Puerto Rico Draft Actions and Alternatives.

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Puerto Rico-Draft Actions and Alternatives

ACTION 1: Determine species to be included for management in the Puerto Rico Fishery Management Plan (FMP)

Alternative 1: No action. The Puerto Rico FMP is composed of all species within the fishery management units (FMUs) historically managed under the Spiny Lobster FMP, Reef Fish FMP, Queen Conch FMP, and the Corals and Reef Associated Plants and Invertebrates FMP.

Alternative 2: Identify species to be managed in Puerto Rico EEZ waters using all or some of the criteria listed below.

For those species for which landings data are available, indicating the species is in the fishery, the Council will choose a set of criteria to determine if a species should be managed under the Puerto Rico FMP. The criteria under consideration include, (A) the status of the stock and/or the present existence of a harvest prohibition, (B) the degree to which the species occurs in state rather than federal waters and can therefore be affected by federal management, (C) the ecological importance of a species within the coral reef ecosystem, and (D) the extent of harvest relative to a pre-established threshold. The selected criteria will identify the species to be managed.

Criterion A. Include for management those species that are presently classified as overfished in U.S. Caribbean waters based on the National Marine Fisheries Service (NMFS) determination, or for which historically identified harvest is now prohibited due to their ecological importance as habitat (corals presently included in the Corals and Reef Associated Plants and Invertebrates FMP) or habitat engineers (midnight, blue, rainbow parrotfish), or those species for which seasonal closures or size limits apply.

Criterion B. Exclude from federal management those species that have been determined to infrequently occur in federal waters based on expert analysis guided by available data.

Criterion C. Include for management those species that are biologically vulnerable, constrained to a specific habitat that renders them particularly vulnerable, or have an essential ecological value, as determined by expert analysis.

Criterion D. Include those species possessing economic importance to the nation or regional economy based on a threshold of landings or value separately determined for each of the recreational, commercial, and aquarium trade sectors as appropriate (e.g., top 90%) and those representing an important component of bycatch, as established by expert analysis.

Alternative 3: For those species for which landings data are available, indicating the species is in the fishery, the Council will follow a stepwise application of a set of criteria to determine if a species should be managed under the Puerto Rico FMP (Table 1.3.1). The criteria under consideration include, in order:

Criterion A. Include for management those species that are presently classified as overfished in U.S. Caribbean 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 and Reef Associated Plants and Invertebrates FMP) or habitat engineers (midnight, blue, rainbow parrotfish), or those species for which seasonal closures or size limits apply;

Criterion B. *From the remainder*, exclude from federal management those species that have been determined to infrequently occur in federal waters based on expert analysis guided by available data;

Criterion C. *From the remainder*, include for management those species that are biologically vulnerable, constrained to a specific habitat that renders them particularly vulnerable, or have an essential ecological value, as determined by expert analysis;

Criterion D. *From the remainder*, include those species possessing economic importance to the nation or regional economy based on a threshold of landings or value separately determined for each of the recreational, commercial, and aquarium trade sectors as appropriate (e.g., top 90%) and those representing an important component of bycatch, as established by expert analysis.

Table 1.3.1. Draft list of species to be included in the Puerto Rico Fishery Management Plan based on Alternative 3.

	SPECIES COMMON NAME	SPECIES SCIENTIFIC NAME
1	CONCH, QUEEN	*Strombus gigas*
2	PARROTFISH, STOPLIGHT	*Sparisoma viride*
3	PARROTFISH, REDTAIL	*Sparisoma chrysopterum*
4	REDBAND PARROTFISH	*Sparisoma aurofrenatum*
5	QUEEN PARROTFISH	*Scarus vetula*
6	PRINCESS PARROTFISH	*Scarus taeniopterus*
7	PARROTFISH, RAINBOW	*Scarus guacamaia*
8	STRIPED PARROTFISH	*Scarus croicensis*
9	PARROTFISH, BLUE	*Scarus coeruleus*
10	PARROTFISH, MIDNIGHT	*Scarus coelestinus*
11	SNAPPER, VERMILION	*Rhomboplites aurorubens*

12	WENCHMAN	*Pristipomoides aquilonaris*
13	SNAPPER, SILK	*Lutjanus vivanus*
14	SNAPPER, BLACK	*Apsilus dentatus*
15	SNAPPER, BLACKFIN	*Lutjanus buccanella*
16	SNAPPER, CARDINAL	*Pristipomoides macropthalmus*
17	SNAPPER, QUEEN	*Etelis oculatus*
18	SNAPPER, LANE	*Lutjanus synagris*
19	SNAPPER, DOG	*Lutjanus jocu*
20	SNAPPER, MUTTON	*Lutjanus analis*
21	SCHOOLMASTER	*Lutjanus apodus*
22	SNAPPER, YELLOWTAIL	*Ocyurus chrysurus*
23	SNAPPER, CUBERA	*Lutjanus cyanopterus*
24	GROUPER,NASSAU	*Epinephelus striatus*
25	GOLIATH GROUPER	*Epinephelus itajara*
26	HIND, RED	*Epinephelus guttatus*
27	CONEY	*Epinephelus fulvus*
28	GRAYSBY	*Epinephelus cruentatus*
29	HIND, ROCK	*Epinephelus adscensionis*
30	GROUPER, RED	*Epinephelus morio*
31	GROUPER, YELLOWFIN	*Mycteroperca venenosa*
32	GROUPER, TIGER	*Mycteroperca tigris*
33	GROUPER, BLACK	*Mycteroperca bonaci*
34	GROUPER, YELLOWEDGE	*Epinephelus flavolimbatus*
35	GROUPER, MISTY	*Epinephelus mystacinus*
36	GROUPER, YELLOWMOUTH	*Mycteroperca interstitialis*
37	FRENCH ANGELFISH	*Pomacanthus paru*
38	ANGELFISH, QUEEN	*Holacanthus ciliaris*
39	ANGELFISH, GRAY	*Pomacanthus arcuatus*
40	GRUNT, WHITE	*Haemulon plumieri*

41	HOGFISH	*Lachnolaimus maximus*
42	HOGFISH, SPANISH	*Bodianus rufus*
43	PUDDINGWIFE	*Halichoeres radiatus*
44	RUNNER, RAINBOW	*Elagatis bipinnulata*
45	JACK, CREVALLE	*Caranx hippos*
46	POMPANO, AFRICAN	*Alectis ciliaris*
47	BLUE TANG	*Acanthurus coeruleus*
48	DOCTORFISH	*Acanthurus chirurgus*
49	SURGEON, OCEAN	*Acanthurus bahianus*
50	TRIGGERFISH, OCEAN	*Canthidermis sufflamen*
51	TRIGGERFISH, QUEEN	*Balistes vetula*
52	TRIGGERFISH, GRAY	*Balistes capriscus*
53	LOBSTER,CARIBBEAN SPINY	*Panulirus argus*
54	GUAGUANCHE	*Sphyraena guachancho*
55	BARRACUDA, GREAT	*Sphyraena barracuda*
56	DOLPHIN	*Coryphaena hippurus*
57	DOLPHIN, POMPANO	*Coryphaena equiselis*
58	CERO	*Scomberomorus regalis*
59	MACKEREL, KING	*Scomberomorus cavalla*
60	MANTA	*Manta birostris*
61	TRIPLETAIL	*Lobotes surinamensis*
62	TUNNY, LITTLE	*Euthynnus alletteratus*
63	TUNA, BLACKFIN	*Thunnus atlanticus*
64	WAHOO	*Acanthocybium solandri*

ACTION 2: Establish stock complexes in the Puerto Rico Fishery Management Unit (FMU)

Alternative 1: No Action. Organize stocks in the Puerto Rico FMU based on the stock complexes historically managed under the Reef Fish, Spiny Lobster, Queen Conch, and Coral and Reef Associated Plants and Invertebrates FMPs.

Alternative 2: Do not organize the stocks in the Puerto Rico FMU in stock complexes.

Alternative 3: Organize stocks in the Puerto Rico FMU into stock complexes based on criteria developed by the Council and their Scientific and Statistical Committee (SSC) in cooperation with NMFS' Southeast Fisheries Science Center and Southeast Regional Office.

Discussion: Action 2 provides the Council the option to organize the stocks in the Puerto Rico FMU into stock complexes. National Standard 1 defines a "stock complex" as a group of stocks that are sufficiently similar in geographic distribution, life history, and vulnerabilities to the fishery such that the impact of management actions on the stock is similar. **Alternative 1** is the no action alternative and would group the stocks in the Puerto Rico FMU based on the existing stock complexes historically managed under the Reef Fish, Spiny Lobster, Queen Conch, and Coral and Reef Associated Plants and Invertebrates FMPs (species-based FMPs). The existing stock complexes were established by the Council based on similar habitat by depth distribution patterns, landings history, and ecology of the species. **Alternative 2** would not organize stocks into stock complexes but would instead consider all the stocks in the Puerto Rico FMU individually for management purposes (i.e., species). **Alternative 3** would allow the Council to reevaluate grouping criteria (e.g., fishing behavior, similarities in harvest gear) to group stocks into stock complexes for the Puerto Rico FMU.

ACTION 3: Define management reference points for species within the Puerto Rico FMU

Action 3 (a): Establish a year sequence for determining mean or median annual landings for each stock within the Puerto Rico FMU.

Alternative 1: No Action. Use the time series in the U.S. Caribbean 2010 or 2011 Comprehensive Annual Catch Limit (ACLs) Amendment to establish management reference points or proxies for stocks in the Puerto Rico FMU.

Alternative 2: Use the longest year sequence of reliable landings data to establish management reference points or proxies for stocks in the Puerto Rico FMU.

Alternative 3. Use the most recent three years of available landings data to establish management reference points or proxies for stocks in the Puerto Rico FMU.

Table 3.a.1. Year sequences under Action 3(a) Alternatives 1 through 3.

	Puerto Rico Commercial	**Puerto Rico Recreational**
Alternative 1	1999-2005 for the commercial and 2000-2005 for the recreational sector for species considered in the 2010 ACL Amendment and 1988-2009 for the commercial and 2000-2009 for the recreational sector for species considered in the 2011 ACL Amendment.	
Alternative 2	1988-2014	2000-2014
Alternative 3	2012-2014	2012-2014

Discussion: Alternative 1 is the no action alternative and would define management reference points or proxies for stocks in the Puerto Rico FMU based on the year sequence previously identified by the Council's SSC when determining the longest year sequence of reliable landings data during the development of the 2010 or the 2011 Comprehensive Annual Catch Limit (ACL) Amendments. In the 2010 Comprehensive ACL Amendment, the Council's SSC determined that the years 1999 through 2005 for the commercial sector, and the years 2000 through 2005 for the recreational sector captured the longest time series of reliable landings data for overfished species (i.e., snappers, groupers, and parrotfishes). In the 2011 Comprehensive ACL Amendment, the Council's SSC determined the years 1988-2009 for the commercial sector, and the years 2000-2009 for the recreational sector captured the longest time series of reliable landings data for all other managed species.

Alternative 2 would include the start years used in the 2011 Comprehensive ACL Amendment through the most recent year of reported landings for both the commercial and recreational sectors in Puerto Rico. The year 2014 is presently the most recent year for which the Southeast Fisheries Science Center has Puerto Rico commercial landings data. Recreational data were collected in Puerto Rico starting in 2000 through the Marine Recreational Fisheries Statistics Survey (i.e., Marine Recreational Information

Program (MRIP)) program. The year 2014 is the most recent year for which Puerto Rico recreational data are available in MRIP.

Alternative 3 would include the most recent three years of available landings data for both the recreational and commercial sectors in Puerto Rico.

The Council will use the year sequences selected in Action 3(a) to define the management reference points in Action 3(b) for the stocks in the Puerto Rico FMU.

Action 3 (b): Establish management reference points for stocks in the Puerto Rico FMU.

Alternative 1: No Action. For stocks in the Puerto Rico FMU, retain the management reference points or proxies presently used for species or species groups within the Reef Fish, Spiny Lobster, Queen Conch, and Coral and Reef Associated Plants and Invertebrates FMPs.

Alternatives 2(a) through 2(m): For stocks in the Puerto Rico FMU, establish management reference points or proxies based on the year sequence of landings data as defined in Action 3(a) and chosen in Table 3.b.1.

Discussion: The Magnuson-Stevens Fishery Conservation and Management Act (MSA) require that FMPs specify a number of reference points for managed fish stocks, including:

- Maximum Sustainable Yield (MSY) – The greatest amount or yield that can be sustainably harvested under prevailing environmental conditions.
- Overfishing Limit (OFL) – The maximum rate of fishing a stock can withstand (MFMT) or maximum yield a stock can produce (OFL) annually, while still providing MSY on a continuing basis.
- Acceptable Biological Catch (ABC) – A term used by a management agency, which refers to the range of acceptable catch for a species or species group.
- Optimum Yield (OY) – The amount or yield that provides the greatest overall benefit to the Nation, taking into account food production, recreational opportunities and the protection of marine ecosystems.
- Annual Catch Limit (ACL) – The level of annual catch of a stock or stock complex that serves as the basis for invoking accountability measures.

Together, these parameters are intended to provide the means to measure the status and performance of fisheries relative to the established FMP goals. Available data in the U.S. Caribbean are not sufficient to support direct estimation of MSY and other key parameters. In such cases, the National Standard 1 guidelines included in the MSA direct regional fishery management councils to adopt other measures of productive capacity, including long-term average catch, which can serve as reasonable proxies.

This section describes reference points or proxies for stocks/stock complexes comprising the Puerto Rico FMU, including alternative approaches for developing the MSY proxy, OFL, ABC, OY, and ACL for each stock or stock complex considered by the Council to ensure compliance with the mandates of the MSA.

None of the parameter estimates considered here represents empirical estimates derived from a comprehensive stock assessment; rather, all are calculated based on landings data averaged over alternative time series.

All the reference points considered in Action 3(b) are closely interrelated, and the MSA places several key constraints on what can be considered in a reasonable suite of alternatives. Optimum yield must be less than or equal to MSY. The ACL must be less than or equal to the ABC level recommended by a Council's SSC or other established peer-review process, and the ABC recommendation must be less than or equal to the OFL.

In Action 3(b), **Alternative 1** is the no action alternative and would retain the present MSY proxy, OY, and overfishing limit definitions specified in the 2010 and 2011 Comprehensive ACL Amendments for the Puerto Rico stock/stock complexes established under the existing species-based FMPs.

Alternatives 2(a) – 2(m) would define management reference points or proxies based on a year sequence selected by the Council for each of the commercial and recreational sectors in Puerto Rico in Action 3(a). Specific definitions are detailed in Table 3.b.1.

The MSY proxy specified by **Alternative 2(a)** would equate to the median of annual landings, calculated from commercial and recreational landings data for the year sequence as defined in Action 3(a). Under **Alternative 2(b)** the MSY proxy would equal the mean annual landings for the year sequence as defined in Action 3(a).

NOAA Technical Memorandum NMFS-SEFSC-616 (Berkson et al. 2011) describes a method (Only Reliable Catch Stocks (ORCS)) for setting OFL for data-poor species and then deriving an ABC level as a proportion of that OFL. This approach (**Alternative 2(c)**) could be applied for stocks in the Puerto Rico FMU. In brief, calculating an OFL using the ORCS methodology is based on two terms: a scalar (or multiplier) derived from the stock status expert opinion analysis (see Table 4 of Berkson et al. 2011), and a catch statistic derived from a time series of historical catches. **Alternative 2(d)** would establish an OFL equal to the MSY proxy.

After the OFL has been defined, the ABC needs to be established. The Council's SSC would make a recommendation to the Council on what the ABC control rule for managed stocks should be (**Alternatives 2(e) – 2(h)**). The Council will then determine the appropriate buffer (100-75 percent) to be applied to reduce from the OFL to the ABC, based upon scientific knowledge of the stock and uncertainty in the estimate of OFL. After establishing the ABCs, the Council would set the ACL values equal to some proportion (100-75 percent or zero) of the ABC to take into account uncertainty, ecological factors, and other concerns (**Alternatives 2(i)** - 2**(m)**).

Table 3.b.1. Options to establish management reference points for stocks in the Puerto Rico Fishery Management Unit.

REFERENCE POINT	
Maximum Sustainable Yield	
Alternative 2(a)	MSY proxy = Median annual landings selected by Council in Action 3(a).
Alternative 2(b)	MSY proxy = Mean annual landings selected by Council in Action 3(a).
Overfishing Limit	
Alternative 2(c)	OFL = MSY proxy adjusted using the ORCS scalar; overfishing occurs when annual landings exceed the OFL, unless NMFS' Southeast Fisheries Science Center (in consultation with the Caribbean Fishery Management Council and it's SSC) determines the overage occurred because data collection/monitoring improved, rather than because landings actually increased.
Alternative 2(d)	OFL = MSY proxy; overfishing occurs when annual landings exceed the OFL, unless NMFS' Southeast Fisheries Science Center (in consultation with the Caribbean Fishery Management Council and it's SSC) determines the overage occurred because data collection/monitoring improved, rather than because landings actually increased.
Acceptable Biological Catch Control Rule	
Alternative 2(e)	ABC= OFL
Alternative 2(f)	ABC= [OFL x 0.90]
Alternative 2(g)	ABC= [OFL x 0.85]
Alternative 2(h)	ABC= [OFL x 0.75]
Optimum Yield/Annual Catch Limit	
Alternative 2(i)	OY = ACL = ABC
Alternative 2(j)	OY = ACL = [ABC x (0.90)]
Alternative 2(k)	OY = ACL = [ABC x (0.85)]
Alternative 2(l)	OY = ACL = [ABC x (0.75)]
Alternative 2(m)	OY = ACL = 0

ACTION 4: Modify or Establish Additional Management Measures as Needed.

Discussion: Action 4 is a place holder that gives the opportunity to the Council to modify or establish any current or additional management measure at this stage of the development of the island-based fishery management plans.

References

CFMC. 2011a. Amendment 2 to the Fishery Management Plan for the Queen Conch Fishery of Puerto Rico and the U.S. Virgin Islands and Amendment 5 to the Reef Fish Fishery Management Plan of Puerto Rico and the U.S. Virgin Islands. Caribbean Fishery Management Council, San Juan, Puerto Rico. 523 pp + Appendices.

CFMC. 2011b. Comprehensive annual catch limit amendment for the Fishery Management Plans of the U.S. Caribbean. Caribbean Fishery Management Council, San Juan, Puerto Rico. 407 pp.