Proposed Rebuilding Plan for the Guam Bottomfish Fishery

Including a Draft Environmental Assessment and Regulatory Impact Review

(RTID 0648-xxxx)

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Abstract

The National Marine Fisheries Service (NMFS) proposes to implement a rebuilding plan for the bottomfish multi-species stock complex in Guam. The Western Pacific Regional Fishery Management Council (Council) developed the rebuilding plan in coordination with NMFS, the Guam Division of Aquatic and Wildlife Resources (DAWR), fishermen, and other interested and affected parties. The Council initiated development of the rebuilding plan due to new information about the Guam bottomfish fishery from the 2019 benchmark stock assessment (Langseth et al. 2019) that found the bottomfish stock complex is overfished, but not subject to overfishing. NMFS adopted the findings of the assessment and determined the stock was overfished, and so notified the Council in February 2020 (85 FR 26940, May 6, 2020).

When NMFS determines that a fishery is overfished or experiencing overfishing, section 304(e) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and implementing regulations at 50 CFR 600.310(j) require the Council to develop a long-term plan to end overfishing and rebuild the stock. The Magnuson-Stevens Act also requires that NMFS implement the rebuilding plan within two years of the determination that a fishery is in an overfished condition or in experiencing overfishing. The Council should submit the rebuilding plan to NMFS within 15 months of the notification of overfishing or an overfished determination to allow sufficient time for NMFS to implement the plan. The rebuilding plan must specify a time for rebuilding that is as short as possible, accounting for the status of the biology of the affected stock(s), the needs of the fishing communities, and the interaction of the stock with the marine ecosystem.

On February 10, 2020, NMFS notified the Council of its determination that the Guam bottomfish fishery, which is managed under the Mariana Archipelago Fishery Ecosystem Plan (FEP), is overfished but not experiencing overfishing based on the results of the most recent benchmark stock assessment for the fishery (Langseth et al. 2019). The NMFS Pacific Islands Fisheries Science Center (PIFSC) produced the stock assessment using data through 2017 on the Guam multi-species bottomfish complex comprised of bottomfish management unit species (BMUS). After notification by NMFS, the Council began developing the rebuilding plan. At its 181st meeting in Honolulu, Hawaii on March 10-12, 2020, the Council recommended ACL of 27,000 pounds (lb) for 2020 through 2022 for the Guam bottomfish fishery. NMFS implemented the 2020 to 2022 ACLs on xxxx.

NMFS PIFSC produced biomass projections for the Guam bottomfish stock complex subject to various amounts of annual catch, assuming the fishery would harvest the full amount of each catch level annually, using the time series of Guam bottomfish catch in the 2019 benchmark stock assessment and additional catch data from the Council's annual Stock Assessment and Fishery Evaluation (SAFE) report. The projections indicate that annual catch of 27,000 lb of bottomfish annually would allow the Guam BMUS stock complex to rebuild biomass to maximum sustainable yield (B_{MSY}) within eight years. Consistent with this information, the Council proposes an ACL of 27,000 lb of bottomfish for Guam starting in 2022 until the stock complex is rebuilt to B_{MSY}. As an in-season AM, NMFS would evaluate available catch information on a monthly basis during the fishing year and close the fishery in Federal waters when the fishery is projected to attain the ACL, or immediately if the ACL is determined to have already exceeded the ACL.As an additional performance standard, if the ACL is exceeded during

any fishing year over the course of the rebuilding plan, NMFS would close the fishery in Federal waters until a coordinated management approach is developed that ensures catch in both Federal and territorial waters can be maintained at levels that allow the stock to rebuild. NMFS and the Council would review and amend the rebuilding plan as necessary using the best scientific information available to allow the reopening of the fishery in Federal waters consistent with rebuilding requirements specified under National Standard 1 of the Magnuson-Stevens Act such that a reasonable method of restricting fishing mortality at the level needed to rebuild in the target timeframe is implemented. Additionally, consistent with section 304(e)(7) of the Magnuson-Stevens Act, NMFS will review the rebuilding plan every two years to ensure that adequate progress is being made toward rebuilding the bottomfish stock complex around Guam.

The proposed rebuilding plan would be in effect from January 1, 2022 until the stock complex has rebuilt to its B_{MSY}. Under existing management in accordance with the *Fishery Ecosystem Plan for the Mariana Archipelago*, as amended (Mariana Archipelago FEP), the fishing year for bottomfish in Guam begins January 1 and ends December 31. The catch projections generated by PIFSC utilize annual catch according to this time frame to project biomass for each fishing year. NMFS would count bottomfish catches from both territorial waters (generally from the shoreline to 3 nautical miles offshore) and Federal waters (the Exclusive Economic Zone) around Guam towards the ACL. NMFS will provide the public an opportunity to provide input and comment on this draft environmental assessment (EA) and the proposed rule when the proposed rule is published in the *Federal Register*.

NMFS and the Council considered a range of alternative management measures, consistent with Magnuson-Stevens Act requirements, to comprise the rebuilding plan, and this draft EA was prepared to evaluate the potential environmental effects of the proposed action. The draft EA includes a description of the information and methods used by NMFS and the Council to develop the proposed management measures, and alternatives to these measures. The analysis in the draft EA indicates that the proposed ACL and AMs would not result in large beneficial or adverse effects on target species, non-target species, bycatch species, protected species, marine habitats, or fishing communities relative to the status quo. NMFS and the Council expect this result because the proposed Federal action is intended to adjust authorized catch levels to allow the stock complex to rebuild while mitigating short-term economic and social impacts to the local fishing community.

How to Comment

NMFS is seeking public comment on the draft EA for the rebuilding plan and Regulatory Impact Review. The reader may find instructions on how to comment and obtain a copy of this draft EA and proposed temporary rule by searching on RIN 0648-xxxx at www.regulations.gov, or by contacting the responsible officials at one of the above addresses.

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LIST OF ACRONYMS AND ABBREVIATIONS

ABC – Acceptable Biological Catch
ACL – Annual Catch Limit
ACT – Annual Catch Target
AM – Accountability Measure
B – Biomass
B_{MSY} – Biomass at Maximum Sustainable Yield
BMUS – Bottomfish Management Unit Species
BSIA – Best Scientific Information Available
CFR – Code of Federal Regulations
CNMI – Commonwealth of the Northern Mariana Islands
CV – Coefficient of Variation
DAWR – Guam Division of Aquatic and Wildlife Resources
DPS – Distinct Population Segment
EA – Environmental Assessment
ECS – Ecosystem Component Species
EEZ – Exclusive Economic Zone
EFH – Essential Fish Habitat
ESA – Endangered Species Act
F – Fishing Mortality
F_{MSY} – Fishing Mortality at Maximum Sustainable Yield
$F_{rebuild}$ – Fishing Mortality associated with achieving T_{target}
FEP – Fishery Ecosystem Plan
fm – Fathoms
FMP – Fishery Management Plan
FONSI – Finding of No Significant Impact
FQ – FONSI Question
FR – Federal Register
ft – Feet
GCA – Guam Code Annotated
GPS – Global Positioning System
H – Harvest Rate
H_{CR} – Harvest Rate associated with overfishing as determined by the Harvest Control Rule
HAPC – Habitats of Particular Concern
lb – Pounds
LOF – List of Fisheries
M – Natural Mortality
MFMT – Maximum Fishing Mortality Threshold
MMPA – Marine Mammal Protection Act
MPA – Marine Protected Area
Magnuson-Stevens Act – Magnuson-Stevens Fishery Conservation and Management Act
MSST – Minimum Stock Size Threshold
MSY – Maximum Sustainable Yield
MUS – Management Unit Species
NA – Not Applicable

NEPA – National Environmental Policy Act
nm – Nautical Miles
NMFS – National Marine Fisheries Service
NOAA – National Oceanic and Atmospheric Administration
OFL – Overfishing Limit
OLE – Office of Law Enforcement
P* – Probability or Risk of Overfishing
PIFSC – Pacific Islands Fisheries Science Center
PIRO – Pacific Islands Regional Office
RIN – Regulatory Identification Number
RIR – Regulatory Impact Review
SAFE report – Stock Assessment and Fishery Evaluation report
SAP – Stock Assessment Program (PIFSC)
SDC – Status Determination Criteria
SEEM – Social, Economic, and Ecological Considerations, or Management Uncertainty
SSC – Scientific and Statistical Committee
T_{max} – Maximum time for rebuilding a stock or stock complex
T_{min} – Minimum time for rebuilding a stock or stock complex
T_{target} – Specified time period for rebuilding a stock or stock complex
USCG – U.S. Coast Guard
USFWS – U.S. Fish and Wildlife Service
WPacFIN – Western Pacific Fisheries Information Network
WPRFMC (or Council) – Western Pacific Regional Fishery Management Council
WPSAR – Western Pacific Stock Assessment Review

1 INTRODUCTION

1.1 Background Information

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) established the Western Pacific Fishery Management Council (Council) in 1976 to develop management plans for fisheries within the United States Fishery Conservation Zone around Hawaii, U.S. Pacific territories, commonwealth, and possessions of the United States in the Pacific Ocean. From the late 1970's through 2009, the Council managed fisheries throughout the Western Pacific Region under separate taxonomic-based fishery management plans (FMPs), including the Bottomfish and Seamount Groundfish FMP (WPRFMC 1986). These FMPs were reorganized into archipelagic fishery ecosystem plans (FEPs) in 2009, including the FEP for the Mariana Archipelago (WPRFMC 2009).

The bottomfish fishery in Guam (hereafter, the fishery) primarily harvests bottomfish management unit species (BMUS), an assemblage or complex of species that include emperors, snappers, groupers, and jacks (Table 1). As authorized by the Magnuson-Stevens Act, the National Marine Fisheries Service (NMFS) and the Council manage the BMUS fishery in Federal waters (i.e., the U.S. Exclusive Economic Zone, or EEZ) around Guam in accordance with the Mariana Archipelago FEP, as amended, and implementing regulations at Title 50 Code of Federal Regulations, Part 665 (50 CFR 665). The Mariana Archipelago FEP and amendments are available at the Council's website.

Table 1. List of BMUS in Guam.

Scientific Name	Common Name(s)	Family
Aphareus rutilans	Red snapper, silvermouth, lehi	Lutjanidae
Caranx ignobilis	Giant trevally, jack	Carangidae
Caranx lugubris	Black trevally, jack	Carangidae
Etelis carbunculus	Red snapper, ehu	Lutjanidae
Etelis coruscans	Red snapper, onaga	Lutjanidae
Lethrinus rubrioperculatus	Redgill emperor	Lethrinidae
Lutjanus kasmira	Blueline snapper	Lutjanidae
Pristipomoides auricilla	Yellowtail snapper	Lutjanidae
Pristipomoides filamentosus	Pink snapper, paka	Lutjanidae
Pristipomoides flavipinnis	Yelloweye snapper	Lutjanidae
Pristipomoides sieboldii	Pink snapper, kalekale	Lutjanidae
Pristipomoides zonatus	Flower snapper, gindai	Lutjanidae
Variola louti	Lunartail grouper, lyretail grouper	Serranidae

The Council began managing the Guam bottomfish fishery in 1986. In the 1980s and 1990s, the fishery was defined by seasonal and small-scale commercial, subsistence, and recreational fishing (Allen and Bartram 2008). Since then, BMUS catch in the fishery continues to vary year to year, ranging from approximately 15,000 pounds (lb) to nearly 60,000 lb; however, total bottomfish catch (i.e., inclusive of all bottomfish species) was as high as nearly 130,000 lb in 1996 (WPRFMC 2020a). Allen and Bartram (2008) also note that the high variability observed

in catches is due to high liners entering and exiting the fishery. Currently, the Guam bottomfish fishery is still active, consisting mostly of vessels less than 25 feet (ft) in length fishing for recreational or subsistence purposes and primarily targeting shallow-water bottomfish species. Commercial vessels tend to be larger and concentrate their effort on the deepwater bottomfish complex (Allen and Bartram 2008; WPRFMC 2020a). The fishery continues to provide subsistence and cultural value for Guam communities.

Since 2012, the Council and NMFS have managed the Guam bottomfish fishery with annual catch limits (ACLs) and accountability measures (AMs) for the BMUS. The Council and NMFS designed the ACLs and AMs to prevent overfishing and ensure the fishery was sustainably managed (see WPRFMC 2011). The Guam bottomfish fishery has not attained or exceeded the ACL in any prior year, and up until the most recent stock assessment in 2019, the fishery was considered to be harvesting BMUS sustainably (Yau et al. 2016; NMFS 2017).

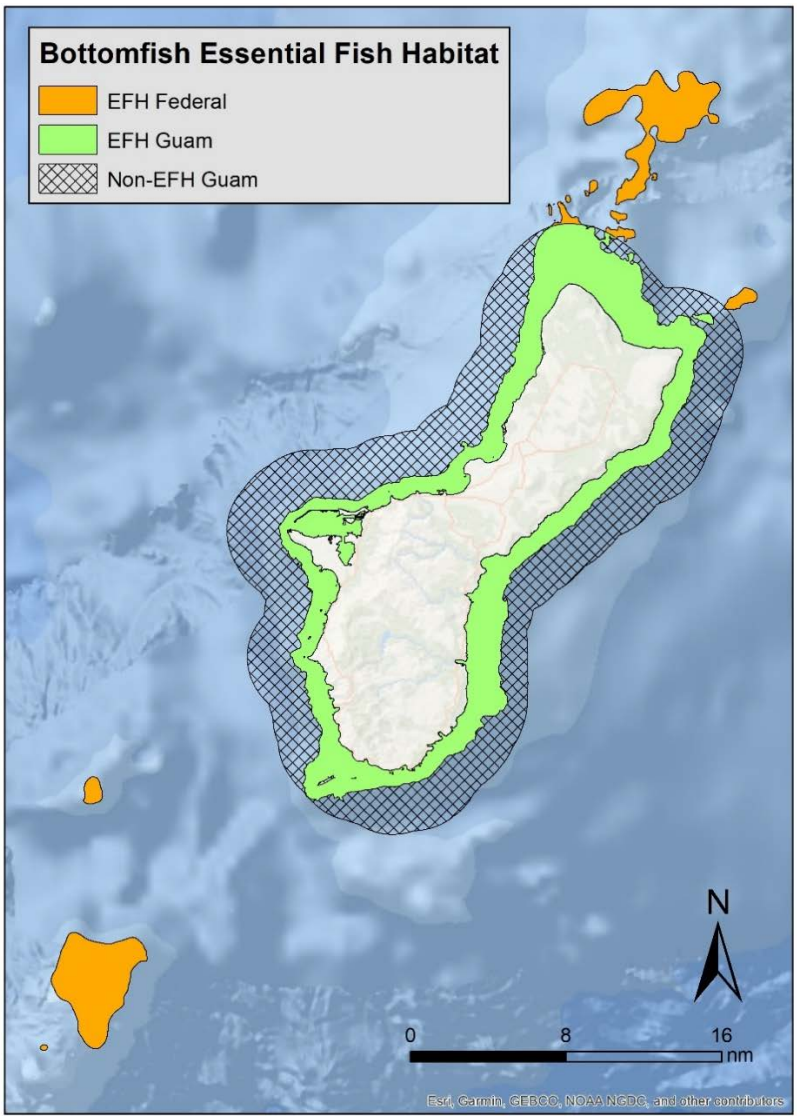

Figure 1. Map of Essential Fish Habitat (EFH) for bottomfish around Guam in Federal and territorial waters.
(Source: NMFS Pacific Islands Regional Office, or PIRO)

The Magnuson-Stevens Act defines EFH as waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity, so bottomfish EFH is analogous to bottomfish habitat where BMUS species may occur for the purposes of this rebuilding plan. Bottomfish habitat exists in both Federal and territorial waters (Figure 1), and while many smaller recreational and subsistence vessels harvest shallow species nearshore, other recreational and larger commercial vessels target fish at the offshore banks (Brodziak et al. 2012). Off-shore banks are primarily deepwater habitat where red snappers (e.g., *Pristipomoides* spp. and *Etelis* spp.), rather than reef-associated bottomfish (e.g., *Lutjanus* spp. and *Lethrinus* spp.), are caught. Catch from both territorial waters (generally, 0–3 nautical miles, nm, from shore) and Federal waters (the EEZ) is counted towards the ACL. As shown in Figure 1, the majority of bottomfish habitat is in territorial waters (73.6 percent), and the rest is in the Federal waters located both to the northeast and southwest of Guam (26.4 percent). Due to incomplete data, the analysis of bottomfish habitat around Guam may exclude some of the smaller offshore banks and fishing grounds targeted by the Guam bottomfish fishery; however, this conservative estimate represents the best information currently available. Existing data reporting systems do not provide quantitative estimates of how much bottomfish catch comes from territorial versus Federal waters, and it is currently not possible to estimate catch of individual species from specific banks or fishing grounds.

1.2 Stock Assessment Findings and Implications

In August 2019, the NMFS Pacific Islands Fisheries Science Center (PIFSC) completed a new benchmark stock assessment for the bottomfish fisheries of Guam, the Commonwealth of the Northern Mariana Islands (CNMI), and American Samoa (Langseth et al. 2019). The assessment is a benchmark, indicating that PIFSC re-evaluated all components of the assessment analyses and made several changes relative to previous assessments of the bottomfish fisheries. The assessment revealed that the Guam bottomfish stock complex is overfished, but is not subject to overfishing, based on the stock status determination criteria (SDC) specified in the Mariana Archipelago FEP (WPRFMC 2009). This is the first assessment that indicated the stock is overfished.

The 2019 benchmark stock assessment analysis differed from previous assessments in several ways. The assessment included additional years of fishing and catch data, used new species lists[1], filtered catch data based on gear, standardized the catch per unit effort for covariates that could affect the catch rate, and applied a Bayesian state space surplus production model[2] (Langseth et al. 2019). Based on information contained in the 2019 assessment (Table 2), the average catch of Guam BMUS for the most recent five-year period of data (2013 to 2017) was 21,677 lb. These numbers included catch of BMUS reported at the species level, plus an estimate of BMUS catch reported under more general categories (e.g., snapper, emperor, deep bottomfish). While estimated total catch data for 2018 and 2019 are available in the Council's

[1] On February 8, 2019, NMFS implemented the Council's recommendation to modify the lists of species in American Samoa, the CNMI, Guam, and Hawaii that are included as BMUS (84 FR 2767). Some species were reclassified as ecosystem component species (ECS) because they were not targeted, were a minor component of the fishery, and were not in need of management. The 2019 stock assessment analyzed the revised stock complexes. In Guam, this reduced the number of species in the stock complex from 17 to 13 (Table 1).

[2] This type of fishery production model is used to assess the biomass and exploitation level of marine populations in situations where age and size information are unavailable. It assumes that population growth, which translates to yield or production, is greatest at an intermediate level of biomass. The excess production at this point is the maximum sustainable yield.

Stock Assessment and Fishery Evaluation (SAFE) Report for the Mariana Archipelago (WPRFMC 2020a), they are not directly comparable to the stock assessment time series. The assessment information estimated the long-term maximum sustainable yield (MSY) in the fishery at an annual catch of 42,100 lb (Table 3). However, the projection values for overfishing probability from 2020 through 2025 (i.e., through the terminal year of the assessment) show that the level of catch associated with a 50 percent probability of overfishing is 36,000 lb of BMUS annually (see Table 16 in Langseth et al. 2019). Therefore, to prevent overfishing in the fishery, the 2019 assessment projection results indicate total catch of BMUS in Guam must be limited to no more than 36,000 lb in each calendar year. This overfishing limit (OFL) is currently much lower than the MSY because the most recent biomass (B) estimates are lower than the biomass needed to produce MSY (i.e., $B_{2017}/B_{MSY} = 0.57$; see Table 23 in Langseth et al. 2019).

PIFSC presented the stock assessment findings to the Council at its 180th meeting on October 22-24, 2019 in Pago Pago, American Samoa (84 FR 53685, October 8, 2019), which showed that BMUS in Guam are overfished but not experiencing overfishing. As required under National Standard 2 of the Magnuson-Stevens Act (50 CFR 600.315), an independent review by a panel of independent fishery science experts (i.e., a Western Pacific Stock Assessment Review, or WPSAR) reviewed the stock assessment and concurred that the changes to the assessment process were appropriate, improved on the previous assessments, and provided scientifically sound management advice (Martell et al. 2019). The Council's Scientific and Statistical Committee (SSC) received the WPSAR panel reports and the peer-reviewed benchmark stock assessment at its 134th meeting on October 15-17, 2019 in Honolulu, Hawaii. Though the SSC expressed its concerns regarding uncertainties with the data used for the stock assessment, it endorsed the assessment for management purposes.

Table 2. Catch of Guam BMUS from 2000 to 2017 used in the new benchmark stock assessment (Langseth et al. 2019).

Year	BMUS Catch (lb)
2000	66,447
2001	46,427
2002	21,727
2003	29,835
2004	25,236
2005	29,046
2006	34,917
2007	18,186
2008	34,249
2009	40,735
2010	26,544
2011	54,062
2012	19,714
2013	30,243
2014	20,554
2015	11,711
2016	30,192

Year	BMUS Catch (lb)
2017	15,684
Recent (five-year) Average	**21,677**

(Source: Langseth et al. 2019)

On January 10, 2020, PIFSC sent a memorandum to the Council stating that NMFS determined the 2019 benchmark stock assessment to be the best scientific information available (BSIA) consistent with National Standard 2. On February 6, 2020, NMFS determined that the Guam Samoa bottomfish stock is overfished but not subject to overfishing. On February 10, 2020, PIRO issued a notification informing the Council of this determination, which included the basis for the change in stock status and outlined the obligations of the Council to take immediate action to implement a plan to rebuild the stock within two years as stipulated by the Magnuson-Stevens Act.

At its 180th meeting in Pago Pago, American Samoa, the Council noted concerns that the precipitously lower OFL in the 2019 stock assessment will severely limit the bottomfish fishery in Guam as well as hamper fishery development aspirations by impacting the approval of bottomfish fishery-related projects using Federal funding. At its 181st meeting on March 9- 12, 2020, held in Honolulu, Hawaii, the Council deliberated on the specification of the ACL for fishing years 2020-2023 for the Guam bottomfish fishery. However, given that the Council must take action by February 2022 to rebuild the stock complex, the Executive Director and the Council Chair, under authority granted by the Council, deemed only that portion of the Council action that sets ACLs for 2020-2022. Using information from the new benchmark stock assessment, its Risk of Overfishing Analysis (P*) working group, and its Social, Economic, and Ecological Considerations, or Management (SEEM) Uncertainty working group, the Council ultimately recommended that the ACL for the fishery be implemented equal to the ABC at 27,000 lb at a 31 percent risk of overfishing. The Council noted that this level of catch would allow harvest to be maximized while preventing overfishing and allowing the Guam bottomfish stock to rebuild with a 50 percent chance of catch not exceeding the ACL. A downward adjustment, post-season accountability measure also was recommended by the Council, where the ACL for the subsequent year will be reduced by the amount of overage from the recent three-year average catch relative to the ACL for the fishery. NMFS and the Council analyzed the 2020-2022 Guam ACL under [insert federal register notice for Marianas ACL final rule].

At the Council's 138th SSC meeting held virtually on November 30 to December 1, 2020, the SSC deliberated on providing a recommendation to the Council for the provisions of the rebuilding plan for the Guam bottomfish fishery. The SSC members noted the trade-offs present between the various alternatives, and recommended that the Council either select Alternative 2, which would allow rebuilding in a relatively shorter amount of time, or Alternative 4, which would promote rebuilding in a relatively longer time frame but with a lower chance that catch would exceed the ACL and cause rebuilding to be delayed. At the 184th Council meeting also held virtually in December 2020, the Council took initial action and recommended: implementing a rebuilding plan for the Guam bottomfish fishery with an ACL of 31,000 lb, an in-season AM to close the fishery if the ACL is projected to be reached, and a post-season AM to reduce the ACL of subsequent years by the amount of overage from a three-year running average of catch if the ACL is exceeded. The Council noted that selecting a higher ACL and potentially

prolonging the rebuilding timeframe would be preferable to recommending a lower ACL with a higher likelihood of being exceeded, which would also delay rebuilding. However, Alternative 4, which would implement an ACL of 31,000 lb alongside AMs, has since been removed from the EA due new biomass projections from PIFSC that indicate the timeline associated with rebuilding under the alternative does not coincide with statutory requirements, and the post-season AM has been removed from each of the action alternatives due to its inability to address the operational issues in the fishery that would cause the exceedance of the ACL (see Section 2.7.6).

1.3 Magnuson-Stevens Act Criteria for Rebuilding Overfished Fisheries

Pursuant to Section 304(e)(2) of the Magnuson-Stevens Act and implementing regulations at 50 CFR 600.310(j)(1), if the Secretary of Commerce (Secretary) determines at any time that a fishery is overfished, overfishing is occurring, or a stock is approaching an overfished condition, the Secretary shall immediately notify the Council and request that action be taken to end overfishing in the fishery and to implement conservation and management measures to rebuild the impacted fish stocks. As required by Magnuson-Stevens Act section 304(e)(3) and implementing regulations at 50 CFR 600.310(j)(2), upon notification of a stock undergoing overfishing, the Council should immediately begin working with its SSC to ensure that the Acceptable Biological Catch (ABC) is set appropriately to end overfishing. The Council must prepare and implement a FMP, plan amendment, or proposed regulations for the fishery within two years to end overfishing and rebuild affected stocks. Council actions should also be submitted to NMFS within 15 months of the initial notification to ensure there is sufficient time to enact the measures. If the Council does not submit one of these items to the Secretary within two years, the Secretary will prepare an FMP or plan amendment and any accompanying regulations to stop overfishing and rebuild affected stocks of fish within nine months as indicated by Magnuson-Stevens Act section 304(e)(5).

Section 304(e)(4) of the Magnuson-Stevens Act and implementing regulations at 50 CFR 600.310(j)(3) state that any FMP, plan amendment, or proposed regulation prepared by a Council pursuant to Magnuson-Stevens Act section 304(e)(3) or 304(e)(5) must specify a time for rebuilding the fishery that is as short as possible and does not exceed 10 years, taking into account the status and biology of the overfished stocks, the needs of the fishing communities, and the interaction of the stock with the marine ecosystem. The minimum time for rebuilding a stock (T_{min}) is the amount of time the stock is expected to take to rebuild to its biomass at MSY (B_{MSY}) in the absence of any fishing mortality, where "expected" refers to a 50 percent chance of attaining B_{MSY} and T_{min} is calculated from the first year the rebuilding plan is likely to be implemented. If T_{min} is less than 10 years, then the maximum time for rebuilding a stock to its B_{MSY} (T_{max}) is 10 years. If T_{min} exceeds 10 years, then T_{max} can be calculated with one of the following methods:

i. T_{min} plus the length of time associated with one generation time for the stock, where "generation time" is the average length of time between when an individual is born and the birth of its offspring;
ii. The amount of time the stock is expected to take to rebuild to B_{MSY} if fished at 75 percent of the Maximum Fishing Mortality Threshold (MFMT); or
iii. T_{min} multiplied by two.

When T_{min} exceeds 10 years, T_{max} is the maximum time for rebuilding linked to the biology of the stock. A Council and its SSC should consider all relevant biological data and its uncertainties when selecting a method for determining T_{max}, and rationale must be provided for the decisions based on BSIA. The target time to rebuild a stock (T_{target}) is the specified time for rebuilding the stock that is considered to be as short a time as possible and cannot exceed T_{max}, and the fishing mortality (F) associated with achieving T_{target} is known as $F_{rebuild}$.

Additionally, pursuant to Section 304(e)(4) of the Magnuson-Stevens Act and implementing regulations at 50 CFR 600.310(j)(3), the action prepared to end overfishing and rebuild a stock must allocate both overfishing restrictions and recovery benefits fairly and equitably among sectors of the fishery and, for a fishery managed under an international agreement, reflect traditional participation in the fishery, relative to other nations, by fishermen of the U.S.

As required by Magnuson-Stevens Act section 304(e)(7) and implementing regulations at 50 CFR 600.310(j)(3)(iv), the Secretary will review rebuilding plans at least every two years to determine whether the plan has resulted in adequate progress towards ending overfishing and rebuilding the affected fish stock. The Secretary may find that adequate progress is not being made if $F_{rebuild}$ or the associated ACL is exceeded and AMs are not correcting the operational issue that caused the overage nor addressing any biological consequences to the stock resulting from the overage. A lack of adequate progress may also be found when the rebuilding expectations of a stock are significantly changed due to new and unexpected information about stock status, which will cause the Secretary to notify the Council to develop and implement a new or revised rebuilding plan within two years. Revising rebuilding timeframes or $F_{rebuild}$ is not necessary unless the Secretary determines adequate progress is not being made. If a stock is not rebuilt by T_{max}, then the fishing mortality rate should be maintained at its current $F_{rebuild}$ or 75 percent of the MFMT, whichever is less, until the stock is rebuilt or the fishing mortality rate is changed as a result of the Secretary finding that adequate progress is not being made.

1.4 Proposed Action

Under the proposed action, the Council would submit and NMFS would implement a rebuilding plan for the Guam bottomfish fishery consistent with Magnuson-Stevens Act section 304(e) and implementing regulations at 50 CFR 600.310(j). The action to rebuild the stock must be implemented within two years (i.e., by February 10, 2022) and would remain in effect until such time that the stock complex is determined to have reached its B_{MSY}. The action alternatives for the proposed rebuilding plan would set an ACL for Guam BMUS starting in 2022 with an in-season AM and an additional performance standard. As an in-season AM, if NMFS projects that the ACL would be reached, then Federal waters would be closed to bottomfish fishing at that point or immediately if it is determined the ACL has already been attained. As a performance standard if the ACL is exceeded (consistent with 50 CFR 600.310(g)(7)), NMFS would close the fishery in Federal waters until a coordinated management approach is developed that ensures catch in both Federal and territorial waters can be maintained at levels that allow the stock to rebuild. NMFS and the Council would review and amend the rebuilding plan as necessary using the best scientific information available to allow the reopening of the fishery in Federal waters closed under this provision consistent with rebuilding requirements specified under National Standard 1 of the Magnuson-Stevens Act such that a reasonable method of restricting fishing mortality at the level needed to rebuild in the target timeframe is implemented.

1.5 Purpose and Need

The purpose and need of this proposed action is to implement management measures to rebuild the Guam bottomfish stock complex from its overfished designation consistent with Magnuson-Stevens Act section 304(e)(3) and implementing regulations at 50 CFR 600.310(j)(2).

1.6 Action Area

The fishery management area for the Mariana Archipelago FEP bottomfish fishery in Guam includes the EEZ around the island of Guam. However, the action area also encompasses those areas in which fishing for BMUS occurs in territorial and Federal waters of Guam (Figure 1). Bottomfish fishing takes place in waters from the surface to more than 275 m depth directly around Guam, but also occurs at several offshore banks, including Galvez Bank, 11-Mile Bank, and Santa Rosa Reef. As of June 3, 2013, commercial fishing is prohibited in the Marianas Trench Marine National Monument (78 FR 32996), which is just over 50 nm east of Guam. Additionally, large vessels (i.e., greater than 50 ft in length) are prohibited from fishing for bottomfish in Federal waters within 50 nm around Guam with the intention of maintaining viable participation and bottomfish catches by small vessels of the fishery in the area (71 FR 64474, November 2, 2006). The fishery does not fish in areas closed to fishing around the island of Guam, which include several Federal marine protected areas (MPAs) and territorial marine preserves established by Guam Division of Aquatic and Wildlife Resources (DAWR), though these areas are primarily situated around nearshore reefs that are not targeted for bottomfish.

1.7 List of Preparers

Western Pacific Regional Fishery Management Council
Thomas Remington, Contractor
Marlowe Sabater, Marine Ecosystem Scientist

NMFS PIRO Sustainable Fisheries Division
Sarah Ellgen, Resource Management Specialist

1.8 Public Review Process and Involvement

The Council and its SSC convene several meetings per year, all of which are open to the public. The Council notifies and invites the public to these meetings through notices published in the *Federal Register* and on its website. Public comment, including both oral and written statements, are accepted by the Council on its agenda items for the meeting.

At the Council's 134th SSC meeting on October 15-17, 2019 in Honolulu, Hawaii and the 180th Council meeting on October 22-24, 2019 in Pago Pago, American Samoa, NMFS presented the results of the most recent benchmark stock assessment for the Guam bottomfish multi-species complex (Langseth et al. 2019). Both meetings were open to the public, which was notified through the *Federal Register* (84 FR 53685, October 8, 2019) and the Council's website. Given the location of the 180th Council meeting, public discussion focused on issues associated with the portion of the stock assessment for bottomfish in American Samoa, including concerns that the data from creel surveys and the commercial receipt program used for the stock assessment are not representative of the fishery despite these being the only data available to use in stock assessments.

At the Council's 135th SSC meeting on March 3 to 5, 2020, options were presented for the SSC to set the ABC for bottomfish fisheries in the Mariana Archipelago alongside associated P* and SEEM analyses. The SSC set the ABC for the Guam bottomfish fishery based on these analyses, and no public comments were received at this time. Subsequently, at its 181st meeting held on March 10-12, 2020, the Council received a presentation on the P* and SEEM analyses as well as on alternatives to specify and ACL and AMs for the bottomfish fisheries in the Mariana Archipelago, including Guam. Council members commented on the need for incorporating management uncertainty in the ACL specification and how the new benchmark stock assessment would change the ACL before making their recommendation. No public comments were received at this time. Both meetings were open to the public, which was notified through the *Federal Register* (85 FR 8568, February 14, 2020) and the Council's website.

At the Council's 138th SSC meeting on November 30-December 1, 2020 and the 184th Council meeting on December 2-4, 2020, both of which were held virtually via web conference, Council staff presented preliminary alternatives for parameters to be recommended for implementation in the rebuilding plan for the Guam bottomfish fishery. Both meetings were open to the public, who received notification through the *Federal Register* (85 FR 73029, November 16, 2020) and the Council's website. At the 138th SSC meeting where the SSC deliberated alternatives for the rebuilding plan, discussion between PIFSC staff and the SSC during the public comment period centered on efforts by the PIFSC Stock Assessment Program (SAP) to enhance the utilization of available data and refine assessment methodologies. At the 184th Council meeting where the Council discussed the potential alternatives for implementing a rebuilding plan for the Guam bottomfish fishery, discussion between PIFSC staff and the Council during the public comment period similarly focused on efforts to improve the next benchmark stock assessment, and PIFSC staff encouraged Council members to discern between these efforts and the current action to implement a rebuilding plan. A public comment by a Guam fisherman expressed confusion as to how the Guam bottomfish stock was determined to be overfished, and that the designation would adversely affect Guam fishermen. The fisherman further commented that the creel surveys do not provide adequate data to make such a determination, that stock assessment scientists did not consider the life history of BMUS species to a sufficient extent, and questioned the application of additional management regimes during the COVID pandemic. The public will also be able to submit comments on the proposed rebuilding plan at the 185th Council meeting in March 2021.

NMFS and the Council will also seek public comment on the draft EA, Regulatory Impact Review (RIR), and proposed rebuilding plan. The reader may find instructions on how to comment and obtain a copy of this EA, RIR and proposed rule by searching for Regulatory Identification Number (RIN) 0648-xxxx at www.regulations.gov, or by contacting the responsible official or Council at the above address. NMFS will solicit comments on the action for a 60-day period when the proposed rule is published. Specific dates will be defined in the published rule. NMFS will consider comments received by the deadline listed in the rule when developing the final rule for the proposed rebuilding plan.

2 DESCRIPTION OF ALTERNATIVES AND OVERVIEW OF THE REBUILDING PLAN

2.1 Development of the Alternatives

The Council developed the alternatives considered in this document, pursuant to Magnuson-Stevens Act requirements, in response to the notification by NMFS PIRO that the Guam bottomfish fishery is overfished but not experiencing overfishing. The Council generated five alternatives to evaluate a range of management options from a baseline of no Federal action (Alternative 1) to the maximum Federal action possible (closing the bottomfish fishery in Federal waters, Alternative 4). Alternative 2 would implement an ACL and in-season AM that would close the Guam bottomfish fishery in Federal waters when the annual catch reaches 27,000 lb, which provides an authorized level of catch that would prevent overfishing and rebuild the stock in eight years. Additionally, NMFS would implement a performance standard that would close the fishery in subsequent years after the ACL is reached until a more effective manner of managing catch is implemented, Alternatives 3 would implement ACLs for the bottomfish fishery at 16,299 lb to rebuild the stock in four years with the same AM and performance standard as Alternative 2. Alternative 4 would implement a closure of Federal waters to bottomfish fishing with an authorized catch level that would allow rebuilding in two years. These alternatives are described in detail below.

The initial phase of alternative development and consideration of their effects on the fishery is the comparison of stock status against measures of overfishing and overfished status, which is done in stock assessments performed by PIFSC. Under the Council's FEP for the Mariana Archipelago (WPRFMC 2009), overfishing of bottomfish occurs when the fishing mortality rate (F) exceeds the fishing mortality rate for maximum sustainable yield (F_{MSY}) for one year or more; this is the MFMT and is expressed as a ratio, $F/F_{MSY} = 1.0$. Thus, if the F/F_{MSY} ratio exceeds 1.0 for one year or more, overfishing is occurring. A stock is a considered to be overfished when its biomass (B) declines below the level necessary to produce MSY on a continuing basis (B_{MSY}), which is when $B \leq (1\text{-}M)*B_{MSY}$, where M is the natural mortality of the stock. The benchmark stock assessment defined M for Pacific Island bottomfish complexes as 0.3 (Langseth et al. 2019), so bottomfish stocks become overfished when $B \leq 0.7*B_{MSY}$; this value is known as the minimum stock size threshold (MSST) and may also be expressed as the ratio $B/B_{MSY} = 0.7$. Thus, if the B/B_{MSY} ratio falls below 0.7, the stock complex is considered overfished. If possible, SDC of MFMT and MSST are applied to individual species within the multi-species stock complex. Alternatively, when that is not possible, SDC are applied to indicator species for the multi-species stock complex. Current fishery data does not have the resolution to allow the use of either approach for bottomfish in Guam, therefore the Council and NMFS apply SDC to the entire bottomfish multi-species complex as prescribed in the Mariana Archipelago FEP (WPRFMC 2009). Both the 2015 (Yau et al. 2016) and 2019 (Langseth et al. 2019) stock assessments used the same approach of evaluating bottomfish as a multi-species stock complex.

The process of developing alternatives, generating rebuilding timelines, and analyzing potential impacts incorporates multiple sources from which time series data could be utilized, including both the time series of catch presented in the stock assessment (Langseth et al. 2019) as well as the time series of catch included in the Council's annual SAFE report (WPRFMC 2020a). Here, the Council initially intended to utilize catch history for the fishery based on the time series from

its annual SAFE report (WPRFMC 2020a), which is comprised of creel survey expansion data provided by the NMFS PIFSC using the Western Pacific Fisheries Information Network (WPacFIN) database. While the catch time series from the stock assessment (Langseth et al. 2019) are considered to be BSIA and generally more complete relative to the creel survey data, the time series from the annual SAFE report provides catch estimates through 2019 whereas the stock assessment data has a terminal year of 2017. Additionally, the creel survey expansions provided in the annual SAFE report are the main source of information for fishery monitoring during the rebuilding plan. Thus, the Council determined that the catch history provided in the annual SAFE report provides more recent data and would be consistent with the mechanism used for monitoring the fishery during the rebuilding plan. However, during the development of this rebuilding plan, the PIFSC SAP appended the catch time series available in the stock assessment with estimates of catch for 2018 and 2019. The Council ultimately decided to utilize the new catch data provided by the PIFSC SAP because the stock assessment, and by extension, the data included therein are BSIA, and these data are used to generate the biomass projections and associated rebuilding timelines in this document. While catch estimates for 2020 are available from the creel survey expansions at the time this document is finalized, the presented outcome and impact analyses only consider data through 2019.

Alternatives 1 and 2

Development of the ACL under Alternatives 1 and 2 began with estimation of the OFL for the Guam bottomfish fishery from the benchmark stock assessment (see Section 2.1.1.1). The Council's SSC accepted the benchmark stock assessment (Langseth et al. 2019) as BSIA at its 134th meeting in October 2019 and recommended the Council convene its P* and SEEM working groups. The Council held a P* working group on January 31, 2020, to quantify the scientific uncertainty associated with the stock assessment and lower the MSY-based OFL to specify the Acceptable Biological Catch (ABC). The P* working group determined a total reduction score of 19 percent, meaning that the highest risk level that the Guam bottomfish fishery can be managed at is a 31 percent risk of overfishing (WPRFMC 2020b). Also, on January 31, 2020, the Council held a SEEM working group meeting, where it was determined that the ACL for the Guam bottomfish fishery should be set equal to the ABC (WPRFMC 2020c). The SEEM working group acknowledged the socioeconomic importance of the bottomfish fishery to Guam fishing communities and noted that any additional reduction of the ABC would likely lead to overages of the conservative quota.

At the Council's 135th SSC meeting in March 2020, the SSC noted that the P* analysis adequately captured the scientific uncertainties associated with the new benchmark stock assessment and recommended the ABC for the Guam bottomfish fishery be set at 31 percent risk of overfishing corresponding to a catch level of 27,000 lb based on the P* analysis. At its 181st meeting in March 2020, the Council recommended the implementation of an ACL of 27,000 lb for the Guam bottomfish fishery, which is consistent with the P* and SEEM analyses and would allow for increased catch while preventing overfishing. There would be an approximately 50 percent chance that the Guam bottomfish fishery would not exceed the ACL from 2020 to 2022 based on historical catch data. This level of authorized catch would allow the bottomfish stock complex to rebuild in eight years. While a downward adjustment post-season AM was recommended by the Council alongside the ACL, Alternative 2 instead proposes the application of an in-season AM to close the fishery when the ACL is reached to help ensure that the Guam

bottomfish stock rebuilds in the proposed time frame alongside a performance standard to close the fishery in subsequent years when the ACL is exceeded until a coordinated management approach is developed that ensures catch in both Federal and territorial waters can be maintained at levels that allow the stock to rebuild. The recommendations of the P * working group, SEEM working group, SSC, and Council combined with analysis of recent catch averages and future projections for the Guam bottomfish fishery resulted in the provisions of Alternative 2, which would authorize a level of annual catch that would rebuild the stock in eight years (i.e., 2022 to 2029). Section 2.4 further describers the provisions of Alternative 2.

Alternative 3

The Council developed of the alternative representing a relatively lower ACL than recommended by the Council previously by using an overage adjustment for the highest level of recorded catch since ACLs began being implemented in 2012 according to the creel survey expansion estimates. Because the estimated annual catch in 2019 of 37,701 lb according to the Council's annual SAFE report (WPRFMC 2020a) exceeds the Council-recommended ACL of 27,000 lb by 10,701 lb, the ACL proposed under Alternative 3 is 16,299 lb. This is equivalent to a P* of 14 to 15 percent, and the level of authorized catch would rebuild the Guam bottomfish stock complex in four years (i.e., 2022 to 2025).

Alternative 4

The Council developed Alternative 4, which involves closing the bottomfish fishery in the Federal waters around Guam for the duration of the rebuilding plan, as the maximum Federal action that NMFS can take to rebuild the fishery. An authorized catch level of 0 lb would rebuild the Guam bottomfish fishery in two years (i.e., 2022 to 2023).

2.1.1 Summary of Guam Bottomfish Fishery Information

2.1.1.1 Estimation of the Overfishing Limit

The 2019 benchmark stock assessment for Guam bottomfish (Langseth et al. 2019) provided the estimate for the long-term MSY for the stock at 42,100 lb (95% confidence interval = 29,300-65,500 lb), which is lower than the estimate for MSY of 56,130 lb in the previous stock assessment update for the stock (Yau et al. 2016). The assessment, which assumes that a six-year ACL set for the stock would be harvested in its entirety for its duration, presents results of projected probabilities of overfishing for Guam bottomfish, and indicates that an ACL set at 36,000 lb would result in a 50 percent probability of overfishing in 2020 through 2025 (Table 3). Therefore, the OFL proxy for this six-year period for the fishery is 36,000 lb despite the long-term MSY estimate of 42,100 lb. The average catch of Guam BMUS from 2017 to 2019 was 29,532 lb with 41,505 lb of catch landed in 2019, the most recent year for which complete catch data are available (Table 5). The recent three-year average catch was approximately 18 percent lower than the OFL, and the 2019 estimated catch exceed the OFL by over 15 percent. The estimated catch in 2019 exceeds the OFL of 36,000 lb but is the only year to do so since the implementation of ACLs in 2012. The standing stock biomass in 2025 associated with this OFL is 222,100 lb with a harvest rate of 17 percent in 2025, and the probability that the stock would be overfished in that year is 37 percent (see Table 15 in Langseth et al. 2019).

Table 3. Projection results showing annual catch (1000 lb) applied across all years from 2020 to 2025 where the specified median probability of overfishing (H/H_{CR}>1) was reached in the terminal year for Guam BMUS.

Probability of overfishing (H/H_{CR}>1) in terminal year	2020	2021	2022	2023	2024	2025	Probability of overfishing (H/H_{CR}>1) in terminal year	2020	2021	2022	2023	2024	2
0.01	2	2	2	3	3	3	0.26	21	23	24	25	25	
0.02	3	3	4	4	5	5	0.27	22	23	24	25	26	
0.03	4	5	5	6	6	7	0.28	23	24	25	26	26	
0.04	5	5	6	7	8	9	0.29	23	24	26	27	27	
0.05	5	6	7	8	9	9	0.30	24	26	26	27	27	
0.06	6	7	9	9	10	11	0.31	25	26	27	27	28	
0.07	7	8	9	10	11	11	0.32	25	27	27	28	28	
0.08	8	9	10	11	12	13	0.33	26	27	27	28	29	
0.09	9	10	11	12	13	13	0.34	26	27	28	29	29	
0.10	9	10	12	13	13	15	0.35	27	28	29	29	30	
0.11	10	11	13	13	14	16	0.36	27	29	29	30	30	
0.12	11	12	13	14	15	16	0.37	28	29	30	30	31	
0.13	11	13	14	15	17	17	0.38	29	30	30	31	31	
0.14	12	13	15	16	17	18	0.39	29	31	31	31	31	
0.15	13	15	16	17	18	18	0.40	30	31	31	31	32	
0.16	13	15	17	18	19	19	0.41	31	31	32	32	32	
0.17	14	16	17	18	19	19	0.42	31	32	32	33	33	
0.18	15	17	18	19	19	21	0.43	32	32	33	33	33	
0.19	16	18	19	19	20	22	0.44	32	32	33	33	33	
0.20	16	18	19	20	21	22	0.45	33	33	33	34	35	
0.21	17	19	20	21	22	23	0.46	33	34	35	35	35	
0.22	18	19	21	22	23	24	0.47	34	35	35	35	35	
0.23	19	20	22	23	23	24	0.48	35	35	35	36	35	
0.24	19	21	22	23	24	24	0.49	35	36	36	36	36	
0.25	20	22	23	24	25	25	0.50	36	36	36	36	36	

(Source: Table 16 in Langseth et al. 2019)

2.1.1.2 Stock Status

While the results of the production model used in the assessment show that the fishery was not overfished nor experiencing overfishing for several years from 1982 to 2017, the stock is overfished but not experiencing overfishing in the terminal year of the analysis (Figure 2). Specifically, in 2017, the most recent year that was considered in the stock assessment for Guam bottomfish, $H_{2017}/H_{CR} = 0.81$ where H is the harvest rate and H_{CR} is the harvest rate associated with overfishing as determined by the harvest control rule, indicating overfishing is not occurring, while $B_{2017}/B_{MSY} = 0.57$, indicating that the stock is overfished (Langseth et al. 2019; Table 4).

In 2019, the most recent year for which catch data are available for Guam BMUS through the Council's annual SAFE report for the Mariana Archipelago (WPRFMC 2020a), the total estimated annual catch was 37,701 lb from boat-based creel surveys, while the estimated commercial catch from the DAWR commercial reporting system was not reported due to data confidentiality rules. The difference between the total estimated creel survey catch and estimated commercial catch is typically considered as the non-commercial component of the fishery. However, the PIFSC SAP total estimated BMUS catch in 2019 was 41,505 lb (Table 5). The estimated recent three-year average catch (2017 to 2019) from the PIFSC SAP was 29,532 lb (Table 5), which comprises nearly 75 percent of the OFL (see Section 2.1.1.1).

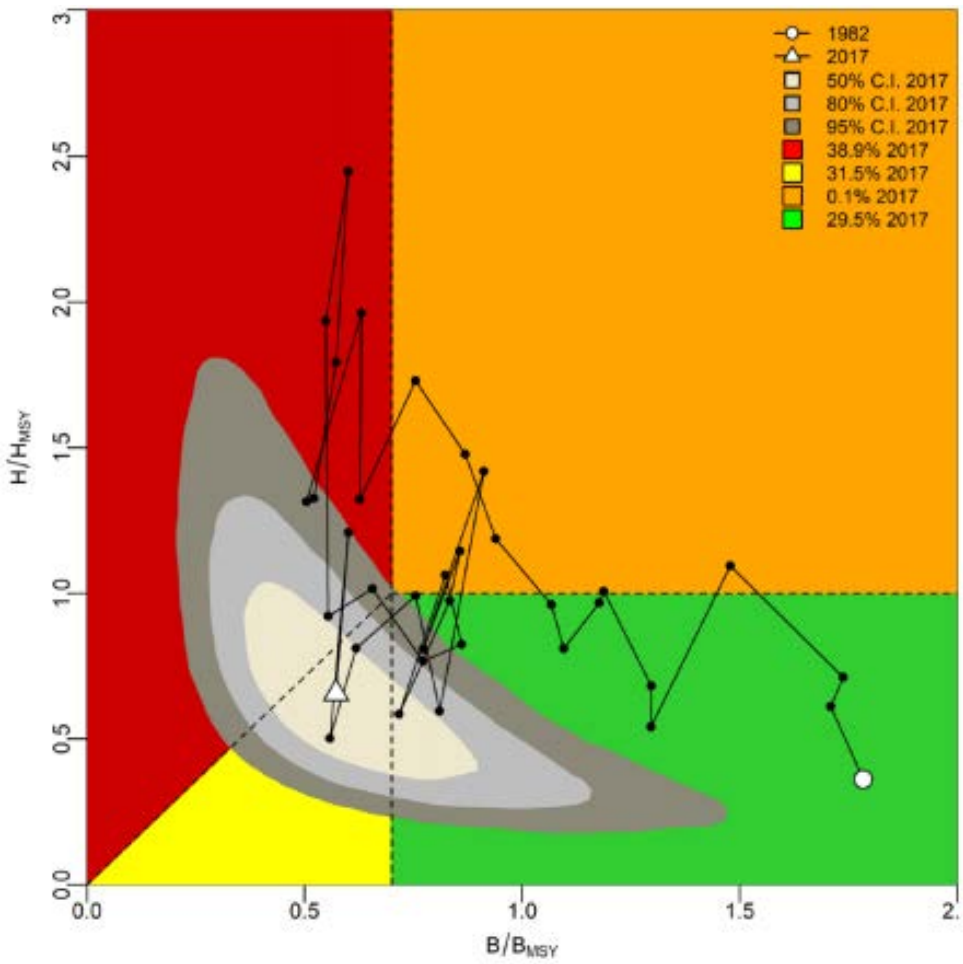

Figure 2. Kobe plot of relative biomass and relative exploitation rate from the best fitting production model for Guam bottomfish from 1982 to 2017.
(Source: Langseth et al. 2019)

Table 4. Stock assessment parameters for the Guam BMUS complex.

Parameter	Value	Notes	Status
MSY	42.1 (29.3-65.5)	Expressed in 1000 lb (with 95% confidence interval)	
H_{2017}	0.11	Expressed in percentage	
H_{CR}	0.170 (0.071-0.382)	Expressed in percentage (with 95% confidence interval)	
H_{2017}/H_{CR}	0.81		No overfishing
B_{2017}	143.0	Expressed in 1000 lb	
B_{MSY}	248.8 (107.1-636.8)	Expressed in 1000 lb (with 95% confidence interval)	
B_{2017}/B_{MSY}	0.57		Overfished

(Source: Langseth et al. 2019)

Table 5. Annual estimated BMUS catch (lb) in Guam from 2000 to 2019.

Year	Estimated Total Catch (lb)	Estimated Commercial Catch (lb)
2000	66,447	12,184
2001	46,427	10,554
2002	21,727	*
2003	29,835	*
2004	25,236	*
2005	29,046	*
2006	34,917	*
2007	18,186	*
2008	34,249	*
2009	40,735	*
2010	26,544	*
2011	54,062	*
2012	19,714	*
2013	30,243	*
2014	20,554	*
2015	11,711	*
2016	30,192	*
2017	15,864	4,002
2018	31,226	3,029
2019	41,505	*
Three-Year Average (2017-2019)	**29,532**	**3,526**

(Source: PIFSC SAP and WPRFMC 2020a)
* Data are confidential due to less than three vendors and/or dealers reporting.

2.2 Features Common Among Alternatives

Each of the alternatives considered assumes that all existing Federal and local resource management regulations would continue alongside non-regulatory monitoring of catch through the creel survey expansions by NMFS and the DAWR commercial reporting system. The Council has two years to prepare and implement an FMP, FMP amendment, or proposed regulations to rebuild an overfished stock if overfishing is still occurring for that stock (see Magnuson-Stevens Act section 304(e) and 50 C.F.R. § 600.310(j)). The Council previously recommended an ACL and post-season AM for the Guam bottomfish fishery for 2020 through 2022 at its March 2020 meeting, which can be maintained or replaced by the provisions of the rebuilding plan once implemented. There is little available information on the life history for Guam BMUS to inform the action alternatives, and little is known about how the stock complex interacts with the surrounding marine ecosystem.

There is no Federal permit or reporting required to fish for BMUS in Guam for vessels less than 50 ft nor is a commercial fishing license required for fishermen engaged in commercial fishing in Guam waters by the territorial government, but the Guam DAWR encourages fishing vendors and dealers to participate in their commercial reporting program. Additionally, DAWR performs

shore- and boat-based creel surveys to gather data on fishing methods used, fishing effort, and annual catch before transferring these data to NMFS. Under each of the alternatives, NMFS would work with DAWR to encourage timely processing of data and would track catches toward any applicable limit as data are provided by DAWR.

In Guam archipelagic fisheries, the fishing year begins January 1 and ends on December 31. For Alternatives 2 and 3, in accordance with 50 CFR 665.4, when NMFS projects that catches would reach an ACL for any stock or stock complex, the agency must restrict fishing for that stock or stock complex in the applicable U.S. EEZ to prevent catches from exceeding the ACL. The restriction may include, but is not limited to, closing the fishery, closing specific areas, or restricting effort (76 FR 37286, June 27, 2011). While an in-season restriction is currently challenging to implement for Guam and other U.S. territorial bottomfish fisheries due to the time needed to produce catch statistics, the Council proposes an in-season AM for Alternatives 2 and 3 that would require NMFS to track catch for the Guam BMUS stock complex relative to its ACL as quickly as possible, requiring close collaboration between DAWR (see Section 2.2.1). If landings of the stock complex exceed the specified ACL during the fishing year, the AM would require NMFS to close the fishery in Federal waters. Additionally, to ensure that the implemented ACL can result in rebuilding of the BMUS stock complex, the Council proposes an additional performance standard in which, if the ACL is exceeded during any fishing year over the course of the rebuilding plan, NMFS would close the fishery in Federal waters until a coordinated management approach is developed that ensures catch in both Federal and territorial waters can be maintained at levels that allow the stock to rebuild. NMFS and the Council would review and amend the rebuilding plan as necessary using the best scientific information available to allow the reopening of the fishery in Federal waters closed under this provision consistent with rebuilding requirements specified under National Standard 1 of the Magnuson-Stevens Act such that a reasonable method of restricting fishing mortality at the level needed to rebuild in the target timeframe is implemented. This would represent a higher performance standard than described under 50 CFR 600.310(g), which required that the Council re-evaluate and adjust the ACL system to ensure its performance and effectiveness if catches exceed any ACL more than once in a four-year period. Future changes to the ACL would be subject to a separate environmental review at such time as changes are proposed and are not part of the current proposed action.

The ability to coordinate a closure of both Federal and territorial waters would improve management measures associated with a designated catch limit, but Guam does not have regulations in place to close bottomfish fishing in territorial waters if a Federal catch limit is reached. For this reason, the following outcome analysis for each proposed alternative account only for action that NMFS can take within its regulatory authority. Each action alternative assumes that only Federal waters could be closed as the result of the in-season AM when NMFS projects that the catch has exceeded the implemented ACL (or in the case of a complete Federal closure under Alternative 4). The explanation of each action alternative describes the ideal scenario where the ACL is caught in full, whereas expected outcomes associated with continued fishing in excess of the ACL are described in the subsequent outcome analysis for each alternative. The analyses are based on an effective date of January 1, 2022, to provide a baseline for comparison if the measures were enacted at the beginning of the current fishing year.

2.2.1 In-Season Monitoring Plan

Under Alternatives 2 and 3, NMFS would review progress of the catches relative to the implemented ACL based on data reports from the Guam DAWR, which monitors the bottomfish fishery through its creel survey program. The in-season AM would require that NMFS close Federal waters around Guam to bottomfish fishing at such time as NMFS projects that the fishery would attain the ACL or immediately if it is determined that the fishery has exceeded the ACL. Because NMFS would not be able to track catches for the fishery in near-real time, Alternatives 2 and 3 would utilize a predetermined scheme to allow for in-season monitoring of the fishery over the course of each fishing year for the duration of the rebuilding plan. The in-season monitoring plan would rely on the use of expanded estimates from the creel survey program in Guam. Although creel survey data are expected to be associated with high scientific uncertainties when expanded during the fishing year, these data represent the best scientific information available to NMFS for the purposes of in-season monitoring under this action. Additionally, this action would represent the first attempt to utilize in-season monitoring for the Guam bottomfish fishery. Previously, the Council and NMFS were not satisfied with the amount of scientific uncertainty in the data when used for in-season monitoring; however, more recently, the overfished designation for the stock complex has prompted the Council and NMFS to reconsider the use of creel survey data for in-season monitoring despite the associated uncertainties because tracking the fishery throughout the fishing year is necessary to ensure that the fishery is adhering to the proposed timelines of the rebuilding plan.

To allow for in-season review of the total running catches for the Guam bottomfish fishery, NMFS would periodically determine the number of catch interviews for which DAWR has provided data. NMFS would tally the number of available catch interviews once per month after the data for that month is received from DAWR. When DAWR has conducted sufficient interviews to allow for appropriate expansion of the available data based on scientific uncertainty, NMFS would estimate the total catch for the fishing year to that point. NMFS expects the first expansion to take place roughly halfway through the year, in the middle of the summer in Guam when bottomfish catches are typically high. However, since fewer interviews increases the uncertainty in the catch estimates for the expansion time period, it is also expected that this semi-annual expansion would have high uncertainties associated with the data. After the initial expansion, NMFS would then perform additional expansions for the entire year on a month-to-month basis, or as DAWR is able to transmit creel survey data, whichever is more frequent. Performing expansions of the running total annual catch for the fishery each month for the second half of the year would allow NMFS to appropriately review harvest relative to the implemented ACL and project if the ACL would be attained in the upcoming month. Utilizing these data, NMFS could then determine if a closure of the fishery is necessary in accordance with the in-season AM.

The creel survey data would be used in this way to monitor the fishery over the course of a fishing year until a more reliable catch monitoring system is in place. For example, ongoing modernization efforts of the WPacFIN database management system will allow for near real-time access to the catch interview and participation data. Additionally, the potential implementation of mandatory commercial permitting and reporting requirements for the Guam bottomfish fishery would generate census data for the commercially-caught bottomfish. Depending on compliance, this could be an improvement over the existing data collection

systems. NMFS would conduct in-season monitoring based on the best scientific information available The Council is supporting Guam in its development of territorial regulations to require licensing and reporting for local commercial fisheries, but implementation of the regulations may not occur for several years.

2.3 Alternative 1: Status Quo

Alternative 1 would continue under the ACLs and AM proposed for 2020 through 2022, which include ACLs of 27,000 lb each fishing year and a post-season AM to reduce the ACL in the subsequent fishing year by the amount of overage if the three-year running average of catch exceeds the ACL for the preceding fishing year, in lieu of implementing a rebuilding plan with a new ACL, AMs, or other associated management measures for BMUS in Guam to rebuild the bottomfish fishery. On February 22, 2021, NMFS published the proposed rule for the 2020 through 2022 ACLs for Guam with public comments due by March 15, 2022 (86 FR 10526). These proposed ACLs and AMs are consistent with the most recent ACL specification made by the Council at its 181st meeting in March 2020. Under Alternative 1, NMFS would implement an ACL of 27,000 lb with no in-season AM to prevent the ACL from being exceeded but with a post-season AM to correct overages. The post-season AM would require NMFS to account for the total estimated catch against the ACL at the end of the fishing year, and if the recent three-year average catch would exceed the ACL, the ACL for the subsequent year would be reduced by the amount of overage. Alternative 1 would serve as the status quo and environmental baseline alternative against which effects on the human environment of action alternatives can be compared.

2.3.1 Expected Fishery Outcome (Alt. 1)

Under Alternative 1, NMFS expects the Guam bottomfish fishery to continue fishing as it has in the past and harvest annual catch of Guam BMUS similar to recent years. NMFS would apply the same ACL implemented for the fishery in 2020 through 2022. This alternative would implement an authorized annual catch that would fall below both the OFL and MSY but provide no mechanism to restrict catch from exceeding the 27,000 lb ACL, which would rebuild the fishery in eight years if maintained.

Although ACLs in previous years were specified for the Guam bottomfish complex prior to the reduction of management unit species (MUS) from 16 to 13 by Amendment 5 to the FEP, annual catches have not been greater than 46 percent of the ACLs since their implementation in 2012 (Table 6). Due to the lack of in-season closures, ACLs in these years also did not functionally constrain the fishery. Catches in 2018 (when no ACL or AMs were implemented), were somewhat similar to catches during several years when ACLs were implemented (see Table 6), though catches in 2019 were slightly higher than catch levels observed in the previous six years but comparable to prior years (e.g., 2009 and 2011). This suggests that fishery performance does not change dramatically whether or not ACLs and AMs are implemented, but it is possible that the fishery may have slightly increased catch in the absence of ACLs due to inherent variability in the fishery. Catch in 2019 would not have exceeded any of the ACL levels implemented since 2012 and is comparable to catch levels prior to 2012 (see Table 5). Similarly, interannual fluctuations in the catch for the six-year period when ACLs were implemented from 2012 to 2017 (Coefficient of Variation, CV = 32.2) were similar to the variability observed over the six-year span immediately prior from 2006 to 2011 (CV = 32.2) and greater than that over course of

available time series data from 1982 to 2011 (CV = 31.1). Because the implemented ACLs did not functionally constrain the bottomfish fishery in the absence of an in-season AM and interannual variability in the fishery since 2012 is comparable to variability observed over the course of the time series, the relatively high variability in catch observed over recent years likely reflects other year-by-year fluctuations in the fishery rather than constraints due to catch limits.

The estimated 2019 catch of 41,505 lb exceeds the OFL (36,000 lb) and is the highest catch recorded since 2011, but it does not reach the long-term MSY (42,100 lb). Under these conditions, past fishery performance can be used to approximate behavior in the fishery while unconstrained (i.e., in the absence of an in-season AM), and it is therefore expected that catches would continue to be similarly variable to past years. The recent average catch of 29,532 lb does not exceed the OFL or the long-term MSY but would take a projected 13 years to rebuild from its overfished state if recent fishery performance is maintained (see Table 9). However, this level of annual catch would exceed the 27,000 lb ACL associated with this alternative and result in an overage adjustment being applied to the ACL for the subsequent year. Additionally, the OFL and MSY may be exceeded with any increase in catch in a subsequent year, and the fishery, if unconstrained, may surpass these sustainable harvest levels specified in Langseth et al. (2019). Thus, this alternative would not provide a viable mechanism to ensure rebuilding of the fishery if participation or catch increased in future years.

Table 6. Comparison of Guam bottomfish catches to the ACLs from 2012 to 2019. ACLs were not implemented in 2018 or 2019.

Year	ACL (lb)	Catch (lb)	Percent of ACL
2012	48,200	19,714	40.90
2013	66,800	30,243	45.27
2014	66,800	20,554	30.77
2015	66,800	11,711	17.53
2016	66,000	30,192	45.75
2017	66,000	15,864	24.04
2018	NA	31,226	NA
2019	NA	41,505	NA

(Source: PIFSC SAP and the Council's annual SAFE reports)

2.3.2 Estimated Conservation and Management Benefit (Alt. 1)

This alternative would not have short-term cultural, economic, or social impacts compared to other alternatives because it would not functionally constrain bottomfish fishing activity and, thus, is not expected to adversely affect the fishing communities. However, Alternative 1 would not ensure that the stock complex can rebuild in a reasonable timeframe. This may cause the stock complex to persist in its overfished state and prolong the time needed to improve the BMUS stock status relative to the action alternatives, which may have longer-term cultural, economic, and social impacts if the decreased health of the stock complex results in lower future catches.

2.3.3 Degree to which this Alternative Mitigates Cultural, Economic, and Social Effects of the Management Measure (Alt. 1)

This alternative would not have short-term cultural, economic, or social impacts compared to other alternatives because it would not functionally constrain bottomfish fishing activity and, thus, is not expected to adversely affect the fishing communities. However, Alternative 1 would not ensure that the stock complex can rebuild in a reasonable timeframe. This may cause the stock complex to persist in its overfished state and elongate the time to improve the BMUS stock status relative to the action alternatives, which may have longer-term cultural, economic, and social impacts if the decreased health of the stock complex hampers future catches.

Since the fishery, and therefore, commercial sales are expected to remain consistent under Alternative 1, the Council anticipates that commercial fishermen would sell around 17.5 percent of recent average catch, or 5,168 lb, annually during the rebuilding plan based on recent data (Table 7). Although commercial sales data for Guam bottomfish are confidential for 2019 due to limited number of vendors, data for 2017 and 2018 can be used to determine recent trends in the commercial fishery. At the recent average price of $4.82 per lb, expected revenue would be $24,910. Using the estimated number of 300 fishery participants from the 2020 List of Fisheries (LOF; 85 FR 21095, April 16, 2020), each fisherman would earn approximately $83. This alternative would not functionally constrain bottomfish fishing activity in Guam, so it is not expected to adversely affect the fishing communities in the territory. Non-commercial fishing (inclusive of recreational, sustenance, and cultural fishing) would likely also be unaffected relative to the Alternative 1.

Table 7. Summary of Guam bottomfish commercial revenues from 2010 to 2019.

Year	Estimated total catch (lb)	Estimated pounds sold (lb)	Percent sold	Estimated adjusted revenue ($)	Adjusted average price per pound ($)
2010	26,544	*	*	*	*
2011	54,062	*	*	*	*
2012	19,714	*	*	*	*
2013	30,243	*	*	*	*
2014	20,554	*	*	*	*
2015	11,711	*	*	*	*
2016	30,192	*	*	*	*
2017	15,864	4,002	25.2	18,131	4.53
2018	31,226	3,028	9.7	15,443	5.10
2019	41,505	*	*	*	*
Three-year avg.	**29,532**	**3,515**	**17.5**	**16,787**	**4.82**

(Source: PIFSC SAP and WPRFMC 2020a)
* Data are confidential due to less than three vendors and/or dealers reporting.

2.4 Alternative 2: Implement an Annual Catch Limit of 27,000 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 2, the Council would recommend that NMFS implement an ACL of 27,000 lb for the Guam bottomfish fishery, at the same level previous recommended by the Council at its 181st meeting for 2020 through 2022 and consistent with recommendations of the SSC and P* working group, with an in-season AM and higher performance standard to allow for the rebuilding of the Guam bottomfish stock complex. NMFS would implement the rebuilding plan starting in 2022 until such time that the Guam bottomfish stock complex is determined to be rebuilt (i.e., attained its B_{MSY} as specified in Langseth et al. 2019). The Council's SSC used the results of the P* working group meeting (WPRFMC 2020b) to set the ABC using a 19 percent reduction to the probability of overfishing, resulting in a catch level of 27,000 lb at a 31 percent risk of overfishing using 2023 as the terminal year. The SEEM working group suggested no further reduction in the risk of overfishing to minimize further impacts on the fishermen and the local fishing community, and recommended that the ACL be set equal to the ABC (WPRFMC 2020c). This level of catch would likely rebuild the Guam bottomfish stock to B_{MSY} in eight years. As an in-season AM, NMFS would track progress of catches in relation to the ACL based on reports of catches provided to NMFS by the Guam DAWR. NMFS would close Federal waters around Guam to bottomfish fishing at such time as the agency estimates the fishery would attain the ACL or immediately if the agency determines that the fishery has attained or exceeded the ACL. NMFS would use catch data collected by local resource management agencies to estimate landings for the stock complex through the fishing year (Jan. 1 – Dec. 31), and NMFS would count catches from both Federal and territorial waters towards the ACL. Due to the moderate level of recent catches relative to the proposed ACL, it is not clear if the fishery would harvest more than 27,000 lb; annual catch in five of the past 10 years have exceeded this ACL As an additional performance standard, if the ACL is exceeded during any fishing year over the course of the rebuilding plan, NMFS would close the fishery in Federal waters until a coordinated management approach is developed that ensures catch in both Federal and territorial waters can be maintained at levels that allow the stock to rebuild. NMFS and the Council would review and amend the rebuilding plan as necessary using the best scientific information available to allow the reopening of the fishery in Federal waters consistent with rebuilding requirements specified under National Standard 1 of the Magnuson-Stevens Act such that a reasonable method of restricting fishing mortality at the level needed to rebuild in the target timeframe is implemented. Alternative 2 reflects the implementation of a similar management regime to the Council's most recent ACL specification at its 131st meeting in March 2020 with the addition of an in-season AM and higher performance standard with no post-season AM.

The Council utilized information from Langseth et al. (2019) and biomass projections by PIFSC SAP (Figure 3; Table 9) to determine the viability of using the provisions of Alternative 2 to rebuild the Guam bottomfish stock in a given time frame, as the specification of a rebuilding time is required per Magnuson-Stevens Act section 304(e)(4) for any overfished fishery. The stock biomass information assumes that the entirety of an ACL would be harvested in a given year for projected catch levels, and the $F_{rebuild}$ values were calculated by converting an estimated harvest rate (H) to F. Because the estimated biomass projections change over time, the estimated F values at a given catch level notedly decrease as biomass increases. Because B_{MSY} for the Guam bottomfish multi-species stock complex is 248,800 lb (Table 4), an ACL of 27,000 lb would allow the Guam bottomfish stock to rebuild to its B_{MSY} in eight years (i.e., by 2029 if

initiated in 2022; Table 9). Thus, T_{target} for this proposed rebuilding plan is eight years. The projections show that, in the absence of fishing, the Guam bottomfish stock complex can rebuild to a biomass of 256,378 lb in two years (i.e., by 2023 if initiated in 2022), so T_{min} for this rebuilding plan is two years. Because T_{min} is less than 10 years, T_{max} is 10 years, pursuant to implementing regulations at 50 CFR 600.310(j)(3)(b)(1). While the shortest possible time to rebuild the stock to B_{MSY} would be to have zero fishing mortality (i.e., annual catch of zero), this would not take into account the needs of the Guam fishing community as required in the Magnuson-Stevens Act section 304(e)(4)(A)(i) and is not possible to enforce in territorial waters. An annual catch of 27,000 lb would both prevent overfishing and ensure that the fishery would rebuild less than 10 years while allowing availability of bottomfish resources to the Guam fishing communities only slightly less than recent average levels. The fishing mortality rate associated with an annual catch level of 27,000 lb is 0.111 to 0.156 (Table 9) so this would be the range of $F_{rebuild}$ over the course of the rebuilding plan. The parameters required by Magnuson-Stevens Act section 304(e) and implementing regulations at 50 CFR 600.310(j)(3) for a rebuilding plan for an overfished fishery are presented in Table 8.

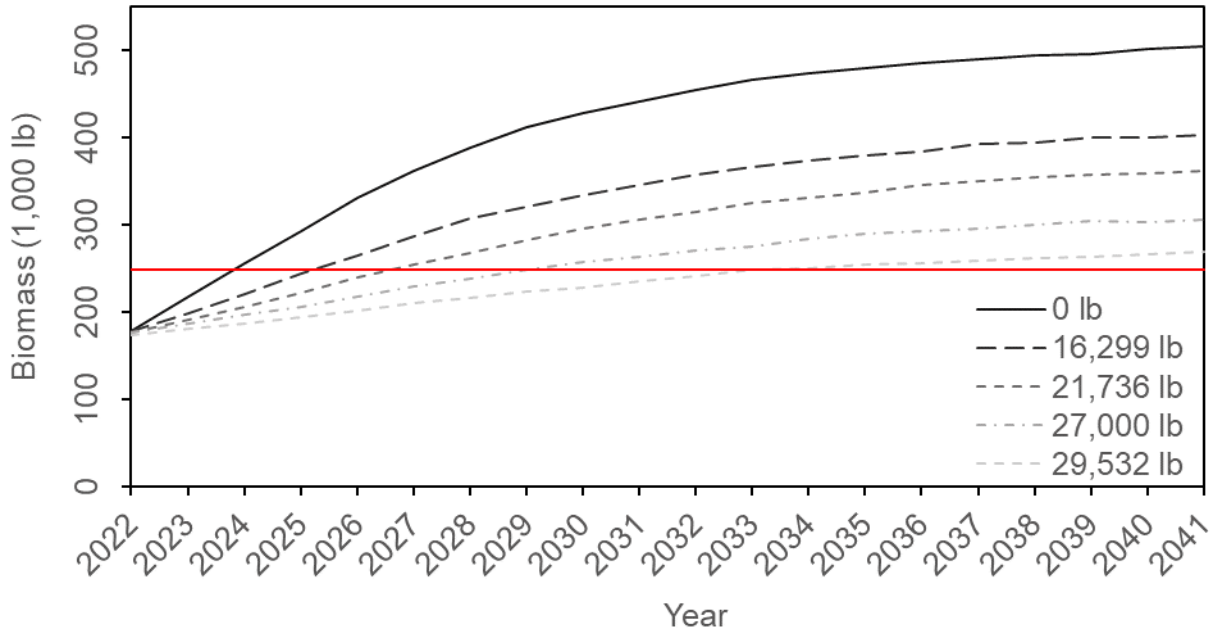

Figure 3. Projected biomass of the Guam bottomfish stock complex from 2020 to 2041 with annual catch levels authorized under each of the presented alternatives in addition to 0 lb, 21,736 lb, and 29,532 lb. The red line denotes B_{MSY} at 248,800 lb.
(Source: PIFSC SAP)

Table 8. Rebuilding plan parameters under Alternative 2 as required by National Standard 1 for an overfished fishery.

Parameter	Value
T_{min}	2 years
T_{target}	8 years
T_{max}	10 years
$F_{rebuild}$	0.115 – 0.156

Table 9. Projected biomass (B; 1,000 lb), probability (prob.) that biomass (B) is greater than or equal to B_{MSY}, and fishing mortality (F) for the Guam bottomfish stock complex from 2022 to 2041 under annual catches (lb) of 0 lb, 16,299 lb, 21,736 lb, 27,000 lb, and 29,532 lb. The highlights indicate the first year the probability that rebuilding has occurred is at least 50 percent. Values for each year represent projections at the beginning of the listed year.

Year	Annual Catch														
	0 lb			16,299 lb			21,736 lb			27,000 lb			29,532 lb		
	B	Prob. $B \geq B_{MSY}$	F	B	Prob. $B \geq B_{MSY}$	F	B	Prob. $B \geq B_{MSY}$	F	B	Prob. $B \geq B_{MSY}$	F	B	Prob. $B \geq B_{MSY}$	F
2022	178.7	0.3052	0	178.3	0.3150	0.0959	176.1	0.3032	0.1317	176.9	0.3064	0.1656	173.3	0.2947	0.1868
2023	218.2	0.4177	0	198.9	0.3801	0.0855	191.1	0.3507	0.1207	186.7	0.3466	0.1562	181.0	0.3223	0.1781
2024	256.4	0.5079	0	221.2	0.4371	0.0765	206.6	0.4017	0.1112	197.0	0.3799	0.1474	186.8	0.3552	0.1721
2025	292.8	0.5813	0	244.2	0.4903	0.0691	222.4	0.4412	0.1029	206.7	0.4054	0.1400	194.3	0.3793	0.1649
2026	331.5	0.6452	0	264.9	0.5354	0.0635	239.7	0.4759	0.0951	217.2	0.4336	0.1327	201.8	0.4003	0.1582
2027	361.5	0.6959	0	287.8	0.5763	0.0583	254.3	0.5050	0.0894	229.5	0.4653	0.1252	210.2	0.4200	0.1514
2028	388.5	0.7324	0	307.2	0.6102	0.0545	268.1	0.5319	0.0845	238.0	0.4794	0.1204	216.8	0.4356	0.1464
2029	412.7	0.7643	0	320.4	0.6316	0.0522	283.2	0.5567	0.0799	248.1	0.4992	0.1152	223.2	0.4507	0.1419
2030	428.6	0.7926	0	334.6	0.6550	0.0499	296.0	0.5781	0.0763	257.5	0.5186	0.1108	228.0	0.4647	0.1387
2031	441.6	0.8189	0	345.6	0.6729	0.0483	306.8	0.5973	0.0735	263.7	0.5271	0.1080	235.2	0.4741	0.1342
2032	455.3	0.8402	0	357.6	0.6843	0.0467	315.4	0.6093	0.0714	270.9	0.5362	0.1050	240.8	0.4840	0.1309
2033	466.1	0.8580	0	366.5	0.7014	0.0455	325.9	0.6271	0.0690	275.9	0.5477	0.1030	248.1	0.4936	0.1267
2034	474.3	0.8722	0	373.4	0.7142	0.0446	331.5	0.6314	0.0678	284.0	0.5557	0.0999	250.9	0.4996	0.1252
2035	480.6	0.8798	0	380.3	0.7241	0.0438	337.2	0.6430	0.0666	290.0	0.5642	0.0977	254.0	0.5042	0.1236
2036	486.1	0.8912	0	384.3	0.7361	0.0433	345.4	0.6518	0.0650	293.6	0.5737	0.0965	256.8	0.5071	0.1222
2037	490.3	0.8994	0	392.5	0.7446	0.0424	350.1	0.6544	0.0641	295.3	0.5748	0.0959	258.7	0.5100	0.1212
2038	494.9	0.9083	0	395.3	0.7496	0.0421	354.7	0.6670	0.0632	300.1	0.5791	0.0943	262.4	0.5139	0.1194
2039	495.9	0.9154	0	400.0	0.7566	0.0416	358.1	0.6724	0.0626	304.8	0.5836	0.0928	263.7	0.5177	0.1188
2040	502.1	0.9226	0	401.2	0.7643	0.0415	359.1	0.6804	0.0624	303.9	0.5886	0.0930	266.6	0.5216	0.1174
2041	504.4	0.9270	0	403.5	0.7670	0.0412	362.6	0.6841	0.0618	306.7	0.5878	0.0922	269.3	0.5259	0.1162

(Source: PIFSC SAP)

2.4.1 Expected Fishery Outcome (Alt. 2)

Under Alternative 2, NMFS expects the Guam bottomfish fishery to continue fishing as it has in the past but harvest slightly less BMUS than recent years due to the implementation of the in-season AM and performance standard. Fishery performance has been relatively consistent regardless of the implementation of an ACL despite some variability (see Table 6). There were no in-season management measures (e.g., fishing closures) that limited fishing activity in previous years, so management under catch limits did not functionally constrain the fishery. Estimated catch in 2018 and 2019, years where no ACL was implemented, had relatively higher catch levels than the previous six years where ACLs were specified; however, the observed fluctuations are consistent with expected variability in the fishery (see Section 2.3.1). Thus, NMFS expects that catch under Alternative 2 would be slightly less than Alternative 1 if recent average fishery performance persists. Catch under Alternative 2 would be more constrained than the status quo and likely result in lower catch levels due to the closure of Federal waters in accordance with the in-season AM and performance standard. NMFS would close Federal waters around Guam when the ACL is exceeded, which would reduce harvest relative to the status quo. Additionally, NMFS closing Federal waters in subsequent years until a management regime that can better control fishing mortality levels would further reduce catch relative to the status quo. A closure of Federal waters would deny fishing access to some of the Guam's offshore banks where bottomfish fishing occurs. There are no regulations in place to close territorial waters alongside Federal waters in this proposed action, so NMFS expects that fishing could continue in territorial waters and may offset potential conservation benefits of a Federal closure if there is any displacement of fishing effort. The performance standard would further restrict catch in subsequent years by closing Federal waters until a more effective management regime can be enacted, likely lowering the total annual catch for the fishery in those years and mitigating the impacts to the rebuilding timeline for the stock complex resulting from the overage in catch. However, if there are years where catch does not approach the ACL, harvest levels under Alternatives 1 and 2 are expected to be the same. Alternative 2 provides a Federal action that would support rebuilding and prevent overfishing within the fishery while allowing a level of annual catch comparable to recent levels. All other applicable fishing regulations would remain in place.

Considering the variability of recent average annual catch levels (Table 5), it is not certain if the Guam bottomfish fishery would attain the ACL of 27,000 lb while rebuilding, but it is possible to occur given that catch has exceeded this level in five of the past 10 years (50 percent). Also, the average catch from the past three years of 29,532 lb comprises 109 percent of the proposed limit. Thus, it is not assured if NMFS would need to implement closure of Federal waters in accordance with the in-season AM but catch would exceed ACL of 27,000 lb if the recent average level of catch continues. If catch remains under the authorized catch level, the fishery would rebuild from its overfished state within eight years. In both cases, management would prevent overfishing given the OFL specified in Langseth et al. (2019). If harvests do persist at the recent average, a simple calculation can be performed to determine the restriction of catch under the in-season AM for this alternative. While data on the seasonality of catch is not available in the bottomfish fishery, assuming that catch is consistent throughout the year allows for a rough estimate of when the fishery may employ the in-season AM using the recent average BMUS catch. If the average annual catch is 29,532 lb and catch is consistent throughout the year

(2,461 lb/month), the catch would exceed the ACL by the end of November and there would be another 2,532 lb expected to be caught after this time. If catches are proportional to bottomfish habitat in Federal and territorial waters (26.4 and 73.6 percent, respectively; see Figure 1), 668 lb that might have ordinarily been caught in Federal waters would not be caught in the fishery. Therefore, the total catch in the first year of the rebuilding plan for this scenario would be 28,864 lb rather than the recent average catch of 29,532 lb. However, this conservation benefit may not be fully realized if fishing effort is displaced to territorial waters, perhaps even exceeding the recent three-year average catch, and this level of catch would still effectively lengthen the proposed rebuilding time for the stock complex.

Additionally, if the ACL is exceeded as is likely due to recent average catch levels, the implementation of the performance standard would close Federal waters to the fishery in subsequent years until a reasonable method of restricting fishing mortality at the level needed to rebuild in the target timeframe is implemented. If a Federal fishery closure is enacted and catches are proportional to bottomfish habitat in Federal and territorial waters (26.4 and 73.6 percent, respectively; see Figure 1), 7,796 lb that might have ordinarily been caught in Federal waters would not be caught in the fishery for a total catch of 21,736 lb. However, this estimate assumes that the recent three-year average remains consistent several years into the future and no displacement of fishing effort into territorial waters after the Federal closure is enacted, which may not occur. Ultimately, with catch values ranging from 21,736 lb to 28,864 lb annually, the NMFS would expect the Guam bottomfish stock complex to rebuild within five to eight years. The rebuilding timeline being maintained would likely be due to the closure of Federal waters during and after the first year of the rebuilding plan, which would result in catches below 27,000 lb for each year Federal waters are closed and result in less total catch than an annual catch 27,000 lb for eight sequential years. In summary, this alternative would constrain fishing relative to recent years depending on variability in the fishery, but assuming that future catches would be consistent with recent averages, Alternative 2 would minimize adverse impacts to both the Guam bottomfish stock complex and fishing community while supporting rebuilding in the originally proposed time frame.

Though fishing cannot necessarily be constrained in territorial waters, Alternative 2 would reduce some catch in the fishery and comply with the Magnuson-Stevens Act, implementing Federal regulations, and the provisions of the Council's FEP. Alternative 2 also meets the stated purpose and need for Federal action to rebuild the Guam bottomfish fishery, which NMFS expects to occur within five to eight years if fishing activity is consistent with recent averages.

2.4.2 Estimated Conservation and Management Benefit (Alt. 2)

NMFS intends Alternative 2 to prevent overfishing and rebuild the Guam bottomfish fishery within five to eight years while allowing relatively less harvest in Federal waters to occur. Under Alternative 2, conservation and management benefits to Guam BMUS are expected from constraining fishing activity in years where catches exceed 27,000 lb (due to the in-season AM) and in subsequent years (due to the application of the performance standard); over the course of the rebuilding plan, catch may be reduced by 668 lb to 7,796 lb due to the closures of Federal waters. Any displacement of fishing effort from Federal waters to territorial waters could offset the anticipated reduction in catch, as NMFS expects the fishery to continue operations in territorial waters in the event of a Federal closure. Also, to prevent exceedances of the ACL

resulting in a delay of the fishery being rebuilt, the implementation of the performance standard would further restrict catch by implementing a Federal closure in subsequent years after the ACL is exceeded until a coordinated management approach is developed that ensures catch in both Federal and territorial waters can be maintained at levels that allow the stock to rebuild. In years where catch is relatively lower and does not reach the ACL, NMFS expects catch to be the same as Alternative 1; these harvest levels would still prevent overfishing and promote rebuilding of the fishery. It is not clear if the catch would exceed the ACL considering catch in the fishery from the past 10 years, but recent average annual catch for the fishery indicates that catch would exceed the ACL if fishery performance remains consistent. Even if catches persist at the level of the recent annual average, the proposed AM and performance standard would help ensure that the fishery rebuilds in a time frame comparable to T_{target}. Thus, the proposed management would mitigate adverse impacts to the Guam bottomfish stock from fishing if harvests consistent with the recent average occur, would provide conservation benefits relative to the status quo, would prevent overfishing, and would promote rebuilding within the proposed time frame.

2.4.3 Degree to which this Alternative Mitigates Cultural, Economic, and Social Effects of the Management Measure (Alt. 2)

The intention of Alternative 2 is to rebuild the Guam bottomfish fishery from its overfished state while mitigating cultural, economic, and social impacts to Guam communities by allowing BMUS harvest in Federal waters given the ACL is not attained and at a total level only slightly less than the recent annual average. Under Alternative 2, cultural, economic, and social effects may impact fishermen who harvest bottomfish in Federal waters if the ACL is exceeded and Federal waters are closed to the fishery as a result, both in-season and in subsequent years. In the first year of the rebuilding plan, if expected catch is 28,864 lb and roughly 17.5 percent of that catch is sold at $4.82 (see Table 7), there would be an expected loss of revenue of $564 for the fishery, or nearly $2 per fisherman (using 300 fishermen estimated in the LOF 2020) relative to the status quo. For subsequent years of the rebuilding plan, with an expected catch of 21,736 lb if the performance standard is applied after an ACL exceedance in the first year, there would be an expected loss of revenue of $6,576, or nearly $22 per fisher. This scenario would be maintained a until a new coordinated management plan is developed that would better constrain catch levels in Federal and territorial waters to allow the stock complex to rebuild in the target timeframe. However, NMFS expects that fishing would continue to occur in territorial waters if the catch attains the ACL and fishing in Federal waters is prohibited, and it is not clear if displacement of fishing effort into territorial waters would mitigate the economic impact to commercial fishermen. Thus, large economic impacts are not expected under Alternative 2. The average amount of bottomfish sold is just 17.5 percent of the total catch, so the Guam bottomfish fishery is predominantly non-commercial, primarily providing fish for recreation and sustenance. Because fishing would be only slightly constrained relative to recent average levels of activity, there are no large cultural or social impacts expected under Alternative 2.

2.5 Alternative 3: Implement an Annual Catch Limit of 16,299 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Alternative 3 involves the Council recommending that NMFS implement a more conservative ACL than Alternative 2 of 16,299 lb (see Section 2.1) for the Guam bottomfish fishery. This ACL would be lower than the recommended risk of overfishing for the fishery of 31 percent by the Council's P* working group for the 2020 to 2022 ACL, reducing the P* to roughly 14 to 15

percent (Table 3). NMFS would implement the rebuilding plan starting in 2022 until such time that the Guam bottomfish stock complex is determined to be rebuilt. Using catch projections from PIFSC (Table 9) and Langseth et al. (2019), the authorized level of catch would have a 50 percent chance to rebuild the Guam bottomfish stock from its overfished state to B_{MSY} in four years; however, due to fishing being expected to continue in territorial waters, the rebuilding time frame could be extended to five to eight years. As an in-season AM, similar to Alternative 2, NMFS would review the progress of fishery catches relative to the ACL as data are provided by DAWR and close Federal waters around Guam to bottomfish fishing at such time as the agency estimates the fishery would attain the ACL or immediately if the agency determines that the fishery has attained or exceeded the ACL. NMFS would use catch data collected by local resource management agencies to estimate landings for the stock complex through the fishing year (Jan. 1 – Dec. 31), and the ACL would account for catches from both Federal and territorial waters. Due to the levels of recent catch in the fishery relative to the proposed ACL, NMFS expects that annual catch would exceed the ACL in subsequent years, resulting in the closure of Federal waters to the fishery and the implementation of a downward adjustment in the ACL; annual catches for eight of the past 10 years have exceeded the proposed ACL, and the recent three-year average catch of 29,532 lb exceeds the proposed ACL by 13,233 lb. Also similar to Alternative 2, this alternative would implement a performance standard in which, if the ACL is exceeded during any fishing year over the course of the rebuilding plan, NMFS would close the fishery in Federal waters until a coordinated management approach is developed that ensures catch in both Federal and territorial waters can be maintained at levels that allow the stock to rebuild. NMFS and the Council would review and amend the rebuilding plan as necessary using the best scientific information available to allow the reopening of the fishery in Federal waters consistent with rebuilding requirements specified under National Standard 1 of the Magnuson-Stevens Act such that a reasonable method of restricting fishing mortality at the level needed to rebuild in the target timeframe is implemented. Compared to Alternative 2, this alternative represents the application of a more conservative ACL intended to allow the Guam bottomfish fishery to rebuild in a shorter time frame than Alternative 2 with the consequence of further reducing available bottomfish resources for the Guam fishing community.

The Council used projection results provided by PIFSC SAP and Langseth et al. (2019) to analyze the potential outcomes of implementing the ACL proposed under Alternative 3 and the associated rebuilding time. The specification of a rebuilding time is required per Magnuson-Stevens Act section 304(e)(4) for a rebuilding plan for an overfished fishery. The stock biomass information assumes that the entirety of an ACL would be harvested in a given year for projected catch levels, and the $F_{rebuild}$ values were calculated by converting an estimated H to F. Because the estimated biomass in the projections changes over time, the estimated F values at a given catch level notedly decrease as biomass increases. Because B_{MSY} for the Guam bottomfish multi-species stock complex is 248,800 lb (Table 4), at a 14 to 15 percent risk of overfishing, authorized catch under an ACL of 16,299 lb would have a 50 percent probability to rebuild the Guam bottomfish stock to its B_{MSY} in four years (i.e., by 2025 if initiated in 2022; Table 9), which is the T_{target} for this alternative. However, the expected rebuilding time for this proposed rebuilding plan is five to eight years because expected catch for the fishery is likely to exceed the ACL based on recent average catches and due to continued harvest of bottomfish in territorial waters (see Section 2.5.1). The T_{min} for this rebuilding plan would be two years (see Section 2.4), and T_{max} is 10 years because T_{min} is less than 10 years pursuant 50 CFR 600.310(j)(3)(b)(1). While the shortest possible time to rebuild the stock to B_{MSY} would be to have zero fishing

mortality (i.e., annual catch of zero), this would not take into account the needs of the Guam fishing community as required in section 304(e)(4)(A)(i) of the Magnuson-Stevens Act and is not possible to enforce in territorial waters. Catch authorized under an ACL of 16,299 lb would both prevent overfishing and ensure that the fishery would rebuild in shorter amount of time than Alternative 2, but the availability of bottomfish resources to Guam fishing communities would be more restricted. The fishing mortality rate associated with an annual catch level of 16,299 lb is 0.063 to 0.086 (Table 9), so this would be the range of $F_{rebuild}$ for the proposed rebuilding plan. The rebuilding parameters required by Magnuson-Stevens Act section 304(e) and implementing regulations at 50 CFR 600.310(j)(3) for a are presented in Table 10.

Table 10. Rebuilding plan parameters under Alternative 3 as required by National Standard 1 for an overfished fishery.

Parameter	Value
T_{min}	2 years
T_{target}	4 years
T_{max}	10 years
$F_{rebuild}$	0.063 – 0.086

2.5.1 Expected Fishery Outcome (Alt. 3)

The expected outcome of Alternative 3 for the Guam bottomfish fishery is that the fishery would likely continue fishing as observed in recent years with a slight reduction in annual catch of Guam BMUS due to the constraints associated with a more conservative ACL, the in-season AM, and the performance standard. Past fishery performance for Guam bottomfish was variable regardless of the implementation of ACLs (Table 6), and in-season AMs were not present in previous years to constrain the fishery. Thus, NMFS expects that catch under a more conservative ACL with Alternative 3 could be more constrained than the status quo and Alternative 2, which may result in lower catch levels assuming fishing activity is comparable to recent average levels. The lower ACL of 16,299 lb is more likely to be exceeded considering recent average levels of annual catch for Guam BMUS, meaning that a closure of Federal waters to bottomfish fishing due to the in-season AM and application of the performance standard for subsequent years are more probable and would further restrict catch. There are no regulations in place to close territorial waters alongside Federal waters in this proposed action, so NMFS expects that fishing could continue in and be displaced to territorial waters, and may offset potential conservation benefits of a Federal closure. Additionally, any exceedance of the ACL would delay the proposed rebuilding time. Alternative 3 provides the Federal action that would support rebuilding and prevent overfishing but also reduce bottomfish resources available to the Guam fishing communities due to a more cautious ACL that is likely to be consistently exceeded. All other applicable fishing regulations would remain in place.

Given recent average annual catch levels (Table 5), it is likely that Guam bottomfish fishery would exceed an ACL of 16,299 lb. Catch in eight of the past 10 years (80 percent) would have exceeded this level of catch, and the average catch from the past three years of 29,532 lb exceeds this limit by nearly 82 percent. Thus, NMFS expects that it would employ the in-season AM to close Federal waters around Guam in the first year of the rebuilding plan. Then, it is also likely that the performance standard would also be employed in the first year to close Federal waters to

the fishery in subsequent years until a reasonable method of restricting catch in both Federal and territorial waters at levels that allow the stock to rebuild is developed and implemented. If catch does not reach ACL for the first four years of the rebuilding plan, the stock could rebuild in that time; this, however, is unlikely given recent fishery performance.

If harvest of Guam BMUS continues at recent average levels every year, a simple calculation can be used to determine the impact of the closure on expected catch. Assuming that catch is consistent throughout the year allows for a rough estimate of monthly bottomfish catch (2,461 lb/month). At this rate, the ACL would be exceeded by July, and there would be another 13,233 lb expected to be caught after this time. If catches are proportional to bottomfish habitat in Federal and territorial waters (see Figure 1), 3,494 lb that might have ordinarily been caught in Federal waters would not be caught in the fishery. Therefore, the total catch for this scenario would be 26,083 lb in 2022, but this reduction may not be fully realized if fishing effort is displaced to territorial waters. This level of catch would also delay the rebuilding time under this alternative. Additionally, an annual catch of 26,083 lb would trigger the performance standard and cause Federal waters to be closed to the fishery in subsequent years until a reasonable method of restricting fishing mortality at the level needed to rebuild in the target timeframe is implemented. NMFS expects a Federal closure to the fishery in subsequent years to result in a total annual catch of 21,763 lb each year, similar to Alternative 4. This scenario would likely cause rebuilding for the stock complex to be delayed to five to eight years. However, this estimate assumes that the recent three-year average remains consistent several years into the future and no displacement of fishing effort into territorial waters after the Federal closure is enacted, which may not occur. Thus, this alternative may slightly reduce catch, mitigate adverse impacts to the Guam bottomfish stock, and allow rebuilding to occur within 10 years despite fishing in territorial waters.

Similar to Alternative 2, fishing cannot necessarily be constrained in territorial waters, but this alternative would restrict more of the variability in interannual catches than Alternative 2 for the first exceedance of the ACL. It may cause greater impacts to Guam's fishing communities than Alternative 2, but Alternative 3 would be in compliance with the Magnuson-Stevens Act, implementing Federal regulations, and the provisions of the Council's FEP that require ACLs and AMs to be implemented to manage the fishery.

2.5.2 Estimated Conservation and Management Benefit (Alt. 3)

Alternative 3 would provide some conservation benefit relative to the status quo alternative by resulting in a lower level of annual catch due to closure of Federal waters in accordance with the in-season AM and performance standard, thus restricting overfishing and supporting the rebuilding of the Guam bottomfish fishery in five to eight years (and potentially a shorter time frame than Alternative 2). Under this alternative, conservation and management benefits to Guam BMUS are expected from constraining years where annual catch may exceed 16,299 lb, as observed in eight of the past 10 years. If catch continues at recent average levels, a Federal closure in accordance with the proposed AM would reduce catch by 3,494 lb in the first year, and the application of the performance standard would result 7,796 lb in subsequent years due to catch not harvested in Federal waters; however, rebuilding time would still be delayed from what NMFS expects under the authorized annual catch level with this reduction in expected catch. Since NMFS expected to apply the performance standard after an ACL exceedance in the first

year of the rebuilding plan, NMFS would enact a Federal closure for the fishery each subsequent year until a management approach to limit catch at levels that would allow the stock to rebuild is implemented. Thus, Alternative 3 would provide slight additional conservation benefits relative to Alternative 2 with respect to rebuilding the fishery in the first year, and rebuilding could occur in a slightly shorter time frame. Any displacement of fishing effort from Federal waters to territorial waters could offset the anticipated reduction in catch due to the closure of Federal waters, as NMFS expects the fishery to continue operations in territorial waters in the event of a Federal closure. In years where catch is relatively lower and does not reach the ACL, NMFS expects catch to be the same as Alternatives 1 and 2; these harvest levels would prevent overfishing and promote rebuilding of the fishery in four years. Thus, the proposed management would reduce adverse impacts to the Guam bottomfish stock complex from fishing, prevent overfishing, and promote rebuilding in a slightly shorter or equal time frame as Alternative 2.

2.5.3 Degree to which this Alternative Mitigates Cultural, Economic, and Social Effects of the Management Measure (Alt. 3)

Alternative 3 would do less to mitigate cultural, economic, and social effects to the Guam fishing community while rebuilding the bottomfish fishery than the status quo or Alternative 2 by establishing a more conservative ACL and further restricting availability of bottomfish resources. Especially for fishermen who primarily harvest bottomfish in Federal waters, impacts may be more prevalent due to increased constraints from a lower ACL and potential Federal closure. Using recent average annual catch, a reduction of 3,494 lb with 17.5 percent expected to be sold at $4.82 would lead to an expected loss of $2,947 in revenue for the fishery, or roughly $10 per fisherman (using 300 fishermen estimated in the LOF 2020) in the first year relative to the status quo alternative. In each of the subsequent year of the rebuilding plan (until a reasonable method of restricting fishing mortality at the level needed to rebuild in the target timeframe is implemented), assuming a complete Federal closure is implemented in accordance with the performance standard, a reduction of 7,796 lb of catch would lead to an expected loss of $6,576, or roughly $22 per fisherman relative to the status quo. These estimates do not consider any reduction in fishing effort from perceived constraints due to the more conservative ACL or any displacement of fishing activity to territorial waters after a closure of Federal waters. NMFS expects that operations would also continue to occur in territorial waters if Federal waters are closed to bottomfish fishing, which may offset some of the cultural, economic, and social impacts associated with this alternative. Thus, there are some economic impacts expected under Alternative 3 if the fishery continues to operate at average levels, but these impacts would be not be present in years where the ACL is not reached. However, because fishing would likely be constrained by Federal closures in most years that this ACL is implemented, it is likely that socioeconomic impacts would be larger under Alternative 3 than under the status quo.

2.6 Alternative 4: Establish a Temporary Moratorium on Bottomfish Fishing in Federal Waters around Guam

Under Alternative 4, the Council would recommend a fishing prohibition for and possession of BMUS in Federal waters around Guam. NMFS would implement the rebuilding plan starting in 2022 until such time that the Guam bottomfish stock complex is determined to be rebuilt. This action would be equivalent to implementing a catch limit of 0 lb in Federal waters around Guam and is the maximum action that the Council could recommend to address the overfished state of Guam bottomfish. There would be no AMs associated with this alternative because catch would

not need to be tracked towards an ACL, so there would be no in-season monitoring or performance standard under Alternative 4. There could be displacement of bottomfish fishing activity in Federal waters around Guam to territorial waters since it is not anticipated that the Guam government would implement a complementary closure of territorial waters for the fishery. Despite fishing for BMUS being likely to continue in territorial waters, Alternative 4 could result in less annual catch for the Guam bottomfish fishery than Alternatives 1 through 3. All other applicable fishing regulations would remain, and the fishery would continue to be monitored.

Using biomass projections for various levels of catch from Langseth et al. (2019) and PIFSC, the time to rebuild the stock to B_{MSY} in the absence of fishing mortality would be two years (Table 9; see Section 2.4), thus both the T_{min} and the T_{target} for this alternative would be two years in accordance with Magnuson-Stevens Act section 304(e)(4) and implementing regulations at 50 CFR 600.310(j)(3). However, because the fishery catch would not actually be 0 lb due to displacement to and continued fishing in territorial waters, the expected time to rebuild under this alternative could realistically extent realistically be five years (see Section 2.6.1). Because Alternative 4 provides an authorized annual catch of 0 lb, the $F_{rebuild}$ for the fishery would be 0 in the absence of fishing. The rebuilding parameters required by Magnuson-Stevens Act section 304(e) and 50 CFR 600.310(j)(3) are presented in Table 11.

Table 11. Rebuilding plan parameters under Alternative 4 as required by National Standard 1 for an overfished fishery.

Parameter	Value
T_{min}	2 years
T_{target}	2 years
T_{max}	10 years
$F_{rebuild}$	0

2.6.1 Expected Fishery Outcome (Alt. 4)

The Council expects that Alternative 4 would cause catches of Guam BMUS to occur at a lower level than recent years and less than for any of the other alternatives over the course of the rebuilding plan. Though the closure of Federal waters around Guam to bottomfish fishing would effectively be the same as setting an ACL of 0 lb, NMFS expects that fishing effort could be displaced to territorial waters. Similarly, is not expected that the Guam government would implement a complementary closure of territorial waters alongside this Federal action, and thus, the bottomfish fishery would likely continue operating normally in territorial waters. As described for the previous action alternatives, the Council and NMFS do not possess the spatial data to determine how much bottomfish fishing is occurring in Federal versus territorial waters or the level of displacement that could occur. If levels of catch are assumed to be equal to the proportion of bottomfish EFH in Federal and territorial waters around Guam, then a rough estimate can be made for the reduction in catch resulting from a Federal closure. Assuming the fishery continues to harvest bottomfish as it has in recent years at 29,532 lb (Table 5), catch could be reduced by 26.4 percent (7,796 lb) using the best available information on bottomfish EFH around Guam (see Figure 1). Expected catch would then be 21,736 lb each year of the rebuilding plan under a closure of Federal waters to the fishery. However, this estimate assumes

that the recent three-year average remains consistent several years into the future and no displacement of fishing effort into territorial waters after the Federal closure is enacted, which are not likely to occur. Thus, Alternative 4 would result in a moderate reduction in fishing but catch would not be completely diminished due to fishing that would occur in territorial waters and the displacement of fishing effort from Federal waters to territorial waters. Due to the anticipated 21,736 lb of catch annually, this measure would have to be in place for five years to rebuild the stock to B_{MSY} (Table 9). Under this alternative, NMFS expects the proposed management to prevent overfishing for Guam BMUS and the stock complex would potentially rebuild in a shorter time than all other alternatives.

Alternative 4 would not restrict fishing in territorial waters, but it would reduce catches from Federal waters to a greater extent considering the entirety of the rebuilding plan than Alternatives 1 through 3. Alternative 4 is the maximum action that the Council could recommend for rebuilding the Guam bottomfish fishery consistent with the Magnuson-Stevens Act and Federal regulations. Additionally, this alternative would likely rebuild the stock in the shortest amount of time, but it does not necessarily consider the needs of the Guam fishing community that is reliant on locally harvested bottomfish from the offshore banks. While Alternative 4 would result in the rebuilding of the rebuilding of the Guam bottomfish fishery from its overfished state more quickly, the other action alternatives allow for increased availability of bottomfish resources in consideration of the Guam fishing community.

2.6.2 Estimated Conservation and Management Benefit (Alt. 4)

Under Alternative 4, the proposed management would prevent overfishing of Guam BMUS and the bottomfish fishery would be rebuilt from its overfished state in the shortest possible amount of time by prohibiting all bottomfish catch in Federal waters. It is anticipated that a complete closure of Federal waters to the fishery could decrease estimated annual catch by 7,769 lb. This reduction of catch would result in increased conservation and management benefits relative to the other action alternatives by eliminating harvest in Federal waters. However, similar to the other action alternatives, any displacement of fishing effort from Federal waters to territorial waters could offset the anticipated reduction in catch. If Federal waters are closed to the fishery under Alternative 4, the Council anticipates that fishing would continue in territorial waters without a complementary closure of territorial waters; it is not expected that the government of Guam will implement such a closure. Thus, Alternative 4 would cause the rebuilding time frame to extend to five years rather than the two years anticipated in the absence of fishing mortality. This alternative would serve to reduce adverse fishery impacts to the greatest practicable extent by preventing overfishing and supporting the rebuilding of the bottomfish fishery in the shortest possible amount of time.

2.6.3 Degree to which this Alternative Mitigates Cultural, Economic, and Social Effects of the Management Measure (Alt. 4)

Under Alternative 4, the Council expects that the Guam bottomfish fishery would harvest annual catches that are moderately less than each of the other action alternatives due to the complete closure of the fishery in Federal waters. However, there may be slight economic impacts to bottomfish fishermen under this alternative. NMFS expects annual catch to be 21,736 lb (see Section 2.6.1) if the fishery operates similar to its recent average levels without harvesting BMUS in Federal waters. If 17.5 percent of this level of catch is commercially sold at $4.82 per

pound (see Table 7), the expected revenue would be $18,334 annually. The estimated number of 300 fishery participants from the 2020 LOF would then earn roughly $61 each if divided equally; this is a decrease of approximately $22, or 27 percent, per fisherman from the status quo alternative. If fishermen compensated for a closure of Federal waters by catching BMUS in territorial waters that remained open to fishing, revenue would be closer to that expected under the status quo. NMFS does not have information to estimate the magnitude of compensation that may occur. If a complementary closure were implemented in territorial waters, the socioeconomic impacts would be much larger, as NMFS expects the catch and revenue of the fishery would drop to zero. Because NMFS expects this alternative to result in less catch than Alternatives 1 through 3 despite fishing being likely to continue in territorial waters, Alternative 4 would still result in less bottomfish available for subsistence and recreational purposes than all other alternatives.

Alternative 4 does not provide for authorized catch in Federal waters, but territorial waters would remain open to fishing for bottomfish. This would allow for some availability of bottomfish resources to the Guam fishing community, however, bottomfish are expected to be available in moderately lower quantities than all other alternatives considered. Alternative 4 would pose greater constraints to fishermen for the slight conservation gain, given that the projected time frame to rebuild the stock under a complete closure would be three years shorter than Alternative 2. The Federal fishery closure would also decrease the amount of bottomfish available to the community for subsistence and recreational purposes, as well as reduce revenues for commercial fishermen. While fishermen's revenues would be less than all other alternatives, the decreases are small and NMFS does not expect the reductions to result in substantial economic impacts to the Guam fishing community. In summary, this alternative does less than all other alternatives to mitigate adverse cultural, economic, and social effects by reducing the amount of fish available to markets in Guam. Thus, Alternative 4 does not meet the need to mitigate socioeconomic effects of the proposed action as well as the other alternatives.

2.7 Alternatives Considered but Not Analyzed

2.7.1 No Management Action

The Council and NMFS considered a no management action alternative for inclusion in the EA to be used as the baseline against which action alternatives would be compared. Under this alternative, the Council would not recommend and NMFS would not implement a rebuilding plan with an ACL, AMs, or other associated management measures for BMUS in Guam to rebuild the bottomfish fishery. Since the fishery did not operate under an ACL in 2018 or 2019, this would act as the environmental baseline alternative relative to that time period. In the absence of an ACL, the fishery would not operate under catch limits and AMs would not be required, but the fishery would continue to be subject to other Federal and territorial management measures such as gear and spatial restrictions. The Council and NMFS would continue to monitor catches through the creel survey expansions, the DAWR commercial reporting system, and other sources of data under a no management alternative. Ultimately, the no management alternative was not analyzed for this action because it is reasonably anticipated that the Guam bottomfish fishery will be subject to the implementation of the ACL and post-season AM recommended by the Council for 2020 through 2022 the fishery and because the

fishery outcomes of a no management alternative would be similar to the status quo alternative included for this action (Section 2.3).

2.7.2 Implement an Annual Catch Limit with Territorial and Federal Components

Under this alternative, NMFS would implement an ACL for the Guam bottomfish fishery with separate components for bottomfish catch harvested in both territorial and Federal waters. This would be functionally equivalent to implementing two different ACLs, one for bottomfish catch in territorial waters and one for bottomfish catch in Federal waters. Implementing two ACLs for separate components of the same fishery was determined to not be reasonable for this action for several reasons. Given the nature of the creel surveys that would be used to monitor the fishery under this rebuilding plan, there are many uncertainties regarding the reliability of spatially-explicit data derived from those surveys. While area codes for bottomfish catch are included in creel survey interviews, it is not clear if they are accurately reported by fishermen. Additionally, implementation of an ACL with two separate components would also be more complicated with respect to tracking each segment of the fishery rather than the fishery as a whole. Further, given that there are doubts that the creel survey data would be sufficient to implement in-season monitoring for the entirety of the fishery during the fishing year, it is likely that there would be greater concerns for engaging in-season monitoring for two separate segments of the same fishery. There may not be a sufficient number of catch interviews for expansion in the middle of the fishing year to be able to generate an estimate of total catch for each segment of the fishery, whereas this issue would be less pronounced when analyzing the entirety of the fishery. Tracking progress towards a separate ACL for the component of the fishery in territorial waters would also be unnecessary, as there would be no meaningful action NMFS could take in the event that the ACL is exceeded to reduce catch in territorial waters. This alternative would also not be in compliance with National Standard 3 of the Magnuson-Stevens Act, which requires that an individual fish stock or stock complex should be managed as a single unit throughout its range.

2.7.3 Implement an Annual Catch Limit of 31,000 lb with an In-Season Accountability Measure

Under this alternative, the Council would recommend that NMFS implement a more lenient ACL than Alternative 2 of 31,000 lb (see Section 2.1) for the Guam bottomfish fishery alongside an in-season AM to close the fishery when NMFS determines that annual catch for the fishing year has attained or exceeded the ACL. This ACL would be consistent with a higher risk of overfishing for the fishery using a previous recommendation by the Council's P* working group of 40 percent in lieu of their more recent recommendation (Table 3). NMFS would still implement the rebuilding plan starting in 2022 until such time that the Guam bottomfish stock complex is determined to be rebuilt. Using catch projections from PIFSC (Table 9) and Langseth et al. (2019), this authorized level of catch would likely rebuild the Guam bottomfish stock from its overfished state to B_{MSY} in 19 years (i.e., by 2040 if initiated in 2019). This alternative would allow additional bottomfish resources for the local community relative to the action alternatives and reduce the likelihood that catches would reach the ACL; thus, alternative provides an ACL that would allow the highest likelihood for the proposed rebuilding timeline to be maintained without imposing additional restrictions to the fishing community.

The Council originally identified this alternative as its preferred alternative at its 184th meeting held virtually on December 2-4, 2020. At that time, the most current biomass projections from

PIFSC SAP estimated that an annual catch level of 31,000 lb would rebuild the Guam bottomfish fishery in six years. However, PIFSC SAP generated new biomass projections in January 2021, which indicated that, using the most recent catch data available through the 2019 fishing year, an annual catch level of 31,000 lb would rebuild the fishery in 19 years instead of six. This substantial increase in the estimated time to rebuild shifted the T_{target} for the alternative well above the T_{max} of 10 years (see Section 2.4), and the change in expected rebuilding timeline under the provisions of the alternative made it unviable for implementation due to it exceeding the upper limit of rebuilding time permissible under statutory requirements.

2.7.4 Implement Federal Permitting and Reporting Alongside Bag Limits

Under this alternative, NMFS would implement annual bag limits for bottomfish fishing in Federal waters in addition to the ACLs and AMs proposed in the presented action alternatives. Federal permitting and reporting would also be implemented to support the monitoring of the bag limits. This alternative was initially presented to the Council and its SSC at their meetings in November and December 2020 but was not heavily considered to be enacted. These provisions would require substantial additional administrative resources and effort relative to all other alternatives to enact the new limitations, establish a permitting scheme, and develop of consistent method of reporting for fishermen. These regulations could also result in additional costs to fishermen to obtain the permit and dedicate time to accurately reporting their catches under the bag limits in Federal waters. Fishermen would also need to learn about the bag limit regulations, comply with the new laws such that they do not harvest more than the limit that they are individually allocated, and report their catches in Federal waters to NMFS. NMFS would need to dedicate resources to developing a system to distribute permits to fishermen, receive their catch reports, and ensure that fishermen are not exceeding their allocated bag limit. Additional resources would also be required by the National Oceanic and Atmospheric Administration (NOAA) Office of Law Enforcement (OLE) and U.S. Coast Guard (USCG) to enforce legal fishing in Federal waters under the bag limits (i.e., fishermen would not be allowed to harvest bottomfish in Federal waters without the associated permit and reporting of their catches). The substantial additional costs and effort required under this alternative would likely result in few benefits.

2.7.5 Implement an Annual Catch Target (ACT) in Addition to an ACL

This alternative would include the implementation of an ACT in addition to the existing ACLs specified in the action alternatives to better prevent the fishery from attaining the ACL in a given fishing year. An ACT, set at some level below the ACL, could be used to buffer the ACL to help ensure that the fishery does not exceed the level of authorized catch. NMFS would close Federal waters around Guam to the bottomfish fishery at such time when NMFS would project the ACT to be attained instead of the ACL. Doing so would make it more likely that the fishery would not harvest levels of catch that would exceed the ACL due to continued fishing in territorial waters after the prohibition of bottomfish catches in Federal waters. Ideally, the ACT would be set at a level consistent with a reduction to the implemented ACL based on the amount of known management uncertainty in the fishery. However, this alternative was not analyzed further because there is no available information specifically accounting for uncertainties in the fishery, so there would be no justifiable level at which the ACT could be set. If a method of determining uncertainty in the fishery is developed in the future, an ACT could be incorporated through a regulatory amendment but would be subject to a separate environmental review.

2.7.6 Implement a Post-Season Accountability Measure

This alternative would employ a post-season AM to augment the implementation of an ACL for the fishery to help ensure that the ACL can result in the rebuilding of the Guam BMUS stock complex. The post-season AM would require an accounting of annual catch (using a three-year running average of recent catch) for the stock complex relative to its ACL immediately after the end of the fishing year, or as soon as possible given the limitations in the data collection and processing methods. If landings for the three-year running average exceed the specified ACL, the AM would require the Council to take action in accordance with 50 CFR 600.310(g) to correct the operational issue that caused the ACL overage. For the purposes of the post-season AM for this rebuilding plan, this would include a recommendation that NMFS implement a downward adjustment to the ACL in the subsequent fishing year by the amount of overage pursuant to 50 CFR 600.310(g)(3). NMFS would compare a three-year running average of catch to the ACL instead of comparing catch from a single year to apply the overage adjustment to the ACL in accordance with 50 CFR 600.310(g)(5). The Guam bottomfish fishery has highly variable catches and lack reliable annual data on which to base a single-year post-season AM due to the nature of the creel survey program that currently collects data on the fishery. Additionally, there is precedence for the use of a three-year running average for the post-season overage adjustment in previous Council actions, as the post-season AM for the 2019 to 2021 ACL for gray jobfish (uku) in the Main Hawaiian Islands utilizes a three-year running average (85 FR 26622).

A post-season AM was not included in the alternatives of this rebuilding plan because it ultimately would not be able to address the operational issues that are likely to cause the exceedance of the implemented ACL for the fishery (i.e., continued fishing in territorial waters). Further, because the recent average catch is higher than each of the ACLs presented in the action alternatives, it is likely that the post-season AM would have to be applied each year of the rebuilding plan and result in an annual reduction of the ACL without tangible conservation benefit.

2.8 Comparison of Features of the Alternatives

Table 12 presents a summary of various features of the alternatives to allow for comparison among the alternatives.

Table 12. Comparison of the proposed fishery management features and expected outcomes for this action.

Topic	Alt. 1 – Status Quo	Alt. 2 – ACL of 27,000 lb w/ In-Season AM and Performance Standard	Alt. 3 – ACL of 16,299 lb w/ In-Season AM and Performance Standard	Alt. 4 – Temporary Moratorium of Fishery in Federal Waters
Also referred to as:	Baseline.	N/A.	N/A.	N/A.
Active fisheries affected	Guam bottomfish.	Same as Alt. 1.	Same as Alt. 1.	Same as Alt. 1.
Active fisheries potentially affected indirectly	Guam troll, CNMI bottomfish.	Same as Alt. 1.	Same as Alt. 1.	Same as Alt. 1.
General characteristics of alternative	ACL set identical to ACL for fishery in 2020 through 2022 with post-season AM. No in-season AM implemented. Lack of in-season AM means that the ACL would not functionally constrain the fishery, and catches are expected to remain similar to the recent annual average.	ACL set to prevent overfishing and rebuild the stock in eight years; in-season fishery closure as the AM with an additional performance standard. Alt. 2 reduces adverse effects on the fishing community relative to Alt. 3 and 4 but would have impacts to the fishing community relative to Alt. 1.	ACL set to prevent overfishing and rebuild the stock in four years, but continued fishing in territorial waters would likely extend rebuilding to five to eight years. In-season fishery closure as the AM with an additional performance standard. Alt. 3 increases adverse effects on the fishing community relative to Alt. 1 and 2.	Moratorium on fishing for or possessing BMUS in Federal waters to rebuild the stock in two years, but continued fishing in territorial waters would likely extend rebuilding to five years. Alt. 5 has no reduction of adverse effects on fishing community during the period of effectiveness.
Time to rebuild under authorized catch	8 years.	8 years.	4 years.	2 years.
Expected time to rebuild	13 years.	5 to 8 years.	5 to 8 years.	5 years.
Authorized annual catch (lb) of BMUS in Guam (ACL)	27,000 lb.	27,000 lb.	16,299 lb.	0 lb.

Monitored by:	Guam DAWR Creel Surveys.	Same as Alt. 1.	Same as Alt. 1.	Same as Alt. 1.
ACL likely to be exceeded in a given year (based on recent average catch)	Yes, the recent average catch is approximately 109% of the ACL.	Same as Alt. 1.	Yes, the recent average catch is approximately 181% of the ACL.	N/A.
Accountability Measures	In-season: N/A. Post-season: At the end of fishing year, if the three-year running average catch exceeds the ACL, NMFS would reduce the ACL for the following year but the amount of overage. Additional performance standard: if the ACL is exceeded more than once in a four year period, the Council would reassess the rebuilding plan and associated ACL.	In-season: If available data indicates the fishery would exceed the ACL, NMFS would close the fishery in Federal waters. Post-season: N/A. Additional performance standard: if the ACL is exceeded during any fishing year over the course of the rebuilding plan, NMFS would close the fishery in Federal waters until a coordinated management approach is developed that ensures catch in both Federal and territorial waters can be maintained at levels that allow the stock to rebuild.	Same as Alt. 2.	No AM or performance standard implemented, as there would be no ACL to track catch towards and NMFS would close the fishery in Federal waters for the duration of the rebuilding plan.
Complementary closure of territorial waters by	N/A.	Not anticipated. Not a part of the proposed	Same as Alt. 2.	Same as Alt. 2.

Guam Government		action.		
Possibility of fishery closure in Federal waters	None.	Possible by late November in 2022 and for the full year in subsequent years.	Possible by August in 2022 and for the full year in subsequent years.	Full year.
Expected annual catch of Guam BMUS (see text for detail)	29,532 lb.	2022: 28,864 lb. Subsequent years: 21,736 lb.	2022: 26,038 lb. Subsequent years: 21,736 lb.	21,736 lb.
Potential to rebuild	Possibly. It is possible if the bottomfish fishery harvests catch consistent with the recent annual average, but years of relatively high catch with no mitigation would hinder rebuilding.	Yes.	Same as Alt. 2.	Same as Alt. 2.
Prevents/reduces overfishing relative to previous years	No. Although NMFS expects catch to be similar to recent annual averages, there would be no mechanism to restrict catch if it is anomalously high.	Yes. Slight reduction of catch relative to recent annual averages (thus, less than Alt. 1).	Yes. Slight reduction of catch relative to recent annual averages (less catch than all alternatives except Alt. 4).	Yes. Moderate reduction of catch relative to recent annual averages (less than all other alternatives).
Authorized catch would allow stock biomass to increase during the specification period	Potentially. If the fishery continues harvesting bottomfish at the recent average without exceeding sustainable harvest levels, rebuilding could occur.	Yes, potentially, the reduction from the recent average would allow biomass to increase at a slight rate; however, biomass increases may not be realized due to a shift of	Yes, potentially, restriction of catch would allow biomass to increase at a slight rate; however, biomass increases may not be realized due to a shift of fishing effort from	Yes, potentially, strict reduction in catch would allow biomass to increase at the maximum rate; however, biomass increases may not be realized due to a shift of

		fishing effort from Federal to territorial waters.	Federal to territorial waters.	fishing effort from Federal to territorial waters.
Mitigates effects of restricting catch to rebuild stock complex during time frame of rebuilding plan	Yes. NMFS would not restrict fishing in the fishery and catch would be the same as in previous years. This alternative lacks long-term benefits of restricting harvest in years of high catch to ensure the rebuilding time frame that the action alternatives would provide.	Yes. More than Alt. 3 and 4 but less than Alt. 1, as NMFS would expect less fishing than under Alt. 1 but more than under Alt. 3 and 4 during rebuilding. The implementation of an ACL slightly less than recent average would help to mitigate impacts on Guam fishing communities that depend on fishing in Federal waters for locally harvested bottomfish relative some of the other action alternatives. Long-term, there would likely be additional benefit to rebuilding the stock than under Alt. 1, which could improve the future outlook of the fishery.	Yes. More than Alt. 4 but less than the other alternatives. Alt. 3 represents the strictest amount of catch allowed in Federal waters among the action alternatives. The conservative ACL would do less than Alt. 2 to ensure bottomfish resources are available to the Guam fishing community. Long-term, there would be additional benefit to rebuilding the stock more quickly than Alt. 2, which may improve the future outlook of the fishery.	In the short term, no, not relative to other action alternatives, since a closure of Federal waters would be the most extreme action that the Council could recommend in implementing a rebuilding plan for the fishery. Long-term, there would likely be additional benefit to rebuilding the stock more quickly than under other action alternatives, which may improve the future outlook of the fishery.

3 AFFECTED ENVIRONMENT AND POTENTIAL EFFECTS OF THE ALTERNATIVES

This section describes the affected fishery, fishery resources, protected species, habitats, and the potential environmental effects of the proposed rebuilding plan on these resources. Climate change and environmental justice are considered, along with potential effects to fishing communities, species marine areas and other resources, and potential effects on fishery administration and enforcement.

3.1 Overview of the Bottomfish Fisheries

Though indigenous peoples of Guam are known to have been highly skilled fishermen throughout their history, the bottomfish fishery as it currently exists was developed in the late 1980s (Allen and Bartram 2008). There are two distinct sectors of the Guam bottomfish fishery that can be identified by both depth fished and species targeted: the shallow water component and the deep water component. The shallow water component (i.e., those fishing at depths of < 500 ft) has historically comprised the largest portion of total bottomfish catch and effort due to lower associated expenses and relative ease of fishing close to shore (Myers 1997), and principally targets reef-dwelling snappers of the genera *Lutjanus*, *Aphareus*, and *Aprion*; groupers of the genera *Epinephelus*, *Variola*, and *Cephalopholis*; jacks of the genera *Caranx* and *Carangoides*; Holocentrids (*Myripristis* spp. and *Sargocentron* spp.); emperors of the genera *Lethrinus* and *Gymnocranius*; and Dogtooth Tuna (*Gymnosarda unicolor*). The deep-water component (i.e., those fishing at depths of > 500 ft) primarily harvests groupers of the genera *Hyporthodus* and *Cephalopholis*, jacks of the genera *Caranx* and *Seriola*, and snappers of the genera *Pristipomoides*, *Etelis*, and *Aphareus* (WPRFMC 2020a). In recent years, deep water species have made up a notable portion of the total expanded bottomfish catch (WPRFMC 2020). Smaller fishing vessels (i.e., < 25 ft in length), which comprise a majority of the Guam bottomfishing fleet, tend to target shallow-water bottomfish species for recreational, subsistence, and small-scale commercial purposes, while the few relatively large vessels in the fishery (i.e., > 25 ft in length) target the deep-water bottomfish complex at offshore banks (e.g., Galvez, Santa Rosa, and Rota Banks) and primarily fish for commercial reasons (WPRFMC 2009; Langseth et al. 2019); however, some recreational vessels less than 25 ft in length have also been known to target deep water bottomfish at the offshore banks and other offshore areas where bottomfish habitat occurs (Langseth et al. 2019).

Bottomfishing around Guam typically occurs using vertical lines with electric or spin-casting reels depending on the fishing depth being targeted (Langseth et al. 2019). Shallow water fishermen, harvesting at depths of 100 to 500 ft, typically use two to four spinning reels with several size 8/0 circle hooks and a weighted fishing line (NMFS 2015). Commercial fishermen fishing in deep water generally operate between two and six electric reels with a 6-lb weight on the end. The long vertical main line has several 1.5 ft branch lines with hooks attached at 1.5 to 3 ft intervals above the weight, although this configuration may vary. Fishermen may also suspend a light or chum bag with chopped squid or fish as bait above the highest hook (NMFS 2015; Allen and Bartram 2008). It is not uncommon for fishermen to combine bottomfishing with other methods of harvest such as trolling, spearing, and jigging, to maximize their catch (WPRFMC 2020a). Federal regulations prohibit bottom trawls, bottom gillnets, explosives, and poisons (50

CFR 665.406). Territorial regulations also prohibit the use of explosives, poisons, and electrical devices (5 Guam Code Annotated (GCA) § 63104 through 63110). Additionally, large vessels (> 50 ft in length) may not fish for bottomfish in the Guam large vessel bottomfish prohibited area (50 CFR 665.403(a)) and must obtain a permit to fish in Guam territorial waters (50 CFR 665.402 and 665.404(a)). Guam's bottomfish fishery is highly seasonal, with fishing effort notably increasing during the summer months when weather and sea conditions are relatively calm. During these periods of favorable conditions, bottomfish fishing tends to increase on the offshore banks in Federal waters as well as on the east side of the island in territorial waters (WPRFMC 2009). It is likely that some fishing vessels that harvest bottomfish on the offshore banks around Guam land their catches in the CNMI (WPRFMC 2002). However, it is prohibited for Guam bottomfish vessels to commercially harvest bottomfish in the CNMI management subarea, which is the EEZ seaward of CNMI territorial waters, without a valid CNMI commercial bottomfish permit (50 CFR 665.404(a)(2) and 665.405(e)).

3.1.1 Overview of the Fishery Data Collection System in Guam

In Guam, local resource management agencies, such as the DAWR collect bottomfish fishery data with assistance from NMFS PIFSC through the boat-based creel survey program, the shore-based creel survey program, and the commercial receipt book program. The Sportfish Restoration Grant from the U.S. Fish and Wildlife Service (USFWS) provides a large portion of the funding for these data collection programs in Guam.

3.1.1.1 Boat-Based Creel Survey Program

The boat-based creel survey program is a long-term program that collects information from fishermen on catch, effort, and participation for offshore fishing activities conducted by commercial and non-commercial fishing vessels. A detailed description of the boat-based creel survey program on Guam is available in Jasper et al. (2016). The boat-based creel surveys are comprised of two survey methods, a roving survey, and an access point survey. Access point surveys are conducted at Agana Boat Basina, Agat Marina, and Merizo Pier and focus on fishermen interviews, while the roving surveys collect participation data. Participation counts are done by recording the number of boats departing or returning from the assigned port during a survey shift and noting the gear type used. The fishermen interviews document catch rates per trip, gear type, species composition, and length/weight measurements of the catch. Survey days are split evenly between weekdays and weekends eight days per month, with both morning and late-afternoon shift. The creel survey data are transcribed into the NMFS WPacFIN database where catch expansion algorithms are applied to the data to generate annual estimates of total boat-based landings.

3.1.1.2 Shore-Based Creel Survey Program

The shore-based creel survey program is a long-term program that collects information from fishermen on catch, effort, and participation for inshore fishing activities. A detailed description of the shore-based creel survey program on Guam is available in Jasper et al. (2016). Roving survey methods are used to sample inshore fishing using land-based and aerial surveys. The land-based surveys are comprised of both participation counts and fishermen interviews. Participation counts are done by driving along the shoreline of a designate region in search of fishermen with data collectors recording fishing effort by gear type. The fishermen interviews document catch rates of shore-based fishermen. The aerial survey is used to help estimate fishing

activity across the whole island of Guam, including in areas that are inaccessible by road. There are four island-wide sample days per month, with two sample days occurring during the week and two sample days occurring on weekends. On each sample day there is a morning and evening shift, during which pre-defined coastal routes are traversed until the route has been completed. Survey dates are randomly selected two to four times per week and the surveys take place over eight-hour periods. The creel survey data are transcribed into the NMFS WPacFIN database where catch expansion algorithms are applied to the data to generate annual estimates of shore-based landings.

3.1.1.3 Commercial Receipt Book Program

The commercial receipt book program monitors fish sold locally in Guam and collects information from dealers and/or vendors who purchase fish directly from fishermen. Commercial reports are typically collected monthly and are tallied at the end of the year after being adjusted based on coverage estimates provided by the vendors, dealers, and/or DAWR. However, data reporting for the program is not mandatory in Guam, and there have frequently been fewer than three dealers providing information on an annual basis. To improve information received through the commercial receipt book program, the Council, DAWR, and PIFSC have partnered to increase vendor participation in the data collection program through the Territory Science Initiative.

3.1.2 Overview of Federal Permit and Reporting Requirements

Bottomfish fishermen in Guam are not required to obtain a Federal permit to fish for BMUS except for large vessels (> 50 ft), which must report their catch and are also prohibited from fishing or anchoring within 50 nm around Guam. Bottomfish fishermen in Guam are not otherwise required to report their BMUS catch to NMFS.

3.1.3 Overview of the In-Season AM

When evaluating catch, NMFS applies all catches of BMUS from both Federal and territorial waters toward the implemented ACL. If available catch data indicates that catch would reach or exceed the ACL, NMFS would close the fishery in Federal waters to constrain fishing mortality and ensure adherence to the rebuilding timeline.

3.1.4 Overview of the Performance Standard

If the ACL is exceeded during any fishing year over the course of the rebuilding plan, NMFS would close the fishery in Federal waters until a coordinated management approach is developed that ensures catch in both Federal and territorial waters can be maintained at levels that allow the stock to rebuild. NMFS and the Council would review and amend the rebuilding plan as necessary using the best scientific information available to allow the reopening of the fishery in Federal waters consistent with rebuilding requirements specified under National Standard 1 of the Magnuson-Stevens Act such that a reasonable method of restricting fishing mortality at the level needed to rebuild in the target timeframe is implemented. This provision is consistent with the implementation of a higher performance standard pursuant to 50 CFR 600.310(g)(7).

3.2 Potential Effects on Physical Resources

There are no known significant impacts to air quality, noise, water quality, view planes, or terrestrial resources from past or current bottomfish fishing activity in Guam. The fishery does not have adverse effects on unique features of the geographic environment, and fishing behavior and effort are not expected to change under any alternative in a manner that would result in effects on physical resources (see Sections 2.3 through 2.6). Given the characteristics of the fishing fleet and the generally offshore nature of the fishing activity, none of the alternatives would result in impacts to air quality, noise, water quality, view planes, or terrestrial resources.

3.3 Guam Bottomfish Fishery and Biological Resources

Guam is the southernmost island of the Mariana Archipelago located in the western Pacific Ocean, and is an unincorporated, organized territory of the United States. It is the largest island in Micronesia, but Guam is relatively small in both land area (549 km^2) and EEZ area (221,504 km^2). Combined, all the other islands in the Mariana Archipelago have a population of 57,559 (World Population Review, accessed December 18, 2020). In contrast, Guam has a population of 169,630 (World Population Review, accessed December 18, 2020), which is nearly triple the population of the CNMI. Dededo Village is the most populous village on the island, inhabited by over 26 percent of the total population of Guam (World Population Review, accessed December 18, 2020). The island itself is characterized by steep topography, protected bays, and extensive coral reefs accompanied by several offshore banks. Guam has a substantial economic influence from the large-scale presence of the U.S. military, though Guam's economy has become more heavily affected by tourism from Asian countries in recent years (WPRFMC 2009).

3.3.1 Overview of Guam's Bottomfish Fishery

NMFS and the Council manage bottomfish fishing in Federal waters around Guam in accordance with the FEP for the Mariana Archipelago (WPRFMC 2009), which was developed by the Council and implemented by NMFS under the authority of the Magnuson-Stevens Act. The U.S. EEZ around Guam is approximately 221,504 km^2 and extends from 3 to 200 nm from the shore, except where truncated by common borders with the EEZs of the CNMI and the Federated States of Micronesia; about 20 percent of the perimeter of Guam's EEZ borders international waters (Allen and Bartram 2008). Roughly half of Guam's shoreline is surrounded by well-developed fringing coral reefs, though these reefs are accompanied by a notable offshore slope and several offshore banks that are accessed by fishermen during the calm weather and sea conditions of the summer months (Myers 1997; WPRFMC 2009). The management structure of Mariana Archipelago FEP emphasizes community participation and increased consideration of the surrounding habitat and ecosystem during management decision making. The Guam DAWR manages bottomfish fishing from 0 to 3 nm from shore. A joint Federal-territorial partnership enforces Federal fishery regulations, and the Mariana Archipelago FEP requires the Council to produce an annual performance report for the fishery (e.g., WPRFMC 2020a).

Currently, there are no Federal permit or reporting requirements for bottomfish fishing in Federal waters around Guam except for large vessels fishing for bottomfish shoreward of the outer boundary of the Guam management subarea (50 CRF 665.404(a)(1)). The Guam bottomfish fishery is monitored using data voluntarily provided by fishermen to DAWR through the boat-based and shore-based creel survey programs. Additionally, DAWR receives voluntary commercial sales data from the commercial receipt book program.

The 2020 LOF estimated that there were more than 300 participants in the Guam bottomfish fishery (85 FR 21095, April 16, 2020). Fishing for bottomfish primarily occurs on vessels less than 25 ft in length due to the lower expenditure and relative ease of fishing closer to shore, though some larger vessels make trips to the offshore banks surrounding Guam to harvest deep water bottomfish species (Myers 1997; WPRFMC 2009). Many commercial fishermen supplement their bottomfish fishing effort with trolling for pelagic fish, and it is not uncommon for commercial fishermen to hold other jobs in addition to fishing (WPRFMC 2009). Since 2000, the boat-based segment of the fishery landed between approximately 11,500 and 66,500 lb of BMUS annually (Table 5). From 2017 to 2018, approximately 25 and 10 percent of that catch has been commercially sold, respectively (Table 7; see Section 3.4.1); participants in the shallow water component of the fishery, which comprises most of the fishery, rarely sell their catch and fish instead for recreational or subsistence purposes, so the fishery is primarily non-commercial (WPRFMC 2009). Though bottomfish fishing has only accounted for 10 to 15 percent of Guam's long-term boat-based fisheries harvest, bottomfish hold fundamental dietary and cultural importance for the people of Guam (Allen and Bartram 2008). Fishing grounds in Federal waters around Guam remain important for the harvest of deep water snappers at offshore banks to provide locally sourced bottomfish the island's inhabitants, and the extensive community networks for sharing locally caught fish suggest that it is likely that the social benefits of fishing are widely shared by many of Guam's long-term residents (WPRFMC 2009).

3.3.1.1 Potential Effect of the Alternatives on the Bottomfish Fishery in Guam

Alternative 1: Status Quo

Under Alternative 1, the status quo alternative, NMFS would implement an ACL of 27,000 lb with no in-season AM to prevent the ACL from being exceeded but with a post-season AM to correct overages. This would mirror the last management action taken for the fishery. Since catch limits were first introduced in 2012, catches for the fishery have been consistently below the implemented ACLs (Table 6). In-season management measures were not used during these years and catch variability in recent years has been similar to variability prior to the implementation of ACLs, indicating that the fishery has not been functionally constrained and performed comparable to how it would in the absence of ACLs and AMs (Section 2.3.1). Post-season AMs were utilized during these years, but the fishery catch never reached or exceeded the implemented ACL. Therefore, the lack of an in-season AM under Alternative 1 is not expected to result in any change to the fishery with respect to fishing gear, effort, participation, intensity, or areas fished, and catches are expected to be similar to those in recent years. Since ACLs were first implemented in 2012, the lowest estimated catch of BMUS from the boat-based fishery in Guam was in 2015 at 11,711 lb, and the greatest catch was in 2019 at 41,505 lb. The average annual catch from 2017 to 2019 was 29,532 lb (Table 5). This level of catch is approximately 82 percent of the six-year OFL of 36,000 lb estimated in the 2019 stock assessment (Langseth et al. 2019).

Collection of data, monitoring catch against the ACL, application of the post-season AM, and enforcement of other fishing regulations for the Guam bottomfish fishery would continue under Alternative 1. Without the implementation of an in-season AM, management review of fishery performance relative to a catch limit would only occur after the end of each fishing year.

Because fishing effort and catch is not expected to change from recent years, NMFS expects catch to remain near the recent annual average of 29,532 lb and, thus, would remain below the level that would prevent overfishing. Additionally, this level of catch, if maintained, would rebuild the Guam bottomfish stock complex from its overfished designation in 13 years. However, any years of relatively high catch due to variability in the fishery may cause the sustainable fishing levels identified in Langseth et al. (2019) to be exceeded and delay rebuilding. Implementing the status quo would address concerns by the Council regarding taking action for the fishery that may result in adverse impacts to the Guam fishing community, but this alternative is not consistent with the purpose and need to establish a rebuilding plan with mechanisms to ensure the fishery is rebuilt from its overfished state consistent with National Standard 1 requirements. Alternative 1 would, however, be consistent with other Magnuson-Stevens Act requirements, implementing regulations, and FEP provisions that require the Council to recommend and NMFS to set a catch limit for MUS on an annual basis.

Alternative 2: Implement an Annual Catch Limit of 27,000 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 2, NMFS would implement an ACL of 27,000 lb with an in-season AM to constrain fishery catch if the ACL were to be exceeded where NMFS would close fishing for BMUS in Federal waters for the remainder of the fishing year if available information indicates that catch would reach the ACL during the fishing year. As a higher performance standard, if the ACL is exceeded during any fishing year over the course of the rebuilding plan, NMFS would close the fishery in Federal waters until a coordinated management approach is developed that ensures catch in both Federal and territorial waters can be maintained at levels that allow the stock to rebuild. During a closure of Federal waters, NMFS would prohibit fishing for and possession of BMUS in Federal waters. Catch data to monitor the fishery comes from both the creel surveys and commercial receipt book program administered by DAWR, who provide NMFS with these data. NMFS would work with DAWR to encourage timely processing of data and would track catches toward the ACL during the fishing year as data are made available.

This alternative would set the ACL at approximately 40 percent of the ACLs most recently implemented in 2016 and 2017 (ACLs were not implemented in 2018 and 2019) and roughly 91 percent of the recent three-year average catch of 29,532 lb. It is not clear how often annual catches would exceed the ACL and trigger the AMs if catches are similar to those in recent years (Table 5), as annual catch from five of the past 10 years have exceeded the proposed ACL. However, if catches remain similar to the recent three-year average in the first year of the rebuilding plan, the fishery would likely attain the implemented ACL by November. A closure of Federal waters to bottomfish fishing could result in a reduction of catch of 668 lb in the first year of the plan if fishing occurs consistent with the proportion of bottomfish habitat in Federal waters versus territorial waters for a total of 28,864 lb to 29,532 lb. This reduction could increase to 7,796 lb in the following years of the rebuilding plan as the Federal waters are closed in accordance with the performance standard. It is anticipated that some fishing effort may be displaced from Federal waters to unrestricted territorial waters in response to a closure of Federal waters to bottomfish fishing without a complementary management in territorial waters. Continued harvest in territorial waters would limit the potential reduction in catch realized from a closure of Federal waters, so NMFS expects catch under this alternative during these years to be 21,736 lb to 29,532 lb (Section 2.4.1). The performance standard would close the fishery in

federal waters in subsequent years until NMFS and the Council amend the rebuilding plan to allow reopening of the fishery in Federal waters after a reasonable method of restricting fishing mortality at the level needed to rebuild in the target timeframe is implemented (Section 2.4.1). Thus, after the first year of the rebuilding plan, the expected annual catch would be 21,736 lb until a new management approach is developed. The fishery is not expected to change the way it fishes with respect to fishing gear, effort, participation, or intensity, but it could change slightly with respected to catch and areas fished since bottomfish fishing may be prohibited in Federal waters if catches remain consistent with the recent average. Alternative 2 provides some conservation benefit to the stock complex by implementing an ACL that would ensure that the fishery rebuilds in eight years and by closing Federal waters when the ACL is exceeded to limit fishing mortality in years where catches exceed the authorized level. Thus, under Alternative 2, the proposed rebuilding plan would provide a conservation benefit relative to the status quo with respect to restricting overfishing and rebuilding the fishery.

The catch level authorized under Alternative 2 would prevent overfishing and rebuild the bottomfish fishery in Guam from its overfished state in eight years. Though catch may exceed the level specified by the ACL due to continued fishing in territorial waters after a Federal fishery closure, catch and overfishing could be reduced compared to the status quo (Section 2.4.1). Implementing the ACL, AM, and performance standard for this alternative would restrict the fishery to harvesting bottomfish in quantities slightly lower than the recent three-year average. Alternative 2 has the potential to result in reduced fishery impacts on the bottomfish stock complex relative to Alternative 1 while limiting adverse social, cultural, and economic effects on the fishing community relative to Alternatives 3 and 4 by allowing a marginally lower catch than recent years.

Alternative 3: Implement an Annual Catch Limit of 16,299 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 3, NMFS would implement an ACL of 16,299 lb with an in-season AM to constrain fishery catch if the ACL were to be exceeded where NMFS would close fishing for BMUS in Federal waters for the remainder of the fishing year if available information indicates that catch would reach the ACL during the fishing year. As a higher performance standard, if the ACL is exceeded during any fishing year over the course of the rebuilding plan, NMFS would close the fishery in Federal waters until a coordinated management approach is developed that ensures catch in both Federal and territorial waters can be maintained at levels that allow the stock to rebuild. During a closure of Federal waters, NMFS would prohibit fishing for and possession of BMUS in Federal waters. Catch data to monitor the fishery comes from both the creel surveys and commercial receipt program administered by DAWR, who provide NMFS with these data. NMFS would work with DAWR to encourage timely processing of data and would track catches toward the ACL during the fishing year as data are made available.

This alternative would set the ACL at approximately 25 percent of the ACLs most recently implemented in 2016 and 2017 and roughly 55 percent of the recent three-year average catch of 29,532 lb. It is anticipated that annual catches could reach the ACL and trigger the AM roughly halfway through the first year of the rebuilding plan, as catches for the fishery in eight of the past 10 years have exceeded the level of authorized catch. If catches remain similar to the recent three-year average, the fishery would exceed the implemented ACL by July in the first year, and

NMFS would close the fishery in Federal waters for the remainder of the fishing year in accordance with the in-season AM and for subsequent years in accordance with the performance standard. A closure of Federal waters in the first year of the rebuilding plan could result in a reduction of catch of 3,494 lb, and expected catch in 2022 would be 26,038 lb to 29,532 lb (Section 2.5.1). The implementation of the performance standard would close the Federal fishery in subsequent years until a reasonable method of restricting fishing mortality at the level needed to rebuild in the target timeframe is implemented. For each of these years, expected annual catch would be 21,763 lb, similar to Alternative 4. It is anticipated that some fishing effort may be displaced from Federal waters to unrestricted territorial waters in response to a closure of Federal waters to bottomfish fishing without a complementary management in territorial waters. Continued harvest in territorial waters would limit the potential reduction in catch realized from a closure of Federal waters, so NMFS expects catch under this alternative during these years to be 21,736 lb to 29,532 lb (Section 2.5.1). Overall, the fishery is not expected to change the way it fishes with respect to fishing gear, effort, participation, or intensity, but it could change slightly with respected to catch and areas fished since bottomfish fishing will likely be prohibited in Federal waters for a large portion of the rebuilding plan. Alternative 3 provides greater conservation benefit to the stock complex than the status quo and Alternative 2 by implementing an ACL intended to rebuild the stock complex in four years, although continued fishing in territorial waters after the ACL is reached would likely extend the rebuilding time to five to eight years. Thus, under Alternative 3, the proposed rebuilding plan would provide a conservation benefit relative to the status quo and Alternative 2 with respect to preventing overfishing and rebuilding the fishery.

The catch level authorized under Alternative 3 would prevent overfishing and rebuild the bottomfish fishery in Guam from its overfished state in four years, however expected exceedances of the ACL and continued fishing in territorial waters would likely delay the rebuilding timeline to be at least five to eight years. It is likely that catch would exceed the level specified by the ACL due to continued fishing in territorial waters after a Federal fishery closure, though the proposed management would reduce catch and overfishing compared to the status quo alternative (Section 2.5.1). Implementing the ACL and AMs for this alternative would be more restrictive than recent ACL recommendations by the Council and its SSC and would restrict fishery harvest of bottomfish to quantities less than observed in recent years. Alternative 3 has the potential to result in reduced fishery impacts on the bottomfish stock complex relative to Alternatives 1 and 2, but does less to mitigate adverse social, cultural, and economic effects on the fishing community.

Alternative 4: Establish a Temporary Moratorium on Bottomfish Fishing in Federal Waters around Guam

Under Alternative 4, NMFS would prohibit fishing for and possession of BMUS in Federal waters around Guam. This alternative is functionally equivalent to an ACL of 0 lb and is the maximum action that the Council could recommend for NMFS to implement to address the overfishing of Guam bottomfish. There would be no AM or performance standard associated with this alternative because catch would not need to be tracked against an ACL. As for all other alternatives, catch would continue to be monitored by DAWR and summarized by the Council in its annual SAFE report (e.g., WPRFMC 2020a).

Because a large amount of the bottomfish habitat around Guam is in territorial waters (see Figure 1), NMFS expects closing Federal waters to reduce catch for the fishery only moderately relative to the other action alternatives. If the fishery continues harvest as it has in recent years at an annual average of 29,532 lb, catch of Guam BMUS may be reduced by 7,796 lb from the average to a total of 21,736 lb due to the Federal fishery closure (Section 2.6.1). However, NMFS expects the displacement of some fishing activity from Federal waters to territorial waters if a closure were to be implemented. Thus, NMFS expects catch under this alternative to range from 21,736 lb to 29,532 lb. The fishery is not expected to make any significant changes to its fishing gear, effort, participation, or intensity as a result of this alternative, but NMFS expects moderate changes for the total amount of catch and areas fished since bottomfish fishing would be prohibited in Federal waters. Due to the moderate reduction in catch expected under this alternative, it would provide some conservation benefit to the Guam bottomfish stock complex relative to all other alternatives. Under the authorized level of annual catch (0 lb), NMFS would expect stock complex to rebuild in two years, but due to continued fishing in territorial waters, rebuilding would likely take five years.

This alternative would prohibit all BMUS fishing in Federal waters to rebuild the fishery, but NMFS expects fishing to continue in territorial waters. However, NMFS expects that the proposed management would reduce catch and overfishing compared to all other alternatives (Section 2.6.1). Implementing Alternative 4 would not address concerns by the Council or its SSC associated with negative impacts to the local fishing community due to the immediate closure of the offshore banks around Guam to bottomfish fishing. Alternative 4 has the potential to reduce adverse effects to the Guam bottomfish stock relative to Alternatives 1 through 3, however, Alternative 4 does not reduce adverse social, cultural, and economic effects on the Guam fishing community to the same extent as the other action alternatives since it would prohibit all bottomfish fishing in Federal waters for the duration of the rebuilding plan. Additionally, this alternative would do less than all other alternatives to address Council concerns regarding negative impacts to the Guam fishing community associated with restricting catch of bottomfish around Guam.

3.3.2 Target, Non-Target, and Bycatch Species

The bottomfish fishery in Guam primarily targets and harvests a complex of 13 species comprised of emperors, snappers, groupers, and jacks (Table 1). BMUS are typically monitored at the complex level, and the 2019 stock assessment (Langseth et al. 2019) provides stock status and biomass projections at this level. Therefore, NMFS would apply the proposed rebuilding plan under the action alternatives to the Guam bottomfish stock complex as a whole rather than to the 13 individual species comprising the group.

The primary sources of information on target, non-target, and bycatch species associated with Guam bottomfish are NMFS stock assessments by Brodziak et al. (2012), Yau et al. (2016), and Langseth et al. (2019) as well as data provided by NMFS and summarized in the Council's annual SAFE report (e.g., WPRFMC 2020a). Most recently, Langseth et al. (2019) estimated the long-term MSY for the stock complex to be 42,100 lb and the six-year OFL proxy at 36,000 lb for 2020 to 2025. The assessment also concluded that the Guam bottomfish stock complex is overfished but not experiencing overfishing (Section 2.1.1). Between 2017 and 2019, the fishery

harvested an average of 29,532 lb (Table 5), which is approximately 70 percent of the MSY and 82 percent of the OFL from the 2019 stock assessment.

The Magnuson-Stevens Act defines bycatch as finfish, mollusks, crustaceans, and all other forms of marine animal and plant life (other than marine mammals and seabirds) that are harvested in a fishery that are not sold or kept for personal use. Bycatch can be further described as either economic or regulatory discards. Economic discards are fish that are discarded because they are of undesirable size, sex, or quality, while regulatory discards are fish that are discarded because regulations do not allow fishermen to retain the fish. Since almost all fishes caught in Guam are considered food fishes, the few discards that occur may be due to regulatory requirements or shark depredation. Data on bycatch harvested in the Guam bottomfish fishery is collected through the boat-based and shore-based creel survey programs run by DAWR and is reported by the Council in its annual SAFE reports. Bottomfish fishing is target-specific, and all but three fish recorded in creel survey fishermen interviews for the bottomfish fishery were kept in 2019 for a bycatch rate of 0.35 percent (see Table 33 in WPRFMC 2020a). Thus, there is no current concern regarding non-target or bycatch species in the fishery.

3.3.2.1 Potential Effects of the Alternatives on Guam Bottomfish

Alternative 1: Status Quo

Under Alternative 1, the Council would recommend and NMFS would implement an ACL of 27,000 lb with no in-season AM to prevent the ACL from being exceeded but with a post-season AM to correct overages. Because recent average catch values for the Guam bottomfish fishery have not approached the ACLs previously specified for the fishery and no in-season AMs were implemented, the previous ACLs did not functionally constrain the fishery. Despite catches slightly increasing in 2018 and 2019 when no ACLs were implemented, this could be due to inherent variability in the fishery (see Section 2.3.1). Due to the lack of an in-season AM under the status quo alternative, NMFS expects the fishery to continue operating as it has in recent years with respect to species targeted, catch, effort, participation, intensity, and areas fished (Section 2.3.1). Annual catches under Alternative 1 are expected to be consistent with the recent three-year average of 29,532 lb. While the stock complex may be able to rebuild at this level of catch in 13 years, there would be no management in place to restrict catch if it exceeds sustainable levels of harvest specified in the stock assessment (Langseth et al. 2019). The lack of an in-season AM under Alternative 1 would not prevent overfishing or ensure rebuilding in years of high catch, so this alternative is not consistent with the purpose and need of this proposed action.

Alternative 2: Implement an Annual Catch Limit of 27,000 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 2, NMFS intends the authorized catch level to prevent overfishing while rebuilding the Guam bottomfish fishery to its B_{MSY} in eight years. However, based on recent annual catch levels, it is possible that the fishery could consistently exceed the authorized level of catch. If the ACL is reached and Federal waters are closed to the fishery in accordance with the in-season AM and performance standard, NMFS expects that there would be displacement of fishing effort to territorial waters where the majority of bottomfish EFH around Guam is situated; such a displacement would delay increase expected catch and delay the proposed

rebuilding timeline. It is anticipated, even with fishery operations continuing normally in territorial waters after a closure of Federal waters, that Alternative 2 would reduce catch in years consistent with the recent three-year average (i.e., 29,532 lb) by 668 to 7,769 lb. Thus, this alternative would reduce expected catch and promote rebuilding to a greater extent than the status quo alternative. While bottomfish harvested in territorial waters are expected to continue experiencing consistent fishing effort, there may be beneficial effects for fish populations at offshore banks in Federal waters (see Figure 1) if a Federal closure is implemented. In summary, NMFS expects Alternative 2 to rebuild the Guam bottomfish fishery in five to eight years and has mechanisms in place to restrict fishing once catch attains the ACL, so fishery impacts on bottomfish populations around Guam would be less likely to occur than under the status quo alternative.

The implementation of the proposed ACL and AMs is not expected to cause large changes in fishery operations relative to recent years and catch levels may only be slightly less than the recent annual average. Fishing may persist in territorial waters if a Federal closure is implemented, but the application of in-season and post season AMs would lessen the impact to the rebuilding timeline under this alternative. The implementation of a Federal closure would likely be late in the fishing year due to the nature of recent average catches relative to the proposed ACL, but the closure would also be likely to provide some conservation benefit to the Guam bottomfish stock complex. If catches continue to be similar to recent annual average, the fishery could rebuild from its overfished state in approximately eight years due to reductions in catch from the closure of Federal waters. The maximum possible action that the Council could recommend for NMFS to implement under Alternative 4 (Section 2.6) would achieve rebuilding of the fishery in five years, but Alternative 2 would allow harvest of bottomfish in Federal waters until the ACL is reached in consideration of mitigating social, cultural, and economic impacts to the Guam fishing community while providing more potential conservation benefits than the status quo.

Alternative 3: Implement an Annual Catch Limit of 16,299 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 3, NMFS intends the authorized catch level to prevent overfishing while rebuilding the Guam bottomfish fishery to its B_{MSY} in four years. However, NMFS expects that the fishery would exceed this level of catch given normal operations of the fishery and due to the displacement of fishing effort to territorial waters, where a large amount of bottomfish EFH around Guam is situated. In the likely event of a Federal fishery closure after the ACL is reached, the rebuilding timeline would be delayed. It is anticipated, even with fishery operations continuing normally in territorial waters after a closure of Federal waters, that Alternative 3 would reduce catch by 3,494 lb to 7,796 lb from the recent annual average of 29,532 lb expected under the status quo. Because this alternative would reduce expected catch from the recent average, it would also reduce overfishing relative to the status quo and allow for rebuilding of the stock complex from its overfished designation, albeit in about five to eight years. While bottomfish harvested in territorial waters are expected to continue experiencing consistent fishing effort, there may be beneficial effects for fish populations at offshore banks in Federal waters (see Figure 1) if a Federal closure is implemented. In summary, NMFS expects Alternative 3 to promote rebuilding to a greater extent than the status quo, so the proposed management could slightly diminish fishery impacts on bottomfish populations around Guam.

While the implementation of the proposed ACL, AM, and performance standard is not expected to cause large changes in fishery operations relative to recent years, catch levels may be slightly reduced compared to the recent annual average. Fishing may persist in territorial waters if a Federal closure is implemented, but rebuilding would still be allowed consistent with the stated purpose and need of this action. The expected closure of Federal waters would likely provide some conservation benefit to the Guam bottomfish stock complex. If the fishery operates under the level of catch authorized by this alternative, NMFS expects the fishery to rebuild in four years; however, if fishing activity continues similar to the recent annual average, rebuilding would likely take closer to five to eight years. The maximum possible action that the Council could recommend for NMFS to implement under Alternative 4 (Section 2.6) would likely achieve rebuilding of the fishery in five years, but Alternative 3 would allow some catch from Federal waters prior to any ACL exceedence. Thus, Alternative 3 has additional consideration for mitigating social, cultural, and economic impacts to the Guam fishing community than Alternative 4 and additional conservation benefit relative to the status quo and Alternative 2.

Alternative 4: Establish a Temporary Moratorium on Bottomfish Fishing in Federal Waters around Guam

Under Alternative 4, NMFS expects the closure of Federal waters around Guam to bottomfish fishing to result in moderately less catch than each of the other action alternatives and would more likely rebuild the fishery in five years instead of the two years expected with zero fishing mortality due to continued fishing in territorial waters. The expected reduction in catch from a Federal closure could be 7,796 lb from the recent average catch of 29,532 lb for a total of 21,763 lb (Section 2.6.1), but displacement of fishing effort from Federal to territorial waters could offset the expected reduction in catch. Therefore, NMFS expects the proposed management to prevent overfishing relative to the status quo alternative. Bottomfish populations at the offshore banks in Federal waters would likely have some conservation benefit from a Federal closure if implemented, but fish harvested in territorial waters would likely experience continued fishing effort consistent with the baseline. Thus, the provisions of Alternative 4 are expected to moderately reduce total catch relative to all other alternatives while rebuilding the stock complex in the shortest time possible, so fishery impacts to Guam bottomfish would also be relatively less than under each of the other alternatives.

Overall, NMFS expects the closure of Federal waters around Guam to bottomfish fishing under Alternative 4 to result in the largest reduction to annual catches for the fishery among the action alternatives. Fishing is still likely to occur in territorial waters, but the stock complex could rebuild consistent with the purpose and need of this action. There would also be some conservation benefit to the stock complex due to the reduction in catch from the complete closure of Federal waters to the fishery. Thus, Alternative 4 would provide a greater conservation benefit than all other alternatives.

3.3.2.2 Potential Effects of the Alternatives on Non-Target Species and Bycatch

Alternative 1: Status Quo

With the same ACL and AM as already specified for the fishery for 2020 to 2022, NMFS expects that the Guam bottomfish fishery would continue to operate as it has in recent years with respect to catch, species targeted, effort, participation, intensity, and areas fished due to the lack

of an in-season AM to functionally constrain the fishery (Section 2.3). Any catch of non-target species and bycatch would continue to be reported by the creel survey program and commercial receipt book program and summarized in the Council's annual SAFE report, which would allow for any changes in the fishery to be monitored. Any notable changes in the catch of non-target species and bycatch could be observed and addressed by fisheries scientists and managers in future management measures. However, NMFS expects that the Guam bottomfish fishery would continue to be target-specific for BMUS under Alternative 1, and, thus, no increases in catches of non-target species and bycatch are anticipated. Therefore, there are no additional impacts expected under the status quo on non-target species and bycatch if fishery operations remain consistent with recent years.

Alternative 2: Implement an Annual Catch Limit of 27,000 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 2, NMFS expects that the Guam bottomfish fishery would continue to operate similar to recent years with respect to species targeted, effort, participation, and intensity with slight changes to catch and areas fished in the event of Federal closure (Section 2.4). Because the majority of bottomfish habitat around Guam is found in territorial waters (approximately 73.6 percent, see Figure 1), it is not expected that the area fished by the fishery would substantially change in the event of a Federal closure. Catch would also be expected to slightly decrease due to the implementation of Federal closures (Section 2.4.1). Thus, since there has recently been extremely low bycatch in the fishery (10-year average bycatch rate of 0.21 percent; see Table 33 in WPRFMC 2020a), shifts in bottomfish fishing due to a Federal closure are not likely to change the relative impact of the fishery on non-target species and bycatch. Because the fishery would not substantially change under Alternative 2 relative to the status quo, catch of non-target species and bycatch are expected to remain low. NMFS and the Council would continue to track catches of all species harvested in the fishery through the creel survey program and the commercial receipt book program, and these data would continue to be summarized by the Council in its annual SAFE report. If relative impacts to non-target species and bycatch are noted to change at some point in the future, fishery scientists and managers would be able to address these changes in future management measures. There are no impacts expected from the proposed ACL, AM, and performance standard under this alternative on non-target species and bycatch if fishery operations do not change substantially relative to recent years.

Alternative 3: Implement an Annual Catch Limit of 16,299 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 3, NMFS would prohibit bottomfish fishing in Federal waters after the cumulative catch for the year reaches 16,299 lb, likely just over halfway through the first fishing year of the rebuilding plan and for the full year in subsequent years until a new management approach is developed in accordance with the performance standard. Because the majority of bottomfish habitat around Guam is found in territorial waters (see Figure 1), it is not expected that the area fished by the fishery would substantially change in the event of a Federal closure. Catches, however, may be reduced due to the implementation of Federal closures. Thus, since there has recently been extremely low bycatch in the fishery (10-year average bycatch rate of 0.21 percent; see Table 33 in WPRFMC 2020a), shifts in bottomfish fishing due to a Federal closure are not likely to change the relative impact of the fishery on non-target species and bycatch. Additionally, species targeted, effort, participation, and intensity are not anticipated to

change drastically under Alternative 3 (Section 2.5.1). Because the fishery would not substantially change under Alternative 3 relative to the status quo, catch of non-target species and bycatch are expected to remain low. NMFS and the Council would continue to track catches of all species harvested in the fishery through the creel survey program and the commercial receipt book program, and these data would continue to be summarized by the Council in its annual SAFE report. If relative impacts to non-target species and bycatch are noted to change at some point in the future, fishery scientists and managers could address these changes in future management measures.

Alternative 4: Establish a Temporary Moratorium on Bottomfish Fishing in Federal Waters around Guam

Under Alternative 4, NMFS would prohibit bottomfish fishing in the Federal waters around Guam. Similar to Alternatives 2 and 3, because there is very low recorded catch of non-target species and bycatch in the Guam bottomfish fishery (i.e., 10-year average bycatch rate of 0.21 percent; see Table 33 in WPRFMC 2020a) and large changes in the area fished by the fishery are not expected due to bottomfish habitat primarily occurring in territorial waters, large changes in the catch of non-target species and bycatch are not expected under this alternative. Similarly, drastic changes are not expected for species targeted, effort, participation, and intensity due to the implementation of a Federal closure. NMFS and the Council would continue to track the catches of all species in the fishery, which would be summarized and reported in the Council's annual SAFE reports. Fishery scientists and mangers could detect any change in impacts to non-target species and bycatch using these data and address these changes in future management measure if they occur.

3.3.3 Protected Species in Guam

There are several protected species known to occur in the waters around Guam, and thus, there exists potential for the Guam bottomfish fishery to interact with these protected species. NMFS has evaluated potential impacts on protected species by the Guam bottomfish fishery such that they can be managed in compliance with the Magnuson-Stevens Act, the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), and other laws as applicable. More detailed descriptions of protected species around Guam are available in Section 3.3.4 of the FEP for the Mariana Archipelago (WPRMFC 2009) and online on the NMFS website.

3.3.3.1 Applicable ESA Coordination for Guam

In a biological opinion submitted on March 8, 2002, for the FMP for Bottomfish and Seamount Groundfish Fisheries of the Western Pacific, NMFS determined that bottomfish and seamount groundfish fisheries of the western Pacific region (including the bottomfish fishery of Guam) that operate in accordance with regulations implementing the FMP to jeopardize the continued existence of any threatened or endangered species under NMFS's jurisdiction. Critical habitat is not designated for any species in Guam, so the bottomfish fishery does not adversely modify critical habitat of any ESA-listed species. Bottomfish fishing vessels are either anchored or slowly moving while fishing, and there have been no reports of observations of substantial interactions between the Guam bottomfish fishery and ESA-listed protected species.

In 2009, the Council recommended and NMFS approved the development of five archipelagic-based FEPs, including the FEP for the Mariana Archipelago. The FEP incorporated and

reorganized elements of the Council's species-based FMPs, including the Bottomfish and Seamount Groundfish Fisheries FMP into a spatially-oriented management plan (75 FR 2198, January 14, 2010). The Council retained all applicable regulations pertaining to bottomfish fishing in the development and implementation of the FEP for the Mariana Archipelago.

There have been several new species added to the list of threatened and endangered species since the 2002 biological opinion by NMFS. On July 3, 2014, NMFS published a final rule that listed four distinct population segments (DPSs) of scalloped hammerhead sharks under the ESA (79 FR 38213), and it was shown that the threatened Indo-West Pacific DPS occurs around Guam. On September 10, 2014, NMFS published a final rule that listed 20 species of reef-building corals as threatened under the ESA (79 FR 53852), and three of those species may occur around Guam. On April 2, 2015, NMFS determined that the continued authorization of the coral reef, bottomfish, crustacean, and precious coral fisheries under the FEP for the Mariana Archipelago is not likely to adversely affect the Indo-West Pacific DPS of scalloped hammerhead sharks or ESA-listed reef building corals.

On January 22, 2018, NMFS issued a final rule to list the giant manta ray as a threatened species under the ESA (83 FR 2916). On January 30, 2018, NMFS issued a final rule to list the oceanic whitetip shark as a threatened species under the ESA (83 FR 4153). On September 28, 2018, NMFS issued a final rule to list the chambered nautilus as a threatened species under the ESA (83 FR 48976), however, chambered nautilus are not known to occur around Guam (NMFS, 2019a). In response to these listings, NMFS reinitiated consultation under the ESA on June 5, 2019, as required by 50 CFR 402.16, to seek concurrence that the Guam bottomfish fishery is not likely to adversely affect the oceanic whitetip shark, giant manta ray, or chambered nautilus. Based on the information in the biological evaluation prepared to support this consultation (NMFS 2019a), NMFS concluded that the Mariana Archipelago bottomfish fisheries (1) may affect, through incidental capture in fishing operations, the oceanic whitetip shark in Guam and the CNMI; and (2) may affect, but is not likely to adversely affect, the giant manta ray in Guam. On June 6, 2019, August 11, 2020, and December 15, 2020, NMFS determined that during the period of consultation, the continued operation of the bottomfish fishery in Guam is not likely to jeopardize the oceanic whitetip shark or giant manta ray, would not violate ESA section 7(a)(2), and would not result in an irreversible or irretrievable commitment of resources precluding implementation of any reasonable and prudent alternatives (NMFS 2019b; NMFS 2020a; NMFS 2020b).

Additional information is provided on sea turtles, marine mammals, seabirds, corals, giant manta rays, and sharks in Guam in the following sections.

3.3.3.2 Sea Turtles in Guam

All sea turtles are subject to protection under the ESA in Guam. Direct harvest, direct harm, and indirect harm are prohibited unless otherwise authorized. NMFS has coordinated the continued authorization of the Guam bottomfish fishery under Section 7 of the ESA. All six sea turtle species occurring in U.S. waters are listed under the ESA. The range of four of these species overlaps with the EEZ around Guam, and they may be encountered by fishermen. Table 13 lists the sea turtle species reasonably likely to occur around Guam. No critical habitat has been established for any sea turtle species in Guam.

Table 13. ESA-listed sea turtles known to occur or reasonably expected to occur in waters around Guam.

Common names/DPS if applicable	Scientific Name	ESA listing status in Guam	Occurrence in Guam	Interactions with the Guam bottomfish fishery through 2019
Green sea turtle (haggan betde) Central West Pacific DPS	*Chelonia mydas*	Endangered DPS	Most common turtle in the Mariana Archipelago. Foraging and minor nesting confirmed.	No interactions observed or reported.
Hawksbill sea turtle (haggan karai)	*Eretmochelys imbricata*	Endangered	Small population foraging with low level nesting.	No interactions observed or reported.
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	Occasional sightings. Overall occurrence is unknown.	No interactions observed or reported.
Olive ridley sea turtle	*Lepidocheylys olivacea*	Threatened	Range across the Pacific Ocean; not confirmed around Guam.	No interactions observed or reported.
Loggerhead sea turtle	*Caretta caretta*	Endangered	May range in the waters of the Mariana Archipelago.	No interactions observed or reported.

On September 22, 2011, NMFS published a final rule determining that the world loggerhead turtle population was comprised of nine DPSs, five of which are an endangered and four that are threatened. While the north Pacific Loggerhead sea turtle DPS may range into the waters around Guam (NMFS 2009), there are no known reports of loggerhead sea turtles in the waters around the Mariana Archipelago (WPRFMC 2009). On April 6, 2016, NMFS and USFWS published a final rule finding that the green sea turtle is composed of 11 DPSs and proposed to replace the current range-wide listing with listing of the DPSs as threatened or endangered (81 FR 20057). The population around Guam is part of the Central West Pacific DPS, which is now listed as endangered.

Sea turtles currently face many threats, including (1) direct harvest of animals and eggs or predation; (2) incidental interactions with fisheries; (3) collisions with vessels and automobiles; (4) urban development / loss of habitat; (5) pollution (e.g., plastics); and (6) climate change. Sea turtle conservation initiatives are also in place, including restoration of habitats, laws to protect turtles, and management of threats to help provide for recovery. More information on the conservation of sea turtles is available on the NMFS website.

Both commercial and non-commercial fisheries have the potential to cause adverse effects to sea turtles, including injuries and mortalities that occur incidental to fishing, such as fishing gear or

vessel interactions. The most likely impacts of the bottomfish fishery in Guam on sea turtles is the potential for vessel collisions causing injuries and mortalities. The frequency of this type of effect is unknown in Guam. However, given the modest number of bottomfish fishing vessels in Guam (an estimated 84 vessels; WPRFMC 2020a), and the fact that bottomfish fishing occurs while either at anchor or slowly drifting over fishing grounds, sea turtle collisions with vessels in this fishery are expected to be rare. As Table 13 indicates, no records exist of interactions between the Guam bottomfish fishery and sea turtles.

A 2002 NMFS Biological Opinion on the FMP for Bottomfish and Seamount Groundfish Fisheries in the Western Pacific Region found that,

> Although hawksbill, leatherback, loggerhead, and olive ridley turtles may be found within the action area and could interact with the FMP bottomfish fishery, there have been no reported or observed incidental takes of these species in the history of the bottomfish fisheries. In addition, hawksbill, leatherback, and olive ridley turtle species are likely to occur only very rarely in the action area. Therefore, NMFS concludes that the proposed action is not likely to adversely affect hawksbill, leatherback, loggerhead, and olive ridley turtles.

Similarly, the Biological Opinion found that,

> Prior biological opinions discussed the potential for adverse effects from vessel lighting and activity near and around nesting beaches utilized by the green turtle. There are no documented green turtle takes resulting from past fishery operations near nesting beaches. There are also no documented takes of green turtles from past fishing operations. Therefore, NMFS concludes that the proposed action is not likely to adversely affect green turtles.

On March 13, 2015, NMFS reinitiated consultation in response to ESA listing of several reef-building corals and the Indo-West Pacific DPS of scalloped hammerhead shark. The supporting biological evaluation found no new information to indicate that the Guam bottomfish fishery may affect ESA-listed marine mammals and turtles or critical habitat in a manner or to an extent not previously considered in prior consultations (NMFS 2015). On June 5, 2019, NMFS reinitiated consultation with respect to the fishery's impacts on the oceanic whitetip shark and giant manta ray and requested confirmation that the previous determinations that the fishery is not likely to adversely affect turtles remain valid. Methods, locations, and target species of fishery operations have not changed substantially since 2002. Also, the fishery has not had any known interactions with sea turtles. Based on this information, it is reasonably concluded that the analysis in the 2002 consultation and the conclusion that the fishery is not likely to adversely affect turtles remain valid.

Potential Effects of the Alternatives on Sea Turtles in Guam

Alternative 1: Status Quo

Under Alternative 1, NMFS would implement same ACL and post-season AM for the Guam bottomfish fishery as specified for 2020 through 2022. The 2002 ESA consultation evaluated the

potential impact of the Guam bottomfish fishery prior to the implementation of management measures such as ACLs, and the lack of an in-season AM to functionally constrain the fishery under this alternative is not expected to change the conduct of the fishery relative to operations considered under this consultation. NMFS expects the fishery to continue catching bottomfish as it has in recent years under the status quo (Section 2.3.1). Because Alternative 1 is not expected to result in changes to fishing activity relative to years considered in previous consultations, this alternative would not increase the potential for, or severity of, interactions between the fishery and ESA-listed sea turtles. The fishery is not likely to adversely affect any ESA-listed sea turtle species under this alternative, and vessel collisions are expected to be rare. In summary, previous consultations found that the Guam bottomfish fishery is not likely to adversely affect sea turtles, and because fishing activity under Alternative 1 is not expected to change, this alternative is not likely to cause any adverse effects to ESA-listed sea turtle species.

Alternative 2: Implement an Annual Catch Limit of 27,000 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 2, NMFS expects BMUS catch in future years to be slightly less than the recent average and may be restricted by a closure of Federal waters if the ACL is exceeded (Section 2.4.1). Because there have been no reported interactions with any species of sea turtles for this fishery in territorial or Federal waters, this change is not expected to affect the number of interactions. Additionally, NMFS expects fishing activity under Alternative 2 to be slightly less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and listed sea turtles. Thus, implementation of Alternative 2 is not expected to change or increase interactions with listed sea turtles in any way not already considered in prior consultations. Under this alternative, the fishery is not likely to adversely affect any listed sea turtle species, vessel collisions would be rare, and there is no anticipated change to the number, severity, or types of interactions with sea turtles.

Alternative 3: Implement an Annual Catch Limit of 16,299 lb, an In-Season Accountability Measure, and a Post-Season Accountability Measure

Under Alternative 3, NMFS expects BMUS catch in future years to be less than the recent average due to the closure of Federal waters when the ACL is reached in accordance with the in-season AM and performance standard, which may result in the displacement of fishing activity to unrestricted territorial waters (Section 2.5.1). Because there have been no reported interactions with any species of sea turtles for this fishery in territorial or Federal waters, this change is not expected to affect the number of interactions. Additionally, NMFS expects fishing activity under Alternative 3 to be less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and listed sea turtles. Thus, implementation of Alternative 3 is not expected to change or increase interactions with listed sea turtles in any way not already considered in prior consultations. Under this alternative, the fishery is not likely to adversely affect any listed sea turtle species, vessel collisions would be rare, and there is no anticipated change to the number, severity, or types of interactions with sea turtles.

Alternative 4: Establish a Temporary Moratorium on Bottomfish Fishing in Federal Waters around Guam

Under Alternative 4, NMFS expects BMUS catch to be moderately reduced from the recent average due to the closure of Federal waters around Guam to bottomfish fishing, though some fishing may be displaced into territorial waters (Section 2.6.1). Since this fishery has no reported interactions with any species of sea turtle in territorial or Federal waters, this change is not expected to affect the number of interactions in the fishery. NMFS expects that fishing activity under Alternative 4 would be moderately less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and listed sea turtles in any way not already considered in prior consultations. Thus, implementation of Alternative 3 is not expected to change or increase interactions with listed sea turtles. Under this alternative, the fishery is not likely to adversely affect any listed sea turtle species, vessel collisions would be rare, and there is no anticipated change to the number, severity, or types of interactions with sea turtles.

All Alternatives

Overall, no alternative considered would substantially change fishing activity in the Guam fishery such that there would be adverse effects to listed sea turtles that have not already been considered in prior consultations of the fishery under the ESA. On June 5, 2019, NMFS reinitiated consultation in response to the listing of the oceanic whitetip shark, giant manta ray, and chambered nautilus to seek concurrence that the Guam bottomfish fishery may affect, but is not likely to affect, any sea turtle.

3.3.3.3 Marine Mammals in Guam

Marine mammal species that are reasonably likely to occur in the Mariana Archipelago are listed in Table 14. In accordance with ESA Section 7(a)(2), NMFS previously evaluated the potential impacts of the Guam bottomfish fishery to ESA-listed marine mammals and determined that the fishery is not likely to adversely affect any species or critical habitat in the action area. NMFS documented its determinations in a Biological Opinion for bottomfish fisheries on March 8, 2002 and a Letter of Concurrence for bottomfish fisheries on June 3, 2008. The MMPA prohibits, with certain exceptions, taking of marine mammals in the U.S. and by persons aboard U.S. flagged vessels (i.e., persons and vessels subject to U.S. jurisdiction). Additionally, the ESA lists five whale species known to occur in the EEZ around Guam (see note under Table 14). Additionally, a single ESA-listed dugong that was observed in Cocos Lagoon in 1975 (Randall et al. 1975). There have been no reports of dugong sightings since then.

Table 14. Marine mammals known to occur or reasonably expected to occur in waters around Guam.

Common Name	Scientific Name	Interactions with the Guam bottomfish Fishery through 2019
Humpback whale*	*Megaptera novaeangliae*	No interactions observed or reported.
Sperm whale*	*Physeter macrocephalus*	No interactions observed or reported.
Blue whale*	*Balaenoptera musculus*	No interactions observed or reported.

Common Name	Scientific Name	Interactions with the Guam bottomfish Fishery through 2019
Fin Whale*	*Balaenoptera physalus*	No interactions observed or reported.
Sei whale*	*Balaenoptera borealis*	No interactions observed or reported.
Blainville's beaked whale	*Mesoplodon densirostris*	No interactions observed or reported.
Bottlenose dolphin	*Tursiops truncatus*	No interactions observed or reported.
Bryde's whale	*Balaenoptera edeni*	No interactions observed or reported.
Common dolphin	*Delphinus delphis*	No interactions observed or reported.
Cuvier's beaked whale	*Ziphius cavirostris*	No interactions observed or reported.
Dwarf sperm whale	*Kogia sima*	No interactions observed or reported.
Dugong*	*Dugong*	No interactions observed or reported.
False killer whale	*Pseudorca crassidens*	No interactions observed or reported.
Fraser's dolphin	*Lagenodelphis hosei*	No interactions observed or reported.
Killer whale	*Orcinus orca*	No interactions observed or reported.
Longman's beaked whale	*Indopacetus pacificus*	No interactions observed or reported.
Melon-headed whale	*Peponocephala electra*	No interactions observed or reported.
Minke whale	*Balaenoptera acutorostrata*	No interactions observed or reported.
Pygmy killer whale	*Feresa attenuata*	No interactions observed or reported.
Pygmy sperm whale	*Kogia breviceps*	No interactions observed or reported.
Risso's dolphin	*Grampus griseus*	No interactions observed or reported.
Rough-toothed dolphin	*Steno bredanensis*	No interactions observed or reported.
Short-finned pilot whale	*Globicephala macrorhynchus*	No interactions observed or reported.
Spinner dolphin	*Stenella longirostris*	No interactions observed or reported.
Spotted dolphin	*Stenella attenuata*	No interactions observed or

Common Name	Scientific Name	Interactions with the Guam bottomfish Fishery through 2019
		reported.
Striped dolphin	*Stenella coeruleoalba*	No interactions observed or reported.

(Source: Eldredge 2003; Randall et al. 1975; Guam DAWR 2006; Council website: http://www.wpcouncil.org)
* Species is also listed under the ESA.

Marine Mammal Protection Act Coordination

The MMPA prohibits, with certain exceptions, taking of marine mammals in the U.S. and by persons aboard U.S. flagged vessels (i.e., persons and vessels subject to U.S. jurisdiction). NMFS classifies the Guam bottomfish fishery as a Category III fishery under Section 118 of the MMPA (85 FR 21079, April 16, 2020). A Category III fishery is one with a low likelihood or no known incidental takings of marine mammals.

Potential Effects of the Alternatives on Marine Mammals in Guam

None of the alternatives considered are expected to impact marine mammals because the Guam bottomfish fishery is not known to affect marine mammals through gear interactions or through disruptions in or adverse effects on prey, and no alternative would change the conduct of the bottomfish fishery in a manner that would alter the type or frequency of marine mammal interactions with the fishery.

Alternative 1: Status Quo

Under Alternative 1, the Council would recommend and NMFS would implement the same ACL and post-season AM applied to the fishery in the most recent management action, with no in-season AM to functionally constrain the fishery. The bottomfish fishery is not known to adversely affect marine mammals in terms of noise, water pollution, accidental entanglement, or competition for food resources. No interactions have been reported between the fishery and marine mammals (Table 14). There have been no comprehensive diet studies of piscivorous marine mammals in Guam and their relationship to the fishery to date. However, evaluation of the bottomfish fishery in Hawaii did not find that it would adversely modify prey populations important to the insular false killer whale (NMFS 2018). The bottomfish fishery in Guam is similar in terms of gear, methods, and species targeted, so it can be reasonably concluded that the fishery is not adversely affecting prey available to marine mammals. Under Alternative 1, the fishery would continue to catch bottomfish as it has in recent years (Section 2.3.1), and catches would continue to be monitored through the fisheries monitoring programs administered by DAWR with assistance from NMFS. In recent years, the fishery has not interacted with or affected marine mammals, and the fishery is not expected to change under Alternative 1, so interactions with marine mammals are not anticipated under this alternative.

Alternative 2: Implement an Annual Catch Limit of 27,000 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 2, the Council would recommend and NMFS would implement an ACL of 27,000 lb, an in-season AM to close fishing for BMUS in Federal waters for the remainder of the fishing year if available information indicates that catch would attain the ACL, and a performance standard to close the fishery in Federal waters until a coordinated management approach is developed that ensures catch in both Federal and territorial waters can be maintained at levels that allow the stock to rebuild. Under this alternative, NMFS expects that BMUS catch would be slightly less than the recent average but some fishing activity may move into territorial waters if a closure of Federal waters is implemented (Section 2.4.1). However, since this fishery has no reported interactions with any species of marine mammal in territorial or Federal waters, this change is not expected to affect the number of interactions. Further, since NMFS expects fishing activity under Alternative 2 to be less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and marine mammals in any way, implementation of Alternative 2 is not expected to change or increase interactions with marine mammals. In summary, this alternative is not expected to change the conduct of the fishery in any way that would affect marine mammals, so interactions with marine mammals and a change to the number, severity, or type of interactions with marine mammals is not expected.

Alternative 3: Implement an Annual Catch Limit of 16,299 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 3, the Council would recommend and NMFS would implement an ACL of 16,299 lb, an in-season AM to close fishing for BMUS in Federal waters for the remainder of the fishing year if available information indicates that catch would attain the ACL, and a performance standard to close the fishery in Federal waters until a coordinated management approach is developed that ensures catch in both Federal and territorial waters can be maintained at levels that allow the stock to rebuild. Under this alternative, NMFS expects that BMUS catch may be slightly reduced from the recent average and some fishing activity may move into territorial waters if a closure of Federal waters is implemented (Section 2.5.1). However, since this fishery has no reported interactions with any species of marine mammal in territorial or Federal waters, this change is not expected to affect the number of interactions. Further, since NMFS expects fishing activity under Alternative 3 to be slightly less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and marine mammals in any way, implementation of Alternative 4 is not expected to change or increase interactions with marine mammals. In summary, this alternative is not expected to change the conduct of the fishery in any way that would affect marine mammals, so interactions with marine mammals and a change to the number, severity, or type of interactions with marine mammals is not expected.

Alternative 4: Establish a Temporary Moratorium on Bottomfish Fishing in Federal Waters around Guam

Under Alternative 4, NMFS would prohibit fishing for bottomfish in Federal waters around Guam, and NMFS expects that BMUS catch may be moderately reduced from the recent average and some fishing activity may move into territorial waters due to the closure of Federal waters (Section 2.6.1). However, since this fishery has no reported interactions with any species of marine mammal in territorial or Federal waters, this change is not expected to affect the number of interactions. Additionally, since NMFS expects that fishing activity under Alternative 4 would

be moderately less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and marine mammals in any way, implementation of Alternative 4 is not expected to change or increase interactions with marine mammals. Overall, this alternative is not expected to change the conduct of the fishery in any way that would affect marine mammals, so interactions with marine mammals and a change to the number, severity, or type of interactions with marine mammals is not expected.

All Alternatives

In summary, there is no new information that indicates that the Guam bottomfish fishery may affect ESA-listed marine mammals in a manner or to an extent not previously considered in past consultations. All prior consultations for ESA-listed marine mammals species remain valid and effective. Because the fishery has had no known interactions with marine mammals, because interactions with marine mammals are expected to remain rare under any of the alternatives under consideration, and because none of the alternatives would substantially change the conduct of the fishery, the fishery is not expected to interact with marine mammals under any of the considered alternatives.

3.3.3.4 Seabirds in Guam

Table 15 lists seabird species that are considered residents or visitors of Guam. Of the presented species, only the Newell's shearwater is listed as threatened under the ESA. According to Wiles (2003), the only resident seabirds in Guam are the brown noddy and the white tern. There have been no sightings of the endangered short-tailed albatross (*Phoebastria albatrus*) although the Mariana Archipelago is within the range of the only breeding colony at Torishima, Japan (WPRFMC 2009). There have been no reports of interactions between the Guam bottomfish fishery and seabirds (WPRFMC 2009).

Table 15. Seabirds occurring in Guam.

English name	Scientific name
Residents (i.e., breeding)	
Brown noddy	*Anous stolidus*
Common fairy-tern (white tern)	*Gygis alba*
Visitors/vagrants/accidental visitors	
Newell's shearwater (ESA threatened)	*Puffinus auricularis newelli*
Wedge-tailed shearwater	*Puffinus pacificus*
Audubon's shearwater	*Puffinus lherminieri*
Short-tailed shearwater	*Puffinus tenuirostris*
Leach's storm-petrel	*Oceanodroma leucorhoa*
Matsudaira's storm-petrel	*Oceanodroma matsudairae*
Red-footed booby	*Sula*
Brown booby	*Sula leucogaster*
Masked booby	*Sula dactylatra*
White-tailed tropicbird	*Phaethon lepturus*
Red-tailed tropicbird	*Phaethon rubricauda*

English name	Scientific name
Great frigatebird	*Fregata minor*
Sooty tern	*Onychoprion fuscatus*
Black noddy	*Anous minutus*

(Source: WPRFMC 2009).

Potential Effects of the Alternatives on Seabirds in Guam

None of the alternatives under consideration are expected to affect seabirds, as the Guam bottomfish fishery is not known to affect seabirds through gear interactions or through disruptions in or adverse effects on seabird prey since seabirds are not known to prey on bottomfish. No alternative considered would change the bottomfish fishery in a manner that would change the type or frequency of interactions with seabirds.

Alternative 1: Status Quo

Under Alternative 1, the Council would recommend and NMFS would implement an ACL and post-season AM consistent with the most recent management for the Guam bottomfish fishery in 2020 through 2022. Under this alternative, NMFS expects that the fishery would continue to catch bottomfish in the same way as recent years because there would be no in-season AM to functionally constrain the fishery (Section 2.3.1). Because the status quo is not expected to change fishing activity relative to previous years, this alternative would not increase the potential for, or severity of, interactions between the fishery and listed seabirds, and the fishery is not likely to adversely affect any listed seabird species under this alternative. In summary, the bottomfish fishery is not known to affect seabirds, and under Alternative 1 the fishery is not expected to substantially change, so the fishery is not likely to adversely affect any seabird species.

Alternative 2: Implement an Annual Catch Limit of 27,000 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 2, NMFS expects BMUS catch to be slightly less than the recent average, and some fishing activity may be displaced into territorial waters if a closure of Federal waters is implemented as an in-season AM or in accordance with the performance standard (Section 2.4.1). However, since this fishery has no reported interactions with any species of seabird in territorial or Federal waters, this change is not expected to affect the number of interactions. Further, since fishing activity under Alternative 2 is expected to be slightly less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and seabirds, implementation of Alternative 2 is not expected to change or increase interactions with listed seabirds in any way. Under this alternative, the fishery is not likely to adversely affect any listed seabird species, and there is no anticipated change to the number, severity, or type of interactions with seabirds.

Alternative 3: Implement an Annual Catch Limit of 16,299 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 3, catch of BMUS may be slightly reduced from the recent average, and some fishing activity may be displaced into territorial waters if a closure of Federal waters is implemented (Section 2.5.1). However, since this fishery has no reported interactions with any

species of seabird in territorial or Federal waters, this change is not expected to affect the number of interactions. Further, since NMFS expects fishing activity under Alternative 3 to be slightly less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and seabirds, implementation of Alternative 3 is not expected to change or increase interactions with listed seabirds in any way. Under this alternative, the fishery is not likely to adversely affect any listed seabird species, and there is no anticipated change to the number, severity, or type of interactions with seabirds.

Alternative 4: Establish a Moratorium on Bottomfish Fishing in Federal Waters around Guam

Under Alternative 4, BMUS catch may be moderately reduced from the recent average, and some fishing activity may be displaced into territorial waters due to the complete closure of Federal waters (Section 2.6.1). However, since this fishery has no reported interactions with any species of seabirds in territorial or Federal waters, this change is not expected to affect the number of interactions. Further, since NMFS expects fishing activity under Alternative 4 to be moderately less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and seabirds, implementation of Alternative 4 is not expected to change or increase interactions with listed seabirds. Under this alternative, the fishery is not likely to adversely affect any listed seabird species, and there is no anticipated change to the number, severity, or type of interactions with seabirds.

All Alternatives

No alternative under consideration would substantially change the conduct of the fishery in a manner that would affect seabirds, and there are no expected adverse effects to these species under the proposed action.

3.3.3.5 ESA-Listed Reef Building Corals in Guam

On September 10, 2014, NMFS listed 20 species of reef-building corals as threatened under the ESA (79 FR 53852). Three species of listed corals are known to occur in waters around Guam from 0–40 m deep. None of the species have common names.

On November 27, 2020, NMFS published a proposed rule in the Federal Register (85 FR 76262) to designate critical habitat for the seven threatened corals in U.S. waters in the Indo-Pacific pursuant to section 4 of the ESA. Three of these corals occur around Guam: *Acropora globiceps*, *Acropora retusa*, and *Seriatopora aculeata*. Specific occupied areas containing physical features essential to the conservation of these coral species are being proposed for designation as critical habitat. At this point in time there is insufficient information to determine the proposed designation's potential impacts on the Guam bottomfish fishery. If the proposal is finalized, NMFS would re-initiate consultation under Section 7 of the ESA to determine the impact of fishing activities on critical habitat and any necessary management measures.

Table 16 lists the ESA-listed coral species found in Guam. Corals usually live in colonies and form “heads” or “shelves”. Generally, thousands of individual coral organisms (polyps) live together in a single structure that grows over time. Recently, many nearshore coral reefs have died through a process called bleaching when coral expel algae that live within them. Bleaching often leads to death for coral colonies by causing malnutrition and increasing the colony’s

susceptibility to disease. Some coral species populations have suffered declines because of bleaching.

Table 16. ESA-listed corals in Guam.

Common name	Scientific Name	ESA listing status in Guam	Occurrence in Guam	Interactions with the Guam bottomfish fishery
None	*Acropora globiceps*	Threatened	Present	No interactions observed or reported
None	*A. retusa*	Threatened	Present	No interactions observed or reported
None	*Seriatopora aculeata*	Threatened	Present	No interactions observed or reported

Potential Effects of the Alternatives on ESA-Listed Reef Building Corals in Guam

Some damage to corals and bottom habitat is possible via anchoring or entanglement of bottomfish fishing gear, but studies in Hawaii where methods are similar found that bottomfish fishing generally has minimal impact on benthic habitat (Kelley and Moffit 2004; Kelley and Ikehara 2006). The bottomfish fishery is a hook-and-line fishery, and fishermen have an interest in minimizing both interactions, not only for the conservation benefit, but also because they do not want to lose their gear. The FEP also protects corals and habitat through prohibitions on the use of bottom-set nets, bottom trawls, explosives, and poisons (WPRFMC 2009). Guam regulations also prohibit the use of explosives (5 GCA § 63104), poisonous or intoxicating substances (5 GCA § 63106), and electrical devices (5 GCA § 63108), specify requirements for the use of gill nets (5 GCA § 63112) including the prohibition of the use of drift gill nets, and prohibit the destruction of coral in the pursuit of fishing (5 GCA § 63113). Federal regulations also state that it is unlawful for any person to fish for, take, or retain any wild live rock or live hard coral except under a valid special permit for scientific research, aquaculture seed stock collection or traditional and ceremonial purposes by indigenous people (50 CFR 665.125(c)). Additionally, territory regulations pursuant to 5 GCA § 63602 prohibits the removal of live coral around Guam. On April 2, 2015, NMFS documented its determination in a Letter of Concurrence that the continued authorization of the bottomfish fishery in Guam is not likely to adversely affect reef-building corals. Methods, locations, and target species of bottomfish fishery operations have not changed substantially since 2015. Also, the fishery has not had any known interactions with listed corals. Based on this information, NMFS reasonably concludes that the analysis in that 2015 consultation and its conclusion that the fishery is not likely to adversely affect listed corals remains valid today. On June 5, 2019, NMFS reinitiated consultation in response to listing of the oceanic whitetip shark, giant manta ray, and chambered nautilus, and to seek concurrence with the conclusion that the Guam bottomfish fishery may affect, but is not likely to affect, any listed coral.

Alternative 1: No Action

Under Alternative 1, NMFS would implement an ACL of 27,000 lb with no in-season AM to prevent the ACL from being exceeded but with a post-season AM to correct overages for the Guam bottomfish fishery. The 2015 consultation evaluated the potential impact of the bottomfish

fishery on ESA-listed corals under a similar management regimen with ACLs and AMs, so NMFS expects that the fishery would continue to catch bottomfish under the status quo in the same way as recent years because the fishery in 2015 was not functionally constrained by the implemented ACLs and AMs (Section 2.3.1). Because this alternative is not expected to change fishing activity relative to years considered the 2015 consultation, the status quo would not increase the potential for, or severity of, interactions between the fishery and listed corals, and the fishery is not likely to adversely affect listed coral species. In summary, the previous consultation found that the bottomfish fishery is not likely to adversely affect corals, and the fishery is not expected to change under Alternative 1, so this alternative is not likely to cause the fishery to adversely affect any listed coral species.

Alternative 2: Implement an Annual Catch Limit of 27,000 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under this alternative, BMUS catch may be slightly less than the status quo, and some fishing activity may be displaced into territorial waters if a closure of Federal waters is implemented as an AM and in accordance with the performance standard(Section 2.4.1). However, since this fishery has no reported interactions with any species of listed coral in territorial or Federal waters, this change is not expected to affect the number of interactions. Since NMFS expects fishing activity under Alternative 2 to be slightly less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and listed corals in any way not already considered in prior consultations, implementation of Alternative 2 is not expected to change or increase interactions with listed corals. There is no anticipated change to the number, severity, or type of interactions with listed corals under this alternative.

Alternative 3: Implement an Annual Catch Limit of 16,299 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 3, BMUS catch may be slightly reduced from the recent average, and some fishing activity may be displaced into territorial waters if a closure of Federal waters is implemented (Section 2.5.1). However, since this fishery has no reported interactions with any species of listed coral in territorial or Federal waters, this change is not expected to affect the number of interactions. Since NMFS expects fishing activity under Alternative 3 to be slightly less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and listed corals in any way not already considered in prior consultations, implementation of Alternative 3 is not expected to change or increase interactions with listed corals. Thus, there is no anticipated change to the number, severity, or type of interactions with listed corals under this alternative.

Alternative 4: Establish a Temporary Moratorium on Bottomfish Fishing in Federal Waters around Guam

Under this alternative, NMFS expects BMUS catch to be moderately reduced from the recent average, and some fishing activity may be displaced into territorial waters due to the closure of Federal waters for the duration of the rebuilding plan (Section 2.6.1). However, since this fishery has no reported interactions with any listed species of coral in territorial or Federal waters, this change is not expected to affect the number of interactions. Further, since NMFS expects fishing activity under Alternative 4 to be moderately less than the status quo, and the status quo

alternative is not expected to increase the potential for or severity of interactions between the fishery and listed corals in any way not already considered in prior consultations, implementation of Alternative 4 is not expected to change or increase interactions with listed corals. There is no anticipated change to the number, severity, or type of interactions with listed corals under this alternative.

All Alternatives

In summary, the bottomfish fishery has no recorded interactions with listed corals, and no alternative under consideration would substantially change the conduct of the fishery, so NMFS does not expect effects on listed coral species that have not already been considered in prior consultations of the fishery under the ESA. Under all alternatives considered, the proposed action is not expected to have a substantial effect on the overall population size of ESA-listed corals in Guam and is not likely to appreciably reduce the likelihood of both survival and recovery of the species in the wild.

3.3.3.6 Scalloped Hammerhead Sharks in Guam

On July 3, 2014, NMFS listed the Indo-West Pacific scalloped hammerhead shark DPS under the ESA (79 FR 38213). The Indo-West Pacific scalloped hammerhead shark DPS occurs in all U.S. Pacific Island territories. Scalloped hammerhead sharks range widely from nearshore to pelagic environments and from the surface to 500 meters (m) deep. Because the shark is listed in Guam, it is illegal to target or retain the shark.

As noted in the final rule (79 FR 38213, July 3, 2014), the significant operative threats to the listed scalloped hammerhead DPSs are overutilization by foreign industrial, commercial, and artisanal fisheries as well as inadequate regulatory mechanisms in foreign nations to protect these sharks from the heavy fishing pressure and related mortality, with illegal fishing identified as a significant problem in areas outside of U.S. jurisdiction. Some fishermen target sharks, including the scalloped hammerhead, to harvest their fins. Incidental capture in fisheries also contributes to increased mortality in this species (79 FR 38213, July 3, 2014).

Conservation initiatives for scalloped hammerhead sharks are in place and include, in addition to the Federal prohibition on retention of the scalloped hammerhead DPS, territorial prohibitions on the retention or transport of any sharks. Additionally, the territorial government passed a law in 2011 (5 GCA § 63114.1) stating that no person shall possess or sell shark fins without a permit or unless for subsistence, traditional, or cultural sharing purposes.

Potential Effects of the Alternatives on Scalloped Hammerhead Sharks in Guam

NMFS conducted Section 7 consultation under the ESA to evaluate the potential effects of the Guam bottomfish fisheries on the Indo-West Pacific DPS of scalloped hammerhead shark. This consultation found that Guam bottomfish fisheries did not have any recorded or observed catches of scalloped hammerhead sharks based creel survey data (NMFS 2015). On April 2, 2015, NMFS concluded that the continued authorization of the bottomfish fishery under the Mariana Archipelago is not likely to adversely affect the Indo-west Pacific scalloped hammerhead shark DPS. Their conclusion was based on the finding that the effects of reauthorizing the fishery were expected to be discountable, as fishery participants are very unlikely interact with Indo-West Pacific scalloped hammerhead sharks because of limited distribution and the location of the

sharks in relation to preferred bottomfish locations and gear depth. Methods, locations, and target species of fishery operations have not changed substantially since 2015. Also, the fishery has not had any known interactions with scalloped hammerhead sharks. Based on this information, NMFS reasonably concludes that the analysis in that 2015 consultation, and the conclusion that the fishery is not likely to adversely affect this species, remain valid today. On June 5, 2019, NMFS reinitiated consultation in response to listing of the oceanic whitetip shark, giant manta ray, and chambered nautilus, and to seek concurrence with the conclusion that the Guam bottomfish fishery may affect, but is not likely to affect, the Indo-West Pacific DPS of scalloped hammerhead shark.

Alternative 1: Status Quo

Under Alternative 1, NMFS would implement same ACL and post-season AM for the Guam bottomfish fishery as specified for 2020 through 2022 with no in-season AM to functionally constrain the fishery. While the 2015 consultation evaluated the potential impact of the bottomfish fishery on scalloped hammerheads under management measures such as ACLs and AMs, NMFS expects the fishery to continue to catch bottomfish under this alternative in the same way as recent years because the fishery in 2015 was also not functionally constrained by the implemented ACLs or AMs (Section 2.3.1). Because the 2015 consultation found that effects of the fishery on the Indo-West Pacific scalloped hammerhead shark DPS would be insignificant and discountable and this alternative is not expected to change fishing activity relative to years considered in the 2015 consultation, this alternative would not increase the potential for, or severity of, interactions between the fishery and the Indo-West Pacific scalloped hammerhead shark, the fishery is not likely to adversely affect this DPS. In summary, the previous consultation found that the bottomfish fishery is not likely to adversely affect the Indo-West Pacific DPS of scalloped hammerhead shark, and under Alternative 1 the fishery is not expected to change, so the fishery is not likely to adversely affect this DPS under the proposed action.

Alternative 2: Implement an Annual Catch Limit of 27,000 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 2, BMUS catch may be slightly less than the recent average, and some fishing activity may be displaced into territorial waters if a closure of Federal waters is implemented (Section 2.4.1). However, since this fishery has no reported interactions with scalloped hammerhead sharks in territorial or Federal waters, this change is not expected to affect the number of interactions. Since NMFS expects fishing activity under Alternative 2 to be slightly less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and the Indo-West Pacific scalloped hammerhead shark in any way not already considered in prior consultations, implementation of Alternative 2 is not expected to change or increase interactions with this DPS. Thus, there is no anticipated change to the number, severity, or type of interactions with this DPS.

Alternative 3: Implement an Annual Catch Limit of 16,299 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 3, BMUS catch may be slightly reduced from the recent average, and some fishing activity may be displaced into territorial waters if a closure of Federal waters is implemented (Section 2.5.1). However, since this fishery has no reported interactions with scalloped hammerhead sharks in territorial or Federal waters, this change is not expected to

affect the number of interactions. Since NMFS expects fishing activity under Alternative 3 to be slightly less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and the Indo-West Pacific scalloped hammerhead shark in any way not already considered in prior consultations, implementation of Alternative 3 is not expected to change or increase interactions with this DPS. Thus, there is no anticipated change to the number, severity, or type of interactions with this DPS.

Alternative 4: Establish a Temporary Moratorium on Bottomfish Fishing in Federal Waters around Guam

Under Alternative 4, BMUS catch may be moderately reduced from the recent average, and some fishing activity may be displaced into territorial waters due to the complete closure of Federal waters (Section 2.6.1). However, since this fishery has no reported interactions with scalloped hammerhead sharks in territorial or Federal waters, this change is not expected to affect the number of interactions. Since NMFS expects fishing activity under Alternative 4 to be moderately less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and the Indo-West Pacific scalloped hammerhead shark in any way not already considered in prior consultations, implementation of Alternative 4 is not expected to change or increase interactions with this DPS. Thus, there is no anticipated change to the number, severity, or type of interactions with this DPS.

All Alternatives

There are no targeted shark fisheries in Guam, and regulations prohibit possession and sale of shark fins. The likelihood of interactions is low, and the 2015 consultation found that Guam fisheries did not have any recorded or observed catches of scalloped hammerhead sharks (NMFS 2015). No alternative under consideration would substantially change the way the fishery is conducted or result in effects on scalloped hammerhead sharks that have not already been considered in the 2015 consultation. Under all alternatives considered, the proposed action is not expected to have a substantial effect on the overall population size of the Indo-West Pacific scalloped hammerhead shark DPS and is not likely to appreciably reduce the likelihood of both survival and recovery of the species in the wild.

3.3.3.7 Oceanic Whitetip Sharks in Guam

On January 30, 2018, NMFS issued a final rule to list the oceanic whitetip shark as threatened under the ESA (83 FR 4153). The oceanic whitetip shark is found in tropical and subtropical seas between 30º N and 35º S latitudes worldwide. The oceanic whitetip shark experiences high encounter and mortality rates in some commercial fisheries (e.g., pelagic longline, purse seine, and gillnet fisheries) throughout its range because of its tropical distribution and tendency to remain in surface waters (NMFS 2019a).

As noted in the final rule, the greatest threat to the oceanic whitetip shark is overutilization from fishing pressure and inadequate regulatory mechanisms to protect the species. However, Guam has territorial measures (5 GCA § 63114.1) that prohibit possession or sale of shark fins without a permit or unless for subsistence, traditional, or cultural sharing purposes. The best available information to estimate interactions with oceanic white tip sharks are boat-based creel surveys, and review of creel survey data from 1993 to 2017 found three reported captures of oceanic whitetip sharks while bottomfish fishing in Guam (NMFS 2019a). On June 5, 2019, NMFS

reinitiated informal consultation under ESA to seek concurrence that bottomfish fishing activities are not likely to adversely affect this species, as required by 50 CFR 402.16. On June 6, 2019, August 11, 2020, and December 15, 2020, NMFS determined that pending that concurrence, the continued operation of the bottomfish fishery in Guam during the period of consultation is not likely to jeopardize the continued existence of the oceanic whitetip shark, would not violate ESA section 7(a)(2), or result in an irreversible or irretrievable commitment of resources precluding implementation of any reasonable and prudent alternatives, and would not violate ESA section 7(d) (NMFS 2019b; NMFS 2020a; NMFS 2020b).

Potential Effects of the Alternatives on Oceanic Whitetip Sharks in Guam

Alternative 1: Status Quo

Under Alternative 1, the Council would recommend and NMFS would implement the same ACL and post-season AM as specified for the Guam bottomfish fishery for 2020 through 2022 with no in-season AM. NMFS expects the bottomfish fishery to continue to catch bottomfish in a manner consistent with recent years, and catches would continue to be monitored through the fisheries monitoring program administered by DAWR with assistance from NMFS. The lack of an in-season AM under Alternative 1 would not provide regulatory oversight ability to limit catch or to promote the rebuilding of the resource. The level of bottomfish catch under this alternative is expected to be similar to average catch of 29,532 lb in recent years (2017 to 2019). The lack of an in-season AM under this alternative would not change the conduct of the fishery relative to recent years (Section 2.3.1). Therefore, this alternative is not expected to increase the potential for interactions between the fishery and oceanic whitetip shark in any way.

Alternative 2: Implement an Annual Catch Limit of 27,000 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 2, BMUS catch may be slightly less than the recent average, and some fishing activity may be displaced into territorial waters if a closure of Federal waters is implemented (Section 2.4.1). However, since this fishery has very few reported interactions with oceanic whitetip sharks in territorial or Federal waters, this change is not expected to affect the number of interactions. Since NMFS expects fishing activity under Alternative 2 to be slightly less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and the oceanic whitetip shark in any way, implementation of Alternative 2 is not expected to change or increase interactions with this species. Thus, there is no anticipated change to the number, severity, or type of interactions with oceanic whitetip sharks.

Alternative 3: Implement an Annual Catch Limit of 16,299 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 3, BMUS catch may be slightly reduced from the recent average, and some fishing activity may be displaced into territorial waters if a closure of Federal waters is implemented (Section 2.5.1). However, since this fishery has very few reported interactions with oceanic whitetip sharks in territorial or Federal waters, this change is not expected to affect the number of interactions. Since NMFS expects fishing activity under Alternative 3 to be slightly less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and the oceanic whitetip shark in any way,

implementation of Alternative 3 is not expected to change or increase interactions with this species. Thus, there is no anticipated change to the number, severity, or type of interactions with oceanic whitetip sharks.

Alternative 4: Establish a Temporary Moratorium on Bottomfish Fishing in Federal Waters around Guam

Under Alternative 4, BMUS catch may be moderately reduced from the recent average, and some fishing activity may be displaced into territorial waters due to the closure of Federal waters (Section 2.6.1). However, since this fishery has very few reported interactions with oceanic whitetip sharks in territorial or Federal waters, this change is not expected to affect the number of interactions. Since NMFS expects fishing activity under Alternative 4 to be moderately less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and the oceanic whitetip shark in any way, implementation of Alternative 4 is not expected to change or increase interactions with this species. There is no anticipated change to the number, severity, or type of interactions with oceanic whitetip sharks.

All Alternatives

There are no targeted shark fisheries in Guam, and regulations prohibit the possession and sale of shark fins. The alternatives under consideration would not change the way the fishery operates with respect to areas fished, gear used, or methods employed in a manner that would alter the likelihood of interactions with oceanic whitetip sharks, so increased interactions with this shark are not anticipated. Based on the infrequency expected interactions with oceanic whitetip sharks, the proposed action is not expected to have a substantial effect on the overall population size of oceanic whitetip sharks under all alternatives considered and is not likely to reduce appreciably the likelihood of both survival and recovery of the species in the wild.

3.3.3.8 Giant Manta Rays in Guam

On January 22, 2018, NMFS issued a final rule to list the giant manta ray as a threatened species under the ESA (83 FR 2916). The giant manta ray is found worldwide in tropical, subtropical, and temperate bodies of water. It is commonly found offshore, in oceanic waters, and near productive coastlines. As noted in the final rule (83 FR 2916, January 22, 2018), the giant manta ray appears to be most at risk of overutilization in the Indo-Pacific and eastern Pacific portions of its range. Targeted fishing and incidental capture of the species in Indonesia, Philippines, Sri Lanka, India, and throughout the eastern Pacific, has led to observed declines in populations.

There are no targeted giant manta ray fisheries in Guam. Manta rays are filter feeders who forage near the surface and do not interact with bottomfish fishing gear (Miller and Klimovich 2016). The rate at which the Guam bottomfish fishery interacts with giant manta rays in other ways is unknown; however, there are no reported or observed collisions with giant manta rays and bottomfish fishing vessels in any island area. Over the last ten years, there have been less than 100 trips per year on average (WPRFMC 2020a). Due to the small number of bottomfish trips in Guam and the fact that there have been no reported or observed collisions between giant manta rays and bottomfish fishing vessels, interactions between the bottomfish vessels and giant manta ray are not expected. On June 5, 2019, NMFS reinitiated informal consultation under ESA to seek concurrence that fishing activities are not likely to adversely affect this species, as required

by 50 CFR 402.16 (NMFS 2019a). On June 6, 2019, August 11, 2020, and December 15, 2020, NMFS determined that pending that concurrence, the continued operation of the bottomfish fishery in Guam during the period of consultation is not likely to jeopardize the continued existence of the giant manta ray, would not violate ESA section 7(a)(2), or result in an irreversible or irretrievable commitment of resources precluding implementation of any reasonable and prudent alternatives, and would not violate ESA section 7(d) (NMFS 2019b; NMFS 2020a; NMFS 2020b).

Potential Effects of the Alternatives on Giant Manta Rays in Guam

Alternative 1: Status Quo

Under Alternative 1, NMFS would implement the same ACL and post-season AM for the Guam bottomfish fishery as specified for 2020 through 2022 with no in-season AM to functionally constrain the fishery. NMFS expects the fishery to continue to catch bottomfish in a manner similar to recent years, and catches would continue to be monitored through the fisheries monitoring program administered by DAWR with assistance from NMFS. The lack of an in-season AM under Alternative 1 would not provide regulatory ability to restrict overfishing and ensure rebuilding of the stock complex during years of variably high catch; however, the level of bottomfish catch under this alternative is expected be similar to the average annual catch in recent years (29,532 lb from 2017 to 2019). The lack of an in-season AM under this alternative is not expected to change the conduct of the fishery since catches would not be constrained (Section 2.3.1). Therefore, this alternative would not increase the potential for interactions between the fishery and giant manta ray in any way.

Alternative 2: Implement an Annual Catch Limit of 27,000 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 2, BMUS catch may be slightly reduced relative to the recent average, and some fishing activity may be displaced into territorial waters if a closure of Federal waters is implemented (Section 2.4.1). However, since this fishery has no reported interactions with giant manta rays in territorial or Federal waters, this change is not expected to affect the number of interactions. Since NMFS expects fishing activity under Alternative 2 to be slightly less the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and the giant manta ray in any way, implementation of Alternative 2 is not expected to change or increase interactions with this species. Thus, there is no anticipated change to the number, severity, or type of interactions with giant manta rays.

Alternative 3: Implement an Annual Catch Limit of 16,299 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 3, BMUS catch may be slightly reduced from the recent average, and some fishing activity may be displaced into territorial waters if a closure of Federal waters is implemented (Section 2.5.1). However, since this fishery has no reported interactions with giant manta rays in territorial or Federal waters, this change is not expected to affect the number of interactions. Since NMFS expects fishing activity under Alternative 3 to be slightly less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and the giant manta ray in any way, implementation of

Alternative 3 is not expected to change or increase interactions with this species. Thus, there is no anticipated change to the number, severity, or type of interactions with giant manta rays.

Alternative 4: Establish a Temporary Moratorium on Bottomfish Fishing in Federal Waters around Guam

Under Alternative 4, BMUS catch may be moderately reduced from the recent average, and some fishing activity may be displaced into territorial waters due to the complete closure of Federal waters (Section 2.6.1). However, since this fishery has no reported interactions with giant manta rays in territorial or Federal waters, this change is not expected to affect the number of interactions. Since NMFS expects fishing activity under Alternative 4 to be moderately less than the status quo, and the status quo alternative is not expected to increase the potential for or severity of interactions between the fishery and the giant manta ray in any way not already considered in prior consultations, implementation of Alternative 4 is not expected to change or increase interactions with this species. Thus, there is no anticipated change to the number, severity, or type of interactions with giant manta rays.

All Alternatives

The alternatives under consideration are not expected to change the way the fishery operates with respect to areas fished, gear used, or methods employed in a manner that would alter the likelihood of interactions with giant manta ray, so interactions with this species are not anticipated. Based on the lack of expected interactions with giant manta rays, the proposed action is not expected to have a substantial effect on the overall population size of the giant manta ray under all alternatives considered and is not likely to appreciably reduce the likelihood of both survival and recovery of the species in the wild.

3.3.4 Habitats and Vulnerable Ecosystems

3.3.4.1 Potential Effects on Essential Fish Habitat and Habitat Areas of Particular Concern

The Magnuson-Stevens Act defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (Magnuson-Stevens Act § 3(10)). This includes the marine areas and their chemical and biological properties that organisms use. 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 MUS of the Bottomfish and Seamount Groundfish FMP (Amendment 6), Crustacean FMP (Amendment 10), Pelagic FMP (Amendment 8), and Precious Corals FMP (Amendment 4) (64 FR 19067, April 19, 1999). NMFS approved additional EFH definitions for coral reef ecosystem species in 2004 as part of the implementation of the Coral Reef Ecosystem FMP (69 FR 8336, February 24, 2004). NMFS approved EFH definitions for deepwater shrimp through an amendment to the Crustaceans FMP in 2008 (73 FR 70603, November 21, 2008).

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 would stress the habitat, and/or the habitat type is rare. The FMPs defined HAPC for bottomfish, crustaceans, pelagic, and

coral reef species in Guam, CNMI, and American Samoa and for bottomfish, pelagic, and coral reef species in the Pacific Remote Island Area.

Ten years later, 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). The Council subsequently carried forward EFH definitions and related provisions for all FMP fishery resources into the respective FEPs. In 2019, Amendment 4 to the American Samoa FEP and Amendment 5 to the Marianas FEP reclassified some bottomfish, pelagic, crustacean, precious coral, and coral reef ecosystem species as ecosystem component species (ECS) (84 FR 2767, February 8, 2019). These species do not have EFH or HAPC under the Magnuson-Stevens Act, as these habitat categories only apply to MUS. The following discussion and analysis of potential effects on EFH and HAPC would only consider these habitat designations for species remaining as BMUS.

Table 17 summarizes the designated areas of EFH and HAPC for Marianas FEP bottomfish by life stage. To analyze the potential effects of a proposed fishery management action on EFH, one must consider all designated EFH.

According to the most recent bottomfish fishery ESA consultations for Guam (April 2, 2015), the current bottomfish fishery is unlikely to have an adverse effect on listed corals in Guam. The findings were based on the fact that the fishery has a small area of spatial overlap between potential coral habitat and bottomfish fishing, the fishery has a low likelihood of bottomfish gear contact based on fishing depth (i.e., no trawling, nets, traps, etc., and only a few weighted hooks and lines deployed at a time), and the fishermen participating in the fishery have a high motivation to avoid coral. Thus, this fishery is not known to adversely affect habitat. Similar methods are used to fish for bottomfish in Guam as in Hawaii, and studies of bottomfish habitat in Hawaii have not found adverse impacts to habitat from bottomfish fishing activities (Kelley and Moffit 2004; Kelley and Ikehara 2006). Also, to prevent and minimize adverse bottomfish fishing impacts to EFH, each western Pacific FEP prohibits the use of explosives, poisons, bottom trawl, and other non-selective and destructive fishing gear. No alternative under consideration for this rebuilding plan would result in substantial changes to the way fishermen conduct the bottomfish fishery in Guam; therefore, the alternatives are not expected to result in adverse effects on bottomfish EFH or HAPC.

Table 17. EFH and HAPC for Guam BMUS.

Guam BMUS	EFH	HAPC
Lehi (*Aphareus rutilans*) Giant trevally (*Caranx ignobilis*) Black trevally (*Caranx lugubris*) Ehu (*Etelis carbunculus*) Onaga (*E. coruscans*) Redgill emperor (*Lethrinus rubrioperculatus*)	**Eggs and larvae:** the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m (200 fathoms, fm). **Juvenile/adults:** the water column and all bottom habitat extending from the	All slopes and escarpments between 40-280 m (20 and 140 fm)

Blueline snapper (*Lutjanus kasmira*) Yellowtail snapper (*Pristipomoides auricilla*) Opakapaka (*P. filamentosus*) Yelloweye snapper (*P. flavipinnis*) Kalekale (*P. sieboldii*) Gindai (*P. zonatus*) Lunartail grouper (*Variola louti*)	shoreline to a depth of 400 m (200 fm)	

3.3.4.2 Marine Protected Areas (MPAs)

Bottomfish fishing is Federally managed in the Marianas Trench Marine National Monument (Monument), where commercial fishing is prohibited in the Islands Unit of the Monument and non-commercial fishing must be authorized under a permit. Additionally, large vessels (> 50 ft) cannot fish for bottomfish in the Guam large vessel bottomfish prohibited area. Harvesting bottomfish is also prohibited in the territorial marine preserves where and/or when fishing is prohibited, such as the Achang Reef Flat or Tumon Bay Marine preserves, though these areas are typically nearshore. These MPAs would not be affected by the proposed action, so adverse effects to them would be unlikely under all alternatives considered. None of the proposed alternatives would change the way bottomfish fishing is conducted with respect to these MPAs, so continued operation of the fishery under the status quo or action alternatives would not result in adverse impacts to the Monument or other MPAs.

3.3.4.3 Vulnerable Marine or Coastal Ecosystems

Precious coral resources are scarcely found in the EEZ around Guam (Grigg and Eldridge 1975), and there is no precious coral fishery currently operating in the territory (WPRFMC 2009). All precious coral species in Guam are classified as ECS. Although little is known about the distribution and abundance of precious corals Guam, bottomfish fishing is unlikely to affect these species. Exposure of precious corals to damage from bottomfish fishing activities is limited due to existing Federal regulations on usage of destructive gears (e.g., trawls, poisons, explosives) that are not subject to change due to the proposed action. In addition to overlapping potential deep water precious coral habitat, the fishery operates in areas that include coral reef ecosystem habitat (e.g., areas shallower than 50 m). As discussed above, the fishery is not known to adversely affect benthic habitats (Section 3.3.3.5 and Section 3.3.4.1).

Fishing activity under the status quo alternative is not expected to change from recent years; therefore, it is unlikely that the fishery would affect vulnerable marine ecosystems such as deep or shallow coral ecosystems under this alternative. Fishing activity under any of the action alternatives is not expected to increase or change substantially relative to the status quo, and none of the alternatives under consideration would change the way the fishery is conducted. Considering that the fishery is not expected to change in a way that would impact vulnerable marine ecosystems under any alternative, the fishery is not expected to affect vulnerable marine ecosystems under any alternative, and no adverse impacts are expected to these areas as a result of implementing any alternative.

In summary, none of the alternatives are expected to change the way in which this fishery is conducted or the magnitude of impacts on habitats. Also, the alternatives under consideration would not change regulations that are in place to prevent and minimize adverse effects from bottomfish fishing on fish habitat. For these reasons, none of the alternatives considered are expected to lead to substantial physical, chemical, or biological alterations to ocean, coral, or coastal habitats or result in impacts to the marine habitat, including areas designated as EFH, HAPC, or unique areas such as MPAs or deep coral ecosystems.

3.4 Potential Effects on the Socio-Economic Setting

3.4.1 Fishing Communities

3.4.1.1 Potential Effects of the Alternatives on the Guam Fishing Community

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

National Standard 8 of the Magnuson-Stevens Act requires that conservation and management measures shall, consistent with the conservation requirements of the Magnuson-Stevens Act (including the prevention of overfishing and the rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (a) provide for the sustained participation of such communities and (b) to the extent practicable, minimize adverse economic effects on such communities. Alternative 2 of the Council's proposed rebuilding plan best accounts for this consideration in that it recommends a catch limit that is relatively close to the recent annual average catch. Additionally, among alternatives that would ensure rebuilding within 10 years, it is least likely to have its ACL exceeded and enforce greater restrictions on the fishery. Alternative 2 would allow for the harvest of bottomfish from offshore banks situated in Federal waters, which would mitigate effects of more stringent management measures on the Guam fishing community.

In 1998, the Council identified Guam as a fishing community and requested the Secretary of Commerce concur with this determination. Guam was recognized in regulation as a fishing community under the Magnuson-Stevens Act on April 19, 1999 (64 FR 19067). The community continues to participate in the Council decision-making process through its representatives on the Council, its Advisory Panel members, through opportunities for public input during the Council's deliberations, through public comment periods during NMFS rulemaking processes.

The most recent SAFE report (WPRFMC 2020a) was the first iteration of the report to present sales data after the ECS amendment that revised the list of BMUS in the Mariana Archipelago from 17 to 13 species, so estimates of commercial sales of just the eleven species that remain classified as BMUS only recently became available. The species that remain BMUS were

selected in part because of their importance to the fishery, and likely comprised most reported sales prior to the ECS amendment.

Table 7 in Section 2.3.3 shows that in between 2017 and 2019, Guam bottomfish fishermen caught an average of 29,532 lb of BMUS annually and, in 2017 and 2018, sold an average of 3,515 lb of BMUS (i.e., an average of 17.5 percent of the estimated catch). Data in 2019 were confidential because there were less than three dealers and/or vendors reporting for the commercial receipt book program in Guam. Based on the commercial estimate of pounds sold (3,028 lb) and the commercial value ($15,443) of the fishery in 2018, the average price per pound was $5.10. The 2020 LOF estimated there were greater than 300 participants in the fishery (85 FR 21095, April 16, 2020). If participation and effort were equal among fishermen in 2018, each of the 300 fishermen would have sold roughly 10 lb of BMUS valued at over $51 for each fisherman.

Alternative 1: Status Quo

Under Alternative 1, the Council would recommend and NMFS would implement the same ACL and post-season AM for the Guam bottomfish fishery as specified for 2020 through 2022, with no in-season AM to functionally constrain the fishery. The level of bottomfish catch under this alternative is expected to be similar to the average annual catch in recent years (29,532 lb from 2017 to 2019) (Section 2.3.1). No available information indicates that commercial sales would change, so NMFS anticipates that an average of 17.5 percent would be sold based on data from 2017 and 2018 for a total 5,168 lb. Using the recent average price of $4.82 per lb from 2017 to 2018, this would generate approximately $24,910 in revenue. Using the estimate of the number of fishery participants from the 2020 LOF, the 300 participants would earn approximately $83 each (Table 18). This alternative would not constrain bottomfish fishing activity in Guam, so it is not expected to affect the fishing communities in Guam. Similarly, non-commercial fishing (inclusive of recreational, sustenance, and cultural fishing) would be unaffected relative to the recent activity under the status quo alternative.

Table 18. Estimated revenues in the Guam bottomfish fishery under different alternatives. All estimates assume 17.5 percent of the expected catch is sold, a price per lb of $4.82, and 300 participants in the fishery.

Year(s)	Alt.	Expected catch (lb)	Expected lb sold	Total revenue ($)	Revenue per participant ($)	Difference from Alt. 1 ($)	Percent difference from Alt. 1
Annually	1	29,532	5,168	24,910	83.03	0.00	0
2022	2	28,864	5,051	24,347	81.16	1.88	2.3
Following Years	2	21,736	3,804	18,334	61.11	21.92	26.4
2022	3	26,038	4,557	21,963	73.21	9.82	11.8
Following Years	3	21,736	3,804	18,334	61.11	21.92	26.4
Annually	4	21,736	3,804	18,334	61.11	21.92	26.4

Alternative 2: Implement an Annual Catch Limit of 27,000 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 2, NMFS expects BMUS catch to be slightly less than the recent annual average catch of 29,532 lb but may be further reduced relative to the status quo in subsequent years of the rebuilding plan if the performance standard is applied. If total bottomfish catch in 2022 is 28,864 lb and 17.5 percent of the catch is sold commercially at $4.82 pound, that means 5,051 lb would be sold for $24,347. Using the number of fishery participants from the 2020 LOF, the 300 participants would earn just over $81 each, which is 2.3 percent less than the status quo (Table 18). If the performance standard is applied after the first year, the expected catch in subsequent years of the rebuilding plan would be 21,736 lb until a coordinated management measure is developed that ensures catch in both Federal and territorial waters can be maintained at levels that allow the stock to rebuild. At this level of expected catch, NMFS anticipates that 3,804 lb would be sold for a total of $18,334, or nearly $71 per fisher; this 26.4 percent decrease would be identical to the expected revenues under Alternative 4 (Table 18). Thus, early in the rebuilding plan, revenues could be restricted relative to the status quo alternative in years of variably high catch due the implementation of a Federal closure to the fishery, and revenues in subsequent years would be further restricted due to the implementation of the performance standard. If fishermen compensated for a closure of Federal waters by catching additional BMUS in territorial waters that remained open to fishing, revenue would be closer to that expected under the status quo. There is no information available to estimate the magnitude of compensation that could occur.

Offshore banks in Federal waters do not have shallow coral reef habitat, so these areas may produce more deepwater snappers for the fishery. However, there is not detailed information on whether catch for commercial or non-commercial purposes comes disproportionately from territorial or Federal waters or the proportion of species that are caught in these waters. Overall, NMFS expects that the amount of fish caught for sustenance and recreational purposes would be affected similarly to fish caught for commercial purposes. Assuming the fishery maintains catch at the recent annual average, there would be a decrease of 2.3 to 26.4 percent in available fish relative to the status quo.

NMFS intends the proposed ACL under this alternative to provide for continued availability of bottomfish resources slightly below the status to the Guam fishing community while promoting rebuilding for the stock complex. Under Alternative 2, fish would be available in slightly reduced quantities than under the status quo alternative in years consistent with the recent average, as opposed to Alternative 3, which would likely result in a closure of Federal waters to bottomfish fishing earlier in the first fishing year. Revenues and fish available for sustenance and recreational purposes under Alternative 2 would range from identical to the status quo to a decrease of 26.4 percent. Overall, NMFS expects the implementation of Alternative 2 to slightly change revenues for Guam bottomfish fishery relative to the status quo during the time frame of the rebuilding plan. However, if the fishery operates at a level that harvests less bottomfish than observed for the recent annual average, this alternative may result in outcomes comparable to the status quo. Thus, fish available for sustenance and recreation purposes and revenue would be less than the baseline in years of average fishery activity, any increases in catch would result in further reductions in available bottomfish and revenue, and any decreases in catch would result in similar outcomes as the status quo. Regardless, there is no expected disruption to the fishery

that would result in any substantial social or economic effects to the Guam fishing community due to the low level of expected decrease in revenue for each participating bottomfish fisherman.

Alternative 3: Implement an Annual Catch Limit of 16,299 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 3, total catch of Guam bottomfish may be slightly reduced from the recent average, and NMFS expects catch to be between 21,763 lb and 29,532 lb annually (Section 2.5.1). If total bottomfish catch is 26,038 lb in 2022 and 17.5 percent of the catch is sold commercially at $4.82 pound, that means 4,557 lb would be sold for $21,963. The 300 participants from the 2020 LOF would earn over $73 each, which is a $10 (11.8 percent) decrease from the status quo (Table 18). In subsequent years of the rebuilding plan under this alternative, if the performance standard is applied and Federal waters are closed to the fishery until a new management measure is developed, expected catch would be 21,736 lb. Expected revenue would then be similar to Alternative 4, with 3,804 lb sold commercially for $18,334 and each fisherman earning $61; this represents a decrease of $22 (26.4 percent) from the status quo alternative. If fishermen compensated for a closure of Federal waters by catching BMUS in territorial waters that remained open to fishing, revenue would be closer to that expected under the status quo alternative for each of the years. However, there is no information available to estimate the magnitude of compensation that could occur. NMFS expects that the amount of fish caught for sustenance and cultural purposes would be affected similarly to fish caught for commercial purposes under Alternative 3. Specifically, there may be a decrease in available fish of 11.8 to 26.4 percent from this alternative relative to the status quo alternative.

NMFS intends the proposed ACL under Alternative 3 to provide for continued availability of bottomfish resources to the Guam fishing community while rebuilding the fishery in four years, though NMFS expects rebuilding to be delayed to five to eight years since fishing would likely continue in territorial waters in the event of a Federal closure. Under Alternative 3, fish would be available in slightly lower quantities than under the status quo alternative. The decrease under Alternative 3 is less than is expected under 4 in the first year, but the expected application of the performance standard would likely result in the closure of Federal waters around Guam to bottomfish fishing until a new management measure is implemented. The decrease in revenue and fish available for recreational and subsistence purposes under Alternative 3 would greater than Alternatives 2 but less than Alternative 4.

Overall, NMFS expects the implementation of Alternative 3 to change the Guam bottomfish fishery slightly relative to the baseline during the time frame of the rebuilding plan. These changes may decrease the amount of fish available and revenue for the fishing community by up to 26.4 percent. Thus, fish available for sustenance, recreational purposes, and revenue would be slightly decreased relative to the status quo alternative, but a disruption to the fishery that would result in any substantial social or economic effects to the Guam fishing community is not expected to the low expected impacts allocated among all fishermen.

Alternative 4: Establish a Temporary Moratorium on Bottomfish Fishing in Federal Waters around Guam

Under Alternative 4, BMUS catch may be moderately reduced from the recent average, and NMFS expects catch to be between 21,736 lb and 29,532 lb (Section 2.6.1). If total catch is

21,736 lb and 17.5 percent of the catch is sold commercially at $4.82 pound, that means 3,804 lb would be sold for $18,334. Using the number of fishery participants from the 2020 LOF, the 300 participants would earn an average of $61 each. This is a decrease of $22, or 26.4 percent from the status quo alternative (Table 18). If fishermen compensated for a closure of Federal waters by catching BMUS in territorial waters that remained open to fishing, revenue would be closer to that expected under the status quo alternative. There is no information available to estimate the magnitude of compensation that could occur.

Detailed information on whether catch for commercial or non-commercial purposes comes disproportionately from territorial or Federal waters or the proportion of species that are caught in these waters is not available. Overall, NMFS expects that the amount of fish caught for sustenance and cultural purposes would be affected similarly to fish caught for commercial purposes. Specifically, there may be a decrease in available fish of 24.6 percent relative to the status quo alternative.

The action under Alternative 4 does not provide for authorized catch in Federal waters, but territorial waters would remain open to fishing for bottomfish, which would allow for some availability of bottomfish resources to the Guam fishing community for the duration of the rebuilding plan. Fish are expected to be available in moderately lower quantities than under the status quo and early years of the other action alternatives. The Federal fishery closure under Alternative 4 may decrease the amount of bottomfish available to the community and the amount of revenue available to fishermen by up to 26.4 percent from the status quo alternative and action alternatives. Implementation of Alternative 4 is therefore expected to affect the fishery and associated communities more than the status quo and action alternatives. The proposed management would decrease revenues relative to the action alternative, but a disruption to the fishery that would result in any large or substantial social or economic effects to the Guam fishing community is not expected since the total anticipated decrease in revenue is $6,576. Overall, this alternative does less than the status quo and other action alternatives to mitigate effects on fish available to markets and for sustenance and recreational purposes in Guam and does not meet the need to mitigate socio-economic effects as well as the other action alternatives.

3.4.1.2 Public Health and Safety at Sea

Considering the past and current operation of the Guam bottomfish fishery, there have been no noted adverse effects on public health and no significant concerns with safety at sea. The fishery has not typically fostered a “race to fish”. NMFS expects this to remain consistent under the status quo. Under Alternatives 2 and 3, the fishery could be subject to a closure of Federal waters; however, NMFS expects fishing to continue in territorial waters where the majority of bottomfish habitat occurs (73.6 percent, see Figure 1), so a race to fish is not expected. Alternative 4, which would implement a complete closure of Federal waters to bottomfish fishing, is also not expected to result in a race to fish since territorial waters would remain open and unrestricted to bottomfish fishing. Because none of the proposed alternatives are expected to result in drastic changes to fishery operations as they are currently and the majority of bottomfish habitat would remain unrestricted with respect to the harvest of BMUS, none of the proposed alternatives are expected to result in an increased likelihood for impacts to public health, issues associated with safety at sea, or a race to fish for bottomfish fishermen in Guam.

3.4.1.3 Potential for Controversy

The Council developed the proposed action for implementation by NMFS via a public process in accordance with the Magnuson-Stevens Act, implementing regulations, the Mariana Archipelago FEP, and other applicable statutes. NMFS and the Council's SSC determined the results of the 2019 stock assessment (Langseth et al. 2019) to be BSIA (Section 1.2), which allows the stock assessment to be used in the setting of ACLs for the Guam bottomfish stock complex consistent with National Standard 2 and the Mariana Archipelago FEP. The Council immediately began work towards this proposed action, as required by the Magnuson-Stevens Act, in consultation with its advisory bodies, NMFS fishery scientists and managers, and DAWR. The Council used BSIA in the development of this proposed action alongside input from the public during publicly noticed Council meetings. This public coordination has not revealed significant controversy regarding impacts to the quality of the human environment from this action (Section 3.4.1). However, Guam bottomfish fishermen and members of the Council have expressed concerns at Council meetings regarding the social, cultural, and economic effects of reducing the availability of bottomfish to the Guam fishing community based on the outcomes of the stock assessment (Langseth et al. 2019), which produced results leading to the proposed action, and that the data used in the stock assessment were not adequate to make the determination that the Guam bottomfish stock complex is overfished.

The concerns regarding adverse impacts to fishermen from this outcome were reflected in the Council's development of the action alternatives which included an ACL only slightly less than the three-year average catch level for the fishery while allowing rebuilding to occur. The 27,000 lb authorized level of catch under Alternative 2 would prevent overfishing according to the six-year OFL estimated by Langseth et al. (2019) and would rebuild the bottomfish stock complex from its overfished designation in eight years; the action would also take the needs of the Guam fishing community into account by implementing the alternative with the highest likelihood of Federal waters remaining open to fishermen while rebuilding within 10 years as required by National 1 of the Magnuson-Stevens Act. Thus, Alternative 2 addresses impacts to the fishery and associated fishing community to the extent permittable by the Magnuson-Stevens Act and implementing regulations by allowing a level of annual catch that is only slightly less than recent annual catches and allows the stock complex to rebuild within the timeframe allowed under statutory requirements. Alternative 2 would also restrict overfishing relative to the status quo in years where there is variably high catch in the fishery and mitigate socioeconomic impacts to the fishing community relative to the maximum action that the Council could recommend (i.e., a closure of Federal waters to the fishery until the stock complex rebuilds). Thus, Alternative 2 satisfies regulatory requirements to prevent overfishing and rebuild the fishery while considering the needs of the fishery and fishing communities by providing a slightly reduced amount of catch that would allow for the management measure to be permissible under regulatory constraints. The Council and NMFS will solicit additional public comments on the potential effects of the proposed action over a 60-day public comment period associated with this rulemaking.

3.4.2 Scientific, Historic, Archeological, or Cultural Resources

Historical and archaeological resources may be found in Federal waters of Guam in the future, but 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 in the areas that the Federal bottomfish fishery operates. Shipwrecks may exist in areas where the fishery operates, but the

fishery is not known to adversely affect shipwrecks. Bottomfish fishermen tend to avoid fishing in, anchoring on, and anchoring near known shipwrecks to avoid losing gear.

Sites with unique scientific resources have not been identified in Guam, apart from those protected as MPAs (Section 3.3.4.2). Fishing is generally restricted in these areas, including fishing for bottomfish, so this fishery would not affect MPAs. NMFS does not expect the proposed rebuilding plan to impact objects or places listed in the National Register of Historical Places as no such areas exist in the U.S. EEZ around Guam. While fishing may occur in areas of potential scientific, cultural, or historical interest, the fishery is not currently known to cause loss or destruction to any such resources, and fishing operations are not expected to significantly change under the implementation any of the alternatives for the proposed rebuilding plan (Sections 2.3 through 2.6). Because management under the action alternatives is not expected to result in significant changes to the conduct of the fishery, none of the action alternatives are expected to result in large adverse impacts to resources of scientific, historic, cultural, or archaeological importance.

3.5 Potential Effects on the Fishery Management Setting

3.5.1 Fishery Agencies and the Council

3.5.1.1 Alternative 1: Status Quo

Under Alternative 1, NMFS expects the fishery to continue to catch bottomfish as it has in recent years where an ACL was specified without an in-season AM, and no substantial changes are expected relative to recent catches or fishing activity (Section 2.3.1). The implementation of the same ACL and post-season AM as specified for 2020 through 2022 under Alternative 1 would not affect administration and enforcement because the status quo would be maintained, and there would be no in-season AM that would require additional administrative action or enforcement. Administrative and enforcement activities and costs would not be expected to change under the status quo relative to recent years.

3.5.1.2 Alternative 2: Implement an Annual Catch Limit of 27,000 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 2, NMFS expects the fishery to harvest slightly less BMUS relative to status quo alternative except in years where the total catch is lower than the recent annual average (e.g., 2015, 2017). It is probable, but not assured, that the fishery would reach the authorized catch of 27,000 lb over the course of the rebuilding plan, which would require that NMFS close Federal waters to bottomfish fishing in accordance with the in-season AM and performance standard. If this occurs, a closure of Federal waters would not require an additional rule but would require more administrative resources to close the fishery and enforce the closure, relative to the status quo alternative where a closure would not be implemented due to the lack of an in-season AM. Although this would be the first time an in-season AM would be used in Guam, NMFS has utilized an in-season closure as an AM in the Hawaii Deep 7 bottomfish fishery since 2007. The Deep 7 fishery reached the catch limit each year from 2007 to 2010, so NMFS has experience with this type of action. If the fishery were closed in Guam, NOAA OLE and USCG would be responsible for enforcing the closure. Enforcement of the bottomfish fishing closure in Federal waters would not be difficult because the 3-mile limit is easily determined using the Global

Positioning System (GPS). The application of the performance standard in subsequent years would similarly require more administrative resources and enforcement effort, but it would not require an additional rule. The development of a new coordinated management approach to allow the reopening of the fishery under the performance standard would also require additional administrative resources to generate the measures. The new regulations would not cause substantial costs to fishermen. Fishermen would continue to comply with existing laws, and they would need to learn about the potential for an in-season closure and comply with the no-retention regulation for BMUS caught in Federal waters if a closure is implemented.

3.5.1.3 Alternative 3: Implement an Annual Catch Limit of 16,299 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Under Alternative 3, NMFS expects the fishery have slightly reduced catch relative to the status quo alternative, as it is likely that annual catches would reach the proposed ACL and result in a closure of the fishery in Federal waters in accordance with the in-season AM and performance standard. If this occurs, a closure of Federal waters would not require an additional rule but would require more administrative resources to close the fishery and enforce the closure, relative to the status quo where a closure would not be implemented. Although this would be the first time an in-season AM would be used in Guam, NMFS has experience with this type of action (see Section 3.5.1.2). If the fishery is closed in Guam, NOAA OLE and USCG would be responsible for enforcing the closure. Enforcement of the bottomfish fishing closure in Federal waters would not be difficult because the 3-mile limit is easily determined using GPS. The application of the performance standard in subsequent years would similarly require more administrative resources and enforcement effort, but it would not require an additional rule. The development of a new coordinated management approach to allow the reopening of the fishery under the performance standard would also require additional administrative resources to generate the measures. The new regulations would not cause substantial costs to fishermen. Fishermen would continue to comply with existing laws, and they would need to learn about the potential for an in-season closure and comply with the no-retention regulation for BMUS caught in Federal waters if a closure is implemented.

3.5.1.4 Alternative 4: Establish a Temporary Moratorium on Bottomfish Fishing in Federal Waters around Guam

Under Alternative 4, the fishery would be closed in Federal waters over the course of the rebuilding plan, so it would not be necessary to evaluate catch relative to an ACL and subsequent administrative action by NMFS would not be necessary to close the fishery in accordance with the in-season AM or develop a new management approach in accordance with the performance standard. This alternative would not require more administrative resources than the status quo, but additional resources from the NOAA OLE and the USCG would be needed to enforce a closure of Federal waters to bottomfish fishing. Enforcement of the bottomfish fishing closure in Federal waters would not be difficult because the 3-mile limit is easily determined using GPS. Fishermen would continue to comply with existing laws, and they would need to learn about the Federal closure and comply with the no-retention regulation for BMUS caught in Federal waters if the closure is implemented. Compliance would be easier for fishermen under Alternative 4 compared to the other action alternatives because the closure of Federal waters would not change over the course of the rebuilding plan.

3.5.2 Territorial Management Agency

3.5.2.1 Alternative 1: Status Quo

The implementation of the status quo would not change responsibilities for the Guam DAWR to monitor or enforce the bottomfish fishery. DAWR would continue to collect catch data through the creel survey and commercial receipt book programs and provide this information to NMFS so they can be reported by the Council in its annual SAFE reports and tracked against the ACL. The status quo would not lead to added burden on territorial management agencies because the management provisions would be the same as previously implemented for the fishery.

3.5.2.2 Alternative 2: Implement an Annual Catch Limit of 27,000 lb, an In-Season Accountability Measure, and a Higher Performance Standard

The use of an ACL, in-season AM, and performance standard for the Guam bottomfish fishery under Alternative 2 is not expected to change fishery monitoring by the local resource management agencies. PIFSC would continue to track catch data in collaboration with the Council relative to the implemented ACL as it is transmitted by DAWR. Because of the need for timely data to support an in-season AM, NMFS would coordinate with DAWR to allow it to monitor the fishery and provide data in a timely and effective manner. Implementation of an ACL of 27,000 lb and potential Federal closure would not affect fishing in territorial waters and therefore not lead to added burden on territorial management agencies.

3.5.2.3 Alternative 3: Implement an Annual Catch Limit of 16,299 lb, an In-Season Accountability Measure, and a Higher Performance Standard

Alternative 3 is also not expected to change fishery monitoring by the local resource management agencies under the implementation of an ACL, in-season AM, and performance standard. Catch data would continue to be collected by DAWR in collaboration with NMFS and the Council, and DAWR would transfer these data to NMFS. The need for timely data would remain to support the in-season AM, so NMFS would coordinate with DAWR to provide prompt and effective monitoring. Thus, the implementation of an ACL of 16,299 lb and potential Federal closure would not affect fishing in territorial waters and therefore not lead to added burden on territorial management agencies.

3.5.2.4 Alternative 4: Establish a Temporary Moratorium on Bottomfish Fishing in Federal Waters around Guam

NMFS expects the implementation of a Federal closure under Alternative 4 to have similar effects on DAWR as Alternatives 2 and 3. Although an in-season AM is not part of Alternative 4, DAWR would continue to collect catch interviews and transmit the data to NMFS. Similar to the other action alternatives, DAWR would not be required to implement a complementary closure to the bottomfish fishery in territorial waters.

3.5.3 Implementation of ACLs and AMs for other Pacific Island Fisheries

The proposed implementation of an ACL, AM, and performance standard for the Guam bottomfish fishery would not conflict with or reduce the efficacy of existing bottomfish resource management by any local resource management agency, NMFS, or the Council. Additionally, the proposed management would also not conflict with ACL and AM implementations for the

other Western Pacific bottomfish fisheries in the American Samoa or Hawaii because these fisheries are geographically separated and bottomfish fishery participants do not fish in different territories such that management in one island area (e.g., Guam) would adversely affect the stock status of bottomfish in another island area (e.g., American Samoa or Hawaii). However, the proximity of Guam to the CNMI may introduce conflicts associated with the implementation of ACL and AMs for the CNMI. Changes to the management regime for bottomfish in Guam may cause Guam-based fishermen to opt to harvest bottomfish in the waters of the CNMI at an increased rate than is normally known to occur. If bottomfish landed in Guam are harvested in the CNMI, there may be impacts to the bottomfish stock complex in the waters of the CNMI that would not be collected or represented in fishery-dependent data; this could result in additional impacts to the bottomfish stock complex in the waters of the CNMI that are not captured by the current monitoring scheme for the territory. Thus, landings of bottomfish in Guam from CNMI waters may lead to overrepresentation of catch relative to the Guam BMUS ACL and underrepresentation of catch relative to the CNMI BMUS ACL. However, there are no available data about which fish are harvested in the waters of one territory or the other, only where the fish are landed. Additionally, this will likely only be the case for non-commercial fishermen, as commercial fishermen harvesting bottomfish in CNMI waters require a permit, so there are no large impacts expected on the implementation of ACLs for CNMI due to the proposed action.

3.6 Other Potential Effects

3.6.1 Biodiversity and Ecosystem Function

To date, there have been no identified effects to marine biodiversity and/or ecosystem function from the Guam bottomfish fishery. Bottomfish species are not known to have critical ecosystem roles, such as other tropical species such as parrotfishes or reef-building corals (Bozec et al. 2013; Wild et al. 2011), and the fishery is not known to have large effects on biodiversity or ecosystem function. None of the alternatives under consideration would result in substantial changes to the fishery with respect to gear, effort, or participation, but may cause slight changes in areas fished if Federal waters are closed to the fishery (Sections 2.3 through 2.6). Therefore, implementation of the proposed rebuilding plan would not affect marine biodiversity and/or ecosystem function.

Bottomfish fishing is not known to be a potential vector for spreading alien species as none of the bottomfish vessels fish outside of the Mariana Archipelago. Although fishermen from Guam could harvest species in waters of the CNMI, the territories share the same archipelagic waters. Because fishing would not change in this regard under any of the alternatives (Sections 2.3 through 2.6), the proposed rebuilding plan would not have the potential to spread invasive species into or within the waters of Guam.

3.6.2 Highly Uncertain Effects, Unique or Unknown Risks

As authorized by the Magnuson-Stevens Act, the Council and NMFS have managed the bottomfish fishery in Guam since 1986 (WPRFMC 1986), and fishery managers and scientists involved in developing the proposed action are highly experienced in terms of understanding the way the fishery operates and the likely outcomes of the proposed measure. An ACL of 27,000 lb with a post-season AM but no in-season AM is being implemented for the fishery from 2020 through 2022, so fishery performance is known under the status quo. The proposed action under

the action alternatives is part of continued management of the fishery under a system of ACLs and AMs that was first used in 2012. Effects on the human environment of operation and management of the fishery under these management measures are generally known and have been considered in the development and recommendation of alternatives.

Analysis of the proposed management action includes consideration of the BSIA and authorized and expected levels of catch. Some uncertainty exists in the potential response of fishermen to a closure of Federal waters since there is no data on the level of displacement from Federal waters to territorial waters that may occur; however, because a small proportion of bottomfish habitat in Guam lies in Federal waters, the difference between the maximum possible effect (i.e., proportional reduction in catch) and minimum possible effect (i.e., no reduction in catch) is relatively small. Notably, NMFS expects either outcome to result in a slight to moderate reduction in catch under the action alternatives compared to the status quo depending on variability in the fishery and displacement of fishing effort. The effects of continued fishing for BMUS within these constraints for the duration of the rebuilding plan are understood based on the stock assessment and are not highly risky. Risks associated with proposed management are therefore not unique or unknown, and potential outcomes are informed by available scientific information.

3.6.3 Environmental Justice

The effect of the alternatives on environmental justice communities that include members of minority and low-income groups was considered. Overall, the fishery is not having a large adverse effect on subsistence harvests of marine resources or on the environment or human health in a way that disproportionately affects members of environmental justice communities. The fishery does not pollute marine waters and, thus, does not have adverse effects to human health or on marine life. The proposed management would apply to everyone that catches bottomfish, so it would not disproportionately affect any particular subset of the bottomfish fishery. The environmental review in this EA shows that the fishery would continue to be conducted in the same way that it has in recent years under the status quo alternative, that Alternatives 2 and 3 may slightly decrease catch compared to the status quo, and that Alternative 4 may moderately decrease catch compared to the status quo. These alternatives could decrease the amount of bottomfish available to fishing communities, though none of the effects are expected to be substantial (Section 3.4.1). The Federal closure or ACL, AMs, and performance standard under the alternatives are intended to prevent overfishing, rebuild the fishery, and mitigate impacts to fishing communities, including minority and low-income groups such that communities that rely on BMUS harvest can continue to benefit from the fishery. Because the fishery is not expected to change its conduct substantially under any alternative, implementation of these management measures is not anticipated to result in substantial changes to the fishery, regardless of which alternative is being considered. As a result, NMFS and the Council found no adverse effects to the environment that could have disproportionately high or adverse effects on members of environmental justice communities in Guam.

3.7 Additional Considerations

3.7.1 Climate Change

Although there are no specific studies examining the potential effects of climate change on Pacific Island bottomfish, changes in the environment from global climate change have the potential to affect bottomfish fisheries. Effects of climate change may include sea level rise, increased intensity or frequency of coastal storms and storm surges, changes in rainfall (more or less) that can affect salinity nearshore or increase storm runoff and pollutant discharges into the marine environment, increased temperatures resulting in coral bleaching, and temperature mediated responses in some marine species (IPCC 2007). The effects from climate change may occur slowly and be difficult to discern from other effects. Climate change has the potential to adversely affect some organisms, while others could benefit from changes in the environment. Increased carbon dioxide uptake can increase ocean acidity which can disrupt calcium uptake processes in corals, crustaceans, mollusks, 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.

The efficacy of the proposed management provision of the rebuilding plan in providing for sustainable levels of fishing for bottomfish is not expected to be adversely affected by climate change. Recent catches and biological status of the stock complex informed the development of the ACL, AMs, and performance standard, and climate change effects, if any, would be indirectly reflected in those statistics. Monitoring of bottomfish catches and stocks would continue, regardless of which alternative is selected, and if environmental factors were found to be affecting the stocks, management could be adjusted in the future.

3.7.1.1 Consideration of Greenhouse Gas Emissions

The Guam bottomfish fishery utilizes vessels that are powered by fossil fuels and emit greenhouse gases from fossil fuel combustion. Management under the alternatives under consideration would not result in a change in fishing in any way that would have large effects on vessel use or fuel consumption or greenhouse gas emissions. If the fishery were to be subject to a closure of Federal waters to bottomfish fishing, some fishing activity may move from offshore banks in Federal waters to closer habitats in territorial waters that require less transit (Figure 1). However, NMFS does not have detailed information on the current level of fishing effort in Federal versus territorial waters or the amount of displacement that may occur. The closure would affect a small proportion of bottomfish habitat, so fishing activity is not expected to change substantially relative to the status quo alternative and any potential decreases in fossil fuel consumption are expected to be minor. For these reasons, none of the action alternatives are expected to result in substantial changes to the way vessels are used, so there would be no change in greenhouse gas emissions.

Table 19. Environmental effects of the alternatives.

Topic/Section	Alt. 1 – Status Quo	Alt. 2 – ACL of 27,000 lb w/ In-Season AM and Performance Standard	Alt. 3 – ACL of 16,299 lb w/ In-Season AM and Performance Standard	Alt. 5 – Temporary Moratorium of Fishery in Federal Waters
Overview of the alternatives	Existing fishery management as specified for 2020 through 2022 with a 27,000 lb ACL and a post-season AM. No in-season AM and no potential for Federal fishery closure.	For each fishing year, fishery operating under proposed ACL of 27,000 lb of BMUS, in-season AM, and performance standard. Authorized catch level would rebuild fishery in eight years, but potential reduction in catch could allow rebuilding in five to eight years. Uncertain if fishery would be subject to an in-season closure and application of the performance standard, but more probable to occur annually based on recent average catch.	For each fishing year, fishery operating under proposed ACL of 16,299 lb of BMUS, in-season AM, and performance standard. Authorized catch levels would rebuild fishery in four years, but continued fishing in territorial waters would likely extend the rebuilding timeline to five to eight years. Likely that fishery would be subject to an in-season closure and application of the performance standard.	Federal waters closed for the duration of the rebuilding. This is functionally equivalent to an ACL of 0 lb in Federal waters. Authorized catch levels would rebuild fishery in two years, but continued fishing in territorial waters would likely extend the rebuilding timeline to five years. No AMs.

Expected fishery outcome of alternatives	Continuation of fishery as operated with same ACL and post-season AM as specified for 2020 through 2022. Fishery expected to continue fishing as in recent years, with average annual catch of 29,532 lb. Catch possibly, but not overly likely, to exceed level of OFL, and rebuilding may still occur in 13 years if catch is consistent with the recent annual average.	Federal fishery may close by November in the first fishing year and be closed for the full year in subsequent years until new management measures are implemented in accordance with the performance standard; catch expected to be less than the status quo.. Desired reduction in harvest of BMUS in these years could be offset by fishing in territorial waters where the majority of bottomfish habitat is located. The reduction in harvest of BMUS from Federal waters would prevent overfishing and allow rebuilding to occur. The AM and performance standard would help maintain the rebuilding timeline in the event of high catch.	Federal fishery may close by July in the first fishing year and be closed for the full year in subsequent years until new management measures are implemented in accordance with the performance standard; catch expected to be less than the status quo and Alt. 2. Desired reduction in harvest of BMUS could be offset by fishing in territorial waters where the majority of bottomfish habitat is located. The reduction in harvest of BMUS from Federal waters would prevent overfishing and allow rebuilding to occur.	Catch expected to be less than all other Alts. with a closure of Federal waters for entirety of each fishing year for the duration of the rebuilding plan. Desired reduction in harvest of BMUS could be offset by fishing in territorial waters where the majority of bottomfish habitat is located. Largest reduction in harvest of BMUS compared to all other Alts. Overfishing would be prevented, and rebuilding could occur in the shortest expected amount of time.

Guam bottomfish fishery (Sections 2.3 through 2.6; see also Potential Effects on Fishing Communities, Section 3.4.1)	No change. Fishing would occur year round. Federal and territorial waters open to fishing with a catch limit but no mechanism to ensure the ACL is not exceeded. BMUS available to community as in previous years, but with possible reduction in catches over time due to potential worsening condition of the stock. Possible rebuilding of the stock during years of average operation, but years of high catch could worsen overfished state of stock complex.	Slight change. A potential closure of Federal waters would affect fishermen who customarily fish in Federal waters. Fishermen could fish year round in territorial waters. BMUS available to community as in previous years, but with possible reduction in catch relative to Alt. 1 if the Federal fishery is closed. Some conservation benefit to the stock complex relative to the status quo, which would provide a higher chance of rebuilding.	Slight change. Likely closure of Federal waters would affect fishermen who customarily fish in Federal waters. Fishermen could fish year round in territorial waters. BMUS slightly less available to community than in previous years, with reduction in catch relative to Alt. 1 and 2 if the Federal fishery is closed. Reduced catches in Federal waters, and conservation benefit to the stock complex relative to Alt. 1 and 2 with a higher chance of rebuilding.	Largest potential change. NMFS would close for the duration of the rebuilding plan. This may adversely affect fishermen who customarily fish in Federal waters. Fishermen could fish year round in territorial waters. Less BMUS available to community than in previous years with possible reduction in catches due to the Federal fishery closure. Reduced catches in Federal waters, reduced overfishing, and some conservation benefit to the stock complex relative to all other Alts.

Fishery operation in terms of location, gear, participation, effort, seasonality	The fishery operates around the island of Guam and its offshore banks. Distribution of harvest from Federal and territorial waters is unknown. 73.6 percent of bottomfish habitat is in territorial waters; most catch is assumed to be from these waters. Seasonality has not undergone detailed analysis - the fishery operates year round but likely has its highest catches from April to June. Alt. 1 would not result in a change to the fishery with respect to location, gear, seasonality, participation, or intensity. (Section 2.3)	Potential slight change to areas fished compared with Alt. 1, but some fishing may be displaced into territorial waters if Federal waters close. Since most fishing likely occurs in territorial waters, this would not result in a large change. Overall, NMFS expects effort to be slightly reduced during the rebuilding plan because of a closure to fishing in Federal waters during years where fishing activity is consistent with the recent annual average. (Section 2.4, Section 3.3.1)	Slight change to areas fished compared with Alt. 1. Some fishing may be displaced into territorial waters over the duration of the rebuilding if Federal waters close as expected. Since most fishing occurs in territorial waters, this would not result in a substantial change. Overall, NMFS expects effort to be reduced during the rebuilding plan because of a closure to fishing in Federal waters for almost half of the year in the beginning of the rebuilding plan and for the entirety of the year later in the rebuilding plan. (Section 2.5, Section 3.3.1)	Slight change to areas fished compared with Alt. 1. NMFS would close Federal waters for the duration of the rebuilding plan, so all fishing would occur in territorial waters during this time. Since most fishing occurs in territorial waters, this would not result in a substantially large change. Overall, NMFS expects effort to be reduced because of the complete closure to fishing in Federal waters for the duration of the rebuilding plan. (Section 2.6, Section 3.3.1)
3.2 Effects on the Physical Environment				

Effects on air and water quality, noise, and view planes	No effect, not considered further.	No change from baseline.	No change from baseline.	No change from baseline.
Effects on unique features of the geographic environment	The fishery does not affect unique features of the geographic environment. (Sections 3.2, 3.3.4, and 3.4.2)	No change from baseline.	No change from baseline.	No change from baseline.
3.3 Effects on the Biological Environment				
Estimated annual catch of BMUS in subsequent years	29,532 lb	Between 21,736 lb and 29,532 lb	Between 21,736 lb and 29,532 lb	Between 21,736 lb and 29,532 lb

3.3.2.1 Effects on target species (BMUS)	Stock would be managed under the same ACL and AM as previously specified for 2020 through 2022. There would not be functional constraints to catch to promote sustainability due to the lack of an in-season AM. Overfishing would not be restricted in years of high catch, and the stock would persist in an overfished state if catches exceed levels of sustainable harvest without impediment.	NMFS would authorize catch at a level that is intended rebuild the fishery in eight years. Overfishing is expected to be prevented, though risk still exists without a complementary closure of the fishery in territorial waters in years of high catch. There could be a reduction in harvest from offshore areas if Federal waters are closed, but it is not clear how when the closure would need to be implemented. There may be less displacement into territorial waters than Alt. 3 due to Federal waters being open to bottomfish fishing until the relatively higher ACL is reached.	NMFS would authorize catch at a level that is intended rebuild the fishery in four years. Overfishing is expected to be prevented, though risk still exists without a complementary closure of the fishery in territorial waters in years of high catch. NMFS expects the fishery to rebuild in five to eight years due to continued fishing in territorial waters after the ACL is reached. There would be a reduction in harvest from offshore areas if Federal waters are closed. There may be less displacement into territorial waters than Alt. 4 due to Federal waters being open to bottomfish fishing until the ACL is reached.	Authorized catch would be functionally equivalent to zero in Federal waters, which is intended to prevent overfishing and rebuild the fishery in two years. However, fishing would not be limited in territorial waters. Rebuilding is expected in five years due to continued fishing in territorial waters. There would be a reduction in harvest of BMUS from offshore areas due to the closure of Federal waters to bottomfish fishing for the duration of the rebuilding plan, which would reduce overfishing and promote rebuilding.

3.3.2.2 Effects on non-target species and bycatch	Under this alternative, fishery effects on non-target stocks are expected to continue at low levels because bottomfish fishing is target-specific, and there has been extremely low recorded bycatch in the fishery in recent years.	No change from baseline.	No change from baseline.	No change from baseline.

3.3.3. Effects on protected species	The fishery is known to have limited level of interactions with protected species and operates within existing ESA and MMPA authorizations. The fishery is a Category III fishery under the MMPA (remote likelihood or no known incidental mortality and serious injury of marine mammals). The fishery is not adversely interacting with seabirds.	No change from baseline.	No change from baseline.	No change from baseline.
3.3.3.1 Effects on critical habitat	There is no designated critical habitat in the action area.	No change from baseline.	No change from baseline.	No change from baseline.

3.3.4 Effects on habitats and vulnerable ecosystems	The fishery uses hooks and lines and is not known to have adverse effects on habitats including EFH or HAPC, coral reefs, or vulnerable ecosystems. The fishery does not operate in areas closed to bottomfish fishing.	No change from baseline.	No change from baseline.	No change from baseline.
3.3.4.3 Effects on other vulnerable marine or coastal ecosystems	The fishery is not known to be adversely affecting other vulnerable coastal ecosystems including deep coral ecosystems.	No change from baseline.	No change from baseline.	No change from baseline.
3.4 Effects on the Socioeconomic Setting				

3.4.1 Fishing communities	The affected fishing community is comprised of people from the island of Guam, which includes fishermen, vendors/dealers, and consumers. BMUS are important for recreational and subsistence uses, and the fishery supports jobs and provides revenue for fishermen. No potential change from recent management under this alternative.	Slight to moderate change. Commercial fishermen would see a reduction in revenues relative to the status quo of 2.3 to 26.4 percent due to the expected closure of Federal waters if the fishery performs consistent with the recent annual average. In this case, there would be a similar reduction in BMUS resources available for the community. Effects on non-commercial, sustenance, and recreational fishing would likely be similar to those for commercial fishing. Fishing in territorial waters would still be available and displacement of effort would partially offset the impacts if a closure is enacted. Long term, the management measure would improve conservation of BMUS over the status quo alternative due to restricting catch in years where the ACL is exceeded.	Slight to moderate change. Commercial fishermen would see a reduction in revenues relative to the status quo of 11.8 to 26.4 percent due to the expected closure of Federal waters if the fishery performs consistent with the recent annual average. In this case, there would be a similar reduction in BMUS resources available for the community. Effects on non-commercial, sustenance, and recreational fishing would likely be similar to those for commercial fishing. Fishing in territorial waters would still be available and displacement of effort would partially offset the impacts if a closure is enacted. Long term, the management measure would improve conservation of BMUS over the status quo alternative and Alt. 2 due to restricting catch in years where the ACL is exceeded.	Moderate change. Revenue reduced 26.4 percent for fishermen each year relative to the recent average for the duration of the rebuilding plan as NMFS would close the fishery in Federal waters. A similar reduction is expected in BMUS resources available for the community. Effects on non-commercial, sustenance, and recreational fishing would be similar to those for commercial fishing. Fishing in territorial waters would still be available and displacement of effort would partially offset the impacts if a closure is enacted. Long term, Alt. 4 would improve conservation of BMUS over all other alternatives but provide less mitigation of management impacts on the fishing community.

3.4.1 Effects on fishery revenue	NMFS expects fishing to continue at levels similar to recent years, and commercial fishermen would realize $24,910 in total revenue if they catch 29,532 lb and 17.5 percent is sold.	Revenue under this alternative is expected to be slightly less than the baseline at $18,334 to $24,347 over the course of the rebuilding plan since catch is expected to be reduced relative to recent levels due to a closure of Federal waters if the ACL is reached.	Revenue under this alternative is expected to be slightly less than the baseline at $18,334 to $22,076 over the course of the rebuilding plan since catch is expected to be reduced relative to recent levels due to a closure of Federal waters if the ACL is reached.	Revenue under this alternative is expected to be moderately less than the other action alternatives at $18,334 each year of the rebuilding plan since catch is expected to be reduced relative to recent levels due to a complete closure of Federal waters.
3.4.1.2 Effects on public health or safety	The fishery is not causing an adverse effect on public health or safety.	No change from baseline.	No change from baseline.	No change from baseline.
3.4.1.2 Safety at sea	There are no known safety-at-sea issues in the fishery.	No change from baseline.	No change from baseline.	No change from baseline.

3.4.1.3 Potential for controversy	There is no potential for controversy from fishermen due the same management being implement as previously for 2020 through 2022.	There may be the potential for controversy with fishermen due to the implementation of a restrictive ACL with a functional constraint in the form of an in-season AM and performance standard that could restrict harvest from offshore banks.	Same as Alt. 2.	There may be the potential for controversy with fishermen due to the fishing grounds in the offshore banks being completely restricted.
3.4.2 Scientific, historic, archaeological, or cultural resources	The fishery is not known to have an adverse effect on historic, archaeological, or cultural resources.	No change from baseline.	No change from baseline.	No change from baseline.

3.5 Effects on the Fishery Management Setting				
3.5.1 NMFS management	NMFS would implement the same catch limit and AM as specified previously and would continue to participate in annual fishery monitoring activities with the Council. NMFS would continue managing the fishery consistent with requirements under the Magnuson-Stevens Act and the Mariana Archipelago FEP. Additional administrative costs may be required to implement a post-season overage adjustment.	NMFS would continue to participate in Council fishery monitoring activities. Additional administrative costs would be required for NMFS to track the fishery's progress toward the ACL in-season, to implement an in-season Federal fishery closure, and to apply a Federal fishery closure in subsequent years in accordance with the performance standard.	Same as Alt. 2.	Similar to Alternative 2, but there would not be a need to track progress toward an ACL, implement an in-season closure, or apply a performance standard. NMFS would implement the closure at the start of each fishing year for the duration of the rebuilding plan.

3.5.1 Council management activities	The Council would continue to review and report annual BMUS catches against the ACL in the annual SAFE report.	No change from baseline.	No change from baseline.	No change from baseline.
3.5.2 Territorial management activities	Guam would continue to administer the commercial receipt and creel survey programs and would continue to enforce fishery related laws in territorial waters and on shore.	No change from baseline.	No change from baseline.	No change from baseline.
Complementary Federal and territorial management of the fishery	No new Federal action under the status quo alternative since NMFS would implement the same management regime as 2020 through 2022, so no change to the management relationship.	Guam is not currently proposing to implement a complementary closure for BMUS in territorial waters if the catch attains the ACL. So, this alternative would result in no change in management by Guam in terms of fishery closure regulation or enforcement.	Same as Alt. 2.	Guam is not currently proposing to implement a complementary closure for BMUS in territorial waters if a complete Federal closure is implemented. So, this alternative would result in no change in management by Guam in terms of fishery closure regulation or enforcement.

Fishermen's compliance	Fishermen would continue to comply with closed fishing areas, territorial laws, and Federal rules regarding destructive fishing practices.	The new regulations would not cause substantial costs to fishermen. Fishermen would continue to comply with existing laws. Fishermen would need to learn about the potential for an in-season closure and comply with the no-retention regulation for BMUS caught in Federal waters if a closure were implemented.	Same as Alt. 2.	Same as Alt. 2. Fishermen would need to learn about the Federal fishery closure and comply with the no-retention regulation for BMUS caught in Federal waters. Compliance for fishermen would be easier than under the other action alternatives because the closure of Federal waters would not change over the course of the rebuilding plan.
Enforcement	NOAA OLE, USCG, and DAWR would continue to enforce fishery regulations around Guam.	Enforcement of the bottomfish fishing closure in Federal waters would not be difficult to enforce because the 3 mile limit is easily determined.	Same as Alt. 2.	Same as Alt. 2.

Violation of Federal, state, or local law or requirements imposed for environmental protection?	No violations are consistently occurring and are not expected.	No change from baseline.	No change from baseline.	No change from baseline.
Would the action under each alternative be expected to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?	No. The Magnuson-Stevens Act and the Mariana Archipelago FEP require that NMFS implement ACLs and AMs for all MUS annually. Implementing status quo management would not change this requirement going forward.	No. The proposed rebuilding plan, despite being long-term, is a limited duration management action intended to benefit BMUS by rebuilding the stock while considering the effects of this new fishery management need on the Guam fishing community. This alternative would not narrow future choices having to do with the fishery.	Same as Alt 2.	Same as Alt 2.
3.6 Other Potential Effects				

3.6.1 Biodiversity and ecosystem function	Other than effects on BMUS stocks, the fishery is not known to be having large adverse effects on biodiversity or ecosystem function. Fishery managers are not aware of imbalances to ecosystem function from the fishery.	No change from baseline.	No change from baseline.	No change from baseline.
3.6.1 Introduction or spread of invasive species	Not currently occurring as a result of fishery management. Some bottomfish vessels travel from Guam to CNMI but remain within the archipelago.	No change from baseline.	No change from baseline.	No change from baseline.

3.6.2 Likelihood the effects on the human environment would be highly uncertain or involve unique or unknown risks	Unlikely. Catches are monitored, and the characteristics of the fishery are known due to a recent stock assessment. The effects of continued fishing for BMUS under an ACL and post-season AM are understood and are not highly risky.	Unlikely. The effects of the proposed action are known due to an understanding of the fishery and a recent stock assessment. The effects of continued fishing for BMUS within the limited constraints of this fishery rebuilding plan are understood and are not highly risky.	Same as Alt. 2.	Same as Alt. 2.
3.6.3 Environmental justice	Members of minority and low-income groups may be affected by fishery management decisions but would not be affected disproportionately. The fishery is not having a large adverse effect on subsistence harvests of marine resources or on the environment or human health in a way that disproportionately affects members of environmental justice communities.	No change from baseline.	No change from baseline.	No change from baseline.

3.7 Additional Considerations				
3.7.1 Climate change and greenhouse gases	The fishery requires the use of vessels that are powered by fossil fuels. NMFS does not control the amount of vessel use or where vessels are used by the fishery.	No substantial change from the baseline. Even if there is a closure of Federal waters to bottomfish fishing, vessel use could be only slightly reduced or remain the same.	Same as Alt. 2	Same as Alt. 2

4 APPLICABLE LAWS

5 REFERENCES

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6 PROPOSED REGULATIONS

7 REGULATORY IMPACT REVIEW