



**WESTERN  
PACIFIC  
REGIONAL  
FISHERY  
MANAGEMENT  
COUNCIL**

## **APPENDIX C**

### **OCTOBER 28, 2004 LETTER FROM COUNCIL CHAIR MORIOKA TO NMSP DIRECTOR DAN BASTA**

**April 14, 2005**



**Western  
Pacific  
Regional  
Fishery  
Management  
Council**

October 28, 2004

Mr. Daniel J. Basta  
Director  
National Marine Sanctuary Program  
1305 East West Highway  
SSMC-4  
Silver Spring, MD 20910

Dear Dan,

Thank you for your letter of September 20, 2004 which accompanied the National Marine Sanctuary Program's *Proposed Northwestern Hawaiian Islands National Marine Sanctuary - Advice and Recommendations on Development of Draft Fishing Regulations Under the National Marine Sanctuaries Act Section 304(a)(5)*.

Given our many conversations concerning the requirement for a full analysis of the likely environmental impacts of management measures prior to any decision making, we were disappointed not to receive a preliminary draft environmental impact statement or comparable analytical document from your office prior to your request for Council action. This requirement appears consistently in several applicable Acts and their implementing regulations (e.g. Sections 301, 303 and 304 of the Magnuson-Stevens Fishery Conservation and Management Act, Sections 304 and 305 of the National Marine Sanctuaries Act, and Sections 101 and 102 of the National Environmental Policy Act<sup>1</sup>) and is intended to ensure that environmental information is available to public officials before recommendations or decisions are made and before actions are taken. In addition, the National Environmental Policy Act instructs that its requirements be integrated with other planning and environmental review procedures required by law or by agency practice so that all such procedures run concurrently rather than consecutively.

Although your office may view the Council's recommendation on draft fishing regulations as the "first step" in the environmental review process, they represent the "last step" in decision making for the Council and are therefore subject to the same procedural and analytical requirements applicable to any other Council decision or recommendation.

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<sup>1</sup> Section 105 of the National Environmental Policy Act affirms that its requirements are "supplementary to those set forth in existing authorities of Federal Agencies" which would include the National Ocean Service and its National Marine Sanctuaries Program.

It is unfortunate that the document which we received on September 20, 2004 consisted of a cursory and in many instances, factually incorrect review of available information on the affected environment, and accompanied by a seriously flawed examination of the potential impacts of several fishery management alternatives.

Additionally, the fishing goal and objectives are highly prescriptive statements that lack rationale or analyses and appear to have been written with the explicit intention of constraining management options to those actions predetermined to be desirable. Further, the inclusion of the undefined and highly subjective phrase "As appropriate to maintain the natural character or biological integrity of any ecosystem of the region" results in a series of fishing objectives that are completely undefined and unmeasurable. The lack of definitions for "natural character," and "biological integrity" once again leaves decision makers and the public with no basis on which to evaluate the desirability or likely outcomes of adopting this proposal. Given this wording, it is the Council's belief that the majority of fishing restrictions proposed are unnecessary as the Northwestern Hawaiian Islands have been recently evaluated as "near pristine" despite their long history of fishing and other uses. Clearly existing management regimes have been successful in protecting the resources and ecosystem of the area.

Attached is a detailed review of the September 20, 2004 *Advice and Recommendations* document as provided by the Council's Scientific and Statistical Committee and Council staff. In summary, reviewers found that the document is fraught with factual errors, undefined terms, unclear methodologies, subjective analyses and unsupported and conflicting statements, and as such does not provide decision makers with the necessary information on which to base effective recommendations or decisions.

Given this lack of available analyses the Council will be unable draft fishing regulations within the 120 day time period indicated in your letter and hereby requests an extension to April 4, 2004. This will allow for the preparation and review of a draft environmental impact statement focused specifically on fishery issues, and draft fishing regulations prior to final action by the Council at their March 2005 meeting.

Please contact me at your earliest convenience if you anticipate any problems with this approach. I am aware of statutory language in the National Marine Sanctuaries Act indicating a 120 day timeline, however there is no requirement, policy or guidance that I am aware which indicates that this timeline must begin prior to the preparation of the appropriate analytical documents that enable fully informed decision making called for by the Magnuson-Stevens Fishery Conservation and Management Act, the National Environmental Policy Act and the National Marine Sanctuaries Act. Such an extension would also be consistent with your commitment to the Council at its October 2002 meeting at Aloha Tower.

As you know the Council supports the establishment of a National Marine Sanctuary in the Northwestern Hawaiian Islands and is committed to working cooperatively with your office to design and implement fishery management measures that are based on the best available information and meet our Nation's environmental, social and economic needs. To achieve this end, the Council has begun a cooperative and participatory process beginning with a meeting on October 29, 2004 with staff from the National Marine Sanctuary Program, the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, NOAA Fisheries, the US Fish and Wildlife Service, the State of Hawaii and the NWHI fishermen. I remain hopeful that we can work together in the spirit of transparent and participatory democracy which is so important to all Americans.

Sincerely,



Roy Morioka  
Council Chair

cc: Western Pacific Congressional Delegation  
Admiral Conrad Lautenbacher  
Bill Hogarth  
Michael Weiss  
Bill Robinson,  
Sam Pooley  
Aulani Wilhelm  
Peter Young  
Jerry Leinecke

**enclosed:** Reviewers' comments on the *Proposed Northwestern Hawaiian Islands National Marine Sanctuary Advice and Recommendations on Development of Draft Fishing Regulations Under the National Marine Sanctuaries Act Section 304(a)(5)*.



**WESTERN  
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COUNCIL**

**Comments on the September 20, 2004  
Proposed Northwestern Hawaiian Islands National Marine Sanctuary  
- Advice and Recommendations on Development of Draft Fishing  
Regulations Under the National Marine Sanctuaries Act Section  
304(a)(5)**

Unfortunately this document consists of a cursory and in many instances factually incorrect review of available information on the affected environment, accompanied by a seriously flawed and conflicting examination of the potential impacts of several fishery management alternatives.

Further, the fishing goal and “objectives” are highly prescriptive statements that lack rationale or analyses and appear to have been written with the explicit intention of constraining management options to those actions predetermined to be desirable as described in NMSP Alternative 3 and its “model regulations”. As a general rule, “objectives” are intended to state the concrete outcome of a series of actions, consistent with an overarching goal. This document instead combines actions and objectives into “objectives” with the apparent intent of setting the context for the Council’s determination of appropriate fishery regulations to achieve the proposed sanctuary’s goals.

In addition, the process described for the implementation of fishing regulations in the proposed Northwestern Hawaiian Islands (NWHI) sanctuary is impracticable and conflicted. For example the document is titled “*Proposed Northwestern Hawaiian Islands National Marine Sanctuary - Advice and Recommendations on Development of Draft Fishing Regulations Under the National Marine Sanctuaries Act Section 304(a)(5)*” and the majority of its text references goals, objectives, and alternatives for the proposed NWHI sanctuary. However the National Marine Sanctuary Program (NMSP) Alternative 3 would actually consist of a temporary management regime followed by the establishment of a new task force which would develop yet another management strategy within 1 year. “The task force shall develop an annual aggregate level of harvest not to exceed catch levels for commercial bottomfish/pelagic trolling and commercial pelagic trolling based on recorded landings for each fisherman operating from December 4, 1999 to December 4, 2000.”

The document goes on to state that “In the interim between designation and adoption of a revised fishery management plan, the Sanctuary shall manage fishing based on a formula for individual fishing caps as provide for by the Executive Orders 13178 and 13196 (EO). The formula will be based on the recommendations of the Reserve Advisory Council, which takes the 5-year period prior to the EO, removes the highest and lowest-year catch data, and averages the remaining years fished during that period.”

Yet a third variation is added in the model regulations for NMSP Alternative 3 which state that “Commercial bottomfishing and associated fishing for pelagics by handline or trolling shall be limited to an amount equal to the Magnuson-Stevens Act permittee’s average catch in pounds for bottomfish [definition includes certain pelagics] and the species catch ratio over the best three of the five calendar years from December 4, 1995 to December 4, 2000 in which the permittee was active in the fishery, as determined by the Director.”

No reviewer was able to discern the actual meaning or anticipated chronology of these varying regimes, which will control the economic prospects of fishery participants for the foreseeable future. This is the worst type of management as it only continues the five years of confusion experienced by affected parties and reduces their opportunities for intelligent and well-informed decision making.

In addition, the proposals themselves do not make sense or achieve the document's own stated objectives or those of the National Marine Sanctuaries Act (NMSA).

For example, any regime which does not provide for new participants (as fisherman-specific caps or quotas would do) will lead to the ultimate demise of the fishery as current participants retire. This would conflict with Objective 7e which would "allow bottomfishing to continue except within sensitive habitats".

Regimes which seek to control harvests through caps or quotas are generally regarded as a last resort by fishery managers as they are known to lead to highgrading, which is the discarding at sea of fish that are of lesser value than other individuals of the same species. Economically, caps and quotas can be expensive to administer as they require dockside inspections, and can lead to foregone opportunities in pulse fisheries such as NWHI uku. By comparison, the current limited entry program and vessel size limit serves to constrain overall effort in a manner that allows individual participants to avoid depleting stocks by carefully rotating their effort over a very large area and range of species depending on local abundance and conditions.

Although the idea of further restricting landings (it is only landings that can be restricted, as species specific targeting in this fishery is not completely possible) to a given species ratio has initial appeal as perhaps balancing ecosystem removals. However experience has shown that such an approach results in even more highgrading as participants are forced to discard species for which they are over quota while they continue to fill their remaining available quotas. Basing these species ratios on historical catches makes sense only if one has reason to believe that these catches were coincidentally in some ecologically preferable balance. No evidence is supplied to indicate that this is the case.

In fact no evidence is supplied that the existing fishery is adversely impacting the proposed sanctuary resources or that any of these conflicting restrictions are necessary, and no credible rationale for their selection is presented. In fact the document itself states that "Data show that in over a decade of fairly stable fishing operations (Figure 6), the target species populations have remained high based on traditional management measures, including MSY (WPRFMC 2004a)."

This is hardly an example of the proposed sanctuary's stated management principles to recognize that the resources of the NWHI are held as a public trust, and to incorporate and integrate best practices and available science. Neither is it consistent with the purposes and policies of the NMSA to both enhance public awareness, understanding, appreciation and wise and sustainable use of the marine environment and the natural, historical, cultural, and archeological resources of the National Marine Sanctuary System, and to facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of these marine areas not prohibited pursuant to other authorities.

Several reviewers further commented on the specific draft goals and objectives for the proposed NWHI sanctuary as follows.

Proposed Goal 2 *Provide for comprehensive and coordinated conservation and management that recognizes and complements existing jurisdictional boundaries and management regimes and stakeholder communities.*

Although laudable, evidence to date strongly indicates a lack of commitment to this goal. Fishermen and local fishery managers have attended numerous meetings and voiced a myriad of concerns both orally and in writing to no apparent effect. To the contrary, public statements by the NMSP have sought to convey an atmosphere of collaboration and consensus when in fact fishery participants and managers have been denigrated and misrepresented in both public and private meetings, threatened with fishery closures if they do not compromise their positions, and disenfranchised from participating in the management process.

Proposed Goal 3 *Manage, minimize, or prevent negative human impacts by allowing access only for those activities that do not threaten the natural character or biological integrity of any ecosystem of the region.*

This is a highly subjective statement that can be understood only in context of the definitions of natural character and biological integrity, neither of which is defined. Further the de facto attempt to extend sanctuary authority to impacts on “any ecosystem of the region” is in direct conflict with the spirit of the NMSA’s implementing regulations which state that “The size of a National Marine Sanctuary, while highly dependent on the nature of the site’s resources, will be no larger than necessary to ensure effective management”. These are key failures of the document and result in an entirely undefined and ambiguous proposal concerning management of the proposed sanctuary. Lacking such definitions, decision makers and the public are unable to gauge the desirability or likely outcomes of adopting this sanctuary proposal.

Associated text indicates that resources shall be used only for direct personal consumption while in the NWHI, and the sale of any marine resources would be prohibited. However “the customary practice by Native Hawaiian Niihau and Kauai families to travel to the NWHI and bring back ocean resources for community sharing” would be permitted. Historical documents indicate that, in addition to fishing activities, Native Hawaiians utilized the NWHI for the collection of feathers, turtle eggs, turtles and albatross wing bones. If these activities are denied then the benefits of cultural access rights are greatly reduced. Any credible analysis should include a discussion of the traditional role and importance of these activities, their potential impacts on the marine ecosystem of the proposed sanctuary and why it is necessary or desirable for them to be prohibited.



Proposed Goal 5 *Support Native Hawaiian cultural, religious, and subsistence practices that are consistent with the long term conservation and protection of the region.*

Associated text indicates that, in addition to the consumption of fish within the sanctuary (defined elsewhere as sustenance use), subsistence harvests would be allowed only by Niihau and Kauai Native Hawaiians who will “bring back ocean resources for community sharing”. No rationale is presented for this measure which would effectively disenfranchise all other Native Hawaiians by denying them access to NWHI resources that many regard as their birthright. This is clearly in conflict with proposed goal 5 as it would limit rather than support Native Hawaiian cultural, religious and subsistence practices. Decision makers should be supplied with an explanation of the rationale, necessity and impacts of excluding Native Hawaiians residing on other islands from accessing the NWHI for such purposes.

Proposed Goal 6 *Support, promote, and coordinate research and long-term monitoring that improves management decision-making and is consistent with the conservation and protection of the region.*

Again, this is a laudable idea but it is contradicted by the lack of research and science presented to support the document’s proposals. This does not bode well for achievement of this goal.

Proposed Goal 7 *Maintain ecosystem integrity by limiting and controlling fishing activities using an ecosystem-based management approach. Maximize ecosystem protection while minimizing adverse socioeconomic impacts. Limit fishing activities to areas that minimize or prevent interactions with corals, seabirds, endangered Hawaiian monk seals, and other protected wildlife, or that do not threaten the natural character or biological integrity of any ecosystem of the region.*

*Objectives: As appropriate to maintain the natural character or biological integrity of any ecosystem of the region:*

*7a. Prohibit non-subsistence crustacean fishing.*

*7b. Prohibit commercial precious coral fishing.*

*7c. Prohibit harvest of all coral species, live rock, all aquaria species and live fish trade species, and algae, sponges, and other invertebrates.*

*7d. Allow recreational fishing for pelagic species except within sensitive habitats.*

*7e. Allow bottomfishing to continue except within sensitive habitats.*

*7f. Allow commercial pelagic fishing using handline, pole and line and trolling gear except within sensitive habitats.*

*7g. Prohibit subsistence use within the sanctuary except for Native Hawaiian subsistence use*

*7h. Allow sustenance fishing for pelagic and bottomfish species using pole and line, trolling and handline methods within the Sanctuary except within sensitive habitats.*

*7i. Allow spearfishing without the use of SCUBA for pelagic species except within sensitive habitats.*

*7j. All fishing not specifically allowed shall be prohibited.*

*7k. When there is uncertainty in available information regarding the potential impacts of any fishing activity, err on the side of resource protection.*

In general these highly prescriptive objectives lack rationale or analyses and appear to have been written with the objective of constraining management options to those actions predetermined by the NMSP to be desirable. Further, the inclusion of the undefined and highly subjective phrase “As appropriate to maintain the natural character or biological integrity of any ecosystem of the region” results in a series of objectives that are completely undefined and unmeasurable. Lacking definitions for “natural character” and “biological integrity” this once again leaves decision makers and the public with no basis on which to evaluate the desirability or likely outcomes of adopting this sanctuary proposal.

Regarding Objective 7a, the document implies that an active lobster fishery would remove stocks that serve as a potential food source for the endangered monk seal however available information indicates that crustaceans made up only 5.7% of fecal and regurgitated samples collected from the NWHI with over 78% of the monk seal diet consisting of teleost species. The document also cites the number of species found as “bycatch” in NOAA’s research traps, however given its acknowledgment that these traps do not have the escape vents required on commercial traps, the relevance of this information is not clear. Further the absolute quantity of this bycatch, as documented in the Council’s comprehensive Sustainable Fisheries Act bycatch amendment, is functionally trivial. In addition, NOAA has previously successfully defended this fishery from these precise charges in Federal Court. The statement that rebuilding of the NWHI lobster population may be occurring, but likely not enough to support a substantial fishery is wholly speculative and unsupported by any theory, data or scientific references. Regarding the claim that “Maintaining a closure of the lobster fishery will not create significant additional socio-economic impact because it is not currently in operation and catch declined 90% while the fishery was open - fluctuating dramatically as it dropped”, the NWHI lobster fishery is not presently nor permanently closed. To the contrary no harvest guidelines have been issued since 2000 while NOAA resolves uncertainty in its population models. A regulatory closure would indeed have significant additional socioeconomic impacts as it would foreclose opportunities for future harvest by NWHI limited entry lobster fishery permit holders who are still financially vested in the fishery. This would represent a loss not only to those permit holders but also to shoreside support industries, consumers, and Hawaii’s economy.

Regarding Objective 7b, associated text contains a series of factual errors and contradictions and fails to acknowledge the Council's recommendations that would address the issues raised. For example it is stated that "Little is known about the size of the standing stock, habitat requirements, growth rates, and many life history traits of targeted species" and "MSY cannot be accurately measured."

To the contrary extensive research has documented that Hawaii's natural populations are relatively stable, and a wide range of age classes are generally present. Further, it is known that western Pacific precious corals share several ecological characteristics: they lack symbiotic algae in tissues (they are ahermatypic) and most are found in deep water below the euphotic zone; they are filter feeders, and many are fan shaped to maximize contact surfaces with particles or microplankton in water column. Most species are uni-sexual or dioecious (sexes are separate) and the age at reproductive maturity is 12-13 years for *secundum* and *dichotoma*, with fertilization appearing to take place in the water column. Western Pacific precious coral larvae are more affected by light and temperature than are adults, with larvae of both *Anipathes* in Hawaii are known to be negatively phototactic which is why they are not found at depths less than 30 meters. The duration of the larval stage is unknown for most species, but Mediterranean studies of *Corallium rubrum* suggest that their larvae remain competent for several weeks. Species of *corallium* exist below the euphotic zone at depths between 350 and 1500 meters where temperature varies between 14 and 3 C. These larvae may avoid settling deeper where lower temperatures may prevent reproduction. Similarly, the lower limit of the *dichotoma* and *grandis* black corals coincides with top of thermocline in the high Hawaii islands. Microzooplankton and particulate organic matter are important in the diets of related *gorgonians*, and like other anthozoan species they are associated with numerous kinds of commensal invertebrates. They are also associated with many species of other anthozoans. They have not been observed to be consistently associated with any kind of finfish or free-swimming invertebrate. Eucidarid sea urchins are known to prey upon precious corals. Because of the great depths at which they live, the precious corals would be expected to be insulated from some short-term drastic changes in the physical environment. For the same reason, it is difficult to imagine circumstances in which man-made pollution would affect their environment, except in the unlikely event that large quantities of heavy material, such as waste from manganese nodule refining, were dumped directly on a bed. Nothing is known of the long-term effects of changes in environmental conditions, such as water temperature or current velocity, on the reproduction, growth, or other life activities of the precious corals. The oldest corals observed at Makapu'u are thought to be 75 years old, and it is believed that black corals may live even longer. Hawaii populations of *Corallium secundum* and *A. dichotoma* appear relatively stable implying a balance between recruitment and mortality. To date, beds of pink, gold and/or bamboo coral have been found at seven locations in the Council's jurisdiction, all in the EEZ around Hawaii. There are also two known major beds of black coral in the Council's area, as well as several minor beds. Most of these are located in Hawaii's state waters, however the largest (the Au'au Channel Bed) extends into the EEZ. The approximate areas of the seven identified beds of precious corals have been determined. These beds are small; only two of them have an area greater than 1 square kilometer, and the largest is 3.6 square kilometers in size. Undocumented reports of large past commercial production by Japanese vessels on the

Milwaukee Banks, some 500 miles beyond the northwestern extreme of the Leeward Hawaiian Islands, and the large physical area of those banks lead to conjecture that precious corals may at some locations occur in much larger aggregations than have as yet been demonstrated by scientific surveys. Asian coral fishers, who have roamed the western and central Pacific for decades, undoubtedly have undocumented and unorganized information on precious coral beds that is unavailable to U.S. researchers and administrators. *Makapu'u Bed*: This bed has experienced the greatest exploitation and thus is the source of much of the available information about the region's precious corals. Estimates of the densities of occurrence of precious coral colonies in their habitat based on in site observations made at the Makapu'u Bed, indicated a sparse, widely separated habit of growth. Surveys of this bed were made in the 1970s, and again in 1997. In 1971 densities of commercial species were determined in an unexploited section of the bed and the size frequency distribution of pink coral was determined. The average density of pink coral in the Makapu'u Bed was 0.022 colonies per square meter. Extrapolation of this figure to the entire bed (3.6 million square meters) results in a standing crop of 79,200 colonies. The 95% confidence limits of the standing crop are 47,200 to 111,700 colonies. Conversion of standing crop colonies to biomass produced an estimate of 43,500 kg for *C. secundum* in the Makapu'u Bed. The estimates of density for gold coral (*Gerardia* sp.) and bamboo coral (*Lepidisis olapa*) in the Makapu'u Bed were 0.003 colonies/m<sup>2</sup> and 0.01 colonies/m<sup>2</sup> respectively. However, the distributional patterns of both of these species were found to be very patchy, much more so than *C. secundum*, and the area where they occurred was only about half that for pink coral, or 1.8 m<sup>2</sup>. The corresponding estimates of unfished abundance for gold and bamboo colonies were 5,400 and 18,000 colonies respectively. Data for the mean weight of colonies in the populations of gold and bamboo coral in the Makapu'u Bed were lacking, but rough estimates were 2.2 kg for gold coral and 0.6 kg for bamboo coral. Multiplying mean weights by densities led to rough estimates of standing crop of about 11,800 kg for *Gerardia* sp. and 10,800 for *Lepidisis* sp. An analysis of growth rings in the cross sections of pink coral branches suggests that colony height increases about 0.9 cm/year, at least to an age of about 30 years. The largest colonies of pink gold found at Makapu'u were rarely more than 60 cm in height. Gold coral colonies were seen to reach a height of about 250 cm, while *Lepidisis olapa* was observed at about 300 cm. The natural mortality rate for pink coral was calculated by first converting the size-frequency distribution of the unfished stock to an age-frequency distribution and then determining the rate of diminution in progressively older age classes. The best estimate of the annual instantaneous mortality rate of *C. secundum* in the Makapu'u Bed is 0.66. This is equivalent to an annual survival rate of about 93% in the absence of fishing. Mortality rates for gold and bamboo coral were not available because their growth rates and age structures were unknown. Pink corals reach sexual maturity at a height of about 12 cm (13 years). The reproductive cycle is annual with spawning taking place during June and July. The relationship between parent stock and recruitment in pink coral is unknown. However, because pink coral is long lived, and the population is composed of many year-classes, the standing stock should be relatively stable even with moderate year-to-year fluctuations in recruitment. An estimate of steady state recruitment of the unexploited Makapu'u stock was obtained by multiplying the virgin stock size (79,200 colonies) by the best estimate of instantaneous mortality (0.066). Given steady state, the instantaneous rate of recruitment should equal the instantaneous rate of natural mortality. This gives an estimate of recruitment to the Makapu'u Bed of 5,277 colonies. Biomass per recruit as a function of age

was calculated in the absence of fishing using a cohort production model. In this model, the cohort gains weight until an age is reached where growth gains are overtaken by natural mortality losses. This is the "critical age" at which the cohort reaches its maximum biomass in the absence of fishing. For pink coral the maximum biomass per recruit, attained by a cohort at age 31.4 years is 237 gm. Maximum sustainable yields for precious corals are calculated using a Beverton and Holt cohort production model where data is available for *Corallium secundum*, and the Gulland Model ( $MSY = 0.4 M B_0$ , where  $m$ =natural mortality and  $B_0$  is virgin biomass) for *Gerardia* and *Lepidisis*. According to the FMP, the estimated MSY for pink coral at Makapu'u Bed is 1,000 kg/yr, the estimated area of Makapu'u Bed is 3.6 km<sup>2</sup>. When fishing is done in such a way that all colonies of a cohort are removed at once, then the yield per recruit is identical to the biomass per recruit at the harvest age. Therefore the maximum yield per recruit is achieved by harvesting all survivors in a cohort of pink coral exactly at the critical age of 31.4 years, and in this case the maximum yield per recruit is 237 gm. In practice this would require an infinite instantaneous fishing mortality rate exactly at 31.4 years. Since this is not feasible, the 237 gm/recruit is a theoretical upper limit to the harvest that may actually be obtained. More realistic figures of yield per recruit are obtained by considering a fishery which applies a steady finite fishing mortality rate to all ages in a cohort above a specified minimum harvest age. With a minimum harvest age of 30 years the maximum yield per recruit is essentially equal to the upper limit of 237 gm, whereas with a minimum harvest age of zero years the greatest yield per recruit possible is only 119 gm. Hence, if non-selective measures are employed, the highest yield per recruit that can be expected is only half the maximum yield per recruit theoretically possible under selective harvesting. As long as recruitment is constant or independent of stock size, a fishing policy which maximizes the yield per recruit will also maximize the total yield on a sustained basis, i.e. it will also produce the maximum sustainable yield. *Brooks Bank Bed*: The current harvest for pink coral at Brooks Bank is 444 kg/yr.<sup>3</sup> This figure was calculated using the following formula provided in the FMP for setting the quota for conditional beds for which site specific data is unavailable.

$$\frac{\text{MSY for Makapu'u Bed}}{\text{Area of Makapu'u Bed}} = \frac{\text{MSY for Conditional Bed}}{\text{Area of Conditional Bed}}$$

The estimated MSY for pink coral at Makapu'u Bed is 1,000 kg/yr, the estimated area of Makapu'u Bed is 3.6 km<sup>2</sup> and the estimated area of Brooks Bank is 1.6 km<sup>2</sup>. A survey of this bed was done in September of 1998. Transects on this survey were 2.1 kilometers in length, and conducted at a depth of 350-505 meters. Red coral (*C. regale*) was observed to be very abundant with thousands of colonies present. Colonies occurred in patches from one to five square meters in size, and were located in waters between 430-517 meters deep. These colonies were up to 50 cm in height and averaged 1 cm in diameter. Extrapolation of this data suggests that a conservative standing crop of 8,000 kg of *C. regale* exists at this bed. If it is assumed that this species of precious coral has the same natural mortality rate as *C. secundum* at the Makapu'u Bed (6.6%), an estimate of the MSY can be derived from the

<sup>3</sup> The final rule implementing the FMP published on 20 August 1983 lists the harvest quota for pink coral at Brooks Bank as 17 kg. This is a typographical error.

formula provided by Gulland :  $MSY = 0.4MB$ , where M is the natural mortality rate and B is the standing crop biomass. Rounding down, it is estimated that 200 kg of *C. regale* could be harvested annually on a sustainable basis based on these data and assumptions. Pink coral (*C. secundum*) was observed to be moderately abundant on the east side of the bank at depths of 363-427 meters, but were generally small (less than 20 cm in height). Gold coral was abundant with 250 large colonies found between 392-467 meters. It was estimated that there was a standing stock of 2,000 kg of live gold coral, with an equal amount observed dead. Observations of finfish in the area were rare, and there was no evidence of predation by sea urchins at this bed. *Wespac Bed*: This bed was also surveyed in 1998. Transects of 3.2 km were made between depths of 360-500 meters. No red coral was observed, however pink coral was abundant, with thousands of colonies in patches ranging from 0.3 to 1.0 square meters in size. Gold coral was rare, with only 2 colonies observed. Finfish (mostly *Polymixia*) were abundant, and there was high predation by *Eucidaris* sea urchins, with 50% of colonies showing signs of predation. *French Frigate Shoals-Gold Pinnacles Bed*: Using monk seal telemetry, the 1998 survey also located a previously unknown bed near French Frigate Shoals which has been named the FFS-Gold Pinnacles Bed. Transects 2.9 km in length at a depth of 360-575 meters found no red coral (*C. regale*), and a low abundance of pink coral (*C. secundum*). The pink coral which was observed was generally small, averaging less than 12 cm in height (Grigg 1998b). Both live and dead gold coral was found in abundance, and 300 colonies were observed in scattered patches at depths of 365-406 meters. Extrapolation of the transect data suggests that a standing crop of 3,000 kg of gold coral exists at the FFS-Gold Pinnacles Bed. If it is assumed that this species of precious coral has the same natural mortality rate as *C. secundum* at the Makapu'u Bed (6.6%), an estimate of the MSY can be derived from the formula provided by Gulland (1970):  $MSY = 0.4MB$ , where M is the natural mortality rate and B is the standing crop biomass. Rounding down, it is estimated that 80 kg of gold coral could be harvested annually on a sustainable basis based on these data and assumptions. Few finfish were observed at this bed, no arrowtooth eels were seen. *Black coral beds*: Grigg and Apresko reported 14 species of black coral known to occur in Hawaiian waters. Historically however commercial fishermen have harvested only three species, *Anthipathes dichotoma* (almost 90% of commercial harvest), *A. grandis* (10%), and *A. ulex* (1%). The two major species (*A. dichotoma* and *A. grandis*) are found in coastal waters from Hawaii to Niihau and may extend up to the Northwestern Hawaiian Islands. *A. dichotoma* exists at depths from 30 to 110 meters while *A. grandis* exists at depths from 45 to 110 meters. Within their depth ranges, both species can be found highly aggregated on, or under, vertical dropoffs, terraces, or undercut notches. The growth rates for *A. dichotoma* and *A. grandis* have been estimated to be 6.42 cm per year and 6.12 cm per year respectively. Plotting gonad diameter versus colony height, Grigg estimated the size of reproductively mature *A. dichotoma* colonies to range from 64 to 80 cm. This implies an age at reproduction of 10 to 12.5 years.

The document also states that "The importance of deep-water precious coral beds as a refuge for eels and bottomfish, and consequently as monk seal foraging habitats is unresolved and may be significant." We do not disagree with this statement, however the document fails to acknowledge that monk seal foraging has been associated with deep-water gold corals and that in response the Council's recommendation would prohibit all harvest of NWHI gold corals, as well as prohibiting harvests of any precious corals at the French Frigate Shoals bed.

Instead Objective 7b (as well as NMSP Alternative 3) proposes to prohibit all NWHI precious corals harvests, again relying on vague and unsupported statements that such activity would be “considered inconsistent with the relevant provisions of the NMSA and goals for the proposed sanctuary” rather than providing a detailed analysis of available information, likely impacts of each alternative, and a rationale as to the necessity of a blanket prohibition. In addition, the statement that the closure of this fishery would likely have no socioeconomic impacts again ignores the fact that this would lead to the loss of the opportunity to harvest available resources and represent a loss not only to future fishery participants but also to shoreside support industries, consumers, and Hawaii’s economy. In all cases, evaluation of impacts must consider not only impacts on the current generation, but impacts that will be felt by future generations.

Regarding Objective 7c the document lacks an assessment of the specific impacts of such harvests on the ecosystem or a rationale for the necessity of a prohibition of these activities. Reference is made to adverse impacts resulting from historical fisheries however no acknowledgement is made that these were largely unregulated fisheries as compared to the carefully controlled coral reef fisheries recommended by the Council. Again the document takes the position that managers are faced with an “all or none” choice in which fisheries are either completely unregulated or closed. This ignores the many management techniques in use by fishery managers to allow controlled harvests of marine resources such that socioeconomic benefits are maximized while adverse ecological impacts are avoided. Analysis of Objective 7 (and NMSP Alternative 3) again includes the statement that the closure of this fishery would likely have no socioeconomic impacts. This ignores the fact that this would lead to the loss of the opportunity to harvest available resources and represent a loss not only to future fishery participants but also to shoreside support industries, consumers, and Hawaii’s economy.

Objectives 7d, 7e, 7f, 7h, and 7i would allow various types of fishing “except within sensitive habitats”. Because the term “sensitive habitats” is undefined, these objectives are highly subjective and their rationale, desirability, necessity and impacts are impossible for decision makers and the public to gauge.

Other issues surrounding Objectives 7e and 7g are discussed above.

Objective 7j conflicts with the NMSA’s implementing regulations which state that “all activities (e.g. fishing, boating, diving, research, education) may be conducted unless prohibited or otherwise regulated...”. Clearly the intent of this statement is to clarify that the default position is that activities are allowed unless specifically prohibited, however Objective 7g would take the reverse position and prohibit all activities unless specifically allowed.

The Council supports Objective 7k as stated, however the associated text indicates that the NMSP interprets this to mean that managers are faced with an “all or none” choice in which fisheries are either completely unregulated or closed. Again, this ignores the many management techniques in use by fishery managers to allow controlled harvests of marine resources such that socioeconomic benefits are maximized while adverse ecological impacts



are avoided. In addition, the document lacks any discussion regarding what scientific information is needed to assess the impacts of activities on the NWHI ecosystem, nor is there a proposition for scientific research and long-term monitoring to improve management and decision making. Without such research, fisheries will remain forever closed due to “uncertainty in available information”.

In conclusion, the objectives of Goal 7 read as very specific regulatory language which restricts flexibility in management approaches. The objectives of Goal 7 should be rewritten to describe the desired state of the sanctuary and not prescribe mechanisms to achieve that state. Therefore Goal 7 and its associated objectives should be revised as follows:

*Goal 7: Maintain ecosystem integrity by applying ecosystem-based management and research principles to fishing activities. Sustain ecosystem protection while minimizing adverse socioeconomic impacts*

*Objectives:*

*7a. Protect ecosystem integrity by applying a precautionary approach and continuing research on crustaceans and precious corals fisheries to determine if, and how, harvests can be allowed without damaging the integrity of the NWHI ecosystem.*

*7b. Protect the substrate of the NWHI ecosystem through prohibitions on the collection of reef building corals and live rock.*

*7c. Protect ecologically valuable areas from damage resulting from fishing activities, consistent with available biological and ecological information.*

*7d. Protect Hawaiian monk seals, sea turtles, seabirds and other protected wildlife by controlling fishing activities in areas where interactions are known to occur.*

*7e. Maintain ecosystem integrity by controlling the harvests of pelagic, bottomfish, and coral reef associated species consistent with available biological and ecological information.*

*7f. Maintain ecosystem integrity while minimizing adverse socioeconomic and cultural impacts.*

*7g. Employ principles of equity and fairness when allocating fishing rights.*

*7h. Protect Native Hawaiian cultural rights by promoting access for non-commercial fishing uses by Native Hawaiians to the extent possible without damaging the integrity of the NWHI ecosystem.*

*7i. Promote increased understanding of the NWHI ecosystem through comprehensive and coordinated research.*



*7j. Apply ecosystem-based principles through coordinated management with NWHI management and research partners.*

Reviewers provided comments on other sections of the document as follows:

The specific methodology underlying the development and application of “screening criteria” is poorly described, circular, and does not withstand scientific scrutiny. For example nowhere does the document assess how various activities would actually impact NWHI marine resources, instead “sensitive ecological areas” are identified based on loosely identified criteria and subjectively ranked. These are then compared to a “bottomfish ranking” of areas in the NWHI which is based on the purported pounds landed from each area. Not only are the landings data incorrect for several areas, there is no consideration given to variations in value by species or interannual variations. Following these ranking exercises, areas in which ecological ranking is “high” while bottomfish ranking is “low” are recommended to be closed despite the lack of any information that bottomfishing has any actual adverse impacts on the area’s resources. Lobster, precious coral and coral reef fisheries are summarily dismissed as inconsistent with the sanctuary’s goals.

In the analyses of fishing alternatives commercial fisheries are required to meet a “burden of proof” that fishing activity does not affect ecosystem/ecological integrity. This policy is not embodied or required in the NMSA or the Goals and Objectives of this Sanctuary. Further, this requirement can never be realized unless there is a definition of ecosystem/ecological integrity and a quantitative threshold for the level of harm. In addition, recreational catch and keep requires reporting while recreational catch and release, sustenance, and Native Hawaiian cultural and subsistence use do not require reporting, yet all involve fish mortality. Also, no caps are proposed for these activities nor do they need to meet the same “burden of proof” required of commercial fishing. Such inconsistencies reveal a lack of a well thought out analytical or management approach to the proposed sanctuary.

The document relies heavily on concerns for monk seals, sea turtles and seabirds, however it largely fails to acknowledge the existence of extensive research and monitoring programs indicating that NWHI fisheries have little to no interactions with these species and that there is no evidence linking these fisheries to adverse impacts on protected or endangered species. In another instance of self-contradiction, although the existing Biological Opinion on the lack of impacts of the NWHI bottomfish fishery on endangered species is noted, the document nevertheless cites concerns for monk seals as a significant reason for constraining this fishery.

The document also contains numerous unsupported statements. For example the document states, “Nevertheless, current fishery management practices, interactions with monk seals, overfishing of susceptible species, and impacts to the coral reef environment have been voiced as ongoing concerns.” No citation or supporting evidence is given for this provocative statement.

Similarly the document states, "Others have noted concern over fishing for *uku* and *hapu'u* because they are reef-related species, as opposed to *onaga*, *opakapaka* and *ehu*, which are deep slope species." Again, no citations or supporting evidence are provided for this vague statement.

In summary, reviewers found the document to lack a coherent analytical or management framework and to appear to have been written to fulfill a pre-existing agenda to severely restrict (and ultimately prohibit) all commercial fishing in the NWHI. Given the lack of supporting documentation that such activities would inherently threaten or damage the area's marine resources, this agenda must be seen as a philosophical opposition to commercial fishing. While such philosophies are certainly legitimate, they should be clearly and publicly debated rather than hiding behind pseudo-analyses and ambiguous presentations that leave decision makers, fishery participants, managers and the public confused and misinformed as to the necessity and impacts of such initiatives. This document is wholly inadequate in its description, rationale and analyses of management measures for the proposed NWHI sanctuary and should not be relied upon for any rational decision making concerning NWHI resource management.