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Environmental Assessment

Specification of Annual Catch Limits and Accountability Measures for Pacific Islands Spiny Lobster Fisheries in Fishing Years 2015 through 2018

(RIN 0648-XD558)

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Abstract:

The Western Pacific Fishery Management Council (Council) recommended that NMFS specify multi-year annual catch limits (ACL) and accountability measures (AM) effective in fishing years 2015-2018, the environmental effects of which are analyzed in this document. NMFS proposes to implement the specifications for fishing year 2015, 2016, 2017, and 2018 separately prior to each fishing year. The specifications pertain to ACL for spiny lobster fisheries in federal waters of the Exclusive Economic Zone (EEZ; generally 3-200 nautical miles or nm) around American Samoa, the Commonwealth of the Northern Mariana Islands (CNMI), Guam, and the main Hawaiian Islands (MHI), and a post-season accountability measure (AM) to correct the overage of an ACL if it occurs. For the American Samoa spiny lobster fishery, the proposed ACL is 4,845 lb and is associated with a probability of overfishing of less than 35 percent. For the CNMI spiny lobster fishery, the proposed ACL is 7,410 lb and is associated with a probability of overfishing of 30 percent. For the Guam spiny lobster fishery, the proposed ACL is 3,135 lb and is associated with a probability of overfishing of less than 35 percent. For the MHI spiny lobster fishery, the proposed ACL is 15,000 lb and is associated with a probability of

overfishing of 25 percent. The fishing year for spiny lobster fisheries in all island areas begins January 1 and ends December 31 annually. Unless modified by NMFS, the ACLs and AMs would be applicable in fishing years 2015, 2016, 2017, and 2018. Each fishing year, spiny lobster catches from both local state/territorial waters (generally from the shoreline to three miles offshore), and federal waters of the EEZ would be counted towards the specified ACL for each island area.

Historically, there has been little to no fishing for spiny lobster in federal waters around American Samoa, Guam, the CNMI and the MHI. This is because spiny lobsters are typically found on rocky substrate in well-protected nearshore areas in crevices and under rocks, and it is much easier and safer for fishers to harvest lobsters in local state/territorial waters, than offshore in the EEZ. Therefore, spiny lobster catch in 2015 through 2018 is expected to continue to come almost exclusively from nearshore state/territorial waters. Currently, catch data from spiny lobster fisheries in nearshore state/territorial waters are generally not available until at least six months after the end of the fishing year. Therefore, in-season monitoring of catch, and in-season AMs applied in federal waters to prevent the ACL from being exceeded (e.g. fishery closures) are not possible in any island area at this time. For this reason, only a post-season AM is possible. Specifically, after the end of each fishing year, if NMFS and the Council determines that the average catch from the most recent three year period exceeds the specified ACL, NMFS proposes to reduce the ACL in the subsequent fishing years by the amount of the overage. Prior to implementing a reduced ACL, NMFS would conduct additional environmental analyses, if necessary, and the public would have the opportunity to provide input and comment on the reduced ACL specification at that time. If an ACL is exceeded more than once in a four-year period, the Council is required to re-evaluate the ACL process, and adjust the system, as necessary, to improve its performance and effectiveness.

The proposed action is needed to comply with the Magnuson-Stevens Fishery Conservation and Management Act and is consistent with provisions of the fishery ecosystem plans for American Samoa, the Mariana Archipelago, and Hawaii, through which NMFS specifies ACLs and AMs for all federally managed species. The Council recommended the ACLs and AMs and developed its recommendations in accordance with the ACL process approved by NMFS, and in consideration of the best available scientific, commercial, and other information.

NMFS prepared this environmental assessment (EA) to evaluate the potential environmental impacts of the proposed ACL specifications and AMs in fishing years 2015 through 2018. The EA includes a description of the information and methods used by the Council to develop the proposed ACLs, and alternatives to the proposed ACL specifications. The analysis in the EA indicates that the proposed ACL specifications and post-season AMs would not result in large beneficial or adverse effects on target, non-target, or bycatch species, protected species, or on marine habitats. This is because the proposed federal action, regardless of which alternative is selected, would not actually limit or constrain spiny lobster catch in any island area, or change the conduct of any federal or state/territorial spiny lobster fisheries in any way. Therefore, impacts of the proposed action would be unchanged from the status quo.
Copies of this EA and final rule can be found by searching on RIN 0648-XD558 at www.regulations.gov, or by contacting the responsible official or Council at the above address.

Environmental Assessment

Specification of Annual Catch Limits and Accountability Measures for Pacific Islands Spiny Lobster Fisheries in Fishing Years 2015 through 2018

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Acronyms and Abbreviations

ABC – Acceptable Biological Catch
ACL – Annual Catch Limit
ACT – Annual Catch Target
AM – Accountability Measure
APA – Administrative Procedure Act
CFR – Code of Federal Regulations
CMUS – Crustacean Management Unit Species
CNMI – Commonwealth of the Northern Mariana Islands
Council – Western Pacific Fishery Management Council
CPUE – Catch per Unit of Effort
DAWR – Guam Division of Aquatic and Wildlife Resources
DAR – State of Hawaii Division of Aquatic Resources
DMWR – American Samoa Department of Marine and Wildlife Resources
DFW – Northern Mariana Islands Division of Fish and Wildlife
EA – Environmental Assessment
EC – Ecosystem Component
ESA – Endangered Species Act
EEZ – Exclusive Economic Zone
FEP – Fishery Ecosystem Plan
FMP – Fishery Management Plan
FR – *Federal Register*
HDAR – Hawaii Division of Aquatic Resources
MHI – Main Hawaiian Islands
Magnuson-Stevens Act – Magnuson-Stevens Fishery Conservation and Management Act
MFMT – Maximum Fishing Mortality Threshold
MMPA – Marine Mammal Protection Act
MRFSS – Marine Recreational Fisheries Statistics Survey
MSST – Minimum Stock Size Threshold
MSY – Maximum Sustainable Yield
MUS – Management Unit Species
NEPA – National Environmental Policy Act
nm – Nautical Miles
NMFS – National Marine Fisheries Service
NOAA – National Oceanic and Atmospheric Administration
OFL – Overfishing Limit
OY – Optimum Yield
P* - Risk of overfishing percentile
PIFSC – NMFS Pacific Islands Fisheries Science Center
PIRO – Pacific Islands Regional Office

SEEM – Social, Economic, and Ecological factors and Management Uncertainty
SSC – Scientific and Statistical Committee
WPacFIN – Western Pacific Fisheries Information Network
WPFMC – Western Pacific Fishery Management Council

1 Background Information

The National Marine Fisheries Service (NMFS) and the Western Pacific Fishery Management Council (Council) manage fishing for crustacean management unit species (MUS) including spiny lobsters, in the Exclusive Economic Zone (EEZ or federal waters; generally 3-200 nautical miles or nm) around the U.S. Pacific Islands through one of four fishery ecosystem plans (FEP) authorized in accordance with the provisions of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).[1] Three of the FEPs are archipelagic-based and include the American Samoa Archipelago FEP, the Hawaiian Archipelago FEP, and the Mariana Archipelago FEP (which covers federal waters around Guam and the Commonwealth of Northern Mariana Islands or the CNMI). The fourth FEP covers federal waters of the U.S. Pacific remote island areas (PRIA) which include Palmyra Atoll, Kingman Reef, Jarvis Island, Baker Island, Howland Island, Johnston Atoll, and Wake Island.

Due to the lack of a developed spiny lobster fishery in EEZ waters around American Samoa, the CNMI, Guam, and the main Hawaiian Islands (MHI), there are few federal fishing regulations at this time. Currently, federal fishing regulations for western Pacific crustacean fisheries, including spiny lobster fisheries are found in 50 CFR 665 and are limited to federal permit and reporting requirements, vessel identification and observer requirements. In EEZ waters around Hawaii, fishing for spiny lobster is further restricted through seasonal closures, and size restrictions. Federal requirements also direct NMFS to specify an annual catch limit (ACL) and implement accountability measures (AM) for all stocks and stock complexes of MUS included in each 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. Additionally, other regulations implemented by other federal agencies and local state and territorial governments may also apply to spiny lobster fishing in the EEZ waters. Appendix A provides a list of spiny lobster MUS in each island area. Federal requirements also direct NMFS to specify an annual catch limit (ACL) and implement accountability measures (AM) for all stocks and stock complexes of MUS included in each 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.

1.1 Overview of the ACL Specification Process

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. This section provides an overview of the ACL specification process.

[1] Nearshore waters, generally within three nm of the shoreline around American Samoa, Guam,the Northern Mariana Islands and Hawaii are subject to the respective jurisdiction and management authority of the Territory of American Samoa, the Territory of Guam, the Commonwealth of the Northern Mariana Islands, and the State of Hawaii and are not part of the FEP management area.

In accordance with the Magnuson-Stevens Act and the FEPs, there are three required elements in the development of an ACL specification. The first requires the Council's Scientific and Statistical Committee (SSC) to calculate an acceptable biological catch (ABC) that is set at or below the stock or stock complex's overfishing limit (OFL). The OFL is an estimate of the catch level above which overfishing is occurring. ABC is the level of catch that accounts for the scientific uncertainty in the estimate of OFL and other scientific uncertainty. In determining the appropriate ABC, the SSC follows the ACL mechanism described in the FEPs, which includes a five-tiered system of "ABC control rules" that allows for different levels of scientific information to be considered (WPFMC and NMFS 2011). Tiers 1, 2 and 3 involve data-rich to data-moderate situations and include levels of scientific uncertainty derived from model-based stock assessments. Tiers 4 and 5 involve data-poor situations and include consideration of scientific uncertainty derived from ad-hoc procedures, including simulation models or expert opinion.

When calculating an ABC for a stock or stock complex[2], the SSC must first evaluate the available information and assign the stock or stock complex into one of the five tiers. The SSC must then apply the control rule assigned to that tier to determine an ABC. For stocks like spiny lobsters that have an estimate of OFL, maximum sustainable yield (MSY) and other MSY-based reference points (Tier 1-3 quality data), the ABC is calculated by the SSC based on the Tier 1-3 ABC control rule, which accounts for scientific uncertainty in the estimate of the OFL, and the acceptable level of risk (as determined by the Council) that catch equal to the ABC would result in overfishing. In plain English, ABC is the maximum value for which the probability or risk of overfishing (P*) is less than 50 percent. In accordance with National Standard 1 guidelines of the Magnuson-Stevens Act the probability of overfishing cannot exceed 50 percent and should be a lower value (74 FR 3178, January 9, 2011). The process described in the FEPs includes a qualitative analysis by which the P* value may be reduced below 50 percent based on consideration of four dimensions of information, including assessment information, uncertainty characterization, stock status, and stock productivity and susceptibility to overfishing. The FEPs also allow the SSC to recommend an ABC that differs from the results of the ABC control rule calculation based on factors such as data uncertainty, recruitment variability, declining trends in population variables, and other factors determined relevant by the SSC. However, the SSC must explain its rationale.

The second step requires the Council to determine an ACL that may not exceed the SSC recommended ABC. The process includes methods by which the ACL may be reduced from the ABC based on social, economic, and ecological considerations, or management uncertainty (SEEM). An ACL set below the ABC further reduces the probability that actual catch will exceed the OFL, and result in overfishing.

The third and final step in the ACL process is the development of AMs. There are two categories of required AMs; in-season AMs, and post-season AMs, which make adjustments to an ACL if it is exceeded. In-season AMs prevent an ACL from being exceeded and may include, but are not

[2] The Magnuson-Stevens Act defines the term "stock of fish" to mean a species, subspecies, geographic grouping, or other category of fish capable of management as a unit. Federal regulations at 50 CFR §660.310(c) defines "stock complex" to mean a group of stocks that are sufficiently similar in geographic distribution, life history, and vulnerability to the fishery such that the impact of management actions on the stock is similar.

limited to, closing the fishery, closing specific areas, changing bag limits, or other methods to reduce catch. An ACT is the management target of the fishery and accounts for management uncertainty in controlling the actual catch at or below the ACL.

If the Council determines that an ACL has been exceeded, the Council may recommend, as a post-season AM, that NMFS reduce the ACL in the subsequent fishing year by the amount of the overage. Additionally, if an ACL is exceeded more than once in a four-year period, the Council is required to re-evaluate the ACL process, and adjust the system for setting ACLs, as necessary, to improve its performance and effectiveness.

Figure 1 illustrates the relationship among the OFL, ABC, and ACLs described in this section. For more details on the specific elements of the ACL specification mechanism and process, see Amendment 1 to the PRIA FEP, Amendment 2 to the American Samoa Archipelago FEP, Amendment 2 to the Mariana Archipelago FEP, Amendment 3 to the Hawaii Archipelago FEP (WPFMC and NMFS 2011), and the final implementing regulations at 50 CFR §665.4 (76 FR 37285, June 27, 2011).

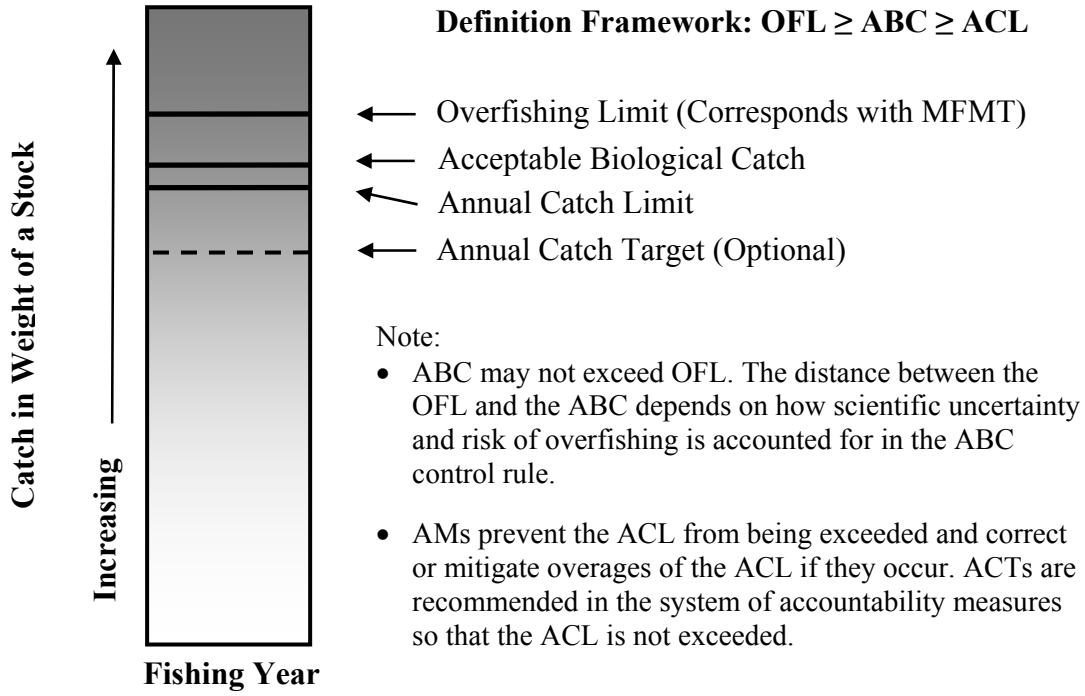

Figure 1. Relationship among OFL, ABC, ACL, ACT and AMs.

1.2 Purpose and Need

The purpose of this action is to use the best scientific information available to specify an ACL and AM for spiny lobster fisheries in federal waters around American Samoa, the CNMI, Guam and the MHI. ACLs are needed in order to comply with the Magnuson-Stevens Act and provisions of the FEPs for American Samoa, the Mariana Archipelago, and Hawaii which

require NMFS to specify ACL and AMs for all MUS identified in an FEP. The fishery management objective of this action is to specify an ACL for each spiny lobster fishery to prevent overfishing from occurring, and provide for long-term sustainability of the fishery resources while allowing fishery participants to continue to benefit from their utilization. Post-season AMs are intended to correct or mitigate overages of the ACL should they occur.

1.3 Proposed Action

The Western Pacific Fishery Management Council recommended NMFS specify multi-year annual catch limits (ACL) and accountability measures (AM) effective in fishing years 2015-2018, the environmental effects of which are analyzed in this document. NMFS proposes to implement the specifications for fishing year 2015, 2016, 2017, and 2018 separately prior to each fishing year. The specifications pertain to ACLs for spiny lobster fisheries in the EEZ around American Samoa, the Commonwealth of the Northern Mariana Islands (CNMI), Guam, and Hawaii, and a post-season AM to correct the overage of an ACL if it occurs. For the American Samoa spiny lobster fishery, the proposed ACL is 4,845 lb and is associated with a probability of overfishing of less than 35 percent. For the CNMI spiny lobster fishery, the proposed ACL is 7,410 lb and is associated with a probability of overfishing of 30 percent. For the Guam spiny lobster fishery, the proposed ACL is 3,135 lb and is associated with a probability of overfishing of less than 35 percent. For the MHI spiny lobster fishery, the proposed ACL is 15,000 lb and is associated with a probability of overfishing of 25 percent. The fishing year for spiny lobster fisheries in all island areas begins January 1 and ends December 31 annually. Unless modified by NMFS, the ACLs and AMs would be applicable in fishing years 2015, 2016, 2017, and 2018.

Each fishing year, spiny lobster catches from both local state/territorial waters (generally from the shoreline to three mile offshore), and federal waters of the EEZ would be counted towards the specified ACL for each island area. Pursuant to federal regulations at 50 CFR 665.4, when an ACL is projected to be reached, based on best available information, NMFS must restrict fishing in federal waters around the applicable island area to prevent the ACL from being exceeded. The restriction may include, but is not limited to closure of the fishery, closure of specific areas, or restriction in effort (76 FR 37286, June 27, 2011). However, projecting the date when an ACL might be reached is not possible for any western Pacific spiny lobster fishery at this time because catch statistics from local state/territorial fisheries are generally not available until at least six months after the data have been collected (See Section 2.1 for more details on local state/territorial data collection programs).. For this reason, the post-season AMs being proposed for spiny lobster fisheries in all island areas is a downward adjustment to an ACL in the subsequent fishing year according to the procedures described below, should catches exceed the specified ACL.

As shown in Tables 2 (American Samoa), 6 (CNMI), 10 (Guam) and 14 (Hawaii), catches of spiny lobster from local state/territorial data collection programs appear to be highly variable from year to year, but below the current long-term estimates of MSY. The reason for this inter-annual variability is unknown, but may be due to changes in local data collection methodologies over time (see Section 2.1). To reduce the influence of inter-annual variability in evaluating fishery performance against the proposed ACLs, NMFS and the Council propose to apply a moving three-year average. Specifically, NMFS and the Council would use the average catch of

fishing years 2013, 2014 and 2015 to evaluate fishery performance against the 2015 ACL; the average catch of fishing years 2014, 2015, and 2016 to evaluate performance against the 2016 ACL; and so on. After the end of each fishing year, the Council and NMFS will determine final spiny lobster catches. If the three-year average catch for spiny lobster exceeded the specified ACL in any fishing year, NMFS would reduce the spiny lobster ACL in the subsequent fishing years by the amount of the overage. Prior to implementing a reduced ACL, NMFS would conduct additional environmental analyses, if necessary, and the public would have the opportunity to provide input and comment on the reduced ACL specification at that time. Additionally, if an ACL is exceeded more than once in a four-year period, National Standard 1 guidelines of the Magnuson-Stevens Act (74 FR 3178, January 9, 2011) require the Council re-evaluate the ACL process, and adjust the system, as necessary, to improve its performance and effectiveness.

The proposed ACL specifications and AMs are based on the recommendations of the Council, and were developed in accordance with the approved ACL mechanism described in the FEPs and implementing federal regulations at 50 CFR §665.4, and in consideration of the best available scientific, commercial, and other information.

1.4 Decision to be Made

After considering public comments on the proposed action and alternatives considered, NMFS will specify ACLs and AMs for the spiny lobster fisheries in federal waters around American Samoa, CNMI, Guam and Hawaii. The ACLs and AMs would be applicable in fishing years 2015 through 2018 which begin on January 1 and end December 31, annually. The Regional Administrator of the NMFS Pacific Islands Regional Office (PIRO) will also use the information in this EA and consider public comments, to make a determination about whether the selected ACL specifications and AMs would be a major federal action with the potential to have a significant environmental impact that would require the preparation of an environmental impact statement.

1.5 Public Involvement

At its 160th meeting, the Council considered and discussed issues relevant to ACL and AM specifications for western Pacific crustacean fisheries including spiny lobster fisheries in American Samoa, the CNMI, Guam, and the MHI, including the ABC recommendations of the 116th SSC. The 116th SSC and the 160nd Council meetings were held June 17-19, 2014, and June 25-27, 2014, respectively. Both meetings were open to the public and advertised through notices in the *Federal register* (79 FR 31310, June 2, 2014), and on the Council's website. The public had an opportunity to comment at the meetings on the proposed ACL specifications and AMs and no public comment was provided at either meeting. The proposed action was also discussed at the 117th SSC meeting held October 14-16, 2014, and the 161st Council meeting, held October 21-23, 2014. Both meetings were open to the public and advertised in Hawaii media as well as the *Federal register* (79 FR 57887, September 26, 2014; 79 FR 59742, October 3, 2014), and on the Council's website. The public had an opportunity to comment at the meetings on the proposed ACL specifications and AMs and no public comment was provided at either meeting. Additionally, on July 21, 2015, NMFS published in the *Federal Register* the proposed

specification and solicited public comments on the action and on the draft EA (80 FR 4346). NMFS received one comment from a federal agency regarding ACLs at Wake Island. NMFS responded to this comment in the final rule.

2 Description of the Alternatives

The alternatives considered in this document include a range of possible ACLs for spiny lobster fisheries in federal waters around American Samoa, Guam, CNMI and the MHI. Although the estimate of the OFL and calculation of the ABC are part of the ACL mechanism, the establishment of these reference points is not part of the proposed federal action. However, a summary of their development is described in this section for informational purposes.[3]

2.1 Description of Ongoing Fishery Data Collection Programs

This section summarizes ongoing fishery data collection programs administered by the state/territorial governments of American Samoa, Guam, the CNMI and Hawaii, and by NMFS that were used to develop the ACLs and will be used to monitor catches in 2015-2018. None of the alternatives considered would change or modify any of these ongoing fishery data collection programs. For a detailed description of the data collection programs summarized here, visit http://www.pifsc.noaa.gov/wpacfin/.

2.1.1 Overview of Ongoing Data Collection Methods in the U.S. Pacific Islands

In American Samoa, Guam and the CNMI, local resource management agencies, with assistance from NMFS Pacific Islands Fisheries Science Center (PIFSC), Western Pacific Fisheries Information Network (WPacFIN), collect fisheries information through three primary fisheries monitoring programs. They include: 1) the boat-based creel survey program, (2) the shore-based creel survey program, and (3) the commercial purchase system or trip ticket invoice program.

2.1.1.1 Boat-based creel survey program

The boat-based creel survey program collects catch, effort, and participation data on offshore fishing activities conducted by commercial, recreational, subsistence and charter fishing vessels. Surveys are conducted at boat ports or ramps, and data collection consists of two main components - participation counts (trips) and fisher interviews. Survey days are randomly selected and the number of survey days range from 3-8 per month. Surveys are stratified by week-days, weekend-days and day- and night-time. Data expansion algorithms are applied by NMFS WPacFIN to estimate total boat-based catches, and are based on port, type of day (e.g., weekend/weekday), and fishing method (Impact Assessment, 2008). The boat-based creel surveys capture fishing activities by persons engaged in commercial, recreational, and subsistence fishing.

[3] OFL is an estimate of the catch level above which overfishing is occurring, and was estimated by the Council using a Biomass Augmented MSY Model described in Sabater and Kleiber (2014). ABC accounts for scientific uncertainty in the estimate of OFL and was calculated at the 116th meeting of the Council's SSC. OFL and ABC are biologically-based reference points and are not part of the federal action.

2.1.1.2 Shore-based creel survey program

The shore-based creel survey program was established to randomly sample inshore fishing trip information and consists of two components: participation counts and fishers interviews. Participation counts are based on a 'bus route' method, with predefined stopping points and time constraints. Survey days are randomly selected, and range from 2-4 times per week. Data expansion algorithms are applied by NMFS WPacFIN to estimate total shore-based catches, and are based on island region, type of day and fishing method (Impact Assessment, 2008). The shore-based creel surveys capture fishing activities by persons engaged in commercial, recreational, and subsistence fishing.

As previously noted the data from both boat-based and shore-based creel survey programs are then expanded using algorithms developed by WPacFIN to generate estimates of total catches from both commercial and non-commercial sectors.

2.1.1.3 Commercial purchase system

The commercial purchase system or "trip ticket invoice" monitors fish sold locally and collects information submitted by vendors (fish dealers, hotels and restaurants) who purchase fish directly from fishers. Each invoice usually compiles daily trip landings. Only American Samoa has mandatory requirements for vendors to submit invoice reports; the other islands have voluntary programs (Impact Assessment, 2008).

2.1.2 Overview of Ongoing Fishery Data Collection Methods in Hawaii

In Hawaii, the majority of fisheries information is collected from the commercial fishing sector through a mandatory license and monthly reporting system administered by the State of Hawaii Division of Aquatic Resources (HDAR). Under State law, anyone who takes marine life for commercial purposes is required to obtain a commercial marine license (CML) and submit a catch report (popularly known as a "C3" form) on a monthly basis. Required information collected includes day fished, area fished, fishing method used, hours fished per method, and species caught (number/pounds caught and released).

Recreational catch information for finfish are also opportunistically collected by HDAR through the Hawaii Marine Recreational Fishing Survey (HMRFS) and annual catch amounts are reported through NMFS Marine Fisheries Statistics Survey (MRFSS) at http://www.st.nmfs.noaa.gov/st1/index.html. As this survey only includes finfish, no information on spiny lobster is captured. A 2006 review of MRFSS by the National Resource Council (NRC) noted that the catch estimation method applied was not correctly matched with the catch sampling survey design, leading to potential bias in the estimates (National Resource Council 2006). In consideration of this finding, the Council in 2006 recommended that MRFSS catch estimates not be used as a basis for management or allocation decisions.

In 2008, NMFS established the National Saltwater Angler Registry Program as part of the Marine Recreational Information Program (MRIP) to improve recreational fisheries information (73 FR 79705, December 30, 2008). This national program requires all recreational anglers in

federal waters that are not otherwise permitted to fish under another federal or state/territorial fishing permit or license to register with NMFS. MRIP then collects information from registered recreational anglers about how often they fish and what they're catching using a system of surveys. Data from MRIP are integrated into MRFSS and are accessible from the MRFSS websites listed above. However, because lobsters are not harvested by angling, but by other fishing methods, spiny lobster data are not collected by MRIP or MRFSS.

2.1.3 Overview of Ongoing Federal Permit and Reporting Requirements

In addition to the data collection programs administered by local resource management agencies, regulations implementing the FEPs also establish federal permit and reporting requirements. Specifically, any vessel used to fish for lobsters in EEZ waters around American Samoa, CNMI, Guam and Hawaii must obtain a federal permit and submit catch logbooks to NMFS within 72 hours of landing. Crustacean Permit Area 1 includes the EEZ around the Northwestern Hawaiian Islands, which is closed to fishing in accordance with regulations implementing the Papahanaumokuakea Marine National Monument (71 FR 51134, August 29, 2006). Crustacean Permit Area 2 includes the EEZ around the main Hawaiian Islands (MHI). Crustacean Permit Area 3 includes the EEZ around American Samoa. Crustacean Permit Area 4 includes the EEZ waters around the U.S. Pacific Remote Island Areas, which is a Marine National Monument where all fishing, including non-commercial fishing is prohibited within 12 nautical miles from the shoreline (78 FR 32996, June 3, 2013). Crustacean Permit Area 5 includes the EEZ around Guam and the CNMI. The affected permit areas for the proposed action where spiny lobster fishing is possible are Crustacean Permit Areas 2 (MHI), 3 (American Samoa), and 5 (Guam and CNMI).

Historically, there has been little to no fishing for spiny lobster in EEZ waters around American Samoa, Guam, the CNMI and the MHI. This is because lobsters are typically found on rocky substrate in well-protected nearshore areas in crevices and under rocks, and it is much easier and safer for fishers to harvest lobsters in local state/territorial waters, than far offshore in the EEZ. Therefore, data from federal logbooks are not available for any Crustacean Permit Area, and fishing in federal waters in the future is expected to be negligible.

Except for HMRFS and MRIP data, NMFS WPacFIN obtains all available spiny lobster fisheries information in the western Pacific, in accordance with cooperative agreements with the local resource management agencies in American Samoa, CNMI, Guam, and Hawaii and provides access to this data on their website http://www.pifsc.noaa.gov/wpacfin. Generally, complete data for catches during a calendar year are not available until at least 6 months after the year has ended.

2.1.4 Data Limitations

While federal permit and catch reporting is required for spiny lobster fisheries in EEZ waters around American Samoa, the CNMI Guam, and the MHI, there have been few if any permitted vessels for these fisheries in the past 20 years. When permits were issued, no fishing was conducted and no catch reported. Therefore, catch data for spiny lobsters comes solely from fishery data collection programs administered by the respective local resource management

agencies, and NMFS expects this will continue to be the only data source for monitoring spiny lobster catches in 2015 through 2018. However, these agencies presently do not have the personnel or resources to process catch data in near-real time, and so fisheries statistics are generally not available until at least six months after the data has been collected. Significant resources would be required to support the establishment of near-real time in-season monitoring capabilities in American Samoa, the CNMI, Guam and Hawaii. Until resources are made available, it will not be possible to monitor and track spiny lobster catches towards the proposed ACL, and only AMs that consist of post-season management measures are possible at this time.

2.2 Development of the Alternatives

The SSC and Council developed their respective spiny lobster ABC and ACL recommendations for 2015 through 2018 in accordance with the Magnuson-Stevens Act and Federal regulations at 50 CFR §665.4 that implement the ACL specification mechanism of the FEPs described in Section 1. This section summarizes the data, methods, and procedures the SSC and Council considered in their deliberations. Reports of all SSC and Council meetings cited in this EA can be obtained from the Council.

2.2.1 Estimation of MSY and OFL

Estimates of MSY and OFL for spiny lobsters in American Samoa, the CNMI, Guam, and the MHI are based on a modeling approach that uses catch data from local resource management agencies as described above; together with a measure of population growth (r), carrying capacity (k), and biomass data from NMFS PIFSC underwater fish census surveys (Williams 2010). This model, termed the "Biomass Augmented Catch-MSY" model is described in detail in Sabater and Kleiber (2014). In summary, the model creates annual biomass projections from a set of r and k combinations that would not result in biomass that would exceed the carrying capacity or the stock being depleted. The assumption behind the biomass can be informed by augmenting the model with an independent source of biomass information.

The Biomass Augmented Catch-MSY model is based on the Catch-MSY model developed by Martell and Froese (2013), but differs in that it incorporates biomass data. Application of the model provides the very first model-based estimate of MSY for spiny lobster in each island area. In addition to estimates of MSY, the Biomass Augmented Catch-MSY model also generates a range of catches that if realized, would result in a probability of exceeding MSY ranging from five to 50 percent (See Appendix B for MSY estimates and probability of overfishing projection results from the Biomass Augmented Catch-MSY model).

Because of the large number of possible combinations of r and k values available to estimate MSY using the Biomass Augmented Catch-MSY model, the model explored two methods to define the most meaningful and most likely (most plausible) range of r and k combinations. Method A allows for only a very narrow range of starting r and k values, while method B allows for a broad range of starting r and k values, with each method providing different MSY estimates and associated probability of overfishing projections. In reviewing the two methods, the SSC at its 114th meeting held March 11-13, 2014, determined the resulting MSY estimates from method B be used for management decisions because this method provides a more complete range of

most likely r and k combinations compared to method A. The 114th SSC also found that method B also yielded r and k density plots that generally correspond better to the estimates of MSY than the method A approach.

Based on the method B approach, the Biomass Augmented Catch-MSY model estimates MSY for American Samoa spiny lobster to be 7,300 lb. However, catch projection results generated from the model estimate the level of catch associated with a 50 percent probability of exceeding MSY to be 7,100 lb. For CNMI spiny lobsters, the model estimates MSY to be 9,600 lb, with the level of catch associated with a 50 percent probability of exceeding MSY at 9,200 lb. For Guam spiny lobster, MSY is estimated to be 4,600 lb, level of catch associated with a 50 percent probability of exceeding MSY at 4,300 lb. For MHI spiny lobster, the model estimates MSY to be 20,400 lb and t level of catch associated with a 50 percent probability of exceeding MSY at 19,200 lb. Consistent with National Standard 1 guidelines (74 FR 3178, January 9, 2011), the Council at its 160th meeting, set OFL for each spiny lobster stock equal to the level of catch associated with a 50 percent probability of exceeding MSY. See Table 1 for a summary of MSY and OFL estimates and other reference points for each western Pacific spiny lobster fishery.

2.2.2 SSC's Calculation of ABC

Under Tier 3 of the ABC control rule for western Pacific fisheries, the SSC must set ABC at a level of catch associated with no more than a 50 percent probability of overfishing, with the appropriate probability of overfishing percentile (P*) established by the Council. The Council's P* working group met in May, June, and December 2013 to review a draft of Sabater and Kleiber (2014), and to apply the qualitative P* reduction analysis described in the FEPs WPFMC and NMFS 2011). The reduction analysis resulted in deductions ranging between 10 to 20 percent. Based on the P* analysis and findings presented in the P* working group's December 2013 report, the SSC at its 115th meeting held June 17-19, 2014, set western Pacific spiny lobster ABCs as follows:

For American Samoa and Guam spiny lobsters, the SSC set the ABCs, at 5,100 lb and 3,300 lb, respectively. These ABCs are each associated with a probability of overfishing of 40 percent. For CNMI spiny lobster, the SSC set the ABC at 7,800 lb, which is associated with a probability of overfishing of 35 percent. For MHI spiny lobster, the SSC set the ABC at 15,800 lb, which is associated with a probability of overfishing of 30 percent. See Appendix C of this document for the precise values from the qualitative P* reduction analysis for each spiny lobster stock. See Table 1 for a summary of ABCs, the associated probability of overfishing values and other reference points for each western Pacific spiny lobster fishery.

2.2.3 Council's ACL and AM Recommendations

At its 160th meeting held June 25-27, 2014, the Council recommended NMFS specify an ACL set at the level of catch that is five percent lower than the SSC's fishing level recommendation in order to account for social, economic, and ecological factors and management uncertainty (SEEM) See Appendix D of this document for the SEEM analysis. Specifically, the Council recommended American Samoa spiny lobster be set at 4,845 lb, CNMI spiny lobster ACL be set at 7,410 lb, Guam spiny lobster ACL be set at 3,135 lb and Hawaii spiny lobster ACL be set at

15,000 lb. See Table 1 for the a summary of ACLs, associated probability of overfishing values and other reference points for each western Pacific spiny lobster fishery.

Because near real-time monitoring of catches are not possible, the Council recommended at its 161st meeting, held October 21-23, 2014, a post-season AM that utilizes a moving three-year average to evaluate fishery performance against the recommended ACL. Specifically, after the end of each fishing year, the Council and NMFS will determine final spiny lobster catches in each island area. NMFS and the Council would use the average catch of fishing years 2013, 2014 and 2015 to evaluate fishery performance against the 2015 ACL; the average catch of fishing years 2014, 2015, and 2016 to evaluate performance against the 2016 ACL; and so on. If the average three-year catch exceeds the recommended ACL, the Council recommended as an AM that NMFS reduce the ACL in the subsequent fishing year by the amount of the overage.

2.3 Description of the Alternatives Considered

This section describes the range of ACL alternatives for spiny lobsters in American Samoa, Guam, the CNMI and Hawaii as well as the associated probabilities of overfishing values for each western Pacific spiny lobster fishery in 2015-2018 based on the r and k method B risk projections from the Biomass Augmented Catch-MSY model (See Appendix B). Table 1 provides a summary of the ACL alternatives considered, the associated risks of overfishing (P*), MSY and OFL estimates and the average catch for fishing years 2011-2013. Alternative 3 is the NMFS preferred alternative in each island area as recommended by the Council.

Table 1. Summary of ACL alternatives and associated risks of overfishing (P*) percentages for spiny lobsters in American Samoa, CNMI, Guam, and MHI in 2015-2018, including MSY-based reference points and 2011-2013 average catch.

	American Samoa Spiny Lobster		**CNMI Spiny Lobster**		**Guam Spiny Lobster**		**MHI Spiny Lobster**	
	MSY =7,300 lb		***MSY =9,600 lb***		***MSY = 4,600 lb***		***MSY =20,400 lb***	
	OFL Proxy = 7,100 lb (P*=50%)		***OFL Proxy = 9,200 lb (P*=50%)***		***OFL Proxy = 4,300 lb (P*=50%)***		***OFL Proxy = 19,200 lb (P*=50%)***	
	ABC =5,100 lb		***ABC = 7,800 lb***		***ABC = 3,300 lb***		***ABC =15,800 lb***	
	ACL (lb)	*Probability of overfishing*	***ACL (lb)***	*Probability of overfishing*	***ACL (lb)***	*Probability of overfishing*	***ACL (lb)***	*Probability of overfishing*
Alternative 1 (No Action)	No ACL	n.a.	No ACL	n.a.	No ACL	n.a.	No ACL	n.a.
Alternative 2 (Status Quo-2014 ACL and NEPA Baseline)	2,300	<5%	5,500	<5%	2,700	25%	10,000	<5%
Alternative 3	**4,845**	<35%	**7,410**	30%	**3,135**	<35%	**15,000**	25%

	American Samoa Spiny Lobster		CNMI Spiny Lobster		Guam Spiny Lobster		MHI Spiny Lobster	
(Preferred)								
Alternative 4 (Lower than Preferred)	4,600	30%	7,100	25%	3,000	30%	14,300	20%
	4,100	25%	6,700	20%	2,700	25%	13,500	15%
	3,700	20%	6,400	15%	2,500	20%	12,600	10%
	3,300	15%	6,100	10%	2,200	15%	11,700	5%
Avg. 2011-2013 Catch	**1,757**		**1,115**		**1,167**		**10,242**	

Source: All values above were obtained from Sabater and Kleiber (2014) in Appendix B.

2.3.1 American Samoa Spiny Lobster ACL Alternatives

2.3.1.1 Alternative 1: No ACL and AM Management (No Action)

Currently, NMFS has not specified an ACL and AM for the American Samoa spiny lobster fishery for fishing year 2015. Under this alternative, NMFS would not specify an ACL for American Samoa spiny lobsters and AMs would not be necessary. However, this alternative would not be in compliance with the Magnuson-Stevens Act, or the provisions of the American Samoa FEP and implementing federal regulations which require NMFS to specify an ACL for all stocks and stock complexes.

Expected Fishery Outcome

Although the potential for catch is unlimited without an ACL and AMs, the lack of an ACL or AMs is not expected to result in changes in the conduct of the fishery, including gear types used, areas fished, level of catch or effort. This is because even without ACLs and AMs, the spiny lobster fishery in American Samoa is sustainable based on the best available commercial and scientific information. As shown in Table 2, the highest recorded catch of spiny lobster catch in American Samoa was 5,388 lb, which occurred in 2006. This level of catch is well below the OFL proxy of 7,100 lb and the MSY of 7,300 lb. Since then, spiny lobster harvest has fluctuated between 1,000 lb and 3,000 lb with the average annual catch for the most recent three year period 2011-2013 being 1,757 lb. During 2011-13, the fishery remained open year round. Under this alternative, American Samoa spiny lobster harvest in 2015 through 2018 is expected to be similar to that described under Alternative 2 and is not expected to exceed the OFL proxy of 7,100 lb.

2.3.1.2 Alternative 2: Specify 2014 ACL of 2,300 lb (Status Quo/NEPA Baseline)

Under Alternative 2, NMFS would specify an ACL of 2,300 lb of spiny lobsters for fishing years 2015 through 2018. This is the same ACL specified by NMFS in 2012 (77 FR 6019, February 7, 2012), 2013 (78 FR 15885, March 13, 2013) and 2014 (79 FR 4276, January 27, 2014) and is the status quo alternative. This ACL was developed using a different method than is proposed under the preferred alternative (Alternative 3), and is equal to the 75th percentile of the long term catch history. For detailed information on the how this ACL was derived, please see the EA for the 2012 ACLs and AMs for crustacean and precious coral fisheries (NMFS 2011). Based on risk projections from method B of the Biomass Augmented Catch-MSY model (Appendix B), an

ACL of 2,300 lb is associated with a less than 5 percent probability of overfishing should the entire ACL be caught (Table 1). This is the NEPA baseline to which all other alternatives are compared.

Under this alternative, if the Council determines the ACL is exceeded, the Council as an AM would take action in accordance with 50 CFR 600.310(g) to correct the operational issue that caused the ACL overage. This may include a recommendation that NMFS reduce the ACL in the subsequent fishing year by the amount of the overage, or other measures, as appropriate.

Expected Fishery Outcome

The expected fishery outcome under Alternative 2 would be the same as under Alternative 1 (No action), and is not expected to result in changes in the conduct of the fishery, including gear types used, areas fished, level of catch or effort. This is because annual catch in fishing years 2015-2018 is expected to be similar to the average annual catch of 1,757 lb from the most recent three-year period (2011-13), and remain below the ACL proposed under this alternative. Catch statistics are not available until at least six months after the data have been collected. Therefore, NMFS and the Council have no way to determine during any fishing year whether the ACL might be reached, and in-season AMs to prevent the ACL from being exceeded are not possible. However, six months after each fishing year, data would become available for NMFS and the Council to determine whether an ACL in the previous year was exceeded.

If NMFS and the Council determines the ACL was exceeded, the proposed post-season AM could trigger a reduced ACL in the subsequent fishing years. However, this post-season AM is also not expected to result in changes in the conduct of the fishery, including gear types used, areas fished, level of catch or effort due to the lack of in-season AMs. This is because spiny lobster catch in 2015 through 2018 is expected to continue to come exclusively from nearshore water where fishing is managed by the Territory of American Samoa, and not by NMFS. Therefore, even if NMFS were to set the ACL to zero in subsequent fishing years, fisher could still continue to fish for spiny lobster in nearshore waters throughout each fishing year in the same manner as under Alternative 1, and as recently occurred in 2011-2013. However, based on historical catches shown in Table 2, the American Samoa lobster fishery is not expected to exceed the OFL proxy of 7,100 lb in any fishing year between 2015-2018.

2.3.1.3 Alternative 3: Specify Council recommended ACL of 4,845 (Preferred)

Under Alternative 3 (the Council's and NMFS' Preferred Alternative), NMFS would specify an ACL at 4,845 lb of spiny lobster for fishing years 2015 through 2018. This is five percent lower than the ABC of 5,100 lb. Based on the Biomass Augmented Catch-MSY model developed by Sabater and Kleiber (2014), an ACL of 4,845 lb is associated with less than a 35 percent probability of overfishing should the entire ACL be caught (Table 1).

Under this alternative, if the Council determines the most recent three-year average catch for spiny lobster exceeded the specified ACL in any fishing year, NMFS would reduce the ACL by the amount of the overage in the subsequent years. See Section 1.3- Proposed Action for detailed information on how this AM would be triggered.

Expected Fishery Outcome

The expected fishery outcome under Alternative 3 would be the same as the expected fishery outcome under Alternative 2 (Status Quo) for the same reasons explained under Alternative 2.

2.3.1.4 Alternative 4: Specify ACL between 3,300 lb and 4,600 lb (lower than preferred)

Under Alternative 4, NMFS would specify an ACL that is lower than the preferred alternative (Alternative 3) for fishing years 2015 through 2018. NMFS included a range of ACLs lower than the ACL that would be established under the preferred alternative in the event that the proposed ACL under Alternative 3 is implemented and exceeded in 2015, 2016 or 2017, and a downward overage adjustment in the amount of the overage is necessary in a subsequent year. Under this alternative, the ACLs could range from 4,600 lb (probability of overfishing of 30 percent should the entire ACL be caught) down to 3,300 lb (probability of overfishing of 15 percent should the entire ACL be caught) (Table 1).

Expected Fishery Outcome

The expected fishery outcome under Alternative 4 would be the same as the expected fishery outcome under Alternative 2 (Status Quo) for the same reasons explained under Alternative 2.

2.3.2 CNMI Spiny Lobster ACL Alternatives

2.3.2.1 Alternative 1: No ACL and AM Management (No Action)

Currently, NMFS has not specified an ACL and AM for the CNMI spiny lobster fishery for fishing year 2015. Under this alternative, NMFS would not specify an ACL for the CNMI spiny lobster stock and AMs would not be necessary. However, this alternative would not be in compliance with the Magnuson-Stevens Act, or the provisions of the Mariana Archipelago FEP and implementing federal regulations which require NMFS to specify an ACL for all stocks and stock complexes..

Expected Fishery Outcome

Although the potential for catch is unlimited without an ACL and AMs, the lack of an ACL or AMs is not expected to result in changes in the conduct of the fishery including gear types used, areas fished, level of catch or effort. This is because even without ACLs and AMs, the spiny lobster fishery in the CNMI is sustainable, based on the best available commercial and scientific information. As shown in Table 6, the highest recorded catch of spiny lobster in the CNMI was 5,610 lb, which occurred in 2005. This level of catch is well below the OFL proxy of 9,200 lb and the MSY of 9,600 lb. Since then, spiny lobster harvest has fluctuated between 600 lb and 4,400 lb, with the average annual catch for the most recent three year period 2011-2013 being 1,115lb. During 2011-13, the fishery remained open year round. Under this alternative, CNMI spiny lobster harvest in 2015 through 2018 is expected to be similar to that described in Alternative 2 and is not expected to exceed the OFL proxy of 9,200 lb.

2.3.2.2 Alternative 2: Specify 2014 ACL of 5,500 lb (Status Quo/NEPA Baseline)

Under Alternative 2, NMFS would set an ACL of 5,500 lb of spiny lobster for fishing years 2015 through 2018. This is the same ACL specified by NMFS in 2012 (77 FR 6019, February 7, 2012), 2013 (78 FR 15885, March 13, 2013) and 2014 (79 FR 4276, January 27, 2014) and is the status quo alternative. This ACL was developed using a different method than proposed under the preferred alternative (Alternative 3), and is equal to the 75th percentile of the long term catch history. For detailed information on the how this ACL was derived, please see the EA for the 2012 ACLs and AMs for crustacean and precious coral fisheries (NMFS 2011). Based on risk projections from method B of the Biomass Augmented Catch-MSY model (Appendix B), an ACL of 5,500 lb is associated with less than a 5 percent probability of overfishing should the entire ACL be caught (Table 1). This is the NEPA baseline to which all other alternatives are compared.

Under this alternative, if the Council determines the ACL is exceeded, the Council as an AM would take action in accordance with 50 CFR 600.310(g) to correct the operational issue that caused the ACL overage. This may include a recommendation that NMFS reduce the ACL in the subsequent fishing year by the amount of the overage, or other measures, as appropriate.

Expected Fishery Outcome

The expected fishery outcome under Alternative 2 would be the same as under Alternative 1 (No action), and is not expected to result in changes in the conduct of the fishery, including gear types used, areas fished, level of catch or effort. This is because annual catch in fishing years 2015-2018 is expected to be similar to the average annual catch of 1,115 lb from the most recent three-year period (2011-13), and remain below the ACL proposed under this alternative. Catch statistics are not available until at least six months after the data have been collected. Therefore, NMFS and the Council have no way to determine during any fishing year whether the ACL might be reached, and in-season AMs to prevent the ACL from being exceeded are not possible. However, six months after each fishing year, data would become available for NMFS and the Council to determine whether an ACL in the previous year was exceeded.

If NMFS and the Council determines the ACL was exceeded, the proposed post-season AM could trigger a reduced ACL in the subsequent fishing years. However, this post-season AM is also not expected to result in changes in the conduct of the fishery, including gear types used, areas fished, level of catch or effort due to the lack of in-season AMs. This is because spiny lobster catch in 2015 through 2018 is expected to continue to come exclusively from nearshore water where fishing is managed by the Commonwealth of the Northern Mariana Islands, and not by NMFS. Therefore, even if NMFS were to set the ACL to zero in subsequent fishing years, fisher could still continue to fish for spiny lobster in nearshore waters throughout each fishing year in the same manner as under Alternative 1, and as recently occurred in 2011-2013. However, based on historical catches shown in Table 6, the CNMI lobster fishery is not expected to exceed the OFL proxy of 9,200 lb in any fishing year between 2015-2018.

2.3.2.3 Alternative 3: Specify Council recommended ACL of 7,410 lb (Preferred)

Under Alternative 3 (the Council and NMFS Preferred), NMFS would specify an ACL of 7,410 lb of spiny lobster for fishing years 2015 through 2018. This ACL is five percent lower than the ABC of 7,800 lb. Based on the Biomass Augmented Catch-MSY model developed by Sabater and Kleiber (2014), an ACL of 7,410 lb is associated with less than a 30 percent probability of overfishing should the entire ACL be caught (Table 1).

Under this alternative, if the Council determines the most recent three-year average catch for spiny lobster exceeded the specified ACL in any fishing year, NMFS would reduce the ACL by the amount of the overage in the subsequent years. See Section 1.3 - Proposed Action for detailed information on how this AM would be triggered.

Expected Fishery Outcome

The expected fishery outcome under Alternative 3 would be the same as the expected fishery outcome under Alternative 2 (Status Quo) for the same reasons explained under Alternative 2.

2.3.2.4 Alternative 4: Specify ACL between 6,100 lb and 7,100 lb (lower than preferred)

Under Alternative 4, NMFS would specify an ACL lower than the preferred alternative (Alternative 3) for fishing for fishing years 2015 through 2018. NMFS included a range of ACLs lower than the ACL that would be established under the preferred alternative in the event that the proposed ACL under Alternative 3 is implemented and exceeded in 2015, 2016 or 2017, and a downward overage adjustment in the amount of the overage is necessary in a subsequent year. Under this alternative, the ACLs could range from 7,100 lb (probability of overfishing of 25% should the entire ACL be caught) down to 6,100 lb (probability of overfishing of 10% should the entire ACL be caught) (Table 1).

Expected Fishery Outcome

The expected fishery outcome under Alternative 4 would be the same as the expected fishery outcome under Alternative 2 (Status Quo) for the same reasons explained under Alternative 2.

2.3.3 Guam Spiny Lobster ACL Alternatives

2.3.3.1 Alternative 1: No ACL and AM Management (No Action)

Currently, NMFS has not specified an ACL for the Guam spiny lobster fishery for fishing year 2015. Under this alternative, NMFS would not specify an ACL for the Guam spiny lobster stock and AMs would not be necessary. However, this alternative would not be in compliance with the Magnuson-Stevens Act, or the provisions of the Mariana Archipelago FEP and implementing federal regulations which require NMFS to specify an ACL for all stocks and stock complexes.

Expected Fishery Outcome

Although the potential for catch is unlimited without an ACL and AMs, the lack of an ACL or AMs is not expected to result in changes in the conduct of the fishery including gear types used, areas fished, level of catch or effort. This is because even without ACLs and AMs, the spiny lobster fishery in Guam is currently sustainable, based on the best available commercial and scientific information. As shown in Table 10, spiny lobster catch in Guam exceeded the current MSY estimate of 4,600 lb in 2006 and again in 2007, when respectively, 5,089 lb and 4,725 lb were caught. Since then, spiny lobster harvest has fluctuated between 900 lb and 2,000 lb with the average annual catch for the most recent three year period 2011-2013 being 1,167 lb. During 2011-13, the fishery remained open year round. Under this alternative, Guam spiny lobster harvest in 2015 through 2018 is expected to be similar to that described in Alternative 2 and is not expected to exceed the OFL proxy of 4,300 lb.

2.3.3.2 Alternative 2: Specify 2014 ACL of 2,700 lb (Status Quo/NEPA Baseline)

Under Alternative 2, NMFS would set an ACL of 2,700 lb of spiny lobster for fishing years 2015 through 2018. This is the same ACL specified by NMFS in 2012 (77 FR 6019, February 7, 2012), 2013 (78 FR 15885, March 13, 2013) and 2014 (79 FR 4276, January 27, 2014) and is the status quo alternative. This ACL was developed using a different method than proposed under the preferred alternative (Alternative 3) and is equal to the 75th percentile of the long term catch history. For detailed information on the how this ACL was derived, please see the EA for the 2012 ACLs and AMs for crustacean and precious coral fisheries (NMFS 2011). Based on risk projections from method B of the Biomass Augmented Catch-MSY model (Appendix B), an ACL of 2,700 lb is associated with a 25 percent probability of overfishing should the entire ACL be caught (Table 1). This is the NEPA baseline to which all other alternatives are compared.

Under this alternative, if the Council determines the ACL is exceeded, the Council as an AM would take action in accordance with 50 CFR 600.310(g) to correct the operational issue that caused the ACL overage. This may include a recommendation that NMFS reduce the ACL in the subsequent fishing year by the amount of the overage, or other measures, as appropriate.

Expected Fishery Outcome

The expected fishery outcome under Alternative 2 would be the same as under Alternative 1 (No action), and is not expected to result in changes in the conduct of the fishery, including gear types used, areas fished, level of catch or effort. This is because annual catch in fishing years 2015-2018 is expected to be similar to the average annual catch of 1,167 lb from the most recent three-year period (2011-13), and remain below the ACL proposed under this alternative. Catch statistics are not available until at least six months after the data have been collected. Therefore, NMFS and the Council have no way to determine during any fishing year whether the ACL might be reached, and in-season AMs to prevent the ACL from being exceeded are not possible. However, six months after each fishing year, data would become available for NMFS and the Council to determine whether an ACL in the previous year was exceeded.

If NMFS and the Council determines the ACL was exceeded, the proposed post-season AM could trigger a reduced ACL in the subsequent fishing years. However, this post-season AM is also not expected to result in changes in the conduct of the fishery, including gear types used, areas fished, level of catch or effort due to the lack of in-season AMs. This is because spiny lobster catch in 2015 through 2018 is expected to continue to come exclusively from nearshore water where fishing is managed by the Territory of Guam, and not by NMFS. Therefore, even if NMFS were to set the ACL to zero in subsequent fishing years, fisher could still continue to fish for spiny lobster in nearshore waters throughout each fishing year in the same manner as under Alternative 1, and as recently occurred in 2011-13. However, based on historical catches shown in Table 10, the American Samoa lobster fishery is not expected to exceed the OFL proxy of 4,300 lb in any fishing year between 2015-2018.

2.3.3.3 Alternative 3: Specify Council recommended ACL of 3,135 lb (Preferred)

Under Alternative 3 (the Council and NMFS Preferred), NMFS would specify an ACL of 3,135 lb of spiny lobster for fishing years 2015 through 2018. This ACL is 5 percent lower than the ABC of 3,300 lb. Based on the Biomass Augmented Catch-MSY model developed by Sabater and Kleiber (2014), an ACL of 3,135 lb is associated with less than a 35 percent probability of overfishing should the entire ACL be caught (Table 1).

Under this alternative, if the Council determines the most recent three-year average catch for spiny lobster exceeded the specified ACL in any fishing year, NMFS would reduce the ACL by the amount of the overage in the subsequent years. See Section 1.3 - Proposed Action for detailed information on how this AM would be triggered.

Expected Fishery Outcome

The expected fishery outcome under Alternative 3 would be the same as the expected fishery outcome under Alternative 2 (Status Quo) for the same reasons explained under Alternative 2.

2.3.3.4 Alternative 4: Specify ACL between 2,200 lb and 3,000 lb (lower than preferred)

Under Alternative 4, NMFS would specify an ACL lower than the preferred alternative (Alternative 3) for fishing for fishing years 2015 through 2018. NMFS included a range of ACLs lower than the ACL that would be established under the preferred alternative in the event that the proposed ACL under Alternative 3 is implemented and exceeded in 2015, 2016 or 2017, and a downward overage adjustment in the amount of the overage is necessary in a subsequent year. Under this alternative, the ACLs could range from 2,200 lb (probability of overfishing of 15% should the entire ACL be caught) to 3,000 lb (probability of overfishing of 30% should the entire ACL be caught) (Table 1).

Expected Fishery Outcome

The expected fishery outcome under Alternative 4 would be the same as the expected fishery outcome under Alternative 2 (Status Quo) for the same reasons explained under Alternative 2.

2.3.4 Hawaii Spiny Lobster ACL Alternatives

2.3.4.1 Alternative 1: No ACL and AM Management (No Action)

Currently, NMFS has not specified an ACL and AM for the MHI spiny lobster fishery for fishing year 2015. Under this alternative, NMFS would not specify an ACL for the MHI spiny lobster stock and AMs would not be necessary. However, this alternative would not be in compliance with the Magnuson-Stevens Act, or the provisions of the Hawaii Archipelago FEP and implementing federal regulations which require NMFS to specify an ACL for all stocks and stock complexes. This is the no action baseline.

Expected Fishery Outcome

Although the potential for catch is unlimited without an ACL and AMs, the lack of an ACL or AMs is not expected to result in changes in the conduct of the fishery including gear types used, areas fished, level of catch or effort. This is because even without ACLs and AMs, the spiny lobster fishery in the MHI is sustainable, based on the best available commercial and scientific information. As shown in Table 14, the highest recorded catch of spiny lobster in Hawaii was 14,437 lb, which occurred in 2009. This level of catch is well below the OFL proxy of 19,200 lb and the MSY of 20,400 lb. Since that time, spiny lobster harvest has fluctuated between 9,700 and 12,300 lb with the average annual catch for the most recent three year period 2011-2013 being 10,242 lb. During 2011-13, the fishery remained open year round. Under this alternative, MHI spiny lobster harvest in 2015 through 2018 is expected to be similar to that described under Alternative 2 and is not expected to exceed the OFL proxy of 19,200 lb.

2.3.4.2 Alternative 2: Specify 2014 ACL of 10,000 lb (Status Quo/NEPA Baseline)

Under Alternative 2, NMFS would set an ACL of 10,000 lb of spiny lobster for fishing years 2015 through 2018. This is the same ACL specified by NMFS in 2012 (77 FR 6019, February 7, 2012), 2013 (78 FR 15885, March 13, 2013) and 2014 (79 FR 4276, January 27, 2014) and is the status quo alternative. This ACL was developed using a different method than proposed under the preferred alternative (Alternative 3) and is equal to the 75th percentile of the long term catch history. For detailed information on the how this ACL was derived, please see the EA for the 2012 ACLs and AMs for crustacean and precious coral fisheries (NMFS 2011). Based on risk projections from method B of the Biomass Augmented Catch-MSY model (Appendix B), an ACL of 10,000 lb is associated with less than a 5 percent probability of overfishing should the entire ACL be caught (Table 1). This is the NEPA baseline to which all other alternatives are compared.

Under this alternative, if the Council determines the ACL is exceeded, the Council as an AM would take action in accordance with 50 CFR 600.310(g) to correct the operational issue that caused the ACL overage. This may include a recommendation that NMFS reduce the ACL in the subsequent fishing year by the amount of the overage, or other measures, as appropriate.

Expected Fishery Outcome

The expected fishery outcome under Alternative 2 would be the same as under Alternative 1 (No action), and is not expected to result in changes in the conduct of the fishery, including gear types used, areas fished, level of catch or effort. This is because annual catch in fishing years 2015-2018 is expected to be similar to the average annual catch of 10,242 lb from the most recent three-year period (2011-13), and remain below the ACL proposed under this alternative. Catch statistics are not available until at least six months after the data have been collected. Therefore, NMFS and the Council have no way to determine during any fishing year whether the ACL might be reached, and in-season AMs to prevent the ACL from being exceeded are not possible. However, six months after each fishing year, data would become available for NMFS and the Council to determine whether an ACL in the previous year was exceeded.

If NMFS and the Council determines the ACL was exceeded, the proposed post-season AM could trigger a reduced ACL in the subsequent fishing years. However, this post-season AM is also not expected to result in changes in the conduct of the fishery, including gear types used, areas fished, level of catch or effort due to the lack of in-season AMs. This is because spiny lobster catch in 2015 through 2018 is expected to continue to come exclusively from nearshore water where fishing is managed by the State of Hawaii, and not by NMFS. Therefore, even if NMFS were set the ACL to zero in subsequent fishing years, fisher could still continue to fish for spiny lobster in nearshore waters throughout each fishing year in the same manner as under Alternative 1, and as recently occurred in 2011-2013. However, based on historical catches shown in Table 2, the American Samoa lobster fishery is not expected to exceed the OFL proxy of 19,200 lb in any fishing year between 2015-2018.

2.3.4.3 Alternative 3: Specify Council recommended ACL of 15,000 lb (Preferred)

Under Alternative 3 (the Council and NMFS Preferred), NMFS would specify an ACL of 15,000 lb of spiny lobster for fishing years 2015 through 2018. This ACL is 5 percent lower than the ABC of 15,800 lb. Based on the Biomass Augmented Catch-MSY model developed by Sabater and Kleiber (2014), an ACL of 15,000 lb is associated with less than 25 percent probability of overfishing should the entire ACL be caught (Table 1).

Under this alternative, if the Council determines the most recent three-year average catch for spiny lobster exceeded the specified ACL in any fishing year, NMFS would reduce the ACL by the amount of the overage in the subsequent years. See Section 1.3 - Proposed Action for detailed information on how this AM would be triggered.

Expected Fishery Outcome

The expected fishery outcome under Alternative 3 would be the same as the expected fishery outcome under Alternative 2 (Status Quo) for the same reasons explained under Alternative 2.

2.3.4.4 Alternative 4: Specify ACL between 11,700 lb and 14,300 lb (lower than preferred)

Under Alternative 4, NMFS would specify an ACL lower than the preferred alternative (Alternative 3) for fishing for fishing years 2015 through 2018. NMFS included a range of ACLs lower than the ACL that would be established under the preferred alternative in the event that the proposed ACL under Alternative 3 is implemented and exceeded in 2015, 2016 or 2017, and a downward overage adjustment in the amount of the overage is necessary in a subsequent year. Under this alternative, the ACLs could range from 14,300 lb (probability of overfishing of 20% should the entire ACL be caught) down to 11,700 lb (probability of overfishing of 5% should the entire ACL be caught) to (Table 1).

Expected Fishery Outcome

The expected fishery outcome under Alternative 4 would be the same as the expected fishery outcome under Alternative 2 (Status Quo) for the same reasons explained under Alternative 2.

2.4 Alternatives Not Considered in Detail

Although required by the Pacific Remote Island Areas (PRIA) FEP, the Council did not recommend and NMFS does not propose to specify an ACL for spiny lobsters in EEZ waters around the PRIA. This is because current federal regulations (78 FR 32996, June 3, 2013) prohibit all fishing, including non-commercial fishing within 12 nm around each of the seven islands and atolls that comprise the PRIA, and there is no lobster habitat seaward of the 12 nm prohibited fishing area. Therefore, there continues to be a functional equivalent of an ACL of zero for spiny lobsters in the PRIA.

3 Affected Environment

This section describes the affected spiny lobster fisheries and fishery resources, and other biological and physical resources that could be affected by the spiny lobster fisheries in American Samoa, CNMI, Guam, and the MHI. Fishing communities are described as are protected marine areas and fishery administration and enforcement.

3.1 American Samoa

3.1.1 Target and Non-Target Stocks

The spiny lobster (*Panulirus penicillatus*) is the main lobster species harvested in American Samoa and is primarily speared at night or taken by hand from the outer reef slope by free divers diving for fish exclusively within territorial waters (Coutoures 2003). Because hand harvest and spearfishing are highly selective techniques, there is no bycatch of non-target stocks in this fishery. American Samoa spiny lobsters are not harvested with nets or traps.

Due to the lack of a developed spiny lobster fishery in federal waters, the Council at its 151st, 154th and 157th meetings directed Council staff to conduct analyses to identify coral reef associated species, including spiny lobsters that may meet the criteria for an "ecosystem

component species" designation in accordance with National Standard 1 guidelines of the Magnuson Stevens Act (76 FR 37285, June 27, 2011). Ecosystem component species are species that are generally not harvested or retained in the EEZ and do not require the specification of reference points such as an ACL, but should be monitored and actively managed in the EEZ if necessary. This initiative is not yet completed, so ACLs are required to be specified for American Samoa spiny lobsters despite the lack of a fishery in federal waters.

3.1.1.1 Summary of American Samoa Spiny Lobster Catch

Very little is known about American Samoa's spiny lobster fishery. The total annual catch of spiny lobsters in American Samoa is unknown. However, annual commercial spiny lobster catch and sales over the past 13 years has ranged between 500 lb to 5,388 lb generating an estimated annual revenue between $2,050 and $22,791. Since the peak of 5,388 lb in 2006, spiny lobster catches have declined with the average annual catch for the most recent three year period 2011-2013 being 1,757 lb. During 2011-13, the fishery remained open year round. It is unknown if the decline in catches is a result in a decline in stock abundance, or other factors such as changes in fishery data collection methodologies. However, based on the recent MSY estimate of 7,300 lb by Sabater and Kleiber (2014), it does not appear that the decline in catches is a result of over exploitation.

Table 2 provides the estimated commercial catch of spiny lobsters from local data collection programs administered by American Samoa Department of Marine Wildlife Resources as described in Section 2.1.1 and reported in Appendix 3 in Sabater and Kleiber (2014). These values are identical to the estimated commercial catches reported by NMFS WPacFIN http://www.pifsc.noaa.gov/wpacfin/as/Data/ECL_Charts/ae2cmain.htm, accessed 11/3/2014, except where noted.

Table 2. Annual estimated commercial catch of spiny lobsters in American Samoa (2000-2013).

Year	Estimated Catch[1] (lb)	Estimated Price/lb[2]	Estimated Revenue
2000	1,564	$3.17	$4,957.88
2001	1,622	$3.37	$5,466.14
2002	943	$3.42	$3,225.06
2003	1,221	$3.60	$4,395.60
2004	500	$4.10	$2,050.00
2005	3,238	$4.32	$13,988.16
2006	5,388	$4.23	$22,791.24
2007	2,118	$4.55	$9,636.90
2008	1,885	$4.95	$9,330.75
2009	2,401	$4.69	$11,260.69
2010	3,905	$3.88	$15,151.40
2011	2,242	$4.07	$9,124.94
2012	1,056	$4.58	$4,836.48
2013	1,973	$3.89	$7,674.97
Avg. 2011-2013	**1,757**		

[1] Source: Appendix 3 in Sabater and Kleiber (2014); Appendix 3 in Sabater and Kleiber (2014) does not include catch data for 2012 and 2013. Therefore, the source of this information is the 2012 and 2013 ACL monitoring report presented at the 160th Council meeting in June 2014 (WPFMC 2014).
[2] Source: Estimated prices are from http://www.pifsc.noaa.gov/wpacfin/as/Pages/as_data_8.php, accessed 11/12/2014.

3.1.2 Fishery Participants and Fishing Communities

3.1.2.1 Fishing Participants

Currently, lobster harvest in American Samoa occurs exclusively within territorial waters. However, aside from commercial landing data, there is no information available on American Samoa's territorial lobster fishery in terms of number of participants or level of fishing effort.

3.1.2.2 Fishing Communities

The Magnuson-Stevens Act defines a fishing community as "...a community that is substantially dependent upon or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew, and fish processors that are based in such communities" (16 U.S.C. § 1802(16)). NMFS further specifies in the National Standard guidelines that a fishing community is "...a social or economic group whose members reside in a specific location and share a common dependency on commercial, recreational, or subsistence fishing or on directly related fisheries dependent services and industries (for example, boatyards, ice suppliers, tackle shops)". National Standard 8 of the Magnuson-Stevens Act requires that conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and the rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (a) provide for the sustained participation of such communities and (b) to the extent practicable, minimize adverse economic impacts on such communities. In 1999, the Council identified American Samoa as a fishing community. The Secretary of Commerce approved this definition on April 19, 2009 (64 FR 19067). Sustainable management of the American Samoa lobster fishery will allow continued harvest of a resource that is important to fishermen, their families, community networks, markets, and visitors for personal consumption (sustenance), supplemental income, and customary exchange.

3.1.3 Fishery Administration and Enforcement

3.1.3.1 Federal Fishery Management Provisions

Because of the lack of a developed spiny lobster fishery in EEZ waters around American Samoa, there are few fishing regulations at this time. Currently, regulations require any vessel used to fish for lobster to have a federal permit, and fishermen must report all catch. Federal regulations also require fishing vessels to carry federal fishery observers on fishing trips if required to do so by NMFS. Additionally, all fishing, including non-commercial fishing is prohibited within 12 nautical miles from the shoreline Rose Atoll, which is marine national monument (78 FR 32996,

June 3, 2013). Enforcement of federal fishing regulations is conducted by NOAA's Office of Law Enforcement and the U.S. Coast Guard.

In addition to fishing regulations, Federal law also requires the Council-appointed American Samoa FEP plan team to prepare an annual report on the performance of all federal fisheries, including the American Samoa spiny lobster fishery by June 30 of each year. The report must contain, among other things, recommendations for Council action and an assessment of the urgency and effects of such actions. Federal regulations also 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. Monitoring of catch against a specified ACL and implementation of AMs is conducted by NMFS and the Council.

3.1.3.2 American Samoa Fishery Management Provisions

In local territorial waters, local laws prohibit harvest of and sale of egg-bearing lobsters, and lobsters that measure less than three and one eighth inches in carapace length. American Samoa has established 14 marine protected areas (MPA) where fishing is strictly regulated or prohibited. These include special management areas, national parks, and community-based MPAs (Wushinich-Mendez and Trappe 2007). Fishing is also regulated within territorial waters designated as the American Samoa National Marine Sanctuary (77 FR 43942, July 26, 2012). Together, these measures help to manage and conserve spiny lobster resources in local territorial waters.

3.1.4 Protected Resources

3.1.4.1 Species Protected under the Endangered Species Act (ESA)

A number of protected species are known or believed to occur in the waters around American Samoa. Table 3 identifies species listed as endangered or threatened under the ESA that are known to occur or could reasonably be expected to occur in marine waters around American Samoa, which may have the potential to interact with the spiny lobster fishery. They include five whales, five sea turtles, a shark, seven species of shallow reef-building corals, and a seabird. There is no critical habitat designated for ESA-listed marine species around American Samoa.

Table 3. Endangered and threatened marine species and seabirds known to occur or reasonably expected to occur in waters round the American Samoa Archipelago.

Endangered and threatened marine species and seabirds known to occur or reasonably expected to occur in waters around the American Samoa Archipelago			
Common name	**Scientific Name**	**ESA listing status in American Samoa**	**Occurrence in American Samoa**
Listed Sea Turtles			
Green sea turtle (laumei enaena and fonu)	*Chelonia mydas*	Threatened	Frequently seen. Nest at Rose Atoll. Known to migrate to feeding grounds.

Endangered and threatened marine species and seabirds known to occur or reasonably expected to occur in waters around the American Samoa Archipelago			
Common name	**Scientific Name**	**ESA listing status in American Samoa**	**Occurrence in American Samoa**
Hawksbill sea turtle (laumei uga)	*Eretmochelys imbricata*	Endangered	Frequently seen. Nest at Rose Atoll and Swain's Island.
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	Very rare in American Samoa. One recovered dead in experimental longline fishing.
Olive ridley sea turtle	*Lepidochelys olivacea*	Threatened	Uncommon in American Samoa. Three sightings.
South Pacific Loggerhead sea turtle distinct population segment (DPS)	*Caretta caretta*	Endangered	Not known to occur in American Samoa.
Listed Marine Mammals			
Blue whale	*Balaenoptera musculus*	Endangered	No known sightings.
Fin whale	*Balaenoptera physalus*	Endangered	No known sightings.
Humpback whale (tafola or i`a manu)	*Megaptera novaeangliae*	Endangered	Most common during Sept. and October. Southern humpback whales mate and calve from June – Sept.
Sei whale	*Balaenoptera borealis*	Endangered	No known sightings.
Sperm whale	*Physeter macrocephalus*	Endangered	Occurs in all months except. Feb. and March.
Listed Sharks			
Scalloped hammerhead shark (Indo-West Pacific DPS)	*Sphyrna lewini*	Threatened	Known to occur.
Listed Shallow Reef-building Corals			
None	*Acropora globiceps*	Threatened	Depth range is 0 to 8 meters (m).
None	*A. jacquelineae*	Threatened	Depth range is 10 to 35 m.
None	*A. retusa*	Threatened	Depth range is 1 to 5 m.
None	*A. speciosa*	Threatened	Depth range is 12 to 40 m, and may occur in mesophotic habitat (<50 m depth).
None	*Euphyllia paradivisa*	Threatened	Depth range is two to 25 m.

Endangered and threatened marine species and seabirds known to occur or reasonably expected to occur in waters around the American Samoa Archipelago			
Common name	**Scientific Name**	**ESA listing status in American Samoa**	**Occurrence in American Samoa**
None	*Isopora crateriformis*	Threatened	Depth range is 0 to 12 m, and and may occur in mesophotic habitat (<50 m depth).
None	*Seriatopora aculeata*	Threatened	Depth range is three to 40m.
Listed Sea Birds			
Newell's Shearwater	*Puffinus auricularis newelli*	Threatened	Uncommon visitor.

Source: http://www.nmfs.noaa.gov/pr/species/esa/listed.htm, accessed October 31, 2014.

Applicable ESA Consultations – American Samoa Crustacean Fisheries

NMFS has evaluated the potential impact of American Samoa FEP crustacean fisheries on ESA listed species under NMFS jurisdiction and has determined that spiny lobster fisheries that operate in accordance with regulations implementing the American Samoa FEP are not likely to adversely affect ESA-listed species or their habitats. NMFS documented these determinations in letters of concurrence dated September 28, 2007, and April 9, 2015. The basis for this determination is generally due to the rare occurrence of ESA-listed species in EEA waters where federal spiny lobster fisheries are authorized to operate, combined with the low level of crustacean fishing occurring in the EEZ, which makes interactions unlikely to occur.

Newell's shearwater (*Puffinus auricularis newelli*) is listed as threatened under the ESA. Generally known with other shearwaters and petrels as ta`i`o in Samoan, this species breeds only in the main Hawaiian Islands, primarily in burrows on steep forested mountain slopes at medium elevation. Newell's shearwater has been sighted once in American Samoa, and is considered an uncommon visitor to the archipelago (Grant et al 1993). Because its presence in American Samoa is rare, and lobster fishermen do not interact with seabirds, the fishery has no effect on this seabird.

3.1.4.2 Species Protected under the Marine Mammal Protection Act (MMPA)

Several non-ESA listed whales, dolphins and porpoises occur in waters around American Samoa and are protected under the MMPA. Table 4 provides a list of non-ESA listed marine mammals known to occur or reasonably expected to occur in waters around American Samoa that have the potential to interact with the American Samoa lobster fishery.

Table 4. Non ESA-listed marine mammals known to occur or reasonably expected to occur in waters around American Samoa.

Non ESA-listed marine mammals known to occur or reasonably expected to occur in waters around American Samoa	
Common Name	**Scientific Name**
Blainville's beaked whale	*Mesoplodon densirostris*
Bottlenose dolphin	*Tursiops truncatus*
Bryde's whale	*Balaenoptera edeni*
Common dolphin	*Delphinus delphis*
Cuvier's beaked whale	*Ziphius cavirostris*
Dwarf sperm whale	*Kogia sima*
False killer whale	*Pseudorca crassidens*
Fraser's dolphin	*Lagenodelphis hosei*
Killer whale	*Orcinus orca*
Melon-headed whale	*Peponocephala electra*
Minke whale	*Balaenoptera acutorostrata*
Pygmy killer whale	*Feresa attenuata*
Pygmy sperm whale	*Kogia breviceps*
Risso's dolphin	*Grampus griseus*
Rough-toothed dolphin	*Steno bredanensis*
Short-finned pilot whale	*Globicephala macrorhynchus*
Spinner dolphin	*Stenella longirostris*
Spotted dolphin (Pantropical spotted dolphin)	*Stenella attenuata*
Striped dolphin	*Stenella coeruleoalba*
Longman's beaked whale	*Indopacetus pacificus*

Sources: NMFS PIRO and PIFSC unpublished data; Council website: http://www.wpcouncil.org

Applicable MMPA Coordination – American Samoa Spiny Lobster Fisheries

The MMPA prohibits, with certain exceptions, taking of marine mammals in the U.S., and by persons aboard U.S. flagged vessels (i.e., persons and vessels subject to U.S. jurisdiction). Under section 118 of the MMPA, NMFS must publish, at least annually, a List of Fisheries (LOF) that classifies U.S. commercial fisheries into one of three categories based upon the level of serious injury and mortality of marine mammals that occurs incidental to each fishery. A Category 1 fishery is one with frequent incidental morality and serious injury of marine mammals. A Category 2 fishery is one with occasional incidental morality and serious injury of marine mammals. A Category 3 fishery is one with a remote likelihood or no known incidental morality and serious injury of marine mammals.

On December 29, 2014, (79 FR 77919), NMFS published the final LOF for 2014 which classified Hawaii spearfishing, Hawaii lobster diving, and Hawaii lobster trap fishery as a Category 3 fishery under Section 118 of the MMPA. To date, NMFS has not included any spiny lobster fishery of American Samoa in the annual LOF. There is no information available

regarding marine mammal interactions in the spiny lobster fishery of American Samoa as no interactions have been reported or observed. However, because spiny lobsters in American Samoa are harvested by spear or by hand, it is reasonable to assume that the American Samoa lobster fishery would be comparable to the Hawaii spearfishing and Hawaii lobster diving fisheries and would have a remote likelihood of incidental mortality and serious injury of marine mammals. Participants in Category 3 fisheries are not required to register in the Marine Mammal Authorization Program prior to engaging in commercial fishing.

3.1.4.3 Seabirds of American Samoa

Seabirds found on and around American Samoa that could potentially interact with fisheries are listed in Table 5. However, because lobsters are harvested by hand or by spear, there have been no known interactions between the American Samoa lobster fishery and seabirds.

Table 5. Seabirds occurring in American Samoa.

Resident seabirds in American Samoa		
Samoan name	**Common name**	***Scientific name***
ta'i'o	Wedge-tailed shearwater	*Puffinus pacificus*
ta'i'o	Audubon's shearwater	*Puffinus lherminieri*
ta'i'o	Christmas shearwater	*Puffinus nativitatis*
ta'i'o	Tahiti petrel	*Pterodroma rostrata*
ta'i'o	Herald petrel	*Pterodroma heraldica*
ta'i'o	Collared petrel	*Pterodroma brevipes*
fua'o	Red-footed booby	*Sula sula*
fua'o	Brown booby	*Sula leucogaster*
fua'o	Masked booby	*Sula dactylatra*
tava'esina	White-tailed tropicbird	*Phaethon lepturus*
tava'e'ula	Red-tailed tropicbird	*Phaethon rubricauda*
atafa	Great frigatebird	*Fregata minor*
atafa	Lesser frigatebird	*Fregata ariel*
gogouli	Sooty tern	*Onychoprion fuscatus;* formerly *Sterna fuscata*
gogo	Brown noddy	*Anous stolidus*
gogo	Black noddy	*Anous minutus*
laia	Blue-gray noddy	*Procelsterna cerulea*
manu sina	White tern / Common fairy-tern	*Gygis alba*

Note: The ta'i'o, or Newell's shearwater is an uncommon visitor in American Samoa.
Source: WPFMC 2009a; and http://www.birdlife.org/datazone/species/factsheet/22694740: retrieved 12/8/14.

3.2 CNMI

3.2.1 Target and Non-Target Stock

The CNMI lobster fishery primarily targets spiny lobsters by hand, with scuba or by free diving. This fishery occurs exclusively within three nautical miles of the inhabited southern islands of Saipan, Tinian, and Rota although, anecdotal information indicates that on the reef surrounding Farallon de Medinilla, bottomfish fishermen have dove for lobsters in the past (WPFMC 2011; NMFS and WPFMC 2009b). Because hand harvest is a highly selective technique, there is no bycatch of non-target stocks in this fishery. CNMI spiny lobsters are not harvested with nets or traps.

A low level of non-commercial harvest of spiny lobsters could occur in EEZ waters surrounding the three northernmost islands of the archipelago within the Islands Unit of the Marianas Trench Marine National Monument. Federal regulations require fishers to obtain a Monument permit and report all catch within the Islands Unit. However, no fishing has occurred since regulations were implemented in 2013.

Due to the lack of a developed spiny lobster fishery in federal waters, the Council at its 151st, 154th and 157th meetings directed Council staff to conduct analyses to identify coral reef associated species, including spiny lobsters that may meet the criteria for an "ecosystem component species" designation in accordance with National Standard 1 guidelines of the Magnuson Stevens Act (76 FR 37285, June 27, 2011). Ecosystem component species are species that are generally not harvested or retained in the EEZ and do not require the specification of reference points such as an ACL, but should be monitored and actively managed in the EEZ if necessary. This initiative is not yet completed, so ACLs are required to be specified for CNMI spiny lobsters despite the lack of a fishery in federal waters.

3.2.1.1 Summary of CNMI Spiny Lobster Catch

Very little is known about CNMI's crustacean fisheries. The annual total catch of spiny lobsters in the CNMI is unknown. However, annual commercial spiny lobster catch and sales over the past 13 years has ranged between 728 lb and 5,610 lb generating an estimated annual revenue between $4,572 and $28,106. Since the peak of 5,610 lb in 2005, spiny lobster catches have declined with the average catch for the most recent three year period 2011-2013 being 1,115 lb. During 2011-13, the fishery remained open year round. It is unknown if the decline in catches is a result in a decline in stock abundance or other factors such as changes in fishery data collection methodologies. However, based on the recent MSY estimate of 9,600 lb by Sabater and Kleiber (2014), it does not appear that the decline in catches is a result of overexploitation.
Table 6 provides the estimated commercial catch of CNMI spiny lobsters from local data collection programs administered by the CNMI Division of Fish and Wildlife as reported by NMFS WPacFIN.

Table 6. Annual estimated commercial catch of spiny lobsters in the CNMI (2000-2013).

Year	Estimated Catch[1] (lb)	Estimated Price/lb[2]	Estimated Revenue
2000	3,967	$5.70	$22,611.90
2001	4,732	$5.76	$27,256.32
2002	4,350	$5.71	$24,838.50
2003	728	$6.28	$4,571.84
2004	2,947	$6.58	$19,391.26
2005	5,610	$5.01	$28,106.10
2006	4,391	$4.90	$21,515.90
2007	3,008	$5.31	$15,972.48
2008	2,259	$5.26	$11,882.34
2009	881	$4.98	$4,387.38
2010	658	$4.87	$3,204.46
2011	810	$6.49	$5,256.90
2012	0	No data	No data
2013	1,420	No data	No data
Avg. 2011-2013	**1,115**		

[1] Source: http://www.pifsc.noaa.gov/wpacfin/cnmi/Data/Landings_Charts/ce3g.htm, accessed 11/3/2014; NMFS WPacFIN website reports a catch of zero spiny lobster for 2012 and 2013 indicating either no spiny lobster catch for that year, no catches were intercepted or reported from local fishery data collection programs, or the data are not available. Therefore, the source of data for 2012 and 2013 is from the ACL monitoring report presented at the 160th Council meeting in June 2014 (WPFMC 2014).
[2] http://www.pifsc.noaa.gov/wpacfin/cnmi/Pages/cnmi_data_2.php, accessed 11/12/2014.

3.2.2 Fishery Participants and Fishing Communities

3.2.2.1 Fishery Participants

Currently, lobster harvest in the CNMI occurs exclusively within territorial waters. However aside from catch data, there is no information available on CNMI's territorial lobster fishery in terms of number of participants or level of fishing effort. NMFS has not issued any permits authorizing non-commercial fishing in federal waters of the Islands Unit of the Mariana Trench Marine National Monument.

3.2.2.2 Fishing Communities

The Magnuson-Stevens Act defines a fishing community as "...a community that is substantially dependent upon or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew, and fish processors that are based in such communities" (16 U.S.C. § 1802(16)). NMFS further specifies in the National Standard guidelines that a fishing community is "...a social or economic group whose members reside in a specific location and share a common dependency on commercial, recreational, or subsistence fishing or on directly related fisheries dependent services and

industries (for example, boatyards, ice suppliers, tackle shops)". National Standard 8 of the Magnuson-Stevens Act requires that conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and the rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (a) provide for the sustained participation of such communities and (b) to the extent practicable, minimize adverse economic impacts on such communities. In 1999, the Council identified the CNMI as a fishing community. The Secretary of Commerce approved this definition on April 19, 2009 (64 FR 19067). Sustainable management of the CNMI lobster fishery will allow continued harvest of a resource that is important to fishermen, their families, community networks, markets, and visitors for personal consumption (sustenance), supplemental income, and customary exchange.

3.2.3 Fishery Administration and Enforcement

3.2.3.1 Federal Fishery Management Provisions

Because of the lack of a developed spiny lobster fishery in EEZ waters around the CNMI, there are few fishing regulations at this time. Currently, regulations require any vessel used to fish for lobster to have a federal permit, and fishermen must report all catch. As noted above, federal regulations also require fishers to obtain a Monument permit and report all catch within the Islands Unit of the Mariana Trench Marine National Monument. Federal regulations also require fishing vessels to carry federal fishery observers on fishing trips if required to do so by NMFS. Enforcement of federal fishing regulations is conducted by NOAA's Office of Law Enforcement and the U.S. Coast Guard.

In addition to fishing regulations, Federal law also requires the Council-appointed Mariana FEP plan team to prepare an annual report on the performance of all federal fisheries, including the CNMI spiny lobster fishery by June 30 of each year. The report must contain, among other things, recommendations for Council action and an assessment of the urgency and effects of such actions. Federal regulations also 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. Monitoring of catch against a specified ACL and implementation of AMs is conducted by NMFS and the Council.

3.2.3.2 CMMI Fishery Management Provisions

In local territorial waters, local laws allow lobster harvest by hand only and prohibit harvest of eggbearing lobsters, and lobsters that measure less than three inches in carpace length. In addition, fishing is prohibited in several no-take marine protected areas including Managaha Marine Conservation Area on Saipan, Bird Island and Forbidden Island Sanctuaries on Saipan, and Sasanhaya Bay Fish Reserve on Rota (Wushinich-Mendez and Trappe 2007). Together, these measures help to manage and conserve spiny lobster resources in local territorial waters.

3.2.4 Protected Resources

3.2.4.1 Species Protected under the Endangered Species Act (ESA)

A number of protected species are reported from the waters around the Mariana Islands. Table 7 identifies species listed as endangered or threatened under the ESA that are known to occur or could reasonably be expected to occur in marine waters around the Mariana Archipelago, including the CNMI, which may have the potential to interact with fisheries. Listed species include five whales, five sea turtles, a shark, three species of shallow reef-building corals and a seabird. There is no critical habitat designated for ESA-listed marine species around the CNMI.

Table 7. Endangered and threatened marine species and seabirds known to occur or reasonably expected to occur in waters around the Mariana Archipelago (CNMI).

Endangered and threatened marine species and seabirds known to occur or reasonably expected to occur in waters around the Mariana Archipelago (CNMI)			
Common name	**Scientific Name**	**ESA listing status in the CNMI**	**Occurrence in the CNMI**
Listed Sea Turtles			
Green sea turtle	*Chelonia mydas*	Threatened	Most common turtle in the Mariana Archipelago. Foraging and minor nesting confirmed on Guam, Rota, Tinian and Saipan.
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered	Small population foraging around Guam and suspected low level around southern islands of CNMI. Low level nesting on Guam.
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	Occasional sightings around Guam. Not known to what extent they are present around Guam and CNMI
Olive ridley sea turtle	*Lepidochelys olivacea*	Threatened	Range across Pacific: not confirmed in the Mariana Archipelago
North Pacific loggerhead sea turtle DPS	*Caretta caretta*	Endangered	No known reports of loggerhead turtles in waters around the Mariana Archipelago
Listed Marine Mammals			
Blue whale	*Balaenoptera musculus*	Endangered	Extremely rare
Fin whale	*Balaenoptera physalus*	Endangered	Infrequent sightings.
Humpback whale	*Megaptera novaeangliae*	Endangered	Infrequent sightings. Winter in the CNMI.

Endangered and threatened marine species and seabirds known to occur or reasonably expected to occur in waters around the Mariana Archipelago (CNMI)			
Common name	**Scientific Name**	**ESA listing status in the CNMI**	**Occurrence in the CNMI**
Sei whale	*Balaenoptera borealis*	Endangered	Infrequent sightings.
Sperm whale	*Physeter macrocephalus*	Endangered	Regularly sighted; most abundant large cetaceans in the region.
Listed Sharks			
Scalloped hammerhead shark (Indo-West Pacific DPS)	*Sphyrna lewini*	Threatened	Known to occur.
Listed Shallow Reef-building Corals			
None	*Acropora globiceps*	Threatened	Depths range is 0 to 8 m
None	*A. retusa*	Threatened	Depth range is one to five meters
None	*Seriatopora aculeata*	Threatened	Depth range is three to 40 meters
Listed Sea Birds			
Newell's Shearwater	*Puffinus auricularis newelli*	Threatened	Rare visitor

Source: http://www.nmfs.noaa.gov/pr/species/esa/listed.htm, accessed October 31, 2014.

Applicable ESA Consultations – CNMI Crustacean Fisheries

NMFS has evaluated the potential impact of Mariana FEP crustacean fisheries on ESA listed species and has determined that spiny lobster fisheries that operate in accordance with regulations implementing the Mariana FEP are not likely to adversely affect ESA-listed species or their habitats. NMFS documented these determinations in letters of concurrence dated September 28, 2007 and April 29, 2015. The basis for this determination is generally due to the rare occurrence of ESA-listed species in EEA waters where federal spiny lobster fisheries are authorized to operate, combined with the low level of crustacean fishing occurring in the EEZ, which makes interactions unlikely to occur.

Newell's shearwater (*Puffinus auricularis newelli*) is listed as threatened under the ESA. This species breeds only in the main Hawaiian Islands, primarily in burrows on steep forested mountain slopes at medium elevation. Newell's shearwater has been sighted in the Marianas, but is considered an uncommon visitor to the archipelago (Drahos 1977; Jouanin 1956). Because its presence in the Mariana Archipelago is rare, and lobster fishermen do not interact with seabirds, the fishery has no effect on this seabird.

3.2.4.2 Species Protected under the Marine Mammal Protection Act (MMPA)

Several non ESA listed whales, dolphins, and porpoises occur in waters around the CNMI and are protected under the MMPA. Table 8 provides a list of non-ESA listed marine mammals known to occur or reasonably expected to occur in waters around the Mariana Archipelago that have the potential to interact with the CNMI crustacean fishery.

Table 8. Non ESA-listed marine mammals known to occur or reasonably expected to occur in waters around the Mariana Archipelago (CNMI).

Non ESA-listed marine mammals known to occur or reasonably expected to occur in waters around the Mariana Archipelago (CNMI)	
Common Name	**Scientific Name**
Blainville's beaked whale	*Mesoplodon densirostris*
Bottlenose dolphin	*Tursiops truncatus*
Bryde's whale	*Balaenoptera edeni*
Common dolphin	*Delphinus delphis*
Cuvier's beaked whale	*Ziphius cavirostris*
Dwarf sperm whale	*Kogia sima*
False killer whale	*Pseudorca crassidens*
Fraser's dolphin	*Lagenodelphis hosei*
Killer whale	*Orcinus orca*
Longman's beaked whale	*Indopacetus pacificus*
Melon-headed whale	*Peponocephala electra*
Minke whale	*Balaenoptera acutorostrata*
Northern elephant Seal	*Mirounga angustirostris*
Pilot whale	*Globicephala malaena*
Pygmy killer whale	*Feresa attenuata*
Pygmy sperm whale	*Kogia breviceps*
Risso's dolphin	*Grampus griseus*
Rough-toothed dolphin	*Steno bredanensis*
Short-finned pilot whale	*Globicephala macrorhynchus*
Spinner dolphin	*Stenella longirostris*
Spotted dolphin	*Stenella attenuata*
Striped dolphin	*Stenella coeruleoalba*

Source: Eldredge 2003; Randall et al. 1975; Council website: http://www.wpcouncil.org

Applicable MMPA Coordination – CNMI Spiny Lobster Fisheries

The MMPA prohibits, with certain exceptions, taking of marine mammals in the U.S., and by persons aboard U.S. flagged vessels (i.e., persons and vessels subject to U.S. jurisdiction). Under section 118 of the MMPA, NMFS must publish, at least annually, a List of Fisheries (LOF) that classifies U.S. commercial fisheries into one of three categories based upon the level of serious injury and mortality of marine mammals that occurs incidental to each fishery. A Category 1

fishery is one with frequent incidental morality and serious injury of marine mammals. A Category 2 fishery is one with occasional incidental morality and serious injury of marine mammals. A Category 3 fishery is one with a remote likelihood or no known incidental morality and serious injury of marine mammals.

On December 29, 2014, (79 FR 77919), NMFS published the final LOF for 2014 which classified Hawaii spearfishing, Hawaii lobster diving, and Hawaii lobster trap fishery as a Category 3 fishery under Section 118 of the MMPA. To date, NMFS has not included any spiny lobster fishery of the CNMI in the annual LOF. There is no information available regarding marine mammal interactions in the spiny lobster fishery of the CNMI as no interactions have been reported or observed. However, because spiny lobsters in the CNMI are harvest by hand, it is reasonable to assume that the CNMI lobster fishery would be comparable to the Hawaii lobster diving fishery and would have a remote likelihood of incidental mortality and serious injury of marine mammals. Participants in Category 3 fisheries are not required to register in the Marine Mammal Authorization Program prior to engaging in commercial fishing.

3.2.4.3 Seabirds of the Mariana Archipelago

The following seabirds in Table 9 are considered residents of Mariana Archipelago: wedge-tailed shearwater (*Puffinus pacificus*), white-tailed tropicbird (*Phaethon lepturus*), red-tailed tropicbird (*Phaethon rubricauda*), masked booby (S*ula dactylatra*), brown booby (*Sula leucogaster*), red-footed booby (*Sula sula*), white tern (*Gygis alba),* sooty tern (*Onychoprion fuscatus;* formerly *Sterna fuscata)*, brown noddy (*Anous stolidus*), black noddy (*Anous minutus*), and the great frigatebird (*Fregata minor*).

The following seabirds in Table 9 have been sighted and are considered visitors (some more common than others) to the Mariana Archipelago: short-tailed shearwater (*Puffinus tenuirostris* - common visitor), Newell's shearwater (*Puffinus auricularis*- rare visitor), Audubon's shearwater (*Puffinus iherminieri*), Leach's storm-petrel (*Oceanodroma leucorhoa*), and the Matsudaira's storm-petrel (*Oceanodroma matsudairae*). Of these, only the Newell's shearwater is listed (as threatened) under the ESA. There have been no sightings of the endangered short-tailed albatross (*Phoebastria albatrus*) in the CNMI although CNMI is within the range of the species' largest breeding colony at Torishima, Japan (WPFMC 2009b). Because lobsters are harvested by hand, with scuba or by free diving, there are no known interactions between seabirds and Mariana Archipelago lobster fisheries (WPFMC 2009b).

Table 9. Seabirds occurring in the Mariana Archipelago (CNMI).

Seabirds of the Mariana Archipelago (R= Resident/Breeding; V= Visitor; Vr=rare visitor; Vc= Common visitor)		
	Common name	***Scientific name***
Vr	Newell's shearwater	*Puffinus auricularis newelli* (ESA:Threatened) rare visitor
R	Wedge-tailed shearwater	*Puffinus pacificus*
V	Audubon's shearwater	*Puffinus lherminieri*
Vc	Short-tailed shearwater	*Puffinus tenuirostris* (common visitor)

Seabirds of the Mariana Archipelago (R= Resident/Breeding; V= Visitor; Vr=rare visitor; Vc= Common visitor)		
	Common name	***Scientific name***
V	Leach's storm-petrel	*Oceanodroma leucorhoa*
V	Matsudaira's storm-petrel	*Oceanodroma matsudairae*
R	Red-footed booby	*Sula sula*
R	Brown booby	*Sula leucogaster*
R	Masked booby	*Sula dactylatra*
R	White-tailed tropicbird	*Phaethon lepturus*
R	Red-tailed tropicbird	*Phaethon rubricauda*
R	Great frigatebird	*Fregata minor*
R	Sooty tern	*Onychoprion fuscatus;* formerly *Sterna fuscata*
R	Brown noddy	*Anous stolidus*
R	Black noddy	*Anous minutus*
R	White tern / Common fairy-tern	*Gygis alba*

Source: WPFMC 2009b.

3.3 Guam

3.3.1 Target and Non-Target Stock

Fishing for lobsters around Guam occurs by hand exclusively in locally-managed territorial waters, usually in a subsistence or recreational context. Because hand harvest is a highly selective technique, there is no bycatch of non-target stocks in this fishery. Guam spiny lobsters are not harvested with nets or traps.

Due to the lack of a developed spiny lobster fishery in federal waters, the Council at its 151st, 154th and 157th meetings directed Council staff to conduct analyses to identify coral reef associated species, including spiny lobsters that may meet the criteria for an "ecosystem component species" designation in accordance with National Standard 1 guidelines of the Magnuson Stevens Act (76 FR 37285, June 27, 2011). Ecosystem component species are species that are generally not harvested or retained in the EEZ and do not require the specification of reference points such as an ACL, but should be monitored and actively managed in the EEZ if necessary. This initiative is not yet completed, so ACLs are required to be specified for Guam spiny lobsters despite the lack of a fishery in federal waters.

3.3.1.1 Summary of Guam Spiny Lobster Catch

Very little is known about Guam's crustacean fisheries. The annual total catch of spiny lobsters in Guam is unknown. However, annual commercial catch and sales over the past 13 years has ranged between 611 lb to 5,089 lb generating an estimated annual revenue between $2,794 and $18,829. The current MSY estimate for Guam spiny lobster is 4,600 lb. This level of catch was exceeded twice in between 2000 and 2013; once in 2006 and again in 2007 when 5,089 lb and 4,725 lb were respectively caught. Since then, spiny lobster catches have declined with the average annual catch for the most recent three year period 2011-2013 being 1,167 lb. During

2011-13, the fishery remained open year round. It is unknown if the decline in catches is a result in a decline in stock abundance or other factors such as changes in fishery data collection methodologies. Whatever the cause, catches since 2007 are below the recent MSY estimate of 4,600 lb by Sabater and Kleiber (2014), and indicate the fishery is currently sustainable.

Table 10 provides the estimated commercial catch of Guam spiny lobsters from local data collection programs administered by the Guam Division of Aquatic and Wildlife Resources as described in Section 2.1.1 and reported in Appendix 3 in Sabater and Kleiber (2014). These values are identical to the estimated commercial catches reported by NMFS WPacFIN http://www.pifsc.noaa.gov/wpacfin/guam/dawr/Pages/gdawr_data_3.php, accessed 11/3/2014, except where noted.

Table 10. Annual estimated commercial catch of spiny lobsters in Guam (2000-2013).

Year	Estimated Catch[1] (lb)	Estimated Price/lb[2]	Estimated Revenue
2000	3,371	$3.87	$13,045.77
2001	1,296	$3.83	$4,963.68
2002	1,527	$3.63	$5,543.01
2003	2,276	$3.28	$7,465.28
2004	2,013	$3.68	$7,407.84
2005	2,873	$3.40	$9,768.20
2006	5,089	$3.70	$18,829.30
2007	4,725	$3.57	$16,868.25
2008	1,168	$3.71	$4,333.28
2009	1,144	$3.70	$4,232.80
2010	1,093	$3.67	$4,011.31
2011	1,980	$3.72	$7,365.60
2012	911	$3.70	$3,710.70
2013	611	$3.73	$2,794.03
Avg. 2011-2013	**1,167**		

[1]Source: Appendix 3 in Sabater and Kleiber (2014); Appendix 3 in Sabater and Kleiber (2014) does not include catch data for 2012 and 2013. Therefore, the source of this information is the 2012 and 2013 ACL monitoring report presented at the 160th Council meeting in June 2014 (WPFMC 2014).
[2] http://www.pifsc.noaa.gov/wpacfin/guam/dawr/Pages/gdawr_data_3.php, accessed 11/12/2014.

3.3.2 Fishery Participants and Fishing Communities

3.3.2.1 Fishery Participants

Currently, lobster harvest in Guam occurs exclusively within territorial waters. However, aside from catch data, there is no information available on Guam's territorial lobster fishery in terms of number of participants or level of fishing effort.

3.3.2.2 Fishing Communities

The Magnuson-Stevens Act defines a fishing community as "...a community that is substantially dependent upon or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew, and fish processors that are based in such communities" (16 U.S.C. § 1802(16)). NMFS further specifies in the National Standard guidelines that a fishing community is "...a social or economic group whose members reside in a specific location and share a common dependency on commercial, recreational, or subsistence fishing or on directly related fisheries dependent services and industries (for example, boatyards, ice suppliers, tackle shops)." National Standard 8 of the Magnuson-Stevens Act requires that conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and the rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (a) provide for the sustained participation of such communities and (b) to the extent practicable, minimize adverse economic impacts on such communities. In 1999, the Council identified Guam as a fishing community. The Secretary of Commerce approved this definition on April 19, 2009 (64 FR 19067). Sustainable management of the Guam lobster fishery will allow continued harvest of a resource that is important to fishermen, their families, community networks, markets, and visitors for personal consumption (sustenance), supplemental income, and customary exchange.

3.3.3 Fishery Administration and Enforcement

3.3.3.1 Federal Fishery Management Provisions

Because of the lack of a developed spiny lobster fishery in EEZ waters around Guam, there are few fishing regulations at this time. Currently, regulations require any vessel used to fish for lobster to have a federal permit, and fishermen must report all catch. Federal regulations also require fishing vessels to carry federal fishery observers on fishing trips if required to do so by NMFS. Enforcement of federal fishing regulations is conducted by NOAA's Office of Law Enforcement and the U.S. Coast Guard.

In addition to fishing regulations, Federal law also requires the Council-appointed Mariana FEP plan team to prepare an annual report on the performance of all federal fisheries, including the Guam spiny lobster fishery by June 30 of each year. The report must contain, among other things, recommendations for Council action and an assessment of the urgency and effects of such actions. Federal regulations also 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. Monitoring of catch against a specified ACL and implementation of AMs is conducted by NMFS and the Council.

3.3.3.2 Guam Fishery Management Provisions

In local territorial waters, it is illegal to spear, puncture or impale spiny lobsters and local laws prohibit harvest of egg-bearing lobsters, and lobsters that measure less than three and one half

inches in carapace length. In addition, fishing is prohibited in five no-take marine preserves including the Pati Point Preserve, Tumon Bay Preserve, Sasa Bay Preserve, and the Achang Reef Flat Preserve (Wushinich-Mendez and Trappe 2007). Together, these measures help to manage and conserve spiny lobster resources in local territorial waters.

3.3.4 Protected Resources

3.3.4.1 Species Protected under the Endangered Species Act (ESA)

A number of protected species are reported from the waters around the Guam. Table 11 identifies species listed as endangered or threatened under the ESA that are known to occur or could reasonably be expected to occur in marine waters around the Mariana Archipelago, including Guam, which may have the potential to interact with fisheries. Listed species include five whales, five sea turtles, a shark, several species of shallow reef-building corals and a seabird. There is no critical habitat designated for ESA-listed marine species around Guam.

Table 11. Endangered and threatened marine species and seabirds known to occur or reasonably expected to occur in waters around the Mariana Archipelago (Guam).

Endangered and threatened marine species and seabirds known to occur or reasonably expected to occur in waters around the Mariana Archipelago (Guam)			
Common name	**Scientific Name**	**ESA listing status in Guam**	**Occurrence in Guam**
Listed Sea Turtles			
Green sea turtle Haggan Betde	*Chelonia mydas*	Threatened	Most common turtle in the Mariana Archipelago. Foraging and minor nesting confirmed on Guam, Rota, Tinian and Saipan.
Hawksbill sea turtle Haggan Karai	*Eretmochelys imbricata*	Endangered	Small population foraging around Guam and suspected low level around southern islands of CNMI. Low level nesting on Guam.
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	Occasional sightings around Guam. Not known to what extent they are present around Guam and CNMI
Olive ridley sea turtle	*Lepidochelys olivacea*	Threatened	Range across Pacific: not confirmed in the Mariana Archipelago
North Pacific Loggerhead sea turtle DPS	*Caretta caretta*	Endangered	No known reports of loggerhead turtles in waters around the Mariana Archipelago.

Endangered and threatened marine species and seabirds known to occur or reasonably expected to occur in waters around the Mariana Archipelago (Guam)			
Common name	**Scientific Name**	**ESA listing status in Guam**	**Occurrence in Guam**
Listed Marine Mammals			
Blue whale	*Balaenoptera musculus*	Endangered	Extremely rare
Fin whale	*Balaenoptera physalus*	Endangered	Infrequent sightings.
Humpback whale	*Megaptera novaeangliae*	Endangered	Infrequent sightings. Winter in the CNMI.
Sei whale	*Balaenoptera borealis*	Endangered	Infrequent sightings.
Sperm whale	*Physeter macrocephalus*	Endangered	Regularly sighted
Listed Sharks			
Scalloped hammerhead shark (Indo-West Pacific DPS)	*Sphyrna lewini*	Threatened	Known to occur.
Listed Shallow Reef-building Corals			
None	*Acropora globiceps*	Threatened	Depths range is 0 to 8 m
None	*A. retusa*	Threatened	Depth range is one to five meters
None	*Seriatopora aculeata*	Threatened	Depth range is three to 40 meters
Listed Sea Birds			
Newell's Shearwater	*Puffinus auricularis newelli*	Threatened	Rare visitor

Source: http://www.nmfs.noaa.gov/pr/species/esa/listed.htm, accessed October 31, 2014.

Applicable ESA Consultations – Guam Crustacean Fisheries

NMFS has evaluated the potential impact of Mariana FEP crustacean fisheries on ESA listed species and has determined that spiny lobster fisheries that operate in accordance with regulations implementing the Mariana FEP are not likely to adversely affect ESA-listed species or their habitats. NMFS documented these determinations in letters of concurrence dated September 28, 2007 and April 29, 2015. The basis for this determination is generally due to the rare occurrence of ESA-listed species in EEA waters where federal spiny lobster fisheries are authorized to operate, combined with the low level of crustacean fishing occurring in the EEZ, which makes interactions unlikely to occur.

Newell's shearwater (*Puffinus auricularis newelli*) is listed as threatened under the ESA. This species breeds only in the main Hawaiian Islands, primarily in burrows on steep forested mountain slopes at medium elevation. Newell's shearwater has been sighted in the Marianas, but is considered an uncommon visitor to the archipelago (Drahos 1977; Jouanin 1956). Because its presence in the Mariana Archipelago is rare, and lobster fishermen do not interact with seabirds, the fishery has no effect on this seabird.

3.3.4.2 Species Protected under the Marine Mammal Protection Act (MMPA)

Several non-ESA listed whales, dolphins and porpoises occur in waters around Guam and are protected under the MMPA. Table 12 provides a list of non-ESA marine mammals known to occur or reasonably expected to occur in waters around the Mariana Archipelago that have the potential to interact with the Guam lobster fishery. A single dugong, listed as endangered, was observed in Cocos Lagoon, Guam in 1975 (Randall et al. 1975). Several sightings were reported in 1985 on the southeastern side of Guam (Eldredge 2003). Since that time, however no reports of dugong sightings have been made.

Table 12. Non ESA-listed marine mammals known to occur or reasonably expected to occur in waters around the Mariana Archipelago (Guam).

Marine mammals known to occur or reasonably expected to occur in waters around the Mariana Archipelago (Guam)	
Common Name	**Scientific Name**
Blainville's beaked whale	*Mesoplodon densirostris*
Bottlenose dolphin	*Tursiops truncatus*
Bryde's whale	*Balaenoptera edeni*
Common dolphin	*Delphinus delphis*
Cuvier's beaked whale	*Ziphius cavirostris*
Dwarf sperm whale	*Kogia sima*
Dugong*	*Dugong dugong*
False killer whale	*Pseudorca crassidens*
Fraser's dolphin	*Lagenodelphis hosei*
Killer whale	*Orcinus orca*
Longman's beaked whale	*Indopacetus pacificus*
Melon-headed whale	*Peponocephala electra*
Minke whale	*Balaenoptera acutorostrata*
Pygmy killer whale	*Feresa attenuata*
Pygmy sperm whale	*Kogia breviceps*
Risso's dolphin	*Grampus griseus*
Rough-toothed dolphin	*Steno bredanensis*
Short-finned pilot whale	*Globicephala macrorhynchus*
Sperm whale	*Physeter macrocephalus*
Spinner dolphin	*Stenella longirostris*
Spotted dolphin	*Stenella attenuata*

Marine mammals known to occur or reasonably expected to occur in waters around the Mariana Archipelago (Guam)	
Common Name	**Scientific Name**
Striped dolphin	*Stenella coeruleoalba*

Source: Eldredge 2003, Randall et al. 1975, (Guam DAWR 2009), Council website: http://www.wpcouncil.org

Applicable MMPA Coordination – Guam Spiny Lobster Fisheries

The MMPA prohibits, with certain exceptions, taking of marine mammals in the U.S., and by persons aboard U.S. flagged vessels (i.e., persons and vessels subject to U.S. jurisdiction). Under section 118 of the MMPA, NMFS must publish, at least annually, a List of Fisheries (LOF) that classifies U.S. commercial fisheries into one of three categories based upon the level of serious injury and mortality of marine mammals that occurs incidental to each fishery. A Category 1 fishery is one with frequent incidental morality and serious injury of marine mammals. A Category 2 fishery is one with occasional incidental morality and serious injury of marine mammals. A Category 3 fishery is one with a remote likelihood or no known incidental morality and serious injury of marine mammals.

On December 29, 2014, (79 FR 77919), NMFS published the final LOF for 2014 which classified Hawaii spearfishing, Hawaii lobster diving, and Hawaii lobster trap fishery as a Category 3 fishery under Section 118 of the MMPA. To date, NMFS has not included any spiny lobster fishery of Guam in the annual LOF. There is no information available regarding marine mammal interactions in the spiny lobster fishery of Guam as no interactions have been reported or observed. However, because spiny lobsters in Guam are harvest by hand, it is reasonable to assume that the Guam lobster fishery would be comparable to the Hawaii lobster diving fishery and would have a remote likelihood of incidental mortality and serious injury of marine mammals. Participants in Category 3 fisheries are not required to register in the Marine Mammal Authorization Program prior to engaging in commercial fishing.

3.3.4.3 Seabirds of the Mariana Archipelago

The following seabirds are considered residents of Mariana Archipelago: wedge-tailed shearwater (*Puffinus pacificus*), white-tailed tropicbird (*Phaethon lepturus*), red-tailed tropicbird (*Phaethon rubricauda*), masked booby (S*ula dactylatra*), brown booby (*Sula leucogaster*), red-footed booby (*Sula sula*), white tern (*Gygis alba),* sooty tern (*Onychoprion fuscatus;* formerly *Sterna fuscata)*, brown noddy (*Anous stolidus*), black noddy (*Anous minutus*), and the great frigatebird (*Fregata minor*). However, According to Wiles (2003), the only resident seabirds on Guam are the brown noddy and the white tern.

The following seabirds in Table 13 have been sighted and are considered visitors (some more common than others) to the Mariana Archipelago; short-tailed shearwater (*Puffinus tenuirostris;* common visitor), Newell's shearwater (*Puffinus auricularis;* rare visitor), Audubon's shearwater (*Puffinus iherminieri*), Leach's storm-petrel (*Oceanodroma leucorhoa*), and the Matsudaira's storm- petrel(*Oceanodroma matsudairae*). Of these, only the Newell's shearwater is listed as threatened under the ESA. There have been no sightings of the endangered short-tailed albatross

(*Phoebastria albatrus*) in Guam although Guam is within the range of the largest breeding colony at Torishima, Japan (WPFMC 2009b). Because lobsters are harvested by hand, there are no known interactions between seabirds and Mariana Archipelago lobster fisheries (WPFMC 2009b).

Table 13. Seabirds occurring in the Mariana Archipelago (Guam).

Seabirds of the Mariana Archipelago (R= Resident/Breeding; V= Visitor; Vr=rare visitor; Vc= Common visitor)		
	Common name	***Scientific name***
Vr	Newell's shearwater	*Puffinus auricularis newelli (ESA:Threatened)*
Vr	Wedge-tailed shearwater	*Puffinus pacificus*
V	Audubon's shearwater	*Puffinus lherminieri*
Vc	Short-tailed shearwater	*Puffinus tenuirostris (common visitor)*
V	Leach's storm-petrel	*Oceanodroma leucorhoa*
Vr	Matsudaira's storm-petrel	*Oceanodroma matsudairae*
Vr	Red-footed booby	*Sula sula*
Vr	Brown booby	*Sula leucogaster*
V	Masked booby	*Sula dactylatra*
Vr	White-tailed tropicbird	*Phaethon lepturus*
Vr	Red-tailed tropicbird	*Phaethon rubricauda*
Vr	Great frigatebird	*Fregata minor*
Vr	Sooty tern	*Onychoprion fuscatus;* foremerly *Sterna fuscata*
R	Brown noddy	*Anous stolidus*
V	Black noddy	*Anous minutus*
R	White tern / Common fairy-tern	*Gygis alba*

Source: WPFMC 2009b

3.4 Hawaii

3.4.1 Target and Non-Target Stock

In Hawaii, fisheries for lobsters target the two species of spiny lobster (*Panulirus marginatus* and *Panulirus penicillatus*) around the main Hawaiian Islands (MHI). Prior to 1999, the majority of spiny lobster production was attributed to the Northwestern Hawaiian Island lobster trap fishery. However, since the closure of the NWHI fishery in 1999, fishing is now confined to the MHI and with more than 97 percent of the total catch coming from state waters, with lobsters taken primarily by hand (WPFMC 2011). Between 1994 and 2004, hand harvest accounted for nearly 80 percent of reported spiny lobster landings in the MHI (Kelly and Messer 2005). Based on commercial catch data collected by the State of Hawaii, only about two percent of the spiny lobster landings from the MHI are estimated to have come from EEZ waters 3 to 200 nm from the shoreline (WPFMC 2011).

Due to the lack of a developed spiny lobster fishery in federal waters, the Council at its 151st, 154th and 157th meeting directed Council staff to conduct analyses to identify coral reef

associated spieces, including spiny lobsters that may meet the criteria for an "ecosystem component species" designation in accordance with National Standard 1 guidelines of the Magnuson Stevens Act (76 FR 37285, June 27, 2011). Ecosystem component species are species that are generally not harvested or retained in the EEZ and do not require the specification of reference points such as an ACL, but should be monitored and actively managed in the EEZ if necessary. This initiative is not yet completed, so ACLs are required to be specified for MHI spiny lobsters despite the lack of a fishery in federal waters.

3.4.1.1 Summary of MHI Spiny Lobster Catch

The annual total catch of spiny lobsters in the MHI is unknown. However, annual commercial catch and sales over the past 13 years has ranged between 7,416 lb to 14,437 lb generating an estimated annual revenue between $96,962 and $176,998. Throughout this period, spiny lobster catches have remained relatively stable with peak catch of 14,437 occurring in 2009. Since that time, spiny lobster catches have declined slightly with the average catch for the most recent three year period 2011-2013 being 10,242 lb. During 2011-13, the fishery remained open year round.

In 2012, 2013 and 2014, NMFS specified a MHI spiny lobster ACL of 10,000 lb, which is based on the 75th percentile of historical catch. See Section 2.3.4.2 for how this limit was established. In 2012, catch was below the ACL, while in 2013, the fishery exceeded the ACL by 429 lb. Data for 2014 is not yet available. Because the Council has revised its system of establishing ACLs for this fishery base on the Biomass Augmented Catch-MSY method, the Council did not recommend a reduced ACL for the 2014 fishing year. Based on the recent MSY estimate of 20,400 lb by Sabater and Kleiber (2014), the Hawaii spiny lobster fishery appears to be sustainable.

Table 14 provides the estimated commercial catch of spiny lobsters in the MHI from local data collection programs administered by the Hawaii Division of Aquatic Resources as described in Section 2.1.2 and reported in Appendix 3 in Sabater and Kleiber (2014), except where noted. In general, these values are greater than the estimated commercial catches reported by NMFS WPacFIN (http://www.pifsc.noaa.gov/wpacfin/hi/Data/Landings_Charts/hr3j.htm, accessed 11/3/2014), as not every lobster caught is sold.

Table 14. Annual reported commercial landings of spiny lobsters in the MHI (2000-2013).

Year	Estimated Catch (lb)[1]	Estimated Price/lb[2]	Estimated Revenue
2000	7,932	$12.19	$96,691.08
2001	7,665	$12.65	$96,962.25
2002	9,579	$12.69	$121,557.51
2003	7,416	$11.90	$88,250.40
2004	8,249	$11.08	$91,398.92
2005	11,949	$10.99	$131,319.51
2006	7,890	$9.66	$76,217.40
2007	8,158	$11.84	$96,590.72
2008	11,846	$12.14	$143,810.44
2009	14,437	$12.26	$176,997.62

Year	Estimated Catch (lb)[1]	Estimated Price/lb[2]	Estimated Revenue
2010	12,222	$12.45	$152,163.90
2011	10,569	$9.23	$97,551.87
2012	9,727	$11.86	$115,362.22
2013	10,429	$10.73	$111,903.17
Avg. 2011-2013	**10,242**		

[1]Source: Appendix 3 in Sabater and Kleiber (2014); Appendix 3 in Sabater and Kleiber (2014) does not include catch data for 2012 and 2013. Therefore, the source of catch data for 2012 and 2013 is from the ACL monitoring report presented at the 160th Council meeting in June 2014 (WPFMC 2014).

[2] http://www.pifsc.noaa.gov/wpacfin/hi/dar/Pages/hi_data_3.php, accessed 11/3/2014

3.4.2 Fishery Participants and Fishing Communities

3.4.2.1 Fishery Participants

Since 2007, NMFS has issued no more than three permits authorizing lobster fishing in federal waters around the MHI any fishing year. However, no fishing or catches have been reported in association with these permits. Moreover, even if catch are reported, this data cannot be made publically available as fishery data with less than three different/unique entities is confidential. There is no information available on the number of State of Hawaii commercial marine license holders participating in the MHI spiny lobster fishery within state waters.

3.4.2.2 Fishing Communities

The Magnuson-Stevens Act defines a fishing community as "...a community that is substantially dependent upon or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew, and fish processors that are based in such communities" (16 U.S.C. § 1802(16)). NMFS further specifies in the National Standard guidelines that a fishing community is "...a social or economic group whose members reside in a specific location and share a common dependency on commercial, recreational, or subsistence fishing or on directly related fisheries dependent services and industries (for example, boatyards, ice suppliers, tackle shops)". National Standard 8 of the Magnuson-Stevens Act requires that conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and the rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (a) provide for the sustained participation of such communities and (b) to the extent practicable, minimize adverse economic impacts on such communities.

In 2002, the Council identified each of the islands of Kauai, Niihau, Oahu, Maui, Molokai, Lanai and Hawaii as a fishing community for the purposes of assessing the effects of fishery conservation and management measures on fishing communities, providing for the sustained participation of such communities, minimizing adverse economic impacts on such communities, and for other purposes under the Magnuson-Stevens Act. The Secretary of Commerce subsequently approved these definitions on August 5, 2003 (68 FR 46112). Sustainable

management of the Hawaii's lobster fishery will allow continued harvest of a resource that is important to fishermen, their families, community networks, markets, and visitors for personal consumption (sustenance), and supplemental income.

3.4.3 Fishery Administration and Enforcement

3.4.3.1 Federal Fishery Management Provisions

In the MHI, federal regulations require any vessel used to fish for lobster to have a federal permit, and fishermen must report all catch. Federal regulations also require fishing vessels to carry a federal fishery observers on fishing trips if required to do so by NMFS. It is illegal to fish for lobsters by any method other than lobster trap or by hand or during the months of May June, July and August. Federal law also prohibits fishing for or retaining any lobster with a carapace length of less than 8.26 cm (three and one quarter inches), a female lobster carrying eggs or a lobster with a punctured or mutilated body or a separated carapace and tail. Enforcement of federal fishing regulations is conducted by NOAA's Office of Law Enforcement and the U.S. Coast Guard.

In addition to fishing regulations, Federal law also requires the Council-appointed Hawaii FEP plan team to prepare an annual report on the performance of all federal fisheries, including the MHI spiny lobster fishery by June 30 of each year. The report must contain, among other things, recommendations for Council action and an assessment of the urgency and effects of such actions. Federal regulations also 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. Monitoring of catch against a specified ACL and implementation of AMs is conducted by NMFS and the Council.

3.4.3.2 State of Hawaii Fishery Management Provisions

In local state waters, Hawaii laws prohibits the fishing for lobster during the months of May, June, July and August, or harvest of lobsters by spear. Additionally state law prohibits taking of lobsters with a carapace length of less than three and one quarter inches and prohibits taking of female lobsters. Additionally, fishing for lobsters is prohibited in numerous locations throughout the state, including marine life conservation districts, fish replenishment areas, natural area reserves (Wushinich-Mendez and Trappe 2007). Together, these measures help to manage and conserve spiny lobster resources in local state waters.

3.4.4 Protected Resources

3.4.4.1 Species Protected under the Endangered Species Act (ESA)

A number of protected species are documented as occurring in the waters around the Hawaiian Islands. Table 15 lists endangered or threatened species occurring in the waters around Hawaii. They include five whales, the Hawaiian monk seal, five listed sea turtles, and three seabirds. Although there is currently no critical habitat designated for ESA-listed marine species around

the main Hawaiian Islands, NMFS has proposed to revise designated critical habitat for endangered Hawaiian monk seals to include areas in the MHI (76 FR 32026, June 2, 2011). However, NMFS has not yet made a determination on whether to designate critical habitat in the MHI.

Table 15. Endangered and threatened marine species and seabirds occurring in the waters of the MHI.

Endangered and threatened marine species and seabirds known to occur or reasonably expected to occur in waters of the Hawaiian Archipelago			
Common name	**Scientific Name**	**ESA listing status in Hawaii**	**Occurrence in Hawaii**
Listed Sea Turtles			
Green sea turtle	*Chelonia mydas*	Threatened	Most common turtle in the Hawaiian Islands. Most nesting occurs in the northwestern Hawaiian Islands. Foraging and haulout in the MHI.
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered	Small population foraging around Hawaii and low level nesting on Maui and Hawaii Islands.
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	Not common in Hawaii.
Olive ridley sea turtle	*Lepidochelys olivacea*	Threatened	Range across Pacific:
North Pacific loggerhead sea turtle DPS	*Caretta caretta*	Endangered	Not common in Hawaii.
Listed Marine Mammals			
Hawaiian Monk seal	*Neomonachus schauinslandi*	Endangered	Endemic tropical seal. Occurs throughout the archipelago. Overall population in decline; MHI population increasing
Blue whale	*Balaenoptera musculus*	Endangered	No sightings or strandings reported in Hawaii but acoustically recorded off of Oahu and Midway Atoll.
Fin whale	*Balaenoptera physalus*	Endangered	Infrequent sightings in Hawaii waters.
Humpback whale	*Megaptera novaeangliae*	Endangered	Migrate through the archipelago and breed during the winter. Est. 6,000-10,000 individuals.

Endangered and threatened marine species and seabirds known to occur or reasonably expected to occur in waters of the Hawaiian Archipelago			
Common name	**Scientific Name**	**ESA listing status in Hawaii**	**Occurrence in Hawaii**
Sei whale	*Balaenoptera borealis*	Endangered	Worldwide distribution. Primarily found in cold temperate to subpolar latitudes. Rare in Hawaii.
Sperm whale	*Physeter macrocephalus*	Endangered	Found in tropical to polar waters worldwide, most abundant cetaceans in the region. Sighted off the NWHI and the MHI.
MHI insular false killer whale DPS	*Pseudorca crassidens*	Endangered	Found in waters within 140 km (60 nm) of the MHI.
Listed Sea Birds			
Newell's Shearwater	*Puffinus auricularis newelli*	Threatened	Rare. Breeds only in colonies on the MHI where it is threatened by predators and urban development.
Hawaiian petrel	*Pterodroma phaeopygia*	Endangered	Rare.
Short-tailed Albatross	*Phoebastria albatrus*	Endangered	Nest in small numbers on Midway in the NWHI.

Source: http://www.nmfs.noaa.gov/pr/species/esa/listed.htm, accessed October 31, 2014.

Applicable ESA Consultations – Hawaii crustacean fisheries

NMFS has evaluated the potential impact of Hawaii FEP crustacean fisheries on ESA listed species and has determined that spiny lobster fisheries that operate in accordance with regulations implementing the Hawaii FEP are not likely to adversely affect ESA-listed species or their habitats. NMFS documented these determinations in letters of concurrence dated April 4, 2008, December 5, 2013. The basis for this determination is generally due to the rare occurrence of ESA-listed species in EEA waters where federal spiny lobster fisheries are authorized to operate, combined with the low level of crustacean fishing occurring in the EEZ, which makes interactions unlikely to occur.

On June 2, 2011 (76 FR 32026), published a proposed rule to designate areas in the main Hawaiian Islands (MHI) as monk seal critical habitat. Specific areas proposed include terrestrial and marine habitats from 5 m inland from the shoreline extending seaward to the 500 m depth contour around Kaula Island, Niihau, Kauai, Oahu, Maui Nui (including Kahoolawe, Lanai, Maui and Molokai) and Hawaii Island. The final determinations on whether to designate monk seal critical habitat in the MHI have not been made. Should NMFS designate critical habitat for this species, or any other ESA-listed species in the future, NMFS will initiate consultation in accordance with Section 7 of the ESA to ensure that Hawaii FEP fisheries, including the spiny lobster fishery, would not result in the destruction or adverse modification of critical habitat.

3.4.4.2 Species Protected under the Marine Mammal Protection Act (MMPA)

Several non-ESA listed whales, dolphins and porpoises, occur in waters around Hawaii and are protected under the MMPA. Table 16, provides a list of non-ESA listed marine mammals known to occur or reasonably expected to occur in waters around the Hawaiian Archipelago that have the potential to interact with the Hawaii crustacean fisheries.

Table 16. Non-ESA-listed marine mammals occurring in the MHI.

Non-ESA-listed marine mammals known to occur or reasonably expected to occur in waters around the MHI	
Common Name	**Scientific Name**
Blainville's beaked whale	*Mesoplodon densirostris*
Bottlenose dolphin	*Tursiops truncatus*
Bryde's whale	*Balaenoptera edeni*
Common dolphin	*Delphinus delphis*
Cuvier's beaked whale	*Ziphius cavirostris*
Dall's porpoise	*Phocoenoides dalli*
Dwarf sperm whale	*Kogia sima*
False killer whale	*Pseudorca crassidens*
Fraser's dolphin	*Lagenodelphis hosei*
Killer whale	*Orcinus orca*
Longman's beaked whale	*Indopacetus pacificus*
Melon-headed whale	*Peponocephala electra*
Minke whale	*Balaenoptera acutorostrata*
Pantropical spotted dolphin	*Stenella attenuata*
Pygmy killer whale	*Feresa attenuata*
Pygmy sperm whale	*Kogia breviceps*
Risso's dolphin	*Grampus griseus*
Rough-toothed dolphin	*Steno bredanensis*
Short-finned pilot whale	*Globicephala macrorhynchus*
Spinner dolphin	*Stenella longirostris*
Spotted dolphin	*Stenella attenuata*
Striped dolphin	*Stenella coeruleoalba*

Source: Council website: http://www.wpcouncil.org

Applicable MMPA Coordination – Hawaii Crustacean Fisheries

The MMPA prohibits, with certain exceptions, taking of marine mammals in the U.S., and by persons aboard U.S. flagged vessels (i.e., persons and vessels subject to U.S. jurisdiction). Under section 118 of the MMPA, NMFS must publish, at least annually, a List of Fisheries (LOF) that classifies U.S. commercial fisheries into one of three categories based upon the level of serious injury and mortality of marine mammals that occurs incidental to each fishery. A Category 1

fishery is one with frequent incidental morality and serious injury of marine mammals. A Category 2 fishery is one with occasional incidental morality and serious injury of marine mammals. A Category 3 fishery is one with a remote likelihood or no known incidental morality and serious injury of marine mammals. On December 29, 2014, (79 FR 77919), NMFS published the final LOF for 2014 which classified Hawaii spearfishing, Hawaii lobster diving, and Hawaii lobster trap fishery as a Category 3 fishery under Section 118 of the MMPA. Participants in Category 3 fisheries are not required to register in the Marine Mammal Authorization Program prior to engaging in commercial fishing. The proposed action does not change the conduct of the fishery in any way and therefore will not introduce impacts not previously considered in prior MMPA determinations.

3.4.4.3 Seabirds of the Hawaiian Archipelago

Seabirds found on and around Hawaii that could potentially interact with fisheries are listed in Table 17. The short-tailed albatross, which is listed as endangered under the ESA, is a migratory seabird that has nested in the NWHI and could be present in the waters of the Hawaii Archipelago. Other listed seabirds found in the region are the endangered Hawaiian petrel (*Pterodroma phaeopygia)* and the threatened Newell's shearwater (*Puffinus auricularis newelli*). Non-listed seabirds known to be present in Hawaii include the black-footed albatross (*Phoebastria nigripes*); Laysan albatross (*P. immutabilis*); wedge-tailed (*Puffinus pacificus*), Audubon's (*P. griseus*), short-tailed (*P. tenuirostris*) and Chirstmas (*P. nativitatis*) shearwaters, as well as the masked (*Sula dactylatra*), brown (*S. leucogaster*), and red-footed *(S. sula*) boobies (or gannets), and a number of petrels and terns, frigate birds, and tropicbirds). Seabirds forage in both State and federal waters, but are not known to and are unlikely to interact with the Hawaii spiny lobster fisheries. There have been no reports of adverse interactions between the Hawaii spiny lobster fisheries and migratory seabirds.

Table 17. Seabirds occurring in the MHI.

Seabirds of the Hawaiian Archipelago (R= Resident/Breeding; V= Visitor; Vr=rare visitor; Vc= Common visitor)		
	Common name	***Scientific name***
R	Hawaiian petrel	*Pterodroma phaeopygia (ESA: Endangered)*
R	Newell's shearwater	*Puffinus auricularis newelli (ESA:Threatened)*
R	Short-tailed albatross	*Phoebastria albatrus (ESA: Endangered)*
R	Black-footed albatross	*Phoebastria nigripes*
R	Laysan albatross	*Phoebastria immutabilis*
R	Wedge-tailed shearwater	*Puffinus pacificus*
V	Audubon's shearwater	*Puffinus lherminieri*
Vc	Short-tailed shearwater	*Puffinus tenuirostris (common visitor)*
R	Christmas shearwater	*Puffinus nativitatis*
V	Leach's storm-petrel	*Oceanodroma leucorhoa*
V	Matsudaira's storm-petrel	*Oceanodroma matsudairae*
R	Red-footed booby	*Sula sula*
R	Brown booby	*Sula leucogaster*
R	Masked booby	*Sula dactylatra*

Seabirds of the Hawaiian Archipelago (R= Resident/Breeding; V= Visitor; Vr=rare visitor; Vc= Common visitor)		
	Common name	***Scientific name***
R	White-tailed tropicbird	*Phaethon lepturus*
R	Red-tailed tropicbird	*Phaethon rubricauda*
R	Great frigatebird	*Fregata minor*
R	Sooty tern	*Onychoprion fuscatus;* formerly *Sterna fuscata*
R	Brown noddy	*Anous stolidus*
R	Black noddy	*Anous minutus*
R	White tern / Common fairy-tern	*Gygis alba*

Source: WPFMC 2009c

4 Potential Impacts of the Alternatives

This section describes the potential impacts of the proposed ACL and AM specifications on the elements of the affected environment described in Section 3.

4.1 American Samoa

4.1.1 Potential Impacts to Target and Non-Target Stock

4.1.1.1 Alternative 1: No ACL and AM Management (No Action)

Currently, NMFS has not specified an ACL and AM for the American Samoa spiny lobster fishery for fishing year 2015. Under the no-action alternative, an ACL would not be specified for the American Samoa spiny lobster fishery and AMs would not be necessary. However, NMFS and the Council would continue to monitor catches of spiny lobster in all island areas based on all available sources of information. Under this alternative, the lack of an ACL or AMs in fishing year 2015 through 2018 is not likely to result in overfishing of spiny lobsters in any year. As shown in Table 2, the highest recorded catch of spiny lobster in American Samoa was 5,388 lb, which occurred in 2006 when there were no ACL and AM mandate in place. This level of catch is well below the OFL proxy of 7,100 lb and MSY estimate of 7,300 lb. Since 2006, American Samoa spiny lobster harvest has fluctuated between 1,000 lb and 3,000 lb with the average annual catch for the most recent three year period 2011-2013 being 1,757 lb. During 2011-13, the fishery remained open year round. Under this alternative, spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, and would be sustainable. Because spiny lobsters in American Samoa are harvested by hand or by spear, there is no bycatch of non-target stocks in this fishery. For these reasons, even without ACL or AM management, the expected impacts to target and non-target stocks would be similar to the impacts described in Alternatives 2 and 3.

4.1.1.2 Alternative 2: Specify 2014 ACL of 2,300 lb (Status Quo/NEPA Baseline)

Under Alternative 2, NMFS would specify an ACL of 2,300 lb of American Samoa spiny lobsters for fishing years 2015 through 2018. Based on risk projections from method B of the

Biomass Augmented Catch-MSY model (Appendix B), an ACL of 2,300 lb is associated with less than a 5 percent probability of overfishing should the entire ACL be caught (Table 1). Under this alternative, NMFS and the Council would continue to monitor catches of spiny lobster based on all available sources of information. However, because catch statistics are not available until at least six months after the data have been collected, NMFS and the Council have no way to determine during the fishing year whether the ACL might be reached, and cannot prevent the ACL from being exceeded. Therefore, fishers would be able to fish throughout the fishing year in the same manner as under Alternative 1, and as recently occurred in 2011-2013.

Based on past fishery performance shown in Table 2, spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, or 1,757 lb. This level of catch is well below the OFL proxy of 7,100 lb and the MSY of 7,300 lb, and would not result in overfishing. Because spiny lobsters in American Samoa are harvested by hand or by spear, there is no bycatch of non-target stocks in this fishery.

Under this alternative, if the Council determines the ACL is exceeded, the Council as an AM would take action in accordance with 50 CFR 600.310(g) to correct the operational issue that caused the ACL overage. This may include a recommendation that NMFS reduce the ACL in the subsequent fishing year by the amount of the overage, or other measures, as appropriate. However, it is unlikely the Council would recommend a reduced ACL if the fishery exceeds 2,300 lb, unless catch exceeds the OFL proxy of 7,100 lb in 2015-2018. If the Council does recommend a reduced ACL, any ACL less than 2,300 lb would have less than a 5 percent probability of overfishing. However, because in-season AMs to prevent the ACL from being exceeded is not possible, compared to Alternative 1, Alternative 2 is not likely to result in changes in the conduct of the fishery, including gear types used, areas fished, level of catch, or have large beneficial or adverse effects on target or non-target stocks.

4.1.1.3 Alternative 3: Specify Council Recommended ACL of 4,845 lb (Preferred)

Under Alternative 3 (the Council's and NMFS' Preferred Alternative), NMFS would specify an ACL at 4,845 lb of American Samoa spiny lobster for fishing years 2015 through 2018. This is five percent lower than the ABC of 5,100 lb. Based on risk projections from method B of the Biomass Augmented Catch-MSY model (Appendix B), an ACL of 4,845 lb is associated with less than a 35 percent probability of overfishing should the entire ACL be caught (Table 1). Under this alternative, NMFS and the Council would continue to monitor catches of spiny lobster based on all available sources of information. However, because catch statistics are not available until at least six months after the data have been collected, NMFS and the Council have no way to determine during the fishing year whether the ACL might be reached, and cannot prevent the ACL from being exceeded. Therefore, fishers would be able to fish throughout the fishing year in the same manner as under Alternative 1 and Alternative 2.

Based on past fishery performance shown in Table 2, spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, or 1,757 lb. This level of catch is well below the OFL proxy of 7,100 lb and the MSY of 7,300 lb, would not result in overfishing. Because spiny lobsters in American Samoa are harvested by hand or by spear, there is no bycatch of non-target stocks in this fishery. Therefore, under Alternative 3, impacts to target and

non-target stocks would be identical to the impacts under Alternative 2, which is identical to the impacts under Alternative 1.

Under this alternative, if the Council determines the three-year average catch for spiny lobster exceeded the proposed ACL in any fishing year, NMFS would reduce the ACL by the amount of the overage in the subsequent years (See Section 1.3- Proposed Action for detailed information on how this AM is triggered). The impacts of a reduced ACL to target and non-target stocks are described in Alternative 4 below.

4.1.1.4 Alternative 4: Specify ACL between 3,300 lb and 4,600 lb (lower than preferred)

Under Alternative 4, NMFS would specify an ACL that is lower than the preferred alternative (Alternative 3) for fishing years 2015 through 2018, but higher than the ACL of 2,300 lb described in Alternative 2 (Status Quo). NMFS included a range of ACLs lower than the ACL that would be established under the preferred alternative in the event that the proposed ACL under Alternative 3 is implemented and exceeded in 2015, 2016 or 2017, and a downward adjustment in the amount of the overage is necessary in a subsequent year. Under this alternative, the American Samoa spiny lobster ACL could range from 4,600 lb (probability of overfishing of 30 percent) down to 3,300 lb (probability of overfishing of 15 percent) (Table 1). Because the OFL proxy for American Samoa spiny lobsters is 7,100 lb, any level of catch below the OFL proxy would not result in overfishing. Therefore, the expected impacts target and non-target stocks as a result of selecting Alternative 4 are expected to be the same as the impacts under Alternatives 2 and 3.

However, if an ACL is exceeded more than once in a four-year period, the Council is required to re-evaluate the ACL process, and adjust the system for setting ACLs, as necessary, to improve its performance and effectiveness. Additionally, if NMFS determines overfishing is occurring, NMFS would immediately notify the Council to take action to end overfishing in the fishery.

4.1.2 Potential Impacts to Fishery Participants and Fishing Communities

In fishing year 2013, the commercial price per pound for American Samoa spiny lobster was $3.89 (Table 2). Based on an average reported commercial landing of 1,757 lb for fishing years 2011-2013, the average annual estimated commercial value for the American Samoa spiny lobster fishery for this three year period was approximately $6,835. The number of participants in this fishery is unknown.

4.1.2.1 Alternative 1: No ACL and AM Management (No Action)

Currently, NMFS has not specified an ACL and AM for the American Samoa spiny lobster fishery for fishing year 2015. Under the no-action alternative, an ACL would not be specified for the American Samoa lobster fishery and AMs would not be necessary. Therefore, fishing would continue throughout the entire fishing year. As shown in Table 2, the highest recorded catch occurred in 2006 when 5,388 lb of spiny lobsters were caught. If there was no ACL, catches could reach or surpass 2006 levels. Using the 2013 price per pound of $3.89, the potential annual fleet-wide revenue during 2015-2018 under Alternative 1 could be at least $20,959 if the record

high of 5,388 lb of spiny lobsters was caught. However, under this alternative, American Samoa spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 1,757 lb. Using the 2013 price per pound $3.89, the expected annual fleet-wide revenue during 2015-2018 under Alternative 1 would be $6,835.

The American Samoa lobster fishery provides fresh lobster for sustenance, customary exchange and other gifts, and allows some lobsters to enter local markets. This provides positive social and economic benefits to fishermen, buyers and the American Samoa fishing community.

4.1.2.2 Alternative 2: Specify 2014 ACL of 2,300 lb (Status Quo/NEPA Baseline)

Under Alternative 2, NMFS would specify an ACL of 2,300 lb of American Samoa spiny lobsters for fishing years 2015 through 2018. Using the 2013 price per pound of $3.89, the annual fleet-wide revenue during 2015-2018 under Alternative 2 would be $8,947 if this level of catch is reached in any fishing year. However, under this alternative, American Samoa spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 1,757 lb and is expected to produce an annual fleet-wide revenue of $6,835. Therefore, under Alternative 2, the impacts to fishery participants and the American Samoa fishing community would be identical to the impacts under Alternative 1.

4.1.2.3 Alternative 3: Specify Council Recommended ACL of 4,845 lb (Preferred)

Under Alternative 3 (the Council and NMFS' Preferred Alternative), NMFS would specify an ACL at 4,845 lb of spiny lobster for fishing years 2015 through 2018. Using the 2013 price per pound of $3.89, the potential annual fleet-wide revenue during 2015-2018 under Alternative 3 would be $18,847 if this level of catch is reached in any fishing year. However, under this alternative, American Samoa spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 1,757 lb and is expected to produce an annual fleet-wide revenue of $6,835. Therefore, under Alternative 3, the impacts to fishery participants and the American Samoa fishing community would be identical to the impacts under Alternative 2, which is identical to the impacts under Alternative 1.

4.1.2.4 Alternative 4: Specify ACL between 3,300 lb and 4,600 lb (lower than preferred)

Under Alternative 4, NMFS would specify an ACL for American Samoa spiny lobsters that is lower than the preferred alternative (Alternative 3) for fishing years 2015 through 2018, but higher than the ACL of 2,300 lb described in Alternative 2 (Status Quo). NMFS included a range of ACLs lower than the ACL that would be established under the preferred alternative in the event that the proposed ACL under Alternative 3 is implemented and exceeded in 2015, 2016 or 2017, and a downward adjustment in the amount of the overage is necessary in a subsequent year. Under this alternative, the ACLs would range from 4,600 lb down to 3,300 lb.

Using the 2013 price per pound of $3.89, the potential annual fleet-wide revenue during 2015-2018 under Alternative 4 would be range from $17,894 down to $12,837. However, American Samoa spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 1,757 lb and is expected to produce an annual fleet-wide revenue of

$6,835. In other words, the impacts to fishery participants and the American Samoa fishing community under Alternative 4 would be identical to the impacts under Alternatives 2 and 3 , which are identical to the impacts under Alternative 1 (.

Because none of the alternatives considered would result in changes in the conduct of the fishery including gear types used, areas fished, level of catch or effort, none of the alternatives considered would affect the safety of fishermen at sea.

4.1.3 Potential Impacts to Fishery Administration and Enforcement

Under all alternatives considered, NMFS and the Council would continue to monitor catches of spiny lobster in all island areas based on all available sources of information, and federal regulations would continue to require the Council-appointed FEP plan team to prepare an annual report on the performance of the American Samoa spiny lobster fishery by June 30 of each year. Additionally, all other regulations implemented by other federal agencies and local state and territorial governments would continue to apply to spiny lobster fisheries operating in the U.S. EEZ.

While Alternatives 2, 3 (Preferred), and 4 would implement ACLs and a post-season accounting of the catch relative to the ACL, none of the alternatives would result in commitment of additional resources or increased need for fishery enforcement as monitoring of catch is required under all alternatives, including the no action alternative.

4.1.4 Potential Impacts to Protected Resources

None of the alternatives considered would modify operations of the American Samoa lobster fishery in any way that would be expected to affect populations of endangered or threatened species or critical habitat in any manner not previously considered in previous ESA or MMPA consultations described in Section 3.1.4.

While Alternatives 2, 3 (Preferred), and 4 would implement ACLs and a possible reduction to the ACL in a subsequent fishing year, if necessary, fishery managers do not have the ability to conduct in-season tracking of catch towards an ACL, and so there is no in-season closure being proposed. Therefore, participants in the American Samoa lobster fishery would continue to fish as they do under the Alternative 1. However, because this fishery is currently sustainably managed and subject to conservation measures in accordance with various resource conservation and management laws, and because no change would occur in the way fishing is conducted, none of the alternatives would result in a change to distribution, abundance, reproduction, or survival of ESA-listed species or increase interactions with protected resources.

Table 18 provides a comparison of the potential impacts of the American Samoa spiny lobster alternatives on elements of the affected environment.

Table 18. American Samoa Spiny Lobster Alternative Comparison Tables.

Topic	Alternative 1 (No Action)	Alternative 2 (Status Quo)	Alternative 3 (Preferred)	Alternative 4 (Lower than Preferred)
ACL specification	No ACL	2,300 lb	4,845 lb	3,300 to 4,600 lb
AM:	No AM	Council would take action to correct issue if ACL is exceeded	NMFS would reduce the ACL in subsequent year, if 3-year average catch exceeds the ACL	Same as Alt. 3
Expected catch in 2015-2018	Similar to Ave. 2011-13 catch of 1,757 lb	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2
Impacts to target stock in terms of probability of overfishing in any given year if the entire ACL amount is caught	Less than 5% probability of overfishing	Same as Alt. 1	<35%	15-30%
Impacts to non-target stock	No impact as hand harvest/ spear method are highly selective fishing methods	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2
Max. potential annual fleet-wide revenue	Unlimited	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2
Impacts to protected species	None observed or reported	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2
Administration and Enforcement	Annual evaluation of fishery performance	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2

4.2 CNMI

4.2.1 Potential Impacts to Target and Non-target Stock

4.2.1.1 Alternative 1: No ACL and AM Management (No Action)

Currently, NMFS has not specified an ACL and AM for the CNMI spiny lobster fishery for fishing year 2015. Under the no-action alternative, an ACL would not be specified for the CNMI a spiny lobster fishery and AMs would not be necessary. However, NMFS and the Council would continue to monitor catches of spiny lobster in all island areas based on all available sources of information.

Under this alternative, the lack of an ACL or AMs in fishing year 2015 through 2018 is not likely to result in overfishing of spiny lobsters in any year. As shown in Table 6, the highest recorded catch of spiny lobster in the CNMI was 5,610 lb, which occurred in 2005 when there were no ACL and AM mandate in place. This level of catch is well below the OFL proxy of 9,200 lb and MSY estimate of 9,600 lb Since 2005, spiny lobster harvest has fluctuated between 600 lb and 4,300 lb with the average annual catch for the most recent three year period 2011-2013 being 1,115 lb. Under this alternative, spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013 and would be sustainable. Because spiny lobsters in the CNMI are harvested by hand, there is no bycatch of non-target stocks in this fishery. For these reasons, even without ACL or AM management, the expected impacts to target and non-target stocks would be similar to the impacts described in Alternatives 2 and 3.

4.2.1.2 Alternative 2: Specify 2013 ACL of 5,500 lb (Status Quo/NEPA Baseline)

Under Alternative 2, NMFS would specify an ACL of 5,500 lb for CNMI spiny lobsters for fishing years 2015 through 2018. Based on risk projections from method B of the Biomass Augmented Catch-MSY model (Appendix B), an ACL of 5,500 lb is associated with less than a 5 percent probability of overfishing should the entire ACL be caught (Table 1). Under this alternative, NMFS and the Council would continue to monitor catches of spiny lobster based on all available sources of information. However, because catch statistics are not available until at least six months after the data have been collected, NMFS and the Council have no way to determine during the fishing year whether the ACL might be reached, and cannot prevent the ACL from being exceeded. Therefore, fishers would be able to fish throughout the fishing year in the same manner as under Alternative 1, and as recently occurred in 2011-2013.

Based on past fishery performance shown in Table 6, spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, or 1,115 lb. This level of catch would be well below the OFL proxy of 9,200 lb and the MSY of 9,600 lb, and would not result in overfishing. Because spiny lobsters in the CNMI are harvested by hand, there is no bycatch of non-target stocks in this fishery.

Under this alternative, if the Council determines the ACL is exceeded, the Council as an AM would take action in accordance with 50 CFR 600.310(g) to correct the operational issue that caused the ACL overage. This may include a recommendation that NMFS reduce the ACL in the subsequent fishing year by the amount of the overage, or other measures, as appropriate. However, it is unlikely the Council would recommend a reduced ACL if the fishery exceeds 5,500 lb, unless catch exceeds the OFL proxy of 9,200 lb in 2015-2018. If the Council does recommend a reduced ACL, any ACL less than 5,500 lb would have less than a 5 percent probability of overfishing. However, because in-season AMs to prevent the ACL from being exceeded is not possible, compared to Alternative 1, Alternative 2 is not likely to result in changes in the conduct of the fishery, including gear types used, areas fished, level of catch, or have large beneficial or adverse effects on target or non-target stocks.

4.2.1.3 Alternative 3: Specify Council Recommended ACL of 7,410 lb (Preferred)

Under Alternative 3 (the Council's and NMFS' Preferred Alternative), NMFS would specify an ACL of 7,410 lb for CNMI spiny lobster for fishing years 2015 through 2018. This is five percent lower than the ABC of 7,800 lb. Based on risk projections from method B of the Biomass Augmented Catch-MSY model (Appendix B), an ACL of 7,410 lb is associated with less than a 30 percent probability of overfishing should the entire ACL be caught (Table 1). Under this alternative, NMFS and the Council would continue to monitor catches of spiny lobster based on all available sources of information. However, because catch statistics are not available until at least six months after the data have been collected, NMFS and the Council have no way to determine during the fishing year whether the ACL might be reached, and cannot prevent the ACL from being exceeded. Therefore, fishers would be able to fish throughout the fishing year in the same manner as under Alternative 1 and Alternative 2.

Based on past fishery performance shown in Table 6, spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, or 1,115 lb. This level of catch would be well below the OFL proxy of 9,200 lb and the MSY of 9,600 lb, and would not result in overfishing. Because spiny lobsters in the CNMI are harvested by hand, there is no bycatch of non-target stocks in this fishery. Therefore, under Alternative 3, impacts to target and non-target stocks would be identical to the impacts under Alternative 2, which is identical to the impacts under Alternative 1 .

Under this alternative, if the Council determines the three-year average catch for spiny lobster exceeded the proposed ACL in any fishing year, NMFS would reduce the ACL by the amount of the overage in the subsequent years (See Section 1.3- Proposed Action for detailed information on how this AM is triggered). The impacts of a reduced ACL to target and non-target stocks are described in Alternative 4 below.

4.2.1.4 Alternative 4: Specify ACL between 6,100 lb and 7,100 lb (lower than preferred)

Under Alternative 4, NMFS would specify an ACL that is lower than the preferred alternative (Alternative 3) for fishing years 2015 through 2018, but higher than the ACL of 5,500 lb described in Alternative 2 (Status Quo). NMFS included a range of ACLs lower than the ACL that would be established under the preferred alternative in the event that the proposed ACL under Alternative 3 is implemented and exceeded in 2015, 2016 or 2017, and a downward adjustment in the amount of the overage is necessary in a subsequent year. Under this alternative, the ACLs could range from 7,100 lb (probability of overfishing of 25 percent), down to 6,100 lb (probability of overfishing of 10 percent) (Table 1). Because the OFL proxy for CNMI spiny lobsters is 9,200 lb, any level of catch below the OFL proxy would not result in overfishing. Therefore, the expected impacts target and non-target stocks as a result of selecting Alternative 4 are expected to be the same as the impacts under Alternatives 2 and 3.

However, if an ACL is exceeded more than once in a four-year period, the Council is required to re-evaluate the ACL process, and adjust the system for setting ACLs, as necessary, to improve its performance and effectiveness. Additionally, if NMFS determines overfishing is occurring, NMFS would immediately notify the Council to take action to end overfishing in the fishery.

4.2.2 Potential Impacts to Fishery Participants and Fishing Community

In fishing year 2011, the commercial price per pound for CNMI spiny lobster was $6.49. Since no price estimate exists for 2012 and 2013, the 2011 value is used in the impacts analysis for this section. Based on an average reported commercial landing of 1,115 lb for fishing years 2011-2013, the average annual estimated commercial value for the CNMI spiny lobster fishery for this three year period was approximately $7,236. The number of participants in this fishery is unknown.

4.2.2.1 Alternative 1: No ACL and AM Management (No Action)

Currently, NMFS has not specified and ACL and AM for the CNMI spiny lobster fishery in fishing year 2015. Under the no-action alternative, an ACL would not be specified for the CNMI lobster fishery and AMs would not be necessary. Therefore, fishing would continue throughout the entire fishing year. As shown in Table 6, the highest recorded catch occurred in 2005 when 5,610 lb of spiny lobsters were caught. If there was no ACL, catches could reach or surpass 2005 levels. Using the 2011 price per pound of $6.49, the potential annual fleet-wide revenue during 2015-2018 under Alternative 1 could be at least $36,409 if the record high of 5,610 lb of spiny lobsters was caught. However, under this alternative, spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 1,115 lb. Using the 2011 price per pound $6.49, the expected potential annual fleet-wide revenue during 2015-2018 under Alternative 1 would be $7,236.

The CNMI lobster fishery provides fresh lobster for sustenance, customary exchange and other gifts, and allows some lobsters to enter local markets. This provides positive social and economic benefits to fishermen, buyers and the CNMI fishing community.

4.2.2.2 Alternative 2: Specify 2013 ACL of 5,500 lb (Status Quo/NEPA Baseline)

Under Alternative 2, NMFS would specify an ACL of 5,500 lb of CNMI spiny lobsters for fishing years 2015 through 2018. Using the 2011 price per pound of $6.49, the potential annual fleet-wide revenue during 2015-2018 under Alternative 2 would be $35,695 if this level of catch is reached in any fishing year. However, under this alternative, the CNMI spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 1,115 lb. and is expected to produce an annual fleet-wide revenue of $7,236. Therefore, under Alternative 2, the impacts to fishery participants and the CNMI fishing community would be identical to the impacts under Alternative 1.

4.2.2.3 Alternative 3: Specify Council Recommended ACL of 7,410 lb (Preferred)

Under Alternative 3 (the Council and NMFS' Preferred Alternative), NMFS would specify an ACL at 7,410 lb of spiny lobster for fishing years 2015 through 2018. Using the 2011 price per pound of $3.89, the potential annual fleet-wide revenue during 2015-2018 under Alternative 3 would be $48,091 if this level of catch is reached in any fishing year. However, under this alternative, CNMI spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 1,115 lb and is expected to produce an annual fleet-wide

revenue of $7,236. Therefore, under Alternative 3, the impacts to fishery participants and the CNMI fishing community would be identical to the impacts under Alternative 2, which is identical to the impacts under Alternative 1 .

4.2.2.4 Alternative 4: Specify ACL between 6,100 lb and 7,100 lb (lower than preferred)

Under Alternative 4, NMFS would specify an ACL that is lower than the preferred alternative (Alternative 3) for fishing years 2015 through 2018, but higher than the ACL of 5,500 lb described in Alternative 2 (Status Quo). NMFS included a range of ACLs lower than the ACL that would be established under the preferred alternative in the event that the proposed ACL under Alternative 3 is implemented and exceeded in 2015, 2016 or 2017, and a downward adjustment in the amount of the overage is necessary in a subsequent year. Under this alternative, the ACLs could range from 7,100 lb down to 6,100 lb.

Using the 2011 price per pound of $3.89, the potential annual fleet-wide revenue during 2015-2018 under Alternative 4 would be range from $46,079 down to $35,598. However, CNMI spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 1,115 lb and is expected to produce an annual fleet-wide revenue of $7,236. In other words, the impacts to fishery participants and the CNMI fishing community under Alternative 4 would be identical to the impacts under Alternatives 2 and 3 , which are identical to the impacts under Alternative 1.

Because none of the alternatives considered would result in changes in the conduct of the fishery including gear types used, areas fished, level of catch or effort, none of the alternatives considered would affect the safety of fishermen at sea.

4.2.3 Potential Impacts to Fishery Administration and Enforcement

Under all alternatives considered, NMFS and the Council would continue to monitor catches of spiny lobster in all island areas based on all available sources of information, and federal regulations would continue to require the Council-appointed FEP plan team to prepare an annual report on the performance of the CNMI spiny lobster fishery by June 30 of each year. Additionally, all other regulations implemented by other federal agencies and local state and territorial governments would continue to apply to spiny lobster fisheries operating in the U.S. EEZ.

While Alternatives 2, 3 (Preferred), and 4 would implement ACLs and a post-season accounting of the catch relative to the ACL, none of the alternatives would result in commitment of additional resources or increased need for fishery enforcement as monitoring of catch is required under all alternatives, including the no action alternative.

4.2.4 Potential Impacts to Protected Resources

None of the alternatives considered would modify operations of the CNMI lobster fishery in any way that would be expected to affect populations of endangered or threatened species or critical

habitat in any manner not previously considered in previous ESA or MMPA consultations described in Section 3.2.4.

While Alternatives 2, 3 (Preferred), and 4 would implement ACLs and a possible reduction to the ACL in a subsequent fishing year, if necessary, fishery managers do not have the ability to conduct in-season tracking of catch towards an ACL, and so there is no in-season closure being proposed. Therefore, participants in the CNMI lobster fishery would continue to fish as they do under the Alternative 1. However, because this fishery is currently sustainably managed and subject to conservation measures in accordance with various resource conservation and management laws, and because no change would occur in the way fishing is conducted, none of the alternatives would result in a change to distribution, abundance, reproduction, or survival of ESA-listed species or increase interactions with protected resources. Table 19 provides a comparison of the potential impacts of the CNMI spiny lobster alternatives on elements of the affected environment.

Table 19. CNMI Spiny Lobster Alternative Comparison Tables.

Topic	Alternative 1 (No Action)	Alternative 2 (Status Quo)	Alternative 3 (Preferred)	Alternative 4 (Lower than Preferred)
ACL specification	No ACL	5,500 lb	7,410 lb	6,100 to 7,100 lb
AM	No AM	Council would take action to correct issue if ACL is exceeded	NMFS would reduce the ACL in subsequent year, if 3-year average catch exceeds the ACL	Same as Alt. 3
Expected catch in 2015-2018	Similar to Ave. 2011-13 catch of 1,115 lb	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2
Impact to target stock in terms of probability of overfishing if the entire ACL is caught	Less than 5% probability of overfishing	Same as Alt. 1	30%	10-20%
Impact to non-target stock	No impact as hand harvest is a highly selective fishing method	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2
Max. potential annual fleet-wide revenue	Unlimited	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2
Impacts to protected species	None observed or reported	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2

Topic	Alternative 1 (No Action)	Alternative 2 (Status Quo)	Alternative 3 (Preferred)	Alternative 4 (Lower than Preferred)
Administration and Enforcement	Annual evaluation of fishery performance	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2

4.3 Guam

4.3.1 Potential Impacts to Target and Non-Target Stock

4.3.1.1 Alternative 1: No ACL and AM Management (No Action)

Currently, NMFS has not specified an ACL and AM for the Guam spiny lobster fishery for fishing year 2015. Under the no-action alternative, an ACL would not be specified for the Guam a spiny lobster fishery and AMs would not be necessary. However, NMFS and the Council would continue to monitor catches of spiny lobster in all island areas based on all available sources of information.

Under this alternative, the lack of an ACL or AMs in fishing year 2015 through 2018 is not likely to result in overfishing of spiny lobsters in any year. As shown in Table 10, spiny lobster catch in Guam exceeded the current OFL proxy of 4,300 lb in 2006 and again in 2007, when respectively, 5,089 lb and 4,725 lb were caught. Since then, spiny lobster harvest has fluctuated between 900 lb and 2,000 lb with the average annual catch for the most recent three year period 2011-2013 being 1,167 lb. This level of catch is well below the OFL proxy and MSY estimate of 4,600 lb. Under this alternative, spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013 and would be sustainable. Because spiny lobsters in Guam are harvested by hand, there is no bycatch of non-target stocks in this fishery. For these reasons, even without ACL or AM management, the expected impacts to target and non-target stocks would be similar to the impacts described in Alternatives 2 and 3.

4.3.1.2 Alternative 2: Specify 2013 ACL of 2,700 lb (Status Quo/NEPA Baseline)

Under this Alternative, NMFS would specify an ACL of 2,700 lb of Guam spiny lobsters for fishing years 2015 through 2018. Based on risk projections from method B of the Biomass Augmented Catch-MSY model (Appendix B), an ACL of 2,700 lb is associated with less than a 25 percent probability of overfishing should the entire ACL be caught (Table 1). Under this alternative, NMFS and the Council would continue to monitor catches of spiny lobster based on all available sources of information. However, because catch statistics are not available until at least six months after the data have been collected, NMFS and the Council have no way to determine during the fishing year whether the ACL might be reached, and cannot prevent the ACL from being exceeded. Therefore, fishers would be able to fish throughout the fishing year in the same manner as under Alternative 1, and as recently occurred in 2011-2013.

Based on past fishery performance shown in Table 10, spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, or 1,167 lb. This level of catch is well below the OFL proxy of 4,300 lb and the MSY of 4,600 lb, and would not result in overfishing. Because spiny lobsters in Guam are harvested by hand, there is no bycatch of non-target stocks in this fishery.

Under this alternative, if the Council determines the ACL is exceeded, the Council as an AM would take action in accordance with 50 CFR 600.310(g) to correct the operational issue that caused the ACL overage. This may include a recommendation that NMFS reduce the ACL in the subsequent fishing year by the amount of the overage, or other measures, as appropriate. However, it is unlikely the Council would recommend a reduced ACL if the fishery exceeds 2,700 lb unless catch exceeds the OFL proxy of 4,300 lb in 2015-2018. If the Council does recommend a reduced ACL, any ACL less than 2,700 lb would have less than a 25 percent probability of overfishing. However, because in-season AMs to prevent the ACL from being exceeded is not possible, compared to Alternative 1, Alternative 2 is not likely to result in changes in the conduct of the fishery, including gear types used, areas fished, level of catch, or have large beneficial or adverse effects on target or non-target stocks.

4.3.1.3 Alternative 3: Specify Council Recommended ACL of 3,135 lb (Preferred)

Under Alternative 3 (the Council's and NMFS' Preferred Alternative), NMFS would specify an ACL at 3,135 lb of spiny lobster for fishing years 2015 through 2018. This is five percent lower than the ABC of 3,300 lb. Based on risk projections from method B of the Biomass Augmented Catch-MSY model (Appendix B), an ACL of 3,135 lb is associated with less than a 35 percent probability of overfishing should the entire ACL be caught (Table 1). Under this alternative, NMFS and the Council would continue to monitor catches of spiny lobster based on all available sources of information. However, because catch statistics are not available until at least six months after the data have been collected, NMFS and the Council have no way to determine during the fishing year whether the ACL might be reached, and cannot prevent the ACL from being exceeded. Therefore, fishers would be able to fish throughout the fishing year in the same manner as under Alternative 1 and Alternative 2.

Based on past fishery performance shown in Table 10, spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, or 1,167 lb. This level of catch is well below the OFL proxy of 4,300 lb and the MSY of 4,600 lb, and would not result in overfishing. Because spiny lobsters in Guam are harvested by hand, there is no bycatch of non-target stocks in this fishery. Therefore, under Alternative 3, impacts to target and non-target stocks would be identical to the impacts under Alternative 2, which is identical to the impacts under Alternative 1.

Under this alternative, if the Council determines the three-year average catch for spiny lobster exceeded the proposed ACL in any fishing year, NMFS would reduce the ACL by the amount of the overage in the subsequent years (See Section 1.3- Proposed Action for detailed information on how this AM is triggered). The impacts of a reduced ACL to target and non-target stocks are described in Alternative 4 below.

4.3.1.4 Alternative 4: Specify ACL between 2,200 lb and 3,000 lb (lower than preferred)

Under Alternative 4, NMFS would specify an ACL that is lower than the preferred alternative (Alternative 3) and generally lower than the ACL of 2,700 lb described in Alternative 2 (Status Quo) for fishing years 2015 through 2018. NMFS included a range of ACLs lower than the ACL that would be established under the preferred alternative in the event that the proposed ACL under Alternative 3 is implemented and exceeded in 2015, 2016 or 2017, and a downward adjustment in the amount of the overage is necessary in a subsequent year. Under this alternative, the ACL could range from 3,000 lb (probability of overfishing of 30 percent) down to 2,200 lb (probability of overfishing of 15 percent) (Table 1).

Because the OFL proxy for Guam spiny lobsters is 4,300 lb, any level of catch below the OFL proxy would not result in overfishing. However, if an ACL is exceeded more than once in a four-year period, the Council is required to re-evaluate the ACL process, and adjust the system for setting ACLs, as necessary, to improve its performance and effectiveness. Additionally, if NMFS determines overfishing is occurring, NMFS would immediately notify the Council to take action to end overfishing in the fishery. Therefore, the expected impacts target and non-target stocks as a result of selecting Alternative 4 are expected to be the same as the impacts under Alternatives 2 and 3.

4.3.2 Potential Impacts to Fishery Participants and Fishing Communities

In fishing year 2013, the commercial price per pound for Guam spiny lobster was $3.73 (Table 10). Based on an average reported commercial landing of 1,167 lb for fishing years 2011-2013, the average annual estimated commercial value for the Guam spiny lobster fishery for this three year period was approximately $4,353. The number of participants in this fishery is unknown.

4.3.2.1 Alternative 1: No ACL and AM Management (No Action)

Currently, NMFS has not specified an ACL and AM for the Guam spiny lobster fishery in fishing year 2015. Under the no-action alternative, an ACL would not be specified for the Guam spiny lobster fishery and AMs would not be necessary. Therefore, fishing would continue throughout the entire fishing year. As shown in Table 10, the highest recorded spiny lobster catch in Guam occurred in 2006 when 5,388 lb of spiny lobsters were caught. If there was no ACL, catches could reach or surpass 2006 levels. Using the 2013 price per pound of $3.73, the potential annual fleet-wide revenue during 2015-2018 under Alternative 1 could be at least $18,982 if the record high of 5,089 lb of spiny lobsters was caught. However, under this alternative, spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 1,167 lb. Using the 2013 price per pound $3.73, the expected potential annual fleet-wide revenue during 2015-2018 under Alternative 1 would be $4,353.

The Guam lobster fishery provides fresh lobster for sustenance, customary exchange and other gifts, and allows some lobsters to enter local markets. This provides positive social and economic benefits to fishermen, buyers and the American Samoa fishing community.

4.3.2.2 Alternative 2: Specify 2013 ACL of 2,700 lb (Status Quo/NEPA Baseline)

Under Alternative 2, NMFS would specify an ACL of 2,7 00 lb of Guam spiny lobsters for fishing years 2015 through 2018. Using the 2013 price per pound of $3.73, the potential annual fleet-wide revenue during 2015-2018 under Alternative 2 would be $10,071 if this level of catch is reached in any fishing year. However, under this alternative, Guam spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 1,167 lb and is expected to produce an annual fleet-wide revenue of $4,353. Therefore, under Alternative 2, the impacts to fishery participants and the Guam fishing community would be identical to the impacts under Alternative 1 (no action).

4.3.2.3 Alternative 3: Specify Council Recommended ACL of 3,135 lb (Preferred)

Under Alternative 3 (the Council's and NMFS' Preferred Alternative), NMFS would specify an ACL at 3,135 lb of Guam spiny lobster for fishing years 2015 through 2018. Using the 2013 price per pound of $3.73, the potential annual fleet-wide revenue during 2015-2018 under Alternative 3 would be $11,694 if this level of catch is reached in any fishing year. However, under this alternative, Guam spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 1,167 lb and is expected to produce an annual fleet-wide revenue of $4,353. Therefore, under Alternative 3, the impacts to fishery participants and the American Samoa fishing community would be identical to the impacts under Alternative 2 (status quo), which is identical to the impacts under Alternative 1.

4.3.2.4 Alternative 4: Specify ACL between 2,200 lb and 3,000 lb (lower than preferred)

Under Alternative 4, NMFS would specify an ACL that is lower than the preferred alternative (Alternative 3), and generally lower than the ACL of 2,700 lb described in Alternative 2 (Status Quo)for fishing years 2015 through 2018. NMFS included a range of ACLs lower than the ACL that would be established under the preferred alternative in the event that the proposed ACL under Alternative 3 is implemented and exceeded in 2015, 2016 or 2017, and a downward adjustment in the amount of the overage is necessary in a subsequent year. Under this alternative, the ACLs could range from 3,000 lb down to 2,200 lb.

Using the 2013 price per pound of $3.73, the potential annual fleet-wide revenue during 2015-2018 under Alternative 4 would be range from $11,190 down to $8,206. However, Guam spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 1,167 lb and is expected to produce an annual fleet-wide revenue of $4,353. In other words, the impacts to fishery participants and the Guam fishing community under Alternative 4 would be identical to the impacts under Alternatives 2 and 3 , which are identical to the impacts under Alternative 1.

Because none of the alternatives considered would result in changes in the conduct of the fishery including gear types used, areas fished, level of catch or effort, none of the alternatives considered would affect the safety of fishermen at sea.

4.3.3 Potential Impacts to Fishery Administration and Enforcement

Under all alternatives considered, NMFS and the Council would continue to monitor catches of spiny lobster in all island areas based on all available sources of information, and federal regulations would continue to require the Council-appointed FEP plan team to prepare an annual report on the performance of the Guam spiny lobster fishery by June 30 of each year. Additionally, all other regulations implemented by other federal agencies and local state and territorial governments would continue to apply to spiny lobster fisheries operating in the U.S. EEZ.
While Alternatives 2, 3 (Preferred), and 4 would implement ACLs and a post-season accounting of the catch relative to the ACL, none of the alternatives would not result in commitment of additional resources or increased need for fishery enforcement as monitoring of catch is required under all alternatives, including the no action alternative.

4.3.4 Potential Impacts to Protected Resources

None of the alternatives considered would modify operations of the Guam lobster fishery in any way that would be expected to affect populations of endangered or threatened species or critical habitat in any manner not previously considered in previous ESA or MMPA consultations described in Section 3.3.4.

While Alternatives 2, 3 (Preferred), and 4 would implement ACLs and a possible reduction to the ACL in a subsequent fishing year, if necessary, fishery managers do not have the ability to conduct in-season tracking of catch towards an ACL, and so there is no in-season closure being proposed. Therefore, participants in the Guam lobster fishery would continue to fish as they do under the Alternative 1 (No Action). However, because this fishery is currently sustainably managed and subject to conservation measures in accordance with various resource conservation and management laws, and because no change would occur in the way fishing is conducted, none of the alternatives would result in a change to distribution, abundance, reproduction, or survival of ESA-listed species or increase interactions with protected resources.

If at any time the fishery, environment, or status of a listed species or marine mammal species were to change substantially, or if the fishery were found to be occurring in or near areas that were designated as critical habitat, NMFS would undertake additional consultation as required to comply with requirements of the ESA and the MMPA.

Table 20 provides a comparison of the potential impacts of the Guam spiny lobster alternatives on elements of the affected environment.

Table 20. Guam Spiny Lobster Alternative Comparison Tables.

Topic	Alternative 1 (No Action)	Alternative 2 (Status Quo)	Alternative 3 (Preferred)	Alternative 4 (Lower than Preferred)
ACL specification	No ACL	2,700 lb	3,135 lb	2,200 to 3,000 lb
AM:	No AM	Council would take action to correct issue if ACL is exceeded	NMFS would reduce the ACL in subsequent year, if 3-year average catch exceeds the ACL	Same as Alt. 3
Expected catch in 2015-2018	Similar to Ave. 2011-13 catch of 1,167 lb	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2
Impact to target stock in terms of probability of overfishing if the entire ACL is caught	Less than 25% probability of overfishing	25%	<35%	15 to 30%
Impact to non-target stock	No impact as hand harvest is highly selective fishing method	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2
Max. potential annual fleet-wide revenue	Unlimited	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2
Impacts to protected species	None observed or reported	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2
Administration and Enforcement	Annual evaluation of fishery performance	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2

4.4 Hawaii

4.4.1 Potential Impacts to Target and Non-Target Stock

4.4.1.1 Alternative 1: No ACL and AM Management (No Action)

Currently, NMFS has not specified an ACL and AM for the MHI spiny lobster fishery in fishing year 2015. Under the no-action alternative, an ACL would not be specified for the MHI a spiny lobster fishery and AMs would not be necessary. However, NMFS and the Council would continue to monitor catches of spiny lobster in all island areas based on all available sources of information.

Under this alternative, the lack of an ACL or AMs in fishing year 2015 through 2018 is not likely to result in overfishing of spiny lobsters in any year. As shown in Table 14, the highest recorded catch of spiny lobster in the MHI was 14,437 lb, which occurred in 2009 when there were no ACL and AM mandate in place. This level of catch is well below the OFL proxy of 19,200 lb and MSY of 20,400 lb. Since 2009, spiny lobster harvest has fluctuated between 9,700 and 12,300 lb with the average annual catch for the most recent three year period 2011-2013 being 10,242 lb. Under this alternative, spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013 and would be sustainable. Because spiny lobsters in the MHI are harvested primarily by hand, and less than 2% of the total spiny lobster catch comes from EEZ waters, there is little to no bycatch of non-target stocks in the fishery. For these reasons, even without ACL or AM management, the expected impacts to target and non-target stocks would be similar to the impacts described in Alternatives 2 and 3.

4.4.1.2 Alternative 2: Specify 2013 ACL of 10,000 lb (Status Quo/NEPA Baseline)

Under Alternative 2, NMFS would specify an ACL of 10,000 lb of MHI spiny lobsters for fishing years 2015 through 2018. Based on risk projections from method B of the Biomass Augmented Catch-MSY model (Appendix B), an ACL of 10,000 lb is associated with a less than 5 percent probability of overfishing should the entire ACL be caught (Table 1). Under this alternative, NMFS and the Council would continue to monitor catches of spiny lobster based on all available sources of information. However, because catch statistics are not available until at least six months after the data have been collected, NMFS and the Council have no way to determine during the fishing year whether the ACL might be reached, and cannot prevent the ACL from being exceeded. Therefore, fishers would be able to fish throughout the fishing year in the same manner as under Alternative 1 and as recently occurred in 2011-2013.

Based on past fishery performance shown in Table 15, spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, or 10,242 lb. While this level of catch would exceed the ACL under this alternative, this level of catch is well below the OFL proxy of 19,200 lb and the MSY of 20,400 lb, and would not result in overfishing. Because spiny lobsters in the MHI are harvested primarily by hand, there is little to no bycatch of non-target stocks in the fishery.

Under this alternative, if the Council determines the ACL is exceeded, the Council as an AM would take action in accordance with 50 CFR 600.310(g) to correct the operational issue that caused the ACL overage. This may include a recommendation that NMFS reduce the ACL in the subsequent fishing year by the amount of the overage, or other measures, as appropriate. However, it is unlikely the Council would recommend a reduced ACL if the fishery exceeds 10,000 lb in 2015-2018 as the OFL proxy is 19,200 lb. If the Council does recommend a reduced ACL, any ACL less than 10,000 lb would have less than a 5 percent probability of overfishing. Because in-season AMs to prevent the ACL from being exceeded is not possible, compared to Alternative 1, Alternative 2 is not likely to result in changes in the conduct of the fishery, including gear types used, areas fished, level of catch, or have large beneficial or adverse effects on target or non-target stocks.

4.4.1.3 Alternative 3: Specify Council Recommended ACL of 15,000 lb (Preferred)

Under Alternative 3 (the Council's and NMFS' Preferred Alternative), NMFS would specify an ACL at 15,000 lb of spiny lobster for fishing years 2015 through 2018. This is five percent lower than the ABC of 15,800 lb. Based on risk projections from method B of the Biomass Augmented Catch-MSY model (Appendix B), an ACL of 15,000 lb is associated with a 25 percent probability of overfishing should the entire ACL be caught (Table 1). Under this alternative, NMFS and the Council would continue to monitor catches of spiny lobster based on all available sources of information. However, because catch statistics are not available until at least six months after the data have been collected, NMFS and the Council have no way to determine during the fishing year whether the ACL might be reached, and cannot prevent the ACL from being exceeded. Therefore, fishers would be able to fish throughout the fishing year in the same manner as under Alternative 1 and Alternative 2.

Based on past fishery performance shown in Table 2, spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, or 10,242 lb. This level of catch is well below the OFL proxy of 19,200 lb and the MSY of 20,400 lb, and would not result in overfishing. Because spiny lobsters in the MHI are harvested primarily by hand, there is little to no bycatch of non-target stocks in the fishery. Therefore, under Alternative 3, impacts to target and non-target stocks would be identical to the impacts under Alternative 2 , which is identical to the impacts under Alternative 1.

Under this alternative, if the Council determines the three-year average catch for spiny lobster exceeded the proposed ACL in any fishing year, NMFS would reduce the ACL by the amount of the overage in the subsequent years (See Section 1.3- Proposed Action for detailed information on how this AM is triggered). The impacts of a reduced ACL to target and non-target stocks are described in Alternative 4 below.

4.4.1.4 Alternative 4: Specify ACL between 11,700 lb and 14,300 lb (lower than preferred)

Under Alternative 4, NMFS would specify an ACL that is lower than the preferred alternative (Alternative 3), but higher than the ACL of 10,000 lb described in Alternative 2 (Status Quo). for fishing years 2015 through 2018. NMFS included a range of ACLs lower than the ACL that would be established under the preferred alternative in the event that the proposed ACL under Alternative 3 is implemented and exceeded in 2015, 2016 or 2017, and a downward overage adjustment in the amount of the overage is necessary in a subsequent year. Under this alternative, the ACL could range from 14,300 lb (probability of overfishing of 20 percent) down to 11,700 lb (probability of overfishing of 5 percent) (Table 1).

Because the OFL proxy for MHI spiny lobsters is 19,200 lb, any level of catch below the OFL proxy would not result in overfishing. Therefore, the expected impacts target and non-target stocks as a result of selecting Alternative 4 are expected to be the same as the impacts under Alternatives 2 and 3.

However, if an ACL is exceeded more than once in a four-year period, the Council is required to re-evaluate the ACL process, and adjust the system for setting ACLs, as necessary, to improve its

performance and effectiveness. Additionally, if NMFS determines overfishing is occurring, NMFS would immediately notify the Council to take action to end overfishing in the fishery.

4.4.2 Potential Impacts to Fishery Participants and Fishing Communities

In fishing year 2013, the commercial price per pound for MHI spiny lobster was $10.73 (Table 14). Based on an average reported commercial landing of 10,242 lb for fishing years 2011-2013, the average annual estimated commercial value for the MHI spiny lobster fishery for this three year period was approximately $1,091,000. The total number of participants in this fishery is unknown.

4.4.2.1 Alternative 1: No Action

Currently, NMFS has not specified and ACL and AM for the MHI spiny lobster fishery in fishing year 2015. Under the no-action alternative, an ACL would not be specified for the MHI spiny lobster fishery and AMs would not be necessary. Therefore, fishing would continue throughout the entire fishing year. As shown in Table 14, the highest recorded catch occurred in 2009 when 14,437 lb of spiny lobsters were caught. If there was no ACL, catches could reach or surpass 2009 levels. Using the 2013 price per pound of $10.73, the potential annual fleet-wide revenue during 2015-2018 under Alternative 1 could be at least $154,909 if the record high of 14,437 lb of spiny lobsters was caught. However, under this alternative, spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 10,242 lb. Using the 2013 price per pound $10.73, the expected potential annual fleet-wide revenue during 2015-2018 under Alternative 1 would be $109,897.

The MHI spiny lobster fishery provides fresh lobster for sustenance, and other gifts, and allows some lobsters to enter local markets. This provides positive social and economic benefits to fishermen, buyers and fishing communities in Hawaii.

4.4.2.2 Alternative 2: Specify 2013 ACL of 10,000 lb (Status Quo/NEPA Baseline)

Under Alternative 2, NMFS would specify an ACL of 10,000 lb of MHI spiny lobsters for fishing years 2015 through 2018. Using the 2013 price per pound of $10.73 the potential annual fleet-wide revenue during 2015-2018 under Alternative 2 would be $107,300 if this level of catch is reached in any fishing year. However, under this alternative, MHI spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 10,242 lb and is expected to produce an annual fleet-wide revenue of $109,897. Therefore, under Alternative 2, the impacts to fishery participants and the fishing communities of Hawaii would be identical to the impacts under Alternative 1.

4.4.2.3 Alternative 3: Specify Council Recommended ACL of 15,000 lb (Preferred)

Under Alternative 3 (the Council and NMFS' Preferred Alternative), NMFS would specify an ACL at 15,000 lb of MHI spiny lobster for fishing years 2015 through 2018. Using the 2013 price per pound of $10.73, the potential annual fleet-wide revenue during 2015-2018 under Alternative 3 would be $160,950 if this level of catch is reached in any fishing year. However,

under this alternative, MHI spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 10,242 lb and is expected to produce an annual fleet-wide revenue of $109,897. Therefore, under Alternative 3, the impacts to fishery participants and the fishing communities of Hawaii would be identical to the impacts under Alternative 2, which is identical to the impacts under Alternative 1.

4.4.2.4 Alternative 4: Specify ACL between 11,700 lb and 14,300 lb (lower than preferred)

Under Alternative 4, NMFS would specify an ACL that is lower than the preferred alternative (Alternative 3), but higher than the ACL of 10,000 lb described in Alternative 2 (Status Quo) for fishing years 2015 through 2018. NMFS included a range of ACLs lower than the ACL that would be established under the preferred alternative in the event that the proposed ACL under Alternative 3 is implemented and exceeded in 2015, 2016 or 2017, and a downward adjustment in the amount of the overage is necessary in a subsequent year. Under this alternative, the ACLs would range from 14,300 lb down to 11,700 lb.

Using the 2013 price per pound of $10.73, the potential annual fleet-wide revenue during 2015-2018 under Alternative 4 would range from $153,439 down to $125,541. However, MHI spiny lobster catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, which is 10,242 lb and is expected to produce an annual fleet-wide revenue of $109,897. In other words, the impacts to fishery participants and fishing communities of Hawaii under Alternative 4 would be identical to the impacts under Alternatives 2 and 3 , which are identical to the impacts under Alternative 1 (no action).

Because none of the alternatives considered would result in changes in the conduct of the fishery including gear types used, areas fished, level of catch or effort, none of the alternatives considered would affect the safety of fishermen at sea.

4.4.3 Potential Impacts to Fishery Administration and Enforcement

Under all alternatives considered, NMFS and the Council would continue to monitor catches of spiny lobster in all island areas based on all available sources of information, and federal regulations would continue to require the Council-appointed FEP plan team to prepare an annual report on the performance of the MHI spiny lobster fishery by June 30 of each year. Additionally, all other regulations implemented by other federal agencies and local state and territorial governments would continue to apply to spiny lobster fisheries operating in the U.S. EEZ.
While Alternatives 2, 3 (Preferred), and 4 would implement ACLs and a post-season accounting of the catch relative to the ACL, none of the alternatives would result in commitment of additional resources or increased need for fishery enforcement as monitoring of catch is required under all alternatives, including the no action alternative.

4.4.4 Potential Impacts to Protected Resources

None of the alternatives considered would modify operations of the MHI lobster fishery in any way that would be expected to affect populations of endangered or threatened species or critical

habitat in any manner not previously considered in previous ESA consultations described in Section 3.4.4.

While Alternatives 2, 3 (Preferred), and 4 would implement ACLs and a possible reduction to the ACL in a subsequent fishing year, if necessary, fishery managers do not have the ability to conduct in-season tracking of catch towards an ACL, and so there is no in-season closure being proposed. Therefore, participants in the Hawaii lobster fishery would continue to fish as they do under the Alternative 1 (No Action). However, because this fishery is currently sustainably managed and subject to conservation measures in accordance with various resource conservation and management laws, and because no change would occur in the way fishing is conducted, none of the alternatives would result in a change to distribution, abundance, reproduction, or survival of ESA-listed species or increase interactions with protected resources.

Table 21 provides a comparison of the potential impacts of the Hawaii spiny lobster alternatives on elements of the affected environment.

Table 21. Hawaii Spiny Lobster Alternative Comparison Tables.

Topic	Alternative 1 (No Action)	Alternative 2 (Status Quo)	Alternative 3 (Preferred)	Alternative 4 (Lower than Preferred)
ACL specification	No ACL	10,000 lb	15,000 lb	11,700 to 14,300 lb
AM	No AM	Council would take action to correct issue if ACL is exceeded	NMFS would reduce the ACL in subsequent year, if 3-year average catch exceeds the ACL	Same as Alt. 3
Expected catch in 2015-2018	Similar to Ave. 2011-13 catch of 10,242 lb	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2
Impact to target stock in terms of probability of overfishing if entire ACL is caught	Approx. a 5% probability of overfishing	<5%	25%	5 to 20%
Impact to non-target stock	No impact as hand harvest is a highly selective fishing method	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2
Max. potential annual fleet-wide revenue	Unlimited	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2

Topic	Alternative 1 (No Action)	Alternative 2 (Status Quo)	Alternative 3 (Preferred)	Alternative 4 (Lower than Preferred)
Impacts to protected species	None observed or reported	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2
Administration and Enforcement	Annual evaluation of fishery performance	Same as Alt. 1	Same as Alt. 2	Same as Alt. 2

4.5 Potential Impacts to Essential Fish Habitat

Essential fish habitat (EFH) is defined as those waters and substrate as necessary for fish spawning, breeding, feeding, and growth to maturity. This includes marine areas and their chemical and biological properties that are utilized by the organism. Substrate includes sediment, hard bottom, and other structural relief underlying the water column along with their associated biological communities. In 1999, the Council developed and NMFS approved EFH definitions for management unit species (MUS) of the Bottomfish and Seamount Groundfish FMP (Amendment 6), Crustacean FMP (Amendment 10), Pelagic FMP (Amendment 8), and Precious Corals FMP (Amendment 4) (74 FR 19067, April 19, 1999). NMFS approved additional EFH definitions for coral reef ecosystem species in 2004 as part of the implementation of the Coral Reef Ecosystem FMP (69 FR8336, February 24, 2004). EFH definitions were also approved for deepwater shrimp through an amendment to the Crustaceans FMP in 2008 (73 FR 70603, November 21, 2008).

Ten years later, in 2009, the Council developed and NMFS approved five new archipelagic-based fishery ecosystem plans (FEP). The FEP incorporated and reorganized elements of the Councils' species-based FMPs into a spatially-oriented management plan (75 FR 2198, January 14, 2010). EFH definitions and related provisions for all FMP fishery resources were subsequently carried forward into the respective FEPs. In addition to and as a subset of EFH, the Council described habitat areas of particular concern (HAPC) based on the following criteria: ecological function of the habitat is important, habitat is sensitive to anthropogenic degradation, development activities are or will stress the habitat, and/or the habitat type is rare. In considering the potential impacts of a proposed fishery management action on EFH, all designated EFH must be considered. The designated areas of EFH and HAPC for all FEP MUS by life stage are summarized in Table 22.

Table 22. EFH and HAPC for Western Pacific FEP MUS.

MUS	Species Complex	EFH	HAPC
Bottomfish MUS	**American Samoa, Guam and CNMI bottomfish species:** lehi (*Aphareus rutilans*) uku (*Aprion virescens*), giant trevally (*Caranx ignoblis*), black trevally (*Caranx lugubris*), blacktip grouper *(Epinephelus fasciatus)*, Lunartail grouper *(Variola louti)*, ehu (*Etelis carbunculus*), onaga (*Etelis coruscans*), ambon emperor *(Lethrinus amboinensis)*, redgill emperor *(Lethrinus rubrioperculatus)*, taape (*Lutjanus kasmira*), yellowtail kalekale (*Pristipomoides auricilla*), opakapaka (*P. filamentosus*), yelloweye snapper (*P. flavipinnis*), kalekale (*P. sieboldii*), gindai (*P. zonatus*), and amberjack (*Seriola dumerili*).	**Eggs and larvae:** the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m (200 fm). **Juvenile/adults:** the water column and all bottom habitat extending from the shoreline to a depth of 400 m (200 fm)	All slopes and escarpments between 40–280 m (20 and 140 fm)
	Hawaii bottomfish species: uku (*Aprion virescens*), thicklip trevally (*Pseudocaranx dentex*), giant trevally (*Caranx ignoblis*), black trevally (*Caranx lugubris*), amberjack (*Seriola dumerili*), taape (*Lutjanus kasmira*), ehu (*Etelis carbunculus*), onaga (*Etelis coruscans*), opakapaka (*Pristipomoides filamentosus*), yellowtail kalekale (*P. auricilla*), kalekale (*P. sieboldii*), gindai (*P. zonatus*), hapuupuu (*Epinephelus quernus*), lehi (*Aphareus rutilans*)	**Eggs and larvae:** the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m (200 fathoms) **Juvenile/adults:** the water column and all bottom habitat extending from the shoreline to a depth of 400 meters (200 fm)	All slopes and escarpments between 40–280 m (20 and 140 fm) Three known areas of juvenile opakapaka habitat: two off Oahu and one off Molokai

MUS	Species Complex	EFH	HAPC
Seamount Groundfish MUS	**Hawaii Seamount groundfish species (50–200 fm):** armorhead (*Pseudopentaceros wheeleri*), raftfish/butterfish (*Hyperoglyphe japonica*), alfonsin (*Beryx splendens*)	**Eggs and larvae:** the (epipelagic zone) water column down to a depth of 200 m (100 fm) of all EEZ waters bounded by latitude 29°–35° **Juvenile/adults:** all EEZ waters and bottom habitat bounded by latitude 29°–35° N and longitude 171° E–179° W between 200 and 600 m (100 and 300 fm)	No HAPC designated for seamount groundfish
Crustaceans MUS	**Spiny and slipper lobster complex (all FEP areas):** spiny lobster (*Panulirus marginatus*), spiny lobster (*P. penicillatus, P.* spp.), ridgeback slipper lobster (*Scyllarides haanii*), Chinese slipper lobster (*Parribacus antarcticus*) **Kona crab :** Kona crab (*Ranina ranina*)	**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) **Juvenile/adults:** all of the bottom habitat from the shoreline to a depth of 100 m (50 fm)	All banks in the NWHI with summits less than or equal to 30 m (15 fathoms) from the surface
	Deepwater shrimp (all FEP areas): (*Heterocarpus* spp.)	**Eggs and larvae:** the water column and associated outer reef slopes between 550 and 700 m **Juvenile/adults:** the outer reef slopes at depths between 300-700 m	No HAPC designated for deepwater shrimp.

MUS	Species Complex	EFH	HAPC
Precious Corals MUS	**Shallow-water precious corals (10-50 fm) all FEP areas:** black coral (*Antipathes dichotoma*), black coral (*Antipathis grandis*), black coral (*Antipathes ulex*) **Deep-water precious corals (150–750 fm) all FEP areas:** Pink coral (*Corallium secundum*), red coral (*C. regale*), pink coral (*C. laauense*), midway deepsea coral (*C.* sp nov.), gold coral (*Gerardia* spp.), gold coral (*Callogorgia gilberti*), gold coral (*Narella* spp.), gold coral (*Calyptrophora* spp.), bamboo coral (*Lepidisis olapa*), bamboo coral (*Acanella* spp.)	EFH for Precious Corals is confined to six known precious coral beds located off Keahole Point, Makapuu, Kaena Point, Wespac bed, Brooks Bank, and 180 Fathom Bank EFH has also been designated for three beds known for black corals in the Main Hawaiian Islands between Milolii and South Point on the Big Island, the Auau Channel, and the southern border of Kauai	Includes the Makapuu bed, Wespac bed, Brooks Banks bed For Black Corals, the Auau Channel has been identified as a HAPC
Coral Reef Ecosystem MUS	**Coral Reef Ecosystem MUS (all FEP areas)**	EFH for the Coral Reef Ecosystem MUS includes the water column and all benthic substrate to a depth of 50 fm from the shoreline to the outer limit of the EEZ	Includes all no-take MPAs identified in the CREFMP, all Pacific remote islands, as well as numerous existing MPAs, research sites, and coral reef habitats throughout the western Pacific

Spiny lobster are found at depths that overlap with EFH for coral reef MUS and certain crustacean and bottomfish MUS. However, spiny lobsters fisheries in American Samoa, Guam, the CNMI and Hawaii are harvested primarily by hand and by spear. These harvest methods are highly selective and are not known to cause damage to the ocean, coastal habitats, corals, or marine habitats. None of the alternatives, including the preferred alternative (Alternative 3) will change the way in which fisheries are conducted. For these reasons, none of the alternatives considered are expected to lead to substantial physical, chemical, or biological alterations to habitat or result in adverse impacts to the marine habitat, including areas designated as EFH, habitat areas of particular concern (HAPC), or unique areas such as marine protected areas, marine sanctuaries or marine monuments.

4.6 Potential Impacts to Biodiversity/Ecosystem Function

When compared against recent fishing harvests, ACLs are higher but are, nevertheless, are lower than MSY and OFL estimates for spiny lobster stocks in all island areas. The specifications were developed using the best available scientific information, in a manner that accords with the

fishery regulations and after considering catches, participation trends, and estimates of the status of the fishery resources. The ACLs and AMs are not likely to cause large adverse impacts to resources because the conduct of lobster fishing would not change as a result of the specifications and post-season AMs. Over the long term, the post-season data review of the fishery performance and status of fish stocks would help to ensure that western Pacific lobster fisheries are being managed and harvested sustainably. Western Pacific lobster fisheries occur at relatively low levels of intensity and, because of the methods used, are target specific. There have been no identified impacts to marine biodiversity and/or ecosystem function from the spiny lobster fisheries in American Samoa, Guam, the CNMI and the MHI and none of the alternatives is expected to result in impacts to these environmental features.

4.7 Potential Impacts to Scientific, Historic, Archeological or Cultural Resources

There are no known districts, sites, highways, structures or objects that are listed in or eligible for listing in the National Register of Historic Places within waters where federal lobster fishing is authorized. Shipwrecks and other objects from the Pacific theatre in World War II could possibly occur in federal waters around the U.S. Pacific Islands. However, lobster fishing methods and activities do not have the potential affect these objects.

Most lobster fishing occurs by hand or by spear in State or territorial waters in American Samoa, Guam, the CNMI, and Hawaii. The lobster fishery is not known to cause the loss or destruction of significant scientific, cultural or historical resources because fishing methods are highly selective techniques using primarily hand harvest or spear and lobster fishing. These methods are also not known to cause damage to the ocean, coastal habitats, corals, or marine habitats. Because the specification of ACLs and AMs would not result in changes to the way any lobster fishery is conducted including type of gear used, area fished, or level of catch or effort as compared with baseline conditions, none of the alternatives are expected to result in large adverse impacts to resources of scientific, historic, cultural, or ecological importance. Lobster fishing in marine protected areas would continue to be subject to permits, reporting, and monitoring that help to ensure the marine resources of these special areas are sustainable.

4.8 Cumulative Effects of the Proposed Action

Cumulative effects refer to the impact on the environment, which results from the incremental effects of a proposed action when added to other past, present, or reasonably foreseeable future actions within the geographic area of the proposed action. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

4.8.1 Mulit-year ACLs and AMs for spiny lobster stocks

The specification of multi-year ACLs and AMs for Pacific Island spiny lobster fisheries in 2015, 2016, 2017 and again in 2018, is not expected to result in cumulative environmental effects. This is because the proposed action would set the ACL for spiny lobsters in each island area substantially lower than the stock's estimated OFL proxy, and annual catches in fishing years 2015-2018 are expected to remain below the proposed ACLs.

4.8.2 ACL and AM specifications for other western Pacific fisheries

In addition to the ACLs and AMs for spiny lobsters being considered in this EA, NMFS is proposing to implement the Council's ACL and AM recommendations for all other western Pacific fisheries for 2015-18 including other crustacean fisheries (slipper lobster, Kona crab and deepwater shrimp), precious coral, MHI non-Deep 7 bottomfish, and coral reef fisheries. NMFS will also continue to specify annual catch limits for MHI Deep 7 bottomfish on an annual basis. These fisheries have been managed using ACLs and AMs since 2012; and these specifications do not have unknown or uncertain impacts. NMFS developed environmental impact analysis documents on the proposed specifications for these fisheries, which can be obtained from NMFS or the Council by request, or at www.regulations.gov using the regulatory identification number (RIN) 0648-XD558.

The lobster fisheries in all four areas that are being considered in this EA do not overlap with other demersal fisheries to a large extent such that ACLs and AMs in the lobster fishery would result in more fishing in other demersal (or pelagic) fisheries. For this reason, the impacts of the proposed lobster ACLs and AMs can be considered separately from the other ACL and AM specifications.

4.8.3 Foreseeable management actions related to western Pacific fisheries

In the foreseeable future, the Council may re-evaluate the need for conservation and management for federal spiny lobster fisheries and may recommend NMFS remove spiny lobsters from the FEPs and/or re-classify species as "ecosystem component" (EC) species. To be considered for possible classification as an EC species, the species should be: 1) a non-target species; 2) a stock that is not determined to be subject to overfishing, approaching overfished, or overfished; 3) not likely to become subject to overfishing or overfished; and 4) generally not retained for sale or personal use. Various methods for categorizing species and EC components have been preliminarily discussed at Council meetings. These include, but are not limited to, species that are caught exclusively or predominately in state/territorial waters, species that occur infrequently in the available time series, species that are non-native to an FEP area, and species associated with ciguatoxin poisoning and are generally discarded.

In accordance with National Standard 1 guidelines found in 50 CFR §600.310(d), EC species are not considered to be "in the fishery" and thus, do not require specification of an ACL. EC species may, but are not required to remain in the FEP for data collection purposes, for ecosystem considerations related to the specification of optimum yield for associated MUS, for consideration in the development of conservation and management measures for a fishery; and/or to address other ecosystem issues (e.g., such as management of bycatch). However, until such time a particular MUS is classified as an EC species, it will remain in the fishery and be subject to the ACL requirements.

4.8.4 Other foreseeable NOAA/NMFS management actions in federal waters

On June 2, 2011, NMFS published a proposed rule (76 FR 32026) to designate areas in the main Hawaiian Islands (MHI) as monk seal critical habitat. Specific areas proposed include terrestrial

and marine habitats from 5 m inland from the shoreline extending seaward to the 500 m depth contour around Kaula Island, Niihau, Kauai, Oahu, Maui Nui (including Kahoolawe, Lanai, Maui and Molokai) and Hawaii Island. The final determinations on whether designate monk seal critical habitat in the MHI have not been made.

At this point in time there is insufficient information in the proposal to allow NMFS to evaluate the potential impact of a designation of monk seal critical habitat on the MHI crustacean fisheries, including spiny lobsters. However, a designation of critical habitat for monk seals in the MHI is not expected to affect the efficacy of using ACLs and AMs to promote long-term sustainability of the MHI crustacean fisheries.

While recent quantitative fatty acid signature analysis results indicate that monk seals consume a wide range of species including lobsters (Iverson et al. 2011); under current levels of fishing pressure in the MHI, the monk seal population is growing, pupping is increasing, and the pups appear to be foraging successfully. In contrast, the Hawaiian monk seal subpopulation continue to decline in the NWHI where fishing has been minimized in past years and recently terminated completely.

Considering that monk seal foraging success appears to be higher in the MHI than in the NWHI despite higher fishing pressure in the MHI, competition for forage with the MHI crustacean fisheries does not appear to be adversely impacting monk seals in the MHI. Therefore, the proposed ACL specifications and AMs is not considered to be affecting monk seals through completion for prey and is not expected to affect the quality of habitat being considered for designation as monk seal critical habitat because no change to the conduct of the existing MHI crustacean fisheries is likely to occur with under the proposed action.
Specifying ACLs will not have an environmental outcome that would affect the agency's decision of whether or not to revise designated critical habitat. The specification would not change the likelihood of interactions, or affect the survival, distribution or behavior of the species in any way. However, if the pending Hawaiian monk seal actions are approved, NMFS will initiate consultation in accordance with Section 7 of the ESA to ensure that Hawaii's fisheries are not likely to jeopardize the continued existence of the species, or result in the destruction or adverse modification of critical habitat.

4.8.5 Other Foreseeable NOAA Actions

On March 26, 2015, NOAA's Office of National Marine Sanctuaries (ONMS) published a proposed rule to expand the boundaries of the Humpback Whale National Marine Sanctuary in the main Hawaiian Islands (80 FR 16224). The purpose of this action is to transition the sanctuary from a single species management approach to an ecosystem-based management approach. The proposal would also change the name of the sanctuary to Na Kai Ewalu National Marine Sanctuary. The phrase means "the eight seas" in Hawaiian language and refers to the channels between the MHI and a poetic reference to the islands themselves.

Because there are no in-season management measures proposed, the ways in which the lobster fishery is conducted is not expected to change and, therefore, the proposed ACL specification and AMs would not have an environmental effect that would affect future decisions about

possible changes to the sanctuary management plan nor would the proposed action affect sanctuary resources to an extent that comprehensive effective management of the Sanctuary would not be possible.

4.8.6 Climate change

Changes in the environment from global climate change have the potential to affect spiny lobster fisheries. 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 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 (Buddenmeier 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 spiny lobster catches are sustainable, regardless of environmental conditions.

The impacts to spiny lobsters from climate change 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.

The efficacy of the proposed ACL and AM specifications in providing for sustainable levels of fishing for spiny lobsters is not expected to be adversely affected by climate change. Recent catches relative to MSY and OFL estimates species helped to inform the development of the ACLs and AMs. Monitoring would continue, and, if monitoring shows overfishing is occurring, ACLs and other fishery management provisions could be adjusted in the future. The proposed specifications are not expected to result in a change to the manner in which any of the affected fisheries are conducted, so no change in greenhouse gas emissions is expected.

For these reasons, climate change, considered in addition to all other factors affecting lobster stocks (including fishing) is not expected to result in a large and adverse cumulative impact on lobster stocks that. The proposed action under each alternative is not expected to change the operation of the fishery and therefore, none of the action alternatives would result in changes in climate change-promoting gas emissions.

5 Consistency with Other Applicable Laws

5.1 National Environmental Policy Act

NOAA Administrative Order (NAO) 216-6, Environmental Review Procedures for Implementing the National Environmental Policy Act, in accordance with NEPA, requires the consideration of effects of proposed agency actions and alternatives on the human environment and allows for involvement of interested and affected members of the public before a decision is made. The NMFS Regional Administrator will use the analysis in this EA and public received on the draft EA to determine whether the proposed action would have a significant environmental impact, which, if so, would require the preparation of an environmental impact statement.

5.2 Preparers and Reviewers

Nikhil Mehta, Fishery Biologist, SERO, SFD (preparer)
Jarad Makaiau, Natural Resource Management Specialist, PIRO, SFD (preparer)
Phyllis Ha, NEPA Specialist, PIRO, SFD NEPA (reviewer)
Michelle McGregor, Regional Economist, PIRO, SFD (reviewer)

5.3 Agencies and Persons Consulted

The proposed action described in this EA was developed in coordination with various federal and local government agencies that are represented on the Western Pacific Fishery Management Council. Specifically, agencies that participated in the deliberations and development of the proposed management measures include:

- American Samoa Department of Marine and Wildlife Resources
- Coastal Zone Management Program of American Samoa
- Guam Department of Agriculture, Division of Aquatic and Wildlife Resources
- Coastal Zone Management Program of Guam
- Hawaii Department of Land and Natural Resources, Division of Aquatic Resources
- Coastal Zone Management Program of Hawaii
- Commonwealth of the Northern Marina Islands Department of Land and Natural
- Coastal Zone Management Program of the CNMI
- Resources, Division of Fish and Wildlife
- U.S. Coast Guard
- U.S. Fish and Wildlife Service
- U.S. Department of State

5.4 Public Coordination

The development of the proposed ACL and AM specifications for spiny lobster fisheries of American Samoa, Guam, the CNMI, and MHI took place in public meetings of the SSC and the Council. In addition, the Council advertised the need to focus on federal annual catch limits and accountability measures in media releases, newsletter articles, and on the Council's website, http://www.wpcouncil.org. Additionally, on July 21, 2015, NMFS published in the *Federal*

Register the proposed specification and solicited public comments on the action and on the draft EA (80 FR 4346). NMFS received one comment from a federal agency regarding ACLs at Wake Island. NMFS responded to this comment in the final rule.

5.5 Endangered Species Act

The Endangered Species Act (ESA) provides for the protection and conservation of threatened and endangered species. Section 7(a)(2) of the ESA requires federal agencies to ensure that any action authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species.

Pursuant to Section 7 of the ESA, NMFS has evaluated the crustacean fisheries managed under the FEPs, including spiny lobster fisheries for potential impacts on ESA-listed species under the jurisdiction of NMFS. Table 23 summarizes ESA section 7 consultations for these fisheries managed under the FEPs for American Samoa, the Marianas (including Guam and CNMI) and Hawaii.

Table 23. ESA section 7 consultations for western Pacific crustacean fisheries.

FEP Fishery	ESA Consultation	NMFS Determination
American Samoa Crustacean Fisheries (Deepwater shrimp, spiny lobster and Kona crab)	September 28, 2007, Letter of Concurrence	Not likely to adversely affect any ESA-listed species or critical habitat
	April 9, 2015, Letter of Concurrence	
CNMI Crustacean Fisheries (Deepwater shrimp, spiny lobster and Kona crab)	September 28, 2007, Letter of Concurrence	Not likely to adversely affect any ESA-listed species or critical habitat
	April 29, 2015, Letter of Concurrence	
Guam Crustacean Fisheries (Deepwater shrimp, spiny lobster and Kona crab)	September 28, 2007, Letter of Concurrence	Not likely to adversely affect any ESA-listed species or critical habitat
	April 29, 2015, Letter of Concurrence	
Hawaii Crustacean Fisheries (Deepwater shrimp, spiny lobster and Kona crab)	April 4, 2008, Letter of Concurrence	Not likely to adversely affect any ESA-listed species or critical habitat
	December 5, 2013, Letter of Concurrence	

Because the proposed action is not expected to modify vessel operations or other aspects of any spiny lobster fishery in the four areas, NMFS concludes that crustacean fisheries in American Samoa, Guam, CNMI, and Hawaii under the preferred proposed action alternatives would not have an adverse effect on ESA listed species or any designated critical habitats that was not considered in prior consultations, and that no further consultation is required at this time.

5.6 Marine Mammal Protection Act

The MMPA prohibits, with certain exceptions, taking of marine mammals in the U.S., and by persons aboard U.S. flagged vessels (i.e., persons and vessels subject to U.S. jurisdiction). Under section 118 of the MMPA, NMFS must publish, at least annually, a List of Fisheries (LOF) that classifies U.S. commercial fisheries into one of three categories based upon the level of serious injury and mortality of marine mammals that occurs incidental to each fishery. A Category 1 fishery is one with frequent incidental morality and serious injury of marine mammals. A Category 2 fishery is one with occasional incidental morality and serious injury of marine mammals. A Category 3 fishery is one with a remote likelihood or no known incidental morality and serious injury of marine mammals.

On December 29, 2014, (79 FR 77919), NMFS published the final LOF for 2014 which classified Hawaii spearfishing, Hawaii lobster diving, and Hawaii lobster trap fishery as a Category 3 fishery under Section 118 of the MMPA. Category 3 fisheries are not required to register with the MMAP in order to engage in commercial fishing. NMFS has not yet included the commercial spiny lobster fisheries of American Samoa, Guam, and CNMI in the annual List of Fisheries. However, because spiny lobsters in the these island areas are harvest by hand or by spear, it is reasonable to assume that the they would be comparable to the Hawaii spearfishing and Hawaii lobster diving fisheries, and would have a remote likelihood of incidental mortality and serious injury of marine mammals.

Because the proposed action would not modify vessel operations or other aspects of any spiny lobster fishery, spiny lobster fisheries in American Samoa, Guam, CNMI and the MHI, spiny lobster fisheries as conducted under the proposed action, are not expected to affect marine mammals in any manner not previously considered or authorized the commercial fishing take exemption under section 118 of the MMPA.

5.7 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) requires a determination that a recommended management measure has no effect on the land, water uses, or natural resources of the coastal zone or is consistent to the maximum extent practicable with an affected state's enforceable coastal zone management program. NMFS determined that the proposed specifications are consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management programs of American Samoa, Guam, the Northern Mariana Islands, and Hawaii. NMFS submitted this determination on June 1, 2015, for review by the appropriate agencies under section 307 of the CZMA.

5.8 National Historic Preservation Act

The National Historic Preservation Act (NHPA) requires federal agencies undergo a review process for all federally funded and permitted projects that will impact sites listed on, or eligible for listing on, the National Register of Historic Places. Currently, there are no known sites or historic properties in EEZ waters 3 to 200 nm offshore of American Samoa, Guam, the CNMI or the MHI that are listed on or eligible for listing on the National Register of Historic Places.

Although shipwrecks and other objects from the Pacific theatre in World War II could possibly occur in federal waters around the U.S. Pacific Islands, lobster fishing, which involve harvest by hand or by spear is not known to have a damaging impact on the marine environment, and the proposed action would not change the manner in which any lobster fishery is conducted. Therefore, the proposed action would have no potential to effect on sites protected by the NHPA.

5.9 Paperwork Reduction Act

The purpose of the Paperwork Reduction Act is to minimize the paperwork burden on the public resulting from the collection of information by or for the Federal government. It is intended to ensure the information collected under the proposed action is needed and is collected in an efficient manner (44 U.S.C. 3501(1)). The proposed action would not establish any new permitting or reporting requirements and therefore it is not subject to the provisions of the Paperwork Reduction Act.

5.10 Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) (5 U.S.C. 601 *et seq.*) requires government agencies to assess and present the impact of their regulatory actions on small entities including small businesses, small organizations, and small governmental jurisdictions. The assessment is done by preparing an Initial Regulatory Flexibility Analysis and Final Regulatory Flexibility Analysis (FRFA) for each proposed and final rule, respectively. Under the RFA, an agency does not need to conduct an IRFA or FRFA if a certification can be made that the proposed rule, if adopted, will not have a significant adverse economic impact on a substantial number of small entities.

On June 12, 2014, the Small Business Administration issued an interim final rule revising small business size standards, effective July 14, 2014 (79 FR 33647). The rule increased the size standard for finfish fishing from 19.0 to $20.5 million, shellfish fishing from $5.0 million to $5.5 million, and other marine fishing from $7.0 million to $7.5 million.

Based on available information presented in this EA, NMFS has determined that all vessels participating in the spiny lobster fisheries in American Samoa, Guam, the CNMI and the MHI are small entities under the Small Business Administration's definition of a small entity. That is, they are engaged in the business of fish harvesting, are independently owned or operated, are not dominant in their field of operation, and have annual gross receipts not in excess of $5.5million, the small business size standard for shellfish fishing.

Even though this proposed ACL and AM would apply to a substantial number of vessels, i.e., 100 percent of the fleet, if fishing were to occur in federal waters, NMFS does not expect the rule will have a significantly adverse economic impact to individual vessels. This is because there is no in-season AM to prevent the fishery from exceeding an ACL, such as a fishery closure. Therefore, fishermen would not be required to alter any aspect of their fishing operations. Additionally, the catch limit does not favor any fisherman or disproportionately adversely affect a certain type of participant. Therefore, there are no disproportionate economic impacts between large and small entities and the proposed action, if implemented, would not have a significant economic impact on small entities. Furthermore, there are no disproportionate

economic impacts among the universe of vessels based on gear, home port, or vessel length. NMFS may request that the Department of Commerce Chief Counsel for Regulation certify to the Small Business Administration that the proposed rule and specifications would not have a significant economic impact on a substantial number of small entities.

5.11 Administrative Procedure Act

All federal rulemaking is governed under the provisions of the Administrative Procedure Act (APA) (5 U.S.C. Subchapter II) which establishes a "notice and comment" procedure to enable public participation in the rulemaking process. Under the APA, NMFS is required to publish notification of proposed rules in the *Federal register* and to solicit, consider and respond to public comment on those rules before they are finalized. The APA also establishes a 30-day waiting period from the time a final rule is published until it becomes effective, with rare exceptions.

The specification of ACLs for spiny lobsters in American Samoa, Guam, the CNMI and Hawaii complies with the provisions of the APA. In developing the proposed ACL specifications and AM recommendations, the Council and the SSC held public meetings, provided opportunities for the public to give comments on the proposed methods, specifications and recommendations, and the Council considered comments from the public and membership. NMFS will publish in the *Federal register*, a proposed specification announcing the proposed ACL specifications and AMs described in this document. The proposed specification will include requests for public comments and inform the public of the availability of the EA and request comments on the EA. After considering public comments, NMFS will publish in the *Federal register* a final specification which will become effective 30 days after publication, unless there is good cause to waive the 30-day delay of effectiveness period.

5.12 Executive Order 12898 Environmental Justice

NMFS considered the effect of the proposed ACL specifications and AMs on Environmental Justice communities that include members of minority and low-income groups. The ACLs would apply to everyone that catches spiny lobsters in federal waters, and no new monitoring is required for the ACL specification or the AM to be implemented. The environmental review in this EA establishes that the proposed specifications of ACLs and provisions for post-season harvest reviews as the AMs in the western Pacific spiny lobster fisheries are not expected to result in a change to the way the fisheries are conducted.

The ACLs and AMs are intended to provide for long-term sustainability of spiny lobsters in American Samoa, Guam, the CNMI and Hawaii. Specification of the ACLs and post-season reviews are expected to benefit the target resources by providing annual review of the fishery performance and other information related to evaluating lobster stock status. This in turn, is expected to benefit fishery participants and fishing communities that rely on this resource for food, employment, recreation and enjoyment. The proposed specifications are not likely to result in a large adverse impact to the environment that could have disproportionately large or adverse effects on members of Environmental Justice communities in American Samoa, Guam, the CNMI, or Hawaii.

5.13 Executive Order 12866 Regulatory Impact Review

A "significant regulatory action" means any regulatory action that is likely to result in a rule that may –

1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal government or communities;
2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

The specification of ACLs and AMs for Pacific Island spiny lobster fisheries is exempt from the procedures of E.O. 12866 because this action contains no implementing regulations.

5.14 Information Quality Act

The Information Quality Act requires federal agencies to ensure and maximize the quality, objectivity, utility, and integrity of information disseminated by federal agencies. To the extent feasible, the information in this document is current. Much of the information was made available to the public during the deliberative phases of developing the proposed specifications during meetings of the Council and its SSC. The information was also improved based on the guidance and comments from the Council's advisory groups.

NMFS staffs prepared the documents based on information provided to the Council by NMFS Pacific Islands Fisheries Science Center (PIFSC) and NMFS Pacific Islands Regional Office (PIRO) and after providing opportunities for members of the public to comment at Council meetings. Additionally, this EA will be made available to the public during the comment period for the proposed specification. The process of public review of this document provides an opportunity for comments on the information contained in this document, as well as for the provision of additional information regarding the proposed specifications and potential environmental effects.

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Appendix A Western Pacific Crustacean Management Unit Species

American Samoa Spiny Lobster Management Unit Species

Scientific Name	English Common Name	Local Name
Panulirus marginatus	spiny lobster	ula
Panulirus penicillatus	spiny lobster	ula-sami

Mariana Spiny Lobster Management Unit Species (CNMI and Guam)

Scientific Name	English Common Name	Local Name (Chamorro/Carolinian)
Panulirus penicillatus	spiny lobster	Mahongang

Hawaii Spiny Lobster Management Unit Species

Scientific Name	English Common Name	Local Name
Panulirus marginatus	spiny lobster	ula
Panulirus penicillatus	spiny lobster	ula

Appendix B Results of the Biomass Augmented Catch-MSY model

Tables B1-B4 below summarize the maximum sustainable yield (MSY) estimates and risk of overfishing percentages for spiny lobsters presented in Appendix 2 in Sabater and Kleiber (2014). Risk projections are presented in 5 percent increments. In accordance with National Standard 1 guidelines of the Magnuson-Stevens Act, the probability of overfishing cannot exceed 50 percent and should be a lower value (74 FR 3178, January 9, 2011).

Table B1. American Samoa Spiny Lobster (k-revise method B results)

MSY Estimate: 7,300 lb	
Risk of overfishing (%)	**Corresponding Catch (lb)**
50%	7,100
45%	6,400
40%	5,900
35%	5,300
30%	4,700
25%	4,300
20%	3,800
15%	3,300
10%	2,800
5%	2,300

Table B2. CNMI Spiny Lobster (k-revise method B results)

MSY Estimate: 9,600 lb	
Risk of overfishing (%)	**Corresponding Catch (lb)**
50%	9,20,,
45%	8,700
40%	8,300
35%	7,800
30%	7,400
25%	7,100
20%	6,700
15%	6,400
10%	6,100
5%	5,700

Table B3. Guam Spiny Lobster (k-revise method B results)

MSY Estimate: 4,600 lb	
Risk of overfishing (%)	**Corresponding Catch (lb)**
50%	4,300
45%	4,000
40%	3,600
35%	3,300
30%	3,000
25%	2,700
20%	2,500
15%	2,200
10%	2,000
5%	1,700

Table B4. Main Hawaiian Islands Spiny Lobster (k-revise method B results)

MSY Estimate: 20,400 lb	
Risk of overfishing (%)	**Corresponding Catch (lb)**
50%	19,200
45%	18,100
40%	17,200
35%	16,500
30%	15,800
25%	15,000
20%	14,300
15%	13,500
10%	12,600
5%	11,700

Appendix C Report of the P* Working Group

WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

P* Working Group Meeting

December 11-12, 2013
1:00 pm – 5:00 pm
Council Conference Room
WPRFMC Office

Day 1
Present On Site: Dr. Pierre Kleiber (ret. NMFS PIFSC), Dr. Bob Humphreys (NMFS PIFSC), Mr. Ed Watamura (Advisory Panel Chair), Mr. Roy Morioka (H-FACT), Mr. Ed Ebisui (Council member, Program Planning Chair), Marlowe Sabater (WPRFMC), Dr. Bob Skillman (ret. NMFS PIFSC), Paul Dalzell (WPRFMC)

On the Conference Line: Dr. Erik Franklin (UH HIMB), Dr. Domingo Ochavillo (DMWR, AS), Dr. Todd Miller (DFW, CNMI), Michael Tenorio (DFW, CNMI), Mr. Jarad Makaiau (NMFS – PIRO)

Day 2
Present On Site: Dr. Pierre Kleiber (ret. NMFS PIFSC), Dr. Bob Humphreys (NMFS PIFSC), Mr. Ed Watamura (Advisory Panel Chair), Mr. Roy Morioka (H-FACT), Mr. Ed Ebisui (Council member, Program Planning Chair), Marlowe Sabater (WPRFMC), Paul Dalzell (WPRFMC), Dr. Erik Franklin (UH HIMB), Gerard DiNardo (NMFS PIFSC), Lennon Thomas (NMFS PIFSC)

On the Conference Line: Dr. Domingo Ochavillo (DMWR, AS), Mr. Jarad Makaiau (NMFS – PIRO)

REPORT

Introductions

Mr. Edwin Ebisui chaired the third meeting of the P* Working Group. In attendance were Robert Skillman, Pierre Kleiber, Robert Humphreys, Ed Watamura, Roy Morioka, Jarad Makaiau, Erik Franklin, Domingo Ochavillo, Todd Miller and Michael Tenorio. Marlowe Sabater and Paul Dalzell provided technical and administrative support.

Recommendations from the SSC

Council staff presented on the summary of the recommendations by the Scientific and Statistical Committee from its 114th meeting. The recommendation focuses on the endorsement of the Martell, Froese and Kleiber (MFK) model for management purposes and directed staff to finalize the MSY estimates for P* analysis. In addition, the SSC recommended to reconvene the P* WG and finalize the criteria to determine the appropriate level of risk and associated acceptable biological catch for the fishing year 2015. The SSC also suggested applying the MFK model to fully assessed Tier 1 stocks (e.g., bottomfish) in order to gauge the MFK model's accuracy. Council staff reminded the working group members that it is critical to finalize the P* score in this meeting in order to meet the timeline needed to complete the specification package to utilize the new ABCs for fishing year 2015.

Review of the previous P* WG Meeting
Council staff summarized the accomplishments of the P* WG from the 2 previous meetings, held May 28-29, 2013 and June 12, 2013, respectively. Staff also presented on the action items of the WG from the second meeting and how those action items were addressed. The actions included: 1) Covert the PSA scores from Thomas (2013) to the same scale as what is used in the Productivity-Susceptibility Dimension of the P* Analysis. The converted values were included in the briefing materials (Document 7.0). This would serve as a proxy for the Guam P-S exercise; 2) Finish/refine the P* criteria particularly the scientific information and the stock status. The scientific information was revisited and the approach aspect elements were re-evaluated for changes; 3) Follow-up with SSC members on their P-S scores. All of the P* WG members assigned to provide P-S scores had submitted their scores and was included in the briefing materials; and 4) Finalize the technical paper. The technical paper was included in the briefing materials as the final draft.

Review of the biomass-augmented catch-MSY model
Dr. Pierre Kleiber presented on the results of the comparative analysis suggested by the SSC to determine accuracy of the MSY results from the augmented catch-MSY model. MSY estimates from the MFK model were compared to MSY estimates from two PIFSC bottomfish stock assessments, the 2011 MHI Deep 7 bottomfish stock assessment and the 2012 bottomfish stock assessment for American Samoa, Guam and the CNMI. In two instances, the results of the augmented catch-MSY model were more conservative than the stock assessment results. Specifically, the results for American Samoa showed more conservative results where the augmented catch-MSY model estimated MSY at 51,000 lbs and the stock assessment estimated MSY at 76,000 lbs. Similarly, the results for CNMI from the catch-MSY approach are less than half of the results of the stock assessment (catch-MSY = 100,000 lbs and stock assessment = 173,000 lbs).

For Guam bottomfish and MHI Deep 7 bottomfish, the augmented catch-MSY approach provided less conservative estimates of MSY. Specifically, for Guam bottomfish, the augmented catch-MSY model estimated an MSY of 60,000 lbs while the stock assessment estimated and MSY of 56,000 lbs. For all comparative analysis, the biomass estimates are incorporated to simulate what was done with the augmented catch MSY approach. However, there is some circularity in the approach because the biomass estimates used in the augmented catch-MSY approach came from the biomass generated by the stock assessment. Similarly for MHI Deep 7 bottomfish, the augmented catch-MSY model resulted in MSY estimates that are higher than the MSY estimated in the PIFSC 2011 stock assessment. The data used for the augmented catch-MSY analysis was catch scenario 2/CPUE scenario 1 where the unreported non-commercial landing was assumed to be 1:1 to the reported commercial landing. The resulting MSY estimate for the catch-MSY approach was 1,548,000 lbs whereas the resulting MSY from the stock assessment (using CPUE scenario 1) was 848,000 lbs which is 45% lower that the catch-MSY result. It was hoped that the estimates be more close to each other.

The discrepancy in the Hawaii results may be due to how the augmented catch-MSY model responds to assumptions in stock exploitation relative to stock biomass. Bottomfish fisheries in the territories (with perhaps the exception of Guam) have high biomass and low fishing mortality. However Hawaii has higher fishing mortality and therefore higher population turnover

per time step. Too much turnover per time step can cause the underlying population model in the catch-MSY approach to be erratic. This is not a problem inherent in the Schaefer model but rather a problem in way it is currently coded in the catch-MSY software. This could be fixed, though perhaps at the expense of longer running times for the model.

The data also for Hawaii goes all the way back to 1948. Simulation run was also conducted to test for effect of the long catch time series by truncating to the most catch data since 1970. The results were almost the same. Also checked was the r-k density plot to see if there is anything wrong, but the plot does not provide any indication that there is something wrong in the *r-k* algorithm.

The Hawaii data seemed to be anomalous in more than one case. The Chair liked the idea that the model is generating conservative results for data poor stocks. However, in the case for stocks that are exploited there must be some ancillary factors affecting the results that need to be accounted for.

Review and changes to the P* Dimensions and Criteria
Council staff presented the different dimensions of the P* analysis and the criteria under each dimension as revised by the P* WG members from the last 2 meetings. The WG members reviewed the preliminary scores of the Model Information and Uncertainty Characterization Dimensions. The WG members retained the preliminary scores and deemed it applicable for the current methods under Tier 3.

For the Model Information Dimension, the WG deemed the MFK model falls somewhere between 2 and 4 since it aspects captured within this range.

Model Information Description	Score
Highly quantitative probabilistic approach that provides estimates of depletion and biomass status; includes MSY benchmarks; model input parameters include fishery dependent and independent information with limited assumptions	0.0
Quantitative probabilistic approach that provides estimates of depletion and biomass status; includes MSY benchmarks; model input parameters include at least fishery dependent or fishery independent information with additional assumptions;	2.0
Quantitative assessment non-probabilistic approach utilizing bulk estimators providing measures of exploitation or B, proxy reference points, includes MSY benchmarks; some sources of mortality accounted for	4.0
Semi quantitative assessment; utilizes estimators that generate relative measures of exploitation or B, proxy reference points, no MSY benchmarks, absolute measures of stock unavailable	6.0
No benchmark values, but reliable catch history	8.0
Bad. No benchmark values, and scarce or unreliable catch records	10.0

In order to determine exactly where, the WG scored the approach aspect. The scores are as follows:

Approach Aspects (AAs)	Score
Reliable catch history	0
Measure of depletion	1
Species-specific data	1
All sources of mortality accounted for (z)	0.5
Fishery independent information	0.5
Probability distribution available (output)	0
Population/biological parameters (r or k etc.)	0.5
SUM	**3.5**

Using the scaling equivalency table, the score of 3.5 has a scaled equivalent of 3.0.

AAs Score	Scaled equivalent	AAs Score	Scaled equivalent
0.5	2.1	4	3.1
1	2.3	4.5	3.3
1.5	2.4	5	3.4
2	2.6	5.5	3.6
2.5	2.7	6	3.7
3	2.9	6.5	3.9
3.5	3.0	7	4.0

Hence for the **Model Information Dimension the score is 3.0.**

The Uncertainty Characterization Dimension had not been revised since this dimension is applicable for a Tier 1 to Tier 3 stock. The WG maintained the **score of 5** for this model-based approach under this Tier. The group scored this dimension as 5.0 since uncertainties can be adjusted by controlling for the range of r and k as well as the process error of the Schaefer Model (see P* WG second meeting report). By process of elimination it cannot be scored as 7.5 because there is an estimate of MSY and probability distribution around that MSY.

The table for this Dimension is shown below:

Uncertainty Characterization Description	Score
Complete. Key determinant – uncertainty in both assessment inputs and environmental conditions included	0.0
High. Key determinant – reflects more than just uncertainty in future recruitment	2.5
Medium. Uncertainties are addressed via statistical techniques and sensitivities, but full uncertainty is not carried forward in projections	**5.0**
Low. Distributions of Fmsy and MSY are lacking	7.5
None. Only single point estimates; no sensitivities or uncertainty evaluations	10.0

Fishing Level Scoring Session

This model approach provides an estimate of relative sustainable harvest level and has limited information on the stock status. Hence the third dimension had been revised to provide insight of F/F_{MSY} and not B/B_{MSY}. Council staff presented a summary of the Fishing Level Table (Document 4.0) and explained how the values were derived. Each of the families with MSY estimates were scored based on the criteria constructed by the P* Working Group at its second meeting. The summary of the scoring criteria is shown in the table below. A logical argument in Excel was crafted following the criteria designed by the WG members. In order to determine the final scores for each family, the WG was asked to define and determine 2 parameters:

1) Define catch – would the catch be defined as the point estimate of the most recent year in the time series; or an average of 3 years; or an average of 5 years
2) Determine MSY based on 2 different method in defining the r and k range – here termed as k-revise method A and k-revise method B

Description	Fishing level	Score
Lightly harvested	Catch << 1/3MSY	0.0
Moderately harvested	Catch < MSY	2.5
Fully harvested	Catch ≈ MSY	5.0
Over harvested	Catch > MSY	7.5
Severely Over harvested	Catch > 2x+MSY	10.0

Rationale for using 3 year average:

The WG members defined catch as average catch over a three year period. Using an average of a recent segment of the catch time series addresses short term fluctuation in catches brought about by variability in productivity and fishery dynamics. A three year average allows us to see trends that are occurring recently and is reasonable time frame for management to be reactive to recent changes in the fishery. This also balances random fluctuation in catch as opposed to real stock change which can then be used as point estimate for comparison with MSY reference points.

Rationale for using k-revise method B:

The catch-MSY method examines 30,000 randomly chosen points in a window in r-k space. Each point corresponds to a pair of r and k values. Plausible r-k pairs are identified if a Schaefer model run with those parameter values can generate a biomass time series that accommodates the catch time series as well as any measured values of biomass and satisfies other criteria such as biomass not going below zero or not exceeding k. The plausibility density in r-k space is interpreted as a probability density from which r, k, and hence MSY can be estimated where

$$MSY=rk/4. \quad (1)$$

At the outset the window in r-k space is determined by ranges of r and k assumed to contain the true values of r and k. These ranges are purposely wide -- perhaps orders of magnitude (particularly for k) -- to minimize the possibility that the true value of either r or k is outside the window. To focus into a region of high density, another set of 30,000 points is then examined

from a revised window and MSY estimated. The revised ranges are calculated based on the outcome from the first window.

There are two methods for calculating the revised range for k, method A and method B, and Figures 1 and 2 show plausibility density for method A and B respectively. The dashed lines in the density plots indicate the locus of points corresponding to a constant value for MSY determined by equation (1) above with r and k estimated from the plausible r-k pairs. Ideally the density plots should show a high density ridge with density sloping off on either side and the MSY line associated with that ridge. Good examples are in the sigma-a plot in Figure 1 and most of the plots in Figure 2. Some of the plots in Figure 1 indicate that the final window in r-k space was missing the highest density ridge, being located too far below/left (e.g. caran-a) or too far above/right (e.g. holo-a). The scattering of holes in the density plots is another indication that the window was not well located, and the near verticality of the MSY lines in several plots indicates that the range in k values was too narrow and badly located. Mis-located windows are also indicated in truncated density distributions of MSY from method A (Figure 3).

Because k-revise method B was more consistent in finding a good k range, the WG members determined that MSY estimates generated from the k-revise method B is preferred over k-revise method A. However, it was suggested that determination of ranges for r and particularly for k might be improved with a more flexible and perhaps interactive method for final placement of the window in r-k space.

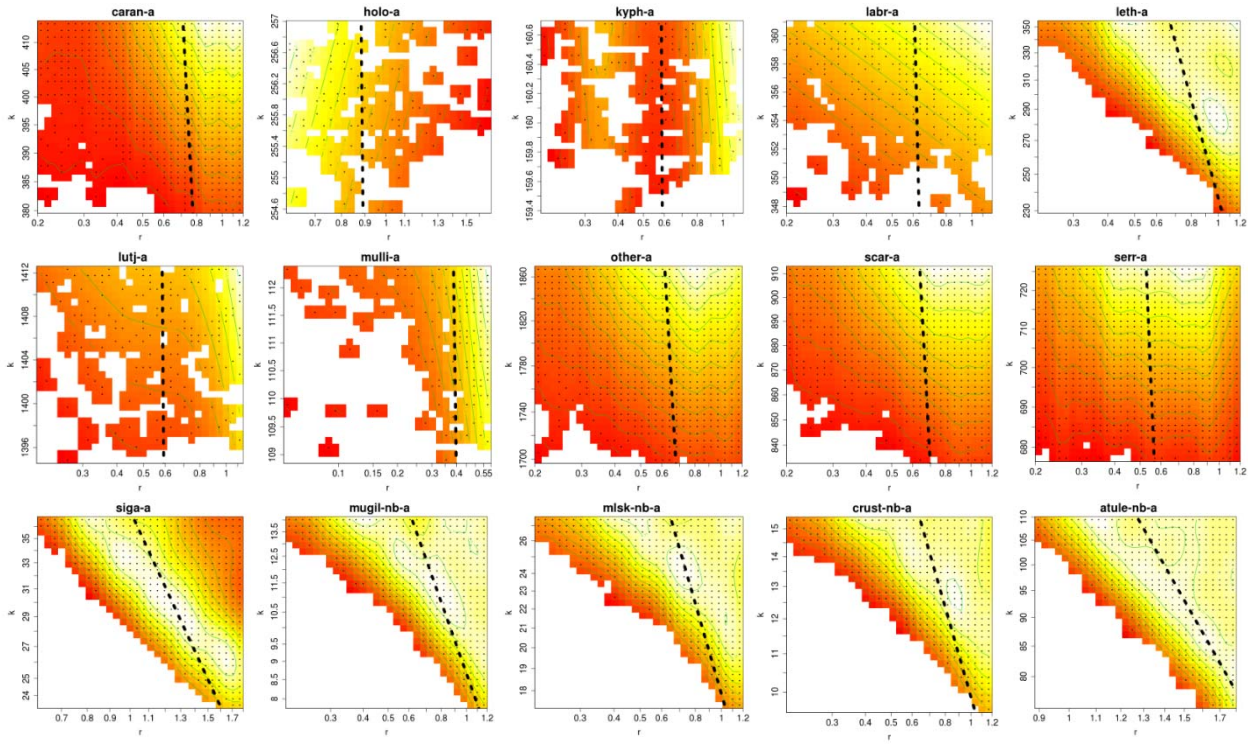

Figure 1. Density of plausible r-k combinations for the different families of reef fish and reef associated organisms using k-revise method A. Dashed lines show the locus of points corresponding to the estimated MSY.

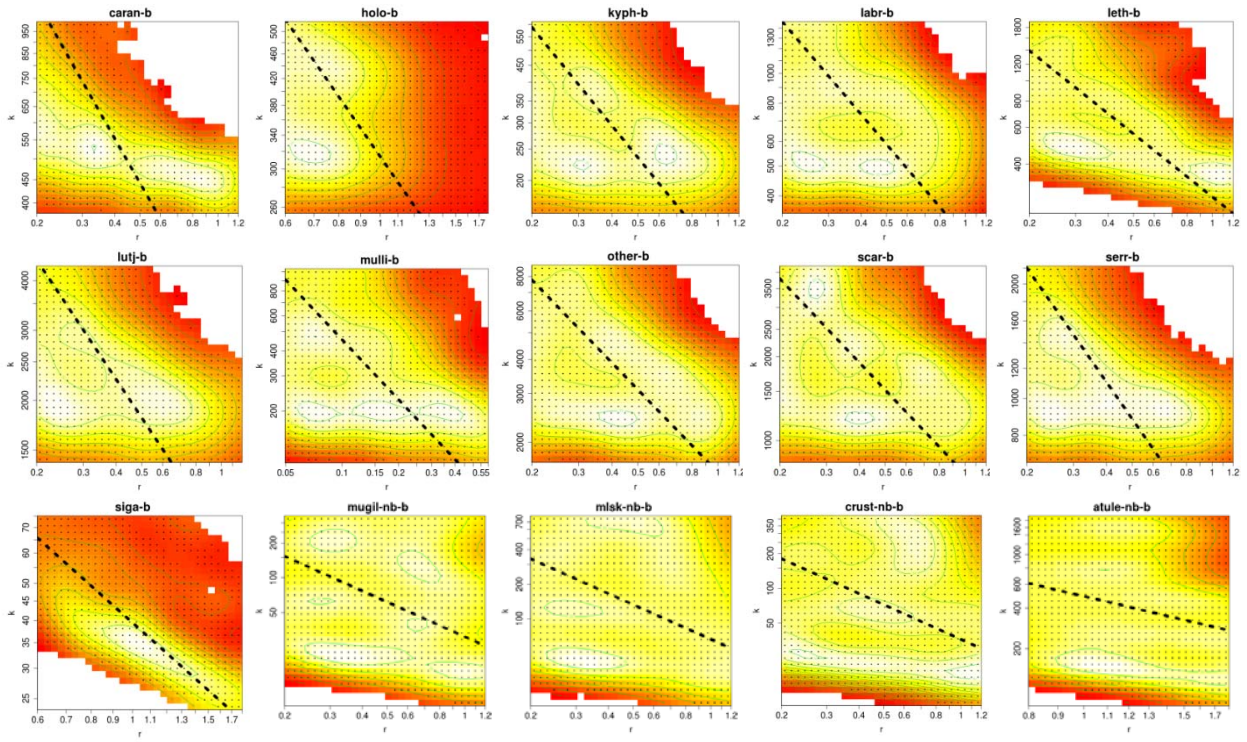

Figure 2. Density of plausible r-k combinations in r-k space for the different families of reef fish and reef associated organisms using k-revise method B. Dashed lines show the locus of points corresponding to the estimated MSY.

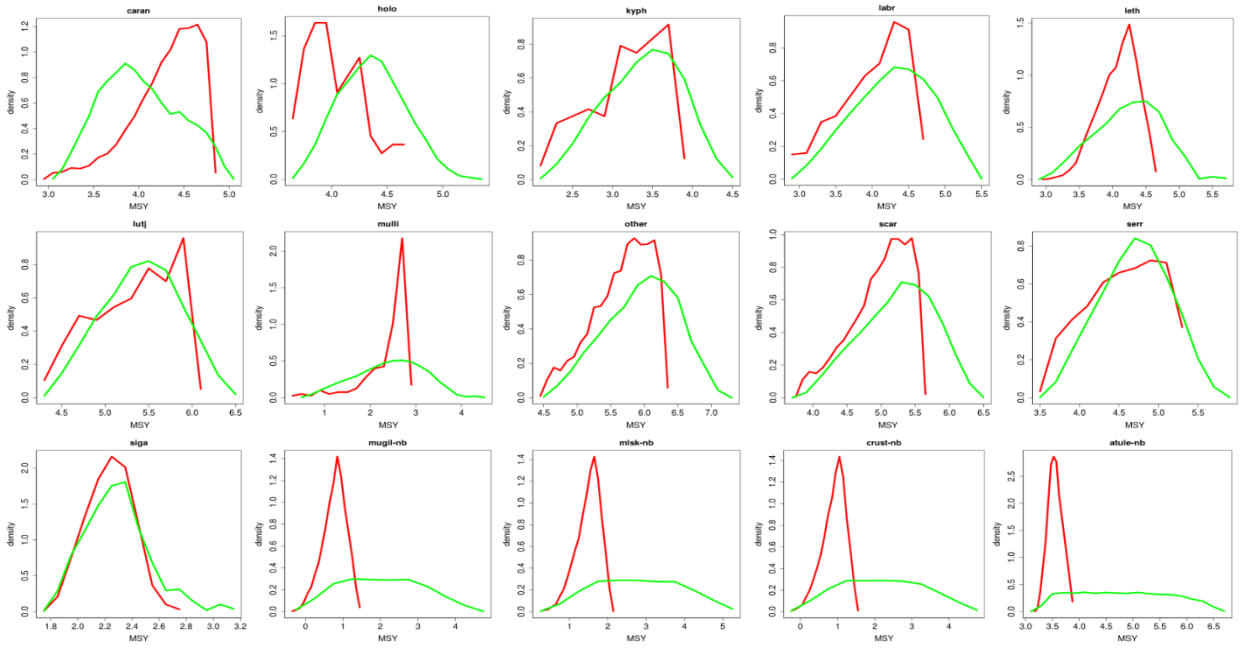

Figure 3. Density distributions of MSY values estimated by k-revise method A (red) and method B (green).

Productivity and Susceptibility Scoring Session
P* Working Group Members were requested to provide a score on the productivity and susceptibility for species that dominates the catch under each of their respective family grouping. When multiple species are scored under each family, the scores were averaged across species to represent the final score.

Productivity and Susceptibility Description	Score
Low risk. High productivity, susceptibility low.	0.0
Low/Medium	2.5
Medium risk. Moderate productivity, and susceptibility	**5.0**
Medium/High	7.5
High risk. Low productivity, high susceptibility	10

Hawaii – Bob Humphreys presented a summary of the Productivity Susceptibility scores (in collaboration with Ed DeMartini) for the coral reef MUS for Hawaii. The scores were given for species that make up the 90% of the coral reef catch. The productivity scores were based on the life history characteristics (e.g. age and growth, longevity, L_{inf} etc.) available from local studies or from the literature. Susceptibility scores were based on the type of fishery it was harvested as well as proximity of the habitat to human presence. If there is no information then a default risk score of 5 is assigned. Details of the PS scores are found in Appendix 1.

Guam – Lennon Thomas presented on the Productivity Susceptibility Analysis for the Guam coral reef MUS. The analysis utilized the expanded creel survey data and focused on 33 species that comprised more than 50% of the catch (Thomas 2013). These species represents the families of reef fishes that have ACLs. Six life history attributes were used to evaluate productivity: 1) Maximum age; 2) Maximum size; 3) Age at maturity; 4) Von Bertalanffy growth coefficient; 5) Natural mortality; and 6) Trophic level; were used to evaluate productivity. On the other hand, the four attributes used to evaluate susceptibility were: 1) Fishery value; 2) Vertical range; 3) Geographic distribution; and 4) Behavior and relationship to catchability; were used to evaluate susceptibility. All attributes were scored on a range of 1 to 3 where 1 is low, 2 is moderate, and 3 is high. The vulnerability of each species was then calculated which is the Euclidean distance from the *xy* orgin of a scatterplot. However, for the purposes of the P* analysis, only the final scores for the productivity and susceptibility were used. The final productivity and susceptibility scores were rescaled to the 0-10 scale of the P* PSA with 2.5 increments. The conversion table is shown below.

DESCRIPTION	PSA_scale	P_scale	S_scale
LOW	1	10	0
	1.1	9.5	0.5
	1.2	9	1
	1.3	8.5	1.5
	1.4	8	2
	1.5	7.5	2.5

DESCRIPTION	PSA_scale	P_scale	S_scale
	1.6	7	3
	1.7	6.5	3.5
	1.8	6	4
	1.9	5.5	4.5
MODERATE	2	5	5
	2.1	4.5	5.5
	2.2	4	6
	2.3	3.5	6.5
	2.4	3	7
	2.5	2.5	7.5
	2.6	2	8
	2.7	1.5	8.5
	2.8	1	9
	2.9	0.5	9.5
HIGH	3	0	10

To ensure compatibility with the study results, the converted scores for the P* PSA and the vulnerability scores were compared. Details of the PS scores are found in Appendix 2.

CNMI – Todd Miller presented on the summary of the Productivity Susceptibility scores (in collaboration with Michael Tenorio, Sean MacDuff and John Gourley) for the coral reef MUS for CNMI. The basis for the scoring was from its commonness or predominance in the underwater census surveys, creel survey, market survey and BioSampling program. For the productivity scores this was based on the frequency of sighting in the underwater surveys. The susceptibility scores were based on whether the species are targeted and its commonality in the commercial and non-commercial landing. Details of the PS scores are found in Appendix 3

American Samoa – Domingo Ochavillo presented the summary of the Productivity Susceptibility scores for the coral reef MUS for American Samoa. The scoring was based on the available life history characteristics for the productivity criteria. Scoring for the susceptibility was based on dominance in the coral reef fish catch. Details of the PS scores are found in Appendix 4.

P* for the Western Pacific Coral Reef Management Unit Species

Summing all the dimension scores yields the total uncertainties and when deducted from the 50% risk of overfishing will result in the P*. If accepted by the SSC, the level of catch associated with P* as provided in Sabater and Kleiber (2013) will correspond to the acceptable biological catch. Since the P* values in Sabater and Kleiber (2013) are presented in 5% increment, the SSC may consider rounding P* values up or down depending on the scores proximity to the incremental value.

Table 1. Summary of the dimension scores and the resulting P* for the Hawaii management unit species with ACLs for fishing year 2015.

Hawaii Grouping	**M.I.**	**U.C**	**S.S**	**P.S**	**∑**	**P***
Acanthuridae – surgeonfish	3	5	0	5.8	13.8	36.2
Atule - *Selar crumenophthalmus*	3	5	2.5	2.5	13.0	37.0
Carangidae – jacks	3	5	0	2.5	10.5	39.5
Carharhinidae – reef sharks	3	5				
Crustaceans – crabs	3	5	5	5	18.0	32.0
Holocentridae – squirrelfish	3	5	2.5	6.3	16.8	33.3
Kyphosidae - rudderfish	3	5	0	5	13.0	37.0
Labridae - wrasses	3	5	0	5	13.0	37.0
Lethrinidae - emperors	3	5	0	5	13.0	37.0
Lutjanidae – snappers	3	5	0	1.2	9.2	40.8
Mollusks – turbo snails; octopus	3	5	5	5	18.0	32.0
Mugilidae – mullets	3	5	2.5	6.6	17.1	32.9
Mullidae – goatfish	3	5	2.5	5.6	16.1	33.9
Opelu - *Decapterus macarellus*	3	5	2.5	5	15.5	34.5
Other CREMUS	3	5	0	6	14.0	36.0
Scaridae – parrotfish	3	5	0	7.5	15.5	34.5
Serranidae - groupers	3	5	0	0	8.0	42.0
Spiny lobster	3	5	0	5	13.0	37.0

Table 2. Summary of the dimension scores and the resulting P* and associated ABCs for the Guam management unit species with ACLs for fishing year 2015.

Guam Grouping	**M.I.**	**U.C**	**S.S**	**P.S**	**∑**	**P***
Acanthuridae – surgeonfish	3	5	2.5	3.9	14.4	35.6
Algae	3	5	0	5	13	37
Selar crumenophthalmus	3	5	7.5	4.3	19.8	30.2
Carangidae – jacks	3	5	5	5.7	18.7	31.3
Carcharhinidae – reef sharks	3	5				
Crustaceans – crabs	3	5	0	5	13	37
Holocentridae – squirrelfish	3	5	0	4.8	12.8	37.2
Kyphosidae – rudderfish	3	5	2.5	5.6	16.1	33.9
Labridae – wrasses	3	5	0	7.5	15.5	34.5
Lethrinidae – emperors	3	5	0	6.3	14.3	35.7
Lutjanidae – snappers	3	5	0	7.4	15.4	34.6
Mollusks – turbo snail; octopus	3	5	0	5	13	37
Mugilidae – mullets	3	5	0	5.8	13.8	36.2
Mullidae – goatfish	3	5	0	3.8	11.8	38.2

Other CREMUS	3	5	0	5	13	37
Scaridae – parrotfish	3	5	2.5	5.8	16.3	33.7
Serranidae – groupers	3	5	0	6.7	14.7	35.3
Siganidae – rabbitfish	3	5	0	4.1	12.1	37.9
Spiny lobster	3	5	0	5	13	37

Table 3. Summary of the dimension scores and the resulting P* and associated ABCs for the CNMI management unit species with ACLs for fishing year 2015.

CNMI Grouping	**M.I.**	**U.C**	**S.S**	**P.S**	**∑**	**P***
Acanthuridae – surgeonfish	3	5	0	4.3	12.3	37.7
Selar crumenophthalmus	3	5	0	2.5	10.5	39.5
Carangidae – jacks	3	5	0	4.2	12.2	37.8
Crustaceans-crab	3	5	0	5	13	37
Holocentridae - squirrelfish	3	5	0	4.8	12.8	37
Kyphosidae – rudderfish	3	5	0	5.6	13.6	36
Labridae – wrasses	3	5	0	7.5	15.5	35
Lethrinidae – emperors	3	5	2.5	4.9	15.4	34.6
Lutjanidae – snappers	3	5	0	3.2	11.2	38.8
Mollusks – turbo snail; octopus	3	5	0	3.2	11.2	38.8
Mugilidae – mullets	3	5	0	4	12	38
Mullidae – goatfish	3	5	0	4	12	38
Other CREMUS	3	5	0	4.8	12.8	37.2
Scaridae – parrotfish	3	5	0	6	14	36
Serranidae – groupers	3	5	0	5.3	13.3	36.7
Siganidae – rabbitfish	3	5	2.5	4	14.5	35.5
Spiny lobster	3	5	0	5	13	37

Table 4. Summary of the dimension scores and the resulting P* and associated ABCs for the American Samoa management unit species with ACLs for fishing year 2015.

American Samoa Grouping	**M.I.**	**U.C**	**S.S**	**P.S**	**∑**	**P***
Acanthuridae – surgeonfish	3	5	0	3.3	11.3	38.7
Selar crumenophthalmus	3	5	0	2.5	10.5	39.5
Carangidae – jacks	3	5	0	5	13	37
Carcharhinidae – reef sharks	3	5				
Crustaceans – crabs	3	5	5	6.3	19.3	30.8
Holocentridae – squirrelfish	3	5	0	6.3	14.3	35.8
Lethrinidae – emperors	3	5	0	5	13	37
Lutjanidae – snappers	3	5	0	7.5	15.5	34.5
Mollusks – turbo snail; octopus	3	5	0	7.5	15.5	34.5

Mugilidae – mullets	3	5	0	5	13	37
Kyphosidae – rudderfish	3	5	0	5	13	37
Labridae – wrasses	3	5	0	5	13	37
Mullidae – goatfish	3	5	0	5	13	37
Siganidae – rabbitfish	3	5	0	2.5	10.5	39.5
Other CREMUS	3	5	0	5	13	37
Scaridae – parrotfish	3	5	0	5	13	37
Serranidae – groupers	3	5	0	3.8	11.8	38.3
Spiny lobster	3	5	0	5	13	37

Rationale for the species grouping
In the initial 2012 ACL specifications, the different coral reef management unit species were grouped by family and ACLs were specified only for groups that comprised 90% of the total catch. This was done to reduce the number of species that would require ACLs as well as include all families that are harvested in large amounts in the fishery. The rest of the families were grouped as the bottom 10% of the catch and assumed not to be significant in terms of total landings.

The data used in the initial 2012 ACL specification was all available catch data up to 2008 for the territories and through 2009 for Hawaii. In the re-analysis of the data to be used in the model based approach, the data was updated to include all available catch through 2012. Catch data for the Territories was from the creel surveys (proxy for total catch to include shore-based and boat-based catch with varying levels of non-commercial catches from multiple gear) and dealer reports (commercial catch). The Hawaii data was only from commercial catch reports filed by fishermen with Commercial Marine Licenses. Non-commercial catch was not included. In the process of identifying the top 90%, the results yield a different grouping compared to the initial specification. This has legal ramifications because the National Standard 1 requires stocks subject to ACL specification be identified. This should be a static list to ensure consistent monitoring of each group over time. Process-wise this will result in the re-calculation of the top 90% every time new data is available otherwise it is not utilizing the best scientific information available. Shifting species groups that require ACLs is hard to monitor and will result in inconsistencies in the specification that ultimately will confuse the stakeholders. The species groupings that result from incorporating data through 2012 are the groups being monitored by the Archipelagic Plan Team and described in the Council annual reports. By using these fixed groupings into the future, it will enable consistent monitoring of catches and groups that would require ACLs should new data become available.

Rationale for the P* values
The assumption behind the tiered system approach is that the scientific uncertainties increase from a data-rich tier (e.g. Tier 1) to a catch-only tier (e.g. Tier 5). So in situations where less information is available regarding stock status as well as the fishery that harvests the stock, a larger buffer is needed to ensure that the stock is not going to be subject to overfishing or being overfished. This follows the precautionary principle in data poor situations. In the case for most of the Western Pacific stocks (e.g. coral reefs) where the current ACLs are based on catch-only information, the uncertainties were reduced when the augmented catch-MSY approach was used

to estimate MSY. Incorporating biomass from underwater census surveys into the model and some information regarding resilience and assumptions on carrying capacity enabled the Council to enhance the ACL specification from the catch-only approach. The critical factor is the biomass because this parameter is commonly estimated by using CPUE as a proxy in most surplus production models, yet these approaches are treated as a Tier 1.

Determining the appropriate level of scientific risk varies between regions. Other Regional Fishery Management Councils had specified either default P* values for each tier and a range of P* with a P*max. Currently, the omnibus amendment does not prescribe a range of P* values for each tier. Each tier is comprised of varying level of scientific information and model reliability. Tier 3 utilizes model based approaches where the uncertainty of OFL (in this case probability distribution around MSY as a proxy for OFL) can be estimated using Monte-Carlo simulation. The criteria for Tier 3 P* analysis was tweaked from the Tier 1 P* analysis applied to western Pacific bottomfish recognizing that the Tier 3 approach is not a real model based stock assessment. The model and scientific information are based on the merits and demerits of parameters and information that fits the Tier 3 methods. Hence a direct comparison between a Tier 1 P* score and a Tier 3 P* score is not feasible. Although intuitively based on the Tiered approach principle, the P* scores in Tier 3 should not exceed or be equal to the Tier 1 P* score. However, in this case, they do. Specifically, P* values for Hawaii CREMUS ranged from 32-42%. Species groups that exceeded or equaled the Tier 1 MHI Deep 7 Bottomfish (P*=40.8) were the families Lutjanidae and Serranidae from Hawaii at 40.8 and 42, respectively. These families are comprised of taape (*Lutjanus kasmira*) and roi (*Cephalopholis argus*) which are non-native species in Hawaii and considered invasive. There are some eradication efforts being conducted (on roi) by local fishing clubs to maintain ecological balance hence limiting catches for these species is not a priority for the Council.

The P* values for MUS groupings from all other jurisdiction falls generally below the P* values for the Tier 1 Territory Bottomfish (American Samoa 41%; Guam 40%; CNMI 39%). The stocks we analyzed and the Territory bottomfish stocks (majority of which are considered reef fish as well) both showed similar characteristics in which biomass levels are high relative to what is currently being harvested. Based on Tables 1-4 above, the P* range for CREMUS in each island area should be follows:

American Samoa - 30.8-39.5%
Guam – 30.2-37.9%
CNMI – 34.6-39.42%
Hawaii – 32-42%

A more detail comparison between the dimensions in the Tier 1 and the Tier 3 accounted for the scientific uncertainties by using a Tier 3 approach. Table 5 shows the comparative scores between assessments versus the augmented catch-MSY approach

Table 5. Comparative analysis of the dimension scores between Tier 1 and Tier 3.

Model	Tier level	D1 score	D2 score	D3 score	D4 score
MHI Deep 7 Bottomfish	1	1.3	0	3	4.9
Am. Samoa shallow/deep BF	1	1.6	5.0	0	1.95
Guam shallow/deep BF	1	1.6	5.0	0	4.45
CNMI shallow/deep BF	1	1.6	5.0	0	4.61
Biomass augmented catch_MSY	3	3.0	5.0	0-7.5	0-7.5

The tier 3 had higher reduced scores for dimension 1 (assessment information) accounting for the lower quality and less quantity of scientific information utilized in the augmented catch-MSY approach. For dimension 2 (uncertainty characterization), the augmented catch-MSY score is similar to the Territory Bottomfish. The territory bottomfish assessment and the augmented catch-MSY approach had uncertainties around the OFL estimates via the probability distribution around the MSY estimate. These uncertainties were not carried forward to future projections for the augmented catch-MSY approach but were accounted for in the Territory bottomfish assessment. In hindsight, the Territory bottomfish assessment should have been scored with a 2.5 instead of 5.

Hawaii Non-Deep 7 Bottomfish

The previous ACL specification of the Hawaii non-deep 7 bottomfish was based on a model result averaging between: 1) the analog approach with the MHI Deep 7 bottomfish; 2) the 75th percentile of the catch; and 3) the average of the past 3 years of catch. Concerns were raised regarding this method of model result averaging for this was not based on any simulation or re-sampling method but simply took an average of three point estimates. This also did not generate any probability distribution around the mean value. In order to be consistent with the current effort to standardize the ACL specification process using the tier 3 approach, the biomass-augmented catch-MSY approach was applied to the updated catch time series of the non-deep 7 and applied the MHI biomass estimate of *Aprion virescens* (locally known as uku) which makes up more than 87% of the non-deep 7 complex.

There were previous recommendations to remove uku from the non-deep 7 complex because of recent changes in the fishery whereby uku is no longer a substitute fish when the MHI deep 7 bottomfish fishery closes. The uku fishery had evolved on its own and is now a regular targeted fishery. If a separate ACL were to be specified for uku, an FEP amendment is required to establish uku as a different management unit. The working group members agreed to keep uku under the non-deep 7 but to also to treat uku as an indicator species to be monitored as a separate species and as a complex.

Using the biomass-augmented catch-MSY approach, the method-B MSY estimate for the non-deep 7 bottomfish is 265,000 lbs. Applying the same stock status determination methodology in the P* analysis, the stock status dimension score is 2.5. The P-S dimension yields a score of 7.5 (see table below for details). Combining all the dimension scores yield a score of **18** and a corresponding P* value of **32**. The risk table is shown below.

Hawaii Coral Reef Ecosystem (Mullidae-Goatfish) (non-FSSI)

Species Name	Scientific Name	Prod.	Susc.	Sum	Ave	Justification
UKU	Aprion virescens	7.5	7.5	15	7.5	Long lived (26 years); slow growing; highly targeted; takes 5 years to reach maturity; average length 50 cm from an Lmax of 81 cm

Risk table for the non-deep 7 bottomfish

risk table – k-revise b									
5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
112.2	129.9	144.5	158.1	172.3	187.1	203.7	221.2	239.9	259.2

Next Step

1. SSC review of the P* score
2. SSC decide which ABC to take given that the risk table is in 5% increment (round up or down

Appendix D Report of the SEEM Working Group

WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

Social, Economic, Ecological, and Management (SEEM) Working Group Meeting for Coral Reef Fisheries in Hawaii, Samoa, and Marianas Archipelagos

February 26-28, 2014
1:00 pm – 5:00 pm
Council Conference Room

DRAFT REPORT

Report Highlights

- Chair welcomed members and asked for introductions.
- Council staff provided background and described Working Group purpose.
- The Working Group discussed fishery attributes that facilitate the use of ACLs in policy and management and the need to consider SEEM factors when setting these catch limits.
- In all island areas (three archipelagos; four political jurisdictions), the current level of observed catch of each coral reef stock is generally far below the stock's assumed biomass (note: this is not the case for the MHI bottomfish fishery, which is managed under a separate management plan.)
- The Working Group decided to use SEEM factors for the NMI that were recently developed by researchers at the NMFS Pacific Islands Fisheries Science Center as a starting point to consider factors important to the other three jurisdictions.
- The Working Group decided to comprehensively describe and score all SEEM factors, but to use only the ecological and management uncertainty factor scores to reduce from ABC, since the Council cannot use the results of a SEEM analysis to increase an ACL.
- Outcome: Based on ecological and management uncertainty considerations, the SEEM Working Group determined that reductions from coral reef MUS ABC in American Samoa, Hawaii, and the Marianas archipelagos of 5%, 5%, and 3% respectively may be warranted.

Full Report

The Council's Coral Reef Fisheries SEEM Working Group met from February 26th – 28th, 2014 at the Council office in Honolulu to examine social, economic, ecological, and management uncertainty factors inherent in coral reef fisheries in American Samoa, Guam, Hawaii, and the Northern Mariana Islands.

Council Vice-Chair, Edwin Ebisui welcomed the Working Group members and opened the meeting with introductions.

Following introductions, Council staff provided a summary of the history of ACL management and the basis for conducting a SEEM analysis on the Region's coral reef fisheries. The Council now uses a catch-MSY model, augmented by Marlowe Sabater and Pierre Klieber to account for biomass, to specify ACLs for the Region's coral reef MUS and as such most of those fisheries are now considered Tier 3 stocks. Because of this change, the Council requested staff to convene a SEEM Working Group to examine SEEM factors for coral reef fisheries in the three island areas.

Staff also provided the Working Group with an overview of the Main Hawaiian Islands bottom fish fishery SEEM analysis, including process and scoring determinations, that was conducted in 2011. Staff recommended that the Working Group consider a similar process for the current analysis, since it has been accepted by the Council and NMFS, but that improvements to the process could be discussed and considered for future SEEM exercises.

The Group discussed the difference between setting ACLs for coral reef fisheries and the MHI bottomfish fishery. In the latter fishery, the ACL is more meaningful, since there is near-real time catch reporting, which enables in-season tracking of catch towards the ACL and ability to close the fishery if the ACL is going to be reached. After considering these differences, the Working Group affirmed the usefulness of conducting a thorough SEEM analysis on regional coral reef fisheries, to guide future SEEM-related research, to highlight the importance of WPacFIN, and to further the ecosystem fishery management approach the Council has undertaken.

Following this discussion, Drs. Cynthia Grace-McCaskey and Leila Sievanen (JIMAR-PIFSC) presented their recent research in the Northern Mariana Islands to determine how fishermen perceived the social and economic importance of reef fisheries, local knowledge of coral reef ecosystems and associated species, and perceptions about various management strategies. The team interviewed 38 fishermen and vendors and worked with Council staff to determine the scope of the research and appropriate questions. A purpose of the research was to provide data into the SEEM analysis for CNMI reef fisheries. Council staff discussed the extent to which this CNMI-specific information applied to regional coral reef fisheries.

Before proceeding to the four SEEM dimensions, the Working Group discussed several topics: fishermen discussing and practicing conservation; income from fishing should include money saved from food fishermen don't have to buy; conflict between ethnic groups; overfishing terminology and perceptions; and village net exceptions in the NMI.

After the presentation, the Group discussed the best way to proceed. It was decided to follow the existing approach and comprehensively describe and score all relevant SEEM factors. Each item will be scored between -2 and +2. This scale was developed by the MHI bottomfish SEEM Working Group. The main benefit of this approach is that it can be used by each member to highlight how important he believes each social and economic factor is and how serious a concern he believes each management uncertainty factor to be. It is also sensitive to the uniqueness of the ecological dimension, where scoring factors tends to be less one-sided (positive or negative) than in the other three dimensions. Finally, since each ecological and

management uncertainty factor can only be given a maximum of -2, there is less potential for one or two items to result in large reductions.

Like the MHI bottom fish SEEM group, the current working group decided that a net positive score across the S and E factors will equal no reduction. The reduction would thus come from the scores of the items in the ecological and management uncertainty factors. The Group also decided to use the NMI study factors as starting factors when discussing the other three jurisdictions. Finally, the Working Group decided to score all SEEM factors for all jurisdictions at the end.

Before proceeding to the four SEEM dimensions, the Group discussed several topics: fishermen discussing and practicing conservation; income from fishing should include money saved from food fishermen don't have to buy; conflict between ethnic groups; overfishing terminology and perceptions; and village net exceptions in the NMI.

Mariana Archipelago

Social Dimension Factors

The Group discussed the importance of understanding the cultural importance around sharing catch and post harvest distribution (fish flow) as well as the various effort triggers, since some of this information was not captured in the PIFSC study interviews. From the social attributes found in the PIFSC study, the Working Group decided to lump "food security" with "diet" and unpack "social identity" and "pride."

The final list of social factors the Working Group selected was:

Allows traditional practices and values to continue
Is an important part of Marianas food security and healthier diet
Reef fishing as part of social identity status
Provides fish important for culturally important events e.g. fiestas, funerals, parties
Is a highly skilled and well-respected practice and occupation
Sense of pride and accomplishment in producing food and cultural benefit to others

Economic Dimension Factors

Most discussion of economic factors centered on the notion that money associated with coral reef fishing in the NMI stayed local, as some interviewees claimed. It was pointed out that while some revenue might stay in the Commonwealth, some of it is remitted and that much of the gear and equipment is purchased off island. The second issue that was discussed was the relative importance of subsistence fishing in reducing an individual's or household's grocery bills.

The final list of economic factors the Working Group selected was:

Supports the local economy
Supplements income of those with part-time jobs or low wages
Is an important source of income and jobs (i.e. primary and secondary)
Acts as an economic "safety net"
Supports extractive tourism/service industries
Supports non extractive value (aesthetic and existence value)
House hold expenses are reduced by subsistence fishing

Ecological Factor Items

Coral reefs provide buffer from large scale perturbation
Uncertainty of ecosystem dynamics (trophic interactions; life history; impacts of climate changes)
Non-fishing factors that affects fish stocks and habitat (pollution, run-off, development)
De-facto MPAs provide additional protection for reef stocks

Management Uncertainty Dimension Factors

Level of education, outreach and enforcement
Management effectiveness (local-federal linkages; real-time accountability measure)
Availability of reliable fishery information (catch, effort, life history, real-time monitoring, late reporting, mis-reporting, under reporting)
Data collection improvement efforts (mandatory reporting in CNMI)
Other management systems may provide additional protection of reef stocks (monuments, sanctuaries, military closed areas)

American Samoa

Social Dimension Factors

The Working Group discussed some of the important cultural differences around fish and fishing in AS. Notably, that there are prescribed ways in which fish are distributed throughout the chief system. The Group also discussed the importance of communal fishing activities, such as for palolo and atulai, and the fact that there tends to be more village control of local fisheries resources than in other areas.

The final list of social factors the Working Group selected was:

Allows traditional practices and values to continue
Is an important part of Am. Samoa food security and healthier diet
Reef fishing as part of social identity status
Provides fish important for culturally important events (e.g. Fa'lavalave, to‘ona‘i funerals, weddings, Chiefly investitures)
Is a highly skilled and well-respected practice and occupation Tautai?
Sense of pride and accomplishment in producing food and cultural benefit to others

Economic Dimension Factors

Members generally agreed that reef fish are not currently an important part of the local economy, but recognized that new fish markets are opening soon and that reef fishing is always there in the event of an economic downturn. In fact, it is not clear what will happen as federal money following the tsunami is phased out.

The final list of economic factors the Working Group selected was:

Supports the local economy
Supplements income of those with part-time jobs or low wages
Is an important source of income and jobs (i.e. primary and secondary)
Acts as an economic “safety net”
Supports extractive tourism/service industries
Supports non extractive value (aesthetic and existence value)
House hold expenses are reduced by subsistence fishing

Ecological Dimension Factors

American Samoa has some unique attributes relevant to ecological factors for ACL consideration. The islands are fairly small and high and receive a lot of annual rainfall, often in intense bouts. When this happens, people tend to stay out of the nearshore water because of pollution and reduced visibility. Members also discussed the ecological implications of management areas, such as community based fishery management sites.

The final list of ecological factors the Working Group selected was:

Coral reefs provide buffer from large scale perturbation
Uncertainty of ecosystem dynamics (trophic interactions; life history; impacts of climatological changes)
Non-fishing factors that affects fish stocks and habitat (pollution, run-off, development); frequency of high rain events and unfavorable weather and climatological conditions keeps people out of the water
Dominance of Community Based FMAs in most villages
Large biomass potential due to under-utilized stocks (due to changes in the social and economic status)

Management Uncertainty Dimension Factors

The Working Group discussed the data uncertainty problem in American Samoa. Improvements have been made, but there continue to no real time tracking of catch and no mechanism or process to close the coral reef fishery should the ACL be reached. There also is limited local capacity to conduct regular government enforcement of fishery regulations.

The final list of management uncertainty factors the Working Group selected was:

Management effectiveness (local-federal coordinated management regime; real-time accountability measure)
Availability of reliable fishery information (catch, effort, life history, real-time monitoring, late reporting, mis-reporting, under reporting)
Timeliness of QA/QC input and output in catch and effort data which would affect the ability to conduct near-real-time monitoring of catch
Data collection improvement efforts (mandatory reporting in Am Samoa; improvement through efforts)
Other management systems may provide additional protection of reef stocks (monuments sanctuaries, CFMP closed areas)

Hawaii

Social Dimension Factors

The cultural context of the reef fishery in Hawaii is more fragmented than in the other archipelagos, owing mostly to demography. However, there are still parts of the islands where coral reef fishing retains its cultural connotations and subsistence importance. Reef fish are also connected to the wider social fabric through events and ceremonies such as luaus, parties and weddings.

The final list of social factors the Working Group selected was:

Allows a variety of cultural, ethnic and Hawaiian traditional practices and values to continue
Is an important part of Hawaii food security and healthier diet
Reef fishing as part of social identity and status (clubs built around these fisheries)
Provides fish important for culturally important events e.g. first birthday luau, weddings, graduations, holidays etc.
Is a highly skilled and well-respected practice and occupation
Sense of pride and accomplishment in producing food and cultural benefit to others
Practice of customary exchange and fish flow to the community is still tied to the contemporary social fabric

Economic Dimension Factors

Members agreed that direct revenue from reef fish sales is not large. However, the sales of fishing gear and other fishing related provisions is likely an economic benefit to each of the islands. In addition, the important tourism component of the economy in some ways depends upon the availability of reef fish (divers, etc.).

The final list of economic factors the Working Group selected was:

Supports the local economy (including the fishing supply chain, fish markets and support network related to fishing)
Supplements income of those with part-time jobs or low wages
Is a source of income and jobs (i.e. primary and secondary)
Acts as an economic “safety net”
Supports extractive tourism/service industries
Supports non extractive value (aesthetic and existence value)
Money stays in the local economy (local manufacturing of fishing gear and supplies)
House hold expenses are reduced by subsistence fishing

Ecological Dimension Factors
The comparatively large size of the Hawaiian Islands makes for additional ecological factors to consider. For example, unlike the other two archipelagos, the Working Group felt that invasive marine species are important to consider. Also, the scale of development and issues like injection wells were discussed.

The final list of ecological factors the Working Group selected was:

Coral reefs provide buffer from large scale perturbation
Uncertainty of ecosystem dynamics (trophic interactions; life history; impacts of climate changes)
Potential effects of fishing interaction with protected species (prey competition)
Non-fishing factors that affects fish stocks and habitat (pollution, run-off, development, injection wells, ecological alteration, physical habitat degradation)
Effects of invasive species on ecological functions and stability
Ecological effects of ciguatera "scare"
De-facto MPAs and MLCDs provide additional protection for reef stocks

Management Uncertainty Dimension Factors
Hawaii management uncertainty items largely mirror the other two areas. The state does benefit from more staff and financial resources, but the islands are larger, which stretch those resources thin. As a result, enforcement is challenging. Also though the State is in the process of improving data collection, reef fish catch and effort statistics can be unreliable, especially for non-commercial participants.

The final list of management uncertainty factors the Working Group selected was:

Level of education, outreach and enforcement
Management effectiveness (local-federal linkages; real-time accountability measure)
Availability of reliable fishery information (commercial catch, effort, life history, real-time monitoring, late reporting, mis-reporting, under reporting)
Data collection improvement efforts (improvements in online reporting); revision of HMRFS
Availability of reliable fishery information (non-commercial catch and effort information is unknown, life history, real-time monitoring, late reporting, mis-reporting, under reporting)
Other management systems may provide additional protection of reef stocks (monuments, State MPAs, military closed areas, community based management areas)

Scoring and Final Scores

The Working Group discussed scoring and factor wording prior to voting, to ensure that all members were approaching the exercise the same way. Members generally agreed that the lack of socially-derived data specific to SEEM scoring for each archipelago was not ideal and discussed the need to conduct research into SEEM factors and the importance of each of those items to members of the fishery. However, most members felt fairly comfortable in making a determination, given that estimated catch is well below the estimated available biomass.

Appendix A contains the scores for each item in each SEEM factor for each archipelago. The table below contains the averaged scores for each factor for each archipelago and the corresponding percentage reduction from ABC recommended by the SEEM Working Group.

Archipelago	Social	Economic	Ecological	Management	% Reduction from ABC
American Samoa	7	6	2	-5	-5
Hawaii	9	8	-1.4	-3.2	-5
Marianas	9	8	0	-3	-3

Following the factor scoring, the Working Group discussed the issue that despite the fact that there is less management uncertainty surrounding MHI bottomfish management than the Region's coral reef fisheries, the management uncertainty scores in this SEEM analysis were less than those produced by the MHI bottomfish fishery SEEM Working Group in 2011. The Group came to three conclusions: 1) Membership of the two SEEM working groups differed, and this will produce different results, 2) the biomass-to-fishing effort ratio is much different for coral reef fisheries than for the MHI bottomfish fishery and it is likely that members were taking this into account when scoring, and 3) this working group worded some factors, especially ones in the ecological and management uncertainty dimensions, more neutrally.

Appendix A. SEEM scores

AMERICAN SAMOA	Mem#1	Mem#2	Mem#3	Mem#4	Mem#5	Mem#6	Mem#7	Mem#8	Mem#9
Social n=6	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**
Allows traditional practices and values to continue	2	1	2	2	2	1	2	1	2
Is an important part of Am. Samoa food security and fishery development	1	1	0	1	1	1	1	0	2
Reef fishing as part of social identity status e.g. tautai	1	1	1	1	1	1	2	0	2
Provides fish important for culturally important events e.g. fa'a lave lave, funerals, weddings etc.	2	2	2	2	2	2	2	0	2
Is a highly skilled and well-respected practice and occupation	1	1	1	1	2	0	2	0	0
Sense of pride and accomplishment in producing food and cultural benefit to others	1	1	1	2	2	0	1	0	1
SUM	8	7	7	9	10	5	10	1	9

	Mem#1	Mem#2	Mem#3	Mem#4	Mem#5	Mem#6	Mem#7	Mem#8	Mem#9
Economic n=7	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**
Supports the local economy through fishery development	1	1	0	0	0	0	1	0	2
Supplements income of those with part-time jobs or low wages	0	2	0	1	0	1	2	0	2
Is an potential source of income and jobs (i.e. primary and secondary)	1	1	1	0	1	0	1	0	2
Acts as a potential economic "safety net"	0	2	1	2	1	1	1	1	2
Supports extractive tourism/service industries	0	1	1	0	0	0	1	0	0
Supports non extractive value (aesthetic and existence value)	0	0	1	1	0	2	1	0	0

House hold expenses are potentially reduced by subsistence fishing	1	1	1	2	1	2	2	0	2
SUM	3	8	5	6	3	6	9	1	10

	Mem#1	Mem#2	Mem#3	Mem#4	Mem#5	Mem#6	Mem#7	Mem#8	Mem#9
Ecological n=5	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**
Coral reefs provide buffer from large scale perturbation	-1	0	1	0	2	-1	1	2	-1
Uncertainty of ecosystem dynamics (trophic interactions; life history; impacts of climatological changes)	-1	-1	-1	-1	-2	0	-1	-2	-1
Non-fishing factors that affects fish stocks and habitat (pollution, run-off, development); frequency of high rain events and unfavorable weather and climatological conditions keeps people out of the water	0	1	-1	-1	-1	0	0	-2	0
Dominance of Community Based FMAs in most villages	0	1	1	2	2	2	2	2	0
Large biomass potential due to under-utilized stocks (due to changes in the social and economic status)	1	1	2	1	2	2	2	2	0
SUM	-1	2	2	1	3	3	4	2	-2

	Mem#1	Mem#2	Mem#3	Mem#4	Mem#5	Mem#6	Mem#7	Mem#8	Mem#9
Management n=6	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**
Level of education, outreach and enforcement	-1	-1	-1	-1	-1	0	-1	-1	0
Management effectiveness (local-federal coordinated management	-2	-2	-2	0	-2	0	-2	-1	-1

regime; real-time accountability measure)									
Availability of reliable fishery information (catch, effort, life history, real-time monitoring, late reporting, mis-reporting, under reporting)	-2	-2	-2	-1	-2	-1	-2	-2	-1
Timeliness of QA/QC input and output in catch and effort data which would affect the ability to conduct near-real-time monitoring of catch	-2	-2	-1	-1	-2	-1	-2	-2	-1
Data collection improvement efforts (mandatory reporting in Am Samoa; improvement through efforts)	1	-1	-2	0	0	1	-1	-1	0
Other management systems may provide additional protection of reef stocks (monuments sanctuaries, CFMP closed areas)	2	1	1	-1	2	2	1	1	0
SUM	-4	-7	-7	-4	-5	1	-7	-6	-3

HAWAII	Mem#1	Mem#2	Mem#3	Mem#4	Mem#5	Mem#6	Mem#7	Mem#8	Mem#9
Social n=7	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**
Allows a variety of cultural, ethnic and Hawaiian traditional practices and values to continue	2	2	2	2	2	1	2	1	1
Is an important part of Hawaii food security and healthier diet	2	1	2	2	2	0	2	1	0
Reef fishing as part of social identity and status (clubs built around these fisheries)	2	2	1	2	1	1	2	1	0
Provides fish important for culturally important events e.g. first birthday luau, weddings, graduations, holidays etc.	2	1	1	2	2	1	2	1	0

Is a highly skilled and well-respected practice and occupation	1	1	1	2	1	1	2	1	0
Sense of pride and accomplishment in producing food and cultural benefit to others	1	1	1	2	2	1	1	1	1
Practice of customary exchange and fish flow to the community is still tied to the contemporary social fabric	1	1	2	2	1	1	2	1	1
SUM	11	9	10	14	11	6	13	7	3

	Mem#1	Mem#2	Mem#3	Mem#4	Mem#5	Mem#6	Mem#7	Mem#8	Mem#9
Economic n=8	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**
Supports the local economy (including the fishing supply chain, fish markets and support network related to fishing)	1	2	2	1	2	0	2	1	1
Supplements income of those with part-time jobs or low wages	1	1	1	1	1	1	2	1	0
Is a source of income and jobs (i.e. primary and secondary)	1	2	0	0	0	1	2	1	0
Acts as an economic “safety net”	0	1	0	2	0	2	1	1	0
Supports extractive tourism/service industries	1	2	1	1	1	-1	2	1	1
Supports non extractive value (aesthetic and existence value)	1	-2	2	2	1	0	2	1	-2
Money stays in the local economy (local manufacturing of fishing gear and supplies)	1	1	1	1	2	1	1	1	1
House hold expenses are reduced by subsistence fishing	1	1	0	2	1	1	2	1	1
SUM	7	8	7	10	8	5	14	8	2

	Mem#1	Mem#2	Mem#3	Mem#4	Mem#5	Mem#6	Mem#7	Mem#8	Mem#9
Ecological n=7	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**

Coral reefs provide buffer from large scale perturbation	-1	0	0	0	2	-1	1	2	-1
Uncertainty of ecosystem dynamics (trophic interactions; life history; impacts of climatological changes)	-1	-1	-1	-1	-2	0	-1	-1	-1
Potential effects of fishing interaction with protected species (prey competition)	0	-1	1	0	-1	0	-1	-1	0
Non-fishing factors that affects fish stocks and habitat (pollution, run-off, development, injection well, ecological alteration, physical habitat degradation)	0	1	1	-2	-2	-1	-1	-2	-2
Effects of invasive species in ecological functions and stability	0	0	0	0	-1	-1	-1	-1	-1
Ecological effects of ciguatera “scare”	0	0	1	0	0	1	1	-1	0
De-facto MPAs provide additional protection for reef stocks	0	0	1	1	1	1	2	1	1
SUM	-2	-1	3	-2	-3	-1	0	-3	-4

	Mem#1	Mem#2	Mem#3	Mem#4	Mem#5	Mem#6	Mem#7	Mem#8	Mem#9
Management n=6	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**
Level of education, outreach and enforcement	-1	0	-2	-1	-1	1	-1	-1	0
Management effectiveness (local-federal linkages; real-time accountability measure)	-2	-1	-2	0	-2	-1	-2	-1	0
Availability of reliable fishery information (commercial catch, effort, life history, real-time monitoring, late reporting, mis-reporting, under reporting)	-1	-1	-2	0	1	-1	-1	0	-1
Data collection improvement efforts (improvements in online reporting); revision of HMRFS	1	0	-2	0	1	0	-2	-1	0

Availability of reliable fishery information (non-commercial catch and effort information is unknown life history, real-time monitoring, late reporting, mis-reporting, under reporting)	-1	-1	-2	-1	-2	-1	-1	-2	-1
Other management systems may provide additional protection of reef stocks (monuments, State MPAs, military closed areas, community based management areas)	2	0	1	1	2	1	1	1	0
SUM	-2	-3	-9	-1	-1	-1	-6	-4	-2

MARIANAS	Mem#1	Mem#2	Mem#3	Mem#4	Mem#5	Mem#6	Mem#7	Mem#8	Mem#9
Social n=6	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**
Allows traditional practices and values to continue	2	1	2	2	2	2	2	2	2
Is an important part of Marianas food security and healthier diet	2	2	2	2	2	1	2	0	2
Reef fishing as part of social identity status	2	1	1	1	1	2	1	1	2
Provides fish important for culturally important events e.g. fiestas, funerals, parties	2	2	2	2	2	1	2	2	2
Is a highly skilled and well-respected practice and occupation	2	2	1	1	1	1	2	0	0
Sense of pride and accomplishment in producing food and cultural benefit to others	2	2	1	1	2	1	1	1	1
SUM	12	10	9	9	10	8	10	6	9

	Mem#1	Mem#2	Mem#3	Mem#4	Mem#5	Mem#6	Mem#7	Mem#8	Mem#9
Economic n=7	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**
Supports the local economy	1	2	1	1	2	0	1	1	1

Supplements income of those with part-time jobs or low wages	2	2	2	1	2	1	2	1	1
Is an important source of income and jobs (i.e. primary and secondary)	2	1	1	1	2	0	1	1	1
Acts as an economic "safety net"	2	2	1	2	2	2	2	2	2
Supports extractive tourism/service industries	1	0	0	1	1	-1	2	0	1
Supports non extractive value (aesthetic and existence value)	1	0	-1	1	1	2	1	1	-1
House hold expenses are reduced by subsistence fishing	2	1	1	2	1	1	2	1	1
SUM	11	8	5	9	11	5	11	7	6

	Mem#1	Mem#2	Mem#3	Mem#4	Mem#5	Mem#6	Mem#7	Mem#8	Mem#9
Ecological n=4	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**
Coral reefs provide buffer from large scale perturbation	-1	1	-1	0	2	-1	1	2	-1
Uncertainty of ecosystem dynamics (trophic interactions; life history; impacts of climatological changes)	-1	-1	-1	-1	-2	0	-1	-2	-1
Non-fishing factors that affects fish stocks and habitat (pollution, run-off, development)	0	1	1	0	2	1	-1	-2	-1
De-facto MPAs provide additional protection for reef stocks	1	1	1	-1	2	2	1	1	-1
SUM	-1	2	0	-2	4	2	0	-1	-4

	Mem#1	Mem#2	Mem#3	Mem#4	Mem#5	Mem#6	Mem#7	Mem#8	Mem#9
Management n=5	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**	**SCORE**
Level of education, outreach and enforcement	-1	-2	0	0	0	0	-1	-1	0

Management effectiveness (local-federal linkages; real-time accountability measure)	-2	-2	-1	0	-2	-2	-2	-2	-1
Availability of reliable fishery information (catch, effort, life history, real-time monitoring, late reporting, mis-reporting, under reporting)	-2	-2	-2	0	0	-1	-2	-2	-1
Data collection improvement efforts (mandatory reporting in CNMI; improvement through efforts)	1	-1	-2	0	0	0	-1	-1	0
Other management systems may provide additional protection of reef stocks (monuments sanctuaries, military closed areas)	2	1	2	-1	2	1	-1	1	0
SUM	-2	-6	-3	-1	0	-2	-7	-5	-2