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Environmental Assessment

Specification of an Annual Catch Limit and Accountability Measures for Main Hawaiian Islands Non-Deep 7 Bottomfish Fisheries in Fishing Years 2015 through 2018

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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 ACLs for non-Deep 7 bottomfish fisheries in federal waters of the Exclusive Economic Zone (EEZ; generally 3-200 nautical miles or nm) around the main Hawaiian Islands (MHI), and a post-season accountability measure (AM) to correct the overage of the ACL if it occurs. For the purpose of ACLs, MHI non-Deep 7 bottomfish include uku (*Aprion virescens*), white ulua (*Caranx ignoblis*), black ulua (*Caranx lugubris*), yellowtail kalekale (*Pristipomoides auricilla*), and butaguchi (*Pseudocaranx dentex*). The proposed ACL is associated with a less than a 30 percent probability of overfishing.

The fishing year for MHI non-Deep 7 bottomfish begins January 1 and ends December 31 annually. Unless modified by NMFS, the ACL and AM would be applicable in fishing years 2015, 2016, 2017, and 2018. Each fishing year, non-Deep 7 bottomfish catches from both local state/territorial waters (generally from the shoreline to three miles offshore), and federal waters of the EEZ around the MHI would be counted towards the specified ACL.

The State of Hawaii collects commercial bottomfish catch data from fishing vessels operating in both state and federal waters. However, this data is generally not available until at least six months after the end of each fishing year. NMFS collects non-commercial bottomfish catch data from fishing vessels operating in federal waters on a per trip-basis. However, there have been no non-commercial bottomfish catch reported in federal waters since 2011, and there is no non-commercial catch reporting mechanism for state waters. 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; only post-season AMs are 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 would 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 the provisions of the Fishery Ecosystem Plan for Hawaii Archipelago, through which require NMFS specifies ACLs and AMs for all federally managed species. The Council recommended the ACL 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 specification and AM 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 limit or constrain non-Deep 7 bottomfish catch in the MHI, or change the conduct of the commercial or non-commercial MHI non-Deep 7 bottomfish 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.

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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
BMUS – Bottomfish Management Unit Species
CFR – Code of Federal Regulations
Council – Western Pacific Fishery Management Council
CPUE – Catch per Unit of Effort
EA – Environmental Assessment

EC – Ecosystem Component
EEZ – Exclusive Economic Zone
ESA – Endangered Species Act
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* - Probability or Risk of Overfishing
PIFSC – NMFS Pacific Islands Fisheries Science Center
PIRO – Pacific Islands Regional Office
SEEM – Social, Economic, and Ecological Considerations, or 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 bottomfish management unit species (BMUS) in the Exclusive Economic Zone (EEZ or federal waters; generally 3-200 nautical miles or nm) around Hawaii through the Fishery Ecosystem Plan for the Hawaiian Archipelago (Hawaii FEP) authorized by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).[1] Prior to 2010, the Northwestern Hawaiian Islands (NWHI) bottomfish fishery, which historically accounted for nearly half of the bottomfish landed in Hawaii, operated under a limited entry system with permit, reporting and observer requirements. However, in 2009, NMFS closed the NWHI fishery within waters of the Papahanaumokuakea Marine National Monument in accordance with the Presidential Proclamation establishing the Monument (71 FR 51134, August 29, 2006). At present, bottomfish fishing managed under the Hawaii FEP only occurs in waters around the main Hawaiian Islands (MHI).

The MHI bottomfish fishery harvests an assemblage of 14 different BMUS. However, NMFS and the Council manage BMUS as two separate stock complexes, the MHI Deep 7 bottomfish stock complex and the MHI non-Deep 7 bottomfish stock complex.[2] The Deep 7 bottomfish stock complex includes onaga (*Etelis coruscans*), ehu (*Etelis carbunculus*), gindai (*Pristipomoides zonatus*), kalekale (*Pristipomoides sieboldii*), opakapaka (*Pristipomoides filamentosus*), lehi (*Aphareus rutilans*), and hapuupuu (*Epinephelus quernus*). The Deep 7 bottomfish are generally found along high-relief, deep slopes, ranging from 80-400 meters. The non-Deep 7 bottomfish include uku *(Aprion virescens)*, white ulua *(Caranx ignoblis)*, black ulua *(Caranx lugubris)*, taape *(Lutjanus kasmira)*, yellowtail kalekale *(Pristipomoides auricilla)*, butaguchi (*Pseudocaranx dentex)* and kahala (*Seriola dumerili).* Fishermen typically catch the non-Deep 7 bottomfish during Deep 7 bottomfish trips, although at shallower depths.

Bottomfish fishing in federal waters is managed though management measures implemented by both the State of Hawaii and NMFS. State management measures that apply to non-Deep 7 bottomfish include a commercial license and reporting requirements and prohibition on fishing within 12 bottomfish restricted fishing areas. Federal management measures at 50 Code of Federal Regulations (CFR) 665 pertain primarily to non-commercial bottomfish fishing and require non-commercial fishermen to obtain a federal non-commercial bottomfish permit and report all catch, and adhere to a bag limit of no more than five Deep 7 bottomfish per trip. Federal requirements also prohibit fishing for BMUS with bottom trawls and bottom set gillnets, and direct NMFS to specify an annual catch limit (ACL) and implement accountability measures (AM) for each bottomfish stock and stock complex as recommended by the Council, and in consideration of the best available scientific, commercial, and other information about the fishery

[1] Nearshore waters, generally within 3 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, the State of Hawaii and are not part of the FEP management area.

[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 vulnerabilities to the fishery such that the impact of management actions on the stocks is similar.

for that stock or stock complex. Additionally, other regulations implemented by other federal agencies and the State of Hawaii may also apply to fishing in the EEZ waters.

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.

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, 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 MHI non-Deep 7 bottomfish 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 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).

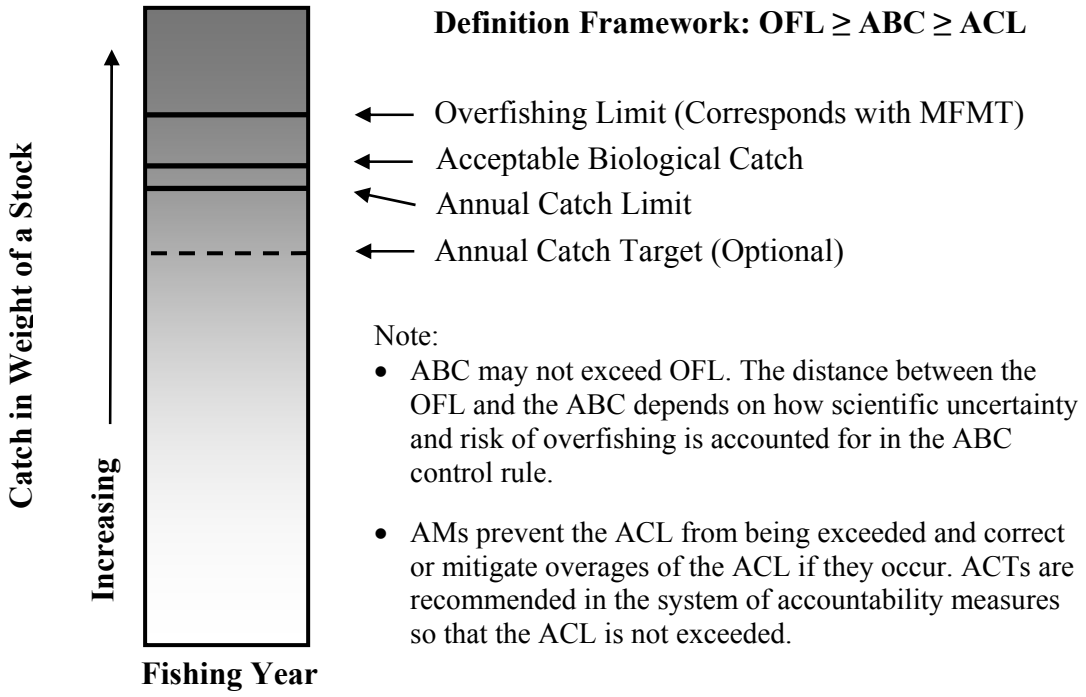

Figure 1. Relationship among OFL, ABC, ACL, ACT and AMs

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 non-Deep 7 bottomfish stock fisheries in federal waters around the MHI. ACLs are needed in order to comply with the Magnuson-Stevens Act and provisions of the Hawaii FEP which requires NMFS to specify ACL and AMs for all MUS identified in the FEP. The fishery management objective of this action is to specify an ACL for MHI non-Deep 7 bottomfish fisheries 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 non-Deep 7 bottomfish 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. The proposed ACL is associated with a less than a 30 percent probability of overfishing. The fishing year for MHI non-Deep 7 bottomfish begins January 1 and ends December 31 annually. Unless modified by NMFS, the ACL and AM would be applicable in fishing years 2015, 2016, 2017, and 2018.

Each fishing year, non-Deep 7 bottomfish catches from both local state waters (generally from the shoreline to three miles offshore), and federal waters of the EEZ around the MHI would be counted towards the specified ACL. 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 the ACL might be reached is not possible at this time because catch data are generally not available until at least six months after the data have been collected (See Section 2.1 for more details on bottomfish data collection program). For this reason, the post-season AMs being proposed for the MHI non-Deep bottomfish fishery 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 Table 3, the annual catch of MHI Deep 7 bottomfish appears to be highly variable ranging from just over 102,000 lb in 2009 to nearly 160,000 lb in 2012, with the most recent three year average between 2011 and 2013 being 135,110 lb. The reason for this inter-annual variability is unknown. However, could be due to availability of Deep 7 bottomfish. For example, when catches of Deep 7 bottomfish are high, catch of non-Deep 7 bottomfish is expected to be low because Deep 7 bottomfish command a higher market price. When catches of Deep 7 bottomfish are low, catch of the non-Deep 7 bottomfish snapper, uku, may increases as it is good substitute to meet market demand for Deep 7 bottomfish. 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 the final non-Deep 7 bottomfish catch. If the three-year average catch for non-Deep 7 bottomfish exceeded the specified ACL in any fishing year, NMFS would 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. 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. The proposed action does not include two non-Deep 7 bottomfish species; taape *(Lutjanus kasmira)*, kahala (*Seriola dumerili)* because the taape is a shallow water snapper belonging to the coral reef family Lutjanidae, and the kahala is a species of jack belonging to the coral reef family Carangidae. For the purpose of ACLs, NMFS will specify an ACL for these two Hawaii species within their respective coral reef family groups through a separate action for Hawaii FEP coral reef ecosystem fisheries, which are described in a separate EA related to this action. Instructions on how to comment on the ACLs and AMs and EA for coral reef ecosystem fisheries can be found by searching on RIN 0648-XD558 at www.regulations.gov, or by contacting the responsible official or Council. In addition to this action, NMFS also proposes to specify an ACL and AMs for the MHI Deep 7 bottomfish stock complex for fishing years 2014-15 and 2015-16 through a separate action. This is because the fishing year for this fishery is not on a calendar year, but annually begins on September 1 and ends August 31 the following year. Instructions on how to comment on that action can be found by searching on RIN 0648-XD082 at www.regulations.gov.

1.4 Decisions to be Made

After considering public comments on the proposed action and alternatives considered, NMFS will specify ACLs and AMs for non-Deep 7 bottomfish fisheries in federal waters around the MHI. The ACL and AM 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 the MHI non-Deep 7 bottomfish fishery, including the ABC recommendation 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 specification and AM 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 comments from one commercial bottomfish fisherman on how the ACL incorporates changes in historical catches. 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 non-Deep 7 bottomfish fisheries in federal waters around 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 in the MHI

This section summarizes ongoing fishery data collection programs State of 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 Fishery Data Collection Methods by the State of 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

[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.

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. 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.

2.1.2 Overview of Ongoing Federal Bottomfish Permit and Reporting Requirements

In addition to the CML programs administered by the State of Hawaii, regulations implementing the Hawaii FEP also require non-commercial fishermen fishing in the EEZ around the MHI for all BMUS, including non-Deep 7 bottomfish to obtain a federal permit and submit catch logbooks to NMFS within 72 hours of landing.

2.1.3 Data Limitations

While federal non-commercial bottomfish permit and catch reporting requirements have been in place since 2008, catch data is negligible, and there has been no non-commercial catch reported from federal logbooks since 2010. The reasons for the lack of catch reporting is unknown. However, because federal regulations limit non-commercial fishermen to five Deep 7 bottomfish fish per trip bag limit, anecdotal information suggests non-commercial bottomfish fishermen have opted to obtain a State CML, which is comparable in cost to the federal non-commercial bottomfish permit, but does not limit CML holders to the 5 fish per trip bag limit. Cost-earning surveys conducted by Hospital and Beavers (2012) report that over 20 percent of CML holders do not sell bottomfish indicating that they are actually non-commercial. Therefore, it is possible that non-commercial catch of both Deep 7 and non-Deep 7 bottomfish are being reported through the CML system rather than through federal non-commercial bottomfish logbooks. Additionally, bottomfish fishermen report that more than half of their bottomfish trips (66 percent) occurred in State waters only (Hospital and Beavers 2012). Therefore, it is also possible that non-commercial

bottomfish fishermen fish exclusively in state waters, and would not be subject to the federal permit or reporting requirement.

For these reasons, NMFS expects the State CML will continue to be the only data source for monitoring non-Deep 7 bottomfish catches in 2015 through 2018. While the State of Hawaii has the capability to monitor and track the catch of the Deep 7 bottomfish towards specified ACL, and prohibit fishing for Deep 7 bottomfish to prevent that ACL from being exceeded, additional resources would be required to extend these capabilities to monitor catches of non-Deep 7 bottomfish. Until such resources are made available, it will not be possible to monitor and track catches of non-Deep 7 bottomfish towards the proposed ACL or implement a similar in-season AMs to prevent the non-Deep 7 bottomfish ACL from being exceeded.

2.2 Development of the Alternatives

The SSC and Council developed their respective non-Deep 7 bottomfish 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 non-Deep 7 bottomfish in 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 MHI non-Deep 7 bottomfish. 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 MHI non-Deep 7 bottomfish to be 265,000 lb. However, catch projection results generated from the model estimates the level of catch associated with a 50 percent probability of exceeding MSY to be 259,200 lb. Consistent with National Standard 1 guidelines (74 FR 3178, January 9, 2011), the Council at its 160th meeting, set OFL for MHI non-Deep 7 bottomfish equal to the level of catch associated with a 50 percent probability of exceeding MSY. See Table 1 for a summary MSY, OFL, and other reference points for MHI non-Deep 7 bottomfish.

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 a deduction of 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 ABC for the MHI non-Deep 7 bottomfish at 187,100 lb, which is associated with a probability of overfishing of 30 percent. See Table 1 for the ABC in relation to the associated probability of overfishing, and other reference points for MHI non-Deep 7 bottomfish.

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 fishing level recommendation for social, economic, and ecological factors and management uncertainty (SEEM). See Appendix C of this document for the SEEM analysis. Specifically, the Council recommended MHI non-Deep 7 bottomfish ACL be set at 178,000 lb. See Table 1 for a summary of the ACL in relation to the associated probability of overfishing value and other reference points for MHI non-Deep 7 bottomfish.

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 non-deep 7 bottomfish catches. 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 MHI non-Deep 7 bottomfish as well as the associated probability of overfishing values 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*), the MSY and OFL estimates and the average catch of MHI non-deep 7 bottomfish for fishing years 2011-2013. Alternative 3 is the NMFS preferred alternative as recommended by the Council.

2.4 Features Common to All Alternatives Considered

Under all alternatives considered, all existing federal fishery regulations codified in 50 CFR 665, as well as any other applicable federal or state fishing regulations will remain in effect. Additionally, NMFS and the Council would continue to monitor catches of MHI non-Deep 7 bottomfish based on all available sources of information, and determine final catches at the end of each fishing year. NMFS also expects to specify an ACL for the MHI Deep 7 bottomfish complex in fishing years 2015 to 2018, and continue the current in-season AM which requires NMFS to prohibit fishing for Deep 7 bottomfish in EEZ waters when NMFS projects the Deep 7 bottomfish ACL will be reached. NMFS expects that the State of Hawaii will continue to implement a complementary fishery closure in state waters to upon closure of EEZ waters.

Table 1. Summary of ACL alternatives and associated risks of overfishing (P*) percentages for MHI non-Deep 7 bottomfish in 2015-2018, including MSY-based reference points and 2011-2013 average catch.

	MHI non-Deep 7 Bottomfish	
	MSY = 265,000 lb	
	OFL Proxy = 259,200 lb (P*=50%)	
	ABC =187,100 lb (P*=30%)	
	ACL (lb)	***Probability of Overfishing (P*)***
Alternative 1 (No ACL)	No ACL	n.a.
Alternative 2 (Status Quo)	140,000 lb	<15%
Alternative 3 (Preferred)	**178,000 lb**	**<30%**
Alternative 4 (Lower than Preferred)	172,300	25%
	158,100	20%
	144,500	15%
	129,900	10%
	112,200	5%
Avg. 2011-2013 Catch	**135,110**	

Source: WPFMC (2014).

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

Currently, NMFS has not specified an ACL and AM for the non-Deep 7 bottomfish fishery for fishing year 2015. Under this alternative, NMFS would not specify an ACL for MHI non-Deep 7 bottomfish 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 FEP and implementing federal regulations which requires 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 MHI non-deep 7 bottomfish fishery is sustainable based on the best available commercial and scientific information. As shown in Table 3, catches of non-deep 7 bottomfish have been increasing since 2000, with the highest recorded catch of 158,245 lb occurring in 2013. However, this level of catch is well below the OFL proxy of 259,200 lb and the long-term MSY of 265,000 lb. In the most recent three year period (2011-2013), the average annual catch of MHI non-Deep 7 bottomfish was 135,110 lb. During 2011-13, the fishery remained open year round. Under this alternative, harvest of MHI non-Deep 7 bottomfish in 2015 through 2018 expected to be similar to that described under Alternative 2 and is not expected to exceed the OFL proxy of 259,000 lb.

2.4.2 Alternative 2: Specify 2014 ACL of 140,000 lb (Status Quo/NEPA Baseline)

Under Alternative 2, NMFS would specify an ACL of 140,000 lb of MHI non-Deep 7 bottomfish for fishing years 2015 through 2018. This is the same ACL specified by NMFS in 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 2013 and 2014 ACLs and AMs for Pacific Island bottomfish fisheries (NMFS 2013). Based on risk projections from method B of the Biomass Augmented Catch-MSY model (Appendix B), an ACL of 140,000 lb is associated with a less than 15 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 address and 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

Under this alternative, non-Deep 7 bottomfish catch in 2015-2018 is expected to be similar to the level of catch in 2013, which was 158,245 lb, and would exceed the ACL under this alternative, but remain below the OFL proxy of 259,200 lb and the long-term MSY of 265,000 lb. However, the expected fishery outcome under Alternative 2 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 catch statistics are not available until at least six months after the data have been collected. So, NMFS and the Council have no way to determine during any fishing year whether the ACL might be reached. Therefore, 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.

As shown in Table 3, catches of non-deep 7 bottomfish exceeded the ACL proposed under this alternative in 2010 and again in 2013 when the fishery caught 145,383 and 158,245 lb of non-Deep 7 bottomfish, respectively. However, this level of catch is well below the OFL proxy of 259,200 lb and the long-term MSY of 265,000 lb.

Because the ACL of 140,000 lb was developed using a different method than is proposed under the preferred alternative (Alternative 3) and without knowledge of the estimate of MSY and OFL, if NMFS and the Council determine catch exceeded the ACL proposed under this alternative, the Council is not expected to recommend as an AM, NMFS reduce the ACL in the subsequent fishing year by the amount of the overage. This is because an ACL 140,000 lb is now considered overly conservative based on the best scientific information available as described in Section 2.2.1.

2.4.3 Alternative 3: Specify Council recommended ACL of 178,000 lb (Preferred)

Under Alternative 3 (the Council and NMFS' Preferred Alternative), NMFS would specify an ACL at 178,000 lb of MHI non-Deep 7 bottomfish for fishing years 2015 through 2018. This is five percent lower than the ABC of 187,100 lb. Based on the Biomass Augmented Catch-MSY model developed by Sabater and Kleiber (2014), an ACL of 178,000 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 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.

2.4.4 Alternative 4: Specify ACL between 112,200 lb and 172,300 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 172,300 lb (probability of overfishing of 25 percent should the entire ACL be caught) down to 112,200 lb (probability of overfishing of 5 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.

3 Affected Environment

This section describes the affected fisheries and fishery resources, and other biological and physical resources that could be affected by the MHI non-Deep 7 bottomfish fishery. Fishing communities are described as are protected marine areas and fishery administration and enforcement.

3.1 Target and Non-Target Stocks

The MHI bottomfish fishery harvests an assemblage of 14 bottomfish management unit species (BMUS) that includes nine snappers, four jacks (trevally) and a single species of grouper. However, NMFS and the Council manage BMUS as two separate stock complexes: the MHI Deep 7 stock complex and the MHI non-Deep 7 stock complex. The Deep 7 bottomfish include onaga (*Etelis coruscans*), ehu (*Etelis carbunculus*), gindai (*Pristipomoides zonatus*), kalekale (*Pristipomoides sieboldii*), opakapaka (*Pristipomoides filamentosus*), lehi (*Aphareus rutilans*), and hapuupuu (*Epinephelus quernus*). Generally, Deep 7 bottomfish are found along high-relief, deep slopes, ranging from 80-400 meters. The non-Deep 7 bottomfish include uku *(Aprion virescens)*, white ulua *(Caranx ignoblis)*, black ulua *(Caranx lugubris)*, taape *(Lutjanus kasmira)*, yellowtail kalekale *(Pristipomoides auricilla)*, butaguchi (*Pseudocaranx dentex)* and kahala (*Seriola dumerili),* and are usually caught during Deep 7 bottomfish trips at shallower depths. Fishermen typically catch the non-Deep 7 bottomfish during Deep 7 bottomfish trips, although at shallower depths. However, fishermen may sometimes target the grey snapper or uku (*Aprion virescens*), particularly when fishing for Deep 7 bottomfish is unfavorable, or if fishing for Deep 7 bottomfish fishery is prohibited due to attainment of the Deep 7 bottomfish ACL. Table 2 lists the Deep 7 and non-Deep 7 bottomfish stock complex, which together comprise the Hawaii BMUS.

Table 2. Hawaii Bottomfish MUS.

Hawaii Bottomfish MUS (*Indicates a Deep 7 bottomfish)		
Common Name	**Scientific Name**	**Local Name**
*Silver jaw jobfish	*Aphareus rutilans*	lehi
Grey jobfish	*Aprion virescens*	uku
Giant trevally	*Caranx ignobilis*	white ulua
Black jack	*Caranx lugubris*	black ulua
*Sea bass	*Epinephelus quernus*	hapuupuu
*Red snapper	*Etelis carbunculus*	ehu
*Longtail snapper	*Etelis coruscans*	onaga, ulaula
Blue stripe snapper	*Lutjanus kasmira*	taape
Yellowtail snapper	*Pristipomoides auricilla*	yellowtail, kalekale
*Pink snapper	*Pristipomoides filamentosus*	opakapaka
*Pink Snapper	*Pristipomoides sieboldii*	kalekale
*Snapper	*Pristipomoides zonatus*	gindai
Thick lipped trevally	*Pseudocaranx dentex*	pig ulua, butaguchi
Amberjack	*Seriola dumerili*	kahala

Table 3 provides a time series of reported commercial catch of each species of the non-Deep 7 species from the MHI (excluding taape and kahala) between the years 2000-2013. Uku (*Aprion virescens*) is the primary non-Deep 7 bottomfish species harvested and accounts for approximately 80 percent of the total non-Deep 7 bottomfish catch annually, followed by white ulua (*Caranx ignobilis*), black ulua (*Caranx lugubris*), and butaguchi (*Pseudocaranx dentex*). Catches of yellowtail kalekale (*Pristipomoides auricilla*) are insignificant relative to other species. Based on this data, the total average catch of all MHI non-Deep 7 bottomfish combined for the most recent three year period (2011-2013) was 135,110 lb. Based on an MSY estimate of 265,000 lb, the MHI non-Deep 7 bottomfish fishery appears to be sustainable.

As previously mentioned in Section 1.3, two non-Deep 7 bottomfish species; taape *(Lutjanus kasmira)*, kahala (*Seriola dumerili)* are included in the ACL and AM specifications for Pacific Island coral reef ecosystem fisheries for the purpose of ACL management.

Table 3. Annual reported commercial catch of non-Deep 7 bottomfish in the MHI (2000-2013).

Fishing Year	Uku	Butaguchi	Black ulua	White ulua	Yellowtail kalekale	Total (lb)
2000	83,318	2,947	73	4,044	0	90,382
2001	58,436	1,814	122	4,199	5	64,576
2002	57,155	1,659	421	4,183	1	63,420
2003	45,704	1,635	1,180	12,873	0	61,391
2004	76,815	1,394	1,034	14,112	43	93,399
2005	63,505	1,493	453	11,213	25	76,688
2006	59,569	298	267	9,076	32	69,241
2007	68,953	880	773	26,722	0	97,328
2008	92,872	1,193	405	15,856	6	110,331

Fishing Year	Uku	Butaguchi	Black ulua	White ulua	Yellowtail kalekale	Total (lb)
2009	87,175	1,083	549	13,794	35	102,636
2010	123,250	772	3,348	17,986	27	145,383
2011	109,497	1,385	1,554	18,904	51	131,391
2012	101,758	742	827	12,368	0	115,695
2013	138,822	1,028	1,155	17,240	0	158,245
Avg. 2011-2013	**116,692**	**1,052**	**1,179**	**16,171**	**51**	**135,110**

Source: Catch data for 2000-2011 was obtained from NMFS (2013); catch data for 2012 and 2013 was obtained from NMFS WPacFIN website: http://www.pifsc.noaa.gov/wpacfin/hi/dar/Pages/hi_data_3.php, accessed 11/13/2014.

As is the case for most fisheries, some of the catch are lost or discarded. Fish may be stripped off the lines by sharks (i.e., lost) or they may be deliberately discarded due to shark damage or because of concerns regarding ciguatoxins. Bycatch in the non-Deep 7 bottomfish fishery is not available. However bycatch in the broader MHI bottomfish fishery was summarized by Kawamoto and Gonzales (2005) using 2003 and 2004 catch and effort data. Overall bycatch in the MHI bottomfish fishery is low with only 8.5 percent of the catch listed as bycatch. The majority of the BMUS bycatch is composed of jacks (kahala, butaguchi and white ulua). Kahala were released likely because the fish are known to be ciguatoxic and have little or no market value in Hawaii (WPFMC, 2007). For example, in 2013, the annual reported catch of kahala was 13,194 lb, of which 1,739 lb was sold (NMFS unpublished data at http://www.pifsc.noaa.gov/wpacfin/reportlanding.php, accessed December 12, 2014.Other than this data, there is no recent bycatch information for the MHI Deep 7 bottomfish fishery.

It is also believed that bycatch of sharks does not result in mortality because fishermen tend to release hooked sharks alive by cutting their hook leaders, and sharks generally do not suffer from barotrauma when brought up from depth (WPFMC 2007). Additionally, when shark depredation occurs, fishermen will move to another area to avoid losing more fish to sharks. There is no updated information on bycatch in the MHI bottomfish fishery.

3.2 Description of Hawaii Bottomfish Fisheries

3.2.1 Fishing Gear

Bottomfish fishermen generally employ a vertical hook-and-line method of fishing, in which weighted and baited lines are lowered and raised with electric or hydraulic powered reels to the desired fishing depth to target particular species. The main line is typically constructed of dacron, or 400–450-pound test monofilament, with hook leaders of 80–120-pound test monofilament. The hooks are circle hooks, generally of the Mustad (conventional scale) sizes 11/0, 12/0, and 13/0, and a typical configuration uses six to eight hooks branching off the main line. The weight is typically 5–6 pounds. The hook leaders are typically 2–3 feet long and separated by about 6 feet along the main line. Hooks can be baited with fish such as aku (*Katsuwonis pelamis*) or bigeye scad (*Selar crumenopthalmus*); however, squid is the bait

typically used. Some fishermen may also suspend a chum bag containing chopped fish or squid above the highest hook to attract fish.

The typical vessel in the MHI bottomfish fleet is made of fiberglass and measures approximately 23 feet long, although there are a few larger full-time commercial vessels in the fishery (Hospital and Beavers, 2012). Specific bottomfish fishing locations favored by fishermen in the MHI vary seasonally according to sea conditions and the availability and price of target species.

3.2.2 Fishery Participants

Table 4 summarizes the number of CML holders reporting catch of non-Deep 7 bottomfish between 2009 and 2013, including the number of trips and total commercial catch, estimated price per/lb and estimated revenue by species and for the non-Deep 7 bottomfish stock complex as a whole. Since 2009, the number of fishers reporting catch of non-Deep 7 bottomfish has increased from 456 to a record high of 658 in 2012, dropping slightly to 610 in 2013. During this period, the number of trips have also declined from a high of 2,410 trips in 2010 down to 2,096 in 2013, while catch increased from 102,636 lb in 2009 to a record high of 158,245 in 2013. During this time, estimated revenue grew from $333,850 lb in 2009 to $639,071 in 2013, which appears to be driven primarily by the higher price per/lb for uku and butaguchi.

In fishing year 2013, 610 fishermen reported catching 158,245 lb of non-Deep 7 bottomfish valued at $639,071. For the most recent three year period (2011-2013), the fishery caught an average of 135,110 lb annually, and generated an annual average revenue of $559,613. Based on these values, the average price per pound of non-Deep 7 bottomfish in 2011-2013 was $4.14.

Table 4. Number of commercial fishers, trips, catch and revenue for MHI non-Deep 7 bottomfish by species (2009-2013).

Year	Non-Deep 7 species	No. CML holders[1] reporting catch	No. trips[1]	Total Commercial Catch (lb)[2]	Estimated Price per lb[2]	Estimated Revenue
2009	Uku	371	1,473	87,175	$3.45	$300,754
	Butaguchi	19	25	1,083	$2.02	$2,188
	Black ulua	15	15	549	$1.86	$1,021
	White ulua	184	529	13,794	$2.16	$29,795
	Yellowtail kalekale	10	12	35	$2.62	$92
	SUM	**456**	**1,912**	**102,636**	**--**	**$333,850**
2010	Uku	405	1,920	123,250	$3.92	$483,140
	Butaguchi	24	33	772	$3.07	$2,370
	Black ulua	16	24	3,348	$1.89	$6,328
	White ulua	199	668	17,986	$2.23	$40,109
	Yellowtail kalekale	4	4	27	$2.27	$61
	SUM	**491**	**2,410**	**145,383**	**--**	**$532,008**

Year	Non-Deep 7 species	No. CML holders[1] reporting catch	No. trips[1]	Total Commercial Catch (lb)[2]	Estimated Price per lb[2]	Estimated Revenue
2011	Uku	382	1,694	109,497	$4.43	$485,072
	Butaguchi	28	36	1,385	$3.56	$4,931
	Black ulua	15	17	1,554	$4.45	$6,915
	White ulua	188	580	18,904	$2.38	$44,992
	Yellowtail kalekale	8	9	51	$2.60	$132.60
	SUM	**616**	**2,116**	**131,391**	**--**	**$542,043**
2012	Uku	407	1,751	101,758	$4.52	$459,946
	Butaguchi	19	35	742	$4.30	$3,191
	Black ulua	19	26	827	$2.64	$2,183
	White ulua	177	554	12,368	$2.62	$32,404
	Yellowtail kalekale	4	5	0	0	0
	SUM	**658**	**2,154**	**115,695**	**--**	**$497,724**
2013	Uku	394	1,769	138,822	$4.21	$584,441
	Butaguchi	15	24	1,028	$4.56	$4,688
	Black ulua	14	27	1155	$2.79	$3,222
	White ulua	168	470	17,240	$2.71	$46,720
	Yellowtail kalekale	4	4	0	--	0
	SUM	**610**	**2,096**	**158,245**	**--**	**$639,071**
Avg. 2011-2013		**628**	**2,122**	**135,110**	**$4.14**	**$559,613**

[1]Source: HDAR (unpublished data)
[2]Source: Catch data for 2009-2011 was obtained from NMFS (2013). Catch data from 2012 and 2013, and estimated price per pound was obtained from NMFS WPacFIN website: http://www.pifsc.noaa.gov/wpacfin/hi/dar/Pages/hi_data_3.php, accessed 11/13/2014.

While there is a fair amount of data on the commercial fishing sector, there is very limited data on the non-commercial fishing sector. In 2008, NMFS as recommended by the Council implemented a mandatory permit and reporting requirement for the non-commercial bottomfish sector. Initially, NMFS issued 80 permits in 2008. Since then, the number permits issued have has declined precipitously.

Because federal regulations limit non-commercial fishermen to five Deep 7 bottomfish fish per trip bag limit, anecdotal information suggests non-commercial bottomfish fishermen have opted to obtain a State CML because it is comparable in cost to the federal non-commercial permit, but does not limit fishermen to five Deep 7 bottomfish per trip. Cost-earning surveys conducted by Hospital and Beavers (2012) report that over 20 percent of CML holders do not sell bottomfish indicating that a substantial number of CML holders are non-commercial. Therefore, it is possible that non-commercial catch of both Deep 7 and non-Deep 7 bottomfish is being reported through the CML system rather than through federal non-commercial logbooks.

Table 5 summarizes the number of federal non-commercial bottomfish permits issued by NMFS between 2008 and 2014, the number of federal permit holders reporting catch of any BMUS, including the number of trips and estimated non-commercial catch of Deep 7 and non-Deep 7 bottomfish. During the most recent three year 2011-2013, there was no non-commercial bottomfish fishing activity reported by the federal permit holders.

Table 5. Number of MHI non-commercial fishers, trips and reported BMUS catch (2008-2014)

Year	No. of Federal Permits Issued	No. of Permits Reporting Catch of BMUS	No. of Trips in the MHI EEZ	Total Reported Logbook Catch (lb)	
				Deep 7 Bottomfish (from Sept 1-Aug. 31 the following year)	*Non-Deep 7 Bottomfish (from Jan. 1 to Dec. 31)*
2008	80	4	9	182	32
2009	59	4	17	309	10
2010	22	confidential	confidential	confidential	confidential
2011	18	0	0	0	0
2012	10	0	0	0	0
2013	3	0	0	0	0
2014	2	0	0	0	0

Source: Kawamoto and Sender (2015)

3.2.3 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.

3.2.4 Fishery Administration and Enforcement

Fishing for BMUS in federal waters around the MHI is managed by regulations implemented by both the State of Hawaii and NMFS. In general, commercial bottomfish fishing in federal waters is managed almost exclusively though measures implemented by the State of Hawaii, which include a commercial license and reporting requirements and 12 bottomfish restricted fishing areas (BRFA) where all fishing, including non-commercial fishing is prohibited.

Federal requirements in 50 Code of Federal Regulations (CFR) 665 generally pertain to non-commercial fishing and require non-commercial bottomfish fishermen in Hawaii to obtain a federal permit and report all catch, and adhere to a bag limit of no more than 5 Deep 7 bottomfish per trip. Federal laws also prohibits the use of bottom trawls and bottom set gillnets.

Although both Deep 7 and non-Deep 7 bottomfish are typically harvested together during a bottomfish-fishing trip, for management purposes NMFS and the Council manage the Deep 7 bottomfish and non-Deep 7 bottomfish as two separate stock complex with separate ACLs and AMs. For the non-Deep 7 bottomfish complex, the fishing year begins January 1 and ends December 31 annually. For the Deep bottomfish stock complex, the fishing begins on September 1 and ends August 31 the following year. 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.

Federal law also requires the Council-appointed Hawaii FEP plan team to prepare an annual report on the performance of all federal fisheries, including MHI bottomfish fisheries 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.

3.3 Protected Resources

3.3.1 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 6 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 6. 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 haul out 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.
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

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**
			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 Bottomfish Fisheries

To date, there have been no observed or reported interactions between MHI bottomfish fisheries and ESA-listed species. In a biological opinion covering MHI bottomfish fishery dated March 18, 2008, NMFS determined that except for the Hawaiian green sea turtles, the fishing activities conducted bottomfish fishing activities are not likely to adversely affect any other ESA-listed marine species that may be found in federal waters of the MHI, or result in the destruction or adverse modification of critical habitat.

For green sea turtles, NMFS determined that there is a potential for them to be killed by vessel transiting State waters in route to and from federal waters around the MHI and authorized an incidental take of up to two green sea turtles per year. However, this analysis was based on an estimated 71,800 bottomfish fishing trips per year. As shown in Tables 4 and 5, the total annual number of commercial and non-commercial bottomfish fishing trips since 2008 has been less than 3,500 per year. Therefore, the potential for collisions with bottomfish fishing vessels is substantially lower than that estimated in the 2008 BiOp and is expected to be negligible.

In 2013, NMFS re-initiated consultation under ESA in response to listing of MHI insular false killer whale distinct population segment under the ESA. In a modification to the 2008 BiOp dated August 7, 2013, NMFS determined that determined that commercial and non-commercial bottomfish fisheries in the MHI that operate in accordance with regulations implementing the Hawaii FEP are not likely to adversely affect MHI insular false killer whale because of the spatial separation between the species and bottomfish fishing activities and low likelihood of collisions, the lack of observed or reported fishery interactions among other reasons.

On June 2, 2011 (76 FR 32026) NMFS 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 yet 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 commercial and non-commercial bottomfish fisheries in the MHI would not result in the destruction or adverse modification of critical habitat.

3.3.2 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 7, provides a list of marine mammals known to occur or reasonably expected to occur in waters around the Hawaiian Archipelago that have the potential to interact with bottomfish fisheries in the MHI.

The commercial and non-commercial bottomfish fisheries in the MHI are not known to have the potential for a large and adverse effect on non-ESA listed marine mammals listed in Table 7. Although these species occur in EEZ waters where these operate, no reported or observed interactions have occurred. Similarly, there have been no observed or reported interactions between the fishery and ESA listed marine mammals listed in Table 6 above.

Table 7. 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**	**Interactions with MHI bottomfish fishery**
Blainville's beaked whale	*Mesoplodon densirostris*	No interactions observed or reported.
Bottlenose dolphin	*Tursiops truncatus*	No interactions observed or reported.
Bryde's whale	*Balaenoptera edeni*	No interactions observed or reported.
Common dolphin	*Delphinus delphis*	No interactions observed or reported.
Cuvier's beaked whale	*Ziphius cavirostris*	No interactions observed or reported.
Dall's porpoise	*Phocoenoides dalli*	No interactions observed or reported.
Dwarf sperm whale	*Kogia sima*	No interactions observed or reported.
False killer whale (other than MHI Insular DPS)	*Pseudorca crassidens*	No interactions observed or reported.

Non-ESA-listed marine mammals known to occur or reasonably expected to occur in waters around the MHI		
Common Name	**Scientific Name**	**Interactions with MHI bottomfish fishery**
Fraser's dolphin	*Lagenodelphis hosei*	No interactions observed or reported.
Killer whale	*Orcinus orca*	No interactions observed or reported.
Longman's beaked whale	*Indopacetus pacificus*	No interactions observed or reported.
Melon-headed whale	*Peponocephala electra*	No interactions observed or reported.
Minke whale	*Balaenoptera acutorostrata*	No interactions observed or reported.
Pantropical spotted dolphin	*Stenella attenuate*	No interactions observed or reported.
Pygmy killer whale	*Feresa attenuata*	No interactions observed or reported.
Pygmy sperm whale	*Kogia breviceps*	No interactions observed or reported.
Risso's dolphin	*Grampus griseus*	No interactions observed or reported.
Rough-toothed dolphin	*Steno bredanensis*	No interactions observed or reported.
Short-finned pilot whale	*Globicephala macrorhynchus*	No interactions observed or reported.
Spinner dolphin	*Stenella longirostris*	No interactions observed or reported.
Spotted dolphin	*Stenella attenuata*	No interactions observed or reported.
Striped dolphin	*Stenella coeruleoalba*	No interactions observed or reported.

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

Applicable MMPA Coordination – Hawaii Bottomfish 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 2015 which classified the Hawaii bottomfish handline fishery as a Category III

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 bottomfish fishery in any way and therefore will not introduce impacts not previously considered in prior MMPA determinations.

3.3.3 Seabirds of the Hawaiian Archipelago

Seabirds found on and around Hawaii that could potentially interact with fisheries are listed in Table 8. 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 MHI bottomfish fishery. In addition, bottomfish fishing gear is deployed close to the vessel and does not afford much opportunity for seabirds to attack the bait. When bottomfish fishing, a weighted mainline is deployed vertically over the side of the vessel and it sinks rapidly beyond the range of a diving seabird. It is retrieved rapidly with electric or hydraulic pullers. The time that bait is within the range of a diving seabird is limited, and the proximity of the vessel hull is a significant deterrent. There have been no reports of interactions between the MHI bottomfish fishery and seabirds.

Table 8. 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*
R	White-tailed tropicbird	*Phaethon lepturus*

Seabirds of the Hawaiian Archipelago (R= Resident/Breeding; V= Visitor; Vr=rare visitor; Vc= Common visitor)		
	Common name	***Scientific name***
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 2009

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 Potential Impacts to Target and Non Target Stocks

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

Currently, NMFS has not specified an ACL and AM for the non-Deep 7 bottomfish fishery for fishing year 2015. Under the no-action alternative, an ACL would not be specified for the the MHI non-Deep 7 bottomfish fishery and AMs would not be necessary. However, NMFS and the Council would continue to monitor catches based on all available sources of information. Under this alternative, the lack of an ACL or AMs in fishing year 2015 though 2018 is not likely to result in overfishing of MHI non-Deep 7 bottomfish in any year. As shown in Table 3, non-Deep 7 bottomfish catches have steadily increased since 2006, peaking in 2013 with a record high catch of 158,245 lb. For the most recent three-year period (2011-2013), the average annual non-Deep 7 bottomfish catch was 135,110 lb. During 2011-13, the fishery remained open year round. These levels of catch are well below the OFL proxy of 259,200 lb and the MSY of 265,000 lb. Under this alternative, MHI non-Deep 7 bottomfish catch in 2015 through 2018 is expected be similar to the average harvest from 2011-2013, and would be sustainable.

Under this alternative, impacts to non-target stocks are expected to continue at low levels and consists of primarily bycatch of BMUS that are known to be ciguatoxic and have little or no market value (i.e., kahala, butaguchi and white ulua), and sharks which are released alive. Ogoing fisheries monitoring by the Council's FEP plan team will help fishery scientists and managers to detect any increase in non-target or bycatch and, address them in future management measures, as needed. 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.

Alternative 2: Specify 2014 ACL of 140,000 lb (Status Quo/NEPA Baseline)

Under Alternative 2, NMFS would specify an ACL of 140,000 lb of MHI non-Deep 7 bottomfish 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 140,000 lb is associated with a less than 15 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 non-Deep 7 bottomfish 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. However, six months after the each fishing year, data would become available for NMFS and the Council to determine whether the ACL in the previous year was exceeded.

Based on past fishery performance shown in Table 3, MHI non-Deep 7 bottomfish catch in 2015 through 2018 is expected be similar to the catch attained in 2013, which was 158,245 lb. This level of catch is well below the OFL proxy of 259,200 lb and the MSY of 265,000 lb, and would not result in overfishing.

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, because the ACL of 140,000 lb was developed using a different method than is proposed under the preferred alternative (Alternative 3) and without knowledge of the estimate of MSY and OFL, if NMFS and the Council determine catch exceeded the ACL proposed under this alternative, the Council is not expected to recommend as an AM, NMFS reduce the ACL in the subsequent fishing year by the amount of the overage. This is because an ACL 140,000 lb is now considered overly conservative based on the best scientific information available as described in Section 2.2.1. If the Council does recommend a reduced ACL, any ACL less than 140,000 lb would have less than a 15 percent probability of overfishing. However, because in-season AMs to prevent the ACL from being exceeded are 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, including bycatch.

Alternative 3: Specify Council Recommended ACL of 178,000 lb (Preferred)

Under Alternative 3 (the Council's and NMFS' Preferred Alternative), NMFS would specify an ACL at 178,000 lb of MHI non-Deep 7 bottomfish 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 178,000 lb is associated with less than a 30 percent probability of overfishing (Table 1). Under this alternative, NMFS and the Council would continue to monitor catches of non-Deep 7 bottomfish 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. However, six months after the each fishing year, data would become available for NMFS and the Council to determine whether the ACL in the previous year was exceeded.

Based on past fishery performance shown in Table 3, MHI non-Deep 7 bottomfish catch in 2015 through 2018 is expected be similar to the catch attained in 2013, which was 158,245 lb and below the proposed ACL of 178,000. This level of catch is well below the OFL proxy of 259,200 lb and the MSY of 265,000 lb, and would not result in overfishing. Therefore, because there would not be a closure of the fishery under Alternative 3 in any of the next 4 years, the fishery would not change and impacts to target and non-target stocks, including bycatch would be identical to the impacts under Alternative 2 (status quo), which is identical to the impacts under Alternative 1 (no action).

Under this alternative, if the Council determines the most recent three-year average catch for MHI non-Deep 7 bottomfish 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 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, including bycatch are described in Alternative 4 below.

Alternative 4: Specify ACL between 112,200 lb and 172,300 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 172,300 lb (probability of overfishing of 25 percent should the entire ACL be caught) down to 112,200 lb (probability of overfishing of 5 percent should the entire ACL be caught) (Table 1). Because the OFL proxy for MHI non-Deep 7 bottomfish is 259,200 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.

4.2 Potential Impacts to Fishery Participants and Fishing Communities

In fishing year 2013, fishermen reported catching and selling 158,245 lb of non-Deep 7 bottomfish valued at $639.071 (Table 4). In this year, the commercial price per pound for non-Deep 7 bottomfish ranged between $2.71 (for white ulua) to $4.21 (for uku). Based on a value of $639,071, the average price per/lb of non-Deep 7 bottomfish in 2013 was approximately $4.04.

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

Under the no-action alternative, an ACL would not be specified for Hawaii non-Deep 7 bottomfish stock and AMs would not be necessary. Therefore, fishing would continue throughout the entire fishing year. As shown in Table 3, the highest recorded catch occurred in 2013 when 158,245 lb of Hawaii non-Deep 7 bottomfish were caught. If there was no ACL, catches could reach or surpass 2013 levels. Using the 2013 average price per pound of $4.04, the expected annual fleet-wide revenue during 2015-2018 under Alternative 1 could be at least $639,071 if the record high of 158,245 lb of non-Deep 7 bottomfish was caught.

The MHI non-Deep 7 bottomfish fishery provides bottomfish for sustenance, and other gifts, and allows some fish to enter local markets. This provides positive social and economic benefits to fishermen, buyers and fishing communities in Hawaii. The operation of the bottomfish fishery is not know to impact public health or safety.

Alternative 2: Specify 2014 ACL of 140,000 lb (Status Quo/NEPA Baseline)

Under Alternative 2, NMFS would specify an ACL of 140,000 lb of MHI non-Deep 7 bottomfish for fishing years 2015 through 2018. 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. Although six months after the each fishing year, data would become available for NMFS and the Council to determine whether the ACL in the previous year was exceeded, even if a lower ACL was implemented, NMFS and the Council are not proposing AMs that include a fishery closure. Therefore, fishers would be able to fish throughout the fishing year in the same manner as under Alternative 1. For this reason, MHI non-Deep 7 bottomfish catch in 2015 through 2018 is expected be similar to the catch attained in 2013, which was 158,245 lb and is expected to produce an annual fleet-wide revenue of $639,071. Therefore, under Alternative 2, the impacts to fishery participants and the fishing communities of Hawaii would be identical to the impacts under Alternative 1 (no action).

Alternative 3: Specify Council Recommended ACL of 178,000 lb (Preferred)

Under Alternative 3 (the Council and NMFS' Preferred Alternative), NMFS would specify an ACL at 178,000 lb of MHI non-Deep 7 bottomfish for fishing years 2015 through 2018. Using the 2013 price per pound of $4.04, the potential annual fleet-wide revenue during 2015-2018 under Alternative 3 would be $719,120 if this level of catch is reached in any fishing year. However, under this alternative, MHI non-Deep 7 bottomfish catch in 2015 through 2018 is expected be similar to the catch attained in 2013, which was 158,245 lb and is expected to produce an annual fleet-wide revenue of $639,071. Therefore, under Alternative 3, the impacts to fishery participants and the fishing communities of Hawaii would be identical to the impacts under Alternative 2 (status quo), which is identical to the impacts under Alternative 1 (no Federal management action). Although six months after the each fishing year, data would become available for NMFS and the Council to determine whether the ACL in the previous year was exceeded, even if a lower ACL was implemented, NMFS and the Council are not proposing AMs that include a fishery closure.

Alternative 4: Specify ACL between 112,200 lb and 172,300 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 ACL could range from 172,300 lb down to 122,200 lb.

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. Although six months after the each fishing year, data would become available for NMFS and the Council to determine whether the ACL in the previous year was exceeded, even if a lower ACL was implemented, NMFS and the Council are not proposing AMs that include a fishery closure. Therefore, fishers would be able to fish throughout the fishing year in the same manner as under Alternative 1 and Alternative 2. For this reason, regardless of what level the ACL is set, MHI non-Deep 7 bottomfish catch in 2015 through 2018 is expected be similar to the catch attained in 2013, which was 158,245 lb and is expected to produce an annual fleet-wide revenue of $639,071. In other words, the impacts to fishery participants and fishing communities of Hawaii under Alternative 4 would be identical to the impacts under Alternative 2 (status quo), which is 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.

4.3 Potential Impacts to Fishery Administration and Enforcement

Under all alternatives considered, NMFS and the Council would continue to monitor catches of MHI non-Deep 7 bottomfish 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 bottomfish fisheries, including the commercial and non-commercial fishing sector by June 30 of each year. Additionally, all other regulations implemented by other federal agencies and the State of Hawaii would continue to apply bottomfish fishing vessels 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, this 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. Additional fishery enforcement would not be needed for any alternative because the Council and NMFS are not proposing to implement a fishery closure.

4.4 Potential Impacts to Protected Resources

To date, there have been no observed or reported interactions between MHI bottomfish fisheries and protected species described in Section 3.3. In a 2008 BiOp prepared for the fishery, NMFS determined that except for the Hawaiian green sea turtle, bottomfish fishing activities are not likely to adversely affect any other ESA-listed marine species that may be found in federal waters of the MHI, or result in the destruction or adverse modification of critical habitat. For green sea turtles, NMFS determined that there is a potential for them to be killed by vessel transiting State waters enroute to and from federal waters around the MHI and authorized an incidental take of up to two green sea turtles per year. However, this analysis was based on an estimated 71,800 bottomfish fishing trips per year.

As shown in Tables 4 and 5, the total annual number of commercial and non-commercial bottomfish fishing trips since the 2008 has been less than 3,500 per year. Therefore, the potential for collisions with bottomfish vessels is substantially lower than estimated in the 2008 BiOp and is unlikely to occur.

In 2013, NMFS re-initiated consultation under ESA in response to listing of MHI insular false killer whale distinct population segment under the ESA. In its modification to the 2008 BiOp dated August 7, 2013, NMFS determined that determined that commercial and non-commercial bottomfish fisheries in the MHI are not likely to adversely affect MHI insular false killer whale because of the spatial separation between the species and bottomfish fishing activities, the low likelihood of collisions, and the lack of observed or reported fishery interactions among other reasons.

None of the ACL or AM alternatives considered would modify operations of the Hawaii non-Deep 7 bottomfish fishery in any way that would be expected to affect endangered or threatened species or critical habitat in any manner not previously considered in previous ESA consultations or MMPA determinations described in Section 3.3.

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 therefore, there is no in-season closure being proposed. Therefore, participants in the MHI non-Deep 7 bottomfish fishery would continue to fish as they do under the Alternative 1 (No Action) and Alternative 2 (Status Quo). 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 9 provides a comparison of the potential impacts of the MHI non-Deep 7 bottomfish alternatives on elements of the affected environment.

Table 9. MHI Non-Deep 7 Bottomfish Alternative Comparison Tables.

Topic	Alternative 1 (No Action)	Alternative 2 (Status Quo)	Alternative 3 (Preferred)	Alternative 4 (Lower than Preferred)
ACL specification	No ACL	140,000 lb	178,000 lb	112,200 to 172,300 lb
AM	No AM	Council would take action to address and 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 2013 catch of 158,245 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	2013 catch of 158,245 lb has less than a 25% probability of overfishing	<15%	<30%	5 to 25%
Impact to non-target stock	Low	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

4.5 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 the 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 10.

At its 154th meeting held June 2012, the Council recommended amending the Hawaii FEP to refine the EFH descriptions for Hawaii bottomfish and seamount groundfish and modify the extent of HAPC designations for these stocks. However, the recommended revisions would not change the overall designation of EFH shown in Table 11 below. While the Council recommended additional HAPC be added, such designations are a subset of EFH and would do not result in any changes to management or administrative requirements. Until the amendment is transmitted to by the Council for Secretarial review, and approved by the Secretary, the EFH/HAPC designations summarized in Table 7 below remains in effect.

Table 10. EFH and HAPC for Hawaii FEP MUS

MUS	Species Complex	EFH	HAPC
Bottomfish MUS	**Deep 7 bottomfish species:** ehu (*Etelis carbunculus*), onaga (*Etelis coruscans*), opakapaka (*Pristipomoides filamentosus*), , kalekale (*P. sieboldii*), gindai (*P. zonatus*), hapuupuu (*Epinephelus quernus*), lehi (*Aphareus rutilans*) **Non-Deep 7 bottomfish species:** uku (*Aprion virescens*), thicklip trevally (*Pseudocaranx dentex*), giant trevally (*Caranx ignoblis*), black trevally (*Caranx lugubris*), amberjack (*Seriola dumerili*), taape (*Lutjanus kasmira*), yellowtail kalekale (*P. auricilla*)	**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° N **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:** 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
Crustaceans MUS	**Deepwater:** (*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):** black coral (*Antipathes dichotoma*), black coral (*Antipathis grandis*), black coral (*Antipathes ulex*) **Deep-water precious corals (150–750 fm):** 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

Source: WPFMC (2009)

To prevent and minimize adverse bottomfish fishing impacts to EFH, each western Pacific FEP prohibits the use of explosives, poisons, bottom trawl and other non-selective and destructive fishing gear. Weighted lines or baited hooks may come into contact with bottom substrates, including coral reefs or mesophotic coral communities during bottomfish fishing operations, and may impact EFH and HAPC. However, research studies to date indicate that bottomfish fishing operations, including gear deployment and a low level of anchor loss are not known to have adverse impacts to EFH (Kelley and Moffitt, 2004; Kelley and Ikehara, 2006).

Bottomfish fishgn methods are not know to cause damage to the ocean, coastal habitats, corals, or marine habitats including designated EFH and HAPC. None of the alternatives, including the preferred alternative (Alternative 3) is expected to change the way in which fisheries are conducted. For this 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 habitats, areas designated as EFH, including bottom substrates, coral reefs,

mesophotic coral communities, 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, the proposed ACL of 178,000 lb for MHI non-Deep 7 bottomfish is higher than recent harvests, but lower than current MSY (265,000 lb) and OFL (259,200 lb) estimates. 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 bottomfish 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 MHI non-Deep 7 bottomfish are being managed and harvested sustainably. MHI non-Deep 7 bottomfish 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 MHI bottomfish fisheries and none of the alternatives is expected to result in impacts to these environmental features. The proposed ACLs and AMs would not result in changes to the MHI bottomfish fishery and would not have large adverse impacts to resources of scientific, historic, cultural, or ecological importance.

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 federal waters of the MHI where bottomfish fishing activities are conducted. Shipwrecks and other objects from the December 7, 1941 attack at Pearl Harbor could possibly occur in federal waters around Oahu. However, bottomfish fishing in the MHI is not known to result in adverse impacts to scientific, historic, archeological or cultural resources because fishermen fish for bottomfish on high-relief, deep slopes where such objects would not be found or come to rest. Because the proposed ACL and AM would not result in changes to MHI bottomfish fisheries, none of the alternatives is expected to result in large adverse impacts to resources of scientific, historic, cultural, or ecological importance. Bottomfish fishing in marine protected areas would continue to be restricted by State laws, and fishing in general will continue to be subject to state commercial license and/or federal non-commercial permit and reporting, and joint state/federal monitoring to 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 Multi-year ACL and AM for MHI non-Deep 7 Bottomfish

The specification of a multi-year ACL and AM for MHI non-Deep 7 bottomfish fisheries in 2015, 2016, 2017 and again in 2018, is not expected to result in cumulative environmental effects to the health of MHI non-Deep 7 bottomfish. This is because the proposed action would set the ACL for substantially lower than the stock's estimated MSY (265,000 lb) OFL proxy (259,200 lb), and annual catches in fishing years 2015-2018 are expected to remain below the proposed ACLs.

4.8.2 ACL and AM Specifications for MHI Deep 7 Bottomfish Fisheries

As noted in Section 1.3 (Proposed Action), NMFS plans to specify an ACL and AMs for commercial and non-commercial fisheries for MHI Deep 7 bottomfish in fishing years 2014-15 and 2015-16 through a separate action. This is because the fishing year for Deep 7 bottomfish is not on a calendar year like non-Deep 7 bottomfish, but rather, begins September 1 and ends August 31 annually. Specifically, NMFS would propose to specify an ACL of 346,000 lb as recommended by the Council.

Unlike the non-Deep 7 bottomfish fishery, NMFS, the Council and the State of Hawaii do have the ability to monitor catch of Deep 7 bottomfish in near real time. Therefore, when the Deep 7 ACL is projected to be reached, NMFS as an AM, would prohibition fishing for Deep 7 bottomfish in federal waters while state law allows the State of Hawaii to implement a similar prohibition in nearshore waters under its jurisdiction.

The proposed action described in this EA not expected to result in cumulative effects to MHI Deep 7 bottomfish. This is because MHI non-Deep 7 bottomfish catch in 2015 through 2018 is expected be similar to the catch attained in 2013 (158,245 lb), and remain below the proposed ACL of 178,000. Therefore, it is unlikely that the proposed action would result in changes in the conduct of MHI bottomfish fisheries, including gear types used, areas fished, level of catch or effort, or create conditions for fishermen to increase harvest of Deep 7 bottomfish in 2015-2018.

Similarly, the specification of an ACL of 346,000 lb and AMs for MHI Deep 7 bottomfish fisheries in fishing year 2014-15 and again in fishing year 2015-16, is not expected to result in cumulative effects to MHI non-Deep 7 bottomfish. This is because annual catches in each of the two years are expected to remain below the proposed ACLs. As such, an in-season AM is not expected to be triggered, thus allowing fishermen to fish for Deep 7 bottomfish throughout the fishing year. Therefore, it is unlikely that the specification of an ACL and AM for MHI Deep 7 bottomfish would result in changes in the conduct of MHI bottomfish fisheries, including gear types used, areas fished, level of catch or effort, or create conditions for fishermen to increase harvest of Deep non-7 bottomfish. Information on the proposed ACL and AM for MHI Deep 7 bottomfish can obtained from NMFS or the Council by request or at www.regulations.gov using the regulatory identification number RIN 0648-XD082.

4.8.3 ACL and AM Specifications for Other Hawaii FEP Fisheries

In addition to the ACLs and AMs for MHI non-Deep 7 bottomfish being considered in this EA, NMFS will propose to implement the Council's ACL and AM recommendations for all other Hawaii fisheries for 2015-18 including crustacean fisheries (spiny lobster, slipper lobster, Kona crab and deepwater shrimp), precious coral fisheries (black coral, pink coral, and bamboo coral), and coral reef fisheries. These fisheries have been managed using ACLs and AMs since 2012; and these specifications do not have unknown or uncertain impacts, and do not interact with the MHI Deep 7 bottomfish fishery in any way. Information on the proposed ACLs and AMs for these fisheries can be obtained from NMFS or the Council by request, or at www.regulations.gov using the regulatory identification number (RIN) 0648-XD558.

The MHI non-Deep 7 bottomfish fishery does not overlap with these other fisheries to a large extent such that ACLs and AMs in the non-Deep 7 bottomfish fishery would result in more fishing in these other fisheries or in the pelagic fisheries. For this reason, the impacts of the proposed MHI non-Deep 7 bottomfish ACL and AM can be considered separately from the ACL and AM specifications for Hawaii crustacean, precious coral, and coral reef fisheries.

4.8.4 Foreseeable Management Actions Related to Hawaii FEP fisheries

In the foreseeable future, the Council may re-evaluate the need for conservation and management for all Hawaii FEP MUS and may recommend NMFS remove certain MUS that are not harvested in EEZ waters from the Hawaii FEP and/or re-classify such 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 and AM requirements.

4.8.5 Other Foreseeable NOAA/NMFS Management Actions

On June 2, 1011 (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 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 critical habitat on the MHI bottomfish fisheries. However, a designation of critical habitat for monk seals in the MHI would not affect the NMFS requirement to specify ACLs and AMs for Hawaii FEP fisheries.

While recent quantitative fatty acid signature analysis results indicate that monk seals consume a wide range of species including certain species of bottomfish (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 continues to decline in the NWHI where fishing has been prohibited.

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 bottomfish fishery 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 bottomfish fisheries is likely to occur 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.

4.8.6 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 MHI non-Deep 7 bottomfish 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.

4.8.7 Climate Change

Changes in the environment from global climate change have the potential to affect MHI bottomfish 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 MHI bottomfish catches are sustainable, regardless of environmental conditions.

The impacts to MHI bottomfish 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 bottomfish is not expected to be adversely affected by climate change. Recent catches relative to MSY and OFL estimates 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 MHI non-Deep 7 bottomfish stocks (including fishing), is not expected to result in a large and adverse cumulative impact on MHI non-Deep 7 bottomfish stocks. The proposed action under each alternative is not expected to change the fishery and therefore, none of the action alternatives would result in changes in climate change-promoting gas emissions.

4.8.8 Other Considerations

Potential for the introduction or spread of a non-indigenous species

MHI bottomfish fisheries are not known to result in the introduction or spread of non-indigenous species and regardless of alternative selected, NMFS does not anticipate the federal action would

result in changes in the conduct of the fishery in terms of gear types used, areas fished, level of catch or effort as compared to baseline conditions.

Potential to result in a precedent for future actions with large adverse effects or represent a decision in principle about a future consideration

The federal action is needed to comply with provisions of the Magnuson-Stevens Act and is consistent with federal regulations implementing the FEPs at 50 CFR 665.4 through which NMFS specifies ACLs and AMs. Since 2012, NMFS has specified an ACL and post-season AMs for MHI non-Deep 7 bottomfish so the proposed federal action does not establish a precedent regarding how the fishery is managed. Operation of the fishery under ACLs and AMs does not result in a decision in principle about future considerations because the fishery will continue to be monitored. Each year, NMFS and the Council will evaluate catches against the ACL and may reduce the ACL in a subsequent year in order to mitigate overages of an ACL if it occurs. MHI bottomfish fisheries as managed under ACLs and AMs are not expected to result in overfishing or in stocks that become overfished. Furthermore, the specification of an ACL and AM in one year would not automatically result in a specific ACL or AM in other future years. As described above, NMFS does not anticipate the federal action would result in changes in the conduct of the fishery in terms of gear types used, areas fished, level of catch or effort as compared to baseline conditions.

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 Reviewer

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Jarad Makaiau, Fishery Policy Analyst, PIRO, SFD (preparer)
Phyllis Ha, NEPA Specialist, PIRO, SFD NEPA (reviewer)
Michelle McGregor, Regional Economist, PIRO, SFD (reviewer)

5.3 Coordination with Others

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
- Guam Department of Agriculture, Division of Aquatic and Wildlife Resources
- Hawaii Department of Land and Natural Resources, Division of Aquatic Resources
- Northern Marina Island Department of Land and Natural 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 Hawaii non-Deep 7 bottomfish has taken place in public meetings of the SSC and the Council. In addition, the Council advertised the need to focus on federal annual catch limits 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 comments from one commercial bottomfish fisherman on how the ACL incorporates changes in historical catches. 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 MHI bottomfish fisheries managed under the Hawaii FEP for potential impacts on ESA-listed species under the jurisdiction of NMFS. Table 11 summarizes ESA Section 7 consultations for Hawaii bottomfish fisheries managed under the Hawaii FEP.

Table 11. ESA Section 7 consultations for Hawaii bottomfish fisheries.

Fishery	Consultation	NMFS Determination
MHI bottomfish fishery	March 18, 2008, Biological Opinion as modified on August 7, 2013.	Likely to adversely affect green sea turtles only; but not likely to jeopardize the continued existence of any ESA-listed species or adversely modify critical habitat

Because the proposed action is not expected to modify vessel operations or other aspects of any fishery, NMFS does not expect the bottomfish fisheries in Hawaii as conducted under the

proposed action, to have an effect on ESA listed species or any designated critical habitats that was not considered in prior consultations.

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 2015 which classified the Hawaii bottomfish handline fishery as a Category III 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. Because the proposed action would not modify vessel operations or other aspects of any fishery, commercial and non-commercial fisheries for MHI non-Deep 7 bottomfish, as conducted under the proposed action, are not expected to affect marine mammals in any manner not previously considered or authorized under 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 program of Hawaii, and submitted this determination on June 1, 2015, for review by the appropriate agencies under section 307 of the CZMA. On June 8, 2015, Hawaii responded that it considers the proposed action to be an implementing measure of the Hawaii FEP, which the Hawaii CZM Program previously reviewed and issued a consistency determination and, therefore, is not subject to the federal consistency review by the Hawaii CZM Program.

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 the MHI that are listed on or eligible for listing on the National Register of Historic Places. Bottomfish fishing is not known to have a damaging impact on the marine environment, including any man-made resources or structures. None of the alternatives would change the manner in which any lobster fishery is conducted.

Therefore, the proposed action is would have no potential to effect historic places 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; and to determine ways to minimize adverse impacts. The assessment is done via the preparation of an Initial Regulatory Flexibility Analyses (IRFA) 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.

In general, the relative importance of MHI bottomfish to commercial participants as a percentage of overall fishing or household income is unknown, as the total suite of fishing and other income-generating activities by individual operations across the year has not been examined. However, based on available information presented in this EA, NMFS has determined that all vessels participating in the MHI bottomfish fishery 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 $20.5million, the small business size standard for finfish fishing.

Even though this proposed ACL and AM would apply to a substantial number of vessels, i.e., 100 percent of the bottomfish fleet, 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 wait period from the time a final rule is published until it becomes effective, with rare exceptions.

The specification of ACLs for non-Deep 7 bottomfish in the MHI complies with the provisions of the APA through the Council's extensive use of public meetings, requests for comments, and consideration of comments in developing ACL and AM recommendations. Additionally, NMFS will publish a proposed rule announcing the proposed ACL and AM specifications described in this document which will include requests for public comments. After considering public comments, NMFS expects to publish a final rule that would then 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 non-Deep 7 bottomfish 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 Hawaii non-Deep 7 bottomfish 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 non-Deep 7 bottomfish in Hawaii. Specification of the ACLs and post-season reviews are expected to benefit the target resources and, therefore, the human communities that rely on their harvest. 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 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 an ACL and AM for MHI non-Deep 7 bottomfish 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 Results of the Biomass Augmented Catch-MSY Model

Tables A-1 below summarize the maximum sustainable yield estimate and risk of overfishing percentages for MHI Deep 7 bottomfish presented in WPFMC (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).

MSY Estimate: 265,000 lb	
Risk of overfishing (%)	**Corresponding Catch (lb)**
50%	259,200
45%	239,900
40%	221,200
35%	203,700
30%	187,100
25%	172,300
20%	158,100
15%	144,500
10%	129,900
5%	112,200

Appendix B 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 siga-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.

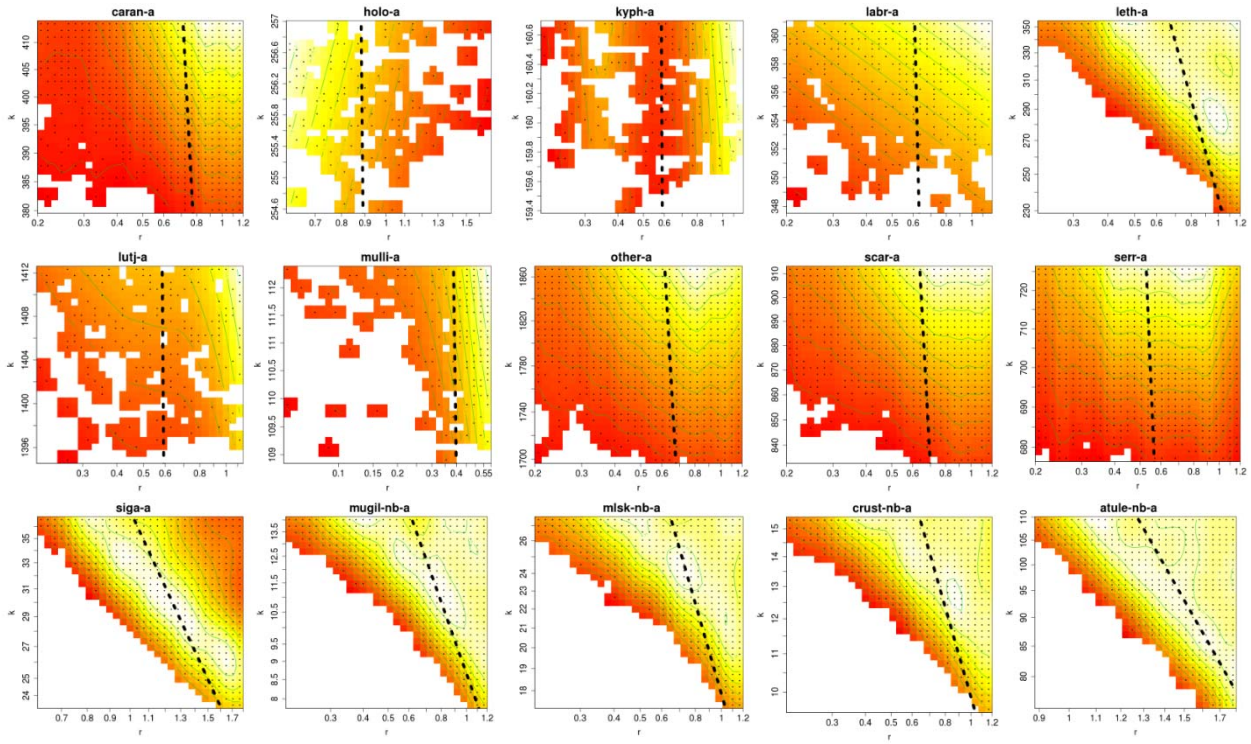

Figure 1. Density of plausible r-k combinations for the different families of reef fish and reef associated organisms using k-revise method A. Dashed lines show the locus of points corresponding to the estimated MSY.

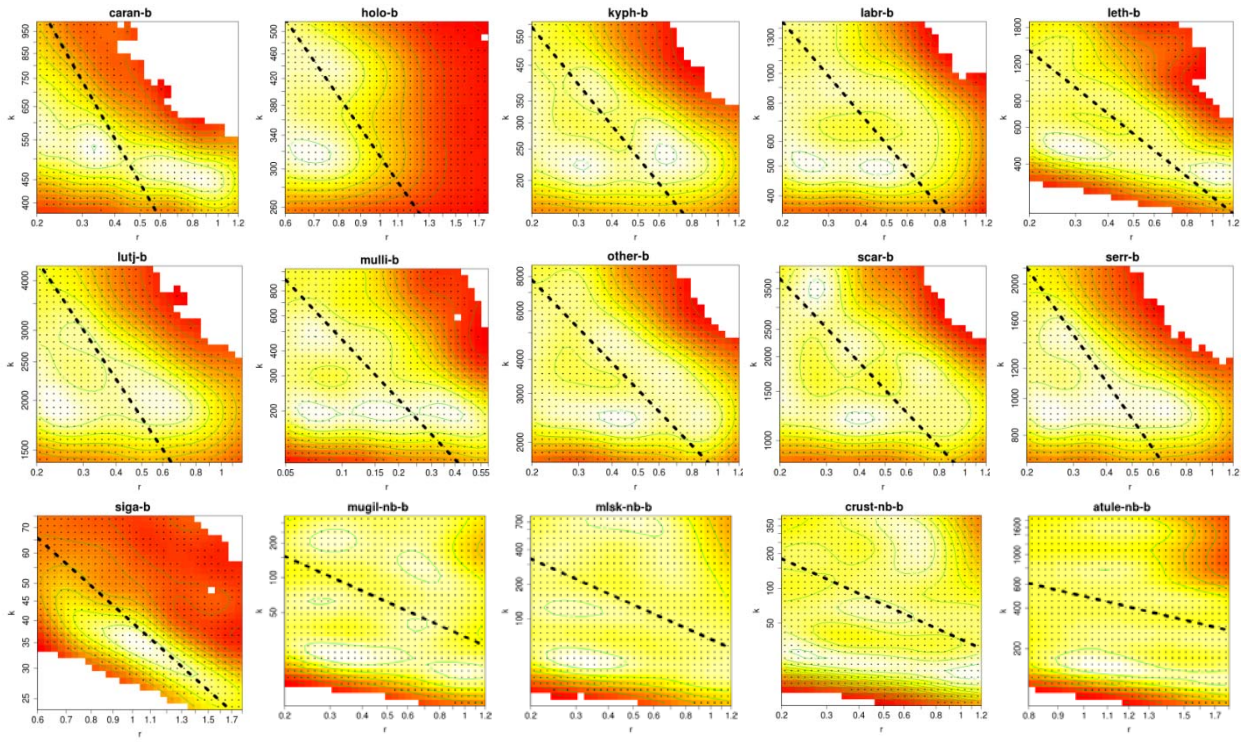

Figure 2. Density of plausible r-k combinations in r-k space for the different families of reef fish and reef associated organisms using k-revise method B. Dashed lines show the locus of points corresponding to the estimated MSY.

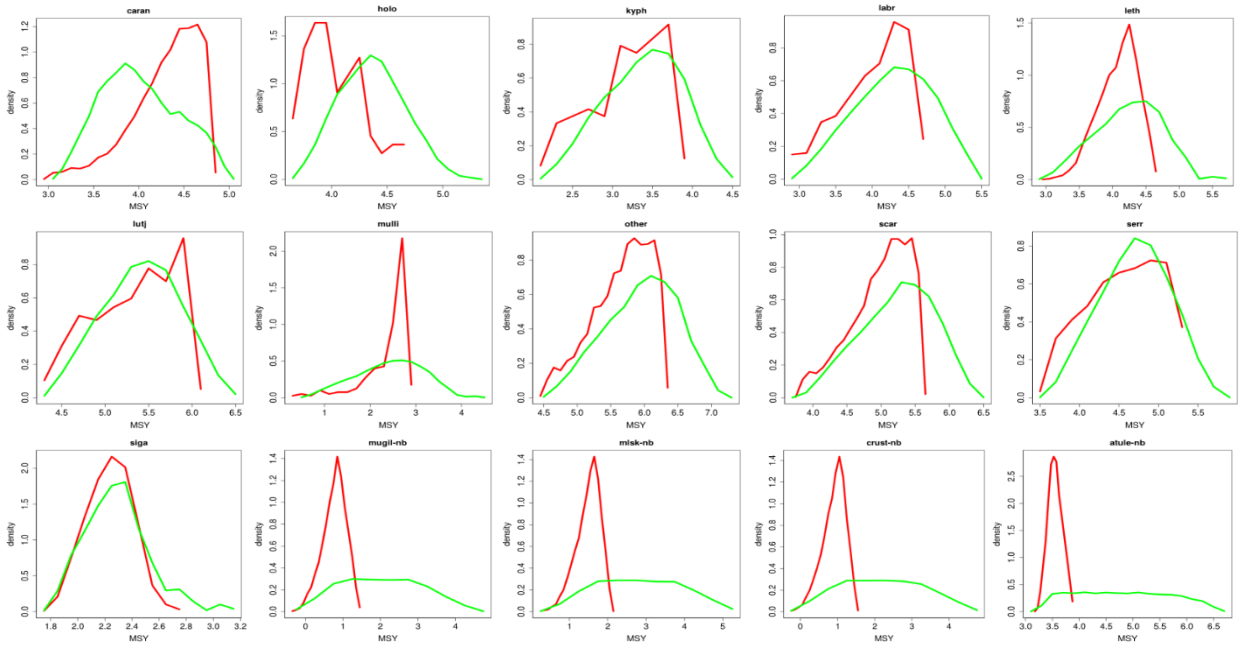

Figure 3. Density distributions of MSY values estimated by k-revise method A (red) and method B (green).

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 C 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 regime; real-time accountability measure)	-2	-2	-2	0	-2	0	-2	-1	-1
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

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Finding Of No Significant Impact

Specification of 2016-2018 Annual Catch Limits and Accountability Measures for Main Hawaiian Islands Non-Deep 7 Bottomfish Fisheries

(RIN 0648-XE587)

March 13, 2017

The National Marine Fisheries Service (NMFS) prepared this Finding of No Significant Impact (FONSI) according to the following guidance:

- NMFS Instruction 30-124-1 – Guidelines for the Preparation of a FONSI (July 22, 2005, renewed August 2014);
- National Oceanic and Atmospheric Administration (NOAA) Administrative Order (NAO) 216-6 – Environmental Review Procedures for Implementing the National Environmental Policy Act (NEPA, May 20, 1999);
- NAO 216-6A (April 22, 2016) – Compliance with the National Environmental Policy Act, Executive Orders 12114 (Environmental Effects Abroad of Major Federal Actions), 11988 and 13690 (Floodplain Management), and 11990 (Protection of Wetlands); and
- Council on Environmental Quality (CEQ) significance criteria at 40 CFR 1508.27(b).

NMFS and the Western Pacific Fishery Management Council (Council) prepared the attached environmental assessment, "Specification of Annual Catch Limits and Accountability Measures for Main Hawaiian Island Non-Deep 7 Bottomfish Fisheries in Fishing Years 2015 through 2018" (EA, August 12, 2015), in accordance with NEPA and agency guidelines. The EA analyzes the potential effects of specifying annual catch limits (ACLs) and accountability measures (AMs) for main Hawaiian island non-Deep 7 bottomfish fisheries for fishing years 2015 through2018. This FONSI considers the information in the 2015 EA, and documents NMFS' evaluation of the potential environmental effects of Alternative 3 in 2016-2018, and potentially Alternative 4 in 2017 or 2018, if an ACL is exceeded and the proposed AM is triggered that reduces the ACL by the amount of the overage. Recent fishery information shows that catches remain within levels considered in the EA.

Background

NMFS and the Council manage fishing for bottomfish management unit species (BMUS) in Federal waters (that is, within the U.S. Exclusive Economic Zone, generally 3-200 nautical miles or nm from shore) around Hawaii through the Fishery Ecosystem Plan for the Hawaii Archipelago (Hawaii FEP) authorized by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Currently, bottomfish fishing managed under the Hawaii FEP only occurs in waters around the main Hawaiian Islands (MHI). As described in section 1 of the EA, there is no commercial fishing in the Northwestern Hawaiian Islands management area. The MHI bottomfish fishery harvests an assemblage of 14 different BMUS.

However, NMFS and the Council manage BMUS as two separate stock complexes; the Deep 7 bottomfish stock complex and non-Deep 7 bottomfish stock complex.[1] The Deep 7 bottomfish include onaga (*Etelis coruscans*), ehu (*Etelis carbunculus*), gindai (*Pristipomoides zonatus*), kalekale (*Pristipomoides sieboldii*), opakapaka (*Pristipomoides filamentosus*), lehi (*Aphareus rutilans*), and hapuupuu (*Epinephelus quernus*). The Deep 7 bottomfish are generally found along high relief, deep slopes, ranging from 80-400 meters. The non-Deep 7 bottomfish include uku *(Aprion virescens)*, white ulua *(Caranx ignoblis)*, black ulua *(Caranx lugubris)*, taape *(Lutjanus kasmira)*, yellowtail kalekale *(Pristipomoides auricilla)*, butaguchi (*Pseudocaranx dentex)* and kahala (*Seriola dumerili)*. Fishermen usually catch the non-Deep 7 bottomfish during Deep 7 bottomfish fishing trips, although at shallower depths.

The Magnuson-Stevens Act and Federal regulations implementing the FEP require NMFS to specify an annual catch limit (ACL) and accountability measures (AMs) to help prevent the fishery from exceeding the ACL for each stock or stock complex (50 CFR 665.4). The Council recommended the proposed ACLs and AMs, considering the best available scientific, commercial, and other information about the fishery.

Federal Action

As recommended by the Council, NMFS proposes to specify an ACL of 178,000 lb of non-Deep 7 bottomfish for the 2016, 2017 and 2018 fishing year. This level of catch is associated with a probability of overfishing of less than 30 percent. The fishing year for MHI non-Deep 7 bottomfish begins January 1 and ends December 31 annually.

Each fishing year, NMFS would monitor non-Deep 7 bottomfish catches from both local state/territorial waters (generally from the shoreline to three mile offshore), and Federal waters around the MHI and compare cumulative catches with the specified ACL. However, NMFS cannot project the date when an ACL might be reached because catch statistics from local state/territorial fisheries are generally not available until at least six months after the data have been collected. Therefore, in-season AMs applied in Federal waters to prevent the ACL from being exceeded (e.g., fishery closures) are not possible. For this reason, only a post-season AM is possible. Specifically, NMFS and the Council would use the average catch of fishing years 2014, 2015 and 2016 to evaluate fishery performance against the 2016 ACL, the average catch of fishing years 2015, 2016 and 2017 to evaluate fishery performance against the 2017 ACL and so on. After the end of each fishing year, if NMFS and the Council determine the three-year average catch for MHI non-Deep 7 bottomfish exceeded the specified ACL, NMFS would reduce the ACL in the subsequent fishing years by the amount of the overage.

The proposed action would implement the ACL specifications and AMs described under Alternative 3 in the 2015 EA, in fishing year 2016. The ACLs and AMs are identical to those NMFS specified in fishing year 2015 (80 FR 52415, August 31, 2015). However, should the fishery exceed the three-year average ACL, the proposed action also includes reducing the ACL

[1] 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) define "stock complex" to mean a group of stocks that are sufficiently similar in geographic distribution, life history, and vulnerabilities to the fishery such that the impact of management actions on the stocks is similar.

by the amount of the overage in a subsequent year, which would be the ACLs described under Alternative 4 in the 2015 EA (a reduced ACL). The EA analyzes the potential effects of Alternatives 3 and 4 in fishing years 2015, 2016, 2017 and 2018 and therefore this FONSI applies to specifications for each of those fishing years. However, NMFS will specify the ACLs annually through proposed and final rulemaking in the *Federal Register*. This would allow interested parties to comment on the proposed ACL each year.

Coordination and Public Involvement

The Council developed preferred Alternative 3 and other alternatives in accordance with the approved ACL mechanism established in the FEP and implementing Federal regulations at 50 CFR 665.4, in consideration of the best available scientific, commercial, and other information about the fishery. At its 166th meeting from June 6–10, 2016, the Council considered recommendations from the SSC's 123rd meeting on May 31–June 2, 2016. The Council evaluated the 2015 catch of MHI non-Deep 7 bottomfish to the 2015 ACL and determined that catch in 2015, as well as the average catch of fishing years 2013, 2014, and 2015 remained below the 2015 ACL.

The 2015 EA anticipated catch at or below the ACL, and contains an analysis of potential effects of the specifications. NMFS is not aware of any new information that changes the environmental baseline or effects associated with these fisheries as described in the EA. Because the fishery is performing as described in the EA, and because the proposed specifications are the same as were considered in the EA, NMFS relies on the analysis in the EA to evaluate the effects of the proposed action.

On January 18, 2017, NMFS made the EA and the proposed specifications available for a 15-day public review and comment period (82 FR 5517). NMFS did not receive comments on the EA.

Significance Analysis

NAO 216-6A Companion Manual (section 7C) and NMFS Instruction 30-124-1 – "Guidelines for the Preparation of a FONSI" contain criteria for determining the significance of the impacts of a proposed action. In addition, CEQ regulations state that the significance of an action should be analyzed in terms of both context and intensity. Each criterion listed below is relevant in making a finding of no significant impact and NMFS has considered them individually, and in combination with the others. NMFS analyzed the significance of this action under Alternatives 3 and 4 based on the NAO 216-6A Companion Manual criteria, the NMFS Instruction 30-124-1, and CEQ context and intensity criteria. These include the following:

1) Can the proposed action reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action?

No. The MHI non-Deep 7 bottomfish stock complex is healthy, and harvests are sustainable. NMFS does not anticipate the proposed action would result in changes in the conduct of MHI commercial or non-commercial bottomfish fisheries in terms of gear types used, areas fished, level of catch or effort as compared to baseline conditions. This is because the proposed action

would set the ACL for MHI non-Deep 7 bottomfish substantially lower than the stock's estimated overfishing limit (OFL) reference point (e.g., the estimated level of catch that would result in overfishing), and catches in 2016, 2017, and 2018 are expected to be well below the proposed ACL (EA sections 2.4.2, 2.4.3, and 2.4.4).

The proposed MHI non-Deep 7 bottomfish ACL of 178,000 lb is associated with a probability of overfishing of less than 30 percent if the entire ACL is caught (EA, section 2.4 and Table 1). Despite the lack of in-season AMs to prevent the ACL from being exceeded, analysis presented in the EA indicate that the expected annual level of MHI non-Deep 7 bottomfish catch in 2016–2018 would be sustainable and would be well below the estimate of maximum sustainable yield (MSY) of 265,000 lb, and the OFL proxy of 259,200 lb, and would not result in overfishing (EA, section 4.1). Based on past fishery performance shown in Table 3 of the EA, MHI non-Deep 7 bottomfish catches in 2016 through 2018 are expected be similar to the catch attained in 2013, which was 158,245 lb and below the proposed ACL of 178,000 (EA section 4.1).[2]

Non-Deep 7 bottomfish are primarily caught during fishing trips that target Deep 7 bottomfish. Therefore, the specification of the non-Deep 7 bottomfish ACL for 2016 and 2017 would not result in more fishing of Deep 7 bottomfish. Additionally, Deep 7 bottomfish would be subject to a separate ACL and AM proposed under a separate action (EA, section 4.8.2). Should the Deep 7 ACL be attained, NMFS would, in accordance with the AM for that fishery, close the fishery for Deep 7 bottomfish through the end of the Deep7 bottomfish fishing year. The MHI non-Deep 7 fishery does not overlap with other fisheries to a large extent such that ACLs and AMs in the fishery would result in more fishing for other demersal (or pelagic) fisheries (EA section 4.8.3)

2) Can the proposed action reasonably be expected to jeopardize the sustainability of any non-target species?

No. Bycatch in the MHI bottomfish fisheries is summarized in the EA, section 3.1. The potential impacts to non-target stocks are addressed in section 4.1 of the EA. Overall bycatch in these fisheries is low with only 8.5 percent of the catch listed as bycatch. The majority of the bycatch consists of non-Deep 7 bottomfish that are known to be ciguatoxic and have little or no market value (i.e. kahala, butaguchi and white ulua). Sharks caught on bottomfish gear do not suffer from barotrauma and may be released alive. Fishermen tend to move to different areas if there is a problem with shark depredation on the target fish, which helps to reduce shark bycatch. NMFS does not expect the proposed action to result in more fishing or greater catches of non-target species (EA, section 4.1). The proposed action under Alternatives 3 and 4 would not change the way the MHI bottomfish fisheries are currently conducted (EA, sections 2.4.2, 2.4.3, and 2.4.4), so there would be no change to impacts on non-target species. Ongoing fisheries monitoring by the Council's Hawaii FEP plan team would help fishery scientists and managers to detect any non-target or bycatch issues and, if any are found, address them in future management measures, as needed. For these reasons, the proposed action under Alternatives 3

[2] NMFS has fishery information from 2014 and 2015 and catches did not exceed the proposed ACL in any year. Specifically catch in 2014 was 104,361 lb and catch in 2015 was 123,852, and the average 2013-2015 catch was 128,675 lb. (Source: Western Pacific Fishery Information Network and State of Hawaii Division of Aquatic Resources)

and 4 would not reasonably be expected to jeopardize the sustainability of any non-target species.

3) Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs?

No. Bottomfish fishing methods are not known to cause damage to the ocean, coastal habitats, corals, or marine habitats, including designated essential fish habitat (EFH) and habitat areas of particular concern (HAPC) for any species (EA, section 4.5). To prevent and minimize adverse bottomfish fishing impacts to EFH, the FEP and regulations prohibit the use of explosives, poisons, bottom trawls and other non-selective or destructive fishing gear. Weighted lines or baited hooks may contact bottom substrates during bottomfish fishing operations, and may affect EFH and HAPC. Research to date, however, indicates that bottomfish fishing, including gear deployment and a low level of anchor loss, does not have adverse impacts to EFH[3].

NMFS does not expect the proposed action under Alternative 3 or 4 to change the gear types used, areas fished, level of catch or effort, as compared to baseline conditions (EA, sections 2.4.2, 2.4.3, and 2.4.4). The proposed specifications would not result in impacts to EFH or HAPC, or the Hawaii coastal zone that have not already been considered in previous consistency determinations (EA sections 4.5 and 5.7). For these reasons, NMFS concludes the proposed action would not lead to substantial physical, chemical, or biological alterations to ocean and coastal habitats, including designated EFH and HAPC (EA sections 4.5 and 5.7).

4) Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?

No. The proposed action is not expected to adversely impact public health or safety because the operation of bottomfish fisheries are not known to impact public health or safety and are not expected to change as a result of the ACL and AM specifications. The proposed action under Alternatives 3 and 4 would not result in a race to fish, or change how and where the fishery operates, and bottomfish fishing would not likely result in public health issues (EA section 4.2). For these reasons, the proposed action would not result in a substantial adverse impact on public health or human safety at sea.

5) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?

No. To date, there have been no observed or reported interactions between MHI bottomfish fisheries and ESA-listed species (EA, section 4.4).

[3] In 2016, NMFS modified EFH and refined HAPC in the MHI, but the modification did not change the extent of bottomfish EFH; rather, it refined information about the use of various habitats by various life stages of bottomfish (81 FR 7494; February 12, 2016). The modification within existing EFH and refinement of HAPC did not change the effects of any fishery authorized under the FEP in such a manner that required additional coordination under the Magnuson-Stevens Act or other law, and does not affect the analysis in the 2015 EA.

In a March 18, 2008, no-jeopardy Biological Opinion (BiOp) NMFS concluded that, with the exception of the green sea turtle (*Chelonia mydas*), MHI bottomfish fisheries are not likely to adversely affect any ESA-listed species. In that BiOp, NMFS determined that vessels transiting State waters to and from Federal waters around the MHI have the potential to collide with and kill Hawaiian green sea turtles. Although that BiOp authorized an incidental take of two green sea turtles per year, NMFS based the analysis on an estimated 71,800 annual fishing trips. Since 2008, the actual number of annual trips has been less than 3,500, so the potential for collisions with bottomfish vessels is substantially lower than estimated in the 2008 BiOp. NMFS determined, based on the best available information, that the fishery likely has a very low level of impact on threatened green turtles (EA section 4.4).

Shortly after the 2015 EA was completed, NMFS, on April 6, 2016, listed 11 DPS of the green sea turtle under the ESA, superseding a 1978 listing for green turtles and applying existing protective regulations to the 11 DPS (81 FR 20058). NMFS determined that three DPS are endangered, and eight DPS, including the Hawaiian green sea turtle (now defined as the Central North Pacific DPS), are threatened. Because NMFS previously evaluated the effects of Hawaii bottomfish fisheries on the threatened Hawaiian green sea turtle population, the formal designation of this stock as a DPS does not provide any additional understanding of potential impacts not considered in prior consultations. Therefore, NMFS does not expect that the proposed action would result in impacts that were not previously considered in previous consultations and the change in status does not modify the analysis in section 4.4 of the 2015 EA.

On August 7, 2013, NMFS modified the 2008 BiOp to address the listing of the MHI insular false killer whale distinct population segment (DPS) as endangered under the ESA. NMFS concluded that MHI bottomfish fisheries are not likely to adversely affect this species (EA, section 4.4).

The EA also considered potential impacts to [then proposed] monk seal critical habitat, including 10 areas in the Northwestern Hawaiian Islands and six in the MHI. The analysis in the EA indicates the proposed action is not expected to result in significant direct or cumulative effects to monk seal critical habitat in the MHI. This is because 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 (EA sections 3.3.1, 4.4 and 4.8.5 sections 3.4.4.1 and 4.8.4). Shortly after the 2015 EA was completed, NMFS, on August 21, 2015, published rule finalizing the monk seal critical habitat areas designation (80 FR 50925). Based on the analysis in the EA, NMFS does not expect the MHI non-Deep 7 bottomfish fishery operating under catch limits would have an adverse impact on monk seals or critical habitat.

EA section 3.3.2 describes that although several species of non-listed marine mammals occur in Hawaiian waters, there have been no observed or reported interactions between the MHI bottomfish fisheries and marine mammals. Sections 3.3.1, 4.4 and 4.8.5 describes NMFS conclusion that the proposed ACL and AM alternatives would not modify the operations of the bottomfish fishery in any way that would be expected to affect listed species or critical habitat in any manner not previously considered in ESA consultations or MMPA determinations.

On September 30, 2016 (after the 2015 EA), the US Fish and Wildlife Service listed the Hawaii DPS of the band- rumped storm-petrel (*Oceanodroma castro*) as endangered (81 FR 67786). This bird's range overlaps that of the MHI bottomfish fishery, but as described in the EA (section 3.6.3), seabirds are not known, and are unlikely, to interact with the MHI bottomfish fishery. Therefore, the recent listing does not change the conclusions of the EA that the action would not have the potential for significant adverse effects on protected seabird species.

The EA also considered information from the December 29, 2014, List of Fisheries (79 FR 77919), which classified Hawaii bottomfish fisheries as Category 3 fisheries under Section 118 of the MMPA (EA, section 5.6). A Category 3 fishery is one with a remote likelihood or no known incidental morality and serious injury of marine mammals. No change was made in either the 2015 LOF (79 FR 77919, December 29, 2014), or the 2016 proposed LOF (81 FR 2055, April 8, 2016.

Based on the analysis in the EA, NMFS does not anticipate the proposed action under Alternatives 3 or 4 would result in changes in gear types used, areas fished, level of catch or effort, as compared to baseline conditions (EA section 4.4). Therefore, NMFS does not expect the proposed action would have effects on endangered or threatened species, marine mammals, seabirds, or critical habitat that have not been previously considered or authorized in ESA consultations or MMPA determinations and is not expected to result in significant direct or cumulative effects.

6) Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

No. To date, there have been no identified impacts to marine biodiversity and/or ecosystem function from MHI bottomfish fisheries and none of the alternatives is expected to result in impacts to these environmental features (EA, section 4.6) As described in the EA, sections 2.4.3 and 2.4.4, NMFS does not anticipate the proposed action would result in changes in the conduct of the fishery in terms of gear types used, areas fished, level of catch or effort as compared to baseline conditions; and, therefore, NMFS expects no substantial impacts on biodiversity or ecosystem function to occur as a result of specifying an ACL and AMs for MHI non-Deep 7 bottomfish fisheries (EA, section 4.6).

7) Are significant social or economic impacts interrelated with natural or physical environmental effects?

No. There are no social or economic impacts interrelated with environmental effects because the proposed action is not expected to change fishing operations, and therefore, the proposed action would not result in environmental effects (EA, section 4.8.1). The proposed action is intended to prevent overfishing while providing positive social and economic benefits to fishermen, buyers and the fishing communities of Hawaii. The proposed specifications would not affect the economics of the fishery (EA, section 4.2 and 5.10). The analysis in the EA found that the proposed action would not result in a large adverse impact to the environment that could have

disproportionately large or adverse effects on members of Environmental Justice communities (EA, section 5.12).

8) Are the effects on the quality of the human environment likely to be highly controversial?

No. The Council developed the recommended ACLs and AMs in a public process in accordance with the provisions of the Magnuson-Stevens Act, the FEPs, and in coordination with fishery scientists, managers, other resource managers, and other interested parties (EA, sections 1.5 and 5.3). This public coordination revealed no controversy regarding potential effects of the proposed action on the quality of the human environment (EA, section 1.5). Furthermore, by providing for annual review of fishery performance against the ACL, the proposed action would help ensure long-term sustainability of the MHI non-Deep 7 bottomfish resources, while allowing for optimal yield from the fishery. During the public review stage of the proposed specifications, NMFS did not receive public comments indicating controversy regarding effects on the quality of the human environment.

9) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

No. NMFS does not expect the proposed action would adversely affect such areas because no such areas have been identified in the EEZ in areas in which the MHI bottomfish fishery is conducted, and because bottomfish fishing activities are not known to result in substantial adverse impacts to the environment including to designated EFH and HAPC (EA, section 4.5) or scientific, historic, archaeological, or cultural resources (EA, section 4.7). Bottomfish fishing in marine protected areas would continue to be restricted by State laws, and fishing would continue to be subject to State of Hawaii commercial licensing and/or Federal non-commercial permits and reporting and joint State/Federal monitoring to help ensure harvests of marine resources remain sustainable. NMFS does not anticipate the proposed action would result in changes in the conduct of the fishery in terms of gear types used, areas fished, level of catch or effort as compared to baseline conditions (EA, sections 2.4.3 and 2.4.4). For these reasons, NMFS concludes there would be no substantial impacts to resources of scientific, historic, cultural or ecological importance.

10) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

No. The effects on the human environment are not highly uncertain or unknown. NMFS has managed Hawaii bottomfish fisheries under a system of ACLs and AMs since 2012. The proposed ACL for MHI non-Deep 7 bottomfish is well below the stock's estimated MSY and OFL reference points, and managers considered the risk of overfishing when setting each ACL. Additionally, the effects of fishing on target and non-stocks, protected resources, marine habitats and fishing communities are not highly uncertain or associated with unknown risks (EA, various sections). This is because the fishery has been managed under ACLs and with the same AMs for

several years, and based on past fishery performance, is fisheries are not expected to exceed the ACLs. The proposed action is not expected to result in a change to the conduct of the MHI bottomfish fishery in terms of gear types used, areas fished, level of catch or effort as compared to baseline conditions (EA, sections 2.4.3 and 2.4.4), and the effects of the proposed action would not have highly uncertain effects or involve unique or unknown risks.

11) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

No. As discussed in Section 4.8 of the EA, the cumulative effects of the proposed action for 2016 was considered in light of other past, present and reasonably foreseeable future actions, including the specification of the proposed ACL and AM again in 2017, and 2018, and the specification of a separate ACL and AM for the MHI Deep 7 bottomfish stock complex. The analysis in Section 4.8.2 indicates proposed action not expected to result in cumulative effects to MHI Deep 7 bottomfish. This is because MHI non-Deep 7 bottomfish catches in 2016 and 2017 and 2018 are expected be similar to the catch attained in 2013 (158,245 lb), 2014 (104,361 lb) and 2015 (123,852 lb) and remain below the proposed ACL of 178,000 and the proposed action would not result in changes in the conduct of MHI bottomfish fisheries, including gear types used, areas fished, level of catch or effort, or create conditions for fishermen to increase harvest of Deep 7 bottomfish in 2016.

Similarly, analysis in Section 4.8.2 indicates that the specification of ACLs and AMs for MHI Deep 7 bottomfish fisheries is not expected to result in cumulative effects to MHI non-Deep 7 bottomfish. This is because annual catches of Deep 7 bottomfish in recent years have remained below the specified ACLs and NMFS expects catches to continue to remain below ACLs in 2016-17 and 2017-18.[4] As such, an in-season AM is not expected to be triggered, thus allowing fishermen to fish for Deep 7 bottomfish throughout the fishing year. Therefore, it is unlikely that the specification of an ACL and AM for MHI Deep 7 bottomfish would result in changes in the conduct of MHI bottomfish fisheries, including gear types used, areas fished, level of catch or effort, or create conditions for fishermen to increase harvest of non-7 bottomfish. Therefore, the proposed action, when considered together with the Deep 7 ACL and AM in fishing years 2016-17 is not expected to result in large adverse cumulative effects of the human environment.

The EA (section 4.8.3) also considered the potential for cumulative effects resulting from the proposed specification of ACLs and for other crustacean, precious coral, and coral reef MUS managed under the Hawaii FEP, and the same post-season accountability AM described in this Federal action. None of the ongoing proposals to specify ACLs and implement post season AMs are likely to result in large adverse effects to the environment because those proposals are not expected to change conduct of any fishery in terms of gear types used, areas fished, level of catch or effort as compared to baseline conditions for those fisheries. The EA describes that the

[4] In the 2014-15 fishing year, total catch of MHI Deep 7 bottomfish was 303,000 lb and below the 2014-15 ACL of 346,000. In the 2015-16 fishing year, total catch of MHI Deep 7 bottomfish was 259,530 lb and remained below the 2015-16 ACL of 326,000. The Council has recommended NMFS reduce the ACL for the 2016-17 and 2017-18 fishing year to 318,000, and 306,000 lb, respectively. However, based on past fishery performance, NMFS expects catch will be similar to 2014-15 and 2015-16 fishing years remain below the Council recommended ACLs. (Source: Western Pacific Fishery Information Network and State of Hawaii Division of Aquatic Resources)

MHI non-Deep 7 bottomfish fishery does not overlap with these other fisheries and impacts of the proposed specifications can be considered separately (EA, section 4.8.3).

12) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

No. As described in Section 4.7 and 5.8 of the EA, 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 Federal waters where NMFS authorizes bottomfish fishing. Although shipwrecks and other objects could possibly occur in Federal waters around Hawaii, bottomfish fishing is not known to result in adverse impacts to scientific, historical, cultural or historical resources because fishermen fish for bottomfish on high-relief deep slopes where such objects would not be found or come to rest (EA, section 4.7). Also, bottomfish fishing is not known to have a damaging impact on the marine environment, including any man-made resources or structures (EA, section 5.8).The specification of ACLs and continuation of AMs would not change the way the MHI bottomfish fishery is conducted, including type of gear used, areas fished, or level of catch or effort as compared with baseline conditions and, therefore, the fishery is not expected to cause loss or destruction of significant scientific, cultural or historic resources that may occur in the U.S. EEZ. (EA, section 4.7).

13) Can the proposed action reasonably be expected to result in the introduction or spread of a non-indigenous species?

No. MHI bottomfish fisheries are not known to result in the introduction or spread of non-indigenous species and NMFS does not anticipate the proposed action would result in changes in the conduct of the fishery in terms of gear types used, areas fished, level of catch or effort as compared to baseline conditions and therefore, the specification of ACLs and AMs are not reasonably expected to result in the introduction or spread of non-indigenous species (EA section 4.8.8).

14) Is the proposed action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

No. The proposed action complies with provisions of the Magnuson-Stevens Act and Federal regulations implementing the FEPs at 50 CFR 665.4, through which NMFS specifies ACLs and AMs. Since 2012, NMFS has specified an ACL and post-season AMs for MHI non-Deep 7 bottomfish so the proposed action does not establish a precedent regarding how the fishery is managed. Operation of the fishery under the proposed ACLs and AMs would not result in a decision in principle about future considerations because the fishery would continue to be monitored. Each year, NMFS and the Council would evaluate catches against the ACL and may reduce the ACL in a subsequent year in order to mitigate overages of an ACL if it occurs. MHI bottomfish fisheries as managed under ACLs and AMs are not expected to result in overfishing or in stocks that become overfished. Furthermore, the specification of an ACL and AM in one year does not automatically result in a specific ACL or AM in other future years. NMFS does not

anticipate the proposed action would result in changes in the conduct of the fishery in terms of gear types used, areas fished, level of catch or effort as compared to baseline conditions. For these reasons, the proposed action would not establish a precedent for future actions with significant effects or represent a decision in principle about future decisions (EA, section 4.8.8).

15) Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

No. The Council developed the recommended ACLs and AMs in a public process in accordance with the provisions of the Magnuson-Stevens Act, the FEPs, and in coordination with fishery scientists, managers, other resource managers, and other interested parties and no such violation of law was revealed. (EA, sections 1.5 and 5.3). Additionally, NMFS evaluated the proposed action for compliance with the Magnuson-Stevens Act, the Endangered Species Act, and the Marine Mammal Protection Act, the Coastal Zone Management Act, the National Historic Preservation Act and other applicable Federal laws, including state laws (EA, sections 4 and 5).

16) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

No. In section 4.8 of the EA, NMFS evaluated the potential for cumulative effects of the proposed Federal action on target and non-target stocks, considering the specification of ACL and AMs for MHI non-Deep7 bottomfish from 2015 through 2018, and the related, yet separate ACL and AM specifications for MHI Deep 7 bottomfish, and other Hawaii FEP fisheries. The analysis also evaluated the proposed action in light of past, present, and reasonably foreseeable future Federal fishery management actions and other NOAA actions, climate change and other considerations. The analysis in the EA allows NMFS to conclude that the proposed Federal action would result in sustainable fishing, would not change the conduct of bottomfish or other fisheries and would provide for ongoing monitoring by fishery scientists and managers. For these reasons, the proposed ACL and AM specifications are not expected to result in cumulative impacts that could have a substantial effect on target and non-target species.

Other Considerations

NMFS also considered the effects of the proposed action on climate change and climate change impacts on the feasibility of the proposed action. The efficacy of the proposed ACL and AM specifications in providing for sustainable levels of fishing for BMUS is not expected to be adversely affected by climate change. Recent catch relative to the current estimates of MSY and OFL informed the development of the ACLs and AMs (EA, section 2.2.1). Monitoring would continue, and if harvests were reduced as a result of climate change impacts, ACLs could be adjusted in the future (EA, section 4.8.7). The proposed action is not expected to result in a change to the manner in which the fisheries are conducted, so no change in greenhouse gas emissions is expected (EA, section 4.8.7)

Determination

Based on the information in this document and the analysis contained in the EA, I have determined that the impact of implementing the proposed action would not significantly impact the quality of the human environment. In addition, NMFS has addressed all beneficial and adverse impacts of the proposed action to reach the conclusion of no significant impact. Accordingly, preparation of an Environmental Impact Statement for this action is not necessary.

	3/13/17
Michael D. Tosatto	Date
Regional Administrator	