits, such as T_{TARGET}, T_{MIN}, and T_{MAX}, harvest control rules satisfying a given target, and potential management measures to constrain fishing mortality to levels determined by the harvest control rule.) Based on internal discussion, Council staff decided in late 2002 that the process and standards alternatives should be analyzed in a separate environmental document. Staff determined the process and standards proposed action is not likely to have significant environmental impacts and, therefore, could be analyzed in an EA. This approach allows these alternatives to be evaluated, and the FMP amended on a more accelerated track. In addition to simplifying the adoption of the rebuilding plan framework, preparation of the subsequent amendments that actually adopt the rebuilding plans can be prepared in a manner that conforms to the already-adopted framework. Because of this change of strategy, NMFS and the Council published a second NOI on March 18, 2003, (68 FR 12888) and identified an additional public scoping opportunity. As described above in Section 1.1, at least two related amendments will be prepared subsequent to this EA, adopting the rebuilding plans themselves.

1.4 Scoping Summary

1.4.1 Background to Scoping

The National Environmental Policy Act of 1969 (NEPA) requires that the public and other agencies be involved in the decision making process. "Scoping" is an important part of this process. Scoping is designed to provide interested citizens, government officials, and tribes an opportunity to help define the range of issues and alternatives that should be evaluated in the environmental impact statement (EIS). NEPA regulations stress that agencies should provide public notice of NEPA-related proceedings and hold public hearings whenever appropriate during EIS development (40 CFR 1506.6).

The scoping process is designed to ensure all significant issues are properly identified and fully addressed during the course of the EIS process. The main objectives of the scoping process are to provide stakeholders with a basic understanding of the proposed action, explain where to find additional information about the project, provide a framework for the public to ask questions, raise concerns, identify issues, recommend options other than those being considered by the agency conducting the scoping, and ensure those concerns are included within the scope of the EIS.

On April 16, 2002, NMFS and the Council published a NOI in the *Federal Register* announcing their intent to prepare an EIS in accordance with the NEPA for Amendment 16 to the Pacific Coast Groundfish Fishery Management Plan. The FMP would be amended to establish procedures for periodic review and revision of rebuilding plans and incorporate rebuilding plans for overfished groundfish species.
NMFS and the Council subsequently decided to prepare two (or more) separate analyses for these actions.

Therefore, on March 18, 2003, NMFS and the Council published a second NOI (68 FR 12888). This NOI:

- presented a schedule for a renewed scoping process, based on the change in approach;
- described a scoping meeting to be held on April 6, 2003;
- identified where additional information about the proposed project could be obtained;
- explained the roles of NMFS and the Council in the EIS and authorization processes;
- described the EIS process after scoping and presented a tentative EIS schedule;
- presented a brief summary of the history of rebuilding plans; and,
- described the alternatives being considered to date by NMFS and the Council for inclusion in the EIS.

Publication of the NOI announced a public and agency scoping comment period that ended on May 30, 2003. Establishing procedures for reviewing and revising rebuilding plans is not expected to result in significant environmental impacts. Therefore, an environmental assessment (EA) is being prepared for those actions, which will be implemented through Amendment 16-1 to the Groundfish FMP. An EIS will be prepared to evaluate the environmental impacts of implementing rebuilding plans for canary rockfish, darkblotched rockfish, lingcod, and Pacific ocean perch, four of the nine species currently declared overfished. This EIS also serves as Amendment 16-2 to the Groundfish FMP. These two environmental impact analyses are the subject of this scoping process. Rebuilding plans for the remaining five overfished species will be evaluated in subsequent environmental impact analyses. Public scoping for these additional analyses will be the subject of separate, subsequent public scoping periods, which are not summarized in this report.

This report summarizes individual scoping comments by categorizing the comments and by the types of issues raised. The report also describes how the Amendment 16-1 EA and Amendment 16-2 EIS incorporate these comments into an evaluation of the environmental impacts of the proposed actions.

1.4.2 Council Scoping and Agency NEPA Scoping

The Council process, which is based on stakeholder involvement, allows for public participation and public comment on fishery management proposals during Council, subcommittee, and advisory body meetings. The advisory bodies involved in groundfish management include the Groundfish Management Team (GMT), with representation from state, federal, and tribal fishery scientists; and the Groundfish Advisory Subpanel (GAP), whose members are drawn from the commercial and recreational fishery, processing, and conservation sectors. The Ad Hoc Allocation Committee, a subpanel of the whole Council, provides advice on allocating

harvest opportunity among the various fishery sectors. These opportunities all constitute the broadly defined Council scoping process, not all of which focuses on the scope and content of NEPA analysis. The Council and its advisory bodies considered rebuilding plans, and took public comment on them, at seven different meetings held in March, April, June, September, and November 2002; and April and June 2003.

In addition, NMFS and the Council hosted a public scoping meeting on April 6, 2003 at the Red Lion Hotel in Vancouver, Washington specifically for the purpose of getting comments on the scope of the NEPA analyses for rebuilding-plan related actions. Approximately 28 people attended. The meeting served two purposes: to listen to and record the public's comments about the proposed action and to respond to requests for background information. NMFS and Council staff were available to answer questions and offer explanations. All comments were documented as part of the administrative record.

1.4.3 Summary of Scoping Comments Received by the Council

Written and oral comments from 18 different sources were received during both Council scoping and the public scoping meeting held on April 6. A summary of commenters is provided below.

Comment source	Number of
Agency	1
Commercial fishing sector	9
Conservation organizations	4
Municipal government	1
Processing sector	2
Tribes	1
TOTAL	18

The number of times an issue is raised during the scoping process provides an indication of the issues that commenters are most concerned about. Scoping also helps agencies eliminate from detailed study issues that are not significant (40 CFR 1501.4(g)).

1.4.3.1 Identification of Issues

Analysis of the comments received during the scoping process is an important step in identifying key concerns about the proposed project. The comments received during the scoping process were individually analyzed and can be separated loosely into four groups.

- Observations and opinions. These comments were not recommendations, but general observations and opinions about the management process, scientific validity, and other topics related to rebuilding plans.
- Issues outside the scope of the analyses.
- Recommendations relevant to this EA (for Amendment 16-1).
- Recommendations relevant the Amendments 16-2 EIS.

1.4.3.2 Recommendations Brought Forward As Part of the Analysis

This section lists the recommendations used in structuring the environmental impact analysis and notes how they have been incorporated into this document. Although the comments summarized below are enclosed in quotes to set them off from the rest of the text, they are not taken verbatim from the written and oral comments received by the Council. Most have been reworded for clarity or brevity. Original written comments, and transcripts of oral comments, are available from the Council upon request.

<u>Science and data</u>

- "How do you measure whether fish are being rebuilt?"

Chapters 1 and 3 will describe the targets used to determine stock status.

Flexibility

- "Commit to maintaining optimum yields (OYs) or sticking to the T_{TARGET}."
- "Rebuilding measures should be in the Groundfish FMP so they have the best assurance of remaining in place."
- "The habitat and bycatch and other management elements should be part of the Groundfish FMP, so that those standards are more difficult to change than under regulation."
- "Resist the temptation to maintain maximum flexibility in rebuilding plans; it's contrary to the Magnuson-Stevens Act and does not show a serious commitment to rebuilding."

These comments relate to the way in which rebuilding plans will be adopted, or come into effect, and the type of rebuilding strategy that will be pursued. These concerns will be addressed in the range of alternatives, specifically the options under Issue 1 in Chapter 2. Effects under this issue will be evaluated in Chapter 4.

Stock Assessment Timelines

- "Coordinate re-evaluation of rebuilding measures with stock assessments (should be done every two years, or change the law)."
- "Properly ensure stocks are being rebuilt (by conducting stock assessments every two years)."

The schedule for evaluating the rebuilding process will be part of the alternatives presented in Chapter 2. The options under Issue 2 cover different review schedules.

Protected Species (Endangered Species Act)

- "If a higher standard for conservation is required under the Endangered Species Act (ESA) for a period of time until species are either de-listed or rebuilt, the Council should use that higher standard."

The possibility of an ESA listing will be accounted for in the range of alternatives, specifically the options under Issue 4 (see Chapter 2).

Precautionary Approach

- "Reduce exploitation rates to compensate for missing or uncertain ecological information."
- "The lack of comprehensive data on the marine environment and species sustainability demands an ecologically protective approach to rebuilding."

These comments relate to the framework used for rebuilding overfished species, which will be discussed in Chapter 3.

Process

- "Clearly define terms (like F, harvest control rule, harvest rule)."
- "Include an end point for implementation in this process (don't keep it open-ended)."
- "Make it clear to the public that there is a standard for P_{MAX}."

These comments relate to the process for adopting rebuilding plans and technical aspects of rebuilding, which will be discussed in Chapters 2 and 3.

1.4.4 Criteria Used to Evaluate the Impacts of the Amendment 16-1 Proposed Action

By screening and considering public comments and input from NMFS, Council staff developed criteria for assessing the impacts of the actions to be implemented under Amendment 16-1. The proposed action establishes a framework for adopting rebuilding plans; because it is primarily administrative, scoping determined that it would not directly affect the environment. For this reason, evaluation criteria focus on effects to the management regime. These criteria are:

The effect on administrative capacity. Complicated procedures for adopting and amending rebuilding plans would require more staff time, while simpler procedures would require less staff time. If more administrative capacity were devoted to adopting and amending rebuilding plans, there would be less capacity to address other management priorities. This could indirectly affect the environment to the degree that un-addressed priorities have a beneficial impact.

The effect on adaptive management. If the rebuilding framework makes it difficult to change the key rebuilding targets (such as the year by which the stock should be rebuilt) that are used to guide rebuilding management measures, it will be difficult to adapt to changing environmental conditions that produce new values for these parameters. This makes the management framework less adaptive and could lead to a situation where management measures do not support rebuilding. Conversely, if rebuilding targets can be changed easily, short-term socioeconomic impacts could take precedence in decision-making over long-term socioeconomic and environmental benefits. This too is not adaptive, since fixed management goals provide a boundary for short-term management responses.

The effect on public participation. Generally, procedural complexity provides more opportunity for public participation and comment. For example, some processes require more Council meetings to make a decision or have a statutory public comment period. Greater public participation can have a number of indirect environmental benefits. First, it forces decision-makers to consider a proposed action from different perspectives, sometimes revealing an environmental impact that the decision-maker would not have otherwise considered. Second, participation can achieve a greater level of buy-in by stakeholders, which can reduce controversy and increase support for and compliance with management measures.

In addition to evaluating the effect of the proposed action on the management regime, using the three criteria outlined above, the EA will also consider the effect of the choice of rebuilding strategy on the potential for successfully rebuilding overfished stocks. The choice of strategy affects options covering the form and content of rebuilding plans and standards for determining the need to revise rebuilding plans. Different strategies will be evaluated in terms of the policy and procedural risks that rebuilding will not occur within the time period identified in the rebuilding plan.

2.0 PROCESS AND STANDARDS ALTERNATIVES

This chapter presents alternative formats and procedures for developing rebuilding plans and implementing measures to rebuild overfished stocks. The following section presents four sets of options, organized around relevant issues. This allows the Council to structure a preferred alternative by combining options identified for each of the four issue categories.

This amendment also makes minor technical additions, corrections, and changes to the FMP. These changes are categorically excluded from analysis as described in Section 6.03.a.3(b)(2) of NAO 216-6. They are summarized in Section 2.2 and documented in the amendatory language found in Appendix A, along with those substantive changes to the FMP approved under the authority of the Magnuson-Stevens Act. A separate memo to file has been prepared by NMFS Northwest Region (NWR) providing the rationale for categorically excluding these changes to the FMP.

2.1 Issues and Options

Options (alternatives) covering four issues related to the development and adoption of rebuilding plans are considered in this chapter:

Issue 1: The form and required elements of rebuilding plans
Issue 2: The process for periodically reviewing rebuilding plans.
Issue 3: Defining events or standards that would trigger revision of a rebuilding plan.
Issue 4: The status of rebuilding measures for species subsequently listed under the Endangered Species Act.

2.1.1 Issue 1- The Form and Required Elements of Rebuilding Plans

The Magnuson-Stevens Act requires that councils or the Secretary take action to end overfishing and rebuild any stock that is overfished or approaching an overfished condition. The standard convention for actions taken to rebuild a stock has been termed the "rebuilding plan." Options under this issue encompass the Magnuson-Stevens Act mandate that rebuilding requirements take the form of an FMP amendment or regulation and the status quo where the rebuilding period was specified solely in policy documents. Three aspects of this issue may be distinguished. First, what rebuilding plan elements and supporting rationale should be incorporated into the FMP and/or regulations? Second, in which venue—the FMP or regulations—should specified rebuilding plan elements or other information appear? Third, if the limits and targets comprising the rebuilding framework can be numerically specified, should these values be included in the FMP or regulations?

From the Magnuson-Stevens Act and National Standard Guidelines (50 CFR 600, Subpart D) it appears that the only specifically identified element of a rebuilding plan that must be set in the FMP or regulation is the rebuilding time (MSA 304(e)(4)(A)).[4/] However, when a stock has been overfished, the FMP must be amended or regulations implemented to "end overfishing and to rebuild affected stocks" (MSA Section 304(e)(3)(b)).[5/] Under the FMP as currently written, actions required to "end overfishing and rebuild the affected stock" are

4/ While only the target rebuilding time must be part of an FMP or regulatory amendment, there are two constraints placed on Council actions to rebuild overfished species. First, remedial actions must fairly and equitably allocate restrictions and recovery benefits among sectors (MSA 304(e)(4)(B)). This appears to be a more specific application of National Standard 6 and not a new requirement to which councils or the Secretary must respond. Second, for fisheries governed under international agreements, the rebuilding action should reflect traditional participation by fishermen of the U.S. relative to those of other countries (MSA 304(e)(4)(C)). None of the West Coast groundfish species are currently governed under international agreements. The groundfish species most likely to be the subject of a future international agreement is Pacific whiting. Halibut and salmon fisheries do come under international agreements and could be affected by the need to substantially restrict groundfish mortality.

5/ CFR 50 Section 600.310 (e)(4)(ii) states that "in cases where overfishing is occurring Council action must be sufficient to end overfishing."

implemented by regulations under the annual management process, derived from the rules for specifying and managing for the OY. As specified in the National Standard Guidelines (50 CFR 600.310 (f)(1)), "in the case of an overfished fishery, [OY is constrained to an amount of harvest mortality] that provides for rebuilding to a level consistent with producing MSY in such fishery." The FMP also specifies that OYs will be constrained by rebuilding needs and fishery management regulations established to meet OY. These provisions therefore appear to meet the standards of Section 304(e)(3): that rebuilding measures be described in FMPs or regulations. However, under Amendment 12 to the groundfish FMP, the Council has set its rebuilding time targets during the annual specification process; these targets are not specified in the FMP or regulations. Thus, the Council omitted from its FMP and regulations the elements required to be part of a rebuilding action. In addition, NMFS has published ancillary guidance describing a number of other parameters not identified in the Magnuson-Stevens Act that should be included in rebuilding plans (Restrepo *et al.* 1998).

The language in the Magnuson-Stevens Act states that rebuilding measures (and specifically, the "time period for ending overfishing and rebuilding the fishery") may be adopted as an FMP, FMP amendment, or regulation. The options described below do not consider developing a new FMP for overfished species. According to these options, rebuilding measures would be described in the existing groundfish FMP, in regulations, or some combination of these two documents. As a general proposition, the FMP describes procedures for managing the fishery and serves as a code obligating the Council and fishery managers to follow these procedures and manage according to specified goals and objectives. Regulations are broader in application, serving as laws governing the behavior of the general public, or in this case that segment of the public using certain fishery resources. The options outlined below also contemplate using regulations to promulgate a relatively narrow subset of a rebuilding strategy: the numerical values for the harvest control rule and target year.

Tables 2.1 and 2.2 illustrate the range of possible elements that may be considered part of a rebuilding plan. The options presented below outline which of these elements would be incorporated in the FMP, regulations, or some combination of these two documents. The term "elements" includes narrowly defined parameters and management measures that would be used to achieve rebuilding targets. These parameters are derived from National Standard Guidelines and the rebuilding analysis methodology (detailed in Section 3.1.2.2); they provide a general framework for determining how overfished stocks may be rebuilt and numerical values can be determined for these parameters. Which of these parameters to incorporate into the FMP and/or regulations, and how to specify them, has been a subject of considerable deliberation in developing this FMP amendment. As discussed in Section 3.1.2.2, the numerical values associated with these parameters are almost certain to change as new stock assessments increase our understanding of the status of overfished stocks. If these values are numerically specified in the FMP/regulations, the FMP may have to be amended frequently in order to update these documents each time new values are calculated. This argues for a "flexible" approach that would limit the number of numerically-specified parameters; instead, parameters are defined by a formula or algorithm relating the parameter to some other measure. Conversely, there is concern that if these parameters are not specified, there will be no fixed guideposts for managers, who might otherwise emphasize the short-term benefits of higher harvests over the long-term goal of rebuilding overfished stocks. This concern favors a "fixed" approach where the value of these parameters would be specified in the FMP/regulations. By the same token, management measures could be described generally or specifically. Tables 2.1 and 2.2 give examples of how these elements might be described under a flexible strategy versus a fixed strategy. Table 2.1 also provides definitions for the terms used to describe rebuilding plan parameters discussed in the options below.

Based on these considerations, the following four options have been identified:

Option 1a **There is no framework for specifying the form of rebuilding plans (status quo).** The FMP as amended by Amendment 12 directs the Council to prepare and adopt rebuilding plans as policy guidance documents as described in FMP Section 5.3.6 (Stock Rebuilding Requirements). However, the Court set aside the relevant parts of Amendment 12 and remanded it (see Section 1.3.3 of this document) without proposing specific changes to FMP language. For the purposes of describing the status quo, the remand can be interpreted to mean that all references in the FMP to rebuilding plans only implemented as part of the annual management process are struck out. Therefore, although the FMP describes the contents of rebuilding plans, it does not describe their form, and there is no framework for rebuilding plan adoption. Currently, management measures described in Section 6.2 of the FMP—including automatic actions,

notices, abbreviated rulemaking actions, and full rulemaking actions—are used to implement interim rebuilding plans. Thus, each rebuilding plan would need to comply with the Magnuson-Stevens Act, but without any additional description of the process in the FMP.

Option 1b **Numerically specify P_{MAX}, T_{MIN}, T_{MAX}, and T_{TARGET}, describe the harvest control rule, and outline the methods used to calculate B_{MSY} in the FMP.** Current guidelines in the FMP with respect to rebuilding plan goals and objectives and the contents of rebuilding plans (Sections 5.3.6.1 and 5.3.6.2 of the FMP[6/]) would be retained as a guide to formulating rebuilding plans. In order to comply with the court order, references to rebuilding plans as policies or principles implemented through annual management would be stricken. Section 5.3.6.2 of the FMP would be amended to state that for each overfished species the numeric value of P_{MAX} (as either a decimal fraction or percent), and T_{MIN}, T_{MAX}, and T_{TARGET} (as dates) would be specified in the FMP. (These values could be incorporated in tabular format.) This section would also state that the FMP would describe the harvest control rule (e.g., as a rate, constant catch, or some combination thereof) and the methods used to calculate B_{MSY} (including relevant formulas). The numerical value associated with the harvest control rule and for B_{MSY} would not necessarily have to be specified. Rebuilding plan adoption would entail amending the FMP to include these specified values in the FMP. If the harvest control rule for a given overfished species was specified in the FMP, and a new stock assessment showed the specified harvest rate would result in the stock reaching the target biomass later than the specified T_{TARGET}, then the recomputed harvest rate satisfying T_{TARGET} would apply until the FMP could be amended to correct specified parameter values.

Option 1c **Numerically specify T_{TARGET} and the harvest control rule in federal groundfish regulations.** The FMP would be amended to state that for each overfished species the target rebuilding year (T_{TARGET}) would be specified (as a date) and the harvest control rule described (e.g., as a rate, constant catch or some combination thereof) and an appropriate numerical value specified in federal groundfish regulations. FMP language also would be revised to better describe the contents of rebuilding plans, the adoption process, and, as above, to strike any language at variance with the court order. If, after a new stock assessment computations reveal the specified harvest control rule would result in the stock reaching its target biomass later than the specified T_{TARGET}, the harvest control rule would be re-specified in federal groundfish regulations through full (notice and comment) rulemaking. The FMP would also describe the following circumstances under which the target year could be changed, (1) after a new stock assessment, re-computed parameters result in a T_{TARGET} greater than T_{MAX}; (2) due to a change in parameters resulting from a new stock assessment, the corresponding OY for the overfished species would result in substantial negative socioeconomic impacts. This second circumstance would have to be supported by commensurate analysis. (These circumstances are exemplary; the Council could change the target year for other reasons, if justifiable through commensurate analysis.) If the Council recommended such a change in the target year, these changes would also be made through full (notice and comment) rulemaking. All other rebuilding plan elements, and updates to rebuilding plans, would be published in the Stock Assessment Fishery Evaluation (SAFE) document.

Option 1d **(<u>Council preferred</u>). Numerically specify T_{TARGET} and the harvest control rule in federal groundfish regulations. In addition, describe the methodology for computing rebuilding parameters and the numerical values for these parameters at the time of rebuilding plan adoption in the FMP.** This Option is similar to Option 1c, except that additional information describing the status of the stock would be included in the FMP. This would include estimates at the time the rebuilding plan was adopted of: unfished biomass (B_0) and target biomass (B_{MSY}), the year the stock would be rebuilt in the absence of fishing (T_{MIN}), the year the stock would be rebuilt if the maximum time period permissible under National Standard Guidelines were applied

6/ As mentioned in Section 2.2 and shown in Appendix A, these section numbers would change in the amended FMP.

(T_{MAX}) and the probability of the stock rebuilding by this date (P_{MAX}), and the year in which the stock would be rebuilt based on the application of stock rebuilding measures (T_{TARGET}). These estimated values serve as management benchmarks. The FMP would not be amended if, as is likely to happen, the values for these parameters change after new stock assessments. This point cannot be over-emphasized because changing these values in the FMP would require frequent amendments. Instead, updated values would be published in the SAFE document. The FMP would also include a description of how these parameters are computed. If the computational method differs for a particular species, then these differences would be described in the FMP. Like Option 1c, both the target rebuilding year (T_{TARGET}) and the harvest control rule would be specified in federal groundfish regulations. As discussed above, full (notice and comment) rulemaking would be used to change the harvest control rule specification in federal groundfish regulations if a new stock assessment reveals the current value would result in the stock reaching its target biomass later than the specified T_{TARGET}. Similarly, the FMP would also describe two circumstances under which the target year could be changed, (1) after a new stock assessment, re-computed parameters result in a T_{TARGET} greater than T_{MAX}; (2) due to a change in parameters resulting from a new stock assessment, the corresponding OY for the overfished species would result in substantial negative socioeconomic impacts. This second circumstance would have to be supported by commensurate analysis. (These circumstances are exemplary; the Council could change the target year for other reasons, if justifiable through commensurate analysis.) If the Council recommended such a change in the target year, these changes would also be made through notice and comment rulemaking.

Currently, rebuilding actions are implemented through the annual process of specifying management measures, as described in Section 6.2.1 of the FMP. Options 1b-1d identify different ways that substantiative elements could be incorporated into the FMP, regulations, or both, in order to obligate the Council and NMFS to manage towards identified targets.

When thinking about the various rebuilding parameters describing how a stock will be rebuilt, it is important to recognize that some of the terms introduced and described above represent policy decisions at the national level, and the Council ***does not have a choice*** in setting their values. The dates for T_{MIN} and T_{MAX} are determined based on guidelines established at the national level. Mean generation time is a biological characteristic that cannot be chosen by policymakers. Thus, the Council cannot choose these values and then use them as a basis for management. Defined in national guidelines, T_{MIN} is a consequence of the productivity of the fish stock and is calculated by fishery biologists based on information they get from a particular stock. Similarly, T_{MAX}, which is calculated from T_{MIN}, does not represent a Council choice.

Fundamentally, when developing a management strategy the Council is able to choose a harvest control rule (which may be expressed as a fishing mortality rate or by some other means), and the corresponding annual level of fishing. This ***does*** represent a Council choice because managers have the means to limit the amount of fish that are caught. However, when rebuilding overfished species, it is possible to think about how to set these fishing limits in different ways. The Council could base their management strategy on either the value of T_{TARGET}, the probability of reaching target biomass in the maximum permissible period (P_{MAX}), or the fishing mortality rate, keeping in mind these three values cannot be chosen independently of one another. In other words, the Council may choose one of these values and derive the other two from it, but they cannot choose the values for two of these terms independently of the third. T_{TARGET} must be the management target, given its name and the fact the Magnuson-Stevens Act states that a time period must be identified. However, it should be apparent the Council could base their choice of T_{TARGET} on P_{MAX} or the harvest rate since all three of these terms are related to each other. If the Council based their decision on P_{MAX}, for example, the corresponding target year and harvest rate could be easily determined through the rebuilding analysis. However, once T_{TARGET} is derived, the stock would have to be managed to that target by adjusting the harvest control rule (or fishing mortality rate) to achieve that target, although the possibility of changing the target year remains open either by FMP amendment (Option 3b) or regulatory amendment (Option 3c and 3d).

Within the management framework, the target year (T_{TARGET}) is the year by which the stock would be rebuilt to its target biomass. In other words, if a stock were to rebuild in any year earlier than the one identified as the target in the FMP or regulations, the specification would still be satisfied. Such a circumstance could come into play if a subsequent rebuilding analysis identifies an earlier target year because stock productivity has

changed (perhaps due to changed environmental conditions). In this case, the Council would not be obligated to re-specify the target year and could continue applying the harvest control rule identified in the FMP and/or regulations. Nor would the Council be obligated to increase the current fishing mortality rate (based on the harvest control rule) so that rebuilding is delayed to the originally-computed target year. On the other hand, there would be no absolute prohibition on adjusting the harvest control rule to increase the fishing mortality rate (and thus OYs) to achieve rebuilding in any later year up to and including the previously computed target year. This is a policy decision; there may be benefits to accepting more rapid rebuilding along with more stable OYs in some instances, while substantial benefits to communities may justify such an increase in other cases. The procedural requirements that are part of Options 1b-1d (an FMP amendment or regulatory amendment) entail evaluation and sufficient justification for any change, based on the Magnuson-Stevens Act and NEPA.

Some possibilities were eliminated from detailed consideration when developing the options outlined above. First, while targets and limits would be described and/or specified under these options, none of the options would require the specific management measures used to achieve these targets be described in the FMP or regulations. Rebuilding plans (and the FMP) could contain general discussion of the types of management measures that will be used, based on a revised enumeration of rebuilding plan contents in Section 4.5.3.2 of the revised FMP (see Appendix A). Although not required, rebuilding plans could identify specific management measures, other than those usually implemented through annual/biennial management, that would be incorporated into the FMP and would be applied in addition to existing management measures identified in the FMP and/or established through the annual/biennial management cycle. Implementing rebuilding-specific management measures generically for all overfished species would, in general, be less adaptive, since stocks will respond to changes in both the management regime and environmental conditions. The groundfish FMP already authorizes a comprehensive framework that allows periodic adjustment of a broad range of management measures in response to stock conditions. This framework can also address stock rebuilding needs by constraining total fishing mortality within limits (i.e., OYs) derived from rebuilding analyses and based on the targets established in rebuilding plans.

A second class of options eliminated from detailed study were those that would adopt flexible specifications of rebuilding parameters. Depending on how they were formulated, flexible specifications would not sufficiently obligate managers to rebuild according to a fixed target. There would thus be a greater risk of changes in targets based on fishery conditions in the short term. The key rebuilding parameters could be numerically specified while other parameters are described in terms of formulas. However, as noted above, since there are essentially two parameters that represent policy choices—T_{TARGET} and the harvest control rule (or fishing mortality rate)—providing the formulas for computing other parameters does little to establish a management framework. (Note that P_{MAX} is also a policy choice. However, this parameter is essentially another way of describing T_{TARGET}. See Section 3.1.2.2 for a discussion.) Options 1c and 1d (the Council-preferred option) incorporate flexibility through a procedural framework. The target, T_{TARGET}, and the means to operationalize it, the harvest control rule, are specified. A procedural mechanism is established to change these parameters, through notice and comment rulemaking, introducing flexibility. However, such changes would have to be found justifiable based on the range of criteria found in the Magnuson-Stevens Act and NEPA.

A third possibility not considered was to identify a generic target that would apply to all overfished stocks. The range for an allowable target year (which must fall between T_{MIN} and T_{MAX}) will vary among stocks based on the underlying biology. A rebuilding probability (P_{MAX}) could be specified for all stocks, from which the specific target year is derived. This approach was not considered because of the variable effect that imposition of a given rebuilding target will have on fisheries targeting mixed stocks. Fishing mortality on less productive stocks needs to be constrained more than on more productive stocks. If both are caught in a single fishery it may be that only one acts as the “binding constraint” on fishing effort. In other words, management measures are tailored to the more constrained stock, and as a result, fishers are not capable of reaching the OY for the less-constrained stock. In seeking a balance between rapid stock rebuilding and the needs of fishing communities (see MSA §304(4)(A)(i)), policymakers need to determine targets on a case-by-case basis. For example, the target for a constraining stock might be relaxed slightly to allow harvesters more opportunity to achieve the OYs for healthy stocks. At the same time, targets for more productive co-occurring overfished stocks can be more restrictive since fishing mortality is restricted by the constraining stock. Over the long-term, as the constraining stock rebuilds, the more restrictive target for the other overfished stock may

come into play, depending on how quickly the second stock rebuilds in comparison to the constraining stock. Because nine Pacific groundfish stocks are currently declared overfished, these case-by-case considerations of targets are critical.

Although the management process may not change very much if rebuilding plan elements become part of the FMP or regulations (since the Council already adheres to interim rebuilding plans when developing annual management measures), public perceptions about the process could be influenced. If more elements are specified in the FMP or regulations, members of the public that are skeptical the Council will adhere to policies intended to rebuild stocks may be reassured. In addition, any changes to the rebuilding strategy, would be accompanied by a more extensive process with greater opportunity for public comment.

The administrative cost associated with a more involved process to incorporate rebuilding plan elements and subsequently update them can be measured as the direct value of the time and various expenses associated with the management process. Where administrative resources are limited, the costs can also be evaluated in terms of the lost opportunity for addressing other policy problems in the fishery. For example, the time and resources needed to amend a rebuilding plan may detract from managers' ability to improve capacity controls in the fishery. In this example the opportunity costs of the administrative action may be viewed as the difference in net benefits between the status quo capacity controls and the improved capacity controls that are delayed because of the need to modify a rebuilding plan.

TABLE 2-1. Parameters that describe the projected growth of the overfished stock towards its rebuilt state. The fixed and flexible specifications are exemplary and do not apply to any actual rebuilding plan or overfished stock.

Parameter	Description	Example of a Fixed Specification	Example of a Flexible Specification
B_0	Unfished stock biomass.	1,000 mt	The product of SPR in an unfished state and the average recruitment during the early years of the fishery.
B_{MSY}	Target stock biomass.	500 mt	40% of B_0 (or $B_{40\%}$)
T_{TARGET}	The target year by which the stock will be rebuilt.	50 years (or 2049)	The median rebuilding year for a specified probability.
T_{MIN}	The time needed to rebuild the stock in the absence of fishing, with a 50% probability.	41 years (or 2040)	The time the stock would be rebuilt in the absence of fishing with at least a 50% probability.
T_{MAX}	The maximum allowable rebuilding time under National Standard guidelines. If T_{MIN} is less than ten years, then T_{MAX} equals ten years. If T_{MIN} is equal to or greater than ten years than T_{MAX} equals T_{MIN} plus one mean generation time.[7/]	58 years (or 2057)	The time needed to rebuild the stock with at least a 50% probability.
Mean Generation Time	A measure of the time needed for a female to replace herself with an equivalently productive female.	17 years	Include explicit formula.
P_{MAX}	The estimated probability of reaching T_{MAX}, may not be less than 50%.	52%	P_{MAX} must remain >50%.
Rebuilding Harvest Control Rule	The harvest control rule that will be followed to rebuild a stock in for a given P_{MAX} and T_{TARGET} years. A harvest control rule associates a given stock size (or stock size proxy) with a given level of fishing mortality and a given level of potential harvest.	E = 0.27	A constant harvest rate sufficient to rebuild by T_{TARGET} with probability P_{TARGET}

7/ This formula is derived from Magnuson-Stevens Act language, which states that stocks will be rebuilt within ten years "except in cases where the biology of the stock of fish, other environmental conditions, or management measures under an international agreement in which the United States participates dictate otherwise" (Sec 304(e)(4)(a)(ii)).

TABLE 2-2. Management measures that could be detailed in rebuilding plans mentioned in the FMP, MSA, and/or identified through scoping. The fixed and flexible specifications are exemplary and do not apply to any actual rebuilding plan or overfished stock.

Element	Description	Example of a Fixed Specification	Example of a Flexible Specification
Allocation	MSA §304(E)(4)(b)); Allocations or allocation priorities for overfished species where specific allocations or allocation priorities have not already been specified under the procedures of the FMP or in the FMP. NOTE: Under other Options 1a-1d specific allocations are specified under existing FMP provisions or the allocation framework and implemented in conjunction with the annual process for setting OY.	"A specified percentage of the OY will be allocated to limited entry trawl."	"Limited entry trawl fisheries will be given preference for available OY"
Bycatch	**Include consideration** of the • the **adequacy of information** on bycatch and bycatch mortality. Measures needed to acquire the bycatch information necessary to adequately implement the harvest control rule may be considered as part of the rebuilding plan or in a separate plan pr regulatory amendment. Adopt risk averse harvest levels sufficient to account for uncertainty about bycatch. • the need for management measures to **minimize bycatch** and minimize the mortality of unavoidable bycatch as part of the rebuilding plans. Measures needed to minimize bycatch or the mortality of unavoidable bycatch may be considered as part of the rebuilding plan or in a separate plan or regulatory amendment.	"Finfish excluders must be used by the shrimp trawl fleet."	"Bycatch will be minimized through future gear modifications."
Habitat	Include specific habitat protection measures.	A specified portion of EFH for an overfished species is closed to fishing.	"Measures to minimize impacts to overfished species' habitat will be evaluated."
Closed Areas	Include consideration of the contribution areas closed to groundfish fishing might make to rebuilding the stock (closed areas could range in extent to restricting all fishing, i.e. no-take marine reserves). Include such measures in the plan as appropriate.	A marine reserve will be created in an identified area.	"Marine reserves will be evaluated as part of a species' rebuilding strategy."

2.1.2 Issue 2- The Process For Periodically Reviewing Rebuilding Plans

Although the Magnuson-Stevens Act requires the Secretary review rebuilding plans at least every two years (§304(e)(7)), an equivalent obligation is not assigned to the councils. Nonetheless, periodic Council review is advisable because changing environmental conditions and unanticipated events make it unlikely that overfished stocks will rebuild precisely to the trajectory that is forecast at the outset of the rebuilding period. Periodic reviews allow the Council to decide if rebuilding measures need to be modified, which would likely entail an FMP or regulatory amendment, or both, depending on the options chosen above. Issue 3 is closely related to the periodic review process because options for the standards triggering a revision are outlined.

Option 2a **The Council reviews rebuilding plans at least every two years (status quo).** Currently, the FMP states "Rebuilding plans will be reviewed periodically, at least every two years, and the Council may propose revisions to existing plans at any time...." For the purposes of the status quo this is interpreted as Council review. Although not explicitly stated in the FMP, for this analysis it is assumed that rebuilding plans are reviewed with respect to goals 1-5 defined in Section 5.3.6.1 of the current FMP. (Section 4.5.3.1 under the revisions proposed in Appendix A.) These goals are:

(1) Achieve the population size and structure that will support the maximum sustainable yield within the specified time period.
(2) Minimize, to the extent practicable, the social and economic impacts associated with rebuilding, including adverse impacts on fishing communities.
(3) Fairly and equitably distribute both the conservation burdens (overfishing restrictions) and recovery benefits among commercial, recreational and charter fishing sectors.
(4) Protect the quantity and quality of habitat necessary to support the stock at healthy levels in the future.
(5) Promote widespread public awareness, understanding and support for the rebuilding program.

Option 2b **(Council-preferred). The Council reviews rebuilding plan goals 2-5 every two years, but goal 1 only with new stock assessments.** As with option 2a, rebuilding plans are reviewed at least every two years to determine the success of the management measures in meeting rebuilding plan goals 2-5 defined in Section 5.3.6.1 of the FMP. New stock assessment data will be used to determine the success of the management measures in meeting the rebuilding plan goal 1. The Council may propose revisions to existing plans at any time, although in general this will occur only during the annual/biennial management process. Any revisions to the rebuilding plan must also be approved by NMFS.

Option 2c **The Council reviews rebuilding plan goals 2-5 every two years; goal 1 is reviewed after stock assessments conducted according to a schedule described in the rebuilding plan.** This is the same as Option 2b except that a schedule for stock assessments is specified in the rebuilding plan and driven by the stock dynamics. For example, more frequent reviews and assessments could be conducted for more productive stocks. The schedule is also structured so that stock assessments and rebuilding plan reviews occur more often as T_{TARGET} draws closer.

Option 2d **The Council reviews rebuilding plan goals 2-5 every two years; goal 1 is reviewed after stock assessments conducted according to a pre-specified schedule described in the FMP.** This is the same as the preceding option except the FMP would specify the following assessment schedule for all overfished stocks: every four years when T_{MAX} is 20 years or more away and then every two years until the stock is rebuilt.

Option 2e **The Council will defer review to the Secretary.** The Council may propose revisions to existing plans at any time, but these must be approved by NMFS. Each year the Council will compare actual harvest mortality to the harvest mortality goals identified in the rebuilding plan. They will also evaluate progress in rebuilding the stock biomass to the MSY level after each new stock assessment. This would be described in annual SAFE documents and the ongoing social and economic impacts of harvest policies necessary to rebuild overfished species would be evaluated

in aggregate as part of annual specification of harvest regulations, which is supported by a NEPA analysis. The SAFE document should assist the Secretary in conducting Magnuson-Stevens Act-mandated two-year reviews (§304(e)(7)). A draft of any Secretarial review will be provided to the Council so they can make comments before it is finalized.

For options 2b, 2c, 2d, and 2e the Council's annual SAFE document will provide (1) the most recent information available on the best estimate of total fishing mortality for comparison to target fishing mortality levels described in the rebuilding plan; (2) the most recent assessment of stock size compared to the expected stock size for the rebuilding trajectory; (3) information on allocation and the social and economic status of the fishery. As noted, this information, and the record of Council actions to protect habitat and promote public awareness of rebuilding programs, would also support the Magnuson-Stevens Act-mandated Secretarial review. If should be emphasized that any option mandating Council review does not preclude Secretarial review, which is mandated in the Magnuson-Stevens Act.

New assessments can result in better estimates of biological parameters or fisheries descriptors. Once incorporated into a new rebuilding analysis, this can result in a dramatic change in rebuilding parameters such as the estimated probability that a stock can rebuild in the time specified, in comparison to previous analyses. For example, as a result of the most recent canary rockfish assessment (Methot and Piner 2002) scientists concluded the stock was less productive (in terms of expected recruitment) than previously thought because of a new estimate of the steepness of the spawner-recruit curve. This in turn increased the estimated value for T_{MIN}, and thus other rebuilding parameters. In addition, a new estimate of selectivity (the size or age classes typically removed by fishing) for a given fishery or the removals allocated to different fisheries with different selectivity patterns can change the estimated rebuilding time even though total catch remains the same. Again citing the most recent canary rockfish assessment, if the estimated proportion of total catch taken by recreational fisheries increases, the target rebuilding year will be delayed because of the generally smaller size that recreational fishers take in comparison to commercial fisheries. (Fishery removals are usually expressed in weight units, such as metric tons. Population productivity, however, is partly a function of the number of individual fish that are, or have the potential to become, spawners. Since more smaller fish will make up a given unit of weight, more actual or potential spawners would be removed if the fishery captures smaller fish than if larger fish were caught.)

Long-term stock assessment schedules would be established under Option 2c and 2d. This approach would be difficult to implement because NMFS cannot commit resources to such a specific schedule over the long term.

The choice between these options will mainly affect administrative burden, and to a certain degree, the distribution of that burden among agencies. Under Options 2a through 2d, the Council would formally review rebuilding measures at least every two years; these reviews would provide much of the information needed by the Secretary for his Magnuson-Stevens Act-mandated biennial review. Although the Council would not conduct a formal review under Option 2e, the analyses and information resulting from the harvest specification process would allow the Council and the Secretary to evaluate rebuilding progress and performance. More frequent review would increase administrative burden; and if such reviews required more extensive revision of the FMP or regulations (depending on the options chosen under Issue 1), this too would result in a heavier workload.

2.1.3 Issue 3- Amending Rebuilding Plans and Adequacy of Progress

Issue 2 contemplates periodic reevaluation of rebuilding measures. It is expected the rebuilding plans would be revised (and necessary FMP or regulatory amendments made) when these periodic reviews reveal a significant discrepancy between current stock status (most likely expressed as the probability of achieving rebuilding within the target time period) and that projected in the original rebuilding plan or in earlier reviews. In most cases the harvest strategy can be adjusted during the annual specification process (or at any other time if necessary) so that rebuilding targets can be met, although this could also require an FMP or regulatory amendment (based on the option chosen under Issue 1). However, there may be times when new information results in a change to some other crucial parameter (B_0 for example), affecting a whole range of other parameters. In these cases the rebuilding plan would be revised, and the FMP and/or regulations amended

to change those elements incorporated therein. The options outlined below detail various standards that could be used to decide if such revisions and amendments are necessary.

Option 3a **No standards to evaluate rebuilding progress (status quo).** Currently, the FMP does not describe a standard to evaluate the adequacy of rebuilding measures and determine if rebuilding parameters or management measures need to be changed.

Option 3b **A standard based on a minimum P_{MAX} value.** If the probability of achieving T_{MAX} falls below 50% (the required minimum value), then progress will be considered inadequate and the harvest control rule must be adjusted to increase the probability of rebuilding within the maximum time to at least 50%. Other needed changes to rebuilding measures would also be considered. Depending on what options are chosen under Issues 1 and 2, FMP and/or regulatory amendments may be required.

Option 3c **A standard based on the specified P_{MAX} value.** This option is identical to option 3b except the probability of achieving T_{MAX} established in each species-specific rebuilding plan (as modified during previous reviews) is used as the standard. If the measured value is below this value then the procedures identified under option 3b would be implemented.

Option 3d **Rebuilding plans will be revised whenever new information from stock assessments or rebuilding analyses reveals a significant change in rebuilding parameters.** The Council, in consultation with the Scientific and Statistical Committee (SSC) and Groundfish Management Team (GMT), will determine on a case-by-case basis whether there has been a "significant" change in a parameter.

Option 3e **(Council-preferred) A specific standard for determining when progress has been adequate is established for each plan.** No generic standard is identified in the FMP for all overfished species. Instead, the FMP would require that each rebuilding plan identify such a standard from a list of possibilities based on the options outlined above.

Options 3b and 3c bracket a range of other possible policies; for example, a required rebuilding plan revision could be triggered by some other probability value, such as one halfway between the specified value (P_{MAX}) and the minimum value (50%). Generally, a standard that allows the probability to deviate significantly from the specified value would risk triggering a sudden, substantial change in the harvest policy with attendant disruptive effects on fisheries. For example, if a specified P_{MAX} of 80% declines over several years to a value below 50%, the required harvest policy change at that point would result in a sudden large reduction in that year's OY, with attendant effects on the fishery. On the other hand, this strategy, by giving relatively wide latitude for changes in P_{MAX}, would lessen the frequency of required revisions to the rebuilding plan (and attendant FMP and regulatory amendments), reducing administrative burden.

Options 3d and 3e would allow relatively more flexibility by giving the Council some control over when and whether to revise rebuilding plans. Option 3e emphasizes a procedural approach that relies on judgements made as part of the Council process. Like the choice of other more flexible components of a rebuilding process and standards framework, there is some risk the public will not trust these judgements. Option 3e maintains flexibility by allowing standards to better match the characteristics of a particular overfished stock.

These review standards are also related to Issue 1, since those options outline the procedural requirements in terms of elements incorporated into the FMP and/or regulations, for changing a rebuilding plan. Option 1b specifies a range of parameters in the FMP. The FMP would need to be amended based on the standard chosen under this issue. Under Option 3b and 3c, for example, the FMP would be amended if the rebuilding probability (P_{MAX}) fell below the relevant threshold. Options 1c and 1d imply more ongoing adjustment in management to achieve identified targets. Unless the target year is changed, it is almost certain that the harvest control rule would have to be changed after new stock assessments so that the stock will still rebuild by the identified target year. Since the target year and rebuilding probability are highly correlated (because both result from the same probability distribution), the standards identified in Options 3b and 3c, based on the rebuilding probability, may not come into play. If the stock is managed based on the target year by adjusting

the harvest control rule, then the rebuilding probability is also likely to stay close to the value originally specified in the rebuilding plan. Under Option 3d it is likely that the SSC and GMT would develop standards to determine what constitutes a "significant" change. These standards could, for example, further specify the circumstance under which the target year would be changed under Options 1c and 1d (the Council-preferred option). The application of any such standards must be based on the best available science, as required by National Standard 2 in the Magnuson-Stevens Act.

Generally, the choices reflected in these options represent tradeoffs between the rebuilding objectives, the social and economic needs of fishing communities, and benefits of the fishery to the nation. In developing rebuilding plans the Council chooses a harvest policy (harvest control rule) that accords with a given rebuilding time and probability. A determination that the rebuilding plan can be allowed to fall behind schedule so long as the probability of rebuilding in T_{MAX} is more than 50%, implies that administrative opportunity costs are sufficiently high and the short-term benefits to the community are likely to be sufficiently important that harvest levels specified in the control rule should be maintained as long as the minimum rebuilding standard is being met. (But as noted above, this approach could result in sudden large and disruptive changes in harvest policy.) In contrast, selection of a more rigid standard would entail frequent rebuilding plan revisions and FMP or regulatory amendments, implying the administrative opportunity costs of frequent revision and amendment are low enough and potential lost opportunity from not re-evaluating the rebuilding program (in terms of future returns to the fishery for example) are so high that rebuilding measures should be re-evaluated whenever stock increases fall behind schedule.

2.1.4 Issue 4- ESA Listed Species

Option 4a **No special provisions (status quo).** There are no special provisions for rebuilding plans for species listed under the Endangered Species Act.

Option 4b **(Council-preferred). ESA jeopardy standards or recovery plans take precedence if they establish a higher standard.** A jeopardy standard or recovery plan for an overfished stock listed under the ESA will supercede the rebuilding plan only if that standard is more restrictive than what would be required for that species under the Magnuson-Stevens Act. If the species were de-listed, but still not considered recovered under the Magnuson-Stevens Act and the original rebuilding plan, then that plan would again determine harvest policy and other management measures until the stock is fully rebuilt. After de-listing, the rebuilding plan may need to be revised to take into account the changed status of and new information about the overfished stock.

Under Option 4a (status quo), if a groundfish stock is listed, the Council might have to develop another plan amendment to address the listing and jeopardy standard or recovery plan. Before such an amendment was approved there could also be some uncertainty about how these species should be managed in the event of a listing. Option 4b anticipates the possibility that a groundfish species could be listed under the ESA and establishes a contingency for dealing with such an event. This option is similar to a provision in the Salmon FMP under which escapement goals for a particular stock are automatically replaced by the jeopardy standard or recovery plan when a stock is listed, except that measures under the Magnuson-Stevens Act would take precedence if they establish a higher standard than the ESA. Option 4b would reduce future administrative costs by obviating the aforementioned plan amendment and by clarifying procedures and processes in the event of a listing. This would facilitate quicker reaction by the Council to any requirements of any such jeopardy standard or recovery plan.

2.1.5 Summary of the Impacts of the Options

The environmental impacts of the options are evaluated in Chapter 4. The proposed action is procedural and, therefore, does not directly affect the natural environment. The direct impacts affect the management regime are evaluated in terms of administrative capacity, adaptive management, public participation, and rebuilding strategy. These direct impacts are summarized in Table 2-3.

TABLE 2-3. Summary of the direct impacts of the options on the management regime. (Page 1 of 1)

Options	Administrative Capacity	Adaptive Management	Public Participation	Rebuilding Strategy Considerations
Option 1a	Lowest impact.	Most flexibility of options.	Opportunities for public comment on strategic changes limited to Council process, and EIS if prepared.	Strategy not clearly defined. Targets relatively easy to change.
Option 1b	Greatest impact.	Least adaptive, unless FMP not amended to update specified parameters.	Opportunity for public comment during FMP amendment process	T_{TARGET} likely management target. Could be changed as part of FMP amendment updating parameter values, if sufficient analysis to support.
Option 1c	Moderate impact because adjustment of strategy part of biennial specifications process.	Very adaptive; harvest rate adjusted to rebuild by target year; opportunity to adjust target, if supported by analysis	Opportunity for public comment through notice and comment rulemaking, in addition to Council process, and EIS if prepared.	Manage to T_{TARGET} but could keep F constant in certain circumstances.
Option 1d	Same as Option 1c	Same as Option 1c	Same as Option 1c. Information in FMP allows public to gauge rebuilding success.	Same as Option 1c. Information in FMP allows tracking of changes in strategy.
Option 2a	Cursory review possible if no major issues.	Easier to respond to changing conditions.	Reviews by advisory bodies, Council subject to public comment.	N/A
Option 2b	Review linked to goals, could require more scrutiny than status quo.	Most adaptive because stock status review tied to need assessment.	Public scrutiny reduced because stock status review less frequent than 2 years.	N/A
Option 2c	Same as Option 2b	Less adaptive than status quo and Option 2b.	Same as Option 2b.	N/A
Option 2d	Less burden if status quo assessments more frequent than 2/4 years.	Least adaptive option.	Least opportunity for public review, except Option 2e	N/A
Option 2e	Least burden on Council, but shifted to NMFS.	Neutral effect.	Least opportunity for public review	N/A

TABLE 2-3. Summary of the direct impacts of the options on the management regime. (Page 1 of 2)

Options	Administrative Capacity	Adaptive Management	Public Participation	Rebuilding Strategy Considerations
Option 3a	Lack of standards could increase burden if process more controversial.	Lack of benchmarks not adaptive.	Process less transparent without standards.	No decision framework for adjusting targets.
Option 3b	Could increase burden if difficult to implement, controversial.	Less flexibility than Option 3d; benchmark "floor" provides flexibility, but could result in abrupt change in OYs.	Benchmark allows public to evaluate rebuilding progress.	Benchmark only relevant in limited circumstances.
Option 3c	More frequent, but smaller adjustments in harvest rate results in burden less or equal to Option 3b.	More adaptive than Option 3b because adjustments more frequent.	Same as Option 3b	Benchmark reached more frequently than Option 3b, but limited use under constant T_{TARGET} strategy.
Option 3d	Likely to increase GMT and SSC workload in comparison to Options 3b and 3c.	More flexible than Options 3c and 3d, adaptiveness depends on development of benchmarks.	If GMT, SSC deliberations not transparent could cause mistrust.	Easier to develop standards consistent with rebuilding strategy.
Option 3e	Adds to work in developing rebuilding plans, but could reduce need for changes later on if generic standards do not match specific stock circumstances.	Most adaptive if pre-specified benchmarks more appropriate than "ad hoc" benchmarks developed under Option 3d	Same as Option 3b, 3c.	Includes all considerations outlined for other Issue 3 options.
Option 4a	Potential future workload greater than Option 4b.	See below.	Opportunity to comment on adoption of ESA provisions in Amendment 16-1.	N/A
Option 4b	Potential future workload less than Option 4a.	Little effect since ESA mandates apply no matter what FMP states.	Opportunity to comment on future amendment to incorporate ESA considerations.	N/A

2.2 Summary of Minor Technical Additions, Corrections and Changes to the FMP

As noted at the beginning of this chapter, various changes will be made to the FMP as part of this amendment that are not substantiative in the sense of affecting fishery management policies, procedures or measures. They are, therefore, categorically excluded from analysis based on the criteria established in Section 6.03.a.3(b)(2) of NAO 216-6, and 40 CFR 1500.4(p), 1508.4 and other sections of CEQ regulations. As noted above, NMFS has prepared a memo to file providing a rationale for this categorical exclusion. These proposed changes are summarized here and documented in Appendix A, which contains the amendatory language.

Goal 1 and Objective 3, related to overfishing and rebuilding are amended to better-reflect the intent of the Magnuson-Stevens Act.

The species list in Section 3.1. of the FMP, species managed by this FMP, is not consistent with the groundfish species list in the annual specification and management measures (FR 67 10490; March 7, 2002) or the list at 50 CFR 660.302. Misspellings are corrected and the following rockfish are specifically identified: chameleon (*Sebastes phillipsi*), dwarf-red (*Sebastes rufianus*), freckled rockfish (*Sebastes lentiginosus*), halfbanded (*Sebastes semicinctus*), pinkrose (*Sebastes simulator*), pygmy (*Sebastes wilsoni*), swordspine (*Sebastes ensifer*), widow (*Sebastes entomelas*), yelloweye (*Sebastes ruberrimus*) yellowmouth (*Sebastes reedi*), and yellowtail (*Sebastes flavidus*).

The terms “maximum fishing mortality threshold” (MFMT) and “minimum stock size threshold” (MSST) are used in the National Standard Guidelines and are intended for use as benchmarks to decide if a stock or stock complex is being overfished or is in an overfished state. The terms used to describe these same thresholds in the FMP are different from those used in the National Standard Guidelines (i.e., MFMT is the same as the F_{MSY} control rule described in the FMP and MSST is the same as the overfished/rebuilding threshold described in the FMP.) To address consistency in terminology, the equivalent terms are defined in Sections 4.1 and 4.4 of the FMP.

The National Standard Guidelines suggest the annual SAFE document contain a description of each stock or stock complex (50 CFR 600.315 (e)(3)). Because the MFMT and MSST are important benchmarks used to determine if overfishing has occurred or if a stock or stock complex is in an overfished state, Section 5.2 of the FMP, will state the SAFE document list the MFMT and MSST for stocks or stock complexes to be listed in SAFE documents. In addition, the last paragraph of Section 5.2 regarding the SAFE document availability and completion schedule is out of date and does not reflect the SAFE document schedule for 2002 and beyond. This language is changed to reflect the current schedule.

Sections 4.2, 4.3.1, and 4.5.1 of the FMP list, summarize and/or reference the F_{MSY} proxies adopted in 1998. The 1998 values are used throughout these sections as examples in the describing F_{MSY} proxies. In spring 2000, the Council’s SSC sponsored a workshop to review the Council’s groundfish exploitation rate policy. For 2001 and beyond, the Council adopted the SSC’s new recommendations for harvest policies of: $F_{40\%}$ for flatfish and whiting, $F_{50\%}$ for rockfish (including thornyheads) and $F_{45\%}$ for other groundfish such as sablefish and lingcod (66 FR 2338, January 11, 2001). The 1998 F_{MSY} proxy values used as examples in the FMP are updated to reflect the Council's current policy.

References to an at-sea observer program in Sections 4.3.1.3, 4.4.2, and 4.6 indicate that no observer program exists from which data are available to upgrade stock assessments and evaluate overfishing. This text is outdated and is updated to reflect the implementation of an at-sea observer program in 2001. Section 6.5.1.2 does not indicate the groundfish observer program is mandatory. The sentence “The Regional Administrator may implement an observer program through a Council-approved federal regulatory framework” is changed to “The Regional Administrator will implement...” to indicate the current observer program is mandatory.

Chapter 4 (Section 4.6 as amended, see Appendix A) discusses Council use of the mixed stock exception for setting OYs. This discussion is revised to make it consistent with the criteria described in the National Standard Guidelines (40 CFR 600.310(d)) for invoking the mixed stock exception.

Although Chapter 5 is entitled "Specification and Apportionment of Harvest Levels," and describes the annual management process, it includes numerous references to the development of rebuilding plans, which will not be on an annual cycle. Additionally, discussion of some topics is spread through numerous sections. Currently, Chapter 4 is a one-page chapter in which optimum yield is discussed in general terms while the considerations and constraints that go into establishing OYs are specified in Chapter 5. A reorganization of Chapters 4 and 5 will (1) place in Chapter 4 all considerations and constraints that go into establishing OYs, including the process and standards for establishing rebuilding plans; (2) place all provisions related to the annual/biennial management process in Chapter 5; and (3) reorganize the sections to construct a more concise document.

The Council may either (1) not approve these changes to the FMP, which would maintain the status quo, or (2) approve any or all of these changes:

(a) Revise the list of species managed under the FMP.
(b) Address differences in the use of the terms MFMT and the minimum stock size threshold (MSST) and the National Standards Guidelines.
(c) Change SAFE document Section 5.2 to include a description of the MFMT and MSST.
(d) Update last paragraph of Section 5.2 regarding the SAFE document availability and completion schedule.
(e) Update Sections 4.2, 4.3.1, and 4.5.1 of the FMP to include the Council adopted the SSC's new recommendations for harvest policies of: $F_{40\%}$ for flatfish and whiting, $F_{50\%}$ for rockfish (including thornyheads) and $F_{45\%}$ for other groundfish such as sablefish and lingcod.
(f) Update the references to an at-sea observer program in Sections 4.3.1.3 , 4.4.2, 4.6, and 6.5.1.2; and
(g) Reorganize Chapters 4 and 5 to produce a more concise document.

3.0 AFFECTED ENVIRONMENT

This chapter describes the affected environment, which is the baseline environmental condition. The baseline represents the status of environmental attributes at a time before the proposed action is implemented, and in Chapter 4 serves as a point of comparison to evaluate possible significant impacts. (The baseline differs from the *Status Quo*, which predicts a future environmental state in the absence of any action alternative.) Because the proposed action is procedural, it will not directly affect the biological or sociological environment. It will affect the management regime in terms of capacity, flexibility and public perceptions. Therefore, the affected environment description in this chapter focuses on these management-related issues. For information on the biological and socioeconomic environment the reader may consult the EIS analyzing the 2003 harvest specifications and management measures for the Pacific Coast groundfish fishery (PFMC 2003). It provides a detailed description of the habitat, species, fisheries and fishing communities, and management issues related to groundfish. In addition, an EIS is being prepared in connection with Amendment 16-2, which evaluates rebuilding plan alternatives for darkblotched rockfish, Pacific ocean perch, canary rockfish and lingcod. It is being prepared concurrently with this EA. Because the rebuilding measures adopted in those rebuilding plans are expected to directly affect the human environment, that EIS describes those resources. This chapter is divided into two main sections describing the management regime, and issues related to the choice of rebuilding strategy. Chapter 4, evaluating the environmental impacts of the alternatives, has a corresponding structure.

3.1 Current Management Regime

The process and standards for adopting rebuilding plans, comprising the proposed action, directly affects the management regime. In Chapter 4 effects to the management regime are evaluated in terms of three issues: administrative capacity, flexibility or adaptive management, and public participation. Baseline information related to these three issues is provided here.

3.1.1 Administrative Capacity

Administrative capacity is a measure of the time available to and productivity of the administrators of the management regime. This can be attributed to each element of the management system: Council members, advisory bodies, Council staff, NMFS staff, and state agency staffs. Capacity is more or less a constant, because the Council meets for defined periods of time and staffs have some total amount of work time. (This assumes no significant expansion in the number of staff.) Because capacity is fixed and administrative capacity fully utilized, the time cost of any management measure actually represents a tradeoff: time spent on one task means less time spent on another. Procedural measures can be assessed in terms of complexity; the more complex the task of implementing and "maintaining" the procedure the more organizational capacity will be required. This means that organizational attention and capacity is shifted away from other tasks that may be equally pressing or important. The allocation of resources among different tasks can have difficult-to-predict indirect effects on the environment if the implementation of management measures are delayed or organizations do not have the opportunity to address broad issues strategically.

NMFS and the states have researchers and professional staff that participate in the formulation of management measures (for example, by conducting the stock assessments used to determine optimum yields). Council advisory bodies, such as the GMT and GAP also play a central role in identifying management targets and measures, and conducting the necessary supporting analyses. All of these personnel may contribute to the preparation of amendment documents. However, the task of preparing the analytical and informational documents required when amending an FMP and promulgating regulations falls mainly on the professional staff employed by the Council and NMFS. (Within NMFS, staff at the NWR are responsible for actions related to the groundfish FMP.) Generally, Council and NWR staffs divide responsibility for preparing of groundfish-related FMP amendment documents, with one or the other office taking the lead. In addition, if a particular action requires the promulgation of regulations, NMFS NWR staff are responsible for preparing these regulations.

The Council has two staff officers working on groundfish, who devote essentially 100% of their time to groundfish-related tasks. (Time spent on FMP/regulatory amendments is limited by a range of other responsibilities, such as staffing workshops and advisory body meetings and preparing briefing materials for

Council meetings.) Two economists carry out economic analysis in support of a range of Council actions, but devote between 35% and 50% of their time to groundfish-related actions. One staff officer ensures that Council processes and documents comply with NEPA-related regulations and also spends about 35% to 50% of his time working on groundfish-related matters. Three other professional staff devote a small amount of time to groundfish-related work, with the primary responsibilities elsewhere.

NMFS NWR has five staff that spend part or all of their time on groundfish-related analysis and regulatory implementation, although not all of their groundfish workload is associated with Council activities. (This excludes fishery scientists working for NMFS who conduct stock assessments and related scientific tasks.) The NWR also has a NEPA coordinator responsible for the development and review of analytical documents and agency NEPA procedures. While Council staff prepare amendment documents (including required environmental and regulatory analyses) and support the Council decision-making process, NMFS staff are responsible for tasks related to the implementation of regulations. They also prepare amendment documents, but are less involved in Council administrative support, for example by staffing Council meetings.

It is very difficult to assess the capacity of these resources, for example in terms of the number of amendments or actions that can be completed in a given time period. In part this is due to the wide variation in the complexity of different management actions and the fact that no one person works full time on a single action; usually several actions are ongoing and other tasks are also part of staff duties. Taking the staff identified above as a whole, at least 20% and possibly as much a third of their time of is directly related to the preparation of the analyses and documentation necessary to implement an amendment or action. (This estimate includes other activities such as rulemaking, including the implementation of seasonal management.) It is also important to note that fishery scientists at NMFS and state agencies carry out much of the analyses supporting management decision-making.

One can also evaluate capacity in terms of the time needed to implement a management action. This also varies tremendously, depending on the nature and complexity of the action. Implementation of periodic or seasonal management has to be completed in a relatively short time period because of the need for fishing regulations to be in place at the beginning of the season. For this reason, a substantial portion of staff resources may be taken up for a relatively short period of time. For example, during the second half of 2002 close to half the staff capacity described above was committed to implementation of groundfish specifications and management measures for 2003. FMP amendments are typically on a more extended schedule, driven in part by Council deliberation and decision-making and also the review requirements within NMFS. Generally speaking, it takes at least six to nine months to implement an FMP amendment, although it is not uncommon for a year or more to elapse because of Council deliberations and the availability of staff to do the work. (This amendment offers a good example. Work began in late 2001 and final approval is expected some time in the latter half of 2003. This extended period is due to the need for the Council to deliberate and the fact that for much of the second half of 2002, most staff time was devoted to implementation of 2003 specifications and management measures.)

A fair assessment would be that Council and NMFS staff have the capacity to complete one or two groundfish FMP amendments per year, if they are of moderate complexity. It should also be noted that a more regulatory amendments—which effect changes in federal regulations as opposed to the FMP—are usually completed in a given time period. NMFS staff bear a larger share of the work needed for these actions than Council staff does. Considering Council and NMFS staffs together, groundfish-related action requiring notice and comment rulemaking requires an equivalent amount of staff capacity.

3.1.2 Adaptive Management

The concept of adaptive management was first developed in the 1970s (Holling 1973) and has been applied widely. Adaptive management assumes uncertainty, promotes “learning” strategies, and envisions a cyclical management process in which management measures are refined in response to new information and understanding of the managed system. A review of adaptive management of Columbia River salmon (Lee and Lawrence 1986) describes it as “a policy framework that recognizes biological uncertainty, while accepting the congressional mandate to proceed on the basis of the ‘best available scientific knowledge.’ An adaptive policy treats the program as a set of experiments designed to test and extend the scientific basis of fish and wildlife management.” Gunderson (1999) argues that flexibility in management institutions and system

resilience are key determinants of adaptive management success. Managing to rebuild overfished species populations is fraught with uncertainty because of the difficulty in predicting future performance. Stock performance depends on the nature of ecosystem resilience. As first described by Holling (1973), resilience may either be interpreted as a return to some "global" equilibrium following perturbation (such as fishing down one population in the system) or in terms of multiple equilibria where future states are unpredictable. For example, the role environmental regimes play in determining recruitment is at best poorly understood, which limits the accuracy of unfished biomass estimates. This limits managers' ability to realistically plan for a future end state of stock recovery. Policy makers may be tempted to replace ecosystem uncertainty with "spurious certitude": "Perhaps the most common solution is to replace the uncertainty of resource issues with the certainty of a process, whether that process is a legal vehicle—such as a new policy, regulation, or lawsuit (Rodger 1997)—or a new institution—such as a technical oversight committee or science advisory committee" (Gunderson 1999, p. 2). Given the long time horizons involved in rebuilding some overfished groundfish populations, uncertainty about future stock performance, and uncertainty about ecosystem performance, a flexible, or adaptive, management regime will be important.

Nyberg (1999) outlines six steps in the adaptive management cycle. (Other authors have posited similar steps (c.f. Olsen 1993).). Rebuilding mandates and the institutional structure of federal fisheries management (including the Council system) provide all the "pieces" to construct these steps: problem identification, program design, implementation, monitoring, evaluation, and adjustment of the management regime, which initiates a new round in the cycle of steps just described. Monitoring and evaluation are the key steps differentiating adaptive management; and flexibility—which makes the regime easier to change in response to new information—is a valuable attribute in these steps. The scenarios presented in this analysis all incorporate procedures to update rebuilding plans, and adjust management measures, in response to new information about overfished stocks. For all scenarios, flexibility of response is constrained by the range of management tools that are both legal and practical. What varies is the procedural complexity entailed in adapting management measures in response to new data. This is a correlate of administrative cost discussed above. More complex procedures will require more administrative resources. (On the other hand, they may force better problem assessment and redesign as part of the adaptive cycle.) Generally, then, flexibility and administrative cost are inversely correlated.

Groundfish management rests on a framework described in the FMP, which allows management targets (OY levels for managed species) to be specified annually, based on regular stock assessments. A range of management measures are then available, which also can be modified annually, in order to constrain fisheries to these targets. (As discussed below, groundfish management is shifting to a two-year cycle.) The adoption of rebuilding plans establish longer term targets for overfished stocks. More generally, the management framework establishes a target biomass, B_{MSY}, and according to the "40-10 rule" even stocks above the overfished threshold but below target biomass are subject to precautionary management. In the rebuilding analyses, the P_{MAX} value is used to determine the fishing mortality rate (F) that is estimated to allow the stock to rebuild to the target given that probability and T_{TARGET} defined as the median rebuilding year. This F is then applied to current estimates of stock size to arrive at its OY or current-year management target. This process allows adaptive management over the longer term because annual targets are tied to a probability-based measure of stock recovery.

The management process is subdivided into two components: developing scientific information and making management recommendations. Stock assessments (and rebuilding analyses) are science driven. They arrive at an estimate of a sustainable yield for a stock (OY) within the management framework. Because of scientific uncertainty, stock assessment results may be presented as a range of values, providing policymakers with an implicit or explicit (as in the case of rebuilding analyses) tradeoff between risk and short-term benefits. The results of this scientifically driven part of the process are then used by the Council in their policymaking capacity. In addition to risk/benefit tradeoffs, the Council also considers the allocation of fishing opportunity and formulates the management measures intended to achieve scientifically-determined targets. The next three subsections describe stock assessments, rebuilding analyses, and Council decision-making.

3.1.2.1 The Stock Assessment Process

Stock assessments for Pacific Coast groundfish are generally conducted by staff scientists of California Department of Fish and Game, Oregon Department of Fish and Wildlife, Washington Department of Fish and

Wildlife, Oregon State University, University of Washington, and the NMFS Southwest, Northwest, and Alaska Fisheries Science Centers. These assessments describe the condition or status of a particular stock and report on its health. This allows biologically sustainable harvest levels to be forecast; scientists can then make management recommendations to maintain or restore the stock. If a stock is determined to be overfished (less than 25% of its unfished biomass), a rebuilding analysis and a rebuilding plan are developed.

For more than 20 years, groundfish assessments have primarily been concentrated on important commercial and recreational species. These species account for most of the historical catch and have been the targets of fishery monitoring and resource survey programs that provide basic information for quantitative stock assessments. However, not all groundfish assessments use the same level of information and precision.

Quantitative and nonquantitative assessments are used for groundfish stocks. For stocks that are assessed quantitatively, scientists use life history data to build a biologically realistic model of the fish stock for these stock assessments; they then calibrate the model so that it reproduces the observed fishery and survey data as closely as possible. Recently similar, but more powerful, models using state-of- the-art software tools have been developed. Assessment models and results are independently reviewed by the Council's Stock Assessment Review (STAR) Panels. It is the responsibility of the STAR Panels to review draft stock assessment documents and relevant information to determine if they use the available scientific data effectively to provide an accurate assessment of the condition of the stock. In addition, the STAR Panels review the assessment documents to ensure that they are sufficiently complete and the research needed to improve assessments in the future is identified. The STAR process is a key element in an overall process designed to make timely use of new fishery and survey data, to analyze and understand these data as completely as possible, to provide opportunity for public comment, and to assure the assessment results are as accurate and error-free as possible.

Following review of assessment models by the STAR Panels, and subsequently the GMT and SSC, the GMT uses the reviewed assessments to recommend preliminary ABCs and OYs to the Council. The SSC comments on the STAR review results and the GMT recommendations. Biomass estimates from an assessment may be for a single year or an the average of the current and several future years. In general, an ABC will be calculated by applying the appropriate harvest policy (MSY proxy) to the best estimate of current biomass. ABCs based on quantitative assessments remain in effect until revised by either a full or partial assessment.

Full assessments provide information on the abundance of the stock relative to historical and target levels, and provide information on current potential yield. Scientists conduct partial assessments when they do not have enough data for a full assessment. Even full assessments can vary widely in reliability because of the amount of data available for modeling. Council-affiliated scientists conduct several assessments each year. Individual stocks may be periodically reassessed as often as every year—currently only the case for Pacific whiting—to every two to four years. However, because of limits on scientific staff and data availability, some species have been assessed only once.

Stocks with ABCs set by non-quantitative assessments typically do not have a recent, quantitative assessment, but there may be a previous assessment or some indicators of the status of the stock. Detailed biological information is not routinely available for these stocks, and ABC levels have typically been established on the basis of average historical landings. Typically, the spawning biomass, level of recruitment, or the current fishing mortality rates are unknown.

Many species have never been assessed and lack the data necessary to conduct even a qualitative assessment, such as a general indication in biomass trend. ABC values have been established for only about 26 stocks. The remaining species are incidentally landed and usually are not listed separately on fish landing receipts. Information from fishery-independent surveys are often lacking for these stocks, because of their low abundance or invulnerability to survey sampling gear. Precautionary measures continue to be taken when setting harvest levels (the OYs) for species that have no or only rudimentary assessments. Since implementation of the 2000 specifications, ABCs have been reduced by 25% to set OYs for species with less rigorous stock assessments, and by 50% to set OYs for those species with no stock assessment. At-sea observer data will be available for use in the near future to upgrade the assessment capability or evaluate overfishing potential of these stocks.

3.1.2.2 Rebuilding Analyses

In the case of overfished species, stock assessment results form the basis of a rebuilding analysis, which in turn is used to develop rebuilding policies and choose the rebuilding target identified in each rebuilding plan. The elements of rebuilding analyses are described in the SSC Terms of Reference for Rebuilding Analyses (SSC 2001). This guidance has been incorporated into a computer program for conducting rebuilding analyses (Punt 2002b). In the analysis the probability the overfished stock will reach the target biomass defining a rebuilt stock (B_{MSY} or $B_{40\%}$) is determined in the absence of fishing (T_{MIN}) and the maximum permissible rebuilding time under National Standard Guidelines (T_{MAX}). The target rebuilding year (T_{TARGET}) is determined based on these limits and the probability of achieving the target biomass by T_{MAX} (denoted P_{MAX}). Probability statements are an estimate that something may happen (in this case, that stocks will reach a given size in a specified time period) and thus also the level of risk associated with a given action. When interpreting rebuilding analyses it is important to understand how probability statements are derived, distinguish the basic policy choice from those parameters determined by national policy, identify different sources of uncertainty, and appreciate that even "fixed" values can change as the system (or fish stock)—and our understanding of it—change over time.

The rebuilding analysis program uses "Monte Carlo simulation" to derive a probability estimate for a given rebuilding strategy. This method projects population growth many times in separate simulations. It accounts for one source of uncertainty about future stock status by randomly choosing the value of a key variable—in this case total recruitment or recruits per spawner—from a range of values. These values can be specified empirically, by listing some set of historical values, or by a relationship based on a model. The SSC recommends the rebuilding analyses use historical values. Because of this variability in a key input value, each individual simulation, or "case," will show a different pattern of population growth. As a result, a modeled population may reach the target biomass in a different year in each of the cases in the Monte Carlo simulation. Figures 3-1 shows the results of five such cases from a hypothetical rebuilding analysis. (The values do not represent any of the actually overfished species.) The horizontal line at 0.4 represents target biomass. It can be seen that population increases steadily in each case, but at a different rate because of differences in the number of recruits in each future year for each case. Case #1 reaches the target biomass soonest, in 2025, while case #5 takes the longest, reaching the target in 2048.

The number of cases that reach the target biomass in any year can be computed and these values cumulated, or successively added together, starting with the first year set for the simulation and running out to some maximum number of years (which could be the case in which the population took the longest time to reach the target biomass or a predetermined maximum value). This cumulative probability shows the number of cases that have reached the target biomass in all the years up to and including the specified year, which is also an estimate of the probability the stock will rebuild by that year.

Figure 3-2 illustrates this concept of cumulative probability. The percent of simulations reaching the target biomass in each year, for some specified fishing mortality rate, is represented by the vertical bars. The five cases shown in the previous figure are plotted along with the other 995 cases that are part of this Monte Carlo simulation. The years in which the five cases in the previous figure reached the target biomass are highlighted in this figure. Case #3, for example, along with 26 other cases (that weren't plotted in the first figure), make up the bar tallying the number of cases rebuilt in 2032. The ascending solid line sums simulations that have reached the target biomass in any of the preceding years, even if biomass declines below the target in subsequent years. This ascending line represents the rebuilding probability. (It is important to note the calculated cumulative probability includes cases reaching the target biomass in any previous year. Species with highly variable recruitment may achieve the target biomass and subsequently fall below it, even in the absence of fishing. If these cases were excluded, the probability of recovery in any given year would likely be lower, depending on species being modeled.)

This technique can be used first to calculate T_{MIN} in probabilistic terms, which is defined as the time needed to reach the target biomass in the absence of fishing with a 50% probability. (It may be said that the 50% value represents "even odds"; it is equally likely the stock has rebuilt or not rebuilt in this year. In all other years it is either more or less likely the stock has rebuilt.) Thus, in a Monte Carlo simulation with 1,000 cases where the fishing mortality rate (F) is set to 0, the number of cases reaching the target biomass in a given year can be cumulated. In Figure 3-3 T_{MIN} is determined by finding the year in which this cumulative value equals

500 (or 50%). In other words, in half the simulations the target biomass was reached in some year up to and including the computed T_{MIN}. Given T_{MIN}, and assuming that it is greater than or equal to ten years (as is the case with most of the overfished groundfish stocks), T_{MAX} is computed by adding the value of one mean generation time. Figure 3-3 shows a T_{MIN} of 15 years (or 2014 if the stock were declared overfished in 1999). A mean generation time of 17 years is added to compute T_{MAX}.

After determining T_{MAX}, multiple Monte Carlo simulations are conducted, varying the fishing mortality rate. This determines the relationship between F and the probability of the stock being rebuilt by T_{MAX}, which is P_{MAX}. Figure 3-4 displays the results of three hypothetical simulations for fishing mortality rates resulting in P_{MAX} values of 90%, 70% and 50% (the minimum permissible rebuilding probability). Since a higher P_{MAX} probability must be achieved by lowering the fishing mortality rate (other things being equal) there is a tradeoff between fishery harvests and rebuilding speed in probabilistic terms. As we reduce fishing, the likelihood the stock will recover in this maximum time period increases.

Once probability distributions have been computed, like those plotted in Figure 3-4, a corresponding T_{TARGET} can be determined for distributions representing different harvest rates (F) and corresponding P_{MAX} values. T_{TARGET} is defined as the median year in each probability distribution, which is simply the year by which half of all cases have already rebuilt, and is unique for a given F and P_{MAX}. Figure 3-4 shows how this is computed for the three plotted fishing mortality rates and corresponding P_{MAX} probabilities. As expected, if we apply the lowest of the three plotted fishing mortality rates (in other words, limit fishing the most), the stock will rebuild the fastest (or more accurately, has the highest probability of rebuilding by T_{MAX}). The target year for the lowest fishing mortality is 25 years. (To determine the actual target year, we add this value to the year in which the stock was declared overfished. Continuing with the example above, if the stock was declared overfished in 1999, then the target year is 2024.) Not surprisingly, this strategy also results in the highest P_{MAX}, equal to 90%. The fishing mortality rate associated with the 70% P_{MAX} value gives a later target year: 2028. Finally, T_{TARGET} equals T_{MAX} for the highest allowable fishing since the P_{MAX} value—50%—is the same probability used to determine T_{TARGET}.

From a policymaking standpoint, the essential tradeoff is between a given level of fishing mortality and the probability the stock will be rebuilt within the maximum permissible time period (P_{MAX}), and the related target year. Although computationally there is a prescribed relationship, with P_{MAX} as an input value, policymakers may wish to base their decisions on F, as expressed in the harvest control rule or simply choose a given target year and determine from it the associated P_{MAX} and F. Figure 3-5, taken from the canary rockfish rebuilding analysis, illustrates this tradeoff. It shows the relationship between any OY level in the current year, P_{MAX} and T_{TARGET}.

As the preceding discussion suggests, probability statements about T_{MAX} tell us the likelihood of an outcome based on our understanding of a fish stock and our ability to model how that stock will grow over time. Since our understanding of these population characteristics is imperfect, some sources of uncertainty are not captured in the aforementioned probability statements. First, inputs to the rebuilding analysis are to a greater or lesser degree best estimates of true values. This applies to basic biological parameters, such as fecundity, that are used to model population growth. Population projections also depend on an estimate of the size and age structure of the modeled stock at the outset of the projected time period, derived from the most recent stock assessment. Similarly, the biomass target ($B_{40\%}$) requires an estimate of the equilibrium population size that would be reached in the absence of fishing (see below). In all these cases the best estimate may not coincide with the true value. The Monte Carlo simulation used in the rebuilding analyses only considers uncertainty about future recruitment, so inaccuracy in the estimation of both species and stock-specific variables will not be captured in resulting probability statements. Finally, there is some uncertainty (or variability) inherent to the Monte Carlo simulation because any one simulation will not include all possible outcomes (or cases). This variability can be assessed by performing several simulations and measuring the variation in the output value (fishing mortality for a given T_{MAX} probability) among these simulations (Punt

2002a). This type of assessment can be used to establish a range around a point estimate (the mean value) expressing the likelihood the true value falls within that range.[8/]

New information may result in new estimates of biological and stock parameters, and assessed uncertainty in the Monte Carlo simulation tells us something about the range of possible outcomes. But rebuilding trajectories will also change over time with new stock assessments and as historical data (such as total catch estimates for past years) replace projected values. The time limits and target—T_{MIN}, T_{MAX}, and T_{TARGET}—fall along a time scale that begins when the stock is declared overfished (y_{DECL}).[9/] Because the rebuilding analysis is usually conducted from one to several years after y_{DECL}, a more recent stock assessment may allow population growth to be projected from the most recent year for which stock structure data (such as mortality, weight, and number of animals for each age class in the population) are available. In subsequent analyses (conducted as new stock assessment data become available), the pool of historical recruitment values will likely differ (with addition of the most recent years' data) and the there will be fewer years for which population growth is projected. (This assumes that T_{MAX} is not re-computed because, for example, changes in stock structure produce a different value for mean generation time.) It is highly likely the new analysis will suggest a different level of fishing mortality to achieve the same P_{MAX} and by extension T_{TARGET}. Conversely, if the policymaker wishes to continue with the same harvest policy—a given fishing mortality rate for example—P_{MAX} and T_{TARGET} would likely be different in the new analysis.

Estimation of Unfished Biomass

Target biomass is directly related to B_0, or unfished biomass. (It is expressed as a percentage of this value.) Target biomass in turn affects the rebuilding trajectory described by T_{MIN}, T_{MAX}, and T_{TARGET}. B_0 is rarely known absolutely; instead, it is calculated based on the relationship between the number of spawning fish and resulting recruits to the fishable population. Modelers choose a time period for which data are available and fishing effort has been at a stable and relatively moderate level. However, biologists are not sure of how important environmental conditions are to survival and growth, versus spawning population size. (A hypothesis favoring spawning population size as the determinant of recruitment is called a "density dependent" spawner to recruitment relationship. For groundfish this relationship is believed to be positive: a larger spawning population results in greater total recruitment.) These considerations complicate the choice of the time period used as basis for unfished biomass computations. For Pacific Coast groundfish these two factors have historically had potentially confounding effects. A large-scale regime shift began in 1977; many scientists believe that generally warmer water produced less favorable conditions for groundfish (Hare and Mantua 2000). The period after 1977 also saw a decline in groundfish populations due to increased fishing effort. If an environmental explanation is favored, one would choose a long time series that encompassed recruitment both before and after 1977 in order to account for the impact of the environmental change. However, this will result in a relatively lower value for B_0 than only using recruitment values before 1977 when biomass and recruitment were closer to an unfished state. The SSC also discussed a third approach in its Terms of Reference (SSC 2001), using spawner-recruit models instead of relying solely on empirical data. These models are problematic because they mathematically presuppose a certain spawner-recruit relationship. The overfished species being modeled may not exhibit this relationship because of its particular biology and ecology. The SSC recommended determining B_0 based on the density-dependent hypothesis and, therefore,

8/ These assessments demonstrates three important points. First, different modeled species will produce different degrees of variability when comparing Monte Carlo simulations because of the underlying variability in the input recruitment data. Second, for a given species and P_{MAX} increasing the number of cases in a simulations decreases uncertainty (or relative variability). But this decrease is not constant; increasing the number of cases in a simulation beyond a certain number produces diminishing returns in terms of reducing uncertainty. Finally, for a given species and number of cases in the Monte Carol simulation, choosing a lower P_{MAX} increases certainty (by decreasing the range of possibly "correct" values for fishing mortality, or OY).

9/ National Standard guidelines identify the initial rebuilding year, for the purpose of calculating targets, as the year in which rebuilding measures were first implemented. For overfished Pacific groundfish this would be the year in which interim rebuilding plan measures were implemented as part of the annual management process. In most cases this was the either y_{DECL} or the following year.

using earlier data (resulting in relatively large values for B_0). Although, as discussed above, the determination of B_0 is not a policy choice, its value does influence policy choices since other parameters, such as target biomass, are defined in relation to B_0.

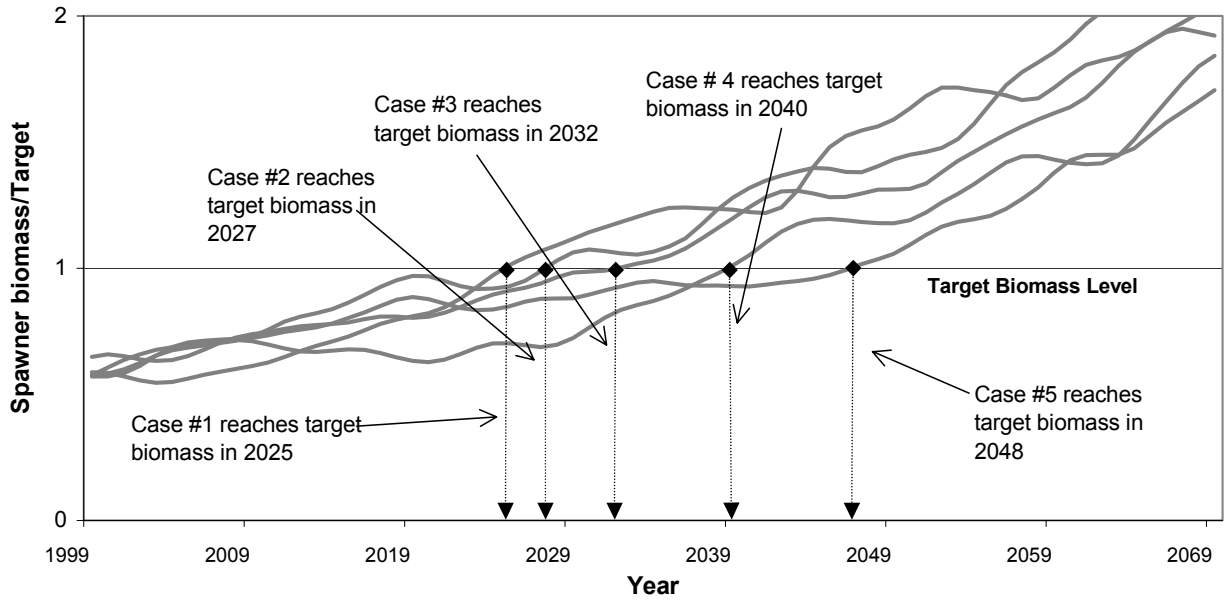

FIGURE 3-1. Example of five cases from a Monte Carlo simulation.

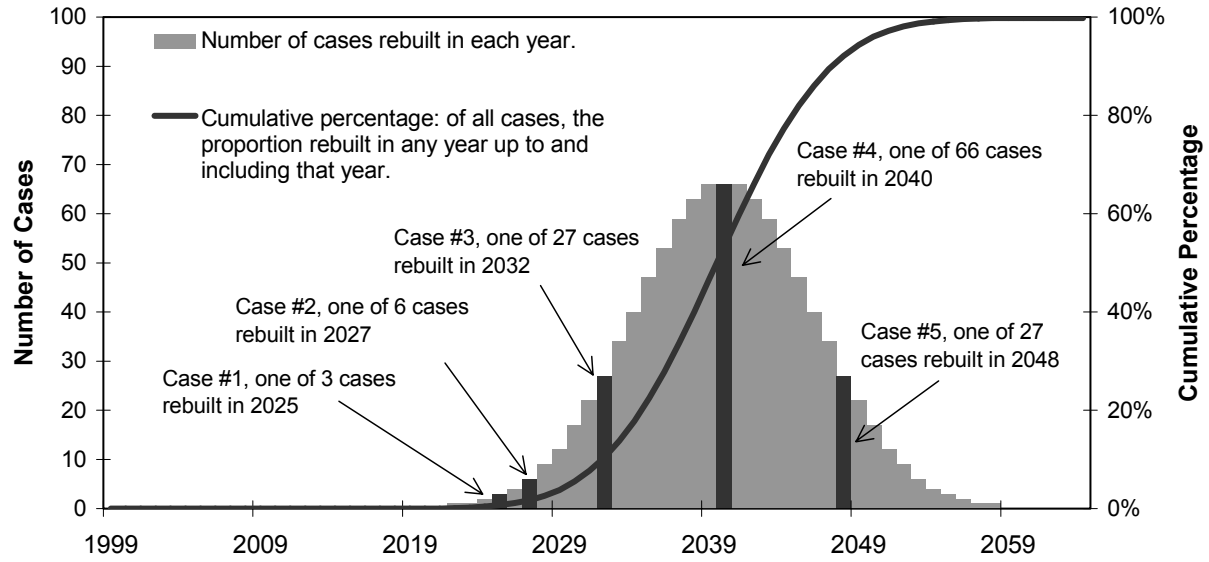

FIGURE 3-2. How cumulative probability is calculated in a Monte Carlo simulation.

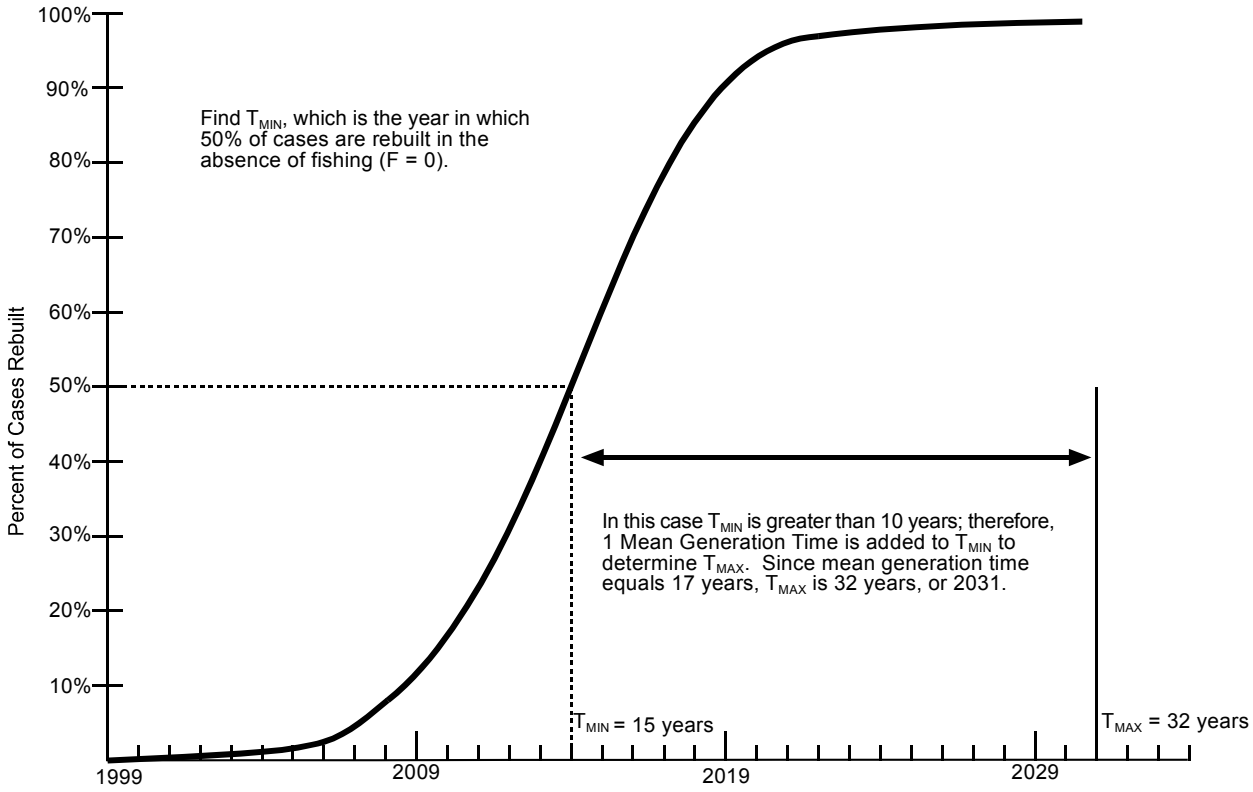

FIGURE 3-3. Calculation of the minimum rebuilding time, T_{MIN}.

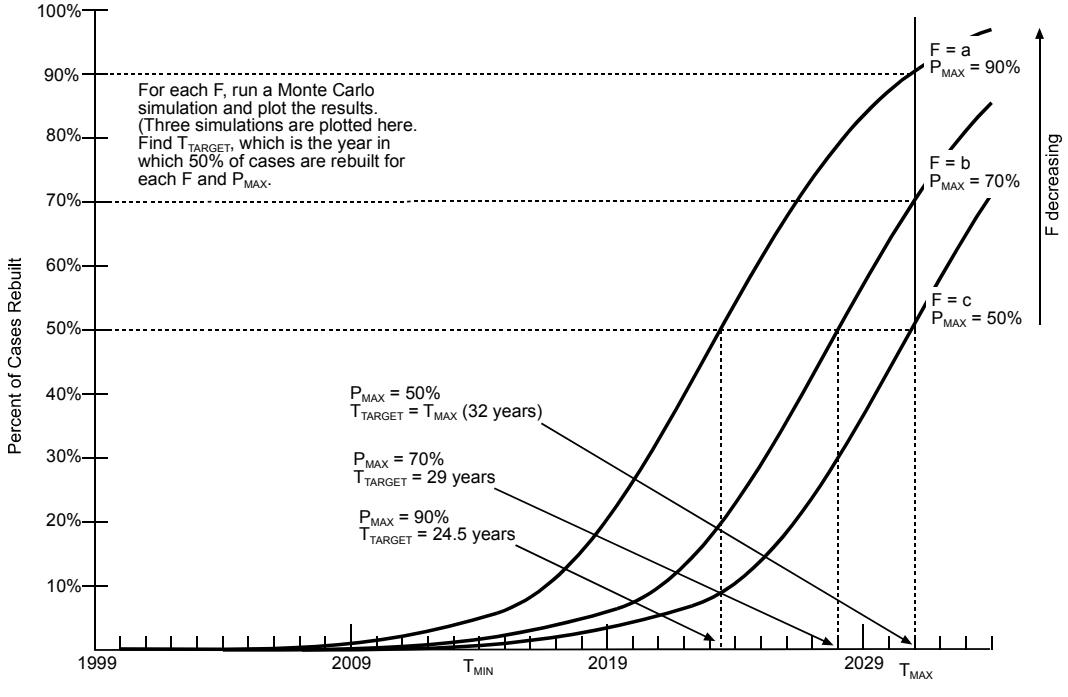

FIGURE 3-4. Computation of the rebuilding probability (P_{MAX}) and the median rebuilding year (T_{TARGET}).

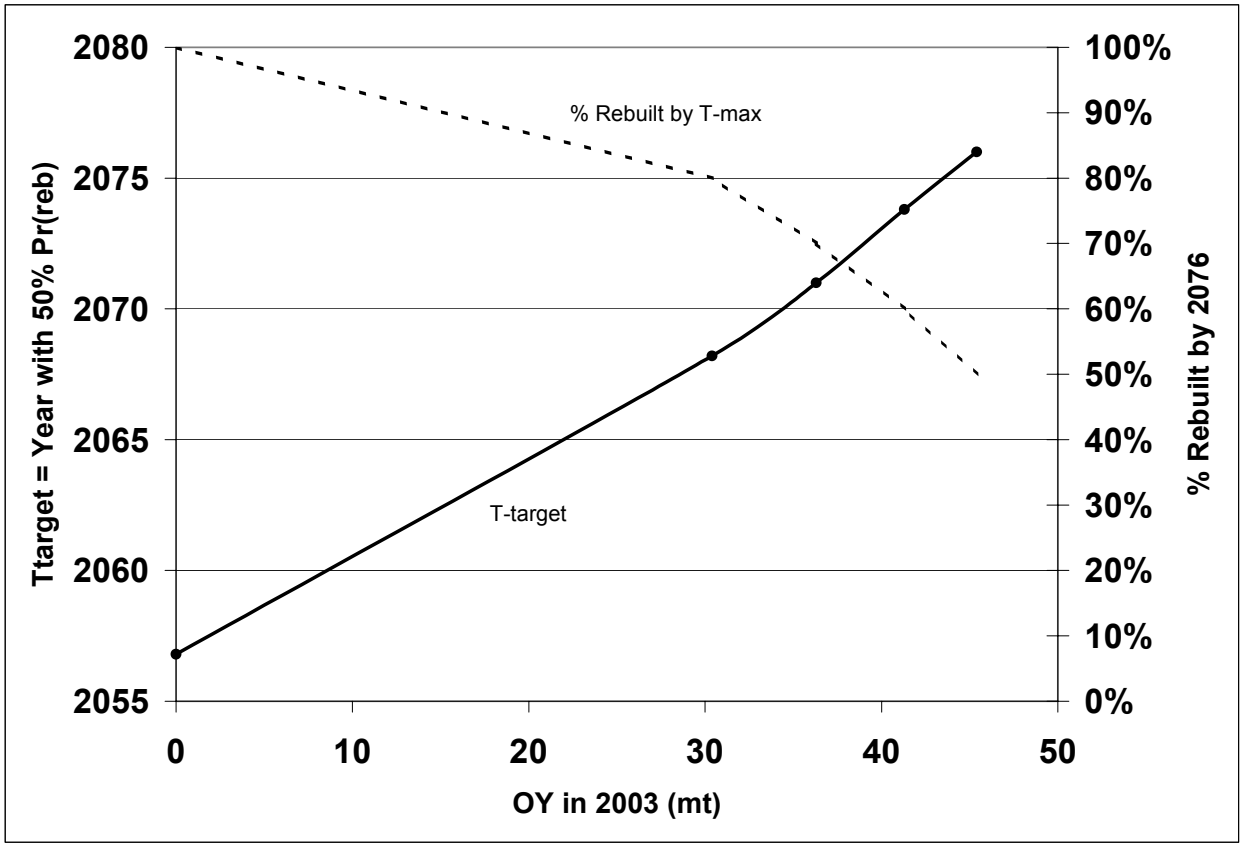

FIGURE 3-5. Tradeoff between OY in 2003, T_{TARGET} and T_{MAX} from the canary rockfish rebuilding analysis (Methot and Piner 2002).

3.1.2.3 Council Decision-making

Periodic Management

Groundfish management is mainly implemented through a framework in the FMP, which allows the Council to recommend new fishing regulations, as long as these measures fall within the range of the principles and policies described in the FMP. Section 6.2 in the groundfish FMP also describes different procedures for establishing and adjusting management measures. To date, this type of "seasonal" management has been implemented through regulations promulgated annually, covering a fishing year, which corresponds to the calendar year. This process requires at least two Council meetings followed by notice and comment rulemaking. Notice and comment rulemaking requires publication of a proposed rule in the *Federal Register* commencing a 30-day public comment period, followed by publication of the final rule, with any modifications stemming from public comment. Once this process is completed, regulations may come into effect. To change rebuilding measures incorporated into regulations this full rulemaking process would be followed. Other actions, such as inseason management changes, may be implemented through more abbreviated processes. But under the options outlined under Issue 1 in this EA (see Section 2.1.1), these procedures would not be applicable to rebuilding measures. As noted in Chapter 2, the same notice and comment rulemaking process used to implement periodic management could be used to change the rebuilding strategy and implement rebuilding measures.

In November 2002, the Council approved Amendment 17 to the groundfish FMP, changing the process for developing groundfish specifications and management measures so that measures could be established for two years, rather than one year. This will provide more time for the Council and NMFS to work on other critical groundfish issues. This schedule also allows enough time for NMFS to publish a proposed rule in the *Federal Register* and take public comment before its final decision on whether to approve the Council recommendations. Because of limited amount of time between a final Council decision and the beginning of the new fishing year, and a lawsuit requiring NMFS to use notice and comment rulemaking, the agency had to implement an emergency rule for the first two months of 2003. This allowed the fishing season to commence while comment continued on the final rule for the rest of the fishing season (March-December). Promulgating both rules results in a procedurally complex and administratively burdensome process. The difficulty of an annual process is compounded by the fishing industry's strong desire the fishing season correspond to the full calendar year in order to assure consistent supply to processors and markets. As management becomes more complex, there is not enough time in a one-year cycle to complete all of the required components, starting with completed stock assessments and ending with annual regulations. In recent years management measures (primarily bag limits and seasons) have also been applied to recreational fisheries, adding to this complexity.

The Council's preferred alternative for Amendment 17 (subject to approval by the Secretary) would establish a biennial management cycle for groundfish, beginning with the 2005-2006 fishing years. Under this alternative, a three Council meeting (November-March/April-June) process would be used to prepare biennial management measures. OY values for managed species would be established for each fishing year during this two-year management period. That is, two one-year OYs would be specified for each managed species.

To ensure the Council could respond to significant changes in a fishery, the Council also included in Amendment 17 a process for reviewing fishing levels during the multi-year management period to ensure sufficiently conservative harvest levels in order to protect and rebuild overfished species. These checkpoints would consider whether new science or assessment information should be used to alter harvest levels. The Council asked the GMT (in consultation with the SSC and GAP) to develop thresholds for determining whether mid-process changes are necessary.

FMP Amendments

Annual management allows adaptation to short-term changes in the status of stocks and the fisheries exploiting them (tied to long-term targets in the case of stocks below the target biomass). Broader changes to the management regime require FMP amendments. (Regulations also may be amended to effect such a change. Generally speaking, the FMP governs the management regime while regulations specify public conduct—in this case, what fishermen may or may not do.) Council Operating Procedure 11 describes the

process for amending the FMP (PFMC 2000). An issue identified by advisory bodies or the public is taken up at the first meeting where the need for action is considered along with possible alternatives. A draft amendment package is then prepared for Council review at a second meeting. During this meeting the Council selects a preferred alternative, if possible, and adopts the draft amendment for public review. Staff then prepare a final draft amendment, which is made available for public comment. Public hearings are held during a third Council meeting and the Council adopts the final amendment for implementation by the Secretary. After the third meeting, Council staff make any needed non-substantive additions and changes and transmit the document to NMFS for review. The Secretary may then disapprove, approve or partially approve the amendment. If disapproved or partially approved, the Council may revise the proposal, addressing concerns raised by the Secretary, and resubmit the amendment. Given this process, aside from any staff time needed to prepare the analyses and supporting documentation, Council decision-making can take six to eight months. This is the minimum time within which three meetings could occur given the Council meeting schedule (bearing in mind that groundfish issues are usually kept off the agenda during the Council's March meeting). For example, about six month would elapse if initial consideration occurred at the April meeting, then the June and September meetings were used to complete the process. Of course, the Council may not be able to consider an action during three successive meetings because of the total time available for the meeting agenda or because requisite document drafts are incomplete. This would lengthen the schedule still further. Additional time is also needed after the Council's final decision to prepare the NEPA document submitted to NMFS to start the agency review process, which results in implementation if the amendment is approved.

3.1.3 Public Participation

An often-cited work on citizen participation (Arnstein 1969) proposes an eight-rung “ladder of participation” (see Figure 3-6). The lowest two rungs represent nonparticipation; public involvement is a means for the organization to persuade or manipulate the public. The next three rungs represent different levels of “tokenism”; an organization may offer opportunities for the public to comment, or express their views on a decision, but there is no guarantee their concerns will be heeded by decision-makers. The last three rungs represent successively higher degrees of true citizen power, to the degree that they have either delegated decision-making authority or actual control over the process. The Council process lies somewhere on the upper rungs of what Arnstein labels tokenism or at the lowest rung of citizen power, labeled partnership (citizens can negotiate with power-holders but do not have ultimate authority). It is also worth mentioning the large body of literature on common property resource institutions (see Ostrom *et al.* 2002 for a recent review), if for no other reason than Arnstein's typology begs the question of what constitutes the potentially enfranchised public. This literature is concerned with arrangements for controlling access to and use of resources that are not privately held. From this perspective “citizen involvement” may be cast in terms of such arrangements and correlated institutions. Fishers—those directly exploiting the resource either commercially or recreationally—tend to be more active in the Council process because of their activities may be directly affected. The broader public, represented to some degree by different environmental groups, have a more diffuse interest in the marine ecosystem and the array of nonextractive or nonmonetary benefits derived from it.

The Council process offers range of forums for public participation, related to Arnstein's ladder of participation. Council members membership is meant to represent a range of stakeholders (although some argue that representation is insufficiently diverse). The GAP reflects the perceptions and opinions of representatives of industry, recreationalists and other constituents on the committee; consensus statements from this body can directly influence Council members’ decisions. (Technical bodies, such as the GMT and SSC similarly promote consensus on scientific issues.) Meetings of these bodies are open to the public, allowing limited participation by nonmembers and, at a minimum, public scrutiny of discussion and decisions. Comments from the public at large, through letters to the Council in advance of meetings and during comment periods at meetings can be collectively influential. The public also has the chance to lobby members of advisory bodies and the Council during meetings, but outside established, formal public comment periods. Once the Council passes on its decisions to NMFS, as recommendations, there are opportunities for the submission of written comments during the rulemaking process. The most visible, and formalized, venues for public participation through commenting are associated with decision-making (either by the Council or NMFS). More complex decision processes (for example, involving multiple stages of review and revision by advisory bodies and the Council) generally afford more opportunity for public comment.

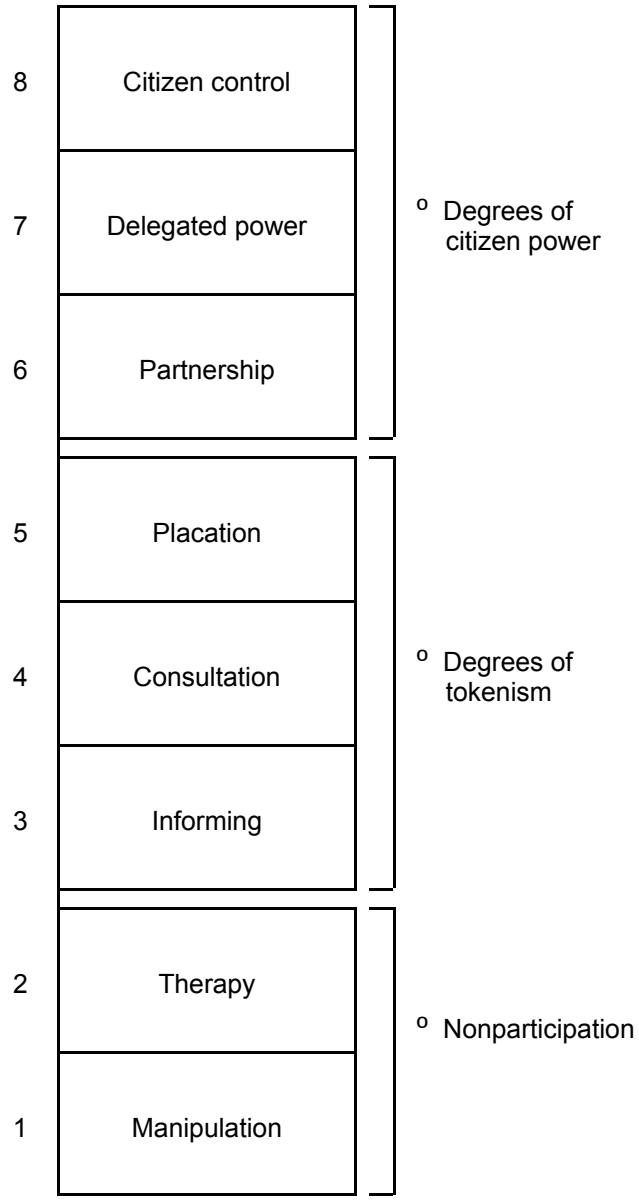

FIGURE 3-6. Levels of citizen participation (Arnstein 1969, p. 217).

Trust is an important corollary of public participation that can play out in a variety of ways. Interest groups and stakeholders who believe they have some influence over decisions are likely to put greater trust in the process. By reducing conflict, influence can stem controversy. (It should be emphasized that in the policy arena conflict and controversy are not necessarily bad things. They force more careful consideration of an issue from different perspectives. This may result in more equitable decisions.) On the other hand, those groups who believe themselves lacking in influence will seek greater transparency and certitude. Transparency allows the public to determine what factors (especially those that are explicitly "political") influence decision-making. Certitude reassures those with less influence that decisions are constrained by explicit rules limiting their scope. Constraints may be external—imposed by legal requirements for example—or self-imposed so that a course of action is fully or permanently determined. As implied in the previous discussion of adaptive management, this type of certitude can be an institutional response to uncertainty, and one that runs counter to adaptive response. This is especially the case if interest groups see uncertainty as a means for specific groups with opposing interests to unduly influence decision-making. This may be an important factor in relation to rebuilding measures because of the high degree of uncertainty about stock status in the future. Uncertainty could be seen to enlarge the range of potentially defensible decisions.

Similarly, invoking adaptative strategies might be seen as an opportunity to accommodate a given set of interests. This aspect of participation, as it relates to controversy, is also evaluated by assessing "certitude," or the degree to which decisions are constrained by established policies. (These are constraints over and above those established by the Magnuson-Stevens Act and National Standard Guidelines.) This characteristic will also tend to vary inversely with flexibility (adaptability).

3.2 Evaluation of Rebuilding Strategies

As discussed in Chapter 2 and section 3.1.2.2, the different parameters used to characterize rebuilding can be assigned to different categories. First, there are biological parameters that describe the underlying characteristics of the stock. Unfished biomass, and by extension the target biomass, and mean generation time fall into this category. Second, there are the two limits—T_{MIN} and T_{MAX}—established by national policy, which denote the minimum possible and maximum allowable rebuilding times. None of these parameters represent a policy choice available to the Council. Finally, there are the strategic parameters, which, along with any adopted management measures, represent a rebuilding strategy. These parameters are F (or a specified harvest control rule), P_{MAX} and T_{TARGET}. As discussed in Chapter 2, the Council may choose any one of these three values as the basis for their rebuilding strategy, although T_{TARGET} needs to be specified in order to comply with language in the Magnuson-Stevens Act. At the request of Council staff, Dr. Andre Punt of the University of Washington School of Fisheries and Aquatic Sciences simulated results of holding any one of these values constant (i.e., using it as the basis for the management strategy) as new stock assessments add new information about recruitment.

The simulation assumes that stock assessment scientists have perfect information about the current age-structure of the population, historical spawning biomass (including the unfished spawning biomass), and historical recruitment. Thus, biological and national policy parameters do not change. Although this is unlikely to be the case, it allows the analysis to focus on the tradeoffs of using different strategic parameters. The simulations assume, however, the stock assessment scientists do not know the stock-recruitment relationship (and hence future recruitment), and must therefore predict future recruitment by assuming the ratio of the number of recruits to spawning biomass size is a constant value. Put another way, there is a true relationship between population size and structure and recruitment, but scientists do not know the parameters for this relationship. Instead, stock assessment scientists use a model representing their current (and incomplete) understanding of the truth.

New recruitment values are added to the projection every three years, mimicking the availability of new estimates from a typical stock assessment cycle (which in reality can vary between two and four years for groundfish). For the simulations where it is held constant, P_{MAX} is set at arbitrarily at 60%. T_{TARGET}—the median rebuilding year for this P_{MAX}—is calculated to be 86 years. (The simulation begins in year 44 of a rebuilding period with a T_{MAX} of 91 years). The F calculated for the initial three years of the simulated period is used to simulate a constant F strategy. In order words, the calculations are based on setting P_{MAX}, T_{TARGET} or F when the first rebuilding analysis is done and not changing the specified value thereafter.

3.2.1 A Constant F Versus Constant T_{TARGET} Strategy

Figures 3-7 through 3-9 display the results of these simulations. Figure 3-7 displays projected population growth under each strategy. Figures 3-8a and 3-8b show the effects of the different strategies on OY and F, respectively. Figures 3-9a and 3-9b show the effects of the different strategies on T_{TARGET} and P_{MAX}. Looking at all of the figures it can be seen that no matter what parameter is held constant the relationship between P_{MAX} and T_{TARGET} does not differ by much. This is reflected in the fact the lines representing these two parameters (dashed or dot-dashed) substantially overlap. In terms of rebuilding strategy, therefore, the essential tradeoff is between managing to a constant F (putting strategic emphasis on the harvest control rule) or T_{TARGET} (as determined for a given P_{MAX}). As seen in Figure 3-7, holding F constant, based on stock condition at the outset of the simulated period, results in faster rebuilding to the target biomass. Larger increments of the population are not removed by fishing as it reaches the target size; as a result, in this simulation at least, the population reaches its target size well before T_{MAX} and continues growing. A constant T_{TARGET} strategy allows F to increase as population approaches the target biomass, based on the 60% probability of achieving it within 91 years (T_{MAX}).

Figure 3-7a shows the effect on annual OYs. Under a constant T_{TARGET} strategy larger biomass increments are removed as the population increases, resulting in the steady increase in OYs seen in Figure 3-8a. OYs are also more variable since F is adjusted up or down in response to changes in recruitment. Figure 3-8b is similar, displaying the change in F, rather than OYs. The horizontal solid line in this figure represents the value of F under a constant F strategy. (By definition, a constant value results in a horizontal line.) A T_{TARGET} (or P_{MAX}) strategy allows F to increase so that a larger fraction of the stock is taken, resulting in decreasing population growth rates as the biomass target nears. The stair-step appearance of F under a constant T_{TARGET} (or P_{MAX}) strategy in this figure simply reflects the fact the same newly computed F is applied during each year in each successive three-year period after a stock assessment. In both figures it can be seen that F, and the resulting OY, have to be adjusted downward after some assessments due to modeled variability in recruitment.

Figures 3-9a and 3-9b show the same relationships in terms of T_{TARGET} and P_{MAX} respectively. In Figure 3-9a the solid line shows the estimate of the target year is successively lowered under a constant F strategy. Estimates of T_{TARGET} under a constant P_{MAX} strategy differ little from the initially computed value. In Figure 3-9b the solid line simply shows that under a constant F strategy P_{MAX} rapidly reaches 100%, because the target biomass is reached much sooner. Again, the relationship between P_{MAX} and T_{TARGET} (represented by the difference between the dot-dashed and dashed lines) varies only slightly due to modifications in recruitment values used in the projections.

In summary, assuming perfect information, there is no scientific basis for favoring one rebuilding strategy over the other. However, they have different implications from a policy perspective. A constant F strategy results in faster rebuilding and more stable OYs year to year. But over time these OYs remain lower than under a constant T_{TARGET} strategy, at least until the stock reaches its target biomass when the MSY harvest rate can be applied. Under the T_{TARGET} strategy, F is adjusted after every assessment so the target biomass will be reached in the target year (with a 50% probability, since it is defined as the median year for any P_{MAX} probability distribution). As a result, OYs will increase as F is readjusted, as long as the population grows, but—by definition—this strategy aims to restore the stock to its target biomass by the target year and not at any earlier date. By the same token, F (and resulting OYs) are adjusted downward in response to reduced recruitment.

3.2.2 Implications of Rebuilding Analysis Input Estimation Errors

As noted above, this simulation assumes perfect information about the input values for the analysis. In some cases stock productivity may be under- or over-estimated, as revealed by subsequent assessments. Obviously, over-estimating productivity for some period of time would have graver consequences than under-estimating it. The current status of bocaccio rockfish offers an instructive, although extreme example of the effect of estimation errors. This species was declared overfished in 1999. In subsequent years recruitment was thought to have been over-estimated resulting in too-high harvest limits, which were then exceeded. In addition, a change in the way rebuilding analyses are structured had an important effect on rebuilding prospects. Previously, T_{MIN} was recalculated starting from the year in which the rebuilding analysis was conducted. The analysis was revised to fix the starting point for the analysis at the year when the stock was declared overfished (in this case 1999) and account for actual harvests in subsequent years up until the year when the analysis is performed. As a result, a revised 2002 rebuilding analysis (MacCall and He 2002), accounting for the over-harvest in the intervening years, shows that even in the absence of fishing P_{MAX} is less than 50%. This is because the limits (T_{MIN} and T_{MAX}) were calculated based on existing recruitment data while the P_{MAX} calculation accounts for the excessive harvests.

A subsequent rebuilding analysis (MacCall 2003) presents a very different picture. A large 2002 year class had been suspected, and the earlier assessments and rebuilding analyses even anticipated its contribution to population productivity. However, no hard data revealing the strength of this “recruitment pulse” was available to include in the 2002 stock assessment and rebuilding analysis, contributing to their pessimistic results. By the time of the 2003 assessment, however, substantive data on the 1999 year class were available. This has resulted in much higher OYs for the same set of rebuilding parameters, a range between 178 and 674 mt for 2004. The 2002 rebuilding analysis appears to have under-estimated recruitment, producing an OY that, in retrospect, was unnecessarily low. At the time of that recruitment, available data suggested that earlier assessments and analyses had been too optimistic, over-estimating recruitment.

A less anomalous situation could arise if T_{MAX} is lowered because new estimates of stock productivity are higher (in other words, productivity was previously under-estimated); a constant T_{TARGET} strategy could result in a target year that is now greater than T_{MAX}. Conversely, the estimate of unfished biomass could be lowered due to new estimates of compensatory effect or other limiting ecological factors. This would also result in a target year greater than T_{MAX} under a constant T_{TARGET} strategy.

Both strategies entail similar risks in cases where stock productivity is over-estimated. A constant F strategy is more conservative in that additional surplus production is not removed as the stock approaches the target biomass. However, any over-estimation of F would apply to the period from the most recent stock assessment. If the over-estimation were small, it would have a slight effect during that period and be overtaken by a slightly delayed increase in stock size. If the over-estimation was large, overfishing could occur, preventing stock growth. Pursuing a constant T_{TARGET} strategy would entail similar risks. The most important assumption in any strategy is that regular stock assessments provide a feedback loop allowing more or less continuous adjustment (at the interval of regular stock assessments) of the fishing mortality rate. Under a constant F strategy such an adjustment would only occur if recruitment had been over-estimated in the last assessment, resulting in an F that was too high. Therefore, in practice OY is likely to change under a constant F strategy as additional information allows better estimation of the current age-structure of the population. This isn't apparent in the figures because perfect information about the current state is assumed. Under a constant T_{TARGET} strategy F would be adjusted after each stock assessment so the stock rebuilds by the target year; estimation errors could also be compensated for as part of this adjustment.

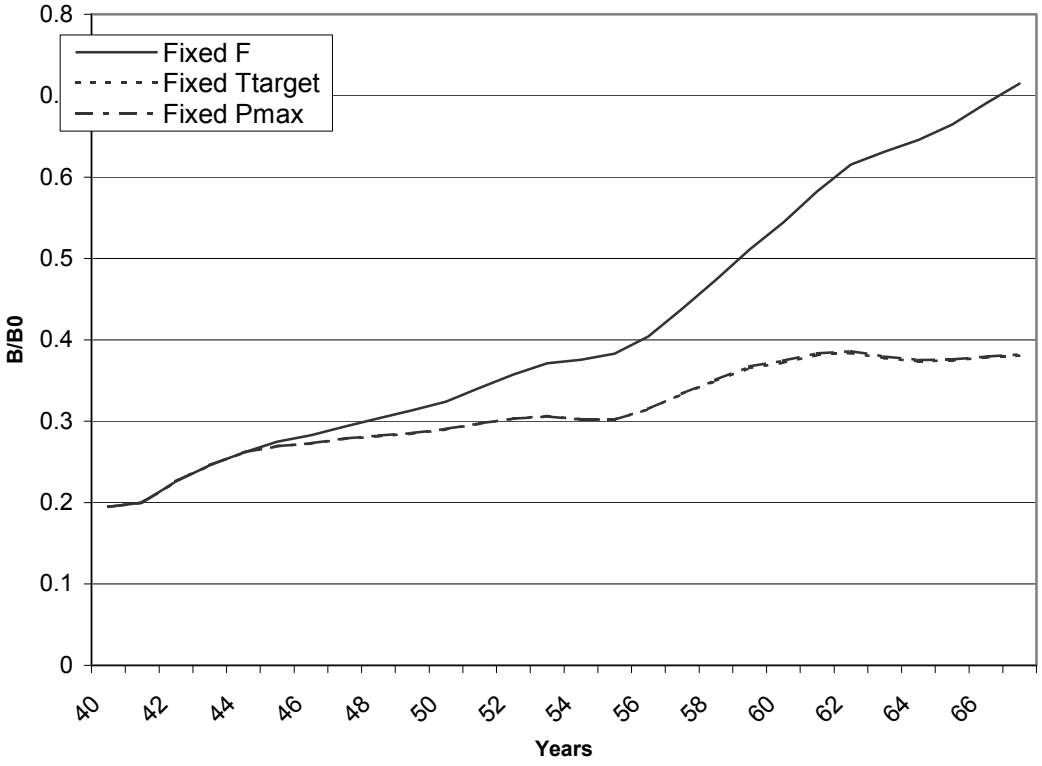

FIGURE 3-7. Biomass trajectories under different strategies.

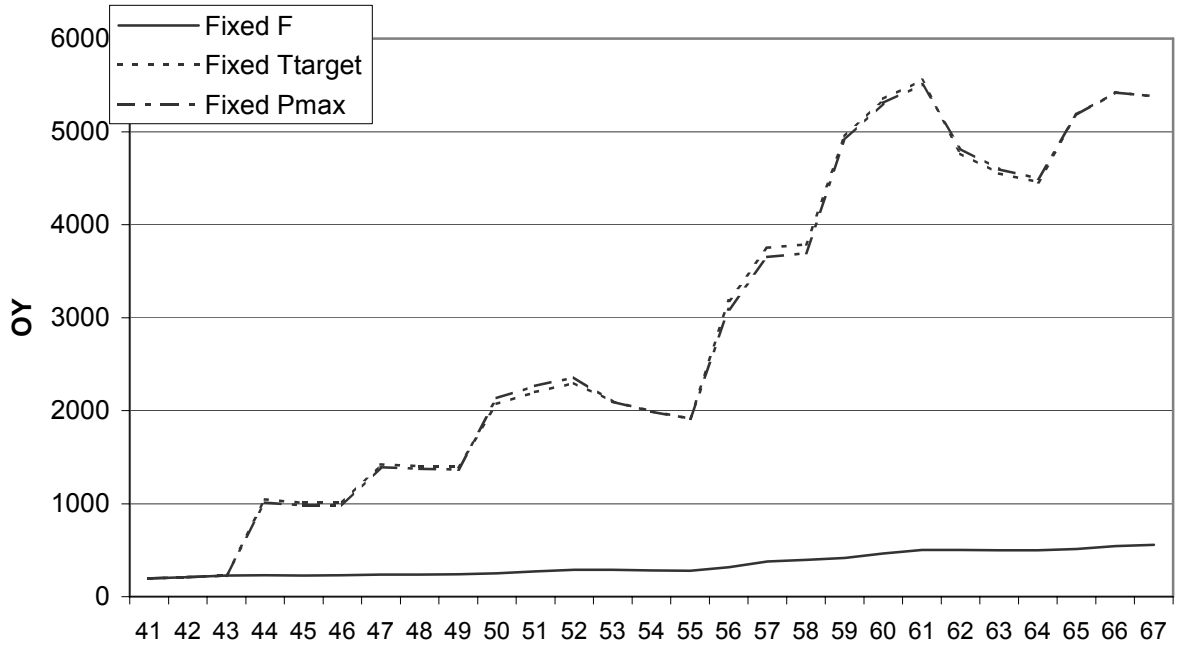

FIGURE 3-8a. Change in catch (OY) over time under different strategies.

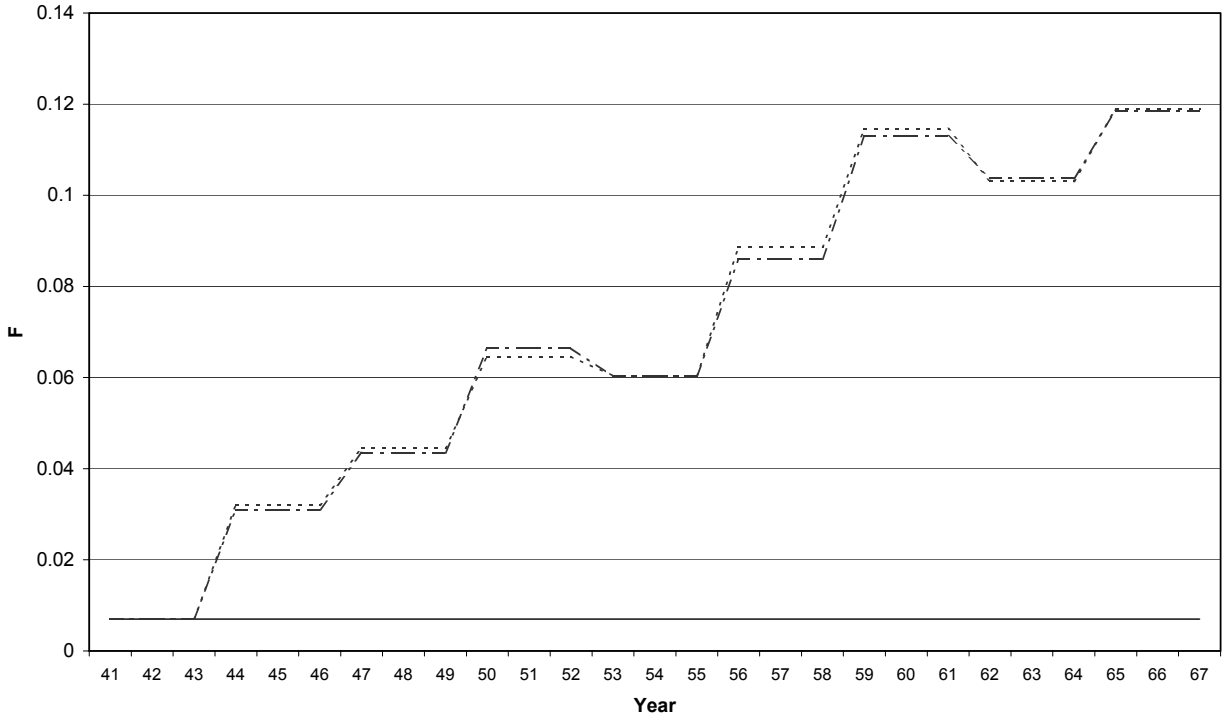

FIGURE 3-8b. Change in F rate over time under different strategies.

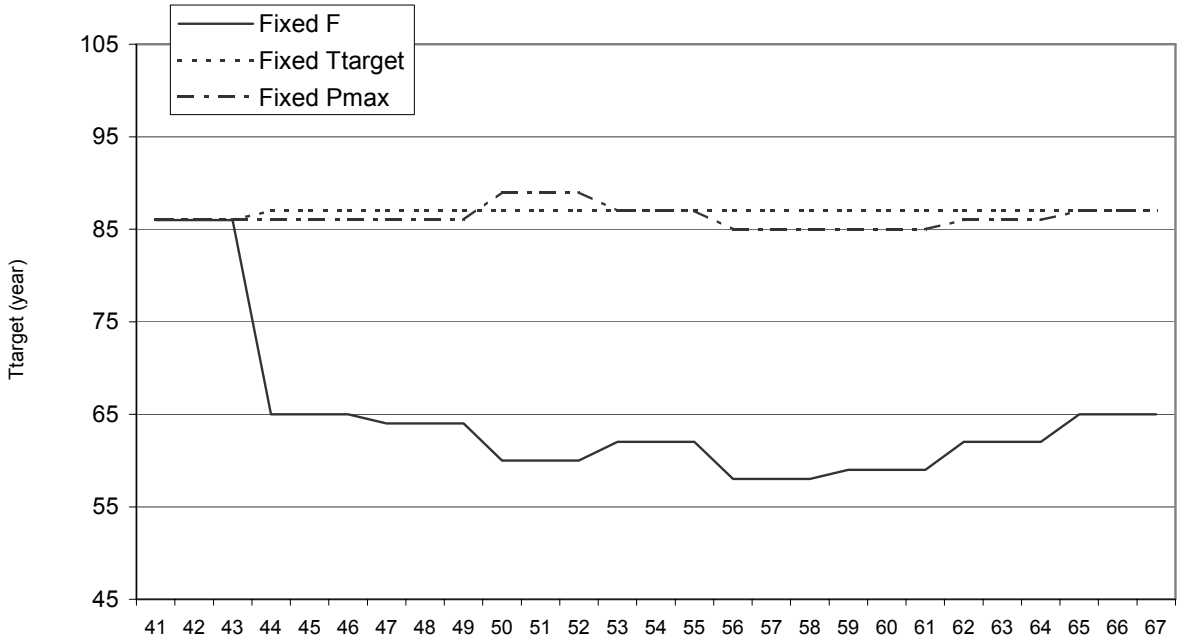

FIGURE 3-9a. Change in T_{TARGET} over time under different strategies.

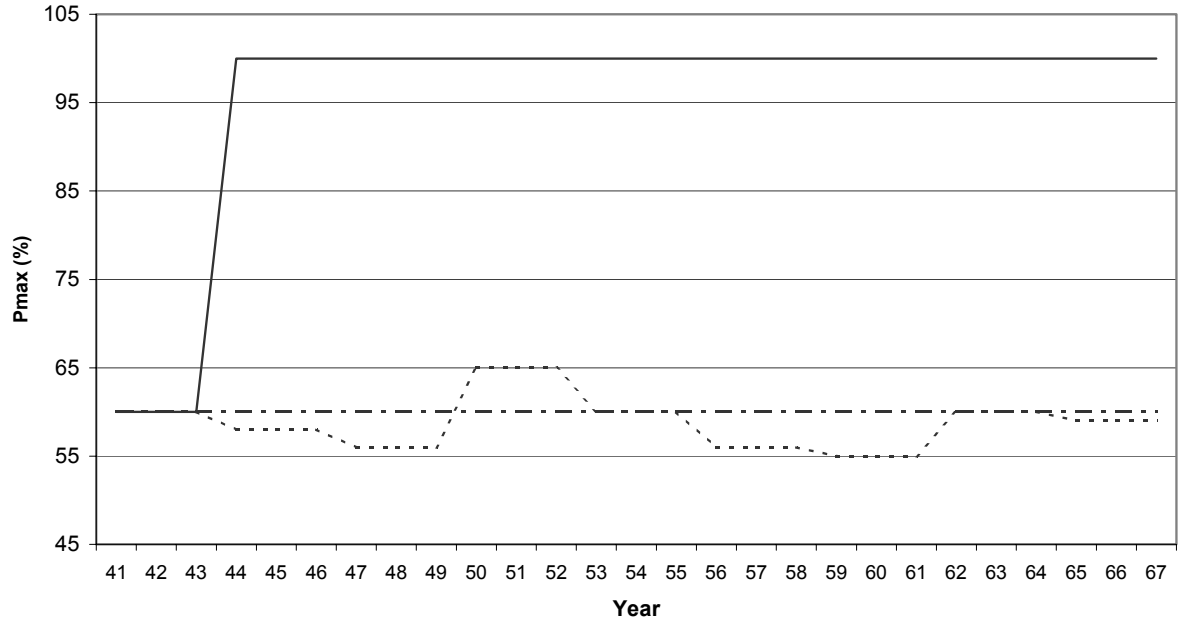

FIGURE 3-9b. Change in P_{MAX} over time under different strategies.

4.0 ENVIRONMENTAL CONSEQUENCES

The environmental consequences of the proposed action are evaluated in terms of direct, indirect and cumulative impacts. Direct impacts "are caused by the action and occur at the same time and place" while indirect impacts "are caused by the action and are later in time or father removed in distance"(40 CFR 1508.8). Cumulative impacts result from the "incremental impact of the action when added to other past, present, and reasonably foreseeable future actions" including activities of agencies and individuals other than the action agency (which in this case is NMFS). The proposed action is procedural in nature: it specifies how rebuilding plans will be adopted and periodically reviewed but does not specify the content of individual rebuilding plans (the value of parameters like P_{MAX}, T_{MAX} and T_{TARGET}, for example). For this reason the proposed action will not have any direct impacts on the human environment. Its effects may be construed as either indirect, since they will occur at a later time and place through the implementation of rebuilding plan measures, or cumulative, since the total impact includes the combined effect of rebuilding plan measures as "reasonably foreseeable future actions."

While not directly affecting the environment, the proposed action will affect the management regime. First, the adopted framework affects how rebuilding strategies will be developed—in terms of the targets and management measures that will be used. Second, the proposed action can be evaluated in terms of the issues discussed in Section 3.3: administrative capacity, adaptive management, and public participation. The options described in Chapter 2 will have varying effects on workload, the degree to which management can adapt to changed conditions, and how much the public, through the Council process, will have assurances that social goals (e.g., resource conservation versus resource use) will be met. These effects could in turn affect the environment based on what management actions can be undertaken given the distribution of institutional resources. Simply put, fixed administrative capacity represents a zero sum game: the time that participants devote to implementing, reviewing and amending rebuilding plans is time taken away from other management initiatives. This expenditure of administrative capacity and management flexibility represents a tradeoff against the obligation to adhere to targets and the opportunity for periodic review, which allows some public participation through the Council process.

These considerations form the basis of the analytical framework underpinning this chapter. Section 4.1 evaluates each set of options in terms of their effect on the management regime, using the issues outlined in Section 3.1. Section 4.2 discusses the potential effects of different rebuilding strategies (in terms of what rebuilding parameter the strategy is based on) and of uncertainty as affected by future stock assessments, based on the discussion of the constant F versus constant T_{TARGET} strategies in section 3.2. Section 4.3 evaluates cumulative effects to the environment, based on future management priorities identified by the Council and the likelihood that different sets of options will diminish the ability to address these priorities.

4.1 Effect on Management Regime

4.1.1. Issue 1: The Form and Content of Rebuilding Plans

4.1.1.1 Option 1a (Status Quo)

There is no framework for specifying the form of rebuilding plans.

Administrative Capacity. This option makes the least demands on administrative capacity in that no additional amendments are needed to implement rebuilding plans, which are implemented through periodic (biennial starting in 2005-2006) management. According to the Court, however, this approach violates the Magnuson-Stevens Act.

Adaptive Management. This option offers the most flexibility for the same reason that it is less demanding of administrative capacity. Rebuilding measures would be easier to change in response to new information or changed environmental conditions, because the FMP and/or regulations do not contain the specified targets, limits and management measures constituting the rebuilding strategy. However, this option is probably less adaptive overall if rebuilding strategies are easily modified in response to the social costs

involved in achieving those targets. For example, if the target year is regularly delayed in order to avoid the costs associated rebuilding by then, the original management goal of rebuilding the stock within a certain time period may not be achieved.

Public Participation. Without FMP amendments or notice and comment rulemaking, there is limited opportunity for public comment directly related to a chosen rebuilding strategy. Comments would have to come as part of the biennial specification of harvest levels and associated management measures. In comparison to the other options, this option affords the least opportunity for public participation. As noted above, public skepticism the Council will stick to rebuilding targets may be higher under the status quo.

4.1.1.2 Option 1b

Numerically specify P_{MAX}, T_{MIN}, T_{MAX}, and T_{TARGET}, describe the harvest control rule, and outline the methods used to calculate B_{MSY} in the FMP.

Administrative Capacity. This option would entail the highest administrative cost of all the Issue 1 options. Numerically specifying both those parameters specified by national policy (T_{MIN} and T_{MAX}) and more than one of the strategic parameters (F, P_{MAX}, and T_{TARGET}) in the FMP would almost guarantee subsequent amendments after every new stock assessment of an overfished species. The values of T_{MIN} and T_{MAX} are likely to change if, for example, new values are added to the pool of recruitment values used in the rebuilding analysis. Furthermore, as discussed in section 3.1.2.2, for any given value of F, P_{MAX} or T_{TARGET}, the other two values are likely to change if the underlying biological information, derived from stock assessments, is updated. An FMP amendment must be accompanied by an EA and may require an EIS, depending on the likelihood of significant impacts. Preparation of these supporting analyses are part of the overall workload that determines administrative cost.

Adaptive Management. This option is the least flexible of all the Issue 1 options for the same reasons that it adds to administrative cost: it would be more difficult to revise the parameters specified in the FMP. This approach is also the least adaptive, if management had to conform to the parameter values in the FMP, even if they were incorrect but had not yet been updated by amendment. Alternatively, this option could function similarly to Option 1d in practice, if it were recognized that management measures could conform to updated parameters values rather than those in the FMP that had become outdated in the absence of an amendment to correct them. In comparison to the status quo, this option would specify rebuilding strategy parameters (T_{TARGET}, P_{MAX}) and entail a greater obligation to manage to these targets. This could serve adaptive management by establishing fixed benchmarks for monitoring and evaluation.

Public Participation. To the degree the FMP would have to be amended more frequently in response to changes in specified parameter values, this option would provide more opportunities for public participation than the status quo. Any analysis under the National Environmental Policy Act (an EA or EIS) requires some amount of scoping, which provides additional opportunities for public involvement. Given that parameter values are updated through the rulemaking process under options 1c and 1d, with the attendant opportunity for public comment both during the Council process and rulemaking, there may be little difference between these three options in this regard. It is also unclear that specifying a greater number of parameters aside from the target year (or F), would help to reduce public skepticism any more than specifying the strategic parameters.

4.1.1.3 Option 1c

Numerically specify T_{TARGET} and the harvest control rule in regulations.

Administrative Capacity. Except for the status quo, this option is likely to entail the least administrative cost of all the Issue 1 options, although it is difficult to distinguish from Option 1d in this regard. It would specify only the target year and the corresponding harvest control rule (which could be described as F). Generally, any specification of the harvest control rule (especially a numerical specification of F) would likely have to be changed after new stock assessments, which would be accomplished through the same notice and comment rulemaking process used for biennial management. T_{TARGET} would only be changed in unusual circumstances and thus infrequently, if at all. Combining these changes with rulemaking for biennial management would

involve moderately less administrative cost than an FMP amendment in terms of the procedural requirements and supporting analysis. An EA or EIS has been prepared to evaluate annual specifications. Biennial specifications will require a similar level of analysis, contributing to workload.

Adaptive Management. This option and Option 1d generally allow the same level of flexibility. This option would require notice and comment rulemaking to change specified parameters, the same process that would be required under Option 1d. As noted, if resulting OYs in a given year were so low the Council wanted to change them to mitigate socioeconomic impacts, T_{TARGET} would have to be re-specified in regulations. If regulations could not be amended in advance or as part of the annual (or biennial) management process, the Council could be obligated to manage according to draconian targets. Generally, this option is very adaptive because it specifies key strategic elements and allows a high degree of flexibility in achieving those targets. In an extreme situation (OYs engendering severe socioeconomic impacts for example) targets could be modified, but not without the deliberations and analysis required as part of rulemaking.

Public Participation. As discussed above under Option 1b, the three action options are likely to afford comparable levels of public participation.

4.1.1.4 Option 1d (Council-preferred)

Describe computation methods for rebuilding parameters in the FMP and specify initial values in the FMP and regulations. Update harvest control rule and T_{TARGET} through rulemaking.

Administrative Capacity. The key difference between this option and Option 1c is that additional material would be incorporated into the FMP as part of rebuilding plan adoption. Rebuilding plan adoption would involve FMP amendments, with a moderate increase in administrative cost in comparison to Option 1c. As discussed above, by updating these parameters through the same rulemaking process used for biennial management, the additional administrative cost (above that devoted to periodic management) would be moderate. An EIS was prepared for 2003 management measures (PFMC 2003). If this level of analysis is needed in future years, this represents a fairly large "fixed cost," suggesting relatively low "marginal cost" for including parameter updates.

Adaptive Management. This option is also similar to Option 1c in terms of flexibility and adaptive management, except the management framework is more fully described in the FMP. This added description would support adaptive management because it allows a high degree of flexibility while clearly specifying at a more formal level the governing principles for managing overfished species (in terms of calculation and use of rebuilding parameters). Description of other rebuilding plan elements, such as particular management measures intended to achieve rebuilding targets, could also be described in the FMP and would better fit into the framework implemented under this option than under the other options. Specified parameter values would be "exemplary," allowing both the public and managers to refer to historical benchmarks over the course of the rebuilding period. At the same time, there would be a similar level of flexibility, as discussed above, to modify strategic parameters in response to new data and/or changing conditions.

Public Participation. As discussed above under Option 1b, the three action options are likely to afford comparable levels of public participation.

4.1.2 Issue 2: Periodic Review and Amendment of Rebuilding Plans

In general, a more rigid review schedule is likely to increase administrative opportunity costs. The frequency of reviews increases total workload, and could preclude the management regime from addressing other management issues arising in the future. If managers decided these issues had to take precedence, departing from a mandated schedule could require an FMP amendment to change the review schedule, adding another impediment to addressing the priority issue that had arisen. Without an amendment more beneficial tasks might have to be set aside in order to conduct reviews.

4.1.2.1 Option 2a (Status Quo)

The Council reviews rebuilding plans every two years.

Administrative capacity. Currently, the FMP states the Council will review rebuilding plans at least every two years, but does not specify that rebuilding plan goals should be the basis of such a review (although these are logical criteria for a review). Therefore, the Council could choose to use the goals identified in the FMP but is not obligated to do so. In the absence of any major issues arising in connection with a particular rebuilding plan, this would allow the Council to conduct a relatively cursory review. In terms of administrative capacity, this would be especially desirable if administrative resources would be better committed to some other management task.

Adaptive management. Flexibility in regard to workload prioritization, discussed above, could also make it easier to respond to changing conditions with respect to the fisheries ecosystem as a whole in comparison to Options 2b through 2d. However, the lack of standards based on FMP-specified goals, a feature of those three options, could make consistent evaluation more difficult. Monitoring and evaluation is an important aspect of adaptive management.

Public participation. It is likely the review task would be carried out by Council advisory bodies (SSC, GMT, GAP) with their recommendations forwarded to the Council for action. All these venues are open to the public and have opportunities for public comment. (Advisory body meetings tend to be more informal and thus afford somewhat greater exchange with nonmember participants. Public comment periods on the Council floor allow issues to be aired in front of a larger audience.) If two-year reviews indeed addressed all five FMP-specified goals this would allow the most frequent participation across a range of issues.

4.1.2.2 Option 2b (Council-preferred)

The Council reviews progress toward stock rebuilding (goal 1) only when a new stock assessment has been completed. The remaining FMP-specified goals are reviewed every two years.

Administrative capacity. This option entails more administrative cost than the status quo because it explicitly links rebuilding plan review to existing FMP-specified goals. Therefore, the Council would be under some obligation to conduct more detailed reviews than under the status quo. To a large extent, the evaluation of stock rebuilding (goal 1) would likely be linked to the kind of "adequacy of progress" standard adopted under Issue 3 (below). It is likely that if these standards were met, the rebuilding plan review would be relatively cursory. However, if the standard is not met, the review may entail revisions to the rebuilding plan. Under the Issue 1 options this could require an FMP or regulatory amendment. As noted above, an EA or EIS must accompany any such action, contributing to workload. This would be true for any of these options, if it triggered a change in the rebuilding plan.

Adaptive management. This option is the most adaptive because it includes particular standards on which to evaluate rebuilding plans, but ties them to stock assessments that are scheduled according to future determinations of need and available institutional resources.

Public participation. All of the options (except Option 2e) mandate some level of review by the Council every two years, except that under the status quo, this review is presumed, based on the Magnuson-Stevens Act rather than specified in the FMP. However, this option, and options 2c and 2d, do not mandate review of stock rebuilding (goal 1) every two years; instead evaluation is tied to stock assessments. Currently, in principal at least, stock assessments are to be carried out on a two-year to four-year rotating schedule for all assessed stocks, although the actual frequency can vary. (Whiting, for example, is assessed annually.) Thus, this option would afford marginally less frequent opportunity for the public to learn about and comment on this central issue. If a review resulted in a revision to the rebuilding plan and associated FMP or regulatory amendment, public scoping during EA or EIS preparation would create additional opportunities for public participation. As noted above, this would be true for true for the other options, if a rebuilding plan revision occurred as a result of the review.

4.1.2.3 Option 2c

The Council reviews progress toward stock rebuilding (goal 1) only when a new stock assessment has been completed. However, unlike Option 2b each rebuilding plan will describe the stock assessment schedule for that species. The remaining FMP-specified goals are reviewed every two years.

Administrative capacity. This option entails more administrative cost than the status quo for the same reasons put forth for Option 2b. It is likely that any stock assessment schedule outlined in a rebuilding plan would not differ substantially from the existing schedule, so there is unlikely to be any meaningful difference in terms of workload when compared to Option 2b.

Adaptive management. This option is somewhat less adaptive than the status quo and Option 2b, in that it would require each plan to pre-specify a stock assessment schedule. It would be difficult to anticipate future contingencies, both in terms of stock status and management priorities, that might recommend that assessments be carried out more or less frequently than what was specified.

Public participation. For the reasons discussed under Option 2b, this option might afford marginally less opportunity for public participation than the status quo. However, as just mentioned, it may be that a specified schedule for stock assessments would result in stock assessments as frequently or more frequently than the status quo. If this were the case, then there were would be no great difference in terms of public opportunity to comment on stock rebuilding in comparison with the status quo.

4.2.2.4 Option 2d

The Council reviews progress toward stock rebuilding (goal 1) only when a new stock assessment has been completed. However, the FMP will describe a stock assessment schedule applying to all overfished species. The remaining FMP-specified goals are reviewed every two years.

Administrative capacity. The proposed FMP-specified stock assessment schedule under this option is every four years for the first 20 years of rebuilding and every two years thereafter until the stock is rebuilt. Of the currently overfished stocks, all but two will take more than 20 years to rebuild. This suggests slightly less of an administrative cost in comparison to the other alternatives, assuming a two- to four-year review cycle (based on stock assessments) for those species versus four years under this options for most overfished species for the foreseeable future.

Adaptive management. This option is the least adaptive because it specifies a generic stock assessment schedule for all overfished species. It is very likely that stock assessment priorities for different overfished species will change over time. For example, a stock that is rapidly recovering or for which managers have a high degree of confidence in the assessment may not need to be assessed as frequently as stocks that do not appear to be responding to rebuilding measures or where their status is less certain. Conversely, managers might want to assess stocks that are rebuilding rapidly (as is the case for lingcod) more frequently than every four years. Under this option, managers would be constrained in the allocation of institutional resources based on current priorities.

Public participation. To the degree the mandated four year stock assessment results in less frequent opportunities for the public to evaluate and comment on the efficacy of rebuilding efforts, this option would result in less opportunity for public participation in comparison to all of the options except perhaps Option 2e.

4.1.2.4 Option 2e

The Council defers all rebuilding plan reviews to the Secretary of Commerce.

Administrative capacity. This option places the least burden on Council administrative resources since the review could be deferred to the Secretary and would therefore allow other management issues to be more effectively addressed. However, this represents a shifting of the administrative cost, not any reduction in it. (Such a deferral would most likely shift review obligation to staff at NMFS NWR, who substantially contribute to Council-related business anyway.)

Adaptive management. In comparison to the other alternatives, this option has a neutral effect on adaptive management. Reviews would likely be conducted (by the Secretary) more frequently than under Options 2b-2e, but no specific criteria (such as FMP-specified goals) would be used in the review. On the other hand, under this option the Council would conduct annual reviews tied to more specific benchmarks (projected harvest mortality and biomass), which would support adaptation of management measures.

Public participation. This option is likely to afford the least opportunity for public participation since the review would be carried out internally by the agency, without direct Council oversight. However, the Council would have the opportunity to comment on the Secretarial review before its publication, allowing some opportunity for public participation through the Council process.

4.1.3 Issue 3: Amending Rebuilding Plans and Adequacy of Progress

4.1.3.1 Option 3a (Status Quo)

The FMP does not describe a standard to evaluate the adequacy of rebuilding measures.

Administrative capacity. A lack of standards results in uncertainty about when targets (e.g., target year, P_{MAX}) need to be adjusted because of differences between the projected and actual rebuilding trajectory. That uncertainty will need to resolved and will be an issue of controversy until standards are established either explicitly or through practice. The development of alternative management policies in an environment where these standards are not well-specified results in a more difficult, complex and contentious process.

Adaptive management. Although the lack of a standard could allow more flexible response to changes in stock status, the lack of benchmarks could make it harder to determine when adaptation is needed. Furthermore, because "adequate progress" is currently unspecified, standards could develop during the rebuilding plan review process. These ad hoc standards could be relatively inflexible in comparison to those deliberately planned in advance. Thus there is considerable uncertainty about the current baseline. This makes it difficult to use status quo as a baseline for comparison; therefore, other options will be compared to Option 3d.

Public participation. Currently, there is no definition of adequacy of progress and the specification of such a definition in a public forum does not appear to be required under the Magnuson-Stevens Act, with such a determination left to the Secretary. A Council definition of adequacy of progress may not constrain the Secretary; however, Secretarial approval of the Council definition may place some additional justification burden on the Secretary if at some future time the Secretary were to select some other measure of the adequacy of progress.

4.1.3.2 Option 3b

If P_{MAX} falls below 50% the harvest rate strategy must be adjusted.

Administrative capacity. By establishing a single standard in advance, alternative standards will not have to be evaluated in the individual rebuilding plans or during their implementation. On the other hand, if this standard does not perform well in practice, the Council will have to devote administrative resources to revising FMP-mandated standards, instead of attending to other management priorities. Using a 50% probability standard could also allow a significant mismatch to develop between the actual harvest rate and the rate needed to achieve the target. This could necessitate a relatively large one-time change in harvest levels (once the 50% threshold is reached), which would be disruptive to the fishery. However, under the framework outlined under Options 1c and 1d, F would be re-specified on a fairly regular basis (after a new assessment and as part of biennial management) in order to achieve the rebuilding target. This would make it unlikely that P_{MAX} would fall below 50% unless there were serious estimation errors in past assessments. Although not directly affecting administrative capacity (in comparison to the other options), the controversy resulting from a steep drop in OY could engender greater deliberation, requiring more administrative resources. It is difficult to assess the relative effect in relation to the status quo. By itself, establishing a standard will not entail any additional administrative cost. These costs could increase, however, if measures needed to meet the standard are difficult to implement or controversial. Alternatively, greater certainty about what standard will be used

to adjust management measures, in comparison to the status quo, could lower administrative costs, by lowering uncertainty and controversy in comparison to the status quo.

Adaptive management. Compared to Option 3d, there would be less flexibility for developing measures of adequacy that might be more tailored to the conditions and characteristics of a particular species. By setting a "floor" triggering a required response, this option establishes a benchmark for adaptive response. Otherwise, it gives the Council some flexibility to increase the harvest rate above planned levels if the stock is recovering more rapidly than expected. With experience, the degree to which this flexibility to increase harvest rates is advisable could be assessed and limited by future amendment.

Public participation. By setting a single standard, both Option 3b and 3c present a relatively straightforward way for the public to evaluate management performance in terms of stock rebuilding. However, in comparison to 3d, these options provide less opportunity for the public to participate in the evaluation process for the same reason that managers would have less flexibility in how they evaluate rebuilding progress.

4.1.3.3 Option 3c

If P_{MAX} falls below the specified value, the harvest rate strategy must be adjusted.

Administrative capacity. This option is similar to Option 3b, but is likely to lead to more frequent adjustment in the harvest strategy because any deviation would have to be addressed, increasing administrative cost. Conversely, these adjustments would not be as large than under that option, making them easier to implement.

Adaptive management. Although similar to Option 3b, this option is preferable to Option 3b with respect to adaptive management, because the harvest rate is continuously adjusted in response to new information. Because harvest rate changes are incremental, OYs would likely vary less dramatically than under Option 3b where a large adjustment would have to be made once the rebuilding probability falls to 50%.

Public participation. Effects on public participation are the same as under Option 3b, above.

4.1.3.4 Option 3d

The Council in consultation with the SSC and GMT will decide on a case-by-case basis whether a significant change in a rebuilding plan parameter requires the plan to be revised/amended.

Administrative capacity. This option is similar to the status quo in that no standard is identified; instead an evaluation process is mandated. It is likely that these advisory bodies would fall somewhere in between Options 3b and 3c in terms of the frequency with which they would recommend revision. Although this option is more general, allowing the SSC and GMT to weigh in on any change in a parameter, P_{MAX} is likely to be the primary factor in their deliberations. They would likely evaluate the tradeoff between frequent change and disruptive change, choosing some intermediate frequency. This option would likely increase GMT and SSC workload, in comparison to Options 3b or 3c, because it not does not provide specific guidance. Therefore, these committees would have to develop their own criteria.

Adaptive management. This option is more flexible than either Option 3b or 3c because an assessment would be made through an expert process, based on current information. However, if no benchmarks are developed through the procedure specified here, the validity of assessments would be difficult to evaluate. Also, as discussed under the status quo and Option 3e, "ad hoc" standards could be less adaptive, or at least less flexible, than those specified in advance.

Public participation. If the process for evaluating rebuilding progress is not transparent with clearly identified benchmarks the public could view the management process with skepticism and mistrust. Conversely, Council processes are very open to public observation and any decision process within the SSC and GMT would be subject to scrutiny and comment. This could give the public a greater hand in the evaluation process. Because changing the rebuilding plan (or key parameters) requires either an FMP amendment

(under Option 1b) or regulatory amendment (under Option 1c or 1d), a NEPA analysis, including public scoping, would be required. This would facilitate public participation.

4.1.3.5 Option 3e (Council-preferred)

The FMP would require that each rebuilding plan identify a standard based on predetermined list of possible standards.

Administrative capacity. Given the variety of ways in which rebuilding harvest control rules might be specified and the appropriate way of specifying the control rule may vary between stocks, it is possible that establishment of a generic adequacy of progress standard for all rebuilding plans will lead to standards that do not match well with the rebuilding harvest control rule. In such an instance, an amendment to the process and standards portion of the FMP would be required, generating more administrative costs, or there would be inefficiencies resulting from the mismatch between the control rule and adequacy standard. Requiring the specification of an adequacy standard in each rebuilding plan means that there will be some additional administrative costs associated with the development of the individual rebuilding plans, as compared to status quo (where no such standards are established) or as compared to options 3b and 3c (where the standards are established as part of the process and standards section of the amendment). However, over the long term costs could be lower if there is a better match between the characteristic of the stock and the standard established for it.

Adaptive management. On the surface, this option provides less flexibility than Option 3d, because the choice of benchmarks or evaluation methods is limited to a pre-specified list. If the list of predetermined standards are more effective than "ad hoc" standards that would be developed under Option 3d, and represent the different characteristics of overfished species (e.g., life span, recruitment variability), this option would be the most adaptive.

Public participation. This option is similar to Option 3b and 3c because standards are determined in advance. This would make it easier for the public to evaluate the management process but limit its influence over it.

4.1.4 Issue 4: ESA Listed Species

4.1.4.1 Option 4a (Status Quo)

There are no special provisions in the FMP for the listing of overfished species under the Endangered Species Act.

Administrative capacity. The FMP and rebuilding plans will need to be amended if a rebuilding species is listed under the ESA.

Adaptive management. See discussion under Option 4b.

Public participation. There is no difference between Option 4a and 4b except for the timing of public participation. This process and standards amendment provides opportunity for public comment on the approach for handling ESA species. Without this provision, action would need to be taken at some future time if a groundfish species were listed under the ESA and there would likely be similar opportunity at that time for public comment on the proposed provision. The public would also be able to comment as NMFS develops jeopardy standards and recovery plans, which are developed outside the Council process.

4.1.4.2 Option 4b (Council-preferred)

If a stock is listed under the ESA, the rebuilding plan defaults to the jeopardy standard or recovery plan developed under the ESA.

Administrative capacity. FMPs will not need to be amended if a rebuilding species is listed under the ESA. The administrative costs associated with such and FMP amendment would be directed to other management activities to benefit the fishery.

Adaptive management. Addressing the effect of ESA listing on rebuilding plans would reduce any future workload associated with an FMP amendment needed to specify this contingency. This would provide the Council with more flexibility to address other management issues. Overall, there may be little or not effect on adaptive management since both rebuilding requirements and ESA action flow from federal law and managers would have to comply with both.

Public participation. See above.

4.2 Effects of the Choice of Rebuilding Strategy

The options under Issue 1 and Issue 3 can be evaluated in terms of the choice of parameters that serve as targets, thus constituting the strategic framework. Issue 1 deals with those parameters that will be incorporated into the FMP or regulations, with some implication of how they will be used as management targets. Issue 3 covers the standards that would be used to during periodic reviews to determine whether a rebuilding plan needs to be revised. Although closely related to Issue 3, Issue 2—covering the timing of periodic reviews—does not directly relate to the choice of strategic parameters. Issue 4 options address provisions in the FMP for possible ESA listing of overfished species and, therefore, do not bear on the choice of strategic parameters.

4.2.1 Issue 1 Options

Issue 1 options are evaluated in terms of the policy and procedural risks that rebuilding will not occur within a time period "as sort as possible," recognizing mitigating biological and socioeconomic factors. These risks are evaluated by assessing how the framework identifies management targets, circumstances where targets could be changed, and the level of analysis required to make such a change.

Option 1a: Status quo. Currently, the FMP establishes a general framework for rebuilding. Although the FMP states that rebuilding plans "will specify a time period for ending the overfished condition and rebuilding the stock," this time period is not specified in the FMP or regulations. When setting 2003 annual specifications, P_{MAX} was the principal parameter used to structure harvest specification (OY) alternatives. This suggests more flexibility in terms of choosing and changing targets during each management cycle. For example, a new stock assessment and rebuilding analysis could substantially increase short-term costs in terms of lowering the OY for a particular species in order to rebuild by the target year. The Council might recommend a later target year and lower P_{MAX} to achieve a higher OY during the impending management cycle. It would not be necessary to amend the FMP or regulations to make such a change. The Council would likely base their decision making on the same type of analysis as has been used for developing past annual specifications and management measures at the outset of the management cycle. Thus, procedurally it is difficult to assess whether such a change would be easier to make than under Option 1c and 1d. (Under Option 1b it would clearly be more difficult because an FMP amendment is required.) Although targets are not incorporated into the FMP or regulations under the status quo, any change in harvest specifications that has the potential to cause significant environmental impacts would necessitate the preparation of an EIS. Thus it may be that the same level of analysis would be required—as part of the harvest specifications process—whether or not targets are part of the FMP or regulations.[10/] However, more public scrutiny might be expected under Options 1c and 1d, especially as part of notice-and-comment rulemaking.

Option 1b: Numerically specify P_{MAX}, T_{MIN}, T_{MAX}, and T_{TARGET}, describe the harvest control rule, and outline the methods used to calculate B_{MSY} in the FMP. This option does not specifically identify any one parameter as the management target. The FMP would need to be amended if the value of any specified parameter changes as a result of a new stock assessment and rebuilding analysis. Since an FMP amendment can take

10/ An EIS accompanied the 2003 annual specifications, and an EIS is again planned for the 2004 annual specifications. (The transition to biennial management also may justify preparation of an EIS for the first cycle, which covers the calendar years 2005-2006.) However, if the management regime becomes more stable, and broader-scale EISs allow future tiering of analyses, EA might be prepared for the harvest specifications. Thus there is a possibility of preparing an EA for the 2007-2008 biennium; this would also be the first opportunity to include any changes to rebuilding targets as part of the NEPA analysis.

a long time to implement, harvest specifications might sometimes have to be developed before the FMP is amended. In this type of interim, the key strategic parameters of T_{TARGET}, F (as expressed in the harvest control rule) and P_{MAX} would be the likely focus of decision making. It is unclear which parameter the Council would be obligated to manage for. T_{TARGET} is presumed given the legal and policy framework supporting rebuilding. But without guidelines specifying which parameter to choose, it would also be possible for the Council to recommend continuing with the same F (as expressed in the harvest control rule) for the next management cycle. Assuming no estimation errors, this would result in faster rebuilding in comparison to a continued T_{TARGET} strategy. Any policy decisions taken during such an interim between the new assessment and completing the FMP amendment would have to be evaluated in the analysis supporting that amendment. A decision reflecting a major change in policy, such as an implied delay in the target year, would likely require a higher level of analysis. Thus, an amendment that would have otherwise been accompanied by an EA might require an EIS.

Option 1c and 1d: Numerically specify T_{TARGET} and the harvest control rule in federal groundfish regulations, and under Option 1d, incorporate additional descriptive material into the FMP. These two options are similar in that both T_{TARGET} and the harvest control rule are specified in regulations and serve as management targets. Although amendment language makes clear that T_{TARGET} should only be changed in unusual circumstances, specific criteria for when such a change is permissible are not included. Changing T_{TARGET} to an earlier year, by managing according to the same harvest control rule (i.e., a constant F strategy) would accelerate long-term environmental benefits (return to target biomass) with little or no change in economic costs and benefits (change in OY), assuming no estimation errors in past or current stock assessments. If the Council pursued this strategy in setting harvest specifications, it would be easier to justify an EA, depending on other factors. If there is no bias in estimation errors, this strategy also becomes more risk averse over time in comparison to a T_{TARGET} strategy, since stock size should increase faster. As noted in Chapter 2, there are other circumstances in which the target year might be changed. The level of analysis required to make such a change cannot be predicted since it depends on a wide range of factors. Suffice to say, shifting to an earlier year, if short-term economic costs are modest, would demand less scrutiny than delaying the target year. Generally speaking, the closer that actual rebuilding adheres to expectations, recognizing that these expectations are framed stochastically, the less likely that impacts will breach significance thresholds, requiring more extensive analysis. Thus, actually pursuing a constant T_{TARGET} strategy throughout the rebuilding period represents the lowest level of risk for a given set of circumstances (recognizing any reduction in fishing mortality reduces the relative rebuilding risk) because it is consistent with the policy framework of rebuilding within a time period that is "as short as possible." By extension, this would demand less analysis in support of decision making over the course of rebuilding than any deviation from the strategy.

4.2.2 Issue 3 Options

These options are assessed in terms of their consistency with rebuilding by the target year (a constant T_{TARGET} strategy) and how they would prompt changes to the strategy.

Option 3a: Status quo. Since there are no standards under this option, it is not clear what would trigger a change in the rebuilding strategy. Presumptively, the Council would manage to the target year, but would have no decision framework for making a change.

Option 3b: Adjust strategy if P_{MAX} falls below 50%. If the initial P_{MAX} value is high enough, this standard is only likely to come into play if the harvest rate is held constant and stock productivity had been grossly overestimated in previous assessments. If the harvest rate is held constant throughout the rebuilding period, and there are no estimation errors, then P_{MAX} will increase from its initial value instead of decreasing. If the harvest rate is adjusted for a constant T_{TARGET}, it is possible that P_{MAX} could fall below 50%, depending on the initial value that was chosen. Figure 3-9b shows P_{MAX} reaching 50% for several years in the simulation under a constant T_{TARGET} strategy, where the initial value was set at 60%. A higher initial P_{MAX} value would decrease the likelihood of falling below 50%, assuming no estimation errors. Setting the target at T_{MAX} (i.e., P_{MAX} equals 50%) would make it likely that P_{MAX} would fall below 50% after some assessments. To some degree, there would be no additional institutional response, given the range of options chosen under Issue 1. Under Option 1b, the FMP would have to be amended when specified values change; this would likely trigger a reassessment of the rebuilding strategy in any case. Under Options 1c and 1d it is presumed that in most

instances the harvest rate (as expressed by the harvest control rule) would be adjusted as necessary during each management cycle. This would result in only slight variations in P_{MAX}, as evidenced by the simulation results in Figure 3-9b, where the dotted line represents the P_{MAX} value under a constant T_{TARGET} strategy. It is likely that this standard would act more as a "safety net" if gross and systematic estimation errors occurred in successive stock assessments. If a new stock assessment and rebuilding analysis accounting for these errors revealed that P_{MAX} had fallen below 50%, this standard would trigger a possible revision of the rebuilding strategy.

Option 3c: Adjust strategy if P_{MAX} falls below its initial value. This standard is a similar but more strict version of Option 3b. The same set of issues would apply, but even without estimation errors P_{MAX} is likely to occasionally fall below its initial value because of recruitment variability. Again, if the management framework presumes frequent changes in the fishing mortality rate (as expressed by the harvest control rule) then this standard would not offer any additional check for reassessing the rebuilding strategy.

Option 3d: The GMT and SSC would jointly evaluate the need to adjust the strategy, based on stock assessments. This alternative does not establish a specific threshold, rather it identifies a process for evaluation. Because it is more flexible, standards could be developed over time that are both based on experience and tailored to the dynamics of the stock in question. For example, if a constant T_{TARGET} strategy is pursued under the framework outlined for Options 1c and 1d, there might be some flexibility to adjust the harvest control rule on a less frequent basis than after every stock assessment, while still maintaining the same target year. As a consequence, P_{MAX} would likely be different from the initially computed value, but this parameter is not specified in regulations under these options. Such an approach could offer some of the benefits of the more stable OYs that result from a constant F strategy with the upward adjustments that are possible under a constant T_{TARGET} strategy. Changing F (as expressed by the harvest control rule) less frequently also would be warranted if there is a lot of uncertainty surrounding stock assessment results. In cases where stock biomass or productivity estimates change substantially, and it is unclear whether this is due to errors in past or current estimates, continuing with the same F could provide more stability until a later stock assessment could be conducted to confirm or dismiss the implied trend. Of course, if the current F appears to high, based on recent, uncertain assessment results, the policy choice would be more complicated. It would be unclear whether past analyses over-estimated F or the most recent analysis is an under-estimate.

Option 3e: Rebuilding plans identify a specific standard (Council-preferred). This option cannot be specifically evaluated, given that it does not identify any one standard. Since standards would be based on the different possibilities encompassed by the preceding options, all of the risks and advantages already discussed would apply to this option.

4.3 Cumulative Effects on Future Management

Cumulative effects are the result of "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions," including those of other agencies, organizations, and individuals (40 CFR 1508.7). They are the total effect, or combination of direct and indirect impacts with external factors affecting components of the human environment. The proposed action will cumulatively affect the environment in two ways. First, rebuilding plans implemented pursuant to this amendment are connected actions, which in combination will cumulatively affect the human environment. Potential cumulative effects on components of the human environment are described below in general terms. Any such discussion is speculative because actual effects depend on the targets chosen for each stock. This EA also incorporates by reference the cumulative effects analysis in the 2003 Groundfish Annual Specifications and Management Measures EIS (PFMC 2003). Management measures for 2003 are largely structured to keep total catch (including bycatch) of overfished species within harvest specifications developed from rebuilding analyses and interim rebuilding plans. Thus, the cumulative effects analysis in the EIS accompanying that action is a good indication of how multiple rebuilding plans, when combined with other, external factors, will affect various resources and human communities.

The second way in which the proposed action will cumulatively affect the human environment depends on the amount of institutional resources the management regime must devote to procedural tasks related to rebuilding plans. Assuming that administrative capacity is fixed, devoting more time and effort to rebuilding plan tasks will take away from other management activities. This can be evaluated in a general way first by

describing a range of outcomes, in terms of the different options chosen, that represent different levels of potential work load. These outcomes, or scenarios, can also be characterized with respect to adaptive management and public participation, which could also have management implications cumulatively affecting the environment.

The status quo (represented by options 1a, 2a, 3a, and 4a) imposes the least additional administrative cost, is moderately adaptive, and affords the least public participation.

The most administratively demanding set of choices would likely be:

- Option 1b: Numerically specify P_{MAX}, T_{MIN}, T_{MAX}, and T_{TARGET}, describe the harvest control rule, and outline the methods used to calculate B_{MSY} in the FMP.
- Option 2d: The Council reviews progress toward stock rebuilding (goal 1) only when a new stock assessment has been completed. However, the FMP will describe a stock assessment schedule applying to all overfished species. The remaining FMP-specified goals are reviewed every two years.
- Option 3c: If P_{MAX} falls below the specified value, the harvest rate strategy must be adjusted.
- Option 4a: There are no special provisions in the FMP for the listing of overfished species under the Endangered Species Act.

Other sets of choices fall within this range. One that would impose a moderate administrative cost is represented by the following choices:

- Option 1c: Numerically specify T_{TARGET} and the harvest control rule in regulations.
- Option 2b: The Council reviews progress toward stock rebuilding (goal 1) only when a new stock assessment has been completed. The remaining FMP-specified goals are reviewed every two years.
- Option 3d: The Council in consultation with the SSC and GMT will decide on a case-by-case basis whether a significant change in a rebuilding plan parameter requires the plan to be revised/amended.
- Option 4b: If a stock is listed under the ESA, the rebuilding plan defaults to the jeopardy standard or recovery plan developed under the ESA.

The Council-preferred options are similar to the set of choices just described in terms of their effect on the management regime:

- Option 1: Numerically specify T_{TARGET} and the harvest control rule in regulations and include current parameter values in the FMP.
- Option 2b: The Council reviews progress toward stock rebuilding (goal 1) only when a new stock assessment has been completed. The remaining FMP-specified goals are reviewed every two years.
- Option 3e: The FMP would require that each rebuilding plan identify a standard based on a predetermined list of possible standards.
- Option 4a: If an overfished species is listed under the Endangered Species Act, any pursuant standards will take precedence over the rebuilding plan if they would result in faster stock rebuilding. If the stock is de-listed before reaching its target biomass, the rebuilding plan comes back into effect until the target is reached.

Considering these sets of choices as representative of the range of outcomes, cumulative effects on the environment are considered here. In addition to rebuilding plan implementation, these effects are evaluated in terms of management initiatives the Council has identified as part of Council staff workload prioritization brought before the Council in November 2002 and the Groundfish Strategic Plan (Ad-Hoc Pacific Groundfish Fishery Strategic Plan Development Committee 2000). The management initiatives identified in these sources are evaluated in terms of four resource-related categories: ecosystem and habitat (including protected species), groundfish, other Pacific Council FMPs, and the socioeconomic environment.

4.3.1 Ecosystem and Habitat, Including Protected Species

Managing to rebuilding plan targets will generally constrain fishing effort in comparison to management without rebuilding targets. However, since stocks are managed under interim rebuilding plans, the short-term effects of rebuilding plan implementation may not differ from current conditions. Considering actual effects is

complicated because of the co-occurrence of overfished stocks in mixed-stock fisheries. In these situations the choice of rebuilding target for one overfished stock can act as a "binding constraint" that limits harvests of other overfished stocks. Recognizing this, there is a broad range in the choice of targets and the consequent level of fishing activity. The total amount of fishing effort in turn would likely correlate with total cumulative effects to non-fish environmental components, including benthic habitat and protected species. Any target year closer to T_{MIN} will constrain fishing more severely; T_{MIN} is the limit at which it is likely that most fishing would cease. At T_{MIN} fisheries would have to be managed for no fishing mortality on that stock; if incidental catch is unavoidable, the fishery would have to be closed. Obviously, at this extreme the effects of fishing on habitat, including protected species, would be minimized. A target at or near T_{MAX} represents the most permissive regime and would allow higher catches of overfished species than under the current interim targets. Presumably the specific management measures that would be implemented under these targets would result in a greater amount of fishing effort, and consequently, more impacts to these environmental components. Over time, overfished stocks are expected to increase to their target biomass (B_{MSY}) at rates that depend on the targets being managed for. Biomass increases would allow more fishing effort to occur with consequent increases in the potential for impacts to habitat and protected species.

In April 2001 NMFS published a Notice of Intent to prepare an EIS to evaluate different ways of designating essential fish habitat (EFH) and minimizing adverse effects to EFH due to fishing, to the extent practicable (66 FR 18586; notice of availability of scoping summary at 67 FR 5963).[11/] The draft EIS is scheduled for publication in August of 2003. Preparation of this EIS is being coordinated by NMFS with some work done by outside consultants. However, the Council and Council staff are involved in several respects. Most importantly, the Council is monitoring EIS development; and prior to its publication, the Council will need to review the document and select its preferred alternative. Because the draft is slated for publication in 2003, it is unlikely that future rebuilding-plan-related workload would affect activities related to this EIS through the draft stage. At this time it is unclear whether any necessary amendments would be developed as part of the EIS process or be implemented at a later time. If any subsequent amendments were necessary, rebuilding plan monitoring and updates could affect the capability of staff to implement them.

The Strategic Plan identifies two habitat-related goals: adopting marine reserves as a management tool and implementing measures to reduce fishing gear impacts to essential fish habitat. Although the Strategic Plan describes marine reserves in the context of fishery management, a related effect would be to reduce habitat impacts in areas where fishing was restricted or prohibited. Closed areas implemented in 2002 and 2003 to minimize bycatch of overfished species are defacto marine protected areas (MPAs), which will afford some habitat protection, since using specified fishing gear types is prohibited in these areas. If the Council were to decide these areas should be developed as a system of semi-permanent or permanent MPAs, considerable staff work would be needed for supporting analyses and likely amendments to Council FMPs. Although these types of changes to the management regime are highly speculative at this time, the EFH EIS discussed above may be the vehicle for implementing habitat-related strategic plan objectives, since tools to identify and assess impacts to EFH could be developed as part of the EIS, and it may contain specific proposals for minimizing fishing gear impacts to EFH.

In summary, although the Council recognizes the need to evaluate and minimize fishing impacts to EFH, no specific proposals are pending. Given this context, any added future workload related to the rebuilding plan process is likely to have a moderate effect on future habitat protection efforts.

NMFS NWR is developing strategies in support of the National Plan of Action to Protect Seabirds. The objectives of the national plan are to reduce seabird bycatch in U.S. longline fisheries, to provide national-level policy guidance on reducing seabird bycatch in U.S. longline fisheries, and to call for an assessment of all U.S. longline fisheries to determine whether a seabird bycatch problem exists. The national plan is part of an international plan developed by the U.N. Food and Agriculture Organization's Committee on Fisheries. If data, collected by the observer program for example, reveals a significant seabird bycatch problem in West Coast longline fisheries managed under the groundfish FMP, amendments may be needed to require gear

11/ This EIS is being prepared pursuant to *American Oceans Campaign et al.* v. *Daley et al.* (Civil Action No. 99-982[GK]).

modifications or changes in fishing strategies. Implementing these measures could be affected by the need for administrative actions related to rebuilding plan changes.

4.3.2 Groundfish, Including Overfished Stocks

Adoption of rebuilding plans will have a long-term beneficial effect on overfished species, since managing to rebuilding targets will facilitate increases in stock size. Rebuilding plans generally require management measures that constrain catches of other, non-overfished groundfish stocks. Although these stocks are already managed to their target biomass under the FMP, rebuilding-plan-related constraints could make it more likely that these stocks return to, remain at, or increase to a level above their target biomass. As discussed above, the effects on groundfish stocks depend on the targets identified in individual rebuilding plans and the way in which management measures necessary to constrain catches to levels consistent with these targets. Choosing a target year closer to T_{MIN} would result in greater short-term reductions in fishing mortality, but stocks are more likely to recover to their target biomass in an earlier year than if the stock is managed for a later target year. More rapid recovery to the target biomass would allow an increase in harvests once the stock is recovered. Once a stock is recovered, the Magnuson-Stevens Act still requires that it be managed to produce MSY. Such management would mitigate potentially significant environmental impacts.

Ongoing management under the groundfish FMP takes up a considerable amount of time within the Council process. The Strategic Plan goal for harvest policies is to establish an allowable level of catch that prevents overfishing while achieving optimum yield based on the best available science. The related procedural mechanism is part of the periodic management cycle. The Council specifies OYs for groundfish species or species complexes and develops management measures intended to constrain harvests to these levels. Through 2003 this was done annually; with the adoption of Amendment 17, the Council will transition to a biennial process beginning in 2005-2006. (A new decision-making schedule will be phased in during the 2004 transition year.) The development of specifications and management measures for 2003 was a time consuming process, both for the Council and staff at NMFS NWR. An EIS was prepared in support of decision-making along with analyses for an emergency rule that had to be promulgated for January and February in order to allow public comment on the regulations for the remainder of the year. Five Council staff and three NMFS NWR staff had to devote a substantial part of their time between June and December 2002 to this task. The biennial process will reduce this workload since decision-making, supporting analysis and rulemaking for specifications and management measures will occur every other year. Nonetheless, given that this had become a complex and controversial process, ongoing groundfish management is likely to consume a large proportion of the Council's time. Reviewing and updating rebuilding plans, and amending the FMP and regulations is likely to impinge on the time available to consider specifications and management measures, especially since the same staff would be involved in both issues. There is some possibility, depending on which options are chosen, that rebuilding-plan-related activities could be combined with the biennial management process. For example, under Option 1d, management targets (e.g., T_{TARGET}, P_{MAX}) would be revised through notice and comment rulemaking. The same rulemaking process used for biennial specifications could be used for these revisions, supported by a single environmental document (EIS or EA). This could reduce the overall administrative burden.

If less time were available to provide supporting analyses and consider decisions related to biennial management, there would be greater risk of mis-specification of harvest levels. If harvest levels are set too high, rebuilding could be impeded or stocks not currently overfished could fall below the minimum stock size threshold. Lower harvest levels due to mis-specifications would reduce the environmental risk, but would result in socioeconomic impacts due to forgone short-term benefits from harvest.

The Council has been discussing delegating management of nearshore groundfish species occurring in California state waters and adjacent EEZ waters to that state. California has developed an FMP for 19 nearshore species. Sixteen of the 19 species included in the FMP are managed by the Council under the guidance of the Federal Groundfish Plan. Currently, fourteen of the sixteen species are actively managed by the Council (nearshore rockfish and California scorpionfish), while only two are monitored (cabezon and kelp greenling). The FMP cannot be fully implemented until the Council delegates or defers management authority, or removes the relevant species from the groundfish FMP. To date, the Council has decided there is insufficient staff time to devote to the process. As an alternative, California proposes developing regulations

that would be consistent with federal regulations in order to implement its FMP. Increased workload stemming from rebuilding plan requirements would further frustrate the Council's ability to delegate management authority. For the relevant federally-managed nearshore species, continued delay in implementing the nearshore FMP would only have a negative impact to the degree that state management is more environmentally beneficial than federal management. However, other state-managed species included in the state's FMP would be affected by any delay, assuming more effective management under the state's FMP.

NMFS is preparing a programmatic EIS for the groundfish FMP with a preliminary draft due to the Council by its September 2003 meeting. Thus, any administrative cost stemming from rebuilding plan revisions is unlikely to affect completion of this document, at least through the draft stage. But this EIS includes a range of alternatives, which represent different management programs including one representing elements in the Groundfish Strategic Plan. Over a longer time period, during which rebuilding-plan-related activity could have an effect on administrative resources, additional FMP amendments may be needed to implement policy recommendations from the Programmatic EIS. The Programmatic EIS evaluates management at a strategic level, and implementation of a preferred alternative could make groundfish management more effective reducing environmental impacts associated with fishing. More time spent on amendments to revise rebuilding plans would make it more difficult to implement measures (through FMP amendments for example) stemming from this analysis.

4.3.3 The Socioeconomic Environment

Cumulative socioeconomic impacts stemming from the adoption of rebuilding plans would depend on how the adopted targets differ from those currently used under interim rebuilding plans. Choice of earlier target years, especially for constraining stocks, would reduce catches of non-overfished species, reducing exvessel revenue and community income in comparison to current conditions. Choice of a later target year would have the opposite effect. Over the long term, as stocks recover to their target biomass, it should be possible to relax management restrictions in order to allow higher catches of non-overfished target species while still limiting harvests of overfished stocks to levels consistent with their rebuilding targets. However, if a target year very near or at T_{MIN} were chosen for one or more species, the short-term impacts could have long-term effects on the ability of individuals and communities to participate in fisheries in the future. Public, private, and social capital could be diverted elsewhere, making it more difficult to re-constitute fishing enterprises once more fish were made available for harvest.

Economic rationalization of groundfish fleets is the main socioeconomic issue currently facing groundfish fisheries. Rationalization entails matching extractive capacity, or capital and labor, to the available fishery resource. Capacity reduction is ranked as the highest priority in the Groundfish Strategic Plan. Congress recently authorized funding that, along with a loan fund, would establish a vessel buy-back program for groundfish limited entry trawl license-holders. First, however, licence-holders must vote by referendum to approve the program. If approved, program implementation may require an FMP amendment. The Council is also considering several other initiatives for fishery rationalization. Establishing license limitation (limited entry) programs for remaining open access groundfish fisheries is highest priority, although work is at a preliminary stage. The Council has also expressed an interest in implementing share-based management in order to promote economic efficiency, including capacity reduction.

Individual fishing quotas (IFQs), where fishers are assigned a specified harvest share or portion of the OY for a given species or species group, have been implemented in a range of fisheries in the U.S. and other countries (Tietenberg 2002). However, these systems have generated controversy because of concerns over equitable distribution of rights. Partly in response to these concerns, Congress established a moratorium on the use of IFQs, which was allowed to expire in late 2002. (Many expect that any reauthorization of the Magnuson-Stevens Act will contain guidelines for how IFQ management can be implemented. In the meantime there are no legal constraints on using this class of management measures.) Expiration of the Congressional ban has renewed the Council's interest in this approach. In the early 1990s, the Council planned to implement an IFQ program for groundfish fixed gear fisheries, but this effort was stymied by the Congressional ban. Instead, a permit stacking program was implemented, which has many features of a share-based approached. The Council is pursuing two tracks in this regard. First, it is interested in implementing a trawl permit stacking program, similar to the program in place for fixed gear fisheries. In the long term these programs could be supplanted by IFQs.

In addition to promoting economic efficiency, rationalization can make it easier to manage fisheries for sustainability if less complex management measures are needed. For example, trip limits, which indirectly limit fishing effort and ensure year-round harvest, should not be necessary. On the other hand, "quota-busting," or free riding, can be a problem in administering IFQs. Because bycatch, especially of overfished species, is a major concern, it would have to be accounted for as part of a quota system. Addressing these issues would require an effective, comprehensive at-sea monitoring program. The current observer program only covers a small proportion of all groundfish vessels. Although sufficient to estimate total catch through statistical techniques, a higher level of monitoring would likely be needed to administer a quota program.

Although the Council is interested in further rationalization through share-based management, in the short-to-medium term staff resources are insufficient to allow work to proceed. Programs of this nature would be complex and controversial (especially given the multi-species nature of groundfish fisheries and the problems presented by bycatch). This would require an extended deliberative process with substantial public involvement, and commensurately detailed analyses in support of any proposed actions. If staff resources were available, these efforts could be a major focus in the future. If the framework for rebuilding plans required a large commitment of staff resources it would be much less likely that rationalization measures could be developed and implemented.

4.3.4 Management Issues

During its November 2002 meeting, the Council was briefed on two proposed workshops to (1) evaluate current methods for calculating unfished biomass (B_0) and MSY, and (2) evaluate the current model used to account for bycatch in total catch estimates and consider how observer data might be used to improve model inputs. These issues are directly relevant to managing overfished species, since rebuilding strategies are predicated on unfished biomass and MSY estimates (to determine target biomass), and bycatch is the main component of total catch mortality for these species since retention is severely limited or prohibited. On a recommendation from the SSC, the bycatch workshop was held in late January 2003 while the scheduling of the B_0/MSY workshop was deferred for an "off year" under the impending multi-year management regime.

Administrative demands stemming from rebuilding plans would likely have minimal effect on these proposals. The bycatch workshop has already been held; efforts are focusing on the integration of observer data into the estimation model. This work is being carried out by science center staff at NMFS, who are minimally affected by administrative workload issues. Some of the members of the SSC and GMT are science center staff. To the degree that more of these committees' time is taken up with rebuilding plans, staff time would be diverted away from the activities described above. For example, if Option 3d is chosen, the GMT and SSC would review rebuilding progress, requiring an additional commitment. Scheduling of a future B_0/MSY workshop could be affected if off years in the management cycle are mainly taken up with rebuilding plan revisions and amendments. Both of these workshops are related to Strategic Plan goals emphasizing the need for better information to set management reference points (e.g., F_{MSY}) and estimate total fishery removals.

These efforts also have the potential to affect workload related to rebuilding plan revision. As discussed above, new estimates of unfished biomass would result in re-computation of rebuilding parameters. Any parameters specified in the FMP or regulations as ongoing reference points (as opposed to "historical" benchmarks as outlined in Option 1d) would have to be changed by amendment. New bycatch accounting methods, if they revealed that past techniques were under-estimating bycatch, could affect rebuilding probability estimates, with results analogous to the current situation described above for bocaccio.

5.0 CONSISTENCY WITH FMP OBJECTIVES AND THE MAGNUSON-STEVENS ACT

5.1 FMP Goals and Objectives

The groundfish FMP goals and objectives are listed below. They way in which Amendment 16-1 addresses each objective is briefly described in italics below the relevant statement.

Management Goals.

> Goal 1 - Conservation. Prevent overfishing by managing for appropriate harvest levels and prevent any net loss of the habitat of living marine resources.

As part of the changes to the FMP under this amendment, Goal 1 is changed to read "Prevent overfishing and rebuild overfished stocks by managing for appropriate harvest levels and prevent, to the extent practicable, any net loss of the habitat of living marine resources." This makes the goal more consistent with the Magnuson-Stevens Act and the purposes of this amendment.

> Goal 2 - Economics. Maximize the value of the groundfish resource as a whole.

> Goal 3 - Utilization. Achieve the maximum biological yield of the overall groundfish fishery, promote year-round availability of quality seafood to the consumer, and promote recreational fishing opportunities.

Objectives. To accomplish these management goals, a number of objectives will be considered and followed as closely as practicable:

Conservation.

> Objective 1. Maintain an information flow on the status of the fishery and the fishery resource which allows for informed management decisions as the fishery occurs.

Measures in this amendment will not affect this objective. Procedures for periodically reviewing and changing rebuilding plans will depend on reliable information about resource status.

> Objective 2. Adopt harvest specifications and management measures consistent with resource stewardship responsibilities for each groundfish species or species group.

Measures in this amendment will not affect this objective. But specified procedures for the adoption and implementation of rebuilding plans will facilitate effective management of overfished species.

> Objective 3. For species or species groups which are below the level necessary to produce maximum sustainable yield (MSY), consider rebuilding the stock to the MSY level and, if necessary, develop a plan to rebuild the stock.

As part of the changes to the FMP under this amendment, Objective 3 is changed to read "For species or species groups that are overfished, develop a plan to rebuild the stock as required by the Magnuson-Stevens Act." This change makes the objective more clearly linked to the stock rebuilding requirements of the Act and the intent of this amendment. The standards and procedures in this amendment facilitate the adoption and implementation of rebuilding plans and, therefore, support this objective.

> Objective 4. Where conservation problems have been identified for nongroundfish species and the best scientific information shows the groundfish fishery has a direct impact on the ability of that species to maintain its long-term reproductive health, the Council may consider establishing management measures to control the impacts of groundfish fishing on those species. Management measures may be imposed on the groundfish fishery to reduce fishing mortality of a nongroundfish species for documented conservation reasons. The action will be designed to minimize disruption of the groundfish fishery, in so far as consistent with the goal to minimize the bycatch of

nongroundfish species, and will not preclude achievement of a quota, harvest guideline, or allocation of groundfish, if any, unless such action is required by other applicable law.

Measures in this amendment do not address this objective.

Objective 5. Describe and identify essential fish habitat (EFH), adverse impacts on EFH, and other actions to conserve and enhance EFH, and adopt management measures that minimize, to the extent practicable, adverse impacts from fishing on EFH.

Measures in this amendment do not address this objective.

Economics.

Objective 6. Attempt to achieve the greatest possible net economic benefit to the nation from the managed fisheries.

This amendment does not address this objective directly. Rebuilding plan implementation should increase net benefits in the long term.

Objective 7. Identify those sectors of the groundfish fishery for which it is beneficial to promote year-round marketing opportunities and establish management policies that extend those sectors fishing and marketing opportunities as long as practicable during the fishing year.

Measures in this amendment do not address this objective.

Objective 8. Gear restrictions to minimize the necessity for other management measures will be used whenever practicable.

Measures in this amendment do not address this objective.

Utilization.

Objective 9. Develop management measures and policies that foster and encourage full utilization (harvesting and processing) of the Pacific coast groundfish resources by domestic fisheries.

Measures in this amendment do not address this objective.

Objective 10. Recognizing the multispecies nature of the fishery and establish a concept of managing by species and gear or by groups of interrelated species.

Measures in this amendment do not address this objective. Rebuilding plans, which will be incorporated and implemented in subsequent amendments, are species- or stock-specific, although associated rebuilding measures will necessarily affect more abundant stocks that co-occur with overfished stocks.

Objective 11. Strive to reduce the economic incentives and regulatory measures that lead to wastage of fish. Also, develop management measures that minimize bycatch to the extent practicable and, to the extent that bycatch cannot be avoided, minimize the mortality of such bycatch. In addition, promote and support monitoring programs to improve estimates of total fishing-related mortality and bycatch, as well as those to improve other information necessary to determine the extent to which it is practicable to reduce bycatch and bycatch mortality.

This amendment does not address this objective directly. The effect of harvest restrictions on bycatch rates could be addressed in rebuilding plans. Rebuilding plans must take into account total fishing mortality and rebuilding measures should also reduce bycatch.

Objective 12. Provide for foreign participation in the fishery, consistent with the other goals to take that portion of the optimum yield (OY) not utilized by domestic fisheries while minimizing conflict with domestic fisheries.

This objective is no longer relevant because the fishery has been declared fully utilized.

Social Factors.

Objective 13. When conservation actions are necessary to protect a stock or stock assemblage, attempt to develop management measures that will affect users equitably.

This amendment does not address this objective directly. Rebuilding plans may discuss allocation among sectors.

Objective 14. Minimize gear conflicts among resource users.

Measures in this amendment do not address this objective.

Objective 15. When considering alternative management measures to resolve an issue, choose the measure that best accomplishes the change with the least disruption of current domestic fishing practices, marketing procedures, and environment.

This amendment does not address this objective directly. The environmental impact analysis of rebuilding plan measures considers disruption of fishing, marketing and the environment. Some disruption is unavoidable.

Objective 16. Avoid unnecessary adverse impacts on small entities.

This amendment does not address this objective directly. Rebuilding plan measures may entail adverse impacts, but these are necessary to rebuild overfished stocks.

Objective 17. Consider the importance of groundfish resources to fishing communities, provide for the sustained participation of fishing communities, and minimize adverse economic impacts on fishing communities to the extent practicable.

This amendment does not address this objective directly. The environmental impact analysis of rebuilding plan measures considers impacts to communities.

Objective 18. Promote the safety of human life at sea.

Measures in this amendment do not address this objective.

Although Amendment 12, the original document specifying rebuilding plan form and content, was remanded in part, the goals and objectives for rebuilding plans enumerated in that document are still relevant. The amendment described five goals, which can be re-cast as objectives falling under the three FMP goals:

Conservation

1. Achieve the population size and structure that will support the maximum sustainable yield within the specified time period.

2. Protect the quantity and quality of habitat necessary to support the stock at healthy levels in the future.

3. Promote widespread public awareness, understanding and support for the rebuilding program.

Economics

4. Minimize, to the extent practicable, the social and economic impacts associated with rebuilding, including adverse impacts on fishing communities.

Utilization

5. Fairly and equitably distribute both the conservation burdens (overfishing restrictions) and recovery benefits among commercial, recreational and charter fishing sectors.

This amendment adheres to these objectives in establishing rebuilding plan elements and plan implementation and review procedures.

5.2 National Standards

An FMP or plan amendment and any pursuant regulations must be consistent with ten national standards contained in the Magnuson-Stevens Act (§301). These are:

National Standard 1 states that 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.

This amendment supports National Standard 1 by facilitating the adoption and implementation of rebuilding plans. Rebuilding plans lay out a strategy for stock rebuilding. Management measures implemented to achieve rebuilding must constrain harvests to a level below the overfishing threshold (maximum fishing mortality rate) for a given overfished species. Thus, in addition to establishing a strategy for stock rebuilding they also dictate the implementation of measures to prevent overfishing.

National Standard 2 states that conservation and management measures shall be based on the best scientific information available.

Rebuilding plans are based on rebuilding analyses that use the most recent stock assessment data and incorporate statistical measures of the likelihood that overfished stocks will recover within a mandated time period. These stock assessments and analyses are conducted by state and federal agency staff scientists with expertise in Pacific groundfish biology, ecology, and fishery science. They employ the best available data.

National Standard 3 states that, to the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

Pacific groundfish are managed on the basis of known stocks when these can be differentiated from the total range of the species. Overfished species are managed individually in that harvest levels are determined for each stock. But managers recognize that many groundfish stocks share common habitats and ecosystems, and fishers may catch them as part of a multi-species complex. This allows unit management of interrelated stocks. Thus management measures are applied to more abundant stocks co-occurring with overfished species that may limit harvests of the healthy stock below optimum yield in order to ensure rebuilding of the associated overfished stocks.

National Standard 4 states that conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges. The proposed measures will not discriminate between residents of different States.

This amendment and consequent rebuilding plans, to the degree that they specify allocation between sectors, will do so in a fair and equitable manner. Allocation decisions may be guided by rebuilding plan objectives and specific policies described in the plans. These decisions are made through the Council process and accordance with its established procedures and policies.

National Standard 5 states that conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

This amendment and resulting rebuilding plans do not address this National Standard directly, except that no measures are intended to allocate groundfish resources solely for the purpose of economic efficiency.

National Standard 6 states that conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources and catches.

This amendment and resulting rebuilding plans recognize the differences between the various groundfish fishery sectors. Different sectors may have different catch levels for overfished species and capacity to avoid or minimize catch of overfished species. Although the primary purpose of measures described in this amendment is to allow overfished stocks to recover, differential impacts were considered when formulating them.

National Standard 7 states that conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

Rebuilding plans will be implemented, reviewed and updated in a consistent and specific manner based on the measures in this amendment. Rebuilding plan measures are implemented through the harvest specifications and management measures process developed for the whole groundfish fishery. This approach is intended to minimize cost and duplication.

National Standard 8 states that conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

The analyses supporting this amendment and the individual rebuilding plans (organized around NEPA requirements) consider the socioeconomic impacts or rebuilding to fishing communities. Rebuilding plans generally do not employ a policy that would rebuild stocks in the minimum time period, which would very likely require a complete cessation of many fisheries. This is meant to minimize impacts to communities by allowing some level of fishing mortality on overfished stocks while identifying a trajectory that will lead to their eventual recovery.

National Standard 9 states that conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

Most overfished species are no longer targeted and in many cases only constitute bycatch due to regulatory discards. Because rebuilding plans must account for total fishing mortality, strategies must minimize bycatch. Rebuilding plan environmental impact analyses also evaluate the impact of the alternative management measures on bycatch.

National Standard 10 states that conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

This amendment does not directly affect safety. Cumulative effects of connected actions (rebuilding plan adoption) on safety are unlikely to differ in nature and intensity from the effects under current management. Management measures to rebuild overfished stocks will be implemented as part of rebuilding plan adoption and/or as part of the periodic harvest specification process. The effect of proposed management measures on safety is considered when these measures are developed.

5.3 Other Applicable Magnuson-Stevens Act Provisions

This amendment and associated rebuilding plans conform to Section 304(e)–Rebuild Overfished Fisheries. The procedural measures described in this EA address the requirement the Council "shall prepare a fishery management plan, plan amendment, or proposed regulations ... to end overfishing in the fishery and to rebuild affected stocks..." (§304(e)(3)). Pursuant rebuilding plans contain the elements required by Section 304(e)(4) and discussed in National Standard guidelines (50 CFR 600.310).

6.0 CROSS-CUTTING MANDATES

In addition to being prepared in accordance with the requirements of the Magnuson-Stevens Act and the National Environmental Policy Act, this document also addresses requirements of other applicable federal laws and Executive Orders. These laws and orders are described here and their applicability to this action assessed.

6.1 Other Federal Laws

6.1.1 Coastal Zone Management Act

Section 307(c)(1) of the Federal Coastal Zone Management Act (CZMA) of 1972 requires all federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. The preferred alternative would be implemented in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management programs of Washington, Oregon, and California. This determination has been submitted to the responsible state agencies for review under section 307(c)(1) of the CZMA. The relationship of the groundfish FMP with the CZMA is discussed in Section 11.7.3 of the groundfish FMP. The groundfish FMP has been found to be consistent with the Washington, Oregon, and California coastal zone management programs. The recommended action is consistent and within the scope of the actions contemplated under the framework FMP.

Under the CZMA, each state develops its own coastal zone management program which is then submitted for federal approval. This has resulted in programs which vary widely from one state to the next. Because the intent of Amendment 16-1 is administrative in nature—to establish the process and standards for adoption and review of rebuilding plans for overfished species—none of the alternatives are expected to affect any state's coastal management program.

6.1.2 Endangered Species Act

NMFS issued Biological Opinions under the ESA on August 10, 1990, November 26, 1991, August 28, 1992, September 27, 1993, May 14, 1996, and December 15, 1999 pertaining to the effects of the groundfish fishery on chinook salmon (Puget Sound, Snake River spring/summer, Snake River fall, upper Columbia River spring, lower Columbia River, upper Willamette River, Sacramento River winter, Central Valley spring, California coastal), coho salmon (Central California coastal, southern Oregon/northern California coastal), chum salmon (Hood Canal summer, Columbia River), sockeye salmon (Snake River, Ozette Lake), and steelhead (upper, middle and lower Columbia River, Snake River Basin, upper Willamette River, central California coast, California Central Valley, south-central California, northern California, southern California). During the 2000 Pacific whiting season, the whiting fisheries exceeded the chinook bycatch amount specified in the Pacific whiting fishery Biological Opinion's (December 15, 1999) incidental take statement estimate of 11,000 fish, by approximately 500 fish. In the 2001 whiting season, however, the whiting fishery's chinook bycatch was about 7,000 fish, which approximates the long-term average. After reviewing data from, and management of, the 2000 and 2001 whiting fisheries (including industry bycatch minimization measures), the status of the affected listed chinook, environmental baseline information, and the incidental take statement from the 1999 whiting BO, NMFS determined in a letter dated April 25, 2002 that a re-initiation of the 1999 whiting BO was not required. NMFS has concluded that implementation of the FMP for the Pacific Coast groundfish fishery is not expected to jeopardize the continued existence of any endangered or threatened species under the jurisdiction of NMFS, or result in the destruction or adverse modification of critical habitat. The proposed action is within the scope of these consultations.

6.1.3 Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) of 1972 is the principle federal legislation that guides marine mammal species protection and conservation policy in the United States. Under the MMPA, NMFS is responsible for the management and conservation of 153 stocks of whales, dolphins, porpoise, as well as seals, sea lions, and fur seals; while the U.S. Fish and Wildlife Service is responsible for walrus, sea otters, and the West Indian manatee.

Off the West Coast, the Steller sea lion (*Eumetopias jubatus*) eastern stock, Guadalupe fur seal (*Arctocephalus townsendi*), and southern sea otter (*Enhydra lutris*) California stock are listed as threatened under the ESA; and the sperm whale (*Physeter macrocephalus*) Washington, Oregon, and California (WOC) stock, humpback whale (*Megaptera novaeangliae*) WOC - Mexico stock, blue whale (*Balaenoptera musculus*) eastern north Pacific stock, and Fin whale (*Balaenoptera physalus*) WOC stock are listed as depleted under the MMPA. Any species listed as endangered or threatened under the ESA is automatically considered depleted under the MMPA.

The West Coast groundfish fisheries are considered a Category III fishery, indicating a remote likelihood of or no known serious injuries or mortalities to marine mammals, in the annual list of fisheries published in the *Federal Register*. Based on its Category III status, the incidental take of marine mammals in the West Coast groundfish fisheries does not significantly impact marine mammal stocks. Amendment 16-1 is administrative in nature and would not change the effects of the groundfish fisheries on marine mammals.

6.1.4 Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 was designed to end the commercial trade of migratory birds and their feathers that, by the early years of the 20th century, had diminished populations of many native bird species. The Act states that it is unlawful to take, kill, or possess migratory birds and their parts (including eggs, nests, and feathers) and is a shared agreement between the United States, Canada, Japan, Mexico, and Russia to protect a common migratory bird resource. The Migratory Bird Treaty Act prohibits the directed take of seabirds, but the incidental take of seabirds does occur. The proposed action is administrative in nature and is unlikely to affect the incidental take of seabirds protected by the Migratory Bird Treaty Act. The cumulative effect of connected actions on seabirds is not likely to significantly differ from current conditions.

6.1.5 Paperwork Reduction Act

The proposed action, as implemented by any of the alternatives considered in this EA, does not require collection of information subject to the Paperwork Reduction Act.

6.1.6 Regulatory Flexibility Act

The purpose of the Regulatory Flexibility Act (RFA) is to relieve small businesses, small organizations, and small governmental entities of burdensome regulations and record-keeping requirements. Major goals of the RFA are; (1) to increase agency awareness and understanding of the impact of their regulations on small business, (2) to require agencies communicate and explain their findings to the public, and (3) to encourage agencies to use flexibility and to provide regulatory relief to small entities. The RFA emphasizes predicting impacts on small entities as a group distinct from other entities and the consideration of alternatives that may minimize the impacts while still achieving the stated objective of the action. An initial regulatory flexibility analysis (IRFA) is conducted unless it is determined that an action will not have a "significant economic impact on a substantial number of small entities." The RFA requires that an IRFA include elements that are similar to those required by EO 12866 and NEPA. Therefore, the IRFA has been combined with the RIR and NEPA analyses.

Section 7 (below) summarizes the analytical conclusions specific to the RFA and EO 12866.

6.2 Executive Orders

6.2.1 EO 12866 (Regulatory Impact Review)

EO 12866, Regulatory Planning and Review, was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. EO 12866 covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. Section 1 of EO 12866 deals with the regulatory philosophy and principles that are to guide agency development of regulations. It stresses that in deciding whether and how to regulate, agencies should assess all of the costs and benefits across all regulatory alternatives. Based on this analysis, NMFS should

choose those approaches that maximize net benefits to society, unless a statute requires another regulatory approach.

The Regulatory Impact Review (RIR) and IRFA determinations are part of the combined summary analysis in Section 7 of this document.

6.2.2 EO 12898 Environmental Justice

EO 12898 obligates federal agencies to identify and address "disproportionately high adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States" as part of any overall environmental impact analysis associated with an action. NOAA guidance, NAO 216-6, at §7.02, states that "consideration of EO 12898 should be specifically included in the NEPA documentation for decision making purposes." Agencies should also encourage public participation—especially by affected communities—during scoping as part of a broader strategy to address environmental justice issues.

The environmental justice analysis must first identify minority and low-income groups that live in the project area and may be affected by the action. Typically, census data are used to document the occurrence and distribution of these groups. Agencies should be cognizant of distinct cultural, social, economic or occupational factors that could amplify the adverse effects of the proposed action. (For example, if a particular kind of fish is an important dietary component, fishery management actions affecting the availability or price of that fish could have a disproportionate effect.) In the case of Indian tribes, pertinent treaty or other special rights should be considered. Once communities have been identified and characterized and potential adverse impacts of the alternatives are identified, the analysis must determine whether these impacts are disproportionate. Because of the context in which environmental justice developed, health effects are usually considered and three factors may be used in an evaluation: whether the effects are deemed significant, as the term is employed by NEPA; whether the rate or risk of exposure to the effect appreciably exceeds the rate for the general population or some other comparison group; and whether the group in question may be affected by cumulative or multiple sources of exposure. If disproportionately high adverse effects are identified, mitigation measures should be proposed. Community input into appropriate mitigation is encouraged.

The EIS prepared for 2003 groundfish specifications and management measures (PFMC 2003) describes coastal communities affected by the proposed action and impacts to those communities. Available demographic data show that, coastal counties where these communities are located are variable in terms of social indicators like income, employment, and race and ethnic composition. However, equivalent data specific to the groups directly affected by the proposed action are not available. Treaty tribes harvesting West Coast groundfish are part of the Council's decision-making process on groundfish management issues; and tribes with treaty rights to salmon, groundfish, or halibut have a seat on the Council.

None of the changes to the FMP under Amendment 16-1 implemented by the proposed action directly affect groundfish allocations or harvest levels that could in turn disproportionately impact low income and minority populations. Actions pursuant to this amendment, most importantly the development of harvest specifications and management measures needed to ensure stock rebuilding could result in changes to coastal communities' income with possible disproportionate effects on low income and minority populations. These actions will be subject to future NEPA analyses in which environmental justice implications can be evaluated.

6.2.3 EO 13132 (Federalism)

Executive Order 13132, which revoked EO 12612, an earlier federalism Executive Order, enumerates eight "fundamental federalism principles." The first of these principles states, "Federalism is rooted in the belief that issues that are not national in scope or significance are most appropriately addressed by the level of government closest to the people." In this spirit, the Executive Order directs agencies to consider the implications of policies that may limit the scope of or preempt states' legal authority. Preemptive action having such "federalism implications" is subject to a consultation process with the states; such actions should not create unfunded mandates for the states; and any final rule published must be accompanied by a "federalism summary impact statement."

The Council process offers many opportunities for states (through their agencies, Council appointees, consultations, and meetings) to participate in the formulation of management measures. This process encourages states to institute complementary measures to manage fisheries under their jurisdiction that may affect federally managed stocks.

None of the proposed changes to the groundfish FMP would have federalism implications subject to EO 13132.

6.2.4 EO 13175 (Consultation and Coordination With Indian Tribal Government)

Executive Order 13175 is intended to ensure regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

The Secretary recognizes the sovereign status and co-manager role of Indian tribes over shared federal and tribal fishery resources. At Section 302(b)(5), the Magnuson-Stevens Act reserves a seat on the Council for a representative of an Indian tribe with federally-recognized fishing rights from California, Oregon, Washington, or Idaho.

The U.S. government formally recognizes the four Washington Coastal Tribes (Makah, Quileute, Hoh, and Quinault) have treaty rights to fish for groundfish. In general terms, the quantification of those rights is 50% of the harvestable surplus of groundfish available in the tribes' usual and accustomed (U and A) fishing areas (described at 50 CFR 660.324). Each of the treaty tribes has the discretion to administer their fisheries and to establish their own policies to achieve program objectives. Accordingly, tribal allocations and regulations have been developed in consultation with the affected tribe(s) and, insofar as possible, with tribal consensus.

None of the alternatives under consideration for Amendment 16-1 would affect tribal groundfish allocations.

6.2.5 EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds)

Executive Order (EO) 13186 supplements the Migratory Bird Treaty Act (above) by requiring federal agencies to work with the U.S. Fish and Wildlife Service to develop memoranda of agreement to conserve migratory birds. NMFS is scheduled to implement its memorandum of understanding by January 2003. The protocols developed by this consultation will guide agency regulatory actions and policy decisions in order to address this conservation goal. The EO also directs agencies to evaluate the effects of their actions on migratory birds in environmental documents prepared pursuant to the National Environmental Policy Act.

As discussed in this EA, the proposed action will not directly affect protected species, including seabirds, and were, therefore, not evaluated. The cumulative effect of connected actions is not likely to differ from current conditions.

7.0 REGULATORY IMPACT REVIEW AND REGULATORY FLEXIBILITY ANALYSIS

None of the proposed changes would be a significant action according to Executive Order (EO) 12866. This action will not have a cumulative effect on the economy of $100 million or more, nor will it result in a major increase in costs to consumers, industries, governmental agencies, or geographical regions. No significant adverse impacts are anticipated on competition, employment, investments, productivity, innovation, or competitiveness of U.S.-based enterprises (see RIR below in Section 7.1). The Small Business/Entities analysis addresses requirements of the Regulatory Flexibility Act. In addition to the information presented in the EA above, a basic economic profile of the fishery is provided in the Council's annual Groundfish Stock Assessment and Fishery Evaluation (SAFE) document.

7.1 Executive Order 12866 - Regulatory Impact Review (Elements Beyond Those Considered in the Environmental Assessment

The purpose of an RIR is to determine whether any of the proposed actions could be considered "significant regulatory actions" according to EO 12866. This analysis has many aspects in common with an EA. Much of the information required for RIR analysis is contained in the EA. Table 7-1 provides references for those required elements of RIR analysis that have already been addressed above.

TABLE 7-1. Regulatory Impact Review - Elements of Analysis

RIR Elements of Analysis	Corresponding Sections in EA
Description of management objectives	Section 1.3, also Chapter 4
Description of the fishery	Chapter 3 (also see the Groundfish SAFE document, and 2003 Groundfish Annual Specs EIS)
Statement of the problem	Section 1.2
Description of each alternative	Chapter 2
Economic analysis of the expected effects of each selected alternative relative to *status quo*	See below and discussion in Chapter 4

The proposed action in this amendment affects only the administrative process by which individual species rebuilding plans are formulated and so does not have significant adverse economic effects on consumers, producers, or processors of groundfish. The EA defines four issues for which options (alternatives) were identified and selected by the Council. Of these four issues, only the options identified under Issue 1 have regulatory implications. The remaining issues are concerned with setting internal Council standards for periodic review and modification of rebuilding plans (Issues 2 and 3), and defining the interaction of a rebuilding plan with recovery plans for a rebuilding species that is subsequently listed under the ESA (Issue 4).

While there may be slight differences between the alternatives in the amount of administrative capacity required to formulate and implement individual species rebuilding strategies, these differences are not quantifiable and will depend more on the variability of periodic stock assessments once a particular rebuilding plan is adopted than on the effects of these proposed actions or the subsequent adoption of individual rebuilding plans.

Table 7-2 summarizes the analysis of the possible regulatory actions under Issue 1 for the relevant RIR evaluation factors.

TABLE 7-2. RIR Tests of "Significant Regulatory Actions" for Issue 1: Form and required elements of rebuilding plans.

EO 12866 Test of "Significant Regulatory Actions"	Option 1a: status quo	Option 1b: numerically specify rebuilding parameters in the FMP	Option 1c: numerically specify T_{TARGET} and harvest control rule in regulations	Option 1d: numerically specify T_{TARGET} and harvest control rule in regulations, and describe the formulas and methodology for determining the other rebuilding parameters in the FMP
Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs or the environment, public health or safety, or state, local, or tribal governments or communities?	NO	NO	NO	NO
Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency?	NO	NO	NO	NO
Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof?	NO	NO	NO	NO
Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in EO 12866?	NO	NO	NO	NO

7.2 Impacts on Small Entities – Initial Regulatory Flexibility Analysis

The RFA requires government agencies to assess the effects that various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those effects. A fish-harvesting business is considered a "small" business by the Small Business Administration (SBA) if it has annual receipts not in excess of $3.5 million. For related fish-processing businesses, a small business is one that employs 500 or fewer persons. For wholesale businesses, a small business is one that employs not more than 100 people. For marinas and charter/party boats, a small business is one with annual receipts not in excess of $5.0 million.

Many of the vessels, processors, and related businesses engaged in the West Coast groundfish fishery are entities that would be classified as small businesses under the above definitions. While there will be no direct impact on small entities as a result of adopting any particular process for formulating rebuilding plans, the implementation of specific rebuilding plans for overfished species may entail substantial economic impacts for groundfish processors, commercial harvesters, and recreational charter vessels. However, these types of impacts are specific to particular stocks or species and so will be addressed in the individual rebuilding plans themselves.

Section 603 (b) of the RFA identifies the elements that should be included in the IRFA. These are bulleted below, followed by information that addresses each element.

- A description of the reasons why action by the agency is being considered.

The purpose and need for the proposed action are discussed in Section 1.2. In summary, there is an immediate need for this action to establish a framework describing how rebuilding plans for stocks that have been declared overfished will be adopted and how the contents of those plans will be codified in regulations or the FMP. National Standard 1 in the Magnuson-Stevens Act requires conservation and management

measures that prevent overfishing. This framework is needed to guide the development and adoption of subsequent rebuilding plans.

- A succinct statement of the objectives of, and legal basis for, the proposed rule.

The objective of the proposed action is to establish consistent process and standards for formulating rebuilding plans for overfished species. The proposed action is also consistent with the Magnuson-Stevens Act and National Standards.

- A description and, where feasible, an estimate of the number of small entities to which the proposed rule will apply.

The proposed action applies directly to the administrative process used to formulate and adopt rebuilding plans for overfished species and only indirectly affects rebuilding plans adopted for individual species. As such, the proposed action has no impact or differential effects on small entities. The economic impacts of subsequent individual rebuilding plans on groundfish processors, commercial harvesting, and recreational charter vessels will be addressed in the rebuilding plans themselves.

- A description of the projected reporting, record-keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirements of the report or record.

The proposed action would not require new reporting, record-keeping, or other compliance requirements.

- An identification, to the extent practicable, of all relevant federal rules, which may duplicate, overlap, or conflict with the proposed rule.

The proposed action would not duplicate, overlap, or conflict with relevant federal rules.

- Summary of impacts

The proposed action would affect only the process by which rebuilding measures are formulated and adopted. As such, it would have no impact on consumers, groundfish processors, commercial harvesters, or recreational charter vessels.

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APPENDIX A
Amendments to FMP Language

This appendix documents revisions to the FMP based on the Council's preferred alternative under Issues 1-4 in Chapter 2.

GUIDE TO SECTIONS AFFECTED BY ISSUES CONSIDERED IN THE FMP AMENDMENT

	Issue	Affected Sections
Issue 1	Form & Required Elements of Species Rebuilding Plans	4.5.2 4.5.3 4.5.4
Issue 2	Process for Periodic Review and Rebuilding Plans	4.5.3.5
Issue 3	Events or Standards that Would Trigger Revision of a Rebuilding Plan	4.5.3.5
Issue 4	ESA Listed Species	4.5.3.6
	Housekeeping Measures	Section 2.1, Goals and Objectives; Table 3-1; All Sections of Chapters 4 and 5; Section 6.5.1.2, Observers

SUMMARY OF CHAPTER 4 AND 5 REORGANIZATION

Sections in Amended Text	From Heading and/or Text in Original
4.0 (new text)	–
4.1	5.3
4.2	5.2
4.3	5.3
–	5.3.1- heading deleted
4.3.1	5.3.1.1
4.3.2	5.3.1.2
4.3.3	5.3.1.3
4.4	–
4.4.1	5.3.3
4.4.2	– text from 5.3.6.2
4.4.3	5.3.4
4.5	–
4.5.1	5.3.5
4.5.2	– text from 5.3.6.2
4.5.3	5.3.6
4.5.3.1	5.3.6.1
4.5.3.2	5.3.6.2
4.5.3.3	5.3.6.3
4.5.3.4	–
4.5.3.5	5.3.6.3
4.5.3.6	5.3.6.3
4.5.3.7	–
4.5.4	–
4.6	4.0, 5.3.2
4.6.1	5.3.2 (elevated subheading)
4.6.2	5.3.2 (elevated subheading)
4.6.3	5.3.2 (elevated subheading)
5.0	5.0

Sections in Amended Text	From Heading and/or Text in Original
5.1	5.0
5.2	5.1
5.3	5.4
–	5.5- section deleted
5.4	5.6
5.5	5.7
5.5.1	5.7.1
5.5.2	5.7.2
–	5.7.3- section deleted

KEY TO AFFECTED FMP LANGUAGE

Underline - inserted text
~~Strikeout~~ - deleted text
[Brackets and **boldface]** - notes on reorganization
{Braces and **boldface}--** - moved text, referenced by new heading numbers. (Original heading numbers may be referenced as appropriate.) Text in original location shown in *grey italic*.
Highlight - pending changes from Amendment 17

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TABLE OF CONTENTS FOR THE AFFECTED SECTIONS OF THE FMP

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2.0 GOALS AND OBJECTIVES

2.1 Goals and Objectives for Managing the Pacific Coast Groundfish Fishery

* * *

Management Goals.

Goal 1 - Conservation. Prevent overfishing and rebuild overfished stocks by managing for appropriate harvest levels and prevent, to the extent practicable, any net loss of the habitat of living marine resources.

* * *

Objective 3. For species or species groups ~~which are below the level necessary to produce maximum sustainable yield (MSY)~~ that are overfished, ~~consider rebuilding the stock to the MSY level and, if necessary,~~ develop a plan to rebuild the stock as required by the Magnuson-Stevens Act.

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3.0 AREAS AND STOCKS INVOLVED

* * *

3.1 Species Managed by this Fishery Management Plan

Table 3-1 is the listing of species managed under this FMP.

TABLE 3-1. Common and scientific names of species included in this FMP.

Common Name	Scientific Name
	SHARKS
Leopard shark	*Triakis semifasciata*
Soupfin shark	*Galeorhinus zyopterus*
Spiny dogfish	*Squalus acanthias*
Big skate	*Raja binoculata*
California skate	*R. inornata*
Longnose skate	*R. rhina*
	RATFISH
Ratfish	*Hydrolagus colliei*
	MORIDS
Finescale codling	*Antimora microlepis*
	GRENADIERS
Pacific rattail	*Coryphaenoides acrolepis*
	ROUNDFISH
Lingcod	*Ophiodon elongatus*
Cabezon	*Scorpaenichthys marmoratus*
Kelp greenling	*Hexagrammos decagrammus*
Pacific cod	*Gadus macrocephalus*
Pacific whiting (hake)	*Merluccius productus*
Sablefish	*Anoplopoma fimbria*
	ROCKFISH[a/]
Aurora rockfish	*Sebastes aurora*
Bank rockfish	*S. rufus*
Black rockfish	*S. melanops*
Black and yellow rockfish	*S. chrysomelas*
Blackgill rockfish	*S. melanostomus*
Blue rockfish	*S. mystinus*
Bocaccio	*S. paucispinis*
~~Bronze spotted~~ Bronzespotted rockfish	*S. gilli*
Brown rockfish	*S. auriculatus*
Calico rockfish	*S. dallii*
California scorpionfish	*Scorpaena gutatta*
Canary rockfish	*Sebastes pinniger*
Chameleon rockfish	*S. phillipsi*
Chilipepper	*S. goodei*
China rockfish	*S. nebulosus*
Copper rockfish	*S. caurinus*
Cowcod	*S. levis*
Darkblotched rockfish	*S. crameri*
Dusky rockfish	*S. ciliatus*
Dwarf-red rockfish	S. rufinanus
Flag rockfish	*S. rubrivinctus*
Freckled rockfish	S. lentiginosus
Gopher rockfish	*S. carnatus*
Grass rockfish	*S. rastrelliger*
Greenblotched rockfish	*S. rosenblatti*
Greenspotted rockfish	*S. chlorostictus*
Greenstriped rockfish	*S. elongatus*

TABLE 3-1. Common and scientific names of species included in this FMP.

Common Name	Scientific Name
Halfbanded rockfish	S. semicinctus
Harlequin rockfish	*S. variegatus*
Honeycomb rockfish	*S. umbrosus*
Kelp rockfish	*S. atrovirens*
Longspine thornyhead	*Sebastolobus altivelis*
Mexican rockfish	*Sebastes macdonaldi*
Olive rockfish	*S. serranoides*
Pink rockfish	*S. eos*
Pinkrose rockfish	*S. simulator*
Pygmy rockfish	*S. wilsoni*
Pacific ocean perch	~~*Sebastes*~~ *S. alutus*
Quillback rockfish	*S. maliger*
Redbanded rockfish	*S. babcocki*
Redstripe rockfish	*S. proriger*
Rosethorn rockfish	*S. helvomaculatus*
Rosy rockfish	*S. rosaceus*
Rougheye rockfish	*S. aleutianus*
Sharpchin rockfish	*S. zacentrus*
Shortbelly rockfish	*S. jordani*
Shortraker rockfish	*S. borealis*
Shortspine thornyhead	*Sebastolobus alascanus*
Silvergray rockfish	*Sebastes brevispinis*
Speckled rockfish	*S. ovalis*
Splitnose rockfish	*S. diploproa*
Squarespot rockfish	*S. hopkinsi*
Starry rockfish	*S. constellatus*
Stripetail rockfish	*S. saxicola*
Swordspine rockfish	*S. ensifer*
Tiger rockfish	*S. nigrocinctus*
Treefish	*S. serriceps*
Vermilion rockfish	*S. miniatus*
Widow rockfish	*S. entomelas*
Yelloweye rockfish	*S. ruberrimus*
Yellowmouth rockfish	*S. reedi*
Yellowtail rockfish	*S. flavidus*
	FLATFISH
Arrowtooth flounder (turbot)	*Atheresthes stomias*
Butter sole	*Isopsetta isolepis*
Curlfin sole	*Pleuronichthys decurrens*
Dover sole	*Microstomus pacificus*
English sole	*Parophrys vetulus*

TABLE 3-1. Common and scientific names of species included in this FMP.

Common Name	Scientific Name
	FLATFISH (continued)
Flathead sole	*Hippoglossoides elassodon*
Pacific sanddab	*Citharichthys sordidus*
Petrale sole	*Eopsetta jordani*
Rex sole	*Glyptocephalus zachirus*
Rock sole	*Lepidopsetta bilineata*
Sand sole	*Psettichthys melanostictus*
Starry flounder	*Platichthys stellatus*

a/ The category "rockfish" includes all genera and species of the family ~~Scopaenidae~~ Scorpaenidae, even if not listed, that occur in the Washington, Oregon, and California area. The ~~Scopaenidae~~ Scorpaenidae genera are *Sebastes, ~~Scorpana~~ Scorpaena, Sebastolobus, and ~~Scorp~~ Scorpaenodes*.

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4.0 PREVENTING OVERFISHING AND ACHIEVING OPTIMUM YIELD

National Standard 1 requires that "Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the OY from each fishery for the U.S. fishing industry." (50 CFR 600.310(a))

"The determination of OY is a decisional mechanism for resolving the Magnuson-Stevens Act's multiple purposes and policies, implementing an FMP's objectives and balancing the various interests that comprise the national welfare. OY is based on MSY, or on MSY as it may be reduced ... [in consideration of social, economic or ecological factors].... The most important limitation on the specification of OY is that the choice of OY and the conservation and management measures proposed to achieve it must prevent overfishing." (50 CFR Section 600.310(b))

This chapter addresses the essential considerations suggested for National Standard 1, as identified in the NMFS guidelines on the standard (600.310):

- Estimating MSY, estimated the MSY biomass and setting the MSY control rule (50 CFR 600.310(c); Section 4.2 of this Chapter).
- Specifying stock status determination criteria (maximum fishing mortality threshold and minimum stock size threshold, or reasonable proxies thereof) (50 CFR 600.310(d); Section 4.4 of this Chapter).
- Actions for ending overfishing and rebuilding overfished stocks (including the development and adoption of rebuilding plans) (50 CFR 600.310(e); Section 4.5 of this Chapter).
- Setting OY and apportionment of harvest levels (50 CFR 600.310(f); Section 4.6 of this Chapter).

In establishing OYs for West Coast groundfish, this FMP uses the interim step of calculating ABCs for major stocks or management units (groups of species). ABC is the MSY harvest level associated with the current stock abundance. Over the long term, if ABCs are fully harvested, the average of the ABCs would be MSY.

OY is set and apportioned under the procedures outlined in Chapter 5.

4.1 Species Categories

[New section title, previously portions of 5.3, as indicated]

{From new section 4.3, para 2 ~~ABC,~~ B_{MSY}, ABC and the overfished/rebuilding stock size threshold cannot be precisely defined for all species, because of the absence of available information for many species managed under the FMP.**}--**. **{From new section 4.3, para 3** For the purpose of setting MSY, ABC, the maximum fishing mortality threshold (MFMT), the minimum stock size threshold (MSST), OY and rebuilding standards, ~~T~~three categories of species are identified. The first are the relatively few species for which a quantitative stock assessment can be conducted on the basis of catch-at-age or other data. ABCs and overfished/rebuilding thresholds can generally be calculated for these species. The second category includes a large number of species for which some biological indicators are available, but a quantitative analysis cannot be conducted. It is difficult to estimate overfished and overfishing thresholds for the second category of species *a priori*, but indicators of long-term, potential overfishing can be identified. ABCs for species in this category are typically set at a constant level and some monitoring is necessary to determine if this level of catch is causing a slow decline in stock abundance. The third category includes minor species which are caught, but for which there is, at best, only information on landed biomass. For species in this category, it is impossible to determine MSY, ABC, or an overfished threshold.**}--**

4.2 Determination of MSY or MSY Proxy and B_{MSY}

[Previously 5.2]

Harvest policies are to be specified according to standard reference points such as MSY (MSY, interpreted as ~~an~~ a maximum average achievable catch under prevailing ecological and environmental conditions over a prolonged period), the long-term average biomass associated with fishing at F_{MSY} is B_{MSY}. ~~the biomass that produces MSY (B_{MSY}) and the fishing rate (F_{MSY}) that tends to hold biomass near B_{MSY}~~. In this FMP, MSY

generally refers to a constant F control rule that is assumed to produce the maximum average yield over time while protecting the spawning potential of the stock. Thus the constant F control rule is generally the proxy for the MSY control rule. ~~. (Pacific whiting is generally based on a variable F control rule.)~~ Fishing rates above F_{MSY} eventually result in biomass smaller than B_{MSY} and produce less harvestable fish on a sustainable basis. Accordingly, management should avoid fishing rates that hold biomass below B_{MSY} for long periods. **{From this section below** The biomass level that produces MSY (i.e., B_{MSY}) is generally unknown and assumed to be variable over time due to long-term fluctuations in ocean conditions, so that no single value is appropriate.**}--** ~~This is especially important during periods of unfavorable environment in which resources may be less productive than usual and the risk of stock depletion is greater.~~ During periods of unfavorable environment it is important to account for reduced sustainable yield levels.

The problem with an F_{MSY} control rule is that it is tightly linked to an assumed level of density-dependence in recruitment, and there is insufficient information to determine the level of density-dependence in recruitment for many West Coast groundfish stocks. Therefore, the use of approximations or proxies is necessary. Absent a more accurate determination of F_{MSY}, the Council will apply default MSY proxies. The current (~~1998~~ 2001) proxies are: $F_{40\%}$ for flatfish and whiting, $F_{50\%}$ for rockfish (including thornyheads) and $F_{45\%}$ ~~$F_{35\%}$~~ for all species such as sablefish and lingcod ~~except rockfish and $F_{40\%}$ for rockfish~~[1/]. However, ~~these~~ values (~~$F_{35\%}$~~ $F_{40\%}$, $F_{45\%}$ and ~~$F_{40\%}$~~ $F_{50\%}$) are provided here as examples only and are expected to be modified from time to time as scientific knowledge improves. If available information is sufficient, values of F_{MSY}, B_{MSY}, and more appropriate harvest control rules may be developed for any species or species group. ~~For example, the Council generally has applied a variable F control rule for management of Pacific whiting.~~

At this time, it is generally believed that, for many species, ~~$F_{35\%}$~~ $F_{45\%}$ strikes a balance between obtaining a large fraction of the MSY if recruitment is highly insensitive to reductions in spawning biomass and preventing a rapid depletion in stock abundance if recruitment is found to be extremely sensitive to reductions in spawning biomass. The long-term expected yield under an ~~$F_{35\%}$~~ $F_{45\%}$ policy depends upon the (unknown) level of density-dependence in recruitment. The recommended level of harvest will reduce the average lifetime egg production by each female entering the stock to ~~35%~~ 45% of the lifetime egg production for females that are unfished.

Because the level of recruitment is expected to decline somewhat as a stock is fished at $F_{45\%}$, the expected B_{MSY} proxy is less than 45% of the unfished biomass. A biomass level of 40% is a reasonable proxy for B_{MSY}. The short-term yield under an ~~$F_{35\%}$~~ $F_{45\%}$ policy will vary as the abundance of the exploitable stock varies. This is true for any fishing policy that is based on a constant exploitation rate. The abundance of the stock will vary, because of the effects of fishing, and because of natural variation in recruitment. When stock abundance is high (i.e., near its average unfished level), short-term annual yields can be approximately two to three times greater than the expected long-term average annual yield. For many of the long-lived groundfish species common on the West Coast, this "fishing down" transition can take decades. Many of the declines in ABC that occurred during the 1980s were the result of this transition from a lightly exploited, high abundance stock level to a fully exploited, moderately abundant stock level. Further declines below the overfished levels in the 1990s were due mostly to much lower than expected recruitment.

~~Recent work (Clark 1993, Mace 1994, and Ianelli 1995) indicates that $F_{35\%}$ may not be the best approximation of F_{MSY}, given more realistic information about recruitment than was initially used by Clark in 1991. In his 1993 publication Clark extended his 1991 results by improving the realism of his simulations and analysis. In particular he (1) modeled stochasticity into the recruitment process, (2) introduced serial correlation into recruitment time series, and (3) performed separate analyses for the Ricker and Beverton-Holt spawner-recruit functions. For rockfish, these changes improved the realism of his spawning biomass per recruit (SPR) harvest policy calculations, because these species are known to have stochastic recruitment and they appear to display serial correlation in recruitments (especially on interdecadal time scales), and because the Beverton-Holt spawner-recruit curve may be biologically the most plausible recruitment model. The effect of each of these changes, in isolation and in aggregate, was to decrease F_{MSY}. Consequently, the estimated~~

~~1/ In the rest of this document use of $F_{35\%}$ will be taken to mean $F_{40\%}$ in the case of rockfish, and the hybrid fishing mortality rate strategy for Pacific whiting.~~

~~SPR reduction needed to provide an optimal F_{MSY} proxy (defined as that level of fishing which produces the largest assured proportion of MSY), must necessarily be increased. Clark concluded that $F_{40\%}$ is the optimal rate for fish stocks exhibiting recruitment variability similar to Alaska groundfish stocks. Likewise, Mace (1994) recommended the use of $F_{40\%}$ as the target mortality rate when the stock recruitment relationship is unknown. Lastly, Ianelli (1995) determined that $F_{44\%}$ was a good F_{MSY} proxy for Gulf of Alaska Pacific ocean perch, although he subsequently indicated that a recent recruitment to that stock was larger than expected and that $F_{44\%}$ may be too conservative in that case.~~

~~Based on this information and advice by its Groundfish Management Team, in 1997 the Council concluded that $F_{40\%}$ should be used as the proxy for F_{MSY} for rockfish in the absence of specific knowledge of recruitment or life history characteristics which would allow a more accurate determination of F_{MSY}. This and other proxies may be revised on the basis of further information and experience.~~

In spring 2000, the Council's Scientific and Statistical Committee (SSC) sponsored a workshop to review the Council's groundfish exploitation rate policy. The workshop explored the historic use of different fishing mortality (F) rates and found that the Council's past practices have generally changed in response to new information from the scientific community. Starting in the early 1990s, the Council used a standard harvest rate of $F_{35\%}$. The SSC's workshop participants reported that new scientific studies in 1998 and 1999 had shown that the $F_{35\%}$ and F_{40}% rates used by the Council had been too aggressive for Pacific Coast groundfish stocks, such that some groundfish stocks could not maintain a viable population over time. A 1999 study, *The Meta-Analysis of the Maximum Reproductive Rate for Fish Populations to Estimate Harvest Policy; a Review* (Myers, et al.) showed that Pacific Coast groundfish stocks, particularly rockfish, have very low productivity compared to other, similar species worldwide. One prominent theory about the reason for this low productivity is the large-scale North Pacific climate shifts that are thought to cycle Pacific Coast waters through warm and cool phases of 20-30 years duration. Pacific Coast waters shifted to a warm phase around 1977-1978, with ocean conditions less favorable for Pacific Coast groundfish and other fish stocks. Lower harvest rates are necessary to guard against steep declines in abundance during these periods of low productivity (low recruitment). After an intensive review of historic harvest rates, and current scientific literature on harvest rates and stock productivity, the SSC workshop concluded that $F_{40\%}$ is too aggressive for many Pacific Coast groundfish stocks, particularly for rockfish. For 2001 and beyond, the Council adopted the SSC's new recommendations for harvest policies of: $F_{40\%}$ for flatfish and whiting, $F_{50\%}$ for rockfish (including thornyheads) and $F_{45\%}$ for other groundfish such as sablefish and lingcod.

In the past, F_{MSY} ~~these~~ fishing rates were treated by the Council (as intended) as targets. Under the Magnuson-Stevens Act as amended in 1996, these fishing rates are more appropriately considered to be ~~limits~~ thresholds ~~which~~ that should not be exceeded (see Section 4.4). **{To new section 4.4.2** *Technically, exceeding F_{MSY} now constitutes overfishing.*}--

The Council will consider any new scientific information relating to calculation of MSY or MSY proxies and may adopt new values based on improved understanding of the population dynamics and harvest of any species or group of species.

{To this section above *The biomass level that produces MSY (i.e., B_{MSY}) is also generally unknown and assumed to be variable over time due to long-term fluctuations in ocean conditions, so that no single value is appropriate.*}-- ~~Current scientific thought is that B_{MSY} (and/or the natural range of biomass under F_{MSY}) usually falls somewhere between 0.3 to 0.5 of the average unfished abundance (mean $B_{unfished}$), and rarely falls below one quarter of that amount, (i.e., B_{MSY} > 0.25 mean $B_{unfished}$). Rebuilding, or at least a reduced harvest rate, may be required if abundance falls below these levels.~~

While B_{MSY} may be set based on the averaged unfished abundance ($B_{unfished}$) ~~T~~there are many possible approximations and estimates of mean $B_{unfished}$. If the necessary data exist, the following standard methodology is the preferred approach:

mean $B_{unfished}$ = mean R * SPR(F=0)

Where mean R is the average estimated recruitment expected under unfished conditions ~~over all reliable years~~, and SPR(F=0) is the spawning potential per recruit at zero fishing mortality rate. ~~Alternative reference points based on mean R * SP($F_{35\%}$) or reconstruction of mean $B_{unfished}$ from stock-recruitment relationships may also be used.~~ SPR(F=0) is normally available as part of the calculation leading to determination of ~~$F_{35\%}$~~ $F_{45\%}$ and is equivalent to $F_{100\%}$.

4.3 Determination of ABC ~~OY, Precautionary Threshold, and (Overfished/Rebuilding Threshold)~~

[Previously 5.3]

~~The Magnuson-Stevens Act as amended in 1996 defines OY as the amount of fish that is prescribed on the basis of MSY from the fishery as reduced by any relevant economic, social, or ecological factors. By this definition, overfishing occurs if a stock is harvested at a level in excess of F_{MSY}. Moreover, overfished stocks (i.e., those that have declined to below a specified (overfished/rebuilding threshold)) are to be rebuilt to a level that is consistent with producing MSY.~~ In establishing OYs for West Coast groundfish, this FMP utilizes the interim step of calculating ABCs for major stocks or management units (groups of species). ABC is the MSY harvest level associated with the current stock abundance. Over the long term, if ABCs are fully harvested, the average of the ABCs would be MSY.

{To new section 4.1 *ABC, B_{MSY}, and overfished/rebuilding stock size threshold cannot be precisely defined for all species, because of the absence of available information for many species managed under the FMP.* **}--**
{To new section 4.4.2 *In this FMP, the term "overfishing" is used to denote situations where catch exceeds or is expected to exceed the established ABC or MSY proxy ($F_{x\%}$). The term "overfished" describes a stock who's abundance is below its overfished/rebuilding threshold). Overfished/rebuilding thresholds in general, are linked to the same productivity assumptions that determine the ABC levels. The default value of this threshold is 25% of the estimated unfished biomass level or 50% of B_{MSY}, if known.* **}--**

{To new Section 4.1 *Three categories of species are identified. The first are the few species for which a quantitative stock assessment can be conducted on the basis of catch-at-age or other data. ABCs and overfished/rebuilding thresholds can generally be calculated for these species. The second category includes a large number of species for which some biological indicators are available, but a quantitative analysis cannot be conducted. It is difficult to estimate overfished and overfishing thresholds for the second category of species a priori, but indicators of long term, potential overfishing can be identified. ABCs for species in this category are typically set at a constant level and some monitoring is necessary to determine if this level of catch is causing a slow decline in stock abundance. The third category includes minor species which are caught, but for which there is, at best, only information on landed biomass. For species in this category, it is impossible to determine MSY, ABC, or an overfished threshold.* **}--**

~~For category 1 species, in addition to the overfished/rebuilding threshold, a precautionary threshold is established. The default value will be 40% of mean $B_{unfished}$. This level of biomass is expected to be near B_{MSY}, and if abundance is between the overfished/rebuilding threshold and the precautionary threshold, a precautionary reduction in harvest will implemented to avoid further declines in abundance.~~ **[This paragraph is deleted because it is redundant with revised text in new section 4.4.1.]**

[Heading 5.3.1 (Determination of ABC) deleted as redundant.]

4.3.1 Stocks with Quantitative Assessments, Category 1

[Previously 5.3.1.1]

The stocks with quantitative assessments are those that have recently been assessed by a catch-at-age analysis. Annual evaluation of the appropriate MSY proxy (e.g., ~~$F_{35\%}$~~ $F_{45\%}$) for species in this category will require some specific information in the SAFE document. Estimated age-specific maturity, growth, and availability to the fishery (with evaluation of changes over time in these characteristics) are sufficient to determine the relationship between fishing mortality and yield-per-recruit and spawning biomass-per-recruit. The estimated time series of recruitment, spawning biomass, and fishing mortality are also required to

determine whether recent trends indicate a point of concern. In general, ABC will be calculated by applying ~~$F_{35\%}$~~ $F_{45\%}$ (or $F_{40\%}$ or $F_{50\%}$ or other established MSY proxy) to the best estimate of current biomass. This current biomass estimate may be for a single year or the average of the present and several future years. Thus, ABC may be intended to remain constant over a period of three or more years. **{To new section 5.4** *All ABCs will remain in effect until revised, and, whether revised or not, will be announced at the beginning of the year along with other specifications.***}--**

4.3.2 Stocks with ABC Set by Nonquantitative Assessment, Category 2

[Previously 5.3.1.2]

These stocks with ABC set by nonquantitative assessments typically do not have a recent, quantitative assessment, but there may be a previous assessment or some indicators of the status of the stock. Detailed biological information is not routinely available for these stocks, and ABC levels have typically been established on the basis of average historical landings. Typically, the spawning biomass, level of recruitment, or the current fishing mortality rate for Category 2 stocks are unknown. The Council places high priority on improving the information for managing these stocks so that they may be moved to Category 1 status.

4.3.3 Stocks Without ABC Values, Category 3

[Previously 5.3.1.3]

Of the 83 groundfish species managed under the FMP, ABC values have been established for only about 25. The remaining species are incidentally landed and usually are not listed separately on fish landing receipts. Information from fishery independent surveys are often lacking for these stocks, because of their low abundance or they are not vulnerable to survey sampling gear. ~~Without an~~ Until sufficient quantities of at-sea observer program data are available or surveys of other fish habitats are conducted, it is unlikely that ~~a data base~~ there will be ~~developed in the future for these stocks to~~ sufficient data to upgrade the assessment ~~capability~~ capabilities or to evaluate their overfishing potential. Interim ABC values may be established for these stocks based on qualitative information, including advice from the Council's advisory entities.

[Original section 5.3.2 (Determination of OY) moved to new section 4.6.]

4.4 Precautionary Thresholds and Overfishing Status Determination Criteria

[New section]

The National Standard Guidelines define two thresholds that are necessary to maintain a stock at levels capable of producing MSY: the maximum fishing mortality threshold (MFMT) and a minimum stock size threshold (MSST). These two limits are intended for use as benchmarks to decide if a stock or stock complex is being overfished or is in an overfished state. The MFMT and MSST are intrinsically linked through the MSY control rule, which specifies how fishing mortality or catches could vary as a function of stock biomass in order to achieve yields close to MSY.

4.4.1 Determination of Precautionary Thresholds

[Previously 5.3.3]

The precautionary threshold is the biomass level at which point the harvest rate will be reduced to help the stock return to the MSY level (see Section 4.5.1 "Default Precautionary and Interim Rebuilding OY Calculation"). The precautionary biomass threshold is in addition to the overfishing and overfished/rebuilding thresholds required under ths Magnuson-Stevens Act (MFMT and MSST). The precautionary biomass threshold is higher than the overfished biomass (MSST). Because B_{MSY} is a long term average, biomass will by definition be below B_{MSY} in some years and above B_{MSY} in other years. Thus, even in the absence of overfishing, biomass may decline to levels below B_{MSY} due to natural fluctuation. By decreasing harvest rates when biomass is below B_{MSY} but maintaining MSY control rule (or proxy control rule) harvest rates for biomass

levels above MSY, the precautionary threshold and accompanying response effectively constitute a control rule that manages for harvests lower than MSY and an average biomass above MSY.

The precautionary threshold is established only for category 1 species. The precautionary threshold will be the B_{MSY} level, if known. The default precautionary threshold will be 40% of the estimated unfished biomass level. The Council may recommend different precautionary thresholds for any species or species group based on the best scientific information about that species or group. It is expected the threshold will be between 25% and 50% of the estimated unfished biomass level.

4.4.2 Determination of Overfishing Threshold

[New section]

{From new Section 4.3 In this FMP, for Category 1 species, the term "overfishing" is used to denote situations where catch exceeds or is expected to exceed the established ABC or MSY proxy ($F_{x\%}$). This can also be expressed as where catch exceeds or is expected to exceed the MFMT. The term "overfished" describes a stock whose abundance is below its overfished/rebuilding threshold, or MSST). Overfished/rebuilding thresholds, in general, are linked to the same productivity assumptions that determine the ABC levels. The default value of this threshold is 25% of the estimated unfished biomass level or 50% of B_{MSY}, if known.**}--** The MFMT is simply the value(s) of fishing mortality in the MSY control rule. **{From new Section 4.2** Technically, exceeding F_{MSY} ~~now~~ constitutes overfishing.**}--**

{From new section 4.5.3.3 (text to end of section) For Category 2 species, the following may be evaluated as potential indicators of overfishing:

- catch per effort from logbooks
- catch area from logbooks
- index of stock abundance from surveys
- stock distribution from surveys
- mean size of landed fish

If declining trends persist for more than three years, then a focused evaluation of the status of the stock, its ABC, and overfishing threshold will be quantified. If data are available, such an evaluation should be conducted at approximately five year intervals even when negative trends are not apparent. In fact, many stocks are in need of re-evaluation to establish a baseline for monitoring of future trends. Whenever an evaluation indicates the stock may be declining and approaching an overfished state, the Council should:

1. Improve data collection for this species so it can be moved to Category 1.

2. Determine the rebuilding rate that would allow the stock to return to MSY in no longer than ten years.

~~For Category 3 species, i~~Information from fishery independent surveys ~~are~~ is often lacking for ~~these~~ Category 3 species because of their low abundance or because they are not vulnerable to survey sampling gear. ~~Without an~~ Until sufficient data become available from the at-sea observer program, ~~it is unlikely that a data base will be developed in the future for these species to evaluate~~ the risk of overfishing these species cannot be fully evaluated.**}--**

4.4.3 Determination of Overfished/Rebuilding Thresholds

[Previously 5.3.4]

The MSST (overfished/rebuilding threshold) is the default value of 25% of the estimated unfished biomass level or 50% of B_{MSY}, if known. ~~As described in section 5.3, T~~the overfished/rebuilding threshold (also referred to as $B_{rebuild}$ ~~MSST~~), $B_{\text{~~rebuild~~}}$, is generally in the range of 25% to 40% of $B_{unfished}$, and may also be written as

$$B_{rebuild} = x\% * \text{mean } R * SPR(F=0)$$

The default overfished/rebuilding threshold for category 1 groundfish is $0.25B_{unfished}$. The Council may establish different thresholds for any species based on information provided in stock assessments, the SAFE document, or other scientific or groundfish management-related report. For example, if B_{MSY} is known, the overfished threshold may be set equal to 50% of that amount. The Council may also specify a lower level of abundance where catch or fishing effort is reduced to zero. This minimum abundance threshold (B_{MIN}) would correspond to an abundance that severely jeopardizes the stock's ability to recover to B_{MSY} in a reasonable length of time; ~~likely values fall between five percent and ten percent of the average unfished level.~~

4.5 Ending Overfishing and Rebuilding

[New Section Title]

4.5.1 Default Precautionary and Interim Rebuilding OY Calculation

[Previously 5.3.5]
[Figure omitted here]

The precautionary threshold, defined in Section 4.4.1, is used to trigger a precautionary management approach. If biomass declines to a level that requires rebuilding (below the MSST), the precautionary management approach also provides an interim rebuilding harvest control policy to guide the setting OY until the Council sets a new rebuilding policy specific to the conditions of the stock and fishery. The default OY/rebuilding ~~plan~~ policy can be described as an "ICES-type catch-based approach" that consists of a modification of the catch policy, where catch (C) declines from $C(F_{MSY})$ at the precautionary threshold in a straight line to F=0 at the minimum abundance threshold of ten percent of the estimated mean unfished biomass (sometimes called pristine or virgin biomass or reproductive potential). This approach could also be described as an OY based on a variable F_{SPR} that is progressively more conservative at low biomass levels. The abbreviated name for this is the "40-10" default adjustment. In most cases, there is inadequate information to estimate F_{MSY}; in such cases, the best proxy for F_{MSY} will be used. The default proxy values will be $F_{40\%}$ for flatfish and whiting, $F_{~~40\%~~50\%}$ for rockfish in the *Sebastes* complex and $F_{~~35\%~~45\%}$ for other species such as sablefish and lingcod. The Council anticipates scientific information about the population dynamics of the various stocks will improve over time and that this information will result in improved estimates of appropriate harvest rates and MSY proxies. Thus, these initial default proxy values will be replaced from time to time. Such changes will not require amendment to the FMP, but the scientific basis for new values must be documented.

The greater amount of catch reduction applied below the precautionary threshold will foster quicker return to the MSY level. If a stock falls below its overfished/rebuilding threshold, this line would be used as the interim rebuilding plan during the year until the Council develops a formal rebuilding plan. The point at which the line intersects the horizontal axis does not necessarily imply zero catch would be allowed, but rather is for determining the slope of the line.

In order to apply this default approach, a minimal amount of information is necessary; only stocks in Category 1 can be managed in this way. For stocks with inadequate information to apply this approach, the Council will consider other methods of ensuring that overfishing will be avoided. The Council will consider the approaches discussed in the National Standard Guidelines in developing such recommendations for stocks in Categories 2 and 3.

4.5.2 Procedures For Calculating Rebuilding Parameters

[New section title]

The Magnuson-Stevens Act and National Standard Guidelines provide a descriptive framework for developing strategies to rebuild overfished stocks. This framework identifies three parameters: a minimum time in which an overfished stock may rebuild to its target biomass (denoted T_{MIN}), a maximum permissible time period for rebuilding the stock to its target biomass (T_{MAX}), and a target year, falling within the time period represented T_{MIN} and T_{MAX} and representing the best of estimate of the year by which the stock will be rebuilt.

{From new section 4.5.3.3 (three paragraphs, reordered) T_{MIN}, ~~T~~the lower limit of the specified time period for rebuilding, will be determined by the status and biology of the stock or stock complex and its interactions with other components of the marine ecosystem or environmental conditions and is defined as the amount of time that would be required for rebuilding if fishing mortality were eliminated entirely.

If the lower limit is less than ten years, then the specified time period for rebuilding may be adjusted upward to the extent warranted by the needs of fishing communities and recommendations by international organizations in which the United States participates, except that no such upward adjustment may result in the specified time period exceeding ten years (which would then constitute T_{MAX}), unless management measures under an international agreement in which the United States participates dictate otherwise.

If the lower limit is ten years or greater, then the specified time period for rebuilding may be adjusted upward to the extent warranted by the needs of fishing communities and recommendations by international organizations in which the United States participates, except that no such upward adjustment can exceed the rebuilding period calculated in the absence of fishing mortality, plus one mean generation time or equivalent period based on the species' life-history characteristics. For example, if a stock could be rebuilt within 12 years in the absence of any fishing mortality, and has a mean generation time of eight years, the rebuilding period could be as long as 20 years, which is T_{MAX}.

The Council may consider a number of factors in determining the time period for rebuilding, including:

1. The status and biology of the stock or stock complex.

2. Interactions between the stock or stock complex and other components of the marine ecosystem or environmental conditions.

3. The needs of fishing communities.

4. Recommendations by international organizations in which the United States participates.

5. Management measures under an international agreement in which the United States participates.**}--**

Calculating Rebuilding Probabilities

Stock assessment results form the basis of a rebuilding analysis, which in turn is used to develop rebuilding policies and choose the rebuilding parameters identified in each rebuilding plan. The elements of rebuilding analyses are described in the *SSC Terms of Reference for Rebuilding Analyses* (SSC, 2001). This guidance has been incorporated into a computer program (Punt 2002). In the analysis the probability that the overfished stock will reach its target biomass is determined with respect to T_{MIN}, T_{MAX}, and T_{TARGET}. The methods for calculating the values of these parameters are described below. This is a simplified explanation of the current methodology; for example, equations and technical specifications are omitted. The SSC may revise their terms of reference in the future and the computer program undergoes continued refinement and elaboration.

The rebuilding analysis program uses “Monte Carlo simulation” to derive a probability estimate for a given rebuilding strategy. This method projects population growth many times in separate simulations. It accounts for possible variability by randomly choosing the value of a key variable—in this case total recruitment or recruits per spawner—from a range of values. These values can be specified empirically, by listing some set of historical values, or by a relationship based on a model. The SSC recommends that the rebuilding analyses use historical values. Because of this variability in a key input value, each simulation will show a different pattern of population growth. As a result, a modeled population may reach the target biomass that defines a rebuilt stock (B_{MSY}) in a different year in each of the simulations.

This technique can be used first to calculate T_{MIN} in probabilistic terms, which is defined as the time needed to reach the target biomass in the absence of fishing with a 50% probability. In other words, in half the

simulations the target biomass was reached in some year up to and including the computed T_{MIN}. Given T_{MIN}, T_{MAX} is computed as 10 years or by adding the value of one mean generation time to T_{MIN}, if T_{MIN} is greater than or equal to 10 years.

After determining T_{MAX}, multiple Monte Carlo simulations are conducted, varying the fishing mortality rate. This determines the relationship between F and the probability of the stock being rebuilt by T_{MAX} (denoted P_{MAX}). Since a higher P_{MAX} probability must be achieved by lowering the fishing mortality rate (other things being equal) there is a tradeoff between fishery harvests and rebuilding speed in probabilistic terms. As fishing mortality is reduced, the likelihood that the stock will recover in this maximum time period increases.

A target year, T_{TARGET}, is then computed as the median rebuilding year for each related F and P_{MAX}. The median year is simply the year by which half of all cases have already rebuilt, and is unique for a given F and P_{MAX}.

It is important to recognize that some of the terms introduced and described above represent policy decisions at the national level and the Council ***does not have a choice*** in setting their values. The dates for T_{MIN} and T_{MAX} are determined based on guidelines established at the national level. Mean generation time is a biological characteristic that cannot be chosen by policymakers. Thus, the Council cannot choose these values and then use them as a basis for management. Defined in national guidelines, T_{MIN} is a consequence of the productivity of the fish stock and is calculated by fishery biologists based on information they get from a particular stock. Similarly, T_{MAX}, which is calculated from T_{MIN}, does not represent a Council choice.

Fundamentally, when developing a management strategy the Council **can** choose a fishing mortality rate and corresponding annual level of fishing. However, when rebuilding overfished species, the choice of F can be based on either the value of T_{TARGET} or P_{MAX}, keeping in mind that these three values cannot be chosen independently of one another. In other words, the Council may choose one of these values and derive the other two from it, but they cannot choose the values for two of these terms independently of the third.

4.5.3 Stock Rebuilding ~~Requirements~~ Plans

[Previously section 5.3.6]

As required by the Magnuson-Stevens Act, within one year of being notified by the Secretary that a stock is overfished or approaching a condition of being overfished, the Council will prepare a recommendation to end the overfished condition and rebuild the stock(s) or to prevent the overfished condition from occurring. For a stock that is overfished, the rebuilding plan will specify a time period for ending the overfished condition and rebuilding the stock. Overfishing restrictions and recovery benefits should be fairly and equitably allocated among sectors of the fishery. ~~A new rebuilding plan or revision to an existing plan proposed by the Council will be submitted to the Secretary along with annual management recommendations as part of the regular annual management process. Once approved by the Secretary, a rebuilding plan will remain in effect for the specified duration of the rebuilding program, or until modified. The Council will make all approved rebuilding plans available in the annual SAFE document or by other means. The Council may recommend the Secretary implement interim measures to reduce overfishing until the Council's program has been developed and implemented.~~

Certain elements of a rebuilding plan developed by the Council, as specified in Section 4.5.3.2 (Contents of Rebuilding Plans), will be submitted to the Secretary as an FMP amendment and implementing regulations. Changes to key rebuilding plan elements will be accomplished through full (notice and comment) rulemaking. Once approved by the Secretary, a rebuilding plan will remain in effect for the specified duration of the rebuilding program, or until modified. The Council will make all approved rebuilding plans available in the annual SAFE document or by other means. The Council may recommend that the Secretary implement interim measures to reduce overfishing until the Council's program has been developed and implemented.

The Council intends its stock rebuilding plans to provide targets, checkpoints, and guidance for rebuilding overfished stocks to healthy and productive levels. ~~The rebuilding plans themselves will not be regulations but principles and policies.~~ They ~~are intended to~~ should provide a clear vision of the intended results and the

means to achieve those results. They will provide the strategies and objectives that regulations are intended to achieve, and proposed regulations and results will be measured against the rebuilding plans. It is likely that rebuilding plans will be revised over time to respond to new information, changing conditions, and success or lack of success in achieving the rebuilding schedule and other goals. If, in response to these revisions, the Council recommends changes to the management target for a particular stock, such changes will be published through full (notice and comment) rulemaking as described in Section 6.2 of this FMP. As with all Council activities, public participation is critical to the development, implementation and success of management programs.

4.5.3.1 Goals and Objectives of Rebuilding Plans

[Previously 5.3.6.1]

The overall goals of rebuilding programs are to (1) achieve the population size and structure that will support the maximum sustainable yield within the specified time period; (2) minimize, to the extent practicable, the adverse social and economic impacts associated with rebuilding, including adverse impacts on fishing communities; (3) fairly and equitably distribute both the conservation burdens (overfishing restrictions) and recovery benefits among commercial, recreational, and charter fishing sectors; (4) protect the quantity and quality of habitat necessary to support the stock at healthy levels in the future; and (5) promote widespread public awareness, understanding and support for the rebuilding program. More specific goals and objectives may be developed in the rebuilding plan for each overfished species.

{Moved from new section 4.5.3.2 To achieve the rebuilding goals, the Council will strive to (1) explain the status of the overfished stock, pointing out where lack of information and uncertainty may require that conservative assumptions be made in order to maintain a risk-averse management approach; (2) identify present and historical harvesters of the stock; (3) where adequate harvest sharing plans are not already in place, develop harvest sharing plans for the rebuilding period and for when rebuilding is completed; (4) set harvest levels that will achieve the specified rebuilding schedule; (5) implement any necessary measures to allocate the resource in accordance with harvest sharing plans; (6) promote innovative methods to reduce bycatch and bycatch mortality of the overfished stock; (7) monitor fishing mortality ~~and the condition of the stock at least every two years to ensure the goals and objectives are being achieved~~ and use available stock assessment information to evaluate the condition of the stock; (8) identify any critical or important habitat areas and implement measures to ensure their protection; and (9) promote public education regarding these goals, objectives, and the measures intended to achieve them.**}--**

4.5.3.2 Contents of Rebuilding Plans

[Previously 5.3.6.2 (corrected from 5.6.3.2)]

{Moved to new section 4.5.3.1 *To achieve the rebuilding goals, the Council will strive to (1) explain the status of the overfished stock, pointing out where lack of information and uncertainty may require that conservative assumptions be made in order to maintain a risk-averse management approach; (2) identify present and historical harvesters of the stock; (3) where adequate harvest sharing plans are not already in place, develop harvest sharing plans for the rebuilding period and for when rebuilding is completed; (4) set harvest levels that will achieve the specified rebuilding schedule; (5) implement any necessary measures to allocate the resource in accordance with harvest sharing plans; (6) promote innovative methods to reduce bycatch and bycatch mortality of the overfished stock; (7) monitor fishing mortality and the condition of the stock at least every two years to ensure the goals and objectives are being achieved (8) identify any critical or important habitat areas and implement measures to ensure their protection; and (9) promote public education regarding these goals, objectives and the measures intended to achieve them.*}--

~~The rebuilding plan will specify any individual goals and objectives including a time period for ending the overfished condition and rebuilding the stock and the target biomass to be achieved. The plan will explain how the rebuilding period was determined, including any calculations that demonstrate the scientific validity of the~~

~~rebuilding period. The plan will identify potential or likely allocations among sectors, identify the types of management measures that will likely be imposed to ensure rebuilding in the specified period, and provide other information that may be useful to achieve the goals and objectives.~~

{Moved to new section 4.5.2 *The Council may consider a number of factors in determining the time period for rebuilding, including:*

1. *The status and biology of the stock or stock complex.*

2. *Interactions between the stock or stock complex and other components of the marine ecosystem or environmental conditions.*

3. *The needs of fishing communities.*

4. *Recommendations by international organizations in which the United States participates.*

5. *Management measures under an international agreement in which the United States participates.*

The lower limit of the specified time period for rebuilding will be determined by the status and biology of the stock or stock complex and its interactions with other components of the marine ecosystem or environmental conditions and is defined as the amount of time that would be required for rebuilding if fishing mortality were eliminated entirely.

If the lower limit is less than ten years, then the specified time period for rebuilding may be adjusted upward to the extent warranted by the needs of fishing communities and recommendations by international organizations in which the United States participates, except that no such upward adjustment may result in the specified time period exceeding ten years, unless management measures under an international agreement in which the United States participates dictate otherwise.

*If the lower limit is ten years or greater, then the specified time period for rebuilding may be adjusted upward to the extent warranted by the needs of fishing communities and recommendations by international organizations in which the United States participates, except that no such upward adjustment can exceed the rebuilding period calculated in the absence of fishing mortality, plus one mean generation time or equivalent period based on the species' life-history characteristics. For example, if a stock could be rebuilt within 12 years in the absence of any fishing mortality, and has a mean generation time of eight years, the rebuilding period could be as long as 20 years.***}--**

Generally, rebuilding plans will contain:

1. A description of the biology and status of the overfished stock and fisheries affected by stock rebuilding measures.

2. A description of how rebuilding parameters for the overfished stock were determined (including any calculations that demonstrate the scientific validity of parameters).

3. Estimates of rebuilding parameters ($B_{unfished}$, B_{MSY}, T_{MIN}, T_{MAX}, and the probability of reaching target biomass by this date, and T_{TARGET}) at the time of rebuilding plan adoption.

4. The process, and any applicable standards, that will be used during periodic review to evaluate progress in rebuilding the stock to the target biomass (see Section 4.5.3.5).

5. Any management measures the Council may wish to specifically describe in the FMP, which facilitate stock rebuilding in the specified period. (These measures would be in addition to any existing measures typically implemented through annual or biennial management. See Section 4.5.3.4 for more information.)

6. Any goals and objectives in addition to or different from those listed in the preceding section.

7. Potential or likely allocations among sectors.

8. For fisheries managed under international agreement, a discussion of how the rebuilding plan will reflect traditional participation in the fishery, relative to other nations, by fishermen of the United States.

9. Any other information that may be useful to achieve the rebuilding plan's goals and objectives.

~~In general, the Council will also consider the following questions in developing rebuilding plans.~~ The following questions also serve as a guide in developing rebuilding plans:

1. What is the apparent cause of the current condition (historical fishing patterns, a declining abundance or recruitment trend, a change in assessment methodology, or other factors)?

2. Is there a downward trend in recruitment that may indicate insufficient compensation in the spawner-recruitment relationship?

3. Based on an comparison of historical harvest levels (including discards) relative to recommended ABC levels, has there been chronic over-harvest?

4. Is human-induced environmental degradation implicated in the current stock condition? Have natural environmental changes been observed that may be affecting growth, reproduction, and/or survival?

5. Would reduction in fishing mortality be likely to improve the condition of the stock?

6. Is the particular species caught incidentally with other species? Is it a major or minor component in a mixed-stock complex?

7. What types of management measures are anticipated and/or appropriate to achieve the biological, social, economic, and community goals and objectives of the rebuilding plan?

Rebuilding plan documents are distinct from the analytical documents required by the National Environmental Policy Act and other legal mandates, although they will reflect the contents of those analyses in a much briefer form. Rebuilding plan elements incorporated into the FMP (in Section 4.5.4) summarize the contents enumerated in this section. Rebuilding plans as a whole will be published in the next annual SAFE document after their approval.

{From new section 4.6 (formerly section 5.3.2) Any new rebuilding program will commence as soon as the first measures to rebuild the stock or stock complex are implemented.**}--**

4.5.3.3 Process for Development and Approval of Rebuilding Plans

[Formerly section 5.3.6.3]

Upon receiving notification that a stock is overfished, the Council will identify one or more individuals to draft the rebuilding plan. ~~If possible, the Council will schedule review and adoption of the proposed rebuilding plan to coincide with the annual management process.~~ A draft of the plan will be reviewed and preliminary action taken (tentative adoption or identification of preferred alternatives), followed by final adoption at a subsequent meeting. The tentative plan or alternatives will be made available to the public and considered by the Council at a minimum of two meetings, unless stock conditions suggest more immediate action is warranted. Upon completing its final recommendations, the Council will submit the proposed rebuilding plan or revision to an existing plan to NMFS for concurrence. ~~In most cases, this will be concurrent with its recommendations for annual management measures. In addition, any proposed regulations to implement the~~A rebuilding plan will be developed ~~in accordance with the framework procedures of this FMP. The Council may designate a state or states to take the lead in working with its citizens to develop management proposals to achieve the rebuilding. Allocation proposals require consideration at a minimum of three Council meetings, as specified in the allocation framework. Rebuilding plans will be reviewed periodically, at least every 2 years, and the~~

~~Council may propose revisions to existing plans at any time, although in general this will be occur only during the annual management process.~~

~~NMFS will review the Council's recommendations and supporting information upon receipt and may approve, disapprove, or partially approve each rebuilding plan. The Council will be notified in writing of the NMFS decision. If NMFS does not concur with the Council's recommendation, reasons for the disapproval will be included in the notification. Once approved, a rebuilding plan will remain in effect for the length of the specified rebuilding period or until revised. Any revisions to a rebuilding plan must also be approved by NMFS.~~following the standard procedures for considering and implementing an FMP amendment under the Magnuson-Stevens Act and other applicable law.

The following elements in each rebuilding plan will be incorporated into the FMP in Section 4.5.4:

1. A brief description of the status of the stock and fisheries affected by stock rebuilding measures at the time the rebuilding plan was prepared.

2. The methods used to calculate stock rebuilding parameters, if substantially different from those described in Section 4.5.2.

3. An estimate at the time the rebuilding plan was prepared of:
   - unfished biomass ($B_{unfished}$) and target biomass (B_{MSY});
   - the year the stock would be rebuilt in the absence of fishing (T_{MIN});
   - the year the stock would be rebuilt if the maximum time period permissible under National Standard Guidelines were applied (T_{MAX}) and the estimated probability that the stock would be rebuilt by this date based on the application of stock rebuilding measures; and
   - the year in which the stock would be rebuilt based on the application of stock rebuilding measures (T_{TARGET}).

4. A description of the harvest control rule (e.g., constant catch or harvest rate) and the specification of this parameter. The types of management measures that will be used to constrain harvests to the level implied by the control rule will also be described (see also Section 4.5.3.4). These two elements, the harvest control rule and a description of management measures, represents the rebuilding strategy intended to rebuild the stock by the target year.

It is likely that over time the parameters listed above will change. It must be emphasized that the values enumerated in the FMP represent estimates at the time the rebuilding plan is prepared. Therefore, the FMP need not be amended if new estimates of these values are calculated. The values for these parameters found in the FMP are for reference, so that managers and the public may track changes in the strategy used to rebuild an overfished stock. However, any new estimates of the parameters listed above will be published in the SAFE documents as they become available.

{Moved to new section 4.4.2 For Category 2 species, the following may be evaluated as potential indicators of overfishing:

catch per effort from logbooks
catch area from logbooks
index of stock abundance from surveys
stock distribution from surveys
mean size of landed fish

If declining trends persist for more than three years, then a focused evaluation of the status of the stock, its ABC, and overfishing threshold will be quantified. If data are available, such an evaluation should be conducted at approximately five year intervals even when negative trends are not apparent. In fact, many stocks are in need of re-evaluation to establish a baseline for monitoring of future trends. Whenever an evaluation indicates the stock may be declining and approaching an overfished state, the Council should:

1. Improve data collection for this species so it can be moved to Category 1.

2. Determine the rebuilding rate that would allow the stock to return to MSY in no longer than ten years.

For Category 3 species, information from fishery independent surveys are often lacking for these species because of their low abundance or they are not vulnerable to survey sampling gear. Without an at-sea observer program, it is unlikely that a data base will be developed in the future for these species to evaluate the risk of overfishing.**}--**

4.5.3.4 Updating Key Rebuilding Parameters

[New heading]

In addition to an initial specification in the FMP, the target year (T_{TARGET}) and the harvest control rule (type and numerical value) will also be specified in regulations. If new information indicates a need to change the value of either of these two parameters, such a change will be accomplished through full (notice and comment) rulemaking as described in Section 6.2 of this FMP. The target year is the year by which the stock would be rebuilt to its target biomass. Therefore, if a subsequent analysis identifies an earlier target year for the current fishing mortality rate (based on the harvest control rule), there is no obligation to change in regulations either the target year (to the computed earlier year) or the harvest control rule (to delay rebuilding to the original target year). Since the target year is a key rebuilding parameter, it should only be changed after careful deliberation. For example, the Council might recommend that the target year be changed if, based on new information, they determine that the existing target year is later than the recomputed maximum rebuilding time (T_{MAX}) or if a recomputed harvest control rule would result in such a low optimum yield as to cause substantial socioeconomic impacts. These examples are not definitive: the Council may elect to change the target year because of other circumstances. However, any change to the target year or harvest control rule must be supported by commensurate analysis.

4.5.3.5 Implementation of Actions Required Under the Rebuilding Plan

[New heading, text based on portions of original section 5.3.6.3, see deleted text in new section 4.5.3.3]

Once a rebuilding plan is adopted, certain measures required in the rebuilding plan may need to be implemented through authorities and processes already described in the FMP. Management actions to achieve OY harvest, and objectives related to rebuilding requirements of the Magnuson-Stevens Act and goals and objectives of the FMP (each of which may require a slightly different process) include: automatic actions, notices, abbreviated rulemaking actions, and full rulemaking actions. (These actions are detailed in Section 4.6, Chapter 5, and Section 6.2.) Allocation proposals require consideration as specified in the allocation framework (see Section 6.2.3.1). Any proposed regulations to implement the rebuilding plan will be developed in accordance with the framework procedures of this FMP.

Any rebuilding management measures that are not already authorized under the framework of the existing FMP, or specified in the FMP consequent of rebuilding plan adoption, will be implemented by further FMP amendments. These plan amendments may establish the needed measures or expand the framework to allow the implementation of the needed measures under framework procedures.

The Council may designate a state or states to take the lead in working with its citizens to develop management proposals to achieve stock rebuilding.

4.5.3.6 Periodic Review of Rebuilding Plans

[New heading, text based on original section 5.3.6.3, see deleted text in new section 4.5.3.3]

Rebuilding plans will be reviewed periodically, but at least every two years, although the Council may propose revisions to an adopted rebuilding plan at any time. These reviews will take into account the goals and objectives listed in Section 4.5.3.1, recognizing that progress towards the first goal, to achieve the population

size and structure that will support MSY within the specified time period, will only be evaluated on receipt of new information from the most recent stock assessment. In evaluating progress towards achieving target biomass, the Council will use the standard identified in the rebuilding plan. When drafting a rebuilding plan one of the following standards, or a standard similar in kind to the following, may be chosen:

- If the probability of achieving the target biomass within the maximum permissible time period (T_{MAX}) falls below 50% (the required minimum value), then progress will be considered inadequate.

- If the probability of achieving the target biomass within the maximum permissible time period (T_{MAX}) falls below the value identified in the rebuilding plan, then progress will be considered inadequate.

- The Council, in consultation with the SSC and GMT, will determine on a case-by-case basis whether there has been a significant change in a parameter such that the chosen management target must be revised.

If, based on this review, the Council decides that the harvest control rule or target year must be changed, the procedures outlined in Section 4.5.3.3 will be followed.

4.5.3.7 Precedence of a Recovery Plan or "No Jeopardy" Standard Issued Pursuant to the Endangered Species Act

[New Section]

Like rebuilding plans pursuant to National Standard 1 in the Magnuson-Stevens Act, a recovery plan pursuant to the Endangered Species Act outlines measures for the conservation and survival of the designated species. Under Section 7 of the Endangered Species Act an agency must consult NMFS when any activity permitted, funded, or conducted by that agency may affect a listed marine species or its designated critical habitat. (In the case of fishery management actions, NMFS is both the action and consulting agency.) As part of these consultations, a biological opinion is produced describing standards that must be met when permitting or implementing the action to ensure that the action is not likely to jeopardize the continued existence of the listed species; these are referred to as "no jeopardy" standards.

Measures under a recovery plan or "no jeopardy" standards in a biological opinion will supercede rebuilding plan measures and targets if they will result in the stock rebuilding to its target biomass by an earlier date than the target year identified in the current rebuilding plan. (If expressed probabilistically, any ESA standard expressed as a combination of date and probability that constitutes a higher standard will take precedence over the equivalent target and probability in the rebuilding plan. For example, an ESA standard requiring recovery by the rebuilding plan target year, but with a higher probability, would take precedence over the rebuilding plan.) If a stock is de-listed before reaching its target biomass, the rebuilding plan will come back into effect until such time as the stock is fully rebuilt.

4.5.4 Summary of Rebuilding Plan Contents

[New heading]

[Reserved]

4.6 Determination of OY

[Previously 5.3.2.]

[The following five paragraphs comprised the entirety of the original Chapter 4.]

Optimum yield (OY) is defined in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) as the amount of fish which will provide the greatest overall benefit to the Nation. The Magnuson-Stevens Act also specifies that OY is based on maximum sustainable yield (MSY), and may be equal to or less than MSY. The fishery management plan (FMP) authorizes establishment of a numerical

or non-numerical OY for any groundfish species or species group and lays out the procedures the Council will follow in determining appropriate numerical OY values. An OY may be specified for the fishery management area as a whole or for specific subareas. Numerical OYs will be specified annually, based on acceptable biological catches (ABCs) for major species or species groups, which are in turn based on quantitative or qualitative stock assessments. "Control rules" for determining the numerical values of OYs ensure they will not exceed the ABCs except under tightly limited conditions.

Most of the 83 species managed by the FMP have never been assessed in either a quantitative or qualitative manner. In some cases even basic catch statistics are unavailable, because many species (rockfish, for example) are not sorted unless specifically required by regulation. Species of this type have generally not been subject to numerical harvest limits, but rather harvest is limited by gear restrictions and market demand. Other management measures which determine the total amount of harvest each year include trip landing and frequency limits. Those species without a specified OY and not included in a multi-species OY will be included in a non-numerical OY, which is defined as all the fish that can be taken under the regulations, specifications, and management measures authorized by the FMP and promulgated by the U.S. Secretary of Commerce. This non-numerical OY is not a predetermined numerical value, but rather the harvest that results from regulations, specifications, and management measures as they are changed in response to changes in the resource and the fishery. In many cases, the absence of a numerical specification reflects the absence of basic management information, such as abundance estimates and catch statistics. The non-numerical OY concept allows for a variable amount of groundfish to be harvested annually, limited by such constraints as gear restrictions, management measures for other species, and/or absence of consumer acceptance or demand.

The close spatial relationship of many groundfish species throughout the management area results in commercial and recreational catches often consisting of mixtures of several species. This is especially the case in the trawl fishery where fishermen may target on one species, but unavoidably harvest several other species. In such cases, the optimum harvest strategy often is to target on a group (complex or assemblage) of groundfish species. ~~The grouping of groundfish species into multispecies numerical and non-numerical OYs provides the flexibility to manage to obtain the optimum public benefit from the groundfish fishery as a whole rather than the maximum yield from each species. In other cases, single species management may be necessary to provide adequate resource protection, bycatch controls, or equitable allocation. In such cases, the Council may determine it more appropriate to use individual species management by means of quotas, harvest guidelines, allocations by gear type, and other management measures.~~

~~Managing multiple species complexes for OY from the complex as a whole necessarily may result in some degree of overfishing or failure to allow recovery to the MSY level for some individual stocks.~~ The Council will ~~strive, to the extent practicable, to~~ avoid allowing overfishing individual stocks and control harvest mortality to allow overfished stocks to rebuild ~~or preventing a stock from recovering~~ to the MSY level. In the event the Council determines that greater long-term benefits will be gained from the groundfish fishery by overfishing individual stocks or by preventing a stock from recovering to its MSY level, it will justify the action in writing in accordance with the procedures and standards identified in this section and the National Standard Guidelines (50 CFR 600.310(d)). ~~in Section 5.3.6 (Stock Rebuilding) or in Section 5.5 (Annual Implementation Procedures for Specifications and Apportionments).~~ Conversely, the Council may determine that greater benefits will accrue from protecting an individual stock by constraining the multiple species complex or specific components of that complex.

Prior to implementation of the FMP in 1982, the states of Washington, Oregon, and California managed the groundfish fishery without the use of quotas. State regulations since the mid-1940s took the form of area closures (such as San Francisco Bay), legal gear definitions, minimum codend mesh regulations, size limits, bag limits, and other nonquota management measures. Implementation of the FMP built upon those historical management practices by increasing the level of catch monitoring, improving the assessment of stock conditions, and establishing other mechanisms for responding to management needs. It provides for continuation of the historical fishery on traditionally harvested groundfish species while allowing for the development of new fisheries for underutilized species. The FMP, as amended, provides for the establishment of resource conservation measures such as harvest guidelines or quotas through the annual specification procedure and annual and inseason management measures through the "points of concern" and

socioeconomic framework mechanisms.

[The remainder of new section 4.6 comprised the original section 5.3.2, except as noted.]

Reduction in catches or fishing rates for either precautionary or rebuilding purposes is an important component of converting values of ABC to values of OY. This relationship is specified by the harvest control rule. All OYs will remain in effect until revised, and, whether revised or not, will be announced at the beginning of the ~~year~~ fishing period along with other specifications (see Chapter 5).

Groundfish stock assessments generally provide the following information to aid in determination of ABC and OY.

1. Current biomass (~~or~~ and reproductive potential) estimate.

2. F_{MSY} or proxy, translated into exploitation rate.

3. Estimate of MSY biomass (B_{MSY}), or proxy, unfished biomass (based on average recruitment), precautionary threshold, and/or overfished/rebuilding threshold.

4. Precision estimate (e.g., confidence interval) for current biomass estimate.

4.6.1 Determination of Numerical OYs If Stock Assessment Information Is Available (Category 1)

[Heading elevated and numbered]

The Council will follow these steps in determining numerical OYs. The recommended numerical OY values will include any necessary adjustments to harvest mortality needed ~~actions~~ to rebuild any stock determined to be below its overfished/rebuilding threshold and may include adjustments to address uncertainty in the status of the stock.

1. ABC: Multiply the current fishable biomass estimate times the F_{MSY} exploitation rate or its proxy to get ABC.

2. Precautionary adjustment: If the abundance is above the specified precautionary threshold, OY may be equal to or less than ABC. If current biomass estimate is less than the precautionary threshold (Section 4.4.1), the harvest rate will be reduced according to the harvest control rule specified in Section ~~5.3.5~~ 4.5.1 in order to accelerate a return of abundance to optimal levels. If the abundance falls below the overfished/rebuilding threshold (Section 4.4.2), the harvest control rule will generally specify a greater reduction in exploitation as an interim management response toward rebuilding the stock while a formal rebuilding plan is being developed. The rebuilding plan will include a specific harvest control rule designed to rebuild the stock, and that control rule will be used in this stage of the determination of OY.

3. Uncertainty adjustments: In cases where there is a high degree of uncertainty about the biomass estimate and other parameters, OY may be further reduced accordingly.

4. Other adjustments to OY: Adjustments to OY for ~~O~~other social, economic, or ecological considerations may be made. There will be, ~~including~~ reductions for anticipated bycatch mortality (i.e. mortality of discarded fish)~~, may be made~~. Amounts of fish harvested as compensation for private vessels participating in NMFS resource survey activities will also be deducted from ABC prior to setting OY.

5. OY recommendations will be consistent with established rebuilding plans and achievement of their goals and objectives ~~unless otherwise adjusted in accordance with section 6 below~~.
   (a) In cases where overfishing is occurring, Council action will be sufficient to end overfishing.
   (b) In cases where a stock or stock complex is overfished, Council action will specify OY in a manner that complies with rebuilding plans developed in accordance with Section 4.5.2. ~~a time period for~~

~~rebuilding the stock or stock complex that satisfies the requirements of section 304(e)(4)(A) of the Magnuson-Stevens Act.~~

~~(i) The Council will consider a number of factors in determining the time period for rebuilding:~~

~~(1) The status and biology of the stock or stock complex.~~

~~(2) Interactions between the stock or stock complex and other components of the marine ecosystem (also referred to as "other environmental conditions").~~

~~(3) The needs of fishing communities.~~

~~(4) Recommendations by international organizations in which the United States participates.~~

~~(5) Management measures under an international agreement in which the United States participates.~~

~~(ii) These factors enter into the specification of the time period for rebuilding as follows:~~

~~(1) The lower limit of the specified time period for rebuilding is determined by the status and biology of the stock or stock complex and its interactions with other components of the marine ecosystem and is defined as the amount of time that would be required for rebuilding if fishing mortality were eliminated entirely.~~

~~(2) If the lower limit is less than ten years, then the specified time period for rebuilding may be adjusted upward to the extent warranted by the needs of fishing communities and recommendations by international organizations in which the United States participates, except that no such upward adjustment can result in the specified time period exceeding ten years, unless management measures under an international agreement in which the United States participates dictate otherwise.~~

~~(3) If the lower limit is ten years or greater, then the specified time period for rebuilding may be adjusted upward to the extent warranted by the needs of fishing communities and recommendations by international organizations in which the United States participates, except that no such upward adjustment can exceed the rebuilding period calculated in the absence of fishing mortality, plus one mean generation time or equivalent period based on the species' life-history characteristics. For example, suppose a stock could be rebuilt within twelve years in the absence of any fishing mortality, and has a mean generation time of eight years. The rebuilding period, in this case, could be as long as 20 years.~~ **[Deleted because it duplicates provisions of section 4.5.3.]**

{To new section 4.5.3.2

(iii) Any new rebuilding program will commence as soon as the first measures to rebuild the stock or stock complex are implemented.**}--**

~~(iv) Any pre-existing rebuilding plans will be reviewed to determine whether they are in compliance with all requirements of the Magnuson-Stevens Act. (Note: Only Pacific ocean perch falls into this category.)~~ **[Deleted because there are no pre-existing rebuilding plans.]**

(c) For fisheries managed under an international agreement, Council action must reflect traditional participation in the fishery, relative to other nations, by fishermen of the United States.

(d) For any stock that has been declared overfished, the open access/limited entry allocation shares may be temporarily revised for the duration of the rebuilding period by amendment to the regulations in accordance with the normal allocation process described in this FMP. However, the Council may at any time recommend the shares specified in chapter 12 of this FMP be reinstated without requiring further analysis. Once reinstated, any change may be made only through the allocation process.

(e) For any stock that has been declared overfished, any vessel with a limited entry permit may be prohibited from operating in the open access fishery when the limited entry fishery has been closed.

6. Adjustments to OY could include increasing OY above the default value up to the overfishing level as long as the management still allows achievement of established rebuilding goals and objectives. In limited circumstances, these adjustments could include increasing OY above the overfishing level as long as the harvest meets the standards of the mixed stock exception in the National Standard Guidelines:

(a) The Council demonstrates by analysis that such action will result in long-term net benefits to the Nation.

(b) The Council demonstrates by analysis that mitigating measures have been considered and that a similar level of long-term net benefits cannot be achieved by modifying fleet behavior, gear selection/ configuration, or other technical characteristic in a manner such that no overfishing would occur.

(c) The resulting rate or level of fishing mortality will not cause any species or evolutionarily significant

unit thereof to require protection under the Endangered Species Act.

7. For species complexes (such as *Sebastes* complex), the OY will generally be set equal to the sum of the individual component ABCs, HGs, and/or OYs, as appropriate.

4.6.2 Determination of a Numerical OY If ABC Is Based on Nonquantitative Assessment (Category 2)

[Heading elevated and numbered]

1. ABC may be based on average of past landings, previous nonquantitative assessment, or other qualitative information.

2. Precautionary adjustments, if any, would be based on relevant information. In general, the Council will follow a risk-averse approach and may recommend an OY below ABC if there is a perception the stock is below its MSY biomass level. If a declining trend persists for more than three years, then a focused evaluation of the status of the stock, its ABC, and the overfishing parameters will be quantified. If data are available, such an evaluation should be conducted at approximately five-year intervals even when negative trends are not apparent. In fact, many stocks are in need of re-evaluation to establish a baseline for monitoring of future trends. Whenever an evaluation indicates the stock may be declining and approaching an overfished state, then the Council should:
   a. Recommend improved data collection for this species.
   b. Determine the rebuilding rate that would increase the multispecies value of the fishery.

3. Uncertainty adjustment: In cases where there is a high degree of uncertainty about the condition of the stock or stocks, OY may be reduced accordingly.

4. Amounts of fish harvested as compensation for industry research activities will also be deducted.

5. These adjustments could include increasing OY above the default value as indicated for Category 1 stocks, items 5 and 6 above.

4.6.3 Non-numerical OY for Stocks with No ABC Values (Category 3)

[Heading elevated and numbered]

Fish of these species are incidentally landed and usually are not listed separately in fish landing receipts. Information from fishery-independent surveys are often lacking for these stocks, because of their low abundance or they are not vulnerable to survey sampling gear. Until sufficient quantities of ~~Without an~~ at-sea observer program data are available or surveys of other fish habitats are conducted and/or requirements that landings of all species be recorded separately, it is unlikely that there ~~a data base~~ will be ~~developed in the future for these stocks to~~ sufficient data to upgrade the assessment ~~capability~~ capabilities or to evaluate their overfishing potential.

These species typically may be included in a non-numerical OY that is defined as all the fish that can be taken under the regulations, specifications, and management measures authorized by the FMP and promulgated by the Secretary. Such an OY may not be a predetermined numerical value, but rather that harvest that results from regulations, specifications, and management measures as they are changed in response to changes in the resource and the fishery. Nothing in this FMP prevents inclusion of these species in a numerical OY if the Council believes that is more appropriate.

(Blank)

5.0 PERIODIC SPECIFICATION AND APPORTIONMENT OF HARVEST LEVELS

The ability to establish and adjust harvest levels is the first major tool at the Council's disposal to exercise its resource stewardship responsibilities. **Each biennial fishing period,** the Council will assess the biological, social, and economic condition of the Pacific Coast groundfish fishery and update maximum sustainable yield (MSY) estimates or proxies for specific stocks (management units) where new information on the population dynamics is available. The Council will make this information available to the public in the form of the *Stock Assessment and Fishery Evaluation (SAFE)* document described in Section 5.1. Based upon the best scientific information available, the Council will evaluate the current level of fishing relative to the MSY level for stocks where sufficient data are available. Estimates of the acceptable biological catch (ABC) for major stocks will be developed, and the Council will identify those species or species groups which it proposes to be managed by the establishment of numerical harvest levels (optimum yields [OYs], harvest guidelines [HGs], or quotas). For those stocks judged to be below their overfished/rebuilding threshold, the Council will develop a stock rebuilding management strategy.

The process for specification of numerical harvest levels includes the estimation of ABC, the establishment of OYs for various stocks, calculation of specified allocations between harvest sectors, and the apportionment of numerical specifications to domestic annual processing (DAP), joint venture processing (JVP), total allowable level of foreign fishing (TALFF), and the reserve. The specification of numerical harvest levels described in this chapter is the process of designating and adjusting overall numerical limits for a stock either throughout the entire fishery management area or throughout specified subareas. **The process normally occurs annually between November and June, but can occur, under specified circumstances, at other times of the fishing year.** The Council will identify those OYs which should be designated for allocation between limited entry and open access sectors of the commercial industry. Other numerical limits which allocate the resource or which apply to one segment of the fishery and not another are imposed through the socioeconomic framework process described in Chapter 6 rather than the specification process.

The National Marine Fisheries Service (NMFS) Regional Administrator will review the Council's recommendations, supporting rationale, public comments, and other relevant information; and, if it is approved, will undertake the appropriate method of implementation. Rejection of a recommendation will be explained in writing.

The procedures specified in this chapter do not affect the authority of the U.S. Secretary of Commerce (Secretary) to take emergency regulatory action as provided for in Section 305(c) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) if an emergency exists involving any groundfish resource or to take such other regulatory action as may be necessary to discharge the Secretary's responsibilities under Section 305(d) of the Magnuson-Stevens Act.

{From end of new section 5.1 This chapter describes the steps in this process.**}--**

5.1 General Overview of the Harvest Specifications and Management Process

[New heading inserted]

The specifications and management process, in general terms, occurs as follows:

1. The Council will determine the MSY or MSY proxy and ABC for each major stock. Typically, the MSY proxy will be in terms of a fishing mortality rate ($F_{x\%}$,) and ABC will be the $F_{x\%}$ applied to the current biomass estimate. The MSY is the maximum long-term average yield expected from annual application of the MSY (or proxy) harvest policy under prevailing ecological and environmental conditions.

2. Every species will either have its own designated OY or be included in a multispecies OY. Species which are included in a multispecies OY may also have individual OYs, have individual HGs, or be included in a HG for a subgroup of the multispecies OY. Stocks without quantitative or qualitative assessment information may be included in a numerical or non-numerical OY.

3. To determine the OY for each stock, the Council will determine the best estimate of current abundance and its relation to its precautionary and overfished thresholds. If the abundance is above the precautionary threshold, OY will be equal to or less than ABC. If abundance falls below the precautionary threshold, OY will be reduced according to the harvest control rule for that stock. If abundance falls below the overfished/rebuilding threshold, OY will be set according to the interim rebuilding rule until the Council develops a formal rebuilding plan for that species.

4. For any stock or stock complex where the Secretary identifies that overfishing is occurring, the Council will take remedial action to end overfishing and prevent the stock or stock complex from falling below the minimum stock size threshold. For any stock the Secretary has declared overfished or approaching the overfished condition, or for any stock the Council determines is in need of rebuilding, the Council will implement such **periodic** management measures as are necessary to rebuild the stock by controlling harvest mortality, habitat impacts, or other effects of fishing activities that are subject to regulation under this **biennial** process. These management measures will be consistent with any approved rebuilding plan. ~~the Council will develop a rebuilding plan and submit it in the same manner as recommendations of the annual management process. Once approved, a rebuilding plan will remain in effect for the specified duration or until the Council recommends and the Secretary approves revision.~~

5. The Council may reserve and deduct a portion of the ABC of any stock to provide for compensation for vessels conducting scientific research authorized by NMFS. Prior to the research activities, the Council will authorize amounts to be made available to a research reserve. However, the deduction from the ABC will be made in the year after the "compensation fishing"; the amounts deducted from the ABC will reflect the actual catch during compensation fishing activities.

6. The Council will identify stocks which are likely to be fully harvested (i.e., the ABC, OY, or HG achieved) in the absence of specific management measures and for which allocation between limited entry and open access sectors of the fishery is appropriate.

7. The groundfish resource is fully utilized by U.S. fishing vessels and seafood processors. The Council may entertain applications for foreign or joint venture fishing or processing at any time, but fishing opportunities may be established only through amendment to this FMP. This section supercedes other provisions of this FMP relating to foreign and joint venture fishing.

{To new section 5.0 *This chapter describes the steps in this process.***}--**

5.2 SAFE Document

[Previously 5.1]

For the purpose of providing the best available scientific information to the Council for evaluating the status of the fisheries relative to the MSY and overfishing definition, developing ABCs, determining the need for individual species or species group management, setting and adjusting numerical harvest levels, assessing social and economic conditions in the fishery, and updating the appendices of this fishery management plan (FMP); a SAFE document is prepared annually. Not all species and species groups can be reevaluated every year due to limited state and federal resources. However, the SAFE document will in general contain the following information:

1. A report on the current status of Washington, Oregon, and California groundfish resources by major species or species group.

2. Specify and update estimates of harvest control rule parameters for those species or species groups for which information is available. **{Copied from new section 4.5, first paragraph** (The Council anticipates scientific information about the population dynamics of the various stocks will improve over time and that this information will result in improved estimates of appropriate harvest rates and MSY proxies. Thus, initial default proxy values will be replaced from time to time. Such changes will not require amendment to the FMP, but the scientific basis for new values must be documented.)**}--**

3. Estimates of MSY and ABC for major species or species groups.

4. Catch statistics (landings and value) for commercial, recreational, and charter sectors.

5. Recommendations of species or species groups for individual management by OYs.

6. A brief history of the harvesting sector of the fishery, including recreational sectors.

7. A brief history of regional groundfish management.

8. A summary of the most recent economic information available, including number of vessels and economic characteristics by gear type.

9. Other relevant biological, social, economic, ecological, and essential fish habitat information which may be useful to the Council.

10. A description of the maximum fishing mortality threshold (MFMT) and the minimum stock size threshold (MSST) for each stock or stock complex, along with other information the Council may use to determine whether overfishing is occurring or a stock or stock complex is overfished. **{Copied from new section 4.4.3, second paragraph** (The default overfished/rebuilding threshold for category 1 groundfish is $0.25B_{unfished}$. The Council may establish different thresholds for any species based on information provided in stock assessments, the SAFE document, or other scientific or groundfish management-related report.)**}--**

~~10.~~ 11. A description of any rebuilding plans currently in effect, a summary of the information relevant to the rebuilding plans, and any management measures proposed or currently in effect to achieve the rebuilding plan goals and objectives.

~~11.~~ 12. A list of annual specifications and management measures that have been designated as routine under processes described in the FMP at Section 6.2.

Under a biennial specifications and management measures process, elements 2, 5, 6, 7, and 11 would not need to be included in a SAFE document in years when the Council is not setting specifications and management measures for an upcoming biennial fishing period. The ~~preliminary~~ stock assessment section of the SAFE document is normally completed ~~late in the year, generally late October,~~ when the most current stock assessment and fisheries performance information is available and prior to the meeting at which the Council approves its final management recommendations for the upcoming **biennial fishing period**. The Council will announce the availability of ~~make~~ the ~~preliminary~~ stock assessment ~~and fishery evaluation~~ section of the SAFE document ~~available~~ to the public by such means as mailing lists or newsletters and will provide copies upon request. ~~A final~~ The fishery evaluation section of the SAFE may be prepared after the Council has made its final recommendations for the upcoming **biennial fishing period** and will include the final recommendations, an estimate of the previous year's catch, and ~~including~~ summaries of ~~proposed and pre-existing~~ rebuilding plans. ~~The final SAFE document, if prepared, will also~~ Availability will be similarly announced and copies made available upon request.

5.3 Authorization and Accounting for Fish Taken as Compensation for Authorized Scientific Research Activities.

[Previously 5.4, sections 5.2 and 5.3 moved to chapter 4.]

At a Council meeting, NMFS will advise the Council of upcoming resource surveys that would be conducted using private vessels with groundfish as whole or partial compensation. For each proposal, NMFS will identify the maximum number of vessels expected or needed to conduct the survey, an estimate of the species and amounts of compensation fish likely to be needed to compensate vessels for conducting the survey, when the fish would be taken, and when the fish would be deducted from the ABC in determining the OY/harvest guideline. NMFS will initiate a competitive solicitation to select vessels to conduct resource surveys. NMFS

will consult with the Council regarding the amounts and types of groundfish species to be used to support the surveys. If the Council approves NMFS' proposal, NMFS may proceed with awarding the contracts, taking into account any modifications requested by the Council. If the Council does not approve the proposal to use fish as compensation to pay for resource surveys, NMFS will not use fish as compensation.

Because the species and amounts of fish used as compensation will not be determined until the contract is awarded, it may not be possible to deduct the amount of compensation fish from the ABC or harvest guideline in the year that the fish are caught. Therefore, the compensation fish will be deducted from the ABC the **biennial fishing period** after the fish are harvested. During the annual specification process, NMFS will announce the total amount of fish caught during the **biennial fishing period** as compensation for conducting a resource survey, which then will be deducted from the following year's ABCs in setting the OYs.

[Section 5.5 (Determination of DAH, DAV, JVP and TALFF) deleted.]

5.4 Biennial Implementation Procedures for Specifications and Management Measures

[Previously 5.6]

Biennially, the Council will develop recommendations for the specification of ABCs, OYs, any HGs or quotas, ~~and apportionments to DAH, DAP, JVP, and TALFF and the reserve~~ over the span of **three** Council meetings. In addition during this process, the Council may recommend establishment of HGs and quotas for species or species groups within an OY.

The Council will develop preliminary recommendations at the first of **three** meetings (usually in **November**) based upon the best stock assessment information available to the Council at the time and consideration of public comment. After the first meeting, the Council will provide a summary of its preliminary recommendations and their basis to the public through its mailing list as well as providing copies of the information at the Council office and to the public upon request. The Council will notify the public of its intent to develop final recommendations at its **third** meeting (usually **in June**) and solicit public comment both before and at its second meeting.

At its second meeting, the Council will again consider the best available stock assessment information which should be contained in the recently completed SAFE report and consider public testimony before adopting final recommendations to the Secretary. Following the **second/third** meeting, the Council will submit its recommendations along with the rationale and supporting information to the Secretary for review and implementation.

Upon receipt of the Council's recommendations supporting rationale and information, the Secretary will review the submission, and, if approved, publish a notice in the *Federal Register* making the Council's recommendations available **for public comment and agency review. Following the public comment period on the proposed rule, the Secretary will review the proposed rule, taking into account any comments or additional information received, and will publish a final rule in the Federal Register, possibly modified from the proposed rule in accordance with the Secretary's consideration of the proposed rule.** **{From new section 4.3.1** All ABCs, OYs, and any HGs or quotas will remain in effect until revised, and, whether revised or not, will be announced at the beginning of the year along with other specifications.**}--**

In the event that the Secretary disapproves one or more of the Council's recommendations, he may implement those portions approved and notify the Council in writing of the disapproved portions along with the reasons for disapproval. The Council may either provide additional rationale or information to support its original recommendation, if required, or may submit alternative recommendations with supporting rationale. In the absence of an approved recommendation at the beginning of the **biennial fishing period**, the current specifications in effect at the end of the previous **biennial fishing period** will remain in effect until modified, superseded, or rescinded.

5.5 Inseason Procedures for Establishing or Adjusting Specifications and Management Measures

[Previously 5.7]

5.5.1 Inseason Adjustments to ABCs

[Previously 5.7.1]

Occasionally, new stock assessment information may become available inseason that supports a determination that an ABC no longer accurately describes the status of a particular species or species group. However, adjustments will only be made during the biennial specifications process and a revised ABC announced at the beginning of the next biennial fishing period. The only exception is in the case where the ABC announced at the beginning of the biennial fishing period is found to have resulted from incorrect data or from computational errors. If the Council finds that such an error has occurred, it may recommend the Secretary publish a notice in the *Federal Register* revising the ABC at the earliest possible date.

5.5.2 Inseason Establishment and Adjustment of OYs, HGs, and Quotas

[Previously 5.7.2]

OYs and HGs may be established and adjusted inseason (1) for resource conservation through the "points of concern" framework described in Chapter 6; (2) in response to a technical correction to ABC described above; or, (3) under the socioeconomic framework described in Chapter 6.

Quotas~~, except for apportionments to DAH, DAP, JVP, TALFF, and reserve,~~ may be established and adjusted inseason only for resource conservation or in response to a technical correction to ABC.

[Section 5.7.3 (Inseason Apportionment and Adjustments to DAH, DAP, JVP, TALFF, and Reserve) deleted.]

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6.0 MANAGEMENT MEASURES

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6.5.1.2 Observers

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The Regional Administrator ~~may~~ will implement an observer program through a Council-approved federal regulatory framework. Details of how observer coverage will be distributed across the West Coast groundfish fleet will be described in an observer coverage plan. NMFS will publish an announcement of the authorization of the observer program and description of the observer coverage plan in the *Federal Register*.

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13.0 REFERENCES

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Myers, R.A., N.J. Barrowman, and R. Hilborn. 2000. The Meta-analysis of the maximum reproductive rate for fish populations to estimate harvest policy; a review. Unpublished report distributed at the March 20-23, 2000, West Coast Groundfish Harvest Rate Policy Workshop sponsored by the Scientific and Statistical Committee of the Pacific Fishery Management Council.

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SSC (Science and Statistical Committee). 2001. SSC terms of reference for groundfish rebuilding analyses. Pacific Fishery Management Council, Portland, April 2001, Briefing Book Exhibit F.7.