

# CHAPTER 6

## IDENTIFICATION AND DESCRIPTION OF ESSENTIAL FISH HABITAT

### 6.1 EFH Background

The Sustainable Fisheries Act—which amended the MSFCMA in 1996—requires several new FMP provisions. The identification and description of essential fish habitat (EFH) for all managed species<sup>1</sup> is among the most important of these additions. According to the MSFCMA, EFH is “those waters and substrate necessary to fish for spawning, breeding or growth to maturity.” This new mandate represents a significant shift in fishery management policy. Because councils must now consider management unit species’ ecological role, they must move beyond traditional single- or multi-species management to a broader ecosystem-based approach. This fits well with the objectives of this fishery ecosystem plan, and more generally, the principals set forth by the Ecosystem Principles Advisory Panel (EPAP 1999), which have guided this plan’s development. As their report pointed out, many existing MSFCMA requirements—EFH in particular—contribute to the ecosystem approach, if effectively implemented.

The EFH provisions are especially important because of the procedural requirements they impose on both councils and federal agencies. First, in their FMPs, councils must identify adverse impacts to EFH resulting from both fishing and non-fishing activities, and describe measures to minimize these impacts. Second, councils can provide comments and make recommendations to federal or state agencies that propose actions that may affect the habitat, including EFH, of a managed species. Based on these comments, and comments from other agencies, the Secretary of Commerce makes recommendations to the action agency on how to minimize the adverse impacts of their actions. Within 30 days, the action agency must provide a written response, describing how they intend to minimize or mitigate identified adverse impacts.

EFH designations in this FMP are based on the best available scientific information, including both environmental and fisheries data. This information was obtained through a series of public meetings of the Council, Scientific and Statistical Committee, FMP plan teams, and fishing industry advisory panels. In addition, the Council worked in close cooperation with NMFS scientists.

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<sup>1</sup>Subsequent guidance allows either individual species or species assemblages to be described.

### 6.1.1 Description of EFH

NMFS guidelines for EFH implementation require that in their FMPs councils:

- Identify and describe EFH for all species managed under an FMP;
- Describe adverse impacts to EFH from fishing activities;
- Describe adverse impacts to EFH from non-fishing activities; and,
- Recommend conservation and enhancement measures to minimize and mitigate the adverse impacts to EFH resulting from fishing- and non-fishing-related activities.

The guidelines recommend that each Council prepare a preliminary inventory of available environmental and fisheries information on managed species. Such an inventory is useful in describing and identifying EFH, and helps to identify missing information about the habitat of a particular species. A wide range of basic information is needed to identify EFH, including data on current and historic stock size, the geographic range of the managed species, the habitat requirements by life history stage, and the distribution and characteristics of those habitats. Since EFH has to be identified for each major life history stage, information about a species' distribution, density, growth, mortality, and production within all the habitats it occupies, or formerly occupied, is also necessary. The inventory should classify these data according to their quality, using these four categories:

- Level 1: All that is known is where a species occurs based on distribution data for all or part of the geographic range of the species;
- Level 2: Data on habitat-related densities or relative abundance of the species are available;
- Level 3: Data on growth, reproduction or survival rates within habitats are available; and,
- Level 4: Production rates by habitat are available.

With higher quality data, those habitats most highly valued by a species can be identified, allowing a more precise designation of EFH. Habitats of intermediate and low value also may be essential, depending on the health of the fish population and the ecosystem. For example, if a species is overfished, and habitat loss or degradation is thought to contribute to its overfished condition, all habitats currently used by the species may be essential. However, no Level 3 or Level 4 data are yet available for CRE MUS.

Despite these data limitations, this FMP describes EFH in text and tables that provide information on the biological requirements for the egg, larvae, juvenile, and adult life stages of all MUS. Because of these limitations, the Council adopted a precautionary approach to EFH designation. As result, the Council's EFH designation for CRE MUS covers all the waters and habitat at depths from the sea surface to 50 fathoms extending from the shoreline (including state and territorial lands and waters) to the outer boundary of the EEZ. This broad EFH designation will ensure that enough habitat is protected to sustain managed species.

In addition to text and tabular descriptions, the distribution and geographic limits of CRE MUS EFH were mapped, using a computer-based geographic information system. This facilitates analysis and presentation. More detailed and informative maps will be produced as more complete information about population responses (e.g., growth, survival, or reproductive rates) to habitat characteristics becomes available.

The Western Pacific Region comprises a range of marine ecosystems used as habitat by coral reef organisms, and each constituent state differs in the type of reef habitat that they contain (Green 1997). (Table 6.1 summarizes their distribution.) Most of the reefs in the Main Hawaiian Islands are large non-structural or fringing reefs. There are also a few barrier reefs and banks or shoals. In contrast, most of the reefs in the NWHI are banks/shoals, although there are also a few atolls, and non-structured and fringing reefs. Similarly, the reefs in the CNMI tend to be mostly banks/shoals or non-structural reefs, although there are some fringing and barrier/lagoon reefs. American Samoa has mostly fringing reefs, with two remote atolls and two non-structural reefs. Most of the reefs on Guam are a mixture of banks/shoals, barrier/lagoon and fringing or non-structural reefs. Other U.S. Pacific Islands are either atolls or have fringing reefs.

**Table 6.1: Occurrence of habitat types in the Western Pacific Region.**

|                               | AS | CNMI | Guam | HI | Other |
|-------------------------------|----|------|------|----|-------|
| Estuaries                     | x  | x    | x    | x  |       |
| Fringing Reefs                | x  | x    | x    | x  | x     |
| Atolls                        | x  |      |      | x  | x     |
| Barrier/Lagoon                | x  | x    | x    | x  |       |
| Non-structural Reef           | x  | x    | x    | x  |       |
| Banks and Shoals              | x  | x    | x    | x  | x     |
| Seagrass Beds                 |    | x    | x    | x  | x     |
| Mangroves                     | x  | x    | x    | x  | x     |
| Pelagic/Open Ocean            | x  | x    | x    | x  | x     |
| Deep Slope Terraces           | x  | x    | x    | x  | x     |
| Patch Reefs                   | x  | x    | x    | x  | x     |
| Reef Communities/ Apron Reefs | x  | x    | x    | x  | x     |

Habitat protection is an essential component of a coral reef ecosystem management regime. Clearly, healthy and intact habitats are fundamental to the health and survival of coral reef species. At the same time, very little data are available to adequately document the extent of these habitats, to identify those that may be particularly critical to various life phases of significant commercial and recreational species, or to best locate appropriate areas for marine reserves.

### 6.1.2 EFH Designation for MUS

Ten alternatives for EFH designation were considered: (1) no action/status quo; (2) species-by-species; (3) family-by-family; (4) habitat/behavioral group; (5) reef obligate species/reef-associated species; (6) designate MUS at a higher taxonomic order; (7) representative species; (8) indicator species; (9) habitat composites; and (10) designate the sessile benthos MUS (e.g., reef-building corals) as EFH for those organisms themselves and for associated species.

This FMP uses an approach similar to one used by both the South Atlantic and the Pacific Fishery Management Councils. Using this approach, MUS are linked to specific habitat "composites" (e.g., sand, live coral, seagrass beds, mangrove, open ocean) for each life history stage, consistent with the depth of the ecosystem to 50 fathoms and to the limit of the EEZ. These designations could also protect species managed under other Council FMPs to the degree that they share these habitats.

Except for several of the major coral reef associated species, very little is known about the life histories, habitat utilization patterns, food habits, or spawning behavior of most coral reef associated species. For this reason, the Council has designated EFH using a two-tiered approach based on the division of MUS into the Currently Harvested Coral Reef Taxa (CHCRT) and Potentially Harvested Coral Reef Taxa (PHCRT) categories (see Section 1.6.2). This is also consistent with the use of habitat composites.

#### *Currently Harvested Coral Reef Taxa MUS*

In the first tier, EFH has been identified for species which are: (1) currently being harvested in state and federal waters and for which some fishery information is available, and (2) are likely to be targeted in the near future based on historical catch data. Table 6.2 summarizes the habitat types used by CHCRT species, grouped into higher taxonomic orders. (Tables 6.2-6.6 may be found after Section 6.2.) The designations of EFH for these MUS are summarized in Table 6.3.

To reduce the complexity and the number of EFH identifications required for individual species and life stages, the Council has designated EFH for species assemblages pursuant to 50 CFR 600.815 (a)(2)(ii)(E). The designation of these "complexes" is based on the ecological relationships among species and their preferred habitat. These species complexes are grouped by the known depth distributions of individual MUS. For a broader description of the life history and habitat utilization patterns of CHCRT, see Volume III.

#### *Potentially Harvested MUS*

EFH has also been designated for the second tier, Potentially Harvested Coral Reef Taxa. These taxa include literally thousands of species encompassing almost all coral reef fauna and flora. However, there is very little scientific knowledge about the life histories and habitat requirements of the thousands of species of organisms that compose these taxa. In fact, a large percentage of these biota have not been described by science. Therefore, the Council has used the

precautionary approach in designating EFH for PHCRT so that enough habitat is protected to sustain managed species. Table 6.4 summarizes the habitat types used by PHCRT species, grouped into higher taxonomic orders. The designation of EFH for these MUS is summarized in Table 6.5. As with CHCRT, the Council has designated EFH for species assemblages pursuant to the federal regulations cited above, and Volume III also contains more detailed descriptions of PHCRT.

## **6.2 Habitat Areas of Particular Concern**

In addition to EFH, the Council also identified habitat areas of particular concern (HPAC) for Coral Reef Ecosystem MUS. HAPCs are specific areas within EFH that are essential to the life cycle of important coral reef species. In determining whether a type or area of EFH should be designated as an HAPC, one or more of the following criteria established by NMFS must be met: (1) the ecological function provided by the habitat is important; (2) the habitat is sensitive to human-induced environmental degradation; (3) development activities are, or will be, stressing the habitat type; or (4) the habitat type is rare. However, it is important to note that if an area meets only one of the HAPC criteria, it will not necessarily be designated an HAPC.

Because of the already-noted lack of scientific data, the Council considered locations that are known to support populations of Coral Reef Ecosystem MUS and meet NMFS criteria for HAPC. Although not one of the criteria established by NMFS, the Council considered designating areas that are already protected—for example, wildlife refuges—as HAPC. The HAPCs identified in Table 6.6 have met at least one of the four criteria listed above, or the fifth criterion just identified. However, a great deal of life history work needs to be done in order to adequately identify the extent of HAPCs and link them to particular species or life stages.

**Table 6.2a: Occurrence of Currently Harvested Management Unit Species.**

**Habitats:** Mangrove (Ma) Lagoon (La) Estuarine (Es) Seagrass Beds (SB) Soft substrate (Ss) Coral Reef/Hard Substrate (Cr/Hr) Patch Reefs (Pr) Surge Zone (Sz) Deep-slope Terraces (DST) Pelagic/Open Ocean (Pe)

**Life-history stages:** Egg (E) Larvae (L) Juvenile (J) Adult (A) Spawners (S)

|  | Ma | La      | Es      | SB | Ss      | Cr/Hs   | Pr      | Sz | DST  | Pe   |
|--|----|---------|---------|----|---------|---------|---------|----|------|------|
| <p>Acanthuridae (surgeonfishes)</p> <p>Subfamily Acanthurinae (surgeonfishes)</p> <p>Orange-spot surgeonfish (<i>Acanthurus olivaceus</i>)</p> <p>Yellowfin surgeonfish (<i>Acanthurus xanopterus</i>)</p> <p>Convict tang (<i>Acanthurus triostegus</i>)</p> <p>Eye-striped surgeonfish (<i>Acanthurus dussumieri</i>)</p> <p>Blue-lined surgeon (<i>Acanthurus nigronis</i>)</p> <p>Whitebar surgeonfish (<i>Acanthurus leucopareus</i>)</p> <p>Blue-banded surgeonfish (<i>Acanthurus lineatus</i>)</p> <p>Blackstreak surgeonfish (<i>Acanthurus nigricauda</i>)</p> <p>Whitecheek surgeonfish (<i>Acanthurus nigricans</i>)</p> <p>White-spotted surgeonfish (<i>Acanthurus guttatus</i>)</p> <p>Ringtail surgeonfish (<i>Acanthurus blochii</i>)</p> <p>Brown surgeonfish (<i>Acanthurus nigrofusus</i>)</p> <p>Elongate surgeonfish (<i>Acanthurus mata</i>)</p> <p>Mimic surgeonfish (<i>Acanthurus pyroferus</i>)</p> <p>Yellow-eyed surgeonfish (<i>Ctenochaetus strigosus</i>)</p> <p>Striped bristletooth (<i>Ctenochaetus striatus</i>)</p> <p>Twospot bristletooth (<i>Ctenochaetus binotatus</i>)</p> | J  | A, J, S | A, J, S | J  | A, J, S | A, J, S | A, J, S |    | A, J | E, L |
| <p>Subfamily Nasianae (Unicornfishes)</p> <p>Bluespine unicornfish (<i>Naso unicornus</i>)</p> <p>Orangespine unicornfish (<i>Naso lituratus</i>)</p> <p>Humphose unicornfish (<i>Naso tuberosus</i>)</p> <p>Blacktounge unicornfish (<i>Naso hexacanthus</i>)</p> <p>Bignose unicornfish (<i>Naso vlamingii</i>)</p> <p>Whitemargin unicornfish (<i>Naso annulatus</i>)</p> <p>Spotted unicornfish (<i>Naso brevirostris</i>)</p> <p>Humpback unicornfish (<i>Naso brachycentron</i>)</p> <p>Barred unicornfish (<i>Naso thynnoides</i>)</p> <p>Gray unicornfish (<i>Naso caesioides</i>)</p>   | J  | A, J, S | J       |    | A, S    | A, J, S | A, J, S |    | A, S | All  |

|   | Ma      | La      | Es      | SB | Ss      | Cr/Hs   | Pr      | Sz      | DST  | Pe   |
|---|---------|---------|---------|----|---------|---------|---------|---------|------|------|
| <b>Balistidae (Trigger Fish)</b><br>Titan triggerfish ( <i>Balistoides viridescens</i> )<br>Clown triggerfish ( <i>B. conspicillum</i> )<br>Orangstriped trigger ( <i>Balistapus undulatus</i> )<br>Pinktail triggerfish ( <i>Melichthys vidua</i> )<br>Black triggerfish ( <i>M. niger</i> )<br>Blue Triggerfish ( <i>Pseudobalistes fuscus</i> )<br>Picasso fish ( <i>Rhinecanthus aculeatus</i> )<br>Wedged Picasso fish ( <i>B. rectangulus</i> )<br>Bridled triggerfish ( <i>Sufflamen fraenatus</i> ) | J       | A, J, S | J       | J  |         | A, J, S | A, J, S | A       | A, S | E, L |
| <b>Carangidae (jacks)</b><br>Bigeye scad ( <i>Selar crumenophthalmus</i> )<br>Mackerel scad ( <i>Decapterus macarellus</i> )  | A, J, S | A, J, S | A, J, S | J  | A, J, S | A, J, S | A, J, S | A, J, S | All  |      |
| <b>Carcharhinidae</b><br>Grey reef shark ( <i>Carcharhinus amblyrhynchos</i> )<br>Silvertip shark ( <i>Carcharhinus albimarginatus</i> )<br>Galapagos shark ( <i>Carcharhinus galapagensis</i> )<br>Blacktip reef shark ( <i>Carcharhinus melanopterus</i> )<br>Whitetip reef shark ( <i>Triaenodon obesus</i> )  | A, J    | A, J    | A, J    | J  | A, J    | A, J    | A, J    |         | A, J | A, J |

|  | Ma   | La      | Es      | SB   | Ss   | Cr/Hs   | Pr      | Sz   | DST  | Pe   |
|--|------|---------|---------|------|------|---------|---------|------|------|------|
| <p>Holocentridae (soldierfish/squirrelfish)</p> <p>Bigscale soldierfish (<i>Myripristis berndti</i>)</p> <p>Bronze soldierfish (<i>Myripristis adusta</i>)</p> <p>Blotcheye soldierfish (<i>Myripristis murdjan</i>)</p> <p>Bricksoldierfish (<i>Myripristis amaena</i>)</p> <p>Scarlet soldierfish (<i>Myripristis pralinia</i>)</p> <p>Violet soldierfish (<i>Myripristis violacea</i>)</p> <p>Whitetip soldierfish (<i>Myripristis vittata</i>)</p> <p>Yellowfin soldierfish (<i>Myripristis chryseres</i>)</p> <p>Pearly soldierfish (<i>Myripristis kuntee</i>)</p> <p>(<i>Myripristis hexagona</i>)</p> <p>Tailspot squirrelfish (<i>Sargocentron caudimaculatum</i>)</p> <p>Blackspot squirrelfish (<i>Sargocentron melanospiros</i>)</p> <p>File-lined squirrelfish (<i>Sargocentron microstoma</i>)</p> <p>Pink squirrelfish (<i>Sargocentron tieroides</i>)</p> <p>Crown squirrelfish (<i>Sargocentron diadema</i>)</p> <p>Peppered squirrelfish (<i>Sargocentron punctatissimum</i>)</p> <p>Blue-lined squirrelfish (<i>Sargocentron tiere</i>)</p> <p>Ala'ih (<i>Sargocentron xantherythrum</i>)</p> <p>(<i>Sargocentron turcatum</i>)</p> <p>(<i>Sargocentron spiniferum</i>)</p> <p>Spotfin squirrelfish (<i>Neoniphon</i> spp.)</p> |      | A, J, S | A, J, S | J    |      | A, J, S | A, J, S |      | A, S | E, L |
| <p>Kuhliidae (flagtails)</p> <p>Hawaiian flag-tail (<i>Kuhlia sandvicensis</i>)</p> <p>Barred flag-tail (<i>Kuhlia mugil</i>)</p>  | A, J | A, J    | A, J    | A, J |      |         |         | A    |      | E, L |
| <p>Kyphosidae (rudderfishes)</p> <p>Rudderfish (<i>Kyphosus bigibbus</i>)</p> <p>(<i>K. cinerascens</i>)</p> <p>(<i>K. vaigiensis</i>)</p>   | J    | A, J, S | A, J, S |      | A, J | A, J, S | A, J, S | A, J |      | All  |



|   | Ma | La   | Es | SB | Ss      | Cr/Hs   | Pr      | Sz   | DST     | Pe   |
|---|----|------|----|----|---------|---------|---------|------|---------|------|
| Labridae (wrasses)                                      |    |      |    |    |         |         |         |      |         |      |
| Saddleback hogfish ( <i>Bodianus bilunulatus</i> )      |    | J    | J  | J  | A, J, S | A, J, S | A, J, S |      | A, J, S | E, L |
| Razor wrasse ( <i>Xyrichtys pavo</i> )                  |    |      |    |    |         |         |         |      |         |      |
| Whitepatch wrasse ( <i>Xyrichtes aneifensis</i> )       |    |      |    |    |         |         |         |      |         |      |
| Triple-tail wrasse ( <i>Cheilinus trilobatus</i> )      |    | A, J | J  |    | A, J, S | A, J, S | A, J, S |      | A, J, S | E, L |
| Floral wrasse ( <i>Cheilinus chlorourus</i> )           |    |      |    |    |         |         |         |      |         |      |
| Harlequin tuskfish ( <i>Cheilinus fasciatus</i> )       |    |      |    |    |         |         |         |      |         |      |
| Ring-tailed wrasse ( <i>Oxycheilinus unifasciatus</i> ) |    | A, J |    |    | A, J, S | A, J, S | A, J, S |      | A, J, S | E, L |
| Bandcheek wrasse ( <i>Oxycheilinus diagrammus</i> )     |    |      |    |    |         |         |         |      |         |      |
| Arenatus wrasse ( <i>Oxycheilinus arenatus</i> )        |    |      |    |    |         |         |         |      |         |      |
| Blackeye thicklip ( <i>Hemigymnus melapterus</i> )      |    | A, J |    | J  | A, J, S | J       | J, S    |      | A, J, S | E, L |
| Barred thicklip ( <i>Hemigymnus fasciatus</i> )         |    |      |    |    |         |         |         |      |         |      |
| Cigar wrasse ( <i>Cheilio inermis</i> )                 |    |      |    |    |         |         |         |      |         |      |
| Threespot wrasse ( <i>Halichoeres trimaculatus</i> )    |    |      |    |    |         |         |         |      |         |      |
| Checkerboard wrasse ( <i>Halichoeres hortulanus</i> )   |    | A, J | J  |    | A, J, S | A, J, S |         | A, J |         | E, L |
| Weedy surge wrasse ( <i>Halichoeres margaritaceus</i> ) |    |      |    |    |         |         |         |      |         |      |
| ( <i>Halichoeres zeylonicus</i> )                       |    |      |    |    |         |         |         |      |         |      |
| Surge wrasse ( <i>Thalassoma purpuraceum</i> )          |    | A, J |    | J  | A, J, S | A, J, S | A, J, S |      |         | E, L |
| Redribbon wrasse ( <i>Thalassoma quinquevittatum</i> )  |    |      |    |    |         |         |         |      |         |      |
| Sunset wrasse ( <i>Thalassoma lutescens</i> )           |    |      |    |    |         |         |         |      |         |      |
| Longface wrasse ( <i>Hologymnosus doliatus</i> )        |    | A, J |    |    | A, J, S | A, J, S |         | A, J |         |      |
| Rockmover wrasse ( <i>Novaculichthys taeniourus</i> )   |    |      |    |    |         |         |         |      |         |      |
| Napoleon wrasse ( <i>Cheilinus undulatus</i> )          | J  | J    |    | J  |         | A, J, S | A, J, S |      | A, S    | E, L |

|  | Ma      | La      | Es      | SB   | Ss      | Cr/Hs   | Pr      | Sz      | DST  | Pe   |
|--|---------|---------|---------|------|---------|---------|---------|---------|------|------|
| <b>Mullidae (goatfish)</b><br>Yellow goatfish ( <i>Mulloidichthys</i> spp.)<br>( <i>Mulloidichthys</i> Pfeugeri)<br>( <i>Mulloidichthys</i> vanicolensis)<br>( <i>Mulloidichthys</i> flaviolineatus)<br><br>Banded goatfish ( <i>Parupeneus</i> spp.)<br>( <i>Parupeneus</i> barberinus)<br>( <i>Parupeneus</i> bifasciatus)<br>( <i>Parupeneus</i> heptacanthus)<br>( <i>Parupeneus</i> ciliatus)<br>( <i>Parupeneus</i> ciliatus)<br>( <i>Parupeneus</i> cyclostomas)<br>( <i>Parupeneus</i> pleurostigma)<br>( <i>Parupeneus</i> indicus)<br>( <i>Parupeneus</i> multifasciatus)<br><br>Bantail goatfish ( <i>Upeneus</i> arge) |         | A, J    | A       | A, J | A, J    | A, J    | A, J    |         |      | E, L |
| <b>Octopodidae (octopuses)</b><br><i>Octopus cyanea</i><br><i>O. ornatus</i>   | A, J, S | All     | A, J, S | All  | All     | All     | All     |         | All  | L    |
| <b>Mugilidae (Mullet)</b><br>Stripped mullet ( <i>Mugil cephalus</i> )<br>Engel's mullet ( <i>Moolgarda engelii</i> )<br>False mullet ( <i>Neomyxus leuciscus</i> )<br>Fringelip mullet ( <i>Crenimugil crenilabris</i> )  | J       | A, J, S | A, J, S | J    |         | A, J    |         | A       |      | E, L |
| <b>Muraenidae (moray eels)</b><br>Yellowmargin moray ( <i>Gymnothorax flavimarginatus</i> )<br>Giant moray ( <i>Gymnothorax javanicus</i> )<br>Undulated moray ( <i>Gymnothorax undulatus</i> )  | A, J, S | A, J, S | A, J, S | A, J | A, J, S | A, J, S | A, J, S | A, J, S | E, L |      |
| <b>Polynemidae (threadfins)</b><br>Threadfin ( <i>Polydactylus sexfilis</i> ) -Moi   | A, J    | A, J, S | A, J, S |      | A, J, S |         |         | A, J    |      | E, L |

|   | Ma      | La      | Es      | SB   | Ss   | Cr/Hs   | Pr      | Sz | DST  | Pe   |
|---|---------|---------|---------|------|------|---------|---------|----|------|------|
| Priacanthidae (bigeyes)<br>Glasseye ( <i>Heteropriacanthus cruentatus</i> )<br>Bigeye ( <i>Priacanthus hamrur</i> )   |         |         |         |      |      | A, J    | A, J    |    | A, J | E, L |
| Siganidae (rabbitfish)<br>Forktail rabbitfish ( <i>Siganus argenteus</i> )<br>Golden rabbitfish ( <i>Siganus guttatus</i> )<br>Gold-spot rabbitfish ( <i>Siganus punctatissimus</i> )<br>Randall's rabbitfish ( <i>Siganus randalli</i> )<br>Scribbled rabbitfish ( <i>Siganus spinus</i> )<br>Vermiculate rabbitfish ( <i>Signaus vermiculatus</i> ) | A, J, S | A, J, S | A, J, S | J    |      | A, J, S | A, J, S |    | E, L |      |
| Scaridae (parrotfishes)<br>Parrotfishes ( <i>Scarus spp.</i> )<br>Pacific longnose parrotfish ( <i>Hipposcarus longiceps</i> )<br>Stareye parrotfish ( <i>Catolomus carolinus</i> )   | J       | A, J, S |         | A, J |      | A, J, S | A, J, S |    |      | E, L |
| Bumphead parrotfish ( <i>Bolbometopon muricatum</i> )   | J       | J       |         | J    |      | A, J, S | A, J, S |    | A, J | E, L |
| Scombridae (tuna/mackerel)<br>Dogtooth tuna ( <i>Gymnosarda unicolor</i> )  |         | A, J, S |         |      | A, J | A, J, S | A, J,   |    | A, J | E, L |
| Sphyrinaeidae (barracudas)<br>Heller's barracuda ( <i>Sphyræna helleri</i> )<br>Great Barracuda ( <i>Sphyræna barracuda</i> )   | A, J    | A, J, S | A, J, S | J    |      | A, J, S | A, J, S |    | A, S | All  |
| Turbinidae (turban shells)<br>Turbo sp.   |         | A, J, S |         |      |      | A, J, S | A, J, S |    | A    | E, L |

**Table 6.2b: Occurrence of Currently Harvested Management Unit Species: Aquarium Taxa/Species.**

|  | Ma      | La      | Es      | SB   | Ss      | Cr/Hs   | PR      | Sz | DST     | Pe   |
|--|---------|---------|---------|------|---------|---------|---------|----|---------|------|
| <b>Acanthuridae (surgeonfishes)</b><br>Yellow tang ( <i>Zebrasoma flavescens</i> )<br>Yellow-eyed surgeonfish ( <i>Ctenochaetus strigosus</i> )<br>Achilles tang ( <i>Acanthurus achilles</i> )  | J       | A, J, S | A, J, S | J    | A, J, S | A, J, S | A, J, S |    | A, J    | E, L |
| <b>Zanclidae</b><br>Moorish Idol ( <i>Zanclus cornutus</i> )   | J       | A, J, S | J       | J    |         | A, J, S | A, J, S |    |         | E, L |
| <b>Pomacanthidae (angelfishes)</b><br><i>Centropyge shepardi</i><br><i>C. flavissimus</i>  |         | A, J    |         |      |         | A, J    | A, J    | A  | J       | E, L |
| <b>Muraenidae</b><br>Dragon moray ( <i>Enchelycore pardalis</i> .)   | A, J, S | A, J, S | A, J, S | A, J | A, J, S | A, J, S | A, J, S | A  | A, J, S | E, L |
| <b>Cirrhitidae (hawkfishes)</b><br>Longnose hawkfish ( <i>Oxyurichthys typus</i> )<br>Flame hawkfish ( <i>Neocirrhites armatus</i> )   |         | A, J, S |         |      |         | A, J, S | A, J, S | A  | A, J, S | All  |
| <b>Chaetodontidae (butterflyfishes)</b><br>Threadfin butterflyfish ( <i>Chaetodon auriga</i> )<br>Raccoon butterflyfish ( <i>Chaetodon lunula</i> )<br>Black-backed butterflyfish ( <i>Chaetodon melanotus</i> )<br>Saddled butterflyfish ( <i>Chaetodon ephippium</i> ) |         | A, J    |         |      |         | A, J    | A, J    |    |         | E, L |
| <b>Pomacentridae (damselfishes)</b><br>Blue-green chromis ( <i>Chromis viridis</i> )<br>Humbug dascyllus ( <i>Dascyllus aruanus</i> )<br>Threespot dascyllus ( <i>Dascyllus trimaculatus</i> )   |         | A, J    |         |      |         | A, J    | A, J    | A  | A, J    | E, L |
| <b>Sabellidae (feather-duster worms)</b>   | A, J, S | A, J, S | A, J, S |      | A, J, S | A, J, S | A, J, S | A  | A, J, S | E, L |

**Table 6.3: Summary of EFH designations for Currently Harvested Coral Reef Taxa.**

| Species Assemblage/Complex | EFH (Egg and Larvae)   | EFH (Adult and Juvenile)  |
|----------------------------|--|---|
| Acanthuridae               | The water column from the shoreline to the outer boundary of the EEZ to a depth of 50 fm.                                  | All bottom habitat and the adjacent water column from 0 to 50 fm.   |
| Balistidae                 | The water column from the shoreline to the outer boundary of the EEZ to a depth of 50 fm.                                  | All bottom habitat and the adjacent water column from 0 to 50 fm.   |
| Carangidae                 | The water column from the shoreline to the outer boundary of the EEZ to a depth of 50 fm.                                  | All bottom habitat and the adjacent water column from 0 to 50 fm.   |
| Carcharhinidae             | N/A  | All bottom habitat and the adjacent water column from 0 to 50 fm to the outer extent of the EEZ.                          |
| Holocentridae              | The water column from the shoreline to the outer boundary of the EEZ to a depth of 50 fm.                                  | All rocky and coral areas and the adjacent water column from 0 to 50 fm.  |
| Kuhliidae                  | The water column from the shoreline to the outer limits of the EEZ to a depth of 50 fm.                                    | All bottom habitat and the adjacent water column from 0 to 25 fm.   |
| Kyphosidae                 | Egg, Larvae and Juvenile: the water column from the shoreline to the outer boundary of the EEZ to a depth of 50 fm.        | All rocky and coral bottom habitat and the adjacent water column from 0 to 15 fm.   |
| Labridae                   | The water column and all bottom habitat extending from the shoreline to the outer boundary of the EEZ to a depth of 50 fm. |   |
| Mullidae                   | The water column extending from the shoreline to the outer boundary of the EEZ to a depth of 50 fm.                        | All rocky/coral and sand-bottom habitat and adjacent water column from 0 to 50 fm.  |
| Mugilidae                  | The water column from the shoreline to the outer limits of the EEZ to a depth of 50 fm.                                    | All sand and mud bottoms and the adjacent water column from 0 to 25 fm.   |
| Muraenidae                 | The water column from the shoreline to the outer boundary of the EEZ to a depth of 50 fm.                                  | All rocky and coral areas and the adjacent water column from 0 to 50 fm.  |
| Octopodidae                | Larvae: The water column from the shoreline to the outer limits of the EEZ to a depth of 50 fm.                            | EFH for the adult, juvenile phase and demersal eggs is defined as all coral, rocky and sand-bottom areas from 0 to 50 fm. |

| Species Assemblage/Complex | EFH (Egg and Larvae)  | EFH (Adult and Juvenile)   |
|----------------------------|---|--|
| Polynemidae                | The water column extending from the shoreline to the outer boundary of the EEZ to a depth of 50 fm.   | All rocky/coral and sand-bottom habitat and the adjacent water column from 0 to 50 fm.       |
| Priacanthidae              | The water column extending from the shoreline to the outer boundary of the EEZ to a depth of 50 fm.   | All rocky/coral and sand-bottom habitat and the adjacent water column from 0 to 50 fm.       |
| Scaridae                   | The water column from the shoreline to the outer limit of the EEZ to a depth of 50 fm.  | All bottom habitat and the adjacent water column from 0 to 50 fm.                            |
| Siganidae                  | The water column from the shoreline to the outer boundary of the EEZ to a depth of 50 fm.   | All bottom habitat and the adjacent water column from 0 to 50 fm.                            |
| Scombridae                 | EFH for all life stages of dogtooth tuna is designated as the water column from the shoreline to the outer boundary of the EEZ to a depth of 50 fm.           |  |
| Sphyraenidae               | EFH for all life stages in the family Sphyraenidae is designated as the water column from the shoreline to the outer boundary of the EEZ to a depth of 50 fm. |  |
| Turbinidae                 | The water column from the shoreline to the outer boundary of the EEZ to a depth of 50 fm.   | All bottom habitat and the adjacent water column from 0 to 50 fm.                            |
| Aquarium Species/Taxa      | All waters from 0-50 fm from the shoreline to the limits of the EEZ.  | All coral, rubble, or other hard-bottom features and the adjacent water column from 0-50 fm. |

**Table 6.4: Occurrence of Potentially Harvested Coral Reef Taxa.**

**Habitat:** Mangrove (Ma) Lagoon (La) Estuarine (Es) Seagrass Beds (SB) Soft substrate (Ss) Coral Reef/Hard Substrate (Cr/Hr) Patch Reefs (Pr) Deep-slope Terraces (DST) Pelagic/Open Ocean (Pe).

**Life History Stage:** Egg (E) Larvae (L) Juvenile (J) Adult (A) Spawners (S).

| Management Unit Species/Taxa  | Ma      | La      | Es      | SB      | Ss      | Cr/Hs   | Pr      | DST     | Pe   |
|---|---------|---------|---------|---------|---------|---------|---------|---------|------|
| Labridae spp. (wrasses)   | J       | A, J, E | J       | J       | A, J    | A, J, S | A, J, S | A, J    | E, L |
| Kuhliidae   | A, J    | A, J    | All     | A, J    |         | A, S    | A, S    |         | E, L |
| Carcharinidae*, Sphyrnidae, (sharks)                                | A, J    | A, J    | A, J    |         | A, J    | A, J    | A, J    | A, J    | A, J |
| Dasyatidae, Myliobatidae, Mobulidae (rays)                          | A, J    | A, J    | A, J    |         | A, J    | A, J    | A, J    | A, J    | A, J |
| Serranidae spp.* (groupers)   | J       | A, J    |         | J       | A, J, S | A, J, S | A, J, S | A, S    | E, L |
| Carangidae* (jacks/trevallies)                                      | A, J, S | A, J, S | A, J, S | J       | A, J, S | A, J, S | A, J, S | A, J, S | All  |
| Holocentridae spp. (soldierfish/squirrelfish)                       |         | A, J, S | A, J, S | J       |         | A, J, S | A, J, S | A, S    | E, L |
| Scaridae spp. (parrotfishes)  | J       | A, J, S |         | A, J    |         | A, J, S | A, J, S |         | E, L |
| Bumphead parrotfish ( <i>Bolbometopon muricatum</i> )               | J       | J       |         | J       |         | A, J, S | A, J, S |         | E, L |
| Mullidae spp. (goatfish)  | A, J, S | A, J, S | A, J, S | A, J    | A, J, S | A, J, S | A, J, S | A, J    | E, L |
| Acanthuridae spp. (surgeonfish/unicornfish)                         | J       | A, J, S | A, J, S | J       | A, J, S | A, J, S | A, J, S | A, J    | E, L |
| Lethrinidae spp. (emperors), *                                      | J       | A, J, S | J       | J       | A, J, S | A, J, S | A, J, S | A, S    | E, L |
| Chlopsidae, Congridae, Moringuidae, Ophichthidae, Muraenidae (eels) | A, J, S | A, J, S | A, J, S | A, J    | A, J, S | A, J, S | A, J, S | A, J, S | E, L |
| Apogonidae (cardinalfish)   | A, J, S | A, J, S | A, J, S | A, J, S |         | A, J, S | A, J, S | A, J, S | E, L |
| Zanclidae spp. (moorish idols)                                      |         | A, J    |         |         |         | A, J    | A, J    |         | E, L |
| Chaetodontidae spp. (butterflyfish)                                 | J       | A, J, S | J       | J       |         | A, J, S | A, J, S | A, S    | E, L |
| Pomacanthidae spp. (angelfish)                                      | J       | A, J, S | J       | J       |         | A, J, S | A, J, S | A, S    | E, L |
| Pomacentridae spp. (damselfish)                                     | J       | A, J, S | J       | J       |         | A, J, S | A, J, S | A, S    | E, L |

| Management Unit Species/Taxa               | Ma      | La      | Es      | SB   | Ss      | Cr/Hs   | Pr      | DST     | Pe   |
|--|---------|---------|---------|------|---------|---------|---------|---------|------|
| Scorpaenidae (scorpionfish)                | J       | A, J, S | A, J, S | J    |         | A, J, S | A, J, S |         | E, L |
| Blenniidae (blennies)                      |         | A, J, S | A, J, S |      | A, J, S | A, J, S | A, J, S | A, J, S | E, L |
| Ephippidae (batfish)                       | J       | A, J, S | J       |      | A, S    | A, J, S | A, J, S | A, S    | All  |
| Monodactylidae (mono)                      | A, J, S | A, J, S | A, J, S |      |         | A, J, S | A, J, S |         | E, L |
| Haemulidae (sweetlips)                     | J       | A, J, S | A, J, S | J    |         | A, J, S | A, J, S |         | E, L |
| Echineidae (remoras)                       |         |         |         |      |         | A, J, S | A, J, S | A, J, S | E, L |
| Malacanthidae (tilefish)                   |         | A, J, S |         |      | A, J, S | A, J, S | A, J, S |         | E, L |
| Acanthoclinidae (spiny basslets)           |         |         |         |      |         | A, J    |         | A, J    | E, L |
| Pseudochromidae (dottybacks)               | J       | J       |         | J    |         | A, J, S | A, J, S |         | E, L |
| Plesiopidae (prettyfins)                   | J       | A, J, S |         |      |         | A, J, S | A, J, S |         | E, L |
| Tetrarogidae (waspfish)                    | J       | A, J, S |         |      |         | A, J, S | A, J, S |         | E, L |
| Caracanthidae (coral crouchers)            |         |         |         |      |         | A, J, S | A, J, S |         | E, L |
| Grammistidae (soapfish)                    |         |         |         |      |         | A, J, S | A, J, S |         | E, L |
| <i>Aulostomus chinensis</i> (trumpetfish)  | J       | A, J, S |         | A, J | A       | A, J, S | A, J, S |         | E, L |
| <i>Fistularia commersoni</i> (coronetfish) | J       | A, J, S |         | A, J |         | A, J, S | A, J, S |         | E, L |
| Anomalopidae (flashlightfish)              |         |         |         |      |         | J       | J       | A, J, S | E, L |
| Clupeidae (herrings)                       | A, J, S | A, J, S | A, J, S |      |         | A, J, S | A, J, S | A, S    | All  |
| Engraulidae (anchovies)                    | A, J, S | A, J, S | A, J, S |      |         | A, J, S | A, J, S | A, S    | All  |
| Gobiidae (gobies)                          | All     | All     | All     | All  | All     | All     | All     | All     | All  |
| Lutjanids (snappers)*                      | A, J, S | A, J, S | A, J, S | J    |         | A, J, S | A, J, S | A, S    | E, L |
| Ballistidae/Monacanthidae spp.             | J       | A, J, S | J       | J    |         | A, J, S | A, J, S | A, S    | L    |
| Siganidae spp. (rabbitfishes)              | A, J, S | A, J, S | A, J, S | J    |         | A, J, S | A, J, S |         | E, L |



| Management Unit Species/Taxa        | Ma      | La      | Es      | SB      | Ss      | Cr/Hs   | Pr      | DST     | Pe   |
|-------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|------|
| Kyphosidae                          | J       | A, J, S | A, J, S |         |         | A, J, S | A, J, S |         | All  |
| Caesionidae                         | J       | A, J, S |         |         | A, S    | A, J, S | A, J, S | A, S    | All  |
| Cirrhitidae                         |         | A, J, S |         |         |         | A, J, S | A, J, S | A, J, S | All  |
| Antennariidae (frogfishes)          |         | All     |         | All     |         | All     | All     |         | L    |
| Syngnathidae (pipefishes/seahorses) | All     | All     |         | All     |         | All     | All     |         | L    |
| Sphyraenidae spp. (barracudas)      | A, J    | A, J, S | A, J, S | J       |         | A, J, S | A, J, S | A, S    | All  |
| Priacanthidae                       | J       | A, J, S | J       |         |         | A, J, S | A, J, S | A, S    | E, L |
| Stony corals                        |         | A, J, S | A, J, S |         |         | A, J, S | A, J, S | A, J, S | E, L |
| Helopora (blue)                     |         | A, J, S | A, J, S |         |         | A, J, S | A, J, S | A, J, S | E, L |
| Tubipora (organpipe)                |         |         |         |         |         | A, J    | A, J    |         |      |
| Azooxanthellates (non-reefbuilders) |         | A, J, S | A, J, S |         | A, J, S | A, J, S | A, J, S | A, J, S | E, L |
| Fungiidae (mushroom corals)         |         | A, J, S | A, J, S |         |         | A, J, S | A, J, S | A, J, S | E, L |
| Sm/Lg Polyped Corals (endemic spp.) |         | A, J    |         |         |         | A, J    | A, J    | A, J    |      |
| Millepora (firecorals)              |         | A, J, S |         |         |         | A, J, S | A, J, S | A, J, S | E, L |
| Soft corals and Gorgonians          |         | A, J, S |         |         | A, J, S | A, J, S | A, J, S | A, J, S | E, L |
| Anemones (non-epifaunal)            | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | E, L |
| Zooanthids                          | A, J, S | A, J, S | A, J, S |         | A, J, S | A, J, S | A, J, S | A, J, S | E, L |
| Sponges                             | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | E, L |
| Hydrozoans                          | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | E, L |
| Stylasteridae (lace corals)         | A, J, S | A, J, S | A, J, S |         |         | A, J, S | A, J, S | A, J, S | E, L |
| Solanderidae (hydroid fans)         | A, J, S | A, J, S | A, J, S |         |         | A, J, S | A, J, S | A, J, S | E, L |
| Bryozoans                           | A, J, S | A, J, S | A, J, S | A, J    |         | A, J, S | A, J, S | A, J, S | E, L |

| Management Unit Species/Taxa                              | Ma      | La      | Es      | SB      | Ss      | Cr/Hs   | Pr      | DST     | Pe   |
|---|---------|---------|---------|---------|---------|---------|---------|---------|------|
| Tunicates (solitary/colonial)                             | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | E, L |
| Feather duster worms (Sabellidae)                         | A, J, S | A, J, S | A, J, S |         | A, J, S | A, J, S | A, J, S | A, J, S | E, L |
| Echinoderms (e.g., sea cucumbers, sea urchins)            | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | E, L |
| Mollusca  | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | E, L |
| Sea Snails (gastropods)                                   | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | E, L |
| Trochus spp.  |         | A, J, S |         |         |         | A, J, S | A, J, S |         | E, L |
| Opisthobranchs (sea slugs)                                | A, J    | A, J, S |         | A, J, S | A, J, S | A, J, S | A, J, S | A, J    | E, L |
| <i>Pinctada margaritifera</i> (black lipped pearl oyster) | A, J    | A, J, S |         |         |         | A, J, S | A, J, S | A, J, S | E, L |
| Tridacnidae   |         | A, J, S |         |         | A, J, S | A, J, S | A, J, S |         | E, L |
| Other Bivalves  | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | E, L |
| Cephalopods   |         | All     | A, J, S | All     | All     | All     | All     | All     | E, L |
| Octopodidae   | A, J, S | All     | A, J, S | All     | All     | All     | All     | All     | L    |
| Crustaceans*  | A, J    | All     | A, J    | A, J    | A, J    | All     | All     | All     | L    |
| Lobsters*   |         | All     |         |         | A, J    | All     | All     | All     | L    |
| Shrimp/Mantis   |         | All     | A, J    | A, J    | A, J    | All     | All     | All     | L    |
| Crabs*  | A, J    | All     | A, J    | A, J    | A, J    | All     | All     | All     | L    |
| Annelids  | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | A, J, S | E, L |
| Algae   | All     | All     | All     | All     | All     | All     | All     | All     |      |
| Live rock   |         | A, J    | A, J    |         |         | A, J, A | A, J, A | A, J, A | E, L |

\*Some species belonging to this taxa will be managed under other FMPs, but ecosystem effects will be addressed by this FMP.

**Table 6.5: Summary of EFH designations for Potentially Harvested Coral Reef Taxa.**

| Species Assemblage/Complex                | EFH (Egg and larvae)  | EFH (Adult and Juvenile) |
|---|---|--------------------------|
| All Potentially Harvested Coral Reef Taxa | EFH for all life stages of Potentially Harvested Coral Reef Taxa is designated as the water column and bottom habitat from the shoreline to the outer boundary of the EEZ to a depth of 50 fm |                          |

**Table 6.6: Habitat Areas of Particular Concern for CRE MUS.**

|                                    | Rarity of Habitat | Ecological function | Susceptibility to Human Impact | Likelihood of Developmental Impacts | Existing Protective Status |
|------------------------------------|-------------------|---------------------|--------------------------------|-------------------------------------|----------------------------|
| <b>NWHI</b>                        |                   |                     |                                |                                     |                            |
| All substrate 0-10 fm              | x                 | x                   | x                              |                                     | x                          |
| Laysan: All substrate 0-50 fm      | x                 | x                   |                                |                                     |                            |
| Midway: All substrate 0-50 fm      | x                 | x                   | x                              |                                     | x                          |
| FFS: All substrate 0-50 fm         | x                 | x                   | x                              | x                                   |                            |
| <b>Main Hawaiian Islands</b>       |                   |                     |                                |                                     |                            |
| Kaula Rock (entire bank)           |                   | x                   | x                              |                                     | x                          |
| Niihau (Lehua Island)              | x                 | x                   | x                              |                                     |                            |
| Kauai (Kaliu Point)                |                   | x                   | x                              |                                     |                            |
| Oahu                               |                   |                     |                                |                                     |                            |
| Pupukea (MLCD)                     |                   | x                   | x                              | x                                   | x                          |
| Shark's Cove (MLCD)                |                   |                     | x                              | x                                   | x                          |
| Waikiki (MLCD)                     |                   |                     | x                              | x                                   | x                          |
| Makapuu Head/Tide Pool Reef Area   |                   | x                   | x                              | x                                   |                            |
| Kaneohe Bay                        | x                 | x                   | x                              | x                                   |                            |
| Kaena Point                        |                   | x                   | x                              |                                     |                            |
| Kahe Reef                          |                   | x                   | x                              |                                     |                            |
| <b>Maui</b>                        |                   |                     |                                |                                     |                            |
| Molokini                           | x                 | x                   | x                              | x                                   | x                          |
| Olowalo Reef Area                  |                   | x                   | x                              | x                                   |                            |
| Honolua-Mokuleia Bay (MLCD)        |                   | x                   | x                              |                                     | x                          |
| Ahihiki Kinau Natural Area Reserve | x                 | x                   | x                              |                                     | x                          |
| Molokai (south shore reefs)        |                   | x                   | x                              |                                     |                            |

**Table 6.6 (cont.).**

|   | Rarity of<br>Habitat | Ecological<br>function | Susceptibility<br>to Human<br>Impact | Likelihood of<br>Development<br>al Impacts | Existing<br>Protective<br>Status |
|---|----------------------|------------------------|--------------------------------------|--|----------------------------------|
| <b>Main Hawaiian Is. (cont.)</b>  |                      |                        |                                      |  |                                  |
| Lanai   |                      |                        |                                      |  |                                  |
| Halope Bay  |                      | x                      | x                                    |  |                                  |
| Manele Bay  |                      | x                      | x                                    | x  |                                  |
| Five Needles  |                      | x                      | x                                    |  |                                  |
| Hawaii  |                      |                        |                                      |  |                                  |
| Lapakahi Bay State Park<br>(MLCD)   |                      | x                      | x                                    |  | x                                |
| Pauko Bay and Reef<br>(MLCD)  |                      | x                      | x                                    |  | x                                |
| Kealakekua  |                      | x                      | x                                    |  | x                                |
| Waialea Bay (MLCD)  | x                    | x                      | x                                    |  | x                                |
| Kawaihae Harbor-Old Kona<br>Airport (MLCD)                                |                      | x                      | x                                    |  | x                                |
| Additional Areas  |                      |                        |                                      |  |                                  |
| All long-term research sites  |                      | x                      | x                                    |  |                                  |
| All CRAMP sites   |                      | x                      | x                                    |  |                                  |
| <b>American Samoa</b>   |                      |                        |                                      |  |                                  |
| Fagatele Bay  | x                    | x                      |                                      |  | x                                |
| Larsen Bay  |                      | x                      | x                                    | x  |                                  |
| Steps Point   |                      | x                      | x                                    |  |                                  |
| Pago Pago (North Coast of<br>Tutuila), National Park of<br>American Samoa | x                    | x                      | x                                    |  | x                                |
| Aunuu Island  | x                    | x                      | x                                    | x  |                                  |
| Rose Atoll  | x                    | x                      |                                      |  | x                                |
| South coast Ofu (marine<br>areas)   | x                    | x                      | x                                    | x  |                                  |
| Aua Transect- Pago Pago<br>harbor, oldest coral reef<br>transect          | x                    | x                      | x                                    | x  |                                  |
| Tau Island  | x                    | x                      | x                                    |  |                                  |

**Table 6.6 (cont.)**

|   | Rarity of<br>Habitat | Ecological<br>function | Susceptibility<br>to Human<br>Impact | Likelihood of<br>Development<br>al Impacts | Existing<br>Protective<br>Status |
|---|----------------------|------------------------|--------------------------------------|--|----------------------------------|
| <b>Guam</b>                             |                      |                        |                                      |  |                                  |
| Cocos Lagoon                            | x                    | x                      | x                                    |  |                                  |
| Orote Point Ecological<br>Reserve Area  | x                    | x                      | x                                    | x  | x                                |
| Haputo Point Ecological<br>Reserve Area | x                    | x                      |                                      |  | x                                |
| Ritidian Point                          | x                    | x                      |                                      |  | x                                |
| Jade Shoals                             | x                    | x                      | x                                    |  |                                  |
| <b>CMNI</b>                             |                      |                        |                                      |  |                                  |
| Saipan (Saipan Lagoon)                  | x                    | x                      | x                                    | x  |                                  |
| <b>US Pacific Remote Islands</b>        |                      |                        |                                      |  |                                  |
| Wake Atoll                              | x                    | x                      |                                      |  | x                                |
| Johnston Atoll                          | x                    | x                      |                                      | x  | x                                |
| Palmyra Atoll                           | x                    | x                      | x                                    |  | x                                |
| Kingman Reef                            | x                    | x                      | x                                    |  | x                                |
| Howland Island                          | x                    | x                      |                                      |  | x                                |
| Baker Island                            | x                    | x                      |                                      |  | x                                |
| Jarvis Island                           | x                    | x                      |                                      |  | x                                |

### 6.3 Fishing Activities That May Adversely Affect EFH

The Council is required to act to prevent, mitigate, or minimize adverse effects from fishing upon evidence that a fishing practice has identifiable adverse effects on EFH for any management unit species (MUS) covered by an FMP. Table 6.7 summarizes EFH for species managed by other FMPs. Adverse fishing impacts may include physical, chemical, or biological alterations of the substrate and loss of, or injury to, benthic organisms, prey species, and their habitat or other components of the ecosystem. FMPs must also contain an assessment of the potential adverse effects of all fishing equipment types used in waters described as EFH. This assessment should consider the relative impacts of all fishing equipment types used in EFH on different types of habitat found within EFH.

The predominant fishing gear types—hook-and-line, longline, troll, traps—used in the fisheries managed by the Council cause few fishing-related impacts to the benthic habitat utilized by coral reef species, bottomfish, crustaceans, or precious corals. The current management regime prohibits the use of bottom trawls, bottom-set nets, explosives, and poisons. The use of non-selective gear to harvest precious corals in the MHI is prohibited. Under this FMP, only selective and non-destructive gear may be allowed to fish for CRE-MUS. Additionally, any gear type not listed in Section 5.4.2 must first be evaluated by the PIAO Administrator in consultation with the Council and the director of the affected state fishery management agency before any such gear may be used. The Council has determined that current management measures to protect fishery habitat are adequate and no additional measures are necessary at this time. However, the Council has identified the following potential sources of fishery-related impacts to benthic habitat that may occur during normal fishing operations:

- Anchor damage from vessels attempting to maintain position over productive fishing habitat.
- Heavy weights and line entanglement occurring during normal hook-and-line fishing operations.
- Lost gear from lobster fishing operations.
- Remotely operated vehicle (ROV) tether damage to precious coral during harvesting operations.

Trash discarded and lost gear (leaders, hooks, and weights) by fishing vessels operating in the EEZ, are a Council concern. A report on the first phase of a submersible-supported research project conducted in 2001 preliminarily determined that bottomfish gear exhibited minimal to no impact on the coral reef habitat (C. Kelley, pers. comm.). A November 2001 cruise in the MHI determined that precious corals harvesting has “negligible” impact on the habitat (R. Grigg, pers. comm.). The Council is concerned with habitat impacts of marine debris originating from fishing operations outside the WPR. NMFS is currently investigating the source and impacts of this debris. International cooperation will be necessary to find solutions to this broader problem.

Because the habitat of pelagic species is the open ocean, and managed fisheries employ variants of hook-and-line gear, there are no direct impacts to EFH. Lost gear may be a hazard to some species due to entanglement, but it has no direct effect on habitat. A possible impact would be caused by fisheries that target and deplete key prey species, but currently there is no such fishery.

Table 6.7: Essential Fish Habitat for Management Unit Species Managed Under Other Fishery Management Plans.

| FMP                                       | Species Complex  | EFH   | HAPC   |
|---|--|---|--|
| <b>Pelagic</b>                            | <b>Temperate species</b><br>Striped Marlin ( <i>Tetrapturus audax</i> ); Bluefin Tuna ( <i>Thunnus thynnus</i> ); Swordfish ( <i>Xiphias gladius</i> ); Albacore ( <i>Thunnus alalunga</i> ); Mackerel ( <i>Scomber</i> spp); Bigeye ( <i>Thunnus obesus</i> ); Pomfret (family Bramidae)  | <b>Eggs and larvae:</b> the (epipelagic zone) water column down to a depth of 200 m (100 fathoms) from the shoreline to the outer limit of the EEZ.<br><br><b>Juvenile/adults:</b> the water column down to a depth of 1,000 m (500 fathoms) from the shoreline to the outer limit of the EEZ | The water column from the surface down to a depth of 1,000 m (500 fathoms) above all seamounts and banks with summits shallower than 2,000 m (1,000 fathoms) within the EEZ. |
| <b>Pelagic</b>                            | <b>Tropical species</b><br>Yellowfin ( <i>Thunnus albacares</i> ); Kawakawa ( <i>Euthynnus affinis</i> ); Skipjack ( <i>Katsuwonus pelamis</i> ); Frigate and bullet tunas ( <i>Auxis thazard</i> , <i>A. rochei</i> ); Blue marlin ( <i>Makaira nigricans</i> ); Slender tunas ( <i>Allothunnus fallai</i> ); Black marlin ( <i>Makaira indica</i> ); Dogtooth tuna ( <i>Gymnosarda unicolor</i> ); Spearfish ( <i>Tetrapturus</i> spp); Sailfish ( <i>Istiophorus platypterus</i> ); Mahimahi ( <i>Coryphaena hippurus</i> , <i>C. equiselas</i> ); Ono ( <i>Acanthocybium solandri</i> ); Opah ( <i>Lampris</i> sp) | <b>Eggs and larvae:</b> the (epipelagic zone) water column down to a depth of 200 m (100 fathoms) from the shoreline to the outer limit of the EEZ.<br><br><b>Juvenile/adults:</b> the water column down to a depth of 1,000 m (500 fathoms) from the shoreline to the outer limit of the EEZ | The water column from the surface down to a depth of 1,000 m (500 fathoms) above all seamounts and banks with summits shallower than 2,000 m (1,000 fathoms) within the EEZ. |
| <b>Pelagic</b>                            | <b>Sharks</b><br>Requiem sharks (family Carcharinidae); Thresher sharks (family Alopiidae); Mackerel sharks (family Lamnidae); Hammerheads sharks (family Sphymidae)   | <b>Eggs and larvae:</b> the (epipelagic zone) water column down to a depth of 200 m (100 fathoms) from the shoreline to the outer limit of the EEZ.<br><br><b>Juvenile/adults:</b> the water column down to a depth of 1,000 m (500 fathoms) from the shoreline to the outer limit of the EEZ | The water column from the surface down to a depth of 1,000 m (500 fathoms) above all seamounts and banks with summits shallower than 2,000 m (1,000 fathoms) within the EEZ. |
| <b>Bottomfish and Seamount Groundfish</b> | <b>Shallow water species (0-50 fm):</b> Uku ( <i>Aprion virescens</i> ), Thicklip trevally ( <i>Pseudocaranx dentex</i> ), Lunartail grouper ( <i>Variola louti</i> ), Blacktip grouper ( <i>Epinephelus fasciatus</i> ), Ambon emperor ( <i>Lethrinus amboinensis</i> ), Redgill emperor ( <i>Lethrinus rubrioperculatus</i> ), Giant trevally ( <i>Caranx ignobilis</i> ), Black trevally ( <i>Caranx lugubris</i> ), Amberjack ( <i>Seriola dumerilii</i> ), Taape ( <i>Lutjanus kasmira</i> )  | <b>Eggs and larvae:</b> the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m (200 fathoms).<br><br><b>Juvenile/adults:</b> the water column and all bottom habitat extending from the shoreline to a depth of 400 m (200 fathoms)             | All slopes and escarpments between 40-280 m (20 and 140 fathoms).<br><br>Three known areas of juvenile opakapaka habitat: Two off Oahu and one off Molokai                   |



| FMP                                | Species Complex   | EFH   | HAPC   |
|------------------------------------|---|---|--|
| Bottomfish and Seamount Groundfish | Deep water species 50-200 fm): Ehu ( <i>Etelis carbunculus</i> ), Onaga ( <i>Etelis coruscans</i> ), Opakapaka ( <i>Pristipomoides filamentosus</i> ), Yellowtail Kalekale ( <i>P. auricilla</i> ), Yelloweye opakapaka ( <i>P. flavipinnis</i> ), Kalekale ( <i>P. sieboldii</i> ), Gindai ( <i>P. zonatus</i> ), Hapupuu ( <i>Epinephelus quernus</i> ), Lehi ( <i>Aphareus rutilans</i> )  | Eggs and larvae: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m (200 fathoms).<br><br>Juvenile/adults: the water column and all bottom habitat extending from the shoreline to a depth of 400 m (200 fathoms)   | All slopes and escarpments between 40-280 m (20 and 140 fathoms).<br><br>Three known areas of juvenile opakapaka habitat: Two off Oahu and one off Molokai |
| Bottomfish and Seamount Groundfish | Seamount Groundfish species (50-200 fm): Armorhead ( <i>Pseudopentaceros richardsoni</i> ), Ratfish/butterfish ( <i>Hyperoglyphe japonica</i> ), Alfonsin ( <i>Beryx splendens</i> )  | Eggs and larvae: the (epipelagic zone) water column down to a depth of 200 m (100 fathoms) of all EEZ waters bounded by latitude 29°-35°<br><br>Juvenile/adults: all EEZ waters and bottom habitat bounded by latitude 29°-35° N and longitude 171° E-179° W between 200 and 600 m (100 and 300 fathoms)  | No HAPC designated for Seamount Groundfish   |
| Crustaceans                        | Spiny and Slipper Lobster Complex<br>Hawaiian spiny lobster ( <i>Panulirus marginatus</i> ), Spiny lobster ( <i>P. penicillatus</i> , <i>P. sp.</i> ), Ridgeback slipper lobster ( <i>Scyllarides haanii</i> ), Chinese slipper lobster ( <i>Parribacus antarcticus</i> )<br><br>Kona Crab<br>Kona crab ( <i>Ranina ranina</i> )  | Eggs and larvae: the water column from the shoreline to the outer limit of the EEZ down to a depth of 150 m (75 fathoms)<br><br>Juvenile/adults: the all bottom habitat from the shoreline to a depth of 100 m (50 fathoms)   | All banks in the NWHI with summits less than or equal to 30 m (15 fathoms) from the surface.   |
| Precious Corals                    | Deep-water Precious Corals (150-750 fm)<br>Pink coral ( <i>Corallium secundum</i> ), Red coral ( <i>C. regale</i> ), Pink coral ( <i>C. laauense</i> ), Midway deepsea coral ( <i>C. sp. nov.</i> ), Gold coral ( <i>Gerardia</i> sp.), Gold coral ( <i>Callogorgia gilberti</i> ), Gold coral ( <i>Narella</i> spp.), Gold coral ( <i>Calyptraphora</i> spp.), Bamboo coral ( <i>Lepidisis olapa</i> ), Bamboo coral ( <i>Acanella</i> spp.)<br><br>Shallow-water Precious Corals (10-50 fm)<br>Black coral ( <i>Antipathes dichotoma</i> ), Black coral ( <i>Antipathis grandis</i> ), Black coral ( <i>Antipathes ulex</i> ) | EFH for Precious Corals is confined to six known precious coral beds located off Keahole Point, Makapuu, Kaena Point, Wespac bed, Brooks Bank and 180 Fathom Bank.<br><br>EFH has also been designated for three beds known for black corals in the Main Hawaiian Islands between Miloli and South Point on the Big Island, the Auau Channel and the southern border of Kauai | Includes the Makapuu bed, Wespac bed, Brooks Banks bed.<br><br>For Black Corals, the Auau Channel has been identified as a HAPC.                           |

There is also a concern that invasive marine and terrestrial species may be introduced into sensitive environments by fishing vessels transiting from populated islands and grounding on shallow reef areas. Of most concern is the potential for unintentional introduction of rats (*Ratus spp.*) to the remote islands in the NWHI and PRIA that harbor endemic landbirds. Although there are no restrictions that prohibit fishing vessels from transiting near these remote islands areas, no invasive species introductions due to this activity have been documented. However, the Council is concerned that this could occur as fisheries expand and emerging fisheries develop in the future. Establishing no-take MPAs—which are mostly contiguous around these remote islands—will deter fishing vessels from transiting near the islands, thus reducing the potential for unintentional groundings and introductions of invasive species.

While the Council has determined that current management measures to protect fishery habitat are adequate, should future research demonstrate a need, the Council will act accordingly to protect habitat necessary to maintain a sustainable and productive fishery in the Western Pacific Region. For a full assessment of potential adverse impacts to EFH from fishing gear currently used in areas designated as EFH see Appendix A- Catalogue of Fishing Gear.

In modern times, some reefs have been degraded by a range of human activities. Comprehensive lists of human threats to coral reefs in the U.S. Pacific Islands are provided by Maragos *et al.* (1996), Birkeland (1997b), Grigg 1997, and Clark and Gulko (1999). (These findings are summarized in Table 6.8.) In general, reefs closest to human population centers are more heavily used and are in worse condition than those in remote locations (Green 1997). Nonetheless, it is difficult to generalize about the present condition of coral reefs in the U.S. Pacific Islands because of their broad geographic distribution and the lack of long-term monitoring to document environmental and biological baselines. Coral reef conditions and use patterns vary throughout the U.S. Pacific Islands.

A useful distinction is between coral reefs near inhabited islands of American Samoa, CNMI, Guam, and the main Hawaiian islands and coral reefs in the remote NWHI, PRIAs, and northern islands of the CNMI. Reefs near the inhabited islands are heavily used for small-scale artisanal, recreational, and subsistence fisheries, and those in Hawaii, Saipan (CNMI), and Guam are also the focus for extensive non-consumptive marine recreation. Rather than a relatively few large-scale mechanized operations, many fishermen each deploy more limited gear. The more accessible banks in the main Hawaiian Islands (Penguin Bank, Kaula Rock), Guam (southern banks), and the CNMI (Esmeralda Bank, Farallon de Medinilla) are the most heavily fished offshore reefs in the FMP management area.

The vast majority of the reefs in the CRE-FMP management area are remote and, in some areas, they have protected status. Most of these are believed to be in good condition. (Table 6.9 summarizes coral reef conditions in the region.) Existing fisheries are limited. The major exception is in the NWHI, where there are commercial fisheries for spiny lobster and deep-slope bottomfish (Green 1997). Poaching by foreign fishing fleets is suspected at Guam's southern banks, in the PRIA, and possibly in other areas. Poachers usually target high-value, and often rare or overfished, coral reef resources. These activities are already illegal but difficult to detect.

**Table 6.8: Threats to Coral Reef in the U.S. Pacific Islands (after Maragos *et al.* 1996; Grigg 1997; Birkeland 1997; Jokiel 1999; Clark and Gulko 1999).**

| Activity                                 | American Samoa | Guam | Hawaii |      | CNMI | Remote U.S. island possessions |
|--|----------------|------|--------|------|------|--------------------------------|
|  |                |      | MHI    | NWHI |      |                                |
| Coastal construction                     | X              | X    | X      |      | X    | X                              |
| Destructive fishing                      | X              |      | X      |      | X    |                                |
| Flooding                                 | X              | X    | X      |      |      |                                |
| Industrial pollution                     | X              |      |        |      | X    |                                |
| Overuse/over harvesting                  | X              | X    | X      |      | X    |                                |
| Nutrient loading (sewage/eutrophication) | X              | X    | X      |      | X    |                                |
| Poaching/depletion of rare species       | X              |      |        |      | X    | X                              |
| Soil erosion/sedimentation               | X              | X    |        |      | X    |                                |
| Vessel groundings/oil spills             | X              | X    |        | X    | X    |                                |
| Military activity                        |                | X    | X      | X    | X    | X                              |
| Hazardous waste                          |                | X    |        | X    |      | X                              |
| Tourist impacts                          |                | X    | X      |      | X    |                                |
| Urbanization                             |                | X    | X      |      |      |                                |
| Thermal pollution                        |                |      | X      |      |      |                                |
| Marine debris                            |                |      | X      | X    |      |                                |
| Introduced species                       |                |      | X      |      |      |                                |

**Table 6.9: Summary of coral reef condition in nearshore areas (0-3 nmi from shore) and offshore areas (3-200 nm from shore) in sub-areas of the U.S. Pacific Islands (after Green, 1997).**

| Location                      | 0-3 nmi               | 3-200 nmi             |
|-------------------------------|-----------------------|-----------------------|
| <b>American Samoa</b>         | Poor-Excellent        | Good-Excellent        |
| <b>CNMI</b>                   | Poor-Excellent        | Good-Excellent        |
| <b>Guam</b>                   | Poor-Good             | Good-Excellent        |
| <b>Hawaii</b>                 |                       |                       |
| Main Hawaiian Islands         | Poor-Good             | Good-Excellent        |
| Northwestern Hawaiian Islands | Excellent             | Excellent             |
| <b>Remote Islands</b>         | Poor-Excellent        | Excellent             |
| <b>Overall</b>                | <b>Poor-Excellent</b> | <b>Good-Excellent</b> |

## **6.4 Non-fishing Related Activities That May Adversely Affect EFH**

Based on the guidelines established by the Secretary under Section 305 (b)(1)(A) of the MSFCMA, NMFS has developed a set of guidelines to assist councils meet the requirement to describe adverse impacts to EFH from non-fishing activities in their FMPs. A wide range of non-fishing activities throughout the U.S. Pacific Islands contribute to EFH degradation. FMP implementation will not directly mitigate these activities. However, as already noted, it will allow NMFS and the Council to make recommendations to any federal or state agency about actions that may impact EFH. Not only could this be a mechanism to minimize the environmental impacts of agency action, it will help them focus their conservation and management efforts.

The Council is required to identify non-fishing activities that have the potential to adversely affect EFH quality and, for each activity, describe its known potential adverse impacts and the EFH most likely to be adversely affected. The descriptions should explain the mechanisms or processes that may cause the adverse effects and how these may affect habitat function. The Council considered a wide range of non-fishing activities that may threaten important properties of the habitat used by managed species and their prey, including dredging, dredge material disposal, mineral exploration, water diversion, aquaculture, wastewater discharge, oil and hazardous substance discharge, construction of fish enhancement structures, coastal development, introduction of exotic species, and agricultural practices. These activities and impacts, along with mitigation measures are detailed in the next section.

### **6.4.1 Habitat Conservation and Enhancement Recommendations**

#### *Background*

According to NMFS guidelines, this FMP must describe ways to avoid, minimize, or compensate for the adverse effects to EFH. It must also promote the conservation and enhancement of EFH. Generally, non-water dependent actions that may have adverse impacts should not be located in EFH. Activities that may result in significant adverse effects on EFH should be avoided where less environmentally harmful alternatives are available. If there are no alternatives, the impacts of these actions should be minimized. Environmentally sound engineering and management practices should be employed for all actions that may adversely affect EFH. Disposal or spillage of any material (dredge material, sludge, industrial waste, or other potentially harmful materials) that would destroy or degrade EFH should be avoided. If avoidance or minimization is not possible, or will not adequately protect EFH, compensatory mitigation to conserve and enhance EFH should be recommended. FMPs may recommend proactive measures to conserve or enhance EFH. When developing proactive measures, councils may develop a priority ranking of the recommendations to assist federal and state agencies undertaking such measures. FMPs should describe a variety of options to conserve or enhance EFH, which may include, but are not limited to:

**Enhancing of rivers, streams, and coastal areas** through new federal, state, or local government planning efforts to restore river, stream, or coastal area watersheds.

**Improve water quality and quantity** through the use of best land management practices to ensure that water quality standards at state and federal levels are met. The practices include improved sewage treatment, disposing of waste materials properly, and maintaining sufficient in-stream flow to prevent adverse effects to estuarine areas.

**Restore or create habitat**, or convert non-EFH to EFH, to replace lost or degraded EFH, if conditions merit. However, habitat conversion at the expense of other naturally functioning systems must be justified within an ecosystem context.

#### **6.4.2 Description of Mitigation Measures for Identified Activities and Impacts**

Established policies and procedures of the Council and NMFS provide the framework for conserving and enhancing EFH. Components of this framework include adverse impact avoidance and minimization, provision of compensatory mitigation whenever the impact is significant and unavoidable, and incorporation of enhancement. New and expanded responsibilities contained in the MSFCMA will be met through appropriate application of these policies and principles. In assessing the potential impacts of proposed projects, the Council and the NMFS are guided by the following general considerations:

- The extent to which the activity would directly and indirectly affect the occurrence, abundance, health and continued existence of fishery resources.
- The extent to which the potential for cumulative impacts exists.
- The extent to which adverse impacts can be avoided through project modification, alternative site selection or other safeguards.
- The extent to which the activity is water dependent if loss or degradation of EFH is involved.
- The extent to which mitigation may be used to offset unavoidable loss of habitat functions and values.

Seven non-fishing activities have been identified that directly or indirectly affect habitat used by management unit species. Impacts and conservation measures are summarized below for each of these activities. Although not all-inclusive, what follows is a good example of the kinds of measures that can help to minimize or avoid the adverse effects of identified non-fishing activities on EFH.

## *Habitat Loss and Degradation*

### Impacts

- Infaunal and bottom-dwelling organisms.
- Turbidity plumes.
- Biological availability of toxic substances.
- Damage to sensitive habitats.
- Current patterns/ water circulation modification.
- Loss of habitat function.
- Contaminant runoff.
- Sediment runoff.
- Shoreline stabilization projects.

### Conservation Measures

1. To the extent possible, fill materials resulting from dredging operations should be placed on an upland site. Fills should not be allowed in areas with subaquatic vegetation, coral reefs or other areas of high productivity.
2. The cumulative impacts of past and current fill operations on EFH should be addressed by federal, state and local resource management and permitting agencies and considered in the permitting process.
3. The disposal of contaminated dredge material should not be allowed in EFH.
4. When reviewing open-water disposal permits for dredged material, state and federal agencies should identify the direct and indirect impacts such projects may have on EFH. When practicable, benthic productivity should be determined by sampling prior to any discharge of fill material. Sampling design should be developed with input from state and federal resource agencies.
5. The areal extent of the disposal site should be minimized. However, in some cases, thin layer disposal may be less deleterious. All non-avoidable impacts should be mitigated.
6. All spoil disposal permits should reference latitude-longitude coordinates of the site so information can be incorporated into GIS systems. Inclusion of aerial photos may also be required to help geo-reference the site and evaluate impacts over time.
7. Further fills in estuaries and bays for development of commercial enterprises should be curtailed.

8. Prior to installation of any piers or docks, the presence or absence of coral reefs and submerged aquatic vegetation should be determined. These areas should be avoided. Benthic productivity should also be determined, and areas with high productivity avoided. Sampling design should be developed with input from state and federal resource agencies.
9. The use of dry stack storage is preferable to wet mooring of boats. If that method is not feasible, construction of piers, docks and marinas should be designed to minimize impacts to the coral reef substrate and subaquatic vegetation.
10. Bioengineering should be used to protect altered shorelines. The alteration of natural, stable shorelines should be avoided.

### *Pollution and Contamination*

#### Impacts

- Introduction of chemicals.
- Introduction of animal wastes.
- Increased sedimentation.
- Wastewater effluent with high contaminant levels.
- High nutrient levels down-current of outfalls.
- Biocides to prevent biofouling.
- Thermal effects.
- Turbidity plumes.
- Affected submerged aquatic vegetation sites.
- Stormwater runoff.
- Direct physical contact.
- Indirect exposure
- Cleanup.

#### Conservation Measures

1. Outfall structures should be placed sufficiently far offshore to prevent discharge water from affecting areas designated as EFH. Discharges should be treated using the best available technology, including implementation of up-to-date methodologies for reducing discharges of biocides (*e.g.*, chlorine) and other toxic substances.

2. Benthic productivity should be determined by sampling prior to any construction activity. Areas of high productivity should be avoided to the maximum extent possible. Sampling design should be developed with input from state and federal resource agencies.
3. Mitigation should be provided for the degradation or loss of habitat from placement of the outfall structure and pipeline as well as the treated water plume.
4. Containment equipment and sufficient supplies to combat spills should be on-site at all facilities that handle oil or hazardous substances.
5. Each facility should have a "Spill Contingency Plan," and all employees should be trained in how to respond to a spill.
6. To the maximum extent practicable, storage of oil and hazardous substances should be located in an area that would prevent spills from reaching the aquatic environment.
7. Construction of roads and facilities adjacent to aquatic environments should include a storm-water treatment component that would filter out oils and other petroleum products.
8. The use of pesticides, herbicides and fertilizers in areas that would allow for their entry into the aquatic environment should be avoided.
9. The best land management practices should be used to control topsoil erosion and sedimentation.

### *Dredging*

#### Impacts

- Infaunal and bottom-dwelling organisms.
- Turbidity plumes.
- Bioavailability of toxic substances.
- Damage to sensitive habitats.
- Water circulation modification.

#### Conservation Measures

1. To the maximum extent practicable, dredging should be avoided. Activities that require dredging (such as placement of piers, docks, marinas, etc.) should be sited in deepwater areas or designed in such a way as to alleviate the need for maintenance dredging.



Projects should be permitted only for water-dependent purposes, when no feasible alternatives are available.

2. Dredging in coastal and estuarine waters should be performed during the time frame when MUS and prey species are least likely to be entrained. Dredging should be avoided in areas with submerged aquatic vegetation and coral reefs.
3. All dredging permits should reference latitude-longitude coordinates of the site so information can be incorporated into Geographic Information Systems (GIS). Inclusion of aerial photos may also be required to help geo-reference the site and evaluate impacts over time.
4. Sediments should be tested for contaminants as per Environmental Protection Agency and U.S. Army Corps of Engineers requirements.
5. The cumulative impacts of past and current dredging operations on EFH should be addressed by federal, state and local resource management and permitting agencies and considered in the permitting process.
6. If dredging needs are caused by excessive sedimentation in the watershed, those causes should be identified and appropriate management agencies contacted to assure action is done to curtail those causes.
7. Pipelines and accessory equipment used in conjunction with dredging operations should, to the maximum extent possible, avoid coral reefs, seagrass beds, estuarine habitats and areas of subaquatic vegetation.

### *Marine Mining*

#### Impacts

- Loss of habitat function.
- Turbidity plumes.
- Resuspension of fine-grained mineral particles
- Composition of the substrate altered.

#### Conservation Measures

1. Mining in areas identified as coral reef ecosystem should be avoided.
2. Mining in areas of high biological productivity should be avoided.
3. Mitigation should be provided for loss of habitat due to mining.

## *Water Intake Structures*

### Impacts

- Entrapment, impingement, and entrainment.
- Loss of prey species.

### Conservation Measures

1. New facilities that rely on surface waters for cooling should not be located in areas where coral reef organisms are concentrated. Discharge points should be located in areas that have low concentrations of living marine resources, or they should incorporate cooling towers that employ sufficient safeguards to ensure against release of blow-down pollutants into the aquatic environment.
2. Intake structures should be designed to prevent entrainment or impingement of MUS larvae and eggs.
3. Discharge temperatures (both heated and cooled effluent) should not exceed the thermal tolerance of the plant and animal species in the receiving body of water.
4. Mitigation should be provided for the loss of EFH from placement of the intake structure and delivery pipeline.

## *Aquaculture Facilities*

### Impacts

- Discharge of organic waste from the farms.
- Impacts to the seafloor below the cages or pens.

### Conservation Measures

1. Facilities should be located in upland areas as often as possible. Tidally influenced wetlands should not be enclosed or impounded for mariculture purposes. This includes hatchery and grow-out operations. Siting of facilities should also take into account the size of the facility, the presence or absence of submerged aquatic vegetation and coral reef ecosystems, proximity of wild fish stocks, migratory patterns, competing uses, hydrographic conditions and upstream uses. Benthic productivity should be determined by sampling prior to any operations. Areas of high productivity should be avoided to the maximum extent possible. Sampling design should be developed with input from state and federal resource agencies.
2. To the extent practicable, water intakes should be designed to avoid entrainment and impingement of native fauna.

3. Water discharge should be treated to avoid contamination of the receiving water and should be located only in areas having good mixing characteristics.
4. Where cage mariculture operations are undertaken, water depths and circulation patterns should be investigated and should be adequate to preclude the buildup of waste products, excess feed and chemical agents.
5. Non-native, ecologically undesirable species that are reared may pose a risk of escape or accidental release, which could adversely affect the ecological balance of an area. A thorough scientific review and risk assessment should be undertaken before any non-native species are allowed to be introduced.
6. Any net pen structure should have small enough webbing to prevent entanglement by prey species.
7. Mitigation should be provided for the EFH areas impacted by the facility.

### *Introduction of Exotic Species*

#### Impacts

- Habitat alteration.
- Trophic alteration.
- Gene pool alteration.
- Spatial alteration.
- Introduction of disease.

#### Conservation Measures

1. Vessels should discharge ballast water far enough out to sea to prevent introduction of non-native species to bays and estuaries.
2. Vessels should conduct routine inspections for presence of exotic species in crew quarters and hull of the vessel prior to embarking to remote islands (PRIAs, NWHI and northern islands of the CNMI).
3. Exotic species should not be introduced for aquaculture purposes unless a thorough scientific evaluation and risk assessment are performed (see section on aquaculture).
4. Effluent from public aquaria display laboratories and educational institutes using exotic species should be treated prior to discharge.

## **6.5 EFH Research Needs**

Additional research is needed to make available sufficient information to support a higher level of description and identification of EFH and HAPC. Additional research may also be necessary to identify and evaluate actual and potential adverse effects on EFH, including, but not limited to, direct physical alteration; impaired habitat quality/functions; cumulative impacts from fishing; or indirect adverse effects, such as sea level rise, global warming, and climate shifts.

The following scientific data are needed to more effectively address EFH provisions:

- The distribution of early life history stages (eggs and larvae) of MUS by habitat.
- Description of juvenile habitat (including physical, chemical, and biological features that determine suitable juvenile habitat).
- Food habits (feeding depth, major prey species, etc.).
- Habitat-related densities for all management unit species life history stages.
- Habitat utilization patterns for different life history stages and species.
- Growth, reproduction, and survival rates for management unit species within habitats.
- Inventory of coral reef ecosystem habitats in the EEZ of the Western Pacific Region.
- Location of important spawning sites.
- Identification of post-larval settlement habitat.
- Establishment of baseline parameters (CPUE) for coral reef ecosystem resources.
- High resolution mapping of bottom topography, bathymetry, currents, substrate types, algal beds, and habitat relief.

NMFS guidelines suggest that the Council and NMFS periodically review and update the EFH components of FMPs as new data become available. The Council recommends that new information be reviewed, as necessary, during preparation of the annual reports by the CRE Plan Team. EFH designations may be changed under the FMP framework processes if information presented in an annual review indicates that modifications are justified

# CHAPTER 7

## SCIENTIFIC DATA AND RESEARCH NEEDS

### 7.1 Ongoing and Proposed Coral Reef-related Research

In response to threats to coral reef ecosystems, President Clinton issued Executive Order 13089 - Coral Reef Protection in June 1998 to direct state and federal agencies to identify actions that may affect U.S. coral reef ecosystems and to use programs and authorities to protect and enhance the condition of these ecosystems.

Before the executive order was signed, state and federal government authorities, in collaboration with NGOs and international government authorities, recognized the necessity of preserving coral reef resources. Each region began formulating a plan of action to strengthen coral reef resource management in response to and with support from the U.S. Coral Reef Initiative. These plans focus on the collection of baseline assessments and identifying problems and areas of concern.

Table 7.1 summarizes the variety of coral reef projects ongoing or proposed around the Pacific Region. (Table 7.1 may be found at the end of this chapter.) The Council supports these research initiatives, because much of the information gained from these projects will complement the Council's research initiatives proposed in this chapter. While the extent of possible research on coral reef ecosystems is tremendous, the Council and its advisory bodies focused on research questions directly related to ecosystem management needs and issues that cut across the various FMPs.

### 7.2 Council Recommendations

The coral reef ecosystems covered under this FMP are geographically distinct, with management areas separated by 5,000 miles of Pacific Ocean. Species composition and richness vary widely between regions, as do fishing and non-fishing threats to the coral reefs.

An adaptive management strategy underlies this FMP because it is based on ecosystem principles. The research outlined in Table 7.1 addresses traditional species-specific management questions. While these projects can help to answer ecosystem-related questions, the Council's research recommendations more specifically support ecosystem-based adaptive management.

Specific questions focus on the multi-use nature of coral reefs, the role of the various coral reef habitats, trophic interactions and the effect of fishing, the value and function of MPAs, and the

individual and synergistic effects that anthropogenic and natural disturbances have on the ecosystem. Particularly important research would address the interactions between fisheries, because the established crustacean, bottomfish, and precious coral fisheries all occur to some extent in the coral reef ecosystem. The following recommendations are derived from needs outlined by the Plan Teams for each of the FMPs, the Ecosystem and Habitat and Indigenous Rights Advisory Panels, and the Scientific and Statistical Committee.

### **7.2.1 Summary of Council-proposed Research**

#### **American Samoa**

1. Examine recovery rates and yields of coral reefs that have been severely damaged by sustained high fishing pressures (Tutuila), with those where fishing pressure is much lower (Manu'a) or entirely absent (Rose Atoll MPA).

#### **CNMI/ Guam**

2. Socio-economic and cultural study of the fishing communities with respect to potential resource allocation.
3. Various projects addressing the multiple land-based threats to the near-shore coral reef ecosystem.

#### **Main Hawaiian Islands**

4. Effect of alien species on coral reef ecosystems, speed of dispersion.
5. Improve Fishery Statistical Surveys to complement commercial fisheries monitoring programs and to facilitate capturing landing and effort data from recreational fishing sectors.
6. Study of historic fisheries data.

#### **Northwestern Hawaiian Islands**

7. Protected species.
8. Effects of ecotourism.
9. Study of deep benthic habitat in relation to ecosystem.
10. Interactions between fisheries operating within the coral reef ecosystem.

#### **PRIAs**

11. Assessments and monitoring as benchmarks for total and species specific biomass, species composition and how habitat structure relates to species density.

## All Areas

12. Mapping.
13. Rapid ecological assessments, biomass surveys, long-term remote and direct monitoring.
14. Education.
15. Marine debris.
16. Effectiveness of MPAs as management tools.
17. Archaeo-ichthyological studies.
18. Relationship between habitat and stock abundance.
19. Determination of indicator species for rapid assessment of reef's health.
20. Relation of natural and anthropogenic stressors.
21. Trophic interactions for ecosystem modeling.
22. Standardization of data collection systems to facilitate use in management.

### 7.2.2 Region-specific Research Needs

The islands of the Western Pacific Region extend in a great arc over the Central and Western Pacific and include parts of Micronesia and Polynesia. The four inhabited archipelagos—Hawaii, Northern Mariana Islands, Guam and American Samoa—all have different geographic, social, and economic characteristics, which influence the types of coral reef fisheries research required in each location. Furthermore, large areas of the Western Pacific Region are uninhabited or under military control and therefore off-limits to commercial fishing. Research in these areas may not be driven primarily by fishery-related issues but by other concerns, such as protected species interactions in the case of the Northwestern Hawaiian Islands, or as benchmarks for comparison between fished and unfished sites.

#### *American Samoa*

American Samoa has a rapidly increasing population, most of which is found on the main large island of Tutuila. The island's population is mainly Polynesian and they are strongly linked through ancestral ties with the people of neighboring (Western) Samoa.<sup>1</sup> Population growth is driven by both new births and the migration of Western Samoans, who can get work permits for American Samoa. Very high harvests of reef fish and invertebrates from American Samoan reefs were documented in the late 1970s.

However, a combination of natural and anthropogenic effects has had a serious impact on American Samoan reefs, particularly on Tutuila, with the effect of depressing catch rates and the volume of fish produced through reef fishing. These include a crown-of-thorns outbreak in the 1970s, which ultimately destroyed 95% of live coral cover in some locations, followed by two severe hurricanes in 1990 and 1991. The hurricanes destroyed most of the coral growth to a depth of 10-15 m, particularly on the north side of the island. This was followed by a mass coral

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<sup>1</sup> Western Samoa renamed itself Samoa in 1998, despite protest from American Samoa.

bleaching event in 1994, probably connected with El Niño. These disturbances, coupled with increasing human impacts such as sedimentation on the reefs, eutrophication of nearshore waters, coastal construction, and solid and chemical waste discharges have resulted in major changes to coral reef habitats and associated reef fish assemblages.

Successive damage to the Tutuila reefs means that American Samoa may be a natural laboratory to look at the behavior and recovery of fish populations in conditions where production has declined through a mix of habitat destruction and high fishing pressure. In response, the commercial fishery has changed its focus over the years from reef fishing to bottomfishing, and currently to longline fishing for albacore and other pelagic fish. Consumer demand for reef fish is now being met in large part by imports from Samoa (formerly Western Samoa). Fishing pressures on reef fish stocks in the less populated Manu'a Islands, to the east of Tutuila, have not changed in the same manner. Fish stocks are not considered over-exploited, and traditional coral reef fishing is currently practiced. Because one of the MPAs slated for implementation through this FMP is at Rose Atoll, American Samoa offers the potential to examine the recovery rates and yields of coral reefs that have been severely damaged by sustained high fishing pressures with those where fishing pressure is much lower or entirely absent.

### *Commonwealth of the Northern Mariana Islands and Guam*

High population growth due to migrants is a feature of both Guam and the Northern Mariana Islands. Most of the immigrants come from East and Southeast Asia to work in the garment industry. Because of their cultural preferences they eat a lot of fish and other seafood. Therefore, they add to the demand for fishery production from coral reef areas. Small-boat fishermen dominate fishing in nearshore areas, catching deep- and shallow-water reef fish and bottomfish species. Due to their proximity to Asia, the potential for a live reef fish fishery exporting to Asia is greatest in these islands. The aforementioned Southeast Asian population—because of its high per capita rate of seafood consumption—will put additional pressure on coral reef resources. Because of this potential increase in fishing pressure, a socio-economic and cultural study of potential resource allocation in their fishing communities has been suggested.

The other major influence on the reefs of the Mariana Islands stems from the growth of the tourist industry in both Guam and CNMI. This has led to the landscaping of large areas of the coast for hotels, golf courses, shops, and other leisure activities. Construction brings with it the threat of sedimentation that smothers live corals, while the development of extensive golf courses may have an effect on near-shore lagoon waters through eutrophication from fertilizer-enriched runoff. Finally, the activities of the tourists themselves can harm reefs. Through spearfishing and charter fishing they add to local fishing pressure. Important habitat-related benthos is lost when they take shells and corals for souvenirs. They can also destroy habitat by walking on reefs in boots and diving fins; using jet-skis in shallow water has a similar, but potentially more widespread, effect. The latter activity has been blamed for diminishing habitat for rabbitfish, which are a popular target species on Guam.



CNMI is also subject to military activity on the island of Farallon de Medinilla (FDM), which is the only northern island in the Mariana chain with substantial coral reefs. FDM is also one of the few potential locations where fisheries can expand in the future. It has been used as a target in U.S. military activities for many years, with subsequent disturbance to the reef from direct bombing and accelerated erosion of the island as well.

Coral reef fisheries research in Guam and the CNMI should focus on how to achieve the best balance between tourism and fishing, given that the leisure industry is the single largest industry in both places. Bombing of FDM has been reported to have only a limited direct effect on the coral reef, but it removes a large area of coral reef from use by fishermen, who must fish more intensively on the remaining reef areas. This may have the undesired effect of placing stresses to stocks occupying those locations.

### *Main Hawaiian Islands*

Like the Mariana Islands, the Main Hawaiian Islands' reefs are affected by the growing tourist industry in Hawaii, where large parts of the coastline have been landscaped for hotels, golf courses, and other leisure activities. Over six million people visit Hawaii each year, while the state has a resident population of about one million people. However, the Hawaiian Islands are much larger than their Micronesian counterparts, and larger areas of the coast are also untouched.

Of all areas within the Western Pacific Region, fishermen in the MHI have the most diverse array of fishing gears and fisheries. These include specialist targeting of small reef fish for the aquarium industry; fish trapping; a variety of crustacean trapping methods; directed fisheries for nearshore small pelagic fishes; and more typical methods like hook-and-line, gill net, seine net, cast net, and spear fishing. Alien species have been introduced into Hawaii through bilge and ballast water, by well-intentioned projects, and through federally supported aquaculture programs. The bluelined snapper (*Lutjanus kasmira*) was one of most contentious introductions; this species has spread throughout the state's coastal waters since its original introduction from French Polynesia. It has been blamed for the subsequent decline of bottomfish species even though there is no evidence for this. Although popular elsewhere in the Pacific, people in Hawaii are unfamiliar with it, and—although common—they do not like to eat it.

Extensive research has been conducted on Hawaii's reefs, but comparatively little is known about reef fisheries in Hawaii. Ironically, large volumes of data are compiled by the State of Hawaii Division of Aquatic Resources on commercial landings and nominal effort of coral reef fisheries by various gear types, with some data extending back to the late 1940s. Furthermore, a detailed survey of fishing in the Hawaiian Islands in the early 1900s provides an important benchmark. Besides landings and nominal effort, there are also indices of fishing effort contained in other databases, such as the Department of Boating and Ocean Recreation (DBOR) small vessel registration records. These data include registration of vessels for commercial fishing and for pleasure, with breakdown by size class and propulsion type. Much of these data remain unanalyzed and their management value unrealized. For example, this type of data was

used to generate production models and MSY for bottomfish fisheries in the MHI (Ralston and Polovina 1982).

In February 2001, the Division of Aquatic Resources, in partnership with NMFS, re-initiated fishery statistical surveys for the MHI. These surveys are designed to collect data on participation, effort, and catch composition, primarily from the vessel-based recreational fishing sector. The Hawaii Marine Recreational Fisheries Surveys (HMRFS) consist of three components: (1) random digit surveys of Hawaii residents to estimate participation and effort for private boats and shore fishing, (2) weekly telephone surveys of 10% of Hawaii charter boat operators, and (3) an intercept survey of private and charter boat fishermen to collect catch data. This component of HMRFS is similar to the creel surveys conducted in other island areas. Re-establishing a detailed survey of fishing in the MHI is essential to increasing managers' knowledge of landings and nominal effort for coral reef fisheries. Not only will it help them to better understand coral reef fisheries in the commercial sector, but in other sectors—including recreational fishing—as well.

In summary, coral reef ecosystem problems in the MHI are similar to those in the Mariana Islands: the MHI also suffer from the impacts of urbanization and the effects of coastal landscaping driven by tourism and population expansion. But because the MHI are relatively large with some inaccessible coasts, there are extensive coastal areas free from these anthropogenic influences. This allows areas with different land uses and population densities to be compared in order to see the impacts on coral reef fisheries. In addition, there are unresolved questions about the impacts of exotic species on indigenous fauna, particularly the successful proliferation of the bluelined snapper. Lastly, unlike other areas of the Western Pacific Region, large volumes of data extending over several decades are available on commercial reef fisheries in Hawaii. It should also be noted that there are many different surveys and sampling programs in Hawaii for both commercial and recreational fisheries. All these data sources should be assessed in order to see what information can be gleaned to better manage Hawaii's coral reef fisheries.

### *Low-use Marine Protected Areas*

The NWHI are a special concern, both regionally and nationally. Native people and foreign fishermen have fished in this area for hundreds of years. However, very little is known about the level of fishing pressure before Council-implemented management. The low-use MPAs that this FMP implements for the NWHI will begin seaward of what is currently a *de facto* no-take MPA (out to 10 fathoms), based on current regulations and fishing practices, and will generally extend from 10-50 fathoms.<sup>1</sup> It has been hypothesized that MPAs are havens where large, fecund species can repopulate the surrounding reef. However, this hypothesis needs to be studied in the presence of regulated fishing pressure. The low-use MPAs of the NWHI will be an ideal location for this research.

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<sup>1</sup>As described in Section 5.2, the CRE-FMP designates as no-take MPAs EEZ waters 0-10 fm as well as 0-50 fm around three other atolls, French Frigate Shoals, Laysan and the northern half of Midway.

### *No-take Marine Protected Areas*

This FMP will also implement no-take MPAs in remote Howland, Baker, and Jarvis Islands, and Kingman Reef. These islands have experienced the least fishing pressure of any location under Council jurisdiction. They are also far removed from non-fishing impacts. Therefore, they are the best sites to determine a benchmark for total and species-specific biomass, species composition, and how habitat structure relates to species density. Assessments are currently underway at many of these locations, and many coral reef scientists want to conduct projects in these near-pristine environments. In order to use the research in these areas for fisheries management, the Council recommends that the scientists coordinate their work. This will allow independent data sets to be coordinated with management-related research elsewhere.

### **7.2.3 Council Recommendations for Ecosystem-based Research**

Each of the topics below has been suggested by one or more of the plan teams and advisory panels involved in the drafting of the Coral Reef Ecosystem FMP. They are the Coral Reef Ecosystem, Bottomfish, Crustacean, Ecosystem and Habitat, and Precious Corals Plan Teams and Advisory Panels, the Indigenous People Advisory Panel, and the Scientific and Statistical Committee.

#### *Interactions of Other FMP's MUS in the Coral Reef Ecosystem*

This FMP proposes close coordination between the plan teams of the Bottomfish, Crustacean and Precious Coral FMPs and the Coral Reef Ecosystem Plan Team. Each of the plan teams recommended research on various associations and interdependencies, thus giving a more integrated picture of the coral reef ecosystem. A greater understanding of these interactions will aid in identifying and addressing issues for resolution among the various FMPs.

#### *Effects of Gear and Marine Debris on Coral Reef Habitat*

Marine debris is an important concern, especially in the NWHI. This debris generally comes from North Pacific fisheries not under Council jurisdiction. A multi-agency effort has been active in removing and cataloguing tons of this debris. The Council supports this effort but believes issues regarding gear and debris originating from Western Pacific fisheries is also of concern. The Council has recommended research on gear and debris effects on the deeper benthic environment. On several occasions concern has been raised about the impact lobster traps have on the coral reef habitat, but little research has been conducted to date. Lost traps impact in ghost fishing is negligible, as research shows that lobsters can exit traps over time. Tangle nets were used in the late 1980s to harvest precious coral from the NWHI. The effects from this fishing has not been analyzed, although their impact has been analyzed in other areas. The NWHI omnibus proposal will have a far greater impact on management issues within the Council's jurisdiction, and has been recommended by the Crustacean and Precious Corals Plan Teams and advisory panels. Submersible-supported cruises in the NWHI and MHI in 2001 found minimal impact from bottomfish gear and precious corals harvesting, respectively.

### *Trophic Interactions*

Simulation models for coral reef ecosystems (ECOPATH and ECOSIM, see Section 2.4) have become sophisticated tools, which can aid resource managers in predicting cascading effects from changes in the system. While these models can provide valuable insight, they require some basic data on trophic interactions. These models will never be able to simultaneously include the thousands of species found in the ecosystem. Research must first determine appropriate model species to use in a given coral reef ecosystem. This will require an understanding of the trophic interactions between habitat, primary production, and representative species of herbivores, omnivores, and top predators.

### *Role of Habitat in Stock Abundance*

Researchers have observed correlations between habitat and stock abundance in several environments. Each of the implemented FMPs' plan teams were interested in designing projects that would address specific questions under this heading.

The Bottomfish Plan Team proposed a project on the importance of precious coral habitat and coral reef habitat on the survivability of juvenile bottomfish MUS. The Crustacean Plan Team proposed a project to differentiate the habitat qualities of the known lobster banks and how these differences contribute to successful recruitment and survival of lobster. The Precious Coral Plan Team is interested in how recruitment of gold coral is affected by bottom habitat. This question is also directly related to possible research on the way in which precious coral habitat affects the abundance of bottomfish, eels, octopus, and other species that use it as refuge.

The teams have also suggested more general research on how the percent cover of live coral affects overall species abundance. Live coral coverage varies widely, due mainly to land-based activities in populated areas and how well it is sheltered from storm events in remote areas. At depths shallower than 10 m coral cover can be determined through satellite imagery, which has become very accessible to scientists in recent years. Combining this information with stock assessments could be very useful in determining productivity and sustainable yields.

### *Effect of MPAs in the Ecosystem and Their Role as Management Tools*

Marine protected areas have become a high profile conservation tool over the past decade. The President's initiative to designate 20% of all U.S. coral reefs as MPAs by 2010 underscores a national commitment to their designation. However, for all of their acceptance as valuable conservation and fishery management tools, very little definitive evidence is available on the effect of MPAs beyond their immediate boundaries. Thus, additional research is needed to best determine their most effective size and locations so that in the future they can be truly effective management tools.

This FMP implements MPAs in the NWHI and PRIAs. The PRIAs have never had much fishing pressure and relatively little anthropogenic disturbance in the past. Designating the entire coral reef habitat as "no-take" for most of these islands ensures that these sites are preserves and not

tools for management. The NWHI, in contrast, has experienced fishing pressure in the past and will continue to experience it in the low-use MPAs. Interactions between the low-use and no-take MPAs under varying oceanographic conditions and fishing pressure along the NWHI archipelago should be examined to better understand what makes MPAs more or less successful in terms of fisheries management and sustainable yield.

### *Interactions and Individual Effects of Anthropogenic and Natural Stressors*

Coral reefs throughout the Pacific are subject to high surf and surge associated with strong seasonal storms. Reefs found near populated areas are subject to land-based stressors and various other human activities. In areas with less shelter from storms, natural events determine the state of the reef. In sheltered areas, which are often near population centers, anthropogenic activities have a greater effect on the reef. Much research has assessed the causes and effects of, and mitigation options for, coral reef threats. In contrast, little research has been conducted to determine the synergistic effects of natural and anthropogenic stresses or combined anthropogenic stresses. In order to focus on the most serious threats to the ecosystem, and to foster interagency cooperation to address these threats, more research of this type is needed.

Additionally, climate and ecosystem shifts may occur over decadal scale cycles or longer which in turn, result in changes in recruitment and productivity of coral reef ecosystem resources. In the past, a climactic shift is believed to have occurred in the central North Pacific in the late 1980s. This produced an ecosystem shift in the NWHI that resulted in a lowering of carrying capacity and declined productivity. Additional research on both short-term and long-term ecosystem variability is needed in order to understand its effects on resources.

### *Determining Indicator Species or Using the Most Commonly Landed Species to Assess Ecosystem Health*

Coral reef monitoring is an expensive and time-consuming process. The value of intensive monitoring has been questioned by some scientists, but deemed vital by others. It is impossible to study every organism in the coral reef ecosystem to determine the state of their health. Thus, as is done in terrestrial and freshwater environments, appropriate indicator species must be identified from which overall ecosystem health can be extrapolated. Baseline studies on their population densities, age structure and seasonal variation could then be completed. If indicator species can be identified, intensive monitoring can be reduced and research money will be available to address emerging issues and specific management needs.

### *Protected Species*

Many protected and endangered species rely on the coral reef environment, especially in the NWHI. Specific research programs are in place to study monk seals, sea turtles, and seabirds. These are very important programs for this FMP because protected species are a major factor in fisheries regulations. The Council continues to use data derived from these programs and continually puts forth new questions to help address issues in fisheries management.

### **7.3 Other Research Addressing Ecosystem Management**

A great deal of research effort has been expended studying the coral reefs of the Hawaiian Islands over the past 100 years. This includes gathering fishery data, reef surveys and monitoring, trophic studies, and a host of other efforts. NMFS, the U.S. Fish and Wildlife Service and the Hawaii Department of Land and Natural Resources undertook a tripartite study of the NWHI in the late 1970s and early 1980s, culminating in two symposia in 1980 and 1983. The wide scope of this research is a benchmark for future research in the NWHI.

Anthropogenic threats are limited in the NWHI. Land-based activities, which cause the greatest damage to reefs in populated areas, are virtually absent. Threats from fishing activities are also limited, due to a limited entry program and other regulatory controls for the two established NWHI fisheries. Limited entry permits for the NWHI fisheries are limited to seventeen permits for the bottomfish fishery and 15 permits for the crustacean fishery. Generally between five and seven lobster vessels actively fish one or two months a year. They are able to fish over a distance of 1,100 miles covering 11,554 km<sup>2</sup> of coral reef habitat. The renewed precious coral fishery has yet to venture to the NWHI, but substantial potential for harvest has been identified.

Potential threats from emerging fisheries, marine debris accumulating on NWHI reefs from north Pacific fisheries, and the health of the resident endangered species region-wide are the major concerns of the Council. In addition, this FMP is a demonstration plan for the ecosystem approach to fisheries management. The following project proposals were developed, keeping in mind the abundance of accumulated knowledge, the true threats to the various reefs under the Council's authority, and the emerging importance of the ecosystem approach to fisheries management. These efforts are principally guided by specific management questions derived from all of the Council's FMPs.

#### **7.3.1 NWHI Omnibus Research Proposal**

Project Deep Reef is a two-year study of the deep reef benthic fishery in the NWHI, using Deepworker 2000 submersibles. The project's goal is to obtain information about deepwater habitats by conducting habitat and stock assessments for lobsters, bottomfish, precious corals, and coral reef ecosystems in order to include all of the NWHI deep reef habitat resources in the Council's FMPs.

For lobsters, specific projects may deal with:

- Monk seal prey dependency.
- Habitat specifics for productive vs. unproductive area comparisons.
- Impact of ghost fishing on lobsters.
- Impact of lobster traps on coral reef habitats.
- Night versus day behavior and stock density differences.
- Characterization of steep-wall habitats for lobsters.

For bottomfish, specific projects may deal with:

- Characterization of juvenile and adult bottomfish habitats.
- Placement of potential reserves.

For precious corals, specific projects may deal with:

- Stock assessments for deep banks and pinnacles particularly around Midway.
- Impact of past dredging by foreign fleets at 180 Fathom Bank (north of Midway).
- Definition of habitat requirement of monk seals for gold coral and arrowtooth eels.

For coral reef ecosystems, specific projects may deal with:

- Depth and range extensions for deep coral reef ecosystems.
- Impacts of the other benthic fisheries in the NWHI on coral reef ecosystems.
- Designation of "protected areas" to establish marine preserves.

### **7.3.2 Archaeo-ichthyological Research**

The archaeological, historical and socio-cultural records from Pacific Islands are increasingly recognized as important data sources for fishery management. Since most fishery biology studies are short-term efforts conducted over a few years at best, and rarely over several decades, they represent only snapshots of a fishery in time. The study period may include years during which conditions in the fishery are extremely favorable, or years when the fishery is in a production trough. The NWHI lobster fishery is a good example of this; it expanded during a favorable oceanic inter-decadal cycle, which produced over-optimistic estimates of fishery production. Landings then fell by an order of magnitude during a subsequent regime shift to a less productive oceanic cycle.

Data from archaeological investigations may cover many centuries rather than a few years and give a much more balanced perspective on resource use and sustainability. Dalzell (1998) has reviewed a number of different archaeological studies that contain insights into coral reef resources use in the Pacific Islands. Excavated mollusc shells and fish bones allow researchers to reconstruct the species composition of pre-historic fishing. In some instances it is possible to reconstruct size frequencies from the data, and in turn generate life history parameters of exploited fish stocks over many centuries.

The archaeological and historical record can also clarify the social and cultural importance of fisheries, and traditional property rights. This is especially important when urbanization and European colonization has caused these practices to decline. This has been amply demonstrated in New Zealand (Aotearoa), where the original Polynesian Maori population was economically and socially marginalized following European settlement in the nineteenth century. Europeans generally ignored Maori concepts of marine tenure and fishery access rights.

However, archaeological studies have produced evidence of a diverse range of Maori fishing activities: they exploited a wide range of fishes and marine mammals—such as seals—and also preserved large amounts of fish. Indeed, in some areas, such as the Muriwhenua region of New Zealand's North Island, fishing became a principal source of nutrition as human populations increased and food from hunting and agriculture became increasingly limited. The Maori have used such evidence to successfully gain recognition of traditional fisheries property rights, which were guaranteed under the 1840 Treaty of Waitangi (Dalzell 1998).

Johannes (1998) has argued that traditional fishery knowledge and folklore of Pacific Islanders is an invaluable assemblage of observations on the biology and ecology of reef and lagoon fishes. He also published a landmark paper in which he used traditional knowledge of fishermen to illustrate the spawning strategies of reef and lagoon fish in the Pacific Islands (Johannes 1978). He has discussed at length the value of traditional knowledge and traditional tenure systems and other customs for the management of Pacific reef and lagoon fisheries (Johannes 1998). Much of Hawaii's cultural fishing heritage has been lost following contact and colonization, however, Carlos Andrade (pers. comm. to Paul Bartram) has suggested that the songs and chants of the people of Ni'ihau Island may be an important source of traditional knowledge on resource use and abundance in the pre-historic NWHI. In Northern Europe a similar oral knowledge source, the Icelandic Sagas, have been used to establish the long term history of herring and cod fisheries (Beverton 1962).

In summary, conventional scientific studies on reef fisheries are needed to manage the resources. There is also information from archaeological, historical, and socio-cultural sources that can provide information for fishery management. Fishery managers in the Western Pacific need to acquaint themselves with these sources and evaluate them for their utility.

### **7.3.3 Hawaii Coral Reef Initiative**

The University of Hawaii, in collaboration with the State DLNR Division of Aquatic Resources, has established the Hawaii Coral Reef Initiative (HCRI) Research Program. The primary purpose of the program is to support monitoring and research activities aimed at building capacity to manage Hawaii's coral reef ecosystems. To fulfill its mission, the program works with local, state and federal agencies, as well as private organizations, in order to achieve the following goals:

- Assess major threats to coral reef ecosystems and provide information for more effective management.
- Advance understanding of biological and physical processes that affect the health of coral reefs.
- Develop a database and information system to store and access data and results.
- Conduct public awareness programs on threats to coral reef ecosystems.
- Implement education and training for coral reef scientists and managers.



Specific objectives of the program are to:

- Monitor coral reef health at sites around the main Hawaiian Islands.
- Monitor impacts of aquarium fish harvesting to West Hawaii coral reefs.
- Identify algae and develop a quantitative sampling method that supports coral reef monitoring.
- Develop real-time water quality monitoring of some coral reefs and the impact of runoff, using macroalgae as an indicator of pollution.
- Develop a rapid assessment method for describing coral reef resources of the NWHI.
- Assess the effectiveness of MPAs to conserve fishery resources and the impact of fishing in a management area.

For 1999-2000, the HCRI Research Program has sponsored four projects, including the statewide Coral Reef Assessment and Monitoring Program (CRAMP), which is designed to identify the controlling factors, both natural and anthropogenic, contributing to the overall health and condition of Hawaii's coral reefs. In addition, the HCRI Research Program will provide professional training for Department of Aquatic Resources staff, broaden public outreach and education efforts, and develop a website to profile management initiatives, research, and the ecosystem.

**Table 7.1: Coral reef related research, monitoring, and management activities in the region.**

| Ongoing Coral Reef Initiatives  |
|---|
| <p><b>National Marine Fisheries Service</b></p> <p><b>Monitoring:</b> rapid and long term assessments, with ships, satellites, buoys in NWHI, PRIAs.</p> <p><b>Fishing Impacts:</b> habitat and trophic linkages.</p> <p><b>Management:</b> work with Council and Coral Reef Ecosystem Fishery Management Plan.</p> <p><b>MPAs:</b> effectiveness and EFH.</p> <p><b>Protected species:</b> seal and turtle studies.</p> <p><b>Education:</b> marine debris.</p> <p><b>Mapping:</b> reef habitat and oceanographic properties.</p> <p><b>Debris:</b> remove, assess, identify source and impacts.</p> <p><b>Fisheries research:</b> biology and ecology of coral reef fish.</p> <p><b>Socio-economic:</b> small boat survey.</p> <p><b>Other:</b> determine indicator taxa for quick assessment</p> |
| <p><b>US Fish &amp; Wildlife Service</b></p> <p><b>Monitoring:</b> reef fish stock assessments, seabirds in NWHI, monitoring of all NWRs in region, except Guam.</p> <p><b>Management:</b> review refuge and ecological services programs.</p> <p><b>Protected species:</b> seal trophic study, green turtle, dolphin.</p> <p><b>Mapping:</b> reef habitat mapping of NWHI, Guam, PRIAs in progress.</p> <p><b>Debris:</b> monitor and removal at Tern Island, French Frigate Shoals.</p> <p><b>Fisheries research:</b> <i>ulua</i> tagging.</p> <p><b>Socio- economic:</b> PCBs and asbestos on Tern Island and PRIAs.</p> <p><b>Other:</b> alien species control and eradication.</p>   |
| <p><b>International Coral Reef Initiative</b></p> <p>Seeks to develop, coordinate and implement policy, coastal and marine management, law enforcement and education programs in collaboration with governments and other organizations for the protection of coral reefs. The International Coral Reef Initiative will also produce an annual report evaluating the health, status and success of implemented programs.</p>  |

| Ongoing Coral Reef Initiatives  |
|---|
| <p><b>Global Coral Reef Monitoring Network</b></p> <p><b>Monitoring:</b> tourist monitoring program, rapid assessments.</p> <p><b>Management:</b> strengthen institutional linkages.</p> <p><b>Education:</b> produce annual reports.</p> <p><b>Socio- economic:</b> link regional socio-economic and cultural organizations.</p> |
| <p><b>Great Barrier Reef Marine Park Authority</b></p> <p><b>Monitoring:</b> assess natural variability.</p> <p><b>Management:</b> advise marine park managers.</p> <p><b>Education:</b> increase information dissemination.</p>  |
| <p><b>James Cook University</b></p> <p><b>Monitoring:</b> resource assessment.</p> <p><b>MPAs:</b> response to fishing pressures.</p> <p><b>Fisheries research:</b> life history, age demographics.</p> <p><b>Socio- economic:</b> tourism impacts.</p> <p><b>Other:</b> coral recruitment.</p>                                   |
| <p><b>South Pacific Commission</b></p> <p><b>Fishing impacts:</b> analyze fisheries data.</p> <p><b>Management:</b> advise countries; management of live reef fisheries.</p> <p><b>Education:</b> training and gear development.</p> <p><b>Fisheries research:</b> sustainability of live reef fish fisheries.</p>                |

| <b>Proposed Coral Reef Initiatives</b>  |
|---|
| <p><b>Coral Reef Task Force</b></p> <p><b>Monitoring:</b> national coordination, web-based data system.</p> <p><b>Fishing impacts:</b> stop destructive practices.</p> <p><b>Management:</b> link marine and land practices, foster ecosystem approach to fisheries management.</p> <p><b>MPAs:</b> strengthen protection, goal of 20% coverage by 2010.</p> <p><b>Education:</b> education coordinator, user groups, decision makers.</p> <p><b>Mapping:</b> high and low resolution; emphasizes MPAs, change.</p> <p><b>Alien Species:</b> work with coral reef aquaculture.</p> <p><b>Socio- economic:</b> user conflict, community- based management.</p> <p><b>Land pollution:</b> water quality, create partnerships, control discharge.</p> <p><b>Other:</b> Create coral reef disease consortium, foster international cooperation.</p> |
| <p style="text-align: center;"><b>Management needs and strategies from the U.S. Pacific Island<br/>Coral Reef Initiative<br/>Funded by NOAA and DOI, Office of Insular Affairs</b></p>  |
| <p><b>American Samoa</b></p> <p><b>Monitoring:</b> reef fish and invertebrate surveys.</p> <p><b>Management:</b> revise laws, enhance enforcement.</p> <p><b>MPAs:</b> educate public on importance.</p> <p><b>Education:</b> marine resource education center.</p> <p><b>Land pollution:</b> water quality assessment.</p> <p><b>Other:</b> laws and enforcement.</p>  |
| <p><b>CNMI</b></p> <p><b>Monitoring:</b> bottomfish surveys, standardize protocol.</p> <p><b>MPAs:</b> identify areas and collect baseline information.</p> <p><b>Education:</b> State of the Reef Report.</p> <p><b>Other:</b> deploy eight FADs</p>   |

**Management needs and strategies from the U.S. Pacific Island  
Coral Reef Initiative  
Funded by NOAA and DOI, Office of Insular Affairs**

**Guam**

**Monitoring:** Territorial Seashore Reserve Plan, restore Tumon Bay.

**Fishing impacts:** gillnet impact on resource.

**Education:** Project Reef Check, Tumon Bay outreach.

**Debris:** remove gillnets.

**Other:** coral cultivation, recruitment, reseeding & settlement.

**Land pollution:** runoff in Tumon Bay reef.

**Hawaii**

**Monitoring:** CRAMP- monitor 30 sites; Rapid Ecological Assessment in the NWHI.

**Education:** community-based education and monitoring.

**Mapping:** purchase satellite images.



# CHAPTER 8

## REGULATIONS, PERMIT APPLICATIONS AND DATA FORMS

### 8.1 Draft Regulations for other western Pacific fisheries Fishery Management Plans

The Coral Reef Ecosystem Fishery Management Plan amends the Bottomfish and Seamount Groundfish, Crustaceans, Pacific Pelagics and the Precious Corals Fishery Management Plans under 660.18, by prohibiting the harvest of all management unit species in no-take areas defined in the Coral Reef Ecosystem FMP and in the CFR §660.12 for western Pacific fisheries. The CRE FMP also amends these existing FMPs under 660.13 to require vessel insurance for operating or transiting in MPAs. These new regulations are included in subpart B - Western Pacific Fisheries - General.

In addition, the CFR §660 Subpart B, Western Pacific Fisheries- General will be amended with the addition of the following line in 660.12 (Definitions):

§660.12 Pacific pelagic management unit species, will be amended by striking the following: Dogtooth tuna (*Gymnosarda unicolor*), Family *Alopiidae*, Family *Carcharhinidae*, Family *Lamnidae*, Family *Sphyrnidae* and ;

Adding the following: (1) Pelagic thresher shark (*Alapias pelagious*), (2) Bigeye thresher shark (*Alopias superciliosus*), (3) Common thresher shark (*Alopias vulpinus*), (4) Silky shark (*Carcharhinus falciformis*), (5) Oceanic whitetip shark (*Carcharhinus longimanus*), (6) Blue shark (*Prionace glauca*), (7) Shortfin mako shark (*Isurus paucus*), (8) Longfin mako shark (*Isurus paucus*), and (9) salmon shark (*Lamna ditropis*).

#### 8.1.1 Regulations

##### § 660.11 Purpose and scope.

(b) Regulations specific to individual fisheries are included in subparts C, D, E, F, and J of this part.

## § 660.12 Definitions

In addition to the definitions in the Magnuson-Stevens Fishery Conservation and Management Act, and in §600.10, the terms used in subpart B through F and subpart J have the following meanings:

*Coral reef ecosystem management unit species* means all of the taxa listed in Table 3, Currently Harvested Coral Reef Ecosystem Management Unit Species, and Table 4, Potentially Harvested Coral Reef Ecosystem Management Unit Species, of this part and do not include the species defined as “bottomfish management unit species,” “crustaceans management unit species,” “Pacific pelagic management unit species” and “precious corals management species:”

*Low use marine protected area* means an area of the EEZ where fishing for or harvesting of coral reef resources is allowed only under a special permit, as specified. Low-use areas are defined as the EEZ around the Northwestern Hawaiian Islands shallower than 50 fathoms which have not been designated no-take, waters shallower than 50 fathoms around Johnston Atoll (16°45' N lat., 169°31' W long.), Wake Island (19° 18' N lat., 166° 35' E long.), Palmyra Atoll (5°53' N lat., 162°05' W long.), and the southern half of the Midway Atoll NWR bisected by the 28° 14' N parallel.

*No-take marine protected area* means an area of the EEZ that is closed to fishing for or harvesting of all defined management unit species. The no-take areas designated in the Coral Reef FMP apply to harvesting of MUS from every Western Pacific Council Fishery Management Plan. These areas are defined as follows: Federal waters shallower than 10 fathoms in the Northwestern Hawaiian Islands and federal waters shallower than 50 fathoms around Jarvis Island (0°23' S, 160°01' W), Howland Island (0°48' N lat., 176° 38' W long.), Baker Island (0° 13' N lat., 176°38' W long.), Kingman Reef (6°23' N lat., 162°24' W long.), Laysan Island (25° 45' N lat., 171°45' W long.), French Frigate Shoals (23° 45' N lat., 166°15' W long.), the northern half of the Midway Atoll NWR bisected by the 28° 14' N parallel, and Rose Atoll (14° 33' S lat., 168°09' W long.).

*Pacific pelagic management unit species* means the following fish:

### **Pacific Pelagic Management Unit Species List**

| <b>Scientific Name</b>                     | <b>English Common Name</b>               |
|--|--|
| <i>Coryphaena</i> spp.                     | Mahimahi (dolphinfishes)                 |
| <i>Acanthocybium solandri</i>              | Wahoo                                    |
| <i>Makaira mazara:</i><br><i>M. indica</i> | Indo-Pacific blue marlin<br>Black marlin |
| <i>Tetrapturus audax</i>                   | Striped marlin                           |
| <i>T. angustirostris</i>                   | Shortbill spearfish                      |



|  |                        |
|--|------------------------|
| <i>Xiphias gladius</i>   | Swordfish              |
| <i>Istiophorus platypterus</i>                                 | Sailfish               |
| <i>Alapias pelagicus</i>                                       | Pelagic thresher shark |
| <i>Alopias superciliosus</i>                                   | Bigeye thresher shark  |
| <i>Alopias vulpinus</i>  | Common thresher shark  |
| <i>Carcharhinus falciformis</i>                                | Silky shark            |
| <i>Carcharhinus longimanus</i>                                 | Oceanic whitetip shark |
| <i>Prionace glauca</i>   | Blue shark             |
| <i>Isurus oxyrinchus</i>                                       | Shortfin mako shark    |
| <i>Isurus paucus</i>   | Longfin mako shark     |
| <i>Lamna ditropis</i>  | salmon shark           |
| <i>Thunnus alalunga</i>  | Albacore               |
| <i>T. obesus</i>   | Bigeye tuna            |
| <i>T. albacares</i>  | Yellowfin tuna         |
| <i>T. thynnus</i>  | Northern bluefin tuna  |
| <i>Katsuwonus pelamis</i>                                      | Skipjack tuna          |
| <i>Euthynnus affinis</i>                                       | Kawakawa               |
| <i>Lampris</i> spp.  | Moonfish               |
| Gempylidae   | Oilfish family         |
| family Bramidae  | Pomfret                |
| <i>Auxis</i> spp., <i>Scomber</i> spp.; <i>Allothunus</i> spp. | Other tuna relatives   |

*Remote U.S. Pacific island possessions* means the islands of Wake, Howland, Baker, Jarvis, Johnston atoll, Palmyra atoll and Kingman Reef.

*Special permit* means a permit issued to allow fishing of coral reef ecosystem resources in restricted marine protected areas and to fish for any potentially-harvested coral reef taxa.

#### § 660.13 Permits and fees.

##### *(c) Application.*

(3) Insurance: All fishing vessels (including those permitted under existing FMPs) operating or transiting in areas designated as marine protected areas shall be required to have insurance to cover vessel removal and pollution liability in the event of a grounding, depending on category of vessel, type of permit, and fishing area.

### § 660.14 Reporting and recordkeeping

(a) *Fishing record forms.* The operator of any fishing vessel subject to the requirements of §§ 660.21, 660.41, 660.81, or 660.101 must maintain on board the vessel an accurate and complete record of catch, effort and other data on report forms provided by the Regional Director. All information specified on the forms must be recorded on the forms within 24 hours after completion of each fishing day. Each form must be signed and dated by the fishing vessel operator. For the fisheries managed under §§ 660.21, 660.41, and 660.81, the original logbook form for each day of the fishing trip must be submitted to the Regional Director within 72 hours of each landing of management unit species. For the fisheries managed under § 660.101, the original logbook form for each day of the fishing trip must be submitted to the Regional Director within 30 days of each landing of management unit species.

(b) *Transshipment logbooks.* Any person subject to the requirements of § 660.21(c) or holds a special permit under 660.101(a.1.iii) must maintain on board the vessel an accurate and complete NMFS transshipment logbook containing report forms provided by the Regional Administrator. All information specified on the forms must be recorded on the forms within 24 hours after the day of transshipment. Each form must be signed and dated by the receiving vessel operator. The original logbook for each day of transshipment activity must be submitted to the PIAO Administrator within 72 hours of each landing of Pacific pelagic management unit species. The original logbook for each day of transshipment activity must be submitted to the PIAO Administrator within seven days of each landing of coral reef ecosystem management unit species.

(f) *Availability of records for inspection.*

(4) *Coral reef ecosystem management unit species.* Any person who has a Coral Reef Ecosystem permit and who is required by state laws and regulations to maintain and submit records of catch and effort, landings and sales for coral reef ecosystem management unit species by this subpart and subpart J of this part must make those records immediately available for federal inspection and copying upon request by an authorized officer.

(g) *State reporting.* Any person who has a permit under §660.21, 660.61, or 660.101 and who is regulated by state laws and regulations to maintain and submit records of catch and effort, landings and sales for vessels regulated by subparts C, E and J of this part must maintain and submit those records in the exact manner required by state laws and regulations.

### § 660.18 Area restrictions.

Fishing, harvesting or taking of management unit species under all FMPs described in subparts C, D, E, F, and J is prohibited in no-take MPAs as defined in §660.12 and;

(1) within the EEZ landward of the 10-fathom curve, as depicted on National Ocean Survey Charts, Numbers 19016, 19019 and 19022, around the Northwestern Hawaiian Islands.

(2) within the EEZ landward of the 50-fathom curve, as depicted on National Ocean Survey Charts, Numbers 19019, 19401 and 19481, around the Northwestern Hawaiian Islands of Laysan, French Frigate Shoals, and the north half of Midway, as defined in the no-take Marine Protected Area definition.

(3) within the EEZ landward of the 50-fathom curve, as depicted on National Ocean Survey Charts, Numbers 83116, 83153 and 83157, around the Pacific Remote Island Areas of Jarvis, Howland and Baker Islands, and Kingman Reef as defined in the no-take Marine Protected Area definition.

(4) within the EEZ landward of the 50-fathom curve, as depicted on National Ocean Survey Charts, Number 83484, around Rose Atoll, as defined in the no-take Marine Protected Area definition.

#### Subpart J – Western Pacific Coral Reef Ecosystem Fisheries

##### § 660.101 Permits and fees.

###### *(a) Applicability.*

(1) Special Permit: Any person or vessel of the United States fishing for, taking or retaining coral reef ecosystem management unit species/taxa must have a special permit if that vessel is used:

(i) To fish for any coral reef ecosystem management unit species/taxa in low-use marine protected areas around the Northwestern Hawaiian Islands or remote U.S. Pacific island possessions, as defined in § 660.12.

(ii) To fish for any potentially-harvested coral reef ecosystem management unit species/taxa in the EEZ around American Samoa, Guam, the main Hawaiian Islands, or the portion of the EEZ measured from a baseline drawn in such a manner that each point on it is 3 nautical miles from the Northern Mariana Islands.

(iii) To transship coral reef ecosystem management unit species shoreward of the outer boundary of the EEZ.

(iv) To fish for any coral reef ecosystem management unit species/taxa for which it has been specifically required to obtain a special permit through framework action.

(v) To fish for any coral reef ecosystem management unit species/taxa with any gear not specifically allowed in this subpart.

###### (2) Exceptions:

(i) Any vessel fishing for MUS covered under a separate FMP does not need an additional permit to fish as outlined by this FMP.

(ii) Any vessel fishing for currently harvested coral reef ecosystem species/taxa outside of a marine protected area, unless specifically enacted via a framework measure.

(iii) Collecting of marine organisms for scientific research or assessment purposes (permit issued directly by NMFS).

(b) *Validity.* Each permit will be valid for fishing only in the fishery management subarea specified on the permit.

(c) *General requirements.* General requirements governing application information, issuance, fees, expiration, replacement, transfer, alteration, display, sanctions and appeals for permits are contained in 660.13.

(d) *Low use marine protected area special permit.* No direct or incidental harvest of coral reef ecosystem management unit species may be conducted in low-use marine protected areas unless authorized by a special permit issued by the PIAO Administrator in accordance with the criteria and procedures specified in this section (other than identified in exceptions).

(1) *Application.* An applicant for a special permit must submit to the PIAO Administrator, at least 60 days before the desired date of permit action, a written application including, but not limited to, the following information:

- (i) The date of the application.
- (ii) The applicant's name, mailing address, and telephone number.
- (iii) A statement describing the objectives of the fishing activity for which a special permit is needed, including a general description of the expected disposition of the resources harvested under the permit (i.e., stored live, fresh, frozen, preserved; sold for food, ornamental, research, or other use).
- (iv) For each vessel to be covered by a special permit:
  - (A) Vessel name (if applicable)
  - (B) Name, address, and telephone number of owner and operator
  - (C) USCG documentation, state license, or registration number
  - (D) Home port
  - (E) Length of vessel
  - (F) Net tonnage
  - (G) Gross tonnage
  - (H) Documentation of vessel insurance to cover cost of vessel removal and pollution liability (name of insurer and amount of insurance coverage against accidental grounding and oil spill).
- (vi) A description of the planned fishing operation, including general timing, duration and location of fishing and gear operation, resources (directed and incidental) expected to be harvested under the special permit, expected catch,

and estimated ecosystem-level, habitat, and protected species impacts of the proposed harvest.

(viii) The signature of the applicant

(2) *Incomplete applications.* The PIAO Administrator may request from an applicant additional information necessary to make the determinations required under this section. An applicant will be notified of an incomplete application within 10 working days of receipt of the application. An incomplete application will not be considered until corrected in writing.

(3) *Issuance.*

(i) If an application contains all of the required information, the PIAO Administrator will forward copies of the application to the Council, the USCG, the fishery management agency of the affected state, and other interested parties, accompanied by the following information:

(A) The current utilization of domestic annual harvesting and processing capacity of the directed and incidental species for which a special permit is being requested.

(B) The current status of resources to be harvested (direct and incidental) in relation to the overfishing definition in the FMP.

(C) Estimated ecosystem, habitat, and protected species impacts of the proposed activity.

(D) Other biological and ecological information relevant to the proposal.

(ii) Following receipt of a complete application, the PIAO Administrator will consult with the Council and the Director of the affected state fishery management agency concerning the permit application and will receive their recommendations for approval or disapproval of the application. The applicant will be notified in advance of a meeting (if needed) at which the application will be considered, and invited to appear in support of the application, if the applicant desires.

(iii) Following a review of the Council's recommendation and supporting rationale, the Regional Administrator may:

(A) Concur with the Council's recommendation and, after finding that it is consistent with the goals and objectives of the FMP, the national standards, and other applicable laws, approve a special permit; or

(B) Reject the Council's recommendation, in which case, written reasons will be provided by the Regional Administrator to the Council for the rejection.

(iv) Within 30 working days after the consultation in paragraph (ii) of this section, or as soon as practicable thereafter, NMFS will notify the applicant in writing if the decision to grant or deny the special permit and, if denied, the reasons for the denial. Grounds for denial of a special permit include the following:

(A) The applicant has failed to disclose material information required, or has made false statements as to any material fact, in connection with his or her application.

(B) According to the best scientific information available, the harvest to be conducted under the permit would detrimentally affect any coral reef resource or coral reef ecosystem in a significant way.

(C) Issuance of the special permit would inequitably allocate fishing privileges among domestic fishermen or would have economic allocation as its sole purpose.

(D) Activities to be conducted under the special permit would be inconsistent with the intent of this section or the management objectives of the FMP.

(E) The applicant has failed to demonstrate a valid justification for the permit.

(F) The activity proposed under the special permit would create a significant enforcement problem.

(G) The applicant has failed to provide documentation of vessel insurance which provides for the cost of vessel removal and pollution liability.

(v) The Regional Administrator may attach terms and conditions to the special permit, if it is granted, consistent with the management objectives of the FMP, including but not limited to:

(A) The maximum amount of each resource that can be harvested and landed during the term of the special permit, including trip limits, where appropriate.

(B) The number, sizes, names and identification numbers of the vessels authorized to conduct fishing activities under the special permit.

(C) The times and places where fishing may be conducted.

(D) The type, size, and amount of gear which may be used by each vessel operated under the special permit.

(E) Data reporting requirements.

(F) Such other conditions as may be necessary to ensure compliance with the purposes of the special permit consistent with the objectives of the FMP.

(4) *Duration.* Unless otherwise specified in the special permit or a superceding notice or regulation, a special permit is effective for no longer than one year, unless revoked, suspended, or modified. Special permits may be renewed following the general procedures in § 660.13.

(5) *Alteration.* Any special permit that has been altered, erased, or mutilated is invalid.

(6) *Validity.* A permit is valid only for the particular vessel(s) named in the application.

(7) *Inspection.* Any special permit must be carried aboard the vessel(s) for which it was issued. The special permit must be presented for inspection upon request of any authorized officer.

(8) *Sanctions.* Failure of the holder of a special permit to comply with the terms and conditions of a special permit, the provisions of § 660.13, any other applicable provisions of this part, the Magnuson Act, or any other regulation promulgated thereunder, is grounds for revocation, suspension, or modification of the special permit with respect to all persons and vessels conducting activities under the special permit. Any action taken to revoke, suspend, or modify a special permit will be governed by 15 CFR part 904 subpart D. Other sanctions available under the statute will be applicable.

(9) *Protected species.* Persons fishing under a special permit must report any incidental take or fisheries interaction with protected species (i.e., all species of sea turtles, seabirds and marine mammals) on a form provided for that purpose. Reports must be submitted to the Regional Administrator within three days of arriving in port.

(10) *Appeals of permit actions.*

(i) Except as provided in subpart D of 15 CFR part 904, any applicant for a permit or a permit holder may appeal the granting, denial, conditioning, or suspension of their permit or a permit affecting their interests to the Regional Administrator. In order to be considered by the Regional Administrator, such appeal must be in writing, must state the action(s) appealed, and the reasons therefore, and must be submitted within 30 days of the original action(s) by the Regional Administrator. The appellant may request an informal hearing on the appeal.

(ii) Upon receipt of an appeal authorized by this section, the Regional Administrator will notify the permit applicant, or permit holder as appropriate, and will request such additional information and in such form as will allow action upon the appeal. Upon receipt of sufficient information, the Regional Administrator will rule on the appeal in accordance with the permit eligibility criteria set forth in this section and the FMP, as appropriate, based upon information relative to the application on file at NMFS and the Council and any additional information, the summary record kept of any hearing and the hearing officer's recommended decision, if any, and such other considerations as deemed appropriate. The Regional Administrator will notify all interested persons of the decision, and the reasons therefor, in writing, normally within 30 days of the receipt of sufficient information, unless additional time is needed for a hearing.

(iii) If a hearing is requested, or if the Regional Administrator determines that one is appropriate, the Regional Administrator may grant an informal hearing

before a hearing officer designated for that purpose after first giving notice of the time, place, and subject matter of the hearing in the Federal Register. Such a hearing shall normally be held no later than 30 days following publication of the notice in the Federal Register, unless the hearing officer extends the time for reasons deemed equitable. The appellant, the applicant (if different), and, at the discretion of the hearing officer, other interested persons, may appear personally or be represented by counsel at the hearing and submit information and present arguments as determined appropriate by the hearing officer. Within 30 days of the last day of the hearing, the hearing officer shall recommend in writing a decision to the Regional Administrator.

(iv) The Regional Administrator may adopt the hearing officer's recommended decision, in whole or in part, or may reject or modify it. In any event, the Regional Administrator will notify interested persons of the decision, and the reason(s) therefore, in writing, within 30 days of receipt of the hearing officer's recommended decision. The Regional Administrator's action constitutes final action for the agency for the purposes of the Administrative Procedures Act.

(v) Any time limit prescribed in this section may be extended for good cause, for a period not to exceed 30 days by the Regional Administrator, either upon his or her own motion or upon written request from the appellant or applicant stating the reason(s) therefore.

(11) *Fees.* A fee is charged for each application for a restricted marine protected area special permit, including permit transfers and permit renewals. The amount of the fee is calculated in accordance with the procedures of the NOAA Finance Handbook, available from the Regional Administrator, for determining the administrative costs of each special product or service. The fee may not exceed such costs and is specified with each application form. The appropriate fee must accompany each application. Failure to pay the fee will preclude issuance of a special permit.

#### § 660.102 Prohibitions.

In addition to the prohibitions in § 600.725 of this chapter, it is unlawful for any person to:

(a) Fish for, take, retain, possess or land any coral reef resource in any portion of the management area as defined in § 660.12 unless:

- (1) A valid permit has been issued for the fishing vessel and area, as specified;
- (2) A permit is not required, as outlined in the permit section of these regulations

or;

(3) The coral reef resources possessed on board the vessel originated outside the management area and this can be demonstrated through receipts of purchase, invoices, fishing logbooks or other documentation.

(b) Fish for, take, or retain any coral reef ecosystem resource:



- (1) That is determined overfished and announced by the Regional Administrator.
- (2) By means of gear or methods prohibited under allowable and restricted gear in this subpart.
- (3) In no-take marine protected areas (except for scientific research).
- (4) In low-use marine protected areas unless a valid special permit has been issued.
- (5) In violation of any permit issued under § 660.13 or in the permit section of this subpart.

(c) Fish for, take, or retain any wild live rock or live hard coral for commercial purposes except under a valid special permit for scientific research (issued by NMFS), aquaculture seed stock collection or traditional and ceremonial purposes by indigenous people.

(d) Engage in fishing without a valid permit or facsimile of a valid permit on board the vessel and available for inspection by an authorized officer, when a permit is required under § 660.13 or in the permit section of this subpart, unless the vessel was at sea when the permit was issued, in which case the permit must be on board the vessel before its next trip.

(e) File false information on any application for a general permit under § 660.13 or a special permit.

(f) Fail to file reports in the exact manner required by a state law or regulation, as required, provided that the person is required to do so by applicable state law or regulation.

(g) Falsify or fail to make, keep, maintain, or submit any logbook or logbook form or other record or report required.

(h) Refuse to make available to an authorized officer or designee of the Regional Administrator for inspection or copying, any records that must be made available.

(i) Fail to affix or maintain vessel or gear markings, as required.

(j) Violate a term or condition of a special permit.

(k) Fail to report any take or interaction with protected species as required.

(l) Fail to notify officials as required.

**§ 660.103 Notification.**

(a) *Before fishing in low-use marine protected area.* The permit holder for a fishing vessel subject to the requirements of the special permit, or agent designated by the permit holder, shall provide a notice to the Regional Administrator at least 72 hours (not including weekends and federal holidays)

before the vessel leaves port on any fishing trip, any part of which occurs in any portion of the EEZ designated as a low-use marine protected area. The vessel operator will be presumed to be an agent designated by the permit holder unless the PIAO Administrator is otherwise notified by the permit holder. The notice must be provided to the office or telephone number designated by the PIAO Administrator. The notice must provide the official number of the vessel, the name of the vessel, the intended departure date, time, and location, the name of the operator of the vessel, and the name and telephone number of the agent designated by the permit holder to be available between 8:00 a.m. to 5:00 p.m. (Hawaii time) on weekdays for NMFS to contact.

(b) *Before landing after fishing in low-use marine protected area.* The operator of a fishing vessel that has been granted a special permit under §660.101 and that has made a trip that harvested coral reef resources in a low-use marine protected area must contact NMFS Enforcement at least 24 hours before landing, and report the port and the approximate date and time at which the coral reef resources harvested on the trip will be landed.

#### § 660.104 Allowable gear and gear restrictions.

(a) *Allowable gear and methods.* Coral reef ecosystem resources may be taken only with allowable gear and methods, as follows:

- (1) hand harvest;
- (2) spear;
- (3) slurp gun;
- (4) hand net/dip net, hoop net (for Kona crab);
- (5) throw net;
- (6) barrier net (for aquarium fish);
- (7) surround/purse nets for targeted schools (e.g., baitfish, big-eyed scad, goatfish) with a minimum of bycatch, and must be attended by swimmers or divers at all times;
- (8) hook-and-line (includes handline [powered or not], rod-and-reel, and trolling);
- (9) traps (with conditions); and
- (10) remote-operating vehicles/submersibles.

(b) *Poisons, explosives, intoxicating substances.* Coral reef resources may not be taken by means of poisons, explosives, or intoxicating substances. Possession of these materials by any vessel having a coral reef ecosystem permit or that is otherwise established to be fishing for coral reef ecosystem resources in the EEZ is prohibited.

(c) *Spearfishing with scuba.* Coral reef resources may not be taken by means of spearfishing with scuba at night (from 6 pm to 6 am) in the Northwestern Hawaiian Islands or the Pacific Remote Island Areas.

(d) *Possession of gear.* Possession or use of trawl nets, gill nets, hookah breathers, or any other gear that is not expressly allowed under these regulations by any vessel holding a permit or that is otherwise established to be fishing for coral reef ecosystem resources in the EEZ is prohibited. Possession of any gear not approved under §660.104 or approved by the PIAO Administrator in the permit process while established to be fishing for coral reef resources in the EEZ is prohibited.

(e) *Existing FMP fisheries.* Existing FMP fisheries shall follow the allowable gear and methods outlined in their respective plans.

(f) *Non-listed gear.* Anyone wishing to fish with gear not included in this list must describe the gear and its method of deployment in the special permit application. A ruling on the allowability of this gear type will be determined by the PIAO Administrator after consultation with the Council and the director of the affected state fishery management agency.

#### § 660.105 Unattended Gear and Gear Identification.

(a) *Identification.* The owner's identification must be marked legibly on all fish and crab traps on board the vessel or deployed in the water by any vessel holding a permit under §660.13 or in this subpart or that is otherwise established to be fishing for coral reef ecosystem resources in the EEZ.

(b) *Enforcement action.*

(1) Unattended traps not marked in compliance with these regulations and found deployed in the EEZ will be considered unclaimed or abandoned property, and may be disposed of in any manner considered appropriate by NMFS or an authorized officer.

(2) Unattended surround nets or bait seine nets found deployed in the EEZ will be considered unclaimed or abandoned property, and may be disposed of in any manner considered appropriate by NMFS or an authorized officer.

#### § 660.106 Area Restrictions

(a) *Low-use MPAs:* Fishing for coral reef ecosystem resources in low-use marine protected areas is allowed only by persons or by vessels for which a special permit has been issued:

(1) Within the EEZ to an inner boundary coterminous with the 10-fathom curve, as depicted on National Ocean Survey Charts, Numbers 19016, 19019 and 19022, around the Northwestern Hawaiian Islands, except for the EEZ landward of the 50-fathom curve around Laysan, French Frigate Shoals, and the southern half of Midway, as defined in 660.12.

(2) Within the EEZ, as depicted on National Ocean Survey Charts, Numbers 83637 and 81664, around the Pacific Remote Island Areas of Palmyra, Johnston Atoll and Wake Island.

(3) Permitted vessels fishing under other FMPs follow regulations in their respective FMP.

(b) Anchoring by fishing vessels over 50 feet in overall length is prohibited in the EEZ seaward of the Territory of Guam west of 144.5 E longitude except in the event of an emergency caused by ocean conditions or by a vessel malfunction that can be documented.

#### § 660.107 Framework for Regulatory Adjustments.

##### *(a) Procedure for established measures.*

(1) Established measures are management measures that, at some time, have been included in regulations implementing the FMP, or for which the impacts have been evaluated in Council/NMFS documents in the context of current conditions.

(2) Following framework procedures of the CRE-FMP, the Council may recommend to the Regional Administrator that established measures be modified, removed, or re-instituted. Such recommendation shall include supporting rationale and analysis, and shall be made after advance public notice, public discussion and consideration of public comment. NMFS may implement the Council's recommendation by rulemaking if approved by the Regional Administrator.

##### *(b) Procedure for new measures.*

(1) New measures are management measures that have not been included in regulations implementing the FMP, or for which the impacts have not been evaluated in Council/NMFS documents in the context of current conditions. New measures include but are not limited to: catch limits; resource size limits; closures; effort limitations; permit requirements; reporting and recordkeeping requirements.

(2) Following the framework procedures of the FMP, the Council will publicize, including by Federal Register notice, and solicit public comment on, any proposed new management measure. After a Council meeting at which the measure is discussed, the Council will consider recommendations and prepare a Federal Register notice summarizing the Council's deliberations, rationale, and analysis for the preferred action, and the time and place for any subsequent Council meeting(s) to consider the new measure. At subsequent public meeting(s), the Council will consider public comments and other information received to make a recommendation to the Regional Administrator about any new measure. NMFS may implement the Council's recommendation by rule making if approved by the Regional Administrator.

(i) The Regional Administrator will consider the Council's recommendation and supporting rationale and analysis, and, if he or she concurs

with the Council's recommendation, will propose regulations to carry out the action. If the Regional Administrator rejects the Council's proposed action, a written explanation for the denial will be provided to the Council within two weeks of the decision.

(ii) The Council may appeal denial by writing to the Assistant Administrator, who must respond in writing within 30 days.

(iii) The Regional Administrator and the Assistant Administrator will make their decisions in accord with the MSFCMA, other applicable laws, and the Coral Reef Ecosystem FMP.

(iv) To minimize conflicts between the federal and state/territorial/commonwealth management systems, the Council will use the procedures in paragraph (a)(2) in this section to respond to state/territorial/commonwealth management actions. Council consideration of action would normally begin with a representative of the state, territorial or commonwealth government bringing a potential or actual management conflict or need to the Council's attention.

#### § 660.108 Management subareas.

(a) The fishery management area is divided into six subareas for the regulation of fishing for coral reef ecosystem management unit species:

(1) Main Hawaiian Islands means the EEZ of the Hawaiian Islands Archipelago lying to the east of 161°20' long.

(2) Northwestern Hawaiian Islands means the EEZ of the Hawaiian Islands Archipelago lying to the west of 161°20'. For purposes of the regulations issued under this subpart, Midway Island is treated as part of the Northwestern Hawaiian Islands.

(3) Guam means the EEZ seaward of the Territory of Guam waters.

(4) American Samoa means the EEZ seaward of the Territory of American Samoa waters.

(5) Commonwealth of the Northern Mariana Islands (CNMI) means that portion of the EEZ seaward from a baseline line drawn 3 nautical miles offshore of the Northern Mariana Islands.

(6) Remote U.S. Pacific island possessions means the EEZ seaward of the islands of Johnston, Wake, Palmyra, Kingman Reef, Howland, Jarvis and Baker.

(b) The inner boundary of the fishery management area is a line coterminous with the shoreline of the Midway Islands, and the Remote U.S. Pacific Island Possessions, with the seaward boundaries of the State of Hawaii, the Territory of Guam, the Territory of American Samoa, and with a baseline drawn three nautical miles offshore of the Commonwealth of the Northern Mariana Islands.

(c) The outer boundary of the fishery management area is a line drawn in such a manner that each point is 200 nautical miles from the baseline from which the territorial sea is measured, or is coterminous with adjacent international maritime boundaries. The outer boundary of the

fishery management area north of Guam will extend to those points which are equidistant between Guam and the island of Rota in CNMI.

§ 660.109 Annual Reports.

(a) *Annual reports.* By July 31 of each year, a Council-appointed coral reef ecosystem plan team will prepare an annual report covering the following topics:

- (1) Fishery performance data, with detailed catch-effort information for target, non-target (incidental) resources and bycatch.
- (2) Summary of new coral reef resource information obtained from fishery-dependent and non-fishery dependent sources.
- (3) Essential fish habitat conditions and sources of degradation including fishing and non-fishing impact to EFH and HAPC in all areas.
- (4) Coral reef ecosystem-level impacts associated with fishing activities regulated under this and other fishery management plans.
- (5) Enforcement activities and problems.
- (6) Administrative actions (e.g., data collection and reporting, permits).
- (7) State and territorial management actions.
- (8) Assessment of need for Council action (including biological, economic, social, enforcement, administrative, and state/territorial/commonwealth/ federal needs, problems, and trends). Indication of potential problems warranting further investigation may be signaled by the following indicator criteria:
  - (i) Significant change in habitat structure or stability.
  - (ii) Significant change in trophic structure or biodiversity.
  - (iii) Significant change in interactions among different fisheries.
  - (iv) Significant change in mean size of the catch of any species or species group.
  - (v) Significant change in catch-per-unit-effort for any species or species group.
  - (vi) Significant change in gear types or methods of fishing.
  - (vii) Interactions with protected species.
  - (viii) Significant coral reef ecosystem cumulative effects.
- (9) Recommendation for Council action.
- (10) Estimated impacts of recommended action.

The FMP establishes a non-regulatory formal process for coordination of the Coral Reef Ecosystem FMP with the existing Bottomfish, Crustaceans, Pelagics and Precious Corals FMPs. Ecosystem issues will be identified and mitigation options identified through interaction among the plan teams.

(b) *Recommendation of management action.*

(1) The Council will evaluate the annual report and advisory body recommendations and may recommend management action by either the state/territorial/commonwealth governments or by federal regulation.

(2) If the Council believes that management action should be considered, it will make specific recommendations to the Regional Administrator after considering the views of its advisory bodies. The Council will assess the need for federal management action.

**Table 3 to Part §660. - Currently Harvested Coral Reef Ecosystem Management Unit Species.**

|                                     |   |
|-------------------------------------|---|
| <b>Acanthuridae (Surgeonfishes)</b> | Orange-spot surgeonfish ( <i>Acanthurus olivaceus</i> )<br>Yellowfin surgeonfish ( <i>Acanthurus xanopterus</i> )<br>Convict tang ( <i>Acanthurus triostegus</i> )<br>Eye-striped surgeonfish ( <i>Acanthurus dussumieri</i> )<br>Blue-lined surgeon ( <i>Acanthurus nigroris</i> )<br>Whitebar surgeonfish ( <i>Acanthurus leucopareius</i> )<br>Blue-banded surgeonfish ( <i>Acanthurus lineatus</i> )<br>Blackstreak surgeonfish ( <i>Acanthurus nigricauda</i> )<br>Whitecheek surgeonfish ( <i>Acanthurus nigricans</i> )<br>White-spotted surgeonfish ( <i>Acanthurus guttatus</i> )<br>Ringtail surgeonfish ( <i>Acanthurus blochii</i> )<br>Brown surgeonfish ( <i>Acanthurus nigrofuscus</i> )<br>Elongate surgeonfish ( <i>Acanthurus mata</i> )<br>Mimic surgeonfish ( <i>Acanthurus pyroferus</i> )<br>Yellow-eyed surgeonfish ( <i>Ctenochaetus strigosus</i> )<br>Striped bristletooth ( <i>Ctenochaetus striatus</i> )<br>Twospot bristletooth ( <i>Ctenochaetus binotatus</i> ) |
|                                     | Bluespine unicornfish ( <i>Naso unicornus</i> )<br>Orangespine unicornfish ( <i>Naso lituratus</i> )<br>Humpnose unicornfish ( <i>Naso tuberosus</i> )<br>Blacktounge unicornfish ( <i>Naso hexacanthus</i> )<br>Bignose unicornfish ( <i>Naso vlamingii</i> )<br>Whitemargin unicornfish ( <i>Naso annulatus</i> )<br>Spotted unicornfish ( <i>Naso brevirostris</i> )<br>Humpback unicornfish ( <i>Naso brachycentron</i> )<br>Barred unicornfish ( <i>Naso thynnoides</i> )<br>Gray unicornfish ( <i>Naso caesius</i> )  |
| <b>Balistidae (Triggerfishes)</b>   | Titan triggerfish ( <i>Balistoides viridescens</i> )<br>Clown triggerfish ( <i>B. conspicillum</i> )<br>Orangestriped trigger ( <i>Balistapus undulatus</i> )<br>Pinktail triggerfish ( <i>Melichthys vidua</i> )<br>Black triggerfish ( <i>M. niger</i> )<br>Blue triggerfish ( <i>Pseudobalistes fucus</i> )<br>Picassofish ( <i>Rhinecanthus aculeatus</i> )<br>Wedge Picassofish ( <i>B. rectangulus</i> )<br>Bridled triggerfish ( <i>Sufflamen fraenatus</i> )  |

|   |   |
|---|---|
| <b>Carangidae (Jacks)</b>                       | Bigeye scad ( <i>Selar crumenophthalmus</i> )<br>Mackerel scad ( <i>Decapterus macarellus</i> )   |
| <b>Carcharhinidae (Sharks)</b>                  | Grey reef shark ( <i>Carcharhinus amblyrhynchos</i> )<br>Silvertip shark ( <i>Carcharhinus albimarginatus</i> )<br>Galapagos shark ( <i>Carcharhinus galapagensis</i> )<br>Blacktip reef shark ( <i>Carcharhinus melanopterus</i> )<br>Whitetip reef shark ( <i>Triaenodon obesus</i> )   |
| <b>Holocentridae (Soldierfish/Squirrelfish)</b> | Bigscale soldierfish ( <i>Myripristis berndti</i> )<br>Bronze soldierfish ( <i>Myripristis adusta</i> )<br>Blotcheye soldierfish ( <i>Myripristis murdjan</i> )<br>Brick soldierfish ( <i>Myripristis amaena</i> )<br>Scarlet soldierfish ( <i>Myripristis pralinia</i> )<br>Violet soldierfish ( <i>Myripristis violacea</i> )<br>Whitetip soldierfish ( <i>Myripristis vittata</i> )<br>Yellowfin soldierfish ( <i>Myripristis chryseres</i> )<br>Pearly soldierfish ( <i>Myripristis kuntee</i> )<br>( <i>Myripristis hexagona</i> )<br>Tailspot squirrelfish ( <i>Sargocentron caudimaculatum</i> )<br>Blackspot squirrelfish ( <i>Sargocentron melanospilos</i> )<br>File-lined squirrelfish ( <i>Sargocentron microstoma</i> )<br>Pink squirrelfish ( <i>Sargocentron tieroides</i> )<br>Crown squirrelfish ( <i>Sargocentron diadema</i> )<br>Peppered squirrelfish ( <i>Sargocentron punctatissimum</i> )<br>Blue-lined squirrelfish ( <i>Sargocentron tiere</i> )<br>Ala'ihī ( <i>Sargocentron xantherythrum</i> )<br>( <i>Sargocentron furcatum</i> )<br>( <i>Sargocentron spiniferum</i> )<br>Spotfin squirrelfish ( <i>Neoniphon spp.</i> ) |
| <b>Kuhliidae (Flag-tails)</b>                   | Hawaiian flag-tail ( <i>Kuhlia sandvicensis</i> )<br>Barred flag-tail ( <i>Kuhlia mugil</i> )   |
| <b>Kyphosidae (Rudderfish)</b>                  | Rudderfish ( <i>Kyphosus biggibus</i> )<br>( <i>Kyphosus cinerascens</i> )<br>( <i>Kyphosus vaigienses</i> )  |



|                                |  |
|--------------------------------|--|
| <b>Labridae (Wrasses)</b>      | Saddleback hogfish ( <i>Bodianus bilunulatus</i> )<br>Napoleon wrasse ( <i>Cheilinus undulatus</i> )<br>Triple-tail wrasse ( <i>Cheilinus trilobatus</i> )<br>Floral wrasse ( <i>Cheilinus chlorourus</i> )<br>Harlequin tuskfish ( <i>Cheilinus fasciatus</i> )<br>Ring-tailed wrasse ( <i>Oxycheilinus unifasciatus</i> )<br>Bandcheek wrasse ( <i>Oxycheilinus diagrammus</i> )<br>Arenatus wrasse ( <i>Oxycheilinus arenatus</i> )<br>Razor wrasse ( <i>Xyrichtys pavo</i> )<br>Whitepatch wrasse ( <i>Xyrichtes aneitensis</i> )<br>Cigar wrasse ( <i>Cheilio inermis</i> )<br>Blackeye thicklip ( <i>Hemigymnus melapterus</i> )<br>Barred thicklip ( <i>Hemigymnus fasciatus</i> )<br>Threespot wrasse ( <i>Halichoeres trimaculatus</i> )<br>Checkerboard wrasse ( <i>Halichoeres hortulanus</i> )<br>Weedy surge wrasse ( <i>Halichoeres margaritaceus</i> )<br>( <i>Halichoeres zeylonicus</i> )<br>Surge wrasse ( <i>Thalassoma purpureum</i> )<br>Redribbon wrasse ( <i>Thalassoma quinquevittatum</i> )<br>Sunset wrasse ( <i>Thalassoma lutescens</i> )<br>Longface wrasse ( <i>Hologymnosus doliatus</i> )<br>Rockmover wrasse ( <i>Novaculichthys taeniourus</i> ) |
| <b>Mullidae (Goatfishes)</b>   | Yellow goatfish ( <i>Mulloidichthys spp.</i> )<br>( <i>Mulloidichthys Pfluegeri</i> )<br>( <i>Mulloidichthys vanicolensis</i> )<br>( <i>Mulloidichthys flaviolineatus</i> )<br>Banded goatfish ( <i>Parupeneus spp.</i> )<br>( <i>Parupeneus barberinus</i> )<br>( <i>Parupeneus bifasciatus</i> )<br>( <i>Parupeneus heptacanthus</i> )<br>( <i>Parupeneus ciliatus</i> )<br>( <i>Parupeneus ciliatus</i> )<br>( <i>Parupeneus cyclostomas</i> )<br>( <i>Parupeneus pleurostigma</i> )<br>( <i>Parupeneus indicus</i> )<br>( <i>Parupeneus multifasciatus</i> )<br>Bantail goatfish ( <i>Upeneus arge</i> )   |
| <b>Mugilidae (Mullet)</b>      | Stripped mullet ( <i>Mulgil cephalus</i> )<br>Engel's mullet ( <i>Moolgarda engeli</i> )<br>False mullet ( <i>Neomyxus leuciscus</i> )<br>Fringelip mullet ( <i>Crenimugil crenilabis</i> )  |
| <b>Muraenidae (Moray eels)</b> | Yellowmargin moray ( <i>Gymnothorax flavimarginatus</i> )<br>Giant moray ( <i>Gymnothorax javanicus</i> )<br>Undulated moray ( <i>Gymnothorax undulatus</i> )  |
| <b>Ocotpodidae</b>             | Octopus ( <i>Octopus cyanea</i> ; <i>O. ornatus</i> )  |
| <b>Polynemidae</b>             | Threadfin ( <i>Polydactylus sexfilis</i> ) -Moi  |

|  |  |
|--|--|
| <b>Pricanthidae (Bigeye)</b>                   | Glasseye ( <i>Heteropriacanthus cruentatus</i> )<br>Bigeye ( <i>Priacanthus hamrur</i> )   |
| <b>Scaridae (Parrotfishes)</b>                 | Humphead parrotfish ( <i>Bulbometapon muracatum</i> )<br>Parrotfishes ( <i>Scarus spp.</i> )<br>Pacific longnose parrotfish ( <i>Hipposcarus longiceps</i> )<br>Stareye parrotfish ( <i>Catolomus carolinus</i> )  |
| <b>Scombridae (Dogtooth tuna)</b>              | Dogtooth tuna ( <i>Gymnosarda unicolor</i> )   |
| <b>Siganidae (Rabbitfish)</b>                  | Forktail rabbitfish ( <i>Siganus aregentus</i> )<br>Golden rabbitfish ( <i>Siganus guttatus</i> )<br>Gold-spot rabbitfish ( <i>Siganus punctatissimus</i> )<br>Randall's rabbitfish ( <i>Siganus randalli</i> )<br>Scribbled rabbitfish ( <i>Siganus spinus</i> )<br>Vermiculate rabbitfish ( <i>Siganaus vermiculatus</i> ) |
| <b>Sphyraenidae (Barracuda)</b>                | Heller's barracuda ( <i>Sphyraena helleri</i> )<br>Great Barracuda ( <i>Sphyraena barracuda</i> )  |
| <b>Turbinidae (turban shells/green snails)</b> | Green snails ( <i>Turbo spp.</i> )   |

|                              |   |
|------------------------------|---|
| <b>Aquarium Taxa/Species</b> | <b>Acanthuridae</b><br>Yellow tang ( <i>Zebrasoma flavescens</i> )<br>Yellow-eyed surgeon fish ( <i>Ctenochaetus strigosus</i> )<br>Achilles tang ( <i>Acanthurus achilles</i> )<br><b>Muraenidae</b><br>Dragon eel ( <i>Enchelycore pardalis</i> )<br><b>Zanclidae</b><br>Morrish idol ( <i>Zanclus cornutus</i> )<br><b>Pomacanthidae</b><br>Angelfish ( <i>Centropyge shepardi</i> and <i>C. flavissimus</i> )<br><b>Cirrhitidae</b><br>Flame hawkfish ( <i>Neocirrhitis armatus</i> )<br><b>Chatodontidae</b><br>Butterflyfish ( <i>Chaetodon auriga</i> , <i>C. lunula</i> , <i>C. melannotus</i> and <i>C. ephippium</i> )<br><b>Pomacentridae</b><br>Damsel fish ( <i>Chromis viridis</i> , <i>Dascyllus aruanus</i> and <i>D. trimaculatus</i> )<br><b>Sabellidae</b><br>Featherduster worm ( <i>Sabellidae</i> ) |
|------------------------------|---|

**Table 4 to Part §660. – Potentially Harvested Coral Reef Ecosystem Management Unit Species.**

|   |  |
|---|--|
| Other Labridae spp. (wrasses)<br>(Those species not listed on CHCRT list)   | Ephippidae (batfish)   |
| Other Carcharhinidae, Sphyrnidae<br>(Those species not listed on CHCRT list)  | Monodactylidae (mono)  |
| Dasyatidae, Myliobatidae, Mobulidae (rays)  | Haemulidae (sweetlips)   |
| Other Serranidae spp. (groupers)<br>(Those species not managed under the Bottomfish FMP<br>or included in proposed bottomfish amendment)                    | Echineidae (remoras)   |
| Carangidae (jacks/trevallies)<br>(Those species not listed on CHCRT list, managed<br>under Bottomfish FMP, or included in proposed<br>bottomfish amendment) | Malacanthidae (tilefish)   |
|   | Acanthoclinidae (spiny basslets)   |
| Other Holocentridae spp. (soldierfish/squirrelfish)<br>(Those species not listed on CHCRT list)   | Pseudochromidae (dottybacks)   |
| Other Mullidae spp. (goatfish)<br>(Those species not listed on CHCRT list)  | Plesiopidae (prettyfins)   |
| Other Acanthuridae spp. (surgeonfish/unicornfish)<br>(Those species not listed on CHCRT list)   | Tetrarogidae (waspfish)  |
| Other Lethrinidae spp. (emperors)<br>(Those species not managed under the Bottomfish FMP<br>or included in proposed bottomfish amendment)                   | Caracanthidae (coral crouchers)  |
| Chlopsidae, Congridae, Moringuidae, Ophichthidae<br>(eels)<br>Other Muraenidae (morays eels)<br>(Those species not listed on CHCRT list)                    | Grammistidae (soapfish)  |
| Apogonidae (cardinalfish)   | <i>Aulostomus chinensis</i> (trumpetfish)  |
| Other Zaclidae spp. (moorish idols)   | <i>Fistularia commersoni</i> (coronetfish)   |
| Other Chaetodontidae spp. (butterflyfish)   | Anomalopidae (flashlightfish)  |
| Other Pomacanthidae spp. (angelfish)  | Clupeidae (herrings)   |
| Other Pomacentridae spp. (damselfish)   | Engraulidae (anchovies)  |
| Scorpaenidae (scorpionfish)<br>(excluding <i>Pontinus macrocephala</i> which is included in<br>proposed bottomfish amendment)                               | Gobiidae (gobies)  |
| Blenniidae (blennies)   | Lutjanidae<br>(Those species not managed under Bottomfish FMP<br>or included in proposed bottomfish amendment) |

|  |  |
|--|--|
| Other Sphyraenidae spp. (barracudas)   | Other Ballistidae/Monocanthidae spp.<br>( <i>Those species not listed on CHCRT list</i> )  |
| Pinguipedidae (sandperches)  | Other Siganidae spp.<br>( <i>Those species not listed on CHCRT list</i> )  |
|  | Other Kyphosidae spp.  |
| Bothidae/Soleidae/Pleurnectidae (flounder/sole)  | Caesionidae  |
| Ostraciidae (trunkfish)  | Cirrhitidae  |
| Tetradontidae/Diodontidae (puffer/porcupinefish)   | Antennariidae (frogfishes)   |
|  | Syngnathidae (pipefishes/seahorses)  |
| Stony corals   | Echinoderms (e.g., sea cucumbers, sea urchins)   |
| Heliopora (blue)   | Mollusca   |
| Tubipora (organpipe)   | Sea snails (gastropods)  |
| Azooxanthellates (non-reefbuilders)  | Trochus spp.   |
| Fungiidae (mushroom corals)  | Opisthobranchs (sea slugs)   |
| Sm/Lg Polyped Corals (endemic spp.)  | <i>Pinctada margaritifera</i> (black lipped pearl oyster)  |
| Millepora (firecorals)   | Tridacnidae  |
| Soft corals and gorgonians   | Other bivalves   |
| Anemones (non-epifaunal)   | Cephalopods  |
| Zooanthids   | Crustaceans (lobsters, shrimps/mantis, true crabs and hermit crabs)<br>( <i>Those species not managed under the Crustacean FMP</i> ) |
| Sponges (non-epifaunal)  | Stylasteridae (lace corals)  |
| Hydrozoans   | Solanderidae (hydroid fans)  |
| Bryozoans  | Annelids   |
|  | Algae  |
| Tunicates (solitary/colonial)  | Live rock  |
| All other coral reef ecosystem marine plants, invertebrates and fishes not listed under existing FMPs. |  |

\* The Council proposed to include 49 species of fish (caught predominantly in Guam, the CNMI and American Samoa with traditional bottomfish methods) as new Bottomfish MUS at the June 2000 Council meeting. The amendment is to be submitted at the same time as the CRE FMP.

## **8.2 Draft Permit Applications and Data Entry Forms**

The following five forms and their associated directions are examples of the forms that will be required as specified earlier (see section 5.3). These forms have been generated by combining the suggestions from each advisory body. As the general permit and data entry forms may be implemented through a framework process at the recommendation of the Council, and the requirements of the special permit and data entry forms are determined on a case by case basis, these forms should only be viewed as examples of what likely will be required.

## General Coral Reef Ecosystem Fishing Permit Application Form

### Applicant Information:

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Name: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Address: \_\_\_\_\_  
Street Apt # City State Zip Code

Vessel Name: \_\_\_\_\_ Home Port: \_\_\_\_\_

Length: \_\_\_\_\_ Net Tonnage: \_\_\_\_\_ Gross Tonnage: \_\_\_\_\_

Vessel USCG Documentation / State License / Vessel Registration (circle one)

Number: \_\_\_\_\_

### Vessel operator:

Name: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Address: \_\_\_\_\_  
Street Apt # City State Zip Code

Is this permit solely to transship coral reef ecosystem taxa received from another vessel around the EEZ of American Samoa, Guam, the main Hawaiian Islands or CNMI? \_\_\_\_\_

In which EEZ Management Subarea will fishing be conducted ? (circle only one)

Main Hawaiian Islands

Guam

American Samoa

CNMI

(Optional) Provide general description of planned fishing operation (e.g., type and amount of gear, intended usage, target and expected catch of incidental species, expected volume of catch, intended disposition of catch, or any additional information ). Use back of this sheet, if necessary.

| Target Species |                         |                             | Expected Incidental Species |                         |       |
|----------------|-------------------------|-----------------------------|-----------------------------|-------------------------|-------|
| Species Name   | Expected Catch (#, wt.) | Why harvested? <sup>1</sup> | Species Name                | Expected Catch (#, wt.) | keep? |
|                |                         |                             |                             |                         |       |
|                |                         |                             |                             |                         |       |
|                |                         |                             |                             |                         |       |

<sup>1</sup> Food, ornamental, research, other

This information is true to the best of my knowledge.

Signature: \_\_\_\_\_

Return to: Pacific Islands Area Office, Southwest Region, NMFS;

Tel: (808) 973-2937; Fax: (808) 973-2941

## **Instructions for General Coral Reef Ecosystem Fishing Permit Application Form**

1. Date the application. A response will be sent to the applicant within 15 days after the receipt of a completed application.
2. Write the name of the vessel for which this permit will be affixed per CFR §660.13 (k). Circle the type of registration the vessel is under and give the appropriate number.
3. Specify whether this permit is for transshipment. If so, describe where and when transshipment will occur as well as which species are likely to be transhipped and for what purpose. This can be done as an attachment. No other information will be needed. Only sign the document. Vessels wishing to transship coral reef ecosystem management unit species shoreward of the outer boundary of the EEZ around the Northwestern Hawaiian Islands and remote U.S. Pacific island possessions must fill out a special permit application.
4. Specify the subarea in which fishing will take place. Each permit will be valid for fishing only in the fishery management subarea specified on the permit.
5. (Optional) Provide general description of planned fishing operation with information regarding gear, target species and related information.
6. Sign.

If an incomplete or improperly completed application is filed, the applicant will be sent a notice of deficiency. If the applicant fails to correct the deficiency within 30 days following the date of notification, the application will be considered abandoned.

## Special Coral Reef Ecosystem Fishing Permit Application Form

### Applicant Information

Name: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Address: \_\_\_\_\_  
Street Apt # City State Zip Code

Vessel Name: \_\_\_\_\_ Home Port: \_\_\_\_\_

Length: \_\_\_\_\_ Net Tonnage: \_\_\_\_\_ Gross Tonnage: \_\_\_\_\_

Vessel USCG Documentation / State License / Vessel Registration (circle one)

Number: \_\_\_\_\_

### Vessel operator:

Name: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Address: \_\_\_\_\_  
Street Apt # City State Zip Code

Is this permit solely to transship coral reef ecosystem taxa received from another vessel around the EEZ of the Northwest Hawaiian Islands, the Pacific Remote Island Areas, or any other MPA? \_\_\_\_\_

Do you agree to accommodate an observer on board while fishing, if required? \_\_\_\_\_

Does vessel have an individual Vessel Monitoring System? \_\_\_\_\_

Does vessel have insurance covering removal/clean-up in event of a grounding? \_\_\_\_\_ Name of Insurer: \_\_\_\_\_

Do you agree to submit data within 30 days of returning to port? \_\_\_\_\_

Circle any special exemption for which you qualify and would like to be eligible for under this permit application (attach description of conditions under which you apply):

Other FMP

Scientific Bioprospecting    General Indigenous    Indigenous use of live rock/coral    Aquaculture seed stock of coral

In which EEZ Management Subarea will fishing be conducted? (circle only one)

Main Hawaiian Islands

Northwest Hawaiian Islands

Guam

Guam's Southern Banks

American Samoa

CNMI

PRIA (specify all) \_\_\_\_\_

Describe your intended fishing effort, general fishing grounds, gear to be used and methods of collection

| Target Species or Taxa |                     |  |                             | Expected Incidental Species or Taxa |                     |       |
|------------------------|---------------------|--|-----------------------------|-------------------------------------|---------------------|-------|
| Species Name           | Expected Catch (lb) | How will it be processed? <sup>1</sup> | Why harvested? <sup>2</sup> | Species Name                        | Expected Catch (lb) | keep? |
|                        |                     |  |                             |                                     |                     |       |
|                        |                     |  |                             |                                     |                     |       |
|                        |                     |  |                             |                                     |                     |       |

Use back, if necessary; total expected catch during permit period for target species required for permit approval

<sup>1</sup> Live, fresh, frozen, preserved, other

<sup>2</sup> Food, ornamental, research, other

Attach statement regarding objectives of fishing operation, estimated ecosystem, habitat and protected species impacts, and any additional information to help support approval of this application

This information is true to the best of my knowledge.

Signature: \_\_\_\_\_

Return to: Pacific Islands Area Office, Southwest Region, NMFS

Tel: (808) 973-2935; Fax: (808) 973-2941



## **Instructions for Special Coral Reef Ecosystem Fishing Permit Application Form**

1. Date the application. A response will be sent to the applicant within 15 days after the receipt of a completed application.
2. Write the name of the vessel for which this permit will be affixed per CFR 660.13 (k). Circle the type of registration the vessel is under and give the appropriate number.
3. Answer the five questions after the information for the vessel operator yes or no. Give the name of the insurer of the vessel for which this permit is being applied. All fishing vessels (including existing FMP fisheries) operating in or transiting a marine protected area must have insurance to cover removal and clean-up.
4. If you intend to harvest live rock or coral, additional information must be attached to show why you are eligible for this exemption. If you intend to harvest in an MPA designated for indigenous use, attach relevant information as well. Scientific and bioprospecting permits may require additional information. Those applying under these circumstances should contact the PIAO before submitting an application.
5. Describe intended fishing effort as best possible (e.g., seasons, duration, etc.).
6. In describing the fishing gear, traps must have permanent legible identification. Describe what the identification is, if applicable. Describe how the gear is intended to be deployed and retrieved.
7. List all expected target and incidental species or taxa in the table and other information as best possible. Provide both numbers and weight for the catch, if appropriate.
8. Sign.

If an incomplete or improperly completed application is filed, the applicant will be sent a notice of deficiency. If the applicant fails to correct the deficiency within 30 days following the date of notification, the application will be considered abandoned.

## General Coral Reef Taxa Daily Catch Report

Name of Licensee: \_\_\_\_\_ Coral Reef Ecosystem Permit No. \_\_\_\_\_  
 Vessel Name: \_\_\_\_\_ Radio Call Sign: \_\_\_\_\_ Vessel Number: \_\_\_\_\_  
 Area Fished: \_\_\_\_\_ (follow regional fishing area designations, where applicable)  
 Type of Gear Used (one report form for each haul with each gear type per day): \_\_\_\_\_  
 Date Gear Set: \_\_\_\_/\_\_\_\_/\_\_\_\_ Time at Start: \_\_\_\_\_ Units of Gear Set: \_\_\_\_\_  
 Date Gear Hauled: \_\_\_\_/\_\_\_\_/\_\_\_\_ Time at End: \_\_\_\_\_ Units of Gear Lost: \_\_\_\_\_  
 Wind Speed: \_\_\_\_\_ Wind Direction: \_\_\_\_\_ Sea Surface Temperature: \_\_\_\_\_ Average Depth: \_\_\_\_\_  
 Target Species (list all): \_\_\_\_\_  
 If gear was lost, give explanation as to reason why (no penalty for lost gear). \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Describe any observed damage to the coral reef and how it occurred. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

| Species | No. Caught | Lbs. Caught | No. Kept | Lbs. Kept | If discarded, why ? | How processed? |
|---------|------------|-------------|----------|-----------|---------------------|----------------|
|         |            |             |          |           |                     |                |
|         |            |             |          |           |                     |                |
|         |            |             |          |           |                     |                |
|         |            |             |          |           |                     |                |
|         |            |             |          |           |                     |                |
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|         |            |             |          |           |                     |                |
|         |            |             |          |           |                     |                |
|         |            |             |          |           |                     |                |
|         |            |             |          |           |                     |                |

| Protected Species Observation       |           |        |       |
|-------------------------------------|-----------|--------|-------|
| Enter Seal & Turtle numbers;        | Monk Seal | Turtle | Other |
| Observed in area                    |           |        |       |
| Observed in vicinity of gear        |           |        |       |
| Interfering with fishing operations |           |        |       |
| Preying on catch                    |           |        |       |
| Entangled, released alive           |           |        |       |
| Entangled, released dead            |           |        |       |

Print Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

All information must be logged within 24 hours after the completion of the fishing day.

Submit this form to NMFS within 30 days of each landing of coral reef harvest.

NMFS Honolulu Laboratory, 2570 Dole St., Honolulu, HI 96822; fax: (808) 983-2902

## **Instructions for General Coral Reef Taxa Daily Catch Report**

1. From the coral reef ecosystem permit, record the permittee and permit number.
2. If the area fished has a specific regional designation, use it. Otherwise use an understandable description or latitudinal and longitudinal coordinates.
3. List units of gear lost and provide an explanation as to why (strong current, storm, bottom topography, etc). There is no penalty for lost gear. This information is solely used for management purposes.
4. Describe damage to the reef. Again, as long as operating within the regulations, there is no penalty for this. This information is solely used for management purposes.
5. Fill in the table as specifically as practical. If a percentage of number or pounds kept is more appropriate, be as accurate in your estimate as possible. Give reasons for any discarded catch. Describe how processed (e.g., live, fresh, frozen, preserved, etc.).
6. Give numbers for all protected species observed in most appropriate box. Do not list same animal in two separate boxes for the same day. List it in the most specific category (generally more specific down the list).
7. All information must be logged, signed and dated within 24 hours after completion of the fishing day.
8. All daily catch reports must be submitted to NMFS within 30 days of landing catch.

## Special Permit/low-use Marine Protected Areas Coral Reef Taxa Daily Catch Report

Name of Licensee: \_\_\_\_\_ Coral Reef Ecosystem Permit No. \_\_\_\_\_

Vessel Name: \_\_\_\_\_ Radio Call Sign: \_\_\_\_\_ Vessel Number: \_\_\_\_\_

Area Fished: \_\_\_\_\_ (follow regional fishing area designations)

Type of Gear Used (one report form for each haul with each gear type per day): \_\_\_\_\_

Date Gear Set:      /      /      Time at Start:      Units of Gear Set:     

Date Gear Hauled:      /      /      Time at End:      Units of Gear Lost:     

Wind Speed: \_\_\_\_\_ Wind Direction: \_\_\_\_\_ Sea Surface Temperature: \_\_\_\_\_ Average Depth: \_\_\_\_\_

**Target Species (list all):** \_\_\_\_\_

Observer on board?

If gear was lost, give explanation as to reason why (no penalty for lost gear).

Describe any observed damage to the coral reef and how it occurred.

[illegible]

## Protected Species Observation

| Enter Seal & Turtle numbers; identify other in appropriate box | Monk Seal | Turtle | Other |
|--|-----------|--------|-------|
| Observed in area   |           |        |       |
| Observed in vicinity of gear                                   |           |        |       |
| Interfering with fishing operations                            |           |        |       |
| Preying on catch   |           |        |       |
| Entangled, released alive                                      |           |        |       |
| Entangled, released dead                                       |           |        |       |

---

Print Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

All information must be logged within 24 hours after the completion of the fishing day.

**Submit this form to NMFS within 30 days of each landing of coral reef harvest.**

NMFS Honolulu Laboratory, 2570 Dole St., Honolulu, HI 96822; fax: (808) 983-2902

## **Instructions for Special Permit Coral Reef Taxa Daily Catch Report**

1. From the coral reef ecosystem permit, record the permittee and permit number.
2. If the area fished has a specific regional designation, use it. Otherwise use an understandable description or latitudinal and longitudinal coordinates.
3. List units of gear lost and provide an explanation as to why (strong current, storm, bottom topography, etc). There is no penalty for lost gear. This information is solely used for management purposes.
4. Describe damage to the reef. Again, as long as operating within the regulations, there is no penalty for this. This information is solely used for management purposes.
5. Fill in the table as specifically as practical. If a percentage of number or pounds kept is more appropriate, be as accurate in your estimate as possible. Give reasons for any discarded catch. Describe how processed (e.g., live, fresh, frozen, preserved, etc.).
6. Give numbers for all protected species observed in most appropriate box. Do not list same animal in two separate boxes for the same day. List it in the most specific category (generally more specific down the list).
7. All information must be logged, signed and dated within 24 hours after completion of the fishing day.
8. All daily catch reports must be submitted to NMFS within 30 days of landing catch.

# NMFS Transshipment Log for Coral Reef Ecosystem Management Unit Species

Vessel: \_\_\_\_\_ Permit No.: \_\_\_\_\_ Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

(Vessel receiving fish)

Broker or Shipping Agent: \_\_\_\_\_

| Vessel: _____                            |                          | Radio Call Sign: _____       |
|--|--------------------------|------------------------------|
| (Vessel offloading fish)                 |                          | Permit Number: _____         |
| Total number of days fished: _____       | Type of Gear Used: _____ |                              |
| Average units of gear set per day: _____ | Area of Catch: _____     |                              |
| Species                                  | Number Received          | Total Weight Received (Lbs.) |
|  |                          |                              |
|  |                          |                              |
|  |                          |                              |
|  |                          |                              |
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|  |                          |                              |
|  |                          |                              |
|  |                          |                              |

Print Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

(Vessel captain / operator)

All required information must be recorded on the form within 24 hours after the day of transshipment.

Submit report to National Marine Fisheries Service within 7 days following the date the vessel arrived in port to land transshipped fish.

NMFS Honolulu Laboratory, 2570 Dole St., Honolulu, HI 96822; fax: (808) 983-2902

## **Instructions for Transshipment Log Report**

1. Vessel receiving ship is the vessel registered to land or transship, shoreward of the outer boundary of the fishery management area, coral reef ecosystem management unit species that were harvested by a vessel in accordance with the CRE FMP.
2. Permit number is the number of the CRE fishing permit issued to the vessel owner by NMFS.
3. Date is the month/day/year that the fish were offloaded to (received by) the vessel.
4. The broker/agent, if any, is the shipping agent handling the transshipment operations for the vessel.
5. Name the vessel offloading the fish (the vessel transferring fish to the receiving vessel).
6. If the vessel offloading fish is a fishing vessel, list type of gear used for fishing and average units of gear set per day. Also list the area (lat/long or sector) that was fished.
7. For each management unit species transferred, enter the number and total weight received.
8. Print the name of the vessel captain/owner submitting the report.
9. Sign and date upon completion of the form.

