

**DRAFT**

**Amendment 4 to the Fishery Ecosystem Plan for American Samoa**

**Amendment 5 to the Fishery Ecosystem Plan for the Mariana Archipelago**

**Amendment 5 to the Fishery Ecosystem Plan for the Hawaii Archipelago**

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***Ecosystem Components***

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Including a Draft Environmental Assessment  
and  
Regulatory Impact Review

June 13, 2018

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**Amendment 4 to the Fishery Ecosystem Plan for American Samoa  
 Amendment 5 to the Fishery Ecosystem Plans for the Mariana Archipelago  
 Amendment 5 to the Fishery Ecosystem Plan for Hawaii**

*Ecosystem Components*

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**Abstract**

The Western Pacific Fishery Management Council (Council) established the Fishery Management Plans for American Samoa, the Mariana Archipelago, and Hawaii (FEPs, as amended) to conserve and manage fisheries in the US Exclusive Economic Zone (EEZ, or federal waters) in the Pacific Islands. Currently, the FEPs include thousands of management unit species (MUS), that is, stocks previously considered to be in a federal fishery and needing conservation and management. Under the National Standard (NS) guidelines (50 CFR 600.305 and 600.310) for the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the Council and the National Marine Fisheries Service (NMFS) manage MUS that generally are targets of a Federal fishery and caught predominantly in Federal waters. Pursuant to NS1, ecosystem component species (ECS) are stocks that are included in an FEP to achieve ecosystem management objectives, but do not require conservation and management. Based on the NS1 guidelines, the Council proposes to amend the three FEPs to reclassify certain MUS as ECS. Reclassifying certain MUS as ECS would allow the Council and NMFS to better prioritize monitoring, assessment, and management resources on species that are in federal fisheries and need of conservation and management. The purpose of this action is to improve efficiency of fishery management in the region.

**How to Comment**

Instructions on how to comment on this document and the associated proposed rule can be found by searching on RIN 0648-BH63 at [www.regulations.gov](http://www.regulations.gov), or by contacting the responsible official or Council at the above address. NMFS must receive any comments by the date specified in the instructions.

## Acronyms and Abbreviations

ABD – Acceptable Biological Catch  
ACL – Annual Catch Limit  
AM – Accountability Measure  
CFR – Code of Federal Regulations  
CNMI – Commonwealth of the Northern Mariana Islands  
DOD – Department of Defense  
EA – Environmental Assessment  
ECEWG – Ecosystem Component Expert Working Group  
ECS – Ecosystem Component Species  
EEZ – Exclusive Economic Zone  
EFH – Essential Fish Habitat  
ESA – Endangered Species Act  
FEP – Fishery Ecosystem Plan  
FMP – Fishery Management Plans  
FR – *Federal Register*  
MFMT – Maximum Fishing Mortality Threshold  
MHI – Main Hawaiian Islands  
MMPA – Marine Mammal Protection Act  
MPA – Marine Protected Area  
MSST – Minimum Stock Size Threshold  
MSY – Maximum Sustainable Yield  
MUS – Management Unit Species  
NEPA – National Environmental Policy Act  
NMFS – National Marine Fisheries Service  
NOAA – National Oceanic and Atmospheric Administration  
NPDES – National Pollutant Discharge Elimination System  
NS – National Standard  
NS1 – National Standard 1  
OY – Optimum Yield  
PHCRT – Potentially Harvested Coral Reef Taxa  
PIFSC – Pacific Islands Fisheries Science Center  
PIRO – Pacific Islands Regional Office  
PRIA – Pacific Remote Island Area  
RFA – Regulatory Flexibility Act  
RFMC – Regional Fishery Management Council  
SAFE – Stock Assessment and Fishery Evaluation Report  
SDC – Status Determination Criteria  
SSC – Scientific and Statistical Committee  
US – United States  
WPFMC – Western Pacific Fishery Management Council (Council)

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# 1 INTRODUCTION

## 1.1 Background Information on NS1

The Council and the National Marine Fisheries Service (NMFS) manage fishing in the Exclusive Economic Zone (EEZ) around US Pacific Islands. The Council and NMFS manage fishing for bottomfish, coral reef ecosystem species, precious corals, and crustaceans in Hawaii, the Mariana Islands (Guam and the Commonwealth of the Northern Mariana Islands (CNMI)), and American Samoa under the Fishery Ecosystem Plans (FEP) for American Samoa, the Mariana Archipelago, and the Hawaii Archipelago, pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). The Magnuson-Stevens Act requires the Council to develop fishery management plans (FMP) for each fishery under its area of management authority (i.e., EEZ or federal waters) that requires conservation and management. As discussed further below, under Magnuson-Stevens Act §306(b), Councils have limited ability to manage stocks predominately caught in state waters. As a result, it may not be practical for Councils to include these stocks in fishery management plans (81 FR 71858, page 71863, October 18, 2016).

Section 303(h) of the Magnuson-Stevens Act sets ten National Standards (NS) for fishery conservation and management, and requires the Secretary of Commerce to establish advisory guidelines to assist in the development of fishery management plans (also known as FEPs in this region). For fisheries under its authority, the first National Standard (NS1) requires that NMFS use conservation and management measures for MUS<sup>1</sup> to prevent overfishing, while achieving optimum yield on a continuing basis.

In 2006, Congress reauthorized the Magnuson-Stevens Act and included modifications to the original NS1. Under a subsequent revision in 2009, the Magnuson-Stevens Act required Regional Fishery Management Councils (RFMC) to amend their fishery management plans (FMP) to include a mechanism for specifying annual catch limits (ACL) for all fisheries at a level such that overfishing does not occur, and to implement accountability measures (AM) to ensure fishing would adhere to these limits. On January 16, 2009, NMFS published NS1 advisory guidelines applicable nationwide under Title 50, Code of Federal Regulations, Section 600.310 (50 CFR 600.310) to assist RFMCs in determining which stocks are in need of conservation and management. (74 FR 3178, January 16, 2009). Under the 2009 NS1 guidelines, all stocks in an FMP were considered to be in the fishery, and thus required conservation and management. Stocks and stock complexes that require fisheries conservation and management are required to have ACLs and AMs, in addition to other management measures that the Council and NMFS had established for these stocks.

The 2009 NS 1 guidelines also provided guidance to RFMCs on how to identify Ecosystem Component Species (ECS). ECS do not require conservation and management and are not subject to ACLs and AMs. The 2009 revisions defined ECS as “non-target species; those not determined to be, or not likely to become, subject to overfishing, approaching overfished, or overfished; or those not generally retained for sale or personal use.” Although ECS are not subject to ACLs and AMs, under the 2009 NS1 guidelines, RFMCs could monitor their harvest

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<sup>1</sup> Stocks that have been identified as “management unit species” or “stocks in the fishery” are stocks that are in need of conservation and management and are required to have ACLs, other reference points, and AMs.

and classify the species as MUS if they determine that conservation and management is warranted.

In 2016, NMFS revised NS1 guidelines in 2016 and provided additional guidance to RFMCs on the stocks that require conservation and management and how to address ECS. Specifically, NMFS clarified that not every fishery requires federal management. However, stocks that are predominately caught in federal waters, and are also overfished or subject to overfishing, or likely to become overfished or subject to overfishing, are considered to require conservation and management. The final NS1 rule states: “If a stock is not predominately (i.e., mainly, or the most part) caught in Federal waters, a council may lack the authority, and thus ability, to adopt measures that would prevent overfishing and rebuild overfished stocks. It would not make sense, in that case, to require a council to automatically include the stock in an FMP” (81 FR 71858, October 18, 2016). Under the 2016 NS1 revisions, Councils should consider the following ten non-exhaustive factors when deciding whether stocks require conservation and management (§ 600.305(c)(1)(i-x)):

1. The stock is an important component of the marine environment.
2. The stock is caught by the fishery.
3. Whether an FMP can improve or maintain the condition of the stock.
4. The stock is a target of a fishery.
5. The stock is important to commercial, recreational, or subsistence users.
6. The fishery is important to the Nation or to the regional economy.
7. The need to resolve competing interests and conflicts among user groups and whether an FMP can further that resolution.
8. The economic condition of a fishery and whether an FMP can produce more efficient utilization.
9. The needs of a developing fishery, and whether an FMP can foster orderly growth.
10. The extent to which the fishery is already adequately managed by states, by state/federal programs, or by federal regulations pursuant to other FMPs or international commissions, or by industry self-regulation, consistent with the requirements of the Magnuson-Stevens Act and other applicable law.

NS1 also makes clear that the above factors are not exhaustive in making the determination of whether stocks require conservation and management. *See* § 600.305(c)(1). Thus, Councils may consider other factors beyond the ten listed in the regulation. § 600.305(c)(3).

Under the 2016 NS1 revisions, NMFS also redefined ECS as “stocks that a council or the Secretary has determined do not require conservation and management, but desire to list in an FMP in order to achieve ecosystem management objectives” (§ 600.305(d)(13)). Consistent with National Standard 9, Magnuson-Stevens Act § 303(b)(12), and other applicable Magnuson-Stevens Act sections, management measures can be adopted in order to, for example, collect data on the ECS, minimize bycatch or bycatch mortality of ECS, protect the associated role of ECS in the ecosystem, and/or to address other ecosystem issues (81 FR 71858, October 18, 2016). Data collection also allows for monitoring the species in case a fishery develops or other indications suggesting changes in federal management.



Under the Magnuson-Stevens Act and (Magnuson-Stevens Act § 303(a) and the NS (§ 600.310 (e)(f)), FEPs and stock assessment and fishery evaluation (SAFE) reports must include:

1. Maximum Sustainable Yield (MSY) and Status Determination Criteria (SDC) (e.g., Minimum Stock Size Threshold (MSST) and Maximum Fishing Mortality Threshold (MFMT));
2. Optimum Yield (OY) at the stock, stock complex, or fishery level and provide the OY specification analysis;
3. Acceptable Biological Catch (ABC) control rule which includes the specification of the Overfishing Limits;
4. Mechanisms for specifying ACLs and Accountability Measures; and
5. Essential Fish Habitat (EFH).

Notably, the above information is not required for ECS in an FMP. Additional information on the management of MUS and ECS is available in WPFMC and NMFS (2011).

## **1.2 Western Pacific Management under NS1**

Prior to the 2006 reauthorization of the Magnuson-Stevens Act, the Council and NMFS managed Western Pacific MUS using a variety of conservation and management measures, including prohibitions of destructive gears, area closures and delineation of low use marine protected area, and permit and reporting. The 2006 reauthorization of Magnuson-Stevens Act required the Councils to refocus fisheries management towards output control with the introduction of ACLs and AMs. To comply with 2006 requirements, the Council, in coordination with NMFS, reviewed the MUS in each FEP and created a multiple FEP-amendment (omnibus amendment) that described the mechanism the Council would use to specify ACLs and AMs for the American Samoa, the Mariana Archipelago (Guam and the CNMI), Hawaii, Pacific Remote Island Areas (PRIA), and Pacific Pelagic fisheries. In addition to describing the ACL mechanism, the amendment also adopted exemptions for identified MUS, which met the criteria for statutory exceptions from ACLs. The amendment also adopted the ECS classification system, but did not identify any ECS at that time. The Council recommended, and NMFS approved, the amendment effective July 27, 2011 (76 FR 37285 and WPFMC and NMFS 2011).

Following the 2016 NS1 guidelines revisions, the Council reassessed the MUS lists in the three FEPs to determine which MUS may be better suited as ECS or stocks that do not require conservation and management. Many of the FEP-listed MUS species are predominately caught in state or territorial waters (generally 0-3 nautical miles from shore (nm))<sup>2</sup>, and not in the US EEZ around American Samoa, the CNMI, Guam, or Hawaii. Although the Council and NMFS have worked to improve on the ACL specification process by generating stock assessments for the data-limited stocks, there is a heavy administrative burden to set ACLs for these stock complexes. These procedures include generating stock assessments for these data-limited species, conducting regional peer-reviews, and applying the control rules to specify ACLs for species not predominantly caught in federal waters.

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<sup>2</sup> At the island of Tinian, federal waters extend to the shoreline around certain lands leased by the US Government under the Lease Agreement Made Pursuant to the Covenant to Establish a Commonwealth of the Northern Mariana Islands in Political Union with the United States of America, dated January 6, 1983, as amended.

Despite having undertaken this work to generate ACLs for all MUS listed in FEPs, NMFS has limited authority to manage fishing activity for species predominately caught in state or territorial waters. As per Magnuson-Stevens Act § 306(b), the Secretary may regulate a fishery within the boundaries of the state, pursuant to the fishery management plan, in cases where a stock is predominately caught in the EEZ. Thus, if a fishery is not predominately caught in federal waters and exceeds the ACL, NMFS and the Council could reduce the ACL in the subsequent fishing year; however, NMFS would not have the authority to unilaterally implement AMs or other management measures in state or territorial waters. Without such authority, ACLs and AMs - for stocks not in need of management and predominately caught in state waters - can not provide meaningful management for many of the stocks in the FEPs.<sup>3</sup>

### **1.3 Purpose and Need for Action**

Since 2012, the Council and NMFS have complied with the requirement to manage all Pacific Island fisheries under ACLs and AMs. Amendment 2 to the American Samoa FEP and the Mariana Archipelago and Amendment 3 to the Hawaii FEP amended the FEPs to establish the ACL specification process (76 FR 37285, June 27, 2011; 78 FR 32996, June 3, 2013; 76 FR 37285, June 27, 2011). The work over the past six years has substantiated early observations that stocks in the FEPs not predominately caught in federal waters or subject to overfishing or are overfished should not be MUS in the FEPs because they do not need conservation and management, and might therefore be more appropriately classified as ECS stocks or species.

The need for this action is to create an efficient and effective federal management of Western Pacific fisheries that focuses resources on those species or stocks caught in federal waters that are in need of conservation and management. The purpose of this action is to improve efficiency of fishery management for NMFS and the Council.

In this way, management would better balance fishing demand or interest with use of resources to support conservation and management work. Such improvements in management would still allow the Council and NMFS to monitor and manage ECS species and stocks as well and identify, in a timely manner, whether federal management is needed per the NS1 guidelines. In addition, the Council may also recommend continued application of other management measures for ECS that meet its ecosystem objectives in the FEP. Other management measures may include (but are not limited to) area closures, gear prohibitions, bycatch limits, seasonal closures, permits, etc.

### **1.4 Proposed Action**

The proposed action is to reclassify various species listed in the Council's FEPs from species in need of federal conservation and management (MUS) to ECS, based on the non-exhaustive ten factors described in §600.305(c)(1) of the NS1 guidelines (81 FR 71858, October 18, 2016). The

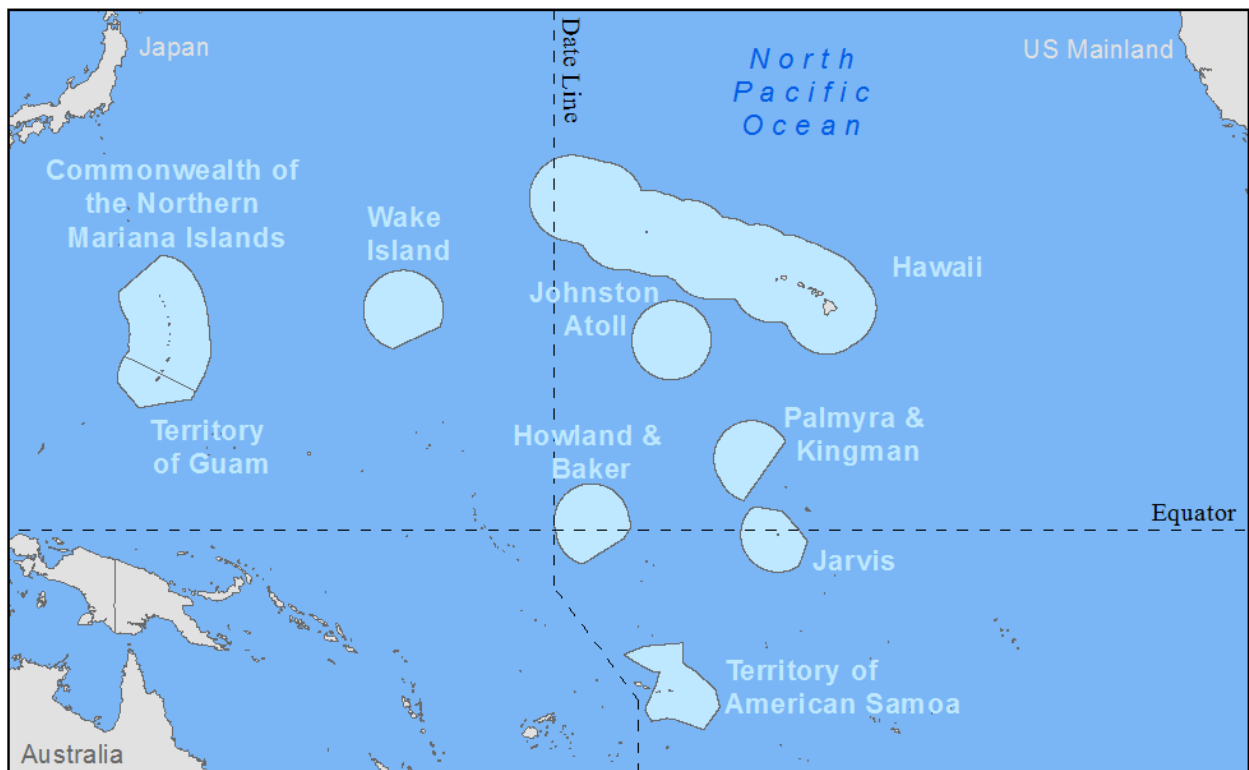
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<sup>3</sup> An exception to this management is Main Hawaiian Islands (MHI) Deep 7 bottomfish, where fishing in federal waters is managed cooperatively though management measures implemented by both the State of Hawaii and NMFS. When NMFS projects the Deep 7 bottomfish ACL would be reached, NMFS prohibits fishing for Deep 7 bottomfish in the EEZ. State of Hawaii law allows the state to implement a complementary fishery closure in state waters after closure in the EEZ.

Council recommended changing the classification of certain species listed as MUS to ECS in the American Samoa, the Mariana Archipelago, and Hawaii FEPs to develop and implement ACLs and AMs for MUS predominately caught in federal waters in need of conservation and management (WPFMC 2009a, WPFMC 2009b, WPFMC 2009c). The Council based their recommendations for ECS classification on criteria established in accordance with the Magnuson-Stevens Act and NS1 guidelines.

### 1.5 Action Area

The action area is the EEZ around American Samoa, Guam, the CNMI, and Hawaii. This action covers all waters and associated marine resources within these areas. The EEZ around Wake Island, Johnston Atoll, Howland & Baker, Jarvis and Palmyra & Kingman (the PRIA) is not included in this action.



**Figure 1.** Map of the Pacific Island Region showing the US Exclusive Economic Zone around American Samoa, the Mariana Archipelago, and Hawaii

### 1.6 Decision(s) to be Made

The Secretary of Commerce in coordination with NMFS, would use the information in this analysis to support a decision on whether to approve, disapprove, or partially approve the proposed amendments and supporting regulations.

This EA, along with the consideration of public comments, will assist NMFS in determining whether the reclassification of certain MUS to ECS in the FEPs would be a major federal action with the potential to have a significant environmental effect. If there is the potential for the

proposed action to have a significant environmental effect, an environmental impact statement would be prepared.

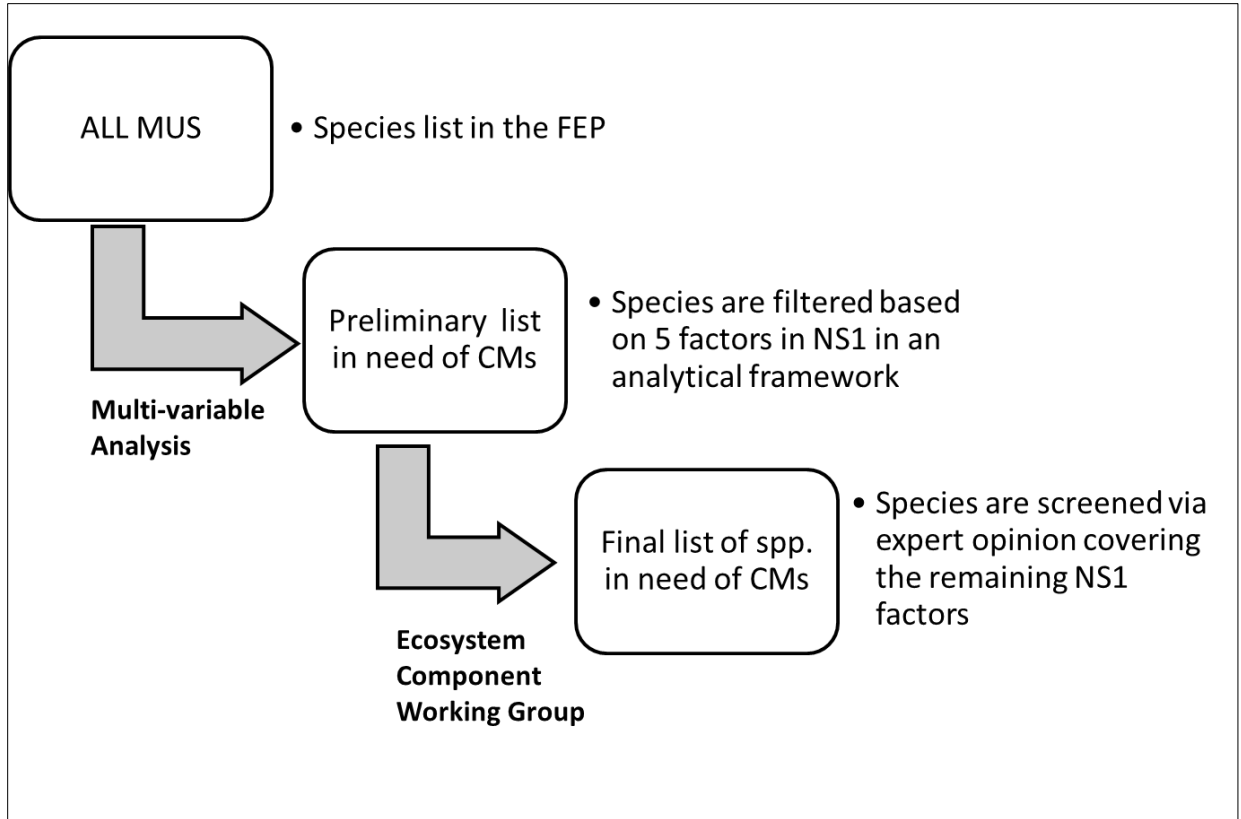
## **1.7 Public Involvement**

The topic of designating some stocks and stock complexes as ECS has been discussed in public meetings since 2007 (see Section 2.1.1, below). The Council and the Scientific and Statistical Committee (SSC) considered the proposed action at the 172<sup>nd</sup> public meeting of the Council and the 128<sup>th</sup> public meeting of the SSC, respectively. The Council members considered and discussed issues relevant to the reclassification of MUS to ECS. The Council evaluated the implications of reclassifying stocks identified as MUS as it relates to the Magnuson-Stevens Act and NS1 guidelines, existing regulations, and EFH requirements. The 128<sup>th</sup> SSC and the 172<sup>nd</sup> Council meetings were held on March 6-8, 2018, and March 14-16, 2018, respectively. Both meetings were open to the public and advertised through notices in the *Federal Register*, and on the Council's website. The public had an opportunity to comment at the meetings on the proposed reclassification and no comments were received. NMFS will publish in the *Federal Register* the proposed FEP amendments and regulatory revisions to reclassify some MUS as ECS. The public will have another opportunity to provide a comment on the action, and NMFS will consider public comments on the proposed action before making a decision on the FEP amendments and publishing the final rule.

## **2 DESCRIPTION OF THE ALTERNATIVES CONSIDERED**

### **2.1 Development of the Alternatives**

NS1 provides ten factors Councils should consider when determining which species under their jurisdiction are in need of conservation and management (81 FR 71858, October 18, 2016). The process of evaluating species in need of conservation and management was comprised of two stages (Fig. 2). The first stage was to conduct the quantitative multi-variable analysis to screen each stock or species for five of the ten NS1 factors. The second stage was to review the preliminary list of species in need of conservation and managements and address the remaining five factors from NS1 using expert opinion and working group discussions.



**Figure 2. Classification process for FEP-listed species**

In the first stage, the Council, in June 2016, adopted a recommendation from its Fishery Ecosystem Plan Team (FEP Team), comprised of federal and state or territorial fishery and ecosystem experts, for Council staff to apply data proxies for five of the NS1 factors for its consideration in the re-classification of species as ecosystem components. (Table 1). The FEP Team selected these proxies because there are available data to support the analysis under this type of analytical framework.

**Table 1. NS1 factors for species in need of conservation and management measures and respective data proxies.**

<b>NS1 factors</b>	<b>Data Proxy</b>
NS1 #1 - Stock is an important component of the marine environment	Proportion of stock (habitat and depth as a proxy) in territorial versus federal water
NS1 #2 - Stock is caught by the fishery	Frequency of the species caught by the fishery over time
NS1 #4 - Stock is a target of a fishery	Species level catch to the total catch
NS1 #5 - Stock is important to commercial, recreational, or subsistence	Standing stock biomass
NS1 #6 - Fishery is important to the Nation or to the regional economy	Revenue

Based on FEP Team advice, the Council further recommended using these data proxies in the multi-dimensional statistical or analytical framework. The analyses focused on determining species that are frequently caught in the fishery and predominately caught in federal waters, generally more than 3 nm from shore. Catch data in Hawaii are attributed to statistical fishing areas, and the nearshore fishing areas end around 2 nm from shore. The analysis for Hawaii ranked species by proportion of catch in federal waters, in this case, defined as catch outside the nearshore (2 nm), statistical fishing areas (HT Harvey and Associates 2017). Experts were asked in a standardized questionnaire to determine the importance of NS factors 3, 4, 6, and 10 as applied to the stocks for which more than 20% catch is from federal waters. Using the RAPFISH (Rapid Appraisal for Fisheries) analytical tool, species were ranked in need of conservation and management based on a set of attributes: ecology (NS1#1), institutional (NS1#3 and 10), economic (NS1#5,6, and 8) and fishery (NS1#2 and 4). For more details of the analytical approach, see HT Harvey and Associates (2017).

Because the territorial areas (American Samoa, Guam, and the CNMI) do not have statistical fishing areas as part of the catch monitoring data system, analyses utilized a multi-dimensional scaling approach to determine species that are similar in terms of frequency in catch records, catch levels, proportion of habitat in the state/territorial waters versus federal waters, standing stock biomass, and level of revenue (see methods, Sabater 2017). In order to achieve the goal of identifying species requiring federal management, the Council staff, in consultation with Pacific Islands Fisheries Science Center (PIFSC) scientists, made the following interpretations and assumptions for the NS1 factors and its respective data proxy in the territorial analyses:

- NS1 factor#1 – In order for a stock to be an important component of the “federal” marine environment, the species has to be significantly present and caught in federal waters. The FEP team used the benthic habitat area by depth and the maximum depth information for each species. The benthic habitats in the territories have no extensive shallow continental shelf but rather have a steep slope going down to great depths (greater than 400 fathoms, fm). Most of the shallow habitats are within 3 miles from shore. Several banks occur in federal waters that are included in the area calculation. Generally, species that occur in a shallow depth distribution are found in State/Territorial waters whereas species with wider depth distribution will be found both in State/Territorial and federal waters.
- NS1 factor#2 – In order to gauge whether the stock is caught by the fishery, the FEP team assumed that, if a stock species is caught, it will continually appear in the fishery database. Species caught more frequently are recorded often and will appear consistently in the catch time series. Since this is the first analysis to use this approach, the analysis used quartiles to create the thresholds for the frequency of occurrence. Species can appear on a 30-year time series 1-25%, 25-50%, 50-75%, 75-100% of the time.
- NS1 factor #4 – For a stock to be a target of a fishery, the species should make up a substantial proportion of the total catch relative to other species. The average species annual expanded catch was divided with the total catch of all species to determine relative contribution to the total catch, which was then ranked from highest to lowest. Species that are assumed to be a target species will have the highest contribution to the

total catch. The ranked list will determine their position on the quartiles similar to the frequency of occurrence.

- NS1 factor #5 – For a stock to be important to commercial, recreational, or subsistence fisheries, species should have a reasonable level of biomass to be targeted. Biomass is used as a proxy for abundance. In order for the stock to be important to the fishery, the biomass level should be sustained. This can also be viewed as an output where conservation and management of the species should lead to a sustainable biomass level.
- NS1 factor #6 – For a stock to be important to the Nation or to the regional economy (in this case commercial value), the species should have high economic value through the volume and the revenue generated from the sale of the species.

The remaining NS1 factors in § 600.305(c)(1) were qualitatively captured in the Ecosystem Component Expert Working Group (ECEWG) discussions. Based on advice from the SSC, the Council formed the ECEWG, comprised of fishery experts, to evaluate the preliminary list for American Samoa, the CNMI, and Guam, generated through the analysis by Sabater (2017) and for Hawaii generated by HT Harvey and Associates (2017). The analyses were prepared separately for Hawaii, and for American Samoa, Guam, and the CNMI due to differences in the data collection systems for Hawaii and the other areas.

For those species or stocks that were not retained as MUS after stage 1 review, the ECEWG considered the remaining NS1 factors (3, 7, 8, 9, and 10) when making a decision to remove or add species to the list of species in need of conservation and management, and the various threshold combinations that would be applied to each filtering stage. The analysis generated three levels of thresholds in quartiles (25, 50, 75). The ECEWG discussed the various threshold combinations applied to each filtering stage. The working group ultimately decided to apply different threshold combinations, instead of a constant threshold at each filtering stage, based on expert knowledge of the fisheries, life history of targeted species, and fishery independent and dependent data sources used in the analysis. For more detail, see the report (<http://www.wpcouncil.org/managed-fishery-ecosystems/annual-catch-limits/ecosystem-components/>). The ECEWG applied this approach to the American Samoa and Mariana lists, and made the following interpretation and assumptions for the following NS1 criteria:

1. NS1 #8 and #9 – For the economic condition of the fishery to improve via efficient utilization and orderly growth in developing fisheries, the ECEWG considered whether there were fishery development efforts occurring in the area.
2. NS1 #10 – To the extent the fishery is already adequately managed by the states, or by the state/federal programs, the ECEWG considered whether there were specific regulations in the FEPs or state or territorial management that would benefit the stock.

For Hawaii, the cut-off level for the percentage of total catch from federal waters initially ranged from 20% to 50%. The ECEWG adopted the report assumption that effective federal management was probably limited to those fisheries where more than 20% of landings were reported from federal waters. The Council, at its 171<sup>st</sup> meeting, directed staff to work with the State of Hawaii to finalize the Hawaii species list. At the 171<sup>st</sup> meeting, the State of Hawaii also

requested that the Council increase the cut-off of species caught in federal waters to 50%, to ensure that the species retained as MUS are considered “predominately” caught in federal waters.

The ECEWG and the Council also looked at other non-NS1 factors in finalizing the list of species in need of conservation and management. These include the following:

1. The FEPs have specific regulations for those species or species complex.
2. The FEPs have specific objectives for those species or species complex.
3. Reasons for including the species in the FEP or FMPs.
4. The species is a target for research that would lead to an assessment.
5. The stock is experiencing overfishing or subject to rebuilding.
6. The species is socially and culturally important.
7. The species is predominantly caught in federal waters.

See Appendix A for the results of the analysis showing the factors associated with each MUS proposed for inclusion in the FEPs. The detailed report of the analyses (Sabater 2017, HT Harvey and Associates 2017) of all MUS currently listed in the FEPs is available from <http://www.wpcouncil.org/managed-fishery-ecosystems/annual-catch-limits/ecosystem-components/>.

The inter-sessional meeting of the Archipelagic Plan Team on February 26, 2018 (83 FR1340, January 11, 2018), resulted in a recommendation to the Council to consider what information is available, the effects on the EFH consultation mechanism<sup>4</sup>, and whether co-management is feasible to finalize the EC species list. Species or stock with sufficient data to generate an assessment would be suitable for ACL management. At the 128<sup>th</sup> SSC meeting (83 FR 7162, February 20, 2018), the SSC formed a working group to further refine the EC species list based on the Archipelagic Plan Team recommendations and PIFSC evaluation of the data available to generate an assessment. The SSC working group reclassified several species as ecosystem components and recommended prioritizing those species for further research and monitoring.<sup>5</sup> At the 172<sup>nd</sup> Council meeting (83 FR 7162, February 20, 2018), the Council designated additional coral reef fish species as ECS because the SSC working group advised the Council that those species are predominately caught in state/territorial waters.

### **2.1.1 Council and SSC Meetings**

The Council and SSC discussed management of Pacific Island fisheries including potential use of ECS designations at the following meetings:

- 96<sup>th</sup> SSC and 139<sup>th</sup> Council Meeting (72 FR 54437, September 25, 2007), the SSC and the Council received a presentation regarding ACLs and AMs and a summary of the workshop held by NMFS on this topic September 20-21, 2007. NMFS proposed during the ACL workshop that one method for distinguishing ECS is to examine OY stocks (target) against non-target stocks and discard, with ACLs anticipated only for OY

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<sup>4</sup> NMFS provides conservation recommendations to federal agencies to help the agency avoid, minimize, mitigate or otherwise offset for any “adverse effects” to EFH to the extent practicable for all MUS. See Section 3.4 Management Setting for more information.

<sup>5</sup> The recommendations are not included in this proposed action, but are part of the SSC March 2018 report.



species. The SSC and Council recommended against using the two-bin approach (OY and ecosystem component categories) as a basis for developing risk assessments and ACLs.

- 97<sup>th</sup> SSC meeting and 140<sup>th</sup> Council meeting (73 FR 15142, March 21, 2008), Council staff presented the alternatives for ACL mechanisms for the different stocks. The Council directed staff to prepare a draft omnibus amendment addressing the ACL mechanism.
- 98<sup>th</sup> SSC meeting and 142<sup>nd</sup> Council meeting (73 FR 31070, May 30, 2008), the Council chose alternatives for the ACL specification including directing staff to compile available information to determine which stocks may qualify as ecosystem components.
- 99<sup>th</sup> SSC and 143<sup>rd</sup> Council meeting (73 FR 57060, October 1, 2008), the Council recommended inclusion of MUS in the ecosystem component after consideration of likelihood and consequence of overfishing. This would classify species as ecosystem component if the species is determined not experiencing overfishing and is not overfished.
- 102<sup>nd</sup> SSC and 146<sup>th</sup> Council meeting (73 FR 50173, September 30, 2009), the Council directed the Plan Teams to re-examine all MUS to determine which species should be retained in the fishery and which should be proposed as ecosystem components.
- 103<sup>rd</sup> SSC and 147<sup>th</sup> Council meeting (75 FR 8674, February 25, 2010), the Council endorsed the SSC recommendation to form a working group to review which species under the FEPs should be considered as a species managed in the fishery and which should be classified as ecosystem components.
- 104<sup>th</sup> SSC and 148<sup>th</sup> Council meeting (75 FR 32372, June 8, 2010), the Council endorsed the SSC recommendation and selected Alternative 2 as the preferred alternative to use the ecosystem component designation because it provides for continued monitoring and detection of changes that might occur in the role of a stock or stock complex in the fishery. With nearly 800 species included in the Council managed fisheries, taking no action was clearly not a reasonable choice. The SSC did not support Alternative 3 (removal of species from the FEP) because the removal of stocks from FEPs would remove any incentive to monitor for any potential changes in the contribution of a stock to Council-managed fisheries.
- 105<sup>th</sup> SSC meeting and 149<sup>th</sup> Council meeting (75 FR 56507, September 16, 2010), the Council approved the inclusion of the use of ecosystem component classification (still the preliminary preferred option) for stocks as an option in the ACL specification process.
- 107<sup>th</sup> SSC meeting and 151<sup>st</sup> Council Meeting (76 FR 30107, May 24, 2011), the Council directed staff to assess the species in coral reef ecosystem MUS and evaluate the catch history for possible ecosystem component reclassification or removal from the management units. Staff conducted the initial analysis and developed a draft amendment. However, the Council postponed further action at the request of the Pacific Islands Regional Office (PIRO) due to higher priorities.

- 163<sup>rd</sup> Council meeting (80 FR 30212, May 27, 2015), the Council directed staff to further explore and provide the Council with details in improving the ACL specification process through an omnibus amendment of the FEPs to include re-classifying certain MUS into ECS.
- 166<sup>th</sup> Council meeting (81 FR 30240, May 16, 2016), the Council endorsed the Plan Team recommendation and directed staff to work with NMFS PIFSC to apply criteria, in addition to the NS1 guidelines, to designate ecosystem component species. The Council further recommended the use of a combination of these criteria and that an analysis be conducted in a multi-dimensional statistical framework. The analysis should also consider weighting the criteria, as well as using a range of threshold levels to evaluate the species to be classified as ecosystem components.
- 125<sup>th</sup> SSC and 169<sup>th</sup> Council meetings (82 FR 11014, February 17, 2017), the Council reviewed the multi-variable analysis conducted to screen species in Guam using the factors described in the NS1 guidelines. The Council directed staff to finalize the ecosystem component analysis for Guam by incorporating the SSC and PIFSC comments and apply the analysis to American Samoa and CNMI data. Furthermore, the Council directed staff to convene the ECEWG, to examine the species that are filtered out to ensure that the final lists of MUS (species or stocks requiring federal management) includes species of social, cultural, economic, biological and ecological importance and species in need of conservation and management.
- 126<sup>th</sup> SSC and 170<sup>th</sup> Council meetings, (82 FR 24952, May 31, 2017) an update on the analysis was provided to the SSC and Council by the Council staff.
- 127<sup>th</sup> SSC and 171<sup>st</sup> Council meetings, (82 FR 44382, September 22, 2017), an options paper was presented to the SSC and Council. The Council selected the preliminary preferred option (2.1) designating the species resulting from the multi-variable analysis and ECEWG evaluation as species in need of conservation and management based on the factors described in §600.305(c)(1) of the NS1 revised guidelines. The Council further selected option 2.2.1 designating the remaining species identified in the FEPs as “ecosystem components” to be retained in the FEPs in order to achieve ecosystem management objectives. The Council also directed staff to explore options for a dedicated monitoring program for the species listed as in need of conservation and management.
- 128<sup>th</sup> SSC and the 172<sup>nd</sup> Council meetings, (83 FR 7162, February 20, 2018), the implications of the classification of MUS were presented. In making their recommendations, the SSC and Council considered the following:
  - 1) Impacts to existing regulations for species re-classified as ECS;
  - 2) Changes to EFH designations associated with reclassifying MUS to ECS;
  - 3) Changes to different sections of the FEPs;
  - 4) Impacts to priorities in monitoring and research;
  - 5) Furthering collaboration between the federal and state/territorial management agencies for species in need of conservation and management; and

## 6) Impacts to permit and reporting provisions.

The SSC formed a working group to refine further the species list based on the PIFSC evaluation of the data available to generate an assessment. The working group reclassified several species as ecosystem components but prioritized those species for further research and monitoring. The Council designated additional coral reef fish species as ECS because all those species are predominately caught in state/territorial waters and would not benefit from harvest-based management.

## 2.2 Description of the Alternatives

The alternatives apply to the MUS lists in the American Samoa, Mariana Archipelago (CNMI and Guam), and Hawaii FEPs. The alternatives are based on the analysis of MUS in relation to the criteria in the NS1 guidelines for classifying ECS, other criteria used by the ECEWG and further deliberation by the Council at its 172<sup>nd</sup> meeting. The summary of the analytical process for reclassifying species from MUS to ECS is in Section 2.1. Because the analytical process used by the Council was based on lists that were developed from intensive data reviews and recommendations of technical experts, there are two potential alternatives: Alternative 1 (no action/status quo) and Alternative 2 (preferred alternative). Alternative 1 is the environmental baseline. It does not meet the purpose and need for the action. Under Alternative 2, NMFS would reclassify some MUS as ECS based on the Council's recommendation, as further described below.

### 2.2.1 Alternative 1: No Action (Status Quo/Current Management)

Under the No Action Alternative, the Council and NMFS would not recommend changes to the existing MUS list in the American Samoa, Mariana Archipelago, and Hawaii FEPs. Management of all species in the MUS would continue to include annual specification of ACLs and AMs, including species that are not predominately caught in federal waters and are not overfished or subject to overfishing.

#### Expected Fishery Outcomes

The expected fishery outcome under Alternative 1 is that the fisheries would continue as they currently operate in terms of location, target and non-target species, catch, effort, fishermen participation, gear composition, seasonality, intensity, or bycatch. The target and non-target species would similarly remain the same. NMFS would continue to manage all MUS using ACLs and AMs. The Council and NMFS would continue to monitor catches of all MUS, and would continue to work with the state and territories to manage these species.

#### Current Fishery Management and Administration, Alternative 1

The Council and NMFS would continue to manage all stocks in the MUS by applying all the requirements for managing stocks in the fishery, including, but not limited to, specification of MSY, SDC, harvest reference points, and EFH. The predominant harvest for many stocks classified as MUS would continue in state or territorial waters. For species and stocks not caught

predominantly in federal waters, the ACLs and AMs would continue to require substantial scientific and administrative resources without direct conservation and management benefits.

Under Alternative 1, NMFS would continue to conduct MUS stock assessments and the Council would recommend annual or multi-year ACLs and AMs for MUS and report MUS catch in the SAFE reports. NMFS and the Council would prioritize MUS for research under the Magnuson-Stevens Act Five-Year Research Priorities. The Council, NMFS and local marine resource management agencies would continue to monitor catches of all species (ECS and MUS).

The Council is also improving the SAFE report and the approach to monitoring stocks and their ecosystems by developing ecosystem indicators and ecosystem models for proactive fishery management. Changes in the indicators that drive the fishery variables would assist the Council in predicting future management options.

Under Alternative 1, there would be no change to EFH designations. Federal agencies would continue to be required to consult with NMFS in accordance with the Magnuson-Stevens Act, for any proposed project that may adversely affect EFH. The Council would continue to perform periodic reviews of EFH and HAPC.

### **2.2.2 Alternative 2: Reclassify some of the MUS as ECS (Preferred Alternative)**

Under Alternative 2, NMFS and the Council would amend the American Samoa, Mariana Archipelago, and Hawaii FEPs to reclassify some of the MUS to ECS. Each FEP would include an ECS list of stocks that have been identified as not in need of conservation and management based on NS1. Alternative 2 would reduce the number of MUS in the American Samoa FEP from 205 species/families to 11 species; from 227 species/families to 13 species in the Marianas FEP; and from 173 species/families to 20 MUS species in the Hawaii FEP. Table 2 provides the list of stocks proposed to remain MUS, and Appendix B lists the stocks to be reclassified as ECS in each FEP.

The Council recommended the proposed reclassification in consideration of the analytical framework (Sabater 2017, HT Harvey and Associates 2017) and the ECEWG deliberations, which included using the ten factors described in §600.305(c)(1) of the NS1 guidelines and the additional five non-NS1 criteria listed in section 2.1. The final list of species that would remain as MUS is the Council recommendation based on advice from its working groups and advisory bodies.

Table 2 lists the final list of MUS species.

**Table 2. MUS for the American Samoa, Mariana Archipelago (CNMI and Guam), and Hawaii FEPs**

<b>American Samoa Bottomfish</b>			
<b>Scientific Name</b>	<b>English common name</b>	<b>Samoan name</b>	<b>Family</b>
<i>Caranx lugubris</i>	black trevally, jack	Taufauli	Carangidae
<i>Lethrinus rubrioperculatus</i>	redgill emperor	filoa-paomumu	Lethrinidae
<i>Aphareus rutilans</i>	red snapper, silvermouth	palu-gutusiliva	Lutjanidae
<i>Aprion virescens</i>	grey snapper, jobfish	Asoama	
<i>Etelis carbunculus</i>	red snapper	palu malau	
<i>Etelis coruscans</i>	red snapper	palu-loa	
<i>Lutjanus kasmira</i>	blueline snapper	Savane	
<i>Pristipomoides filamentosus</i>	pink snapper	palu-`ena`ena	
<i>Pristipomoides flavipinnis</i>	yelloweye snapper	palu-sina	
<i>Pristipomoides zonatus</i>	snapper	palu-ula, palu-sega	
<i>Variola louti</i>	lunartail grouper	papa, velo	Serranidae
<b>Mariana Archipelago Bottomfish</b>			
<b>Scientific Name</b>	<b>English common name</b>	<b>Local name Chamorro/Carolinian</b>	<b>Family</b>
<i>Caranx ignobilis</i>	giant trevally, jack	tarakitu, etam	Carangidae

<i>Caranx lugubris</i>	black trevally, jack	tarakiton attelong, orong	
<i>Lethrinus rubrioperculatus</i>	redgill emperor	mafuti, atigh	Lethrinidae
<i>Aphareus rutilans</i>	red snapper, silvermouth	lehi, maroobw	Lutjanidae
<i>Etelis carbunculus</i>	red snapper	buninas agaga', falaghal moroobw	
<i>Etelis coruscans</i>	red snapper	abuninas, taighulupegh	
<i>Lutjanus kasmira</i>	blueline snapper	funai, saas	
<i>Pristipomoides auricilla</i>	yellowtail snapper	buninas, falaghal-maroobw	
<i>Pristipomoides filamentosus</i>	pink snapper	buninas, falaghal-maroobw	
<i>Pristipomoides flavipinnis</i>	yelloweye snapper	buninas, falaghal-maroobw	
<i>Pristipomoides sieboldii</i>	pink snapper	NA	
<i>Pristipomoides zonatus</i>	snapper	buninas rayao amariyu, falaghal-maroobw	
<i>Variola louti</i>	lunartail grouper	bueli, bwele	Serranidae
<b>Hawaii Deep 7 Bottomfish</b>			
<b>Scientific Name</b>	<b>Species Name</b>	<b>Local Hawaiian Name</b>	<b>Family</b>
<i>Aphareus rutilans</i>	silver jaw jobfish	lehi	Lutjanidae
<i>Pristipomoides filamentosus</i>	pink snapper	‘ōpakapaka	
<i>Etelis coruscans</i>	longtail snapper	onaga or ‘ula‘ula koa‘e	
<i>Pristipomoides sieboldii</i>	pink snapper	kalekale	
<i>Etelis carbunculus</i>	red snapper	ehu	
<i>Pristipomoides zonatus</i>	snapper	gindai	

<i>Hyporthodus quernus</i> (previously <i>Epinephalus querns</i> )	sea bass	hapu'upu'u	Serranidae
<b>Hawaii FEP Non-Deep 7 Bottomfish</b>			
<b>Scientific Name</b>	<b>Species Name</b>	<b>Local Hawaiian Name</b>	<b>Family</b>
<i>Aprion virescens</i>	gray jobfish	uku	Lutjanidae
<b>Hawaii FEP Precious Corals</b>			
<b>Scientific name</b>	<b>English common name</b>	<b>Local Hawaiian Name</b>	<b>Family name</b>
<i>Pleurocorallium secundum</i>	Pink coral	NA	Corallidae
<i>Hemicorallium laauense</i>	Red coral	NA	Corallidae
<i>Kulamanamana haumeaee</i>	Gold coral	NA	Parazoanthidae
<i>Acanella</i> spp.	Bamboo coral	NA	Isididae
<i>Antipathes griggi</i>	Black coral	NA	Antipatheria
<i>Antipathes grandis</i>	Black coral	NA	
<i>Myriopathes ulex</i>	Black coral	NA	
<b>Hawaii FEP Crustacean</b>			
<b>Scientific name</b>	<b>English common name</b>	<b>Local Hawaiian Name</b>	<b>Family name</b>
<i>Heterocarpus</i> spp.	Deepwater shrimp	NA	Pandalidae
<i>Ranina ranina</i>	Kona crab	papa'i kua loa	Raninidae

<b>Hawaii FEP Seamount Groundfish</b>			
<b>Scientific name</b>	<b>English common name</b>		<b>Family name</b>
<i>Hyperoglyphe japonica</i>	Raftfish	NA	Centrolophidae
<i>Beryx splendens</i>	Alfonsin	NA	Berycidae
<i>Pentaceros wheeleri</i>	Armorhead	NA	Pentacerotidae



## Expected Fishery Outcomes, Alternative 2

Alternative 2 would not result in changes to the conduct of any fishery. The proposal to designate some MUS as ECS would not change the fishery in terms of location, target and non-target species, catch, effort, fishermen participation, gear composition, seasonality, intensity, or bycatch because the administrative designation to ECS will not affect effort. Moreover, ACLs and AMs do not constrain fisheries for any species reclassified to ECS. We expect all fisheries to remain at status quo and continue to operate sustainably because the Council and NMFS would continue to monitor ECS catches, and would continue to work with the state and territories to manage these species via ecosystem-based fishery management approaches.

## Fishery Management and Administrative Outcomes, Alternative 2

Alternative 2 would improve management efficiency by focusing management and scientific resources on MUS stocks predominately caught in federal waters that require conservation and management. Under Alternative 2, the Council and NMFS would continue to manage MUS as required by the FEPs. NMFS would continue to conduct MUS stock assessments and the Council would recommend annual or multi-year ACLs and AMs for MUS. NMFS and the Council would also monitor MUS in the SAFE reports and MUS would be prioritized for research under the Magnuson-Stevens Act Five-Year Research Priorities.

Some groups of MUS would be entirely reclassified as ECS as they are not in need of conservation and management (Appendix B). The ECS classification would not diminish the Council's ability to collect and monitor fishery data. The Council is improving the SAFE reports and the approach to monitoring stocks and their ecosystems. One of these approaches is developing ecosystem indicators and ecosystem models for proactive fishery management. The next generation of SAFE reports would include using ecosystem indicators to interpret the fishery trends. Changes in the indicators that drive the fishery variables, e.g., the presence of ECS in monitored catch, could inform SAFE reports and potential future management options.

Section 303 of the Magnuson-Stevens Act lists fishery management requirements that would not apply to ECS. These include the identification of SDC, EFH, and specification of MSY, OY ACLs and AMs, among others. For the current Coral Reef Ecosystem MUS, Alternative 2 would remove the classification of the Currently Harvested Coral Reef Taxa (CHCRT) and Potentially Harvested Coral Reef Taxa (PHCRT) and all species within those current groups would become ECS. Additionally, EFH designations would no longer apply to ECS. Therefore, while FEPs may describe, identify, and protect habitats for ECS, federal agencies that undertake actions that have the potential for adverse effects to habitat would not trigger the requirements for EFH consultations, as EFH would not be identified for ECS unless the habitat is designated EFH for a MUS. Similarly, Councils are not required to minimize the adverse effects of fishing on habitat of ECS, unless the habitat is designated EFH for a MUS (67 FR 2343, January 17, 2002).

Under Alternative 2, the Council and NMFS would retain some regulations for ECS in the FEPs for ecosystem-based management. The Council and NMFS would retain permitting, record-keeping, and reporting requirements to monitor ECS catch to determine if changes in the status of ECS indicate the need for an ECS to be re-classified as MUS via an amendment action.

Ecosystem-related management measures (e.g., area and seasonal management, ban on destructive gear) and monitoring (permit and reporting) would remain in the regulations for ECS the same as for MUS. Appendix C provides the proposed regulatory text changes for Alternative 2.

### 2.2.3 Summary Comparison of Features of Alternatives Considered

Table 3 provides a comparison of features of the Alternatives.

**Table 3. Comparison of Features of the Alternatives**

<b>Topic:</b>	<b>Alternative 1 No action. Status quo/ NEPA baseline</b>	<b>Alt. 2. Proposed Action (Council Preferred)</b>
Short topic:	Do not amend three FEPs to include lists of ECS, do not amend three FEPs to reclassify some MUS as ECS.	Amend three FEPs to include ECS table as an appendix.  Amend three FEPs to re-classify some MUS as ECS.
<b>Changes to FEPs</b>		
Would the FEPs list MUS and ECS?	The FEPs currently include lists of MUS.  The current FEPs do not feature ECS or stocks.	Yes. FEPs would continue to list MUS in a table.  The FEPs would include a list of ECS in an appendix.
Are any management measures applied to ECS?	N/A (Baseline).	Yes, primarily for purposes of monitoring but some may require permits. Species re-classified as ECS would not be in need of “conservation and management”.  Re-classification of ECS would be done in accordance with applicable guidelines under the Magnuson-Stevens Act.
Any species or stock removed from an FEP?	N/A (Baseline).	No.
Any species or stock added to an FEP or moved into a different fishery?	N/A (Baseline).	No.
<b>Fishery Management Changes (Overview)</b>		
Would catches be monitored?	Yes. All MUS are currently subject to monitoring.	Yes. MUS catch would still be monitored, and ECS catch would be subject to monitoring.
Would permits be required?	Yes, for any fishery that requires permits.  Permits include: Main Hawaiian Islands non-commercial bottomfish, special coral reef ecosystem fishing, western	Yes. No change for MUS.  For ECS, the continuation of permit requirements would depend on the species or stock. Permits would continue to apply in order to harvest precious corals, bottomfish and crustaceans in the Western Pacific

Topic:	Alternative 1 No action. Status quo/ NEPA baseline	Alt. 2. Proposed Action (Council Preferred)
	<p>Pacific precious coral, western Pacific crustaceans, Guam large vessel bottomfish, CNMI bottomfish, and marine national monument fishing.</p> <p>Permit information is available at:  <a href="http://www.fpir.noaa.gov/SFD/SFD_permits_index.html">http://www.fpir.noaa.gov/SFD/SFD_permits_index.html</a>.</p>	<p>Region that currently are in the MUS, but would be reclassified as ECS under this alternative.</p> <p>Harvesting coral reef ecosystem MUS with authorized gear currently does not require permits; thus, harvesting coral reef ECS would also not require permits. In the future, if the Council recommends removing a permit requirement from an ECS, separate environmental review would be done.</p>
<p>Would a special permit be required to harvest coral reef ecosystem species with gear not previously authorized?</p>	<p>Yes.</p>	<p>Yes, a special permit would be required for coral reef ecosystem species harvested with gear not previously authorized.</p>
<p>What happens to the (Currently Harvested Coral Reef Taxa) CHCRT and the PHCRT (Potentially Harvested Coral Reef Taxa) categories for coral reef ecosystem species?</p>	<p>The categories would remain in place and would not change. The permit requirement to harvest PHCRT would remain.</p>	<p>CHCRT and PHCRT species would be identified as coral reef ECS and no federal permit would be required for harvesting coral reef ECS. For coral reef ECS, data collection would continue through state and territory monitoring programs.</p>
<p>Would time and area closures, gear restrictions, vessel markings still apply?</p>	<p>Yes for any fishery that has such requirements.</p> <p>Requirements may be found in the FEPs, as amended, and under CFR Part 665 Subparts A, B, C and D.</p>	<p>Yes for MUS and ECS for any fishery that has such requirements now.</p> <p>These are ecosystem-based measures that conserve the role of the MUS and ECS in the ecosystem. These measures also allow for monitoring of the MUS and ECS.</p>
<p>Would OFL, ABC, ACLs and AMs be required?</p>	<p>Yes for all MUS.</p>	<p>Yes for all MUS. This would include bottomfish fisheries in American Samoa, Mariana Archipelago, and Hawaii FEPs; and crustacean, precious coral, and seamount groundfish fisheries in the Hawaii FEP.</p> <p>ECS would not be required to have an annual ACL or AM.</p>

<b>Topic:</b>	<b>Alternative 1 No action. Status quo/ NEPA baseline</b>	<b>Alt. 2. Proposed Action (Council Preferred)</b>
Would specific stock MSY and OY be required?	Yes for all MUS.	<p>Yes for the MUS in the bottomfish fisheries in American Samoa, Mariana Archipelago, and Hawaii FEPs.</p> <p>Yes for the MUS in the crustacean and precious coral fisheries in Hawaii Archipelago FEP.</p> <p>ECS would not be required to have MSY and OY specified. This would include the precious corals and crustaceans in American Samoa and Mariana Archipelago.</p>
Would specific stock status determination criteria be required? (MFMT; MSST?)	Yes, for all MUS (where data allow the determination criteria to be developed). Where data are not sufficient, NMFS and the Council would continue to rely on other means of evaluating stock status.	<p>Yes for all MUS as described in the baseline.</p> <p>These criteria would not be required for ECS.</p>
Would fisheries description be required in the FEP?	Yes for all fisheries in the FEPs.	<p>Yes for the bottomfish fisheries in American Samoa, Mariana Archipelago, and Hawaii FEPs.</p> <p>Yes for the crustacean and precious coral and seamount groundfish fisheries in Hawaii FEP.</p> <p>No for the precious coral and crustacean fisheries in the American Samoa and Marianas FEPs.</p>
Would there be EFH Designations?	Yes. EFH would be designated for any MUS.	<p>Yes. EFH would be designated for any MUS.</p> <p>EFH would not be designated for any ECS. The American Samoa and Mariana Archipelago FEPs would have EFH descriptions removed for coral reef ecosystem and crustacean species groups. The Hawaii FEP would have EFH descriptions removed for coral reef ecosystem species groups.</p> <p>Please see Tables 6-8 in Section 4.2.1.</p>
Are EFH Consultations required?	Yes, EFH is currently designated for all MUS except for precious corals fisheries in American Samoa, and the CNMI and Guam.	EFH would continue to be designated for all MUS and federal agencies would be required to consult with NMFS if a proposed action is expected to adversely affect EFH.

Topic:	Alternative 1 No action. Status quo/ NEPA baseline	Alt. 2. Proposed Action (Council Preferred)
	Federal agencies must consult with NMFS if proposals are expected to adversely affect EFH.	The EFH designation for ECS would no longer apply and the consultation requirement would no longer apply in certain areas.

### 2.3 Alternatives Considered, but Rejected from Further Analysis

An alternative presented to the Council at the 171<sup>st</sup> meeting was to remove species from the FEPs that were not in need of conservation and management and not designate ECS in the FEPs. The SSC did not support this option and the Council did not select it, because the SSC and the Council would like to monitor potential future catches of these species and retain management of these species using an ecosystem approach.

Other possible alternatives considered but rejected from further analysis were different combinations of threshold levels at each filtering stages in the multi-variable analysis (Sabater 2017), as well as the different levels of catch in federal waters (HT Harvey and Associates 2017). Simulating multiple combinations of the threshold per filtering stage would require significant effort that was not likely to provide substantially different information to inform the Council’s decision than Alternative 2. The ECEWG considered these combinations; the final threshold levels are described in the report (WPFMC 2017a).

### **3 DESCRIPTION OF THE AFFECTED ENVIRONMENT**

This section describes the affected fisheries and fishery resources, and other biological and physical resources. The affected environment includes all waters and associated demersal marine resources within the federal waters of the American Samoa, Guam, CNMI, and Hawaii, as managed under the FEPs (WPFMC 2009a, WPFMC 2009b, WPFMC 2009c). The FEPs provide a place-based fisheries management approach for bottomfish, coral reef ecosystem, crustaceans, and precious corals. The FEPs are available at: <http://www.wpcouncil.org/fishery-plans-policies-reports/marianas-fishery-ecosystem-plan/>

The SAFE Reports (WPFMC 2017b, WPFMC 2017c, WPFMC 2017d) describe the recent descriptions of resources and performance of the fisheries in American Samoa, the CNMI, Guam, and Hawaii. For Hawaii, the SAFE report includes status of the deep-7 bottomfish, non deep-7 bottomfish, and coral reef, crustacean MUS. For the CNMI and Guam, and the American Samoa, the SAFE reports provide performance data on the bottomfish and coral reef MUS. Each SAFE report also includes information on projected species interactions in the fisheries, indications of climate change and related oceanic conditions in the western Pacific region, and marine planning discussions, and a report on EFH information. The SAFE reports are available at: <http://www.wpcouncil.org/fishery-plans-policies-reports/fishery-reports-2/>.

#### **3.1 Affected Physical Environment**

The action area includes all waters from the shoreline to the extent of the EEZ around American Samoa, the CNMI, Guam, and Hawaii, where state, territorial and Federal fisheries are operating. The Samoa archipelago consists of seven major volcanic islands, several small islets, and two coral atolls. The largest islands in this chain are Upolu (~436 square miles) and Savai'i (~660 square miles). The Mariana archipelago, roughly oriented north-south and approximately 425 miles long, includes the island of Guam and the CNMI, which consists of 14 main islands (Farallon de Pajaros, Maug, Asuncion, Agrihan, Pagan, Alamagan, Guguan, Sarigan, Anatahan, Farallon de Medinilla, Saipan, Tinian, Aguigan, and Rota). Only Saipan, Rota, and Tinian are permanently inhabited. The Hawaiian Islands extend for nearly 1,500 miles from Kure Atoll in the northwest to the Island of Hawaii in the southeast, and was formed by a hot spot within the Pacific Plate. The Hawaiian Islands are often grouped into the Northwestern Hawaiian Islands (Nihoa to Kure) and the Main Hawaiian Islands (MHI) (Hawaii to Niihau). Physical features of the affected environment in the action area include a range of habitats including sandy coastal areas, coral reefs, seagrass beds, lagoons, open ocean waters, and the features of those habitats such as circulation, temperature, salinity. For more information on the physical setting of the fisheries, please see the FEPs (WPFMC 2009a, WPFMC 2009b, WPFMC 2009c).

#### **3.2 Affected Biological Resources**

##### **3.2.1 Marine Protected Areas**

Fisheries as part of the proposed action may operate in or near a number of marine protected areas (MPA) and NMFS has reviewed fishing activities effects on those resources. For example, fishing may be authorized in the Islands Unit (islands of Uracus, Maug, and Asuncion) of the

Marianas Trench Marine National Monument (CNMI) ([http://www.fpir.noaa.gov/SFD/SFD\\_permits\\_info.html#MNMFP](http://www.fpir.noaa.gov/SFD/SFD_permits_info.html#MNMFP)) and the Hawaiian Islands Humpback Whale National Marine Sanctuary (<https://hawaiihumpbackwhale.noaa.gov/>). The fisheries may operate near Bottomfish Restricted Fishing Areas (<http://dlnr.hawaii.gov/dar/fishing/bottom-fishing/>) and Marine Life Conservation Districts (<http://dlnr.hawaii.gov/dar/marine-managed-areas/hawaii-marine-life-conservation-districts/>) in Hawaii.

### **3.2.2 Affected Target Species, Non-Target Species, Bycatch, Biodiversity, and Protected Species**

Under the current management scheme, all stocks and species in the FEPs are considered MUS and, therefore, in need of conservation and management. Demersal species and stocks of bottomfish, seamount groundfish, coral reef species, precious corals, and crustaceans are managed under a range of measures described in the FEPs. In the Hawaii FEP these include the Deep 7 bottomfish: onaga (*Etelis coruscans*), ehu (*E. carbunculus*), gindai (*Pristipomoides zonatus*), kalekale (*P. sieboldii*), opakapaka (*P. filamentosus*), lehi (*Aphareus rutilans*), and hapuupuu (*Hyporthodus quernus*); non-Deep 7 bottomfish; deepwater shrimp; spiny lobster slipper lobster; kona crab; and precious corals (black coral, pink coral, and bamboo coral). In the American Samoa and Marianas FEPs, MUS include deepwater shrimp, spiny lobster, slipper lobster, kona crab, black coral, and coral reef ecosystem MUS. Protected species that may interact with the fisheries include protected species (e.g., sea turtles, listed marine mammals, hammerhead sharks, listed corals, listed seabirds). The latest status information of the target, non-target, bycatch, biodiversity, and protected species that may be affected by fisheries can be found in the annual SAFE reports (WPFMC 2017b, WPFMC 2017c, WPFMC 2017d).

### **3.2.3 Essential Fish Habitat and Habitat Areas of Particular Concern**

Consistent with the Magnuson-Stevens Act, and other applicable laws, NMFS and the Council designated EFH at the time it became a requirement. The Council also designated habitat areas of particular concern (HAPC) for some MUS. The reclassification of certain MUS to ECS under the proposed action would result in a change to EFH and HAPC descriptions in the FEPs and would eliminate EFH requirements for the ECS species listed in Appendix A.

#### *Overview of the EFH requirement under Magnuson-Stevens Act and the Council's application of the requirements*

In 1996, Congress amended the Magnuson-Stevens Act and required the identification and description of EFH for all federally managed species. EFH is defined in the Magnuson-Stevens Act as “those waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity.” In 1999, NMFS issued guidelines to assist RMFCs in implementing the EFH provisions. The WPFMC developed the EFH designations and the Secretary of Commerce approved the Bottomfish and Seamount Groundfish, Crustaceans, Pelagic and Precious Corals EFH designations on February 3, 1999 (64 FR 19068); the Coral Reef Ecosystem MUS on June 14, 2002 (69 FR 8336); and the deepwater shrimp MUS on November 21, 2008 (73 FR 70603). The FEPs identify the distribution and life history information on which EFH designations are based (see Appendix 1 of the FEPs), as well as research and information needs by MUS. EFH

designations must be based on the best scientific information available. This information should include a hierarchy of data of increasing quality for supporting EFH designations: (1) distribution, (2) densities, (3) demographics, (4) productivity (67 FR 2343, January 17, 2002). The best scientific information available that the Council inventoried in its initial EFH designations effort rarely exceeded level 1 (distribution).

While the descriptions of habitat requirements were generally species-specific, the Council ultimately designated EFH at a species complex level to reduce the complexity and number of EFH designations (64 FR 19068, 69 FR 8336, 73 FR 70603). EFH is generally designated for the egg/larval and juvenile/adult life stages combined, resulting in two unique EFH definitions per species complex with the exceptions of precious corals, Hawaii bottomfish, and coral reef ecosystem MUS. Precious coral EFH is designated only for the benthic phase and only in Hawaii. Hawaii bottomfish EFH is described at the stock level (WPFMC 2016). The proposed action would not affect the EFH or HAPC designations for pelagic MUS (Table 4).

**Table 4. EFH and HAPC for Pelagic MUS.**

<b>Life Stage</b>	<b>EFH</b>	<b>HAPC</b>
Egg/larval	The water column down to a depth of 200 m (100 fm) from the shoreline to the outer limit of the EEZ	Water column from the surface down to a depth of 1,000 m (500 fm) above all seamounts and banks with summits shallower than 2,000 m (1,000 fm) within the EEZ
Juvenile/adult	The water column down to a depth of 1,000 m (500 fm)	

For coral reef ecosystem MUS, the Council chose to designate EFH by habitat composites. Each life stage of each managed coral reef species, usually at the family level, was linked to a specific habitat composite (e.g., sand, seagrass beds, mangrove, coral reef) as EFH, consistent with the depth of the ecosystem to 50 fm and to the limit of the EEZ (WPFMC 2002). To reduce complexity, the Council described the species complex level of coral reef ecosystem MUS as currently harvested coral reef taxa or potentially harvested coral reef taxa. Table 5 provides the current EFH designations in the action area.

*Habitat Areas of Particular Concern*

The Council also identified HAPC for bottomfish, pelagic, crustacean, and precious coral MUS on February 3, 1999 (64 FR 19068); and the Coral Reef Ecosystem MUS on June 14, 2002 (69 FR 8336). HAPCs are subsets of EFH that meet one or more of the following criteria established by NMFS: (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. The purpose of identifying HAPCs is to focus conservation efforts on localized areas within EFH that are vulnerable to degradation or are especially important ecologically for managed fish. Areas designated as HAPCs may receive increased scrutiny from NMFS regarding effects to EFH (NMFS 2006). Table 6 identifies HAPCs for the American Samoa, Mariana, and Hawaii FEPs.



### *Current combined EFH, all areas*

To summarize, the current combined EFH footprint for all MUS identified in the Western Pacific FEPs includes all bottom substrate from the shoreline to the 400 m isobaths; outer reef slopes from the 400 m to the 700 m isobaths; and the water column from the shoreline to the EEZ to a depth of 1000 meters (m). The proposed action would result in changes to the combined EFH footprint described in Section 4.2.2, Table 7. Marine and estuarine ecosystems comprising EFH designations for the species complexes include intertidal, mangrove forests, seagrass beds, coral reefs, deep reef slopes, banks and seamounts, deep ocean floor, and the pelagic environment (Minton 2017). As a result, this action may indirectly affect the following ecosystem resources below, described in more detail in Minton 2017:

- Intertidal zone - between the highest and lowest extent of the tides intermittently exposed to air. May be comprised of hard (e.g., basalt, limestone, etc.) or unconsolidated (e.g., sand, cobble, etc.) substratum, which determines associated fauna.
- Mangrove forests - tropical, coastal, forest ecosystems comprised of mangrove trees that grow in saline or brackish water. Help stabilize shorelines and serve as nursery habitat for coral reef fishery species.
- Seagrasses - marine flowering plants that assist in fisheries production, and sediment accumulation and stabilization.
- Coral reefs - carbonate rock structures and corresponding unconsolidated substratum that support viable populations of reef-building organisms, and a variety of associated invertebrates and fish.
- Deep reef slopes - deep-water reef-building corals will grow where there is enough light and appropriate substratum is available.
- Banks and seamounts - underwater features created by undersea volcanos. Shallower areas of these areas may include coral reef ecosystems.
- Deep ocean - provides nutrient regeneration and biogeochemical cycling to sustain primary and secondary productivity in the marine environment.
- Pelagic - the largest ecosystem in the Western Pacific Region, connects the benthic other marine ecosystems.

**Table 5. Current EFH Designations**

<b>FEP</b>	<b>Fishery</b>	<b>Stock or Stock Complex</b>	<b>Life Stage(s)</b>	<b>EFH Designation (Status Quo)</b>
<b>American Samoa and Mariana</b>	Bottomfish	Shallow-water and deep-water complexes	Egg/larval	The water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m (200 fm)
			Juvenile/adult	The water column and all bottom habitat extending from the shoreline to a depth of 400 m (200 fm)
<b>American Samoa, Mariana, and Hawaii</b>	Coral Reef Ecosystem	Currently harvested coral reef taxa, Labridae	Egg/larval	The water column and all bottom habitat from the shoreline to the outer boundary of the EEZ to a depth of 100 m (50 fm)
		Currently harvested coral reef taxa ,Octopodidae	Egg	All coral, rocky, and sand-bottom areas from 0 to 100 m (50 fm)
		Currently harvested coral reef taxa , Carcharhinidae	Egg/larval	No designation
		All other currently harvested coral reef taxa	Egg/larval Egg/larval/juvenile – Kyphosidae only Larval – Octopodidae only	The water column from the shoreline to the outer boundary of the EEZ to a depth of 100 m (50 fm)
		Currently harvested coral reef taxa, Carcharhinidae, Labridae	Juvenile/adult	All bottom habitat and the adjacent water column from 0 to 100 m (50 fm) to the outer extent of the EEZ.
		Currently harvested coral reef taxa, Holocentridae and Muraenidae	Juvenile/adult	All rocky and coral areas and the adjacent water column from 0 to 100 m (50 fm)
		Currently harvested coral reef taxa, Kuhliidae	Juvenile/adult	All bottom habitat and the adjacent water column from 0 to 50 m (25 fm)
		Currently harvested coral reef taxa, Kyphosidae	Adult	All rocky and coral bottom habitat and the adjacent water column from 0 to 30 m (15 fm)
		Currently harvested coral reef taxa, Mullidae, Octopodidae, Polynemidae, Priacanthidae	Juvenile/adult	All rocky/coral bottom and sand bottom habitat and the adjacent water column from 0 to 100 m (50 fm)

		Currently harvested coral reef taxa, Mugilidae	Juvenile/adult	All sand and mud bottom and the adjacent water column from 0 to 50 m (25 fm)
<b>American Samoa, Mariana, and Hawaii</b>	Coral Reef Ecosystem	Currently harvested coral reef taxa, Scombridae (dogtooth tuna), Sphyraenidae	Juvenile/adult	Only the water column from the shoreline to the outer boundary of the EEZ to a depth of 100 m (50 fm)
		Currently harvested coral reef taxa, Aquarium Species/Taxa	Juvenile/adult	Coral, rubble, and other hard-bottom features and the adjacent water column from 0 to 100 m (50 fm)
		All other currently harvested coral reef taxa	Juvenile/adult	All bottom habitat and the adjacent water column from 0 to 100 m (50 fm)
		Potentially harvested coral reef taxa	All life stages	The water column and all bottom habitat from the shoreline to the outer boundary of the EEZ to a depth of 100 m (50 fm)
	Crustaceans	Crustaceans, Spiny and slipper lobsters, Kona crab	Egg/larval	The water column from the shoreline to the outer limit of the EEZ down to a depth of 150 m (75 fm)
			Juvenile/adult	All of the bottom habitat from the shoreline to a depth of 100 m (50 fm)
		Deepwater shrimp	Egg/larval	The water column and associated outer reef slopes between 550 and 700 m
			Juvenile/adult	The outer reef slopes at depths between 300-700 m
<b>Hawaii</b>	Bottomfish	Shallow stocks: <i>Aprion virescens</i> , <i>Lutjanus kasmira</i> , <i>Caranx ignobilis</i>	Egg	Pelagic zone of the water column in depths from the surface to 240 m, extending from the official US baseline to a line on which each point is 50 miles from the baseline
			Post-hatch pelagic	Pelagic zone of the water column in depths from the surface to 240 m, extending from the official US baseline to the EEZ boundary
			Post-settlement	Benthic or benthopelagic zones, including all bottom habitats, in depths from the surface to 240 m bounded by the official US baseline and 240 m isobath
			Sub-adult/adult	Benthopelagic zone, including all bottom habitats, in depths from the surface to 240 m bounded by the official US baseline and 240 m isobath.

<b>Hawaii</b>	Bottomfish	Intermediate stocks: <i>Aphareus rutilans</i> , <i>Pristipomoides filamentosus</i> , <i>Hypothodus quernus</i> , <i>Caranx lugubris</i> , <i>Pseudocaranx cheilio</i> , <i>Seriola dumerili</i>	Eggs	Pelagic zone of the water column in depths from the surface to 280 m ( <i>A. rutilans</i> and <i>P. filamentosus</i> ) or 320 m ( <i>H. quernus</i> ) extending from the official US baseline to a line on which each point is 50 miles from the baseline
		Intermediate stocks: <i>Aphareus rutilans</i> , <i>Pristipomoides filamentosus</i> , <i>Hypothodus quernus</i> , <i>Caranx lugubris</i> , <i>Pseudocaranx cheilio</i> , <i>Seriola dumerili</i>	Post-hatch pelagic	Pelagic zone of the water column in depths from the surface 280 m ( <i>A. rutilans</i> and <i>P. filamentosus</i> ) or 320 m ( <i>H. quernus</i> ), extending from the official US baseline to the EEZ boundary
			Post-settlement	Benthic ( <i>H. quernus</i> and <i>A. rutilans</i> ) or benthopelagic ( <i>A. rutilans</i> and <i>P. filamentosus</i> ) zones, including all bottom habitats, in depths from the surface to 280 m ( <i>A. rutilans</i> and <i>P. filamentosus</i> ) or 320 m ( <i>H. quernus</i> ) bounded by the 40 m isobath and 100 m ( <i>P. filamentosus</i> ), 280 m ( <i>A. rutilans</i> ) or 320 m ( <i>H. quernus</i> ) isobaths
			Sub-adult/adult	Benthic ( <i>H. quernus</i> ) or benthopelagic ( <i>A. rutilans</i> and <i>P. filamentosus</i> ) zones, including all bottom habitats, in depths from the surface to 280 m ( <i>A. rutilans</i> and <i>P. filamentosus</i> ) or 320 m ( <i>H. quernus</i> ) bounded by the 40 m isobath and 280 m ( <i>A. rutilans</i> and <i>P. filamentosus</i> ) or 320 m ( <i>H. quernus</i> ) isobaths
	Deep stocks: <i>Etelis carbunculus</i> , <i>Etelis coruscans</i> , <i>Prisipmoides auricilla</i> , <i>Pristipomoides seiboldii</i> , <i>Pristipomoides zonatus</i>	Eggs	Pelagic zone of the water column in depths from the surface to 400 m, extending from the official US baseline to a line on which each point is 50 miles from the baseline	
		Post-hatch pelagic	Pelagic zone of the water column in depths from the surface to 400 m, extending from the official US baseline to the EEZ boundary	
		Post-settlement	Benthic zone, including all bottom habitats, in depths from 80 to 400 m bounded by the official US baseline and 400 m isobath	
		Sub-adult/adult	Benthic ( <i>E. carbunculus</i> and <i>P. zonatus</i> ) or benthopelagic ( <i>E. coruscans</i> , and <i>P. seiboldii</i> ) zones, including all bottom habitats, in depths from 80 to 400 m bounded by the official US baseline and 400 m isobaths	

<b>Hawaii</b>	Bottomfish	Seamount groundfish	Eggs and post-hatch pelagic	Pelagic zone of the water column in depths from the surface to 600 m, bounded by the official US baseline and 600 m isobath, in waters within the EEZ that are west of 180°W and north of 28°N
			Post-settlement	Benthic or benthopelagic zone in depths from 120 m to 600 m bounded by the 120 m and 600 m isobaths, in all waters and bottom habitat, within the EEZ that are west of 180°W and north of 28°N
			Sub-adult/adult	Benthopelagic zone in depths from 120 m to 600 m bounded by the 120 m and 600 m isobaths, in all waters and bottom habitat, within the EEZ that are west of 180°W and north of 28°N
	Crustaceans	Spiny and slipper lobsters, Kona crab	Eggs and larvae	The water column from the shoreline to the outer limit of the EEZ down to a depth of 150 m (75 fm)
			Juveniles/adults	All of the bottom habitat from the shoreline to a depth of 100 m (50 fm)
	Precious Coral	Deep-water	Benthic	Six known precious coral beds located off Keahole Point, Makapuu, Kaena Point, Wespac bed, Brooks Bank, and 180 Fathom Bank
		Shallow-water	Benthic	Three beds known for black corals in the MHI between Milolii and South Point on the Big Island, the Auau Channel, and the southern border of Kauai

**Table 6. Habitat areas of particular concern for MUS of the American Samoa, Mariana Archipelago, and Hawaii FEPs**

<b>FEP</b>	<b>Fishery</b>	<b>Stock or Stock Complex</b>	<b>HAPC</b>
American Samoa, Mariana	Bottomfish	Shallow- and deep-water	All slopes and escarpments between 40 m and 280 m (20 and 140 fm)
American Samoa	Coral Reef Ecosystem	Currently and potentially harvested coral reef taxa	Fagatele Bay, Larsen Bay, Step's Point, National Park of American Samoa on the north coast of Tutuila and marine areas at Tau Island and south coast of Ofu, Aunuu Island, Rose Atoll, Aua Transect in Pago Pago harbor
Mariana – CNMI	Coral Reef Ecosystem	Currently and potentially harvested coral reef taxa	Saipan Lagoon
Mariana-Guam	Coral Reef Ecosystem	Currently and potentially harvested coral reef taxa	Cocos Lagoon, Ritidian Point, Jade Shoals, Orote Point and Haputo Point Ecological Reserve Areas
Hawaii	Coral Reef Ecosystem	Currently and potentially harvested coral reef taxa	Kaula Rock (entire bank); Lehua Island, Niihau; Kaliu Point, Kauai; Makapuu Head/Tide Pool Reef Area, Kaneohe Bay, Kaena Point, Kahe Reef, Oahu; Molokini, Olowalo Reef Area, Ahikihi Kinau Natural Area Reserve, Maui; South shore reefs, Molokai; Halope Bay, Manele Bay, Five Needles, Lanai; Kealakekua, Hawaii Island; all long-term research sites; all Coral Reef Assessment and Monitoring Program sites; all Marine Life Conservation Districts: Pupukeya, Shark's Cove, and Waikiki, Oahu; Honolulu-Mokuleia Bay, Maui; Lapakahi Bay State Park, Puako Bay and Reef, Waialea Bay, Kawaihae Harbor-Old Kona Airport, Hawaii Island
	Crustaceans	Spiny and slipper lobsters, Kona crab	All banks in the NWHI with summits less than or equal to 30 m (15 fm) from the surface <sup>1</sup>
	Precious Coral	Deep-water	Makapuu, Wespac, and Brooks Bank bed
Shallow-water		Auau Channel bed	
Hawaii	Bottomfish	All bottomfish stocks	Discrete areas at Kaena Point, Kaneohe Bay, Makapuu Point, Penguin Bank, Pailolo Channel, North Kahoolawe, and Hilo (please see WPFMC 2016, section 3.3.3 for GPS coordinates of the locations and WPFMC 2016, Appendix 2 for maps)

<b>FEP</b>	<b>Fishery</b>	<b>Stock or Stock Complex</b>	<b>HAPC</b>
Hawaii	Bottomfish	Seamount groundfish	Congruent with EFH (See Table 5)

<sup>1</sup> In the text of the amendment designating EFH (WPFMC 1998), only banks with summits shallower than 30 m in the northwestern Hawaiian Islands (NWHI) were identified as HAPC for the crustacean MUS (p. 47); whereas maps in Appendix 4 of that document depicted HAPC as all banks and pinnacles with summits less than 30 m in the NWHI, Guam, the CNMI, and American Samoa. While the Mariana and American Samoa FEPs identify all banks with summits less than 30 m as HAPC for crustacean MUS, the Council did not recommend modifications to its EFH and HAPC designations at the time that it restructured the fishery management plans into FEPs. If there are differences between the descriptions of EFH in text, maps, and tables, the textual description is ultimately determinative of the limits of EFH (67 FR 2343 at 2377).

### **3.3 Socio-economic Setting**

Under the Magnuson-Stevens Act, socio-economic considerations of proposed FEP amendments and fishery management actions should consider effects on fishing communities, other resource or area users, markets, earnings, disproportionately high and adverse health or environmental effects on members of minority or low-income populations, and health and safety.

Each of the islands in Hawaii and American Samoa, the CNMI, and Guam are considered fishing communities and fishery participants include commercial, non-commercial and recreational (e.g., visitors). There is no subsistence fishing in the EEZ. Subsistence fishing, gathering of seaweeds, opihi, and other marine species occurs only in territorial and state waters. For more information on the socio-economic background of the fisheries, please see the FEPs (WPFMC 2009a, WPFMC 2009b, WPFMC 2009c).

### **3.4 Management Setting**

The proposed action to reclassify some MUS as ECS would affect the scope of stocks for the setting of ACLs and may affect some EFH consultations in the future. The management background for these practices are described below.

#### *ACLs*

Federal regulations at 50 CFR 665.4 (76 FR 37285, June 27, 2011) require NMFS to specify ACLs and AMs for each stock or stock complex of MUS identified in an FEP, as recommended by the Council, and in consideration of the best available scientific, commercial, and other information about the fishery for that stock or stock complex. NMFS currently specifies ACLs and AMs for stocks and species in the FEPs covering fisheries in the four island areas. NMFS analyzes the effects of the alternatives to setting ACLs, most recently in the EAs for the 2017 ACLs and AMs for Kona crab (83 FR 5051, February 5, 2018), Pacific Island crustacean precious coral and territorial bottomfishes (82 FR 58129, December 11, 2017) and MHI Deep 7 bottomfish (82 FR 29778, June 30, 2017) (NMFS 2016, NMFS 2017a, NMFS 2017b). The FEPs and the annual SAFE reports for American Samoa, Mariana Archipelago, and Hawaii provide more detail on the ACL specification process (WPFMC 2009a, WPFMC 2009b, WPFMC 2009c, WPFMC 2017b, WPFMC 2017c, WPFMC 2017d).

#### *EFH consultations and other habitat-related requirements*

Under the 1996 amendments to the Magnuson-Stevens Act, NMFS and RFMCs are required to identify EFH for MUS in their fishery management plans. The Council's EFH designations are important because of the procedural requirements they impose on both Councils and federal agencies. First, for each MUS, Councils must identify EFH and minimize adverse impacts from federally authorized fishing activities on EFH. Second, the Magnuson-Stevens Act mandates that federal agencies conduct an EFH consultation with NMFS for "any action authorized, funded, or undertaken by a federal agency, or proposed to be authorized, funded, or undertaken by a federal agency" that may adversely affect EFH. This includes any project requiring a federal permit (e.g., from the US Army Corps of Engineers and Environmental Protection Agency), federal activities (e.g., Department of Defense (DOD) military activities and National Oceanic and



Atmospheric Administration (NOAA) management actions), and federally-funded activities implemented by a federal agency or a federal designee. In American Samoa, Mariana Archipelago, and Hawaii, these actions include aquaculture; installation of buoys, moorings, aids to navigation; cables and utilities; coastal hardening such as seawalls and revetments; infrastructure construction and development (e.g., resorts, housing, and critical infrastructure); dredging; drilling and/or geotechnical boring; harbor construction and repair; fish pond restoration; flood mitigation and erosion control; outfall pipes and repairs; transportation projects (highway, bridge, rail); and wave energy projects. Examples of federal agencies that most frequently consult with PIRO include the DOC, the US Army Corps of Engineers, and the Department of Transportation.

Under the Magnuson-Stevens Act, an adverse effect means “any impact that reduces the quality and/or quantity of EFH.” Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate; and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components. Adverse effects to EFH may result from actions occurring within EFH or “upstream” from EFH; and may include site-specific or habitat-wide impacts including individual, cumulative, or synergistic consequences of actions. Through EFH consultation, NMFS must provide conservation recommendations to the federal action agency (Magnuson-Stevens Act, 16 U.S.C. 1855 Section 305(b)(2) and 305(b)(4)) which may help the agency avoid, minimize, mitigate or otherwise offset for any “adverse effects” to EFH to the extent practicable for all MUS. The agency must respond to the recommendations in writing; if a response is inconsistent with NMFS conservation recommendations, the federal agency must explain its reasoning for not following the recommendation, including scientific justification (see 600.920(k)). If the interagency disagreement persists, the action may be elevated to the NMFS assistant administrator for further resolution with the action agency. For more information on EFH and consultation requirements, see the American Samoa, Mariana Archipelago, and Hawaii FEPs (WPFMC 2009a, WPFMC 2009b, WPFMC 2009c) and EFH consultation information and guidance provided at [http://www.fpir.noaa.gov/HCD/hcd\\_efh.html](http://www.fpir.noaa.gov/HCD/hcd_efh.html).

There are primarily three other types of federal regulatory functions that occur in areas currently designated as EFH and would continue to apply without EFH designation: consultations under the ESA and the Fish and Wildlife Coordination Act, and permitting under the Clean Water Act and/or the Rivers and Harbors Act. There are six habitat-forming coral species listed as threatened in American Samoa, and four coral species listed as threatened in the Marianas; none are listed in Hawaii. When a federal action occurs that is likely to adversely affect these corals, the federal action agency must consult with NMFS under Section 7 of the ESA. Consultation under the Fish and Wildlife Coordination Act is intended to protect fish and wildlife when federal actions result in the control or modification of a natural stream or body of water, and impacts to fish and wildlife from proposed water resource development projects are evaluated and recommendations are provided. Permits are issued by the Department of the Army under Sections 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act for projects involving dredge and/or fill (Section 404) and for the placement of structures that modify navigable waters (Section 10).

Under Section 404 of the CWA, compensatory mitigation is required for federally authorized impacts to aquatic resources, including special aquatic sites such as coral reefs and vegetated

shallows or seagrass beds. Compensatory mitigation is meant to replace the ecosystem function of the affected resources for the purposes of offsetting unavoidable adverse impacts which remain after practicable avoidance and minimization has been achieved (73 FR 19687, April 10, 2008). National Pollutant Discharge Elimination System (NPDES) permits are issued by the EPA or delegated state agency for discharges into US waters. NPDES permits place monitoring requirements and limits, including turbidity, on facilities that discharge water to the environment to control point source pollution.

Federal agencies are also required to evaluate the potential environmental effects of their activities on the marine environment under the NEPA. Finally, Executive Order 13089 requires federal agencies to identify their actions that may affect US coral reef ecosystems, use their programs to protect and enhance the conditions of such ecosystems, and ensure that their actions will not degrade the conditions of such ecosystems to the extent permitted by law.

## **4 POTENTIAL EFFECTS OF THE ALTERNATIVES**

This section describes the potential effects of each alternative on the components of the affected environment identified in Section 3 above.

### **4.1 Potential Effects of Alternative 1: No Action (Status Quo)**

Current fisheries are not having large adverse changes to physical or biological resources. Federal fishing activities currently do not affect the physical environment including water or air quality, currents, temperature, salinity, or weather patterns. Through the SAFE reports, NMFS and the Council monitor and evaluate these fisheries annually to ensure sustainability to biological resources. NMFS also develops NEPA analyses to evaluate the potential environmental effects of the proposed ACL and AMs for the FEP-managed fisheries. These NEPA analyses have determined that there is no significant impact from these fisheries. There have been no identified impacts to marine biodiversity and/or ecosystem function from fisheries in federal waters of Hawaii, Guam, the CNMI, and the American Samoa. See NMFS 2015a, NMFS 2015b, NMFS 2016, NMFS 2017b.

### **4.2 Potential Effects of Alternative 2 (Preferred Alternative)**

Alternative 2 would reclassify some stocks from MUS to ECS, but would have essentially no change in fisheries effort and operation, and very limited changes to federal fisheries management as further explained below.

#### **4.2.1 Effects of Alternative 2 on Physical Environment**

The proposed action reclassifies some MUS to ECS, and the reclassification would not result in a change to any fishery in terms of location, target and non-target species, catch, effort, fishermen participation, gear composition, seasonality, intensity, or bycatch because the administrative designation to ECS will not affect effort. Because the proposed action would not change any fishery activity, this alternative does not have the potential to have effects on the physical environment including on water or air quality, currents, temperature, salinity, or weather patterns.

#### **4.2.2 Effects of Alternative 2 on Biological Resources**

*Effect of the proposed action on target stocks, non-target stocks, bycatch, biodiversity, protected species, and marine protected areas*

As the proposed action would not change any fishery activities, there would not be direct or indirect effects on target and non-target species, bycatch, biodiversity, marine habitat from fishing activities, or protected species (including marine mammals, non-target fish, seabirds, and invertebrates). The only difference in active management that would occur from the proposed classification of ECS is that the Council and NMFS would no longer develop ACLs and AMs for ECS. The proposed action would not result in changes to any fishery because the current management scheme does not limit any fishery in a way that would change under the proposed action. This is because NMFS does not currently have the authority to implement or enforce AMs within state or territorial waters for species not predominately caught in federal waters. Therefore, with the exception of MHI Deep 7 which is jointly federal-State managed, species caught predominantly in state or territorial waters do not benefit from the ACL management regime. Although the Council could implement lower ACLs to account for ACL exceedance in the previous fishing year, lower ACLs do not restrict the fishing effort in the current fishing year, as a result, the subsequent fishing year could also experience exceeded ACLs. Thus, removing the ACLs and AMs from the existing management regime for stocks not predominately caught in federal waters that are not in need of conservation and management would not result in changes to the fishery. Monitoring, review by the Council, and research would continue for MUS and ECS. Table 2 (Proposed MUS) and Appendix B (Proposed ECS) together reflect the changes in the list of MUS.

As the proposed action would not result in changes to the conduct of any fishery, it would not affect biodiversity, predator-prey or other biological resources including protected species (e.g., sea turtles, listed marine mammals, hammerhead sharks, listed corals, listed seabirds) beyond the how the fisheries are currently managed as described in the FEPs and SAFE reports. Western Pacific federal fisheries have the potential for unintentional interactions with listed species or marine mammals. All federal fisheries are currently authorized in accordance with Magnuson-Stevens Act, the Endangered Species Act (ESA), and the Marine Mammal Protection Act (MMPA) and have been reviewed and coordinated under all applicable laws. Because no fishery would change because of the proposed action, and because interactions between both fisheries and other federal proposals would be reviewed under applicable law, protected species will not be considered further. The proposed action would not affect MPAs.

*Effects on Essential Fish Habitat and Habitat Areas of Particular Concern*

EFH consultations would be required for all activities that may adversely affect EFH for MUS. The Council's recommendation to reclassify some stocks of MUS as ECS would result in the removal of EFH descriptions for reclassified stocks and would no longer require federal agencies to consult with NMFS on the potential effects on those areas no longer identified as EFH. The requirement for the Council to minimize effects on EFH for authorized fishing activities to the extent practicable would also be removed for ECS (67 FR 2343).

NMFS and the Council evaluated the potential changes to EFH/HAPC coverage under the proposed action. For purposes of analysis, changes to EFH in this section are considered at two different levels. First, we examine changes at the combined EFH footprint level, which can be conceptualized as a composite of all EFH designations present in the action area. Next, we examine changes at the stock complex level (e.g., American Samoa bottomfish, Hawaii deep-water precious coral). The combined EFH footprint level accounts for the overlap in areas designated as EFH at the species complex level. Changes to HAPC are only considered at the stock complex level, as HAPC designations are subsets of EFH. The direct effects from the proposed action on changes to EFH designations are described below. The indirect effects of the proposed action are discussed under *Indirect Effects from immediate changes to EFH* (below).

*Combined EFH footprint level evaluation*

The combined substrate EFH footprint under the proposed action would change in the American Samoa, Guam, and CNMI action areas because the proposed action would result in removing the substrate EFH designation for deepwater shrimp MUS. The designation that would be removed includes the outer reef slopes between 400 and 700 m for the juvenile and adult life stages of deepwater shrimp in American Samoa, the CNMI, and Guam. The combined substrate EFH footprint would not change in the Hawaii action area.

The combined water column EFH designation would not change, because EFH for pelagic MUS includes the water column from the shoreline to the EEZ to a depth of 1000 m throughout the action area, and encompasses the current water column EFH designation for all current MUS.

Table 7 summarizes the impacts on the EFH designations for all MUS combined for the action areas.

**Table 7. Summary of Effects of the Alternative 2 on combined EFH designation**

Action Area	Combined EFH Footprint		Change in combined EFH Footprint (EFH is not designated for ECS)
	Alternative 1: Status Quo	Alternative 2 (preferred): New MUS Lists	
American Samoa	The water column from the shoreline to EEZ, and from the surface to 1000 m  All bottom habitat from the shoreline to a depth of 400 m (200 fm), and the outer reef slopes at depths between 400 m to 700 m (200 fm and 350 fm)	The water column from the shoreline to EEZ, and from the surface to 1000 m  All bottom habitat from the shoreline to a depth of 400 m (200 fm)	No change in water column EFH  Remove substrate designation for outer reef slopes between 400 m and 700 m depth (200 fm and 350 fm)

Action Area	Combined EFH Footprint		Change in combined EFH Footprint (EFH is not designated for ECS)
	Alternative 1: Status Quo	Alternative 2 (preferred): New MUS Lists	
<b>Hawaii</b>	The water column from the shoreline to EEZ, and from the surface to 1000 m  All bottom habitat from the shoreline to a depth of 400 m (200 fm), and the outer reef slopes at depths between 400 m to 700 m (200 fm and 350 fm)	The water column from the shoreline to EEZ, and from the surface to 1000 m  All bottom habitat from the shoreline to a depth of 400 m (200 fm), and the outer reef slopes at depths between 400 m to 700 m (200 fm and 350 fm)	No change
<b>Guam and CNMI</b>	The water column from the shoreline to EEZ, and from the surface to 1000 m  All bottom habitat from the shoreline to a depth of 400 m (200 fm), and the outer reef slopes at depths between 400 m to 700 m (200 fm and 350 fm)	The water column from the shoreline to EEZ, and from the surface to 1000 m  All bottom habitat from the shoreline to a depth of 400 m (200 fm)	No change to water column EFH  Remove substrate designation for outer reef slopes between 400 m and 700 m depth (200 fm and 350 fm)

*Stock complex level evaluation*

At the stock complex level, EFH/HAPC designations under the proposed action would result in one of three outcomes for each stock or stock complex:

- EFH/HAPC Outcome 1. No change in EFH/HAPC geographic extent (same as status quo) because current MUS would remain MUS.
- EFH/HAPC Outcome 2. No change in EFH/HAPC geographic extent because some species from the same stock complex would remain MUS.
- EFH/HAPC Outcome 3. EFH/HAPC is no longer designated because all MUS in the stock complex would become ECS.

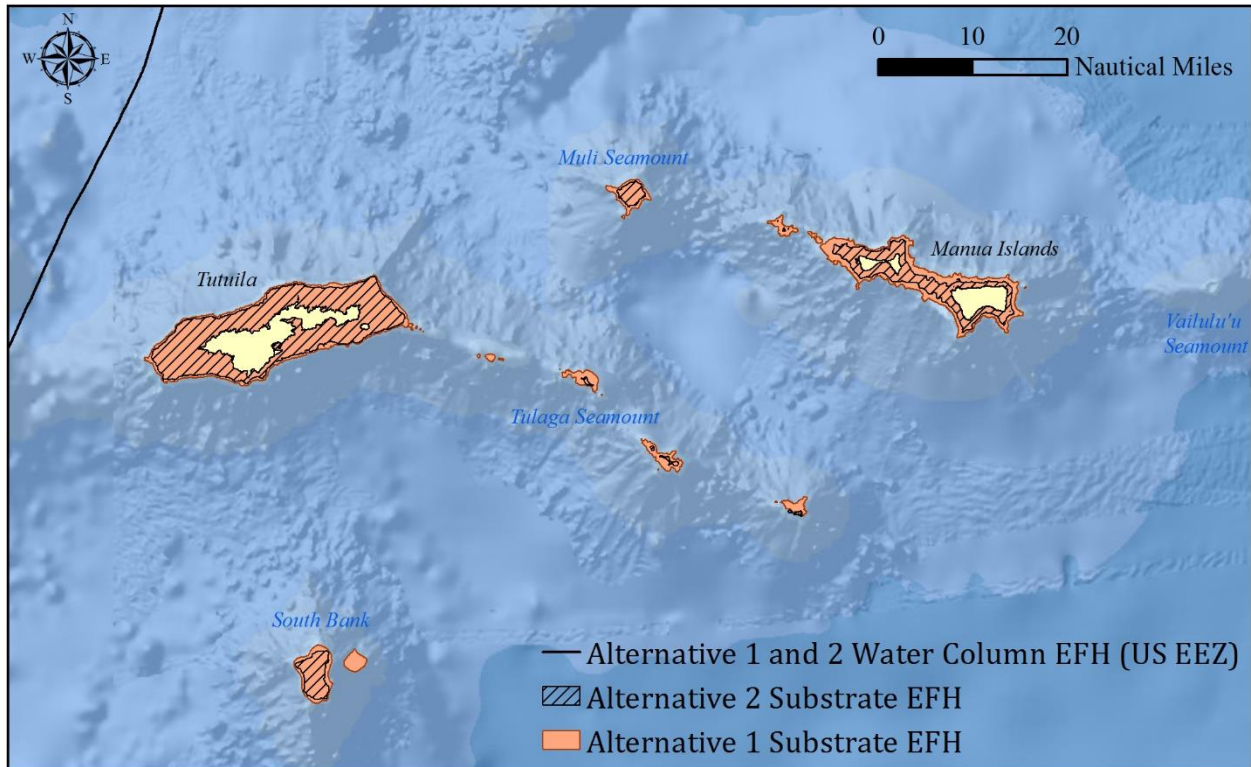
*EFH/HAPC outcomes of Alternative 2*

In general, there would be no change in the geographic extent of EFH at the species complex level for bottomfish MUS in the management area of the American Samoa, Mariana Archipelago, and Hawaii FEPs or for precious coral and crustaceans in the Hawaii FEP. Coral reef ecosystem EFH and HAPC would no longer be designated for all action areas and crustacean EFH would be removed from the American Samoa, Guam, and CNMI action areas. EFH designations would no longer apply for any ECS under the proposed action.

The following sections, organized by geographic area, discuss the changes to the EFH designations under each alternative at the combined EFH footprint level and stock complex level, and changes to HAPC.

### American Samoa Archipelago

Figure 3 shows the combined EFH footprint under both alternatives around the developed islands and fished banks of the American Samoa Archipelago.



**Figure 3. Combined substrate EFH footprint, or substrate EFH limit, of the alternatives in American Samoa. Rose Atoll and Swains Island are not shown.**

As depicted in Figure 3, certain areas of deep slope (between 400 m and 700 m depth (200 fm and 350 fm)) would no longer be designated as EFH under Alternative 2 because deepwater shrimp would be designated as ECS. EFH from another stock complex does not overlap with deepwater shrimp EFH. The area of outer reef slopes between 400 and 700 m is not well mapped throughout the EEZ, so the area of substrate EFH that will be removed is not quantifiable. Rose Atoll and Swains Islands are not shown due to the paucity of activities occurring in nearby waters with the potential to adversely affect EFH. At least one cable-laying project has occurred in this area in the past, but at this time information on what activities may occur in the future are unavailable.

Table 8 shows the change in EFH/HAPC designations or outcome type expected under each alternative at the stock complex level for American Samoa.

- EFH/HAPC Outcome 1. No change in EFH/HAPC geographic extent (same as status quo) because current MUS would remain MUS.
- EFH/HAPC Outcome 2. No change in EFH/HAPC geographic extent because some species from the same stock complex would remain MUS.
- EFH/HAPC Outcome 3. EFH/HAPC is no longer designated because all MUS in the stock complex would become ECS.

**Table 8. American Samoa Archipelago: EFH and HAPC outcomes under each alternative for each stock complex in the FEP.**

Fishery	Stock Complex	Alternative 1 (status quo)		Alternative 2 (preferred): New MUS Lists	
		EFH Outcome	HAPC Outcome	EFH Outcome	HAPC Outcome
Bottomfish	Shallow- and deep-watershallow-water and deep-water	1	1	2 <sup>1</sup>	2
Coral reef ecosystem	American Samoa currently and potentially harvested coral reef taxa	1	1	3	3
Crustacean	Spiny and slipper lobsters, Kona crab	1	1	3	NA <sup>2</sup>
Crustacean	Deepwater shrimp	1	1	3	NA

<sup>1</sup>Shallow-water bottomfish to which the EFH designations under Alternative 2 (preferred) would no longer apply include four species: blacktip grouper (*Epinephelus fasciatus*), ambon emperor (*Lethrinus amboinensis*), amberjack (*Seriola dumerili*) and giant trevally (*Caranx ignobilis*). Deep-water bottomfish include yellowtail snapper (*Pristipomoides auricilla*) and kalekale (*P. sieboldii*).

<sup>2</sup>Not Applicable

The EFH designations in the American Samoa FEP would not change under Alternative 1. Under Alternative 2, the EFH designation for bottomfish would no longer apply to four species of bottomfish in the shallow-water complex or two species of bottomfish in the deep-water complex. Despite the reclassification of six species, the geographic extent would not change. Eleven species of bottomfish would remain in the MUS, and therefore the EFH designation of bottomfish species would be retained and EFH consultation would thus continue.

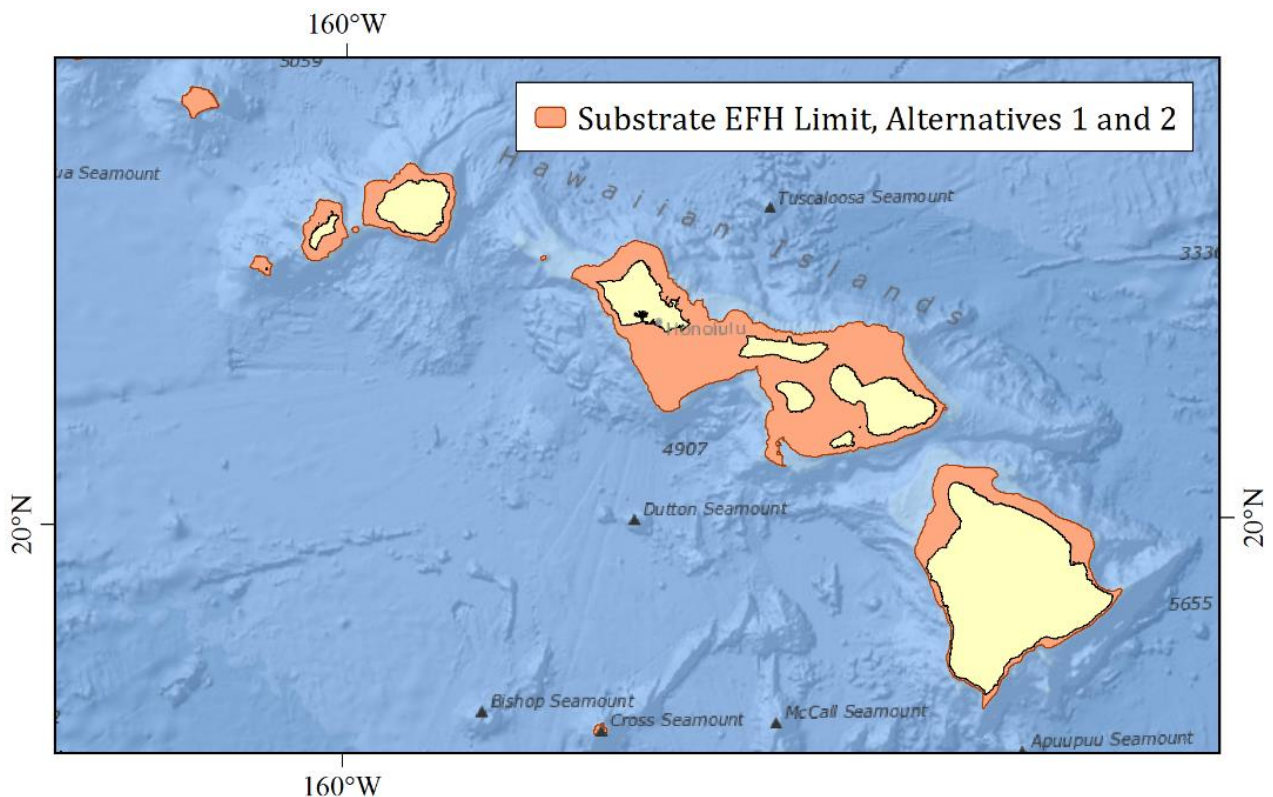
Under Alternative 2, the EFH designations for the crustacean spiny lobster, slipper lobster and Kona crab complex and deepwater shrimp complex, as well as the coral reef ecosystem complex, would be not be designated in the FEP. The geographic extent of substrate EFH for spiny lobster, slipper lobster, and Kona crab and coral reef ecosystem stock complexes are completely contained within the geographic extent of substrate EFH for the juvenile/adult life stages of bottomfish. Substrate EFH for the juvenile/adult life stage of deepwater shrimp overlaps with substrate EFH for the juvenile/adult life stage of bottomfish in the 300 to 400 m depth range.

EFH would not occur in the deep reef slopes between 400 and 700 m in the combined EFH footprint as a result of reclassifying the deepwater shrimp into ECS.

The HAPC designations would not change under Alternative 1, and the bottomfish HAPC designation would not change under Alternative 2. Coral reef ecosystem HAPC would be removed under Alternative 2. These areas occur within the geographic extent of bottomfish EFH and include Fagatele Bay, Larsen Bay, Step's Point, National Park of American Samoa on the north coast of Tutuila and marine areas at Tau Island and south coast of Ofu, Aunuu Island, Rose Atoll, Aua Transect in Pago Pago harbor. These areas also occur within the National Marine Sanctuary of American Samoa, except for Larsen Bay, Step's Point, and the Aua transect.

## Hawaii

Figure 4 shows the combined substrate EFH footprint under both alternatives around the MHI.



**Figure 4. Combined substrate EFH footprint, or substrate EFH limit, under both alternatives around the Main Hawaiian Islands. The Northwestern Hawaiian Islands are not shown.**

As depicted in Figure 4, the combined EFH footprint would not change under either alternative. EFH is designated in the Northwestern Hawaiian Islands (NWHI), but is not shown due to the paucity of activities occurring in the NWHI with the potential to adversely affect EFH.

- EFH/HAPC Outcome 1. No change in EFH/HAPC geographic extent (same as status quo) because current MUS would remain MUS.



- EFH/HAPC Outcome 2. No change in EFH/HAPC geographic extent because some species from the same stock complex would remain MUS.
- EFH/HAPC Outcome 3. EFH/HAPC is no longer designated because all MUS in the stock complex would become ECS.

**Table 9. Hawaii: EFH and HAPC outcomes under each alternative for each stock complex in the FEP.**

Fishery	Stock or Stock Complex	Alternative 1: Status Quo		Alternative 2 (preferred): New MUS Lists	
		EFH Outcome	HAPC Outcome	EFH Outcome	HAPC Outcome
<b>Bottomfish and seamount groundfish</b>	Shallow, <i>Aprion virescens</i>	1	1	1	2
	Shallow, <i>Lutjanus kasmira</i>	1	1	3	2
	Shallow, <i>Caranx ignobilis</i>	1	1	3	2
<b>Bottomfish and seamount groundfish</b>	Intermediate, <i>Aphareus rutilans</i>	1	1	1	2
	Intermediate, <i>Pristipomoides filamentosus</i>	1	1	1	2
	Intermediate, <i>Hyporthodus quernus</i>	1	1	1	2
	Intermediate, <i>Caranx lugubris</i>	1	1	3	2
	Intermediate, <i>Pseudocaranx cheilio</i>	1	1	3	2
	Intermediate, <i>Seriola dumerili</i>	1	1	3	2
	Deep, <i>Etelis carbunculus</i>	1	1	1	2
	Deep, <i>Etelis coruscans</i>	1	1	1	2
	Deep, <i>Pristipomoides auricilla</i>	1	1	3	2
	Deep, <i>Pristipomoides sieboldii</i>	1	1	1	2
	Deep, <i>Pristipomoides zonatus</i>	1	1	1	2
<b>Bottomfish and seamount groundfish</b>	Seamount groundfish	1	1	1	1
<b>Coral Reef Ecosystem</b>	Currently and potentially harvested coral reef taxa	1	1	3	3
<b>Crustaceans</b>	Spiny and slipper lobsters, Kona crab	1	1	2 <sup>1</sup>	2
<b>Crustaceans</b>	Deepwater shrimp	1	1	1	NA
<b>Precious Coral</b>	Deep-water	1	1	2 <sup>1</sup>	2
<b>Precious Coral</b>	Shallow-water	1	1	1	1

<sup>1</sup>Crustaceans to which the EFH designations under Alternative 2 (preferred) would no longer apply include 2 species of spiny lobster (*Panulirus marginatus*, *P. penicillatus*) and the slipper lobster family, Scyllaridae.

<sup>2</sup>Deep-water precious coral species to which the EFH designations under Alternative 2 (preferred) would no longer apply include species of pink or red coral (*Corallium regale* and other *Corallium* spp.), certain species of gold coral (*Callogorgia gilberti*, *Narella* spp., *Calyptrophora* spp.) and one species of bamboo coral (*Lepidisis olapa*).

The EFH designations in the Hawaii FEP would not change for any species complex under Alternative 1. Under Alternative 2, the EFH designations would not change for eight stocks of bottomfish, deepwater shrimp, or shallow-water precious coral. The EFH designations for bottomfish would no longer be designated under Alternative 2 for two shallow stocks, three intermediate stocks, and one deep stock.

Also, under Alternative 2, the EFH designations for crustaceans in the spiny lobster, slipper lobster, and Kona crab crustaceans complex would no longer apply for two species of spiny lobster and species belonging to the slipper lobster family. Despite this reclassification, the geographic extent of crustaceans EFH would not change for the Kona crab. All nearshore benthic habitat is considered EFH for Kona crab.

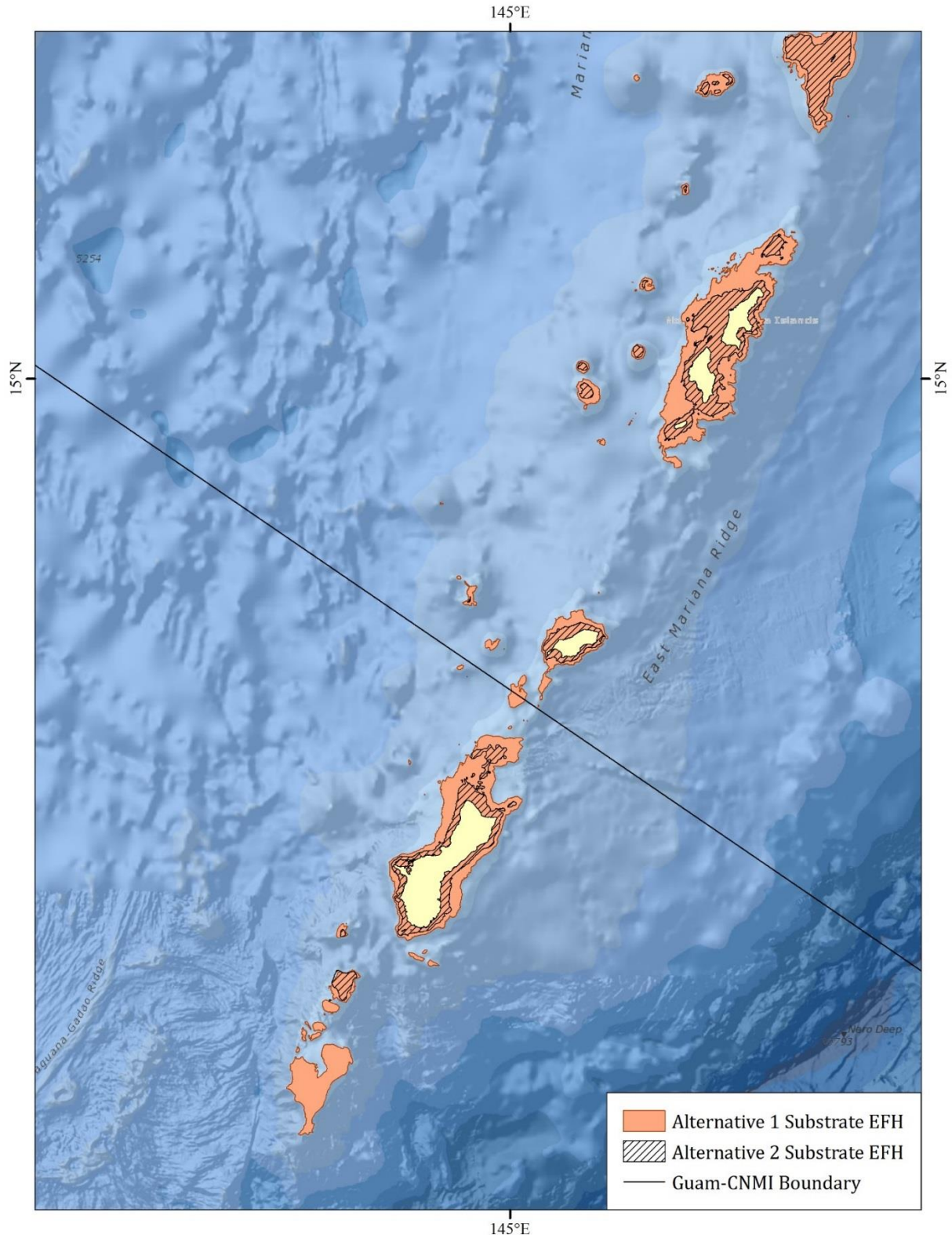
The EFH designations for deep-water precious coral would no longer apply for species of pink or red coral (*Corallium regale* and other *Corallium* spp.), certain species of gold coral (*Callogorgia gilberti*, *Narella* spp., *Calyptrophora* spp.) and one species of bamboo coral (*Lepidisis olapa*) under Alternative 2. The geographic extent of EFH for deep-water precious corals would remain the same, as four species of precious coral would remain in the deep-water precious coral species complex.

Under Alternative 2, the EFH designations for the coral reef ecosystem species complex would be removed from the FEP. The current geographic extent of coral reef ecosystem substrate EFH for the juvenile/adult life stages is congruent with and therefore completely contained within the geographic extent of crustacean EFH for the juvenile/adult life stages of Kona crab and *Aprion virescens* or uku under Alternative 2.

The HAPC designations would not change under Alternative 1, and the bottomfish, precious coral, seamount groundfish, and crustacean HAPC designations would not change under Alternative 2. Coral reef ecosystem HAPC would be removed under Alternative 2. In the Main Hawaiian Islands, HAPC includes all long-term research sites, all Coral Reef Assessment and Monitoring Program sites, all Marine Life Conservation Districts, and several other areas identified in Table 6. These areas are all contained within the geographic extent of bottomfish and crustacean EFH, and would therefore trigger EFH consultations if an agency's actions may adversely affect these areas.

### **Mariana Archipelago**

Figure 5 shows the combined EFH footprint under both alternatives around the developed islands and fished banks of the Mariana Archipelago.



**Figure 5. Combined substrate EFH footprint, or substrate EFH limits, of the alternatives in the Mariana Archipelago. Islands north of Farallon de Medinilla and the Western Mariana Ridge are not shown.**

As depicted in Figure 5, certain areas of deep slope (between 400 m and 700 m depth (200 fm and 350 fm)) would not be designated as EFH under Alternative 2 because deepwater shrimp would be ECS. EFH from another complex also does not overlap with deepwater shrimp EFH. The area of outer reef slopes between 400 and 700 m is not well mapped throughout the EEZ, particularly in the West Mariana Ridge, so the area of EFH that would not be designated is not quantifiable. The northern islands of the CNMI are not shown because the islands are not developed. At least one cable-laying project has occurred in this area in the past, but at this time information on what activities may occur in the future are most likely limited to light fishing activities, monument research activities, and Department of Defense (DOD) training and testing activities. Under the proposed action, the DOD and other federal agencies would be required to consult with NMFS where EFH remains.

Table 10 summarizes the three potential outcomes from the proposed action.

- EFH/HAPC Outcome 1. No change in EFH/HAPC geographic extent (same as status quo) because current MUS would remain MUS.
- EFH/HAPC Outcome 2. No change in EFH/HAPC geographic extent because some species from the same stock complex would remain MUS.
- EFH/HAPC Outcome 3. EFH/HAPC is no longer designated because all MUS in the stock complex would become ECS.

**Table 10. Mariana Archipelago: EFH and HAPC outcomes under each alternative for each stock complex in the FEP**

Fishery	Stock Complex	Alternative 1: Status Quo		Alternative 2 (preferred): New MUS Lists	
		EFH Outcome	HAPC Outcome	EFH Outcome	HAPC Outcome
Bottomfish	Shallow-water and deep-water	1	1	2 <sup>1</sup>	2
Coral Reef Ecosystem	Currently and potentially harvested coral reef taxa	1	1	3	3
Crustaceans	Spiny and slipper lobsters, Kona crab	1	1	3	NA <sup>2</sup>
Crustaceans	Deepwater shrimp	1	1	3	NA

<sup>1</sup> Shallow-water bottomfish to which the EFH designations under Alternative 2 (preferred) would no longer apply include 4 species in Guam and the CNMI: uku (*Aprion virescens*), blacktip grouper (*Epinephelus fasciatus*), amberjack (*Seriola dumerili*), and ambon emperor (*Lethrinus amboinensis*); and the black trevally (*C. lugubris*) in CNMI.

<sup>2</sup> Not applicable.

The EFH designations in the Mariana Archipelago FEP would not change under Alternative 1. Under Alternative 2, the EFH designation for bottomfish would no longer apply to four species of bottomfish in the shallow-water complex in Guam and five species in the shallow-water

complex in the CNMI. Despite the reclassification of these species, the geographic extent would not change. Thirteen species of bottomfish would remain in the MUS in Guam and twelve in CNMI and, therefore, the EFH designation of bottomfish species would be retained.

Under Alternative 2, the EFH designations for the crustacean spiny lobster, slipper lobster and Kona crab complex and deepwater shrimp complex, as well as the coral reef ecosystem complex, would not be designated in the FEP. The geographic extent of substrate EFH for spiny lobster, slipper lobster, and Kona crab and coral reef ecosystem stock complexes are completely contained within the geographic extent of substrate EFH for the juvenile/adult life stages of bottomfish. Substrate EFH for the juvenile/adult life stage of deepwater shrimp overlaps with substrate EFH for the juvenile/adult life stage of bottomfish in the 300 to 400 m depth range. The loss of EFH in the deep reef slopes between 400 and 700 m in the combined EFH footprint results from reclassifying the deepwater shrimp to ECS.

The HAPC designations would not change under Alternative 1, and the bottomfish HAPC designation would not change under Alternative 2. Coral reef ecosystem HAPC would be removed under Alternative 2. These areas include Cocos Lagoon, Ritidian Point, Jade Shoals, Orote Point and Haputo Point Ecological Reserve Areas in Guam and Saipan Lagoon in the CNMI. The ecological reserve areas on Guam are protected areas within the DOD's jurisdiction. Ritidian Point is located within the Guam National Wildlife Refuge at Anderson Air Force Base, while Jade Shoals occurs within Apra Harbor. Cocos Lagoon occurs within NMFS' Habitat Blueprint Focus Area at Manell-Geus. These areas would remain high priority conservation sites on Guam without the HAPC designation. Saipan Lagoon and the Guam coral reef ecosystem HAPC all occur within the geographic extent of bottomfish EFH.

### ***Indirect Effects from Immediate Changes to EFH***

The proposed action would not have effects on the environment, but in the future, indirect and cumulative impacts to physical and biological resources (such as effects on water quality or substrate quality including coral reefs) could potentially occur through the actions of other federal agencies. If a proposed action by another federal agency could have potential adverse effects to an area that would no longer be EFH for a federally managed fishery (Alternative 2), that federal action would take place without the benefit of an EFH consultation with NMFS and the resulting conservation and enhancement recommendations to protect fish habitat. NMFS issues EFH conservation recommendations for action agencies to implement; however, NMFS does not recommend that federal agencies take actions beyond their statutory authority (67 FR 2343).

### ***Potential for change in number of EFH consultations***

NMFS considered whether the immediate and unavoidable change in EFH would result in a reduced number of EFH consultations. NMFS receives up to 300 consultation requests annually, and conducts about 130 consultations. Because there would be no change in EFH under Alternative 1, there would be no change in the number of expected EFH consultations under Alternative 1.

We obtained information on the number of ongoing EFH consultations before the agency with potential adverse impacts in the combined substrate EFH footprint that would not be designated as EFH under Alternative 2 (e.g., benthic habitats from 400 to 700 m in American Samoa, Guam and CNMI). Currently, NMFS is a cooperating agency on the Mariana Islands Testing and Training (MITT) Supplemental Environmental Impact Statement (EIS) action. This action is in its early planning stages, and the Navy has not yet requested an EFH consultation. This potential action may affect the 400 m to 700 m depth range in Guam and the CNMI through the military expended materials falling to the seafloor, similar to the impacts analyzed in the 2015 MITT EIS. The Navy did consult with NMFS on the 2015 MITT. In response to NMFS recommendation to avoid discharging military expended materials in waters shallower than 700 m, the Navy stated that it could not practicably avoid discharging expended materials in all designated EFH areas at depths less than 700 m. In the Record of Decision for the 2015 MITT EIS, DOD concluded that training and testing activities would not impact the ability of marine substrates to serve their function as habitat (DOD 2015). Therefore, NMFS does not expect that the change to substrate EFH under the proposed action would indirectly result in a change in how the Navy carries out testing and training activities, and expects that there would be no additional environmental impact from the Navy's action.

In the past, at least one EFH consultation for underwater cables has occurred for adverse impacts to the benthic environment in the 400 to 700 m depth range in American Samoa and in Guam and the CNMI. Besides military testing and training activities, scientific research is another category of activities which may impact this area. Under the proposed action, the water column is designated as pelagic EFH to a depth of 1,000 m throughout the EEZ; therefore, consultations would occur for water column effects in the action area. As there would no longer be benthic environment consultations required for 400 to 700 m, EFH assessments would not evaluate effects to the benthic environments in the 400 to 700 m depth range in the American Samoa, CNMI, and Guam action areas. This would not result in a change in the total number of EFH consultations under Alternative 2 as consultations for the pelagic water column designation would still be in effect. However, NMFS would no longer provide EFH conservation and enhancement recommendations designed to minimize adverse effects on benthic substrate in these areas. Other applicable laws encourage federal agencies to evaluate and mitigate potential large effects on the benthic environment.

#### *Potential for change in quality or nature of EFH consultations*

NMFS also considered whether the reclassification to ECS would change the quality or nature of EFH consultations. This is a potential result from Outcome 2 and 3 for areas that would remain EFH under Alternative 2, but for which fewer species comprise the combined EFH designation. We consulted with the NMFS Habitat Conservation Division, and the potential for change in the nature of EFH consultations under the proposed action is that the habitat utilization patterns of MUS, and not ECS, would influence NMFS EFH conservation recommendations to offset adverse effects on EFH.

For example, under the proposed action, the consultation on a federal agency's proposed project in Hawaii that occurs within Bottomfish and Crustacean EFH would need to consider the habitat utilization patterns of both remaining MUS species, uku (*Aprion virescns*) and Kona crab, to

determine the level of adverse impact and appropriate EFH conservation recommendations. The uku EFH in the Hawaii is designated as all substrate from the official US shoreline to 240 m depth. The life history information in the FEP describes adult habitat as consisting of the open waters of deep lagoons, channels, or seaward reefs (WPFMC 2016). Uku, unlike the deeper water bottomfish, do not have feeding habits constrained by substrate association (Parrish 1987). EFH for the juvenile and adult life stage of Kona crab is designated as all bottom habitat from the shoreline to 100 m. The life history information in the FEP describes adult Kona crab habitat as sandy bottom habitat at depths between 24 and 115 m (WPFMC 1998). In order to maintain yields of uku and Kona crab and their contribution to a healthy ecosystem, conservation recommendations for a proposed project would reflect the need to protect the open waters of deep lagoons, channels, seaward reefs, and sandy bottoms habitats.

### *Conclusions*

Because NMFS EFH conservation recommendations are advisory in nature, an analysis of what effects could be expected in the absence of NMFS expertise associated with EFH conservation recommendations would be speculative. Agencies act under their own authority to implement EFH conservation recommendations. Any major federal actions with the potential to effect the environment are subject to NEPA review by the acting agency, and it is not within NMFS authority to determine whether the actions of other agencies have significant effects.

Other federal mandates encourage agencies to minimize impacts on the marine environment, including ESA, the Fish and Wildlife Coordination Act, Clean Water Act, and EO 13089. In the absence of EFH conservation recommendations, consultations under Section 7 of the ESA for listed corals in the American Samoa, Guam, and CNMI action areas, and consistency reviews under the Coastal Zone Management Act and significant aquatic site mitigation requirements in all island areas are expected to mitigate the intensity of effects from other agencies and provide similar protections that EFH does. These consultations and requirements would continue to proceed in all regional jurisdictions as they do currently, similar to the EFH consultation requirement for MUS.

#### **4.2.3 Effects on Socio-economic Setting**

As the proposed action is reclassifying some stocks of MUS to ECS and would not change any fishery activities, the proposed action would not affect socio-economic factors (fishing communities, participation in the fishery, environmental justice, cultural, historical and archaeological resources, and revenue) and these topics will not be discussed further.

#### **4.2.4 Effects on Management Setting for Species in the FEPs**

The proposed action would not change management for MUS, but would reduce the number of MUS in the three FEPs, that is, American Samoa from 205 species/families to 11 species; from 227 species/families to 13 species in the Mariana Archipelago; and from 173 species/families to 20 MUS species in Hawaii.

Table 2 lists the final list of MUS species.

Table 2 provides the final list of MUS and Appendix B lists the ECS in each FEP. While ECS would not be subject to ACL specification process or other requirements of FEPs for MUS, under the proposed action, other fisheries management measures would remain (see Table 3. Comparison of Features of the Alternatives).

### *ACLs*

Alternative 2 would remove the requirement for the Council and NMFS to establish ACLs for 561 stocks. The Council process for specifying ACLs entails meetings of advisory groups to quantify uncertainty in scientific assessments, set the acceptable biological catch, and quantify social, economic, ecological, and management uncertainty on the frequency that new scientific information affecting stock reference points becomes available. ACL specifications are required on an annual basis, which can take months of environmental and economic review.

ACLs have not been providing a conservation benefit for the ECS species, for the same reason that this action does not change the conduct of the fisheries or the sustainability of most of the species in the FEPs. This is because when an ACL is reached for stocks not caught predominately in federal waters and not in need of conservation management, NMFS and the Council would lack the authority to implement AMs in state or territorial waters; therefore, fishing mortality on the stock is not necessarily reduced with ACL management as fishing could continue to occur in state/territorial waters. The species remaining on the MUS list are principally caught in federal waters and ACLs would continue to provide conservation and management for MUS. When an ACL is reached, NMFS and the Council can effectively reduce fishing mortality in federal waters and therefore provide a conservation benefit to stocks. ECS would be monitored through the Council's Stock Assessment and Fishery Evaluation (SAFE) reporting process. The Council would monitor catches of ECS to determine whether species are principally caught in federal waters or if catch, effort, biomass, or other data tracked in the SAFE reports indicates a resource concern.

A reduction in the administrative burden associated with setting and monitoring ACLs is a positive outcome from the proposed action. Resources currently dedicated to this process, including staff time for holding advisory body meetings and working groups dedicated to implementing the ACL mechanism, meetings and preparing regulatory packages, expertise on Council advisory bodies, will be redirected toward effective monitoring and management of federal stocks.

### *EFH consultations*

The management change in EFH consultations is not part of the proposed action, but is an outcome associated with approving the proposed reclassification. Federal agencies with actions that may adversely affect EFH must consult with NMFS. As discussed in Section 4.2.2, the total number of consultations is not expected to change because of the proposed action. In determining how to offset adverse impacts to EFH, NMFS and action agencies would focus on



the habitat utilization patterns of MUS only. The nature of EFH consultations would change because fewer MUS remain under Alternative 2, as described in Section 4.2.2.

### **4.3 Potential Cumulative Effects of the Proposed Action**

Cumulative effects refer to the combined effects on the human environment that result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Further, cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. The cumulative effects analysis examines whether the direct and indirect effects of the alternatives considered on a given resource interacts with the direct and indirect effects of other past, present and reasonably foreseeable actions on that same resource to determine the overall, or cumulative effects on that resource.

#### **4.3.1 Cumulative Effects on the Physical and Biological Environment**

The proposed action would result in continued management of all species in the FEPs. NMFS and the Council will continue to specify ACLs and AMs for all MUS, and not for ECS. Our review showed that the change in classification would not result in any change to fishing including location, gear, effort, target species, catch, so the reclassification would not result in effects on the physical and biological environment. Therefore, there is no potential for the reclassification to result in cumulative adverse effects on the environment when considered in the context of past, present and reasonably foreseeable actions by the agency and others.

Recently, NMFS completed a stock assessment for 27 species of coral reef associated fish stocks (Nadon 2017). The assessment results indicate that 11 of the species are currently experiencing overfishing. However, based on analyses described in HT Harvey & Associates (2017), none of the 27 species are predominantly harvested in federal waters, rather, and the majority are caught exclusively in state waters. Because Council recommended measures intended to end or prevent overfishing may not be applicable in state waters, the proposed action would not change the fishery in terms of location, target and non-target species, catch, effort, fishermen participation, gear composition, seasonality, intensity, or bycatch. However, NMFS and the Council would continue to monitor catches of MUS and ECS species. If the fishery expands into federal waters, or co-management with the state and territories become a management option, then the Council could consider reclassifying certain ECS reclassified as MUS.

Armorhead is overfished due to international fishing outside of US jurisdiction and is subject to a moratorium in federal waters within the Hancock Seamounts Ecosystem Management Area northwest of Midway Atoll. Armorhead would remain an MUS; the Hawaii FEP and the proposed action would not interact to reduce the effectiveness of the current moratorium in helping to promote recovery of the stock.

The Council has recommended or is considering a number of proposed fishery management actions. These include proposed changes to the American Samoa longline limited entry permit program; proposed changes to the retention of swordfish in the American Samoa longline fleet; exemptions for longline vessels from the American Samoa Large Vessel Prohibited Area;

development of a framework for implementing domestic catch and effort limits for fish stocks which are managed internationally, and domestic limits for the catch of striped marlin; development of an aquaculture program in the western Pacific; refining precious coral EFH; and updating the non-fishing impacts section of the FEPs. These projects are in the proposal stage and, although NMFS is generally familiar with these future management actions, they have not been evaluated in full. Nevertheless, the proposed action would not interact with these future fisheries actions and aquaculture management programs because the proposed action would not change any fishery managed under the affected FEPs.

In addition to the projects under consideration by the Council, activities by others that are occurring that may affect the same resources or occur in the same areas as demersal fisheries include military training and testing in Hawaii, Guam, and the CNMI; military and merchant marine vessel traffic in all areas; nearshore development; coastal and open ocean aquaculture; state fisheries; and alternative energy development including ocean thermal energy conversion, wave energy, and seawater air conditioning.

We examined the potential for cumulative effects on the physical and biological environment from changes to requirements for federal action agencies to consult on proposed actions that may adversely affect EFH. As described above, the geographic changes would occur in deep areas farther offshore, where not much federal activity occurs. The change is limited to substrate; the water column from the shoreline to the extent to a depth of 1,000 m would remain designated as EFH throughout the EEZ. A number of other review requirements for federal projects would remain in place including NEPA, Clean Water Act, among others.

Because the proposed action would result in fewer species comprising the EFH designations, we examined the potential for future adverse effects related to changes in the basis for EFH consultations. We can look at an example such as a federal proposal affecting a breakwater in Hawaii where there is no critical habitat for listed species. At present, a federal agency that may adversely affect EFH would consult with NMFS. NMFS would review the proposal and provide EFH conservation recommendations to offset adverse effects to EFH. This consultation and advisement process would still remain for all areas with EFH.

#### **4.3.2 Climate Change**

Changes in the environment from increased atmospheric carbon dioxide (CO<sub>2</sub>) concentrations have the potential to affect fisheries in American Samoa, the CNMI, Guam and Hawaii. Effects of climate change may include: sea level rise; increased intensity or frequency of coastal storms and storm surges; changes in rainfall (more or less) that can affect salinity nearshore or increase storm runoff and pollutant discharges into the marine environment; increased temperatures resulting in coral bleaching and hypothermic responses in some marine species (IPCC, 2007). Increased carbon dioxide uptake from increased atmospheric carbon dioxide concentrations can increase ocean acidity, which can disrupt calcium uptake processes in corals, crustaceans, mollusk, reef-building algae, and plankton, among other organisms (Houghton et al. 2001; The Royal Society 2005; Caldeira and Wickett 2005; Doney 2006; Kleypas et al. 2006). Climate change can also lead to changes in ocean circulation patterns, which can affect the availability of prey, migration, survival, and dispersal (Buddemeier et al. 2004). Damage to coastal areas due to storm surge or sea level rises as well as changes to catch rates, migratory patterns, or visible

changes to habitats are among the most likely changes that would be noted first. Climate change has the potential to adversely affect some organisms, while others could benefit from changes in the environment to ensure that the catches are sustainable, regardless of environmental conditions.

Climate change effects on fisheries may be difficult to discern from other impacts; however monitoring of physical conditions and biological resources by a number of agencies will continue to occur and will allow fishery managers to continually make adjustments in fishery management regimes in response to changes in the environment for any alternative. Climate change is not expected to interact with any stocks to result in an effect on stocks once some species are reclassified from MUS to ECS. Catches of all species in the FEP by federal, state, and territorial fisheries would continue to be monitored. NMFS and the Council would continue to specify ACLs and AMs for all stocks remaining as MUS. The Council and NMFS may modify the MUS list in the future to include additional species as needed based on changing conditions and the effects on marine species. The proposed action is not expected to result in a change to the manner in which any of the affected fisheries are conducted. Therefore, continued fishing would not have a cumulatively large and adverse effect on any marine resource despite ongoing change to the environment related to climate change. The proposed action would not result in changes to the consumption of energy by fishermen or changes to emissions from fishing vessels.

For these reasons, climate change, considered in addition to all other factors considered in this EA, would not combine with the proposed measure to result in a large and adverse cumulative effect on American Samoa, Mariana Archipelago, or Hawaii FEP fisheries stocks.

Climate changes would not affect the efficacy of the management improvements that are intended by designating some MUS as ECS. The preferred alternative would result in fewer ACLs and AMs, but is not expected to change the operation of the fisheries or the sustainable management of fisheries.

### **4.3.3 Other Effects**

Potential effects from the proposed action would be limited to the physical and biological resources and the management setting as described above. We do not anticipate these effects from the action to have both beneficial and adverse effects that might result in a significant effect.

Decisions to reclassify MUS to ECS under the proposed action would not establish precedents or narrow decisions about reclassifying MUS in the future, or otherwise change the way NMFS and the Council manage any of the fisheries. The proposed action will support ongoing management in fisheries that are considered sustainable, and would not affect the Council or NMFS' ability to establish effective ACLs or AMs in the future.

## 5 SUMMARY OF POTENTIAL EFFECTS

**Table 11. Summary of potential fishery and fishery management changes and potential effects of the alternatives on fisheries and other resources.**

	<b>Status Quo</b>	<b>Alternative 2</b>
<b>Brief Description of Alternative</b>	No MUS would be reclassified as ECS in any of the three Archipelagic FEPs (American Samoa, Mariana or Hawaii)	Reclassify some MUS as ECS and some would remain as MUS.
<b>Areas affected</b>	American Samoa, Mariana Islands (CNMI and Guam), and Hawaii	American Samoa, Mariana Islands (CNMI and Guam), and Hawaii
<b>Fishery Locations</b>	Federal fisheries occur in waters of the US EEZ in the state of Hawaii and territories of American Samoa and Guam, and the CNMI. State or territorial fisheries generally occur within 3nm from shore in these four areas.	No change.
<b>Highlights of relevant fishery management scheme</b>	<p>MUS are subject to ACLs and AMs.</p> <p>Regulations include requirements for permits, reports, gear markings, prohibitions on certain gear and authorizations.</p> <p>The Council (including NMFS and local fisheries agencies) monitors marine fisheries in the four areas on a regular basis.</p>	<p>MUS would continue to be subject to ACL specifications and AMs. The number of species or stocks that would be subject to ACLs and AMs would be reduced.</p> <p>Most of the existing regulatory management provisions and monitoring would continue to apply to both MUS and ECS.</p>
<b>EFH</b>	<p>NMFS and the Council have designated EFH for all MUS. Table 5 lists the current EFH designations.</p> <p>HAPC is a subset of EFH and comprises areas of special importance to MUS. Table 6 describes HAPC.</p> <p>Federal agencies must consult with NMFS on the potential effects of proposed actions that may adversely affect EFH.</p>	<p>The proposed designation of ECS would not directly affect EFH because the designations would not change the way any fishery is being conducted including location, target and non-target species, catch, effort, fishermen participation, gear composition, seasonality, intensity, or bycatch.</p> <p>NMFS and the Council would continue to designate EFH for all MUS and periodically review EFH designations in accordance with the Magnuson-Stevens Act. Changes in geographic area for EFH and changes to HAPC are described in the EA in section 4.2.2. In the future, the geographic extent of habitat designated as EFH could change, depending on future Council reviews. It would be speculative to try to anticipate what those changes</p>

	<b>Status Quo</b>	<b>Alternative 2</b>
		would be. Federal agencies would conduct site- and project-specific environmental reviews.
<b>Permits</b>	Permits are required to fish for certain stocks or species or in certain areas. These include: MHI non-commercial bottomfish, special coral reef ecosystem fishing, western Pacific precious coral, western Pacific crustaceans, Guam large vessel bottomfish, CNMI bottomfish.	No change. Permits would be required for MUS species reclassified as ECS.
<b>Current and expected fishery outcomes</b>	The affected fisheries are nearshore and EEZ fisheries in all areas including: hand and spear for spiny and slipper lobsters and Kona crab; bottomfish fisheries in all areas including Deep 7 bottomfish fisheries in Hawaii; seamount groundfish fisheries; coral reef ecosystem fisheries (pole and line, spear fishing, and net fishing); and precious coral fisheries.	No change to any fishery including location, target and non-target species, catch, effort, fishermen participation, gear composition, seasonality, intensity, or bycatch.
<b>Effects on the Physical Environment</b>		
<b>Effects on physical parameters (e.g., water and air quality, currents, temperature, salinity, weather patterns)</b>	The physical environment is the oceanic and coastal setting of the four island areas and described in three Archipelagic FEPs.	No change. The proposed action would not change any fishery activity; therefore, this alternative does not have the potential to have effects on the physical environment including on water or air quality, currents, temperature, salinity, or weather patterns.
<b>Effects on the Biological Resources</b>		
<b>Target species, non-target species, bycatch, biodiversity, marine habitat from fishing activities, protected species, and MPAs</b>	All stocks and species in the FEPs are MUS and, therefore, in need of conservation and management. Demersal species and stocks of bottomfish, seamount groundfish, coral reef species, precious corals, and crustaceans are managed under a range of measures described in the FEPs.  Prior analyses developed for setting ACLs and AMs have determined there is no significant impact from these fisheries. Monitoring of fishing and its effects on biodiversity would	No change to the fisheries in any way that would affect catches of target or non-target species, bycatch, biodiversity, marine habitat from fishing activities, or protected species. Monitoring, review by the Council, and research would continue. No change in how fisheries would affect MPAs.

	<b>Status Quo</b>	<b>Alternative 2</b>
	<p>continue through the Council and research programs.</p> <p>All federal fisheries are currently authorized in accordance with all applicable laws.</p> <p>NMFS has previously reviewed effects of fishing activities on MPAs.</p>	
<b>Socio-Economic Effects</b>		
<b>Fishing communities; general participation in the fishery; environmental justice; cultural, historic, and archaeological resources; gross revenue at risk</b>	The FEPs describe the socio-economic factors in American Samoa, Mariana Islands (CNMI and Guam), and Hawaii.	No change to the fisheries and no effect on socio-economic factors.
<b>Management Setting Effects</b>		
<b>ACLs</b>	Annual specification of ACLs and AMs for species that do not have meaningful conservation and management value, and caught primarily in state or territorial waters.	The number of MUS would be reduced: in the American Samoa FEP from 205 species/families to 11 species; from 227 species/families to 13 species in the Marianas FEP; and from 173 species/families to 20 MUS species in the Hawaii FEP.
<b>EFH Consultation</b>	Federal agencies are required to consult with NMFS on project that would potentially effect EFH.	Agencies would no longer be required to consult on projects occurring in the outer reef slopes between 400 and 700 m in the American Samoa and Marianas FEPs management areas, or for habitats within the combined EFH footprint that are not used by MUS. Because the water column is designated as pelagic EFH to a depth of 1,000 m throughout the EEZ, activities occurring in this area would likely trigger a consultation for water column effects. We expect the total number of EFH consultations would remain stable.
<b>Other Potential Effects</b>		
<b>Climate and Adaptation</b>	Changing climate has the potential to affect various fishery species, habitats, and protected species through ocean warming, increase ocean acidification, changes in	No change to fisheries, so there is no potential for cumulative effects on the environment when also considering potential changes to the marine setting.

	<b>Status Quo</b>	<b>Alternative 2</b>
	currents, nutrient cycles, and increased terrestrial inputs from stormwater runoff, to name a few.	Climate changes would not affect the efficacy of the management improvements by designating some MUS as ECS.

## **6 PREPARERS, REVIEWERS, AND COORDINATION WITH OTHERS**

### **6.1 Preparers and Reviewers**

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### **6.2 Coordination with Others**

The proposed action described in this EA was developed in coordination with various Federal, state, and local government agencies that are represented on the Council. Specifically, representatives of the following agencies that participated in the deliberation and development of the proposed management measures include:

- American Samoa Department of Marine and Wildlife Resources
- Guam Department of Agriculture, Division of Aquatic and Wildlife Resources
- Hawaii Department of Land and Natural Resources, Division of Aquatic Resources
- Hawaii Department of Business, Tourism and Development, Coastal Zone Management Program
- Northern Mariana Island Department of Land and Natural Resources, Division of Fish and Wildlife
- US Coast Guard
- US Fish and Wildlife Service
- US Department of State

The amendments, including a draft EA, will be published in the *Federal Register* for a 60-day review period, and coordinated with the Coastal Zone Management Offices of each area.

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## **APPENDIX A. MANAGEMENT UNIT SPECIES AND NATIONAL STANDARD 1 FACTORS**

Appendix A provides the proposed MUS for each area, and the NS1 factors that correspond to each. The Council recommended the MUS lists to NMFS based on the process described in Section 2.1, Development of the Alternatives.

### NS1 Factors

1. The stock is an important component of the marine environment.
2. The stock is caught by the fishery.
3. Whether an FMP can improve or maintain the condition of the stock.
4. The stock is a target of a fishery.
5. The stock is important to commercial, recreational, or subsistence users.
6. The fishery is important to the Nation or to the regional economy.
7. The need to resolve competing interests and conflicts among user groups and whether an FMP can further that resolution.
8. The economic condition of a fishery and whether an FMP can produce more efficient utilization.
9. The needs of a developing fishery, and whether an FMP can foster orderly growth.
10. The extent to which the fishery is already adequately managed by states, by state/federal programs, or by federal regulations pursuant to other FMPs or international commissions, or by industry self-regulation, consistent with the requirements of the Magnuson-Stevens Act and other applicable law.

## Proposed American Samoa MUS

### Bottomfish

Scientific Name	Common Name	Samoan name	Family	NS1 Factors Met
<i>Caranx lugubris</i>	black trevally, jack	tafauli	Carangidae	1,2,4,6,8,9,10
<i>Lethrinus rubrioperculatus</i>	redgill emperor	filoa-paomumu	Lethrinidae	1,2,4,5,6,8,9,10
<i>Aphareus rutilans</i>	red snapper, silvermouth	palu-gutusiliva	Lutjanidae	1,2,4,6,8,9,10
<i>Aprion virescens</i>	grey snapper, jobfish	asoama		1,2,4,5,6,8,9,10
<i>Etelis carbunculus</i>	red snapper	palu malau		1,2,4,6,8,9,10
<i>Etelis coruscans</i>	red snapper	palu-loa		1,2,4,6,8,9,10
<i>Lutjanus kasmira</i>	blueline snapper	savane		1,2,4,5,6,8,9,10
<i>Pristipomoides filamentosus</i>	pink snapper	palu-`ena`ena		1,2,4,6,8,9,10
<i>Pristipomoides flavipinnis</i>	yelloweye snapper	palu-sina		1,2,4,6,8,9,10
<i>Pristipomoides zonatus</i>	snapper	palu-ula, palu-sega		1,2,4,6,8,9,10
<i>Variola louti</i>	lunartail grouper	papa, velo	Serranidae	1,2,4,5,6,8,9,10

## Proposed Mariana MUS

### Bottomfish

Scientific Name	Common Name	Local name Chamorro/Carolinian	Family	NS1 Factors Met
<i>Caranx ignobilis</i>	giant trevally	tarakitu, etam	Carangidae	1,2,4,6,8,10
<i>Caranx lugubris</i>	black trevally, jack	tarakiton attelong, orong		
<i>Lethrinus rubrioperculatus</i>	redgill emperor	mafuti, atigh	Lethrinidae	1,2,4,5,6,8,10
<i>Aphareus rutilans</i>	red snapper, silvermouth	lehi, maroobw	Lutjanidae	1,2,4,6,8,10
<i>Etelis carbunculus</i>	red snapper	buninas agaga', falaghal moroobw		1,2,4,6,8,10
<i>Etelis coruscans</i>	red snapper	abuninas, taighulupegh		1,2,4,6,8,10
<i>Lutjanus kasmira</i>	blueline snapper	funai, saas		1,2,4,5,6,8,10

<i>Pristipomoides auricilla</i>	yellowtail snapper	buninas, falaghal-marooow		1,2,4,6,8,10
<i>Pristipomoides filamentosus</i>	pink snapper	buninas, falaghal-marooow		1,2,4,6,8,10
<i>Pristipomoides flavipinnis</i>	yelloweye snapper	buninas, falaghal-marooow		1,2,4,6,8,10
<i>Pristipomoides sieboldii</i>	pink snapper	NA		1,2,4,6,8,10
<i>Pristipomoides zonatus</i>	snapper	buninas rayao amariyu, falaghal-marooow		1,2,4,6,8,10
<i>Variola louti</i>	lunartail grouper	bueli, bwele	Serranidae	1,2,4,5,6,8,10

## Proposed Hawaii MUS

### Deep 7 Bottomfish

Scientific Name	Common Name	Local Hawaiian Name	Family	NS1 Factors Met
<i>Aphareus rutilans</i>	silverjaw jobfish	lehi	Lutjanidae	1,2,3,4,5,6,8,10
<i>Etelis carbunculus</i>	red snapper	ehu		1,2,3,4,5,6,8,10
<i>Etelis coruscans</i>	longtail snapper	onaga or 'ula'ula koa'e		1,2,3,4,5,6,8,10
<i>Pristipomoides filamentosus</i>	pink snapper	'opakapaka		1,2,3,4,5,6,8,10
<i>Pristipomoides sieboldii</i>	pink snapper	kalekale		1,2,3,4,5,6,8,10
<i>Pristipomoides zonatus</i>	snapper	gindai		1,2,3,4,5,6,8,10
<i>Hyporthodus quernus</i>	sea bass	hapu'upu'u	Serranidae	1,2,3,4,5,6,8,10

### Non-Deep 7 Bottomfish

Scientific Name	Common Name	Local Hawaiian name	Family	NS1 Factors Met
<i>Aprion virescens</i>	gray jobfish	uku	Lutjanidae	1,2,3,4,5,6,8,10

### Precious Corals

Scientific name	Common Name	Family	NS1 Factors Met
<i>Antipathes grandis</i>	Black coral	Antipatheria	1,2,3,4,5,6,8,10
<i>Antipathes griggi</i>	Black coral		1,2,3,4,5,6,8,10
<i>Myriopathes ulex</i>	Black coral		1,2,3,4,5,6,8,10
<i>Hemicorallium laauense</i>	Red coral	Corallidae	Existing regulations
<i>Pleurocorallium secundum</i>	Pink coral		Existing regulations
<i>Acanella</i> spp.	Bamboo coral	Isididae	Existing regulations
<i>Kulamanamana haumea</i>	Gold coral	Parazoanthidae	Existing regulations

### Crustaceans

Scientific name	Common name	Local Hawaiian name	Family name	NS1 Factors Met
<i>Heterocarpus</i> spp.	Deepwater shrimp	NA	Pandalidae	1,2,3,4,5,6,8,10
<i>Ranina ranina</i>	Kona crab	papa‘i kua loa	Raninidae	1,2,3,4,5,6,8,10

### Seamount Groundfish

Scientific name	Common Name	Family	NS1 Factors Met
<i>Beryx splendens</i>	Alfonsin	Berycidae	Existing regulations
<i>Hyperoglyphe japonica</i>	Raftfish	Centrolophidae	Existing regulations
<i>Pentaceros wheeleri</i>	Armorhead	Pentacerotidae	Existing regulations

## APPENDIX B. ECOSYSTEM COMPONENT SPECIES

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## 1 AMERICAN SAMOA ECOSYSTEM COMPONENT SPECIES

### 1.1 Bottomfish Ecosystem Component Species

Scientific Name	Common Name	FAMILY
<i>Caranx ignobilis</i>	giant trevally, jack	Carangidae
<i>Lethrinus amboinensis</i>	ambon emperor	Lethrinidae
<i>Pristipomoides auricilla</i>	yellowtail snapper (goldflag jobfish)	Lutjanidae
<i>Seriola dumerili</i>	amberjack	Carangidae
<i>Etelis sp. (from the PIFSC cruise)</i>	un id bottomfish sp	Lutjanidae
<i>Pristipomoides sieboldii</i>	pink snapper (kalekale)	Lutjanidae
<i>Epinephelus fasciatus</i>	blacktip grouper	Serranidae
	Bottomfish (misc)	

### 1.2 Crustacean Ecosystem Component Species

Scientific Name	Common Name	FAMILY
<i>Panulirus marginatus</i>	spiny lobster	Palinuridae
<i>Panulirus penicillatus</i>	spiny lobster	Palinuridae
<i>Ranina ranina</i>	Kona crab	Raninidae
<b>Scyllaridae</b>	Slipper lobster	Scyllaridae

### 1.3 Precious Coral Ecosystem Component Species

Scientific Name	Common Name	FAMILY
<i>Hemicorallium laauense</i> (prev. <i>Corallium regale</i> )	Pink coral	Coralliidae
<i>Pleurocorallium secundum</i> (prev. <i>Corallium secundum</i> )	Pink coral	Coralliidae
<i>Corallium sp.</i>	Pink or Red Corals	Coralliidae
<i>Acanella sp.</i>	Bamboo coral	Isididae
<i>Lepidisis olapa</i>	Bamboo coral	Isididae
<i>Callogorgia gilberti</i>	Gold Coral	Primnoidae
<i>Calyptrophora sp.</i>	Gold Coral	Primnoidae
<i>Narella sp.</i>	Gold Coral	Primnoidae
<i>Kulamanamana haumeaiae</i> (prev. <i>Gerardia sp.</i> )	Gold Coral	Parazoanthidae
<i>Antipathes griggsi</i> (prev. <i>Antipathes dichotoma</i> )	Black Coral	Antipathidae
<i>Antipathes grandis</i>	Black Coral	Antipathidae
<i>Myriopathes ulex</i> (prev. <i>Antipathes ulex</i> )	Black Coral	Myriopathidae



#### 1.4 Coral Reef Ecosystem Component Species

Regulations specify PHCRT by family level; the known species within each family from WPacFIN data collections are included here for clarity

Scientific Name	Common Name	FAMILY
<i>Acanthurus xanthopterus</i>	Yellowfin surgeonfish	Acanthuridae
<i>Naso hexacanthus</i>	Black tongue unicornfish	Acanthuridae
<i>Naso lituratus</i>	Orangespine unicornfish	Acanthuridae
<i>Caranx sexfasciatus</i>	Bigeye trevally	Carangidae
<i>Elagatis bipinnulata</i>	Rainbow runner	Carangidae
<i>Selar crumenophthalmus</i>	Bigeye scad	Carangidae
<i>Sargocentron melanospilos</i>	Blackspot squirrelfish	Holocentridae
<i>Sargocentron microstoma</i>	Filelined squirrelfish	Holocentridae
<i>Sargocentron xantherythrum</i>	Hawaiian squirrelfish	Holocentridae
<i>Lethrinus xanthochilus</i>	Yellowlip Emperor	Lethrinidae
<i>Etelis radiosus</i>	Scarlet snapper	Lutjanidae
<i>Lutjanus bohar</i>	Twinspot/red snapper	Lutjanidae
<i>Lutjanus gibbus</i>	Humpback snapper	Lutjanidae
<i>Paracaesio stonei</i>	Stone's snapper	Lutjanidae
<i>Hyporthodus octofasciatus</i>	Eightbar grouper	Serranidae
<i>Saloptia powelli</i>	Powell's grouper	Serranidae
<b>Acanthuridae</b>	Surgeonfishes	Acanthuridae
<i>Acanthurus achilles</i>	Achilles tang	Acanthuridae
<i>Acanthurus blochii</i>	Ringtail surgeonfish	Acanthuridae
<i>Acanthurus dussumieri</i>	Eye-striped surgeonfish	Acanthuridae
<i>Acanthurus guttatus</i>	Whitespotted surgeonfish	Acanthuridae
<i>Acanthurus leucopareius</i>	Whitebar surgeonfish	Acanthuridae
<i>Acanthurus lineatus</i>	Blue-banded surgeonfish	Acanthuridae
<i>Acanthurus mata</i>	Elongate surgeonfish	Acanthuridae
<i>Acanthurus nigricans</i>	Whitecheek surgeonfish	Acanthuridae
<i>Acanthurus nigricauda</i>	Blackstreak surgeonfish	Acanthuridae
<i>Acanthurus nigrofuscus</i>	Brown surgeonfish	Acanthuridae
<i>Acanthurus nigroris</i>	Bluelined surgeonfish	Acanthuridae
<i>Acanthurus olivaceus</i>	Orange-spot surgeonfish	Acanthuridae
<i>Acanthurus pyroferus</i>	Mimic surgeonfish	Acanthuridae
<i>Acanthurus sp.</i>	Surgeonfishes/tangs	Acanthuridae
<i>Acanthurus triostegus</i>	Convict tang	Acanthuridae
<i>Ctenochaetus binotatus</i>	Twospot bristletooth	Acanthuridae
<i>Ctenochaetus striatus</i>	Striped bristletooth	Acanthuridae
<i>Ctenochaetus strigosus</i>	Yellow-eyed bristletooth	Acanthuridae
<i>Naso annulatus</i>	Whitemargin unicornfish	Acanthuridae
<i>Naso brachycentron</i>	Humpback unicornfish	Acanthuridae

<i>Naso brevirostris</i>	Spotted unicornfish	Acanthuridae
<i>Naso caesius</i>	Gray unicornfish	Acanthuridae
<i>Naso hexacanthus</i>	Black tongue unicornfish	Acanthuridae
Naso sp.	Naso tang	Acanthuridae
Naso sp.	Unicornfishes (misc)	Acanthuridae
<i>Naso thynnoides</i>	Barred unicornfish	Acanthuridae
<i>Naso tuberosus</i>	Humpnose unicornfish	Acanthuridae
<i>Naso unicornis</i>	Bluespine unicornfish	Acanthuridae
<i>Naso vlamingii</i>	Bignose unicornfish	Acanthuridae
<i>Zebrasoma velifer</i>	Pacific sailfin tang	Acanthuridae
<b>Order Actinaria</b>	Anemones	Multiple families
<b>Order Alcyonacea</b>	Soft corals	Multiple families
<i>Anguilla marmorata</i>	Freshwater eel	Anguillidae
<b>Anomalopidae</b>	Flashlightfishes	Anomalopidae
<b>Antennariidae</b>	Frogfishes	Antennariidae
<b>Apogonidae</b>	Cardinalfish	Apogonidae
<i>Hypoatherina temminckii</i>	Silversides	Atherinidae
<i>Aulostomus chinensis</i>	Trumpetfish	Aulostomidae
<b>Azooxanthellates</b>	Ahermatypic corals	Azooxanthellate
<i>Balistapus undulatus</i>	Orangestripe triggerfish	Balistidae
<b>Balistidae</b>	Triggerfish	Balistidae
<i>Balistoides conspicillum</i>	Clown triggerfish	Balistidae
<i>Balistoides viridescens</i>	Titan triggerfish	Balistidae
<b>Batoidea</b>	Rays	Batoidea
<b>Belonidae</b>	Needlefish	Belonidae
<b>Blenniidae</b>	Blennies	Blenniidae
<b>Bothidae</b>	Flounders	Bothidae
<i>Asterorhombus cocosensis</i>	Angler flatfish	Bothidae
<b>Caesionidae</b>	Fusiliers	Caesionidae
<i>Caesio caerulaurea</i>	Gold banded fusilier	Caesionidae
<b>Carangidae</b>	Jacks and scads	Carangidae
<i>Carangoides coeruleopinnatus</i>	Blue kingfish trevally	Carangidae
<i>Carangoides orthogrammus</i>	Goldspot trevally	Carangidae
<i>Carangoides sp.</i>	Trevally (misc)	Carangidae
<i>Caranx melampygus</i>	Bluefin trevally	Carangidae
<i>Caranx papuensis</i>	Brassy trevally	Carangidae
Caranx sp.	Jacks (misc)	Carangidae
<i>Decapterus sp.</i>	Mackerel scad (opelu)	Carangidae
<i>Scomberoides lysan</i>	Leatherback	Carangidae
<i>Trachinotus blochii</i>	Snubnose pompano	Carangidae
<i>Uraspis secunda</i>	Whitemouth trevally	Carangidae

<b>Caracanthidae</b>	Coral crouchers	Caracanthidae
<b>Carcharhinidae</b>	Reef sharks (misc)	Carcharhinidae
<i>Carcharhinus albimarginatus</i>	Silvertip shark	Carcharhinidae
<i>Carcharhinus amblyrhynchos</i>	Grey reef shark	Carcharhinidae
<i>Carcharhinus galapagensis</i>	Galapagos shark	Carcharhinidae
<i>Carcharhinus melanopterus</i>	Blacktip reef shark	Carcharhinidae
<i>Triaenodon obesus</i>	White tip reef shark	Carcharhinidae
<b>Chaetodontidae</b>	Butterflyfishes	Chaetodontidae
<i>Chaetodon auriga</i>	Butterflyfish (auriga)	Chaetodontidae
<i>Chaetodon ephippium</i>	Saddleback butterflyfish	Chaetodontidae
<i>Chaetodon lunula</i>	Racoon butterflyfish	Chaetodontidae
<i>Chaetodon melannotus</i>	Butterflyfish (melanotic)	Chaetodontidae
<i>Chaetodon sp.</i>	Butterflyfishes (misc)	Chaetodontidae
<i>Chanos chanos</i>	Milkfish	Chanidae
<b>Chlopsidae</b>	Eels	Chlopsidae
<i>Coptodon zillii</i>	Tilapia	Cichlidae
<b>Cirrhitidae</b>	Hawkfishes	Cirrhitidae
<i>Amblycirrhitus bimacula</i>	Two spotted hawkfish	Cirrhitidae
<i>Cirrhitus pinnulatus</i>	Stocky hawkfish	Cirrhitidae
<i>Neocirrhites armatus</i>	Flame hawkfish	Cirrhitidae
<b>Clupeidae</b>	Herrings	Clupeidae
<b>Congridae</b>	Eels	Congridae
<i>Conger cinereus</i>	White eel	Congridae
<i>Conger sp.</i>	Conger eels	Congridae
<b>Cyprinidae</b>	Prettyfins	Cyprinidae
<b>Dasyatididae</b>	Skates	Dasyatididae
<i>Diodon sp.</i>	Porcupinefish	Diodontidae
<b>Echeneidae</b>	Remoras	Echeneidae
<b>Echinoderm</b>	Sea cucumbers and sea urchins	Echinoderm
<b>Engraulidae</b>	Anchovies	Engraulidae
<b>Ephippidae</b>	Batfishes	Ephippidae
<b>Exocoetidae</b>	Flyingfish	Exocoetidae
<i>Fistularia commersonii</i>	Cornetfish	Fistulariidae
<b>Fungiidae</b>	Mushroom corals	Fungiidae
<b>Gerreidae</b>	Mojarras	Gerreidae
<b>Gobiidae</b>	Gobies	Gobiidae
<i>Plectorhinchus sp.</i>	Sweetlips	Haemulidae
<b>Heliopora</b>	Blue corals	Heliopora
<b>Hemiramphidae</b>	Halfbeaks	Hemiramphidae
<b>Holocentridae</b>	Soldierfishes and squirrelfishes	Holocentridae
<i>Myripristis adusta</i>	Bronze soldierfish	Holocentridae

<i>Myripristis amaena</i>	Brick soldierfish	Holocentridae
<i>Myripristis berndti</i>	Bigscale soldierfish	Holocentridae
<i>Myripristis chryseres</i>	Yellowfin soldierfish	Holocentridae
<i>Myripristis hexagona</i>	Double tooth soldierfish	Holocentridae
<i>Myripristis kuntee</i>	Pearly soldierfish	Holocentridae
<i>Myripristis murdjan</i>	Blotcheye soldierfish	Holocentridae
<i>Myripristis pralinia</i>	Scarlet soldierfish	Holocentridae
<i>Myripristis violacea</i>	Violet soldierfish	Holocentridae
<i>Myripristis vittata</i>	Whitetip soldierfish	Holocentridae
<i>Sargocentron caudimaculatum</i>	Tailspot squirrelfish	Holocentridae
<i>Sargocentron diadema</i>	Crown squirrelfish	Holocentridae
<i>Sargocentron punctatissimum</i>	Peppered squirrelfish	Holocentridae
<i>Sargocentron sp.</i>	Squirrelfish	Holocentridae
<i>Sargocentron spiniferum</i>	Saber squirrelfish	Holocentridae
<i>Sargocentron tiere</i>	Bluelined squirrelfish	Holocentridae
<i>Sargocentron tiereoides</i>	Pink squirrelfish	Holocentridae
<i>Sargocentron violaceum</i>	Violet squirrelfish	Holocentridae
<i>Neoniphon aurolineatus</i>	Yellowstriped squirrelfish	Holocentridae
<i>Neoniphon opercularis</i>	Blackfin squirrelfish	Holocentridae
<i>Neoniphon sammara</i>	Sammara squirrelfish	Holocentridae
<i>Kuhlia mugil</i>	Barred flagtail	Kuhliidae
<i>Kuhlia sp.</i>	Mountain bass	Kuhliidae
<b>Kuhliidae</b>	Flagtails	Kuhliidae
<b>Kyphosidae</b>	Rudderfishes (misc)	Kyphosidae
<i>Kyphosus bigibbus</i>	Rudderfish (biggibus)	Kyphosidae
<i>Kyphosus cinerascens</i>	Rudderfish (cinerascens)	Kyphosidae
<i>Kyphosus cornelii</i>	Western drummer	Kyphosidae
<i>Kyphosus sp.</i>	Rudderfish	Kyphosidae
<i>Kyphosus vaigiensis</i>	Lowfin drummer	Kyphosidae
<i>Cheilinus chlorourus</i>	Floral wrasse	Labridae
<i>Cheilinus fasciatus</i>	Harlequin tuskfish	Labridae
<i>Cheilinus sp.</i>	Cheilinus wrasse (misc)	Labridae
<i>Cheilinus trilobatus</i>	Triple tail wrasse	Labridae
<i>Cheilinus undulatus</i>	Cheilinus undulatus	Labridae
<i>Cheilio inermis</i>	Cigar wrasse	Labridae
<i>Gomphosus varius</i>	Bird wrasse	Labridae
<i>Halichoeres hortulanus</i>	Checkerboard wrasse	Labridae
<i>Halichoeres margaritaceus</i>	Weedy surge wrasse	Labridae
<i>Hemigymnus fasciatus</i>	Barred thicklip	Labridae
<i>Hemigymnus melapterus</i>	Blackeye thicklip	Labridae
<i>Iniistius aneitensis</i>	Whitepatch wrasse	Labridae

<b>Labridae</b>	Wrasses (misc)	Labridae
<i>Novaculichthys taeniourus</i>	Rockmover wrasse	Labridae
<i>Oxycheilinus arenatus</i>	Arenatus wrasse	Labridae
<i>Oxycheilinus digramma</i>	Bandcheck wrasse	Labridae
<i>Thalassoma lutescens</i>	Sunset wrasse	Labridae
<i>Thalassoma purpureum</i>	Surge wrasse	Labridae
<i>Thalassoma quinquevittatum</i>	Red ribbon wrasse	Labridae
<i>Thalassoma trilobatum</i>	Christmas wrasse	Labridae
<b>Leiognathidae</b>	Ponyfish	Leiognathidae
<i>Gnathodentex aureolineatus</i>	Goldenline bream	Lethrinidae
<i>Gnathodentex aureolineatus</i>	Yellowspot emperor	Lethrinidae
<i>Gymnocranius grandoculis</i>	Blueline bream	Lethrinidae
<b>Lethrinidae</b>	Emperors (misc)	Lethrinidae
<i>Lethrinus erythracanthus</i>	Orangespot emperor	Lethrinidae
<i>Lethrinus microdon</i>	Longnose emperor	Lethrinidae
<i>Lethrinus miniatus</i>	Sweetlip emperor	Lethrinidae
<i>Monotaxis grandoculis</i>	Bigeye emperor	Lethrinidae
<i>Aphareus furca</i>	Brown jobfish	Lutjanidae
<b>Lutjanidae</b>	Inshore snappers	Lutjanidae
<i>Lutjanus bohar</i>	Twinspot/red snapper	Lutjanidae
<i>Lutjanus fulvus</i>	Yellow margined snapper	Lutjanidae
<i>Lutjanus monostigma</i>	Onespot snapper	Lutjanidae
<i>Lutjanus rufolineatus</i>	Rufous snapper	Lutjanidae
<i>Lutjanus sanguineus</i>	Blood snapper	Lutjanidae
<i>Lutjanus timoriensis</i>	Timor snapper	Lutjanidae
<i>Macolor niger</i>	Black snapper	Lutjanidae
<i>Paracaesio kusakarii</i>	Kusakar's snapper	Lutjanidae
<i>Pristipomoides multidens</i>	Multidens snapper	Lutjanidae
<i>Malacanthus sp.</i>	Tilefishes	Malacanthidae
<i>Millepora sp.</i>	Fire corals	Milleporidae
<i>Masturus lanceolatus</i>	Sunfish	Molidae
<b>Monacanthidae</b>	Filefishes	Monacanthidae
<i>Monodactylus argenteus</i>	Silver batfish	Monodactylidae
<b>Moringuidae</b>	Eels	Moringuidae
<i>Crenimugil crenilabis</i>	Fringelip mullet	Mugilidae
<i>Ellochelon vaigiensis</i>	Diamond scale mullet	Mugilidae
<b>Mugil cephalus</b>	Mulletts	Mugilidae
<i>Neomyxus leuciscus</i>	False mullet	Mugilidae
<b>Mullidae</b>	Goatfish (misc)	Mullidae
<i>Mulloidichthys flavolineatus</i>	Yellowstripe goatfish	Mullidae
<i>Mulloidichthys pfluegeri</i>	Orange goatfish	Mullidae

<i>Mulloidichthys sp.</i>	Yellow goatfishes	Mullidae
<i>Mulloidichthys vanicolensis</i>	Yellowfin goatfish	Mullidae
<i>Parupeneus sp.</i>	Banded goatfish (misc)	Mullidae
<i>Parupeneus barberinus</i>	Dash-and-dot goatfish	Mullidae
<i>Parupeneus ciliatus</i>	White-lined goatfish	Mullidae
<i>Parupeneus cyclostomus</i>	Yellowsaddle goatfish	Mullidae
<i>Parupeneus heptacanthus</i>	Redspot goatfish	Mullidae
<i>Parupeneus indicus</i>	Indian goatfish	Mullidae
<i>Parupeneus insularis</i>	Parupenus insularis	Mullidae
<i>Parupeneus multifasciatus</i>	Multi-barred goatfish	Mullidae
<i>Parupeneus pleurostigma</i>	Side spot goatfish	Mullidae
<i>Parupeneus trifasciatus</i>	Doublebar goatfish	Mullidae
<b>Muraenidae</b>	Eels	Muraenidae
<i>Enchelycore pardalis</i>	Dragon eel	Muraenidae
<i>Gymnothorax flavimarginatus</i>	Yellowmargin moray eel	Muraenidae
<i>Gymnothorax javanicus</i>	Giant moray eel	Muraenidae
<i>Gymnothorax moringa</i>	Spotted moray eels	Muraenidae
<i>Gymnothorax sp.</i>	Moray eels	Muraenidae
<i>Gymnothorax undulatus</i>	Undulated moray eel	Muraenidae
<b>Myliobatidae</b>	Rays	Myliobatidae
<i>Aetobatus narinari</i>	Eagle ray	Myliobatidae
<i>Scolopsis monogramma</i>	Monogram monocle bream	Nemipteridae
<b>Ophichthidae</b>	Eels	Ophichthidae
<b>Ostraciidae</b>	Trunkfishes	Ostraciidae
<b>Pempheridae</b>	Sweepers	Pempheridae
<i>Pempheris sp.</i>	Nurse shark	Pempheridae
<b>Pinguipedidae</b>	Sandperches	Pinguipedidae
<i>Polynemus sp.</i>	Threadfin	Polynemidae
<b>Pomacanthidae</b>	Angelfishes	Pomacanthidae
<i>Centropyge flavissima</i>	Lemonpeel Angelfish	Pomacanthidae
<i>Pomacanthus imperator</i>	Emperor angelfish	Pomacanthidae
<b>Pomacentridae</b>	Damsel-fishes	Pomacentridae
<i>Abudefduf septemfasciatus</i>	Banded sergeant	Pomacentridae
<i>Abudefduf sp.</i>	Sergeant major	Pomacentridae
<i>Dascyllus trimaculatus</i>	Threespot Damselfish	Pomacentridae
<i>Heteropriacanthus cruentatus</i>	Glasseye	Priacanthidae
<b>Priacanthidae</b>	Bigeyes	Priacanthidae
<i>Priacanthus blochii</i>	Paeony bulleye	Priacanthidae
<i>Priacanthus hamrur</i>	Moontail bullseye	Priacanthidae
<i>Priacanthus sp.</i>	Bigeye squirrelfish	Priacanthidae
<b>Pseudochromidae</b>	Dottybacks	Pseudochromidae

<i>Bulbometopon muricatum</i>	Bulbometopon muricatum	Scaridae
<i>Calotomus carolinus</i>	Stareye parrotfish	Scaridae
<i>Hipposcarus longiceps</i>	Longnose parrotfish	Scaridae
<i>Scarus schlegeli</i>	Yellowband parrotfish	Scaridae
<i>Scarus sp.</i>	Parrotfishes (misc)	Scaridae
<i>Gymnosarda unicolor</i>	Dogtooth tuna	Scombridae
<i>Caracanthus maculatus</i>	Coral crouchers	Scorpaenidae
<i>Pterois sp.</i>	Lionfish	Scorpaenidae
<b>Scorpaenidae</b>	Scorpionfishes	Scorpaenidae
<i>Anyperodon leucogrammicus</i>	Slender grouper	Serranidae
<i>Cephalopholis argus</i>	Peacock grouper	Serranidae
<i>Cephalopholis aurantia</i>	Golden hind	Serranidae
<i>Cephalopholis igarashiensis</i>	Ybanded grouper	Serranidae
<i>Cephalopholis sexmaculata</i>	Six-banded grouper	Serranidae
<i>Cephalopholis sonnerati</i>	Tomato grouper	Serranidae
<i>Cephalopholis spiloparaea</i>	Pygmy grouper	Serranidae
<i>Epinephelus hexagonatus</i>	Hexagon grouper	Serranidae
<i>Epinephelus lanceolatus</i>	Giant grouper	Serranidae
<i>Epinephelus longispinis</i>	Longspine grouper	Serranidae
<i>Epinephelus maculatus</i>	Spotted grouper	Serranidae
<i>Epinephelus melanostigma</i>	One-bloch grouper	Serranidae
<i>Epinephelus merra</i>	Honeycomb grouper	Serranidae
<i>Epinephelus miliaris</i>	Netfin grouper	Serranidae
<i>Epinephelus morrhua</i>	Striped grouper	Serranidae
<i>Epinephelus polyphekadion</i>	Smalltooth grouper	Serranidae
<i>Epinephelus sp.</i>	Groupers (misc)	Serranidae
<i>Epinephelus tauvina</i>	Greasy grouper	Serranidae
<i>Epinephelus timorensis</i>	Yellowspot grouper	Serranidae
<i>Plectropomus areolatus</i>	Squaretail grouper	Serranidae
<i>Plectropomus laevis</i>	Saddleback grouper	Serranidae
<i>Plectropomus leopardus</i>	Leopard coral trout	Serranidae
<b>Serranidae</b>	Inshore groupers	Serranidae
<i>Variola albimarginata</i>	White-edged lyretail	Serranidae
<b>Siganidae</b>	Rabbitfish	Siganidae
<i>Siganus argenteus</i>	Forktail rabbitfish	Siganidae
<i>Siganus spinus</i>	Scribbled rabbitfish	Siganidae
<b>Solanderidae</b>	Hydroid corals	Solanderidae
<b>Soleidae</b>	Soles	Soleidae
<i>Sphyraena barracuda</i>	Great barracuda	Sphyraenidae
<i>Sphyraena forsteri</i>	Bigeye barracuda	Sphyraenidae
<i>Sphyraena helleri</i>	Heller's barracuda	Sphyraenidae

<i>Sphyraena qenie</i>	Blackfin barracuda	Sphyraenidae
<i>Sphyraena sp.</i>	Barracudas (misc)	Sphyraenidae
<b>Sphyraenidae</b>	Small barracuda	Sphyraenidae
<b>Sphyrnidae</b>	Hammerhead shark	Sphyrnidae
<b>Stylasteridae</b>	Lace corals	Stylasteridae
<i>Synanceia sp.</i>	Stonefish	Synanceiidae
<b>Syngnathidae</b>	Seahorses	Syngnathidae
<b>Synodontidae</b>	Lizardfish	Synodontidae
<i>Terapon jarbua</i>	Terapon perch	Terapontidae
<i>Zanclus cornutus</i>	Moorish Idol	Zanclidae
	Reef fish (misc)	
	Live rock	
	Algae	
<b>Phylum: Annelids</b>	Segmented worms	Multiple families
<i>Tridacna sp.</i>	Giant clam	Cardiidae
<b>Class Bivalvia</b>	Clams (misc)	Multiple families
<i>Conus sp.</i>	Cone snail	Conidae
<b>Subphylum Crustaceans</b>	Lobsters, shrimps, mantis shrimps, true crabs and hermit crabs	Multiple families
<b>Cucumariidae</b>	Sea cucumber	Cucumariidae
<i>Diadema sp.</i>	Sea urchins (misc)	Diadematidae
<i>Echinothrix diadema</i>	Black sea urchin	Diadematidae
<i>Plebidonax deltoides</i>	Pipi clam	Donacidae
<i>Actinopyga mauritiana</i>	Surf redfish	Holothuriidae
<i>Bohadschia argus</i>	Cubed leopard sea cucumber	Holothuriidae
<i>Bohadschia argus</i>	Leopard sea cucumber	Holothuriidae
<i>Holothuria (Halodeima) atra</i>	Cubed loli	Holothuriidae
<i>Holothuria (Halodeima) atra</i>	Loli	Holothuriidae
<i>Anodontia (Anodontia) edentula</i>	Mangrove clam	Lucinidae
<i>Atrina rigida</i>	Pen shell clam	Pinnidae
<b>Phylum: Porifera</b>	Sponges	Multiple families
<i>Salmacis sp.</i>	White sea urchin	Temnopleuridae
<i>Trochus sp.</i>	Turban snail	Trochidae
<i>Tubipora musica</i>	organpipe corals	Tubipora
<b>Subphylum: Tunicates</b>	Sea squirts	Multiple families
<i>Turbo sp.</i>	Green snails	Turbinidae
	Invertebrates (misc)	
<i>Callistoctopus ornatus</i>	Octopus (ornatus)	Octopodidae
<i>Octopus cyanea</i>	Octopus (cyanea)	Octopodidae
<i>Octopus sp.</i>	Octopus	Octopodidae
<b>Phylum: Mollusca</b>	Clams, oysters, sea snails, sea slugs	Multiple families



Teuthida	Squid	Order: Teuthida
	Red algae	Division: Rhodophyta
	Seaweeds	
<i>Carpilius maculatus</i>	Seven-11 crab	Carpiliidae
<i>Coenobita clypeatus</i>	Hermit crab	Coenobitidae
<b>Grapsidae</b>	Grapsid crab	Grapsidae
<i>Ocypode ceratophthalmus</i>	Pa'a crab	Ocypodidae
<b>Order: Decapoda</b>	Crabs	Multiple families
<b>Order: Decapoda</b>	Small crab	Multiple families
<i>Scylla serrata</i>	Mangrove crab	Portunidae
<i>Parasesarma erythodactylum</i>	Large red crab	Sesarmidae
<b>Order: Zoanthinaria</b>	Soft zoanthid corals	Multiple families

## 2 GUAM ECOSYSTEM COMPONENT SPECIES

### 2.1 Bottomfish Ecosystem Component Species

Scientific Name	Common Name	Family
<i>Epinephelus fasciatus</i>	blacktip grouper	Serranidae
<i>Seriola dumerili</i>	amberjack	Carangidae
<i>Aprion virescens</i>	grey snapper, jobfish	Lutjanidae
<i>Lethrinus amboinensis</i>	ambon emperor	Lethrinidae

### 2.2 Crustacean Ecosystem Component Species

Scientific Name	Common Name	Family
<i>Panulirus marginatus</i>	spiny lobster	Palinuridae
<i>Panulirus penicillatus</i>	spiny lobster	Palinuridae
<i>Heterocarpus sp</i>	deepwater shrimp	Pandalidae
<b>Pandalidae</b>	deepwater shrimp	Pandalidae
<i>Pandalus sp</i>	deepwater shrimp	Pandalidae
<i>Ranina ranina</i>	Kona crab	Raninidae
<b>Scyllaridae</b>	slipper lobster	Scyllaridae

### 2.3 Precious Coral Ecosystem Component Species

Scientific Name	Common Name	Family
<i>Hemicorallium laauense</i> (prev. <i>Corallium regale</i> )	Pink coral	Coralliidae
<i>Pleurocorallium secundum</i> (prev. <i>Corallium secundum</i> )	Pink coral	Coralliidae
<i>Corallium sp.</i>	Pink or Red Corals	Coralliidae
<i>Acanella sp.</i>	Bamboo coral	Isididae
<i>Lepidisis olapa</i>	Bamboo coral	Isididae
<i>Callogorgia gilberti</i>	Gold Coral	Primnoidae
<i>Calyptrophora sp.</i>	Gold Coral	Primnoidae
<i>Narella sp.</i>	Gold Coral	Primnoidae
<i>Kulamanamana haumea</i> (prev. <i>Gerardia sp.</i> )	Gold Coral	Parazoanthidae
<i>Antipathes griggi</i> (prev. <i>Antipathes dichotoma</i> )	Black Coral	Antipathidae
<i>Antipathes grandis</i>	Black Coral	Antipathidae
<i>Myriopathes ulex</i> (prev. <i>Antipathes ulex</i> )	Black Coral	Myriopathidae

## 2.4 Coral Reef Ecosystem Component Species

Regulations specify PHCRT by family level; the known species within each family from WPacFIN data collections are included here for clarity

Scientific Name	Common Name	Family Name
<b>Acanthuridae</b>	Surgeonfishes/tangs	Acanthuridae
<i>Naso hexacanthus</i>	Black tongue unicornfish	Acanthuridae
<i>Naso unicornis</i>	Bluespine unicornfish	Acanthuridae
<i>Carangoides orthogrammus</i>	Goldspot trevally	Carangidae
<i>Caranx melampygus</i>	Bluefin trevally	Carangidae
<i>Caranx sexfasciatus</i>	Bigeye trevally	Carangidae
<i>Elagatis bipinnulata</i>	Rainbow runner	Carangidae
<i>Selar crumenophthalmus</i>	Atulai	Carangidae
<i>Myripristis berndti</i>	Bigscale Soldierfish	Holocentridae
<i>Sargocentron spiniferum</i>	Long-Jawed Squirrelfish	Holocentridae
<i>Lethrinus erythracanthus</i>	Orange-Spotted Emperor	Lethrinidae
<i>Lethrinus olivaceus</i>	Longface Emperor	Lethrinidae
<i>Lethrinus xanthochilus</i>	Yellowlip Emperor	Lethrinidae
<i>Monotaxis grandoculis</i>	Bigeye Emperor	Lethrinidae
<i>Aphareus furca</i>	Silvermouth/Jobfish	Lutjanidae
<i>Lutjanus fulvus</i>	Flametail Snapper	Lutjanidae
<i>Lutjanus gibbus</i>	Humpback Snapper	Lutjanidae
<i>Chlorurus microrhinos</i>	Steephead Parrotfish	Scaridae
<i>Hipposcarus longiceps</i>	Parrotfish	Scaridae
<i>Scarus altipinnis</i>	Fil-Finned Parrotfish	Scaridae
<i>Scarus forsteni</i>	Tricolor Parrotfish	Scaridae
<i>Scarus rubroviolaceus</i>	Parrotfish	Scaridae
<i>Scarus schlegeli</i>	Chevron Parrotfish	Scaridae
<i>Gymnosarda unicolor</i>	Dogtooth Tuna	Scombridae
<i>Variola albimarginata</i>	Whmargin Lyretail Grouper	Serranidae
<i>Acanthurus achilles</i>	Achilles tang	Acanthuridae
<i>Acanthurus bariene</i>	Bariene's surgeonfish	Acanthuridae
<i>Acanthurus blochii</i>	Ringtail surgeonfish	Acanthuridae
<i>Acanthurus chronixis</i>	Chronixis surgeonfish	Acanthuridae
<i>Acanthurus dussumieri</i>	Eye-striped surgeonfish	Acanthuridae
<i>Acanthurus guttatus</i>	Whitespotted surgeonfish	Acanthuridae
<i>Acanthurus leucocheilus</i>	Whitebar surgeonfish	Acanthuridae
<i>Acanthurus leucopareius</i>	Palelipped surgeonfish	Acanthuridae
<i>Acanthurus lineatus</i>	Blue-banded surgeonfish	Acanthuridae
<i>Acanthurus maculiceps</i>	White-Freckled surgeonfish	Acanthuridae
<i>Acanthurus mata</i>	Elongate surgeonfish	Acanthuridae

<i>Acanthurus nigricans</i>	Whitecheek surgeonfish	Acanthuridae
<i>Acanthurus nigricauda</i>	Blackstreak surgeonfish	Acanthuridae
<i>Acanthurus nigrofuscus</i>	Brown surgeonfish	Acanthuridae
<i>Acanthurus nigroris</i>	Bluelined surgeonfish	Acanthuridae
<i>Acanthurus nubilus</i>	Surgeonfish	Acanthuridae
<i>Acanthurus olivaceus</i>	Orangeband surgeonfish	Acanthuridae
<i>Acanthurus pyroferus</i>	Mimic surgeonfish	Acanthuridae
<i>Acanthurus thompsoni</i>	Thomson's surgeonfish	Acanthuridae
<i>Acanthurus triostegus</i>	Convict tang	Acanthuridae
<i>Acanthurus xanthopterus</i>	Yellowfin surgeonfish	Acanthuridae
<i>Ctenochaetus binotatus</i>	Twospot bristletooth	Acanthuridae
<i>Ctenochaetus hawaiiensis</i>	Black surgeonfish	Acanthuridae
<i>Ctenochaetus marginatus</i>	Blue-spotted Bristletooth	Acanthuridae
<i>Ctenochaetus striatus</i>	Striped bristletooth	Acanthuridae
<i>Ctenochaetus strigosus</i>	Yellow-eyed bristletooth	Acanthuridae
<i>Ctenochaetus tominiensis</i>	Tomini's surgeonfish	Acanthuridae
<i>Naso annulatus</i>	Whitemargin unicornfish	Acanthuridae
<i>Naso brachycentron</i>	Humpback unicornfish	Acanthuridae
<i>Naso brevirostris</i>	Spotted unicornfish	Acanthuridae
<i>Naso caesius</i>	Gray unicornfish	Acanthuridae
<i>Naso lituratus</i>	Orangespine unicornfish	Acanthuridae
<i>Naso lopezi</i>	Naso tang	Acanthuridae
<i>Naso thynnoides</i>	Barred unicornfish	Acanthuridae
<i>Naso tuberosus</i>	Humpnose unicornfish	Acanthuridae
<i>Naso vlamingii</i>	Bignose unicornfish	Acanthuridae
<i>Paracanthurus hepatus</i>	Hepatus tang	Acanthuridae
<i>Zebrasoma flavescens</i>	Yellow tang	Acanthuridae
<i>Zebrasoma scopas</i>	Brown tang	Acanthuridae
<i>Zebrasoma velifer</i>	Pacific sailfin tang	Acanthuridae
<b>Order: Actinaria</b>	Anemones	Multiple families
<i>Albula argentea</i>	Bonefish	Albulidae
<i>Albula glossodonta</i>	Indo-Pacific Bonefish	Albulidae
<b>Albulidae</b>	Bonefish	Albulidae
<b>Order: Alcyonacea</b>	Soft corals	Multiple families
<b>Alepisauridae</b>	Lancetfishes	Alepisauridae
<i>Alepisaurus ferox</i>	Lancetfish	Alepisauridae
<b>Ambassidae</b>	Glass Perch	Ambassidae
<i>Ambassis buruensis</i>	Glassie	Ambassidae
<i>Ambassis interrupta</i>	Glassie	Ambassidae
<i>Anguilla bicolor</i>	Freshwater Eel	Anguillidae
<i>Anguilla marmorata</i>	Freshwater Eel	Anguillidae

<b>Anguillidae</b>	Freshwater Eel	Anguillidae
<b>Anomalopidae</b>	Flashlightfish	Anomalopidae
<i>Anomalops katoptron</i>	Flashlightfish	Anomalopidae
<i>Photoblepharon palpebratum</i>	Flashlightfish	Anomalopidae
<b>Antennariidae</b>	Anglerfish	Antennariidae
<i>Antennarius biocellatus</i>	Frogfish	Antennariidae
<i>Antennarius maculatus</i>	Sargassumfish	Antennariidae
<i>Antennarius pictus</i>	Painted Frogfish	Antennariidae
<i>Antennarius randalli</i>	Randall'S Frogfish	Antennariidae
<i>Antennatus analis</i>	Pigmy Frogfish	Antennariidae
<i>Antennatus coccineus</i>	Freckled Frogfish	Antennariidae
<i>Antennatus coccineus</i>	Giant Frogfish	Antennariidae
<i>Antennatus dorehensis</i>	Bandtail Frogfish	Antennariidae
<i>Antennatus nummifer</i>	Spotfin Frogfish	Antennariidae
<i>Antennatus rosaceus</i>	Spiney-Tufted Frogfish	Antennariidae
<i>Antennatus tuberosus</i>	Bandfin Frogfish	Antennariidae
<i>Histrio histrio</i>	Sargassum Fish	Antennariidae
<b>Aploactinidae</b>	Velvetfishes	Aploactinidae
<i>Cocotropus larvatus</i>	Velvetfish	Aploactinidae
<i>Apogon coccineus</i>	Cryptic Cardinalfish	Apogonidae
<i>Apogon doryssa</i>	Longspine Cardinalfish	Apogonidae
<i>Apogon eremeia</i>	Cardinalfish	Apogonidae
<i>Apogon sp.</i>	Cardinalfish	Apogonidae
<i>Apogonichthyoides melas</i>	Black Cardinalfish	Apogonidae
<i>Apogonichthyoides nigripinnis</i>	Cardinalfish	Apogonidae
<i>Apogonichthys ocellatus</i>	Ocellated Cardinalfish	Apogonidae
<i>Apogonichthys perdix</i>	Perdix Cardinalfish	Apogonidae
<b>Apogonidae</b>	Cardinalfishes	Apogonidae
<i>Cheilodipterus artus</i>	Lined Cardinalfish	Apogonidae
<i>Cheilodipterus intermedius</i>	Intermediate Cardinalfish	Apogonidae
<i>Cheilodipterus isostigmus</i>	Cardinalfish	Apogonidae
<i>Cheilodipterus macrodon</i>	Lg-Toothed Cardinalfish	Apogonidae
<i>Cheilodipterus quinquelineatus</i>	5-Lined Cardinalfish	Apogonidae
<i>Cheilodipterus singapurensis</i>	Truncate Cardinalfish	Apogonidae
<i>Fibramia amboinensis</i>	Cardinalfish	Apogonidae
<i>Fibramia lateralis</i>	Inshore Cardinalfish	Apogonidae
<i>Fibramia thermalis</i>	Sangi Cardinalfish	Apogonidae
<i>Foa brachygramma</i>	Bay Cardinalfish	Apogonidae
<i>Foa sp.</i>	Cardinalfish	Apogonidae
<i>Fowleria marmorata</i>	Marbled Cardinalfish	Apogonidae
<i>Fowleria punctulata</i>	Spotcheek Cardinalfish	Apogonidae

<i>Fowleria vaiulae</i>	Cardinalfish	Apogonidae
<i>Fowleria variegata</i>	Variiegated Cardinalfish	Apogonidae
<i>Gymnapogon philippinus</i>	Philippine Cardinalfish	Apogonidae
<i>Gymnapogon urospilotus</i>	Cardinalfish	Apogonidae
<i>Jaydia ellioti</i>	Elliot'S Cardinalfish	Apogonidae
<i>Nectamia bandanensis</i>	Bigeye Cardinalfish	Apogonidae
<i>Nectamia fusca</i>	Guam Cardinalfish	Apogonidae
<i>Nectamia savayensis</i>	Gray Cardinalfish	Apogonidae
<i>Ostorhinchus angustatus</i>	Broad-Striped Cardinalfish	Apogonidae
<i>Ostorhinchus compressus</i>	Ohcre-Striped Cardinalfish	Apogonidae
<i>Ostorhinchus dispar</i>	Redspot Cardinalfish	Apogonidae
<i>Ostorhinchus hartzfeldii</i>	Hartzfeld's cardinalfish	Apogonidae
<i>Ostorhinchus nigrofasciatus</i>	Black-Striped Cardinalfish	Apogonidae
<i>Ostorhinchus notatus</i>	Cardinalfish	Apogonidae
<i>Ostorhinchus novemfasciatus</i>	7-Lined Cardinalfish	Apogonidae
<i>Ostorhinchus sealei</i>	Seale'S Cardinalfish	Apogonidae
<i>Ostorhinchus taeniophorus</i>	Bandfin Cardinalfish	Apogonidae
<i>Pristiapogon exostigma</i>	Eyeshadow Cardinalfish	Apogonidae
<i>Pristiapogon fraenatus</i>	Bridled Cardinalfish	Apogonidae
<i>Pristiapogon kallopterus</i>	Iridescent Cardinalfish	Apogonidae
<i>Pristiapogon taeniopterus</i>	Bandfin Cardinalfish	Apogonidae
<i>Pristicon rhodopterus</i>	Cardinalfish	Apogonidae
<i>Pristicon trimaculatus</i>	3-Spot Cardinalfish	Apogonidae
<i>Pseudamia amblyuroptera</i>	Cardinalfish	Apogonidae
<i>Pseudamia gelatinosa</i>	Cardinalfish	Apogonidae
<i>Pseudamia hayashii</i>	Cardinalfish	Apogonidae
<i>Pseudamia zonata</i>	Cardinalfish	Apogonidae
<i>Pseudamiops gracilicauda</i>	Cardinalfish	Apogonidae
<i>Rhabdamia gracilis</i>	Cardinalfish	Apogonidae
<i>Siphamia fistulosa</i>	Cardinalfish	Apogonidae
<i>Siphamia fuscolineata</i>	Cardinalfish	Apogonidae
<i>Siphamia tubifer</i>	Cardinalfish	Apogonidae
<i>Sphaeramia nematoptera</i>	Cardinalfish	Apogonidae
<i>Sphaeramia orbicularis</i>	Cardinalfish	Apogonidae
<i>Taeniamia biguttata</i>	Twinspot Cardinalfish	Apogonidae
<i>Taeniamia fucata</i>	Orange-Lined Cardinalfish	Apogonidae
<i>Taeniamia zosterophora</i>	Blackbelted Cardinalfish	Apogonidae
<i>Verulux cypselurus</i>	Cardinalfish	Apogonidae
<i>Zapogon evermanni</i>	Evermann'S Cardinalfish	Apogonidae
<i>Zoramia fragilis</i>	Cardinalfish	Apogonidae
<i>Zoramia gilberti</i>	Gilbert'S Cardinalfish	Apogonidae

<i>Zoramia leptacantha</i>	Bluestreak Cardinalfish	Apogonidae
<i>Zoramia perlita</i>	Pearly Cardinalfish	Apogonidae
<b>Atherinidae</b>	Silverside	Atherinidae
<i>Atherinomorus duodecimalis</i>	Tropical Silverside	Atherinidae
<i>Atherinomorus endrachtensis</i>	Striped Silverside	Atherinidae
<i>Atherinomorus lacunosus</i>	Silverside	Atherinidae
<i>Atherinomorus lacunosus</i>	Hardyhead Silverside	Atherinidae
<i>Atherion elymus</i>	Bearded Silverside	Atherinidae
<i>Hypoatherina barnesi</i>	Silverside	Atherinidae
<i>Hypoatherina ovalaua</i>	Silverside	Atherinidae
<i>Hypoatherina temminckii</i>	Silverside	Atherinidae
<i>Stenatherina panatela</i>	Panatella Silverside	Atherinidae
<b>Aulostomidae</b>	Trumpetfish	Aulostomidae
<i>Aulostomus chinensis</i>	Trumpetfish	Aulostomidae
<i>Abalistes stellatus</i>	Starry Triggerfish	Balistidae
<i>Balistapus undulatus</i>	Undulate Triggerfish	Balistidae
<b>Balistidae</b>	Triggerfishes	Balistidae
<i>Balistoides conspicillum</i>	Clown Triggerfish	Balistidae
<i>Balistoides viridescens</i>	Titan Triggerfish	Balistidae
<i>Canthidermis maculata</i>	Rough Triggerfish	Balistidae
<i>Melichthys niger</i>	Black Triggerfish	Balistidae
<i>Melichthys vidua</i>	Pinktail Triggerfish	Balistidae
<i>Odonus niger</i>	Redtooth Triggerfish	Balistidae
<i>Pseudobalistes flavimarginatus</i>	Ymargin Triggerfish	Balistidae
<i>Pseudobalistes fuscus</i>	Blue Triggerfish	Balistidae
<i>Rhinecanthus aculeatus</i>	Picassofish	Balistidae
<i>Rhinecanthus rectangulus</i>	Wedge Picassofish	Balistidae
<i>Rhinecanthus verrucosus</i>	Blackbelly Picassofish	Balistidae
<i>Sufflamen bursa</i>	Scythe Triggerfish	Balistidae
<i>Sufflamen chrysopterum</i>	Halfmoon Triggerfish	Balistidae
<i>Sufflamen fraenatum</i>	Bridle Triggerfish	Balistidae
<i>Xanthichthys auromarginatus</i>	Guildd Triggerfish	Balistidae
<i>Xanthichthys caeruleolineatus</i>	Bluelined Triggerfish	Balistidae
<i>Xanthichthys mento</i>	Crosshatch Triggerfish	Balistidae
<i>Xenobalistes tumidipectoris</i>	Triggerfish	Balistidae
<i>Ablennes hians</i>	Barred Needlefish	Belonidae
<b>Belonidae</b>	Needlefish	Belonidae
<i>Platybelone argalus platyura</i>	Keeled Needlefish	Belonidae
<i>Strongylura incisa</i>	Reef Needlefish	Belonidae
<i>Strongylura leiura</i>	Littoral Needlefish	Belonidae
<i>Tylosurus acus melanotus</i>	Keeled Houndfish	Belonidae

<i>Tylosurus crocodilus</i>	Houndfish	Belontiidae
<b>Berycidae</b>	Lantern-Eye Fish	Berycidae
<i>Beryx decadactylus</i>	Flashlightfish	Berycidae
<i>Alticus arnoldorum</i>	Blenny	Blenniidae
<i>Aspidontus dussumieri</i>	Lance Blenny	Blenniidae
<i>Aspidontus taeniatus</i>	Cleaner Mimic	Blenniidae
<i>Atrosalarias holomelas</i>	Blenny	blenniidae
<i>Blenniella chrysospilos</i>	Blenny	Blenniidae
<i>Blenniella cyanostigma</i>	Blenny	Blenniidae
<i>Blenniella gibbifrons</i>	Blenny	Blenniidae
<i>Blenniella interrupta</i>	Interrupted Rockskipper	Blenniidae
<i>Blenniella paula</i>	Bluedash rockskipper	Blenniidae
<i>Blenniella periophthalmus</i>	Blenny	Blenniidae
<b>Blenniidae</b>	Blennies	Blenniidae
<i>Cirripectes castaneus</i>	Chestnut Blenny	Blenniidae
<i>Cirripectes fuscoguttatus</i>	Spotted Blenny	Blenniidae
<i>Cirripectes perustus</i>	Blenny	Blenniidae
<i>Cirripectes polyzona</i>	Barred Blenny	Blenniidae
<i>Cirripectes quagga</i>	Squiggly Blenny	Blenniidae
<i>Cirripectes stigmaticus</i>	Red-Streaked Blenny	Blenniidae
<i>Cirripectes variolosus</i>	Red-Speckled Blenny	Blenniidae
<i>Ecsenius bandanus</i>	Banda Clown Blenny	Blenniidae
<i>Ecsenius bicolor</i>	Blenny	Blenniidae
<i>Ecsenius opsifrontalis</i>	Blenny	Blenniidae
<i>Ecsenius sellifer</i>	Blenny	Blenniidae
<i>Ecsenius yaeyamaensis</i>	Blenny	Blenniidae
<i>Enchelyurus kraussii</i>	Blenny	Blenniidae
<i>Entomacrodus caudofasciatus</i>	Blenny	Blenniidae
<i>Entomacrodus cymatobiotus</i>	Blenny	Blenniidae
<i>Entomacrodus decussatus</i>	Blenny	Blenniidae
<i>Entomacrodus niuafoouensis</i>	Blenny	Blenniidae
<i>Entomacrodus sealei</i>	Blenny	Blenniidae
<i>Entomacrodus stellifer</i>	Blenny	Blenniidae
<i>Entomacrodus striatus</i>	Blenny	Blenniidae
<i>Entomacrodus thalassinus</i>	Blenny	Blenniidae
<i>Exallias brevis</i>	Blenny	Blenniidae
<i>Glyptoparus delicatulus</i>	Blenny	Blenniidae
<i>Istiblennius bellus</i>	Beautiful Rockskipper	Blenniidae
<i>Istiblennius dussumieri</i>	Streaky Rockskipper	Blenniidae
<i>Istiblennius edentulus</i>	Blenny	Blenniidae
<i>Istiblennius lineatus</i>	Blenny	Blenniidae



<i>Litobranchus fowleri</i>	Blenny	Blenniidae
<i>Meiacanthus anema</i>	Poison-Fang Blenny	Blenniidae
<i>Meiacanthus atrodorsalis</i>	Poison-Fang Blenny	Blenniidae
<i>Meiacanthus ditrema</i>	1-Stripe Poison-Fang Blenny	Blenniidae
<i>Meiacanthus grammistes</i>	Striped Poison-Fang Blenny	Blenniidae
<i>Nannosalarias nativitatis</i>	Combtooth Blenny	Blenniidae
<i>Omobranchus obliquus</i>	Mangrove Blenny	Blenniidae
<i>Omobranchus rotundiceps</i>	Blenny	Blenniidae
<i>Omox biporos</i>	Blenny	Blenniidae
<i>Parenchelyurus hepburni</i>	Blenny	Blenniidae
<i>Petroscirtes breviceps</i>	Blenny	Blenniidae
<i>Petroscirtes mitratus</i>	Blenny	Blenniidae
<i>Petroscirtes thepassii</i>	Blenny	Blenniidae
<i>Petroscirtes variabilis</i>	Blenny	Blenniidae
<i>Petroscirtes xestus</i>	Blenny	Blenniidae
<i>Plagiotremus laudandus</i>	Blenny	Blenniidae
<i>Plagiotremus rhinorhynchus</i>	Red Sabbertooth Blenny	Blenniidae
<i>Plagiotremus tapeinosoma</i>	Blenny	Blenniidae
<i>Praealticus natalis</i>	Blenny	Blenniidae
<i>Praealticus poptae</i>	Blenny	Blenniidae
<i>Rhabdoblennius nitidus</i>	Barred-chin blenny	Blenniidae
<i>Rhabdoblennius rhabdotrachelus</i>	Blenny	Blenniidae
<i>Rhabdoblennius snowi</i>	Blenny	Blenniidae
<i>Salarias alboguttatus</i>	White-spotted blenny	Blenniidae
<i>Salarias fasciatus</i>	Spotted Rock Blenny	Blenniidae
<i>Salarias luctuosus</i>	Blenny	Blenniidae
<i>Salarias segmentatus</i>	Blenny	Blenniidae
<i>Stanulus seychellensis</i>	Blenny	Blenniidae
<i>Xiphasia matsubarai</i>	Blenny	Blenniidae
<i>Asterorhombus intermedius</i>	Flounder	Bothidae
<i>Asterorhombus intermedius</i>	Intermediate Flounder	Bothidae
<b>Bothidae</b>	Flounders	Bothidae
<i>Bothus mancus</i>	Peacock Flounder	Bothidae
<i>Bothus pantherinus</i>	Leopard Flounder	Bothidae
<i>Engyprosopon sp.</i>	Flounder	Bothidae
<i>Bregmaceros nectabanus</i>	Codlet	Bregmacerotidae
<b>Bregmacerotidae</b>	Codlets	Bregmacerotidae
<i>Brosmophyciops pautzkei</i>	Free-Tailed Brotula	Bythitidae
<b>Bythitidae</b>	Livebearing Brotulas	Bythitidae
<i>Dinematichthys iluocoeteoides</i>	Bythitid	Bythitidae

<i>Microbrotula sp</i>	Brotula	Bythitidae
<i>Caesio caerulea</i>	Scissor-Tailed Fusilier	Caesionidae
<i>Caesio cuning</i>	Fusilier	Caesionidae
<i>Caesio lunaris</i>	Lunar Fusilier	Caesionidae
<i>Caesio teres</i>	Yellowback Caesio	Caesionidae
<b>Caesionidae</b>	Fusilier	Caesionidae
<i>Gymnocaesio gymnoptera</i>	Fusilier	Caesionidae
<i>Pterocaesio lativittata</i>	Yellowstreak Fusilier	Caesionidae
<i>Pterocaesio marri</i>	Twinstripe Fusilier	Caesionidae
<i>Pterocaesio pisang</i>	Ruddy Fusilier	Caesionidae
<i>Pterocaesio tessellata</i>	Mosaic Fusilier	Caesionidae
<i>Pterocaesio tile</i>	Bluestreak Fusilier	Caesionidae
<i>Pterocaesio trilineata</i>	3-Striped Fusilier	Caesionidae
<b>Callanthiidae</b>	Goldies	Callanthiidae
<i>Grammatorcynus sp.</i>	Goldies	Callanthiidae
<i>Grammatorcynus sp.</i>	Goldies	Callanthiidae
<i>Anaora tentaculata</i>	Dragonet	Callionymidae
<b>Callionymidae</b>	Dragonets	Callionymidae
<i>Callionymus delicatulus</i>	Delicate Dragonet	Callionymidae
<i>Callionymus enneactis</i>	Mangrove Dragonet	Callionymidae
<i>Callionymus simplicicornis</i>	Simple-Spined Dragonet	Callionymidae
<i>Diplogrammus goramensis</i>	Dragonet	Callionymidae
<i>Neosynchiropus ocellatus</i>	Ocellated Dragonet	Callionymidae
<i>Synchiropus circularis</i>	Circled Dragonet	Callionymidae
<i>Synchiropus laddi</i>	Ladd'S Dragonet	Callionymidae
<i>Synchiropus morrisoni</i>	Morrison'S Dragonet	Callionymidae
<i>Synchiropus sp.</i>	Dragonet	Callionymidae
<i>Synchiropus splendidus</i>	Mandarin Fish	Callionymidae
<i>Antigonia malayana</i>	Boarfish	Caproidae
<b>Caproidae</b>	Boarfishes	Caproidae
<b>Caracanthidae</b>	Coral Crouchers	Caracanthidae
<i>Caracanthus maculatus</i>	Velvetfish	Caracanthidae
<i>Caracanthus unipinna</i>	Velvetfish	Caracanthidae
<i>Alectis ciliaris</i>	Pennantfish/threadfin	Carangidae
<i>Alectis indica</i>	Malabar Trevally	Carangidae
<i>Atule mate</i>	Atulai	Carangidae
<b>Carangidae</b>	Jack (misc)	Carangidae
<i>Carangoides coeruleopinnatus</i>	Blue kingfish trevally	Carangidae
<i>Carangoides coeruleopinnatus</i>	Trevally	Carangidae
<i>Carangoides dinema</i>	Shadow kingfish	Carangidae
<i>Carangoides ferdau</i>	Bar jack	Carangidae

<i>Carangoides fulvoguttatus</i>	Yellow dotted trevally	Carangidae
<i>Carangoides hedlandensis</i>	Headnotch trevally	Carangidae
<i>Carangoides plagiotaenia</i>	Barcheek trevally	Carangidae
<i>Carangoides talamparoides</i>	Jacks (misc)	Carangidae
<i>Caranx papuensis</i>	Brassy trevally	Carangidae
<i>Caranx sp.</i>	Trevally	Carangidae
<i>Decapterus macarellus</i>	Mackerel scad	Carangidae
<i>Decapterus macrosoma</i>	Mackerel scad	Carangidae
<i>Decapterus maruadsi</i>	Round scad	Carangidae
<i>Decapterus russelli</i>	Round scad	Carangidae
<i>Gnathanodon speciosus</i>	Golden trevally	Carangidae
<i>Megalaspis cordyla</i>	Torpedo scad	Carangidae
<i>Naucrates ductor</i>	Pilotfish	Carangidae
<i>Naucratinii</i>	Elagatis, Scomberoides	Carangidae
<i>Scomberoides lysan</i>	Leatherback	Carangidae
<i>Selar boops</i>	Atulai	Carangidae
<i>Seriola rivoliana</i>	Almaco jack	Carangidae
<i>Trachinotus bailloni</i>	Small spotted pompano	Carangidae
<i>Trachinotus blochii</i>	Silver or Snubnose pompano	Carangidae
<b>Tribe Carangini</b>		Carangidae
<i>Ulua mentalis</i>	Mandibular kingfish	Carangidae
<i>Uraspis helvola</i>	Kingfish	Carangidae
<i>Uraspis secunda</i>	Deep trevally	Carangidae
<i>Uraspis uraspis</i>	Whitemouth trevally	Carangidae
<b>Carapidae</b>	Pearlfish	Carapidae
<i>Carapus mourlani</i>	Pearlfish	Carapidae
<i>Encheliophis boraborensis</i>	Pearlfish	Carapidae
<i>Encheliophis gracilis</i>	Pearlfish	Carapidae
<i>Encheliophis homei</i>	Pearlfish	Carapidae
<i>Encheliophis vermicularis</i>	Pearlfish	Carapidae
<i>Onuxodon fowleri</i>	Bivalve Pearlfish	Carapidae
<b>Carcharhinidae</b>	Sharks	Carcharhinidae
<i>Carcharhinus albimarginatus</i>	Carcharhinidae	Carcharhinidae
<i>Carcharhinus amblyrhynchos</i>	Carcharhinidae	Carcharhinidae
<i>Carcharhinus galapagensis</i>	Carcharhinidae	Carcharhinidae
<i>Carcharhinus limbatus</i>	Blackfin Shark	Carcharhinidae
<i>Carcharhinus melanopterus</i>	Carcharhinidae	Carcharhinidae
<i>Galeocerdo cuvier</i>	Tiger Shark	Carcharhinidae
<i>Negaprion acutidens</i>	Lemon Shark	Carcharhinidae
<i>Triaenodon obesus</i>	Reef Whitetip Shark	Carcharhinidae
<i>Aeoliscus strigatus</i>	Shrimpfish	Centriscidae

<b>Centriscidae</b>	Shrimpfishes	Centriscidae
<i>Chaetodon auriga</i>	Threadfin Butterflyfish	Chaetodontidae
<i>Chaetodon baronessa</i>	E Triangular Butterflyfish	Chaetodontidae
<i>Chaetodon bennetti</i>	Bennetts Butterflyfish	Chaetodontidae
<i>Chaetodon burgessi</i>	Burgess' Butterflyfish	Chaetodontidae
<i>Chaetodon citrinellus</i>	Speckled Butterflyfish	Chaetodontidae
<i>Chaetodon ephippium</i>	Saddleback Butterflyfish	Chaetodontidae
<i>Chaetodon flavocoronatus</i>	Ylw-Crn Butterflyfish	Chaetodontidae
<i>Chaetodon kleinii</i>	Kleins Butterflyfish	Chaetodontidae
<i>Chaetodon lineolatus</i>	Lined Butterflyfish	Chaetodontidae
<i>Chaetodon lunula</i>	Racoon Butterflyfish	Chaetodontidae
<i>Chaetodon lunulatus</i>	Redfined Butterflyfish	Chaetodontidae
<i>Chaetodon melannotus</i>	Black-Back Butterflyfish	Chaetodontidae
<i>Chaetodon mertensii</i>	Mertens Butterflyfish	Chaetodontidae
<i>Chaetodon meyeri</i>	Meyer'S Butterflyfish	Chaetodontidae
<i>Chaetodon modestus</i>	Butterflyfish	Chaetodontidae
<i>Chaetodon ocellicaudus</i>	Spot-Tail Butterflyfish	Chaetodontidae
<i>Chaetodon octofasciatus</i>	8-Banded Butterflyfish	Chaetodontidae
<i>Chaetodon ornatissimus</i>	Ornate Butterflyfish	Chaetodontidae
<i>Chaetodon oxycephalus</i>	Spot-Nape Butterflyfish	Chaetodontidae
<i>Chaetodon punctatofasciatus</i>	Spotbnded Butterflyfish	Chaetodontidae
<i>Chaetodon quadrimaculatus</i>	4-Spotted Butterflyfish	Chaetodontidae
<i>Chaetodon rafflesii</i>	Latticed Butterflyfish	Chaetodontidae
<i>Chaetodon reticulatus</i>	Retculted Butterflyfish	Chaetodontidae
<i>Chaetodon semeion</i>	Dotted Butterflyfish	Chaetodontidae
<i>Chaetodon speculum</i>	Oval-Spot Butterflyfish	Chaetodontidae
<i>Chaetodon tinkeri</i>	Tinker'S Butterflyfish	Chaetodontidae
<i>Chaetodon trifascialis</i>	Chevron Butterflyfish	Chaetodontidae
<i>Chaetodon ulietensis</i>	Pac Dblsddl Butterflyfish	Chaetodontidae
<i>Chaetodon unimaculatus</i>	Teardrop Butterflyfish	Chaetodontidae
<i>Chaetodon vagabundus</i>	Vagabond Butterflyfish	Chaetodontidae
<b>Chaetodontidae</b>	Butterflyfish	Chaetodontidae
<i>Coradion chrysozonus</i>	Orangebanded Coralfish	Chaetodontidae
<i>Forcipiger flavissimus</i>	Longnosed Butterflyfish	Chaetodontidae
<i>Forcipiger longirostris</i>	Big Longnose Butterflyfish	Chaetodontidae
<i>Hemitaurichthys polylepis</i>	Pyrimid Butterflyfish	Chaetodontidae
<i>Hemitaurichthys thompsoni</i>	Butterflyfish	Chaetodontidae
<i>Heniochus acuminatus</i>	Longfined Bannerfish	Chaetodontidae
<i>Heniochus chrysostomus</i>	Pennant Bannerfish	Chaetodontidae
<i>Heniochus diphreutes</i>	Bannerfish	Chaetodontidae
<i>Heniochus monoceros</i>	Masked Bannerfish	Chaetodontidae

<i>Heniochus singularius</i>	Singular Butterflyfish	Chaetodontidae
<i>Heniochus varius</i>	Humphead Bannerfish	Chaetodontidae
<i>Champsodon vorax</i>	Gaper	Champsodontidae
<b>Champsodontidae</b>	Gapers	Champsodontidae
<b>Chanidae</b>	Milkfish	Chanidae
<i>Chanos chanos</i>	Milkfish	Chanidae
<b>Chlopsidae</b>	False Moray Eel	Chlopsidae
<i>Kaupichthys atronasmus</i>	Bl-Nostril False Moray	Chlopsidae
<i>Kaupichthys brachychirus</i>	Shortfin False Moray	Chlopsidae
<i>Kaupichthys hyoprорoides</i>	Common False Moray	Chlopsidae
<i>Cichla ocellaris</i>	Peacock Bass	Cichlidae
<b>Cichlidae</b>	Cichlids	Cichlidae
<i>Coptodon zillii</i>	Tilapia	Cichlidae
<i>Oreochromis mossambicus</i>	Tilapia	Cichlidae
<i>Amblycirrhitus bimacula</i>	2-Spot Hawkfish	Cirrhitidae
<i>Cirrhitichthys aprinus</i>	Threadfin Hawkfish	Cirrhitidae
<i>Cirrhitichthys falco</i>	Falco'S Hawkfish	Cirrhitidae
<i>Cirrhitichthys oxycephalus</i>	Pixy Hawkfish	Cirrhitidae
<b>Cirrhitidae</b>	Hawkfish	Cirrhitidae
<i>Cirrhitus pinnulatus</i>	Stocky Hawkfish	Cirrhitidae
<i>Cyprinocirrhites polyactis</i>	Swallowtail Hawkfish	Cirrhitidae
<i>Isocirrhites sexfasciatus</i>	6-Band Hawkfish	Cirrhitidae
<i>Neocirrhites armatus</i>	Flame Hawkfish	Cirrhitidae
<i>Oxycirrhites typus</i>	Longnose Hawkfish	Cirrhitidae
<i>Paracirrhites arcatus</i>	Arc-Eyed Hawkfish	Cirrhitidae
<i>Paracirrhites forsteri</i>	Freckeled Hawkfish	Cirrhitidae
<i>Paracirrhites hemistictus</i>	Whitespot Hawkfish	Cirrhitidae
<i>Clarias batrachus</i>	Air-Breath Catfish	Clariidae
<i>Clarias macrocephalus</i>	Air-Breath Catfish	Clariidae
<b>Clariidae</b>	Air-Breath Catfish	Clariidae
<i>Amblygaster clupeioides</i>	Blue Pilchard	Clupeidae
<i>Amblygaster sirm</i>	Spotted Pilchard	Clupeidae
<b>Clupeidae</b>	Herring,Sprat,Sardines	Clupeidae
<i>Herklotsichthys quadrimaculatus</i>	Gold Spot Herring	Clupeidae
<i>Spratelloides delicatulus</i>	Blue Sprat	Clupeidae
<i>Spratelloides gracilis</i>	Silver Sprat	Clupeidae
<i>Ariosoma fasciatum</i>	Barred Sand Conger	Congridae
<i>Ariosoma scheelei</i>	Scheele'S Conger	Congridae
<i>Blachea xenobranchialis</i>	Conger Eel	Congridae
<i>Conger cinereus</i>	White Eel	Congridae

<i>Conger oligoporus</i>	Conger Eel	Congridae
<i>Conger sp.</i>	Conger Eel	Congridae
<b>Congridae</b>	White, Conger, Garden Eel	Congridae
<i>Gorgasia preclara</i>	Orange-Barred Garden Eel	Congridae
<i>Gorgasia sp</i>	Conger Eel	Congridae
<i>Heteroconger hassi</i>	Conger Eel	Congridae
<i>Chalixodytes tauensis</i>	Saddled Sandburrer	Creediidae
<b>Creediidae</b>	Sand Burrowers	Creediidae
<i>Limnichthys nitidus</i>	Sand Burrower	Creediidae
<i>Dactyloptena orientalis</i>	Flying Gurnard	Dactylopteridae
<i>Dactyloptena peterseni</i>	Flying Gurnard	Dactylopteridae
<b>Dactylopteridae</b>	Flying Gurnard	Dactylopteridae
<b>Dasyatidae</b>	Stingray	Dasyatidae
<i>Himantura fai</i>	Whipray	Dasyatidae
<i>Himantura granulata</i>	Wh Tail Whipray	Dasyatidae
<i>Himantura uarnak</i>	Leopard Ray	Dasyatidae
<i>Neotrygon kuhlii</i>	Blue-Spotted Sting Ray	Dasyatidae
<i>Pastinachus sephen</i>	Shortsnouted Ray	Dasyatidae
<i>Taeniurops meyeri</i>	Giant Reef Ray	Dasyatidae
<i>Urogymnus asperrimus</i>	Porcupine Ray	Dasyatidae
<i>Diodon eydouxii</i>	Porcupinefish	Diodontidae
<i>Diodon hystrix</i>	Porcupinefish	Diodontidae
<i>Diodon liturosus</i>	Porcupinefish	Diodontidae
<b>Diodontidae</b>	Porcupinefish	Diodontidae
<i>Dussumieria elopsoides</i>	Sprat	Dussumieriidae
<i>Dussumieria sp</i>	Sprats	Dussumieriidae
<b>Echeneidae</b>	Diskfishes	Echeneidae
<i>Echeneis naucrates</i>	Remora	Echeneidae
<i>Phtheirichthys lineatus</i>	Slender Suckerfish	Echeneidae
<i>Remora osteochir</i>	Remora	Echeneidae
<i>Remora remora</i>	Remora	Echeneidae
<b>Echinorhinidae</b>	Bramble Shark	Echinorhinidae
<i>Echinorhinus brucus</i>	Bramble Shark	Echinorhinidae
<i>Echinorhinus cookei</i>	Bramble Shark	Echinorhinidae
<i>Butis amboinensis</i>	Gudgeon	Eleotridae
<i>Calumia godeffroyi</i>	Sleeper	Eleotridae
<b>Eleotridae</b>	Sleepers	Eleotridae
<i>Eleotris fusca</i>	Gudgeon	Eleotridae
<i>Giuris margaritacea</i>	Sleeper	Eleotridae
<i>Ophiocara porocephala</i>	Sleeper	Eleotridae
<i>Oxyeleotris lineolata</i>	Sleeper	Eleotridae

<b>Emmelichthyidae</b>	Bonnet Mouths	Emmelichthyidae
<i>Emmelichthys karnellai</i>	Bonnetmouth	Emmelichthyidae
<i>Erythrocles scintillans</i>	Bonnetmouth	Emmelichthyidae
<i>Encrasicholina devisi</i>	Gold Anchovy	Engraulidae
<i>Encrasicholina heteroloba</i>	Blue Anchovy	Engraulidae
<i>Encrasicholina punctifer</i>	Oceanic Anchovy	Engraulidae
<b>Engraulidae</b>	Anchovies	Engraulidae
<i>Stolephorus apiensis</i>	Samoan Anchovy	Engraulidae
<i>Stolephorus indicus</i>	Indian Anchovy	Engraulidae
<i>Stolephorus insularis</i>	Gold Esurine Anchovy	Engraulidae
<i>Stolephorus multibranchus</i>	Caroline Islands Anchovy	Engraulidae
<i>Stolephorus pacificus</i>	West Pacific Anchovy	Engraulidae
<i>Stolephorus sp.</i>	Anchovy	Engraulidae
<i>Thryssa baelama</i>	Little Priest	Engraulidae
<b>Ephippidae</b>	Batfish	Ephippidae
<i>Platax orbicularis</i>	Batfish	Ephippidae
<i>Platax pinnatus</i>	Pinnate Spadefish	Ephippidae
<i>Platax teira</i>	Longfin Spadefish	Ephippidae
<i>Etmopterus pusillus</i>	Spiny Dogfish shark	Etmopteridae
<i>Cheilopogon spilopterus</i>	Flying Fish	Exocoetidae
<i>Cheilopogon spilopterus</i>	Flying Fish	Exocoetidae
<i>Cheilopogon unicolor</i>	Flying Fish	Exocoetidae
<i>Cypselurus angusticeps</i>	Flying Fish	Exocoetidae
<i>Cypselurus poecilopterus</i>	Flying Fish	Exocoetidae
<b>Exocoetidae</b>	Flying Fish	Exocoetidae
<i>Exocoetus volitans</i>	Flying Fish	Exocoetidae
<i>Hirundichthys speculiger</i>	Flying Fish	Exocoetidae
<i>Parexocoetus brachypterus</i>	Flying Fish	Exocoetidae
<i>Parexocoetus mento</i>	Flying Fish	Exocoetidae
<i>Prognichthys albimaculatus</i>	Flying Fish	Exocoetidae
<i>Prognichthys sealei</i>	Flying Fish	Exocoetidae
<i>Fistularia commersonii</i>	Cornetfish	Fistulariidae
<b>Fistulariidae</b>	Cornetfish	Fistulariidae
<b>Fungiidae</b>	Mushroom corals	Fungiidae
<b>Gerreidae</b>	Mojarras	Gerreidae
<i>Gerres erythrourus</i>	Deep-Bodied Mojarra	Gerreidae
<i>Gerres filamentosus</i>	Filamentous Mojarra	Gerreidae
<i>Gerres filamentosus</i>	Mojarra	Gerreidae
<i>Gerres longirostris</i>	Common Mojarra	Gerreidae
<i>Gerres oblongus</i>	Oblong Mojarra	Gerreidae
<i>Gerres oyena</i>	Oyena Mojarra	Gerreidae

<i>Gigantura indica</i>	Telescopefish	Giganturidae
<b>Giganturidae</b>	Telescopefish	Giganturidae
<i>Nebrius ferrugineus</i>	Nurse Shark	Ginglymostomatidae
<b>Gobiesocidae</b>	Clingfish	Gobiesocidae
<i>Lepadichthys caritus</i>	Clingfish	Gobiesocidae
<i>Lepadichthys minor</i>	Clingfish	Gobiesocidae
<i>Liobranchia stria</i>	Clingfish	Gobiesocidae
<i>Amblyeleotris fasciata</i>	Goby	Gobiidae
<i>Amblyeleotris fontanesii</i>	Goby	Gobiidae
<i>Amblyeleotris guttata</i>	Goby	Gobiidae
<i>Amblyeleotris periophthalma</i>	Prawn Goby	Gobiidae
<i>Amblyeleotris randalli</i>	Goby	Gobiidae
<i>Amblyeleotris steinitzi</i>	Brown-Barred Goby	Gobiidae
<i>Amblyeleotris wheeleri</i>	Bluespotted Goby	Gobiidae
<i>Amblygobius decussatus</i>	Goby	Gobiidae
<i>Amblygobius linki</i>	Link's goby	Gobiidae
<i>Amblygobius nocturnus</i>	Goby	Gobiidae
<i>Amblygobius phalaena</i>	Goby	Gobiidae
<i>Amblygobius sp</i>	Goby	Gobiidae
<i>Asterropteryx ensifera</i>	Goby	Gobiidae
<i>Asterropteryx semipunctata</i>	Bluespotted goby	Gobiidae
<i>Austrolethops wardi</i>	Goby	Gobiidae
<i>Awaous grammepomus</i>	Goby	Gobiidae
<i>Awaous guamensis</i>	Goby	Gobiidae
<i>Bathygobius cocosensis</i>	Goby	Gobiidae
<i>Bathygobius cotticeps</i>	Goby	Gobiidae
<i>Bathygobius fuscus</i>	Goby	Gobiidae
<i>Bryaninops amplus</i>	Goby	Gobiidae
<i>Bryaninops erythrops</i>	Goby	Gobiidae
<i>Bryaninops natans</i>	Goby	Gobiidae
<i>Bryaninops ridens</i>	Goby	Gobiidae
<i>Bryaninops yongei</i>	Goby	Gobiidae
<i>Cabillus tongarevae</i>	Goby	Gobiidae
<i>Callogobius bauchotae</i>	Goby	Gobiidae
<i>Callogobius centrolepis</i>	Goby	Gobiidae
<i>Callogobius hasseltii</i>	Goby	Gobiidae
<i>Callogobius maculipinnis</i>	Goby	Gobiidae
<i>Callogobius okinawae</i>	Goby	Gobiidae
<i>Callogobius plumatus</i>	Goby	Gobiidae
<i>Callogobius sclateri</i>	Goby	Gobiidae
<i>Callogobius sp.</i>	Goby	Gobiidae



<i>Cristatogobius sp</i>	Goby	Gobiidae
<i>Cryptocentroides insignis</i>	Goby	Gobiidae
<i>Cryptocentrus caeruleomaculatus</i>	Goby	Gobiidae
<i>Cryptocentrus cinctus</i>	Goby	Gobiidae
<i>Cryptocentrus leptocephalus</i>	Goby	Gobiidae
<i>Cryptocentrus sp.</i>	Goby	Gobiidae
<i>Cryptocentrus strigiliceps</i>	Goby	Gobiidae
<i>Cryptocentrus strigiliceps</i>	Goby	Gobiidae
<i>Ctenogobiops aurocingulus</i>	Goby	Gobiidae
<i>Ctenogobiops feroculus</i>	Goby	Gobiidae
<i>Ctenogobiops pomastictus</i>	Goby	Gobiidae
<i>Ctenogobiops tangaroai</i>	Long-Finned Prwn Goby	Gobiidae
<i>Eviota afelei</i>	Kawakawa	Gobiidae
<i>Eviota albolineata</i>	Herring	Gobiidae
<i>Eviota bifasciata</i>	Goby	Gobiidae
<i>Eviota cometa</i>	Goby	Gobiidae
<i>Eviota distigma</i>	Goby	Gobiidae
<i>Eviota fasciola</i>	Goby	Gobiidae
<i>Eviota herrei</i>	Goby	Gobiidae
<i>Eviota infulata</i>	Goby	Gobiidae
<i>Eviota lachdeberei</i>	Goby	Gobiidae
<i>Eviota latifasciata</i>	Goby	Gobiidae
<i>Eviota melasma</i>	Goby	Gobiidae
<i>Eviota nebulosa</i>	Goby	Gobiidae
<i>Eviota pellucida</i>	Goby	Gobiidae
<i>Eviota prasina</i>	Goby	Gobiidae
<i>Eviota prasites</i>	Goby	Gobiidae
<i>Eviota punctulata</i>	Goby	Gobiidae
<i>Eviota queenslandica</i>	Goby	Gobiidae
<i>Eviota saipanensis</i>	Goby	Gobiidae
<i>Eviota sebreei</i>	Goby	Gobiidae
<i>Eviota sigillata</i>	Goby	Gobiidae
<i>Eviota smaragdus</i>	Goby	Gobiidae
<i>Eviota sp.</i>	Goby	Gobiidae
<i>Eviota sparsa</i>	Goby	Gobiidae
<i>Eviota storthynx</i>	Goby	Gobiidae
<i>Eviota zonura</i>	Goby	Gobiidae
<i>Exyrias belissimus</i>	Goby	Gobiidae
<i>Exyrias puntang</i>	Goby	Gobiidae
<i>Fusigobius longispinus</i>	Goby	Gobiidae

<i>Fusigobius neophytus</i>	Goby	Gobiidae
<i>Fusigobius signipinnis</i>	Goby	Gobiidae
<i>Gladiogobius ensifer</i>	Goby	Gobiidae
<i>Glossogobius celebius</i>	Goby	Gobiidae
<i>Glossogobius giuris</i>	Goby	Gobiidae
<i>Gnatholepis anjerensis</i>	Goby	Gobiidae
<i>Gnatholepis cauerensis</i>	Goby	Gobiidae
<i>Gnatholepis cauerensis</i>	Eyebar goby	Gobiidae
<i>Gnatholepis sp</i>	Goby	Gobiidae
<b>Gobiidae</b>	Goby	Gobiidae
<i>Gobiodon albofasciatus</i>	Goby	Gobiidae
<i>Gobiodon citrinus</i>	Goby	Gobiidae
<i>Gobiodon okinawae</i>	Goby	Gobiidae
<i>Gobiodon quinquestrigatus</i>	Goby	Gobiidae
<i>Gobiodon rivulatus</i>	Goby	Gobiidae
<i>Gobiopsis bravoii</i>	Goby	Gobiidae
<i>Gobius bontii</i>	Goby	Gobiidae
<i>Heteroleotris sp</i>	Goby	Gobiidae
<i>Istigobius decoratus</i>	Goby	Gobiidae
<i>Istigobius ornatus</i>	Goby	Gobiidae
<i>Istigobius rigilius</i>	Goby	Gobiidae
<i>Istigobius spence</i>	Goby	Gobiidae
<i>Kelloggella cardinalis</i>	Goby	Gobiidae
<i>Kelloggella quindecimfasciata</i>	Goby	Gobiidae
<i>Koumansetta hectori</i>	Goby	Gobiidae
<i>Koumansetta rainfordi</i>	Goby	Gobiidae
<i>Lotilia graciliosa</i>	Goby	Gobiidae
<i>Macrodontogobius wilburi</i>	Goby	Gobiidae
<i>Mahidolia mystacina</i>	Goby	Gobiidae
<i>Mugilogobius tagala</i>	Goby	Gobiidae
<i>Mugilogobius villa</i>	Goby	Gobiidae
<i>Oplopomops diacanthus</i>	Goby	Gobiidae
<i>Oplopomus oplopomus</i>	Goby	Gobiidae
<i>Opua nephodes</i>	Goby	Gobiidae
<i>Oxyurichthys guibei</i>	Goby	Gobiidae
<i>Oxyurichthys microlepis</i>	Goby	Gobiidae
<i>Oxyurichthys ophthalmonema</i>	Goby	Gobiidae
<i>Oxyurichthys papuensis</i>	Goby	Gobiidae
<i>Oxyurichthys tentacularis</i>	Goby	Gobiidae
<i>Palutrus pruinosa</i>	Goby	Gobiidae
<i>Palutrus reticularis</i>	Goby	Gobiidae

<i>Pandaka sp</i>	Goby	Gobiidae
<i>Paragobiodon echinocephalus</i>	Goby	Gobiidae
<i>Paragobiodon lacunicolus</i>	Goby	Gobiidae
<i>Paragobiodon melanosomus</i>	Goby	Gobiidae
<i>Paragobiodon modestus</i>	Goby	Gobiidae
<i>Paragobiodon xanthosoma</i>	Goby	Gobiidae
<i>Periophthalmus argentilineatus</i>	Goby	Gobiidae
<i>Periophthalmus kalolo</i>	Goby	Gobiidae
<i>Pleurosicya bilobata</i>	Goby	Gobiidae
<i>Pleurosicya carolinensis</i>	Caroline Ghost Goby	Gobiidae
<i>Pleurosicya coerulea</i>	Blue Coral Ghost Goby	Gobiidae
<i>Pleurosicya fringilla</i>	Fringed Ghost Goby	Gobiidae
<i>Pleurosicya micheli</i>	Michael'S Ghost Goby	Gobiidae
<i>Pleurosicya mossambica</i>	Common Ghost Goby	Gobiidae
<i>Pleurosicya muscarum</i>	Goby	Gobiidae
<i>Pleurosicya plicata</i>	Plicata Ghost Goby	Gobiidae
<i>Priolepis cincta</i>	Goby	Gobiidae
<i>Priolepis farcimen</i>	Goby	Gobiidae
<i>Priolepis inhaca</i>	Goby	Gobiidae
<i>Priolepis semidoliata</i>	Goby	Gobiidae
<i>Psammogobius biocellatus</i>	Goby	Gobiidae
<i>Pseudogobius javanicus</i>	Goby	Gobiidae
<i>Redigobius bikolanus</i>	Goby	Gobiidae
<i>Redigobius bikolanus</i>	Goby	Gobiidae
<i>Redigobius tambujon</i>	Goby	Gobiidae
<i>Sicyopterus macrostetholepis</i>	Goby	Gobiidae
<i>Sicyopterus micrurus</i>	Goby	Gobiidae
<i>Sicyopterus sp</i>	Goby	Gobiidae
<i>Sicyopus sp</i>	Goby	Gobiidae
<i>Sicyopus zosterophorus</i>	Goby	Gobiidae
<i>Signigobius biocellatus</i>	Goby	Gobiidae
<i>Silhouettea sp</i>	Goby	Gobiidae
<i>Smilosicyopus leprurus</i>	Goby	Gobiidae
<i>Stenogobius genivittatus</i>	Goby	Gobiidae
<i>Stenogobius sp</i>	Goby	Gobiidae
<i>Stiphodon elegans</i>	Goby	Gobiidae
<i>Stiphodon sp</i>	Goby	Gobiidae
<i>Taenioides limicola</i>	Goby	Gobiidae
<i>Tomiyamichthys lanceolatus</i>	Goby	Gobiidae
<i>Trimma caesiura</i>	Goby	Gobiidae
<i>Trimma naudei</i>	Goby	Gobiidae

<i>Trimma okinawae</i>	Goby	Gobiidae
<i>Trimma sp.</i>	Goby	Gobiidae
<i>Trimma sp.</i>	Goby	Gobiidae
<i>Trimma taylori</i>	Goby	Gobiidae
<i>Trimma tevegae</i>	Goby	Gobiidae
<i>Trimmatom eviotops</i>	Goby	Gobiidae
<i>Valenciennesa muralis</i>	Glass Goby	Gobiidae
<i>Valenciennesa parva</i>	Parva Goby	Gobiidae
<i>Valenciennesa puellaris</i>	Goby	Gobiidae
<i>Valenciennesa sexguttata</i>	Goby	Gobiidae
<i>Valenciennesa sp</i>	Goby	Gobiidae
<i>Valenciennesa strigata</i>	Goby	Gobiidae
<i>Vanderhorstia ambanoro</i>	Goby	Gobiidae
<i>Vanderhorstia ornatissima</i>	Goby	Gobiidae
<i>Diplphos sp</i>	Bristlemouth	Gonostomatidae
<i>Gonostoma atlanticum</i>	Bristlemouth	Gonostomatidae
<b>Gonostomatidae</b>	Bristlemouths	Gonostomatidae
<i>Sigmops ebelingi</i>	Bristlemouth	Gonostomatidae
<i>Diagramma pictum</i>	Slatey Sweetlips	Haemulidae
<b>Haemulidae</b>	Sweetlips	Haemulidae
<i>Plectorhinchus albovittatus</i>	2-Lined Sweetlips	Haemulidae
<i>Plectorhinchus chaetodonoides</i>	Harlequin Sweetlips	Haemulidae
<i>Plectorhinchus chrysotaenia</i>	Celebes Sweetlips	Haemulidae
<i>Plectorhinchus flavomaculatus</i>	Sweetlip	Haemulidae
<i>Plectorhinchus gibbosus</i>	Gibbus Sweetlips	Haemulidae
<i>Plectorhinchus lessonii</i>	Lined Sweetlips	Haemulidae
<i>Plectorhinchus lineatus</i>	Goldman'S Sweetlips	Haemulidae
<i>Plectorhinchus obscurus</i>	Giant Sweetlips	Haemulidae
<i>Plectorhinchus picus</i>	Spotted Sweetlips	Haemulidae
<i>Plectorhinchus sp</i>	Sweetlip	Haemulidae
<i>Plectorhinchus vittatus</i>	Oriental Sweetlips	Haemulidae
<i>Pomadasys kaakan</i>	Common Javelinefish	Haemulidae
<b>Genus: Heliopora</b>	Blue corals	Genus: Heliopora
<i>Euleptorhamphus viridis</i>	Ribbon Halfbeak	Hemiramphidae
<b>Hemiramphidae</b>	Halfbeak	Hemiramphidae
<i>Hemiramphus archipelagicus</i>	Halfbeak	Hemiramphidae
<i>Hemiramphus far</i>	Halfbeak	Hemiramphidae
<i>Hemiramphus lutkei</i>	Halfbeak	Hemiramphidae
<i>Hyporhamphus acutus</i>	Halfbeak	Hemiramphidae
<i>Hyporhamphus affinis</i>	Halfbeak	Hemiramphidae
<i>Hyporhamphus dussumieri</i>	Halfbeak	Hemiramphidae

<i>Oxyporhamphus micropterus</i>	Smallwing Flying Fish	Hemiramphidae
<i>Zenarchopterus dispar</i>	Esturine Halfbeak	Hemiramphidae
<b>Holocentridae</b>	Squirrel,Soldierfishes	Holocentridae
<i>Holocentrus adscensionis</i>	Furcate Squirrelfish	Holocentridae
<i>Myripristis adusta</i>	Bronze Soldierfish	Holocentridae
<i>Myripristis amaena</i>	Brick Soilderfish	Holocentridae
<i>Myripristis amaena</i>	Doubletooth Soldierfish	Holocentridae
<i>Myripristis chryseres</i>	Yellowfin Soldierfish	Holocentridae
<i>Myripristis kuntee</i>	Pearly Soldierfish	Holocentridae
<i>Myripristis murdjan</i>	Red Soldierfish	Holocentridae
<i>Myripristis pralinia</i>	Scarlet Soldierfish	Holocentridae
<i>Myripristis violacea</i>	Violet Soldierfish	Holocentridae
<i>Myripristis vittata</i>	White-Tipped Soldierfish	Holocentridae
<i>Myripristis woodsi</i>	White-Spot Soldierfish	Holocentridae
<i>Neoniphon argenteus</i>	Clearfin Squirrelfish	Holocentridae
<i>Neoniphon aurolineatus</i>	Yellowstriped Squirrelfish	Holocentridae
<i>Neoniphon opercularis</i>	Blackfin Squirrlefish	Holocentridae
<i>Neoniphon sammara</i>	Bloodspot Squirrelfish	Holocentridae
<i>Ostichthys brachygnathus</i>	Deepwater Soldierfish	Holocentridae
<i>Ostichthys kaianus</i>	Deepwater Soldierfish	Holocentridae
<i>Plectrypops lima</i>	Cardinal Squirrelfish	Holocentridae
<i>Sargocentron caudimaculatum</i>	Tailspot Squirrelfish	Holocentridae
<i>Sargocentron cornutum</i>	3-Spot Squirrelfish	Holocentridae
<i>Sargocentron diadema</i>	Crown Squirrelfish	Holocentridae
<i>Sargocentron dorsomaculatum</i>	Spotfin Squirrelfish	Holocentridae
<i>Sargocentron ittodai</i>	Samurai Squirrelfish	Holocentridae
<i>Sargocentron lepros</i>	Squirrelfish	Holocentridae
<i>Sargocentron melanospilos</i>	Blackspot Squirrelfish	Holocentridae
<i>Sargocentron microstoma</i>	Finelined Squirrelfish	Holocentridae
<i>Sargocentron praslin</i>	Dark-Striped Squirrelfish	Holocentridae
<i>Sargocentron punctatissimum</i>	Speckled Squirrelfish	Holocentridae
<i>Sargocentron tiere</i>	Blue-Lined Squirrelfish	Holocentridae
<i>Sargocentron tiereoides</i>	Pink Squirrelfish	Holocentridae
<i>Sargocentron violaceum</i>	Violet Squirrelfish	Holocentridae
<b>Subfamily Holocentrinae</b>	Squirrelfishes	Holocentridae
<b>Subfamily Myripristinae</b>	Soldierfishes	Holocentridae
<i>Iso hawaiiensis</i>	Keeled Silverside	Isonidae
<b>Isonidae</b>	Keeled Silversides	Isonidae
<b>Istiophoridae</b>	Billfishes	Istiophoridae
<i>Kraemeria bryani</i>	Sand Dart	Kraemeriidae
<i>Kraemeria cunicularia</i>	Sand Dart	Kraemeriidae

<i>Kraemeria samoensis</i>	Sand Dart	Kraemeriidae
<b>Kraemeriidae</b>	Sand Darts	Kraemeriidae
<i>Kuhlia marginata</i>	Dark-Margined Flagtail	Kuhliidae
<i>Kuhlia mugil</i>	Barred Flagtail	Kuhliidae
<i>Kuhlia rupestris</i>	River Flagtail	Kuhliidae
<b>Kuhliidae</b>	Flagtails	Kuhliidae
<b>Kyphosidae</b>	Rudderfish	Kyphosidae
<i>Kyphosus bigibbus</i>	Insular Rudderfish	Kyphosidae
<i>Kyphosus cinerascens</i>	Highfin Rudderfish	Kyphosidae
<i>Kyphosus vaigiensis</i>	Lowfin Rudderfish	Kyphosidae
<i>Anampses caeruleopunctatus</i>	Chiseltooth Wrasse	Labridae
<i>Anampses geographicus</i>	Geographic Wrasse	Labridae
<i>Anampses melanurus</i>	Wrasse	Labridae
<i>Anampses meleagrides</i>	Yellowtail Wrasse	Labridae
<i>Anampses twistii</i>	Yellowbreasted Wrasse	Labridae
<i>Bodianus anthioides</i>	Lyretail Hogfish	Labridae
<i>Bodianus axillaris</i>	Axilspot Hogfish	Labridae
<i>Bodianus bimaculatus</i>	2-Spot Slender Hogfish	Labridae
<i>Bodianus diana</i>	Diana'S Hogfish	Labridae
<i>Bodianus loxozonus</i>	Blackfin Hogfish	Labridae
<i>Bodianus mesothorax</i>	Mesothorax Hogfish	Labridae
<i>Bodianus tanyokidus</i>	Hogfish	Labridae
<i>Cheilinus chlorourus</i>	Floral Wrasse	Labridae
<i>Cheilinus fasciatus</i>	Red-Breasted Wrasse	Labridae
<i>Cheilinus oxycephalus</i>	Snooty Wrasse	Labridae
<i>Cheilinus trilobatus</i>	Tripletail Wrasse	Labridae
<i>Cheilinus undulatus</i>	Napoleon wrasse	Labridae
<i>Cheilio inermis</i>	Cigar Wrasse	Labridae
<i>Choerodon anchorago</i>	Yel-Cheeked Tuskfish	Labridae
<i>Choerodon fasciatus</i>	Harlequin Tuskfish	Labridae
<i>Cirrhilabrus balteatus</i>	Wrasse	Labridae
<i>Cirrhilabrus cyanopleura</i>	Wrasse	Labridae
<i>Cirrhilabrus exquisitus</i>	Exquisite Wrasse	Labridae
<i>Cirrhilabrus johnsoni</i>	Johnson'S Wrasse	Labridae
<i>Cirrhilabrus katherinae</i>	Wrasse	Labridae
<i>Cirrhilabrus luteovittatus</i>	Yellowband Wrasse	Labridae
<i>Cirrhilabrus rhomboidalis</i>	Rhomboid Wrasse	Labridae
<i>Cirrhilabrus rubrimarginatus</i>	Red-Margined Wrasse	Labridae
<i>Coris aygula</i>	Clown Coris	Labridae
<i>Coris batuensis</i>	Dapple Coris	Labridae
<i>Coris dorsomacula</i>	Pale-Barred Coris	Labridae

<i>Coris gaimard</i>	Yellowtailed Coris	Labridae
<i>Cymolutes praetextatus</i>	Knife Razorfish	Labridae
<i>Cymolutes torquatus</i>	Finescale Razorfish	Labridae
<i>Diproctacanthus xanthurus</i>	Wandering Cleaner Wrasse	Labridae
<i>Epibulus insidiator</i>	Sling-Jawed Wrasse	Labridae
<i>Epibulus sp</i>	Sling-Jawed Wrasse	Labridae
<i>Gomphosus varius</i>	Bird Wrasse	Labridae
<i>Halichoeres biocellatus</i>	2-Spotted Wrasse	Labridae
<i>Halichoeres chloropterus</i>	Drab Wrasse	Labridae
<i>Halichoeres chrysus</i>	Canary Wrasse	Labridae
<i>Halichoeres hortulanus</i>	Checkerboard Wrasse	Labridae
<i>Halichoeres leucurus</i>	Wrasse	Labridae
<i>Halichoeres margaritaceus</i>	Weedy Surge Wrasse	Labridae
<i>Halichoeres marginatus</i>	Dusky Wrasse	Labridae
<i>Halichoeres melanurus</i>	Pinstriped Wrasse	Labridae
<i>Halichoeres melasmapomus</i>	Black-Ear Wrasse	Labridae
<i>Halichoeres nigrescens</i>	Wrasse	Labridae
<i>Halichoeres ornatissimus</i>	Ornate Wrasse	Labridae
<i>Halichoeres papilionaceus</i>	Shwartz Wrasse	Labridae
<i>Halichoeres papilionaceus</i>	Seagrass Wrasse	Labridae
<i>Halichoeres prosopeion</i>	Wrasse	Labridae
<i>Halichoeres richmondi</i>	Richmond'S Wrasse	Labridae
<i>Halichoeres scapularis</i>	Zigzag Wrasse	Labridae
<i>Halichoeres sp.</i>	Wrasse	Labridae
<i>Halichoeres trimaculatus</i>	3-Spot Wrasse	Labridae
<i>Halichoeres zeylonicus</i>	Wrasse	Labridae
<i>Hemigymnus fasciatus</i>	Striped Clown Wrasse	Labridae
<i>Hemigymnus melapterus</i>	1/2 & 1/2 Wrasse	Labridae
<i>Hologymnosus annulatus</i>	Wrasse	Labridae
<i>Hologymnosus doliatus</i>	Ring Wrasse	Labridae
<i>Iniistius aneitensis</i>	Yellowblotch Razorfish	Labridae
<i>Iniistius celebicus</i>	Celebe'S Razorfish	Labridae
<i>Iniistius geisha</i>	Razorfish	Labridae
<i>Iniistius melanopus</i>	Yellowpatch Razorfish	Labridae
<i>Iniistius pavo</i>	Blue Razorfish	Labridae
<i>Labrichthys unilineatus</i>	Tubelip Wrasse	Labridae
<b>Labridae</b>	Wrasse	Labridae
<b>Labridae</b>	Jansen'S Wrasse	Labridae
<i>Labroides bicolor</i>	Bicolor Cleaner Wrasse	Labridae
<i>Labroides dimidiatus</i>	Bluestreak Cleaner Wrasse	Labridae
<i>Labroides pectoralis</i>	Black-Spot Cleaner Wrasse	Labridae

<i>Labropsis alleni</i>	Allen'S Wrasse	Labridae
<i>Labropsis micronesica</i>	Micronesian Wrasse	Labridae
<i>Labropsis xanthonota</i>	Wedge-Tailed Wrasse	Labridae
<i>Macropharyngodon meleagris</i>	Leopard Wrasse	Labridae
<i>Macropharyngodon negrosensis</i>	Negros Wrasse	Labridae
<i>Novaculichthys taeniourus</i>	Dragon Wrasse	Labridae
<i>Novaculoides macrolepidotus</i>	Seagrass Razorfish	Labridae
<i>Oxycheilinus arenatus</i>	Arenatus Wrasse	Labridae
<i>Oxycheilinus bimaculatus</i>	2-Spot Wrasse	Labridae
<i>Oxycheilinus celebicus</i>	Celebes Wrasse	Labridae
<i>Oxycheilinus digramma</i>	Bandcheek Wrasse	Labridae
<i>Oxycheilinus orientalis</i>	Oriental Wrasse	Labridae
<i>Oxycheilinus unifasciatus</i>	Ringtail Wrasse	Labridae
<i>Paracheilinus bellae</i>	Wrasse	Labridae
<i>Paracheilinus sp</i>	Wrasse	Labridae
<i>Polylepion russelli</i>	Wrasse	Labridae
<i>Pseudocheilinops ataenia</i>	Wrasse	Labridae
<i>Pseudocheilinus evanidus</i>	Striated Wrasse	Labridae
<i>Pseudocheilinus hexataenia</i>	6 Line Wrasse	Labridae
<i>Pseudocheilinus octotaenia</i>	8 Line Wrasse	Labridae
<i>Pseudocheilinus sp</i>	Line Wrasse	Labridae
<i>Pseudocheilinus tetrataenia</i>	4 Line Wrasse	Labridae
<i>Pseudocoris aurantiofasciata</i>	Rust-Banded Wrasse	Labridae
<i>Pseudocoris heteroptera</i>	Torpedo Wrasse	Labridae
<i>Pseudocoris yamashiroi</i>	Yamashiro'S Wrasse	Labridae
<i>Pseudodax moluccanus</i>	Chiseltooth Wrasse	Labridae
<i>Pseudojuloides atavai</i>	Polynesian Wrasse	Labridae
<i>Pseudojuloides cerasinus</i>	Smalltail Wrasse	Labridae
<i>Pteragogus cryptus</i>	Wrasse	Labridae
<i>Pteragogus guttatus</i>	Wrasse	Labridae
<i>Stethojulis bandanensis</i>	Red-Shoulder Wrasse	Labridae
<i>Stethojulis strigiventer</i>	Wrasse	Labridae
<i>Stethojulis trilineata</i>	Wrasse	Labridae
<i>Thalassoma amblycephalum</i>	2 Tone Wrasse	Labridae
<i>Thalassoma hardwicke</i>	6 Bar Wrasse	Labridae
<i>Thalassoma lunare</i>	Crescent Wrasse	Labridae
<i>Thalassoma lutescens</i>	Sunset Wrasse	Labridae
<i>Thalassoma purpureum</i>	Surge Wrasse	Labridae
<i>Thalassoma quinquevittatum</i>	5-Stripe Surge Wrasse	Labridae
<i>Thalassoma trilobatum</i>	Xmas Wrasse	Labridae



<i>Wetmorella albofasciata</i>	Wh-Barred Pygmy Wrasse	Labridae
<i>Wetmorella nigropinnata</i>	Bl-Spot Pygmy Wrasse	Labridae
<i>Xiphocheilus sp</i>	Wrasse	Labridae
<i>Carcharodon carcharias</i>	Great White Shark	Lamnidae
<i>Isurus oxyrinchus</i>	Mackerel Shark	Lamnidae
<i>Equulites elongatus</i>	Slipmouth	Leiognathidae
<i>Equulites stercorarius</i>	Oblong Slipmouth	Leiognathidae
<i>Gazza achlamys</i>	Lg-Toothed Ponyfish	Leiognathidae
<i>Gazza minuta</i>	Toothed Ponyfish	Leiognathidae
<b>Leiognathidae</b>	Ponyfishes	Leiognathidae
<i>Leiognathus equulus</i>	Common Slipmouth	Leiognathidae
<i>Leiognathus longispinis</i>	Slipmouth	Leiognathidae
<i>Photopectoralis bindus</i>	Slipmouth	Leiognathidae
<i>Secutor ruconius</i>	Pugnose Soapy	Leiognathidae
<i>Gnathodentex aureolineatus</i>	Yellow-Spot Emperor	Lethrinidae
<i>Gymnocranius euanus</i>	Japanese Bream	Lethrinidae
<i>Gymnocranius grandoculis</i>	Blue-Lined Bream	Lethrinidae
<i>Gymnocranius griseus</i>	Grey Bream	Lethrinidae
<i>Gymnocranius microdon</i>	Blue-Spotted Bream	Lethrinidae
<i>Gymnocranius sp.</i>	Stout Emperor	Lethrinidae
<b>Lethrinidae</b>	Emperors	Lethrinidae
<i>Lethrinus atkinsoni</i>	Yellowtail Emperor	Lethrinidae
<i>Lethrinus erythropterus</i>	Longfin Emperor	Lethrinidae
<i>Lethrinus genivittatus</i>	Longspine Emperor	Lethrinidae
<i>Lethrinus harak</i>	Thumbprint Emperor	Lethrinidae
<i>Lethrinus lentjan</i>	Pinkear Emperor	Lethrinidae
<i>Lethrinus microdon</i>	Smtoothed Emperor	Lethrinidae
<i>Lethrinus obsoletus</i>	Orange-Striped Emperor	Lethrinidae
<i>Lethrinus ornatus</i>	Ornate Emperor	Lethrinidae
<i>Lethrinus semicinctus</i>	Black-Blotch Emperor	Lethrinidae
<i>Lethrinus variegatus</i>	Slender Emperor	Lethrinidae
<i>Wattsia mossambica</i>	Large-Eye Bream	Lethrinidae
<i>Lobotes surinamensis</i>	Triplefin	Lobotidae
<b>Lobotidae</b>	Tripletails	Lobotidae
<i>Dendrochirus biocellatus</i>	Scorpionfish	Lutjanidae
<b>Lutjanidae</b>	Snappers	Lutjanidae
<i>Lutjanus argentimaculatus</i>	River Snapper	Lutjanidae
<i>Lutjanus biguttatus</i>	Two-Spot Snapper	Lutjanidae
<i>Lutjanus bohar</i>	Red Snapper	Lutjanidae
<i>Lutjanus bouton</i>	Snapper	Lutjanidae
<i>Lutjanus decussatus</i>	Checkered Snapper	Lutjanidae

<i>Lutjanus ehrenbergii</i>	Blackspot Snapper	Lutjanidae
<i>Lutjanus fulviflamma</i>	Snapper	Lutjanidae
<i>Lutjanus malabaricus</i>	Malabar Snapper	Lutjanidae
<i>Lutjanus monostigma</i>	Onespot Snapper	Lutjanidae
<i>Lutjanus rivulatus</i>	Scribbled Snapper	Lutjanidae
<i>Lutjanus sebae</i>	Snapper	Lutjanidae
<i>Lutjanus semicinctus</i>	1/2-Barred Snapper	Lutjanidae
<i>Lutjanus vitta</i>	One-Lined Snapper	Lutjanidae
<i>Macolor macularis</i>	Bl And Wh Snapper	Lutjanidae
<i>Macolor niger</i>	Black Snapper	Lutjanidae
<i>Paracaesio sordida</i>	Fusilier	Lutjanidae
<i>Paracaesio xanthura</i>	Yellowtail Fusilier	Lutjanidae
<i>Randallichthys filamentosus</i>	Deepwater Snapper	Lutjanidae
<i>Lutjanus</i> sp	Shallow Snappers	Lutjanidae
<i>Symphorichthys spilurus</i>	Sailfin Snapper	Lutjanidae
<i>Hoplolatilus cuniculus</i>	Tilefish	Malacanthidae
<i>Hoplolatilus fronticinctus</i>	Tilefish	Malacanthidae
<i>Hoplolatilus starcki</i>	Tilefish	Malacanthidae
<b>Malacanthidae</b>	Tilefishes	Malacanthidae
<i>Malacanthus breviostris</i>	Quakerfish	Malacanthidae
<i>Malacanthus latovittatus</i>	Striped Blanquillo	Malacanthidae
<b>Megalopidae</b>	Tarpons	Megalopidae
<i>Megalops cyprinoides</i>	Indo-Pacific Tarpon	Megalopidae
<i>Gunnellichthys monostigma</i>	Wormfish	Microdesmidae
<i>Gunnellichthys pleurotaenia</i>	Onestripe Wormfish	Microdesmidae
<i>Gunnellichthys viridescens</i>	Wormfish	Microdesmidae
<b>Microdesmidae</b>	Wormfish	Microdesmidae
<i>Nemateleotris decora</i>	Decorated Dartfish	Microdesmidae
<i>Nemateleotris helfrichi</i>	Helfrichs' Dartfish	Microdesmidae
<i>Nemateleotris magnifica</i>	Fire Dartfish	Microdesmidae
<i>Paragunnellichthys seychellensis</i>	Seychelle'S Wormfish	Microdesmidae
<i>Parioglossus formosus</i>	Beautiful Hover Goby	Microdesmidae
<i>Parioglossus lineatus</i>	Lined Hover Goby	Microdesmidae
<i>Parioglossus nudus</i>	Naked Hover Goby	Microdesmidae
<i>Parioglossus palustris</i>	Palustris Hover Goby	Microdesmidae
<i>Parioglossus rainfordi</i>	Rainford'S Hover Goby	Microdesmidae
<i>Parioglossus raoi</i>	Rao'S Hover Goby	Microdesmidae
<i>Parioglossus taeniatus</i>	Taeniatus Hover Goby	Microdesmidae
<i>Parioglossus verticalis</i>	Vertical Hover Goby	Microdesmidae
<i>Ptereleotris evides</i>	Blackfin Dartfish	Microdesmidae

<i>Ptereleotris hanae</i>	Filament Dartfish	Microdesmidae
<i>Ptereleotris heteroptera</i>	Spot-Tail Dartfish	Microdesmidae
<i>Ptereleotris lineopinnis</i>	Dartfish	Microdesmidae
<i>Ptereleotris microlepis</i>	Pearly Dartfish	Microdesmidae
<i>Ptereleotris zebra</i>	Zebra Dartfish	Microdesmidae
<b>Genus: Millepora</b>	Fire corals	Milleporidae
<i>Masturus lanceolatus</i>	Sharptail Sunfish	Molidae
<b>Molidae</b>	Ocean Sunfishes	Molidae
<i>Ranzania laevis</i>	Trunkfish	Molidae
<i>Acreichthys tomentosus</i>	Seagrass Filefish	Monacanthidae
<i>Aluterus monoceros</i>	Unicorn Filefish	Monacanthidae
<i>Aluterus scriptus</i>	Filefish	Monacanthidae
<i>Amanses scopas</i>	Filefish	Monacanthidae
<i>Brachaluteres taylori</i>	Taylor'S Inflator Filefish	Monacanthidae
<i>Cantherhines dumerilii</i>	Gray Leatherjacket	Monacanthidae
<i>Cantherhines fronticinctus</i>	Specktaled Filefish	Monacanthidae
<i>Cantherhines pardalis</i>	Honeycomb Filefish	Monacanthidae
<b>Monacanthidae</b>	Filefishes	Monacanthidae
<i>Oxymonacanthus longirostris</i>	Longnose Filefish	Monacanthidae
<i>Paraluteres prionurus</i>	Blacksaddle Mimic	Monacanthidae
<i>Paramonacanthus cryptodon</i>	Filefish	Monacanthidae
<i>Paramonacanthus japonicus</i>	Filefish	Monacanthidae
<i>Pervagor alternans</i>	Yelloweye Filefish	Monacanthidae
<i>Pervagor aspricaudus</i>	Orangetail Filefish	Monacanthidae
<i>Pervagor janthinosoma</i>	Blackbar Filefish	Monacanthidae
<i>Pervagor melanocephalus</i>	Blackheaded Filefish	Monacanthidae
<i>Pervagor nigrolineatus</i>	Blacklined Filefish	Monacanthidae
<i>Pseudalutarius nasicornis</i>	Rhino Leatherjacket	Monacanthidae
<i>Rudarius minutus</i>	Minute Filefish	Monacanthidae
<b>Monodactylidae</b>	Monos	Monodactylidae
<i>Monodactylus argenteus</i>	Mono	Monodactylidae
<b>Moridae</b>	Codlings	Moridae
<i>Physiculus sp</i>	Codling	Moridae
<i>Moringua ferruginea</i>	Rusty Spaghetti Eel	Moringuidae
<i>Moringua javanica</i>	Java Spaghetti Eel	Moringuidae
<i>Moringua microchir</i>	Spaghetti Eel	Moringuidae
<b>Moringuidae</b>	Worm Eel	Moringuidae
<i>Chelon macrolepis</i>	Ceram Mullet	Mugilidae
<i>Chelon melinopterus</i>	Giantscale Mullet	Mugilidae
<i>Crenimugil crenilabis</i>	Fringelip Mullet	Mugilidae
<i>Crenimugil heterocheilos</i>	Mullet	Mugilidae

<i>Ellochelon vaigiensis</i>	Yellowtail Mullet	Mugilidae
<i>Moolgarda engeli</i>	Engel'S Mullet	Mugilidae
<i>Moolgarda seheli</i>	Bluespot Mullet	Mugilidae
<i>Mugil cephalus</i>	Gray Mullet	Mugilidae
<b>Mugilidae</b>	Mullet	Mugilidae
<i>Neomyxus leuciscus</i>	Acute-Jawed Mullet	Mugilidae
<i>Oedalechilus labiosus</i>	Foldlip Mullet	Mugilidae
<b>Mullidae</b>	Goatfishes	Mullidae
<i>Mulloidichthys flavolineatus</i>	Yellowstriped Goatfish	Mullidae
<i>Mulloidichthys pfluegeri</i>	Orange Goatfish	Mullidae
<i>Mulloidichthys sp</i>	Juvenile Goatfish	Mullidae
<i>Mulloidichthys vanicolensis</i>	Yellowfin Goatfish	Mullidae
<i>Parupeneus barberinoides</i>	Bicolor goatfish	Mullidae
<i>Parupeneus barberinus</i>	Dash And Dot Goatfish	Mullidae
<i>Parupeneus ciliatus</i>	White-Lined Goatfish	Mullidae
<i>Parupeneus cyclostomus</i>	Yellow Goatfish	Mullidae
<i>Parupeneus heptacanthus</i>	Redspot Goatfish	Mullidae
<i>Parupeneus indicus</i>	Indian Goatfish	Mullidae
<i>Parupeneus multifasciatus</i>	Multibarred Goatfish	Mullidae
<i>Parupeneus pleurostigma</i>	Sidespot Goatfish	Mullidae
<i>Parupeneus sp</i>	Goatfish	Mullidae
<i>Parupeneus trifasciatus</i>	Doublebar goatfish	Mullidae
<i>Upeneus taeniopterus</i>	Band-Tailed Goatfish	Mullidae
<i>Upeneus taeniopterus</i>	Goatfish	Mullidae
<i>Upeneus tragula</i>	Blackstriped Goatfish	Mullidae
<i>Upeneus vittatus</i>	Yellowbanded Goatfish	Mullidae
<b>Muraenesocidae</b>	Pike Eels	Muraenesocidae
<i>Muraenesox cinereus</i>	Pike Conger	Muraenesocidae
<i>Anarchias allardicei</i>	Allardice'S Moray	Muraenidae
<i>Anarchias cantonensis</i>	Canton Island Moray	Muraenidae
<i>Anarchias seychellensis</i>	Seychelles Moray	Muraenidae
<i>Channomuraena vittata</i>	Long-Jawed Moray	Muraenidae
<i>Echidna leucotaenia</i>	Whiteface Moray	Muraenidae
<i>Echidna nebulosa</i>	Snowflake Moray	Muraenidae
<i>Echidna polyzona</i>	Girdled Moray Eel	Muraenidae
<i>Echidna unicolor</i>	Unicolor Moray	Muraenidae
<i>Enchelycore bayeri</i>	Bayer'S Moray	Muraenidae
<i>Enchelycore bikiniensis</i>	Bikini Atoll Moray	Muraenidae
<i>Enchelycore kamara</i>	Dark-Spotted Moray	Muraenidae
<i>Enchelycore schismatorhynchus</i>	White-Margined Moray	Muraenidae
<i>Enchelynassa canina</i>	Viper Moray	Muraenidae

<i>Gymnomuraena zebra</i>	Zebra Moray	Muraenidae
<i>Gymnothorax berndti</i>	Moray Eel	Muraenidae
<i>Gymnothorax buroensis</i>	Buro Moray	Muraenidae
<i>Gymnothorax elegans</i>	Moray Eel	Muraenidae
<i>Gymnothorax enigmaticus</i>	Enigmatic Moray	Muraenidae
<i>Gymnothorax fimbriatus</i>	Fimbriated Moray	Muraenidae
<i>Gymnothorax flavimarginatus</i>	Yellow-Margined Moray	Muraenidae
<i>Gymnothorax fuscomaculatus</i>	Brown Spotted Moray	Muraenidae
<i>Gymnothorax gracilicauda</i>	Graceful-Tailed Moray	Muraenidae
<i>Gymnothorax hepaticus</i>	Moray Eel	Muraenidae
<i>Gymnothorax javanicus</i>	Giant Moray	Muraenidae
<i>Gymnothorax margaritophorus</i>	Blotch-Necked Moray	Muraenidae
<i>Gymnothorax marshallensis</i>	Marshall Isles Moray	Muraenidae
<i>Gymnothorax melatremus</i>	Dirty Yellow Moray	Muraenidae
<i>Gymnothorax melatremus</i>	Moray Eel	Muraenidae
<i>Gymnothorax meleagris</i>	Whitemouth Moray	Muraenidae
<i>Gymnothorax monochrous</i>	Monochrome Moray	Muraenidae
<i>Gymnothorax monostigma</i>	1-Spot Moray	Muraenidae
<i>Gymnothorax neglectus</i>	Moray Eel	Muraenidae
<i>Gymnothorax nudivomer</i>	Yellowmouth Moray	Muraenidae
<i>Gymnothorax pictus</i>	Peppered Moray	Muraenidae
<i>Gymnothorax pindae</i>	Pinda Moray	Muraenidae
<i>Gymnothorax polyuranodon</i>	Moray Eel	Muraenidae
<i>Gymnothorax polyuranodon</i>	Fiji Moray Eel	Muraenidae
<i>Gymnothorax richardsonii</i>	Richardson'S Moray	Muraenidae
<i>Gymnothorax rueppelliae</i>	Yellow-Headed Moray	Muraenidae
<i>Gymnothorax thyrsoideus</i>	White-Eyed Moray	Muraenidae
<i>Gymnothorax undulatus</i>	Undulated Moray	Muraenidae
<i>Gymnothorax zonipectis</i>	Zonipectis Moray	Muraenidae
<b>Muraenidae</b>	Morays	Muraenidae
<i>Pseudechidna brummeri</i>	White Ribbon Eel	Muraenidae
<i>Rhinomuraena quaesita</i>	Ribbon Eel	Muraenidae
<i>Scuticaria tigrina</i>	Tiger Snake Moray	Muraenidae
<i>Strophidon sathete</i>	Giant Esturine Moray	Muraenidae
<i>Uropterygius concolor</i>	Unicolor Snake Moray	Muraenidae
<i>Uropterygius fasciolatus</i>	Gosline'S Snake Moray	Muraenidae
<i>Uropterygius fuscoguttatus</i>	Brown-Spotted Snake Eel	Muraenidae
<i>Uropterygius kamar</i>	Moon Moray	Muraenidae
<i>Uropterygius macrocephalus</i>	Lg-Headed Snake Moray	Muraenidae
<i>Uropterygius marmoratus</i>	Marbled Snake Moray	Muraenidae
<i>Uropterygius micropterus</i>	Tidepool Snake Moray	Muraenidae

<i>Uropterygius polypilus</i>	Lg-Spotted Snake Moray	Muraenidae
<i>Uropterygius supraforatus</i>	Moray Eel	Muraenidae
<i>Uropterygius xanthopterus</i>	Moray Eel	Muraenidae
<i>Diaphus schmidti</i>	Lanternfish	Myctophidae
<b>Myctophidae</b>	Lanternfishes	Myctophidae
<i>Myctophum brachygnathum</i>	Laternfish	Myctophidae
<i>Aetobatus narinari</i>	Spotted Eagle Ray	Myliobatidae
<i>Aetomylaeus maculatus</i>	Eagle Ray	Myliobatidae
<i>Manta birostris</i>	Manta Ray	Myliobatidae
<b>Myliobatidae</b>	Eagle Ray	Myliobatidae
<i>Eptatretus carlhubbsi</i>	Hagfish	Myxinidae
<b>Myxinidae</b>	Hagfish	Myxinidae
<b>Nemipteridae</b>	Threadfin Breams	Nemipteridae
<b>Nemipteridae</b>	Breams	Nemipteridae
<i>Nemipterus furcosus</i>	Forktail Bream	Nemipteridae
<i>Nemipterus hexodon</i>	Butterfly Bream	Nemipteridae
<i>Nemipterus peronii</i>	Notched Butterfly Bream	Nemipteridae
<i>Nemipterus peronii</i>	Butterfly Bream	Nemipteridae
<i>Pentapodus caninus</i>	Smalltooth Whiptail	Nemipteridae
<i>Pentapodus trivittatus</i>	3-Striped Whiptail	Nemipteridae
<i>Scolopsis affinis</i>	Spinecheek	Nemipteridae
<i>Scolopsis bilineata</i>	2 Line Spinecheek	Nemipteridae
<i>Scolopsis ciliata</i>	Ciliate Spinecheek	Nemipteridae
<i>Scolopsis lineata</i>	Bl And Wh Spinecheek	Nemipteridae
<i>Scolopsis margaritifera</i>	Margarite'S Spinecheek	Nemipteridae
<i>Scolopsis taenioptera</i>	Spinecheek	Nemipteridae
<i>Scolopsis trilineata</i>	3 Line Spinecheek	Nemipteridae
<i>Scolopsis xenochroa</i>	Spinecheek	Nemipteridae
<b>Nomeidae</b>	Man-Of-War Fish	Nomeidae
<i>Psenes cyanophrys</i>	Freckeled Driftfish	Nomeidae
<i>Eutremus teres</i>	Mantis Shrimp	Odontodactylidae
<i>Apterichtus klazingai</i>	Snake Eel	Ophichthidae
<i>Brachysomophis crocodilinus</i>	Snake Eel	Ophichthidae
<i>Callechelys catostoma</i>	Snake Eel	Ophichthidae
<i>Callechelys marmorata</i>	Snake Eel	Ophichthidae
<i>Cirricaecula johnsoni</i>	Fringelip Snake Eel	Ophichthidae
<i>Echelus uropterus</i>	Snake Eel	Ophichthidae
<i>Evips percinctus</i>	Snake Eel	Ophichthidae
<i>Ichthyapus vulturis</i>	Snake Eel	Ophichthidae
<i>Lamnostoma orientalis</i>	Oriental Snake Eel	Ophichthidae
<i>Leiuranus semicinctus</i>	Saddled Snake Eel	Ophichthidae

<i>Leiuranus versicolor</i>	Snake Eel	Ophichthidae
<i>Muraenichthys schultzei</i>	Snake Eel	Ophichthidae
<i>Muraenichthys sibogae</i>	Snake Eel	Ophichthidae
<i>Myrichthys colubrinus</i>	Banded Snake Eel	Ophichthidae
<i>Myrichthys colubrinus</i>	Snake Eel	Ophichthidae
<i>Myrichthys maculosus</i>	Spotted Snake Eel	Ophichthidae
<b>Ophichthidae</b>	Snake Eel	Ophichthidae
<i>Ophichthus cephalozona</i>	Dark-Shouldered Snake Eel	Ophichthidae
<i>Ophichthus polyophthalmus</i>	Snake Eel	Ophichthidae
<i>Phaenomonas cooperae</i>	Snake Eel	Ophichthidae
<i>Phyllophichthus xenodontus</i>	Snake Eel	Ophichthidae
<i>Schismorhynchus labialis</i>	Snake Eel	Ophichthidae
<i>Schultzidia johnstonensis</i>	Snake Eel	Ophichthidae
<i>Schultzidia retropinnis</i>	Snake Eel	Ophichthidae
<i>Scolecenchelys gymnota</i>	Snake Eel	Ophichthidae
<i>Scolecenchelys laticaudata</i>	Snake Eel	Ophichthidae
<i>Scolecenchelys macroptera</i>	Snake Eel	Ophichthidae
<i>Brotula multibarbata</i>	Reef Cusk Eel	Ophidiidae
<i>Brotula townsendi</i>	Townsend'S Cusk Eel	Ophidiidae
<b>Ophidiidae</b>	Cusk Eel	Ophidiidae
<b>Opistognathidae</b>	Jawfishes	Opistognathidae
<i>Opistognathus sp</i>	Variable Jawfish	Opistognathidae
<i>Opistognathus sp</i>	Wass' Jawfish	Opistognathidae
<b>Oplegnathidae</b>	Knifejaws	Oplegnathidae
<i>Oplegnathus punctatus</i>	Spotted Knifejaw	Oplegnathidae
<b>Orectolobidae</b>	Nurse,Zebra,Carpet Sharks	Orectolobidae
<i>Lactoria cornuta</i>	Longhorn Cowfish	Ostraciidae
<i>Lactoria diaphana</i>	Spiny Cowfish	Ostraciidae
<i>Lactoria fornasini</i>	Thornback Cowfish	Ostraciidae
<b>Ostraciidae</b>	Boxfish, Cowfish	Ostraciidae
<i>Ostracion cubicus</i>	Cube Trunkfish	Ostraciidae
<i>Ostracion meleagris</i>	Spotted Trunkfish	Ostraciidae
<i>Ostracion rhinorhynchus</i>	Largenose Boxfish	Ostraciidae
<i>Ostracion solorensis</i>	Reticulate Boxfish	Ostraciidae
<i>Rhynchostracion nasus</i>	Smallnose Boxfish	Ostraciidae
<i>Lestidium nudum</i>	Barracudina	Paralepididae
<b>Paralepididae</b>	Barracudinas	Paralepididae
<i>Eurypegasis draconis</i>	Dragon Fish	Pegasidae
<b>Pegasidae</b>	Dragonfish	Pegasidae
<i>Parapriacanthus ransonneti</i>	Sandperch	Pempheridae
<b>Pempheridae</b>	Sweepers	Pempheridae

<i>Pempheris oualensis</i>	Bronze Sweeper	Pempheridae
<i>Pentaceros wheeleri</i>	Amourhead	Pentacerotidae
<b>Pentacerotidae</b>	Armourheads	Pentacerotidae
<i>Chrionema squamiceps</i>	Duckbill	Percophidae
<b>Percophidae</b>	Duckbills	Percophidae
<i>Parapercis clathrata</i>	Latticed Sandperch	Pinguipedidae
<i>Parapercis cylindrica</i>	Cylindrical Sandperch	Pinguipedidae
<i>Parapercis millepunctata</i>	Blk-Dotted Sandperch	Pinguipedidae
<i>Parapercis multiplicata</i>	Red-Barred Sandperch	Pinguipedidae
<i>Parapercis tetracantha</i>	Black-Banded Sandperch	Pinguipedidae
<i>Parapercis xanthozona</i>	Blotchlip Sandperch	Pinguipedidae
<b>Pinguipedidae</b>	Sand Perch	Pinguipedidae
<i>Cymbacephalus beauforti</i>	Flathead	Platycephalidae
<b>Platycephalidae</b>	Flathead	Platycephalidae
<i>Rogadius welanderi</i>	Flathead	Platycephalidae
<i>Sunagocia arenicola</i>	Broadhead Flathead	Platycephalidae
<i>Sunagocia otaitensis</i>	Fringlip Flathead	Platycephalidae
<i>Thysanophrys chiltonae</i>	Longsnout Flathead	Platycephalidae
<i>Plesiobatis daviesi</i>	Roundray	Plesiobatidae
<i>Acanthoplesiops hiatti</i>	Hiatt'S Basslet	Plesiopidae
<i>Callopleiops altivelis</i>	Longfin	Plesiopidae
<b>Plesiopidae</b>	Longfins	Plesiopidae
<i>Plesiops coeruleolineatus</i>	Red-Tipped Longfin	Plesiopidae
<i>Plesiops corallicola</i>	Bluegill Longfin	Plesiopidae
<i>Plesiops oxycephalus</i>	Sharp-Nosed Longfin	Plesiopidae
<b>Plotosidae</b>	Eel Catfishes	Plotosidae
<i>Plotosus lineatus</i>	Striped Eel Catfish	Plotosidae
<i>Polymixia japonica</i>	Beardfish	Polymixiidae
<b>Polymixiidae</b>	Beardfish	Polymixiidae
<i>Polydactylus sexfilis</i>	6 Feeler Threadfin	Polynemidae
<b>Polynemidae</b>	Threadfins	Polynemidae
<i>Apolemichthys griffisi</i>	Angelfish	Pomacanthidae
<i>Apolemichthys trimaculatus</i>	Flagfin Angelfish	Pomacanthidae
<i>Apolemichthys xanthopunctatus</i>	Angelfish	Pomacanthidae
<i>Centropyge aurantia</i>	Golden Angelfish	Pomacanthidae
<i>Centropyge bicolor</i>	Bicolor Angelfish	Pomacanthidae
<i>Centropyge bispinosa</i>	Dusky Angelfish	Pomacanthidae
<i>Centropyge colini</i>	Colin'S Angelfish	Pomacanthidae
<i>Centropyge fisheri</i>	White-Tail Angelfish	Pomacanthidae
<i>Centropyge flavissima</i>	Lemonpeel Angelfish	Pomacanthidae
<i>Centropyge heraldi</i>	Herald'S Angelfish	Pomacanthidae



<i>Centropyge loriculus</i>	Flame Angelfish	Pomacanthidae
<i>Centropyge multicolor</i>	Multicolor Angelfish	Pomacanthidae
<i>Centropyge nigriocella</i>	Black-Spot Angelfish	Pomacanthidae
<i>Centropyge nox</i>	Midnight Angelfish	Pomacanthidae
<i>Centropyge shepardi</i>	Shepard'S Angelfish	Pomacanthidae
<i>Centropyge tibicen</i>	Keyhole Angelfish	Pomacanthidae
<i>Centropyge vrolikii</i>	Pearlscale Angelfish	Pomacanthidae
<i>Chaetodontoplus mesoleucus</i>	Vermiculated Angelfish	Pomacanthidae
<i>Genicanthus bellus</i>	Ornate Angelfish	Pomacanthidae
<i>Genicanthus melanospilos</i>	Black-Spot Angelfish	Pomacanthidae
<i>Genicanthus watanabei</i>	Watanabe'S Angelfish	Pomacanthidae
<i>Paracentropyge multifasciata</i>	Multibarred Angelfish	Pomacanthidae
<b>Pomacanthidae</b>	Angelfishes	Pomacanthidae
<i>Pomacanthus imperator</i>	Emperor Angelfish	Pomacanthidae
<i>Pomacanthus navarchus</i>	Blue-Girdled Angelfish	Pomacanthidae
<i>Pomacanthus semicirculatus</i>	Semicircle Angelfish	Pomacanthidae
<i>Pomacanthus sexstriatus</i>	6-Banded Angelfish	Pomacanthidae
<i>Pomacanthus xanthometopon</i>	Blue-Faced Angelfish	Pomacanthidae
<i>Pygoplites diacanthus</i>	Regal Angelfish	Pomacanthidae
<i>Abudefduf lorentzi</i>	Blackspot Sergeant	Pomacentridae
<i>Abudefduf notatus</i>	Yellowtail Sergeant	Pomacentridae
<i>Abudefduf septemfasciatus</i>	Banded Sergeant	Pomacentridae
<i>Abudefduf sexfasciatus</i>	Scis-Tail Sgt Major	Pomacentridae
<i>Abudefduf sordidus</i>	Black Spot Sergeant	Pomacentridae
<i>Abudefduf vaigiensis</i>	Sergeant-Major	Pomacentridae
<i>Amblyglyphidodon aureus</i>	Damsel	Pomacentridae
<i>Amblyglyphidodon curacao</i>	Staghorn Damsel	Pomacentridae
<i>Amblyglyphidodon leucogaster</i>	White-Belly Damsel	Pomacentridae
<i>Amblyglyphidodon ternatensis</i>	Ternate Damsel	Pomacentridae
<i>Amphiprion chrysopterus</i>	Org-Fin Anemonefish	Pomacentridae
<i>Amphiprion clarkii</i>	Clark'S Anemonefish	Pomacentridae
<i>Amphiprion frenatus</i>	Tomato Anemonefish	Pomacentridae
<i>Amphiprion melanopus</i>	Dusky Anemonefish	Pomacentridae
<i>Amphiprion ocellaris</i>	False Clown Anemonefish	Pomacentridae
<i>Amphiprion perideraion</i>	Pink Anemonefish	Pomacentridae
<i>Amphiprion tricinctus</i>	3-Banded Anemonefish	Pomacentridae
<i>Cheiloprion labiatus</i>	Minstrel Fish	Pomacentridae
<i>Chromis acares</i>	Midget Chromis	Pomacentridae
<i>Chromis agilis</i>	Bronze Reef Chromis	Pomacentridae
<i>Chromis alpha</i>	Yel-Speckled Chromis	Pomacentridae
<i>Chromis amboinensis</i>	Ambon Chromis	Pomacentridae

<i>Chromis analis</i>	Yellow Chromis	Pomacentridae
<i>Chromis atripectoralis</i>	Black-Axil Chromis	Pomacentridae
<i>Chromis atripes</i>	Dark-Fin Chromis	Pomacentridae
<i>Chromis caudalis</i>	Blue-Axil Chromis	Pomacentridae
<i>Chromis delta</i>	Deep Reef Chromis	Pomacentridae
<i>Chromis elerae</i>	Twin-Spot Chromis	Pomacentridae
<i>Chromis lepidolepis</i>	Scaly Chromis	Pomacentridae
<i>Chromis lineata</i>	Lined Chromis	Pomacentridae
<i>Chromis margaritifer</i>	Bicolor Chromis	Pomacentridae
<i>Chromis retrofasciata</i>	Black-Bar Chromis	Pomacentridae
<i>Chromis ternatensis</i>	Ternate Chromis	Pomacentridae
<i>Chromis vanderbilti</i>	Vanderbilt'S Chromis	Pomacentridae
<i>Chromis viridis</i>	Blue-Green Chromis	Pomacentridae
<i>Chromis weberi</i>	Weber'S Chromis	Pomacentridae
<i>Chromis xanthochira</i>	Yel-Axil Chromis	Pomacentridae
<i>Chromis xanthura</i>	Black Chromis	Pomacentridae
<i>Chrysiptera biocellata</i>	2-Spot Demoiselle	Pomacentridae
<i>Chrysiptera brownriggii</i>	Surge Demoiselle	Pomacentridae
<i>Chrysiptera caeruleolineata</i>	Blue-Line Demoiselle	Pomacentridae
<i>Chrysiptera cyanea</i>	Blue Devil	Pomacentridae
<i>Chrysiptera glauca</i>	Gray Demoiselle	Pomacentridae
<i>Chrysiptera oxycephala</i>	Blue-Spot Demoiselle	Pomacentridae
<i>Chrysiptera rex</i>	King Demoiselle	Pomacentridae
<i>Chrysiptera talboti</i>	Talbot'S Demoiselle	Pomacentridae
<i>Chrysiptera traceyi</i>	Tracey'S Demoiselle	Pomacentridae
<i>Chrysiptera unimaculata</i>	1-Spot Demoiselle	Pomacentridae
<i>Dascyllus aruanus</i>	Humbug Dascyllus	Pomacentridae
<i>Dascyllus melanurus</i>	Black-Tail Dascyllus	Pomacentridae
<i>Dascyllus reticulatus</i>	Reticulated Dascyllus	Pomacentridae
<i>Dascyllus trimaculatus</i>	3-Spot Dascyllus	Pomacentridae
<i>Dischistodus chrysopoecilus</i>	White-Spot Damsel	Pomacentridae
<i>Dischistodus melanotus</i>	Black-Vent Damsel	Pomacentridae
<i>Dischistodus perspicillatus</i>	White Damsel	Pomacentridae
<i>Hemiglyphidodon plagiometopon</i>	Damsel fish	Pomacentridae
<i>Lepidozygus tapeinosoma</i>	Fusilier Damsel	Pomacentridae
<i>Neoglyphidodon melas</i>	Royal Damsel	Pomacentridae
<i>Neoglyphidodon nigroris</i>	Yellowfin Damsel	Pomacentridae
<i>Neopomacentrus nemurus</i>	Coral Demoiselle	Pomacentridae
<i>Neopomacentrus taeniurus</i>	Freshwater Demoiselle	Pomacentridae
<i>Neopomacentrus violascens</i>	Violet Demoiselle	Pomacentridae

<i>Plectroglyphidodon dickii</i>	Dick'S Damsel	Pomacentridae
<i>Plectroglyphidodon imparipennis</i>	Bright-Eye Damsel	Pomacentridae
<i>Plectroglyphidodon johnstonianus</i>	Johnston Isle Damsel	Pomacentridae
<i>Plectroglyphidodon lacrymatus</i>	Jewel Damsel	Pomacentridae
<i>Plectroglyphidodon leucozonus</i>	White-Band Damsel	Pomacentridae
<i>Plectroglyphidodon phoenixensis</i>	Phoenix Isle Damsel	Pomacentridae
<b>Pomacentridae</b>	Damsel-fishes	Pomacentridae
<i>Pomacentrus adelus</i>	Damsel-fish	Pomacentridae
<i>Pomacentrus amboinensis</i>	Ambon Damsel	Pomacentridae
<i>Pomacentrus auriventris</i>	Goldbelly Damsel	Pomacentridae
<i>Pomacentrus bankanensis</i>	Speckled Damsel	Pomacentridae
<i>Pomacentrus brachialis</i>	Charcoal Damsel	Pomacentridae
<i>Pomacentrus burroughi</i>	Burrough'S Damsel	Pomacentridae
<i>Pomacentrus chrysurus</i>	White-Tail Damsel	Pomacentridae
<i>Pomacentrus coelestis</i>	Neon Damsel	Pomacentridae
<i>Pomacentrus emarginatus</i>	Outer Reef Damsel	Pomacentridae
<i>Pomacentrus grammorhynchus</i>	Blue-Spot Damsel	Pomacentridae
<i>Pomacentrus moluccensis</i>	Lemon Damsel	Pomacentridae
<i>Pomacentrus nagasakiensis</i>	Nagasaki Damsel	Pomacentridae
<i>Pomacentrus nigromanus</i>	Black-Axil Damsel	Pomacentridae
<i>Pomacentrus pavo</i>	Sapphire Damsel	Pomacentridae
<i>Pomacentrus philippinus</i>	Philippine Damsel	Pomacentridae
<i>Pomacentrus reidi</i>	Reid'S Damsel	Pomacentridae
<i>Pomacentrus simsiang</i>	Blueback Damsel	Pomacentridae
<i>Pomacentrus vaiuli</i>	Princess Damsel	Pomacentridae
<i>Pomachromis exilis</i>	Slender Reef-Damsel	Pomacentridae
<i>Pomachromis guamensis</i>	Guam Damsel	Pomacentridae
<i>Stegastes albifasciatus</i>	White-Bar Gregory	Pomacentridae
<i>Stegastes fasciolatus</i>	Pacific Gregory	Pomacentridae
<i>Stegastes lividus</i>	Farmerfish	Pomacentridae
<i>Stegastes nigricans</i>	Dusky Farmerfish	Pomacentridae
<i>Cookeolus japonicus</i>	Bulleye	Priacanthidae
<i>Heteropriacanthus cruentatus</i>	Glasseye	Priacanthidae
<i>Heteropriacanthus cruentatus</i>	Deepwater Glasseye	Priacanthidae
<b>Priacanthidae</b>	Bigeyes	Priacanthidae
<i>Priacanthus alalaua</i>	Bigeye	Priacanthidae
<i>Priacanthus hamrur</i>	Goggle-Eye	Priacanthidae
<i>Pristigenys meyeri</i>	Bigeye	Priacanthidae
<i>Lubbockichthys multisquamatus</i>	Robust Dottyback	Pseudochromidae

<i>Manonichthys polynemus</i>	Long-Finned Dottyback	Pseudochromidae
<i>Pictichromis porphyrea</i>	Magenta Dottyback	Pseudochromidae
<b>Pseudochromidae</b>	Dottybacks	Pseudochromidae
<i>Pseudochromis cyanotaenia</i>	Surge Dottyback	Pseudochromidae
<i>Pseudochromis fuscus</i>	Dusky Dottyback	Pseudochromidae
<i>Pseudochromis marshallensis</i>	Marshall Is Dottyback	Pseudochromidae
<i>Pseudochromis tapeinosoma</i>	Dottyback	Pseudochromidae
<i>Pseudoplesiops revellei</i>	Revelle'S Basslet	Pseudochromidae
<i>Pseudoplesiops rosae</i>	Rose Island Basslet	Pseudochromidae
<i>Pseudoplesiops sp</i>	Basslet	Pseudochromidae
<i>Pseudoplesiops typus</i>	Hidden Basslet	Pseudochromidae
<b>Rhinobatidae</b>	Guitarfish	Rhinobatidae
<i>Rhynchobatus djiddensis</i>	Guitarfish	Rhinobatidae
<b>Samaridae</b>	Righteye Flounders	Samaridae
<i>Samariscus triocellatus</i>	3 Spot Flounder	Samaridae
<i>Bolbometopon muricatum</i>	Bumphead parrotfish	Scaridae
<i>Calotomus carolinus</i>	Bucktooth Parrotfish	Scaridae
<i>Calotomus spinidens</i>	Spineytooth Parrotfish	Scaridae
<i>Cetoscarus bicolor</i>	Bicolor Parrotfish	Scaridae
<i>Chlorurus bleekeri</i>	Parrotfish	Scaridae
<i>Chlorurus bowersi</i>	Parrotfish	Scaridae
<i>Chlorurus frontalis</i>	Tan-Faced Parrotfish	Scaridae
<i>Chlorurus sordidus</i>	Bullethead Parrotfish	Scaridae
<i>Chlorurus sp.</i>	Parrotfish	Scaridae
<i>Leptoscarus vaigiensis</i>	Seagrass Parrotfish	Scaridae
<b>Scaridae</b>	Parrotfishes	Scaridae
<i>Scarus chameleon</i>	Parrotfish	Scaridae
<i>Scarus dimidiatus</i>	Parrotfish	Scaridae
<i>Scarus festivus</i>	Parrotfish	Scaridae
<i>Scarus flavipectoralis</i>	Yellowfin Parrotfish	Scaridae
<i>Scarus frenatus</i>	Vermiculate Parrotfish	Scaridae
<i>Scarus ghobban</i>	Blue-Barred Parrotfish	Scaridae
<i>Scarus globiceps</i>	Parrotfish	Scaridae
<i>Scarus hypselopterus</i>	Java Parrotfish	Scaridae
<i>Scarus niger</i>	Black Parrotfish	Scaridae
<i>Scarus oviceps</i>	Parrotfish	Scaridae
<i>Scarus prasiognathos</i>	Greenthroat Parrotfish	Scaridae
<i>Scarus psittacus</i>	Pale Nose Parrotfish	Scaridae
<i>Scarus quoyi</i>	Parrotfish	Scaridae
<i>Scarus sp.</i>	Parrotfish	Scaridae
<i>Scarus spinus</i>	Parrotfish	Scaridae

<i>Scarus tricolor</i>	Tricolor Parrotfish	Scaridae
<i>Scarus xanthopleura</i>	Parrotfish	Scaridae
<b>Scatophagidae</b>	Scats	Scatophagidae
<i>Scatophagus argus</i>	Scat	Scatophagidae
<i>Schindleria praematura</i>	Schindleriid	Schindleriidae
<b>Schindleriidae</b>	Schindleriid	Schindleriidae
<i>Grammatorcynus bilineatus</i>	2-Lined Mackerel	Scombridae
<i>Rastrelliger brachysoma</i>	Mackerel	Scombridae
<i>Rastrelliger kanagurta</i>	Striped Mackerel	Scombridae
<i>Scomberomorus commerson</i>	Narrow-Barred King Mackerel	Scombridae
<i>Dendrochirus brachypterus</i>	Scorpionfish	Scorpaenidae
<i>Dendrochirus zebra</i>	Zebra Lionfish	Scorpaenidae
<i>Parascorpaena mcadamsi</i>	Mcadam'S Scorpionfish	Scorpaenidae
<i>Parascorpaena mossambica</i>	Mozambique Scorpionfish	Scorpaenidae
<i>Pontinus macrocephalus</i>	Lg-Headed Scorpionfish	Scorpaenidae
<i>Pontinus sp</i>	Scorpionfish	Scorpaenidae
<i>Pontinus tentacularis</i>	Scorpionfish	Scorpaenidae
<i>Pterois antennata</i>	Spotfin Lionfish	Scorpaenidae
<i>Pterois radiata</i>	Clearfin Lionfish	Scorpaenidae
<i>Pterois volitans</i>	Turkeyfish	Scorpaenidae
<i>Rhinopias frondosa</i>	Weedy Scorpionfish	Scorpaenidae
<b>Scorpaenidae</b>	Scorpionfish	Scorpaenidae
<i>Scorpaenodes guamensis</i>	Guam Scorpionfish	Scorpaenidae
<i>Scorpaenodes hirsutus</i>	Hairy Scorpionfish	Scorpaenidae
<i>Scorpaenodes kelloggi</i>	Kellogg'S Scorpionfish	Scorpaenidae
<i>Scorpaenodes minor</i>	Minor Scorpionfish	Scorpaenidae
<i>Scorpaenodes parvipinnis</i>	Coral Scorpionfish	Scorpaenidae
<i>Scorpaenodes varipinnis</i>	Blotchfin Scorpionfish	Scorpaenidae
<i>Scorpaenopsis diabolus</i>	Devil Scorpionfish	Scorpaenidae
<i>Scorpaenopsis macrochir</i>	Flasher Scorpionfish	Scorpaenidae
<i>Scorpaenopsis oxycephala</i>	Tassled Scorpionfish	Scorpaenidae
<i>Scorpaenopsis papuensis</i>	Papuan Scorpionfish	Scorpaenidae
<i>Scorpaenopsis sp</i>	Scorpionfish	Scorpaenidae
<i>Sebastapistes cyanostigma</i>	Yellowspotted Scorpionfish	Scorpaenidae
<i>Sebastapistes fowleri</i>	Pygmy Scorpionfish	Scorpaenidae
<i>Sebastapistes galactacma</i>	Galactacma Scorpionfish	Scorpaenidae
<i>Sebastapistes mauritiana</i>	Mauritius Scorpionfish	Scorpaenidae
<i>Sebastapistes strongia</i>	Barchin Scorpionfish	Scorpaenidae
<i>Taenianotus triacanthus</i>	Leaf Fish	Scorpaenidae
<i>Aethaloperca rogaa</i>	Red-Flushed Grouper	Serranidae
<i>Anyperodon leucogrammicus</i>	Grouper	Serranidae

<i>Aporops bilinearis</i>	2-Lined Soapfish	Serranidae
<i>Belonoperca chabanaudi</i>	Soapfish	Serranidae
<i>Cephalopholis argus</i>	Peacock Grouper	Serranidae
<i>Cephalopholis aurantia</i>	Orange Grouper	Serranidae
<i>Cephalopholis boenak</i>	Brownbarred Grouper	Serranidae
<i>Cephalopholis cyanostigma</i>	Grouper	Serranidae
<i>Cephalopholis igarashiensis</i>	Ybanded Grouper	Serranidae
<i>Cephalopholis leopardus</i>	Leopard Grouper	Serranidae
<i>Cephalopholis miniata</i>	Coral Grouper	Serranidae
<i>Cephalopholis polleni</i>	Harlequin Grouper	Serranidae
<i>Cephalopholis sexmaculata</i>	6-Banded Grouper	Serranidae
<i>Cephalopholis sonnerati</i>	Tomato Grouper	Serranidae
<i>Cephalopholis sp.</i>	Grouper	Serranidae
<i>Cephalopholis spiloparaea</i>	Pygmy Grouper	Serranidae
<i>Cephalopholis urodeta</i>	Flag-Tailed Grouper	Serranidae
<i>Cromileptes altivelis</i>	Grouper	Serranidae
<i>Epinephelus chlorostigma</i>	Brown-Spotted Grouper	Serranidae
<i>Epinephelus coeruleopunctatus</i>	Orange Grouper	Serranidae
<i>Epinephelus coioides</i>	Orange Spot Grouper	Serranidae
<i>Epinephelus corallicola</i>	Grouper	Serranidae
<i>Epinephelus cyanopodus</i>	Grouper	Serranidae
<i>Epinephelus fuscoguttatus</i>	Blotchy Grouper	Serranidae
<i>Epinephelus hexagonatus</i>	Hexagon Grouper	Serranidae
<i>Epinephelus howlandi</i>	Grouper	Serranidae
<i>Epinephelus lanceolatus</i>	Giant Grouper	Serranidae
<i>Epinephelus macrospilos</i>	Grouper	Serranidae
<i>Epinephelus maculatus</i>	Highfin Grouper	Serranidae
<i>Epinephelus malabaricus</i>	Malabar Grouper	Serranidae
<i>Epinephelus melanostigma</i>	Bl-Spot Honeycomb Grouper	Serranidae
<i>Epinephelus merra</i>	Honeycomb Grouper	Serranidae
<i>Epinephelus miliaris</i>	Grouper	Serranidae
<i>Epinephelus morrhua</i>	Grouper	Serranidae
<i>Epinephelus ongus</i>	Wavy-Lined Grouper	Serranidae
<i>Epinephelus polyphekadion</i>	Marbled Grouper	Serranidae
<i>Epinephelus retouti</i>	Truncated Grouper	Serranidae
<i>Epinephelus retouti</i>	Grouper	Serranidae
<i>Epinephelus socialis</i>	Tidepool Grouper	Serranidae
<i>Epinephelus spilotoceps</i>	4-Saddle Grouper	Serranidae
<i>Epinephelus tauvina</i>	Greasy Grouper	Serranidae
<i>Gracila albomarginata</i>	Wh-Margined Grouper	Serranidae
<i>Grammistes sexlineatus</i>	Yellowstripe Soapfish	Serranidae

<i>Grammistops ocellatus</i>	Ocellate Soapfish	Serranidae
<i>Hyporthodus septemfasciatus</i>	7-Banded Grouper	Serranidae
<i>Liopropoma lunulatum</i>	Swissguard Basslet	Serranidae
<i>Liopropoma maculatum</i>	Swissguard Basslet	Serranidae
<i>Liopropoma mitratum</i>	Swissguard Basslet	Serranidae
<i>Liopropoma multilineatum</i>	Swissguard Basslet	Serranidae
<i>Liopropoma pallidum</i>	Pallid Basslet	Serranidae
<i>Liopropoma susumi</i>	Pinstripe Basslet	Serranidae
<i>Liopropoma tonstrinum</i>	Redstripe Basslet	Serranidae
<i>Luzonichthys waitei</i>	Magenta Slender Basslet	Serranidae
<i>Luzonichthys whitleyi</i>	Whitley'S Slender Basslet	Serranidae
<i>Odontanthias borbonius</i>	Fairy Basslet	Serranidae
<i>Odontanthias katayamai</i>	Fairy Basslet	Serranidae
<i>Plectranthias fourmanoiri</i>	Fourmanoir'S Basslet	Serranidae
<i>Plectranthias kamii</i>	Basslet	Serranidae
<i>Plectranthias longimanus</i>	Long-Finned Basslet	Serranidae
<i>Plectranthias nanus</i>	Pygmy Basslet	Serranidae
<i>Plectranthias rubrifasciatus</i>	Basslet	Serranidae
<i>Plectranthias winniensis</i>	Basslet	Serranidae
<i>Plectropomus areolatus</i>	Squaretail Grouper	Serranidae
<i>Plectropomus laevis</i>	Saddleback Grouper	Serranidae
<i>Plectropomus leopardus</i>	Leopard Coral Trout	Serranidae
<i>Plectropomus oligacanthus</i>	Blue-Lined Coral Trout	Serranidae
<i>Pogonoperca punctata</i>	Spotted Soapfish	Serranidae
<i>Pseudanthias bartlettorum</i>	Bartlet'S Fairy Basslet	Serranidae
<i>Pseudanthias bicolor</i>	Bicolor Fairy Basslet	Serranidae
<i>Pseudanthias cooperi</i>	Red-Bar Fairy Basslet	Serranidae
<i>Pseudanthias dispar</i>	Peach Fairy Basslet	Serranidae
<i>Pseudanthias huchtii</i>	Fairy Basslet	Serranidae
<i>Pseudanthias lori</i>	Lori'S Anthias	Serranidae
<i>Pseudanthias pascalus</i>	Purple Queen	Serranidae
<i>Pseudanthias pleurotaenia</i>	Sq-Spot Fairy Basslet	Serranidae
<i>Pseudanthias randalli</i>	Randall'S Fairy Basslet	Serranidae
<i>Pseudanthias smithvanizi</i>	Smithvaniz' Fairy Basslet	Serranidae
<i>Pseudanthias sp</i>	Fairy Basslet	Serranidae
<i>Pseudanthias squamipinnis</i>	Fairy Basslet	Serranidae
<i>Pseudanthias tuka</i>	Y Striped Fairy Basslet	Serranidae
<i>Pseudanthias ventralis</i>	L-Finned Fairy Basslet	Serranidae
<i>Pseudogramma polyacantha</i>	Soapfish	Serranidae
<i>Pseudogramma sp</i>	Soapfish	Serranidae
<i>Rabaulichthys sp</i>	Fairy Basslet	Serranidae

<i>Saloptia powelli</i>	Powell'S Grouper	Serranidae
<i>Selenanthias myersi</i>	Basslet	Serranidae
<b>Serranidae</b>	Sea Basses, Groupers	Serranidae
<i>Serranocirrhitus latus</i>	Hawkfish Anthias	Serranidae
<b>Subfamily Grammistinae</b>	Soapfish	Serranidae
<b>Subfamily Grammistinae</b>	Soapfishes	Serranidae
<i>Scarus rivulatus</i>	Parrotfish	Siganidae
<b>Siganidae</b>	Rabbitfish	Siganidae
<i>Siganus argenteus</i>	Fork-Tail Rabbitfish	Siganidae
<i>Siganus argenteus</i>	Manahak (Forktail Rabbitfish)	Siganidae
<i>Siganus argenteus</i>	Manahak	Siganidae
<i>Siganus canaliculatus</i>	Seagrass Rabbitfish	Siganidae
<i>Siganus canaliculatus</i>	White-Spotted Rabbitfish	Siganidae
<i>Siganus corallinus</i>	Coral Rabbitfish	Siganidae
<i>Siganus doliatus</i>	Pencil-Streaked Rabbitfish	Siganidae
<i>Siganus fuscescens</i>	Fuscescens Rabbitfish	Siganidae
<i>Siganus guttatus</i>	Golden Rabbitfish	Siganidae
<i>Siganus lineatus</i>	Lined Rabbitfish	Siganidae
<i>Siganus puellus</i>	Masked Rabbitfish	Siganidae
<i>Siganus punctatissimus</i>	Peppered Rabbitfish	Siganidae
<i>Siganus punctatus</i>	Gold-Spotted Rabbitfish	Siganidae
<i>Siganus randalli</i>	Randal'S Rabbitfish	Siganidae
<i>Siganus spinus</i>	Scribbled Rabbitfish	Siganidae
<i>Siganus vermiculatus</i>	Vermiculated Rabbitfish	Siganidae
<i>Siganus vulpinus</i>	Rabbitfish	Siganidae
<b>Sillaginidae</b>	Sillagos	Sillaginidae
<i>Sillago sihama</i>	Cardinalfish	Sillaginidae
<i>Aseraggodes melanostictus</i>	Black Spotted Sole	Soleidae
<i>Aseraggodes whittakeri</i>	Whittaker'S Sole	Soleidae
<i>Aseraggodes xenicus</i>	Smith'S Sole	Soleidae
<i>Pardachirus pavoninus</i>	Peacock Sole	Soleidae
<i>Soleichthys heterorhinos</i>	Banded Sole	Soleidae
<b>Soleidae</b>	Soles	Soleidae
<b>Solenostomidae</b>	Ghost Pipefish	Solenostomidae
<i>Solenostomus cyanopterus</i>	Ghost Pipefish	Solenostomidae
<i>Solenostomus paradoxus</i>	Ornate Ghost Pipefish	Solenostomidae
<i>Sphyraena acutipinnis</i>	Sharptin Barracuda	Sphyraenidae
<i>Sphyraena barracuda</i>	Great Barracuda	Sphyraenidae
<i>Sphyraena flavicauda</i>	Yellowtail Barracuda	Sphyraenidae
<i>Sphyraena forsteri</i>	Blackspot Barracuda	Sphyraenidae
<i>Sphyraena novaehollandiae</i>	Arrow Barracuda	Sphyraenidae



<i>Sphyraena obtusata</i>	Pygmy Barracuda	Sphyraenidae
<i>Sphyraena putnamae</i>	Slender Barracuda	Sphyraenidae
<i>Sphyraena qenie</i>	Blackfin Barracuda	Sphyraenidae
<b>Sphyraenidae</b>	Barracudas	Sphyraenidae
<i>Sphyrna lewini</i>	Hammerhead shark	Sphyrnidae
<i>Sphyrna mokarran</i>	Hammerhead shark	Sphyrnidae
<b>Sphyrnidae</b>	Hammerhead shark	Sphyrnidae
<i>Stegostoma fasciatum</i>	Leopard Shark	Stegostomatidae
<b>Sternoptychidae</b>	Hatchetfishes	Sternoptychidae
<i>Belonepterygion fasciolatum</i>	Spiney Basslets	Subfamily Acanthoclininae
<i>Symphysanodon typus</i>	Symphysanid	Symphysanodontida e
<b>Symphysanodontidae</b>	Sympysanodon	Symphysanodontida e
<i>Inimicus didactylus</i>	Spiny Devilfish	Synanceiidae
<i>Synanceia verrucosa</i>	Stonefish	Synanceiidae
<b>Synaphobranchidae</b>	Cutthroat Eel	Synaphobranchidae
<i>Synaphobranchus sp</i>	Cutthroat Eel	Synaphobranchidae
<i>Bhanotia nuda</i>	Pipefish	Syngnathidae
<i>Bulbonaricus brauni</i>	Pipefish	Syngnathidae
<i>Choeroichthys brachysoma</i>	Pipefish	Syngnathidae
<i>Choeroichthys sculptus</i>	Pipefish	Syngnathidae
<i>Corythoichthys flavofasciatus</i>	Network Pipefish	Syngnathidae
<i>Corythoichthys haematopterus</i>	Pipefish	Syngnathidae
<i>Corythoichthys intestinalis</i>	Reef Pipefish	Syngnathidae
<i>Corythoichthys nigripectus</i>	Bl-Breasted Pipefish	Syngnathidae
<i>Corythoichthys ocellatus</i>	Ocellated Pipefish	Syngnathidae
<i>Corythoichthys polynotatus</i>	Many-Spotted Pipefish	Syngnathidae
<i>Corythoichthys schultzi</i>	Guided Pipefish	Syngnathidae
<i>Cosmocampus banneri</i>	Roughridge Pipefish	Syngnathidae
<i>Cosmocampus darrosanus</i>	D'Arros Pipefish	Syngnathidae
<i>Cosmocampus maxweberi</i>	Maxweber'S Pipefish	Syngnathidae
<i>Doryrhamphus excisus excisus</i>	Bluestripe Pipefish	Syngnathidae
<i>Doryrhamphus janssi</i>	Janss' Pipefish	Syngnathidae
<i>Doryrhamphus negrosensis</i>	Negros Pipefish	Syngnathidae
<i>Dunckerocampus dactyliophorus</i>	Banded Pipefish	Syngnathidae
<i>Halicampus brocki</i>	Brock'S Pipefish	Syngnathidae
<i>Halicampus dunckeri</i>	Duncker'S Pipefish	Syngnathidae
<i>Halicampus mataafae</i>	Samoan Pipefish	Syngnathidae
<i>Halicampus nitidus</i>	Glittering Pipefish	Syngnathidae

<i>Hippichthys cyanospilos</i>	Pipefish	Syngnathidae
<i>Hippichthys spicifer</i>	Pipefish	Syngnathidae
<i>Hippocampus histrix</i>	Pipefish	Syngnathidae
<i>Hippocampus kuda</i>	Pipefish	Syngnathidae
<i>Micrognathus andersonii</i>	Anderson'S Shrt-Nosed Pipefish	Syngnathidae
<i>Micrognathus pygmaeus</i>	Pygmy Short-Nosed Pipefish	Syngnathidae
<i>Microphis brachyurus</i>	Pipefish	Syngnathidae
<i>Microphis brevidorsalis</i>	Pipefish	Syngnathidae
<i>Microphis leiaspis</i>	Pipefish	Syngnathidae
<i>Microphis manadensis</i>	Pipefish	Syngnathidae
<i>Microphis retzii</i>	Pipefish	Syngnathidae
<i>Minyichthys myersi</i>	Myer'S Pipefish	Syngnathidae
<i>Minyichthys myersi</i>	Ventricose Milda	Syngnathidae
<i>Phoxocampus diacanthus</i>	Pipefish	Syngnathidae
<b>Syngnathidae</b>	Pipefish, Seahorse	Syngnathidae
<i>Syngnathoides biaculeatus</i>	Alligator Pipefish	Syngnathidae
<i>Trachyrhamphus bicoarctatus</i>	Double-Ended Pipefish	Syngnathidae
<i>Saurida gracilis</i>	Graceful Lizardfish	Synodontidae
<i>Saurida nebulosa</i>	Nebulous Lizardfish	Synodontidae
<b>Synodontidae</b>	Reef Lizardfish	Synodontidae
<b>Synodontidae</b>	Lizardfish	Synodontidae
<i>Synodus binotatus</i>	2-Spot Lizardfish	Synodontidae
<i>Synodus dermatogenys</i>	Clearfin Lizardfish	Synodontidae
<i>Synodus jaculum</i>	Blackblotch Lizardfish	Synodontidae
<i>Synodus variegatus</i>	Variegatus Lizardfish	Synodontidae
<i>Terapon jarbua</i>	Crescent-Banded Grunter	Terapontidae
<b>Terapontidae</b>	Thornfishes	Terapontidae
<i>Amblyrhynchotes honckenii</i>	Evileye Puffer	Tetraodontidae
<i>Arothron hispidus</i>	Brown Puffer	Tetraodontidae
<i>Arothron manilensis</i>	Puffer	Tetraodontidae
<i>Arothron mappa</i>	Puffer	Tetraodontidae
<i>Arothron meleagris</i>	White-Spot Puffer	Tetraodontidae
<i>Arothron nigropunctatus</i>	Black-Spotted Puffer	Tetraodontidae
<i>Arothron stellatus</i>	Star Puffer	Tetraodontidae
<i>Canthigaster amboinensis</i>	Puffer	Tetraodontidae
<i>Canthigaster bennetti</i>	Puffer	Tetraodontidae
<i>Canthigaster compressa</i>	Puffer	Tetraodontidae
<i>Canthigaster coronata</i>	Sharp Back Puffer	Tetraodontidae
<i>Canthigaster epilampra</i>	Puffer	Tetraodontidae
<i>Canthigaster janthinoptera</i>	Puffer	Tetraodontidae
<i>Canthigaster leoparda</i>	Puffer	Tetraodontidae

<i>Canthigaster ocellicineta</i>	Circle-Barred Toby	Tetraodontidae
<i>Canthigaster papua</i>	Papuan Toby	Tetraodontidae
<i>Canthigaster solandri</i>	Sharpnose Puffer	Tetraodontidae
<i>Canthigaster valentini</i>	Saddle Shpns Puffer	Tetraodontidae
<i>Lagocephalus lagocephalus</i>	Oceanic Blasop	Tetraodontidae
<i>Lagocephalus sceleratus</i>	Silverstripe Blasop	Tetraodontidae
<b>Tetraodontidae</b>	Smooth Puffers	Tetraodontidae
<i>Tetraroge barbata</i>	Mangrove Waspfish	Tetrarogidae
<b>Tetrarogidae</b>	Waspfishes	Tetrarogidae
<b>Toxotidae</b>	Archerfishes	Toxotidae
<b>Toxotidae</b>	Banded Archerfish	Toxotidae
<i>Halimochirurgus alcocki</i>	Spikefish	Triacanthodidae
<b>Triacanthodidae</b>	Spikefishes	Triacanthodidae
<b>Trichonotidae</b>	Sand Divers	Trichonotidae
<i>Trichonotus sp</i>	Micronesian Sand-Diver	Trichonotidae
<i>Pterygotrigla multiocellata</i>	Ocellated Gurnard	Triglidae
<i>Pterygotrigla sp</i>	Gurnard	Triglidae
<b>Triglidae</b>	Gurnards	Triglidae
<i>Triodon macropterus</i>	3 Tooth Puffer	Triodontidae
<i>Triodon macropterus</i>	3 Tooth Puffer	Triodontidae
<b>Triodontidae</b>	Tripletooth Puffers	Triodontidae
<i>Ceratobregma helenae</i>	Triplefin	Tripterygiidae
<i>Enneapterygius hemimelas</i>	Triplefin	Tripterygiidae
<i>Enneapterygius minutus</i>	Triplefin	Tripterygiidae
<i>Enneapterygius nanus</i>	Triplefin	Tripterygiidae
<i>Helcogramma capidata</i>	Triplefin	Tripterygiidae
<i>Helcogramma chica</i>	Triplefin	Tripterygiidae
<i>Helcogramma hudsoni</i>	Triplefin	Tripterygiidae
<i>Norfolkia brachylepis</i>	Triplefin	Tripterygiidae
<b>Tripterygiidae</b>	Triplefins	Tripterygiidae
<i>Ucla xenogrammus</i>	Longjaw Triplefin	Tripterygiidae
<b>Genus: Tubipora</b>	Organpipe corals	Tubiporidae
<b>Uranoscopidae</b>	Stargazers	Uranoscopidae
<i>Uranoscopus sp</i>	Stargazer	Uranoscopidae
<i>Allomicrodesmus dorotheae</i>	Dorothea'S Wiggler	Xenisthmidae
<b>Xenisthmidae</b>	Flathead Wiggler	Xenisthmidae
<i>Xenisthmus polyzonatus</i>	Barred Wiggler	Xenisthmidae
<i>Xenisthmus sp.</i>	Wiggler	Xenisthmidae
<b>Zanclidae</b>	Moorish Idols	Zanclidae
<i>Zanclus cornutus</i>	Moorish Idol	Zanclidae
<b>Order: Zoanthinaria</b>	Soft zoanthid corals	Multiple families

Misc. Bottomfish	Bottomfish (Misc)	
Misc. Reeffish	Reef fish (misc)	
Misc. Shallow bottomfish	Shallow Bottomfish (misc)	
<i>Acanthaster planci</i>	Crown-Of-Thorns	Acanthasteridae
<b>Acteonidae</b>	Bubble Shells,Sea Hares	Acteonidae
<i>Pupa solidula</i>	Solid Pupa	Acteonidae
<i>Alpheidae</i>	Snapping Shrimp	Alpheidae
<i>Alpheus bellulus</i>	Snapping Shrimp	Alpheidae
<i>Alpheus paracrinitus</i>	Snapping Shrimp	Alpheidae
<i>Synalpheus carinatus</i>	Snapping Shrimp	Alpheidae
<i>Hydatina physis</i>	Gr-Lined Paber Bubble	Aplustridae
<i>Anadara antiquata</i>	Antique Ark	Arcidae
<i>Arca navicularis</i>	Indo-Pacific Ark	Arcidae
<i>Arca ventricosa</i>	Ventricose Ark	Arcidae
<b>Arcidae</b>	Ark Shells	Arcidae
<i>Barbatia amygdalumtotsum</i>	Almond Ark	Arcidae
<i>Argonauta argo</i>	Common Paper Nautilus	Argonautidae
<i>Argonauta hians</i>	Brown Paper Nautilus	Argonautidae
<i>Argonauta nodosa</i>	Nodose Paper Nautilus	Argonautidae
<i>Argonauta nouryi</i>	Noury'S Paper Nautilus	Argonautidae
<i>Argonauta nouryi</i>	Gruner'S Paper Nautilus	Argonautidae
<b>Argonautidae</b>	Paper Nautiluses	Argonautidae
<b>Asterinidae</b>	Starfish	Asterinidae
<b>Asteropseidae</b>	Starfish	Asteropseidae
<b>Astropectinidae</b>	Starfish	Astropectinidae
<i>Atlanta peronii</i>	Peron's Sea Butterfly	Atlantidae
<b>Atlantidae</b>	heteropods	Atlantidae
<i>Balanus sp.</i>	Acorn Barnacle	Balanidae
<i>Parhippolyte misticia</i>	Hump-Backed Shrimp	Barbouriidae
<b>Bathysquillidae</b>	Mantis Shrimp	Bathysquillidae
<b>Brissidae</b>	Irregular Urchins	Brissidae
<b>Bryozoa</b>	Moss animals	Bryozoa
<b>Buccinidae</b>	Goblets,Dwarf Tritons	Buccinidae
<i>Cantharus fumosus</i>	Smoky Goblet	Buccinidae
<i>Cantharus undosus</i>	Waved Goblet	Buccinidae
<i>Clivipollia pulchra</i>	Beautiful Goblet	Buccinidae
<i>Pollia fragaria</i>	Strawberry Goblet	Buccinidae
<i>Bulla ampulla</i>	Ampule Bubble	Bullidae
<b>Bullidae</b>	Bubble Shells	Bullidae
<i>Bullina lineata</i>	Lined Bubble	Bullidae
<i>Micromelo undatus</i>	Mini Lined-Bubble	Bullidae

<i>Bursa bubo</i>	Giant Frog Shell	Bursidae
<i>Bursa bufonia</i>	Warty Frog Shell	Bursidae
<i>Bursa cruentata</i>	Blood-Stain Frog Shell	Bursidae
<i>Bursa granulata</i>	Granulate Frog Shell	Bursidae
<i>Bursa lamarcki</i>	Lamarck'S Frog Shell	Bursidae
<i>Bursa mammata</i>	Udder Frog Shell	Bursidae
<i>Bursa rhodostoma</i>	Wine-Mth Frog Shell	Bursidae
<i>Bursa rubeta</i>	Ruddy Frog Shell	Bursidae
<b>Bursidae</b>	Frog Shells	Bursidae
<i>Tutufa (Tutufa) bufo</i>	Red-Mth Frog Shell	Bursidae
<i>Calappa bicornis</i>	Box Crab	Calappidae
<i>Calappa calappa</i>	Box Crab	Calappidae
<i>Calappa hepatica</i>	Box Crab	Calappidae
<b>Calappidae</b>	Box Crabs	Calappidae
<i>Cycloes granulosa</i>	Box Crab	Calappidae
<i>Mursia spinimanus</i>	Box Crab	Calappidae
<b>Cancridae</b>	Cancrids	Cancridae
<i>Hippopus hippopus</i>	Giant Clam	Cardiidae
<i>Subfamily: Tridacninae</i>	Giant Clams	Cardiidae
<i>Tridacna crocea</i>	Giant Clam	Cardiidae
<i>Tridacna derasa</i>	Lagoon Giant Clam	Cardiidae
<i>Tridacna gigas</i>	Giant Clam	Cardiidae
<i>Tridacna maxima</i>	Common Giant Clam	Cardiidae
<i>Tridacna squamosa</i>	Fluted Giant Clam	Cardiidae
<i>Cardita variegata</i>	Varitated Cardita	Carditidae
<b>Carditidae</b>	Carditid Clams	Carditidae
<i>Fragum fragum</i>	Pac Strawberry Cockle	Carditidae
<i>Trachycardium angulatum</i>	Angulate Cockle	Carditidae
<i>Carpilius convexus</i>	7-11 Crab	Carpiliidae
<i>Carpilius maculatus</i>	7-11 Crab	Carpiliidae
<i>Casmaria erinaceus</i>	Vibex Bonnet	Cassidae
<i>Casmaria ponderosa</i>	Heavy Bonnet	Cassidae
<b>Cassidae</b>	Helmet Shells	Cassidae
<i>Cassis cornuta</i>	Horned Helmet	Cassidae
<i>Cavolinia globulosa</i>	Sea Butterfly	Cavoliniidae
<i>Cavolinia tridentata</i>	3-Toothed Cavoline	Cavoliniidae
<i>Cavolinia uncinata</i>	Uniccate Cavoline	Cavoliniidae
<b>Cavoliniidae</b>	Sea Butterflies	Cavoliniidae
<i>Diacria trispinosa</i>	3-Spined Cavoline	Cavoliniidae
<i>Cephea sp</i>	Jellyfish	Cepheidae
<b>Cerithiidae</b>	Turret, Worm-Shells	Cerithiidae

<i>Cerithium columna</i>	Column Certh	Cerithiidae
<i>Cerithium nodulosum</i>	Giant Knobbed Certh	Cerithiidae
<i>Clypeomorus bifasciata</i>	Morus Certh	Cerithiidae
<i>Rhinoclavis aspera</i>	Rough Vertigus	Cerithiidae
<i>Rhinoclavis sinensis</i>	Obelisk Vertigus	Cerithiidae
<i>Chama lazarus</i>	Lazarus Jewel Box	Chamidae
<b>Chamidae</b>	Jewel Boxes	Chamidae
<i>Acanthopleura spinosa</i>	Spiney Chiton	Chitonidae
<b>Chitonidae</b>	Chitons	Chitonidae
<b>Cidaridae</b>	Cidarians	Cidaridae
<i>Clio cuspidata</i>	Pyramid Clio	Cliidae
<i>Clio pyramidata</i>	Irregular Urchins	Cliidae
<b>Clypeasteridae</b>		Clypeasteridae
<i>Colubraria muricata</i>	Maculated Dwarf Triton	Colubrariidae
<i>Colubraria nitidula</i>	Shiny Dwarf Triton	Colubrariidae
<i>Colubraria tortuosa</i>	Twisted Dwarf Triton	Colubrariidae
<b>Conidae</b>	Cone Shells	Conidae
<i>Conus arenatus</i>	Sand-Dusted Cone	Conidae
<i>Conus aulicus</i>	Princely Cone	Conidae
<i>Conus aureus</i>	Aureus Cone	Conidae
<i>Conus auricomus</i>	Gold-Leaf Cone	Conidae
<i>Conus bandanus</i>	Banded Marble-Cone	Conidae
<i>Conus bullatus</i>	Bubble Cone	Conidae
<i>Conus capitaneus</i>	Captain Cone	Conidae
<i>Conus catus</i>	Cat Cone	Conidae
<i>Conus chaldaeus</i>	Chaldean Cone	Conidae
<i>Conus coffeae</i>	Leaden Cone	Conidae
<i>Conus coronatus</i>	Crowned Cone	Conidae
<i>Conus cylindraceus</i>	Cylindrical Cone	Conidae
<i>Conus daucus</i>	Comma Cone	Conidae
<i>Conus distans</i>	Distantly-Lined Cone	Conidae
<i>Conus ebraeus</i>	Hebrew Cone	Conidae
<i>Conus eburneus</i>	Ivory Cone	Conidae
<i>Conus episcopatus</i>	Episcopus Cone	Conidae
<i>Conus flavidus</i>	Pacific Yellow Cone	Conidae
<i>Conus frigidus</i>	Frigid Cone	Conidae
<i>Conus generalis</i>	General Cone	Conidae
<i>Conus geographus</i>	Geography Cone	Conidae
<i>Conus glans</i>	Acorn Cone	Conidae
<i>Conus imperialis</i>	Imperial Cone	Conidae
<i>Conus legatus</i>	Ambassador Cone	Conidae

<i>Conus leopardus</i>	Leopard Cone	Conidae
<i>Conus litoglyphus</i>	Lithography Cone	Conidae
<i>Conus litteratus</i>	Lettered Cone	Conidae
<i>Conus lividus</i>	Livid Cone	Conidae
<i>Conus luteus</i>	Luteus Cone	Conidae
<i>Conus magnificus</i>	Dignified Cone	Conidae
<i>Conus miles</i>	Soldier Cone	Conidae
<i>Conus miliaris</i>	1000-Spot Cone	Conidae
<i>Conus moreleti</i>	Morelet'S Cone	Conidae
<i>Conus muriculatus</i>	Muricate Cone	Conidae
<i>Conus musicus</i>	Music Cone	Conidae
<i>Conus mustelinus</i>	Weasel Cone	Conidae
<i>Conus obscurus</i>	Obscure Cone	Conidae
<i>Conus pertusus</i>	Pertusus Cone	Conidae
<i>Conus pulicarius</i>	Flea-Bite Cone	Conidae
<i>Conus rattus</i>	Rat Cone	Conidae
<i>Conus retifer</i>	Netted Cone	Conidae
<i>Conus sanguinolentus</i>	Blood-Stained Cone	Conidae
<i>Conus sponsalis</i>	Marriage Cone	Conidae
<i>Conus striatellus</i>	Striatellus Cone	Conidae
<i>Conus striatus</i>	Striated Cone	Conidae
<i>Conus terebra</i>	Terebra Cone	Conidae
<i>Conus tessulatus</i>	Checkered Cone	Conidae
<i>Conus textile</i>	Textile Cone	Conidae
<i>Conus tulipa</i>	Tulip Cone	Conidae
<i>Conus varius</i>	Varius Cone	Conidae
<i>Conus vexillum</i>	Flag Cone	Conidae
<i>Conus vitulinus</i>	Calf Cone	Conidae
<i>Mitra tuberosa</i>	Bumpy Miter	Costellariidae
<i>Vexillum cancellarioides</i>	Cancellaria Miter	Costellariidae
<i>Vexillum crocatum</i>	Saffron Miter	Costellariidae
<i>Vexillum exasperatum</i>	Roughened Miter	Costellariidae
<i>Vexillum patriarchale</i>	Patriarchal Miter	Costellariidae
<i>Vexillum semifasciatum</i>	Half-Banded Miter	Costellariidae
<i>Vexillum speciosum</i>	Specious Miter	Costellariidae
<i>Vexillum turben</i>	Turbin Miter	Costellariidae
<i>Vexillum unifasciatum</i>	Decorated Miter	Costellariidae
<b>Cryptochiridae</b>	Hapalocarcinids	Cryptochiridae
<b>Cucumariidae</b>	Sea Cucumbers	Cucumariidae
<i>Cuvierina columnella</i>	Cigar Pteropod	Cuvierinidae
<i>Cribrarula cribraria</i>	Sieve Cowry	Cypraeidae

<i>Cryptocypraea dillwyni</i>	Dillwyn'S Cowry	Cypraeidae
<i>Cypraea arabica</i>	Arabian Cowry	Cypraeidae
<i>Cypraea argus</i>	Eyed Cowry	Cypraeidae
<i>Cypraea beckii</i>	Beck'S Cowry	Cypraeidae
<i>Cypraea caputserpentis</i>	Snake'S Head Cowry	Cypraeidae
<i>Cypraea carneola</i>	Carnelian Cowry	Cypraeidae
<i>Cypraea chinensis</i>	Chinese Cowry	Cypraeidae
<i>Cypraea clandestina</i>	Clandestine Cowry	Cypraeidae
<i>Cypraea cylindrica</i>	Sowerby'S Cowry	Cypraeidae
<i>Cypraea eglantina</i>	Eglantine Cowry	Cypraeidae
<i>Cypraea erosa</i>	Eroded Cowry	Cypraeidae
<i>Cypraea globulus</i>	Globular Cowry	Cypraeidae
<i>Cypraea helvola</i>	Honey Cowry	Cypraeidae
<i>Cypraea hirundo</i>	Swallow Cowry	Cypraeidae
<i>Cypraea isabella</i>	Isabelle Cowry	Cypraeidae
<i>Cypraea labrolineata</i>	Lined-Lip Cowry	Cypraeidae
<i>Cypraea limacina</i>	Limacina Cowry	Cypraeidae
<i>Cypraea mappa</i>	Map Cowry	Cypraeidae
<i>Cypraea mariae</i>	Marie'S Cowry	Cypraeidae
<i>Cypraea mauritiana</i>	Humpback Cowry	Cypraeidae
<i>Cypraea microdon</i>	Microdon Cowry	Cypraeidae
<i>Cypraea moneta</i>	Money Cowry	Cypraeidae
<i>Cypraea poraria</i>	Porus Cowry	Cypraeidae
<i>Cypraea punctata</i>	Punctata Cowry	Cypraeidae
<i>Cypraea scurra</i>	Jester Cowry	Cypraeidae
<i>Cypraea stolid</i>	Stolid Cowry	Cypraeidae
<i>Cypraea teres</i>	Teres Cowry	Cypraeidae
<i>Cypraea tigris</i>	Tiger Cowry	Cypraeidae
<i>Cypraea ventriculus</i>	Ventral Cowry	Cypraeidae
<i>Cypraea ziczac</i>	Undulating Cowry	Cypraeidae
<b>Cypraeidae</b>	Cowrys	Cypraeidae
<i>Lyncina aurantium</i>	Golden Cowry	Cypraeidae
<i>Lyncina lynx</i>	Lynx Cowry	Cypraeidae
<i>Lyncina vitellus</i>	Pacific Deer Cowry	Cypraeidae
<i>Mauritia depressa</i>	Depressed Cowry	Cypraeidae
<i>Mauritia maculifera</i>	Reticulated Cowry	Cypraeidae
<i>Monetaria annulus</i>	Gold-Ringer Cowry	Cypraeidae
<i>Palmadusta humphreyii</i>	Humphrey'S Cowry	Cypraeidae
<i>Pustularia bistrinotata</i>	Bistro Cowry	Cypraeidae
<i>Pustularia cicercula</i>	Chick-Pea Cowry	Cypraeidae
<i>Staphylaea nucleus</i>	Nuclear Cowry	Cypraeidae



<i>Staphylaea staphylaea</i>	Grape Cowry	Cypraeidae
<i>Talparia talpa</i>	Mole Cowry	Cypraeidae
<i>Diadema savignyi</i>	Longspine Urchin	Diadematidae
<i>Diadema setosum</i>	Longspine Urchin	Diadematidae
<b>Diadematidae</b>	Sea Urchins	Diadematidae
<i>Echinothrix calamaris</i>	Longspine Urchin	Diadematidae
<i>Echinothrix diadema</i>	Longspine Urchin	Diadematidae
<i>Dardanus gemmatus</i>	Marine Hermit Crab	Diogenidae
<i>Dardanus megistos</i>	Marine Hermit Crab	Diogenidae
<i>Dardanus pedunculatus</i>	Marine Hermit Crab	Diogenidae
<i>Dardanus sp.</i>	Marine Hermit Crab	Diogenidae
<b>Diogenidae</b>	Marine Hermit Crabs	Diogenidae
<b>Superfamily Doridoidea</b>	Dorid Nudibranchs	Dorididae
<i>Dorippe frascone</i>	Dorippid Crab	Dorippidae
<i>Dromia dormia</i>	Sponge Crab	Dromiidae
<b>Dromiidae</b>	Sponge Crabs	Dromiidae
<b>Echinasteridae</b>	Reef Starfish	Echinasteridae
<b>Echinometridae</b>	Sea Urchins	Echinometridae
<i>Heterocentrotus mammillatus</i>	Slate Pencil Urchin	Echinometridae
<b>Echinothuriidae</b>	Sea Urchins	Echinothuriidae
<b>Ellobiidae</b>	Melampus Shells	Ellobiidae
<i>Melampus luteus</i>	Yellow Melampus	Ellobiidae
<i>Enoplometopus debelius</i>	Soft Lobster	Enoplometopidae
<i>Enoplometopus holthuisi</i>	Soft Lobster	Enoplometopidae
<i>Enoplometopus occidentalis</i>	Hairy Lobster	Enoplometopidae
<b>Eurysquillidae</b>	Mantis Shrimp	Eurysquillidae
<b>Fasciolariidae</b>	Spindles	Fasciolariidae
<i>Latirus nodatus</i>	Nobby Spindle	Fasciolariidae
<i>Leucozonia rudis</i>	Spindle	Fasciolariidae
<b>Galatheidae</b>	Squat Lobsters	Galatheidae
<b>Gecarcinidae</b>	Gecarcinids	Gecarcinidae
<i>Gonodactylaceus mutatus</i>	Mantis Shrimp	Gonodactylidae
<i>Gonodactylellus affinis</i>	Mantis Shrimp	Gonodactylidae
<b>Gonodactylidae</b>	Mantis Shrimp	Gonodactylidae
<i>Gonodactylus chiragra</i>	Mantis Shrimp	Gonodactylidae
<i>Gonodactylus platysoma</i>	Mantis Shrimp	Gonodactylidae
<i>Gonodactylus smithii</i>	Mantis Shrimp	Gonodactylidae
<b>Grapsidae</b>	Shore Crabs	Grapsidae
<i>Grapsus albolineatus</i>	Shore Crab	Grapsidae
<i>Grapsus tenuicrustatus</i>	Shore Crab	Grapsidae
<i>Atys naucum</i>	Wh Pacific Atys	Haminoeidae

<i>Harpa amouretta</i>	Little Love Harp	Harpidae
<i>Harpa harpa</i>	True Harp	Harpidae
<i>Harpa major</i>	Major Harp	Harpidae
<b>Harpidae</b>	Harp Shells	Harpidae
<b>Hemisquillidae</b>	Mantis Shrimp	Hemisquillidae
<i>Hexabranchnus sanguineus</i>	Spanish Dancer	Hexabranchnidae
<i>Emerita pacifica</i>	Mole Crab	Hippidae
<b>Hippolytidae</b>	Hump-Backed Shrimp	Hippolytidae
<i>Thor amboinensis</i>	Ambonian Shrimp	Hippolytidae
<i>Actinopyga lecanora</i>	Stonefish	Holothuriidae
<i>Actinopyga miliaris</i>	Blackfish	Holothuriidae
<i>Actinopyga obesa</i>	Sea Cucumber	Holothuriidae
<i>Actinopyga sp.</i>	Sea Cucumber	Holothuriidae
<i>Bohadschia argus</i>	Sea Cucumber	Holothuriidae
<i>Bohadschia marmorata</i>	Brown Sandfish	Holothuriidae
<i>Bohadschia paradoxa</i>	Sea Cucumber	Holothuriidae
<i>Bohadschia sp.</i>	Sea Cucumber	Holothuriidae
<i>Holothuria atra</i>	Lollyfish	Holothuriidae
<i>Holothuria edulis</i>	Pinkfish	Holothuriidae
<i>Holothuria fuscogilva</i>	White Teatfish	Holothuriidae
<i>Holothuria fuscopunctata</i>	Elephant'S Trunkfish	Holothuriidae
<i>Holothuria hilla</i>	Sea Cucumber	Holothuriidae
<i>Holothuria impatiens</i>	Sea Cucumber	Holothuriidae
<i>Holothuria leucospilota</i>	Sea Cucumber	Holothuriidae
<i>Holothuria sp</i>	Sea Cucumber	Holothuriidae
<b>Holothuriidae</b>	Sea Cucumber	Holothuriidae
<i>Pearsonothuria graeffei</i>	Sea Cucumber	Holothuriidae
<b>Homolidae</b>	Homolids	Homolidae
<b>Hydrozoans</b>	Hydroid corals	Hydrozoans
<i>Hymenocera picta</i>	Harlequin Shrimp	Hymenoceridae
<b>Hyperiididae</b>	Hyperid Amphipods	Hyperiididae
<i>Achaeus japonicus</i>	Spider Crab	Inachidae
<i>Camposcia retusa</i>	Decorator Crab	Inachidae
<i>Janthina janthina</i>	Janthina Snail	Janthinidae
<b>Janthinidae</b>	Pelagic Snails	Janthinidae
<i>Lima vulgaris</i>	Indo-Pac Spiny Lima	Limidae
<i>Limaria fragilis</i>	Fragile Lima	Limidae
<b>Limidae</b>	Limas	Limidae
<b>Lithodidae</b>	Lithodids	Lithodidae
<b>Lithoglyptidae</b>	Barnacles	Lithoglyptidae
<i>Littoraria undulata</i>	Undulate Periwinkle	Littorinidae

<i>Littorina scabra</i>	Scabra Periwinkle	Littorinidae
<b>Littorinidae</b>	Periwinkles	Littorinidae
<i>Sepioteuthis lessoniana</i>	Bigfin Reef Squid	Loliginidae
<i>Codakia punctata</i>	Punctate Lucina	Lucinidae
<b>Lucinidae</b>	Lucinas	Lucinidae
<b>Lycaeidae</b>	Lycaeids	Lycaeidae
<b>Lysiosquillidae</b>	Mantis Shrimp	Lysiosquillidae
<i>Macrophthalmus telescopicus</i>	Telescope-Eye Crab	Macrophthalmidae
<b>Majidae</b>	Spider Crabs	Majidae
<i>Mithrodia bradleyi</i>	Spiney-Armed Starfish	Mithrodiidae
<i>Domiporta filaris</i>	File Miter	Mitridae
<i>Domiporta granatina</i>	Flecked Miter	Mitridae
<i>Imbricaria conularis</i>	Cone-Like Miter	Mitridae
<i>Imbricaria olivaeformis</i>	Olive-Shaped Miter	Mitridae
<i>Imbricaria punctata</i>	Bonelike Miter	Mitridae
<i>Mitra acuminata</i>	Acuminate Miter	Mitridae
<i>Mitra bernhardina</i>	Bernhard'S Miter	Mitridae
<i>Mitra cardinalis</i>	Cardinal Miter	Mitridae
<i>Mitra chrysalis</i>	Chrysalis Miter	Mitridae
<i>Mitra chrysostoma</i>	Gold-Mth Miter	Mitridae
<i>Mitra coffea</i>	Coffee Miter	Mitridae
<i>Mitra contracta</i>	Contracted Miter	Mitridae
<i>Mitra cucumerina</i>	Kettle Miter	Mitridae
<i>Mitra ferruginea</i>	Rusty Miter	Mitridae
<i>Mitra fraga</i>	Strawberry Miter	Mitridae
<i>Mitra imperialis</i>	Imperial Miter	Mitridae
<i>Mitra incompta</i>	Tesselate Miter	Mitridae
<i>Mitra mitra</i>	Episcopal Miter	Mitridae
<i>Mitra papalis</i>	Papal Miter	Mitridae
<i>Mitra rubritincta</i>	Red-Painted Miter	Mitridae
<i>Mitra stictica</i>	Pontifical Miter	Mitridae
<b>Mitridae</b>	Miter Shells	Mitridae
<i>Neocancilla clathrus</i>	Clathrus Miter	Mitridae
<i>Neocancilla papilio</i>	Butterfly Miter	Mitridae
<i>Pterygia crenulata</i>	Crenulate Miter	Mitridae
<i>Pterygia fenestrata</i>	Fenestrate Miter	Mitridae
<i>Pterygia nucea</i>	Nut Miter	Mitridae
<i>Pterygia scabricula</i>	Rough Miter	Mitridae
<i>Sabricola casta</i>	Chaste Miter	Mitridae
<b>Phylum Annelids</b>	Segmented worms	Multiple families
<b>Class Asteroidea</b>	Starfish	Multiple families

<b>Class Bivalvia</b>	Bivalves	Multiple families
<b>Class Crinoidea</b>	Crinoids	Multiple families
<b>subPhylum Crustacea</b>	Lobsters, Shrimps/Mantis shrimps, true crabs and hermit crabs	Multiple families
<b>Class Echinoidea</b>	Sea Urchins	Multiple families
<b>Class Echinoidea</b>	Sea Urchins	Multiple families
<b>Class Holothuroidea</b>	Sea Cucumbers	Multiple families
<b>Class Mollusca</b>	Mollusca	Multiple families
<b>Class Ophiuroidea</b>	Basket,Brittle, Serpentstars	Multiple families
<b>Infraorder: Brachyura</b>	True Crabs	Multiple families
<b>Order Archaeogastropoda</b>	Diotocardia	Multiple families
<b>Order Decapoda</b>	Decapod Crustaceans	Multiple families
<b>Order Teuthida</b>	Squids	Multiple families
<b>Order: Stomatopoda</b>	Mantis Shrimps	Multiple families
<i>Chicomurex laciniatus</i>	Lacy Murex	Muricidae
<i>Chicoreus brunneus</i>	Burnt Murex	Muricidae
<i>Chicoreus ramosus</i>	Ramose Murex	Muricidae
<i>Chicoreus triquetra</i>	Triquetra Murex	Muricidae
<i>Coralliophila erosa</i>	Eroded Coral Shell	Muricidae
<i>Coralliophila violacea</i>	Violet Coral Shell	Muricidae
<i>Cronia biconica</i>	Bionic Rock Shell	Muricidae
<i>Drupa clathrata</i>	Clatherate Drupe	Muricidae
<i>Drupa elegans</i>	Elegant Pacific Drupe	Muricidae
<i>Drupa grossularia</i>	Digitate Pacific Drupe	Muricidae
<i>Drupa morum</i>	Purple Pacific Drupe	Muricidae
<i>Drupa ricinus</i>	Prickley Pacific Drupe	Muricidae
<i>Drupa rubusidaeus</i>	Strawberry Drupe	Muricidae
<i>Homalocantha anatomica</i>	Anatomical Murex	Muricidae
<i>Mancinella armigera</i>	Belligerent Rock Shell	Muricidae
<i>Marchia bipinnata</i>	Pinnacle Murex	Muricidae
<i>Marchia martinetana</i>	Fenestrate Murex	Muricidae
<i>Menathais tuberosa</i>	Tuberoso Rock Shell	Muricidae
<b>Muricidae</b>	Murex Shells	Muricidae
<i>Naquetia trigonula</i>	Tragonula Murex	Muricidae
<i>Nassa francolina</i>	Francolina Jopas	Muricidae
<i>Pterynotus elongatus</i>	Club Murex	Muricidae
<i>Pterynotus laqueatus</i>	Fluted Murex	Muricidae
<i>Pterynotus tripterus</i>	3-Winged Murex	Muricidae
<i>Purpura persica</i>	Perssian Purpura	Muricidae
<i>Quoyula madreporarum</i>	Quoy'S Coral Shell	Muricidae
<i>Rapa rapa</i>	Rapa Snail	Muricidae

<i>Subfamily Coralliophilinae</i>	Coral Shells	Muricidae
<i>Vitularia miliaris</i>	Spotted Vitularia	Muricidae
<b>Mytilidae</b>	Mussels	Mytilidae
<i>Septifer bilocularis</i>	Box Mussel	Mytilidae
<b>Nannosquillidae</b>	Mantis Shrimp	Nannosquillidae
<b>Nassariidae</b>	Nassa Mud Snails	Nassariidae
<i>Nassarius graniferus</i>	Granulated Nassa	Nassariidae
<i>Nassarius margaritifera</i>	Margarite Nassa	Nassariidae
<i>Nassarius papillosus</i>	Pimpled Basket	Nassariidae
<i>Mammilla mammata</i>	Breast-Shaped Moon	Naticidae
<b>Naticidae</b>	Moon Shells	Naticidae
<i>Polinices tumidus</i>	Pear-Shaped Moon	Naticidae
<b>Nautilidae</b>	Nautilus	Nautilidae
<i>Nautilus pompilius</i>	Chambered Nautilus	Nautilidae
<b>Nephropidae</b>	Soft Lobsters	Nephropidae
<i>Nerita albicilla</i>	Ox-Palate Nerite	Neritidae
<i>Nerita plicata</i>	Plicate Nerite	Neritidae
<i>Nerita polita</i>	Polished Nerite	Neritidae
<i>Nerita signata</i>	Reticulate Nerite	Neritidae
<b>Neritidae</b>	Nerites	Neritidae
<i>Callistoctopus ornatus</i>	Ornate Octopus	Octopodidae
<b>Octopodidae</b>	Octopus	Octopodidae
<i>Octopus cyanea</i>	Common Octopus	Octopodidae
<i>Octopus luteus</i>	Red Octopus	Octopodidae
<i>Octopus sp</i>	Octopus	Octopodidae
<i>Octopus sp</i>	Long-Armed Octopus	Octopodidae
<i>Octopus teuthoides</i>	Elongate Octopus	Octopodidae
<i>Ocypode ceratophthalma</i>	Large Ghost Crab	Ocypodidae
<i>Ocypode cordimana</i>	Ghost Crab	Ocypodidae
<i>Ocypode saratan</i>	Ghost Crab	Ocypodidae
<b>Ocypodidae</b>	Ocypodids	Ocypodidae
<b>Odontodactylidae</b>	Mantis Shrimp	Odontodactylidae
<i>Odontodactylus brevirostris</i>	Mantis Shrimp	Odontodactylidae
<i>Odontodactylus scyllarus</i>	Mantis Shrimp	Odontodactylidae
<i>Oliva annulata</i>	Amethyst Olive	Olividae
<i>Oliva carneola</i>	Carnelian Olive	Olividae
<i>Oliva miniacea</i>	Red-Mth Olive	Olividae
<i>Oliva paxillus</i>	Peg Olive	Olividae
<b>Olividae</b>	Olive Shells	Olividae
<i>Ophidiaster confertus</i>	Orange Starfish	Ophidiasteridae
<i>Octopus sp</i>	Pelagic Octopus	Opisthoteuthidae

<b>Oreasteridae</b>	Starfish	Oreasteridae
<i>Crassostrea gigas</i>	Giant Oyster	Ostreidae
<i>Crassostrea mordax</i>	Mangrove Oyster	Ostreidae
<b>Ostreidae</b>	True Oysters	Ostreidae
<i>Calpurnus verrucosus</i>	Umbilicate Ovula	Ovulidae
<i>Ovula ovum</i>	Common Egg Cowry	Ovulidae
<b>Ovulidae</b>	Egg Shells	Ovulidae
<i>Prionovolva fruticum</i>	Fruit Ovula	Ovulidae
<b>Paguridae</b>	Soldier Hermit Crab	Paguridae
<i>Paguritta gracilipes</i>	Coral Hermit Crab	Paguridae
<i>Paguritta harmsi</i>	Coral Hermit Crab	Paguridae
<i>Ancylomenes holthuisi</i>	Commensal Shrimp	Palaemonidae
<i>Cuapetes kororensis</i>	Commensal Shrimp	Palaemonidae
<i>Cuapetes tenuipes</i>	Commensal Shrimp	Palaemonidae
<i>Dasycaris zanzibarica</i>	Commensal Shrimp	Palaemonidae
<i>Gnathophylloides mineri</i>	Bumblebee Shrimp	Palaemonidae
<i>Gnathophyllum americanum</i>	Bumblebee Shrimp	Palaemonidae
<i>Laomenes amboinensis</i>	Commensal Shrimp	Palaemonidae
<i>Laomenes ceratophthalmus</i>	Commensal Shrimp	Palaemonidae
<i>Leander plumosus</i>	Palaemonid Shrimp	Palaemonidae
<b>Palaemonidae</b>	Palaemonid Shrimp	Palaemonidae
<i>Palaemonidae</i>	Commensal Shrimp	Palaemonidae
<i>Palaemonidae</i>	Bbee And Harlequin Shrimp	Palaemonidae
<i>Periclimenes brevicarpalis</i>	Commensal Shrimp	Palaemonidae
<i>Periclimenes imperator</i>	Commensal Shrimp	Palaemonidae
<i>Periclimenes inornatus</i>	Commensal Shrimp	Palaemonidae
<i>Periclimenes ornatus</i>	Commensal Shrimp	Palaemonidae
<i>Periclimenes psamathe</i>	Commensal Shrimp	Palaemonidae
<i>Periclimenes soror</i>	Commensal Shrimp	Palaemonidae
<i>Periclimenes venustus</i>	Commensal Shrimp	Palaemonidae
<i>Pliopontonia furtiva</i>	Commensal Shrimp	Palaemonidae
<i>Pontonides unciger</i>	Commensal Shrimp	Palaemonidae
<i>Stegopontonia commensalis</i>	Commensal Shrimp	Palaemonidae
<i>Urocaridella antonbruunii</i>	Palaemonid Shrimp	Palaemonidae
<i>Justitia longimana</i>	Long-Handed Lobster	Palinuridae
<i>Palinurellus wieneckii</i>	Mole Lobster	Palinuridae
<i>Panulirus femoristriga</i>	Painted Crayfish	Palinuridae
<i>Panulirus homarus</i>	Painted Crayfish	Palinuridae
<i>Panulirus longipes</i>	Painted Crayfish	Palinuridae
<i>Panulirus ornatus</i>	Painted Crayfish	Palinuridae
<i>Panulirus sp</i>	Painted Crayfish	Palinuridae

<i>Panulirus versicolor</i>	Painted Crayfish	Palinuridae
<i>Daldorfia horrida</i>	Elbow Crab	Parthenopidae
<b>Parthenopidae</b>	Elbow Crabs	Parthenopidae
<i>Rhinolambrus longispinus</i>	Elbow Crab	Parthenopidae
<i>Excellichlamys spectabilis</i>	Spectacular Scallop	Pectinidae
<i>Gloripallium speciosum</i>	Speciosus Scallop	Pectinidae
<i>Laevichlamys cuneata</i>	Cook'S Scallop	Pectinidae
<i>Laevichlamys squamosa</i>	Squamose Scallop	Pectinidae
<i>Mirapecten mirificus</i>	Miraculous Scallop	Pectinidae
<b>Pectinidae</b>	Scallops	Pectinidae
<i>Semipallium tigris</i>	Tiger Scallop	Pectinidae
<i>Heteropeneaeus sp</i>	Deepwater Shrimps	Penaeidae
<i>Metapeneaeopsis sp</i>	Penaeid Prawn	Penaeidae
<i>Metapeneaeopsis sp</i>	Penaeid Prawn	Penaeidae
<i>Metapeneaeopsis sp</i>	Penaeid Prawn	Penaeidae
<b>Penaeidae</b>	Panaeid Prawns	Penaeidae
<i>Penaeus latisulcatus</i>	Penaeid Prawn	Penaeidae
<i>Penaeus monodon</i>	Penaeid Prawn	Penaeidae
<i>Percnon planissimum</i>	Flat Rock Crab	Percnidae
<i>Distorsio anus</i>	Anal Triton	Personidae
<b>Phronimidae</b>	Phronimids	Phronimidae
Anchylomera	Anchylomerids	Phrosinidae
<b>Phyllophoridae</b>	Sea Cucumbers	Phyllophoridae
<i>Zebrida adamsii</i>	Urchin Crab	Pilumnidae
<i>Pinna bicolor</i>	Bicolor Pen Shell	Pinnidae
<i>Pinna saccata</i>	Baggy Pen Shell	Pinnidae
<b>Pinnidae</b>	Pen Shells	Pinnidae
<i>Plagusia depressa</i>	Shore Crab	Plagusiidae
<b>Platyscelidae</b>	Platyscelids	Platyscelidae
<i>Petrolisthes lamarckii</i>	Porcelain Crab	Porcellanidae
<b>Porcellanidae</b>	Porcellanid Crabs	Porcellanidae
<b>Phylum: Porifera</b>	Sponges	Multiple families
<i>Charybdis (Charybdis) hawaiiensis</i>	Red Sw Crab	Portunidae
<i>Charybdis erythroductyla</i>	Red-Legged Sw Crab	Portunidae
<i>Lupocyclus quinquedentatus</i>	Swimming Crab	Portunidae
<i>Podophthalmus vigil</i>	Long-Eyed Swimming Crab	Portunidae
<b>Portunidae</b>	Swimming Crabs	Portunidae
<i>Portunus pelagicus</i>	Blue Swimming Crab	Portunidae
<i>Portunus sanguinolentus</i>	Swimming Crab	Portunidae
<i>Scylla serrata</i>	Mangrove Crab	Portunidae

<i>Thalamita crenata</i>	Swimming Crab	Portunidae
Unid sp 1	Portunid Crab	Portunidae
Unid sp 2	Portunid Crab	Portunidae
<b>Protosquillidae</b>	Mantis Shrimp	Protosquillidae
<i>Asaphis deflorata</i>	Gaudy Sand Clam	Psammobiidae
<i>Asaphis violascens</i>	Pacific Sand Clam	Psammobiidae
<i>Pseudosquilla ciliata</i>	Mantis Shrimp	Pseudosquillidae
<b>Pseudosquillidae</b>	Mantis Shrimp	Pseudosquillidae
<i>Isognomon ehippium</i>	Saddle Tree Oyster	Pteriidae
<i>Pinctada margaritifera</i>	Pearl Oyster	Pteriidae
<b>Pteriidae</b>	Pearl Oysters	Pteriidae
<b>Pteriidae</b>	Tree Oysters	Pteriidae
<i>Milda ventricosa</i>	Ventricose Milda	Pyramidellidae
<i>Otopleura auriscati</i>	Cat'S Ear Otopleura	Pyramidellidae
<i>Pyramidella sulcata</i>	Sulcate Pyram	Pyramidellidae
<b>Pyramidellidae</b>	Pyram Shells	Pyramidellidae
<i>Charonia tritonis</i>	Triton Trumpet	Ranellidae
<i>Cymatium hepaticum</i>	Liver Triton	Ranellidae
<i>Cymatium lotorium</i>	Black-Spotted Triton	Ranellidae
<i>Gelagna succincta</i>	Clandestine Triton	Ranellidae
<i>Gutturnium muricinum</i>	Short-Neck Triton	Ranellidae
<i>Gyrineum pusillum</i>	Purple Gyre Triton	Ranellidae
<i>Gyrineum roseum</i>	Rosy Gyre Triton	Ranellidae
<i>Monoplex aquatilis</i>	Aquatile Hairy Triton	Ranellidae
<i>Monoplex gemmatus</i>	Jeweled Triton	Ranellidae
<i>Monoplex nicobaricus</i>	Nicobar Hairy Triton	Ranellidae
<i>Monoplex pilearis</i>	Common Hairy Triton	Ranellidae
<i>Monoplex vespaceus</i>	Dwarf Hairy Triton	Ranellidae
<b>Ranellidae</b>	Tritons	Ranellidae
<i>Ranularia pyrum</i>	Pear Triton	Ranellidae
<i>Septa rubecula</i>	Red Triton	Ranellidae
<i>Turritriton labiosus</i>	Wide-Lipped Triton	Ranellidae
<i>Lyreidus tridentatus</i>	3-Toothed Frog Crab	Raninidae
<i>Cinetorhynchus hiatti</i>	Hingebeak Prawn	Rhynchocinetidae
<b>Rhynchocinetidae</b>	Hinge-Beaked Prawns	Rhynchocinetidae
<i>Arctides regalis</i>	Slipper Lobster	Scyllaridae
<i>Ibacus sp</i>	Slipper Lobster	Scyllaridae
<i>Sepia latimanus</i>	Broadclub Cuttlefish	Sepiidae
<i>Sepia sp.</i>	Cuttlefish	Sepiidae
<i>Metasepia pfefferi</i>	Flamboyant Cuttlefish	Sepiolidae
<b>Solenoceridae</b>	Solenocerids	Solenoceridae



<b>Sphaerasteridae</b>	Starfish	Sphaerasteridae
<b>Spondylidae</b>	Thorny Oysters	Spondylidae
<i>Spondylus squamosus</i>	Ducal Thorny Oyster	Spondylidae
<i>Oratosquilla oratoria</i>	Mantis Shrimp	Squillidae
<b>Squillidae</b>	Mantis Shrimp	Squillidae
<b>Squillidae</b>	Mantis Shrimp	Squillidae
<b>Squillidae</b>	Mantis Shrimp	Squillidae
<b>Stenopodidae</b>	Cleaner Shrimp	Stenopodidae
<i>Stenopus hispidus</i>	Banded Coral Shrimp	Stenopodidae
<i>Stichopodidae</i>	Sea Cucumbers	Stichopodidae
<i>Stichopus chloronotus</i>	Greenfish	Stichopodidae
<i>Stichopus horrens</i>	Sea Cucumber	Stichopodidae
<i>Stichopus noctivagus</i>	Sea Cucumber	Stichopodidae
<i>Stichopus sp</i>	Sea Cucumber	Stichopodidae
<i>Stichopus variegatus</i>	Curryfish	Stichopodidae
<i>Thelenota ananas</i>	Prickly Redfish	Stichopodidae
<i>Thelenota anax</i>	Amberfish	Stichopodidae
<i>Thelenota sp.</i>	Sea Cucumber	Stichopodidae
<i>Harpago chiragra</i>	Chiragra Spider Conch	Strombidae
<i>Lambis crocata</i>	Ormouth Spider Conch	Strombidae
<i>Lambis lambis</i>	Common Spider Conch	Strombidae
<i>Lambis scorpius</i>	Scorpio Conch	Strombidae
<i>Lambis sp.</i>	Spider Conch	Strombidae
<i>Lambis truncata</i>	Giant Spider Conch	Strombidae
<i>Sinustrombus taurus</i>	Bull Conch	Strombidae
<b>Strombidae</b>	True Conchs	Strombidae
<i>Strombus dentatus</i>	Samar Conch	Strombidae
<i>Strombus fragilis</i>	Fragile Conch	Strombidae
<i>Strombus gibberulus</i>	Gibbose Conch	Strombidae
<i>Strombus haemastoma</i>	Lavender-Mouth Conch	Strombidae
<i>Strombus lentiginosus</i>	Silver-Lip Conch	Strombidae
<i>Strombus luhuanus</i>	Red-Lip Conch	Strombidae
<i>Strombus microurceus</i>	Micro Conch	Strombidae
<i>Strombus mutabilis</i>	Mutable Conch	Strombidae
<i>Strombus plicatus</i>	Pretty Conch	Strombidae
<i>Strombus sinuatus</i>	Lacinate Conch	Strombidae
<i>Terebellum terebellum</i>	Terebellum Conch	Strombidae
<i>Synapta maculata</i>	Sea Cucumber	Synaptidae
<i>Synapta sp</i>	Sea Cucumber	Synaptidae
<b>Synaptidae</b>	Sea Cucumbers	Synaptidae
<b>Synaptidae</b>	Sea Cucumber	Synaptidae

<i>Trochus niloticus</i>	Top Shell	Tegulidae
<i>Serratina capsoides</i>	Box-Like Tellin	Tellinidae
<i>Tellina linguafelis</i>	Cat'S Tongue Tellin	Tellinidae
<i>Tellina remies</i>	Remie'S Tellin	Tellinidae
<i>Tellina scobinata</i>	Rasp Tellin	Tellinidae
<b>Tellinidae</b>	Tellin Clams	Tellinidae
<b>Temnopleuridae</b>	Sea Urchins	Temnopleuridae
<i>Hastula lanceata</i>	Lance Auger	Terebridae
<i>Hastula penicillata</i>	Pencil Auger	Terebridae
<i>Terebra affinis</i>	Similar Auger	Terebridae
<i>Terebra areolata</i>	Fly-Spotted Auger	Terebridae
<i>Terebra argus</i>	Eyed Auger	Terebridae
<i>Terebra babylonica</i>	Babylonian Auger	Terebridae
<i>Terebra cerethina</i>	Certhlike Auger	Terebridae
<i>Terebra chlorata</i>	Short Auger	Terebridae
<i>Terebra crenulata</i>	Crenulated Auger	Terebridae
<i>Terebra dimidiata</i>	Dimidiate Auger	Terebridae
<i>Terebra felina</i>	Tiger Auger	Terebridae
<i>Terebra funiculata</i>	Funnel Auger	Terebridae
<i>Terebra guttata</i>	Spotted Auger	Terebridae
<i>Terebra maculata</i>	Marlinspike Auger	Terebridae
<i>Terebra nebulosa</i>	Cloud Auger	Terebridae
<i>Terebra subulata</i>	Subulate Auger	Terebridae
<i>Terebra undulata</i>	Undulate Auger	Terebridae
<b>Terebridae</b>	Auger Shells	Terebridae
<i>Tetraclitella divisa</i>	Acorn Barnacle	Tetraclitidae
<i>Malea pomum</i>	Apple Tun	Tonnidae
<i>Tonna perdix</i>	Partridge Tun	Tonnidae
<b>Tonnidae</b>	Tun Shells	Tonnidae
<i>Pseudoboletia maculata</i>	Common Urchin	Toxopneustidae
<i>Toxopneustes pileolus</i>	Flower Urchin	Toxopneustidae
<b>Toxopneustidae</b>	Shortspine Urchins	Toxopneustidae
<i>Tripneustes gratilla</i>	Shortspine Urchin	Toxopneustidae
<i>Tectus pyramis</i>	Pyramid Top	Trochidae
<b>Trochidae</b>	Top Shells	Trochidae
<i>Trochus radiatus</i>	Radiate Top	Trochidae
<b>Subphylum: Tunicates</b>	Tunicates	Multiple families
<b>Turbinellidae</b>	Vases	Turbinellidae
<i>Vasum ceramicum</i>	Ceramic Vase	Turbinellidae
<i>Vasum turbinellum</i>	Common Pacific Vase	Turbinellidae
<b>Turbinidae</b>	Turban Shell	Turbinidae

<i>Turbo argyrostomus</i>	Silver-Mouth Turbin	Turbinidae
<i>Turbo petholatus</i>	Tapestry Turbin	Turbinidae
<i>Turbo setosus</i>	Rough Turbin	Turbinidae
<i>Gafrarium tumidum</i>	Tumid Venus	Veneridae
<i>Lioconcha castrensis</i>	Camp Pitar Venus	Veneridae
<i>Lioconcha hieroglyphica</i>	Hieroglyphic Venus	Veneridae
<i>Lioconcha ornata</i>	Ornate Pitar Venus	Veneridae
<i>Periglypta crispata</i>	Crispate Venus	Veneridae
<i>Periglypta puerpera</i>	Youthful Venus	Veneridae
<i>Periglypta reticulata</i>	Reticulate Venus	Veneridae
<b>Veneridae</b>	Venus Shells	Veneridae
<i>Eriphia sebana</i>	Redeye Crab	Xanthidae
<i>Etisus dentatus</i>	Red-Reef Crab	Xanthidae
<i>Etisus splendidus</i>	Red-Reef Crab	Xanthidae
<i>Etisus utilis</i>	Brown-Reef Crab	Xanthidae
Unid Megalops	Xanthid Crab	Xanthidae
Unid sp 1	Xanthid Crab	Xanthidae
Unid sp 2	Xanthid Crab	Xanthidae
<b>Xanthidae</b>	Dark-Finger Coral Crabs	Xanthidae
<i>Zosimus aeneus</i>	Shallow Reef Crab	Xanthidae
<i>Caulerpa racemosa</i>	Algae	Caulerpaceae
<i>Caulerpaceae</i>	Algae	Caulerpaceae
<i>Halodule uninervis</i>	Algae	Cymodoceaceae
<i>Division: Anthophyta</i>	Algae	Multiple families
<i>Sargassum polycystum</i>	Algae	Sargassaceae
<i>Turbinaria ornata</i>	Algae	Sargassaceae
<i>Enteromorpha clathrata</i>	Algae	Ulvaceae
	Live rock	

### 3 COMMONWEALTH OF NORTHERN MARIANA ISLANDS ECOSYSTEM COMPONENT SPECIES

#### 3.1 Bottomfish Ecosystem Component Species

Scientific Name	Common Name	FAMILY
<i>Seriola dumerili</i>	amberjack	Carangidae
<i>Lethrinus amboinensis</i>	ambon emperor	Lethrinidae
<i>Epinephelus fasciatus</i>	blacktip grouper	Serranidae
<i>Caranx lugubris</i>	black trevally, jack	Carangidae
<i>Randallichthys filamentosus</i>	Randall's snapper	Lutjanidae
<i>Hyporthodus octofasciatus</i>	eightband grouper	Serranidae
<i>Aprion virescens</i>	grey snapper, jobfish	Lutjanidae

#### 3.2 Crustacean Ecosystem Component Species

Scientific Name	Common Name	FAMILY
<i>Panulirus marginatus</i>	spiny lobster	Palinuridae
<i>Panulirus penicillatus</i>	spiny lobster	Palinuridae
<i>Heterocarpus sp.</i>	deepwater shrimp (saltwater shrimp)	Pandalidae
<i>Ranina ranina</i>	kona crab	Raninidae
Family Scyllaridae	slipper lobster	Scyllaridae

#### 3.3 Precious Coral Ecosystem Component Species

Scientific Name	Common Name	FAMILY
<i>Hemicorallium laauense</i> (prev. <i>Corallium regale</i> )	Pink coral	Coralliidae
<i>Pleurocorallium secundum</i> (prev. <i>Corallium secundum</i> )	Pink coral	Coralliidae
<i>Corallium sp.</i>	Pink or Red Corals	Coralliidae
<i>Acanella sp.</i>	Bamboo coral	Isididae
<i>Lepidisis olapa</i>	Bamboo coral	Isididae
<i>Callogorgia gilberti</i>	Gold Coral	Primnoidae
<i>Calyptrophora sp.</i>	Gold Coral	Primnoidae
<i>Narella sp.</i>	Gold Coral	Primnoidae
<i>Kulamanamana haumea</i> (prev. <i>Gerardia sp.</i> )	Gold Coral	Parazoanthidae
<i>Antipathes griggi</i> (prev. <i>Antipathes dichotoma</i> )	Black Coral	Antipathidae
<i>Antipathes grandis</i>	Black Coral	Antipathidae
<i>Myriopathes ulex</i> (prev. <i>Antipathes ulex</i> )	Black Coral	Myriopathidae

### 3.4 Coral Reef Ecosystem Component Species

Regulations specify PHCRT by family level; the known species within each family from WPacFIN data collections are included here for clarity

Scientific Name	Common Name	FAMILY
<i>Acanthurus xanthopterus</i>	Yellowfin Surgeonfish	Acanthuridae
<i>Ctenochaetus striatus</i>	Striped bristletooth	Acanthuridae
<i>Ctenochaetus binotatus</i>	Twospot bristletooth	Acanthuridae
<i>Naso lituratus</i>	Orangespine Unicornfish	Acanthuridae
<i>Naso unicornis</i>	Bluespine Unicornfish	Acanthuridae
<i>Zebrasoma flavescens</i>	Yellow tang	Acanthuridae
<i>Carangoides orthogrammus</i>	Yellow Spotted Trevally	Carangidae
<i>Caranx melampygus</i>	Bluefin Trevally	Carangidae
<i>Caranx papuensis</i>	Brassy Trevally	Carangidae
<i>Caranx sexfasciatus</i>	Bigeye Trevally	Carangidae
<i>Caranx sp. (juvenile)</i>	EE: Juvenile Jacks	Carangidae
<i>Scomberoides lysan</i>	Leatherback	Carangidae
<i>Selar crumenophthalmus</i>	Bigeye Scad	Carangidae
<i>Elagatis bipinnulata</i>	Rainbow Runner	Carangidae
<i>Myripristis berndti</i>	Berndt's soldierfish	Holocentridae
<i>Myripristis murdjan</i>	Murdjan's soldierfish	Holocentridae
<i>Myripristis violacea</i>	violet soldierfish	Holocentridae
<i>Cheilinus undulatus</i>	humphead wrasse	Labridae
<i>Lethrinus harak</i>	Blackspot Emperor	Lethrinidae
<i>Lethrinus obsoletus</i>	Yellowstripe Emperor	Lethrinidae
<i>Lethrinus olivaceus</i>	Longnose Emperor	Lethrinidae
<i>Lethrinus xanthochilus</i>	Yellowlips Emperor	Lethrinidae
<i>Monotaxis grandoculis</i>	Bigeye Emperor	Lethrinidae
<i>Aphareus furca</i>	Smalltooth Jobfish	Lutjanidae
<i>Lutjanus gibbus</i>	Humpback Snapper	Lutjanidae
<i>Mulloidichthys flavolineatus</i>	Yellowstripe Goatfish	Mullidae
<i>Parupeneus barberinus</i>	Dash & Dot Goatfish	Mullidae
<i>Chlorurus frontalis</i>	tanfaced parrotfish	Scaridae
<i>Chlorurus microrhinos</i>	Pacific steephead parrotfish	Scaridae
<i>Hipposcarus longiceps</i>	longnose parrotfish	Scaridae
<i>Scarus altipinnis</i>	filament fin parrotfish	Scaridae
<i>Scarus ghobban</i>	bluebarred parrotfish	Scaridae
<i>Scarus rubroviolaceus</i>	red lipped parrotfish	Scaridae
<i>Cephalopholis argus</i>	peacock grouper	Serranidae
<i>Siganus argenteus</i>	forktailed rabbitfish	Siganidae

<b>Scientific Name</b>	<b>Common Name</b>	<b>FAMILY</b>
<i>Siganus sp.</i>	Rabbitfish (menahac)	Siganidae
<i>Acanthurus lineatus</i>	Bluebanded Surgeonfish	Acanthuridae
<b>Acanthuridae</b>	Surgeonfishes	Acanthuridae
<i>Acanthurus nigroris</i>	Bluelined Surgeon	Acanthuridae
<i>Acanthurus sp.</i>	Surgeonfish (misc.)	Acanthuridae
<i>Acanthurus triostegus</i>	Convict Tang	Acanthuridae
<i>Naso sp.</i>	Unicornfish (misc.)	Acanthuridae
<b>Order Actinaria</b>	Anemones	Multiple families
<b>Order Alcyonacea</b>	Soft corals	Multiple families
<b>Anomalopidae</b>	Flashlightfishes	Anomalopidae
<b>Antennariidae</b>	Frogfishes	Antennariidae
<b>Apogonidae</b>	Cardinal Misc.	Apogonidae
<i>Aulostomus chinensis</i>	Trumpetfish	Aulostomidae
<b>Balistidae</b>	Triggerfish (misc.)	Balistidae
<i>Rhinecanthus aculeatus</i>	Picasso Trigger	Balistidae
<i>Rhinecanthus rectangulus</i>	Wedge Trigger	Balistidae
<b>Belonidae</b>	Needlefish	Belonidae
<b>Blenniidae</b>	Blennies	Blenniidae
<b>Bothidae</b>	Flounders	Bothidae
<i>Bothus sp.</i>	Flounder (misc)	Bothidae
<b>Bryozoa</b>	Moss animals	Bryozoa
<b>Caesionidae</b>	Fusilier (misc.)	Caesionidae
<b>Caracanthidae</b>	Coral crouchers	Caracanthidae
<b>Carangidae</b>	Jacks and Scads	Carangidae
<i>Caranx sp.</i>	Jacks (misc.)	Carangidae
<i>Decapterus macarellus</i>	Mackerel Scad	Carangidae
<i>Trachinotus bailloni</i>	Small-spotted pompano	Carangidae
<i>Trachinotus blochii</i>	Snubnose pompano	Carangidae
<b>Carcharhinidae</b>	Reef sharks (misc)	Carcharhinidae
<b>Chaetodontidae</b>	Butterflyfish	Chaetodontidae
<b>Chlopsidae</b>	Eels	Chlopsidae
<i>Chanos chanos</i>	Milkfish	Chanidae
<b>Cirrhitidae</b>	Hawkfishes	Cirrhitidae
<b>Clupeidae</b>	Herrings	Clupeidae
<b>Congridae</b>	Eels	Congridae
<b>Dasyatidae</b>	Rays	Dasyatidae
<b>Echeneidae</b>	Remoras	Echeneidae
<b>Engraulidae</b>	Anchovies	Engraulidae

Scientific Name	Common Name	FAMILY
<b>Ephippidae</b>	Batfoshes	Ephippidae
<i>Fistularia commersonii</i>	Cornetfish	Fistulariidae
<b>Fungiidae</b>	Mushroom Corals	Fungiidae
<i>Gerres sp.</i>	Mojarra	Gerreidae
<b>Gobiidae</b>	Gobies	Gobiidae
<b>Haemulidae</b>	Sweetlips	Haemulidae
<i>Plectorhinchus picus</i>	Sweetlips	Haemulidae
<b>Heliopora</b>	Blue corals	Heliopora
<b>Holocentridae</b>	Squirrelfish, Soldierfish	Holocentridae
<b>Hydrozoa</b>	Hydroid corals	Hydrozoa
<b>Kyphosidae</b>	Rudderfishes	Kyphosidae
<i>Kyphosus cinerascens</i>	Highfin Rudderfish Silver	Kyphosidae
<i>Kyphosus sp.</i>	Rudderfish (guilli)	Kyphosidae
<i>Kyphosus sp.</i>	Highfin Rudderfish Brown	Kyphosidae
<i>Kuhlia mugil</i>	Barred flag-tail	Kuhliidae
<i>Cheilinus trilobatus</i>	Tripletail Wrasse	Labridae
<b>Labridae</b>	Wrasse	Labridae
<i>Calotomus carolinus</i>	stareye parrotfish	Labridae
<i>Iniistius celebicus</i>	Bronzespot Razorfish	Labridae
<i>Iniistius pavo</i>	Blue Razorfish	Labridae
Razorfish (misc)	Razorfish (misc)	Labridae
<b>Lethrinidae</b>	Emperors	Lethrinidae
<i>Gnathodentex aureolineatus</i>	Yellowspot emperor	Lethrinidae
<i>Gymnocranius sp.</i>	Stout Emperor	Lethrinidae
<i>Lethrinus atkinsoni</i>	Yellowtail Emperor	Lethrinidae
<i>Lethrinus erythracanthus</i>	Orangefin Emperor	Lethrinidae
<i>Lethrinus ornatus</i>	Ornate Emperor	Lethrinidae
<i>Lethrinus sp.</i>	Emperor (mafute/misc.)	Lethrinidae
<b>Lutjanidae</b>	Snapper (misc. shallow)	Lutjanidae
<i>Lutjanus bohar</i>	Red Snapper	Lutjanidae
<i>Lutjanus fulvus</i>	Flametail Emperor	Lutjanidae
<i>Lutjanus monostigma</i>	Onespot Snapper	Lutjanidae
<b>Malacanthidae</b>	Tilefishes	<b>Malacanthidae</b>
<b>Millepora</b>	Fire corals	Millepora
<b>Monacanthidae</b>	Filefish (misc)	Monacanthidae
<b>Monodactylidae</b>	Monos	Monodactylidae
Mugilidae	Mullet	Mugilidae
<b>Mullidae</b>	Goatfish	Mullidae

Scientific Name	Common Name	FAMILY
<i>Parupeneus pleurostigma</i>	Sidespot Goatfish	Mullidae
<i>Parupeneus trifasciatus</i>	Two-barred Goatfish	Mullidae
<i>Gymnothorax eurostus</i>	Moray eel	Muraenidae
<i>Gymnothorax flavimarginatus</i>	Yellowmargin moray eel	Muraenidae
<i>Gymnothorax javanicus</i>	Giant moray eel	Muraenidae
<i>Gymnothorax undulatus</i>	Undulated moray eel	Muraenidae
<b>Muraenidae</b>	Eels	Muraenidae
<b>Myliobatidae</b>	Skates	Myliobatidae
<b>Ophichthidae</b>	Eels	Ophichthidae
<b>Ostraciidae</b>	Trunkfishes	Ostraciidae
<b>Pinguipedidae</b>	Sandperches	Pinguipedidae
<i>Polydactylus sexfilis</i>	Threadfin	Polynemidae
<b>Plesiopidae</b>	Prettyfins	Plesiopidae
Family Pomacanthidae	Angelfish	Pomacanthidae
Family Pomacentridae	Damselfish	Pomacentridae
<i>Heteropriacanthus cruentatus</i>	Bigeye/glasseye	Priacanthidae
<i>Priacanthus hamrur</i>	Goggle-eye	Priacanthidae
<b>Pseudochromidae</b>	Dottybacks	Pseudochromidae
<i>Bolbometopon muricatum</i>	Humphead parrotfish	Scaridae
<i>Bulbometopon muricatum</i>	Bumphead parrotfish	Scaridae
<i>Leptoscarus vaigiensis</i>	Seagrass Parrotfish	Scaridae
<i>Scarus sp.</i>	Parrotfish (misc.)	Scaridae
<i>Gymnosarda unicolor</i>	Dogtooth tuna	Scombridae
<b>Scorpaenidae</b>	Scorpionfishes	Scorpaenidae
<i>Cephalopholis argus</i>	Peacock Grouper	Serranidae
<i>Cephalopholis igarashiensis</i>	Yellow Banded Grouper	Serranidae
<i>Cephalopholis sonnerati</i>	Tomato Grouper	Serranidae
<i>Cephalopholis urodeta</i>	Flagtail Grouper	Serranidae
<i>Epinephelus corallicola</i>	Coral Grouper	Serranidae
<i>Epinephelus maculatus</i>	Highfin Grouper	Serranidae
<i>Epinephelus merra</i>	Honeycomb Grouper	Serranidae
<i>Epinephelus polyphekadion</i>	Marbled Grouper	Serranidae
<b>Serranidae</b>	Grouper (misc.)	Serranidae
<i>Plectropomus laevis</i>	Saddleback Grouper	Serranidae
<i>Saloptia powelli</i>	Pink Grouper	Serranidae
<i>Variola albimarginata</i>	White Lyretail Grouper	Serranidae
<b>Siganidae</b>	Rabbitfishes	Siganidae
<i>Siganus punctatus</i>	Rabbitfish (h.feda)	Siganidae



<b>Scientific Name</b>	<b>Common Name</b>	<b>FAMILY</b>
<i>Siganus spinus</i>	Rabbitfish (sesjun)	Siganidae
<b>Soleidae</b>	Soles	Soleidae
<b>Sphyraenidae</b>	Barracudas	Sphyraenidae
<b>Sphyrnidae</b>	Sharks	Sphyrnidae
<i>Sphyrna lewini</i>	Hammerhead shark	Sphyrnidae
<b>Syngnathidae</b>	Pipefishes, Seahorses	Syngnathidae
<b>Synodontidae</b>	Lizardfish misc.	Synodontidae
<b>Tetraodontidae</b>	Pufferfish, Porcupine fishes	Tetraodontidae
<b>Tubipora</b>	Organpipe corals	Tubipora
<b>Zanclidae</b>	Moorish Idols	Zanclidae
<b>Zoanthinaria</b>	Soft zoanthid corals	Zoanthinaria
Bottomfish (misc)	Bottomfish (misc)	
Reef fish (misc)	Reef fish (misc)	
Shallow bottom	Shallow bottom	
<b>Class Bivalvia</b>	Clam/bivalve	Multiple families
<b>Cucumariidae</b>	Sea Cucumber	Cucumariidae
<b>Phylum Echinoderms</b>	Sea cucumbers, Sea urchins	Multiple families
<i>Octopus sp.</i>	Octopus	Octopodidae
<b>Phylum Porifera</b>	Sponges	Multiple families
<b>Phylum Mollusca</b>	Clams, oysters, sea snails, sea slugs, octopus, squids	Multiple families
<b>Order Teuthida</b>	Squid	Multiple families
<i>Trochus sp.</i>	Trochus	Trochidae
<b>subphylum Tunicates</b>	Sea squirts	Multiple families
Invertebrates	Invertebrates	
<i>Birgus latro</i>	Coconut Crab	Diogenidae
Lemu	Lemu	
Seaweeds	Seaweeds	
<b>Phylum Crustacea</b>	Lobsters, Shrimps/Mantis shrimps, true crabs and hermit crabs	Multiple families
Crabs (misc)	Crabs (misc)	infraorder Brachyura
<b>Phylum Annelida</b>	Segmented worms	Multiple families
	Live rock	
	Algae	

## 4 HAWAII ECOSYSTEM COMPONENT SPECIES

### 4.1 Bottomfish Ecosystem Component Species

Scientific Name	Species Name	Family
<i>Pristipomoides auricilla</i>	yellowtail snapper (kalekale)	Lutjanidae
<i>Caranx ignobilis</i>	giant trevally (white ulua)	Carangidae
<i>Caranx lugubris</i>	black trevally (black ulua)	Carangidae
<i>Lutjanus kasmira</i>	taape	Lutjanidae
<i>Seriola dumerili</i>	greater amberjack (kahala)	Carangidae
<i>Pseudocaranx dentex</i>	pig lipped trevally (butaguchi)	Carangidae

### 4.2 Precious Coral Ecosystem Component Species

Scientific Name	Species Name	Family
<i>Corallium sp.</i>	Pink or Red Corals	Coralliidae
<i>Lepidisis olapa</i>	Bamboo coral	Isididae
<i>Callogorgia gilberti</i>	Gold Coral	Primnoidae
<i>Calyptrophora sp.</i>	Gold Coral	Primnoidae
<i>Narella sp.</i>	Gold Coral	Primnoidae

### 4.3 Coral Reef Ecosystem Component Species

Regulations specify PHCRT by family level; the known species within each family from WPacFIN data collections are included here for clarity

Scientific name	English common name	Family name
<i>Acanthurus olivaceus</i>	orange-spot surgeonfish	Acanthuridae
<i>Acanthurus xanthopterus</i>	yellowfin surgeonfish	Acanthuridae
<i>Acanthurus triostegus</i>	convict tang	Acanthuridae
<i>Acanthurus dussumieri</i>	eye-striped surgeonfish	Acanthuridae
<i>Acanthurus nigroris</i>	blue-lined surgeon	Acanthuridae
<i>Acanthurus leucopareius</i>	whitebar surgeonfish	Acanthuridae
<i>Acanthurus nigricans</i>	whitecheek surgeonfish	Acanthuridae
<i>Acanthurus guttatus</i>	white-spotted surgeonfish	Acanthuridae
<i>Acanthurus blochii</i>	ringtail surgeonfish	Acanthuridae
<i>Acanthurus nigrofuscus</i>	brown surgeonfish	Acanthuridae
<i>Ctenochaetus strigosus</i>	yellow-eyed surgeonfish	Acanthuridae
<i>Ctenochaetus striatus</i>	striped bristletooth	Acanthuridae
<i>Naso unicornus</i>	bluespine unicornfish	Acanthuridae

<i>Naso lituratus</i>	orangespine unicornfish	Acanthuridae
<i>Naso hexacanthus</i>	black tongue unicornfish	Acanthuridae
<i>Naso annulatus</i>	whitemargin unicornfish	Acanthuridae
<i>Naso brevirostris</i>	spotted unicornfish	Acanthuridae
<i>Naso caesius</i>	gray unicornfish	Acanthuridae
<i>Zebрасoma flavescens</i>	yellow tang	Acanthuridae
<i>Melichthys vidua</i>	pinktail triggerfish	Balistidae
<i>Melichthys niger</i>	black triggerfish	Balistidae
<i>Rhinecanthus aculeatus</i>	picassofish	Balistidae
<i>Sufflamen fraenatum</i>	bridled triggerfish	Balistidae
<i>Decapterus macarellus</i>	Mackerel scad	Carangidae
<i>Selar crumenophthalmus</i>	Bigeye scad	Carangidae
<i>Carcharhinus amblyrhynchos</i>	grey reef shark	Carcharhinidae
<i>Carcharhinus galapagensis</i>	galapagos shark	Carcharhinidae
<i>Carcharhinus melanopterus</i>	blacktip reef shark	Carcharhinidae
<i>Triaenodon obesus</i>	whitetip reef shark	Carcharhinidae
<i>Myripristis berndti</i>	bigscale soldierfish	Holocentridae
<i>Myripristis amaena</i>	brick soldierfish	Holocentridae
<i>Myripristis chryseres</i>	yellowfin soldierfish	Holocentridae
<i>Myripristis kuntee</i>	pearly soldierfish	Holocentridae
<i>Sargocentron microstoma</i>	file-lined squirrelfish	Holocentridae
<i>Sargocentron diadema</i>	crown squirrelfish	Holocentridae
<i>Sargocentron punctatissimum</i>	peppered squirrelfish	Holocentridae
<i>Sargocentron tiere</i>	blue-lined squirrelfish	Holocentridae
<i>Sargocentron xantherythrum</i>	Hawaiian squirrelfish	Holocentridae
<i>Sargocentron spiniferum</i>	saber or long jaw squirrelfish	Holocentridae
<i>Neoniphon spp</i>	spotfin squirrelfish	Holocentridae
<i>Kuhlia sandvicensis</i>	Hawaiian flag-tail	Kuhliidae
<i>Kyphosus biggibus</i>	rudderfish	Kyphosidae
<i>Kyphosus cinerascens</i>	rudderfish	Kyphosidae
<i>Kyphosus vaigiensis</i>	rudderfish	Kyphosidae

<i>Bodianus bilunulatus</i>	saddleback hogfish	Labridae
<i>Oxycheilinus unifasciatus</i>	ring-tailed wrasse	Labridae
<i>Xyrichtys pavo</i>	razor wrasse	Labridae
<i>Cheilio inermis</i>	cigar wrasse	Labridae
<i>Thalassoma purpureum</i>	surge wrasse	Labridae
<i>Thalassoma quinquevittatum</i>	red ribbon wrasse	Labridae
<i>Thalassoma lutescens</i>	sunset wrasse	Labridae
<i>Novaculichthys taeniourus</i>	rockmover wrasse	Labridae
<i>Mulloidichthys</i> spp	yellow goatfish	Mullidae
<i>Mulloidichthys pfleugeri</i>	orange goatfish	Mullidae
<i>Mulloidichthys vanicolensis</i>	yellowfin goatfish	Mullidae
<i>Mulloidichthys flavolineatus</i>	yellowstripe goatfish	Mullidae
<i>Parupeneus</i> spp	banded goatfish	Mullidae
<i>Parupeneus bifasciatus</i>	doublebar goatfish	Mullidae
<i>Parupeneus cyclostomas</i>	yellow saddle goatfish	Mullidae
<i>Parupeneus pleurostigma</i>	side-spot goatfish	Mullidae
<i>Parupeneus multifasciatus</i>	multi-barred goatfish	Mullidae
<i>Upeneus arge</i>	bandtail goatfish	Mullidae
<i>Mugil cephalus</i>	stripped mullet	Mugilidae
<i>Neomyxus leuciscus</i>	false mullet	Mugilidae
<i>Gymnothorax flavimarginatus</i>	yellowmargin moray eel	Muraenidae
<i>Gymnothorax javanicus</i>	giant moray eel	Muraenidae
<i>Gymnothorax undulatus</i>	undulated moray eel	Muraenidae
<i>Enchelycore pardalis</i>	dragon eel	Muraenidae
<i>Octopus cyanea</i>	octopus	Octopodidae
<i>Octopus ornatus</i>	octopus	Octopodidae
<i>Polydactylus sexfilis</i>	threadfin	Polynemidae
<i>Heteropriacanthus cruentatus</i>	glasseye	Priacanthidae
<i>Priacanthus hamrur</i>	bigeye	Priacanthidae
<i>Scarus</i> spp	parrotfish	Scaridae
<i>Calotomus carolinus</i>	stareye parrotfish	Scaridae

<i>Sphyraena helleri</i>	Heller's barracuda	Sphyraenidae
<i>Sphyraena barracuda</i>	great barracuda	Sphyraenidae
<i>Turbo</i> spp	green snails turban shells	Turbinidae
<i>Zanclus cornutus</i>	moorish idol	Zanclidae
<i>Chaetodon auriga</i>	butterflyfish	Chaetodontidae
<i>Chaetodon lunula</i>	raccoon butterflyfish	Chaetodontidae
<i>Chaetodon ephippium</i>	saddleback butterflyfish	Chaetodontidae
<b>Sabellidae</b>	featherduster worm	Sabellidae
<b>Labridae</b>	wrasses	Labridae
<b>Carcharhinidae, Sphyrnidae</b>	sharks	Carcharhinidae, Sphyrnidae
<b>Dasyatidae, Myliobatidae</b>	rays and skates	Dasyatidae, Myliobatidae
<b>Serraniae</b>	groupers, seabass	Serraniae
<b>Malacanthidae</b>	Tilefishes	Malacanthidae
<b>Carangidae</b>	jacks and scads	Carangidae
<b>Holocentridae</b>	solderfishes and squirrelfishes	Holocentridae
<b>Mullidae</b>	goatfishes	Mullidae
<b>Acanthuridae</b>	surgeonfishes	Acanthuridae
<b>Echeneidae</b>	Remoras	Echeneidae
<b>Muraenidae, Congridae, Ophichthidae</b>	eels	Muraenidae, Congridae, Ophichthidae
<b>Apogonidae</b>	cardinalfishes	Apogonidae
<b>Clupeidae</b>	Herrings	Clupeidae
<b>Engraulidae</b>	Anchovies	Engraulidae
<b>Caracanthidae</b>	coral crouchers	Caracanthidae
<b>Gobiidae</b>	Gobies	Gobiidae
<b>Lutjanidae</b>	snappers	Lutjanidae
<i>Aulostomus chinensis</i>	Trumpetfish	Aulostomidae
<i>Fistularia commersoni</i>	Cornetfish	Fistulariidae
<i>Zanclus cornutus</i>	moorish Idols	Zanclidae
<b>Chaetodontidae</b>	butterflyfishes	Chaetodontidae
<b>Pomacanthidae</b>	Angelfishes	Pomacanthidae
<b>Pomacentridae</b>	damsel fishes	Pomacentridae
<b>Scorpaenidae</b>	scorpionfishes, lionfishes	Scorpaenidae
<b>Blenniidae</b>	Blennies	Blenniidae
<b>Sphyraenidae</b>	barracudas	Sphyraenidae
<b>Pinguipedidae</b>	sandperches	Pinguipedidae

<b>Bothidae, Soleidae, Pleurnectidae</b>	flounders and soles	Bothidae, Soleidae, Pleurnectidae
<b>Ostraciidae</b>	trunkfishes	Ostraciidae
<b>Balistidae</b>	trigger fishes	Balistidae
<b>Kyphosidae</b>	rudderfishes	Kyphosidae
<b>Cirrhitidae</b>	hawkfishes	Cirrhitidae
<b>Tetradontidae</b>	puffer fishes and porcupine fishes	Tetradontidae
<b>Antennariidae</b>	Frogfishes	Antennariidae
<b>Syngnathidae</b>	pipefishes and seahorses	Syngnathidae
<b>Phylum Echinoderm</b>	sea cucumbers and sea urchins	Multiple families
<b>Phylum Mollusca</b>	clams, oysters, sea snails, sea slugs	Multiple Families
<b>Azooxanthellate</b>	ahermatypic corals	Azooxanthellate
<b>Fungiidae</b>	mushroom corals	Fungiidae
	small and large coral polyps	
<b>Order Alcyonacea</b>	soft corals	
<b>Order Actinaria</b>	Anemones	Multiple families
<b>Order Zoanthinaria</b>	soft zoanthid corals	Multiple families
<b>Solanderidae</b>	hydroid corals	Solanderidae
<b>Styasteridae</b>	lace corals	Styasteridae
<b>Subphylum Crustaceans</b>	lobsters, shrimps, mantis shrimps, true crabs and hermit crabs	Multiple families
<b>Bryozoa</b>	Moss animals	Bryozoa
<b>Hydrozoans</b>	Hydroid corals	Hydrozoans
<i>Pinctada margaritifera</i>	black-lip pearl oyster	<i>Pinctada margaritifera</i>
	sea squirts	Tunicates
<b>Phylum Porifera</b>	Sponges	Multiple families
<b>Class Cephalopods</b>	Octopi	Multiple families
	Seaweed	Algae
		Live rock
<b>Phylum Annelids</b>	segmented worms	Multiple families

**APPENDIX C. DRAFT PROPOSED REGULATIONS**

## **APPENDIX D. REGULATORY IMPACT REVIEW**

This Regulatory Impact Review (RIR) provides an assessment of the costs and benefits of the proposed action and other alternatives in accordance with Executive Order 12866 (E.O. 12866) and its guidelines established in OMB Circular A-4. This RIR is for a NMFS proposed action to reclassify certain species listed as management unit species (MUS) to ecosystem component species (ECS) which would amend the fishery ecosystem plans (FEP) for Hawaii Archipelago, Mariana Archipelago, and American Samoa

### Description of the Problem and Management Objectives

The Western Pacific Fishery Management Council (Council) recommended and the National Marine Fisheries Service (NMFS) proposes to change the classification of certain species listed as management unit species (MUS) to ecosystem component species (ECS) in the fishery ecosystem plans (FEP) for the Hawaii Archipelago, Mariana Archipelago, and American Samoa. The proposed action would reduce an unnecessary burden on the Council and NMFS (including its member entities) to develop and implement ACLs and AMs for stocks that are not in need of conservation and management.

In 2009, NMFS published National Standard 1 advisory guidelines which defined ECS as “non-target species; those not determined to be, or not likely to become, subject to overfishing, approaching overfished, or overfished; or those not generally not retained for sale or personal use.” Species that are classified as ECS would not require annual catch limits (ACL) or accountability measures (AM). Since 2012, the Council and NMFS have complied with the requirement to manage all Pacific Island fisheries under ACLs and AMs. This work substantiated early observations that ACLs and AMs are not providing meaningful management for a number of stocks and those might be more appropriately managed as ECS. Applying management only to those stocks that are MUS would allow the Council and NMFS to focus resources on species that are in need of conservation and management and better balance fishing demand or interest with use of resources to support conservation and management work. Such improvements in management would still allow the Council and NMFS to monitor and manage ECS species and stocks as well. The need for this action is to create an efficient and effective federal management of Western Pacific fisheries that focuses resources on those species or stocks caught in federal waters that are in need of conservation and management.

### Description of Affected Fishery

For more information on socio-economic background of the fisheries, see the FEPs (WPFMC 2009a, WPFMC 2009b, WPFMC 2009c, WPFMC 2009d) and the most recent annual SAFE reports for the American Samoa, Mariana Archipelago, and Hawaii Archipelago (WPFMC 2017a, WPFMC 2017b), WPFMC 2017c).

### Description of Alternatives

*Alternative 1: No Action (Status Quo/Current Management):*



Under the No Action Alternative, the Council and NMFS would not recommend changes to the existing MUS list in the American Samoa, Mariana, and Hawaii FEPs.

*Alternative 2 (Preferred): Reclassify some of the MUS as ECS*

Under Alternative 2, NMFS and the Council would amend the American Samoa, Mariana Archipelago, and Hawaii Archipelago FEPs to reclassify some of the MUS to ECS. Each FEP would include an ECS list of stocks not in need of conservation and management. Alternative 2 would reduce the number of MUS in the American Samoa FEP from 205 species/families to 11 species; from 227 species/families to 13 species in the Marianas FEP; and from 173 species/families to 20 MUS species in the Hawaii FEP.

Economic Impacts

*No Action Alternative*

Under this alternative (status quo), the current management regime would remain the same and fishing practices, catch and landings would remain similar to those of recent years.

NMFS would continue to manage all MUS using ACLs and AMs. The Council and NMFS would continue to monitor catches of all species and stocks in the current MUS and would continue to work with the state and territories to manage these species. For species and stocks caught predominantly in state and territorial waters, the ACLs and AMs would continue to require substantial scientific and administrative resources without direct conservation and management benefits. These species would be subject to stock assessments and review and NMFS, the Council, and the local marine resource management agencies would continue to monitor all catches, and review catches against ACLs and AMs. In addition, preserving the current MUS list would maintain the EFH designated areas that currently apply. Federal agencies would still need to consult with NMFS in accordance with the Magnuson-Stevens Act, for any proposed project that may adversely affect those areas.

*Preferred Alternative*

The proposed action would reclassify some MUS to ECS, but this would not result in changes to any fishery and how they operate because under the current management scheme, ACLs and AMs currently do not limit the conduct of these fisheries that catch the species proposed for reclassification. Monitoring, review by the Council, and research would continue for MUS and ECS. Table 2 (Proposed MUS) and Appendix B (Proposed ECS) of the Environmental Assessment together reflect the proposed changes to the list of MUS.

The reclassification of some MUS to ECS would result in a smaller number of species and stocks of MUS that would be monitored and reviewed against their ACLs, which would reduce overall costs associated with these administrative activities. The Council may recommend ECS to remain in the FEP for data collection purposes and/or recommend management measures for ECS.

EFH designations would no longer apply to species and stocks that are reclassified as ECS, unless the habitat is designated EFH for a MUS as well. As a result, the proposed action would reduce the EFH footprint in American Samoa, Guam, and CNMI, because of the removal of the substrate EFH designation for deepwater shrimp MUS (the other EFH that would have been removed with the reclassification to ECS overlap with EFH of MUS that would remain). Figures 3, 4, and 5 of the environmental assessment depict the changes of the EFH. Federal agencies would no longer be required to consult with NMFS on potential effects on those areas. As a result, these agencies would require less staff time or other resources for the consultation process as well as any mitigation measures that would be requested by NMFS to offset impacts to EFH. Similarly, NMFS would expect to have lower administrative costs overall with regard to EFH consultations. On the other hand, without the EFH consultation, there is some likelihood that the action with a federal nexus would result in some habitat modification that would adversely affect critical deepwater shrimp and other marine species that rely on that habitat for any parts of their lifecycles, which could in turn constrain productivity of the fishery. The reduction in productivity could extend to the human community in terms of decrease of seafood availability, although with the very little amount of federal activity currently occurring in these areas, as identified in the environmental assessment, this reduction in productivity resulting from the reduced EFH footprint, is likely to be negligible.

#### Significance under E.O. 12866

For the purposes of determining significance under E.O. 12866, this rule is *not*:

- 1) Expected to have an annual effect on the economy of more than \$100 million, or to adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety; or state, local or tribal governments or communities;
- 2) Likely to create any serious inconsistencies or otherwise interfere with any actions taken or planned by another agency;
- 3) Likely to materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights or obligations of recipients thereof; and
- 4) Likely to raise novel or policy issues arising out of legal mandates, or the principles set forth in the Executive Order.

Based on these findings, this rule is determined to not be significant under E.O. 12866.