

DRAFT
DISCUSSION PAPER
NON-TARGET SPECIES COMMITTEE
JUNE 3-4, 2004

This paper addresses the status of a Council initiative to revise management of non-target species in the Bering Sea/Aleutian Islands and Gulf of Alaska and the interplay among the Council, its Non-target Species Committee, and ad hoc technical working group. The Non-target Species Committee has identified that it was most interested in obtaining more information about current management strategies at this early stage. The committee identified that it can not begin developing its recommendations without the Council's identification of specific policy goals and approaches. The ad hoc committee has identified that its work is complete, unless the Council tasks it with a specific charge. The Council has not focused on the policy and legal issues due to the press of other business. To assist the Council, the committee and group will convene together on June 3-4, 2004 to attempt to further refine the decisions needed by the Council before analysis may begin.

Council At its April 2004 meeting, the Council identified a preferred alternative for the Alaska Groundfish Fisheries Programmatic SEIS, which analyzed alternative management policies for the BSAI and GOA groundfish FMPs. The preferred alternative reflects a conservative, precautionary approach to ecosystem-based fisheries management, and communicates a policy direction for the future of the groundfish fisheries. The preferred alternative consists of three components:

1. a management approach statement that describes the goals of, and rationale and assumptions behind the alternative;
2. a set of management objectives that complement and further refine the goals set forth in the management approach; and
3. a pair of example FMP "bookends" that illustrate and frame the range of implementing management measures for each objective.

The Council identified its **fishery management goal** as follows:

to provide sound conservation of the living marine resources; provide socially and economically viable fisheries and fishing communities; minimize human-caused threats to protected species; maintain a healthy marine resource habitat; and incorporate ecosystem-based considerations into management decisions.

The Council selected **45 management objectives** to help focus its consideration of potential management measures. Objective 5 pertains to the proposed action for the creation of a new species category to prevent overfishing:

Continue to improve the management of species through species categories.

The Council identified bookends to illustrate the intended implementation of its preferred alternative for Objective 5. One bookend identified the status quo management of setting a group TAC for "other species" and maintain the target, "other species," PSC, and non-specified species categories. The other bookend addressed a possible approach for enhancing management of other species and non-specified species. The status of each bookend action is also identified. A "✓" indicates that the bookend action is currently in the FMP or in regulations. "O" indicates that an amendment analysis has been initiated, that the action is ongoing. "A" indicates that the action would require an amendment analysis to be initiated.

PA.1		PA.2	
- Set group TAC for “other species”. - Maintain species categories (target, “other species”, PSC and non-specified species)	✓	- Develop criteria for ‘splitting and lumping’ of species in order to have a consistent approach over as wide a range as possible (‘other species’, rockfish, non-specified, etc.)	O
	✓	- Consider breaking sharks and skates and additional groups out of “other species” group for TAC setting	A
		- Develop criteria to bring a non-specified species into a managed category	A

During its consideration of the Draft PSEIS in 2002 and 2003, the Council received four reports from an ad hoc working group of Groundfish Plan Team, Scientific and Statistical Committee (SSC) members, and other interested NOAA Fisheries and NOAA General Counsel staff. In response to recommendations from its Groundfish Plan Teams and SSC, the Council initiated an analysis to address the three items listed under Preferred Alternative 2 bookend. In June 2003, the Council appointed a committee and tasked it with reviewing the findings of the ad hoc group and providing recommendations on the following:

1. Identify efficient methods for monitoring of non-target catch
2. Improve abundance estimates of non-target species
3. Develop harvest recommendations that build sustainable populations of non-target species

Committee The committee met twice in 2003. One was a brief organizational meeting in October 2003. It identified that its role was unclear and it was unprepared to respond to the Council’s charge at that early stage. It was most interested in obtaining the information listed below from staff. Requests #1 and #3 are addressed in Appendix I. Request #4 will be provided by the AFSC prior to the meeting. Requests #2, #5, and #6 were provided by Dr. Grant Thompson, AFSC in December 2003 and are posted on the Council website: http://www.fakr.noaa.gov/npfmc/current_issues/non_target/non_target.htm

1. Table of groundfish species in the Bering Sea, Aleutian Islands, and Gulf of Alaska by management category, overfishing tier, biomass, average harvest from 1999-2003, using data from trawl surveys, observer program and commercial landings
2. List of tiers and a summary of criteria for placing a species into a tier
3. List of current management categories and criteria for placing a species into a category
4. List of species that are ecologically sensitive
5. Primer on overfishing and the tier structure during the December meeting from the Plan Team chairs
6. Primer on stock assessments during the December meeting from the Plan Team chairs

Group To date, the ad hoc group has recommended a management approach, goals, objectives, criteria, policy, management alternatives, and numerous policy and legal decision points on management on target and non-target species in the groundfish FMPs for the Council and committee. Those recommendations follow.

Proposed problem statement

The current management regime does not provide appropriate protection for all species in the ecosystem impacted by the groundfish fisheries, including species for which little biological information is available. Nor does it provide appropriate opportunities for all groundfish fisheries, including those which might be impacted by measures designed to protect species for which little biological information is available.

Proposed Alternatives for analysis

Alternative 1. No action.

Alternative 2. Revise the BSAI and GOA groundfish FMPs:

Action 1. Identify the fishery management units in the groundfish FMPs to include only target, non-target and forage fish species categories (non-specified species allow for incidental catch measures and monitoring but are outside of the FMP).

Option. Move all non-target species into the forage fish category.

Action 2. List the species in the target, non-target, and forage fish species categories that are within the FMP management area.

Option 1. List non-target and forage fish species.

Option 2. Do not list any species in the management categories.

Action 3. Identify a *policy* based on scientific *criteria* to determine single species or assemblage management (split or lump);

Action 4. Identify a *policy* based on scientific *criteria* to determine when sufficient data is available to move species between the non-target and target species categories.

The proposed **management policy for Alternative 2, Action 3** is a multi-step process listed below. Each of the following steps will require balancing the biological needs of the species, economics of the fisheries, community impacts, and management policy.

Step 1. Separate groundfish species into:

- (a) target species category, if there is an intent by the commercial fishery to catch and market it
- (b) non-target species category, if there is no intent to catch/market it would contain either single species or complexes;

Step 2. Sort:

- (a) single species into target category if targeted/marketed and there is adequate information for assessment and management
- (b) all remaining single species and all species complexes;

Step 3. Characterize non-target species as:

- (a) sensitive
- (b) non-sensitive;

Step 4. Manage:

- (c) target species category by specifying optimum yield and overfishing definitions relative to MSY (status quo);
- (d) non-target species category by protecting them from negative fishing effects of the target groundfish fisheries by either or both:
 - i. management measures (maximum retainable allowances, closed areas, seasonal apportionments, etc.)
 - ii. monitoring only;

Step 5. Establish a mechanism to transition species between categories;

Step 6. Create separate fishery management units in the groundfish FMPs for target and non-target species categories.

Step 1 would separate species and complexes into two categories. Some stocks/species are true targets of groundfish fisheries, in the sense that groundfish fishermen actively seek to catch and market them in significant quantities. These would be categorized as “target” species. The groundfish FMPs need to insure that these stocks/species are managed on the basis of National Standard 1, where both optimum yield and overfishing are defined relative to maximum sustainable yield. Therefore, the recommended **management goal for target species is to optimize sustainable yield.**

The second part of Step 1 is to place those single species and all complexes that are not intended targets of fisheries into a non-target species category. The proposed action is to list non-target species separately from the target species category because they are: (1) caught incidentally to the target fishery; (2) often are not intended to be caught; and (3) are not substantially retained or marketed. The Magnuson-Stevens Act requires OY and the overfishing definition to be specified at the “fishery” level. However, the non-target species are not a “fishery,” so these requirements of the Act would not apply. A primary **management goal of non-target management is protection from negative fishing effects**. Corresponding objectives could include:

- preventing “squid boxes” (a constraint on a target fishery resulting from the fishery hitting its catch limit of a non-target species before hitting the limit of the target)
- determining whether the cost of recovering a stock may exceed the benefits
- developing an accounting system that provides an “early warning” of overfishing
- examining distribution effects of:
 - (a) closed areas resulting in relocating a fishery into areas with different non-target species catch composition or rates and
 - (b) shrinking species distribution as a result of indirect fishery effects.

The catch of non-target species is considered “bycatch” based on the broad definition of bycatch used by NMFS. Therefore, an appropriate secondary **management goal for non-target species would be to decrease bycatch to the extent practicable** (National Standard 9). It would be practicable to reduce bycatch mortality if such a reduction would increase the overall net benefit of that fishery to the nation. Identifying when it is practicable to decrease the bycatch mortality for a particular species is a difficult issue that is at the heart of this proposal. The Council, with assistance from its advisors, should develop criteria or a process for determining the extent to which it is practicable to decrease the bycatch of non-target species. Suggestions for determining when it is practicable to address bycatch of non-target species could include the following:

- non-target population should be healthy, sustainable
- fisheries will not cause an unacceptable risk of a steep and rapid population decline
- fisheries will not cause an unacceptable risk of extinction of harvested stocks

Step 2 would use data quality and species sensitivity (to overfishing) to sort complexes, groups, and species to prioritize management strategies. A decision matrix (below) identifies the criteria for splitting or lumping species. The case for splitting assemblages into species occurs with good data and high sensitivity. The case for lumping species into assemblages occurs with poor data and low sensitivity. Lumping can occur with good data and low sensitivity, if convenient for management. Species could be lumped into an assemblage, regardless of the data quality/sensitivity issue if they are caught together, have the same possible or recommended exploitation rate, similar life history, etc. For example, dissimilar life histories, rather than insufficient data, would lead to a recommendation to not lump shark and skate species together into a management complex, but may allow lumping of shark species together or skate species together.

Data and sensitivity are defined below. The source and age of data should be considered in determining placement in the overfishing tier categories. The decision matrix results in highly sensitive species with either good or poor data being managed as single species. Low sensitive species may be managed as either single species or complexes, depending on management goals. Species with poor survey coverage should be managed as single species with a plan for improving information and alternative (to TACs) management, with highly sensitive species having a greater priority for improving data collection than those with low sensitivity. Biology should predominate the separation into high and low sensitivity.

Data Quality (tier-specific)	Sensitivity	
	high	low
good survey coverage	single species	complex if needed for management or single species
poor survey coverage	single species	complex or single species
	start high quality data collection	collect additional data if possible
	interim quality, precautionary	
	no directed fishery	
	alternative management strategies	
	under alternative management schemes,	
	low MRB, area/time closures, creative thinking.	

Data quality defined by the appropriateness of the survey coverage in space (relative to the species range and habitat), time of year, gear; and the precision of the survey estimate (i.e., its coefficient of variance)

Sensitivity defined by life history, habitat, economic value, co-occurrence with target fishery, easily misidentified, risk of disproportionate harvest to biomass, current management measures, exploitation rate, and biomass

Currently, target species, other species, and forage fish are in the groundfish fishery management unit (FMU) (and are managed under an OFL). Prohibited and non-specified species are not in the FMUs (and are not managed under an OFL). Forage fish was identified as a model for proposals for non-target species management (for those species that are incidentally-caught with target species).

Step 3, would identify a process and criteria for determining sensitivity and additional management measures for non-target species and complexes. Non-target species could be classified into two general classes:

1. “non-sensitive” species - unlikely to suffer negative population effects from fishing
2. “sensitive” species - likely to suffer negative population effects even as bycatch

Some species or complexes may be either “non-sensitive” or “sensitive” due to trophic role, ecological importance, low abundance, low fecundity, long life, slow growing, poorly understood, current stock trend, historical abundance. Life history traits may lead to a determination of sensitive. Non-sensitive species are high r-selected¹ (e.g., squid, Alaska plaice). Management may be limited to a monitoring program. Sensitive species are low r-selected (e.g., rockfishes, sharks). Sensitivity to negative fishery effects would determine the priorities for data collection and research. A research plan would be needed to develop an optimal sampling methodology. Methods for assessing species sensitivity within each of these broad criteria need to be outlined (e.g., criteria for *rapid decline in an abundance trend* (x% per year) could be identified).

Four possible criteria for defining non-target species as sensitive are: (1) rapidly declining abundance trend; (2) sensitive life history traits; (3) restricted range and or specific habitat; and (4) crucial role in ecosystem (predator prey or other dependent association).

Sensitive life history traits were identified as those contributing to the overall potential for a population to increase (the “r” parameter in the logistic growth equation or its equivalent). A spectrum of life history patterns were identified which ranged from “high resilience” to “very low resilience” categories. In general, “high resilience” species with high potential rates of population increase have one or more of the following traits: fast growth rates, low age at maturity, high fecundity, and are relatively short lived. At the other end

¹r selected species are defined by an unstable environment; density independent; small size of organism; energy used to make each individual is low; many offspring are produced; early maturity; short life expectancy; each individual reproduces only once; most of the individuals die within a short time but a few live much longer

of the spectrum, “very low resilience” species with low potential rates of population increase may have slow growth rates, late age at maturity, low fecundity, and / or very long lives. Two intermediate categories were proposed, such that species could be classified generally as high resilience, average resilience, moderate to low resilience, and very low resilience. Non-target species could be classified as having sensitive life history traits if they were classified as moderate to low resilience or very low resilience species.

Definitions for *restricted range* and *habitat specificity* would assist in the identification of sensitive species, but it may be difficult to establish criteria for the amount of range restriction that would cause concern. So little is known about the specific habitat associations of most current target species, let alone non-target species. However, observed restricted range or occurrence in specific locations over time might indicate a habitat association and be evidence enough for additional management measures (likely spatial) to protect the species from fishing effects.

Crucial role in the ecosystem is also undefined at this time. The main questions that can be answered with current data are who preys on the species in question, and who is preyed upon by the species? Gathering adequate data to address this question would likely identify which non-target species were candidates for special management under this criterion. One example would be the forage fish category, in which multiple taxonomic families were placed off limits as target species because of their collective importance as prey for marine mammals, birds, and target groundfish. Other non-target taxa could be added to this existing category as it becomes clear that they are essential forage species (e.g., squid, octopus, and eelpouts), rather than placing them in the proposed non-target species category.

Additional management measures would be designed to apply to the criterion of highest concern. For example, a non-target species with an extremely restricted range would receive additional protection from fishing effects by closing part or all of the range to fishing (with certain gear types, during certain seasons, as appropriate). Alternatively, a more evenly distributed species with sensitive life history traits and a severely declining abundance trend might be managed with a bycatch cap to limit take to a known amount each year.

Recommended process for prioritizing species for management action is adapted from USFWS²:

To conserve fish diversity and to preserve future options with respect to resource use in the North Pacific, reducing the likelihood of having to propose any groundfish species for Federal listing as endangered or threatened, (maintain system integrity as a whole, sustain populations, prevent significant fishery related adverse impacts), a committee (perhaps the groundfish plan teams) would assign each non-target complex a ranking, ranging from 1 (low) to 5 (high) priority for each of the following factors: spawning distribution, non-spawning distribution, relative abundance, fishery related impact in and out of spawning season, population trend, are of importance. Higher scores reflect more concern.

Under **Step 4**, the Council would continue current management of target species to maximize OY; however, the OY would need to be respecified to reflect the narrower list of species under the OY. The subsequent change in OY would depend on the relative contribution of the removed (i.e., non-target) species to the original estimate. The Council would continue to apply quota specifications and in-season management as the best tool to achieve its management goals and objectives. The TAC management system would only apply to single species. The exception is for species that may be genetically distinct but morphologically indistinguishable (e.g., the several rougheye rockfishes). This category would include the following for the BSAI and GOA (except where noted): pollock, Pacific cod, sablefish, Atka mackerel, rock sole, yellowfin sole, flathead sole, dover sole, rex sole, Greenland turbot, Pacific ocean perch, shortraker rockfish and

² NonGame Birds of Management Concern – The 1995 List; Source: <http://migratorybirds.fws.gov/reports/specon/intro.html> and Birds of Conservation Concern 2002; Source: <http://migratorybirds.fws.gov/reports/BCC02/BCC2002.pdf>

rougeye rockfish (trawl fisheries only), shortspine thornyheads, yelloweye rockfish, GOA northern rockfish, GOA dusky rockfish, GOA arrowtooth flounder, and GOA skates. This list may be revised by the Council with assistance from its advisors.

Although no management changes would occur for target species under the proposed action to create a non-target species category, some improvements to stock assessments for target species could occur. These may include identifying the tier in which species are managed, why species are in a particular tier, and what might be necessary to progress to the more data rich tiers. A separate discussion of whether to prioritize information gathering to move lower tier or higher tier species to the next higher tier level is ongoing.

In general, **management objectives of non-target species management are to monitor catch and the stock, discourage targeting, and minimize bycatch to the extent practical.** The objective is NOT to optimize yield for non-target species; therefore setting MSY-based ABCs, OFLs, or TACs is inappropriate. First, there may not be sufficient information to set a MSY-based OFL. Second, it may not make sense to manage some species under an OFL, even if there was sufficient information. The MSA defines the term “conservation and management” as all the rules and regulations, methods, and other measures that are designed to assure that irreversible or long-term adverse effects on the marine environment are avoided. It states that there will be a multiplicity of options available with respect to future uses of these resources, some of which might include future fishery yield potential. Therefore, a separate FMU for non-target species with a separate goal (not based on MSY) would be adopted.

A second part of Step 4 is to protect remaining species from *potentially harmful/negative* impacts of the target groundfish fisheries. Non-target species or complexes would be identified as to which would be monitored only and which would require management measures (it may be possible to collapse this into a determination that all non-sensitive species would be monitored only (and perhaps have MRAs) and all sensitive species require additional management measures to protect them).

All non-target species would be monitored at the most detailed, practicable taxonomic level in surveys and at some specified group level in fisheries for catch reporting. Non-target monitoring categories could be classified as: high, medium, low (uncommon). These would be determined based on priorities based on either future yield potential, sensitivity to harvest, or other ecological reasons. Monitoring *may* include age-structured population modeling for non-target stocks of interest, and often would increase the amount of scientific information about the stock. It would include both fishery dependent and fishery independent elements. However, it may be determined not to prepare stock assessments for non-target species that are currently assessed (e.g., BSAI Alaska plaice), with staff priorities changed to gather more information rather than assess poorly studied fishes. NMFS staff would monitor survey biomass and or abundance trends, fishery catch-per-unit-effort trends, and fishery retention rates at the lowest practical taxonomic level (although bycatch MRAs might be set at higher levels for complexes). In addition, “representative species” from each major taxon would be monitored for changes in length composition or age composition if ageing methods exist. Representative species would be useful indicators for a group if they were the most commonly encountered in the fishery. Improvements to species identification, which are already in progress in the observer program, would be required for this program to succeed.

For those non-target species requiring more than monitoring, Step 4 would maintain or develop management measures limiting the harvest of non-target species or complexes. Non-target species or complexes requiring management measures, in addition to monitoring, would be subject to at least a MRA. This would discourage targeting, but the proposed system would allow for some use of incidental catch and some limited market exploration. New fisheries could develop with constraints until sufficient data is collected to determine an appropriate harvest limit. Some non-target species are more sensitive to unintended negative fishing effects than others. Thus, criteria for sensitivity and additional management measures to protect more sensitive species needs to be defined. These additional management measures would be implemented in addition to

a MRA and monitoring which would be implemented for all non-target species. There always will be reasons that necessitate management changes, such as uncertainty and new information, but the appropriate level of protection for non-target species should be provided in a way that is more flexible, effective, efficient, and responsive to their sensitivity. For example, in order to ensure that precautionary biological reference points are not exceeded, protection could be provided by time/area closures, gear restrictions/modifications, size limits, or bycatch allowances. Clearly, some stocks are sensitive to fishing pressure resulting from bycatch alone.

Step 5 would identify a process for addressing transitional species, i.e., those that may be moved from non-target to target categories as a fishery develops could be managed using experimental fishing permits, with data and observer requirements, to collect information necessary for management (e.g., setting TACs).

Two methods for opening a target fishery are identified: (1) industry would petition the Council to open a directed fishery or (2) the Groundfish Plan Teams would report that the retention rates of a particular species are maximized and may warrant consideration to transition them from the non-target category to a directed fishery under a plan amendment. *(Note that a plan amendment would be required if the Council chooses to list the species in the management categories as proposed under Alternative 2, Action 2.)* The first year could be an experimental fishery (issue a permit and attach conditions, for example, small vessels using longlines have to take a VMS or observer). The Council should consider whether an experimental fishing permit, or other recordkeeping and reporting requirements are appropriate for a developing fishery or whether the Council would make each determination for each case separately. The new NMFS catch accounting system was implemented with the goal of computing catch of species using the same method as for PSC.

Step 6 would create separate FMUs in the groundfish FMPs for target and non-target species categories, and perhaps for forage fish. Each FMU would have an associated management goal, objectives and measures (restrictions).

In summary, NMFS has the responsibility to rebuild stocks that are overfished, to prevent overfishing (where overfished and overfishing may each have different definitions for target and non-target species), and ensure that management actions would not result in a species becoming endangered or threatened. NMFS, the State of Alaska (ADF&G), and academic institutions have the responsibility to inform the Council on biologically acceptable methods of managing fisheries. The Council's responsibility is to identify issues and develop methods for efficiently managing marine stocks. But that discussion is dependent on the development of appropriate biological reference points for non-target species. To that end, draft policy descriptions as noted in Appendix 2 are recommended for consideration by the Council and its advisors.

Council/committee decisions:

- Adopt terms of reference for the committee
- Adopt one of two choices for a process to amend the BSAI and GOA FMPs:
 - (1) one comprehensive analysis to revise management of all non-target species or
 - (2) separate analyses for: (a) other rockfishes; (b) other flatfishes; and (c) other species
- Adopt a timeline for Council action
- Adopt a problem statement
- Identify FMU(s), component species, and management objectives
- Address the following policy questions/issues identified by the ad hoc working group:
 - Define role of (target and non-target) groundfish species in the ecosystem
 - What are the potential losses and gains from the proposed system?
 - Outline a process for monitoring and identifying species of conservation concern (e.g., ecological sensitivity) to ensure the protection of these stocks at current or an increased level. Bycatch reduction (National Standard 9³) is one way to achieve the goal of protection from negative fishery effects. A prioritization matrix (see USFWS model) could be used to identify high priority species currently managed within a complex. Would using this matrix to identify candidates for separation from target species complexes enhance their conservation beyond status quo management? Develop criteria or a process for determining the extent to which it is practicable to decrease the bycatch of non-target species.
 - Is it acceptable for non-target (including “non-specified”) species to fall into an overfished status as long as they are not threatened or endangered?
 - What are the criteria for establishing retention limits or time area closures for non-target species?
 - How would non-target species be ensured to be sustainable if these criteria are not or can not be defined (e.g., so they would not become endangered)?
 - What non-target indicators trigger an action, and when is it no longer needed? Can it be addressed reasonably (acceptable cost)?
 - How to define the non-target complexes? How to assess appropriate MRA level for each species/complex as a minimum measure. MRAs should be constraining enough to ensure fisheries develop under control but not so restrictive that fishery/market exploration can’t happen How to identify whether MRA is sufficient protection? Expand in-season authority (prohibited species status, hotspot closures) to protect non-target species?
 - How to manage the remaining species?
 - Revise the overfishing level tier system to eliminate tier 6 for target species, because a target fishery would not occur if the biomass is unknown under the proposed system.
 - Define the threshold between target and non-target (tells you when to move between categories). Is it a target fishery if one harvester is catching it and selling it? A rapid increase in catch or retained catch, or a change in average fish size over time are possible indicators. How to transition target species to non-targets (e.g., GOA Atka mackerel)? Would action require a plan amendment or could it be part of the specification process?
 - Define the role of the groundfish plan teams. Proposed schedule for consideration:
 - (a) The September Groundfish Plan Teams focus on non-target species by reviewing AFSC (and ADF&G) staff reports at their September meetings. Plan teams examine trends, picks from management options depending on category of species and severity of problems. Teams forward their recommendations either for additional targeted data collection or possible management action to the SSC and Council.
 - (b) The November Plan Team meetings focus on reviewing stock assessments and recommending OFLs and ABCs for target species (and other duties) at their November meetings.

³ 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.

In October 2003, the Non-Target Species Committee requested information summaries on the following items:

1. Table of groundfish species in the Bering Sea, Aleutian Islands, and Gulf of Alaska by management category using data from trawl surveys, observer program and commercial landings by:
 - overfishing tier
 - biomass
 - average harvest from 1999-2003
2. List of tiers and a summary of criteria for placing a species into a tier
3. List of current management categories and criteria for placing a species into a category

Bering Sea/Aleutian Island Groundfish Species Category

Target Species	Area	2004 Biomass	2004 OFL	OFL Tier	2004 ABC	2004 TAC	1999-2003 Catch
Pollock	EBS	11,000,000	2,740,000	1a	2,560,000	1,492,000	1,295,806
	AI	175,000	52,600	5	39,400	1,000	1,182
	Bogoslof	198,000	39,600	5	2,570	50	
Pacific cod	BSAI	1,660,000	350,000	3a	223,000	215,500	189,796
Yellow fin sole	BSAI	1,560,000	135,000	3a	114,000	86,075	74,378
Greenland turbot	BSAI	132,000	19,300	3a	4,740	3,500	5,051
	BS				3,162	2,700	4,238
	AI				1,578	800	813
Arrowtooth flounder	BSAI	696,000	142,000	3a	115,000	12,000	12,748
Rock sole	BSAI	1,160,000	166,000	3a	139,000	41,000	39,629
Flathead sole	BSAI	505,000	75,200	3a	61,900	19,000	17,311
Alaska plaice	BSAI	1,050,000	258,000	3a	203,000	10,000	6,387
Other flatfish	BSAI	90,300	18,100	5	13,500	3,000	7,503
Sablefish	EBS	32,000	4,020	3b	3,000	2,900	889
	AI	39,000	4,620	3b	3,450	3,100	1,018
Pacific Ocean Perch	BSAI	349,000	15,800	3b	13,300	12,580	11,624
	BS				2,128	1,408	714
	AI				11,172	11,172	10,910
	Eastern				3,059	3,059	2,729
	Central Western				2,926 5,187	2,926 5,187	2,830 5,351
Northern rockfish	BSAI	142,000	8,140	3a	6,880	5,000	
	BS						556
	AI						5,169
Shortraker	BSAI	23,400	701	5	526	526	220
Rougheye	BSAI	10,400	259	5	195	195	350
Other rockfish (incl. sharpchin)	EBS	18,300	1,280	5	960	460	188
	AI	12,100	846	5	634	634	659
Atka mackerel	BSAI	286,000	78,500	3a	66,700	63,000	52,766
	Eastern				11,240	11,240	11,249
	Central				31,100	31,100	25,566
	Western				24,360	20,660	16,901
Squid	BSAI	n/a	2,620	6	1,970	1,275	841
Other Species	BSAI		81,150	5	46,810	27,205	26,026
BS/AI TOTAL		19,138,500	4,193,736		3,620,535	2,000,000	1,744,372

BSAI = Bering Sea & Aleutians

OFL = overfishing level

BS = Bering Sea

ABC = acceptable biological catch

*01-03

*through 11/08/03 including CDQ TAC = total allowable catch

Gulf of Alaska Groundfish							
Species	Area	2004 Biomass	2004 OFL	Tier	2004 ABC	2004 TAC	1999-2003 Catch
Pollock	W (61)				22,930	22,930	
	C (62)				26,490	26,490	
	C (63)				14,040	14,040	
	WYAK				1,280	1,280	
	SubTotal	740,440	91,060		64,740	64,740	
	EYAK/SEO	28,980	8,690		6,520	6,520	
	Total	769,420	99,750	3b	71,260	71,260	67,540
Pacific Cod	W				22,610	16,957	
	C				35,800	27,116	
	E				4,400	3,960	
	Total	484,000	102,000	3a	62,810	48,033	52,340
Sablefish	W				2,930	2,930	
	C				7,300	7,300	
	WYAK				2,550	2,550	
	SEO				3,770	3,770	
	Total	179,000	22,160	3b	16,550	16,550	13,210
Deep water flatfish¹	W				310	310	
	C				2,970	2,970	
	WYAK				1,880	1,880	
	EYAK/SEO				910	910	
	Total	99,620	8,010	5, 6	6,070	6,070	11,000
Rex sole	W				1,680	1,680	
	C				7,340	7,340	
	WYAK				1,340	1,340	
	EYAK/SEO				2,290	2,290	
	Total	99,950	16,480	5	12,650	12,650	3,170
Shallow water flatfish²	W				21,580	4,500	
	C				27,250	13,000	
	WYAK				2,030	2,030	
	EYAK/SEO				1,210	1,210	
	Total	375,950	63,840	4, 5	52,070	20,740	5,265
Flathead sole	W				13,410	2,000	
	C				34,430	5,000	
	WYAK				3,430	3,430	
	EYAK/SEO				450	450	
	Total	292,670	64,750	3a	51,720	10,880	1,690
Arrowtooth flounder	W				23,590	8,000	
	C				151,840	25,000	
	WYAK				10,590	2,500	
	EYAK/SEO				8,910	2,500	
	Total	2,453,390	228,130	3a	194,930	38,000	22,055

Species	Area	2004 Biomass	2004 OFL		2004 ABC	2004 TAC	1999-2003 Catch
Other Slope rockfish	W				40	40	
	C				300	300	
	WYAK				130	130	
	EYAK/SEO				3,430	200	
	Total	89,460	5,150	4, 5	3,900	670	750
Northern rockfish	W				770	770	
	C				4,100	4,100	
	E ³				0	0	
	Total	95,150	5,790	3a	4,870	4,870	4,070
Pacific ocean perch	W	50,430	2,990		2,520	2,520	
	C	167,901	9,960		8,390	8,390	
	WYAK	16,610			830	830	
	SEO				1,600	1,600	
	E	32,019	2,890				
	Total	266,960	15,840	3a	13,340	13,340	10,760
Shortraker/ rougheye	W				254	254	
	C				656	656	
	E				408	408	
	Total	73,000	2,510	4, 5	1,318	1,318	1,580
Pelagic shelf rockfish	W				370	370	
	C				3,010	3,010	
	WYAK				210	210	
	EYAK/SEO				880	880	
	Total	57,400	5,570	3a, 5	4,470	4,470	3,540
Demersal Shelf Rockfish	Total	20,168	690	4	450	450	300
Thornyhead rockfish	W				410	410	
	C				1,010	1,010	
	E				520	520	
	Total	86,200	2,590	5	1,940	1,940	1,250
Atka Mackerel	Total	unk	6,200	6	600	600	230
Other Species	Total	unk	NA	NA	NA	12,592	4,510
Skates				5			
Total		5,442,338	649,460		498,948	264,433	203,260

2. List of tiers and a summary of criteria for placing a species into a tier

Tier 1) *Information available: Reliable point estimates of B and B_{MSY} and reliable pdf of F_{MSY} .*

1a) *Stock status: $B/B_{MSY} > 1$*

$F_{OFL} = m_A$, the arithmetic mean of the pdf

$F_{ABC} \leq m_H$, the harmonic mean of the pdf

1b) *Stock status: $a < B/B_{MSY} \leq 1$*

$F_{OFL} = m_A \times (B/B_{MSY} - a)/(1 - a)$

$F_{ABC} \leq m_H \times (B/B_{MSY} - a)/(1 - a)$

1c) *Stock status: $B/B_{MSY} \leq a$*

$F_{OFL} = 0$

$F_{ABC} = 0$

2) *Information available: Reliable point estimates of B , B_{MSY} , F_{MSY} , $F_{35\%}$, and $F_{40\%}$.*

2a) *Stock status: $B/B_{MSY} > 1$*

$F_{OFL} = F_{MSY}$

$F_{ABC} \leq F_{MSY} \times (F_{40\%}/F_{35\%})$

2b) *Stock status: $a < B/B_{MSY} \leq 1$*

$F_{OFL} = F_{MSY} \times (B/B_{MSY} - a)/(1 - a)$

$F_{ABC} \leq F_{MSY} \times (F_{40\%}/F_{35\%}) \times (B/B_{MSY} - a)/(1 - a)$

2c) *Stock status: $B/B_{MSY} \leq a$*

$F_{OFL} = 0$

$F_{ABC} = 0$

3) *Information available: Reliable point estimates of B , $B_{40\%}$, $F_{35\%}$, and $F_{40\%}$.*

3a) *Stock status: $B/B_{40\%} > 1$*

$F_{OFL} = F_{35\%}$

$F_{ABC} \leq F_{40\%}$

3b) *Stock status: $a < B/B_{40\%} \leq 1$*

$F_{OFL} = F_{35\%} \times (B/B_{40\%} - a)/(1 - a)$

$F_{ABC} \leq F_{40\%} \times (B/B_{40\%} - a)/(1 - a)$

3c) *Stock status: $B/B_{40\%} \leq a$*

$F_{OFL} = 0$

$F_{ABC} = 0$

4) *Information available: Reliable point estimates of B , $F_{35\%}$, and $F_{40\%}$.*

$F_{OFL} = F_{35\%}$

$F_{ABC} \leq F_{40\%}$

5) *Information available: Reliable point estimates of B and natural mortality rate M .*

$F_{OFL} = M$

$F_{ABC} \leq 0.75 \times M$

6) *Information available: Reliable catch history from 1978 through 1995.*

OFL = the average catch from 1978 through 1995, unless an alternative value is established by the SSC on the basis of the best available scientific information

$ABC \leq 0.75 \times OFL$

Tiers Grouped by Basis

Evaluate Quality of Information about Population Dynamics of the Stocks and Use Catch Control Rules according to 6 Tiers of Data Quality

- Tiers 1-2 based on MSY directly
 - Tier 1: most Information –reliable B, Bmsy, pdf of Fmsy
use when **uncertainty can** be estimated
(EBS pollock)
 - Tier 2: less Information –reliable B, Bmsy, Fmsy, F35, F40
use when **uncertainty can't** be estimated
- Tiers 3-4 based on spawning per recruit
 - Tier 3: reliable B, B40, F35, F40
use when **recruitment can** be estimated
(3a: BSAI: Pacific cod, yellowfin sole, Greenland turbot, arrowtooth flounder, rock sole, flathead sole, Alaska plaice, northern rockfish, Atka mackerel)
(3b: BS, AI sablefish, BSAI Pacific ocean perch)
 - Tier 4: reliable B, F35, F40
use when **recruitment can't** be estimated
- Tier 5 reliable B and M; based on natural mortality rate
(AI pollock, Bogoslof pollock, BSAI: other flatfish, shortraker rockfish, rougheye rockfish, EBS and AI other rockfish, BSAI other species)
- Tier 6 reliable catch history data; based on average catch
(BSAI squid)

3. List of current management categories and criteria for placing a species into a category

Five categories of species or species groups are likely to be taken in the groundfish fishery. The optimum yield concept is applied to all except the “prohibited species” (and “non-specified species” in proposed revisions to the FMPs) category. These categories are described as follows and listed in Table 3 and 4.

Target species – are those species that support either a single species or mixed species target fishery, are commercially important, and for which a sufficient data base exists that allows each to be managed on its own biological merits. Accordingly, a specific TAC is established annually for each target species. Catch of each species must be recorded and reported. In the BSAI FMP, this category includes pollock, Pacific cod, sablefish, yellowfin sole, Greenland turbot, arrowtooth flounder, rock sole, flathead sole, Alaska plaice, “other flatfish,” Pacific ocean perch, northern rockfish, shortraker rockfish, rougheye rockfish, “other rockfish,” Atka mackerel, and squid. In the GOA FMP, this category includes walleye pollock, Pacific cod, sablefish, shallow and deep water flatfish, rex sole, flathead sole, arrowtooth flounder, Pacific ocean perch, shortraker/rougheye rockfish, northern rockfish, “other slope” rockfish, pelagic shelf rockfish, demersal shelf rockfish, thornyhead rockfish, Atka mackerel, and skates.

Other Species – are those species or species groups that currently are of slight economic value and not generally targeted upon. This category, however, contains species with economic potential or which are important ecosystem components, but insufficient data exist to allow separate management. Accordingly, a single TAC applies to this category as a whole. Catch of this category as a whole must be recorded and reported. In the BSAI FMP, this category includes sculpins, sharks, skates, and octopus. In the GOA FMP, this category includes squid, sculpins, sharks, and octopus.

Forage fish species – are those species which are a critical food source for many marine mammal, seabird and fish species. The forage fish species category is established to allow for the management of these species in a manner that prevents the development of a commercial directed fishery for forage fish. Management measures for this species category will be specified in regulations and may include such measures as prohibitions on directed fishing, limitations on allowable bycatch retention amounts, or limitations on the sale, barter, trade or any other commercial exchange, as well as the processing of forage fish in a commercial processing facility.

Prohibited Species – are those species and species groups the catch of which must be avoided while fishing for groundfish, and which must be returned immediately to sea with a minimum of injury except when their retention is authorized by other applicable law. Groundfish species and species groups under the FMP for which the quotas have been achieved shall be treated in the same manner as prohibited species.

Nonspecified species – are those species and species groups of no current economic value taken by the groundfish fishery only as an incidental catch in the target fisheries. These species include, but are not limited to, those listed in Tables 3 and 4. Virtually no data exist which would allow population assessments. No record of catch is necessary. The allowable catch for this category is the amount which is taken incidentally while fishing for target and other species, whether retained or discarded.

Species included in the BSAI FMP species categories

Prohibited Species¹	Pacific halibut Pacific herring Pacific salmon Steelhead King crab Tanner crab
Target Species²	Walleye pollock Pacific cod Sablefish Yellowfin sole Greenland turbot Arrowtooth flounder Rock sole Flathead sole Alaska plaice Other flatfish Pacific ocean perch Northern rockfish Shortraker rockfish Rougheye rockfish Other rockfish Atka mackerel Squid
Other Species³	Sculpins Sharks Skates Octopus
Forage Fish Species⁴	Osmeridae family (eulachon, capelin, and other smelts) Myctophidae family (lanternfishes) Bathylagidae family (deep-sea smelts) Ammodytidae family (Pacific sand lance) Trichodontidae family (Pacific sand fish) Pholidae family (gunnels) Stichaeidae family (pricklebacks, warbonnets, eelblennys, cockscombs, and shannys) Gonostomatidae family (bristlemouths, lightfishes, and anglemouths) Order Euphausiacea (krill)
Nonspecified Species⁵	Eelpouts (family Zoarcidae) Poachers (family Agonidae) and alligator fish Snailfish, Lumpfishes, Lumpsuckers (family Cyclopteridae) Rattails (family Macrouridae) Ronquils, Searchers (family Bathymasteridae) Lancetfish (family Alepisanvidae) Prowfish (<i>Zaprora silenus</i>) Hagfish (<i>Eptatretus sp.</i>) Lampreys (<i>Lampetra sp.</i>) Anemones, barnacles, crinoids, egg cases, hermit crab, isopods, jellyfishes, mussels, polychaetes, sand dollar, sea cucumber, sea mouse, sea pen, sea potato, sea slug, sea urchins, starfishes, tunicates, crab - unidentified, sponge - unidentified, miscellaneous - unidentified

¹Must be returned to the sea

²TAC for each item

³Aggregate TAC for group

⁴Management measures for forage fish are established in regulations implementing the FMP

⁵List not exclusive: includes any species not listed under prohibited, target, "other," or forage fish species categories; proposed to be deleted in the revised FMP

Species included in the GOA FMP species categories

Prohibited Species¹	Pacific halibut Pacific herring Pacific salmon Steelhead trout King crab Tanner crab
Target Species²	Walleye pollock Pacific cod Sablefish Flatfish (shallow-water flatfish, deep-water flatfish, rex sole, flathead sole, arrowtooth flounder) Rockfish (Pacific ocean perch, northern rockfish, shortraker and roughey rockfish, other slope rockfish, pelagic shelf rockfish, demersal shelf rockfish, thornyhead rockfish) Atka mackerel Skates (big and longnose skates, other skates)
Other Species³	Squid Sculpins Sharks Octopus
Forage Fish Species⁴	Osmeridae family (eulachon, capelin, and other smelts) Myctophidae family (lanternfishes) Bathylagidae family (deep-sea smelts) Ammodytidae family (Pacific sand lance) Trichodontidae family (Pacific sand fish) Pholidae family (gunnels) Stichaeidae family (pricklebacks, warbonnets, eelblennys, cockscombs, and shannys) Gonostomatidae family (bristlemouths, lightfishes, and anglemouths) Order Euphausiacea (krill)

¹Must be immediately returned to the sea

²TAC for each item

³Aggregate TAC for group

⁴Management measures for forage fish are established in regulations implementing the FMP

The ad hoc working group on non-target species management identified the following questions to be addressed by the Council prior to developing an analysis of the proposed alternatives. The group attempted to resolve the policy aspects raised by these questions. Staff will assume the Council concurs with the proposed responses unless it directs otherwise.

What are the management implications of reorganizing the groundfish FMP species into target, non-target, forage fish, prohibited and non-specified species categories? The Council has the responsibility to develop an FMP for each “fishery” under its authority that requires conservation and management; however, “fishery” is vaguely defined in the Magnuson-Stevens Act. The management structure of an FMP, addressing both required and discretionary provisions under the Act, depends on how the FMU is described. A Council may develop management objectives for a fishery or portion of a fishery identified in the FMP, with advice from its scientific and public advisors. Rules could be applied differently to components of an FMU, e.g., some species are managed under OFLs while others are not. Target and other species categories are in the FMU (and are managed under an OFL). Prohibited and non-specified species have been determined not to be in the FMU (and are not managed under an OFL). Separate FMUs (one for optimizing yield of target species and one for conserving non-target species) would move some or all non-specified species (along with other rockfishes, other flatfishes, and other species) into a new FMU. The management burden on the Council and NMFS would be determined by policy. Creating the forage fish category did not itself increase the burden on observer program or in-season management.

Does every stock of fish within the Council’s geographical area of authority have to be a member of some group for which OY and OFL are specified? The short answer is no. First, the Magnuson-Stevens Act defines the term “fish” as follows. Numerous stocks of “fish” are not members of any group for which OY and OFL are specified in FMPS adopted by other Councils.

- 3(12) The term “fish” means finfish, mollusks, crustaceans, and all other forms of marine animal and plant life other than marine mammals and birds.

Second, the Act itself implies that some stocks do not require Federal management, as stated below:

302(h) FUNCTIONS.—Each Council shall, in accordance with the provisions of this Act—
 (1) for each fishery under its authority that requires conservation and management, prepare and submit to the Secretary (A) a fishery management plan, and (B) amendments to each such plan that are necessary from time to time (and promptly whenever changes in conservation and management measures in another fishery substantially affect the fishery for which such plan was developed);
 [emphasis added]

Inclusion of the phrase “that requires conservation and management” implies that some fisheries *do not* require conservation and management. A “fishery,” in turn, is defined as follows:

- 3(13) The term “fishery” means—
4. one or more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics; and
 5. any fishing for such stocks.

Thus, if a fishery is defined as one or more stocks of fish, if some fisheries do not have to be governed by an FMP, and if OYs and OFLs are specified only for fisheries governed by an FMP, it follows that some stocks do not have to be members of any group for which OY and OFL are specified.

Process Implementation of this change to groundfish management could be completed in one large BSAI/GOA plan amendment that would identify a new non-target species category, and implement unique MRAs for each species/group. Sensitive non-target species, currently covered by at least complex level TACs (rockfish complexes, flatfish complexes), would remain under target species management as a complex until separate, specific, additional management measures are designed to provide better protection than the complex level TACs. Under another approach, three separate BSAI/GOA plan amendments could be developed for rockfishes, flatfishes, and other species. The Council or its committee would identify which approach to initiate and the priority for development of the three analyses if that approach is selected. Three separate analytical teams could be assembled to concentrate on each complex with concurrent or sequential timelines.

What are the management implications of designating species currently managed by the FMP as “target” species as “non-target species?” Does this mean that they may be “overfished” as long as they are not driven to a threatened or endangered status? Section 303(a)(1)(a) of the Magnuson-Stevens Act requires that FMPs contain conservation and management measures for a fishery to prevent overfishing and rebuild overfished stocks. The Council could identify some other level of conservation that precedes ESA. The forage fish model was discussed in this context. Implementation of National Standard 9 could require the use of biological reference points for bycatch species.