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## **FINDING OF NO SIGNIFICANT IMPACT**

### **Annual Catch Limit and Accountability Measures for Main Hawaiian Islands Kona Crab 2020-2023**

(RIN 0648-BJ84)

November 25, 2020

#### **Introduction**

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

- National Oceanic and Atmospheric Administration (NOAA) Administrative Order (NAO) 216-6A (April 22, 2016), “Compliance with the National Environmental Policy Act (NEPA), Executive Orders 12114 (Environmental Effects Abroad of Major Federal Actions), 11988 and 13690 (Floodplain Management), and 11990 (Protection of Wetlands); and its associated Companion Manual (January 13, 2017); and
- Council on Environmental Quality (CEQ) significance criteria at 40 CFR 1508.27<sup>1</sup>.

NMFS proposes to implement annual catch limits and accountability measures for the Hawaii Kona crab fishery. If approved, NMFS will specify an ACL of 30,802 lb and an annual catch target (ACT) of 25,491 lb. These measures will apply in the Exclusive Economic Zone around the main Hawaiian Islands (MHI) for fishing years (calendar years) 2020-2023. NMFS will also implement two AMs: an in-season closure of the MHI Kona crab fishery if catch is projected to reach the ACT, and a post-season adjustment if catch exceeds the ACL. If catch exceeds the ACT, but is below the ACL, NMFS would not apply a post-season correction. Additionally, if the fishery exceeds the ACL more than once in a four-year period, the Council must re-evaluate the ACL process for that fishery and adjust the system to improve its performance and effectiveness in ensuring sustainability of the fishery.

NMFS based the management measures on a 2018 benchmark stock assessment, in consideration of the best available scientific, commercial, and other information about the fishery and in accordance with the ACL process set forth in the Fishery Ecosystem Plan for the Hawaii Archipelago (FEP). The stock assessment estimated that the overfishing limit for MHI Kona crab is 33,989 lb. The proposed ACL and ACT are associated with a 38% and 20% risk of

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<sup>1</sup> This FONSI was prepared using the 1978 CEQ NEPA Regulations. NEPA reviews initiated prior to the effective date of the 2020 CEQ regulations may be conducted using the 1978 version of the regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020 (85 FR 43304). This review began on June 29, 2020, and the agency has decided to proceed under the 1978 regulations.



overfishing, respectively. The fishery landed an average of 3,316 lb of Kona crab annually in the past three years.

## **Environmental Assessment**

NMFS prepared the attached environmental assessment (EA) “Annual Catch Limits and Accountability Measures for Hawaii Kona Crab 2020-2023”. The EA analyzed potential impacts on the human environment from implementing a range of possible ACLs and AMs for MHI Kona crab. The EA considered five management alternatives, including the proposed action, a Status Quo Alternative, and a No-Action Alternative. Briefly, the alternatives considered were:

- Alternative 1: No Action Alternative. Do not specify an ACL or AM.
- Alternative 2: Status Quo Alternative. Specify an ACL of 3,500 lb. Implement post-season AM only.
- Alternative 3: Specify an ACL of 30,802 lb and set an ACT of 28,324 lb. Implement in-season and post-season AMs.
- Alternative 4: Specify an ACL of 30,802 lb and set an ACT at 25,491 lb. Implement in-season and post-season AMs.
- Alternative 5: Specify an ACL of 30,802 lb and set an ACT at 21,243 lb. Implement in-season and post-season AMs.

The EA indicates that none of the alternatives is likely to change the catch, effort, participation or operation of the fishery and the fishery is expected to continue as it has in recent years under the proposed alternatives (Table 5). NMFS will implement Alternative 4. The EA indicates that this alternative would not result in a large change to the fishery, but would provide added management oversight through annual review and evaluation of the fishery against the ACL as compared to the no action or status quo alternatives (Section 2.2.3). As described below in the “Significance Analysis,” the EA described that an ACL of 30,802 lb and an ACT of 25,391 lb, along with AMs, would provide sufficient management to ensure that harvests would be sustainable and the stock complex would not be subject to overfishing or become overfished. Additionally, non-target catches, impacts to protected species, and other interactions with the associated environment are expected to be similar as those from recent years as well (EA, Table 11). As described in the EA (section 1.1, 2.2) all existing applicable Federal regulations will continue and all applicable Hawaii regulations are expected to continue. All State monitoring and data collection programs are expected to continue as well.

On October 15, 2020, NMFS published in the *Federal Register* a proposed rule for an ACL of 30,802 lb and ACT of 25,491 lb for the Hawaii Kona crab fishery for fishing years 2020-2023 and in-season and post-season AMs (85 FR 65336). The proposed rule was accompanied by the draft EA, dated September 22, 2020. NMFS requested public review and comments on the proposed rule and draft EA. The comment period ended on November 5, 2020. NMFS received four relevant comments in support of the proposed rule (EA, section 1.7). None of the comments resulted in a change to the rule or the analysis in the EA.

## Significance Analysis

The Council on Environmental Quality (CEQ) Regulations of 1978 state that the determination of significance using an analysis of effects requires examination of both context and intensity, and lists ten criteria for intensity (40 CFR 1508.27). In addition, the Companion Manual for NOAA Administrative Order 216-6A, dated January 13, 2017, provides sixteen criteria, the same ten as the CEQ Regulations and six additional, for determining whether the impacts of a proposed action are significant. We discuss each criterion below with respect to the proposed action, and consider each individually and in combination with the other criteria.

The significance analysis that follows is the result of analyzing the effects of the fishery after the management measures in Alternative 4 have been implemented and comparing those effects with those that are currently present in the fishery operating without an ACL or AM (as described under Alternative 1). We base the impacts on expected fishery outcomes, which we explained above and in the EA (section 2.2), including analysis based on the potential for a fishery closure if the ACT was attained.

*1. Can the proposed action reasonably be expected to cause both beneficial and adverse impacts that overall may result in a significant effect, even if the effect will be beneficial?*

No. The proposed action to implement an ACL and AMs under Alternative 4 is not expected to result in a significant change to the Hawaii Kona crab fishery or significant effect on fishery resources or other features of the environment. The proposed action would not change the fishery in terms of target and non-target species, fishery participation, gear composition, or bycatch (EA, sections 4.1.4, 4.2.4, 4.3). The EA describes that the fishery would continue to fish as it has in recent years, and fishery managers would continue to monitor and evaluate the fishery and Kona crab stocks (EA, sections 2.2, 2.2.4). NMFS and the Council proposed the action to ensure sustainable management of the Hawaii Kona crab stock (EA, section 1.3).

The EA considered beneficial and adverse effects of fishing at the proposed ACL and AMs for the 2020-2023 fishing years, but did not find significant adverse or beneficial effects on any resource (EA, sections 4.1.4, 4.2.4, 4.3, 4.3, 4.6). Based on the probability of overfishing projections contained in the 2018 benchmark stock assessment of Kona crab in the MHI (Kapur et al., 2019), this ACL and ACT is associated with a 38% and 30% risk of overfishing, respectively (EA, Table 2, section 2.2.4). Using this new benchmark assessment information conforms to National Standard 2 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), which requires the use of the best scientific information available for management. This alternative also utilizes the information from the P\* and SEEM working group meetings that accounted for the scientific and management uncertainties in accordance with the ACL specification process described in the FEP (EA, section 2.1.3). While the EA describes a new in-season AM that requires NMFS to close the fishery in Federal waters once the ACT is reached, the fishery is not likely to reach the ACT if the fishery performance is similar to the past 10 years (EA, section 2.2.4, 4.1.4). Even if the fishery performs close to the highest recent catch of 13,153 lb during the 2008 fishing year, the fishery would still remain open and the AMs would not be triggered. In summary, for the reasons

described above, NMFS does not expect the ACL and AM, proposed under Alternative 4, to result in significant beneficial or adverse effects.

*2. Can the proposed action reasonably be expected to significantly affect public health or safety?*

No. The Hawaii Kona crab fishery is not known to experience or cause public health or safety-at-sea issues. The proposed ACL and AMs would not change the fishery in a substantial manner that would have an effect on public health or safety at sea. The ACL and AMs would not cause a race to fish. Therefore, there is no potential for a significant adverse effect to public health or safety (EA, section 4.5.1).

*3. Can the proposed action reasonably be expected to result in significant impacts to unique characteristics of the geographic area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?*

No. No historic or cultural resources, marine protected areas, or ecologically critical areas are known to be affected by the Kona crab fishery. Fishermen harvest Kona crab with circular nets approximately 1 m across, set on sandy bottom habitats at depths ranging from 15 to 45 m (EA, sections 1.1, 3.1). These harvest methods are highly selective for Kona crabs and are not known to cause damage to the ocean, coastal habitats, corals, or marine habitats. Additionally, Kona crab fishermen are unlikely to set their nets around known shipwrecks to prevent loss of gear (EA, section 3.5). The proposed action would not affect marine protected areas (MPAs) because fishing in MPAs would continue to be regulated under applicable state and Federal laws. As described in the EA, the proposed ACLs and AMs would not change the fishery in any manner. Therefore, in summary, the analysis in the EA did not find that the proposed action would have the potential to have significant effects on historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas (EA, sections 4.4 and 4.6.1).

*4. Are the proposed action's effects on the quality of the human environment likely to be highly controversial?*

No. The potential effects of the Kona crab fishery on the human environment are well-understood. Kona crab harvest methods are highly selective and are not known to cause damage to the ocean, coastal habitats, corals, or marine habitats (EA, section 4.4). The proposed action would not have the potential to lead to substantial effects on physical, chemical, or biological alterations to habitat or result in adverse impacts to marine habitat including areas designated as essential fish habitat (EFH), habitat areas of particular concern (HAPC), or unique areas such as MPAs, marine sanctuaries or marine monuments (EA, sections 4.0, 4.4, 4.7.1, 4.7.2).

The Council requested, and NMFS developed, the proposed action in a public process in accordance with the Magnuson-Stevens Act, the FEP, and other applicable laws. NMFS and the Council began using ACLs and AMs to manage this fishery in 2012 and have specified ACLs for every year except 2016 and 2018 (EA, Table 3). The management measures are not entirely new to fishery participants or fishery managers. While we do not expect the in-season AM to be triggered, it would not be difficult for fishermen to understand or comply with. The fishery outcomes are predictable, and NMFS has evaluated the effects thoroughly in the EA. Both

NMFS and the Council's Scientific and Statistical Committee determined the 2018 stock assessment, on which the ACLs and ACTs are based, to be the best scientific information available (EA, section 2.1.1). NMFS has not identified any controversy about the potential effects of the proposed action's effects on the quality of the human environment.

NMFS considered input from other interested parties through a process that provided opportunity for public comments during publicly noticed Council meetings. All meetings were open to the public and advertised in Hawaii media as well as the Federal Register (84 FR 24759, May 29, 2019), and on the Council's website. No comments were provided to NMFS indicating controversy about the ACLs or ACT or the use of the in-season accountability, nor that indicated controversy about the potential environmental effects analysis (see public comment statement above).

*5. Are the proposed action's effects on the human environment likely to be highly uncertain or involve unique or unknown risks?*

No. NMFS considered the proposed action's effects on the human environment and found that it does not involve highly uncertain or unknown effects. NMFS and the Council began using ACLs and AMs to manage this fishery in 2012 and have specified ACLs for every year except 2016 and 2018 (EA, section 1.6, Table 3). Catch history in the fishery indicates that the fishermen do not change behavior in response to ACL and AMs (EA, section 3.2, Figure 4). Kona crabs are also managed by State of Hawaii laws that provide for closed seasons, and prohibitions on the harvest of gravid females and individuals less than 4-inch carapace length. These regulations help to promote conservation of the species (EA, section 1.1). NMFS and Hawaii would continue to monitor the fishery, and the AMs provide for continued review of the performance of the fishery in comparison with carefully developed ACLs and ACTs (EA, section 2.2). Given agency experience with managing this fishery, the effects on the human environment from the proposed action are not difficult to predict and, therefore, the effects of proposed action are not highly uncertain or involve unique or unknown risks (EA, section 1.6, 2.1.2, 4.7.1).

*6. Can the proposed action reasonably be expected to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?*

No. NMFS and the Council began using ACLs and AMs to manage this fishery in 2012 and have specified ACLs for every year except 2016 and 2018 (EA, Table 3). The ACL and AMs for 2020-2023 were developed in accordance with the process in the approved FEP (EA, section 1.6). The proposed ACL, ACT, and AMs are not expected to change the fishery and the fishery is considered sustainable (EA, sections 2.11, 2.2, Table 5, 4.1). While the use of an ACT and in-season fishery closure is new to this fishery, an ACT and in-season fishery closure are commonly used fisheries management tools that help ensure the ACL is not exceeded (EA, section 1.6). Thus, the selected ACL and AM would not establish a precedent with the potential for significant adverse effects (EA, section 3.8).

The proposed catch limits would not foreclose or narrow future options for ACL or AMs. First, the fishery is not expected to change substantially in terms of area fished or intensity of fishing (EA, section 2.2, Tables 5, 4.1). Second, the EA describes that NMFS and the Council monitor

the fishery, review catch data annually, and make ACL and AM recommendations in public meetings (EA, sections 1.7, 2.1.1, 2.1.3). Lastly, our analysis shows that the Hawaii Kona crab stock is currently not overfished and overfishing is not occurring, and the stock would continue to be healthy under the proposed action (EA, section 2.2.4, Table 5, 4.1).

*7. Is the proposed action related to other actions that when considered together will have individually insignificant but cumulatively significant impacts?*

No. The analysis found no past, present, or reasonably foreseeable actions that could combine or interact with the effects from the proposed ACL and AM to result in cumulatively significant impacts. The ACLs were developed in consideration of all fishery effects on Kona crab stocks, and considered the potential for climate change impacts to Kona crabs (EA, section 4.7.4.4). The proposed action effects are primarily limited to mortality of Kona crab (EA, section 4.1). The ACL and AM would ensure the sustainability of the Hawaii Kona crab stock and take into consideration all known sources of mortality including past, present, and reasonably foreseeable future actions that may cause Kona crab mortality (EA, section 4.7.2.1). The EA considered harvests at the level of the ACL and concluded the ACL and AMs would not result in cumulatively large and adverse effects on Kona crab stocks including if this level of catch were to occur year after year (EA, section 4.7)

*8. Can the proposed action reasonably be expected 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. NMFS is not aware of any districts, sites, structures or objects listed in or eligible for listing in the National Register of Historic Places within offshore areas fished by the Kona crab fishery. Shipwrecks may exist in areas where the fishery operates, but Kona crab fishermen tend to avoid fishing or anchoring on or near known shipwrecks in order to avoid losing gear (EA, section 3.5). The proposed ACL and AMs would not change the fishery in any manner; therefore, there is no potential for loss or destruction of significant scientific, cultural, or historical resources (EA, section 4.6.1).

*9. Can the proposed action reasonably be expected to have a significant impact on endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973?*

No. The Hawaii Kona crab fishery does not adversely affect listed species or critical habitat. Because the proposed action would not change fishing operations, it would not cause any effects to Endangered Species Act (ESA) listed species or designated critical habitat that have not been addressed in existing consultations. The EA considered the potential for changes to occur with respect to new listings and consultations. The EA describes that if the fishery, environment, or status of a listed species or marine mammal were to change substantially, or if the fishery were found to be occurring in or near areas that were designated as critical habitat, NMFS would undertake additional consultation as required by the ESA (EA, sections 3.3, 4.3 and 4.7.2.2).

*10. Can the proposed action reasonably be expected to threaten a violation of Federal, state, or local law or requirements imposed for environmental protection?*

No. The proposed action of implementing an ACL and AM is consistent with the Magnuson-Stevens Act and other applicable laws (EA, section 5). The proposed action was coordinated with the public and the State of Hawaii Division of Aquatic Resources through Council meetings and *Federal Register* notices. The project was coordinated with the Hawaii Coastal Zone Management (CZM) Program and found to be consistent with the CZM Program. Furthermore, neither NMFS nor the Council received any comments during the public review and comment period that indicated the proposed action would threaten a violation of such laws or requirements.

*11. Can the proposed action reasonably be expected to adversely affect stocks of marine mammals as defined in the Marine Mammal Protection Act?*

No. The EA described the Hawaii Kona crab fishery as a fishery that does not adversely affect stocks of marine mammals. The Hawaii Kona crab fishery is a Category III fishery under the most recent List of Fisheries (85 FR 21079, April 16, 2020). A Category III fishery is one with a remote likelihood or no known incidental mortality and serious injury of marine mammals. Because the proposed action would not modify vessel operations or other aspects of the Kona crab fishery in the MHI, NMFS does not expect the fishery to affect marine mammals in any manner not previously considered by the List of Fisheries Classification or authorized under the commercial fishing take exemption of section 118 of the MMPA (EA, sections 4.2, 5.5).

*12. Can the proposed action reasonably be expected to adversely affect managed fish species?*

No. The proposed action would 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 compared to the baseline of no ACL or AM. Harvest methods used in the Kona crab fishery are highly selective and do not affect other managed species (EA, section 3.1). The proposed action would not change the fishery in terms of target and non-target species, gear composition, or bycatch (EA, sections 4.1.4, 4.3)., For these reasons, the proposed action is not expected to adversely affect any managed fish species.

*13. Can the proposed action reasonably be expected to adversely affect essential fish habitat as defined under the Magnuson-Stevens Fishery Conservation and Management Act?*

No. The Hawaii Kona crab fishery does not adversely affect designated EFH or HAPC. Kona crab are harvested by circular shaped nets approximately 1 m across and set on sandy bottom habitats at depths ranging from 15 to 45 m (EA, sections 1.1, 3.1). These harvest methods are highly selective and are not known to cause damage to the ocean, coastal habitats, corals, or marine habitats. Because the proposed action would not alter the fishery, it would not have the potential to cause substantial damage to the ocean or coastal habitats including designated EFH or HAPC (EA, section 4.4).

*14. Can the proposed action reasonably be expected to adversely affect vulnerable marine or coastal ecosystems, including but not limited to, deep coral ecosystems?*

No. The fishery does not affect marine or coastal ecosystems due to fishing gear and location. Because the proposed action would not change fishing for Kona crab in any substantial manner, the proposed action would not substantially affect ocean or coastal habitats, including vulnerable marine or coastal ecosystems (EA, section 4.4).

*15. Can the proposed action reasonably be expected to adversely affect biodiversity or ecosystem functioning (e.g., benthic productivity, predator-prey relationships, etc.)?*

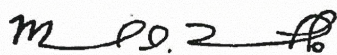
No. The purpose of the proposed action is to ensure the sustainability of the Kona crab fishery in Hawaii through implementation of an ACL and AMs. The Council based its recommendations for the proposed ACL and ACT on a 2018 stock assessment and included consideration of other ecological functions (see, EA, section 2.1.1). The Council's Archipelagic Plan Team considers ecosystem information when developing the Stock Assessment and Fishery Evaluation Report, which the SSC may consult when recommending ABCs (EA, section 1.6). There are no known adverse effects on biodiversity or ecosystem functioning from this relatively small fishery, with fewer than 50 fishermen reporting catch of Kona crab annually since 2010 (EA, sections 3.2, 4.6.2, 4.7.2.3). Because the proposed action would not change fishing for Kona crab in a substantial manner and would help ensure long term sustainability of the fishery and Hawaii Kona crab stock, the proposed action would not cause adverse effects on biodiversity or ecosystem functioning.

*16. Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?*

No. The Kona crab fishery is not known to introduce such species, and the proposed action would not change fishing activities to create a potential for non-indigenous species to be introduced or spread (EA, section 4.6).

## **Determination**

In view of the information in this document and the analysis contained in the 2020 EA "Annual Catch Limits and Accountability Measures for Main Hawaiian Islands Kona Crab 2020-2023", NOAA has determined that the proposed action will not significantly impact the quality of the human environment. In determining no significant impacts, all beneficial and adverse impacts of the proposed action have been addressed. Accordingly, it is not necessary to prepare an environmental impact statement for this action.



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Michael D. Tosatto  
Regional Administrator

11/25/2020

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Date



Attachments:

NMFS (National Marine Fisheries Service). 2020. Environmental Assessment: Annual Catch Limits and Accountability Measures for Main Hawaiian Islands Kona Crab 2020-2023. National Marine Fisheries Service, Honolulu, Hawaii. 67 pp.

Reference:

Kapur, M.R., Fitchett, M.D., Yau, A.J., Carvalho, F. 2019. 2018 Benchmark Stock Assessment of Main Hawaiian Islands Kona Crab. NOAA Tech Memo. NMFS-PIFSC-77. 114 pp. doi:10.25923/7wf2-f040.

# **Annual Catch Limits and Accountability Measures for Main Hawaiian Islands Kona Crab 2020-2023**

## **Final Environmental Assessment including a Regulatory Impact Review**

(RIN 0648-BJ84)

November 17, 2020

**Responsible Agency:** Pacific Islands Regional Office (PIRO)  
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National Oceanic and Atmospheric Administration (NOAA)

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## Abstract

The National Marine Fisheries Service (NMFS) proposes to implement an annual catch limit (ACL), an annual catch target (ACT), and accountability measures (AM) for Kona crab, *Ranina ranina*, in the U.S. Exclusive Economic Zone (EEZ) around the main Hawaiian Islands (MHI), as recommended by the Western Pacific Fishery Management Council (Council). The ACL, ACT, and AM would apply to Kona crab catches for fishing years 2020, 2021, 2022 and 2023.

The Council developed the proposed ACL, ACT, and AM for Kona crab in accordance with requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and with the approved processes specified in the Fishery Ecosystem Plan for the Hawaiian Archipelago (FEP). At its June 2019 meeting, the Council recommended that NMFS implement an ACL of 30,802 lb and an ACT of 25,491 lb of Kona crab in each fishing year from 2020 through 2023. The fishing year for Kona crab is the calendar year. The fishery has landed an annual average of 3,316 lb of Kona crab in the past three years.

The proposed action also includes two AM for this fishery, an in-season AM and a post-season AM. As a first AM, if an ACT is projected to be reached in any fishing year, NMFS would implement an in-season closure of the commercial and non-commercial fisheries for MHI Kona crab in Federal waters. NMFS and the Council are able to monitor commercial catches of Kona crab on a monthly basis in both State and Federal waters using data collected by the State of Hawaii, and will use these data to monitor catch relative to the ACL and ACT. As a second AM, in the event that the fishery does not close in time and the catch exceeds the ACL, NMFS would reduce the ACL in the next fishing year by the amount of the overage and would make an adjustment to the ACT as well. In the event that the catch exceeds the ACT but is below the ACL, a post-season correction would not be applied. The proposed action would not require a change to monitoring or fishery data collection.

Prior to implementing a reduced ACL and ACT, the Council and its Scientific and Statistical Committee (SSC) would review fishery performance and other factors, and make a recommendation to NMFS. NMFS would conduct additional environmental analyses, if necessary, and the public would have the opportunity to provide input and comment on the ACL and ACT specification at that time. Also, under National Standard 1 (NS1) of the Magnuson-Stevens Act, 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.

NMFS and the Council prepared this EA to evaluate the potential environmental impacts of the proposed ACL, ACT, and AMs. The EA includes a description of the information and methods used by the Council to develop the proposed management measures, and analyzes a range of alternatives. The EA describes the affected environment and the potential effects of the alternatives on target and non-target stocks, protected species, and other factors. Analyses described in the EA indicate that none of the alternatives are likely to change the catch, effort, participation or operation of the fishery and the fishery is expected to continue as it has in recent years under the proposed alternatives.

Management of Kona crab under the proposed ACL, ACT, and AMs are intended to prevent overfishing and provide for continued sustainable harvest of the Kona crab resource. The proposed action would not require a change to monitoring or fishery data collection.

NMFS provided the public with a review and comment period on the draft EA. We received comments from four individuals that generally supported the action. Copies of this EA and final rule are found under RIN 0648-BJ84 at [www.regulations.gov](http://www.regulations.gov), or by contacting the responsible official or Council at the above addresses.

## ACRONYMS AND ABBREVIATIONS

ABC – Acceptable Biological Catch  
ACL – Annual Catch Limit  
ACT – Annual Catch Target  
AM – Accountability Measure  
APA – Administrative Procedure Act  
CFR – Code of Federal Regulations  
CML – Commercial Marine License  
Council – Western Pacific Fishery Management Council  
CPUE – Catch per Unit of Effort  
EA – Environmental Assessment  
ECS – Ecosystem Component Species  
ESA – Endangered Species Act  
EEZ – Exclusive Economic Zone  
FEP – Fishery Ecosystem Plan  
FMP – Fishery Management Plan  
FR – *Federal Register*  
HDAR – State of 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  
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  
NS1 – National Standard 1 of the Magnuson-Stevens Act  
OFL – Overfishing Limit  
P\* - Risk of overfishing percentile  
PIFSC – NMFS Pacific Islands Fisheries Science Center  
PIRO – NMFS Pacific Islands Regional Office  
SEEM – Social, Economic, and Ecological factors and Management Uncertainty  
SSC – Scientific and Statistical Committee  
WPacFIN – Western Pacific Fisheries Information Network  
WPFMC – Western Pacific Fishery Management Council

# Annual Catch Limits and Accountability Measures for Main Hawaiian Islands Kona Crab 2020-2023

## Environmental Assessment, including a Regulatory Impact Review

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# 1 INTRODUCTION

The National Marine Fisheries Service (NMFS) proposes to implement an annual catch limit (ACL), an annual catch target (ACT), and other accountability measures (AMs) for Kona crab (*Ranina ranina*) in the main Hawaiian Islands (MHI) in fishing years 2020, 2021, 2022 and 2023. NMFS and the Western Pacific Fishery Management Council (Council) prepared this Environmental Assessment (EA) in accordance with the requirements of National Oceanographic and Atmospheric Administration's (NOAA) Administrative Order (NAO) Section 216-6A, "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 the associated Companion Manual. NAO 216-6A requires review under the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations, and other related authorities including review of environmental consequences on the human environment prior to making a decision. Section 1 of this EA provides background to understand the fishery, the proposed alternatives, the purpose, and the need for action. The proposed alternatives are described in Section **Error! Reference source not found.** The affected environment and analyses of the potential impacts on the human environment are in Sections **Error! Reference source not found.** and **Error! Reference source not found.**, respectively. Compliance with other applicable laws and coordination with others is found in Section **Error! Reference source not found.** References cited are listed in Section **Error! Reference source not found.**

## 1.1 Background Information

NMFS and the Council manage fisheries for crustacean management unit species (MUS) in Federal waters (the U.S. Exclusive Economic Zone or EEZ) around the Hawaiian Islands. They do this in accordance with the Fishery Ecosystem Plan for the Hawaii Archipelago (Hawaii FEP) and implementing regulations at 50 CFR Part 665 as authorized by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Marine waters within 3 nm of the shoreline are subject to the jurisdiction of the State of Hawaii and are not part of the Hawaii FEP management area. This action pertains to the management of Kona crab.

Kona crab, sometimes referred to as the "spanner crab" or "frog crab," is commercially harvested over much of its range in the equatorial Pacific. The crabs display sexual dimorphism, with males growing to a much larger size than females (Uchida 1986). Sex composition in catches of Kona crabs are approximately 49% male and 51% female (Wiley and Pardee, 2018). Fishermen are readily able to distinguish the sexes of adult crabs based on differences in morphology ( Figure 1).

Fishing for Kona crab occurs in both State and Federal waters around the MHI and the fishing year runs from January 1 through December 31. Fishermen target crabs by setting strings of baited circular shaped nets on sandy bottom habitats for an average soak time of one hour (Kennelly and Craig 1989). Kona crabs are consumed in social gatherings, graduations, weddings, or holidays and generally need to be consumed within a day of capture and can spoil quickly.

The Hawaii commercial Kona crab fishery is currently subject to a suite of management regulations. Federal requirements direct NMFS to specify an ACL and implement other measures, including AMs, to ensure sustainability for all stocks and stock complexes of MUS included in each FEP. There are also numerous Hawaii State regulations intended to conserve Kona crab resources including a prohibition on taking of female Kona crab (Hawaii Revised Statutes §188-58.5); a minimum size for male crabs of 4 inches (carapace length), seasonal closures (May-August), and gear restrictions (e.g., no spearing Kona crab, minimum net mesh size) (Hawaii Administrative Rule Title 13, Subtitle 4, Chapter 95 §13-95-51). Recent studies in Hawaii have shown that post-release mortality of female crabs is 10.77% (Wiley, 2017; Wiley and Pardee, 2018). Additionally, fishermen are required to have a Commercial Marine License (CML) issued by the State of Hawaii to harvest Kona crab for commercial purposes and report catch on a monthly basis. In the past decade, the number of annual licenses holders, trips taken, and catch has trended downward, although a slight increase did occur in 2018 and 2019 (Table 1).

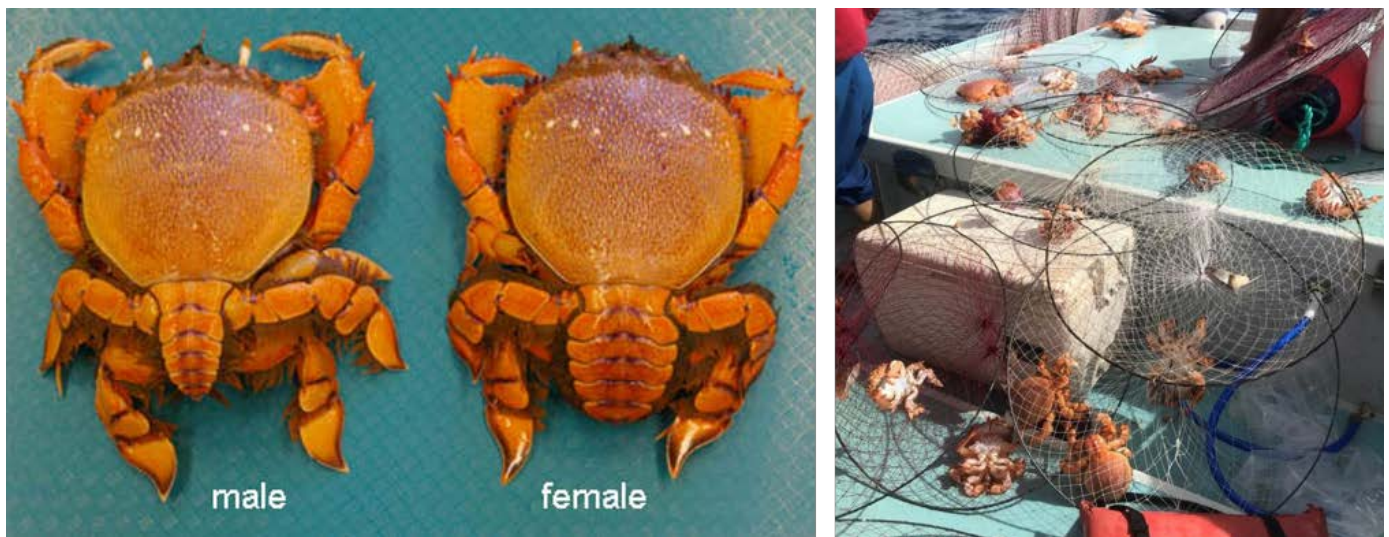
**Table 1.** Hawaii Annual Stock Assessment and Fishery Evaluation Report (2019) data showing the time-series data for the main Hawaiian Islands Kona crab fishery. Source: (WPFMC, 2019a)

| <b>Fishing Year</b>      | <b># License Holders Reporting Catch</b> | <b># Trips</b> | <b>Catch (lb)</b> |
|--------------------------|--|----------------|-------------------|
| 2008                     | 35                                       | 221            | 13,153            |
| 2009                     | 43                                       | 168            | 7,519             |
| 2010                     | 39                                       | 209            | 11,449            |
| 2011                     | 49                                       | 190            | 10,609            |
| 2012                     | 41                                       | 128            | 8,149             |
| 2013                     | 28                                       | 106            | 9,551             |
| 2014                     | 29                                       | 59             | 2,999             |
| 2015                     | 24                                       | 64             | 2,293             |
| 2016                     | 23                                       | 49             | 2,518             |
| 2017                     | 17                                       | 36             | 1,690             |
| 2018                     | 22                                       | 57             | 2,561             |
| 2019                     | 23                                       | 85             | 5,698             |
| <b>Average (08 – 19)</b> | 31                                       | 114            | 6,516             |
| <b>Average (08 – 13)</b> | 39                                       | 170            | 10,072            |
| <b>Average (14 – 19)</b> | 23                                       | 58             | 2,960             |

## 1.2 Proposed Action

NMFS proposes to implement an ACL of 30,802 lb, an ACT of 25,491 lb, and in-season and post-season AMs for the Hawaii Kona crab fishery in the EEZ around the MHI each year for fishing years 2020–2023, as recommended by the Council. Catch from State and Federal waters will count toward catch limits. The Council recommended the ACL based on the most recent benchmark stock assessment for Kona crab in the MHI (Kapur et al., 2019), consistent with the Magnuson-Stevens Act and in accordance with the ACL process set forth in the Hawaii FEP (refer to Section 1.6 below for more information on the ACL process).

Under the proposed action, in each of the four fishing years, NMFS and the Council would monitor the Kona crab catches from both State waters (generally from the shoreline to 3 nm offshore) and Federal waters around the MHI and evaluate catches against the ACL and ACT. As a first AM, if an ACT is projected to be reached in any fishing year, NMFS would implement an in-season closure of the commercial and non-commercial fisheries for MHI Kona crab in Federal waters. As a second AM, in the event that the fishery does not close in time, for example due to a delay in reporting, and the catch exceeds the ACL, NMFS would reduce the ACL in the next fishing year by the amount of the overage and would make an adjustment to the ACT as well. In the event that the catch exceeds the ACT but is below the ACL, a post-season correction would not be applied. The proposed action would not require a change to monitoring or fishery data collection.



**Figure 1.** Dorsal view of male and female Kona crab (Left). Kona crab and nets used in the fishery. (Right). Nets with Kona crab catch from the cooperative research fishing conducted by Poseidon Fisheries Research funded by the Council. Source: Hawaii Division of Aquatic Resources

As an additional performance measure specified in each FEP, if catches exceed any ACL more than once in a four-year period, the Council must re-evaluate the ACL process, and adjust the system, as necessary, to improve its performance and effectiveness. Future changes to an ACL would be subject to separate environmental review at such time as changes are proposed, and are not part of the current proposed action.

### 1.3 Purpose and Need for Action

The purpose of this action is to comply with the requirements of the Magnuson-Stevens Act, the Hawaii FEP, and implementing regulations that require implementation of ACL and AMs for HI MUS, including Kona crab, as recommended by the Council, and in consideration of the best available scientific, commercial, and other information. The need for this action is to prevent

overfishing and to provide for the long-term sustainability of the MHI Kona crab fishery while allowing fishery participants to continue to benefit from their utilization. AMs are needed to reduce the potential of exceeding an ACL and are used to correct or mitigate overages of the ACL should they occur.

#### **1.4 Action Area**

The action area for this EA is waters where fishing for Kona crab occurs in State and Federal waters throughout the MHI. The range of Kona crab fishing is sandy substrate from around 5 to 400 m deep. Waters around islands northwest of Niihau are not part of the action area because commercial fishing is prohibited in Papahānaumokuākea Marine National Monument (50 CFR 404.6).

#### **1.5 Decision(s) to be Made**

After considering public comments on the proposed action and alternatives considered, NMFS will implement an ACL, ACT, and AMs for Kona crab for the 2020–2023 fishing years. NMFS will use the information in this EA to consider the potential effects of the proposed action and alternatives on the affected environment before taking final action. Finally, the Regional Administrator will use the information in this EA to make a determination about whether the selected ACL, ACT, and AMs would be a major Federal action with the potential to have a significant environmental impact, which would require NMFS to prepare an environmental impact statement before proceeding.

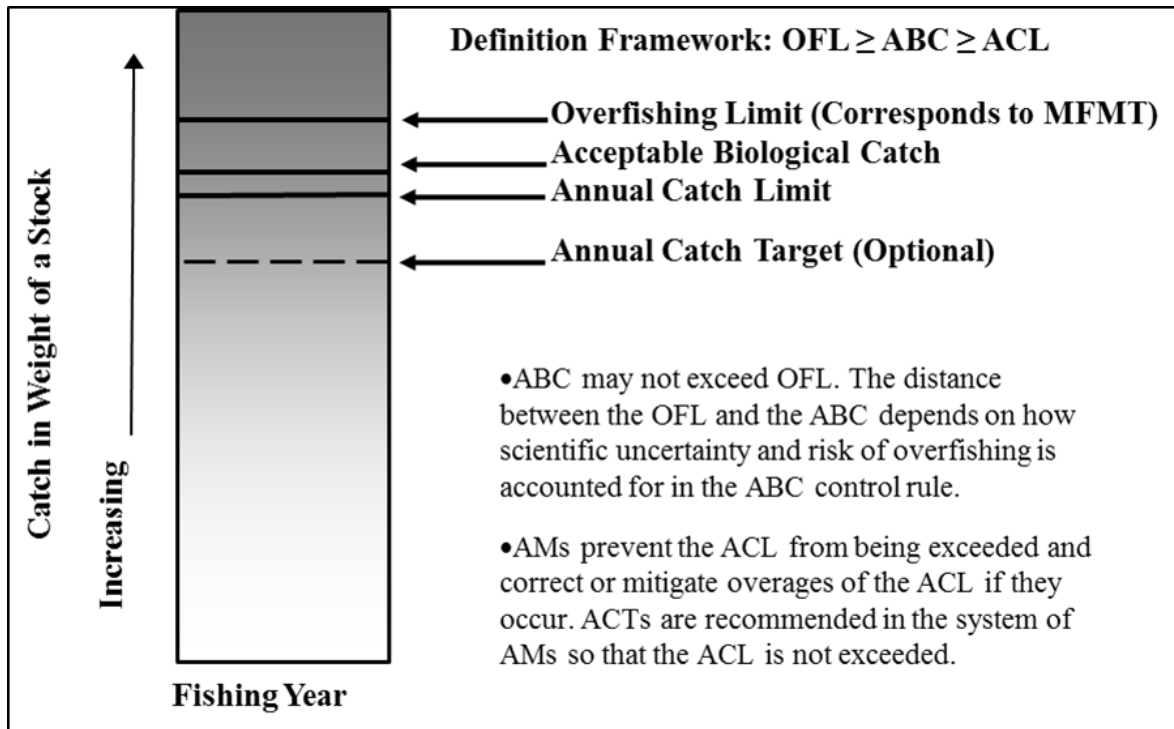
#### **1.6 Overview of the ACL and AM Implementation Process**

Kona crab fishermen have been subject to an ACL and a post-season AM since 2012, when the requirement to have these management measures was first implemented for this fishery. Federal regulations at 50 CFR 665.4 (76 FR 37285, June 27, 2011) require NMFS to implement an ACL and AM(s) for all Hawaii MUS, as recommended by the Council, based on the best scientific, commercial, and other information available about the fishery. The same Federal regulations allow for NMFS to specify an ACT that is below the ACL, as recommended by the Council. When used, the ACT serves as the basis for invoking AMs. This section provides an overview of the process the Council used to develop its management recommendations for Kona crab.

In accordance with the Magnuson-Stevens Act and the Hawaii FEP, there are three required elements in the development of an ACL as show in Figure 2: calculate the acceptable biological catch (ABC), determine an ACL that may not exceed the ABC, and develop AMs.

In the first step, the Council’s Scientific and Statistical Committee (SSC) calculates an ABC that is set at or below the stocks overfishing limit (OFL). The OFL is an estimate of the catch level above which overfishing is occurring and corresponds with the maximum fishing mortality threshold (MFMT). In accordance with Federal regulations at 50 CFR 600.310 implementing National Standard 1 (NS1) of the Magnuson-Stevens Act, the probability of overfishing (P\*, pronounced “P-star”) may not exceed 50%, and should be a lower value. In plain English, the ABC is the maximum amount the fishery can catch that provides at least a 50% chance, or better, of not overfishing the stock.

To determine the appropriate ABC, the FEP includes a five-tiered system of ABC control rules based on the different levels of scientific information available for a fishery (Fig. 3). An ABC control rule is an established policy set by the Council, in consultation with its SSC, which articulates how the ABC will be set compared to the OFL (e.g., if the ABC will be at or below the OFL). The SSC must evaluate the available data for the stock and assign the stock into one of the five tiers. The SSC must then apply the control rule assigned to that tier to determine ABC. Stocks such as Kona crab that have estimates of maximum sustainable yield (MSY) and other MSY-based reference points derived from statistically-based stock assessment models are classified as Tier 1-3 (Figure 3).



**Figure 2.** General relationship between OFL, ABC, ACL, and ACT.

Second, the Council must determine an ACL that may not exceed the ABC recommended by the SSC. An ACL set below the ABC further reduces the probability that actual catch will exceed the ABC and OFL and result in overfishing. The SSC may reduce the ABC below the OFL considering factors evaluated in a P\* analysis. The Council may then reduce the ACL below the ABC in consideration of social, economic, ecological, and management (SEEM) factors in a SEEM analysis (Hospital et al., 2019).

The third and final element in the ACL process is the inclusion of AMs. There are two categories of AMs, in-season AMs and post-season AMs. In-season AMs prevent an ACL from being exceeded and may include closing the fishery, closing specific areas, changing bag limits, setting an ACT, or other methods to reduce catch. Establishing an ACT can help ensure the ACL is not exceeded. The Council has two options for setting an ACT. Under the first option, the Council could set the ACL equal to the ABC and then recommend an ACT lower than the ACL based on the SEEM analysis. Under the second option, the Council may recommend an ACT lower than

the ACL based on only the management uncertainty (the “M” portion) identified in a SEEM analysis (Hospital et al., 2019) and, in fact, NS1 guidelines suggest management uncertainty be accounted for during the establishment of AMs for a fishery, including the use of ACTs. The Omnibus Amendment for the Western Pacific Region to Establish a Process for Specifying Annual Catch Limits and Accountability Measures defines management uncertainty as “arising due to insufficient information about true catch (e.g., late reporting, underreporting and misreporting of landings), lack of management precision, and/or the ability to close the fishery before a catch limit is exceeded” (WPFRC and NMFS, 2011). While the P\* analysis considers management uncertainty arising from underreporting and misreporting of catch, the SEEM analysis is more forward-looking and considers uncertainty arising from concerns about compliance and/or management capacity.

Post-season AMs reduce the ACL and ACT in subsequent years if the ACL is exceeded in order to mitigate potential impacts to fish stocks. Additionally, if any fishery exceeds an ACL more than once in a four-year period, the Council is required to re-evaluate the ACL process for that fishery, and adjust the system as necessary to improve its performance and effectiveness in ensuring sustainability of the fishery.

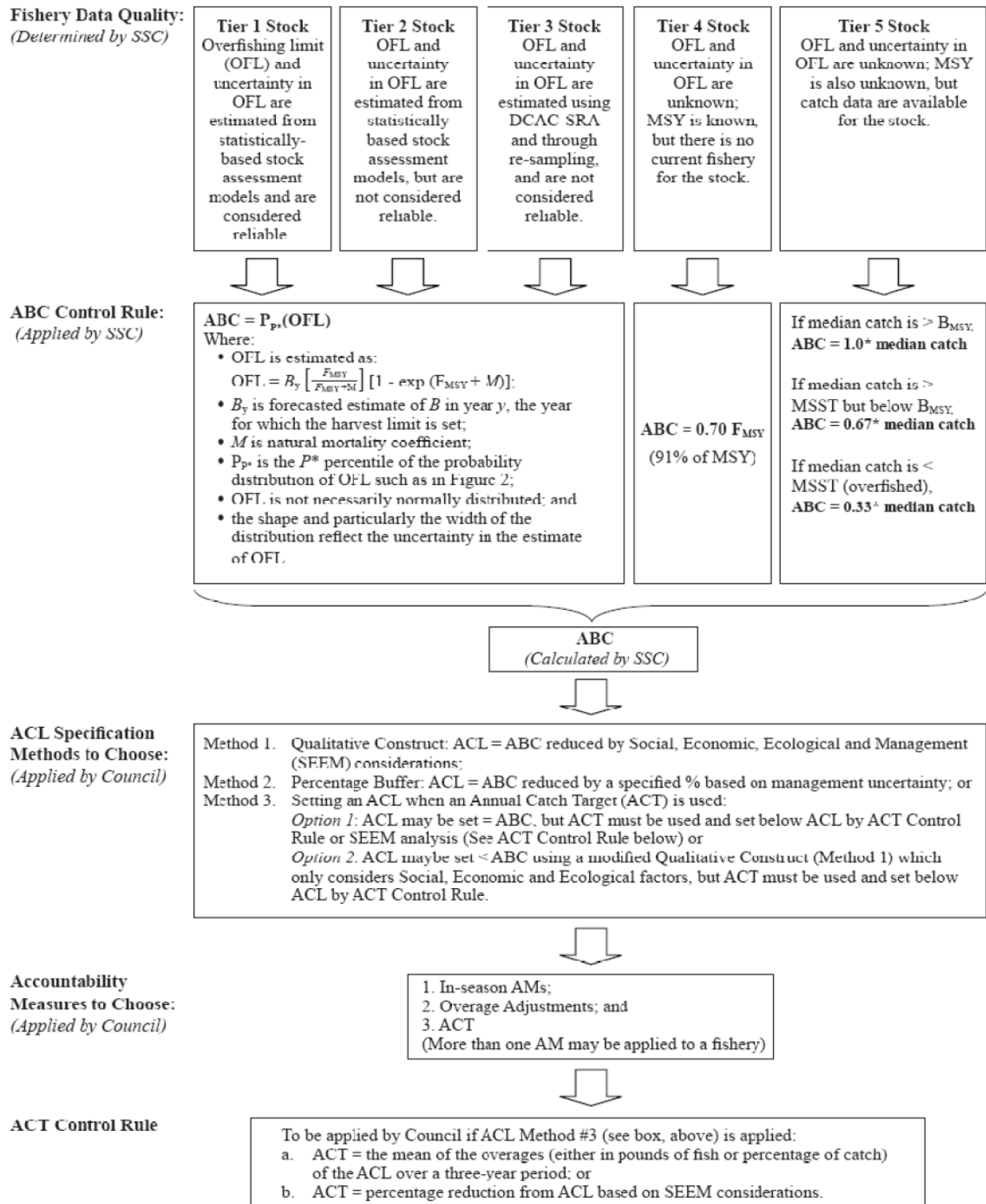
Refer to Section 2.1 for specific information on the development on the OFL, ABC, ACL, and ACT as well as the P\* and SEEM process.

## **1.7 Public Involvement**

Development of the proposed ACL, ACT, and AMs were made in a public process. The recommended management measures were discussed by the Council at a number of public meetings. The Kona crab P\* working group meeting was held at the Council office on April 12, 2019. At its 132nd meeting on June 18, 2019, the SSC evaluated the different options for setting the ABC based on the P\* working group analysis. At its 178th meeting, held in Honolulu, HI on June 25, 2019, the Council considered and discussed issues relevant to ACL, ACT, and AM specifications for the MHI Kona crab fishery, including the ABC recommendations from the Council’s SSC. Reports of all SSC and Council meetings cited in this EA can be obtained from the [Council](#).

All meetings were open to the public and advertised in Hawaii media as well as the Federal Register (84 FR 24759, May 29, 2019), and on the Council’s website. The public had an opportunity to comment at the meetings on the proposed management measures. No comments were provided on the level of catch or accountability measures.

On October 15, 2020, NMFS published in the *Federal Register* a proposed rule for an ACL of 30,802 lb and ACT of 25,491 lb for the Hawaii Kona crab fishery and in-season and post-season AMs for fishing years 2020 – 2023 (85 FR 65336). The proposed rule was accompanied by the draft EA, dated September 22, 2020. NMFS requested public review and comments on the proposed rule and draft EA. The comment period ended on November 5, 2020. We received comments from four individuals that generally supported the action. None of the comments resulted in a change to the rule or the analysis in the EA.



**Figure 3.** Overview of the schematic for setting the ABC, ACL, and ACT (from WPFMC and NMFS, 2011).

## **1.8 List of Preparers**

### Preparers:

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### Reviewers:

Phyllis Ha – Resource Management Specialist, PIRO SFD

Jarad Makaiau – Fish and Wildlife Administrator, PIRO SFD

Ariel Jacobs –NEPA Coordinator, PIRO



## **2 ALTERNATIVES CONSIDERED INCLUDING NO ACTION**

The alternatives considered in this document include a range of possible ACLs and ACTs for the Hawaii Kona crab fishery. The SSC utilized the results of the P\* analysis (WPFMC 2019b) to set the ABC while the Council utilized the results of the SEEM analysis (WPFMC 2019c) to recommend the ACL and the ACT. Although the estimation of the OFL and calculation of the ABC are part of setting the ACL, the establishment of these reference points is conducted through the peer review process and Council process. These values are not part of the proposed Federal action.

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

The SSC and Council developed their respective Kona crab ABC, ACL, and ACT recommendations in accordance with the Magnuson-Stevens Act, Federal regulations at 50 CFR 665.4, and the Hawaii FEP as outlined in Section 1.1.1. The amendment to the Hawaii FEP that implemented management using ACLs and AMs limits the timeframe of management measures that can be implemented to four years (WPFMC and NMFS, 2011)<sup>1</sup>. That affords the Council the discretion to recommend management measures through 2023. However, the 2018 stock assessment (Kapur et al., 2019) provides projections of catch limits for seven years (through 2026). The Council used the 2026 timeframe when recommending catch levels for the ACL and ACT to provide as long-term perspective as possible. The EA will analyze the implementation of management measures over the seven-year timeframe, consistent with the Council perspective and in the event that the Council wishes to maintain these measures throughout the period addressed by the stock assessment through a future recommendation.

#### **2.1.1 Stock Assessment and Peer Review**

In 2015, Thomas et al. prepared a stock assessment for Kona crab that estimated stock abundance, fishing mortality, and biomass for the fishery using commercial landings data from 1970 through 2006. The 2015 assessment (which has since been updated) found that Hawaii Kona crab stock had reached an overfished status in 2006, and were likely still overfished in 2010. In December 2015, the Center for Independent Experts (CIE) completed a peer review of the 2015 assessment that supported the conclusion the Kona crab stock had been overfished in 2006 but pointed out the significant amount of uncertainty with the assessment's future projections of the stock's status after 2006 and the current status of the stock. After reviewing the Thomas et al. (2015) stock assessment and the CIE review, and acting upon the request from the Council, PIRO requested additional review from the PIFSC. In a memo dated January 20, 2016, PIFSC concurred that the stock projections beyond 2006 probably do not accurately describe current Hawaii Kona crab stock size or structure.

In June 2017 the PIFSC initiated a benchmark stock assessment for Kona crab, which was peer reviewed through the Western Pacific Stock Assessment Review (WPSAR) process in Honolulu,

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<sup>1</sup> The Council can revisit an ACL to improve performance and effectiveness of the fishery, or if a stock assessment or BSIA determines the ACL is not sufficient to prevent overfishing. Additionally, if any fishery exceeds an ACL more than once in a four-year period, the Council is required to re-evaluate the ACL process for that fishery, and adjust the system as necessary to improve its performance and effectiveness in ensuring sustainability of the fishery.

HI on September 10-14, 2018 and finalized in February 2019. The 2019 benchmark stock assessment addresses the concerns noted by Hall (2015) regarding the assessment by Thomas et al. (2015). Specifically, the assessment addressed uncertainty previously unaccounted for, including unreported catch and incidental mortality of female crab catch following the prohibition of female crab harvest in 2006, and new sources of information were also included. Results from the benchmark stock assessment conclude that, in 2016, the Hawaii Kona crab fishery was not overfished (defined as a ratio of current biomass to biomass at MSY greater than 0.7<sup>2</sup>) with a 0.0% probability of the status being overfished in 2016. In 2016, the stock was not experiencing overfishing (defined as a ratio of harvest to harvest at MSY greater than 1), with 0.0% probability of overfishing occurring. The biomass in 2016 was estimated to be 885,057 lb (Kapur et al., 2019). The median MSY estimate for total Hawaii Kona crab catch is 73,069 lb, though the reported component of that MSY (reduced to account for non-commercial catch and regulatory discards<sup>3</sup>) is estimated to be at 25,869 lb (Table 6 in Kapur et al., 2019).

At its 131st meeting, held in Honolulu, HI on March 12, 2019, the Council's SSC considered and discussed the 2018 benchmark stock assessment (Kapur et al., 2019) and the peer review report (Haddon, 2018). The SSC considered the 2019 benchmark assessment as Best Scientific Information Available (BSIA) for the stock status and setting harvest limits. At its 176th meeting, held in Honolulu on March 19, 2019, the Council accepted the SSC BSIA recommendation and directed staff to organize a working group to quantify the scientific uncertainty through the P\* process and the management uncertainty through the SEEM process. On September 24, 2019, the PIFSC also determined this stock assessment to be BSIA.

### **2.1.2 Calculation of the OFL**

Kapur et al. (2019) quantified overfishing risks for various future catch levels from 2020 to 2026. The assessment concluded that a 50% probability of overfishing in 2026 corresponds to an annual reported catch of 33,989 lb (Table 2). The projections assume catch would be the same each year. The SSC and Council used this longer timeframe, which provides a more conservative approach. For example, a 50% probability of overfishing in only 2020 would correspond to a 44,256 lb catch in that year. When looking at a longer timeframe, a 50% probability of overfishing through 2026 would correspond to a catch of 33,989 lb in each fishing year.

If catch in a given year is less than expected, the true risk of overfishing in subsequent years would be less than shown in the table. For example, in the above example where the risk in 2026 is the frame of reference, a catch of 25,000 lb, rather than 33,989 lb in the first year would mean

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<sup>2</sup> Since no reference points are specified for Hawaii Kona crab, overfished and overfishing reference points come from Table 23 of the Hawaii FEP for Northwest Hawaiian Islands lobster stocks. The value of 0.7 comes from the minimum stock size threshold defined by the ABC control rule.

<sup>3</sup> Annual reported catch is converted to estimated annual total catch using a two-step process: 1) calculating adjusted reported catch by adding discarded female mortality (based on a sex composition in catches of 49% male and 51% female (Wiley and Pardee, 2018) and a post-release mortality of female crabs of 10.77% (Wiley, 2017; Wiley and Pardee, 2018)) and 2) calculating total catch by adding unreported catch to adjusted reported catch. The unreported catch is the adjusted reported catch by year scaled by the unreported catch ratio (UCR). Due to a lack of available information to specifically estimate non-commercial unreported catch of Kona crab, the assessment uses a UCR of 1.54 which is the mean annual ratio of unreported to reported catch for the Deep-7 complex from 1948 to 2016 (Langseth et al., 2018).

the actual risk of overfishing in subsequent years would be less than 50%. The table does not provide specific values for how much the risk is reduced as actual catch scenarios unfold, so the benefit would be qualitative rather than quantitative.

**Table 2.** Probability of overfishing corresponding to catch of Kona crab in lb by year. Catch values for a given probability of overfishing in a given year assume equal catch in all previous years. (Source: Table 10 in Kapur et al., 2019)

| <b>P(Overfishing)</b> | <b>2020</b> | <b>2021</b> | <b>2022</b> | <b>2023</b> | <b>2024</b> | <b>2025</b> | <b>2026</b> |
|-----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>0.10</b>           | 24,429      | 23,721      | 23,013      | 22,659      | 21,951      | 21,597      | 21,243      |
| <b>0.20</b>           | 30,094      | 29,032      | 27,970      | 27,262      | 26,554      | 25,845      | 25,491      |
| <b>0.25</b>           | 32,572      | 30,802      | 30,094      | 29,032      | 28,324      | 27,616      | 26,908      |
| <b>0.30</b>           | 35,051      | 33,280      | 31,864      | 30,802      | 29,740      | 29,386      | 28,324      |
| <b>0.35</b>           | 37,175      | 35,051      | 33,635      | 32,218      | 31,510      | 30,448      | 29,740      |
| <b>0.38</b>           | 38,591      | 36,467      | 34,697      | 33,280      | 32,218      | 31,510      | 30,802      |
| <b>0.40</b>           | 39,299      | 37,175      | 35,405      | 33,989      | 32,926      | 31,864      | 31,156      |
| <b>0.45</b>           | 41,778      | 38,945      | 37,529      | 35,759      | 34,697      | 33,635      | 32,572      |
| <b>0.50</b>           | 44,256      | 41,070      | 39,299      | 37,529      | 36,113      | 35,051      | 33,989      |

### 2.1.3 Development of the Council’s recommendation for Hawaii Kona crab ABC, ACL, and AMs in 2020–2023

Using the final 2018 benchmark stock assessment, the Council at its 176th meeting on March 19, 2019, directed staff to organize working groups to conduct the P\* and SEEM analysis. The Kona crab P\* working group meeting was held at the Council office on April 12, 2019 and was comprised of assessment scientists, fishery managers, and Kona crab fishermen. The working group scored the four scientific uncertainty dimensions: 1) assessment information, 2) uncertainty characterization, 3) stock status, and 4) productivity-susceptibility. Per NS1 of the Magnuson-Stevens Act, P\* may not exceed 50% and should be a lower value. After accounting for the scientific uncertainty dimensions, the P\* analysis quantified a reduction of 12% from the OFL and therefore the P\* should not be greater than 38% (specifically the OFL minus the P\* reduction = 50% – 12% = 38%, WPFMC 2019b). A P\* of 0.38 equals an ACL of 30,806 (Table 2).

The SEEM working group meeting was held at the Council office on May 2, 2019 and was comprised of economist and social scientists, an anthropologist, fishery managers, and a Kona crab fisherman. The working group utilized a standardized SEEM dimensions and criteria. The working group recommended using the social, ecological and economic dimensions to set the ACL and the management uncertainty dimension to set the ACT. The SEEM analysis accounted for the timescale for catch monitoring with a 40 day delay, the ability to project the catch to determine the potential closure date, and the time it takes to close the Federal waters. The analysis also considered the State regulations in managing the Kona crab fishery. The working group concluded that no further reduction in the P\* was needed when accounting for the social, economic, and ecological dimensions and therefore no further reduction in the ACL (i.e., P\* = 38% and ACL = 30,802 lb). The analysis quantified a reduction of 8% for the management

uncertainty. If only the management uncertainty (“M”) portion of the SEEM analysis is used to set an ACT, as described under Option 2 of the ACT Control Rule (see Figure 3), then this represents an ACT at a risk of overfishing equal to 30% or 25,324 lb (specifically 38% - 8% = 30%, WPFMC 2019c).

At its 132nd meeting on June 18, 2019, the SSC deliberated and discussed the outcome of the P\* analysis for the MHI Kona crab and evaluated the different options for setting the ABC based on the P\* analysis. The SSC chose between the following options:

1. Option 1 – Do not set the ABC,
2. Option 2 – Status quo and set the ABC based on the Thomas et al. (2015) at 3,500 lb,
3. Option 3 – Set ABC based on the updated 2019 benchmark stock assessment at P\* level from the working group analysis at P\*=38% equivalent to 30,802 lb,
4. Option 4 – Set ABC based on the updated 2019 benchmark stock assessment at P\* level 10% lower than the value generated by the P\* analysis at P\*=28% equivalent to 27,970 lb, and
5. Option 5 – Set ABC based on the updated 2019 benchmark stock assessment at P\* level 20% lower than the value generated by the P\* analysis at P\*=18% equivalent to 24,783 lb.

The SSC chose option 3 because it utilizes the best scientific information available (Kapur et al., 2019) and the results from the P\* analysis.

#### **2.1.4 Council ACL and AM Recommendations**

At its 178th meeting held June 25-27, 2019, the Council accepted the SSC’s ABC recommendation and reviewed the SEEM analysis. The Council evaluated the different options for setting the ACT based on the SEEM analysis. The Council chose between the following alternatives:

1. No Action. No harvest limits will be specified for fishing years 2020–2023,
2. Specify the previous harvest limit at 3,500 lb using the old assessment (Thomas et al., 2015) for fishing years 2020–2023,
3. Specify the ACL equals ABC at P\*=38% at 30,802 lb using the 2019 benchmark stock assessment and set an ACT at 28,324 lb (based on SEEM analysis at P\*=30%),
4. Specify the ACL equals ABC at P\*=38% at 30,802 lb using the 2019 benchmark stock assessment and set an ACT at 25,491 lb (10% lower than the SEEM analysis at P\*=20%), and
5. Specify the ACL equals ABC at P\*=38% at 30,802 lb using the 2019 benchmark stock assessment and set an ACT at 21,243 lb (20% lower than the SEEM analysis at P\*=10%)

The Council deliberated the options presented and selected option 4 as the preferred option. The Council chose a more conservative level for the ACT in the event that the fishery redevelops if the State of Hawaii removes the no-take of female prohibition. The prohibition results in more than 50% regulatory discards which curtails the viability of this fishery. HDAR has been exploring this possibility and has proposed regulations to initiate the process. Additionally, the Council chose, as the preferred alternative, accountability measures that would prevent the ACT from being exceeded. First, an in-season closure will be used as an accountability measure based on the projected date on when the ACT will be reached for the

MHI Kona crab fishery. Second, in the event that the ACL is exceeded in a fishing year, a post-season adjustment in the amount of the overage will be applied to the ACL and ACT in the subsequent fishing year. In the event that only the ACT has been exceeded in a fishing year, no overage adjustment would be applied.

## 2.2 Description of the Alternatives

This section describes a range of ACL, ACT, and AM alternatives for MHI Kona crab fisheries in fishing years 2020–2023 and expected fishery outcomes.

### *Features common to all alternatives*

The action alternatives considered in this document include ACLs and AMs, as they are the management measures that require annual decision-making based on the best available science for the Kona crab fishery in Hawaii. If any fishery exceeds an ACL more than once in a four-year period, the Council is required to re-evaluate the ACL process for that fishery, and adjust the system as necessary to improve its performance and effectiveness in ensuring sustainability of the fishery. NMFS would continue to rely primarily on the HDAR fishery data collection programs to obtain catch and effort data for the Kona crab fishery in Hawaii. Each alternative assumes continuation of all existing Federal and local resource management laws and regulations. None of the proposed alternatives requires a change to monitoring or collecting fishery data. Table 3 summarizes the alternatives considered, including their associated P\* based on risk projections from the 2018 benchmark stock assessment. In accordance with guidelines of NS1 of the Magnuson-Stevens Act, the P\* cannot exceed 50% and should be a lower value (74 FR 3178, January 9, 2011).

**Table 3.** Summary of ACT, ACL, and associated probability of overfishing (P\*) under each alternative.

| <b>Alternatives</b>   | <b>Annual ACL (lb)</b> | <b>P* associated with ACL</b> | <b>Annual ACT (lb)</b> | <b>P* associated with ACT</b> |
|---|------------------------|-------------------------------|------------------------|-------------------------------|
| <b>Alternative 1</b> - No Action  | No ACL                 | NA                            | No ACT                 | NA                            |
| <b>Alternative 2</b> - Previous ACL (status quo)  | 3,500                  | < 0.01                        | No ACT                 | NA                            |
| <b>Alternative 3</b> – Use ACL from 2018 benchmark assessment and ACT at P* level from the SEEM Analysis                          | 30,802                 | 38%                           | 28,324                 | 30%                           |
| <b>Alternative 4</b> - Use ACL from 2018 assessment and ACT at P* level 10% lower than SEEM Analysis ( <i>Council preferred</i> ) | 30,802                 | 38%                           | 25,491                 | 20%                           |
| <b>Alternative 5</b> - Use ACL from 2018 benchmark assessment and ACT at P* level 20% lower than SEEM Analysis                    | 30,802                 | 38%                           | 21,243                 | 10%                           |

**Table 4.** Harvest limit reference points (in lb) comparing catch with the ACL and the proportion of the ACL caught. 2012 was the first year an ACL was specified. The ACLs for fishing years

2012 to 2015 are based on the Tier 5 control rule (75<sup>th</sup> percentile of the entire catch time series) while the ACL for 2017 and 2019 are based on Thomas et al. (2015). No ACL was specified in 2016 and 2018.

| Fishing year | MSY    | OFL | ABC    | ACL    | Catch | Proportion of ACL caught |
|--------------|--------|-----|--------|--------|-------|--------------------------|
| 2012         | NA     | NA  | 27,600 | 27,600 | 8,149 | 30%                      |
| 2013         | NA     | NA  | 27,600 | 27,600 | 9,551 | 35%                      |
| 2014         | NA     | NA  | 27,600 | 27,600 | 2,999 | 11%                      |
| 2015         | NA     | NA  | 27,600 | 27,600 | 2,293 | 8%                       |
| 2016         | NA     | NA  | 27,600 | None   | 2,518 | NA                       |
| 2017         | 40,400 | NA  | 3,500  | 3,500  | 1,690 | 48%                      |
| 2018         | NA     | NA  | NA     | None   | 2,561 | NA                       |
| 2019         | NA     | NA  | NA     | 3,500  | 5,698 | 162% <sup>4</sup>        |

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

Under Alternative 1, NMFS would not specify an ACL for the MHI Kona crab fishery for fishing years 2020–2023 and there would be no AMs. This Alternative would not be consistent with the Magnuson-Stevens Act requirements or the provisions of the Hawaii FEP, which require NMFS to specify an ACL and AMs for all stocks and stock complexes, and is considered as part of the no management action baseline required under NEPA because the previous 2019 ACL specification ended December 31, 2019.

#### Expected Fishery Outcome

Under this Alternative, not specifying an ACL or AM is not expected to result in large changes to the conduct of the fishery, including gear types used, areas fished, level of catch or effort, target and non-target stocks, or protected species. This continuity is expected because, based upon the best available commercial and scientific information, the MHI Kona crab fishery has not been constrained by catch limits in recent years. As shown in Table 4, commercial catches of MHI Kona crab have historically remained below previous catch limits, with the exception of 2019, as well as OFL and MSY estimates. This alternative would not provide a mechanism to ensure sustainable management of the fishery if participation or catches increased significantly.

### 2.2.1 Alternative 2: Specify the ACL of 3,500 lb (Status quo Alternative)

The status quo alternative, in contrast to the no action alternative, mirrors the last management action taken on the fishery. Under this alternative, NMFS would specify an annual ACL of 3,500 lb for MHI Kona crab for the 2020–2023 fishing years. As a post-season AM, NMFS and the Council will evaluate the catch after each fishing year to determine if the average catch of the

<sup>4</sup> The MHI Kona crab ACL and AMs for 2019 were not established until June 4, 2020 (85 FR 26622). Under the 2019 rule, the only AM was a post-season adjustment in the subsequent fishing year if the average of the most recent three-years of catch exceeded the ACL. The three-year average of catch for 2017 – 2019 is 3,316 lb which is less than the ACL specified in 2019.

three most recent years exceeds the ACL. If it does, the Council would recommend a reduction of the ACL of that fishery in the subsequent year equal to the amount of the overage.

### Expected Fishery Outcome

This ACL is identical to the ACL NMFS specified for the fishery in fishing year 2019 (85 FR 26622, May 5, 2020), which expired on December 31, 2019. This is also the same ACL specified in 2017 ((83 FR 5051, February 5, 2018). These specifications were based on the previous 2015 stock assessment (Thomas et al., 2015). According to that assessment, an ACL of 3,500 lb, per State regulation of male crabs only, would rebuild the stock within 20 years. However, based on the most recent 2018 benchmark stock assessment of Kona crab in the MHI (Kapur et al., 2019), an ACL of 3,500 lb is now associated with a less than 1% probability of overfishing. Based on the new benchmark assessment by Kapur et al. (2019), the proposed ACL would be substantially below the OFL and ABC, and could potentially be overly restrictive in terms of allowing fishery participants to benefit from the harvest of sustainably managed Kona crab resources.

Under Alternative 2, the specification of an ACL of 3,500 lb is not expected to result in changes in the conduct of the fishery over recent years, including gear types used, areas fished, level of catch or effort. This continuity is expected because, based upon the best available commercial and scientific information, the MHI Kona crab fishery has not been constrained by catch limits in recent years. Even though the catch in 2019 exceeded the ACL, the average three-year catch did not exceed the ACL, therefore no overage adjustment was applied in the subsequent years as a post-season AM. Additionally, with no in-season closure the conduct of the fishery is not expected to change. However, if catches were to increase to more historic levels, as was seen in 2008 –2013 when the fishery caught an average of 10,072 lb annually (Table 1), there is a potential for the fishery to reach or exceed 3,500 lb. In the event that happens, the ACL would be reduced in the subsequent year.

### **2.2.2 Alternative 3: Specify an ACL of 30,802 lb and set an ACT of 28,324 lb**

Under Alternative 3, NMFS would specify an annual ACL of 30,802 lb and set an ACT of 28,324 lb for MHI Kona crab for the fishing years 2020–2023. NMFS and the Council would continue to monitor catches based on all available sources of information and if catch is projected to exceed the ACT then NMFS would implement an in-season closure of the commercial and non-commercial fisheries for MHI Kona crab in Federal waters as an AM. As a post-season AM, in the event that the fishery does not close in time and the catch exceeds the ACL, NMFS would reduce the ACL and the ACT in the next fishing year by the amount of the overage. In the event that the catch exceeds the ACT but is below the ACL, a post-season correction would not be applied.

### Expected Fishery Outcome

Based on the probability of overfishing projections contained in the 2018 benchmark stock assessment of Kona crab in the MHI (Kapur et al., 2019), this ACL and ACT is associated with a 38% and 30% risk of overfishing, respectively. Using this new benchmark assessment information conforms to National Standard 2 of the Magnuson-Stevens Act, which requires the

use of the best scientific information available for management. This alternative also utilizes the information from the P\* and SEEM working group meetings that accounted for the scientific and management uncertainties following the ACL specification process described in the Hawaii FEP.

This alternative would allow for a higher risk of overfishing than the status quo alternative (Alternative 2), Alternative 4 or Alternative 5; but the risk of overfishing would be less than the no action alternative (Alternative 1). However, the fishery is not likely to reach the ACT if the fishery performance is similar to the past 10 years. Even if the fishery performs close to the highest recent catch of 13,153 lb during the 2008 fishing year, the fishery would still remain open and the AMs would not be triggered. This alternative is expected to ensure the fishery remains sustainable in case participation or catch increases.

If an in-season closure occurs, the State of Hawaii has no parallel management measures to implement a complementary fishery closure in State waters thus the State waters would still be open to fishing. No information is available to estimate the amount of catch coming from State versus Federal waters. State and Federal laws require fishermen to report on a per-month basis. Late reporting could occur but is unlikely to cause the fishery to exceed the ACL.

In summary, this alternative is not expected to result in changes in the conduct of the fishery over recent years, including gear types used, areas fished, level of catch or effort. Harvest of Kona crab in the MHI would continue to be sustainable and the stock complex is not expected to be subject to overfishing or become overfished. Non-target catches, impacts to protected species, and other interactions with the associated environment are expected to be similar as those from recent years as well.

### **2.2.3 Alternative 4: Specify an ACL of 30,802 lb and set an ACT at 25,491 lb (Council-preferred Alternative)**

Under Alternative 4, NMFS would specify an annual ACL of 30,802 lb and an ACT of 25,491 lb for MHI Kona crab for the fishing years 2020–2023. NMFS and the Council would continue to monitor catches based on all available sources of information and if catch is projected to exceed the ACT then NMFS would implement a closure of the commercial and non-commercial fisheries for Kona crab in Federal waters as an AM. As a post-season AM, in the event that the fishery does not close in time and the catch exceeds the ACL, NMFS would reduce the ACL in the next fishing year by the amount of the overage and would make an adjustment to the ACT as well. In the event that the catch exceeds the ACT but is below the ACL, a post-season correction would not be applied.

#### Expected Fishery Outcome

Based on the probability of overfishing projections contained in the 2018 benchmark stock assessment of Kona crab in the MHI (Kapur et al., 2019), this ACL and ACT is associated with a 38% and 20% risk of overfishing. Using this new benchmark assessment information conforms to National Standard 2 of the Magnuson-Stevens Act, which requires the use of the best scientific information available for management. This alternative also utilizes the information from the P\* and SEEM working group meetings that accounted for the scientific and management



uncertainties following the ACL specification process described in the Hawaii FEP. This ACT is also the closest to the reported component of the median MSY estimate (25,869 lb) from the 2019 assessment.

The level of catch under this Alternative would allow for a higher risk of overfishing than Alternative 2 (Status quo) but a lower risk of overfishing than Alternative 3. Thus, this Alternative is more conservative than Alternative 3. To summarize discussion of the SSC at the 132nd meeting, this additional 10% buffer in the ACT from the ACL provides an additional precautionary management option to further account for other factors, including those yet unidentified, that add to the uncertainties in managing this stock. For example, the HDAR has proposed regulation that would remove the current prohibition on the taking of female crabs. This prohibition results in more than 50% regulatory discards which curtails the viability of this fishery. Without this prohibition, the fishery could redevelop and catch could increase. Top Kona crab fishermen can land over 100 lb of crabs per trip. The ACT is 2,833 lb less than Alternative 3, which would equate to 28 trips, assuming fishermen caught 100 lb of Kona crab per trip. Additionally, the use of an ACT that is further reduced from the ACL is designed to minimize the need for an overage adjustment as part of the AM.

As with Alternative 3, the fishery is not likely to reach the ACT if the fishery performance is similar to the past 10 years. Even if the fishery performs close to the highest recent catch of 13,153 lb during the 2008 fishing year, the fishery would still remain open and the AMs would not be triggered. This alternative is expected to ensure the fishery remains sustainable in case participation or catch increases.

If an in-season closure occurs, the State of Hawaii has no parallel management measures to implement a complementary fishery closure in State waters thus the State waters would still be open to fishing. The additional 10% buffer in the ACT would help to ensure the ACL is not exceeded in the event Federal waters are closed and effort shifts to State waters. State and Federal laws require fishermen to report on a per-month basis. Late reporting could occur but is unlikely to occur at a rate that would cause the fishery to exceed the ACT or ACL.

In summary, this alternative is not expected to result in changes in the conduct of the fishery over recent years, including gear types used, areas fished, level of catch or effort. Harvest of Kona crab in the MHI would continue to be sustainable and the stock complex is not expected to be subject to overfishing or become overfished.

#### **2.2.4 Alternative 5: Specify an ACL of 30,802 lb and set an ACT at 21,243 lb**

Under Alternative 5, NMFS would specify an annual ACL equal to ABC at 38% risk of overfishing with an associated catch limit of 30,802 lb and set an ACT of 21,243 lb of MHI Kona crab for the fishing years 2020–2023. NMFS and the Council would continue to monitor catches based on all available sources of information and if catch is projected to exceed the ACT then NMFS would implement a closure of the commercial and non-commercial fisheries for Kona crab in Federal waters as an AM. As a post-season AM, in the event that the fishery does not close in time and the catch exceeds the ACL, NMFS would reduce the ACL in the next fishing year by the amount of the overage and would make an adjustment to the ACT as well. In

the event that the catch exceeds the ACT but is below the ACL, a post-season correction would not be applied.

### Expected Fishery Outcome

Based on the probability of overfishing projections contained in the 2018 benchmark stock assessment of Kona crab in the MHI (Kapur et al., 2019), an ACT of 21,243 lb is associated with a 10% risk of overfishing. This alternative also utilizes the information from the P\* and SEEM working group meetings that accounted for the scientific and management uncertainties following the ACL specification process described in the Hawaii FEP.

This Alternative is more precautionary than the no action alternative, but it is less conservative than the Status quo Alternative. The ACT is lower than Alternatives 3 and 4, and thus associated with a probability of overfishing that is 20% and 10% lower than those alternatives, respectively. Therefore, Alternative 5 is more conservative than Alternatives 3 and 4.

As with Alternative 4, the additional 20% buffer in the ACT from the ACL provides an additional precautionary management option to further account for other factors, including those yet unidentified, that add to the uncertainties in managing this stock. Additionally, the use of an ACT that is further reduced from the ACL is designed to minimize the need to use of an overage adjustment as part of the AM.

The fishery is not likely to reach the ACT if the fishery performance is similar to the past 5 years. Even if the fishery performs close to the highest recent catch of 13,153 lb during the 2008 fishing year, the fishery would still remain open and the AMs would not be triggered. This alternative is expected to ensure the fishery remains sustainable in case participation or catch increases.

If an in-season closure occurs, the State of Hawaii has no parallel management measures to implement a complementary fishery closure in State waters thus the State waters would still be open to fishing. The additional 20% buffer in the ACT would help to ensure the ACL is not exceeded in the event Federal waters are closed and effort shifts to State waters. State and Federal laws require fishermen to report on a per-month basis. Late reporting could occur but is unlikely to cause the fishery to exceed the ACT.

In summary, this alternative is not expected to result in changes in the conduct of the fishery over recent years, including gear types used, areas fished, level of catch or effort. Harvest of Kona crab in the MHI would continue to be sustainable and the stock complex is not expected to be subject to overfishing or become overfished. Non-target catches, impacts to protected species, and other interactions with the associated environment are expected to be similar as those from recent years as well.

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

Under NS1 of the Magnuson-Stevens Act, it is possible to specify a catch limit equivalent to the OFL (50% risk of overfishing). However, an ACL of 33,989 lb was not considered as an option in deliberations of the SSC or Council, because it would not be consistent with the process

required under the Hawaii FEP for a Tier 1 stock that incorporates results of the P\* and SEEM analyses (Section 2.1.3). We agree with the Council and do not analyze an ACL of 33,989 in this EA.

We also do not analyze as an action alternative an ACL that is less than the ABC. No further reductions from the ABC are necessary due to social, ecological, or economic dimensions, and management uncertainty is accounted for in the ACT alternatives. Additionally, NS1 guidelines recommend ACTs in the system of accountability measures so that ACL is not exceeded and the ACT must be below the ACL. Setting the ACL below the ABC would reduce the buffer between the ACL and the ACT and increase the chance of exceeding the ACL in a given fishing year. Using an ACL that is set below the ABC would be inconsistent with the purpose and need statement of this EA because it would not be managing the fishery to prevent overfishing while achieving optimum yield.

**Table 5.** Comparison of the fishery management features and expected outcomes of the alternatives. Note: Long-term maximum sustainable yield (MSY) for the MHI Kona crab is estimated as 73,069 lb/year; and the overfishing limit is estimated as 33,989 lb (Kapur et al., 2019). See text for more detail.

| <b>Feature</b>                                 | <b>Alt. 1. No Action</b>       | <b>Alt. 2 (Status Quo)</b>   | <b>Alt. 3</b>   | <b>Alt. 4 (Council preferred)</b>                                      | <b>Alt. 5</b>   | <b>Remarks</b>   |
|--|--------------------------------|--|---|--|---|--|
| General characteristic of the Alternative      | No ACL specified.              | MHI Kona crab ACL specified at same level as 2019 fishing year = 3,500 lb<br>Same AMs as in the past | Higher ACL than in recent years.<br>AMs: ACT and in-season monitoring and closure | Lower ACT than Alt. 3;<br>ACL higher than Alt 2.<br>Same AMs as Alt. 3 | Lower ACT than the Alt 3 and 4<br>ACT. ACL higher than Alt. 2. Same AMs as Alt. 3 | New information is available from 2018 stock assessment for MHI Kona crab (Kapur et al., 2019) which allowed for an adjustment to the ABC. |
| Annual Catch Limit (ACL)                       | n/a                            | 3,500 lb   | 30,802 lb   | 30,802 lb  | 30,802 lb   | Recommended annual ACL for the next 4 years  |
| Annual Catch Target (ACT)                      | n/a                            | n/a  | 28,324 lb   | 25,491 lb  | 21,243 lb   | Recommended annual ACT for the next 4 years  |
| Probability of Overfishing (P*) associated     | n/a                            | n/a but corresponds to <1% P* in the 2018 assessment   | ACL = 38%<br>ACT = 30%  | ACL = 38%<br>ACT = 20%   | ACL = 38%<br>ACT=10%  | P* is the probability of overfishing occurring if the entire ACL is caught. Details in the text.   |
| Complies with Magnuson-Stevens Act, Hawaii FEP | No. ACL and AMs not specified. | No   | Yes   | Yes  | Yes   |  |

| <b>Feature</b>   | <b>Alt. 1. No Action</b>   | <b>Alt. 2 (Status Quo)</b>                        | <b>Alt. 3</b>  | <b>Alt. 4 (Council preferred)</b> | <b>Alt. 5</b>   | <b>Remarks</b>  |
|--|--|---|--|-----------------------------------|-----------------|---|
| Expected Fishery Outcome                                     | Commercial fishing effort expected to continue as in recent years. No change to fishing effort, location, season, gear, or target species. | Same as Alt. 1.                                   | Same as Alt. 1.  | Same as Alt. 1.                   | Same as Alt. 1. | Neither ACL nor ACT is expected to be attained unless the fishery expands to pre-2000 levels                |
| Accountability Measure 1                                     | There would be no in-season closure under this alternative   | Same as Alt. 1.                                   | Closure of fishery in Federal waters when NMFS projects the ACT would be reached | Same as Alt. 3.                   | Same as Alt. 3. | This AM is possible in collaboration with HDAR. HDAR would provide the monthly reports to NMFS and Council. |
| Likelihood the Kona crab fishery would close in a given year | Not applicable. With no ACL, there would be no need for an AM. Fishing for Kona crab in the MHI could occur year round.                    | Not applicable. No in-season closure would occur. | Based on recent catches in the fishery, a closure would not be likely            | Same as Alt. 3                    | Same as Alt 3.  |   |

| <b>Feature</b>  | <b>Alt. 1. No Action</b>   | <b>Alt. 2 (Status Quo)</b>   | <b>Alt. 3</b>  | <b>Alt. 4 (Council preferred)</b> | <b>Alt. 5</b>   | <b>Remarks</b>  |
|---|--|--|--|-----------------------------------|-----------------|---|
| Accountability Measure 2                                    | There would be no overage adjustment implemented under this alternative  | If the most recent three-year average of the catch exceeds the ACL, NMFS would apply an overage adjustment to the ACL in the following year. | No adjustment to ACT if catch >ACT; overage adjustment if catch >ACL | Same as Alt. 3.                   | Same as Alt. 3. | This AM is possible in collaboration with HDAR. HDAR would provide the monthly reports to NMFS and Council.         |
| Likelihood that an overage adjustment would occur           | Not applicable.  | Based on recent catches in the fishery, Alternative 2 has the greatest potential to result in an overage adjustment.                         | Very unlikely, based on recent catch history.                        | Same as Alt. 3                    | Same as Alt. 3  | Monthly monitoring would help fishery managers reduce the likelihood of an exceedance of the ACL in any given year. |
| Expected change in participation (# vessels) in the fishery | Average # vessels fishing for Kona crab = 23 (2014 – 2019). Participation is expected to be similar to recent years. | Same as Alt. 1   | Same as Alt. 1   | Same as Alt. 1                    | Same as Alt. 1  | Participation in the commercial Kona crab fishery is not expected to change with any alternative.                   |
| Fishing Permits required                                    | State Commercial Marine License required to fish commercially for Kona crab around Hawaii.                           | Same as Alt. 1   | Same as Alt. 1   | Same as Alt. 1                    | Same as Alt. 1  | Fishing permit requirements would be the same for all alternatives.   |

| <b>Feature</b>      | <b>Alt. 1. No Action</b>   | <b>Alt. 2 (Status Quo)</b>                                | <b>Alt. 3</b>  | <b>Alt. 4 (Council preferred)</b> | <b>Alt. 5</b>   | <b>Remarks</b>   |
|---------------------|--|---|--|-----------------------------------|-----------------|--|
| State Mgmt Measures | Seasonal closure between May 1 to August 31 of each fishing year, four-inch min carapace length, and no take of female prohibition | Same as Alt. 1  | Same as Alt. 1   | Same as Alt. 1                    | Same as Alt. 1  | State restrictions apply for the whole fishery   |
| Catch Monitoring    | HDAR collects commercial Kona crab catch data from fishing vessels supplied to NMFS and the Council every 40 days.                 | Same as Alt. 1  | Same as Alt. 1   | Same as Alt. 1                    | Same as Alt. 1  | Monitoring of catch would be the same for all alternatives.                                    |
| Enforcement         | Enforcement costs related to fishing permits and reports.  | Enforcement costs related to fishing permits and reports. | Enforcement costs related to fishing permits, reports, and any Federal fishery closures. | Same as Alt. 3.                   | Same as Alt. 3. | None of the alternatives would result in large changes to the need for or cost of enforcement. |

| <b>Feature</b>  | <b>Alt. 1. No Action</b>  | <b>Alt. 2 (Status Quo)</b>  | <b>Alt. 3</b>  | <b>Alt. 4 (Council preferred)</b>  | <b>Alt. 5</b>  | <b>Remarks</b>  |
|---|---|---|--|--|--|---|
| Ease of compliance on the part of fishermen   | No ACL or ACT to comply with. Fishermen would have to comply with fishing permit and reporting.   | Fishermen would have to comply with permit, reporting, and any fishery overages that are implemented. | Fishermen would have to comply with permit, reporting, and any implemented fishery closures/overages                             | Same as Alt. 3.  | Same as Alt. 3.  | None of the alternatives present large differences in ease of compliance for fishermen. |
| Would the alternative provide opportunities for participants to fish for Kona crab? | Harvests would be allowed, but Kona crab would not be actively managed so there would not be management controls to ensure long-term sustainability of the fishery. | Yes, but the ACL would be highly conservative relative to the OFL.                                    | Yes. Alt. 3 provides for the most fishing opportunities among the Alternatives, with 30% buffer from OFL to prevent overfishing. | Yes. Provides an intermediate level of fishing, with 20% buffer from OFL to prevent overfishing. | Yes. Provides an intermediate level of fishing, with 10% buffer from OFL to prevent overfishing. |   |



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

This section describes the affected fisheries and fishery resources, target and non-target species, and other biological and physical resources. Climate change and environmental justice are considered, along with potential impacts to fishing communities, special marine areas and other resources, and fishery administration and enforcement.

#### **3.1 Target and Non-Target Species**

Kona crab is commercially harvested over much of its range in the equatorial Pacific (Fig. 1). On average, Kona crabs spend about 22 hours per day buried in the sand, with males spending more time emerged than females (Skinner and Hill, 1986). However, Kennelly and Watkins (1994) found feeding rates and emergence time in females to be highly correlated with their reproductive cycle. Ovarian growth for female Kona crabs occurs from February to May resulting in increased feeding during these months (Fielding and Haley, 1976). Egg-bearing (berried) females rarely emerge from the sand, with the highest frequency of emergence occurring between June and July (Onizuka, 1972).

The crabs display sexual dimorphism, with males growing to a much larger size than females (Uchida 1986). Recent observations have found sex composition in catches of Kona crabs to be 49% male and 51% female (Kapur et al., 2019). In Hawaii, males are believed to reach maturity at 2.9 inch carapace length, while the majority of females reach sexual maturity at 2.6 inch carapace length (Fielding and Haley, 1976; Onizuka, 1972). It is important to note that males must be large enough to successfully dig female crabs out of the sand in order to reproduce (Skinner and Hill, 1986; Minagawa, 1993). It would take an average of 4.3 years for male crabs and 6.3 years for female crabs to reach the legal size in Hawaii, (Kapur et al., 2019). Fishermen are readily able to distinguish the sexes of adult crabs based on morphology.

Fishing for Kona crab in Federal waters around the MHI is managed by regulations implemented by NMFS in accordance with the Magnuson-Stevens Act and the Hawaii FEP. Federal regulations require NMFS to implement ACLs and AMs for each stock or stock complex of MUS identified in an FEP. Further, NMFS and the Council conduct monitoring of catch against a specified ACL and implementation of AMs. The current management regime under the FEP prohibits the use of non-selective and destructive gear (e.g., bottom trawls, bottom-set nets, explosives, and poisons). The fishery is also managed through measures implemented by the State of Hawaii, which include a CML and reporting requirements, no-take of female crabs, minimum size limit of 4 inches carapace length, and a spawning season closure from May to August of the calendar year.

Fishermen target crabs by setting strings of baited circular shaped nets on sandy bottom habitats for an average soak time of one hour (Kennelly and Craig 1989). Recent studies in Hawaii have shown that post-release mortality of female crabs is 10.77% (Wiley, 2017; Wiley and Pardee, 2018). Fishing for Kona crab in Federal waters mainly occurs in Penguin Bank, an area off the coasts of Maui, Molokai and Lanai that requires a vessel to get to. While Penguin Bank accounts for less than 20% of all trips taken for Kona crab, it has a significantly higher CPUE and occurrence of larger crabs (Thomas, 2011).

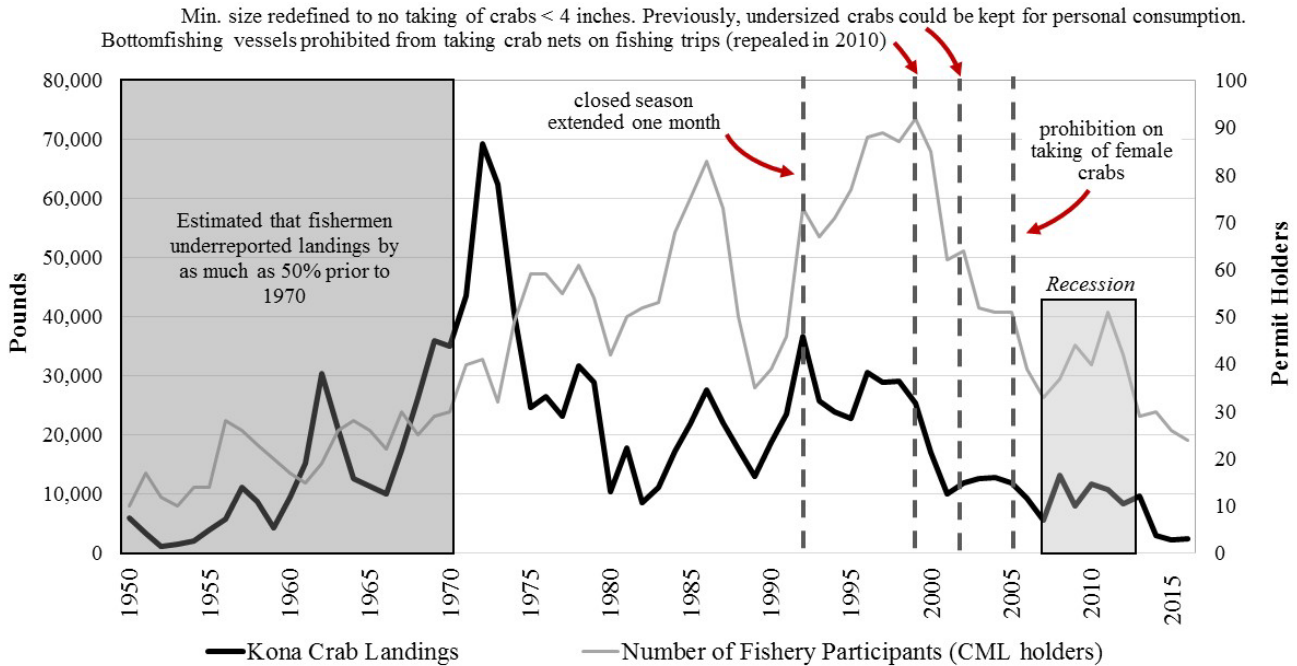
Given the specialized gear used to target crabs, the bycatch rate is low and most of the species are not retained. Non-target bycatch includes kuahonu crabs (white crab), female Kona crabs, and undersized Kona crabs. Recent data did not show any catches of white crabs which are attracted to the baited Kona crab nets. White crabs are attracted to the baited Kona crabs nets. However, catch of white crabs is minimal. Since 2012, there has been only one year (2014) in which three or more CML fishermen caught white crab (WPFMC 2020). In 2014, three fishermen reported catching 19 lb of white crab, in comparison to 2,999 lb of Kona crab caught (WPFMC 2020). Therefore, white crabs comprised 0.6% of the total crab catch in that year. Mortality associated with the regulatory discarding of female and undersized crabs is low and are estimated to be about 1.8%, provided fishermen handle the female and juvenile crabs with care to prevent loss of limbs (Wiley, 2016).

### **3.2 Socio-economic Setting**

Participation in the Kona crab fishery varies from year to year. The number of CML holders reporting catch of Kona crab in Hawaii has steadily declined from 85 commercial fishermen in 2000 to a low of 17 fishermen in 2017 (Figure 4). In the last five years, there were 25 or fewer CML holders that reported catching Kona crab (Table 6). More than 50% of Kona crab catch is from Federal waters (NMFS 2011).

On average, about half of the commercial catch is retained for personal use (47%, Table 6). The value of the fishery has varied in recent years and peaked at \$36,664 in 2012 but has averaged \$15,536 from 2011–2019. The commercial price per pound for Kona crab in Hawaii has ranged from \$7.42 to \$5.00 since 2011. While the price for Kona crab has generally increased from 2011 – 2018, the reported catch (in pounds) and sales (in dollars and pounds) have been declining over the same timeframe. It is likely that sale of Kona crab is a method of cost recovery for fishing trips rather than a constant source of revenue. Fishermen could likely be opportunistically fishing for Kona crab or are fishing for Kona crab in conjunction with targeting one or more additional species.

There have been anecdotal reports of Kona crab for sale in the retail market in excess of what is reported by dealer sales. This discrepancy could be the result of imports from other countries or territories, illegal and unreported catch, or inaccurate memories (WPFMC 2019c). Given the distinctive shape of Kona crab, it is not likely the result of mislabeling or misidentification.



**Figure 4.** History of catch and licenses in the Kona crab commercial fishery, as well as major management changes or other economic influences.

**Table 6.** Summary of Fishery Participants and Economic Value of the Kona crab Fishery (2011–2019). Source: Landings and logbook data from State of Hawaii, Dept. of Land and Natural Resources Division of Aquatic Resources (HDAR 2019).

| Fishing Year | CML Holders Reporting Catch | CML Holders Reporting Sales | Kona Crab Catch (lb) | Dealer Reported Sales (lb) | Price (\$) per pound | Dealer Reported Sales (\$) | % of Catch Sold |
|--------------|-----------------------------|-----------------------------|----------------------|----------------------------|----------------------|----------------------------|-----------------|
| 2010         | 48                          | 12                          | -                    | 6,402                      | -                    | 27,342                     | -               |
| 2011         | 49                          | 15                          | 10,609               | 6,561                      | 5.00                 | 32,805                     | 62              |
| 2012         | 41                          | 10                          | 8,149                | 7,161                      | 5.12                 | 36,664                     | 88              |
| 2013         | 28                          | 9                           | 9,551                | 4,563                      | 5.70                 | 26,009                     | 48              |
| 2014         | 29                          | 8                           | 2,999                | 602                        | 6.16                 | 3,708                      | 20              |
| 2015         | 24                          | 6                           | 2,293                | 966                        | 5.58                 | 5,390                      | 42              |
| 2016         | 23                          | 4                           | 2,518                | 177                        | 6.00                 | 1,062                      | 7               |
| 2017         | 17                          | 5                           | 1,690                | 876                        | 6.26                 | 5,477                      | 52              |
| 2018         | 22                          | 4                           | 2,561                | 1,460                      | 7.10                 | 10,373                     | 57              |
| 2019         | 23                          | 4                           | 5,698                | 2,479                      | 7.42                 | 18,336                     | 43              |

### 3.3 Protected Species

A number of protected species are documented as occurring in the waters around the Hawaiian Islands and there is the potential for interactions with the crustacean fisheries of the Hawaii Archipelago. The Hawaii crustacean fisheries have been evaluated for impacts on protected resources and are managed in compliance with the requirements of the Magnuson-Stevens Act, the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), the Migratory Bird Treaty Act, and other applicable statutes.

Table 7 lists endangered or threatened species occurring in the waters around Hawaii, and Table 8 summarizes the ESA consultations for listed species. In a letter of concurrence covering the Fishery Management Plan (FMP) for the Crustacean Fisheries of the Western Pacific, dated April 4, 2008, NMFS determined crustacean fisheries of Hawaii that operate in accordance with regulations implementing the FMP, inclusive of the spiny and slipper lobster fisheries, deepwater shrimp fisheries, and Kona crab fishery were not likely to adversely affect ESA-listed species or habitats. NMFS again evaluated Hawaii crustacean fisheries for potential impacts to ESA-listed marine species under NMFS jurisdiction and documented its conclusions in a March 13, 2008, Biological Opinion (BiOp) that concluded that Hawaii Crustacean fisheries, may affect, but are not likely to adversely affect ESA-listed species.

**Table 7.** Endangered and threatened marine species and seabirds occurring in the waters of the Hawaiian Archipelago

| Common name<br>( <i>Scientific name</i> )                          | ESA listing<br>status in Hawaii                                    | Occurrence in Hawaii  |
|--|--|---|
| <b>Listed Sea Turtles</b>  |  |   |
| Green sea turtle<br>( <i>Chelonia mydas</i> )                      | Threatened<br>Distinct<br>Population<br>Segment (DPS) in<br>Hawaii | Most common turtle in the Hawaiian Islands.<br>Most nesting occurs in the northwestern<br>Hawaiian Islands. Foraging and haulout in the<br>MHI. |
| Hawksbill sea turtle<br>( <i>Eretmochelys<br/>imbricata</i> )      | Endangered   | Small population foraging around Hawaii and<br>low level nesting on Maui and Hawaii Islands.  |
| Leatherback sea<br>turtle<br>( <i>Dermochelys<br/>coriacea</i> )   | Endangered   | Rarely known to nest or forage around Hawaii.<br>Rarely sighted while traveling between nesting<br>and foraging habitats.                       |
| Olive riddle<br>sea turtle<br>( <i>Lepidochelys<br/>olivacea</i> ) | Threatened   | No nesting or foraging grounds in Hawaii.<br>Infrequently sighted while traveling between<br>nesting and foraging habitats.                     |
| North Pacific<br>loggerhead DPS<br>( <i>Caretta caretta</i> )      | Endangered DPS<br>in Hawaii  | No nesting or foraging grounds in Hawaii.<br>Infrequently sighted while traveling between<br>nesting and foraging habitats.                     |

|   |                          |  |
|---|--------------------------|--|
| <b>Listed Marine Mammals</b>                                      |                          |  |
| Hawaiian monk seal<br>( <i>Neomonachus schauinslandi</i> )        | Endangered               | Endemic tropical seal. Occurs throughout the archipelago. Population trend uncertain;  |
| Blue whale<br>( <i>Balaenoptera musculus</i> )                    | Endangered               | No sightings or strandings reported in Hawaii but acoustically recorded off Oahu and Midway Atoll.   |
| Fin whale<br>( <i>B. physalus</i> )                               | Endangered               | Infrequent sightings in Hawaii waters.   |
| Sei whale<br>( <i>B. borealis</i> )                               | Endangered               | Worldwide distribution. Primarily found in cold temperate to subpolar latitudes. Rare in Hawaii.   |
| Sperm whale<br>( <i>Physeter macrocephalus</i> )                  | Endangered               | Found in tropical to polar waters worldwide. Sighted off the NWHI and the MHI.   |
| MHI insular false killer whale<br>( <i>Pseudorca crassidens</i> ) | Endangered DPS in Hawaii | Found in waters within 140 km (60 nm) of the MHI.  |
| <b>Listed Sea Birds</b>   |                          |  |
| Newell's shearwater<br>( <i>Puffinus auricularis newelli</i> )    | Threatened               | Rare. Breeds only in colonies on the MHI where it is threatened by predators and urban development.  |
| Hawaiian petrel<br>( <i>Pterodroma phaeopygia</i> )               | Endangered               | Rare.  |
| Band-rumped storm-petrel<br>( <i>Oceanodroma castro</i> )         | Endangered Hawaii DPS    | Rare   |
| Short-tailed albatross<br>( <i>Phoebastria albatrus</i> )         | Endangered               | Nest in small numbers on Midway Atoll in the NWHI.   |
| <b>Listed Fish</b>  |                          |  |
| Giant manta ray<br>( <i>Manta birostris</i> )                     | Threatened               | Found worldwide in tropical, subtropical, and temperate bodies of water and is commonly found offshore, in oceanic waters, and near productive coastlines. |
| Oceanic whitetip shark<br>( <i>Carcharhinus longimanus</i> )      | Threatened               | Found worldwide in tropical and sub-tropical waters. They live from the surface of the water to at least 498 ft deep.                                      |

| <b>Critical Habitat</b>                     |                          |   |
|---|--------------------------|---|
| Monk seal critical habitat                  | Endangered               | Includes the seafloor and marine habitat to 10 m above the seafloor from the 200 m depth contour through the shoreline, and extending into terrestrial habitat 5 m inland from the shoreline between identified boundary points around all islands in the MHI |
| Insular False killer whale critical habitat | Endangered DPS in Hawaii | Extends from the 45-meter (m) depth contour to the 3,200-m depth contour around the MHI from Niihau east to Hawaii  |

In 2009, the Council recommended, and NMFS approved, the development of five archipelagic-based fishery ecosystem plans (FEPs) including the Hawaii Archipelago FEP. The FEP incorporated and reorganized elements of the Council’s species-based FMPs, including the Crustacean FMP, into a spatially-oriented management plan (75 FR 2198, January 14, 2010). All applicable regulations concerning crustacean fishing were retained through the development and implementation of the FEP for the Hawaii Archipelago. No substantial changes to the crustacean fishery around Hawaii have occurred since the FEP was implemented that have required further consultation.

In 2013, NMFS re-initiated ESA consultation for Hawaii crustacean fisheries in response to the listing of the MHI insular false killer whale (IFKW) DPS as an endangered species under the ESA. The consultation evaluated the effects of all Hawaii crustacean fisheries on all ESA-listed species and designated critical habitat. In a letter of concurrence dated December 5, 2013, NMFS issued a determination that the continued authorization of crustacean fisheries in the Hawaiian Archipelago may affect, but is not likely to adversely affect, endangered or threatened species or designated critical habitat. Specifically, NMFS concluded that effects of the Hawaii crustacean fisheries are expected to be insignificant, discountable or beneficial.

On April 6, 2016, (81 FR 20058) NMFS published a final rule to list 11 DPS of the green sea turtle (*Chelonia mydas*) under the ESA. Based on the best available scientific and commercial data, and after considering comments on the proposed rule, NMFS determined that three DPS are endangered and eight DPS are threatened. The Hawaiian green turtle population was listed as the Central North Pacific DPS. NMFS determined that this population should retain a threatened designation under ESA. Because the 2008 BiOp analyzed this same population and its ESA status did not change, NMFS did not re-initiate consultation and the conclusions of the 2008 BiOp remain valid with respect to the green turtle DPS.

**Table 8.** ESA section 7 consultations for western Pacific crustacean fisheries.

| <b>ESA Listed Species or Critical Habitat</b>  | <b>ESA Consultation</b>                 | <b>NMFS Determination</b>   |
|--|---|---|
| <i>sea turtles</i> : green, loggerhead sea turtles, olive ridley, hawksbill sea turtles, leatherback<br><i>marine mammals</i> : blue, fin humpback, North Pacific right, sei, and sperm whales; Hawaiian monk seals  | April 4, 2008, Letter of Concurrence    | Not likely to adversely affect any ESA-listed species or critical habitat |
| <i>sea turtles</i> : green, N. Pacific loggerhead DPS<br>sea turtles, olive ridley, hawksbill sea turtles, leatherback<br><i>marine mammals</i> : MHI insular false killer DPS, blue, fin, humpback, North Pacific right, sei, and sperm whales; Hawaiian monk seals | December 5, 2013, Letter of Concurrence | Not likely to adversely affect any ESA-listed species or critical habitat |
| Hawaiian monk seal critical habitat  | March 1, 2016 Letter of Concurrence     | Not likely to adversely affect  |
| Oceanic whitetip sharks  | September 18, 2018 No Effects Memo      | No Effects  |
| Giant manta rays   | September 18, 2018 No Effects Memo      | No Effects  |
| MHI IFKW DPS critical Habitat  | September 18, 2018 No Effects Memo      | No Effects  |

In January 2018, NMFS published a final rule listing oceanic whitetip sharks and giant manta rays as threatened species under the ESA (January 30, 2018, 83 FR 4153 and January 22, 2018, 83 FR 2916, respectively). There have been no known interactions with oceanic white tip, giant manta ray, or MHI IFKW DPS critical habitat in the Kona crab fishery. The flat loop net configuration and bottom setting is not known to result in harmful interactions with these ESA listed species. Camera surveys done by Poseidon Fisheries Research documented tiger sharks and spotted eagle ray eating the bait and the tangled crabs, respectively, without becoming entangled.

In a memo dated September 18, 2018, NMFS concluded that there is no potential for interactions between crustacean fisheries and giant manta rays because their habitat utilization and feeding preferences do not overlap; therefore the management and operation of crustacean fisheries would have no effect on the giant manta ray. In a memo dated September 18, 2018, NMFS concluded that there is sufficient spatial separation between crustacean fisheries and oceanic whitetip shark populations; therefore the management and operation of crustacean fisheries would have no effect on the oceanic whitetip shark.

### 3.4 Habitats and Vulnerable Ecosystems

Essential fish habitat (EFH) is defined in the Magnuson-Stevens Act as those waters and substrate 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 Crustaceans MUS in the Crustacean FMP and bottomfish in the Bottomfish and Seamount Groundfish FMP (Amendment 6). In 2009, the Council developed and NMFS approved five new archipelagic-based FEPs. The FEPs 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. EFH is generally designated for the egg/larval and juvenile/adult life stages combined, resulting in two unique EFH definitions per species complex. EFH consultations would be required for all activities that may adversely affect EFH for MUS. NMFS considers all EFH in determining whether a proposed fishery management action may affect EFH.

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 Hawaii FEP Crustacean and bottomfish management unit species (BMUS) are summarized in Tables 9 and 10.

**Table 9.** EFH and HAPC for Hawaii FEP Crustacean and Precious Coral MUS.

| MUS            | Species Complex                              | EFH   | HAPC   |
|----------------|--|---|--|
| Crustacean MUS | Kona crab                                    | <p><b>Eggs and larvae:</b> the water column from the shoreline to the outer limit of the EEZ down to a depth of 150 m (75 fm)</p> <p><b>Juvenile/adults:</b> all of the bottom habitat from the shoreline to a depth of 100 m (50 fm)</p> | All banks in the NWHI with summits less than or equal to 30 m (15 fm) from the surface |
|                | Deepwater shrimp ( <i>Heterocarpus</i> spp.) | <p><b>Eggs and larvae:</b> the water column and associated outer reef slopes between 550 and 700 m</p> <p><b>Juvenile/adults:</b> the outer reef slopes at depths between 300-700 m</p>   | No HAPC designated for deepwater shrimp.   |



**Table 10.** EFH and HAPC for bottomfish and seamount groundfish.

| Species Assemblage               | EFH (eggs) / EFH (post-hatch pelagic)   | EFH (post-settlement)   | EFH (sub-adult/adult)  | HAPC (all life stages)   |
|----------------------------------|---|---|--|--|
| Bottom fish Shallow Complex      | Water column from 0-240 m depth extending from the shoreline to the outer boundary of the EEZ | Water column from 0-240 m depth extending from the shoreline to the outer boundary of the EEZ         | Same as post-settlement  | Kaena Point, Oahu<br>Kaneohe Bay, Oahu<br>Makapuu, Oahu<br>Penguin Bank, Oahu<br>Pailolo Channel, Maui<br>North Kahoolawe, Kahoolawe<br>Hilo, Hawaii<br>(see Amendment 4 text and Appendices 4 and 5 for specific site locations) (WPFMC and NMFS 2015). |
| Bottom fish Intermediate Complex | Water column from 0-320 m depth extending from the shoreline to the outer boundary of the EEZ | Water column from 40-320 m depth from the shoreline to the outer boundary of the EEZ                  | Same as post-settlement  | Same as Bottom fish Shallow Complex  |
| Bottom fish Deep Complex         | Water column from 0-400 m depth extending from the shoreline to the outer boundary of the EEZ | Water column from 80 -400 m depth from the shoreline to the outer boundary of the EEZ                 | Same as post-settlement  | Same as Bottom fish Shallow Complex  |
| Seamount Ground fish             | Pelagic waters 0–600 m depth within the EEZ north of 29° N and west of 179° W                 | Benthic or benthopelagic waters from 120-600 m depth within the EEZ north of 29° N and west of 179° W | Benthopelagic waters from 120-600 m depth within the EEZ north of 29° N and west of 179° W | All waters from 0-600 m depth within the EEZ north of 29° N and west of 179° W   |

### 3.5 Resources Eliminated from Detailed Study

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 Kona crab fishing activities are conducted. Shipwrecks and other objects from the December 7, 1941 attack at Pearl Harbor could occur in Federal waters around Oahu, but fisherman are unlikely to set crab nets around shipwrecks in order to prevent entanglement. For these reasons, Kona crab fishing in the MHI is not known to result in adverse impacts to scientific, historic, archeological, or cultural resources. Because none of the alternatives have the potential to change the fishery in any way that would cause the fishery to fish around known shipwrecks, this topic will not be considered further in this EA.

## 4 ENVIRONMENTAL EFFECTS OF THE ALTERNATIVES

This section describes the potential effects of each alternative on the components of the affected environment or other socio-economic elements identified in Section 3.0 above. Table 11 provides a summary of the potential effects of the proposed alternatives.

There are no known significant impacts to air quality, noise, water quality, view planes, or terrestrial resources from past or current Kona crab fishing activity. Fishing behavior and effort are not expected to change under any action alternative in a manner that would result in effects on physical resources. This is because recent and expected harvests are well below the proposed ACL or ACT. Therefore, given the characteristics of the vessels in the fishery and the offshore nature of the fishing activity, none of the proposed action alternatives would affect air quality, noise, water quality, view planes, or terrestrial resources.

**Table 11.** Summary of the affected environment and potential effects of the proposed alternatives

|   | Alternative 1  | Alternative 2<br>Status Quo | Alternative 3                         | Alternative 4<br>Council<br>preferred | Alternative 5                       |
|---|--|-----------------------------|---------------------------------------|---------------------------------------|-------------------------------------|
| Proposed<br>ACL/ACT                               | No ACL   | ACL of 3,500                | ACL= 30,802<br>lb<br>ACT=28,324<br>lb | ACL= 30,802<br>lb<br>ACT=25,491<br>lb | ACL= 30,802<br>lb ACT=<br>21,243 lb |
| Impact to<br>Target<br>Stock                      | No adverse<br>impact to the<br>target stock                      | Same as<br>Alternative 1    | Same as<br>Alternative 1              | Same as<br>Alternative 1              | Same as<br>Alternative 1            |
| Impact to<br>non-target<br>or bycaught<br>species | No additional<br>impact to non-<br>target or<br>bycaught species | Same as<br>Alternative 1    | Same as<br>Alternative 1              | Same as<br>Alternative 1              | Same as<br>Alternative 1            |
| Protected<br>Resources<br>Impact                  | No additional<br>impact expected                                 | Same as<br>Alternative 1    | Same as<br>Alternative 1              | Same as<br>Alternative 1              | Same as<br>Alternative 1            |
| Economic<br>Impact to<br>fishery<br>participants  | Similar to recent<br>years                                       | Same as<br>Alternative 1    | Same as<br>Alternative 1              | Same as<br>Alternative 1              | Same as<br>Alternative 1            |

### 4.1 Effects Target and Non-Target Species

#### *Effects common to all alternatives*

Non-target bycatch includes kuahonu crabs (white crab), female Kona crabs, and undersized Kona crabs. Under all of the alternatives, the fishery would continue to comply with existing

State regulations that prohibit retention of female and undersized crabs. These regulations affect interest and viability of the fishery as after these regulations were implemented participation in the fishery declined. Additionally, catch of non-target species is not expected to increase under any of the action alternatives since the proposed specifications are not expected to result in a significant increase in catch or expansion of the fishery. Furthermore, discard mortality rates are low. Although not expected, should catches increase, studies showed that the MHI Kona crab has a low discard mortality rate of 1.8%, provided fishermen handle the female and juvenile crabs with care to prevent loss of limbs (Wiley, 2016). Ongoing fisheries monitoring by NMFS and the Council would help fishery scientists and managers to detect any increase in non-target catch and address this in future management measures, as needed. For these reasons, even without ACL or AM management, the expected impacts to non-target stocks would be minor and similar to levels in recent years. Therefore, catches of non-target species are expected to continue to be at low levels and would be sustainable under all of the alternatives.

#### **4.1.1 Alternative 1: No ACL and AM Management (No Action)**

Under the No Action alternative, NMFS would not specify an ACL for Kona crab in the MHI and AMs would not be implemented. 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 years 2020 - 2023 would not be likely to result in overfishing of MHI Kona crab in any year if catch remains similar to recent levels. The average catch in the past three years was 3,316 lb, which equates to less than 1% risk of overfishing (Kapur et al., 2019). Given that this is a specialized fishery it is expected that catch levels will remain at similar levels. Even the highest catch in recent years (13,153 lb in 2008) equates to a 1-2% risk of overfishing. Therefore, under this alternative, the harvest of Kona crab in the MHI could continue to be sustainable and the stock complex is not expected to be subject to overfishing or become overfished. However, the lack of an ACL and AMs under Alternative 1 may not provide regulatory ability for Federal managers to prevent future overfishing and ensure the long-term sustainability of the resource.

With no ACL or AMs, Alternative 1 is not likely to result in changes in the conduct of the fishery, including gear types used or areas fished, or have large adverse effects on target or non-target stocks. Under this alternative, we find that harvest of Kona crab in the MHI would continue to be sustainable and the stock complex is not expected to be subject to overfishing or become overfished.

#### **4.1.2 Alternative 2: Specify an ACL of 3,500 lb (Status quo Alternative)**

Under Alternative 2, NMFS would specify an ACL of 3,500 lb in fishing years 2020 - 2023. This ACL is identical to the ACL that NMFS specified for the fishery in fishing year 2019 (85 FR 26622, May 5, 2020). That specification was based on the previous 2015 stock assessment (Thomas et al., 2015). Based on the most recent benchmark stock assessment (Kapur et al., 2019) an ACL of 3,500 lb is equivalent to a risk of overfishing of less than one percent. This Alternative has the most conservative ACL when compared to the no action alternative or Alternatives 3, 4, and 5. Therefore, it is expected that under this alternative, harvest of Kona crab in the MHI would continue to be sustainable and the stock is not expected to be subject to overfishing or become overfished.

Under this alternative, NMFS and the Council would continue to monitor catches based on all available sources of information. Under Alternative 2, there is a chance the fishery would exceed the ACL of 3,500 lb. Given that this is a specialized fishery it is expected that catch levels will remain similar to those reported in recent years. In 2019 the fishery caught 5,698 lb. The most recent regulations included an AM where NMFS and the Council will evaluate the catch after each fishing year to determine if the average catch of the three most recent years exceeds its ACL. If it does, the Council would recommend a reduction of the ACL in the subsequent year equal to the amount of the overage. The average catch of the most recent three years was 3,316 lb (Table 1). Therefore, in 2020 there would be no overage adjustment to the ACL.

Alternative 2 is not likely to result in changes in the conduct of the fishery, including gear types used, areas fished, or number of participants or have large adverse effects on target or non-target stocks. Under this alternative, we find that harvest of Kona crab in the MHI would continue to be sustainable and the stock complex is not expected to be subject to overfishing or become overfished.

#### **4.1.3 Alternative 3: Specify an ACL of 30,802 lb and set an ACT of 28,324 lb**

Under Alternative 3, NMFS would specify an ACL equal to the ABC at 30,802 lb and an ACT of 28,324 lb of MHI Kona crab in fishing years 2020 - 2023. The proposed ACL of 30,802 lb is the same as for Alternatives 4, and 5. Based on the probability of overfishing projections contained in the 2018 benchmark stock assessment of Kona crab in the MHI (Kapur et al., 2019), an ACT of 28,324 lb is associated with a 30% risk of overfishing. However, this ACT is less than the OFL of 33,989 lb and MSY of 73,069. Given that this is a specialized fishery, it is expected that catch levels will remain at similar levels. Therefore, under this alternative, harvest of Kona crab in the MHI would continue to be sustainable and the stock is not expected to be subject to overfishing or become overfished.

The ACT would trigger a fishery closure and would prevent the fishery from exceeding the ACL. This ACT is the highest ACT compared to the action alternatives and would provide the smallest buffer between the ACT and ACL. Therefore, Alternative 3 has slightly more potential for the fishery to exceed the ACL. However, this ACT is eight and a half times higher than the average catch in the past three years (3,316 lb) and we do not expect the ACL will be exceeded in any fishing year.

The proposed ACL and ACT are not expected to result in an increase in catch above recent levels and therefore we do not expect there to be significant change in the conduct of the fishery or expansion of the fishery. For example, a slightly lower ACL of 27,600 lb was specified from 2012 – 2016 (Table 4). During this time, the fishery was not constrained by this ACL and, in fact, the number of participants and catch generally declined (Table 1). However, the decline is thought to be due in part to full-time fishermen retiring from the fishery (HDAR, pers. comm.).

Alternatives 3, 4, and 5 would implement an in-season AM that would close the fishery in Federal waters if the ACT was reached. Unless the State is able to implement a complementary closure in State waters, the effectiveness of the closure would be reduced should fishermen opt to continue fishing in State waters. Nevertheless, the proposed measure would provide enhanced

protection of Kona crab stock in Federal waters, compared to Alternatives 1 and 2, which do not have an in-season AM.

There is a low probability that the fishery would exceed the ACT and be shut down. If the fishery closed it could encourage a shift to fishing for white crabs. Shifting to white crab fishing would require using a crab trap rather than loop nets. In this case, white crabs are no longer bycatch but target species.

Alternative 3 is not likely to result in changes in the conduct of the fishery, including gear types used, areas fished, or number of participants or have large adverse effects on target or non-target stocks or bycatch species. Under this alternative, we find that harvest of Kona crab in the MHI would continue to be sustainable and the stock complex is not expected to be subject to overfishing or become overfished.

#### **4.1.4 Alternative 4: Specify an ACL of 30,802 lb and set an ACT at 25,491 lb (Council-preferred Alternative)**

Under Alternative 4, NMFS would specify an ACL equal to the ABC at 30,802 lb and an ACT of 25,491 lb of MHI Kona crab in fishing years 2020 - 2023. The proposed ACL of 30,802 lb is the same as for Alternatives 3 and 5. Based on the probability of overfishing projections contained in the 2018 benchmark stock assessment of Kona crabs in the MHI (Kapur et al., 2019), an ACT of 25,491 lb is associated with a 20% risk of overfishing. An ACT of 25,491 is less than the OFL of 33,989 lb and MSY of 73,069 lb. This level of catch would allow for a higher risk of overfishing than the status quo alternative (Alternative 2) and a slightly higher risk of overfishing than Alternative 3 but it is more conservative than Alternative 5. Given that this is a specialized fishery it is expected that catch levels will remain similar to those reported in recent years. Therefore, it is expected that under this alternative, harvest of Kona crab in the MHI would continue to be sustainable and the stock is not expected to be subject to overfishing or become overfished.

The ACT would trigger a fishery closure and would prevent the fishery from exceeding the ACL. Under this alternative, there would be a larger buffer between the ACT and ACL than Alternative 3. Therefore, it is less likely the ACL will be exceeded under Alternative 4 than Alternative 3. The ACT under this alternative is also nearly eight times higher than the average catch in the past three years (3,316 lb) so we do not expect the ACL will be exceeded in any fishing year.

The proposed ACL and ACT are not expected to result in an increase in catch above recent levels and therefore we do not expect there to be significant change in the conduct of the fishery or expansion of the fishery. For example, a slightly lower ACL of 27,600 lb was specified from 2012 – 2016 (Table 4). During this time, the fishery was not constrained by this ACL and, in fact, the number of participants and catch generally declined (Table 1). However, the decline is thought to be due in part to full-time fishermen retiring from the fishery (HDAR, pers. comm.).

Alternatives 3, 4, and 5 would implement an in-season AM that would close the fishery in Federal waters if the ACT was reached. Unless the State is able to implement a complementary closure in State waters, the effectiveness of the closure would be reduced should fishermen opt to

continue fishing in State waters. Nevertheless, the proposed measure would provide enhanced protection of Kona crab stock in Federal waters, compared to Alternatives 1 and 2, which do not have an in-season AM.

Like under Alternative 3, there is a low probability that the fishery would exceed the ACT and be shut down. If the fishery closed it could encourage a shift to fishing for white crabs. Shifting to white crab fishing would require using a crab trap rather than loop nets. In this case, white crabs are no longer bycatch but target species.

Therefore, like the alternatives previously discussed, Alternative 4 is not likely to result in changes in the conduct of the fishery, including gear types used, areas fished, or have large adverse effects on target or non-target stocks or bycatch species. Under this alternative, we find that harvest of Kona crab in the MHI would continue to be sustainable and the stock complex is not expected to be subject to overfishing or become overfished.

#### **4.1.5 Alternative 5: Specify an ACL of 30,802 lb and set an ACT at 21,243 lb**

Under Alternative 5, NMFS would specify an ACL equal to the ABC at 30,802 lb and an ACT of 21,243 lb of MHI Kona crab in fishing years 2020 - 2023. The proposed ACL of 30,802 lb is the same as for Alternatives 3 and 4. Based on the probability of overfishing projections contained in the 2018 benchmark stock assessment (Kapur et al., 2019), an ACT of 21,243 lb is associated with a 10% risk of overfishing. This level of catch would allow for a higher risk of overfishing than the status quo alternative, but it is more conservative than Alternatives 3 and 4. However, this ACT is less than the OFL of 33,989 lb and MSY of 73,069 lb. Given that this is a specialized fishery, it is expected that catch levels will remain at similar levels. Therefore, it is expected that under this alternative, harvest of Kona crab in the MHI would continue to be sustainable and the stock is not expected to be subject to overfishing or become overfished.

The ACT would trigger a fishery closure and would prevent the fishery from exceeding the ACL. Under this alternative, there would be a larger buffer between the ACT and ACL than Alternatives 3 and 4. Therefore, it is less likely the ACL will be exceeded under Alternative 5 than the other action alternatives. The ACT under this alternative is also more than seven times higher than the average catch in the past three years (3,316 lb) so we do not expect the ACL will be exceeded in any fishing year.

The proposed ACL and ACT are not expected to result in an increase in catch above recent levels and therefore we do not expect there to be significant change in the conduct of the fishery or expansion of the fishery. For example, a slightly lower ACL of 27,600 lb was specified from 2012 – 2016 (Table 4). During this time, the fishery was not constrained by this ACL and, in fact, the number of participants and catch generally declined (Table 1). However, the decline is thought to be due in part to full-time fishermen retiring from the fishery (HDAR, pers. comm.).

Under Alternatives 3, 4, and 5, which have an in-season AM that involves a fishery closure in Federal waters when the ACT is reached, unless the State is able to implement a complementary closure in State waters, the effectiveness of the closure would be reduced should fishermen opt to continue fishing in State waters. Nevertheless, the proposed measure would provide enhanced

protection of Kona crab stock in Federal waters, compared to Alternatives 1 and 2, which do not have an in-season AM.

Like under Alternatives 3 and 4, there is a low probability that the fishery would exceed the ACT and be shut down. If the fishery was closed it could encourage a shift to fishing for white crabs. Shifting to white crab fishing would require using a crab trap rather than loop nets. In this case, white crabs are no longer bycatch but target species.

Therefore, like Alternatives discussed previously, Alternative 5 is not likely to result in changes in the conduct of the fishery, including gear types used, areas fished, or have large adverse effects on target or non-target stocks or bycatch species. Under this alternative, we find that harvest of Kona crab in the MHI would continue to be sustainable and the stock complex is not expected to be subject to overfishing or become overfished.

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

### **4.2.1 Alternative 1: No ACL and AM Management (No Action Alternative)**

Under the no-action alternative, which is the baseline alternative, the Hawaii Kona crab fishery would not be managed using an ACL, AMs would not be needed, fishing would continue unconstrained, and the fishery would be monitored by HDAR, NMFS and the Council. Having no ACL specified is not expected to result in an expansion of the fishery by new fishermen. Given the offshore fishing grounds, it would take a significant financial investment to become active in the fishery if fisherman did not already own a vessel. Specialized gear would need to be purchased to participate in the fishery. Additionally, the fishery would still be required to discard female and undersized crabs. Therefore, we expect participation and catch to continue as it has in recent years.

The highest recent catch was used as the basis for evaluating economic impacts of the No Action Alternative. If the Kona crab fishery caught an amount similar to the highest level of catch in the past decade (10,609 lb) it would generate a potential catch value of \$64,078 (Table 6). However, taking into consideration that on average 47% of the catch is sold and an average price per pound of \$6.04, the effective commercial value is \$30,117. However, over the past decade the price per pound has increased slightly with declining catch. As catch increases, the price per pound could likely decrease. Therefore, using the average price per pound of \$6.05 is likely an over-estimate of the actual price that would be paid at this catch level and the effective commercial value would be lower.

**Table 12.** Value of the total catch for each Alternative, assuming the ACL in Alternative 2 or the ACT in Alternative 3, 4, and 5 is fully caught. Value is based on an average price of \$6.04 per pound and the commercial value of the total catch based on 47% of catch being sold (from Table 6). Alternative 1 is based on the highest catch in the past decade (10,609 lb) to simulate no limit (from Table 1).

| Alternative | Catch        | Catch Value (\$) | Commercial Value (\$) |
|-------------|--------------|------------------|-----------------------|
| 1           | None         | \$64,078         | \$30,117              |
| 2           | 3,500 (ACL)  | \$21,140         | \$9,936               |
| 3           | 28,324 (ACT) | \$171,077        | \$80,406              |
| 4           | 24,491 (ACT) | \$147,926        | \$69,525              |
| 5           | 21,243 (ACT) | \$128,308        | \$60,305              |

#### 4.2.2 Alternative 2: Specify the ACL at 3,500 lb (Status quo Alternative)

Under this Status Quo Alternative, NMFS would specify an ACL of 3,500 lb for the 2020 to 2023 fishing years. This ACL is based on the previous stock assessment (Thomas et al., 2015) and is the same ACL that was specified in 2017 and 2019. The proposed ACL is not expected to affect fishery effort but, based on recent information, this ACL would be excessively low and would not allow the fishery to attain MSY. Additionally, this alternative has the greatest chance of exceeding the ACL and having a reduction in catch for the following year. For example, in 2019 the fishery caught 5,698 lb. The most recent regulations included an AM where NMFS and the Council will evaluate the catch after each fishing year to determine if the average catch of the three most recent years exceeds its ACL. If it does, the Council would recommend a reduction of the ACL in the subsequent year equal to the amount of the overage. The average catch of the most recent three years was 3,316 lb (Table 1). While in fishing 2020 there would be no overage adjustment to the ACL, if the catch in 2020 was the same as 2019 then an overage adjustment would need to be applied for fishing year 2021. This could lead to a continual reduction in the ACL over time.

To evaluate the potential economic impact of Alternative 2, Table 6 provides detail on the result of the fishery performing at that level. Assuming that the full ACL was caught, and fishermen sell 47% of their catch for \$6.04 per lb, the sold component of the catch would generate fleet-wide revenue of \$9,936 per year. This alternative had the lowest economic revenue when compared to the status quo or action alternatives. A lower specification is not expected to prompt a race to fish and jeopardize public safety.

Dealer reported sales have not exceeded \$40,000 in the past ten years and have averaged about \$16,500 annually (Table 6). Given the low value of the fishery, it is likely that sale of Kona crab is a method of cost recovery for fishing trips rather than a constant source of revenue. Fishermen could likely be opportunistically fishing for Kona crab or are fishing for Kona crab in conjunction with targeting one or more additional species. Under this alternative, these opportunities could be limited for fishermen.



Therefore, under this alternative, a larger effect on fishery participants is expected compared to Alternative 1 or the action alternatives. We expect fishing participation would remain relatively low and for catches to continue as they have in recent years when the same ACL was implemented.

#### **4.2.3 Alternative 3: Specify an ACL of 30,802 lb and set an ACT of 28,324 lb**

Under this Alternative, NMFS would specify an ACT of 28,324 lb for Hawaii Kona crab. If recent fishing trends continue, NMFS does not expect the fishery would reach the ACL. The potential catch value associated with this level of catch is \$171,077 and, assuming that 47% of the catch is sold, the commercial value of the catch is \$80,406. This Alternative provides the highest level of catch and therefore the highest economic potential compared to the rest of the Alternatives.

Specifying a significantly higher ACL than was implemented in recent years is not expected to result in an expansion of the fishery by new fishermen looking to take advantage of the higher quota. Given the offshore fishing grounds, it would take a significant financial investment to become active in the fishery if fisherman did not already own a vessel. Specialized gear would need to be purchased to participate in the fishery. Additionally, the fishery would still be required to discard female and undersized crabs.

Therefore, the effects on fishery participants under this alternative are expected to be similar to Alternative 1. We expect fishing participation would remain relatively low and for catches to continue as they have in recent years.

#### **4.2.4 Alternative 4: Specify an ACL of 30,802 lb and set an ACT at 25,491 lb (Council-preferred Alternative)**

Under this Alternative, NMFS would specify an ACT of 25,491 lb for Hawaii Kona crab. If recent fishing trends continue, NMFS does not expect the fishery would reach the ACL. The potential catch value associated with this level of catch is \$147,926 and assuming that 47% of the catch is sold, the commercial value of the catch is \$69,525. This is higher than Alternatives 1, 2, and 5, but lower than Alternative 3.

Specifying a significantly higher ACL than was implemented in recent years is not expected to result in an expansion of the fishery by new fishermen looking to take advantage of the higher quota. Given the offshore fishing grounds, it would take a significant financial investment to become active in the fishery if fisherman did not already own a vessel. Specialized gear would need to be purchased to participate in the fishery. Additionally, the fishery would still be required to discard female and undersized crabs.

Therefore, the effects on fishery participants are expected to be similar to Alternative 1. We expect fishing participation would remain relatively low and for catches to continue as they have in recent years.

#### **4.2.5 Alternative 5: Specify an ACL of 30,802 lb and set an ACT at 21,243 lb**

Under this Alternative, NMFS would specify an ACT of 21,243 lb for Hawaii Kona crab. If recent fishing trends continue, NMFS does not expect the fishery would reach the ACL. The potential catch value associated with this level of catch is \$128,308 and assuming that 47% of the catch is sold, the commercial value of the catch is \$60,305. This is higher than Alternatives 1 and 2, but lower than Alternatives 3 and 4.

Specifying a significantly higher ACL than was implemented in recent years is not expected to result in an expansion of the fishery by new fishermen looking to take advantage of the higher quota. Given the offshore fishing grounds, it would take a significant financial investment to become active in the fishery if fisherman did not already own a vessel. Specialized gear would need to be purchased to participate in the fishery. Additionally, the fishery would still be required to discard female and undersized crabs.

Therefore, the effects on fishery participants are expected to be similar to Alternative 1. We expect fishing participation would remain relatively low and variable, and for catches to continue as they have in recent years.

#### **4.3 Protected Species**

None of the alternatives considered would modify operations of the Hawaii Kona crab 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 or MMPA consultations. Under all the alternatives, this fishery would still be subject to conservation measures in accordance with various resource conservation and management laws. Since no change is expected in the way fishing is conducted under any of the alternatives, we do not expect there to be a change to distribution, abundance, reproduction, or survival of ESA-listed species or an increase in interactions with protected resources. If at any time the fishery, environment, or status of a listed species or marine mammal species were to change substantially, or if the fishery were found to be occurring in or near areas that were designated as critical habitat, NMFS would undertake additional consultation as required to comply with requirements of the ESA and the MMPA.

#### **4.4 Habitat and Vulnerable Ecosystems**

Hawaiian Kona crabs are found at depths that overlap with EFH for certain crustacean and Hawaii bottomfish MUS. However, Kona crab are harvested by circular shaped nets approximately 1 m across and set on sandy bottom habitats at depths ranging from 50 to 150 ft. These harvest methods are highly selective and are not known to cause damage to the ocean, coastal habitats, corals, or marine habitats. EFH consultations would be required for all activities that may adversely affect EFH for MUS. None of the alternatives, including the preferred alternative (Alternative 4) will change the way in which fisheries are conducted. For these reasons, none of the alternatives considered are expected to lead to substantial physical, chemical, or biological alterations to habitat or result in adverse impacts to the marine habitat, including areas designated as EFH, habitat areas of particular concern (HAPC), or unique areas such as marine protected areas, marine sanctuaries or marine monuments.

## **4.5 Effects on Management Setting**

The proposed action is a continuation of ongoing and coordinated management efforts to maintain a sustainable Kona crab fishery in the MHI through implementation of an ACL based on the best scientific information available. Under all Alternatives considered, the Council-appointed FEP plan team would continue to prepare an Annual SAFE Report on the performance of the MHI Kona crab 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 to Kona crab fishing vessels operating in the EEZ. The State would continue to manage catches by requiring a CML and fishing reports, prohibit the take of female crabs, apply the minimum size of 4 inch carapace length, and implementation of the spawning seasonal closure.

Alternative 1 may reduce administrative costs slightly relative to the action alternatives because without an ACL, NMFS would not need to monitor catch in near real time. Also, there would be no administrative cost associated with closing the fishery under the No Action and Status Quo Alternatives. Also under these alternatives, enforcement would not be needed to enforce a fishery closure, although enforcement would be required to support compliance and other regulations. However, Alternative 1 does not comply with the Magnuson-Stevens Act or Hawaii FEP, which requires that NMFS implement an ACL for MHI Kona crabs and the ACL under Alternative 2 would be excessively low, would not allow the fishery to attain MSY, provide the lowest economic revenue to the fishery, and has the greatest potential for implementing an overage adjustment in the following year.

Alternatives 3, 4, and 5 comply with the Magnuson-Stevens Act and the ACL implementation process described in the Hawaii FEP and Amendment 3. If the catch exceeds the ACT the fishery would be closed. Closing the fishery would incur administrative and enforcement costs. However, given recent catch history (Table 1), the fishery is unlikely to reach the ACT associated with Alternatives 3, 4, or 5.

### **4.5.1 Federal Agencies and the Council**

The Council in accordance with the approved FEPs currently manages fisheries in Federal waters, and NMFS PIRO is responsible for implementing and enforcing fishery regulations that implement the FEPs. NMFS PIFSC conducts research and reviews fishery data provided through logbooks and fishery monitoring systems administered by State and territorial resource management agencies. The Council, PIRO, and PIFSC collaborate with local agencies in the administration of fisheries of the western Pacific through other activities including coordinating meetings, conducting research, developing information, processing fishery management actions, training fishery participants, and conducting educational and outreach activities for the benefit of fishery communities.

NOAA's Office of Law Enforcement (OLE) is responsible for enforcement of the nation's marine resource laws, including those regulating fisheries and protected resources. OLE Pacific Islands Division oversees enforcement of Federal regulations in American Samoa, Guam, the

Commonwealth of the Northern Mariana Islands, and Hawaii and enters into Joint Enforcement Agreements (JEA) with each participating State and territory.

The U.S. Coast Guard's (USCG) Fourteenth District (Honolulu) jurisdiction is the EEZ and high seas in the western and central Pacific. At over 10 million square miles, its area of responsibility is the largest of any USCG District. The USCG patrols the region with airplanes, helicopters, and surface vessels, as well as monitors vessels through the NMFS-supplied vessel monitoring system (VMS), which remotely indicates the position of certain federally permitted fishing vessels in the region.

The proposed ACL and AM specifications would not require a change to monitoring or collecting fishery data. The State of Hawaii already requires Kona crab fishermen to have a Commercial Marine License (CML) and report catch on a monthly basis. Monthly monitoring of catch data toward the ACT would require additional management oversight to be conducted by PIFSC in collaboration with the Council and the local resource management agency. Managing the fishery with the new in-season AM and a post-season AM is likely to affect fishery managers by requiring additional management effort to be expended to conduct outreach and educational activities to inform the affected public of any fishery closure or change in ACL and ACT from previous fishing years. These activities will require the expenditure of public funds to pay for the new level of management activity. These are administrative activities and will not likely lead to environmental effects.

Management of the Kona crab fishery with a new ACL, ACT, and AM will require changes to law enforcement, as agents will need to understand new requirements and will be tasked with enforcing any fishery closure that is enacted if the ACT is reached. These activities will require the expenditure of public funds to pay for any activity above the current level of law enforcement conducted in the area. However, given the history of the fishery, it is unlikely that the ACT will be reached and enforcement levels would likely be similar to recent years when the fishery did not reach the ACL or when an ACL was not specified. Changes to law enforcement are not currently projected to have environmental effects. The ACL and AM specifications would not result in any change to the fishery that would pose an additional risk to human safety at sea.

#### **4.5.2 Local Agencies**

Currently, the State of Hawaii is responsible for the conservation and management of fishery resources in State waters and onshore. The State monitors catch through licenses and fishery data collection programs, conducts surveys of fishermen and scientific surveys of fish stocks, establishes and manages marine protected areas, provides outreach and educational services, serves on technical committees, and enforces local and Federal resource laws through Joint Enforcement Agreements, among other responsibilities.

The specification of an ACL and AMs for Kona crab in Hawaii is not expected to result in changes to fishery management or monitoring by the local resource management agencies, at this time. This is because the State of Hawaii has no mechanism to close State waters should the fishery reach the ACT and a closure is enacted in Federal waters, so administrative costs would not change for the State relative to the baseline alternative. Additionally, monitoring of monthly

catch data toward the ACT would be conducted by PIFSC in collaboration with local resource management agencies and the Council. These are administrative activities and will not likely lead to environmental effects.

### **4.5.3 Environmental Justice**

The continued management of the MHI Kona crab fishery with or without an ACL or AMs is not expected to have environmental effects that could result in large or adverse effects on communities in Hawaii. The fisheries of the western Pacific region are subject to ongoing regulations that help ensure fishing is sustainable. Management under the action alternatives are intended to provide for sustainability of crustaceans. Sustainable fisheries management helps ensure that marine seafood resources and the human communities that rely on their harvest, are properly managed over the short and long term. None of the alternatives would have an adverse effect on sustenance harvests. For these reasons, none of the alternatives have the potential to have environmental justice implications.

### **4.5.4 Climate Change**

Changes in the environment from global climate change have the potential to affect crustacean and precious coral 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 (Buddemeier et al., 2004). Damage to coastal areas due to storm surge or sea level rises as well as changes to catch rates, migratory patterns, or visible changes to habitats are among the most likely changes that would be noted first. Climate change has the potential to adversely affect some organisms, while others could benefit from changes in the environment.

The impacts from climate change may be difficult to discern from other impacts; however, monitoring of physical conditions and biological resources by a number of agencies would continue to occur and would allow fishery managers to continually make adjustments in fishery management regimes in response to changes in the environment.

Under the no-action alternative, no ACL or AM would be specified and fishing would occur as it has been in the recent past. As shown in the EA effects analyses above, in Alternatives 2 – 5, the ACL and AMs would not result in a change to any fishery including target species, gear used, areas fished, or effort. Because the proposed specifications are not expected to result in a change to the manner in which any of the affected fisheries are conducted, none of the action alternatives would result in a change in greenhouse gas emissions from fishing vessels.

## **4.6 Other Effects**

There would be no potential for the alternatives to result in the introduction of or spread of invasive species because the fishery is not known to have such issues and we do not expect the operation of the fishery to change under any of the alternatives. The proposed action would not result in changes to safety for fishery participants. Because the fishery is not constrained by an ACL, the proposed ACL and AMs would not result in a race to fish that could have safety implications. The fishery is not known to be having adverse effects on predators of Kona crabs or on prey. The continuation of the fishery under any of the alternatives would not change harvest in any way that would affect predator-prey relationships or biodiversity.

The decision to establish an ACL and a post-season AM under any of the action alternatives would not establish precedents for future specifications as future management measures would be subject to environmental and public review. The MHI Kona crab fishery has been operating under an ACL and a post-season AM made annually since 2012. Although the proposed in-season AM would be a new management measure for the MHI Kona crab fishery, the specifications comply with the Hawaii FEP and national requirements for all MUS to be managed under ACLs and AMs. Additionally, an in-season AM would not establish a precedent for future actions as future management measures would be subject to environmental and public review. Furthermore, the proposed ACLs and AMs do not foreclose or narrow future management options, as NMFS is able to adjust them through subsequent rulemaking.

### **4.6.1 Scientific, Historic, Archaeological 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 Kona crab 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, Kona crab fishing in the MHI is not known to result in adverse impacts to scientific, historic, archeological or cultural. Because the proposed ACL and AM would not result in changes to MHI Kona crab fisheries, none of the alternatives is expected to result in large adverse impacts to resources of scientific, historic, cultural, or ecological importance. Kona crab fishing in marine protected areas will continue to be restricted by applicable state or Federal 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.

### **4.6.2 Biodiversity and Ecosystem Function**

Alternative 1 does not actively prevent indirect effects to biodiversity and ecosystem function, because it does not manage overall fishing as required under the Magnuson-Stevens Act and the Hawaii FEP. Under this No Action Alternative, total catch and associated fishing activity would not be limited. However, effects on the ecosystem are not expected if the fishery were to perform as it has in recent years and catch the recent maximum. The MHI Kona crab fishery has low bycatch, and does not impact the habitat, as discussed previously (Section 4.1).

Except for the No Action Alternative, the proposed ACL and ACTs are lower than the median MSY estimate for total Hawaii Kona crab catch and the OFL. The proposed ACL, ACTs, and AMs were developed using the best available scientific information, in accordance with the fishery regulations, and after considering catches, participation trends, and estimates of the status of the fishery resources. None of the Alternatives under consideration are expected to change the way the fishery is conducted. To date, there have been no identified impacts to marine biodiversity, marine resources, and/or ecosystem function from the MHI Kona crab fisheries. The proposed ACL and AMs would not have large adverse impacts to marine biodiversity, marine resources, and/or ecosystem function.

Additionally, Kona crab fishing is not known to be a potential vector for introducing or spreading new alien species as none of vessels fish outside of Hawaiian waters. For this reason, none of the alternatives are expected to increase the potential for the spread of alien species into or within Hawaiian waters.

#### **4.7 Potential Cumulative Effects of the Alternatives**

The direct effect of the proposed action is limited to mortality on the Kona crab stock. Cumulative impacts are the impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes those actions. Past and present effects on the Kona crab stock are the past and current Kona crab fishery, as described in Sections 1, 2, and 3 and are considered in the setting of ACL and AM specifications. Besides the proposed ACL and AM specifications, NMFS does not have any other foreseeable management actions that are likely to affect the Kona crab fishery or cause a change in the expected mortality to Kona crab. There are no other reasonably foreseeable NMFS management actions pending that would be affected by or interact with the specification of the ACL and AMs that would change the environmental effects review. Numerous activities take place in Federal, State, and territorial waters including military and maritime uses, wind and tidal power, communication uses, and conservation activities. These activities do not present foreseeable future activities that would have impacts on the Kona crab stock because of the limited distribution of the Kona crab stock, and there is no information that any of these types of activities are planned where Kona crab occur.

##### **4.7.1 Cumulative Effects Related to Effects on the Physical Environment**

The MHI Kona crab fishery is not known to be having adverse effects on air quality, noise, water quality, view planes, or terrestrial resources, and continued management of the fishery using ACLs and AMs would not change effects on the physical environment. Fishing behavior and effort are not expected to change substantially under any Alternative. Alternatives 3, 4, and 5 have the potential to result in more fishing trips, should the fishery expand, but the limited increase in fishing trips would not interact with other activities in the same marine areas and result in large and adverse effects on these resources.

## **4.7.2 Cumulative Effects Related to Effects on the Biological Environment**

### **4.7.2.1 Target, Non-target, and Bycatch Species**

Under Alternative 1, the fishery would not operate with an ACT or AMs in the next 4 years. This alternative would not provide active management of the Kona crab to prevent overfishing. There could be an increase in fishing effort, and fishing trips because the fishery would not be constrained.

Under the Status Quo alternative (Alternative 2), and the other action alternatives (Alternatives 3, 4, and 5), fishing would be constrained by closing once the ACT is caught. The ACT and AM together would result in continued sustainable management of the Kona crab stock complex.

The continued management of the fishery using the proposed ACTs and AMs for 2020-2023 is not expected to result in large and adverse effects to the stock. The probability of the stock being overfished in 2023 after four years of catches of 25,491 lb is 1.6%. If the entire ACT was not caught, the actual risk of overfishing would be less than the estimated risk level described in the 2018 stock assessment. For example, if the fishery does not catch 25,491 lb in each of the first two fishing years, the actual risk of overfishing would be less than 20% for an ACT of 25,491 lb in the third fishing year. This aspect of the risk projections provides an additional layer of precaution to ACT in future years.

Though this EA focuses on implementing ACLs for fishing years 2020-2023, the 2018 stock assessment on which these recommendations are based contains projections for catch levels and associated risk of overfishing through fishing year 2020-2026 (Kapur et al., 2019). If necessary, NMFS and the Council may use this stock assessment as a basis for recommending ACLs and AMs for 2024-2026, given consistency with acceptable levels of risk that were identified during P\* and SEEM analyses. For example, carrying an ACT of 25,491lb forward for the 2024-2026 fishing year would result in a risk of overfishing of between 20 and 21% if the entire ACT had been caught in each of the previous fishing years. Based on the recent performance of the fishery, annual catches are expected to remain below the proposed ACT in Preferred Alternative 4, so the actual risk of overfishing would likely be less than this.

The stock assessment considered the potential effects on stock health of all commercial catches together with non-commercial catches in the MHI. There is no catch occurring in the Northwestern Hawaiian Islands. Therefore, catches of Kona crab by fishermen that are not in the commercial fishery were considered and there would not be an unknown or unsustainable cumulative effect.

The proposed ACLs and ACTs under Alternatives 3, 4, and 5 include consideration of both scientific and management uncertainties, and, therefore, they have built in buffers to account for uncertainty, and we do not anticipate that any of the alternatives would have a risk of large unknown effects that could result in adverse cumulative effects in target and non-target species. The Council and its SSC applied a quantitative method to develop the P\* estimates. P\* (risk of overfishing) was computed on best scientific information available and including scientific uncertainty for four dimensions: 1) assessment information, 2) assessment uncertainty, 3) stock status, and 4) productivity and susceptibility (WPFMC and NMFS, 2011). Building in this buffer



reduces the potential for large adverse cumulative effects of the proposed ACLs and AMs on sustainability of the fishery and non-target species.

The Council and its SSC also applied a qualitative analysis related to management uncertainties considering four factors acceptable biological are 1) Social, 2) Economic; 3) Ecological, and 4) Management uncertainty (SEEM) considerations (WPFMC and NMFS 2011). This information was incorporated into the ACL and ACT by subtracting SEEM scores from the ABC. Building in this buffer reduces the potential for large adverse cumulative effects of the proposed ACLs and AMs on sustainability of the fishery due to any of these factors.

#### **4.7.2.2 Potential Cumulative Effects on Protected Species**

Under all alternatives under consideration, fishing is expected to remain within levels considered during consultations and no additional effects to protected species are expected. The fishery would continue to be authorized and conducted in accordance with Section 7 of the ESA and the MMPA. The analysis of effects of the MHI Kona crab fishery under each of the alternatives found that the fishing is not likely to have significant effects on the survival or recovery of any listed species, largely because the fishery has low levels of interactions with these listed species. NMFS analysis of effects on ESA- and MMPA-listed species took into consideration outside actions that affect the same species. In general, continued management of the fishery under the full suite of management measures, including the proposed ACLs and AMs for the next several years, would not change the fishery in any way that is likely to have the potential for large and adverse cumulative effects on listed species.

#### **4.7.2.3 Potential Cumulative Effects on Habitat and Vulnerable Ecosystems**

Habitat considerations were incorporated into the development of the ACLs through the Council deliberation process and public comment periods. To date, there have been no identified impacts to marine biodiversity, marine resources, and/or ecosystem function from the MHI Kona crab fisheries. None of the Alternatives under consideration are expected to change the way the fishery is conducted. Therefore, the proposed ACL and AMs would not have large adverse impacts to marine biodiversity, marine resources, and/or ecosystem function. Additionally, none of the proposed ACLs are expected to have adverse cumulative effects to EFH or HAPCs given the nature of the MHI Kona crab fishery.

Furthermore, Kona crab fishing is not known to be a potential vector for introducing or spreading new alien species as none of vessels fish outside of Hawaiian waters. For this reason, none of the alternatives are expected to increase the potential for the spread of alien species into or within Hawaiian waters.

#### **4.7.3 Potential Cumulative Effects Related to Socio-economic Effects**

Management of the MHI Kona crab fishery using ACLs and associated AMs is not known to have large adverse effects on the socio-economic setting. Implementation of an ACL greater than recent average catch allows for greater harvests, associated increases in effort and revenue, and a continued supply of Kona crab to fishing communities (see Section 4.2). Social and economic considerations were incorporated into the development of the ACLs through the Council

deliberation process and public comment periods, and none of the proposed ACLs are expected to have adverse cumulative effects to the socio-economic setting given the nature of the MHI Kona crab fishery.

Implementation of proposed ACLs is not likely to be associated with a rapid expansion of the fishery (Table 4) that could have adverse social effects. A number of factors serve as barriers to increased participation in the fishery. Given the offshore fishing grounds, it would take a significant financial investment to become active in the fishery if fisherman did not already own a vessel. Specialized gear would need to be purchased to participate in the fishery. Additionally, the fishery would still be required to discard female and undersized crabs. Therefore, we expect participation and catch to continue as it has in recent years. Management of the fishery under scientifically based catch limits supports a sustainable fishery that maintains these social and economic benefits.

#### **4.7.4 Other Considerations**

##### **4.7.4.4 Climate Change**

Changes in the environment from global climate change have the potential to affect crustacean and precious coral 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 (Buddemeier et al., 2004). Damage to coastal areas due to storm surge or sea level rises as well as changes to catch rates, migratory patterns, or visible changes to habitats are among the most likely changes that would be noted first. Climate change has the potential to adversely affect some organisms, while others could benefit from changes in the environment.

The impacts from climate change may be difficult to discern from other impacts; however, monitoring of physical conditions and biological resources by a number of agencies would continue to occur and would allow fishery managers to continually make adjustments in fishery management regimes in response to changes in the environment. Under the no-action alternative, no ACL or AM would be specified and fishing would occur as it has been in the recent past. As shown in the EA effects analyses above, in Alternatives 2 – 5, the ACL and AMs would not result in a change to any fishery including target species, gear used, areas fished, or effort. Because the proposed specifications are not expected to result in a change to the manner in which any of the affected fisheries are conducted, none of the action alternatives would result in a change in greenhouse gas emissions from fishing vessels.

## *Consideration of greenhouse gas emissions*

Although implementation of the proposed ACLs could result in increased fishing, the amount of vessel use is not regulated by NMFS. Fishing vessel owners could use their vessels for other fishing, recreational, or economic purposes. For these reasons, none of the proposed Alternatives are expected to result in changes to the manner in which vessels are used, so no change in greenhouse gas emissions from vessels in the fishery is expected.

For these reasons, climate change, considered in addition to all other factors affecting MHI Kona crab stocks (including fishing), is not expected to result in a large and adverse cumulative impact on MHI Kona crab stocks in the short term or the long term. The proposed ACLs are intended to provide for long-term sustainability of the Kona crab fishery.

## **5 APPLICABLE LAWS**

### **5.1 National Environmental Policy Act**

In accordance with NEPA, NOAA Administrative Order (NAO) 216-6A – 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 requires NMFS to consider the effects of proposed agency actions and alternatives on the human environment. As part of this process, NMFS and the Council provide opportunities for the involvement of interested and affected members of the public before a decision is made. NMFS and the Council prepared this EA in accordance with NEPA and its implementing regulations, at 40 CFR 1500–1508<sup>5</sup>, and in coordination with various Federal and local government agencies that are represented on the Council. NMFS will use this EA to consider the effects of the proposed action on the human environment, taking into consideration public comments on the proposed action presented in this document, and to determine whether the proposed action would have a significant environmental impact requiring the preparation of an environmental impact statement.

On October 15, 2020, NMFS published in the *Federal Register* a proposed rule for an ACL of 30,802 lb and ACT of 25,491 lb for the Hawaii Kona crab fishery and in-season and post-season AMs for fishing years 2020 – 2023 (85 FR 65336). The proposed rule was accompanied by the draft EA, dated September 22, 2020. NMFS requested public review and comments on the proposed rule and draft EA. The comment period ended on November 5, 2020. We received comments from four individuals that generally supported the action. NMFS considered public comments in finalizing the EA and in making its decision on the proposed action, and responds to comments in the final specification. The NMFS Regional Administrator will use this EA to consider the effects of the proposed action on the human environment, taking into consideration public comments on the proposed action presented in this document, and to determine whether the proposed action would have a significant environmental impact requiring the preparation of an environmental impact statement.

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<sup>5</sup> CEQ published new NEPA regulations on July 16, 2020 that enter into effect on September 14, 2020 (see 85 FR 43304). This EA was under development prior to September 14, 2020, and thus, has been prepared in accordance with the 1978 CEQ NEPA regulations that applied prior to the new regulations entering into effect.

## **5.2 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 this proposed action is consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management programs of the State of Hawaii. NMFS submitted this determination for review by the appropriate state agency under section 307 of the CZMA on April 27, 2020. On May 1, 2020, the State of 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. Therefore, the proposed action is not subject to the Federal consistency review by the Hawaii CZM Program.

## **5.3 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 the EEZ around the MHI where Kona crab fishing occurs that are listed on or eligible for listing on the National Register of Historic Places. Although shipwrecks and other objects from the Pacific Theatre in World War II could possibly occur in Federal waters around the U.S. Pacific Islands, Kona crab fishing is not known to have a damaging impact on the marine environment, and the proposed action would not change the manner in which any Kona crab fishery is conducted.

## **5.4 Endangered Species Act**

The ESA provides for the protection and conservation of threatened and endangered species. Section 7(a)(2) of the ESA requires Federal agencies to ensure that any action authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. Pursuant to Section 7 of the ESA, NMFS has evaluated the crustacean fisheries managed under the FEPs, including spiny lobster fisheries for potential impacts on ESA-listed species under the jurisdiction of NMFS. Table 8 summarizes ESA section 7 consultations for these fisheries managed under the FEP Hawaii. The proposed action is not expected to modify vessel operations or other aspects of any crustacean fishery and would likely not have an adverse effect on ESA listed species or any designated critical habitats that was not considered in prior consultations.

## **5.5 Marine Mammal Protection Act**

The MMPA prohibits, with certain exceptions, the take of marine mammals in the U.S. and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the United States. The MMPA gives NMFS as delegated by the Secretary of Commerce, the authority and duties for all cetaceans (whales, dolphins, and porpoises) and

pinnipeds (seals and sea lions, except walruses). With this responsibility, NMFS required to prepare and periodically review stock assessments of marine mammal stocks.

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. These categories are based on the level of serious injury and mortality of marine mammals that occurs incidental to each fishery. Specifically, the MMPA mandates that each fishery be classified according to whether it has frequent, occasional, or a remote likelihood of or no known incidental mortality or serious injury of marine mammals. A Category 1 fishery is one with frequent incidental mortality and serious injury of marine mammals. A Category 2 fishery is one with occasional incidental mortality and serious injury of marine mammals. A Category 3 fishery is one with a remote likelihood or no known incidental mortality and serious injury of marine mammals.

According to the final 2020 LOF (85 FR 21079, April 16, 2020), the Hawaii Kona crab loop net is classified as a Category III fishery under Section 118 of the MMPA. Participants in Category III fisheries are not required to register in the Marine Mammal Authorization Program prior to engaging in commercial fishing. Because NMFS and the Council do not expect the proposed action to modify vessel operations or other aspects of any fishery, it would not introduce impacts not previously considered in prior MMPA determinations or the List of Fisheries classification.

## **5.6 National Historic Preservation Act**

The National Historic Preservation Act requires Federal agencies undergo a review process for all federally funded and permitted projects that will affect sites listed on, or eligible for listing on, the National Register of Historic Places. There are presently no known districts, sites, highways, cultural resources structures or objects listed in or eligible for listing in the National Register of Historic Places in the EEZ around the MHI. Kona crab 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 likely change the conduct of the Kona crab fishery.

## **5.7 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.

NMFS has initially determined that this action is not significant for the purpose of E.O. 12866.

## **5.8 Executive Order 13132 (Federalism)**

The objective of E.O. 13132 is to guarantee the Constitution's division of governmental responsibilities between the Federal government and the states. Federalism implications are defined as having substantial direct effects on states or local governments (individually or collectively), on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. NMFS and the Council do not expect that this action would impact or alter the relationship between the Federal government and the government of the State of Hawaii.

## **5.9 Information Quality Act**

The IQA and NOAA standards (NOAA Information Quality Guidelines, September 30, 2002) recognize information quality is composed of three elements: utility, integrity, and objectivity. National Standard 2 of the Magnuson-Stevens Act states that an FMP's (FEP's) conservation and management measures shall be based upon the best scientific information available. This EA incorporates the best biological, social, and economic information available to date, including the most recent biological information on, and assessment of, the fishery resources and protected resources, and the most recent information available on fishing communities, including their dependence on the Kona crab fishery, and up-to-date economic information (landings, revenues, etc.). The management alternatives contained in this EA are supported by the available scientific information, and are designed to meet the conservation goals and objectives of the Hawaii FEP, the Magnuson-Stevens Act, and other applicable laws.

The data and analyses used to develop the measures are presented in this EA. All reference materials are properly referenced within the appropriate sections of the EA. The information product was prepared by Council and NMFS staff based on information provided by NMFS Pacific Islands Fisheries Science Center (PIFSC), NMFS PIRO, and the State of Hawaii Division of Aquatic Resources. The information product was reviewed by PIRO and PIFSC staff, and NMFS Headquarters (including the Office of Sustainable Fisheries). Legal review was performed by NOAA General Counsel, Pacific Islands Section and Enforcement Section, for consistency with applicable laws, including but not limited to the Magnuson-Stevens Act, National Environmental Policy Act, Administrative Procedure Act, Paperwork Reduction Act, Coastal Zone Management Act, Endangered Species Act, Marine Mammal Protection Act, and Executive Orders 13132 and 12866.

## **5.10 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.

## **5.11 Regulatory Flexibility Act**

The Regulatory Flexibility Act (5 U.S.C. 601 et seq.) requires government agencies to assess and

present the impact of their regulatory actions on small entities, including small businesses, small organizations, and small governmental jurisdictions. The assessment is done by preparing an Initial Regulatory Flexibility Analysis (IRFA) and Final Regulatory Flexibility Analysis (FRFA) for each proposed and final rule, respectively. Under the Regulatory Flexibility Act, 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.

Based on available information presented in this EA, NMFS has determined that all vessels participating in the MHI Kona crab 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 \$11 million, the small business size standard for shellfish fishing.

Even though this proposed ACL, ACT, and AMs would apply to a substantial number of vessels, i.e., 100% of the fleet, NMFS does not expect the rule will have a significantly adverse economic impact to individual vessels. The proposed ACT is much higher than the ACL implemented in 2017 and 2019 (3,500 lb). This increase is because the most recent stock assessment incorporated several changes that resulted in markedly different outputs compared to the previous assessment, upon which the previous ACLs were based. The proposed ACL is not expected to result in an expansion of the fishery by new fishermen looking to take advantage of the higher quota compared to previous years. Given the offshore fishing grounds for Kona crab, it would take a significant financial investment to become active in the fishery if fisherman did not already own a vessel and the required specialized gear. The proposed action, if implemented, is not expected to constrain the fishery, given that the proposed ACL and ACT are both more than double the highest catch recorded over the past 10 years, which was 10,609 lb in 2011. Furthermore, the fishery would still be managed by State of Hawaii regulations (e.g., discarding of female and undersized crabs) that limits interest and viability of the fishery.

While NMFS and the Council are considering as AMs, both an in-season closure in the Kona crab fishery if catch is projected to reach the ACT and a post-season adjustment if the catch exceeds the ACL, the proposed ACT is several times higher than the reported catch in 2019, so either accountability measure is unlikely to be needed. The ACL, ACT, and AM, as proposed, would not change the gear types, areas fished, effort, or participation of the fishery during each fishing year.

Based on available information, NMFS has determined that all vessels engaging in the commercial and non-commercial fisheries for Kona crab (NAICS Code: 11411) are small entities. That is, they are engaged in the business of fish harvesting, independently owned or operated, not dominant in their field of operation, and have annual gross receipts not in excess of \$11 million. Therefore, there would be no disproportionate economic impacts between large and small entities. Furthermore, there would be 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.

## **5.12 Executive Order 12898 (Environmental Justice)**

E.O. 12898 requires Federal agencies to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. E.O. 12898 also provides for agencies to collect, maintain, and analyze information on patterns of subsistence consumption of fish, vegetation, or wildlife. That agency action may also affect subsistence patterns of consumption and indicate the potential for disproportionately high and adverse human health or environmental effects on low-income populations, and minority populations. Agencies should also consider environmental justice when conducting NEPA analyses.

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 Kona crab in Federal waters, and no new monitoring is required for the ACL specification or the AMs to be implemented. The environmental review in this EA establishes that the proposed specifications of ACLs and AMs in Kona crab fishery 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 the Hawaii Kona crab fishery. Specification of the ACLs and post-season reviews are expected to benefit the target resources by providing annual review of the fishery performance and other information related to evaluating lobster stock status. This in turn, is expected to benefit fishery participants and fishing communities that rely on this resource for food, employment, recreation and enjoyment. The proposed specifications are not likely to result in a large adverse impact to the environment that could have disproportionately large or adverse effects on members of environmental justice communities in Hawaii.

## **5.13 Administrative Procedure Act**

All Federal rulemaking is governed under the provisions of the 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. In developing the proposed ACL and AM recommendations, the Council held public meetings, provided opportunities for the public to comment on the proposed methods and recommendations, and the Council considered comments from the public and advisory bodies in making its recommendation. NMFS will publish a proposed rule and solicit public comments on this EA and the proposed ACLs and AMs.



## 6 REFERENCES

- Brown, I.W. 1985. The Hawaiian Kona crab fishery. Queensland Department of Primary Industries, Brisbane, Australia. 20 pp.
- Buddemeier, R.W., J.A. Kleypas, and R.B. Aronson. 2004. Coral Reefs and Global Climate Change: Potential Contributions of Climate Change to Stresses on Coral Reef Ecosystems. Pew Center on Global Climate Change, Arlington, VA. 56 pp.
- Caldeira, K., and M.E. Wickett. 2005. Ocean model predictions of chemistry changes from carbon dioxide emissions to the atmosphere and ocean. *Journal of Geophysical Research* 110 (C09S04).
- Clark, T.A. 1972. Exploration for deep benthic fish and crustacean resources in Hawaii. Hawaii Institute of Marine Biology Technical report, University of Hawaii 29: 1-18.
- Doney, S.C. 2006. The dangers of ocean acidification. *Scientific American*, 294(3): 58-65.
- Fielding, A., and S.R. Haley. 1976. Sex ration, size at reproductive maturity and reproduction of the Hawaiian Kona crab *Rainina ranina* (Linnaeus) (Brachyura, Gymnopleura, Raininidea). *Pacific Science* 30: 131-145.
- Hall, N.G. 2015. Center for Independent Experts (CIE) Report on the Independent Peer Review of the Kona Crab Benchmark Assessment. 34 pp. See full report at: [http://www.pifsc.noaa.gov/peer\\_reviews/wpsar/index.php#review\\_of\\_Kona\\_crab\\_assessment\\_2015](http://www.pifsc.noaa.gov/peer_reviews/wpsar/index.php#review_of_Kona_crab_assessment_2015).
- Hastie, L., and W. Saunders. 1992. On the distribution and fishery potential of the Japanese Red Crab *Chaceon granulatus* in the Palauan Archipelago, Western Caroline Islands. *Mar. Fish, Rev.* 54 (1): 26–32.
- HDAR (Hawaii Division of Aquatic Resources). 2016. Landings data from State of Hawaii, Department of Land and Natural Resources, Division of Aquatic Resources.
- Hospital, J., B. Schumacher, A. Ayers, K. Leong, and C. Severance. 2019. A Structure and Process for Considering Social, Economic, Ecological, and Management Uncertainty Information in Setting of Annual Catch Limits: SEEM\*. PIFSC internal report IR-19-011. Pacific Islands Regional Office. Honolulu, HI. 13 pp.
- Houghton, J.T., Y. Ding, D.J. Griggs, M. Noguer, P.J. van der Linden, and D. Xiaosu (Eds.) 2001. IPCC Third Assessment Report: Climate Change 2001: The Scientific Basis. Cambridge University Press, Cambridge, UK, 944 pp. [[http://www.grida.no/climate/ipcc\\_tar/wg1/index.htm](http://www.grida.no/climate/ipcc_tar/wg1/index.htm)] [Also see: Summary for Policymakers and Technical Summary, 98 pp.]
- IPCC (Intergovernmental Panel on Climate Change). 2007. Summary for Policymakers. In: *Climate Change 2007. The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*

- [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (Eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- Kapur, M.R., M.D. Fitchett, A.J. Yau, and F. Carvalho. 2019. 2018 Benchmark Stock Assessment of Main Hawaiian Islands Kona Crab. NOAA Tech Memo. NMFS-PIFSC-77, 114 p. doi:10.25923/7wf2-f040
- Kennelly, S.J., and J.S. Craig. 1989. Effects of trap design, independence of traps and bait on sampling populations of spanner crabs *Ranina ranina*. Mar. Ecol. Prog. Ser. 51: 49-56.
- Kennelly, S.J., and D. Watkins. 1994. Fecundity and reproductive period and their relationship to catch rates of spanner crabs, *Ranina ranina*, of the east coast of Australia. Journal of Crustacean Biology 24: 146-150.
- Kennelly, S.J., D. Watkins, and J.R. Craig. 1990. Mortality of discarded spanner crabs *Ranina ranina* in a tangle-net fishery laboratory and field experiments. Journal of Experimental Marine Biology and Ecology 140: 39-48
- Kleypas, J.A., R.A. Feely, V.J. Fabry, C. Langdon, C.L. Sabine, and L.L. Robbins. 2006. Impacts of Ocean Acidification on Coral Reefs and Other Marine Calcifiers: a Guide for Future Research. Workshop Report, National Science Foundation, National Oceanic and Atmospheric Administration, and the U.S. Geological Survey.
- Minagawa, M., and M. Murano. 1993. Effects of prey density on survival, feeding rate, and development of zoeas of the red frog crab *Ranina ranina* (Crustacea, Decapoda, raninidae). Aquaculture 113: 91-100.
- NMFS (National Marine Fisheries Service). 2001. Final Environmental Impact Statement for the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region.
- NMFS. 2011. Environmental Assessment; Annual Catch Limit Specifications and Accountability Measures for Pacific Islands Crustacean and Precious Coral Fisheries in 2012 and 2013. NMFS Pacific Islands Regional Office, Honolulu, HI. 182 pp.
- NMFS. 2013. Supplemental Information Report: 2014 Annual Catch Limits and Accountability Measures for Pacific Island Bottomfish, Crustacean, Precious Coral, and Coral Reef Ecosystem Fisheries. NMFS Pacific Islands Regional Office. Honolulu, HI. 14 pp.
- NMFS. 2016. National Environmental Policy Act Categorical Exclusion; Annual Catch Limits and Accountability Measures for Pacific Island Crustacean and Precious Coral Fisheries in 2015-2018. NMFS Pacific Islands Regional Office. Honolulu, HI. 6 pp.
- NMFS and WPFMC (Western Pacific Fishery Management Council). 2009. Final Programmatic Environmental Impact Statement. Toward an Ecosystem Approach for the Western

Pacific Region: From Species-Based Fishery Management Plans to Place-Based Fishery Ecosystem Plans. 464 pp.

- Onizuka, E.W. 1972. Management and development investigations of the Kona crab, *Ranina ranina* (Linnaeus). Final report. Department of Land Natural Resources, Division of Fish and Game, State of Hawaii, Honolulu, Hawaii.
- Polovina, J.J., J.P. Dunne, P.A. Woodworth, and E.A. Howell. 2011. Projected expansion of the subtropical biome and contraction of the temperate and equatorial upwelling biomes in the North Pacific under global warming. *Journal of Marine Science* 68(6): 986–995. doi:10.1093/icesjms/fsq198.
- Portner, H.O., D.M. Karl, P.W. Boyd, W.L. Cheung, S.E. Lluch-Cota, Y. Nojiri, D.N. Schmidt, and P.O. Zaviolov. 2014. "2014: Ocean Systems." In *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by C.B. Field, V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, et al., 411-484. Cambridge and New York: Cambridge University Press. [http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-Chap6\\_FINAL.pdf](http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-Chap6_FINAL.pdf).
- Skinner, D.G., and B.J. Hill. 1986. Catch rate and emergence of male and female spanner crabs (*Ranina ranina*) in Australia. *Marine Biology* 91: 461-465.
- Sydeman, W.J., E. Poloczanska, T.R. Reed, and S.A. Thompson. 2015. Climate change and marine vertebrates. *Science* 350 (6262): 772-777. doi:10.1126/science.aac9874.
- The Royal Society. 2005. *Ocean acidification due to increasing atmospheric carbon dioxide*. The Royal Society, London. 60 pp.
- Thomas, L., H. Lee and K. Piner. 2015. *Characterization and Assessment of the Main Hawaiian Island Kona Crab (Ranina ranina) Fishery*. Assessment conducted: 2010–2011. Report prepared October 2015. 34 pp.
- Uchida, R.N. 1986. Raninidae. *In Fisheries Atlas of the Northwestern Hawaiian Islands*.
- Uchida, R.N., and J.H. Uchiyama (Eds.). 1986. *Fishery atlas of the Northwestern Hawaiian Islands*. U.S. Dept. of Commerce, NOAA Technical Report NMFS No.38. 142 pp.
- Vansant, J.P. 1978. A survey of the Hawaiian Kona crab fishery. A thesis submitted to the graduate division of the University of Hawaii in partial fulfillment of the requirements for the degree of Master of Science in Oceanography. 59 pp.
- Wiley, J. 2017. Post-release mortality within the Hawaiian Kona crab, *Ranina ranina*, fishery. Western Pacific Fishery Management Council. Honolulu, HI 96813. 108 pp.

- Wiley, J., and C. Pardee. 2018. Post Release Mortality in the Hawaiian Kona Crab Fishery. Western Pacific Fishery Management Council.
- WPFMC. 2008. Amendment 13 to the Fishery Management Plan for the Crustacean Fisheries of the Western Pacific Region, Management of *Heterocarpus* spp. Fisheries, Including Federal Permit and Reporting Requirements. October 23, 2008.
- WPFMC. 2009. Fishery Ecosystem Plan for the Hawaii Archipelago. Western Pacific Fishery Management Council, Honolulu, HI.
- WPFMC. 2011. Acceptable Biological Catches, Annual Catch Limits, and Accountability Measures for Miscellaneous Insular Species. October 31, 2011.
- WPFMC. 2014. Council Action Memo for 160th meeting. Found at <http://www.wpcouncil.org/wp-content/uploads/2014/06/Final-160th-Council-Meeting-Action-Memo.pdf>.
- WPFMC. 2016. Evaluation of 2015 Catches Relative to its Respective Annual Catch Limits. Memo 8.B(1) rev1 for consideration at the 160<sup>th</sup> Council meeting held June 25 – 27, 2014 in Honolulu, HI.
- WPFMC. 2019a. Hawaii Fishery Ecosystem Plan Annual Stock Assessment and Fishery Evaluation Report. Western Pacific Fishery Management Council, Honolulu, HI.
- WPFMC. 2019b. Report on the P\* Analysis for the Main Hawaiian Island Kona Crab Fishery. Western Pacific Fishery Management Council, Honolulu, HI.
- WPFMC. 2019c. Report on the SEEM Analysis for the Main Hawaiian Island Kona Crab Fishery. Western Pacific Fishery Management Council, Honolulu, HI.
- WPFMC and NMFS. 2011. Omnibus Amendment for the Western Pacific Region to Establish a Process for Specifying Annual Catch Limits and Accountability Measures. Including an Environmental Assessment. February 24, 2011.
- WPFMC and NMFS. 2015. Amendment 4 to the Hawaii Archipelago Fishery Ecosystem Plan. June 16, 2015.

**APPENDIX A. DRAFT PROPOSED REGULATIONS**

This section contains the proposed regulations the Council deems necessary or appropriate to implement the conservation and management measures described in the FEP amendment document, based on the preferred alternative.

**PART 665 – FISHERIES IN THE WESTERN PACIFIC**

1. The authority citation for 50 CFR part 665 continues to read as follows:

**Authority:** 16 U.S.C. 1801 *et seq.*

2. Revise § 665.253 to read as follows:

**§ 665.253 Annual Catch Limits (ACL).**

(a) *Deepwater Shrimp.*

(1) In accordance with § 665.4, the ACL for deepwater shrimp for each fishing year are as follows:

| <b>Deepwater Shrimp Fishery</b> | <b>2020</b> | <b>2021</b> |
|---------------------------------|-------------|-------------|
| ACL (lb)                        | 250,733     | 250,733     |

(2) If the average catch of the three most recent years of deepwater shrimp exceeds the specified ACL in a fishing year, the Regional Administrator will reduce the ACL for the subsequent year by the amount of the overage.

(b) *MHI Kona crab.* (1) In accordance with § 665.4, the ACL and annual catch target (ACT) for MHI Kona crab for each fishing year are as follows:

| <b>Kona Crab Fishery</b> | <b>2020</b> | <b>2021</b> | <b>2022</b> | <b>2023</b> |
|--------------------------|-------------|-------------|-------------|-------------|
| ACL (lb)                 | 30,802      | 30,802      | 30,802      | 30,802      |
| ACT (lb)                 | 25,491      | 25,491      | 25,491      | 25,491      |

(2) When the Kona crab ACT is projected to be reached based on analyses of available information, the Regional Administrator shall publish a document to that effect in the Federal Register and shall use other means to notify affected fishermen. The document will include an advisement that the fishery will be closed beginning at a specified date, which is not earlier than seven days after the date of filing the closure notice for public inspection at the Office of the Federal Register, until the end of the fishing year in which the annual catch limit is reached.

(3) On and after the date specified in paragraph (d)(1) of this section, no person may fish for, possess, sell, or offer for sale any Kona crab from a closed fishery in the Federal waters of the MHI, except as otherwise allowed in this section.

(4) If landings of MHI Kona crab exceed the specified ACL in a fishing year, the Regional Administrator will reduce the ACL and the ACT for the subsequent year by the amount of the overage.

\* \* \* \* \*

## APPENDIX B. REGULATORY IMPACT REVIEW

### Regulatory Impact Review

#### Proposed Specifications; 2020–2023 Annual Catch Limits and Accountability Measures for the Hawaii Kona Crab Fishery

(RIN 0648-BJ84)

#### 1. Introduction

This document is a regulatory impact review (RIR) prepared under Executive Order (E.O.) 12866, “Regulatory Planning and Review.” The regulatory philosophy of E.O.12866 stresses that, in deciding whether and how to regulate, agencies should assess all costs and benefits of all regulatory alternatives and choose those approaches that maximize the net benefits to society. To comply with E.O. 12866, NMFS prepares an RIR for regulatory actions that are of public interest. The RIR provides an overview of the problems, policy objectives, and anticipated impacts of regulatory actions. The regulatory philosophy of E.O. 12866 is reflected in the following statement:

*In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages, distributive impacts; and equity), unless a statute requires another regulatory approach.*

The proposed action would establish an annual catch limit (ACLs), annual catch target (ACT), and accountability measures (AMs) for Kona crab in the U.S. Exclusive Economic Zone around the main Hawaiian Islands (MHI) for fishing years 2020, 2021, 2022, and 2023.

#### 2. Problem Statement and Management Objective

The purpose of this action is to comply with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act and the Fishery Ecosystem Plan for the Hawaii Archipelago. Specifically, the action would implement ACLs for the fishery. The need for this action is to prevent overfishing and to provide for long-term sustainability of the fishery, while allowing fishery participants to continue to benefit from their utilization. AMs are needed to reduce the potential of exceeding an ACL and are used to correct or mitigate overages of the ACL should they occur.

### **3. Description of the MHI Kona Crab Fishery**

The number of fishermen reporting catch of Kona crab in Hawaii has generally declined over the past two decades. In the last five years, 25 or fewer commercial fishermen reported catching Kona crab each year, with more than half of Kona crab caught in Federal waters. From 2014 to 2019, an average of 23 commercial fishermen caught an average of 2,960 lb of Kona crab per year with number of trips across the fleet averaging 58 per year. In general, over the past decade, fishermen sold about half of the Kona crab caught, ranging from 7% of catch sold in 2016 to 88% sold in 2012.

More detail on the fishery can be found in Section 3.2 of the Environmental Assessment (EA), which evaluates the potential effects of specifying ACL and AMs for the 2020-2023 fishing years.

### **4. Description of the Alternatives**

#### **4.1 Alternative 1: No ACL and AM Management (No Action Alternative)**

Under Alternative 1, NMFS would not specify an ACL for the fishery for 2020-2023 fishing years and there would be no AMs. This Alternative would not be consistent with the Magnuson-Stevens Act requirements or the provisions of the Hawaii FEP, which require NMFS to specify an ACL and AMs for all stocks and stock complexes, and is considered as part of the no management action baseline required under NEPA because the previous 2019 ACL specification ended on December 31, 2019.

#### **4.2 Alternative 2: Specify the ACL of 3,500 lb (Status quo Alternative)**

Under Alternative 2, NMFS would specify an ACL of 3,500 lb for the 2020 - 2023 fishing years. As a post-season AM, NMFS and the Council will evaluate the catch after each fishing year to determine if the average catch of the three most recent years exceeds the ACL. If it does, the Council would recommend a reduction of the ACL of that fishery in the subsequent year equal to the amount of the overage.

#### **4.3 Alternative 3: Specify an ACL of 30,802 lb and set an ACT of 28,324 lb**

Under Alternative 3, NMFS would specify an ACL of 30,802 lb and set an ACT of 28,324 lb for the fishing years 2020-2023. NMFS and the Council would continue to monitor catches based on all available sources of information and if catch is projected to exceed the ACT then NMFS would implement an in-season closure of the commercial and non-commercial fisheries for MHI Kona crab in Federal waters as an AM. As a post-season AM, in the event that the fishery does not close in time and the catch exceeds the ACL, NMFS would reduce the ACL in the next fishing year by the amount of the overage and would make an adjustment to the ACT as well.

#### **4.4 Alternative 4: Specify an ACL of 30,802 lb and set an ACT at 25,491 lb (Council-preferred Alternative)**

Under Alternative 4, NMFS would specify an ACL of 30,802 lb and an ACT of 25,491 lb for the fishing years 2020-2023. NMFS and the Council would continue to monitor catches based on all available sources of information and if catch is projected to exceed the ACT then NMFS would implement a closure of the commercial and non-commercial fisheries for Kona crab in Federal



waters as an AM. As a post-season AM, in the event that the fishery does not close in time and the catch exceeds the ACL, NMFS would reduce the ACL in the next fishing year by the amount of the overage and would make an adjustment to the ACT as well.

#### **4.5 Alternative 5: Specify an ACL of 30,802 lb and set an ACT at 21,243 lb**

Under Alternative 5, NMFS would specify an ACL of 30,802 lb and set an ACT of 21,243 lb for the fishing years 2020-2023. NMFS and the Council would continue to monitor catches based on all available sources of information and if catch is projected to exceed the ACT then NMFS would implement a closure of the commercial and non-commercial fisheries for Kona crab in Federal waters as an AM. As a post-season AM, in the event that the fishery does not close in time and the catch exceeds the ACL, NMFS would reduce the ACL in the next fishing year by the amount of the overage and would make an adjustment to the ACT as well.

### **5. Analysis of Alternatives**

This section describes potential economic effects of alternatives that were considered and evaluates the impacts of the action alternatives 2-5.

#### **5.1 Alternative 1: No ACL and AM Management (No Action Alternative)**

Under this Alternative, not specifying an ACL or AM would likely result in catch during the 2020-2023 fishing season similar to recent years because the fishery had not been constrained by catch limits in recent years. Alternative 1 is not expected to result in large changes to the conduct of the fishery, including gear types used, areas fished, level of catch or effort, target and non-target stocks, or protected species, markets, or the fishing community.

Under the no-action alternative, the fishery would not be managed using ACLs, AMs would not be needed, fishing would continue unconstrained, and the fishery would be monitored by HDAR, NMFS, and the Council. Even without an ACL the fishery is not likely to experience an expansion with new participants. Given the offshore fishing grounds, it would take a significant financial investment to become active in the fishery if fisherman did not already own a vessel. Specialized gear would need to be purchased to participate in the fishery. Additionally, the fishery would still be required to discard female and undersized crabs. Therefore, we expect participation and catch to remain similar as seen in recent years.

If the fishery caught an amount similar to the highest level of catch in the past decade (10,609 lb in 2011), it would generate a potential catch value of \$78,718, based on the 2019 average price of \$7.42 per lb. If fishery reflected more recent catch patterns, averaging 3,316 lb from 2017-2019, the value of catch would be closer to \$37,000. The actual revenues earned from catch is expected to be lower because, between 2017 and 2019, the portion sold ranged from 43-57%.

Alternative 1 may reduce administrative costs slightly relative to the action alternatives because without an ACL, NMFS would not need to monitor catch in near real time. Also, there would be no administrative cost associated with closing the fishery under the No Action and Status Quo Alternatives. Also under these alternatives, enforcement would not be needed to enforce a fishery closure, although enforcement would be required to support compliance and other regulations.

## **5.2 Alternative 2: Specify the ACL of 3,500 lb (Status quo Alternative)**

Alternative 2 specifies the same ACL implemented for 2017 and 2019 (NMFS did not implement an ACL for Kona crab in 2018). Alternative 2 is not expected to result in large changes to the conduct of the fishery, including gear types used, areas fished, level of catch or effort, markets, or the fishing community. This expectation is based on the fishery not having been constrained by catch limits in recent years, including 2017 and 2019 when this ACL was in place. However, if catches were to increase to levels seen in 2008 - 2013 when the fishery caught an average of 10,072 lb annually, there is a potential for the fishery to see a three-year average that reaches or exceeds 3,500 lb.

If the fleet caught the full ACL of Kona crab, it would generate a potential catch value of \$25,970, based on the 2019 average price of \$7.42 per lb. The actual revenues earned from catch is expected to be lower, since between 2017 and 2019, the portion sold ranged from 43-57%. This alternative may potentially yield the lowest revenue from Kona crab landings fleetwide compared to the status quo or action alternatives. Furthermore, as it is likely that sales of Kona crab is a method of cost recovery for fishery, rather than a constant source of revenue, this alternative could slightly limit those opportunities for cost recovery, compared to the no action, or all other action alternatives.

Administrative costs under Alternative 2 may be higher relative to those of the other action alternatives because in addition to the need for monitoring catch in near real time, there is greater likelihood of having to enforce a fishery closure.

## **5.3 Alternative 3: Specify an ACL of 30,802 lb and set an ACT of 28,324 lb**

Alternative 3 would allow for a higher risk of overfishing than the status quo alternative (Alternative 2), Alternative 4 or Alternative 5 because of the higher ACT; but the risk of overfishing would be less than the no action alternative (Alternative 1). However, the fishery is not likely to reach the ACT, given recent fishery performance. Even if the fishery performs close to the highest recent catch of 13,153 lb during the 2008 fishing year, the fishery would still remain open without the need for AMs.

Alternative 3 is not expected to result in changes in the conduct of the fishery over recent years, including gear types used, areas fished, level of catch or effort, markets, or the fishing community. Specifying a significantly higher ACL than was implemented in recent years is not expected to result in an expansion of the fishery. Given the offshore fishing grounds, it would take a significant financial investment to become active in the fishery if fisherman did not already own a vessel. Fishermen would need to purchase specialized gear to participate in the fishery, and they are still required to discard female and undersized crabs under State of Hawaii regulations, all of which limits interest and viability of the fishery. As a result, participation would likely remain relatively low while catches to continue as they have in recent years. Therefore, the effects on fishery participants is expected to be similar to Alternative 1.

Management costs under Alternative 3 are expected to be a higher than Alternative 1, potentially lower than Alternative 2, and comparable for Alternatives 4 and 5. If the catch exceeds the ACT, the resulting fishery closure would incur administrative and enforcement costs. However, given recent catch history, the fishery is unlikely to reach the ACT associated with Alternatives 3, 4, or 5.

#### **5.4 Alternative 4: Specify an ACL of 30,802 lb and set an ACT at 25,491 lb (Council-preferred Alternative)**

Alternative 4 is similar to Alternative 3 with a slightly lower ACT. The effects on the fishery, markets and fishing community, as well as management costs, are expected to be similar as well.

#### **5.5 Alternative 5: Specify an ACL of 30,802 lb and set an ACT at 21,243 lb**

Alternative 5 is similar to Alternatives 3 and 4 except with a lower ACT. The effects on the fishery, markets and fishing community, as well as management costs, are expected to be similar as well.

#### **5.6 Determination of Significant Regulatory Action**

Pursuant to E.O. 12866, a regulation is considered a “significant regulatory action” if it is expected to result in: (1) an annual effect 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 governments 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 or 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 this executive order. Based on the information provided above, this regulatory action was determined to not be economically significant for the purposes of E.O. 12866.