



Draft Puerto Rico Fishery Management Plan Overview and Summary of Environmental Analyses

The *Comprehensive Fishery Management Plan (FMP) for the Puerto Rico Exclusive Economic Zone (EEZ)* (Puerto Rico FMP) was developed by the Caribbean Fishery Management Council (Council) following the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1801 et seq.).

This summary includes the major components of the National Environmental Policy Act (NEPA) document contained within the draft Puerto Rico FMP, including an overview of the actions, discussion of the proposed alternatives, and a summary of the effects of the proposed alternatives.

Fishery resources in the U.S. Caribbean EEZ have been traditionally managed under four species-based FMPs: FMP for the Reef Fish Fishery of Puerto Rico and the U.S. Virgin Islands (USVI) (Reef Fish FMP); FMP for the Spiny Lobster Fishery of Puerto Rico and the USVI (Spiny Lobster FMP); FMP for the Queen Conch Resources of Puerto Rico and the USVI (Queen Conch FMP); and, FMP for Corals and Reef Associated Plants and Invertebrates of Puerto Rico and the USVI (Coral FMP). The Council approved the concept of moving from species-based FMPs to three island-based FMPs, applicable to three U.S. Caribbean management areas: (1) Puerto Rico; (2) St. Thomas/St. John, USVI, and; (3) St. Croix, USVI. This management transition was evaluated in a 2014 environmental assessment (EA) prepared by the Council, in partnership with the National Marine Fisheries Service (NMFS). The 2014 EA also evaluated the impact of incorporating the most current regulations under the Reef Fish, Spiny Lobster, Queen Conch, and Coral FMPs into each of the FMPs for Puerto Rico, St. Thomas/St. John, and St. Croix. This change in U.S. Caribbean fishery management strategy provides a means to tailor fisheries management to the individual characteristics of each of these island management areas. If approved by the Secretary of Commerce, completing this transition, as proposed and described in each of the three island-based FMPs, would allow managers to better account for biological, ecological, social, and economic differences among the islands comprising the U.S. Caribbean region.

With the exception of the management revisions proposed in Actions 2-7 discussed in the draft Puerto Rico FMP and its associated NEPA document, shifting from species-based FMPs to island-based FMPs (Action 1) would only repackage the existing management measures and thus would be largely an administrative exercise. Moreover, tailoring management measures to specific island management areas could potentially make fisheries management more effective



by ensuring to the greatest possible degree that optimum yield (OY) is achieved while minimizing adverse direct or indirect effects to the environment.

The Council no longer manages U.S. Caribbean fisheries resources exclusively within a U.S. Caribbean-wide context. Instead, with the exception of tilefish and aquarium trade species, the Council already applies certain required management measures separately within each of the three island management areas. Through actions taken in the 2010 and 2011 Caribbean Annual Catch Limit (ACL) Amendments, the Council established boundaries to define EEZ subdivisions for each island management area (*i.e.*, Puerto Rico, St. Thomas/St. John, St. Croix), and established separate, island-specific acceptable biological catch (ABC), ACL and accountability measure (AM) values within each of those three EEZ subdivisions. However, other components of management, including a proxy for maximum sustainable yield (MSY) and an overfishing limit (OFL), were maintained at a region-wide level. The Puerto Rico FMP presently under development by the Council would fully transition to island-based management for the Puerto Rico EEZ. As a result, MSY (or a proxy, depending on data availability), status determination criteria (SDC), management reference points, and all other management regulations would be set at the level of the Puerto Rico management area.

Action 1: Transition Fisheries Management in the Puerto Rico EEZ from a Species-based Approach to an Island-based Approach.

This action provides two alternatives for conducting fishery management in the Puerto Rico EEZ. Actions 2-7 tier build off from Action 1.

Alternative 1 is the no action alternative. The transition from a species-based to a fully island-based approach to management would not be implemented. Instead, the four presently existing U.S. Caribbean-region FMPs (Reef Fish, Spiny Lobster, Queen Conch, and Coral) would remain in place. No change to federal fishery management would occur.

Preferred Alternative 2 would establish a new Puerto Rico FMP and would repeal the existing species-based FMPs. The new Puerto Rico FMP would include all fishery management measures presently included in the Spiny Lobster, Reef Fish, Queen Conch, and Coral FMPs that are applicable to the Puerto Rico EEZ. The rationale and background for this transition was presented in the 2014 EA.

It would be necessary to implement **Preferred Alternative 2** of Action 1 for all three of the island FMPs, because it is not possible to partially transition from species-based management to island-based management. If **Preferred Alternative 2** was only selected for Puerto Rico, then certain management measures that were established at the U.S. Caribbean level could still apply. The result would be management measures applicable across the entire U.S. Caribbean region



under the remaining species-based FMP(s) other management measures applicable specifically to the Puerto Rico EEZ. Those overlapping management measures could be contradictory and likely would cause confusion. The effects of such contradictory management would be generally negative, in many cases unenforceable, and would violate the mandates of the Magnuson-Stevens Act. So for transitioning to island-based management, it must apply to all three island groups or not at all.

Management measures established at the region level in the species-specific FMPs would not be easily transferred to the island-based FMPs. Therefore, if the Council chooses **Preferred Alternative 2**, some revisions would be required. Those revisions are addressed as Actions 2-7 of this document.

Action 1 Alternatives Effects Summary

Alternative 1 of Action 1 would leave in place the existing species-based approach to federal fishery management in the Puerto Rico EEZ. To the extent that federal fishery management in the Puerto Rico EEZ has been effective under the Reef Fish, Spiny Lobster, Queen Conch, and Coral FMPs as amended, this is a viable alternative. But those FMPs contain management measures that may no longer be appropriate for effective fishery management in the Puerto Rico EEZ (and throughout the region). For example, the Reef Fish FMP was originally developed to manage shallow-water stocks, some of which do not occur in the deeper waters of the Puerto Rico EEZ and are therefore under the jurisdiction of the Commonwealth of Puerto Rico rather than the Council. As a result, management actions recommended by the Council and implemented by NMFS applicable only in federal waters would have little if any impact on those reef fish stocks that occur exclusively or predominantly in Commonwealth waters. Choosing to take no action in **Alternative 1** might prove beneficial to the administrative environment in the short-term because maintaining the status quo would not require administrative adjustments. However, long-term effects would be negative as federal management was focused on stocks over which the Council has little or no influence. Indirect effects to the physical, biological/ecological, and socio-economic environments largely would be negative for those same reasons. Other indirect effects on the socio-economic environment could be expected from **Alternative 1** in the form of diminished compliance with fishery regulations and less participation in management activities.

Preferred Alternative 2 would have effects to the human environment mostly similar to those described for **Alternative 1**. Regulations would be repackaged from a Caribbean-wide EEZ domain to a Puerto Rico EEZ domain, but the regulations would remain the same in most respects. Short-term effects on the administrative environment would be negative, but minor as the new regulations are established. However, most short-term effects to the physical, biological/ecological, and socio-economic environments would be the same as for **Alternative 1**



because, based solely on the outcome from Action 1, the applied regulatory environment would not change. In the long term, the island-based approach proposed by **Preferred Alternative 2** could potentially minimize impacts to the physical, biological, economic, and social environments from fishing activities by enhancing fisheries management. However, the ultimate outcome from implementing **Preferred Alternative 2** of Action 1 depends on the extent to which the proposed management actions presented and discussed in Actions 2-7 are implemented. Those effects are briefly discussed in the corresponding sections below. In general, long-term effects to the human environment would be expected to be positive as discussed in Section 1.4 of the 2014 EA.

Action 2: Stocks Managed under the Puerto Rico FMP

This action addresses stocks in need of conservation and management in Puerto Rico EEZ waters, and provides three alternative approaches to identifying those stocks. Action 2 follows from the Council selecting Preferred Alternative 2 in Action 1.

Alternative 1 is the no action alternative. The Puerto Rico FMP, as created under Preferred Alternative 2 of Action 1, would continue to be composed of all stocks within the fishery management units presently managed under the Reef Fish, Spiny Lobster, Queen Conch, and Coral FMPs.

Preferred Alternative 2 provides a list of five criteria to be applied in a stepwise fashion to identify those stocks in need of conservation and management. The criteria are applied to stocks for which landings data are available. Criterion A captures those stocks that are presently classified as overfished in Puerto Rico EEZ waters based on NMFS' determination, or for which historically identified harvest is now prohibited due to their ecological importance as habitat (corals presently included in the Corals FMP) or habitat engineers (midnight, blue, rainbow parrotfish), or those species for which seasonal closures or size limits apply under current federal management. These stocks would be in need of continued management. From the remainder of the stocks (*i.e.*, those not addressed by Criterion A), Criterion B would exclude from management those stocks that infrequently occur in federal waters and therefore would not respond to federal management measures. From the remainder of stocks not included via Criterion A or excluded via Criterion B, Criterion C would ensure those stocks that are biologically vulnerable, constrained to a specific habitat, or have an essential ecological value are included in the management plan. From the remainder of the species not included via Criteria A or C, or excluded via Criterion B, Criterion D identifies stocks of economic importance to the national or regional economy, or that constitute an important component of bycatch, and would therefore be appropriate for inclusion in the management plan. From the list of stocks identified for inclusion in the management plan based on Criteria A, C, and D, or



excluded via Criterion B, Criterion E would include for management any additional stocks the Council determines are in need of conservation and management.

Under **Preferred Alternative 2**, 18 reef fish stocks would be newly included in the federal management regime and 29 reef fish stocks would be simultaneously removed from management, resulting in an overall decrease in the number and composition of managed reef fish (from 81 to 63) compared to the outcome from **Alternative 1**. Similar to **Alternative 1**, **Preferred Alternative 2** would continue to include spiny lobster and queen conch. In contrast to **Alternative 1**, all species of sea cucumbers and sea urchins occurring in Puerto Rico EEZ waters would be added to the FMP. In addition to the 94 species or genera of corals that were previously managed under the Corals FMP (*i.e.*, **Alternative 1**), **Preferred Alternative 2** would include all corals¹ for management in the Puerto Rico FMP.

Alternative 3 would consider the same criteria identified in **Preferred Alternative 2**, but in this case, all or only a subset of the criteria are applied, in any order, in the selection of species in need of conservation and management. The Council considered **Alternative 3** but decided not to move forward with it. Therefore, this alternative was eliminated from further detailed study.

Action 2 Alternative Effects Summary

Alternative 1 would continue management of those stocks that are included under the existing FMPs, and therefore would not have direct physical, biological/ecological, socio-economic, or administrative effects when compared to the present situation. Indirect biological/ecological, socio-economic, and administrative effects would be expected because **Alternative 1** would not extend management to other species that may be in need of conservation and management. The Council would not set management reference points or other conservation measures for those species, or otherwise ensure those species are managed in a manner that prevents overfishing while achieving, on a continuing basis, the OY from the fishery as required by NS1 of the Magnuson-Stevens Act. Additionally, not including species that are economically important could have both short- and long-term socioeconomic effects on fishermen if unregulated harvest results in depletion of the stock. Conversely, including stocks predominantly harvested from Puerto Rico commonwealth waters in a management plan applicable only to federal waters is administratively ineffective because of the lack of federal authority and resultant enforcement capacity in those local waters, particularly with respect to application of accountability measures in response to harvest exceeding the ACL. Finally, in response to changing environmental (e.g., habitat availability or health) or anthropogenic (e.g., fishing practices) factors, the species to be managed need to be reevaluated periodically to maximize biological and socioeconomic benefits.

¹ At their 153rd Regular meeting, the Council moved to include all soft, hard, mesophotic, and deep water corals under the new island-based FMPs. This would include all species in Orders Scleractinia (hard corals), Alcyonacea (soft corals), and Antipatharia (black corals).



Revising federal fishery management in Puerto Rico EEZ waters, as proposed herein, provides that opportunity. Under **Alternative 1**, that opportunity is lost, as the Council would take no action to reevaluate and revise (as appropriate) the species to be included for federal management.

Preferred Alternative 2 would identify species in need of conservation and management using an expert-based analysis of available data and information applied within an ordered set of evaluation criteria. The outcome of this ordered selection process would result in a change in the number and composition of stocks subject to federal management in Puerto Rico EEZ waters relative to **Alternative 1**.

Few if any direct or indirect physical effects to the environment would be expected, beyond those already experienced under the present management regime, from application of **Preferred Alternative 2**. Although some reef fish would be removed from management, and others added, the methods used to harvest those reef fish (and any resultant physical impacts from those harvest methods) would not be expected to change.

Preferred Alternative 2 would have minor direct and indirect biological/ecological effects associated with the revised list of species included for management. Removing species from management would have minimal direct effects because those species are being removed due to their minimal harvest levels from federal waters. Regarding species that would be added to management, their harvest levels could be impacted by federal management, but those management impacts would not be expected to be significant because management measures for these species would be based on current fishing activities. In general, effects that do result are expected to be positive, as federal management should result in healthier and more sustainable stocks. Indirect effects also would be realized, again predominately in a positive sense. The selection process outlined in **Preferred Alternative 2** ensures harvest of those species contributing valued ecosystem services such as grazing (e.g., parrotfish and sea urchins), nutrient regeneration (e.g., sea cucumbers), or as prey species (e.g., jacks and pelagics) is maintained at a sustainable level. Thus, relative to **Alternative 1**, **Preferred Alternative 2** would be more beneficial to the biological/ecological environment because it would (1) direct resources to the management and protection of species that are truly in need of federal conservation and management; (2) allow inclusion of species that are in need of federal management but have not been previously subject to such management; and (3) remove from management those species that are not affected by federal management activities. That rearrangement of species to be managed would increase the likelihood of sustainable harvest, as a means both to enhance food security for the island of Puerto Rico and to rebuild and sustain the natural ecological balance of the coral reef ecosystem within the context of sustainable harvest.



Preferred Alternative 2 could create a short-term negative socio-economic impact to fishermen that fish for those stocks newly added to management. This would occur if management measures applied to those newly added species, including for example ACLs or size limits, result in a reduction in the allowable harvest or an increase in the effort required to obtain that harvest. However, in the long term, positive effects would be expected as the management measures work to prevent overfishing while achieving, on a continuing basis, the OY from the fishery.

Preferred Alternative 2 would benefit the administrative environment because it would direct resources to the management and protection of species that occur in federally managed waters and that are therefore responsive to federal management measures. Short-term effects include additional administrative burden to effect new management regime, training on application of new regulations, and outreach and education to the public in the content and implications of the new management regime. In the long-term, positive administrative outcomes would result from a more focused, responsive, and appropriate federal approach to managing commercially and recreationally harvested stocks in the Puerto Rico EEZ. That administrative effort would be made more efficient by removing species from management that are rarely caught and of little commercial or recreational consequence in the Puerto Rico EEZ.

The direct or indirect effects of applying **Alternative 3** would depend on the criteria selected and the order those criteria are applied, both of which are unknown at this time.

Action 3: Revise Stocks or Stock Complexes in the Puerto Rico FMP

This action considers alternative methods for grouping stocks into stocks complexes (**Alternatives 1-3**), then determines if one or more indicator stocks (and which species) should be assigned to the stock complex (**Alternative 4**).

Alternative 1 is the no action alternative. As explained above, **Alternative 1** follows from a decision to transition to island-based management under Alternative 2 of Action 1. The Puerto Rico FMP created in Action 1, retains stock complexes presently used for management in Puerto Rico EEZ waters, based on the Reef Fish, Spiny Lobster, Queen Conch, and Coral FMPs. The no action alternative under Action 3 would not revise these stock complex groupings. Species newly added to management based on Action 2 would not be assigned to complexes.

Alternative 2 would result in stocks not being assigned to stock complexes.

Preferred Alternative 3 would organize stock complexes based on scientific analysis, applying outcomes from one or more methods such as statistical analyses, information from past data evaluations, biological and life history similarities, or expert opinion.



Preferred Alternative 4 would identify indicator stocks and is composed of two sub-alternatives. **Preferred Sub-alternative 4a** makes the determination that indicator stocks would be used, and then describes the process to be used to identify one or more appropriate indicator species. Criteria used to guide the choice of indicator stocks include percent of catch, whether the stock is targeted by the fishery, habitat co-occurrence, life history and vulnerability, catch co-occurrence, data availability, and market. All stocks comprising the stock complex would be managed based on the indicator stock. No indicator stocks would be assigned under **Preferred Sub-alternative 4b**. For each stock complex, either of the sub-alternatives can be applied.

Action 3 Alternative Effects Summary

Alternative 1 would continue management of stocks and stock complexes included under the existing FMPs and would not have additional direct physical, biological/ecological, economic, or social effects, as it would not alter current management. However, **Alternative 1** would have indirect biological effects, as the stocks/stock complexes under management would not be updated to reflect the most current or best information available. Similarly, **Alternative 1** would not establish stock complexes for the species new to management (brought in under Action 2). These limitations could directly increase the administrative burden associated with managing stocks and stock complexes, especially if the current management measures result in frequent administrative actions, such as the application of AMs. Without reliable and consistent data, particularly for those newly added species that would not be assigned to a complex as appropriate, the reference points that are established and AMs that could follow may create closures and other problems that disrupt current fishing patterns. Each of these outcomes would likely result in negative indirect economic and social effects associated with lost harvest opportunity and resultant fishing community impacts.

Alternative 2 would likely have the greatest direct and indirect effects on the physical, biological/ecological, economic, social, and administrative environments, and those effects would be expected to be negative in most respects. Each stock would be managed individually regardless of the amount of data available for that stock, or whether there are similarities among two or more stocks in life history or fishing practices that would allow those stocks to be more effectively managed as a unit. The least impactful direct and indirect effects would be on the physical environment, because impacts of fishing activities on the physical environment (*i.e.*, the habitat, particularly that constituting the coral reef) would remain relatively constant regardless of the distribution (or not) of stocks among complexes.

Biologically and ecologically, managing at the level of the individual stock, when grouped management is a viable option, could have negative consequences if the individual stock is subject to a regulatory closure, prohibiting fishing for the stock, but other stocks are not. Group management might be viable because the stocks occupy overlapping habitats and are caught



using the same gear in the same locations, indicating that they will likely be harvested together. Thus, if one stock is subject to a regulatory closure and others are not, there could be direct impacts via bycatch-related overharvest of the stock experiencing regulatory closure as the fishermen pursue those coincident stocks not governed by the regulatory closure.

Economically, managing at the level of individual stock is likely to result in more regulatory discards and lost financial benefit than that which would occur under **Alternative 1**. Hence, benefits associated with **Alternative 2** are less than those of **Alternative 1**. Similarly, with regard to social effects, any outcomes that result in more frequent application of management measures, particularly those that reduce access to a stock and particularly if that access occurs because of an ACL based on poor data would have indirect effects on the fishing communities reliant on those stocks.

Administratively, tracking the performance of many individual stocks rather than fewer stock complexes requires more administrative effort, likely will require more individual management actions, and will require a greater level of enforcement. Additionally, the resultant stock-specific management measures could potentially be insufficient and inefficient, resulting in more frequent and potentially unnecessary future actions.

Preferred Alternative 3 would be expected to have beneficial effects resulting from allowing the species to be managed either as individual stocks or as stock complexes using the best available information. The stocks/stock complexes established in **Preferred Alternative 3** were determined by the Council's Scientific and Statistic Committee (SSC) and the Puerto Rico District Advisory Panel (DAP) based on the most current fishery information, the most updated biological characteristics available for the species, and expert analysis of those data. There may be some short-term administrative effects associated with creating new management measures for the new stocks/stock complexes, but the long-term administrative effects would be expected to be more beneficial than **Alternative 1** or **Alternative 2** because the flexibility of **Preferred Alternative 3** would allow the stocks/stock complexes to be best tailored for the Puerto Rico fishery. **Preferred Alternative 3** ensures the process includes consideration of all managed stocks, in direct opposition to **Alternative 2**, which allows no grouping, and **Alternative 1**, which limits the number of stocks available for grouping. That tailoring should result in the establishment of more appropriate management measures, which would in turn result in fewer unnecessary ACLs exceeded or AMs applied. There is likely a better chance of setting ACLs (due to the availability of better scientific data) that would provide adequate protection of the stock with **Preferred Alternative 3** than with **Alternative 2**, which, through time, would provide greater indirect economic benefits. **Preferred Alternative 3** therefore provides the direct and indirect benefits to the physical, biological/ecological, economic, and social environment largely denied by **Alternative 2** and limited by **Alternative 1**.



Preferred Alternative 4 would build upon the benefits of **Preferred Alternative 3**, as the stocks and stock complexes would remain the same, but one or more indicator stocks could be selected (**Preferred Sub-alternative 4a**) or not selected (**Preferred Sub-alternative 4b**) depending on the information available for the stocks in the stock complex. All effects would be expected to be identical between **Preferred Alternative 3** and **Preferred Sub-alternative 4b**, because not choosing an indicator for all stock complexes results in the same list as **Preferred Alternative 3**. In contrast, **Preferred Sub-alternative 4a** may result in a greater benefit to the physical, biological/ecological, economic, social, and administrative environments. Essentially, selecting an indicator stock that is both targeted by the fishery and best represents the vulnerability of the other species in the complex would provide more conservative management for all the stocks in the complex, because once the ACL for the indicator is reached, then all stocks in the complex would be closed to further harvest. Using an established set of criteria, the Council's SSC determined, for each stock complex, whether or not an indicator stock would provide additional benefits, specifically to the biological/ecological and administrative (*i.e.*, management) environments. Those benefits then extend to the physical environment by ensuring that species caught together are managed together and fishing activity would respond accordingly to minimize fishing impacts to the environment. Benefits also extend to the economic environment by increasing the likelihood that implementation of management measures is appropriate and necessary, to the social environment by reducing the likelihood of unnecessary and inappropriate management interventions, and to the administrative environment by reducing the number of stocks for which landings must be monitored against the ACL and by reducing the frequency of management interventions particularly with respect to ACL overages.

Action 4: Status Determination Criteria (SDC) and Management Reference Points for Stocks/Stock Complexes in the Puerto Rico FMP

This action describes alternative approaches for establishing SDC and management reference points. Four alternatives are included. **Alternative 1**, **Preferred Alternative 3**, and **Alternative 4** provide different approaches to setting SDC and reference points. **Preferred Alternative 2** considers whether reference points are specified separately for each of the commercial and recreational fishing sectors. Different alternatives may be chosen for each stock/indicator/stock complex depending on the data available for making reference point determinations.

Alternative 1 is the no action alternative. In the Puerto Rico FMP, the previously established SDC and management reference points for those species currently under federal management in the Reef Fish, Spiny Lobster, Queen Conch, and Coral FMPs, would still apply. This alternative would not establish SDC or reference points for those species new to management resulting from Preferred Alternative 2 of Action 2, and thus would not comply with the Magnuson-Stevens Act.



Preferred Alternative 2 would allow for a determination as to whether reference points are established for the entire stock/complex/indicator or separately for each of the commercial and recreational sectors comprising that stock/complex/indicator.

Preferred Alternative 3 defines a three-step process for determining SDC and management reference points. Step 1 would require application of the Council's four-tier Acceptable Biological Catch (ABC) Control Rule (CR). For stocks/stock complexes with valid assessments, CR Tiers 1, 2, or 3 would be applied, depending on the extent of data used in the assessment and the fishing mortality level (F) at MSY or its proxy chosen by the Council. In contrast, Tier 4 would be applied when inadequate data are available with which to conduct a formal stock assessment. Within Tier 4, a sustainable yield level (SYL) would first be defined based on the product of the 75th percentile (Tier 4a) or mean (Tier 4b) of the landings during a reference period and an adjustment scalar. That SYL is then reduced to the ABC using a buffer that reflects the Scientific and Statistical Committee's determination of scientific uncertainty associated with the data used to calculate SYL.

Step 2 addresses data limitations that prevent establishment of an MSY based on outcomes from a valid quantitative assessment. Instead, Step 2 provides three sub-alternatives for setting an estimate of fishing mortality rate when harvest is at the maximum sustainable yield (the "F_{MSY} proxy") based on various fishing mortality rates. **Sub-alternative 3a** establishes a fishing mortality rate equivalent to maximum fishing mortality rate (F_{MAX}), whereas **Sub-alternatives 3b** equates F_{MSY} to the fishing mortality rate at a 40% SPR (in other words, the existing populations spawning capacity when it numbers 40% of an unfished population) and **Preferred Sub-alternative 3c** sets that rate at a 30% SPR.

Step 3 would specify the ACL and OY for each stock/complex. Step 3 provides six sub-alternatives for establishing the ACL. The ACL would be reduced from ABC based on the Council's choice of buffer reduction to account for management uncertainty. The OY would be set equal to the ACL. **Sub-alternative 3d** would set OY = ACL = ABC; **Sub-alternative 3e** (preferred for all stocks except angelfish, parrotfish, surgeonfish) would set OY = ACL = ABC x 0.95; **Sub-alternative 3f** sets the OY = ACL = ABC x 0.90; **Sub-alternative 3g** (preferred for angelfish, parrotfish, surgeonfish) would set the OY = ACL = ABC x 0.85; **Sub-alternative 3h** sets the OY = ACL = ABC x 0.75; and **Sub-alternative 3i** would set OY = ACL = 0.

Alternative 4 follows previously established procedures for determining stock/stock complex SDC and reference points (2010 and 2011 Caribbean ACL Amendments). This alternative is composed of four steps, each containing various sub-alternatives. Step 1 provides four sub-alternatives for defining the year sequence to be used for calculating average landings: **Sub-**



alternative 4a uses the longest year sequence of reliable² landings data available to set management reference points, as applicable; **Sub-alternative 4b** uses the longest time series of pre-Caribbean Sustainable Fisheries Act (SFA) Amendment landings data that is considered to be consistently reliable³ to set management reference points; **Sub-alternative 4c** uses 2012-2016 as the most recent five years of available landings data to set management reference points; and **Sub-alternative 4d** uses another year sequence, as recommended by the Council's SSC, to set management reference points.

Step 2 determines how the year sequence chosen in Step 1 would be used to establish the proxy for MSY and, from that, the OFL, with three sub-alternatives providing a choice among use of mean, median, or maximum landings for the year sequence chosen in Step 1: **Sub-alternative 4e** uses the median annual landings from the year sequence selected in Alternative 4, Step 1; **Sub-alternative 4f** uses the mean annual landings from the year sequence selected in Alternative 4, Step 1; and **Sub-alternative 4g** (for the recreational sector) uses the maximum of a single year of recreational landings x 3 during the year sequence selected in Alternative 4, Step 1.

Step 3 provides five sub-alternatives for establishing the ABC for each stock/stock complex based on the OFL for that stock/stock complex. Each sub-alternative provides a unique reduction buffer to be applied to the OFL to account for scientific uncertainty in the establishment of ABC: **Sub-alternative 4h** does not specify an ABC Control Rule and adopts the ABC recommended by the Council's SSC; **Sub-alternative 4i** adopts an ABC Control Rule where $ABC = OFL$; **Sub-alternative 4j** adopts an ABC Control Rule where $ABC = OFL \times 0.90$; **Sub-alternative 4k** adopts an ABC Control Rule where $ABC = OFL \times 0.85$; and **Sub-alternative 4l** adopts an ABC Control Rule where $ABC = OFL \times 0.75$.

Step 4 provides six sub-alternatives for establishing the ACL for each stock/complex based on the ABC for that stock/complex. Each sub-alternative provides a unique reduction buffer to be applied to the ABC to account for management uncertainty in the establishment of the ACL. The OY is then set equal to the ACL. **Sub-alternative 4m** sets $OY = ACL = ABC$; **Sub-alternative 4n** sets $OY = ACL = ABC \times 0.95$; **Sub-alternative 4o** sets $OY = ACL = ABC \times 0.90$; **Sub-alternative 4p** sets $OY = ACL = ABC \times 0.85$; **Sub-alternative 4q** sets $OY = ACL = ABC \times 0.75$; and **Sub-alternative 4r** sets $OY = ACL = 0$.

² Defined in both the 2010 and 2011 Caribbean ACL Amendments: more recent time-series landings data that are more reliable than baseline but that are affected by recent regulatory changes.

³ Defined in both the 2010 and 2011 Caribbean ACL Amendments: reflects landings prior to implementation of the Caribbean SFA Amendment in 2005, thereby approximating sustainable yield.



Action 4 Alternative Effects Summary

Alternative 1 would result in the continuation of SDC and management reference points established in the 2010 and 2011 Caribbean ACL Amendments. Implementation of **Alternative 1** would be expected to have negative short- and long-term effects on the human environment, including the physical, biological/ecological, social, and economic environments. **Alternative 1** simply carries over the existing reference points and SDC. There is no allowance to respond to availability of additional data, and no opportunity to adapt to a changing suite of managed stocks. In particular, stocks newly added to the Puerto Rico FMP would not be accounted for in **Alternative 1**, creating potential short- and long-term negative effects because harvest levels and associated fishing activities would not be monitored or managed. Short-term administrative effects might be neutral because no additional action needs to be taken.

Establishing sector-specific reference points as proposed in **Preferred Alternative 2** would be inconsequential with respect to the biological/ecological environment because the total ACL would remain the same regardless of whether that total ACL was subdivided among the commercial and recreational sectors. Assuming a continuation of the pattern of sector-based fishing as occurred during the reference landings period upon which each sector's reference points were based, effects to the physical environment also would not be expected to change. For the social and economic environments, allocations reflect historic fishing patterns and by inference historic social practices and economic opportunities. These would also not be expected to change. Effects on the administrative environment also would be minimal, as administration of a sector-based management scheme will continue. To the extent species are added or removed from management according to Action 2, or to the extent complexes are rearranged or indicator stocks are established for those complexes according to Action 3, some administrative adjustments would be required resulting in minor short-term effects on the administrative environment.

Preferred Alternative 3 would be expected to have positive short- and long-term effects on the physical, biological/ecological, social, and economic environments associated with the Puerto Rico EEZ specifically and with the biological and social environments of Puerto Rico generally. Applying the best scientific information available to ensure federally managed stocks are harvested sustainably over the long-term ensures those fish and invertebrate populations supporting harvest are exploited to the greatest practicable extent while protecting reproductive capacity and maintaining effective ecological contributions. Establishing appropriate harvest reference points, taking into account both the biological needs and the ecological contributions of the stock as would be prescribed by **Preferred Alternative 3**, provides positive short- and long-term benefits to the physical environment both directly by managing fishing effort and associated gear impacts and indirectly by managing the ecological integrity of the coral reef ecosystem.



Positive short- and long-term biological/ecological effects would similarly and additionally be provided by **Preferred Alternative 3**. Positive short- and long-term biological/ecological effects, and the associated positive short- and long-term effects to the physical environment, translate to positive short- and long-term effects on the social and economic environments by stabilizing harvest and thereby increasing the predictability of harvest opportunities. Clearly, many factors influence the economic health and cultural vibrancy of fishing communities, and many of those factors (e.g., local and global economic trends, weather events) are beyond the control of fishery management. But a stable and predictable resource base is necessary to economic and cultural health.

Preferred Alternative 3 would be expected to result in minor negative short-term administrative effects as effort is expended to modernize landings tracking protocols to account for establishment of new reference points and inclusion of new species. But the long-term effects to the administrative environment would be positive. Putting into action reference points that utilize the best scientific information available ensures to the greatest practicable extent that administrative efforts, including monitoring and enforcement efforts, are properly expended to track harvest against allowable and appropriate levels and to apply management and enforcement remedies when necessary and appropriate within the context of a sustainable resource.

Effects to the physical, biological/ecological, social, and economic environments resulting from implementation of **Alternative 4** would be expected to be more beneficial than those that would be realized from implementation of **Alternative 1** but less beneficial than those from implementation of **Preferred Alternative 3**. Providing a mechanism for developing reference points for all managed species, as called for in **Alternative 4**, would result in positive effects, but the extent of those positive effects would be limited by an inability to consider and apply the best scientific information available and to update management as those data expand and improve. Administratively, short-term effects would be negative but minor, due to the additional administrative effort to update regulations and public awareness documents. Long-term administrative effects likely would be minor and positive, due to the expected stabilization of management and enforcement.

Action 5: Accountability Measures for Stocks and Stock Complexes in the Puerto Rico FMP

Action 5 would re-establish AMs for previously managed stocks/stock complexes and establish AMs for stocks/stock complexes new to management in the Puerto Rico FMP. Action 5 includes five alternatives.

Alternative 1 is the no action alternative and would retain the methods for triggering and applying an AM presently included in the Reef Fish, Spiny Lobster, Queen Conch, and Coral



FMPs for previously managed stocks but would not establish AMs for stocks added to management in Action 2.

Preferred Alternative 2 (preferred for reef fish and lobster) applies the same post-season approach to applying AMs as was prescribed in the Reef Fish, Spiny Lobster, Queen Conch, and Coral FMPs, but provides the Council the opportunity to expand that AM approach to those stocks/stock complexes newly added to management. This alternative includes sub-alternatives to select the determinant for triggering an AM. **Sub-alternative 2a** uses a single year of applicable landings, beginning with the most recent available complete year of landings; **Sub-alternative 2b** uses a single year of applicable landings, beginning with the most recent available complete year of landings, then a 2-year average of total landings from that single year and the subsequent year, and thereafter a progressive running two-year average; **Sub-alternative 2c** uses a single year of applicable landings, beginning with the most recent available complete year of landings, then a 2-year average of applicable landings from that single year and the subsequent year, then a three-year average of applicable landings from those two years and the subsequent year, and thereafter a progressive running three-year average; **Preferred Sub-alternative 2d** uses a single year of applicable landings, using landings from 2018; then a single year of applicable landings, using landings from 2019; then a 2-year average of applicable landings from 2019 and the subsequent year (2019-2020); then a three-year average of applicable landings from those two years and the subsequent year (2019-2021); and thereafter a progressive running three-year average (2020-2022, 2021-2023, etc.). The Regional Administrator in consultation with the Council may deviate from the specific time sequences based on data availability.

Preferred Alternative 3 would establish an annual catch target (ACT) for the pelagic stocks/stock complexes (dolphinfish, tripletail, tunas, mackerel, and wahoo) only, and rely on the ACT as an AM; upon exceeding the ACT, the Council in consultation with the Southeast Fisheries Science Center (SEFSC) would assess whether corrective action is needed. **Preferred Alternative 3** has two steps. Step 1 would specify the ACT for each pelagic stock/stock complex for which the AM is based on an ACT. The Council would choose one of three options that set the ACT as a percentage of the ACL: **Preferred Sub-alternative 3a** sets the ACT as 90% of the ACL; **Sub-alternative 3b** sets the ACT as 80% of the ACL; and **Sub-alternative 3c** sets the ACT as 70% of the ACL.

In Step 2, the Council would choose one of four options to determine the sequence of years to be used to determine if an ACL overage has occurred, thereby triggering an AM. **Sub-alternatives 3d, 3e, 3f, and 3g (Preferred)** propose the use of the same years as in **Preferred Alternative 2, Sub-alternatives 2a-2d.**



Alternative 4 would establish an in-season AM for stocks or stock complexes in the FMP. Harvest would be prohibited for the remainder of the fishing season if the total ACL is reached or projected to be reached.

Preferred Alternative 5 (preferred for corals, sea cucumbers, sea urchins, Nassau grouper, goliath grouper, manta ray, spotted eagle ray, southern stingray, queen conch, midnight, blue, rainbow parrotfish) proposes that for a stock with a harvest prohibition, the prohibition would serve as the AM.

Action 5 Alternative Effects Summary

For those stocks that are included under the existing FMPs, applying the approach in **Alternative 1** would not have direct physical, biological/ecological, socio-economic, or administrative effects. But, **Alternative 1** would not be compliant with the requirements of the Magnuson-Stevens Act for several reasons. First, AMs would not be carried over for those stocks newly added to the Puerto Rico FMP. Second, for those stocks previously managed in the Reef Fish, Spiny Lobster, Queen Conch, and Coral FMPs and brought into the Puerto Rico FMP via Action 1, **Preferred Alternative 2**, **Alternative 1** would ensure accountability to new ACLs established under Action 4, but would not account for reorganization of the stock complexes resulting from the Council's preferred alternatives in Action 3. As a result, the assigned ACL would not appropriately reflect the composition of the stock complex and, because of that, would not faithfully follow the process proposed in Action 4, Preferred Alternative 3 for setting reference points. These outcomes could negatively affect the socioeconomic and biological/ecological environments by potentially failing to achieve OY or to minimize the risk of stock depletion due to a failure to properly manage harvest.

The management changes described in **Preferred Alternative 2** (preferred for reef fish and spiny lobster) would be expected to have minimal direct and/or indirect physical, biological/ecological, socioeconomic, and administrative effects. For stocks already under management, few if any direct or indirect physical effects to the environment would be expected, beyond those already experienced under the present management regime. For stocks newly added to management, positive benefits to the biological/ecological environment would be expected because landings would be kept to the ACL in the year following an ACL exceedance; thereby ensuring fishing effort is managed as necessary to prevent a subsequent exceedance of the ACL. These positive biological/ecological benefits translate directly into positive socioeconomic benefits resulting from a reliable and sustained resource base.

Under **Preferred Alternative 3** (preferred for pelagic stocks), biological/ecological effects would likely be less beneficial relative to the other alternatives because the AM would not close



harvest when triggered, risking potential depletion of the resource. In contrast, socioeconomic effects resulting from application of **Preferred Alternative 3** would be more beneficial relative to the other alternatives, at least in the short-term, because harvest would not be constrained without additional action from the Council. However, the Council would be expected to revise their management approach in response to recommendations from the SEFSC, with a reasonable expectation that those management revisions would benefit stock productivity in the long-term with resultant benefits to the biological/ecological and socioeconomic environments. **Sub-alternative 3c** provides the most conservative response because the ACT trigger represents the smallest percentage of the ACL and therefore provides the greatest likelihood that the Council, in consultation with the SEFSC, would convene. That likelihood decreases with **Sub-alternative 3b** and bottoms out with **Preferred Sub-alternative 3a**. Note, however, that even **Preferred Sub-alternative 3a** does not prevent a response to an ACT exceedance; it simply requires the highest level of landings to invoke the Council and SEFSC response.

Alternative 4 would be expected to provide essentially the same effects as **Preferred Alternative 2**. However, the overall effects of **Alternative 4** would exceed those provided from application of **Preferred Alternative 2** because the AM would be applied within the season, prior to an ACL exceedance, rather than in the following year in response to an ACL exceedance. This approach provides greater assurance that harvest will be conducted in a sustainable manner and will avoid intermittent overharvest events. Those beneficial advantages would accrue to all managed stocks/stock complexes.

Biological/ecological effects resulting from the application of **Preferred Alternative 5** (preferred for corals, sea cucumbers, sea urchins, Nassau grouper, goliath grouper, manta ray, spotted eagle ray, southern stingray, queen conch, midnight, blue, and rainbow parrotfish) would be positive and more substantial than those realized from any of the other alternatives. But those benefits would only apply to stocks already assigned an ABC of zero based on the Council's preferred alternatives in Action 4. Socioeconomic effects would be negative and more substantial than those realized from any of the other alternatives, although that outcome already would be established in Action 4.

Action 6: Essential Fish Habitat (EFH) Description and Identification for Species Not Previously Managed in Federal Waters of Puerto Rico.

Action 6 describes EFH for those stocks not previously managed in the Reef Fish, Spiny Lobster, Queen Conch, and Coral FMPs but being added to the Puerto Rico FMP. The Council would not change the EFH designations for stocks currently under management, and this action does not address EFH for those stocks. Those EFH provisions were brought into the Puerto Rico FMP based on Preferred Alternative 2 of Action 1. Action 6 is composed of three alternatives.



Alternative 1 is the no action alternative. Under this alternative, EFH would not be described and identified for species included in the Puerto Rico FMP that were not previously managed. This alternative does not comply with requirements of the Magnuson-Stevens Act.

Preferred Alternative 2 would provide for the use of functional relationships between life history stages and the marine and estuarine habitats of Puerto Rico when describing and identifying EFH. This alternative follows the same process used in the 2005 Caribbean Sustainable Fisheries Act Amendment to identify and describe EFH for managed species in the Council FMPs.

Alternative 3 would allow the use of one or more methods for describing and identifying EFH, including distribution data, species density within specific habitats, spatial relationships between habitat and species, habitat suitability models, life history traits, or habitat-specific production estimates.

Action 6 Alternative Effects Summary

In identifying EFH (**Preferred Alternative 2** and **Alternative 3**), the benefits to the physical and biological environments outweigh the negative impacts. In identifying EFH for the new 18 fish and invertebrate species proposed for management, there could be the potential to identify new areas or new threats to already designated EFH. The fishing gears used in fishing for the new species have already been analyzed for impacts to EFH in the Puerto Rico EEZ.

Unless management measures are proposed to decrease fishing impact to habitats, bycatch or other aspects that impact EFH, **Preferred Alternative 2** and **Alternative 3** would have non-significant effects on the physical, biological, ecological, economic, social and administrative environments. **Alternative 1** however, in not complying with the requirements of the Magnuson-Stevens Act, would have a significant impact on the administrative environment.

To summarize, identification and designation of EFH would not have a direct effect on the biological or physical environment but would likely result in indirect effects to the administrative environment due to consultation requirements and could create controversy within the social environment due to differences in desired methodologies for designating EFH. It would be expected that the identification and description of EFH would indirectly benefit the biological and physical environments, due to the EFH consultation requirements.

Action 7: Framework Procedures for the Puerto Rico FMP

Action 7 includes framework procedures available to the Council to more quickly and efficiently adjust reference points and management measures in response to changing fishery conditions.



Four alternative approaches are considered. Within each of **Alternatives 1-4**, both open and closed framework procedures are available for inclusion.

Alternative 1 is the no action alternative. Framework measures presently included in the Reef Fish, Spiny Lobster, Queen Conch, and Coral FMPs, and included in the Puerto Rico FMP under Action 1, Alternative 2 would be retained, and no additional framework measures added.

Preferred Alternative 2 would utilize a base framework procedure for determining items to be included as framework measures. This alternative includes an abbreviated framework procedure within the open framework.

Alternative 3 would utilize a broad framework procedure for determining items to be included as framework measures.

Alternative 4 would utilize a narrow framework procedure for determining items to be included as framework measures.

Action 7 Alternative Effects Summary

Modifying the framework procedure in Action 7 would not be not expected to have direct effects on the physical or biological/ecological environments. Indirect effects to the physical and biological/ecological environments would be expected from those framework measures that result in a more effective protection of the habitat from gear/habitat interactions (physical effects) or a faster protection to the biology of the stocks (biological effects) than if the measure was changed through a regular FMP amendment, including those that minimize the interaction of fishing gear with endangered species such as habitat-forming corals and those that close/open areas to fishing, adjust harvest, and regulate fishing effort.

The potential indirect physical and biological/ecological benefits from **Alternative 3** would be expected to be slightly greater than those from **Alternatives 1, 2 (Preferred)**, and **4**, given that **Alternative 3** allows for a broader spectrum of measures that can be rapidly implemented through framework. **Alternative 4** would be the least beneficial to the physical and biological/ecological environments because the range of actions that could be taken more expeditiously through framework is more limited than the other alternatives.

Administratively, by allowing the use of both abbreviated and standard frameworks and the inclusion of a comprehensive list of actions, **Preferred Alternative 2** would provide the best balance between the actions allowed to be implemented under the framework and the procedure required to take these actions. Also when compared to **Alternatives 1, 3, and 4, Preferred**



Alternative 2 provides the opportunity for sufficient public review and involvement in the process, while still accommodating the ability for more streamlined implementation.

None of the alternatives will have a direct impact on the economic environment, as these are administrative actions. Regulations that may be forthcoming in response to a change in framework procedures could indirectly result in a change in the economic environment by changing effort and/or fishing techniques.

In terms of social effects, timing and public input become the parameters that are most constrained or alleviated by the various alternatives for a framework procedure. **Alternative 1** does not allow new framework procedures that may be tailored specifically to Puerto Rico, which may result in some indirect negative social effects. The framework procedure in **Preferred Alternative 2** provides the most flexibility compared to **Alternatives 1, 3, and 4** and would likely have the most beneficial social effects. The proposed framework actions in **Alternative 3** are likely to have slightly fewer beneficial social effects than those provided by **Preferred Alternative 2**, as **Alternative 3** does not require as much public input under certain procedures. **Alternative 4** requires the most extensive input from the public, AP and SSC, including three Council meetings, which could extend the process unnecessarily when expedited action is needed.