4.0 ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

How This Section is Organized

This Section examines the environmental consequences that could be expected to result from adoption of each of the alternatives to both the specifications and management measures process issue and to the optimum yield duration issue. As discussed in Section 1.0, Purpose and Need for Action, the purposes in and needs for considering these alternatives are to:

- Comply with a court order to provide more opportunity for public comment in the NMFS rule publication process
- Streamline the process of and reduce the workload associated with developing specifications and management measures so that more Council and NMFS time may be devoted to issues other than specifications and management measures development.

Therefore, this section will consider the environmental effects of the specifications and management measures process and of the potential alternatives to that process, as well as considering the environmental effects of alternative OY durations. The specific effects of the specifications and management measures adopted for 2003 were analyzed in the EIS for the 2003 ABC and OY specifications and management measures (Council 2003.) Concurrent to this FMP amendment, the Council is also considering Amendment 16, an FMP amendment on rebuilding overfished species. The NEPA analysis for Amendment 16 and for the overfished species rebuilding plans associated with Amendment 16 will evaluate the alternatives for rebuilding overfished species and how rebuilding measures that are part of the specifications and management measures process affect the human environment.

This section forms the analytic basis for the comparison of issues across alternative specifications and management measures processes and alternative OY durations. The potential of each alternative to affect one or more components of the human environment is discussed in this section; direct and indirect effects of the alternatives are discussed in this analysis. Direct effects are caused by an action and occur at the same time and place as the action, while indirect effects occur later in time and/or further removed in distance from the direct effects (40 CFR 1508.27). Direct effects of some of the alternatives include the effects of a potential change in the start date of the fishery management period on the Council's management process. Indirect effects from a change in fishery start date could include increased or decreased fishing pressure on particular groundfish stocks at different times of the year.

4.1 Physical Impacts of the Alternatives

Physical impacts generally associated with fishery management actions are effects resulting from changes in the physical structure of the benthic environment as a result of fishing practices (e.g. gear effects and fish processing discards). Although groundfish fishing activity affects the physical environment, the process of implementing specifications and management measures does not have an effect on the physical environment. Discussions of the effects on the physical environment of the specifications and management measures for a particular year are found within the appropriate NEPA analyses for that year's specifications and management measures. Concurrent to this Amendment 17, NMFS is also drafting an Environmental Impact Statement on the effects of groundfish fishing on EFH. The effects on the physical environment of the full suite of groundfish management measures and policies will be considered within that EIS.

4.2 Biological Impacts of the Alternatives

The biological impacts generally associated with fishery management actions are effects resulting from: 1) harvest of fish stocks that may result in changes in food availability to predators, changes in population

structure of target fish stocks, and changes in community structure; 2) entanglement and/or entrapment of non-target organisms in active or inactive fishing gear; 3) major shifts in the abundance and composition of the marine community as a result of fishing pressure.

In this section, alternative specifications and management measures processes and alternative OY durations are examined for their potential effects on the biological environment. The primary areas where the process itself could affect the environment are: 1) the effect of potential fishing effort shifts caused by changes to the fishing season start date on target and non-target species; 2) the effect of the management process on the age of the resource surveys and assessments used in setting harvest specifications; and 3) the effect of the management process on the ability of the scientific process to describe and analyze the status of groundfish stocks and to estimate the harvestable surpluses of those stocks. Amendment 17 is administrative in nature and is not expected to have significant effects on the biological environment. If, at the beginning of a fishery management cycle, the Council sets suitably conservative harvest management measures, the season start date would not have any effect on the biological environment. In 2000 and 2001, however, management measures set at the beginning of the management cycle (January 1) were not conservative enough to maintain a year-round fishery for all species and all fishing sectors. If the fishery closures in the latter halves of these two years are indicative of future management challenges, the fishery season start date may have an effect on the biological environment, discussed below. Amendment 17 would also affect the scientific process for developing stock assessments that supports the Council's management process. The timing of the scientific process may have indirect effects on the quality of data and scientific analyses used in setting specifications and management measures. Table 4.2 provides these effects in a matrix format.

Table 4.2.1 Summary of the Potential Biological Impacts of Alternative Specifications and Management Measures Processes and Alternative OY Durations

BIOLOGICAL ISSUES	Effects on marine communities from fishing effort shifts due to season changes	Effects on the age of the resource surveys and assessments used in setting harvest specifications	Effects on data availability (Fishery and mortality data, age, size, growth & recruitment data, resource surveys)	Effects on advanced models (Stock assessments, multi-species interactions, habitat, climate)
Threshold	If this specifications and management measures process results in a time-shift in fishing effort, how might it affect when specific stocks and stock mixes are taken?	"Best available data" and "most recently available data" are two different concepts. How would this specifications and management measures process affect the use of the most recently available data?	Could this specifications and management measures process result in more and better catch, abundance, and biological data being available to stock assessment modelers and the public?	Could this specifications and management measures process provide more opportunities to develop, review and refine scientific models to improve the "best available science?"
Process Alternative 1, status quo, no action: 2-meeting annual process (Sept & Nov,) Jan 1 start date	Status quo/no action alternative tends to result in early attainment of harvest allocations and fishing closures during Oct-Dec. Although this schedule decreases fishing pressure during early winter flatfish spawning aggregation months of Nov-Dec, fishing pressure is heavy again during later flatfish spawning aggregation months of Jan-March. Bycatch of protected rockfish species in flatfish fisheries tends to be lower during winter flatfish spawning aggregation periods. This schedule also leaves open fishing opportunities during summer months, when flatfish tend to move to more shallow depths and when bycatch of protected slope rockfish species is higher in fisheries targeting healthier slope rockfish and DTS stocks. Because Alternative 1 is an annual process, all OYs are one-year OYs, although a particular species may have the same one-year OY for several years at a time, depending upon stock assessment timing.	Under status quo/no action, resource surveys are conducted annually. Stock assessments are conducted triennially, with one-third of all assessed stocks receiving assessment updates each year. For some species, data from a resource survey in Year 1 is assessed in Year 2 and fishing occurs on that assessment in Year 3. At the other extreme, data from a resource survey in Year 1 is not assessed until Year 4, with fishing occurring on that assessment in Year 5. For all alternatives, resource surveys occur in summer/autumn months. Assessments based on those surveys are generally not available until May 1 of the following year. Duration of OYs, whether one-year, two-year, or mixed would not affect data availability.	No measurable effect on data gathering and availability. Availability of data used to assess stock status and potential biological yields tends to be most dependent on financial commitments that agencies & other interested parties make to data gathering. Catch data needed for inseason monitoring least available/ reliable early in fishing year. Jan 1 fishing year start could result in more in-year management fluctuations for species with heavier fishing pressure during Jan-Apr (DTS complex, flatfish.) Duration of OYs, whether one-year, two-year, or mixed would not affect data availability.	Status quo/no action alternative uses annual updates of one-third of all assessed stocks, with STAR processes that review both models used and data sources that contribute to models. Status quo STAR process increases workload for stock assessment authors who are annually preparing both models and data sources used in models for STAR review. Duration of OYs, whether one-year, two-year, or mixed would not affect advanced modeling.
Process Alternative 2: 3-meeting biennial process (April, June & Sept,) Mar 1start date	Given closure trends under status quo, March 1 start date would likely result in early allocation attainment and closures during Dec-Feb. Alternative 2 could thus reduce fishing pressure on flatfish during winter spawning aggregation months, but could also result in greater fishing pressure on healthy flatfish stocks in periods when bycatch of protected rockfish stocks is higher. Like Alternative 1, summer fishing months would continue open. If this alternative were implemented with some or all species managed with two-year OYs, as opposed to one-year OYs, early attainment and closure period could lengthen, possibly to Oct-Feb of second year in two-year fishing period. With two-year OYs, management measures would need to be more conservative at the start of the two-year fishing period to hedge against early closures during the second year in the fishing period.	Biennial management process would allow a biennial scientific process. Additional financial resources devoted to groundfish resource surveys should allow for biennial or annual surveys. Under this 3-meeting process, a resource survey would occur in Year 1, stock assessments in Year 2, management deliberations in Year 3, and fishing based on the Year 2 stock assessments would occur in Years 4 and 5. This alternative allows roughly the same newness of data use as the status quo alternative for two-thirds of assessed stocks, with *later* data use for one-third of assessed stocks. Duration of OYs, whether one-year, two-year, or mixed would not affect data availability.	No measurable change in data gathering and availability over Alternative 1. Alternative 2 has March 1 start date, which could result in more in-year management fluctuations for species with heavier fishing pressure during Mar-Jun (DTS complex & flatfish for Mar/ Apr; widow & yellowtail rockfish taken in pelagic trawls, all species taken in small boat hook-and-line fisheries during warmer May/June period.) Duration of OYs, whether one-year, two-year, or mixed would not affect data availability.	Improvement in model development and data use over Alternative 1. Biennial management process would allow biennial scientific process, with model development and review occurring in one year, then stock assessments that plug data into developed models occurring in alternate years. Biennial process could be expected to improve quality & variety of models used, to improve use of already-collected data on unassessed stocks, and to allow more time for exploring habitat and ecosystem modeling. Duration of OYs, whether one-year, two-year, or mixed would not affect advanced modeling.

BIOLOGICAL ISSUES	Effects on marine communities from fishing effort shifts due to season changes	Effects on the age of the resource surveys and assessments used in setting harvest specifications	Effects on data availability (Fishery and mortality data, age, size, growth & recruitment data, resource surveys)	Effects on advanced models (Stock assessments, multi-species interactions, habitat, climate)
Process Alternative 3: 3-meeting, biennial process (Nov, March/April & June,) Jan 1 start date	If biennial process sets annual harvest allocations against biennial OYs, this alternative should have no measurable changes over Alternative 1. If this alternative were implemented with some or all species managed with two-year OYs, as opposed to one-year OYs, early attainment and closure period could lengthen over Alternative 1, possibly to Aug-Dec of second year in two-year fishing period. With two-year OYs, management measures would need to be more conservative at the start of the two-year fishing period to hedge against early closures during the second year in the fishing period.	Same as Alternative 2 with respect to both annual specifications process and OY duration issues.	No measurable change over Alternative 1 with respect to either annual specifications process or OY duration issues.	Same as Alternative 2 with respect to both annual specifications process and OY duration issues.
Process Alternative 4: 3-meeting, biennial process (June, Sept & Nov,) May 1 start date	Given closure trends under status quo, May 1 start date would likely result in early allocation attainment and closures during Feb-Apr period. Alternative 4 would thus allow fishing pressure on flatfish during winter spawning aggregation months, when bycatch of protected rockfish stocks is lower. The major biological disadvantage of this alternative is that fishery data availability would be lowest during summer months of first year of the two-year fishing period. Pleasant weather summer months tend to have greater vessel participation and tend to show higher bycatch of protected rockfish stocks in fisheries targeting healthier stocks. If this alternative were implemented with some or all species managed with two-year OYs, as opposed to one-year OYs, early attainment and closure period could lengthen over Alternative 1, possibly to Dec-Apr of second year in two-year fishing period. With two-year OYs, management measures would need to be more conservative at the start of the two-year fishing period to hedge against early closures during the second year in the fishing period.	Biennial management process would allow a biennial scientific process. Additional financial resources devoted to groundfish resource surveys should allow for biennial or annual surveys. Under this 3-meeting process, a resource survey would occur in Year 1, stock assessments and management deliberations in Year 2, and fishing based on those assessments would occur in Years 3 and 4. This combination of a 3-meeting process with Years 3 and 4 use of data is possible because of the May 1 fishing period start date. This alternative allows roughly the same newness of data use as the status quo alternative for two-thirds of assessed stocks, with *earlier* data use for one-third of assessed stocks. Duration of OYs, whether one-year, two-year, or mixed would not affect data availability.	No measurable change in data gathering and availability over Alternative 1 with respect to both annual specifications process and OY duration issues. Alternative 4 has May 1 start date, which could result in more in-year management fluctuations for species with heavier fishing pressure during May-Aug (widow & yellowtail rockfish taken in pelagic trawls; all species taken in small boat hook-and-line fisheries in warm months.)	Same as Alternative 2 with respect to both annual specifications process and OY duration issues.
Process Alternative 5: 2-meeting, biennial process (June & Sept,) March 1 start date	Same as Alternative 2 with respect to both annual specifications process and OY duration issues..	Same as Alternative 4 with respect to both annual specifications process and OY duration issues. However, earlier use of data is possible with this alternative because it is a 2-meeting process. Of the four biennial alternatives, this alternative provides the shortest time between resource survey and fishing activity.	Same as Alternative 2 with respect to both annual specifications process and OY duration issues..	Same as Alternative 2 with respect to both annual specifications process and OY duration issues..

4.2.1 Biological Effects of Changing the Fishing Season Start Date and of Differing OY Durations

With the specifications and management measures process, fishery managers set annual harvestable amounts for each groundfish species or species group and try to construct trip limits for those species that will allow the harvest of the OYs of healthy stocks without allowing total catch of overfished and depleted stocks to exceed their OYs. Setting a year of trip limits is a delicate balancing act that requires consideration of when groundfish stocks and non-groundfish stocks are most available, when healthy and depleted stocks mix in a way that makes clean harvesting of healthy stocks more likely, and when different sectors of the fishing fleet are most likely to fish with which type of gear and in what waters. Ideally, managers would like to set a trip limit structure at the beginning of the fishing year that perfectly predicts all of these variables. In reality, however, fish stocks and the fishing fleet often behave in ways that are not predicted by the harvest models used in setting the year's management measures. As fishery scientists and managers track the fishery through the year, landings levels may be higher or lower than predicted at the beginning of the year. At within-year analyses of landings levels, usually at the Council's April, June, and September meetings, managers will make inseason adjustments to trip limit levels to either accelerate or decelerate landings rates. Under the current management structure (status quo/no action alternative,) managers have historically allowed more fishing during the warm weather months, with the expectation that landings of some species may be restricted or shut down toward the end of the calendar/fishing year.

For many years, the Council has managed the groundfish fishery with the aim of maintaining a year round fishery, as articulated in Goal 3 and Objective 7 of the FMP:

> Goal 3: "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"
>
> 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."

The Council has historically interpreted Goal 3 and Objective 7 to mean that all sectors of the fishery should be open year round, with the exception of the primary whiting and primary sablefish seasons. Maintaining a year round fishery has become more difficult in recent years, due to the need to reduce the effects of the different sectors of the fishery on overfished species. Commercial and recreational hook-and-line fisheries off California south of 40°10' N. lat., for example, have had shortened seasons in 2001 and 2002. In both of these years, many groundfish fishery sectors have been also shut down or notably reduced in the latter half of the year. These fishery closures and reductions were needed largely because managers had set management measures underestimating the level of fishery participation in the first half of the year.

Amendment 17 contemplates changing the process for setting specifications and management measures, not the standards by which they are set or the goals for managing the fishery. Whether the majority of fishery sectors continue to operate year round is a factor of management measures developed at the beginning of the fishing period, not a factor of when that fishing period begins. Because the fishing period start date will not affect the overall amount of each target species taken within the fishing period, there is no discernable difference between the effects of the different fishing period start dates on targeted groundfish stocks. If fishery managers were able to perfectly predict fishing effort for all sectors at all times during the year, the different fishing period start dates would also have no effect on the bycatch of overfished and depleted stocks. If, however, the pattern of late-season closures continues, the effect of the fishery on incidentally taken overfished and depleted species will vary according to the times of year when fishing effort is strongest. These effects could have been even stronger if the Council had recommended using two-year OYs for some (Issue 2, Alternative 3) or all (Alternative 2) managed species. Without adequately conservative initial management measures, the closure period could become

a 6-7 month closure at the end of the second fishing year, rather than two 3-4 month closures at the end of each fishing year.

Figure 4.2.1 Volume of Groundfish Landings By Month, 1997-2001

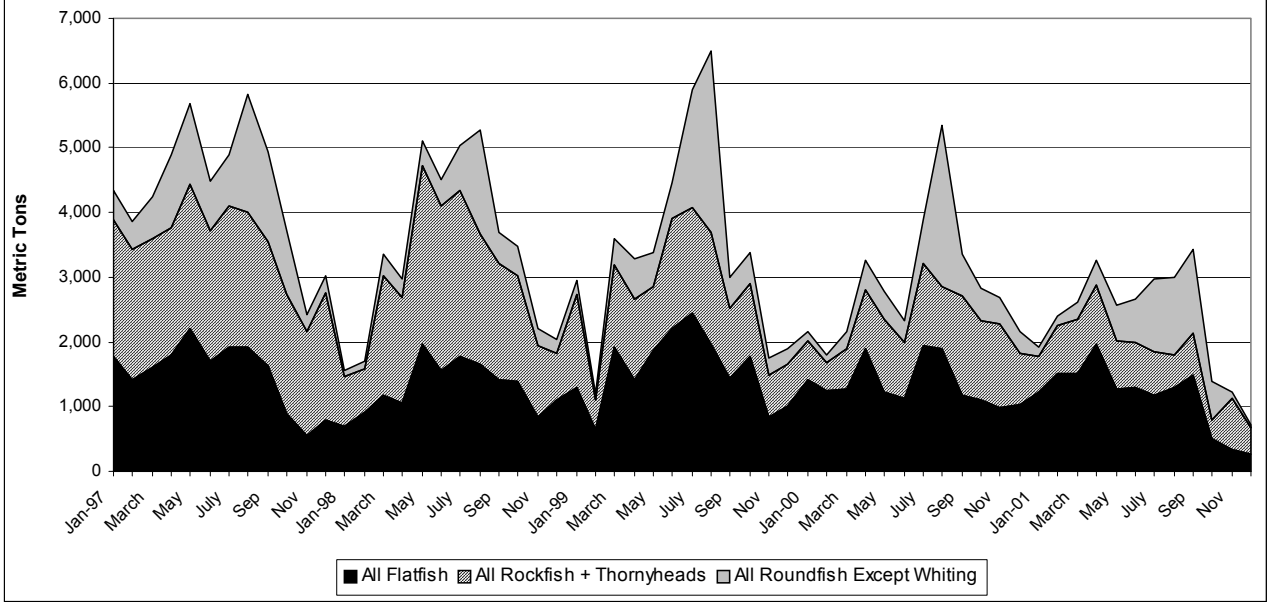


Figure 4.2.1 shows groundfish landings by month, for 1997-2001. Over this five year period, there has been a notable decline in overall groundfish landings, particularly for rockfish species. In each year, roundfish landings spiked during the summer sablefish seasons. In all years, landings of all groundfish were higher in the March-September period than in the winter months. This same trend was also evident in 2001, although the year-end decline in 2001 was due to regulatory restrictions rather than to either market restrictions or fisher disinclination to operate during winter weather. Each year also shows a spike of higher landings in January, at the new opening of the fishing years. Although the year-round fishery policy is evident in that groundfish landings are being made in every month, the greatest volume of groundfish landings has occurred during the summer months.

Figures 4.2.2-5, below, show the estimated bycatch rates of overfished species taken incidentally in DTS complex (Dover sole, thornyheads, sablefish) and flatfish trawl fisheries north and south of 40°10' N. lat. [Note: Figures 4.3.2 and 4.3.3, for north of 40°10', show a bycatch rate percentage scale of up to 5% of target landings amounts. Figures 4.3.4 and 4.3.5, for south of 40°10', show a bycatch rate percentage scale of up to 2% of target landings amounts.] For most of the overfished species, these figures show higher bycatch rates in bimonthly periods 3 (May-June) and 4 (July-August). These estimated bycatch rates were provided by James Hastie of the NMFS Northwest Fisheries Science Center and have been used in the Environmental Impact Statement for the 2003 specifications and management measures and by the Council in its deliberations concerning that management action.

Under Process Alternative 1 (status quo/no action,) harvest allocations tend to be attained by late fall, with restrictions or closures occurring in the October through December period. This schedule tends to reduce pressure on flatfish stocks during the early part of their spawning season; however, spawning is usually still occurring when the fishery re-opens January 1. The advantage of allowing heavier fishing pressure on flatfish stocks during their spawning season is that they tend to be most aggregated then, less mixed with other groundfish stocks like rockfish. The disadvantage of allowing fishing on spawning aggregations that occur during the early part of the management period is that the fish are so readily available for harvest

that a large proportion of the year's harvestable surplus for a particular species may be taken in the first few months of the fishery. In a fishery managed by an FMP that puts a priority on year-round harvest availability, a large harvest of healthy flatfish stocks early in the year could jeopardize the availability of flatfish or co-occurring protected stocks later in the year. A January 1 fishing period start date also usually ensures that the fishery will be open during the summer months. Hook-and-line fisheries do not tend to target flatfish stocks, but do pursue sablefish and rockfish during the summer. Status quo fixed gear sablefish management allows a small daily or weekly trip limit fishery for the limited entry and open access fisheries throughout the year and the larger limited entry tiered sablefish fishery. Sablefish stock health is more likely affected by possible discard in the daily/weekly trip limit fisheries and possible highgrading discard in the tiered fisheries than by any particular overall fishing period start date.

Figure 4.2.2 Flatfish Fishery North of 40°10', Bycatch Rates of Overfished Species

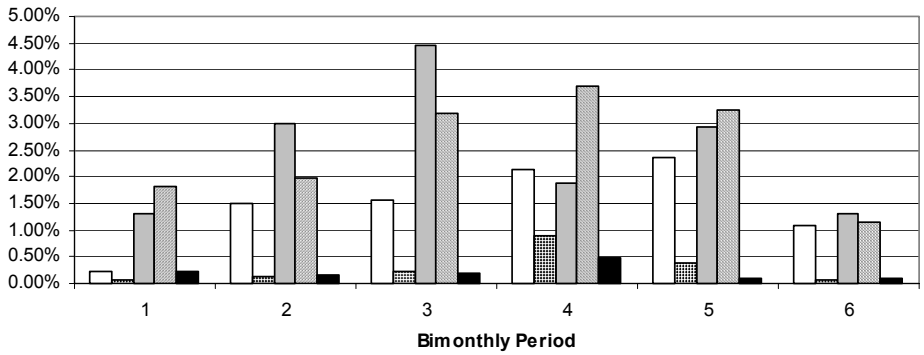
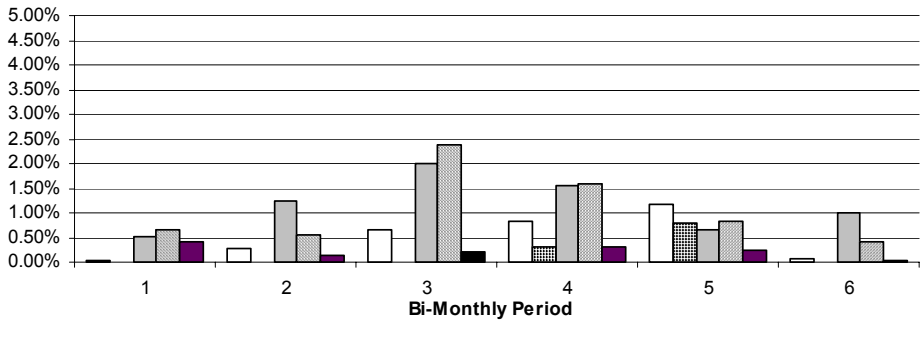


Figure 4.2.3 DTS Fishery North of 40°10', Bycatch Rates of Overfished Species



Like the status quo alternative, Process Alternative 3 also has a January 1 fishing period start date. Process Alternative 3, however, is a biennial process. This process alternative allows consideration of the OY duration alternatives (Issue 2). Specifications, such as ABCs, could be set for two years without affecting fishery participation. If harvest allocations or OYs are set in two-year increments, fishing pressure could be fairly consistent for the first 18 months of the two-year period, with notable restrictions and closures in the final six months of the period. To protect against this possibility, the Council would have to set particularly conservative management measures during the early part of the first fishing year in the period.

For both Process Alternative 1 and Process Alternative 3, the October-December slow period tends to fall in months when bycatch of overfished species occurs at relatively lower rates. The Council first analyzed the bycatch rates of overfished species in particular target fisheries for its 2002 specifications and management measures. That analysis was used to concentrate fisheries targeting healthy stocks in the months when bycatch of overfished species tends to be lower. Unanticipated landings of darkblotched rockfish south of 40°10' in the commercial fishery and unexpectedly high bocaccio landings in the recreational fishery south of 40°10' led to early closures of fisheries affecting both of these stocks. The

start date of the fishery does not affect the bycatch rates of overfished species taken in fisheries targeting healthier stocks. However, if fishery landings have outcomes that were unexpected when management measures were set, as happened in 2002, fishery slowings and closures would occur toward the end of the management period. If Process Alternative 3 were combined with two-year OYs (OY Duration Alternatives 2 or 3,) fishery slowings and closures would likely occur during the second half of the second year of the management period.

Figure 4.2.4 Flatfish Fishery South of 40°10', Bycatch Rates of Overfished Species

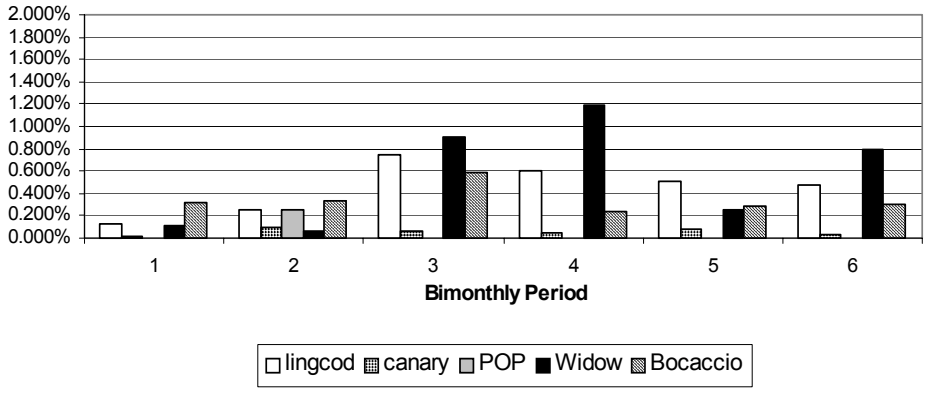
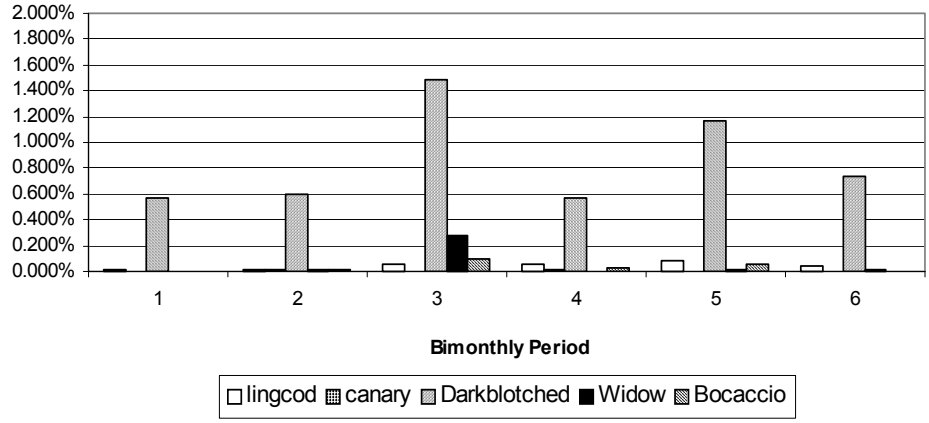


Figure 4.2.5 DTS Fishery South of 40°10', Bycatch Rates of Overfished Species



For some fisheries, landings data may not be available for use in data analysis until several months after the landings have been made. In general, the states of Oregon and Washington have fairly swift commercial fishery data availability, while the commercial landings made in California may not be available in a coastwide database until 3-5 months after the landings have been made. Recreational fisheries data, primarily the Recreational Fisheries Information Network (RecFIN) database, is usually not considered an accurate picture of landings until a full year of fishing has occurred and data from that year has been analyzed. Given these commercial and recreational fisheries data delay situations, a January 1 fishing period start date may not allow stock assessment authors working in January-April to use all of the data from the prior fishing year in their assessments.

Process Alternatives 2 and 5 are biennial processes with March 1 fishing period start dates. A March 1 start date, with a corresponding February 28/29 ending date could push the restriction and closure period from the status quo October-December to a new December-February. For flatfish fishing on spawning aggregations, this change in slow periods may or may not affect incidental catch rates of overfished species. Vessels that have traditionally targeted flatfish during the January-February period could instead target flatfish during November-December, although that strategy change could mean forgoing Dungeness crab fishing opportunities. Similar to Process Alternatives 1 and 3, Process Alternatives 2 and 5 would ensure open fisheries during the summer months, which have traditionally been stronger for hook-and-line fisheries. Also like Process Alternative 3, these two biennial processes could have the management

challenge of stronger effort in the first year and a half of the two-year management period with restrictions and closures for possibly 4-6 months of the second year. These longer closures during the second year of the management period would be more likely if the Council had chosen to use two-year OYs (OY Duration Alternatives 2 and 3) instead of one-year OYs (OY Duration Alternative 1.) Changing the fishing period start date to March 1 from January 1 would not change the amounts of either targeted or incidentally taken stocks that are harvested in the groundfish fishery. As discussed above for Process Alternatives 1 and 3, however, the fishing period start date could affect the months of the period-end fishery slowings and closures. Under Process Alternatives 2 and 5, the expected slow months of October-February tend to have the lowest incidental catch rates of overfished species. Regardless of which fishing period start date is chosen, annual landings of targeted healthy stocks could be increased if landings levels were concentrated during the winter months to take advantage of the lower overfished species bycatch rates during those months. With a March 1 fishing year start date and the typical January-April stock assessment schedule, commercial and recreational fishery data used in stock assessments would be less up to date than it would be under Process Alternatives 1 and 3. Stock assessment scientists would be working with data from about two-thirds of the prior fishing year, whereas the January 1 start date would allow data use from about three-quarters of the prior fishing year.

Process Alternative 4 is a biennial process with a May 1 start date. A May 1 start date, with a corresponding April 30 ending date could push the restriction and closure period from the status quo October-December to a new February-April. The advantage of this start date is that it would leave open some of the stronger months for targeting healthy stocks with lower incidental catch of overfished species. Unfortunately, the notable biological disadvantage of a May 1 start date is that fishery data availability would be lowest during the summer months of the first year of the two-year fishing period. Summer weather tends to allow greater fishery participation and the summer months tend to show higher incidental catch rates for overfished stocks taken in fisheries targeting healthy stocks. In order to protect against unpredictable harvest spikes, managers would have to severely restrict early summer fishing in at least the first year of the two-year fishing period. Without those restrictions, landings in those early months could quickly eat up allocations of both healthy and protected stocks. With respect to bycatch of overfished species, this process alternative is similar to all of the others in that it could result in fishery slowings and closures occurring during months when the bycatch rates of overfished species tend to be lower. And, as with all other process alternatives, choosing an OY duration alternative that would allow two-year OYs could result in a longer slowing and closure period at the end of the two-year cycle if the management measures set at the start of the cycle were not adequately conservative. With a May 1 fishing year start date and the typical January-April stock assessment schedule, commercial and recreational fishery data used in stock assessments would be less up to date than it would be under all other alternatives. Stock assessment scientists would be working with data from about one-half of the prior fishing year under this alternative.

Many of the potential biological effects of shifting the fishing year start date and of setting two-year OYs should more properly be considered effects of the Council's year-round fishery policy, rather than effects of the start date of a management period. If, for example, the trawl flatfish fisheries were managed with a four month season of November through February, allocations of those flatfish stocks could be taken entirely during periods when bycatch of overfished stocks is relatively low.

4.2.2 Biological Effects of Changing to the Management Process on "Best Available Science" and Stock Assessment Timeliness

At National Standard 2, the Magnuson-Stevens Act requires that conservation and management measures be based on the best available scientific information (16 U.S.C. 1826). Table 4.2.1, above, briefly analyzes the effects of changing the specifications and management measures process on the:

- Age of the resource survey and stock assessments used in setting harvest specifications
- Availability and quality of more and better catch, abundance, and biological data

- Availability and quality of advanced scientific models used to assess stock and ecosystem health

Section 3.2.1 discusses the scientific process and the types of information and tools needed for that process. In considering the biological effects of the management process on the environment, we must look at the quality of the scientific information that we use in that management process. The Magnuson-Stevens Act and other legislation commonly call for the use of the "best available science," but that concept is often confused with "most recently available science." For example, data from a resource survey conducted in 2002 may be the most recently available data for informing the harvestable surplus of a particular species in 2003, but without a stock assessment for that species, using that data for the 2003 fishing season could not be considered using the best available science.

Data availability from resource surveys and other sources is generally dependent upon the financial resources that scientific agencies devote to gathering data. For many years, NMFS has conducted triennial West Coast groundfish resource surveys. A recent strengthening of Congressional interest in scientific information about West Coast groundfish has provided the agency with the resources to conduct biennial or annual resource surveys. These increased data gathering resources would be available under any of the process alternatives. Therefore, this document discusses the effect of all of the process alternatives on best available science with the assumption that all alternatives, including status quo, include annual or biennial resource surveys. While the specifications and management measures process should not affect the availability and quality of data used as the basis for stock assessments and other scientific analyses, that process can affect when the data is used and the scientific process by which it is used. Resource survey timing and use of data from those surveys would be affected by the process alternatives as follows:

Table 4.2.2 Data Availability and Use in the Management Process

	Alternative 1			Alternative 2	Alternative 3	Alternative 4	Alternative 5
Resource Survey Conducted	Year 1			Year 1	Year 1	Year 1	Year 1
Stock Assessment Conducted	1st/3rd stocks, Year 2, using Year 1 data	2nd/3rd stocks, Year 3, using Years 1-2 data	3rd/3rd stocks, Year 4, using Years 1-3 data	Year 2	Year 2	Year 2	Year 2
Management Process Occurs	1st/3rd stocks, Year 2	2nd/3rd stocks, Year 3	3rd/3rd stocks, Year 4	Year 3	Year 3	Year 2	Year 2
Fishing on Year 1 Resource Survey Occurs	1st/3rd stocks, Years 3-5 on Year 1 data	2nd/3rd stocks, Years 4-6 on Years 1-2 data	3rd/3rd stocks, Years 5-7 on Years 1-3 data	Years 4/ 5*	Years 4/ 5	Years 3/4*	Years 3/4*
Time Gain/Loss of "Most Recently Available Data" Over Other Alternatives	Data is used sooner than all other alternatives for at least 1/3rd of assessed stocks each year. However, assessments for all stocks occur on less frequent basis than all biennial alternatives, which means that data is also used for the *longest* period under this alternative.			Data use oldest in this alt., as fishing occurs in Years 4/5 and fishing year begins March 1.	Data use older than Alts. 4 and 5, but slightly more recent than Alt. 2 due to January 1 start.	Data use newer than Alt. 2 by 10 months and newer than Alt. 3 by 8 months.	Data use newest in this alt. Newer than Alt. 2 by a year, than Alt. 3 by 10 months, and than Alt. 4 by 2 months.

*For Process Alternatives 2 and 5, the "year" in which fishing would occur would be March 1 through February 28/29. For Process Alternative 4, the "year" would be May 1 through April 30.

In addition to affecting the timing of resource survey data use, the management process can also affect the quality and type of scientific analysis conducted on that data. An annual specifications and management measures process does not allow contributing scientific agencies enough time to conduct stock assessments on all assessed species each year. As a result, the status quo stock assessment process is to update stock assessments for one-third of all assessed species each year. Stock assessment authors will also try to add new stocks to the list of assessed species every year, although the addition of new species sometimes results in the delay of stock assessments for other species (See

Section 3.2.1). Under a biennial management process (Process Alternatives 2-5,) the scientific process would also become biennial, with one year spent on developing and evaluating stock assessment models and the second year spent on analyzing resource survey and other data. The major benefits of allowing more time for model exploration and development would be more rigorously analyzed stock assessments and overfished species rebuilding models for currently assessed stocks, new assessment models for unassessed stocks for which data already exists, and new modeling efforts on multi-species interactions, habitat use, or ecosystem/climate models.

Stock assessments are conducted to determine the abundance of fish stocks and to project the level of future catch that will achieve the target harvest policy. These determinations cannot be made with absolute accuracy and the further they are used to project into the future, the greater the confidence intervals on the projection. When an assessment is conducted, it will use accumulated historical data as well as data that is as current as possible. Thus, assessments gradually should become more accurate as they incorporate longer time series and "learn" from past assessments. However, several factors contribute to inaccuracy in the projections. Projections may be inaccurate if: the assessment itself is inaccurate, future recruitments are different than projected in the assessment, or future catch differs from the level forecast in the assessment. Although there is much research devoted to prediction of recruitment levels, substantial improvement in this area is years away. Therefore, it is necessary to frequently update assessments to track true changes in stock abundance and adjust for past inaccuracies in stock estimates.

Over the past 15 years, the timeliness of the transition from survey to assessment to management action has varied greatly. The most timely has been that for Pacific whiting. Summer whiting surveys have been analyzed the following winter and used to adjust the fishery level less than a year after the survey is conducted. But this survey is only conducted triennially so this high timeliness has occurred only every third year. For most other species, the most recent survey data has already been one to several years old when it is used in the assessments, and the assessment results are used to set an ABC level that is kept constant for about three years until another assessment is conducted. During the stock declines of the 1990's, this low timeliness meant that downward adjustments in ABC lagged substantially behind the stock declines, thus contributed to the decline itself.

There are insufficient data, funds and staff to update every assessment every year for immediate adjustment of harvest levels. However, status quo ABC and OY calculations are best estimates and do not incorporate any consideration for the timeliness of implementation. The level of inaccuracy of the projection may cause either underachievement of optimum yield or overfishing. If projected catches are to have no more than a 50% probability of exceeding the overfishing level, then future harvest rates may need to be reduced to adjust for the increased inaccuracy of long projections. If a higher degree of avoiding overfishing is desired, then it would be even more important to progressively reduce the harvest level as the interval between assessments increases.

As shown in Table 4.2.2, the status quo/no action alternative tends to allow the use of the most recently available data for at least one-third of all assessed stocks. This use of most recently available data, however, should not be confused with the use of the best available science. Process Alternatives 2-5 would tend to provide the management process with better science than the annual stock assessment and management process of Process Alternative 1. These biennial alternatives provide stock assessment scientists with a greater opportunity to review and improve overall stock assessment methods and models, as they provide a two year cycle of stock assessments and model review. Of the four biennial alternatives, Process Alternative 5 makes the most timely use of stock assessments and provides the best insurance that fishing activities conducted against those stock assessments will reflect the pictures of stock health and abundance drawn by those assessments. Process Alternative 2 allows the longest time lag between resource surveys and fishing activities conducted against the stock assessments that fall out of the surveys. Thus, under Process Alternative 2, the Council would likely have to set more conservative harvest levels than under Process Alternative 5 in order to ensure that a retrospective analysis of fishing activities does not show that overfishing has occurred. Process Alternatives 3 and 4 fall between

Alternatives 2 and 5 in terms of their timeliness of stock assessment use, with Alternative 3 being less timely than Alternatives 4 and 5, and Alternative 4 being more timely than Alternatives 2 and 3.

4.3 Socio-Economic Impacts of the Alternatives

The socio-economic impacts generally associated with fishery management actions are effects resulting from: 1) changes in harvest (whether directed commercial or indirected as recreational charter) availability and processing opportunities that may result in unstable income opportunities; 2) changes to access privileges associated with license limitation and individual quota systems; 3) fishing season timing or structure restrictions that may improve or reduce the safety of fishing activity; 4) fishing season timing or structure restrictions that may or may not take into account the social and cultural needs of fishery participants. Of these elements, the specifications and management measures process would not affect access privileges. The Council is currently discussing license limitation in the open access fisheries and trawl permit stacking. If the Council decides to move forward with either of these programs, the effects of changing fishery access privileges would be analyzed in the appropriate NEPA documents for those programs.

In this section, alternative specifications and management measures processes are examined for their potential socio-economic effects. The primary areas where the process itself could affect fishing industries and communities are: 1) the effect of changes to the fishing season start date on harvest availability and processing opportunity; 2) the effect of changes to the fishing season start date on fishery structure and safety; 3) the effect of changes to the fishing season start date on social and cultural needs of fishery participants. In addition to these direct effects on fishery management actions on fishing industries and communities, changing the specifications and management measures process may affect the fishing public, general public, and participants in the fishery management process in: 1) the amount of management and science time devoted to developing annual specifications and management measures and the resultant staff resources for actions outside of that process; 2) the number and timing of Council meetings used to develop specifications and management measures; 3) the time available for public participation in the NMFS publication and evaluation of Council specifications and management measures recommendations. Table 4.3.1 provides these effects in a matrix format.

Table 4.3.1 Summary of Potential Socio-Economic Impacts of Alternative Specifications and Management Measures Processes and Alternative OY Durations

SOCIO-ECONOMIC ISSUES	Effects of changing season start date on harvest availability and processing opportunity	Effects of changing season start date on safety and social/cultural needs of fishing communities	Effects of management time and public review and analysis devoted to specifications and management measures process
Threshold	How would this specifications and management measures process affect harvest availability and processing opportunity for fishery participants? Would participation in fisheries other than groundfish fisheries be affected by a change in season start date?	How would this specifications and management measures process affect the safety of fishery participants? Would changing the start of the fishing season affect the social/cultural needs of fishing communities?	Does this specifications and management measures process allow more or less management time for other, non-specifications activities? How does this particular process affect public review and comment opportunities?
Process Alternative 1, status quo, no action: 2-meeting annual process (Sept & Nov,) Jan 1 start date	Status quo/no action alternative tends to result in early attainment of harvest allocations and fishing closures during Oct-Dec. For fishers wishing to operate during winter months and for processing plants, this slow groundfish period coincides with the Dungeness crab fishing and processing season. Just as Dungeness crab opportunities are decreasing in January-February, groundfish are again available for harvesting and processing. Recreational fishing tends to be slow during this period for most of the West Coast, except perhaps south of Point Conception, CA.	The specifications and management measures process itself does not tend to affect the safety of fishery participants, although the fishing period start date could have some effect on safety. Under status quo, fishing opportunities tend to slow down or close entirely during early winter months when offshore conditions are less navigable (Oct-Dec.) Cultural groups that might be most affected by a possible Oct-Dec closure could include individual fishers and processors wanting to increase their pre-holiday incomes and gain access to seasonal markets.	Status quo/no action alternative tends to devote the most management time to specifications and management measures because it is an annual process. The status quo schedule has a 2-meeting (Sept/Nov) process of Council proposals and final recommendations, followed by a Jan 1 publication of NMFS final rule implementing those regulations. In this process, public comment is received by the Council during the Sept/Nov period and by NMFS following publication of the final rule. Of the five alternatives, this schedule is the most compressed for management staff. For 2002, the Council held a 3-meeting process (June/Sept/Nov) followed by a Jan 1 NMFS proposed and emergency rule publication and public comment period and a Mar 1 final rule publication. While this 2002 variation lengthened staff time for the Council process, it increased staff workload for the NMFS process without increasing available work time. Duration of OYs, whether one-year, two-year, or mixed would not affect management time and public review and analysis devoted to specifications and management measures.
Process Alternative 2: 3-meeting biennial process (April, June & Sept,) Mar 1start date	Given closure trends under status quo, March 1 start date would likely result in early allocation attainment and closures during Dec-Feb. Similar to Alternative 1, this alternative would result in slower groundfish landings or closures during a period of higher Dungeness crab landings. With this potential closure period, however, fishers and processors might have less access to the stronger flatfish spawning aggregations of the mid-winter period. As with Alternative 1, recreational fishing tends to be slow during the winter months. If this alternative were implemented with some or all species managed with two-year OYs, as opposed to one-year OYs, early attainment and closure period could lengthen, possibly to Oct-Feb of second year in two-year fishing period. With two-year OYs, management measures would need to be more conservative at the start of the two-year fishing period to hedge against early closures during the second year in the fishing period.	This alternative would tend to result in declining landings and closures during the Dec-Feb period, which like the slow months of Alternative 1 include rougher winter weather months. Cultural groups that might be most affected by a possible Dec-Feb closure could include individual fishers and processors wanting to increase their pre-holiday incomes or gain access to seasonal markets. Under two-year OY duration alternatives, the slowing and closure period could lengthen, possibly to Oct-Feb, in which case groups affected by this period under both Process Alternatives 1 and 2 would be affected by the longer slow period in the second fishing year of the two year period.	Like all of the biennial alternatives, Alternative 2 would decrease overall time spent on developing specifications and management measures because the process would take place every two years instead of every year. Public review and comment would occur in Apr/Sept period for the Council process and following a Jan 1 publication of a NMFS proposed rule. Of the five alternatives, this schedule allows the most lengthy period for Council staff work time (11-19 months,) as it relies on stock assessments conducted in the prior year. NMFS staff work time = 5.5 months. This alternative relies on an April meeting for proposing specifications, which have historically been final meetings for salmon management process, leaving little Council time and energy for groundfish issues. March 1 start date would mean that inseason adjustments for final 3 months of year (Dec-Feb) would be made at a Nov meeting. Duration of OYs, whether one-year, two-year, or mixed would not affect management time and public review and analysis devoted to specifications and management measures.

SOCIO-ECONOMIC ISSUES	Effects of changing season start date on harvest availability and processing opportunity	Effects of changing season start date on safety and social/cultural needs of fishing communities	Effects of management time and public review and analysis devoted to specifications and management measures process
Process Alternative 3: 3-meeting, biennial process (Nov, March/April & June,) Jan 1 start date	Same as Alternative 1. If this alternative were implemented with some or all species managed with two-year OYs, as opposed to one-year OYs, early attainment and closure period could lengthen, possibly to Aug-Dec of second year in two-year fishing period. With two-year OYs, management measures would need to be more conservative at the start of the two-year fishing period to hedge against early closures during the second year in the fishing period.	Same as Alternative 1. Under two-year OY duration alternatives, the slowing and closure period could lengthen, possibly to Aug-Dec, in which case groups affected by this period under both Process Alternative 1 as well as vessels and processors that tend to not have groundfish alternatives in early autumn would be affected by the longer slow period in the second fishing year of the two year period.	Alternative 3 would be similar to Alternative 2 in benefits derived from Council time devoted to issues other than the groundfish specifications and management measures. Depending on when stock assessments are complete, this alternative could provide Council staff 14 months work time and NMFS staff 6.5 months work time. This alternative includes an April (salmon) meeting. Jan 1 start date would mean that inseason adjustments for final 3 months of year (Oct-Dec) would be made at Sept meeting, with final check for Dec at the Nov meeting. Duration of OYs, whether one-year, two-year, or mixed would not affect management time and public review and analysis devoted to specifications and management measures.
Process Alternative 4: 3-meeting, biennial process (June, Sept & Nov,) May 1 start date	Given closure trends under status quo, May 1 start date would likely result in early allocation attainment and closures during Feb-Apr period. This schedule would keep the fisheries open through stronger flatfish months and allow participants to switch between flatfish and Dungeness crab at will. A Feb-Apr groundfish closure could also have the negative effect of a very lean 3-month period between Dungeness crab fishing/processing season and the shrimp, salmon and albacore seasons. For some of the small boat fishers, this alternative could also mean a lack of fishing opportunity in their traditional start-up fishing months. Early spring recreational fishing opportunities could also be curtailed under this schedule. If this alternative were implemented with some or all species managed with two-year OYs, as opposed to one-year OYs, early attainment and closure period could lengthen, possibly to Dec-Apr of second year in two-year fishing period. With two-year OYs, management measures would need to be more conservative at the start of the two-year fishing period to hedge against early closures during the second year in the fishing period.	This alternative would tend to result in declining landings and closures during the Feb-Apr period, which could mean increased fishing during the preceding rough winter weather months. Treaty tribe subsistence fishing for groundfish could be most affected by May 1 start date, as a notable proportion of tribal groundfish landings occur in March-April, concurrent with the tribal halibut season start. Although tribal groundfish landings opportunities could not be restricted based on non-tribal use of all available resources, management between tribal and non-tribal fishing opportunities would have to be monitored more closely to ensure groundfish availability for tribal fishing seasons. Under two-year OY duration alternatives, the slowing and closure period could lengthen, possibly to Dec-Apr, in which case groups affected by this period under both Process Alternatives 2 and 4 would be affected by the longer slow period in the second fishing year of the two year period.	Alternative 4 would be similar to Alternative 2 in benefits derived from Council time devoted to issues other than the groundfish specifications and management measures. This alternative could provide Council staff 9 months work time and NMFS staff 6 months work time. May 1 start date would mean that inseason adjustments for final 5 months of year (Dec-Apr) would be made at a Nov meeting, with final check for Apr at the March meeting. May 1 fishing period start date would require restructuring of the non-tribal whiting and fixed gear primary sablefish season management processes, as both seasons currently begin in April. May 1 fishing period start date could also require change to tribal sablefish management process, as treaty tribes' sablefish season currently begins in March. This alternative would not interfere with a salmon-focused Council meeting. Duration of OYs, whether one-year, two-year, or mixed would not affect management time and public review and analysis devoted to specifications and management measures.
Process Alternative 5: 2-meeting, biennial process (June & Sept,) March 1 start date	Same as Alternative 3 with respect to both annual specifications process and OY duration process.	Same as Alternative 3 with respect to both annual specifications process and OY duration process.	Alternative 5 would be similar to Alternative 2 in benefits derived from Council time devoted to issues other than the groundfish specifications and management measures. This alternative could provide Council staff 9 months work time and NMFS staff 5.5 months work time. Like Alternative 2, March 1 start date would mean that inseason adjustments for final 3 months of year (Dec-Feb) would be made at a Nov meeting. Unlike Alternatives 2-4, this alternative would be a 2-meeting Council process, leaving less Council meeting time for discussing specifications and management measures. This alternative would not interfere with a salmon-focused Council meeting. Duration of OYs, whether one-year, two-year, or mixed would not affect management time and public review and analysis devoted to specifications and management measures.

4.3.1 Socio-Economic Effects of Changing Season Start Date

As detailed above in Table 4.3.1, the five process alternatives consider a range of fishing season start dates: January 1 (Alternatives 1 and 2,) March 1 (Alternatives 2 and 5,) and May 1 (Alternative 4.) In crafting these alternatives, the Multi-Year Management Committee considered only fishing year start dates that would coincide with both the start of a traditional "major" commercial cumulative limit period and with the start of a Recreational Fisheries Information Network (RecFIN) two-month recreational fishing "wave." Using these criteria was intended to allow a smooth transition of catch and landings data analysis from the current specifications and management measures process to any of the alternative processes. Based on these criteria, potential start dates could have been January 1, March 1, May 1, July 1, September 1, and November 1.

Groundfish has historically provided West Coast commercial fisheries participants with a relatively steady source of income over the year, supplementing the other more seasonal fisheries (Table 4.3.2). Although groundfish contributed only about 17% of total annual ex-vessel revenue during 2000, seasonally groundfish played a more significant role, providing 1/5 to 1/3 of ex-vessel revenue coastwide during April and also each of the three summer months.

Table 4.3.2 Percent of monthly exvessel value of all 2000 commercial fishery landings made on the West Coast in various fisheries stratified by month ($000)

Species Group	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Sablefish	0.8%	1.3%	3.6%	6.0%	3.7%	3.4%	6.3%	20.3%	5.7%	4.4%	4.3%	2.2%	5.8%
Whiting	0.0%	0.0%	0.0%	0.2%	1.9%	3.5%	7.6%	6.7%	4.4%	0.0%	0.0%	0.0%	2.3%
Flatfish	8.9%	5.5%	5.4%	7.1%	4.1%	3.2%	3.2%	2.7%	2.7%	3.0%	3.2%	3.0%	4.2%
Rockfish	2.5%	3.3%	5.6%	6.5%	5.6%	4.7%	5.6%	3.3%	5.9%	5.0%	6.8%	3.2%	4.6%
Other GF	0.2%	0.7%	0.3%	0.7%	1.1%	1.4%	1.3%	0.8%	0.8%	0.5%	0.4%	0.3%	0.7%
Shrimp/Prawns	1.6%	2.7%	3.8%	6.8%	7.1%	16.2%	14.3%	8.2%	8.3%	5.0%	1.6%	1.3%	6.2%
Crab/Lobster	51.0%	41.6%	29.6%	19.6%	15.9%	13.0%	7.2%	4.3%	8.3%	18.3%	18.4%	50.3%	23.5%
Salmon	0.2%	0.3%	0.2%	0.7%	17.1%	13.7%	10.0%	13.6%	13.3%	8.2%	2.0%	0.4%	6.9%
HMS	1.2%	6.5%	2.6%	4.7%	1.1%	1.4%	7.3%	16.3%	19.8%	19.6%	8.6%	6.7%	8.9%
CPS	13.5%	13.3%	11.3%	10.6%	8.1%	6.1%	7.8%	4.9%	6.5%	11.6%	25.0%	15.4%	11.0%
Other	20.2%	24.9%	37.5%	37.2%	34.3%	33.4%	29.3%	18.9%	24.2%	24.4%	29.7%	17.3%	25.9%

Section 4.2.1 discusses the potential biological effects on the marine environment of changing the fishing season start date. While not necessarily implied by choice of start date, the status quo January 1 fishing period start has historically tended to result in more intense fishing pressure at the beginning of the year, followed by increased overall participation and reduced per vessel participation mid-year, with any necessary landings slow downs or closure occurring around October-December. Extending this logic, shifting the start date to March 1, May 1, July 1, September 1 or November 1 would simply shift the activity cycle forward by a corresponding number of months, but still result in late season closures.

Impacts on markets supplied by the affected fisheries would be limited to possible changes or disruptions in the supply of local groundfish to fresh markets and to processors. While this may negatively affect fishers, processors, restaurants and others involved in the local supply chain, it is not anticipated to have a significant impact on the overall availability or price of fish in local markets because West Coast groundfish do not command a large enough share of world markets to notably affect prices, and local shortages would be offset by local supplies of substitute species or by supplies imported from outside the region.

Process Alternative 3 uses the same January 1 start date as the status quo/no action Process Alternative 1. Under both alternatives, following current season trends, harvest allocations would tend to be attained

Figure 4.3.1 Landings Volumes for Selected Larger-Volume West Coast Fisheries, 1997-2001

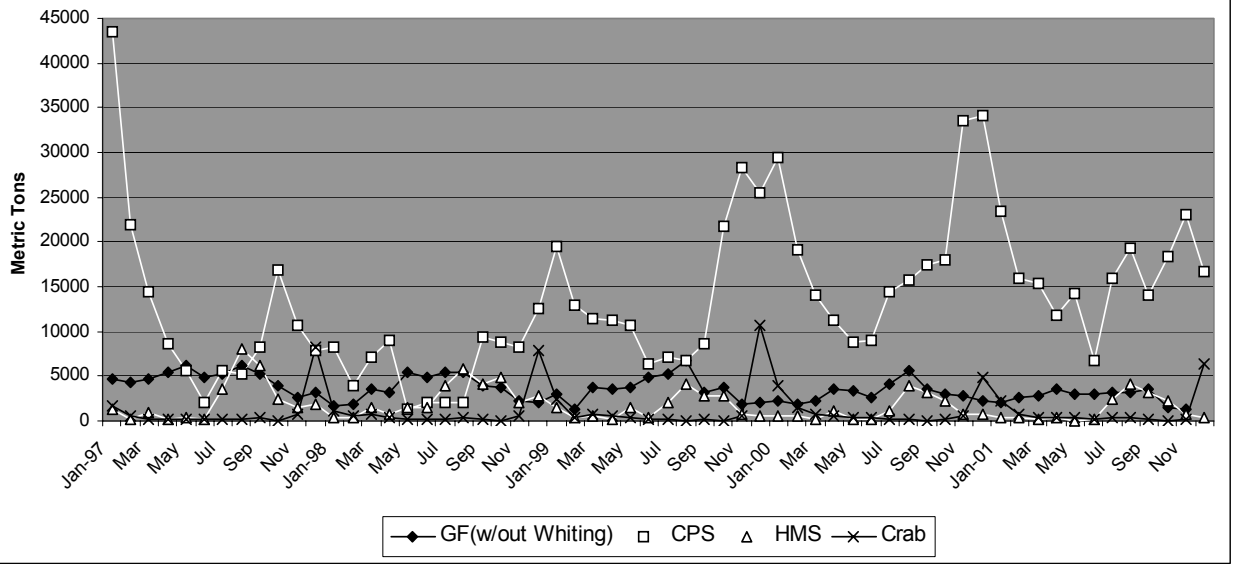
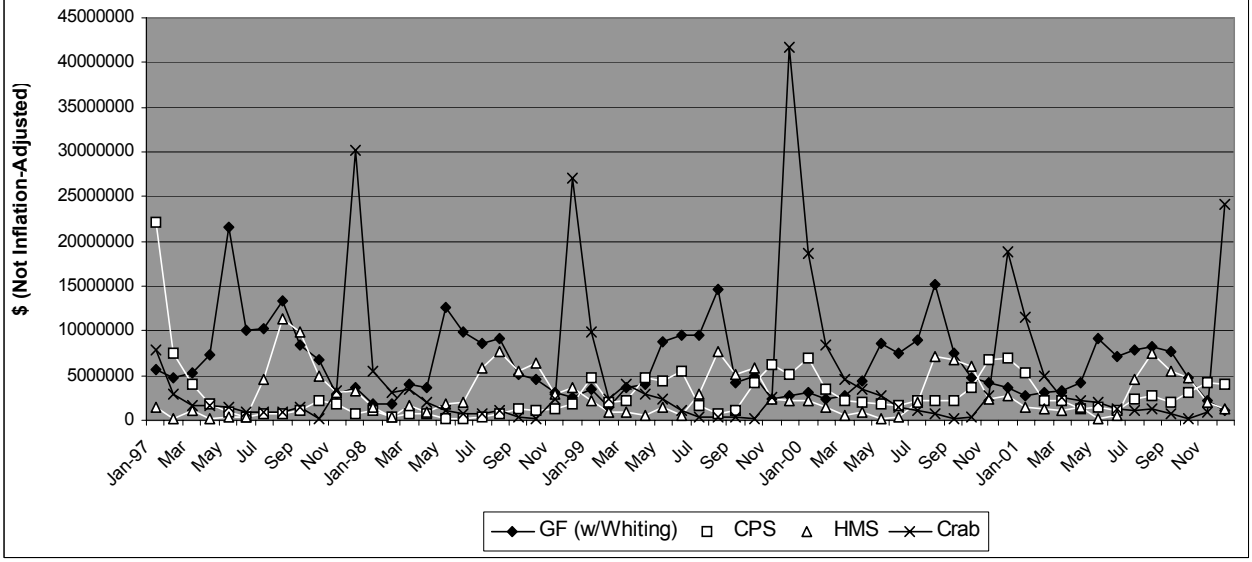


Figure 4.3.2 Landings Value for Selected Higher-Value West Coast Fisheires, 1997-2001

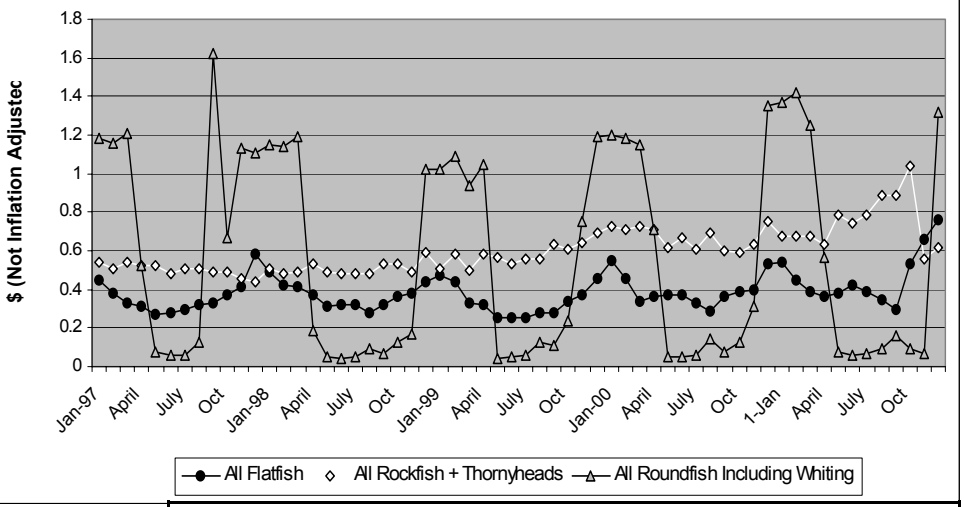


by late fall, with restrictions or closures occurring in the October-December period. In terms of safety, fishery restrictions and closures toward the end of the year when weather conditions are least favorable may be more acceptable. Small vessel operators who might want to have access to groundfish allocations during better weather months might be more adversely affected economically by summer closures than they are by winter closures. However for vessels operating off Southern California, winter weather is generally milder so restrictions during this period may be less important from a safety standpoint.

From the processors perspective, the January 1 start date with early winter restrictions may be economically acceptable because the Dungeness crab and coastal pelagic species (CPS) fishing seasons

tend to be strong in the November through January period. Those fisheries may allow fish processing plants to stay open during an otherwise slow groundfish period. There are also disadvantages, however to a January 1 start date with early winter restrictions and closures for fish marketers. During the November-December period, Americans spend a great deal of money, buying gifts and entertaining friends and family either at home or at restaurants. December holidays and New Year's are also celebrated in other countries with purchases of a wide range of luxury foods. Marketing and export opportunities, particularly to cultures with more fish-oriented diets, may be lost during this potentially lucrative time of year, although studies have shown that export opportunities may be determined as much by relative exchange rates and the availability of competitive substitutes as by the presence of potential markets (Sigel, 1984.).

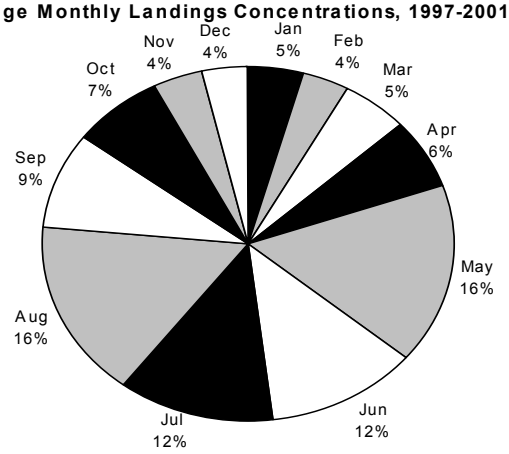
Figure 4.3.3 Price Per Pound for Groundfish Groups, By Month, 1997-2001



Note: Values and Prices in figures in this section not adjusted for inflation. Based on gross domestic product implicit price deflator, $1.00 in 2001 = $ 0.977 in 2000, $0.956 in 1999, $0.942 in 1998, and $0.931 in 1997.

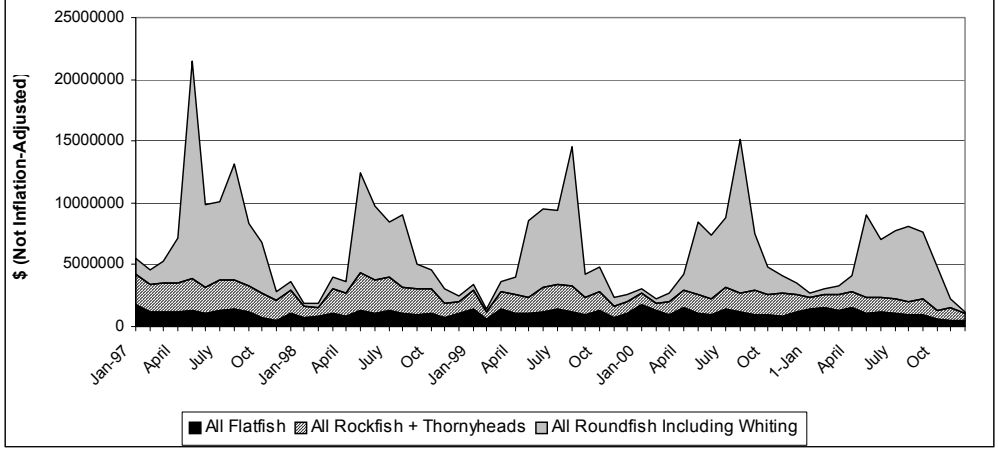
Winter closures may also affect the ability of fishery participants to manage the financial challenges of the holiday season. Like most Americans, groundfish fishery participants could probably better meet those challenges if they were able to increase their incomes during that November-December period. Process Alternatives 1 and 3 have the disadvantage of a fishing period start date that may result in fewer fishing opportunities at a time of year when fishery participants may have a greater need for income. Additionally, Process Alternative 3 could be modified to allow two-year OYs (OY Duration Alternatives 2 or 3,) which could place the slow end-of-period season into the latter half of the second year in a two-year cycle. The August-October period would not result in additional losses of holiday marketing opportunities, but could force the groundfish industry into a more dramatic cycle of openings and closures than under one-year OYs. To counteract this possibility, the Council would need to set conservative management measures at the start of the two-year management cycle.

Figure 4.3.4 Groundfish Landings (Including Whiting,) By Value, Average Monthly Landings Concentrations, 1997-2001



Process Alternatives 2 and 5 are biennial processes with March 1 fishing period start dates. A March 1 start date, with a corresponding February 28/29 ending date could push the restriction and closure period from the status quo October-December to a new December-February period. For processors that focus on Dungeness crab, a slow period in December-February might be more advantageous in northern ports, where crab tends to enter its hardshell phase later than in the south. Processors at the southern end of the Dungeness crab range (central-northern California) would be at a disadvantage because the hardshell phase for crab in their area tends to come in November-December, a time when they might want to continue to accept groundfish landings. On the other hand, CPS fisheries are concentrated in the southern part of the coast and those also operate strongly during the winter months. In terms of safety, a December-February closure probably has no measurable change over an October-December closure. Additionally, a slow December-February period may provide more year-end holiday marketing opportunities than an October-December closure. Conversely, closure in the early part of the calendar year may reduce marketers ability to participate in Asian cultures' celebration of New Years tied to the lunar calendar. Many Asian and Asian-American cultures tend to consume more fish per-capita than other American culture groups, making Asian holiday celebrations important fish-consumption periods. As with Process Alternative 3, setting two-year OYs could result in a long closure period at the end of the second fishing year. Under Process Alternatives 2 and 5, this period would likely occur in October-December, affecting both the groups that would be affected with one-year OYs under Process Alternative 3 and under Alternatives 2 and 5. Again, a more conservative harvest regime at the start of the management period could counteract the end-of-period closures.

Figure 4.3.5 Value of Groundfish Landings By Month, 1997-2001



Process Alternative 4 is a biennial process with a May 1 start date. A May 1 start date, with a corresponding April 30 ending date could push the restriction and closure period from the status quo October-December to a new February-April. This start date could ensure open groundfish fisheries throughout the Dungeness crab season, allowing vessels and processing plants to switch between crab or CPS and groundfish at will. Having a slow groundfish period of February-April, however, might be difficult for West Coast fishery participants trying to fill out their incomes between the Dungeness crab and CPS seasons and the shrimp, salmon and albacore seasons of spring and summer. For vessel safety and small vessel income, Process Alternative 4 is the least advantageous because February-April is the period when small vessels that do not fish during winter are just starting to get back on the water. Many fishers would not want to see a period of management-constrained fishing opportunities following immediately on the heels of a period of weather-constrained periods. Conversely, the knowledge that the fisheries would likely close during the February-April period would push vessel operators to fish during winter weather that they might otherwise avoid, thereby compromising safety. Like the potential December-February slow period associated with a March 1 start date, a February-April slow period associated with May 1 start could also negatively affect producers supplying fish for consumption during Asian and Asian-American New Years celebrations as well as during Lent, a period in the Christian calendar when many persons increase their fish consumption. Similar to all of the other Process Alternatives, the effects of this

alternative would vary according to whether one-year (OY Duration Alternative 1,) two-year (OY Duration Alternative 2,) or mixed (OY Duration Alternative 3) OY periods are used. Without conservative management measures, the lengthy closure period that could be associated with two-year OYs under this alternative would likely occur in December-April. This closure period would affect all of the groups described as affected under Process Alternatives 2 and 5 as well as those affected by the May 1 start date under Process Alternative 4.

A May 1 start date could require reorganization of both tribal and nontribal fishing opportunities for groundfish. The logistics of tribal commercial fishery management under a May 1 start date will be addressed in the next section, along with nontribal commercial fishery logistical concerns. For most tribal fisheries, however, there are also subsistence and ceremonial uses of different fish species. Much of the subsistence fishing by the four groundfish treaty tribes occurs during the March-April tribal commercial halibut and sablefish fisheries. Nontribal groundfish fisheries would need to be managed in a way that would ensure groundfish availability for all tribal commercial, subsistence and ceremonial fisheries during the February-April period.

As with biological effects, many of the potential socio-economic effects of shifting the fishing year start date should more properly be considered effects of the Council's year-round fishery policy, rather than effects of the start date of a management period. Socio-economic effects resulting from different closure periods associated with the alternative season start dates or with one- or two-year OY durations could more accurately be attributed to inadequate tools for the allocation of managed species among user groups and to the lack of management tools that would allow fishery participants access during periods most advantageous to their particular business needs. Ideally, vessel operators and processors should be able to take advantage of whichever seasonal markets best fit their needs. Small vessel operators should not be forced to fish during inclement weather because of concerns about fishery closures during spring and summer months. Vessel operators afforded the privilege of fishing for both Dungeness crab and groundfish, or groundfish and shrimp, should be able to time their fishing trips based on the migratory patterns of their target species and the needs of their own marketing strategies and those of their associated processors. While implementing multi-year groundfish management will not alleviate all season-related management problems for fisheries participants, it should be a positive step toward improving the stability and certainty of seasonal groundfish allocations for participating harvesters and processors. The improved science and management made possible with multi-year planning will help mitigate the closure cycle by stabilizing groundfish allocations and landings throughout the season.

4.3.2 Socio-Economic Effects of the Council and NMFS Public Review Processes

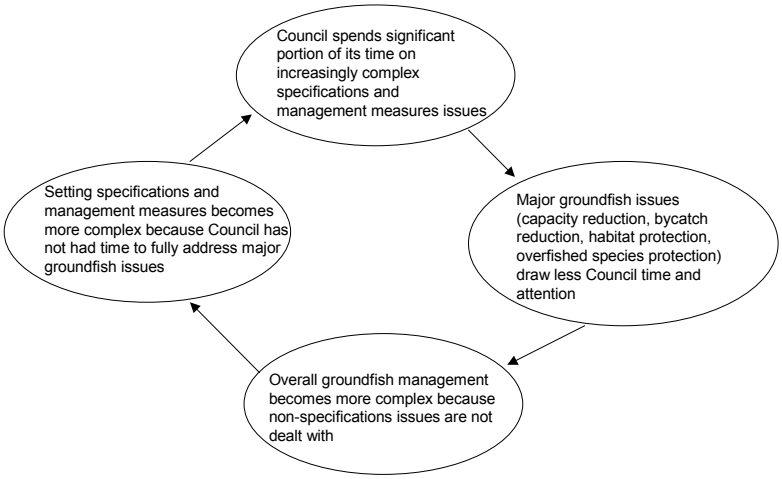
The changes to the Council's specifications and management measures process considered in Amendment 17 will also affect overall Council process and schedule. Each of the alternatives allows more or less Council and NMFS staff work time and uses a different number of Council meetings to achieve the same results. Alternatives that use more Council meetings to develop a specifications and management measures package may be more costly in terms of Council time spent on each issue, but may result in better overall analysis with less Council time spent on correcting mistakes. In addition to issues related to developing the specifications and management measures, changing the Council's process may also alter scheduling for inseason management measures. And, changing the Council meetings at which groundfish issues are considered may also conflict with non-groundfish issues traditionally considered at those meetings. Table 4.3.3 compares these factors across the process alternatives. OY duration would not affect the Council process.

Table 4.3.3 Council process issues under Amendment 17 alternatives

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Number of Council meetings needed to develop two years of specifications	4	3	3	3	2
Available time for Council staff and Council advisory committees analysis work	7 months	11-19 months	14 months	9 months	9 months
Available time for NMFS regulations development, publication, & public review period	2 months	5.5 months	6.5 months	6 months	5.5 months
Amount of time between the last Council meeting of the fishing year and the start of the new fishing period. (Inseason measures adjustment period.)	3 months. Inseason changes for Oct-Dec made in Sept, with final check at Nov. meeting.	3 months. Inseason changes for Dec-Feb made in Nov, no new meetings until after 3/1 start date.	3 months. Inseason changes for Oct-Dec made in Sept, with final check at Nov. meeting.	5 months. Inseason changes for Dec-Apr made in Nov, with final check at Mar. meeting.	3 months. Inseason changes for Dec-Feb made in Nov, no new meetings until after 3/1 start date.
Process includes a March or April meeting that could conflict with salmon management process?	No	Yes	Yes	No	No

Under Process Alternative 1 (status quo/no action,) the Council uses the highest number of meetings to develop specifications and management measures for a two-year period. Before setting up the Groundfish Multi-year Management Committee, the Council had decided to use a three-meeting process to develop annual specifications and management measures. With an annual three-meeting process, the Council would have used six meetings to develop specifications and management measures for a two-year period. In general, the Council considers groundfish issues at four out of five meetings per year, with the fifth meeting (March) used only for updates and preparatory discussions. One of the notable process advantages of Process Alternatives 2-5 is that the Council would have an "off" year in which it would not be developing specifications and management measures. During that off year, the Council could use its groundfish meetings to address its notable backlog of long-term groundfish management issues. Under status quo, the Council is stuck in a cycle that forces participants to spend so much time on specifications and management measures development that they are unable to work on issues (like capacity reduction) that could ultimately help to reduce the complexity of the specifications and management measures.

Figure 4.3.6 Council's Groundfish Management Efforts



In addition to varying in the number of meetings that would be used to develop specifications and management measures, the alternatives also vary in the amount of time that they allot for Council staff and Council advisory bodies to

provide background documentation and analysis for the Council's work. Process Alternative 2 provides the longest period (11-19 months,) with the Council's work time dependent on when stock assessments are completed, while the shortest period (7 months) is provided under status quo (Process Alternative 1). The level of analysis and background documentation required in each specifications and management measures process would be based on the factors particular to that year's process and would not vary between alternatives. A disadvantage of the alternatives with shorter periods for background analyses is that these periods are generally only sufficient in years when there are no notable questions about the outcomes of new stock assessments and overfished species rebuilding plans. In developing the 2003 specifications, for example, the Council had to hold emergency stock assessment reviews between its preliminary (June) and final (September) specifications meetings. The results of these reviews had to be folded into the analysis for 2003 specifications and management measures. Conversely, a disadvantage of the alternatives with longer analysis periods is that the analysis becomes farther disconnected in time from the science that was conducted in support of the analysis. Even in the current specifications and management measure process, new information that arises between the completion of stock assessment and the Council's final decisions affects those decisions. With a longer analysis period, there are more opportunities for new information to arise, making both analysis and decisions more complex.

With the exception of status quo, the alternatives are essentially the same in terms of the duration of time allowed for NMFS to draft proposed implementing regulations, receive public comment, respond to that comment and draft final implementing regulations. The minimum time needed to complete this process is 5 months from the Council's final recommendation on specifications and management measures. The status quo process was revised for 2003 to ensure adequate opportunity for public review of and comment on the specifications and management measures regulatory package. Under the 2003 process, NMFS expects to implement an emergency rule for January-February 2003 management measures, and publish an associated proposed rule for the complete 2003 specifications and management measures package. The agency expects to publish the final rule for the 2003 specifications and management measures by March 1, 2003. This emergency/proposed rule process could not be used on a regular basis, as emergency rules are intended for emergencies, not planned-for events.

All of the alternatives, except for Process Alternative 4, has three months between the last Council meeting at which an inseason action may be recommended and the start of the new fishing year/period. Under Process Alternatives 1 and 3, the Council would be able to make inseason adjustments at its September meeting for the October-December period. The November Council meeting is usually not useful for making inseason adjustments, as those adjustments could only affect the month of December. Groundfish fishing activity tends to be slow in December, so there is little that the Council can change for December that will have much effect on the overall landings patterns for the year. Under Process Alternatives 2 and 5, the Council would be able to make inseason adjustments at its November meeting for the December-February period. Unlike Process Alternatives 1 and 3, the Council would not have an interim meeting for last-month checks on landings levels. With Process Alternative 4, the November Council meeting would also be the last Council meeting at which the Council could make inseason adjustments before the start of the new fishing period. Process Alternative 4 features a May 1 start date, which means that the Council could make last-month changes at its March meeting, but those would not take effect until the last month of the fishing period. As with Process Alternatives 1 and 3, adjustments made in the last month of the fishing period could not be expected to notably alter the overall landings patterns for the year. If the Council were to adopt Process Alternative 4, it may also have to set up a process that would allow either NMFS or a telephone conference of Council representatives to make inseason adjustments as needed during the December-April period.

Similar to the annual groundfish management cycle, the annual salmon management cycle is a carefully orchestrated set of meetings, all carefully timed to use up-to-date information and agreements in setting the new year's management measures. The Council addresses annual salmon management measures at its March (proposed) and April (final) meetings. To ensure that the Council is fully able to concentrate on salmon issues, the March meeting has traditionally had few to no groundfish items on its agenda. The Council's groundfish advisory bodies, the GMT and the GAP, do not meeting during the March meeting.

Although groundfish issues are on the Council's April meeting agendas and the GMT and GAP meet during the Council's April meeting, groundfish issues dealt with in April also tend to be less rigorous than those dealt with in June, September, and November. Process Alternative 2 and 3 both include a March or April meeting in the specifications and management measures development process. If the Council is to include specifications and management measures development in a March or April meeting, it will likely have to ensure that it addresses no other groundfish issues during those meetings, so that it may continue to devote the bulk of its attention to salmon management.

In addition to these longer term issues, there are several short-term logistical issues associated with changing the fishing year start date that could affect the Council process and its participants. If the Council chooses either Process Alternative 1 or 3, the fishing period start date of January 1 would remain the same. Process Alternatives 2 and 5 have a March 1 fishing year start date. To shift from a January 1 to March 1 start date, the Council and NMFS would need to create separate ABCs/OYs and management measures for the January/February period of the transition year, followed by a new set of specifications and management measures for the March 1 - February 28/29 period following the transition period. [Note: Transition scenarios for Process Alternatives 3 (Council preferred) and 5 (SSC recommended) are presented in Appendix B.] Similarly, the Process Alternative 4 May 1 start date would require a four month transitional set of ABCs/OYs and management measures. Shifting to the May 1 start date of Process Alternative 4 would also require that the Council make arrangements for accommodating the current management structure of the tribal commercial halibut/sablefish fisheries, the non-tribal primary fixed gear sablefish fishery, and the shorebased primary whiting season south of 42° N. lat. Table 4.3.4 examines some of the transitional issues that might have to be addressed for each of these fisheries under an Process Alternative 4 May 1 start date.

Table 4.3.4 Logistical Issues for Period-Defined Fisheries Associated with a May 1 Start Date

Fishery	Issues to be Addressed in Transition to May 1 Start Date
Tribal Halibut/Sablefish Fisheries	The bulk of tribal groundfish fishing occurs in March/April, concurrent with the major halibut and sablefish fisheries. Process Alternative 4 would not affect the tribal halibut fisheries. If the tribal sablefish fisheries were set to take their entire sablefish allocation during the March/April period, a May 1 start date would also not affect those fisheries. The tribal sablefish allocation is set at the beginning of the fishing period and the period when it is taken is not affected by the activities of the non-tribal fisheries. However, under Process Alternative 4, fishing activities beyond May 1 would be conducted against new ABCs/OYs and allocations. Should the tribes wish to hold a sablefish season that began in March and lasted through April and into May or beyond, the tribes and the Council would have to discuss how to best manage tribal harvests against two different allocations within a single tribal management period. It would be impractical for the tribes to move their fisheries earlier than March both because their groundfish fisheries are managed in concert with their halibut fisheries (which have a fishing period start date controlled by an international commission,) and because tribal fisheries operate off of northern Washington and rough weather in this northern area tends to prevent many tribal and non-tribal vessels from operating during winter months.
Limited Entry Fixed Gear Primary Sablefish Fishery	Amendment 14 to the FMP set the limited entry fixed gear primary sablefish season at April 1 through October 31. In order to maintain an April-October season within the May-April fishing period specified in Process Alternative 4, the Council would have to create two fishing seasons for each year: one held from May 1 through October 31 and a second season held from April 1 through April 30. At the May 1 start date, fishing could commence on the new period's sablefish ABC/OY. Alternatively, the Council could decide to shorten the primary sablefish season to May-October in order to eliminate the complexity of running two back-to back seasons fishing against different ABCs/OYs. This latter alternative may prove unpopular given the many years this fleet has invested in moving their management regime from a brief derby fishery to a longer season with more safety and flexibility for participants.
Primary Whiting Season South of 42° N. lat.	Opening dates for the non-tribal shorebased whiting season differ by area. In 2002, the shorebased fishery between 42° N. lat. and 40°30' N. lat. opened on April 1 and the shorebased fishery south of 40°30' N. lat. opened on April 15. North of 42° N. lat., the fishery opened on May 15. If the Council were to implement a May 1 start date through Amendment 17, it would likely also have to formalize a percentage of the shorebased whiting fishery allocation to be set aside for harvesting in April. Under Process Alternative 4, April would be the end of the overall fishing period. Without a set aside for the southern shorebased whiting fisheries, the shorebased whiting allocation would likely be taken in the earlier part of the fishing period (May-August). April openings are set for the southern shorebased fleet to allow that fleet to take advantage of whiting's springtime migration northward. Moving the fishing period start date for the southern whiting fishery would be impractical because later dates could prevent southern vessels and processors from accessing whiting as it migrates through their waters.

4.4 Cumulative Effects

Cumulative effects must be considered when evaluating the alternatives to the issues considered in the EA. Cumulative impacts are those combined effects on quality of the human environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what Federal or non-Federal agency or person undertakes such other actions (40 CFR 1508.7, 1508.25(a), and 1508.25(c)).

For the issues considered in this document, the geographic area that would be affected by this action is the U.S. West Coast EEZ. Potential direct and indirect effects of the preferred and other alternatives to the specifications and management measures issue and to the OY duration issue are detailed above and summarized in Tables 4.2.1 and 4.3.1.

Of the past, proposed, and reasonably foreseeable future actions that are expected to also affect these same waters, the most notable is the action to implement Pacific Coast groundfish fishery management measures for 2003. For 2003, large-scale depth-based restrictions for fishing across much of the continental shelf were adopted and are intended to further the conservation goals and objectives of the FMP by allowing fishing to continue in areas and with gears that can harvest healthy stocks with little incidental catch of low abundance species. The effects of the 2003 groundfish specifications and management measures have been described and analyzed in a Final Environmental Impact Statement (EIS) prepared by the Council staff. This action would not affect the 2003 specifications and management measures, although it would revise the development process for specifications and management measures for 2005 and beyond. For those years, this action would provide the Council and NMFS more time to develop and review the specifications and management measures, and more time for the public to review and comment upon the regulatory package. To the extent that this action provides more time for managers to carefully consider the complex specifications and management measures harvest regulations package, this action in combination with future specifications and management measures actions will have positive effects on the environment.

Amendment 16 to the FMP will specify the required contents of rebuilding plans and defines species specific rebuilding plans. This proposed action will support rebuilding measures over time by providing scientists who support the Council's management process with more time to develop and revise overfished species rebuilding plans, and by providing NMFS, the Council, and the public more time to review and comment upon those rebuilding plans.

One of the Council's motivations for considering multi-year management was to free up Council time from the annual process of developing and considering the specifications and management measures harvest regulations package. To the extent that this action does free up Council and NMFS time, the Council expects to devote some of its work time to actions that would reduce overcapacity in the fishery. The long-term effects of this action would then be to provide managers with time and opportunity to consider the complex task of reducing capacity in the groundfish fisheries, which would ultimately have positive effects on the environment affected by this action.

Table 4.4.1 – Expected effects of preferred alternatives if effects accumulate over time	
Issue/Alternative	**Expected effects**
Issue 1, Alternative 3 (preferred): biennial management with November/April/June Council process and January 1 start date	Preferred alternative would revise specifications and management measures process so that: these harvest regulations are set for a two-year period, the Council process would occur over the November/April/June meetings prior to the start of the management period; and, the fishing year would start on January 1. Over time, these changes are only expected to have effects on the environment to the extent that they open Council and NMFS schedules to address issues other than the burdensome specifications and management measures.
Issue 2, Alternative 1 (preferred): Two one-year OYs for all species managed under the biennial process.	Preferred alternative would require that the Council and NMFS continue to set Optimum Yields for each year, rather than for each biennium. Over the short term, this action is expected to prevent wild fluctuations in management measures between the two years in each management biennium. Over the long term, more stability in management measure between years is expected to reduce fisher frustration with frequency and magnitude of changes to management actions, but is otherwise not expected to have any long-term effects on the environment.

Table 4.4.2 Direct & indirect impacts of all Issue 1 alternatives if effects accumulate over time					
Issue 1 – Management Process	Alternative 1 Status Quo, Annual Process, June/Sept Council meetings, Jan 1 start date	Alternative 2 Biennial Process, Apr/June/Sept Council meetings, March 1 start date	Alternative 3 Biennial Process, Nov/Apr/June Council meetings, Jan 1 start date	Alternative 4 Biennial Process, June/Sept/Nov Council meetings, May 1 start date	Alternative 5 Biennial Process, June/Sept Council meetings, March 1 start date
Groundfish Species					
Effect on sustainability	N	N	N	N	N
Prey availability	N	N	N	N	N
Habitat	N	N	N	N	N
Non-groundifsh fish species including: CPS, forage fish, prohibited					
Incidental take -Effect on sustainability	N	N	N	N	N
Prey availability	N	N	N	N	N
Habitat	N	N	N	N	N
ESA listed Salmonids					
Incidental take -Effect on sustainability	N	N	N	N	N
Prey availability	N	N	N	N	N
Habitat	N	N	N	N	N
Marine mammals	N	N	N	N	N
Incidental take -Effect on sustainability	N	N	N	N	N
Prey availability	N	N	N	N	N
Habitat	N	N	N	N	N
Seabirds					
Incidental take -Effect on sustainability	N	N	N	N	N
Prey availability	N	N	N	N	N
Habitat	N	N	N	N	N
Sea Turtles					
Incidental take -Effect on sustainability	N	N	N	N	N
Prey availability	N	N	N	N	N
Habitat	N	N	N	N	N
Marine Habitat					
Damage to biota	N	N	N	N	N

Table 4.4.2 Direct & indirect impacts of all Issue 1 alternatives if effects accumulate over time					
Issue 1 – Management Process	Alternative 1 Status Quo, Annual Process, June/Sept Council meetings, Jan 1 start date	Alternative 2 Biennial Process, Apr/June/Sept Council meetings, March 1 start date	Alternative 3 Biennial Process, Nov/Apr/June Council meetings, Jan 1 start date	Alternative 4 Biennial Process, June/Sept/Nov Council meetings, May 1 start date	Alternative 5 Biennial Process, June/Sept Council meetings, March 1 start date
Damage to benthic habitat	N	N	N	N	N
Impacts on related non-groundfish fisheries					
Direct effect on state managed fisheries	N	N	N	N	N
Direct effect on tribal managed fisheries	N	N	N	N	N
Direct effect of federally managed fisheries	N	N	N	N	N
Socio-economic factors					
Harvesters	N	N	N	N	N
Processors	N	N	N	N	N
Fish prices	N	N	N	N	N
Ex-vessel value to industry	N	N	N	N	N
Safety of human life	N	N	N	N	N
Management and Enforcement	N	N	N	N	N
Costs to consumers	N	N	N	N	N
Communities	N	N	N	N	N

N=nonsignificant impact expected S=significant impact either positive (+) or negative (-) U=unknown

Table 4.4.3 Direct & indirect impacts of all Issue 2 alternatives if effects accumulate over time			
Issue 2 – OY Duration	Alternative 1 Status Quo, One-Year OYs, Two per Biennium	Alternative 2 Two-Year OYs, One per Biennium	Alternative 3 Mixture of One-Year and Two-year OYs, by species, within Biennium
Groundfish Species			
Effect on sustainability	N	N	N
Prey availability	N	N	N
Habitat	N	N	N
Non-groundifsh fish species including: CPS, forage fish, prohibited species, and unlisted			
Incidental take -Effect on sustainability	N	N	N
Prey availability	N	N	N
Habitat	N	N	N
ESA listed Salmonids			
Incidental take -Effect on sustainability	N	N	N
Prey availability	N	N	N
Habitat	N	N	N
Marine mammals	N	N	N
Incidental take -Effect on sustainability	N	N	N
Prey availability	N	N	N
Habitat	N	N	N
Seabirds			
Incidental take -Effect on sustainability	N	N	N
Prey availability	N	N	N
Habitat	N	N	N
Sea Turtles			
Incidental take -Effect on sustainability	N	N	N

Table 4.4.3 Direct & indirect impacts of all Issue 2 alternatives if effects accumulate over time			
Issue 2 – OY Duration	Alternative 1 Status Quo, One-Year OYs, Two per Biennium	Alternative 2 Two-Year OYs, One per Biennium	Alternative 3 Mixture of One-Year and Two-year OYs, by species, within Biennium
Prey availability	N	N	N
Habitat	N	N	N
Marine Habitat			
Damage to biota	N	N	N
Damage to benthic habitat	N	N	N
Impacts on related non-groundfish fisheries			
Direct effect on state managed fisheries	N	N	N
Direct effect on tribal managed fisheries	N	N	N
Direct effect of federally managed fisheries	N	N	N
Socio-economic factors			
Harvesters	N	N	N
Processors	N	N	N
Fish prices	N	N	N
Ex-vessel value to industry	N	N	N
Safety of human life	N	N	N
Management and Enforcement	N	N	N
Costs to consumers	N	N	N
Communities	N	N	N

N=nonsignificant impact expected S=significant impact either positive (+) or negative (-) U=unknown