7.0 PROPOSED ACTIONS AND ALTERNATIVES

7.1 Proposed Actions

The Council proposes the following measures for regulating the harvest of the management unit species in the U.S. FCZ of the Western Pacific Region:

Foreign Longliners

1. Area closures: It would be prohibited for foreign longline vessels to fish in the following areas of the FCZ of the Western Pacific Region:

   a. Within 150 miles of the main Hawaiian islands (east of 161° W. longitude);

   b. Within 100 miles of the Northwestern Hawaiian Islands (west of 161° W. longitude) including Midway island;

   c. Within 150 miles of Guam;

   d. Within a rectangle around the principal islands of American Samoa bounded by 14° S. and 15° S. latitude and 168° W. and 171° W. longitude, and within a one degree (1°) square surrounding Swains island; and

   e. Within 12 miles of each U.S. Pacific island possession except for Midway island where a 100 miles closure would apply. While Midway island is a possession of the United States, it is being treated as if it is part of the State of Hawaii for the purpose of the FMP.

   These areas are graphically depicted in Figure 3.1 (Page 3-2).

2. Permits: Foreign longline vessels would be required to obtain permits prior to fishing in the open areas of the FCZ of the Western Pacific Region.

3. Effort plans: Foreign longline vessels would be required to file effort plans two (2) months prior to entering the open areas of the FCZ for fishing purposes.

4. Catch and effort limits: There would be no limit on the amount of fishing or the amount of catch made and retained by foreign longline vessels in the open areas of the FCZ.

5. Reporting: Foreign longline vessels would be required to collect catch and effort data and data on sea turtle and marine mammal interactions on forms provided by the NMFS and to submit those data to the NMFS within two (2) months of leaving the FCZ.

6. Observers: Foreign longliner vessels would be required to carry observers when so directed by the Regional Director, Southwest Region, NMFS, in accordance with the MFCMA.

Foreign Drift-Gillnetters

1. Prohibition: It would be prohibited for foreign vessels to use drift-gillnets anywhere in the FCZ of the Western Pacific Region.

Domestic Drift-Gillnetters

1. Experimental permits: Fishing by domestic vessels in the FCZ with drift-gillnets would be prohibited, except where authorized by an experimental fishing permit issued by the Regional Director of the NMFS.

2. Reporting: Domestic drift-gillnetters would be required to collect catch and efort data and data on sea turtle and marine mammal interactions and to submit those data to the NMFS within three (3) days of landing.

Foreign Pole-and-Line Tuna Vessels, Foreign Purse Seine Tuna Vessels and Domestic Purse Seine Tuna Vessels

1. Catch and effort limits: There would be no limit on the amount of fishing or the amount of catch of tuna and non-tuna species made by these classes of vessels in the FCZ.

2. Data collection: The State Department, in cooperation with the NMFS, shall request voluntary submission of catch records for species taken incidentally to tuna fishing by these classes of vessels. These vessels would be encouraged to collect data on their catches of the management unit species made in the open areas of the FCZ. If information on incidental catches is not obtained within one year of the effective date of this FMP, then the Council shall consider the promulgation of mandatory reporting requirements for incidental catches in the FCZ for these classes of vessels.

Other Domestic Vessels

1. No restrictions: Other than restricting domestic drift-gillnet fishing to an experimental permit, no other Federal requirements would be added at this time.

2. Data collection: The Western Pacific Fishery Information Network (WPACFIN), a central source of region-wide fisheries data maintained by the NMFS, would be used to monitor the activities of domestic vessels. Existing Territorial and State licensing and data reporting and collection programs would be retained. A sampling program would be used for estimating recreational catches and effort levels for the management unit species in Hawaii.

Annual Reports

The NMFS, in cooperation with State and Territorial agencies, shall prepare an annual report for the Council by June 30 of each year on the domestic and foreign fisheries under this plan in the previous year, including a summary of catch (by species), effort, areas of fishing, changes in catch rates for individual species by different gear types and other significant changes in the fisheries for the management unit species and tuna.

Five-Year Review

The Council in cooperation with the NMFS and State and Territoral agencies shall conduct a full review of the FMP in five years. The review will assess the effectiveness of the FMP in meeting the Council's objectives, the need to revise the objectives, and the need for changes in any management measures including adjustments of area closures, and adding new measures such as data collection or reporting requirements for the domestic fisheries which take the management unit species and the tunas.

7.2 Alternatives Management Approaches Considered

Before settling on the specific regulatory measures in this revised FMP, the Council considered two broad alternatives: (a) continue the PMP, and (b) amend the PMP.

7.2.1 Continue the PMP (No Action)

The no action alternative would continue the present regulatory measures applicable to foreign longlining in the FCZ (Section 5.2). The Executive Summary (Section 3) and the Introduction (Section 4) to this FMP indicate why the Council concluded that maintaining the PMP is not desirable. The PMP has apparently caused foreign longline vessels to refrain from authorized fishing in all areas of the FCZ of the Western Pacific Region. This outcome is unintended and unnecessary. It is unnecessary because foreign longline fishing in the FCZ of the widely scattered U.S. possessions (see Figure 3.1) would tend to have the same kind of effect on the domestic fisheries for the management unit species in Hawaii, Guam, and American Samoa as foreign longline fishing in international waters which are beyond national controls. An annual average (1971-77) of nearly 1,900 vessel days were spent by Japanese and Taiwanese longliners fishing in the FCZ of U.S. possessions in the Pacific (Table 6.3). More foreign longline fishing effort was expended in the FCZ of the U.S. possessions than in the FCZ of the CNMI, Guam, and American Samoa combined, and nearly as much as in the FCZ of the Hawaiian archipelago. Foreign longline fishing could be allowed in these areas with no perceivable impact on the domestic fisheries for the management unit species.

If foreign fishing were to occur under the PMP, it would be extremely difficult and costly to enforce the measures of the PMP since at-sea enforcement would be needed in addition to aerial surveillance and observer coverage. The cost of compliance to the PMP's requirements (i.e., fishing under quotas, hold inspections, non-retention and release of fish) would be high for foreign longline vessels. Moreover, the cost in terms of "waste" of dead and dying fish could be high as well (Tables 7.1 and 7.2). Further, the PMP deals only with foreign longline vessels, not with drift-gillnet fishing, pole-and-line and purse seine fishing, nor with any of the domestic fisheries. The PMP does not provide a framework for monitoring the various domestic fisheries for pelagic species to determine if management measures may be needed in the future should problems arise. Therefore, continued reliance on the PMP was rejected by the Council.

TABLE 7.1

CONDITION OF BILLFISH UPON LANDING ON LONGLINE GEAR

Species	Percent Dead	
	Honolulu Laboratory Data	Far Seas Fisheries Research Laboratory Data
Blue Marlin	70.9	44.4
Striped Marlin	45.5	23.3
Swordfish	60.0	45.6
Black Marlin	74.3	45.9
Sailfish/Shortbill Spearfish	75.0	57.8

TABLE 7.2

POTENTIAL "WASTE" OF BILLFISH*

Species	Mortality Rate (%)	Mortality (Metric Tons)		
		Hawaii	Guam	American Samoa
Blue Marlin	70.9	34.8	30.5	51.1
Striped Marlin	45.5	54.7	.9	9.2
Swordfish	60.0	66.7	3.0	4.8
Black Marlin	74.3	1.5	.5	11.8
Sailfish/Spearfish	75.0	16.5	1.5	3.8
ALL BILLFISH SPECIES		174.2	47.4	80.7

* = Assumes 1973-1977 average catch, by area, with mortality rates as determined by NMFS Honolulu Laboratory, and assuming no retention of billfish in the full FCZ of Hawaii, Guam and American Samoa.

7.2.2 Amend the PMP

This approach would involve amending the PMP to address some of the problems identified above. An amended PMP could establish area closures, adopt a non-numeric definition of OY, and simplify some of the administrative requirements applicable to foreign longlining. An amended PMP also could establish a prohibition of foreign use of drift-gillnets, as is proposed in the FMP, incorporate procedures for monitoring incidental catches of the management unit species made by foreign pole-and-line and purse seine tuna vessels, and could serve as a vehicle to generate annual reports on foreign fishing in the FCZ of the Western Pacific Region.

It is important to recognize, however, that a PMP can only establish ground rules for foreign fishing in the FCZ. Only a FMP can establish measures for domestic fishing. Thus, if the PMP were amended, there would be no framework for monitoring the domestic fisheries for the management unit species, and if problems or conflicts arose in the future, a FMP would have to be prepared. The prohibition of domestic use of drift-gillnets, other than through an experimental fishing permit, could not be implemented under an amended PMP, nor would there be a basis for a strengthened State/Territory/NMFS data collection programs. Finally, in amending the PMP, NMFS would essentially be duplicating much of the effort already undertaken by the Council in developing this FMP. Such duplication would be wasteful, especially if a FMP was found to be needed soon thereafter. The Council concluded, therefore, that amendments to the PMP could not address all of the weaknesses of the PMP and, therefore, this was not the preferred alternative.

7.3 Alternative Management Strategies

7.3.1 Foreign Fishing

7.3.1.1 Monitoring Only - Longline Fisheries

The previous discussions point out that alternative measures for managing the foreign longline fisheries are necessary to replace the PMP. Alternative management measures, however, must be more than simply monitoring of the foreign longline fisheries through permit requirements, check-in/check-out procedures, and catch and effort reporting. Such monitoring requirements for the foreign longline fisheries are essential, but they are not sufficient in themselves to achieve most of the objectives of the FMP. Under this option, there would be unlimited opportunity for foreign longline harvests of the management unit species, potential waste of billfish, mahimahi, wahoo

and oceanic sharks if they were not retained, and, most importantly, no demonstrable increase in the catch rates and value of the domestic fisheries for the management unit species. The risk of domestic conflicts with foreign longline gear would increase. The "monitoring only" approach for the foreign longline fisheries was therefore rejected by the Council.

7.3.1.2 Monitoring Only - Pole-and-Line Fisheries

The foreign pole-and-line (baitboat) fishery has taken more tuna in the FCZ of the Western Pacific Region than the foreign longline fisheries. The catch of Japanese baitboats in the FCZ is predominantly skipjack tuna with the remaining portion mostly comprised of small yellowfin and bigeye tuna, and, less frequently, albacore tuna. While the target of foreign baitboats is tuna, their catch in the FCZ also includes mahimahi, some wahoo, and, much more rarely, an occasional small billfish. On June 6, 1985, the Coast Guard boarded a Japanese pole-and-line vessel inside the FCZ near Midway and Kure islands and found that the vessel had retained 107 mahimahi, 3 wahoo and 3 bags of squid which were caught inside the FCZ. The Coast Guard also discovered 75 mahimahi on another Japanese pole-and-line vessel boarded on July 7, 1985, but found no evidence that these fish were taken inside the FCZ.

Data provided by the Hawaii Division of Aquatic Resources on the species composition of the catch of the Honolulu-based aku (skipjack tuna) fleet strongly indicate that mahimahi is the principal species in the management unit which is quite vulnerable to the pole-and-line method of fishing for tuna. Mahimahi accounted for between 0.1 to 1.2% of the total annual landings of the Honolulu-based skipjack tuna fleet covering the years 1978-1983. The reported landings of mahimahi made by the local skipjack tuna vessels, however, comprised between 1.3 to 7.4% of the total reported commercial landings of mahimahi covering all domestic gear types during the same period. The local baitboats also reported catches of several other species (rainbow runner, wahoo) but the quantities of these miscellaneous catches were extremely minor. If catches of mahimahi made by local baitboats are indicative of possible catches of mahimahi made by foreign pole-and-line tuna vessels, then there is cause for developing a procedure to monitor the nature and magnitude of incidental catches made by foreign baitboats in the FCZ of the Western Pacific Region. The Council has determined that data on the species composition of the catches of foreign pole-and-line boats operating in the U.S. FCZ would be beneficial for determining whether or not anything should be done with respect to incidental catches made by foreign pole-and-line vessels. The Council recommends that the U.S. State Department

in cooperation with the National Marine Fisheries Service, should request voluntary submission of catch data for the management unit species taken incidentally by foreign pole-and-line tuna vessels in the U.S. FCZ of the Western Pacific Region compared to the volume of their catches of tuna.

7.3.1.3 Monitoring Only - Purse Seine Fisheries

While the western Pacific has recently become a major area of fishing for tuna by purse seiners of many nationalities, the Council has not received any reports of foreign purse seiners fishing in the U.S. FCZ of the Western Pacific Region. However, the Council has been apprised (February 1985) of a Japanese fishing company's request to the State Department to do test fishing in the U.S. FCZ between Midway Island and the main Hawaiian Islands using both pole-and-line and purse seine vessels. Non-tuna catches made by Japanese purse seiners operating in the western Pacific have ranged between 0.31 to 1.70% (by weight) of their total annual catches during 1973-1982 (Table 6.14). While catches of the management unit species made by purse seiners are small relative to their tuna catches, the actual volumes of the management unit species taken by purse seiners along with the tunas are quite significant since the volumes of tuna taken by purse seiners are so large. Purse seiner catches of tuna in the western Pacific reached 370,000 tons in 1984 (Doulman, 1985). The Council has not been able to acquire sufficient information on the species composition of purse seiner catches of non-tuna species nor on the amounts of the management unit species that might be taken in the FCZ by purse seine vessels. The Council, therefore, recommends that the State Department and the NMFS request voluntary submission of catch data covering foreign purse seine fishing in the U.S. FCZ which would generate information on the species composition of non-tuna catches, the weights of non-tuna catches (by species), and the weights of tuna catches made in the FCZ so that incidental catches of the management unit species made by foreign purse seiners in the FCZ can be compared to their tuna catches. The Council has decided that this information is needed in order to determine if there might be cause to develop management measures for billfish, mahimahi, wahoo and oceanic sharks regarding their take in purse seine gear. If information on incidental catches is not obtained within one year of the effective date of this FMP, the Council shall consider mandatory reporting requirements for incidental catches of foreign purse seine vessels operating in the FCZ of the Western Pacific Region.

7.3.1.4 Control Foreign Fishing Effort - Longline Fisheries

This alternative encompasses several options to affect the amount, location, or timing of foreign fishing effort.

Area closures of the FCZ around Hawaii, Guam, and American Samoa for the full year are the simplest option to effectuate. Depending on their geographic extent, area closures to foreign longline fishing could address some of the weaknesses of the PMP. If foreign longlining were prohibited in the FCZ, a portion of the management unit species that would have otherwise been taken by foreign longline vessels could become available to domestic fishermen. In 1976, the total foreign longline catch of all species of billfish in the FCZ around Hawaii was almost 500 MT (Yong and Wetherall, 1980), while the estimated domestic billfish catch was 732 MT for that year (Cooper and Adams, 1978). Thus, if domestic vessels had taken the foreign catch that year, domestic vessels' catches of billfish would have increased significantly, and the values associated with an increase in billfish catches would be very large. Whether there would be increases in domestic catches of billfish and associated species of a large magnitude is debatable. However, objectives 1-5 (Section 4.2) would be achieved to the greatest extent possible with full area closures. There would be no "waste" associated with non-retention and release of dead and dying billfish (Objective 6), and the risk of domestic foreign/gear conflicts would be eliminated altogether (Objective 7). A prohibition of foreign longlining would not affect other forms of foreign fishing for tuna such as pole-and-line and purse seine fishing which are more selective in taking tuna (Objective 8). The cost of administering and enforcing a full closure would be very low compared to the PMP.

If some foreign longlining were to be permitted, less complete effort restrictions could be imposed. Seasonal restrictions could limit foreign longline effort during the months when incidental catch rates for the principal species in the management unit are highest. Partial area closures to foreign longline fishing could be adopted for areas in which catch rates of the management unit species on foreign longline gear are highest or in areas where domestic fishing for the management unit species is concentrated. Limits could be imposed in terms of the absolute number of foreign longline vessels allowed into the FCZ, or the number of hooks allowed to be set, or the total number of vessel days fished. Combinations of seasonal, area, or gear restrictions could be adopted to limit foreign fishing effort.

Compared to full closures of the FCZ to foreign longline fishing, partial effort restrictions would diminish the attainment of Objectives 1-5. But so long as the level of

foreign catch of the management unit species were reduced and the availability of the management unit species for domestic vessels were increased, then the domestic fisheries would still benefit but not as much as under a full closure of the FCZ to foreign longline fishing. If foreign vessels were not required to release the management unit species in areas of the FCZ open to foreign longline fishing, there would be no waste of the management unit species (Objective 6). The risk of gear conflicts could be reduced substantially (Objective 7), and there would be less interference with foreign longlining for tuna and no interference at all with foreign pole-and-line and purse seine fishing operations for tuna (Objective 8). The statistical data base might be improved, since foreign nations might be more inclined to cooperate in exchanging fishing data provided that their vessels had some access to the FCZ (Objective 9). International cooperation on the management of highly migratory species could conceivably be promoted, but with less immediate priority given to domestic fishing interests (Objective 10). Partial area restrictions could be relatively inexpensive to enforce unless they were combined with effort limits which would require more active monitoring of foreign fishing activities to insure that those limits were being observed. Limits on the number of vessels would be less costly to enforce than limits on number of vessel days allowed or the total number of hooks set.

7.3.1.5 Control Foreign Fishing Effort - Drift-Gillnet Fisheries

There is no history of foreign drift-gillnet fishing in the U.S. FCZ of the Western Pacific Region other than a March 25, 1983 Coast Guard seizure of a Japanese gillnetter caught fishing in the U.S. FCZ of the Northwestern Hawaiian Islands (NWHI) without a permit. The vessel's catch consisted of significant quantities of striped marlin, swordfish, and mahimahi besides tuna (Section 6.11.1). The vessel's catch log also indicated that 69 porpoises were caught outside of the FCZ and they were not retained. Regulations promulgated by the Japanese Government prohibit Japanese gillnet vessels from setting their nets in broad reaches of the Pacific ocean including in most parts of the U.S. FCZ of the Western Pacific Region except for in small areas near the southeast and northwest extremities of the FCZ surrounding the Hawaiian archipelago, the northernmost corner of the FCZ of the Commonwealth of the Northern Mariana Islands, and in the southern half of the U.S. FCZ surrounding Johnston Island. At the Council's urging, the National Marine Fisheries Service (NMFS) informed the Japanese Government that the area closures established by the Government of Japan to control Japanese drift-gillnet fisheries cut across

the U.S. FCZ of the Western Pacific Region in the above-mentioned locations, mistakenly implying to Japanese fishermen that drift-gillnet fishing is permitted in these FCZ waters. The NMFS requested that proper Japanese officials notify the Japanese gillnet fleets about the overlap of permitted Japanese drift-gillnet fishing areas with the U.S. FCZ of the Western Pacific Region so that Japanese fishermen do not assume that gillnet fishing is permitted in U.S. waters. The Council wishes to maintain the present U.S. policy of disallowing all foreign drift-gillnet fishing in the U.S. FCZ of the Western Pacific Region for the following reasons:

(1) Drift-gillnet fishing inevitably results in a high catch of the management unit species and marine mammals;

(2) The area closures established by the Government of Japan to control the "marlin and others" drift-gillnet fishery by Japanese vessels already includes most parts of the U.S. FCZ of the Western Pacific Region; and

(3) There are no compelling reasons for legalizing foreign drift-gillnet fishing in U.S. waters even though the largest portion of catches of drift-gillnet vessels operating in tropical waters probably is tuna.

7.3.1.6 Control Foreign Catch - Foreign Longline Fishery

Besides controlling foreign fishing effort, the Council also considered options to restrict the foreign catch of the management unit species. The most direct limit on catch is quotas for the different species in the management unit. The first difficult step would be to establish appropriate quotas for individual species. Presumably, the catch limits for each of the management unit species would be above zero but less than some average of historic levels to promote increased availability or transfers of catches of the management unit species to domestic fishermen and to provide some opportunity for foreign vessels to fish for tuna. A second difficulty is to agree on what should be done once a quota is reached for a specific species in the management unit in a particular area of the FCZ. Should further foreign longlining be prohibited, or should a non-retention rule be instituted instead? Quotas to foreign longline fishing could be established in areas of the FCZ which are important to domestic fishermen. This could result in a greater probability of transfer of fish from foreign to domestic

fishermen and increased values associated with the domestic fisheries for the management unit species, and a lower risk of domestic and foreign gear conflicts. The difficulties with this approach are determination of the appropriate quotas by area and by species, and determination of appropriate management measures (full closure, non-retention) when a quota for any single species is reached. It might be possible to institute a "value transfer" approach, in which foreign longline vessels would pay to the U.S. a partial or full ex-vessel value of all management unit species caught in open areas and seasons. This would not, however, result in the transfer of catches, but the U.S. would nonetheless receive a measure of the commercial value of the fish taken by foreign vessels.

Catch limits are less useful than effort restrictions in terms of meeting the Council's objectives. A quota approach in which an area of the FCZ would be closed once a quota was reached for any single species in the management unit could have a very similar effect as a general prohibition on foreign longlining. If a quota was set for a species that was quite abundant, such that the single species quota would be reached quickly, then further foreign longline fishing would be prohibited. Lower quotas would tend to be more effective in achieving catch transfers from foreign to domestic fishermen and increased fishery values associated with the domestic fisheries for the management unit species than higher quotas (Objectives 1-5). Waste would be minimized with low quotas (Objective 6), and gear conflicts would be largely precluded (Objective 7). There could be considerable interference with foreign longline fishing for tuna under a low quota approach for the management unit species, but not with other forms of tuna fishing (Objective 8). The data base might be marginally improved (Objective 9), but international cooperation would not necessarily be more likely to occur (Objective 10).

If quotas to foreign longliners for each of the species in the management unit were set at a higher level, and if a non-retention policy for a species was imposed once that species' quota was reached, then transfers of catch to domestic fisheries and increased values stemming from domestic fisheries would be less likely to occur. Waste would still occur under this approach, and gear conflicts could also be likely, but interference with foreign longlining for tuna would be decreased. A better data base could be established with a high quotas policy, and international cooperation might be promoted more effectively than with low quotas or with effort restrictions.

A crucial element in the catch restriction approach through quotas would be the cost of effective monitoring of the foreign longline fishery. Catch restrictions can be meaningful

only with accurate and timely foreign catch reports, and at-sea boardings and inspections to verify the levels of harvest of the management unit species made in the FCZ. To the extent catch restrictions are flexible (e.g., allowing non-retention of a species in the management unit once a quota is reached for that species) such management approaches introduce greater monitoring and enforcement expenses, probably accompanied with a decreasing likelihood of catch transfers of the management unit species from foreign longline to domestic fishermen.

7.3.1.7 Seasonal Variations on Effort Restrictions

There are pronounced seasonal variations in the catches of the different pelagic species in the management unit made in different parts of the FCZ of the Western Pacific Region by foreign and domestic fishermen. Catch or area restrictions to foreign fishing could be based on the variability in the seasonal availability of the different species in the management unit.

In Hawaiian waters, catches of blue marlin made by domestic fishermen peak in late summer, while catches of striped marlin are highest in the winter and spring months. Catch data reported to the HDAR indicate that mahimahi catches have a bimodal distribution with highest catches in spring and autumn. The two distinct peaks in mahimahi catches and the rather low availability of mahimahi catches in Hawaiian waters at other times of the year are suggestive of a band of high stock density moving through the Hawaiian islands first in one direction and then in the other. Wahoo catches in Hawaii are highest in the summer months. The catch of mahimahi in Guam is highest from January through March, while wahoo catches usually peak during October through December. Catches of billfish in Guam, as well as that of tuna, generally peak during the summer months (June - August). In American Samoa, the largest domestic catches of the management unit species are made in the southern hemisphere's spring and summer months, i.e., the months of October through February.

Foreign longline catch records show comparable seasonal variablity for billfish catches with highest catches of blue marlin made in the FCZ of Hawaii in the summer and highest catches of striped marlin made in the spring and fall. The seasonablity of mahimahi and wahoo catches on foreign longline gear is unknown because catches of these species are not logged separately.

On the average, for the years 1973-1977, 76% of the annual foreign longline tuna catch but only 56% of the foreign

longline billfish catch in the FCZ surrounding Hawaii was taken during a 5-month winter period (October through February) (see Table 7.3 through 7.6). Twice as much billfish (mostly striped marlin and swordfish) and more than 4 times as much tuna are caught by foreign longliners during these 5 winter months as compared to an equivalent 5-month summer period. Seventy-five percent of the winter month foreign longline catch (billfish and tunas combined) is taken from the NWHI portion of the FCZ. Striped marlin and swordfish account for over 90% of the NWHI winter billfish catch, while bigeye and albacore tuna dominate the winter month catch of tunas made by foreign longliners in the NWHI. Blue marlin and yellowfin tuna are the principal species taken on foreign longline gear in the FCZ of the main Hawaiian islands during the summer months.

Unlike the winter fishery in which most of the foreign longline catch is made in the NWHI FCZ, the waters surrounding the main Hawaiian Islands become the principal focus of foreign longlining during the summer months. The FCZ of the main Hawaiian Islands accounts for 86% of summer month foreign longline tuna catches and 63% of the summer month foreign billfish catch. Thirty-four percent (34%) of the foreign summer month billfish catch is blue marlin, followed closely by swordfish (27%) and striped marlin (26%). For the Hawaii Islands FCZ in total, only 17% of the average annual (1973-1977 data) foreign longline tuna catch is made during the spring/summer months (April through August). Twenty-seven percent of the annual foreign longline billfish catch is made during this spring/summer period for the FCZ as a whole.

In the FCZ around Guam, the majority of foreign longline catches of billfish occurs in the September through March period (Table 7.7).

The seasonality of foreign longline catches of billfish in the FCZ around American Samoa was not studied. The rectangular areas recommended by the Council for closure to foreign longline fishing within the FCZ of American Samoa are a very small portion (about 14%) of the entire area of the FCZ surrounding American Samoa. The Council, therefore, recommended a year-round closure, and did not feel that there was a need to examine seasonal closures to foreign longline fishing for the FCZ of American Samoa.

The seasonality of domestic and foreign catches and effort can be considered in several ways. First, if certain areas of the FCZ are heavily used at different times of the year by domestic fishermen, or if the principal species in the management unit appear to be especially vulnerable to domestic gear types at certain times of the year, then the area or season closures to foreign longline fishing selected by the Council

TABLE 7.3

AVERAGE CATCH (1973-1977) AND EX-VESSEL VALUE (1980 PRICES) OF BILLFISH AND TUNA TAKEN BY FOREIGN LONGLINERS IN THE VARIOUS SUBZONES OF THE U.S. FCZ AROUND THE MAIN HAWAIIAN ISLANDS AND THE NORTHWESTERN HAWAIIAN ISLANDS MADE DURING THE ENTIRE YEAR

NORTHWESTERN HAWAIIAN ISLANDS	MAIN HAWAIIAN ISLANDS				
	Miles	0	50	100	200
	0	A = 0 B = 0 C = 0 D = 0 E = 0 F = 0	A = 11.0 MT B = $28,349 C = 105.5 MT D = $355,861 E = 116.5 MT F = $384,210	A = 28.1 MT B = $71,211 C = 246.3 MT D = $831,830 E = 274.4 MT F = $903,041	A = 102.6 MT B = $251,805 C = 865.9 MT D = $2,994,856 E = 968.5 MT F = $3,246,661
	50	A = 33.2 MT B = $91,159 C = 273.0 MT D = $915,391 E = 306.2 MT F = $1,006,550	A = 44.2 MT B = $119,508 C = 378.5 MT D = $1,271,252 E = 422.7 MT F = $1,390,760	A = 61.3 MT B = $162,370 C = 519.3 MT D = $1,747,221 E = 580.6 MT F = $1,909,591	A = 135.8 MT B = $342,964 C = 1,138.9 MT D = $3,910,247 E = 1,274.7 MT F = $4,253,211
	100	A = 86.6 MT B = $237,144 C = 647.7 MT D = $2,143,078 E = 724.3 MT F = $2,380,222	A = 97.6 MT B = $265,493 C = 743.2 MT D = $2,498,939 E = 840.8 MT F = $2,764,432	A = 114.7 MT B = $308,355 C = 884.0 MT D = $2,974,908 E = 998.7 MT F = $3,283,263	A = 189.2 MT B = $488,949 C = 1,503.6 MT D = $5,137,934 E = 1,692.8 MT F = $5,626,883
	200	A = 200.1 MT B = $544,832 C = 1,399.6 MT D = $4,545,624 E = 1,599.7 MT F = $5,090,456	A = 211.1 MT B = $573,181 C = 1,505.1 MT D = $4,901,485 E = 1,716.2 MT F = $5,474,666	A = 228.2 MT B = $616,043 C = 1,645.9 MT D = $5,377,454 E = 1,874.1 MT F = $5,993,497	A = 302.7 MT B = $796,637 C = 2,265.5 MT D = $7,540,480 E = 2,568.2 MT F = $8,337,717

A = Catch of billfish.
B = Ex-vessel value of billfish catch.
C = Catch of tunas.
D = Ex-vessel value of tuna catch.
E = Total catch of billfish and tunas.
F = Ex-vessel value of billfish and tuna catch.

TABLE 7.4

AVERAGE CATCH (1973-1977) AND EX-VESSEL VALUE (1980 PRICES) OF BILLFISH AND TUNA TAKEN BY FOREIGN LONGLINERS IN THE VARIOUS SUBZONES OF THE U.S. FCZ AROUND THE MAIN HAWAIIAN ISLANDS AND THE NORTHWESTERN HAWAIIAN ISLANDS DURING OCTOBER THROUGH MARCH: FOREIGN STRIPED MARLIN SEASON*

NORTHWESTERN HAWAIIAN ISLANDS	MAIN HAWAIIAN ISLANDS				
	Miles	0	50	100	200
	0	A = 0 B = 0 C = 0 D = 0 E = 0 F = 0	A = 5.4 MT B = $14,194 C = 64.5 MT D = $195,997 E = 69.9 MT F = $210,191	A = 13.9 MT B = $35,765 C = 145.3 MT D = $436,056 E = 159.2 MT F = $471,821	A = 43.4 MT B = $109,150 C = 450.3 MT D = $1,335,697 E = 493.7 MT F = $1,444,847
	50	A = 23.5 MT B = $64,294 C = 255.0 MT D = $854,100 E = 278.5 MT F = $918,394	A = 28.9 MT B = $78,488 C = 319.5 MT D = $1,050,097 E = 348.4 MT F = $1,128,585	A = 37.4 MT B = $100,059 C = 400.3 MT D = $1,290,156 E = 437.7 MT F = $1,390,215	A = 66.9 MT B = $173,444 C = 705.3 MT D = $2,189,797 E = 772.2 MT F = $2,363,241
	100	A = 59.3 MT B = $162,419 C = 587.3 MT D = $1,964,505 E = 646.6 MT F = $2,126,924	A = 64.7 MT B = $176,613 C = 651.8 MT D = $2,160,502 E = 716.5 MT F = $2,337,115	A = 73.2 MT B = $198,184 C = 732.6 MT D = $2,400,561 E = 805.8 MT F = $2,598,745	A = 102.7 MT B = $271,569 C = 1,037.6 MT D = $3,300,202 E = 1,140.3 MT F = $3,571,771
	200	A = 125.0 MT B = $342,405 C = 1,263.8 MT D = $4,116,050 E = 1,388.8 MT F = $4,458,455	A = 130.4 MT B = $356,599 C = 1,328.3 MT D = $4,312,047 E = 1,458.7 MT F = $4,668,646	A = 138.9 MT B = $378,170 C = 1,409.1 MT D = $4,552,106 E = 1,548.0 MT F = $4,930,276	A = 168.4 MT B = $451,555 C = 1,714.1 MT D = $5,451,747 E = 1,882.5 MT F = $5,903,302

A = Catch of billfish.
B = Ex-vessel value of billfish catch.
C = Catch of tunas.
D = Ex-vessel value of tuna catch.
E = Total catch of billfish and tunas.
F = Ex-vessel value of billfish and tuna catch.
* = Period of the year in which approximately 75% of the average annual catch of striped marlin is made by foreign longliners.

TABLE 7.5

AVERAGE CATCH (1973-1977) AND EX-VESSEL VALUE (1980 PRICES) OF BILLFISH AND TUNA TAKEN BY FOREIGN LONGLINERS IN THE VARIOUS SUBZONES OF THE U.S. FCZ AROUND THE MAIN HAWAIIAN ISLANDS AND THE NORTHWESTERN HAWAIIAN ISLANDS DURING MARCH THROUGH OCTOBER: FOREIGN BLUE MARLIN SEASON*

	MAIN HAWAIIAN ISLANDS				
	Miles	0	50	100	200
NORTHWESTERN HAWAIIAN ISLANDS	0	A = 0 B = 0 C = 0 D = 0 E = 0 F = 0	A = 6.5 MT B = $16,849 C = 52.0 MT D = $198,719 E = 58.6 MT F = $215,568	A = 16.8 MT B = $41,966 C = 125.1 MT D = $479,371 E = 141.9 MT F = $521,337	A = 66.2 MT B = $161,074 C = 476.3 MT D = $1,875,068 E = 524.5 MT F = $2,036,142
	50	A = 11.2 MT B = $30,730 C = 48.2 MT D = $171,563 E = 59.4 MT F = $202,294	A = 17.7 MT B = $47,579 C = 100.2 MT D = $370,282 E = 118.9 MT F = $417,861	A = 28.0 MT B = $72,696 C = 173.3 MT D = $650,934 E = 201.2 MT F = $723,631	A = 77.3 MT B = $191,804 C = 524.4 MT D = $2,046,631 E = 582.7 MT F = $2,238,435
	100	A = 30.4 MT B = $83,232 C = 100.3 MT D = $348,623 E = 130.7 MT F = $431,855	A = 37.0 MT B = $100,080 C = 152.3 MT D = $547,342 E = 189.3 MT F = $647,422	A = 47.2 MT B = $125,198 C = 225.4 MT D = $827,994 E = 272.6 MT F = $953,191	A = 96.6 MT B = $244,305 C = 576.6 MT D = $2,223,691 E = 673.2 MT F = $2,467,996
	200	A = 81.2 MT B = $218,446 C = 218.2 MT D = $730,713 E = 299.4 MT F = $950,158	A = 87.7 MT B = $236,294 C = 270.2 MT D = $929,432 E = 360.0 MT F = $1,165,726	A = 98.0 MT B = $261,412 C = 343.3 MT D = $1,210,084 E = 441.3 MT F = $1,471,495	A = 147.4 MT B = $380,520 C = 694.4 MT D = $2,605,780 E = 841.9 MT F = $2,986,300

A = Catch of billfish.
B = Ex-vessel value of billfish catch.
C = Catch of tunas.
D = Ex-vessel value of tuna catch.
E = Total catch of billfish and tunas.
F = Ex-vessel value of billfish and tuna catch.
* = Period of the year in which approximately 75% of the average annual catch of blue marlin is made by foreign longliners.

TABLE 7.6

AVERAGE CATCH (1973-1977) AND EX-VESSEL VALUE (1980 PRICES) OF BILLFISH AND TUNA TAKEN BY FOREIGN LONGLINERS IN THE VARIOUS SUBZONES OF THE U.S. FCZ AROUND THE MAIN HAWAIIAN ISLANDS AND THE NORTHWESTERN HAWAIIAN ISLANDS DURING MAY THROUGH NOVEMBER*: DOMESTIC BILLFISH SEASON

NORTHWESTERN HAWAIIAN ISLANDS	MAIN HAWAIIAN ISLANDS			
Miles	0	50	100	200
0	A = 0 B = 0 C = 0 D = 0 E = 0 F = 0	A = 6.0 MT B = $15,712 C = 48.4 MT D = $185,768 E = 54.4 MT F = $201,480	A = 15.7 MT B = $40,259 C = 117.2 MT D = $447,326 E = 132.9 MT F = $487,585	A = 63.9 MT B = $157,532 C = 441.0 MT D = $1,720,039 E = 504.9 MT F = $1,877,571
50	A = 3.9 MT B = $12,180 C = 73.6 MT D = $267,404 E = 77.5 MT F = $279,584	A = 9.9 MT B = $27,892 C = 122.0 MT D = $453,172 E = 131.9 MT F = $481,064	A = 19.6 MT B = $52,439 C = 190.8 MT D = $714,730 E = 210.4 MT F = $767,169	A = 67.8 MT B = $169,712 C = 514.6 MT D = $1,987,443 E = 582.4 MT F = $2,157,155
100	A = 13.4 MT B = $35,387 C = 148.7 MT D = $530,264 E = 162.1 MT F = $565,591	A = 19.4 MT B = $51,099 C = 197.1 MT D = $715,972 E = 216.5 MT F = $767,071	A = 29.1 MT B = $75,646 C = 265.9 MT D = $977,530 E = 295.0 MT F = $1,053,176	A = 77.3 MT B = $192,919 C = 589.7 MT D = $2,250,243 E = 667.0 MT F = $2,443,162
200	A = 46.5 MT B = $119,775 C = 301.7 MT D = $1,036,460 E = 348.2 MT F = $1,156,235	A = 52.5 MT B = $135,487 C = 350.1 MT D = $1,222,228 E = 438.6 MT F = $1,357.715	A = 62.2 MT B = $160,034 C = 418.9 MT D = $1,483,786 E = 481.1 MT F = $1,643,820	A = 110.4 MT B = $277,307 C = 742.7 MT D = $2,756,499 E = 853.1 MT F = $3,033,806

A = Catch of billfish.
B = Ex-vessel value of billfish catch.
C = Catch of tunas.
D = Ex-vessel value of tuna catch.
E = Total catch of billfish and tunas.
F = Ex-vessel value of billfish and tuna catch.
* = Period of the year in which approximately 75% of the average annual catch of billfish (all species combined) is made by fishermen in Hawaii.

TABLE 7.7

AVERAGE CATCH (1971-75) AND EX-VESSEL VALUE (1980) OF BILLFISH AND TUNA TAKEN BY FOREIGN LONGLINERS IN THE VARIOUS SUBZONES OF THE U.S. FCZ OF GUAM DURING VARIOUS TIMES (SEASONS) OF THE YEAR

FCZ Sub Area (Miles)	Seasons of Year	Average (1971-75) Billfish Catch (MT)	Ex-Vessel Value of Average Billfish Catch $	Average (1971-75) Tuna Catch (MT)	Ex-Vessel Value of Average Tuna Catch $
200	Entire Year	17.2	$40,486	100.0	$263,955
100	Entire Year	5.9	14,040	34.4	91,764
50	Entire Year	1.4	3,413	8.9	23,284
200	Sept/March	13.1	30,769	80.8	213,276
100	Sept/March	3.7	8,929	24.5	62.421
50	Sept/March	0.9	2,124	5.4	13,151
200	April/Aug	4.1	9,717	19.2	50,679
100	April/Aug	2.1	5,111	9.9	29,343
50	April/Aug	0.5	1,289	3.5	10,133

should emphasize the potential for large gains to domestic fisheries by ensuring that domestic fishermen have priority in those areas at those times of the year. Conversely, the Council should also be sensitive to the potential for larger tuna "losses" for foreign longliners if areas are closed at times when their tuna catch rates are especially high. Therefore, the Council evaluated a large number of alternative combinations of area/season closures to foreign longline fishing to qualitatively assess the potential gains to domestic fishermen and losses to foreign longline fishermen. Tables 7.8 and 7.9 illustrate the results of these evaluations for the FCZ around Hawaii (considering both the main Hawaiian islands and NWHI) and Guam respectively.

TABLE 7.8 - AREA AND SEASON CLOSURE ALTERNATIVES TO FOREIGN LONGLINE FISHING WITHIN VARIOUS SUBZONES OF THE U.S. FCZ OF THE MAIN AND NORTHWESTERN HAWAIIAN ISLANDS (NWHI)

*Rank Order	% of Total Annual Value of Billfish & Tuna ($8,337,117)	Size of Area Closure Between Main	NWHI	Season	Average (1973-77) Billfish Catch (MT)	Average (1973-77) Tuna Catch (MT)	Billfish Catch Tuna Catch	% of Average Annual (1973-77) Foreign Pacific Ocean Billfish Catch (56,500 MT)	% of Average Annual (1973-77) Foreign Pacific Ocean Tuna Catch (245,300 MT)
1	100.0	200	200	Entire Year	302.7	2,265.5	.13	.53	.92
		200	200	May/Dec					
2	78.8	100	100	Jan/Apr	225.9	1,959.7	.12	.39	.79
3	71.9	100	200	Entire Year	228.2	1,645.9	.14	.40	.67
4	70.8	200	200	Oct/Feb	168.4	1,714.1	.10	.29	.69
5	67.5	200	100	Entire Year	189.2	1,503.6	.13	.33	.61
		200	200	March/Oct					
6	63.7	100	100	Entire Year	214.9	1,353.0	.16	.08	.55
7	59.1	100	200	Oct/Feb	138.9	1,409.1	.10	.24	.57
8	51.0	200	50	Entire Year	135.8	1,138.9	.12	.24	.46
		200	-	Entire Year					
9	45.7	-	100	May/Nov	116.0	1,014.6	.11	.20	.41
10	42.8	200	100	Oct/Feb	102.7	1,037.6	.10	.18	.42
11	39.4	100	100	Entire Year	114.7	884.0	.13	.20	.36
12	38.9	200	-	Entire Year	102.6	865.9	.12	.18	.35
13	36.4	200	200	May/Nov	110.4	742.7	.15	.19	.30
14	35.8	200	200	March/Oct	147.4	694.4	.21	.26	.28
15	31.2	100	100	Oct/Feb	73.2	732.6	.10	.12	.29
16	29.6	200	100	March/Oct	96.6	576.6	.17	.17	.23
17	29.3	200	100	May/Nov	77.3	589.7	.13	.13	.24
18	28.3	200	50	Oct/Feb	66.9	705.3	.09	.11	.28
19	26.8	200	50	March/Oct	77.3	524.4	.15	.13	.21
20	25.9	200	50	May/Nov	67.8	514.6	.13	.12	.20
21	24.4	200	-	March/Oct	66.2	476.3	.14	.11	.19
22	22.9	100	50	Entire Year	61.3	519.3	.12	.10	.21
23	22.5	200	-	May/Nov	63.9	441.0	.14	.11	.17
24	19.7	100	200	May/Nov	62.2	418.9	.15	.11	.17
25	17.6	100	200	March/Oct	98.0	343.3	.29	.17	.13
26	17.3	200	-	Oct/Feb	43.4	450.3	.10	.07	.18
27	16.7	100	50	Oct/Feb	37.4	400.3	.09	.06	.16
28	12.6	100	100	May/Nov	29.1	265.4	.11	.05	.10
29	11.4	100	100	March/Oct	47.2	225.4	.21	.08	.09
30	10.8	100	-	Entire Year	28.1	246.3	.11	.03	.10
31	9.2	100	50	May/Nov	19.6	190.8	.10	.03	.07
32	8.7	100	50	March/Oct	28.0	173.3	.16	.04	.07
33	6.3	100	-	March/Oct	16.8	125.1	.13	.02	.05
34	5.8	100	-	May/Nov	15.7	117.2	.13	.02	.04
35	5.7	100	-	Oct/Feb	13.9	145.3	.10	.02	.05

* = Ranked according to the percentage of the value of the average annual catch of billfish and tuna made by foreign longliners in the FCZ of the Hawaiian archipelago that would be "displaced" by each area/season closure option.

TABLE 7.9 - AREA AND SEASON CLOSURE ALTERNATIVES TO FOREIGN LONGLINE FISHING WITHIN VARIOUS SUBZONES OF THE U.S. FCZ OF GUAM

*Rank Order	% of Total Annual Value of Billfish & Tuna ($304,441)	Size of Area Closure	Season	Average (1971-75) Billfish Catch (MT)	Average (1971-75) Tuna Catch (MT)	Billfish Catch / Tuna Catch	% of Average Annual (1973-77) Foreign Catch of Billfish Made in the U.S. FCZ of the Western Pacific Region (779 MT)	% of Average Annual (1973-77) Catch of Tunas Made by Foreign Longliners in the U.S. FCZ of the Western Pacific Region (5,430 MT)
1	100.0	200	Entire Year	17.2	100.0	.17	2.21	1.84
2	91.5	200 100	April/Aug Entire Year	15.3	90.7	.17	1.96	1.67
3	80.3	200	Sept/March	13.1	80.0	.16	1.68	1.48
4				5.9	34.4	.17	.76	.63
5	23.4	100	Sept/March	3.7	24.5	.15	.47	.45
6	19.8	200	April/Aug	4.1	19.2	.21	.53	.35
7	11.3	100	April/Aug	2.1	9.9	.23	.27	.18
8	8.8	50	Entire Year	1.4	8.9	.16	.18	.16
9	5.0	50	Sept/March	0.9	5.4	.17	.12	.10
10	3.8	50	April/Aug	0.5	3.5	.14	.06	.06

* = Ranked according to the percentage of the value of the average annual catch of billfish and tuna made by foreign longliners in the FCZ of Guam that would be "displaced" by each area/season closure option.

The dilemma in applying a seasonal approach to area closures for foreign longline fishing in the FCZ of the Western Pacific Region stems from the fact that the abundance of each of the principal species in the management unit (blue marlin, striped marlin, mahimahi and wahoo) peaks during different times of the year. Choosing the summer months for closures to foreign longline fishing, for example, would benefit recreational fishermen in Hawaii and Guam who target on blue marlin but would do very little to enhance the catches and catch rates of striped marlin which are a major target species for domestic commercial fishermen in Hawaii. A summer closure would also not be beneficial with respect to domestic catches of mahimahi since the abundance of mahimahi peaks during the spring and fall months of each year in Hawaii and during the winter months in Guam. Conversely, choosing a winter-month closure for foreign longline fishing could be expected to increase domestic catches of striped marlin, but it would ignore the interests of fishermen in Hawaii and in American Samoa who seek blue marlin, mahimahi and wahoo. Since there really is no "off-season" for the domestic fisheries for the major species in the management unit, the Council decided to reject the seasonal approach for restricting foreign longline fishing and focused on year-round area closure options instead.

7.3.1.8 Voluntary Controls

The Magnuson Act prescribes certain minimum requirements which must be met for foreign fishing in the FCZ, including fishing permits and fees and coverage by U.S. observers. Except for these statutory requirements, other management measures could be pursued through a voluntary approach as opposed to casting a management program in the form of Federal regulations. For example, foreign longline operators could voluntarily abstain from fishing in certain areas, or could agree to limit the number of vessels or other measures to limit fishing effort in certain areas.

While it is the intent of Congress to achieve 100% observer coverage, the Magnuson Act does, however, allow the exercise of some discretion to exempt some foreign fishing vessels from having to have an observer on board provided that:

1. the facilities of the foreign fishing vessel for quartering of a U.S. observer, or for carrying out observer functions are so inadequate or unsafe that the health or safety of an observer could be jeopardized, or

2. the time during which a foreign fishing vessel engages in fishing in the U.S. FCZ is of such short duration that the placing of a U.S. observer aboard the vessel would be impractical or uneconomical, or

3. in a situation where a fleet of catcher vessels fishing in the U.S. FCZ transfer their catch to a mothership aboard on which is a U.S. observer; in this situation, only a portion (representative sample) of the catcher vessels need to have an observer on board, or

4. when an observer is not available "for reasons beyond the controls of the Secretary", exclusive of a lack of funds.

These legally defined observer waiver conditions (Sec. 201(i)(2)) provide flexibility for achieving something less than 100% observer coverage. With the consent of the Council, the NMFS could develop a mutually agreed upon observer program in cooperation with the management of fleets of foreign longliners. It might not be necessary to place observers on all longline vessels from nations which voluntarily limit their fishing effort or provide timely data on catch and effort regarding their fishing activities in the FCZ of the Western Pacific Region.

The principal advantages of voluntary agreements is that they are in harmony with U.S. tuna policy, and can provide flexibility in negotiating arrangements for international management of highly migratory species. Voluntary approaches to problem resolution can help foster mutual understanding of problems, objectives, and priorities of managing <u>all</u> highly migratory species. Voluntary agreements initially pertaining to fishing for the management unit species in the FCZ can be a step towards international agreements dealing with all highly migratory species, inclusive of tunas, throughout the central and western Pacific. A substantial portion of the compliance burden can be placed on the fishery participants themselves rather than on the Federal Government. An agreement could provide that a pattern of willful violations of the terms of a voluntary agreement would trigger the imposition of mandatory measures with U.S. enforcement and penalties for violations backed up by U.S. law.

On the other hand, voluntary agreements would be of limited value if they were not entered into by vessels of all nations participating in a fishery in a particular region. This is a difficult problem in the Western Pacific Region since vessels from various tuna fishing associations of Japan, Korea and Taiwan are active in different areas of the central, south, and western Pacific (with some overlap). A second problem is that there must be assurance that individual vessels caught violating

a voluntary agreement would, in fact, have sanctions imposed on them by their representative organizations. Mandatory provisions in a FMP are backed by a reasonable certainty of prosecution if violations are discovered. This certainty decreases considerably with voluntary agreements. A third general problem is that any voluntary agreement would, by definition, be less stable or predictable than mandatory provisions having the force of U.S. law. Finally, the entry of new nations or new fishing federations into a fishery governed by voluntary agreements would further complicate an already complicated situation.

It is uncertain whether meaningful voluntary agreements governing foreign fishing in the FCZ can be developed with the fishing fleets of Japan, Korea, and Taiwan presently involved in longline fishing in waters abutting the Council's areas of jurisdiction. Over the years in developing this plan, the Council has had a series of discussions with both Korean and Japanese tuna fishing interests and government officials, but no discussions have yet been conducted with Taiwanese fishing industry representatives or government officials. Voluntary agreements are possible mechanisms for effectuating some of the measures desired under this plan. If it were possible to have voluntary agreements successfully negotiated and implemented, depending on their scope, there would not be as much of an immediate need to implement the measures recommended by this FMP in the form of regulations.

7.3.1.9 Summary of Alternative Management Strategies for Foreign Fishing

The general alternative strategies narratively described in Section 7.3.2 for managing the various foreign fisheries are compared in Table 7.10 in terms of achieving the objectives of the FMP. A plus sign indicates that an objective is being met to some degree. A zero indicates that there is no effect on a particular objective. A minus sign indicates that a management alternative would work against achieving a particular objective of the FMP. The net effect on all of the objectives of the FMP for a given management strategy is simply a summarization of pluses and minuses.

This exercise is interesting and is highly subjective. The bottom line or "net effect" would tend to vary depending on the value judgement of the individual doing the exercise. Not only is assigning a positive or negative sign a subjective decision, but a magnitude or weight could also be attached to each plus or minus sign as well, thus complicating the situation. Table 7.10 simply illustrates that the FMP

TABLE 7.10

ALTERNATIVE MANAGEMENT STRATEGIES FOR FOREIGN FISHING IN TERMS OF ACHIEVING THE OBJECTIVES OF THE FMP

Objectives of the FMP (Section 4.2)	Alternative Management Strategies For Foreign Fishing: Monitor Only Longline Fisheries 7.3.1.1	Monitor Only Pole-and-Line Fisheries 7.3.1.2	Monitor Only Purse Seine Fisheries 7.3.1.3	Control Fishing Effort: Longline Fisheries 7.3.1.4	Control Fishing Effort: Drift-Gillnet Fisheries 7.3.1.5	Control Catch: Longline Catch 7.3.1.6	Control Fishing Effort: Longline Fisheries But Only Seasonally 7.3.1.7	Voluntary Controls: Longline Fisheries 7.3.1.8
1. To promote the growth of domestic harvests of the management unit species and domestic fishery values associated with these species.	-	0	0	+	+	+,0	0	-
2. To enhance the opportunity for successful recreational fishing experiences for the management unit species by domestic fishermen.	-	0	0	+	+	+	0	-
3. To improve the opportunity for domestic commercial fishermen to engage in profitable fishing operations for pelagic species.	-	-	-	+	+	+,0	0	-
4. To enhance the marketability of sportfishing charter-boat services.	-	0	0	+	+	+	0	-
5. To promote domestic marketing of the management unit species in lieu of marketing of some of these species in Guam and American Samoa by purse seine fishermen and foreign longline fishermen.	-	0	-	+	0	+	0	+
6. To eliminate waste of billfish and other management unit species which are taken along with tuna on foreign longline gear, and by purse seine and drift-gillnet vessels.	+	0	+	+	+	0	+	+
7. To diminish the risk of domestic/foreign gear conflicts in the FCZ, and to preclude the possibilities of its occurrence in areas of concentrated domestic fishing.	-	-	-	+	+	0	0	+
8. To the extent consistent with the above objectives, to minimize interference with foreign tuna fishing in the U.S. FCZ, with special regard for the need to maintain deliveries of tuna to American Samoa canneries.	+	+	+	0	-	-	+	+
9. To improve the statistical base for better stock assessment and for better future decisions to conserve and manage pelagic fish resources throughout their range.	+	+	+	-	-	-	0	+
10. To promote international/regional management of highly migratory species throughout their range as long as domestic fishery benefits under this plan are maintained or enhanced.	0	+	0	+	+	-	+	+
11. To conserve billfish and associated species to the extent practicable in the FCZ while international agreements are being developed.	0	0	0	-	0	-	+	0
NET EFFECT[a] on All Objectives	-3 ==	+1 ==	0 =	+6 ==	+5 ==	≠0 ==	+4 ==	+2 ==

+ = Positive impact; - = negative impact; 0 = no impact.

objectives are best met by regulating foreign longline fishing effort and by disallowing foreign drift-gillnet fishing in the FCZ of the Western Pacific Region.

7.3.2 Alternatives for Further Analysis to Control Foreign Longline Fishing

On the basis of information presented in previous sections of this chapter, the Council has concluded that:

(1) Foreign drift-gillnet fishing should not to be allowed in the FCZ of the Western Pacific Region, and domestic drift-gillnet fishing may not be conducted unless first specifically authorized by an experimental fishing permit;

(2) For the time being, foreign pole-and-line (live bait) fishing and purse seine fishing for tuna by foreign and domestic vessels should be allowed in the FCZ of the Western Pacific Region subject to voluntary submission of data on catches of the management unit species and tuna;

(3) Regarding foreign longline fishing, the Council has decided that area closures of parts of the FCZ of the Western Pacific Region warrant further analyses and comparisons of impacts.

It is acknowledged at the outset that biological, ecological and stock conservation facets regarding the migratory species in the management unit are not among the factors that the Council can hope to control. The Council has noted several times previously that biological and ecological factors are certainly important. However, conservation and management measures for fisheries for billfish and the other species in the management unit solely in the FCZ cannot be expected to result in significant biological or ecological effects. Controlling fishing mortality only in the FCZ will not have a perceptible impact on highly migratory billfish stocks or on stocks of related pelagic species throughout their range in the Pacific. Elimination of the non-retention approach should, however, have some positive effects by eliminating the potential for waste. All area/seasonal closure options to foreign longline fishing will probably have essentially the same biological and ecological effects. The major impacts of area/seasonal closure alternatives will be in the amount and distribution of benefits and costs to different sectors of the domestic and foreign fisheries, and in the degree of administrative difficulty and enforceability of the closure alternatives.

The previous discussions provided a backdrop for considering the effects of a variety of closure alternatives in relation to the Council's objectives. Obviously, the effects vary not only with respect to the size of the closures considered but also to the extent which foreign longliners would either fish in the open areas of the FCZ or relocate to areas beyond the boundaries of the FCZ. The following examples will indicate, in qualitative and in quantitative terms, where possible, the range of possible impacts of selected alternatives depending on the degree of transfer of the management unit species from foreign to domestic fishermen and on the response of foreign fishermen to the alternative considered.

7.3.2.1 Preferred Area Closure Alternative: The Proposed Action

Under this alternative, it is assumed that the foreign longline effort previously applied in the FCZ areas recommended to be closed would relocate beyond the FCZ; that the fishing effort applied in the open areas of the FCZ would continue at the 1973-77 average level; that the catch rates for billfish and tuna would remain at 1973-77 average levels; and that the proportion of catches of mahimahi and wahoo relative to total catches of billfish and tuna would be the same as for Hawaii longline vessels (1978-83 average).

Range of Impacts:

a) Domestic Fisheries. There would be a near maximum potential for transfers of catches of the management unit species from the foreign longline fisheries to the domestic fisheries. Foreign interception of blue marlin in the FCZ which are headed for fishing grounds used by domestic fishermen near the main Hawaiian Islands and Guam would be nearly precluded. The interception of striped marlin migrating along the NWHI chain would be lessened considerably; and there would be near maximum availability of mahimahi, wahoo and oceanic sharks in areas of importance to domestic vessels including vessels which troll and longline in the waters of the NWHI. The amounts of actual catch gains to U.S. fishermen cannot be quantified.

b) Foreign Fisheries. Foreign longline vessels fishing in the FCZ surrounding the Hawaiian archipelago would apply 873 vessel days of fishing effort, down from 1,898 vessel days per year which is the average for the 1973-77 period (Yong and Wetherall, 1980). The estimated catch of tuna would be 1,079 MT (all species combined). The estimated catches of

billfish (150 MT), mahimahi (12 MT), and wahoo (9 MT) would be about 50-60% lower than the average annual catches of these species in 1973-77. Around Guam, foreign longline effort would decrease to 127 vessel days, and catches of billfish, mahimahi, wahoo and tuna would decrease by about 75% to an estimated 183 MT of total catch of all species combined. There would be almost no change in foreign longline effort or catches in the FCZ around American Samoa or U.S. Possessions. The total foreign longline effort in the entire FCZ of the Western Pacific Region would decrease by about 1,406 vessel days, a drop of about 26% for the average of the 1973-77 period. The total foreign longline catch of billfish in the FCZ of the Western Pacific Region would be about 568 MT (down about 26%) and 3,685 MT of tuna would be caught (down about 30%). All catches of the management unit species would be retained, and compliance with the area closures would be simple in comparison to the non-retention provisions of the PMP.

c) Enforcement Requirements. Aerial surveillance and a limited observer program based on effort plans should be sufficient to monitor foreign fishing activity. At-sea vessel patrols by the U.S. Coast Guard and vessel inspections would be kept at a minimum level as they are at present.

d) "Waste" of Fish. There would be no waste since all species hooked on longline gear would be retained.

e) Flow of Data. Foreign longline catch and effort data would be collected as fishing occurs.

f) Potential for Gear Conflicts. There would be a very low risk of gear conflicts between the foreign and the domestic fisheries under the preferred alternative.

7.3.2.2 PMP Non-Retention Zones Converted to Area Closure Zones

It is assumed that the effort previously applied by foreign longliners in the PMP's non-retention zones (Table 5.1) would shift outside of the FCZ; that the effort in the open areas of the FCZ (previously the retention zones) would continue as before, and that catch rates for billfish and tuna would be maintained at 1973-77 levels; and the ratio of foreign longline catches of mahimahi and wahoo relative to total catches would be the same as for Hawaii longline vessels (1978-83 average).

Range of Impacts:

a) Domestic Fisheries. There could be a modest potential for increased domestic catches of the management unit species resulting from transfers from foreign longline catches. Foreign longline interception of blue marlin headed for primary fishing grounds in the main Hawaiian islands and Guam would be increased significantly compared to the preferred alternative. Interception of striped marlin in the waters of the NWHI on foreign longline gear would be increased compared to the preferred alternative, thus reducing their availability to domestic fishermen. There would be much less of a potential of transfers of the management unit species in general from foreign to domestic fishermen than under the preferred closures; and domestic catches of mahimahi and wahoo would be less likely to increase than under the proposed action.

b) Foreign Fisheries. There would be a smaller "loss" of billfish, mahimahi, wahoo, sharks and tuna to foreign longliners than under the preferred alternative. In the FCZ around Hawaii, the estimated catch of billfish would be 269 MT, down from 302.7 MT in 1973-77. The estimated catch of tuna would be 1,756 MT, down from 2,276 MT for the 1973-77 annual average. The estimated catch of mahimahi and wahoo would be around 35 MT, about 25% less than what was made in the full FCZ during 1973-77. Total foreign longline effort would be about 1,449 days, down from the 1973-77 annual average by about 449 vessel days. There would be no loss of hooks and lines due to releasing of fish since all fish could be retained. Around Guam, the estimated billfish catch would be 15.8 MT, only 1.4 MT less than in 1971-75; and the tuna catch would be 91.1 MT, only 8.9 MT less than what was caught previously. The estimated catch of mahimahi and wahoo would be about 2 MT, down about 25% from 1971-75. Total foreign longline effort in the FCZ surrounding Guam would be down about 25% from 1971-75 levels. There would be no loss of fishing gear since all species caught would be retained. There would be a very slight change in foreign longline catch or effort in the FCZ of American Samoa and no change in the FCZ of U.S. possessions.

c) Enforcement Requirements. Aerial patrols and observers would be sufficient. Vessel inspections should not be needed. Vessel patrols would only be needed to seize vessels which are spotted for fishing without a permit on routine air surveillance missions.

d) "Waste" of Fish. There would be no waste since all fish caught would be retained.

e) Flow of Data. Foreign longline data would be collected as fishing occurs.

f) Potential for Gear Conflicts. There would be a much higher risk of gear conflicts than under the preferred alternative as domestic fishing vessels, especially longliners in Hawaii, fish much beyond the PMP's non-retention zones. Domestic longline vessels now fish as far as 600 miles from Honolulu (P. Bartram, pers. communication).

7.3.2.3 Preferred Area Closures with some Relocation of Foreign Longline Vessels in the Open Areas of the FCZ

The assumption under this alternative is that as the proposed closures go into effect, the foreign effort in the open areas would remain as in the 1973-77 period, and that the foreign effort expended previously in the closed areas around the main Hawaiian islands and the NWHI would relocate in the open area of the FCZ around the NWHI. It is also assumed that the foreign fishing effort previously applied in the closed area around Guam would relocate beyond the FCZ. Catch rates in the open areas are asssumed to be maintained as for the average of the 1973-77 period.

Range of Impacts:

a) Domestic Fisheries. The potential for transfers of catches from the foreign longline fisheries to the domestic fisheries would be partially realized, but at a lower level compared to the first alternative. The interception of blue marlin by foreign longliners would be nearly precluded. Foreign interception of migrating striped marlin would be at a relatively low level but at a level which is higher than under the preferred alternative. There would be a good likelihood that the other species in the management unit would become increasingly available in FCZ areas fished by domestic fishermen, but at slightly lesser levels than under the preferred alternative. The actual amount of gain to domestic fishermen cannot be predicted.

b) Foreign Fisheries. Annual catches would be reduced slightly from historical levels. Total annual foreign longline effort under this alternative in the FCZ of the Western Pacific Region would be 4,851 vessel days, down from 5,452 vessel days per year in 1973-77. The estimated catch of billfish would be 703 MT, but there could be a change in species composition of the catch, with less blue

marlin taken, but higher catches of striped marlin and swordfish compared to the preferred alternative. Catches of tuna would drop slightly to about 4,674 MT, and there would be a shift to more bigeye and albacore tuna and less yellowfin tuna taken. The catch of mahimahi, wahoo and sharks would drop slightly in relation to the decrease in effort. Since all catches would be retained, there would be no losses of hooks and lines associated with cutting fish free as required by the PMP. Compliance with the area closures would be relatively simple.

c) Enforcement Requirements. Aerial patrols and occassional observers could be sufficient to enforce the plan and to monitor foreign fishing activity. No budget increases would be required for enforcement purposes.

d) "Waste" of Fish. There would be no waste under this alternative.

e) Flow of Data. Data would be collected as fishing occurs.

f) Gear Conflicts. The potential of gear conflicts would be minor, although the risk would be somewhat higher than under the proposed action since there would be a higher density of foreign longline fishing in the open areas of the FCZ than under the preferred alternative.

7.3.2.4 Retain the PMP (Section 5.2)

The assumption made here is that foreign longline fishing would resume at historic (1973-77) levels within both the retention and non-retention zones.

Range of Impacts:

a) Domestic Fisheries. The possible shift of billfish, mahimahi, wahoo and shark catches to domestic fisheries would be very slight. Relatively small numbers of billfish would be released by longliners, and survival rates are low. There would be slight increases possible, but not probable, in the catch of blue marlin (up to 14 MT in Hawaii, 12 MT in Guam, and 11 MT in American Samoa), and lesser increases likely for other billfish species, including a slight increase (up to 13 MT) possible for swordfish around Hawaii and possible increases of 8 MT for striped marlin and 3 MT of black marlin to American Samoa vessels. The likelihood

of meaningful increases in domestic fishing values is very low under this alternative since many billfish die upon release and only some of those which survive are caught again.

b) Foreign Longline Fisheries. Large catches of billfish (total TALFF is 618 MT), tuna (5,403 MT), and other species (total TALFF is 1,779 MT) would be made and retained (Table 5.2). Releases of billfish would total about 161 MT, with consequent losses (unquantifiable) of hooks, line and time. Foreign effort would be 5,452 vessel days (1973-77 average) for the FCZ of the Western Pacific Region as a whole.

c) Enforcement Requirements. U.S. Coast Guard and NMFS would be unable to enforce the PMP under these conditions with current resources. At-sea vessel patrols, observers, and inspections would be required. A 10% observer coverage alone would cost about $54,500 (5,452 vessel days x .10 coverage x $100/day observer cost), not including the time and cost of hiring and training observers.

d) "Waste" of Fish. About 161 MT of billfish would be released at sea, much of which would be blue marlin with a 70.9% mortality rate. Thus, approximately 113 MT of billfish would be wasted. Unknown amounts of mahimahi, wahoo, and sharks would also be wasted.

e) Flows of Data. Detailed data on foreign catch and effort in the FCZ would be collected on a relatively timely basis.

f) Potential for Gear Conflicts. The chances for gear conflicts would be very high, since foreign longlining would occur throughout the FCZ, including in non-retention zones which come very close to shore.

7.3.2.5 PMP Remains in Effect But Fishing Does Not Occur in the Non-Retention Zones

It is assumed that 700 foreign longline vessels would obtain permits to fish in the FCZ with allocations for the management unit species. Fishing, however, would occur only beyond the non-retention zones established by the PMP. Foreign longliners would relocate to areas where billfish can be retained subject to TALFF limitations.

Range of Impacts:

a) Domestic Fisheries. The potential increase in billfish catch and in domestic fishery values would be quite low. Very small numbers of billfish and other non-tuna species would be released, and most of the released fish would be blue marlin. Up to 14 MT of blue marlin and 13 MT of swordfish would be subject to capture by domestic vessels in Hawaii; up to 12 MT of blue marlin could be transferred to Guam vessels; and up to 11 MT of blue marlin, 8 MT of striped marlin, and 3 MT of black marlin could be transferred to American Samoa vessels.

b) Foreign Longline Fisheries. Longline fisheries would increase their tuna catches slightly (5,436 MT), would retain the billfish TALFF (618 MT), and would retain the TALFFs for other non-tuna species (1,779 MT). The actual gross billfish catch (821 MT) would be somewhat larger than the 1973-77 average (779 MT) since catch rates in retention zones are higher than in non-retention zones around Hawaii (unknown for other areas). Thus, a larger total amount of billfish would be released with losses of hooks, line and time. Foreign longline effort would remain at 5,452 vessel days.

c) Enforcement Requirements. U.S. Coast Guard and NMFS would be unable to actively enforce the PMP under these conditions with current resources. At-sea vessel patrols, observers and vessel inspection would be needed. Hiring and training observers would be costly.

d) "Waste" of Fish. Approximately 120 MT of billfish would be wasted [(821 MT total catch - 618 MT TALFF) x 60% average mortality rate = 120 MT]. Unknown amounts of other non-tuna species would also be wasted.

e) Flow of Data. Foreign longline catch and effort data would be collected on a timely basis.

f) Potential for Gear Conflicts. the risk of gear conflicts would initially be moderately high and would increase as domestic fishing vessels continue expanding their range of operations as is expected.

7.3.2.6 Summary Comparison of Impacts Under Alternatives Considered to Control Foreign Longline Fishing

Table 7.11 provides a qualitative comparison of the effects of the considered alternatives to control foreign long-

line fishing in the FCZ of the Western Pacific Region. The table compares the alternatives narratively described in Section 7.3.2 under several different assumptions of fishing behavior of foreign longliners for each alternative considered, and the expected resultant impacts on the catches of the management unit species and tuna for domestic fishermen and foreign longline fishermen alike. The larger the extent of the area closures to foreign longliners and the greater the degree of relocation of "displaced" foreign longline fishing effort to beyond the FCZ, the greater the domestic catches of the management unit species and tuna can be expected to be. Conversely, small area closures would provide more reasonable opportunity for foreign longline fishing for tuna in the FCZ, but with small expected benefits to domestic fishermen as well. The preferred area closure to foreign longline fishing would only affect about one quarter of the past pattern of foreign longline fishing in the FCZ of the Western Pacific Region, yet it would nearly maximize expected catch gains to domestic fishermen.

7.3.3 Domestic Fishing

The Council has considered the possibility that regulatory measures regarding the managment unit species might eventually be needed for the domestic fishery sectors. Briefly, the domestic fishery alternatives examined by the Council are as follows:

7.3.3.1 Rely on Existing State and Territorial Measures

Under this option, existing State and Territorial regulations and data collection programs would stay in effect. There are currently no State or Territorial restrictions on domestic fishing for or landing of billfish and the other species in the management unit taken in the FCZ or in State and Territorial waters around Hawaii, Guam and American Samoa. However, certain administrative requirements must be met in Hawaii. Fishermen in Hawaii must possess a Commercial Marine License if they sell their catch. Once licensed, fishermen are also required to file monthly reports on all fish caught, whether or not they are actually sold. There are no restrictions on gear types, seasons, areas, or size of fish for fishing for any of the species in the management unit by domestic vessels in Hawaii, Guam or American Samoa.

This approach would be neutral in effect with regard to Objectives 1-5. Recreational and commercial fishermen would continue to be free to fish for billfish, mahimahi, wahoo and

TABLE 7.11 - COMPARISON OF IMPACTS UNDER ALTERNATIVES CONSIDERED TO CONTROL FOREIGN LONGLINE FISHING IN THE FCZ OF THE WESTERN PACIFIC REGION

	Alternative				
Impact On:	Preferred Area Closure Alternative* 7.3.2.1	PMP's Non-Retention Zones Converted to Closures* 7.3.2.2	Preferred Area Closure Alternative** 7.3.2.3	Retain the PMP, Fishing Takes Place In Retention and Non-Retention Zones 7.3.2.4	PMP Stays In Effect But Fishing Does Not Occur In Non-Retention Zones 7.3.2.5
Domestic Catch of:					
Management Unit Species	Max. Gain	Slight	Near Max. Gain	Very Slight	Slight
Tuna	Max. Gain	Very Slight	Near Max. Gain	None	Very Slight
Foreign Longline Catch of:					
Management Unit Species	Approx. 25% less than historical average	Large	Approx. 25-35% less+ than historical average	Very Large	Large
Tuna		Large		Maximum	Very Large
Enforcement:					
Mode	Air	Air	Air	Air, Sea, Observers	Air, Sea, Observers
Feasibility	Adequate	Adequate	Adequate	Not w/Current Resources	Not w/Current Resources
"Waste" of Management Unit Species	None	None	None	Very Large	Very Large
Data Flow	Good	Good	Good	Moderate	Good
Gear Conflicts	Very Low	Moderate	Low	Highest	Moderate

* Assumes that historical (1973-77) foreign longline effort in closed areas of the FCZ would relocate beyond the FCZ.

** Assumes that historical (1973-77) foreign longline effort in closed areas of the FCZ would relocate to the open areas of the FCZ.

\+ Assumes catch rates fall because of higher effort in open areas.

oceanic sharks just as they are now under the PMP, which applies only to foreign vessels. There is, however, an important exception. Domestic fishing with drift-gillnets in the FCZ qould be prohibited by the FMP, except when authorized by an experimental fishing permit issued by the Regional Director of the NMFS. This approach would also have no impact with respect to waste of fish taken on foreign longline gear (Objective 6). Continuing existing State and Territorial measures would have no impact on the potential risk of gear conflicts (Objective 7); it would not add to or detract from interference with foreign tuna fishing in the FCZ (Objective 8); it would add to the statistical base for future management decisions (Objective 9); and this option would be largely neutral with respect to promoting international cooperation. The "no action" alternative regarding domestic fisheries, other than for drift-gillnet fishing in the FCZ, provides maximum freedom for domestic vessels to fish for billfish and associated species in the FCZ and in State and Territorial waters (Objective 10). There would be no change in State, Territorial, or Federal government expenses associated with the domestic billfish fisheries under this approach. In short, the "no action" alternative would essentially maintain the status quo. Domestic drift-gillnet fisheries would be free to operate without any restriction in the U.S. FCZ of the Western Pacific Region.

7.3.3.2 Monitor Only

It is important to differentiate between the term "data reporting requirements" and "data collection programs". "Data reporting" is generally used to describe reports or data which fishermen or processors would be required to submit under a FMP. The MFCMA provides that a FMP can require such data reports from participants in a fishery. "Data Collection" programs generally refer to agency efforts to collect data through means such as household or mail surveys, creel census surveys and port sampling. "Data Reporting" is a mandatory burden imposed on the fishery. "Data Collection", on the other hand, is an attempt to obtain data by voluntary cooperation with the fishery participants. A monitoring program for pelagic fisheries as large and complex as those for billfish and associated species and tuna would have elements of both.

Time series of catch, effort and catch rate (CPUE) are needed for better determination of the status of stocks in local waters, as indicators of the economic health of the domestic fisheries for the management unit species, and the extent to which the objectives of the FMP are being achieved. Information from Pacific Ocean fisheries will be needed to further assess and refine conclusions on stock conditions,

assuming that the stock structures of the management unit species are as broad and pervasive as they are believed to be. Information on the domestic fisheries and on the FMPs effectiveness will be generated from monitoring domestic fishing activities. The options before the Council include adding the weight of Federal authority to current State and Territorial reporting requirements; establishing comprehensive data reporting requirements for all domestic fishermen who fish for the management unit species; and a variety of in-between alternatives.

The practicability and costs of data collection in relation to the importance of securing accurate data are significant considerations. The Council recognizes that commercial enterprises which have long submitted accurate and complete data covering their fishing trips and catches will continue to keep doing so. The Council also recognizes that the many part-time commercial or subsistence fishermen or sports fishermen in the island areas served by the Council, some of whom only occasionally sell their catch, are less likely to submit detailed, accurate catch reports covering all of their fishing trips. Indeed, complete reporting by all classes of fishermen would overwhelm the existing data reporting systems in Hawaii and Guam with a flood of logbook forms or catch reports. Further, the cost of enforcing universal catch and effort data submission requirements could be prohibitive. The Council is also sensitive to the possible resentment or resistance of fishermen toward any Federal data submission requirements that they may perceive as being unnecessary detailed or "privileged" information (notwithstanding Federal prohibitions on and penalties for unauthorized release of confidential information).

The Council endorses the regional Fishery Information Network (FIN) developed by the Honolulu Laboratory of the NMFS. FIN covers each of the Council's island areas, including the CNMI. Data on catch, effort and sales of the management unit species made in Hawaii, Guam, American Samoa and the CMNI are now being incorporated as data files in the Network. At the same time, the Council, the Hawaii Division of Aquatic Resources and the Honolulu Laboratory of the NMFS are working together in establishing a sample design so that repeated periodic sample surveys can be conducted to collect specific sets of data for estimating fishing effort for and catches of the management unit species made by non licensed fishermen in Hawaii and to evaluate the effectiveness of this FMP.

The Council has concluded that it is premature to propose major adjustments in current State and Territorial data reporting requirements under this FMP. Section 10 describes the data collection programs to be incorporated under this FMP. These will be reviewed annually as more porgress is made in the FIN program.

7.3.3.3 Restrictions on Domestic Fishing

Figure 7.2 displays, in a decision tree format, the types of controls that could be placed on the domestic fisheries for the management unit species to address problems of overfishing, user conflicts, waste, inefficiency, or other concerns.

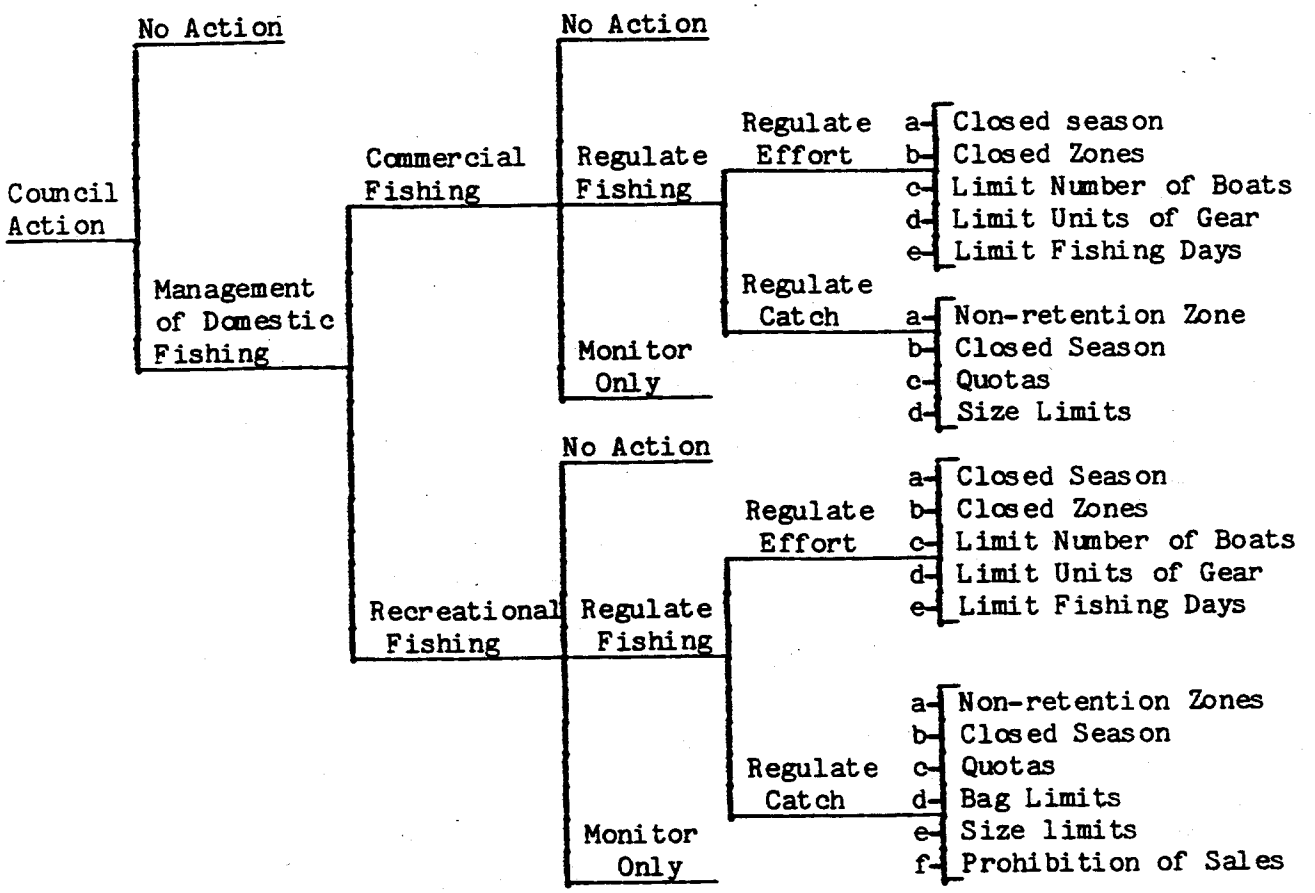
Two general categories of direct restrictions on domestic fishing for the management unit species are regulation of fishing effort and regulation of catches, either singularly or in combination. Either catch or effort restrictions, or both, could be applied to commercial or recreational fishing for the management unit species in the island areas served by the Council. However, it must be noted that in Hawaii, Guam, American Samoa and the CMNI, the distinctions between commercial and recreational fishing for pelagic species are highly blurred. It is a pervasive practice of recreational fishermen in the islands to sell portions of their catches of the management unit species and tuna to help defray out-of-pocket costs of their fishing trips. When fishing is good, recreational fishermen can even make a small profit from their leisure pursuit. Thus, any catch constraints on recreational fishing for pelagic species in the island areas served by the Council could affect the volume of fish entering local markets for fresh fish and, in turn, affect the prices of fresh fish to consumers.

7.3.3.3a Control Effort

Among the effort restrictions briefly considered by the Council are area closures, seasons, and license limitations. Depending on the extent of each of these measures, catches of the management unit species made by domestic fishermen could be sharply reduced, with corresponding drops in fishermen's incomes and increased consumer prices for the management unit species. Area closures would affect landings of tuna as well since domestic fishermen who catch billfish, mahimahi and wahoo are likely to catch much more tuna than the management unit species. Prohibiting landings of the management unit species during a season would result in discards and waste of dead fish in a mixed species fishery. Controlling the number of vessels in a fishery through license limitations would result in a reduction of total effort, but the impacts on catches of the management unit spcies would depend on which class or classes of vessels were being restricted. Vessels which participate in the domestic fisheries which catch the management unit species have widely different effot and capacity levels and success rates. It might be possible to eliminate, say, a half of the small boat

FIGURE 7.2

OPTIONS OPEN TO THE COUNCIL FOR REGULATING DOMESTIC FISHING



recreational trollers and yet not reduce the levels of billfish harvests by very much. Any such limitation would also be very difficult to enforce. Moreover, the extent to which any effort limits on the domestic fisheries could contribute to the conservation of the stocks of the management unit species is very unlikely. While the catches of the management unit species made by domestic fishermen have been increasing, they still make up a minute percentage of total catches of these species made in the Pacific Ocean. Therefore, even major reductions in domestic catches would be expected to have no measurable effects on the stocks of the management unit species assuming that their ranges and stock structures are as broad and pervasive as is commonly believed.

7.3.3.3b Control Catch

Catch restrictions can include quotas, bag limits per trip, size limits, tag-and-release requirements, and gear restrictions. These kinds of measures are applied in many fisheries to control catch in the interests of conservation and reducing conflicts. Quotas can be applied to the commercial or recreational segments of the domestic fisheries which catch the management unit species, or to both. However, there would be great difficulty at arriving at an equitable quota or bag limit by species for the different domestic fishery segments which catch billfish and the other species in the management unit in addition to tunas. Also, there would be great perplexity in a mixed species fishery regarding what to do when a quota for one species was reached while established quotas for the other species in the management unit were not close to being approached. Also, as in the case of the foreign longline fishery, an application of the non-retention approach in the domestic fisheries for the management unit species would result in a waste of fish with no apparent conservation benefits stemming from catch-and-release requirements. Enforcement of quotas or bag limit requirements is usually very costly because high quality data are normally needed on a timely basis, and landings must be carefully and systematically monitored to check on compliance with the quotas or bag limits. Size limits would pose similar problems in determination of appropriate sizes, what to do with inadvertent catches of undersized fish, and in enforcing the chosen size limits. Tag-and-release programs might eventually lead to an improved understanding on growth rate and migratory patterns of the management unit species, but tag-and-release programs appear to be more suitable to voluntary efforts than for mandatory requirements. Gear restrictions, either in the type or amount of gear allowed, serve a useful purpose in some fisheries, and provides a means for distinguishing between commercial and recreational fishermen in other fisheries. However,

gear restrictions would probably serve no useful purpose in regulating the catches of the management unit species made by island fishermen since recreational and commercial fishermen use the same type and amount of gear, other than longline gear which is strictly commercial. It is unlikely that restrictions on domestic fishermen (other than on drift-gillnets) would serve useful purposes in terms of meeting the objectives of the plan. Finally, as with limits on effort, catch limits will have very little or no biological conservation effect for the stocks of the migratory pelagic species in the management unit. The range of the stocks is believed to be so great, and the portion of the catch of each species taken in the FCZ by domestic fishermen is so small relative to ocean-wide catches, that actions taken in the FCZ alone to conserve the stocks would be of marginal value, at best, in maintaining the productivity of the stocks involved.

To date, there is virtually no history in the use of floating drift-gillnets by domestic fishermen to catch pelagic species in any of the island areas served by the Council. A few fishermen in the islands have apparently experimented with drift-gillnets but abandoned the idea after failing to achieve much success through their experimentation. There have been rumors that some of the albacore troll vessels were poised to start using drift-gillnets for catching surface feeding albacore tuna schools found on the high seas northwest of Midway Island. Apparently, nothing has actually happened regarding these rumors since the albacore vessels still remaining in Hawaii continue to troll for albacore during the season and fish for bottomfish or longline for tuna during the off-season for albacore tuna. It is quite feasible, however, that some California-based drift-gillnetters might relocate to the island areas served by the Council.

The use of drift-gillnets in other parts of the world has created difficulties:

(1) Navigation problems and tangling of propellor shafts when vessels accidentally run into floating nets;

(2) Portions of nets get lost or are discarded and get carried into areas where they can do harm to sea turtles, seals, sea birds and other creatures valued by society;

(3) Gillnets are not very selective regarding the mix of pelagic fish species and marine mammals that inhabit the surface waters of tropical oceans;

(4) The quality of net-caught fish is generally lower compared to hook-caught fish, largely because of bruising of the flesh and longer exposure to warm waters after death compared to hook-caught fish; and

(5) The use of drift-gillnets can cause keen user group conflicts and resultant political problems which are best avoided when possible.

Therefore, the Council, acting upon advice received from fishermen serving on the Pelagic Species Advisory Panel, has decided to recommend a general prohibition on the use of drift-gillnet gear in the FCZ by domestic fishermen, except only when authorized by a special experimental fishing permit issued by the Regional Director of the NMFS.

7.3.3.4 Choice of Alternative Regarding the Domestic Fisheries

Other than the proposed general prohibition on the use of drift-gillnets, the Council has concluded from the available information that there are no conservation, economic or social gains which can be realized by Federal intervention in the domestic fisheries for billfish and the other species in the management unit in the FCZ at this time. Domestic catches of these species do not pose a risk of overfishing of any of the stocks. The level of fishing mortality in the FCZ is very low relative to the fishing mortality over the assumed range of the species involved. It would be irrational to establish domestic effort or catch limitations in the FCZ in the absence of demonstrable conservation effects so long as there are no international agreements establishing conservation measures throughout the range of the species in the management unit. At the same time, there are no known user conflicts in the FCZ that require a direct Federal response. Domestic fishermen have not expressed any concerns about the desire or need for domestic fishery restrictions, other than to recommend that the Council consider prohibiting purse seine fishing in the areas of the FCZ used regularly by domestic fishermen and to tightly control the use of drift-gillnets. Domestic fisheries are generally undeveloped relative to the catch potentials from the FCZ as a whole. Expansion of the existing domestic fisheries is desirable, and is more likely to happen without Federal regulation than with.

Consequently, the Council decided that continuation of established data acquisition programs in the State of Hawaii and the Territories of Guam and American Samoa regarding the management unit species is the best alternative to follow for the present domestic fisheries out of all of the alternatives examined. The FMP does, however, recommend improved monitoring programs, an annual report on the fisheries which take the management unit species, and a full review of the FMP in five years (Section 10).

7.4 Rationale for the Preferred Alternative

The proposed actions selected by the Council, out of all other alternatives considered, are itemized in Sections 3.1 and 7.1. The reasons for the Council's choice of the proposed combination of management measures rather than any of the other alternative measures considered are summarized, once again, in relation to the National Standards of the Magnuson Act and other applicable factors:

1. Prevent overfishing while achieving the optimum yield (OY) - Management measures of any kind applied solely to the FCZ cannot be expected to prevent overfishing of any of the migratory species in the management unit. The prevailing scientific hypothesis is that each of the species in the management unit residing in the FCZ at any one time are probably but a small part of much larger and far ranging population of these species in the Pacific Ocean. While the preferred alternative cannot prevent overfishing, it does prevent the potential waste of billfish, mahimahi and wahoo under the fish discard, non-retention approach of the PMP. Unlike the guiding philosophy of the PMP, the Council's preferred alternative nearly maximizes the potential for enhanced social and economic values associated with increased catches of the management unit species made by domestic fishermen. While foreign drift-gillnet vessels will be prohibited from fishing in the FCZ and foreign longline vessels will be restricted from using longline gear in areas of the FCZ which are important to domestic fishermen, nonetheless, all sub-areas of the U.S. FCZ of the Western Pacific Region (main Hawaiian islands, NWHI, Guam, American Samoa and U.S. Possessions) will be open to foreign longline fishing to at least some degree. Thus, a reasonable opportunity for foreign longline vessels to fish in the FCZ for tuna will be restored by the Council's preferred alternative, and no limits will be placed on their effort or catch in the open areas of the FCZ. Foreign pole-and-line and purse seine fishermen for tuna will not be affected directly by this FMP.

2. Best scientific information available - This revised FMP incorporates all relevant information that has become available since the Council's original Billfish FMP was completed in 1981. To the knowledge of the Council, this FMP contains the best scientific information available on which the choice of the preferred management measures was made. This has been certified by the Council's Scientific and Statistical Committee and by the scientists on the Planning Team. The FMP also contains measures to expand the information base in future years.

3. Inter-related stocks of fish managed as a unit - The proposed plan improves on the Council's original Billfish FMP by including mahimahi, wahoo, and oceanic sharks in the management unit. This has provided added justification for the need of the FMP because these

species, especially mahimahi and wahoo, are of great importance to the domestic fisheries in the island areas served by the Council. This revised FMP is also a major improvement on the Council's original Billfish FMP, as well as on the PMP, because it also encompasses drift-gillnet, baitboat, and purse seine fishing in addition to longlining. All of these gear types take the management unit species, as well as tuna, but in varying amounts and proportions.

4. Non-discrimination between residents of different States - The measures in this plan do not discriminate in any way, either directly or indirectly, between residents of different States.

5. Promote efficiency - Fishing by domestic fishermen for the management unit species should be more efficient and productive since the plan's management measures are intended to nearly maximize the availability of the management unit species in waters which are most heavily fished by domestic vessels and in adjacent waters as well. Also, foreign longline vessels will be much less restricted than under the PMP since the non-retention and manner of fish release requirements would be dropped, as well as the quotas. Thus, foreign longline fishing in the open areas of the FCZ can be pursued more efficiently under this FMP as all fish which are hooked can be retained without losses of fishing gear and time.

6. Allow for variations and contingencies - An inherent characteristic of each of the highly migratory species in the management unit is that their abundance and availability in any one place are of highly variable from year-to-year. The measures of the FMP are expected to increase the potential for large catches of the management unit species made by domestic fishermen during years of high abundance while reducing the risk of poor catches due to competition from foreign longlining in the FCZ in years of low abundance. The FMP provides for annual reviews of the status of the fisheries for the management unit species and a five-year review of the entire management program as initially set forth in this FMP.

7. Minimize costs and avoid unnecessary duplication - The area closure approach taken by this FMP is intended to make enforcement feasible in the face of shrinking enforcement budgets. Current budgets should be sufficient to administer and enforce the plan. The FMP's measures pertaining to foreign fishing should be enforceable by aerial surveillence and observer coverage of selected vessels, unlike the PMP which would require very expensive at-sea capability to enforce the non-retention and quota regulations if foreign longline fishing for tuna were to occur. Other than a general prohibition on the use of drift-gillnets, except where allowed through experimental fishing permits, the FMP does not propose Federal regulations governing the take of the management unit species by domestic fishermen. The Council proposes to rely on improved State and Territory data collection programs. No Federal reporting requirements are proposed for domestic vessels at this time except for drift-gillnet fishing under an experimental fishing permit.

8. Balancing of domestic and foreign interests - This is not one of the National Standards of the Magnuson Act. A balancing test (Appendix C), however, is required for a legal review of proposed management plans for billfish and associated species vis-a-vis the U.S.' open-access policy on tuna. The Council's initial Billfish FMP proposed closures of the entire FCZ surrounding the main Hawaiian islands and Guam to foreign longline fishing. The modification in the area closures in this plan means that all sub-areas of the U.S. FCZ will now be accessible to some degree to foreign longline fishing for tuna, and that whatever foreign longline fishing occurs will be less tightly controlled with respect to non-retention, fish release requirements, and quotas. Also foreign fishing for tuna by pole-and-line vessels and purse seine vessels will not be subject to any controls on effort or catches. The extent in the modifications of the area closures to foreign longline fishing, however, are not so substantial that adverse effects on domestic catches of the management unit species would be expected. The certainty of protection of important fishing areas for domestic fishermen realized through this FMP is a net benefit in contrast to the uncertainties associated with the PMP. In the Council's view, there is also a benefit to foreign longline fishing interests in the reduction of the overall regulatory burden. In short, both domestic and foreign interests would be better served under the FMP in the long run compared to the PMP.

7.5 Conclusion

In conclusion, this revised FMP is significant improvement over the PMP in several major respects. The measures proposed in the Council's preferred alternative are intended to increase the values of the domestic fisheries for the management unit species while providing a more reasonable opportunity for foreign vessels to fish for tuna in the FCZ of the Western Pacific Region than under the PMP. Domestic fishermen could expect to realize larger catches, higher catch rates, and better fishery development prospects with the FMP than under the PMP. The potential associated with the PMP's non-retention approach would be eliminated while the possibility of gear conflicts will be precluded in the areas closed to foreign longlining. Foreign vessels would no longer be subject to quotas or non-retention requirements. The NMFS can and should develop a mutually acceptable observer program with foreign nations to minimize the burden posed by having to pick up and disembark observers at U.S. ports for each and every foreign vessel wishing to fish in the 1.5 million square mile FCZ of the Western Pacific Region. The plan presents a straightforward and easily complied with management approach compared to the PMP. The cost-effectiveness of the FMP is much greater than that of the PMP. The alternatives considered (i.e., seasonal and smaller area closures) would not achieve as large a likelihood of increased domestic fishery benefits compared to the preferred alternative.

Finally, the draft FMP also recognizes the need for and promotes the establishment of an international program for managing all migratory species, as called for under Article 64 of the Convention of the Law of the Sea:

> "The coastal State and other States whose nationals fish in the region for highly migratory species... shall co-operate directly or through appropriate international organizations with a view to ensuring conservation and promoting the objective of optimum utilization of such species throughout the region, both within and beyond the exclusive economic zone. In regions where no appropriate international organization exists, the coastal State and other States whose nationals harvest these species in the region shall cooperate to establish such an organization and participate in its work."

This FMP is a step towards such co-operation in that the Council seeks to facilitate easier foreign access to tuna in the FCZ while simultaneously protecting domestic fishing interests for the management unit species. This is the balance being sought by the Council.