6.0 SUMMARY OF ENVIRONMENTAL MANAGEMENT ISSUES

Based on the environmental impacts disclosed in Chapters 4 and 5, this chapter summarizes a range of issues that an EIS must address. These issues are identified at 40 CFR 1502.6, describing the analysis of environmental consequences in an EIS. The last two sections in this chapter describe mitigation measures (as required by 40 CFR 1502.1(h)) and identify unavoidable adverse impacts (as required by 40 CFR 1502.16).

6.1 Short-term Uses Versus Long-term Productivity

Balancing short-term use and long-term productivity is the essence of the proposed action. The Magnuson-Stevens Act and NSGs establish a framework for rebuilding overfished stocks—establishing long-term productivity—while recognizing short-term use as reflected in the needs of fishing communities. National Standard 1 guidelines establish outer boundaries for balancing this tradeoff: T_{MIN}, which places greatest emphasis on rapidly returning to maximum long-term productivity (MSY), and T_{MAX}, which places greatest emphasis on short-term use while rebuilding stocks. The specific tradeoff between short-term use and long-term productivity is expressed by the choice of a target year, T_{TARGET}, which must fall within these boundaries. If a T_{TARGET} closer to T_{MAX} is chosen, harvest rates will be higher, and short-term use is thus favored. If a T_{TARGET} closer to T_{MIN} is chosen, harvest rates will be lower, and the stock is more likely to rapidly rebuild, favoring long-term productivity. The mixed stock exception, identified in National Standard 1 guidelines and used as the basis of one of the alternatives in this EIS favors short-term use, in terms of sustainable harvests of healthy stocks in a complex, over a return to B_{MSY} for selected stocks. Under this alternative the canary rockfish stock would be managed to prevent further declines in population size, but not to achieve long-term maximum productivity as represented by B_{MSY} stock size. (Other stocks would be managed according to the targets in the other alternatives.)

Comparing the target year to the midpoint between T_{MIN} and T_{MAX} is one way to evaluate the tradeoff between short-term benefits of harvest and long-term benefits of rapid rebuilding. Except for canary rockfish, the rebuilding targets that would be established by the *Council Preferred* alternative fall in a midrange between the two limits imposed by the NSGs:

Stock	Midpoint between T_{MIN} and T_{MAX}	T_{TARGET}
Darkblotched rockfish	2031	2030
POP	2027	2027
Canary rockfish	2067	2074
Lingcod	2008	2008

Another way of expressing this tradeoff is by the rebuilding probabilities (P_{MAX}) associated with the target year for each stock. For canary rockfish and lingcod these values are 60%, somewhat lower than the probabilities calculated for darkblotched rockfish (80%) and POP (70%). However, the lower probabilities are still risk averse. Lingcod is a productive stock, and even with the assumed risk—a two in five chance the stock won't rebuild by 2009—the stock is likely to reach its target biomass in a comparatively short time. Canary rockfish are much less productive; even in the absence of fishing, the stock is likely to take more than 60 years to rebuild. Canary rockfish are also caught in a wide range of fisheries from waters off Central California northward. The Council chose a target year and related rebuilding probability that would allow a higher level of bycatch. The socioeconomic value directly attributable to this additional canary rockfish bycatch is less important than the opportunity to harvest other, healthy fish stocks that results from permitting some bycatch. This was an important consideration in giving more weight to short-term benefits while assuming a later rebuilding target. (See Section 4.4.1 for a discussion of the relation between OY reductions for overfished species and forgone harvests of other stocks.)

6.2 Irreversible Resource Commitments

An irreversible commitment represents some permanent loss of an environmental attribute or service. The use of non-renewable resources are irreversible; unsustainable renewable resource use may be irreversible if future production is permanently reduced or, at the extreme, is extinguished.

The use of non-renewable energy resources, such as fossil fuel, represents a pervasive irreversible commitment associated with the proposed action, because fishing vessels are mechanically powered. The use of energy is discussed below in Section 6.4.

The proposed action does not by itself represent an irreversible commitment because renewable resources are being managed within an adaptive framework. If a stock were extirpated or species went extinct, this would represent an irreversible resource commitment. Although the proposed action is intended to rebuild stocks, there is some risk—albeit very small—that measurement or model error would lead to mis-specification of harvest rates. Such mis-specification would have to occur over a long period of time in order to drive stocks down to a level where the population was no longer viable and entered an extinction spiral. Even if stocks do not go extinct, however, stock condition could result in an irreversible resource commitment. First, although not conclusively demonstrated for the four overfished stocks considered in this EIS, ecological relationships can produce a depensation effect (Walters and Kitchell 2001). Smaller-sized co-occurring species whose population is kept in check, due to predation by adults of the overfished stock, are released from this constraint. They then prey on larvae and juveniles of the overfished stock, thus suppressing recruitment. If such a situation pertains, stocks may be very slow to rebuild even if fishing mortality is substantially decreased. A very long recovery period, amounting to hundreds of years, may be considered irreversible from a practical standpoint. Although the stock may eventually recover, it would have little relevance to any policy or planning time horizon.

6.3 Irretrievable Resource Commitments

A resource is irretrievably committed if its use is lost for time, but is not actually or practically lost permanently. The proposed action establishes a framework for setting harvest rates that allow overfished stocks to recover to target biomass over some time period. Rebuilding targets indirectly constrain fish harvests based on the harvest specifications necessary to rebuild stocks. The fish that are harvested represent an irretrievable resource commitment, as do the inputs in terms of capital and labor (including energy and resources) needed to harvest and market these fish.

6.4 Energy Requirements and Conservation Potential of the Alternatives

The proposed action indirectly affects energy use primarily in the form of fossil fuels used to power surveillance craft and fishing vessels. Energy used in at-sea and aerial monitoring and enforcement activities is a direct effect. Change in the level of this type of monitoring is hard to predict because it depends on the types of management measures that will be implemented annually (for 2004), biennially (for 2005 through 2006 onwards), and inseason. Generally, the use of depth-based restrictions, which were brought into use in late 2002, would require more surveillance to be effective. Vessel monitoring systems that remotely track vessels by satellite, would compensate somewhat for the increased surveillance need. A final rule for a vessel monitoring system was prepared in 2003 with implementation scheduled for January 2004. Finally, the availability of ships and aircraft to conduct surveillance, which is partly contingent on U.S. Coast Guard mission priorities, will also dictate the level and the number of patrols, affecting energy use. For these reasons, it is difficult to predict how energy use would change from baseline conditions. The proposed action indirectly affects fishing activity, and thus, the consumption of fuel by fishing vessels. Fuel consumption is likely to correlate with harvest levels, which are, in part, determined by the effect of rebuilding measures. For example, the *Maximum Conservation* alternative would likely sharply reduce or eliminate much commercial and recreational fishing on the West Coast, with a corresponding reduction in vessel fuel consumption. The other alternatives would allow higher harvest levels, but it is not possible to forecast how they might affect fuel consumption.

The proposed action could affect overall production efficiency, including energy consumption. Production efficiency can be likened to CPUE, except the effort measure would account for all energy consumption, not

just energy consumed during gear deployment.[13/] Although overfished species may account for a small part of the production side of the balance sheet, they act as constraining stocks, limiting the amount of target species that can be caught on a given fishing trip due to restrictive management measures. Lower harvest limits for overfished species could, therefore, translate into lower overall production efficiency. All of the action alternatives are intended to allow stocks to return to B_{MSY}, so production efficiency should increase over time. Under the *Maximum Conservation* alternative, groundfish fishing would largely cease until stocks recovered; production efficiency would not apply until recovery at which time higher production efficiency would presumably obtain. The *Maximum Harvest* alternative would result in a longer period of lower production efficiency as fishing occurred during stock recovery. Of course these scenarios do not account for a wide range of mitigating factors that could affect efficiency. For example, the number of fishing vessels is likely to decrease, either through policy initiatives such as vessel buyback and permit retirement in limited entry fisheries, or fisheries reaching a new, lower open access equilibrium. In response to increases in cost resulting from lower production efficiency, fishermen could also invest in new technology, depending on availability and cost, that might reduce energy consumption (and thereby, costs). This might happen over the long term, but even a general trend is not predictable because of the various countervailing factors that could affect this type of capital investment.

6.5 Urban Quality, Historic Resources, and the Design of the Built Environment

The Newport Beach dory fleet, which would be affected by the proposed action, is considered a historic resource locally. Although the proposed action does not directly affect urban quality, other historic resources, or the design of the built environment, it may have indirect effects. Fishing fleets add to the character of many West Coast communities and are a determining factor in investment in port infrastructure, including the maintenance of navigation channels. Aside from any broad effects on community income, a decline in the number of vessels, which is likely to occur under more restrictive management measures, could affect infrastructure investment and might contribute to changes in the character of waterfront areas.

6.6 Possible Conflicts Between the Proposed Action and Other Plans and Policies For the Affected Area

Overfished groundfish species are caught incidentally in fisheries managed under other Council FMPs (for salmon, coastal pelagic species, and highly migratory species (which is pending completion). Very restrictive measures, such as those that would be required to meet the rebuilding targets in the *Maximum Conservation* alternative, are likely to affect these fisheries and thus conflict with some of the objectives of these FMPs. (FMPs try to strike a balance between conservation and utilization, so they include objectives related to resource use.)

6.7 Mitigation

An EIS must discuss “means to mitigate the adverse environmental impacts” stemming from the proposed action (40 CFR 1502.1(h)), even if the adverse impacts are not by themselves significant. The proposed action is itself essentially mitigative; four overfished groundfish stocks will be rebuilt to more beneficial stock sizes based on the targets identified in the *Council Preferred* alternative. In order to meet these targets, total fishing mortality must be limited to annual OY levels projected to allow the stocks to rebuild. However, implementation of the means—or management measures—that would constrain fishing mortality is not part of the proposed action. This will be accomplished through the biennial specification of ABCs, OYs, and management measures authorized by the FMP management framework.[14/] Given this context, in comparison to the *No Action* alternative, the *Council Preferred* alternative would reduce adverse impacts resulting from the regulated activity. Nonetheless, further mitigation measures could address the adverse impacts that would still occur with implementation of the *Council Preferred* alternative. Potential mitigation measures are

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13/ The unit value of the effort term can be highly variable, depending on what measures are available. If effort were measured by total days at sea, then fishing effort and production efficiency would be closely correlated. However, if effort is measured as the amount of time fishing gear is deployed, then various “fixed cost” commitments, such as energy used transiting to fishing grounds and searching for fish to set on, would not be accounted for.

14/ Note that harvest limits and management measures were established annually through the 2004 fishing year. The biennial management cycle starts in 2005-2006.

discussed with respect to the components of the human environment potentially affected by the proposed action.

Habitat and ecosystem: Although adverse impacts to overfished species' habitats may be caused by a range of natural events and human activities, mitigation measures within the scope of NMFS authority would address fishing-related impacts. Closed areas are currently used to reduce overfished species bycatch. Because bottom trawling is prohibited in these areas, they also reduce related adverse impacts to benthic habitat within their boundaries. In a separate action, NMFS is preparing an EIS to identify and describe groundfish essential fish habitat, and identify habitat areas of particular concern (HAPCs) within EFH. The alternatives in this EIS will include measures to minimize adverse effects on EFH caused by fishing. These measures could supplement existing closed areas, by proposing marine protected areas that maximize habitat protection while still keeping fishing vessels out of areas where overfished species bycatch is high.

Groundfish, including overfished species: Management measures implemented through the biennial process could provide additional mitigation if overfished species bycatch (or total fishing mortality on these stocks) is less than the OYs computed for a given rebuilding target. In some cases, this is simply a function of the constraints imposed by the overfished species with the lowest OY. Management measures needed to stay within this OY limit harvests of all co-occurring stocks—including other overfished species—to levels below their OYs. This is not intended mitigation but does have a mitigative effect. Management measures intended to further reduce bycatch rates below current rates would be explicitly mitigative. (A reduction in the bycatch *rate* means, that for every unit of target species harvested, a smaller increment of the overfished species is caught.) NMFS is currently preparing an EIS evaluating different bycatch reduction programs for the groundfish fishery. Alternatives in this EIS propose a variety of new management measures. Many of these measures will require additional FMP amendments and/or regulatory actions to implement. In addition, accurate bycatch monitoring is necessary, both to ensure total fishing mortality is actually below the OY for a species and to evaluate the efficacy of new management measures. NMFS implemented an at-sea observer program for groundfish fisheries in May 2001, which is providing generally more accurate data to estimate bycatch rates than previously used data sources (trawl logbooks, for example). However, the observer program covers a fraction of the fleet at any given time (in the first year of the program about 20% of bottom trawl trips carried observers). A higher level of observer coverage, resulting in more reliable estimates of total fishing mortality on a per-vessel basis would make a wider range of bycatch reduction measures feasible. For example, sector- or vessel-specific bycatch caps or a tradable quota system could be implemented. Tradable quotas would likely be allocated for both target and bycatch species. In addition to limiting total mortality, these types of management programs could provide incentives for fishermen to find ways to reduce their bycatch rates, since they would more directly bear the cost of producing bycatch. Gear modifications can also reduce bycatch rates. Experimental bycatch reducing gear could be more widely tested through the exempted fishing permit program authorized under the groundfish FMP.

Socioeconomic sectors: Adverse socioeconomic impacts are attributable to reductions in commercial harvests and recreational fishing opportunities necessary to rebuild stocks. Evaluating these impacts is made difficult because of the tradeoff between short- and long-term costs and benefits (see Section 4.5). Imposing short-term costs in the form of harvest reductions should result in a long-term net benefit in the form of future MSY harvests. (Note that the MSY concept encompasses both maximum *and* sustainable harvests, so that once rebuilt, these stocks could support an ongoing stream of higher harvests.) One general form of mitigation is to compensate fishermen directly through subsidies or the provision services, such as job retraining programs for displaced workers. NMFS is implementing a vessel buyback program for the limited entry groundfish trawl fleet, which is a related form of mitigation. If permit holders agree by referendum, vessels would be purchased and permanently retired from fishing, along with any associated commercial fishing permits. The program would be funded through a combination of subsidies (in the form of a loan guarantee) and payments by permit holders remaining in the fishery. Although the primary purpose of the program is to reduce trawl fleet capacity, it will indirectly mitigate socioeconomic costs by compensating those wishing to exit the fishery. The forms of mitigation discussed above for impacts to groundfish stocks are also a form of socioeconomic mitigation if target species harvests can be sustained or increased while reducing overfished species bycatch.

6.8 Significant and Unavoidable Adverse Impacts

The EIS must include a discussion of those adverse effects that cannot be avoided (40 CFR 1502.16). This discussion focuses on potentially significant adverse impacts of the proposed action, as implemented by the *Council Preferred* alternative. CEQ regulations at 40 CFR 1508.27 defines “significantly” in terms of both

context and intensity, and provides ten factors to consider when evaluating the intensity of an impact. NOAA provides agency guidance in determining significant impacts of fishery management actions in administrative order NAO 216-6 at §6.02, which expand on the CEQ definition. These criteria focus on the components of the human environment most likely to be affected by these types of actions.

Based on the guidance in these two sources, the proposed action may could *potentially* jeopardize the sustainability of any target or non-target species that may be affected by the action (NAO 216-6 §6.02a & b). This could occur due to both individual and cumulative effects (NAO 216-6 §6.02f, 40 CFR 1508.27(b)(7)). The *Council Preferred* alternative establishes targets for rebuilding four overfished groundfish stocks. Although these overfished species are, in general, considered non-target stocks—because retention is limited or prohibited—they could be considered targets in some cases. For example, lingcod may be a target species in recreational fisheries. Therefore, it is better to consider these two criteria together. There is a risk that these stocks will not rebuild within the maximum permissible time period (T_{MAX}), and this would constitute a significant impact. In addition, the rebuilding probability estimates are based on recruitment variability alone. There are a variety of other uncertainties that, if quantifiable, could contribute to this risk. These include both measurement errors (e.g., inaccurate bycatch monitoring) and model uncertainty (e.g., errors in the causal relationships in stock assessment models) that could contribute to the over-specification of OYs, which could allow overfishing to occur, or at least delay stock rebuilding. In addition, the effect of environmental conditions, including ecological interactions and shifts in the climate regime, have not been integrated into stock assessment models. These factors are complex and over time could have both adverse and beneficial impacts on stock rebuilding. CEQ regulations identify highly uncertain effects, including unique or unknown risks, as a factor in judging significance (40 CFR 1502.27(b)(5)). Both the risk and uncertainty involved in stock rebuilding, especially given the context of long rebuilding periods for many species, qualifies as a potentially significant impact.

CEQ regulations also state that "the degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about future consideration" (40 CFR 1502.27(b)(6)) should be part of the significance evaluation. The proposed action would establish rebuilding targets upon which future actions are predicated. First, in order to meet these targets, management measures have to be specified during biennial management. Management measures result in direct and indirect impacts, depending on the location and intensity of regulated fisheries. The most likely significant impacts would be socioeconomic, resulting from any potential reductions in fishing opportunity. (Note, however, that if rebuilding is successful, fishing opportunity will increase.) The choice of rebuilding targets for these four species also dictate, to some degree, the targets that may be chosen for other overfished species subject to the future adoption of rebuilding plans. The combination of targets must be considered cumulatively, given the constraint OYs for one overfished species may impose on potential harvest of other overfished species.

The proposed action may potentially impact biodiversity and ecosystem function within the affected area (NAO 216-6 §6.02g). Although unlikely, stocks could decline further, even if stocks are managed to rebuilding targets, due to the risk and uncertainty factors already discussed. Further decline could result in shrinking ranges and local extinctions for affected species, constituting a loss in biodiversity. Unrecovered stocks also affect ecosystem structure and function.

The proposed action could have significant social or economic impacts interrelated with the potential significant natural or physical environmental effects discussed above (NAO 216-6 §6.02h). In the short term, significant socioeconomic effects, resulting from lost fishing opportunity, are likely. If rebuilding strategies are successful, there will be significant socioeconomic benefits in terms of increased fishing opportunity.

Overall, the proposed action is beneficial. This net benefit, although unquantified, will occur if long-term benefits from rebuilding overfished stock outweigh the short-term costs. Potential significant impacts would occur if rebuilding strategies are unsuccessful, which is contingent on risk and uncertainty.