



DRAFT
Options for Hawaii Bottomfish
Essential Fish Habitat and Habitat of Particular Concern

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Introduction

Options being considered for Hawaii Archipelago Bottomfish and Seamount Groundfish are presented below in two categories – the first for bottomfish species and second for seamount groundfish species. The first set of three options are to refine EFH for the first 14 shallow and deepwater bottomfish management unit species listed in Table 1. The second set of three options are to refine EFH for the remaining three species of seamount groundfish listed in Table 1. The current EFH and HAPC designations for bottomfish and seamount groundfish are explained in Table 2. The range of options for both bottomfish and seamount groundfish are listed below.

Table 1. Hawaii Archipelago Bottomfish Management Unit Species (BMUS)

Common Name	Local Name	Scientific Name
Bottomfish Shallow Complex		
*Silver jaw jobfish	lehi	<i>Aphareus rutilans</i>
Grey jobfish	uku	<i>Aprion virescens</i>
Giant trevally	white ulua	<i>Caranx ignobilis</i>
Black jack	black ulua	<i>Caranx lugubris</i>
Thick lipped trevally	pig ulua, butaguchi	<i>Pseudocaranx dentex</i>
Amberjack	kahala	<i>Seriola dumerili</i>
Bottomfish Deep Complex		
*Sea bass	hapuupuu	<i>Epinephelus quernus</i>
*Red snapper	ehu	<i>Etelis carbunculus</i>
*Longtail snapper	onaga, □ulaula	<i>Etelis coruscans</i>
Blue stripe snapper	taape	<i>Lutjanus kasmira</i>
Yellowtail snapper	yellowtail, kalekale	<i>Pristipomoides auricilla</i>
*Pink snapper	opakapaka	<i>Pristipomoides filamentosus</i>
*Pink Snapper	kalekale	<i>Pristipomoides sieboldii</i>
*Snapper	gindai	<i>Pristipomoides zonatus</i>
Seamount Groundfish		
Alfonsin	N/A	<i>Beryx splendens</i>
Ratfish/butterfish	N/A	<i>Hyperoglyphe japonica</i>
Armorhead	N/A	<i>Pseudopentaceros richardsoni</i>

* Indicates a Deep 7 bottomfish

Table 2. Current EFH and HAPC Designations for Bottomfish and Seamount Groundfish

	Species Complex	EFH	HAPC
Bottomfish Shallow Water Complex	Shallow-water species (0–50 fm): uku (<i>Aprion virescens</i>), thicklip trevally (<i>Pseudocaranx dentex</i>), giant trevally (<i>Caranx ignobilis</i>), black trevally (<i>Caranx lugubris</i>), amberjack (<i>Seriola dumerili</i>), taape (<i>Lutjanus kasmira</i>)	Eggs and Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m (200 fm). Juvenile/adults: the water column and all bottom habitat extending from the shoreline to a depth of 400 m (200 fm)	All slopes and escarpments between 40–280 m (20 and 140 fm). Three known areas of juvenile opakapaka habitat: two off Oahu and one off Molokai
Bottomfish Deep Water Complex	Deep-water species (50–200 fm): ehu (<i>Etelis carbunculus</i>), onaga (<i>Etelis coruscans</i>), opakapaka (<i>Pristipomoides filamentosus</i>), yellowtail kalekale (<i>P. auricilla</i>), kalekale (<i>P. sieboldii</i>), gindai (<i>P. zonatus</i>), hapuupuu (<i>Epinephelus quernus</i>), lehi (<i>Aphareus rutilans</i>)	Eggs and Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m (200 fathoms) Juvenile/adults: the water column and all bottom habitat extending from the shoreline to a depth of 400 meters (200 fm)	All slopes and escarpments between 40–280 m (20 and 140 fm). Three known areas of juvenile opakapaka habitat: two off Oahu and one off Molokai
Seamount Groundfish	Seamount groundfish species: armorhead (<i>Pseudopentaceros richardsoni</i>), ratfish/butterfish (<i>Hyperoglyphe japonica</i>), alfonsin (<i>Beryx splendens</i>)	Eggs and Post Hatch Pelagic: the (epipelagic zone) water column down to a depth of 200 m (100 fm) of all EEZ waters bounded by latitude 29°–35° Juvenile/adults: all EEZ waters and bottom habitat bounded by latitude 29°–35° N and longitude 171° E–179° W between 200 and 600 m (100 and 300 fm)	No HAPC designated for seamount groundfish

Summary of EFH and HAPC Options

Essential Fish Habitat

Three options are presented for refining EFH designations for shallow and deep water Bottomfish species in the Hawaii Archipelago. They include:

1. No Action – EFH designation for bottomfish remain the same.
2. Shallow, Intermediate and Deep-water Complexes with individual EFH definitions for all species and life stages (eggs, post hatch pelagic, post settlement and sub-adult – adult).
3. Shallow, Intermediate and Deep-water Complexes with individual EFH definitions for Deep-7 Species and life stages (eggs, post hatch pelagic, post settlement and sub-adult – adult)

Three options presented for refining EFH designations for seamount groundfish species in the Hawaii Archipelago include:

1. No Action – EFH for groundfish remain the same
2. Define EFH for specific life stages and add area specific boundary designations for groundfish at Cross Seamount
3. Define species specific EFH for life stages and remove the area specific designation for groundfish

Habitat of Particular Concern

Three options are presented for refining and/or designating HAPC for bottomfish in the Hawaii Archipelago. They include:

Bottomfish

1. No-Action – Current Designations
2. Sixteen Defined HAPC Areas – Review Recommendations
3. Seven Defined HAPC Areas – WPSAR Recommendations

Two options are presented for defining HAPC for seamount groundfish in the Hawaii Archipelago. They include:

Seamount Groundfish

1. No Action – No defined HAPC areas
2. Two Defined HAPC areas -- WPSAR Recommendation

Bottomfish FEH Options

Option 1 - No Action for Bottomfish EFH

Fishery	Species	Eggs/Larvae	Juveniles/Adults
Bottomfish 0-400m	15 bottomfish species	pelagic out to EEZ 0-400m	benthic or benthopelagic 0-400m

The current bottomfish EFH designation as shown in the table above has remained in place since established in the Bottomfish and Seamount Ground FMP in 2001. The designation was adopted based on the following assumptions and information:

- a) Eggs and larvae of at least some of the species in this fishery reach surface waters

- b) Eggs and larvae depth ranges do not extend below those of adults because the eggs of broadcast spawners are typically neutral or positively buoyant
- c) Juveniles are no deeper than eggs, larvae, and adults
- d) While the adults of some of the species were observed at depths below 400m, these records represented a very low proportion of the total number of records for these species.

Previously, eggs and larvae were combined as were juveniles and adults however these have been broken out into separate categories per recommendations provided in the "Guidance to Refine the Description and Identification of Essential Fish Habitat" document distributed in 2006 and heretofore referred to as the guidance document.

At the time of original EFH designation, there was not enough data on the relative productivity of different habitats to develop EFH designation based on Level-3 or Level 4 data. Given the uncertainty concerning the life histories and habitat requirements of many BMUS, the Council designated EFH for adult and juvenile bottomfish as the water column and all bottom habitat extending from the shoreline to a depth of 400 m (200 fathoms) encompassing the steep drop-offs and high relief habitats that are important for bottomfish.

The eggs and larvae of all BMUS are pelagic, floating at the surface until hatching and subject thereafter to advection by the prevailing ocean currents. There have been taxonomic studies of these life stages of snappers and groupers. At the time of EFH designation, few larvae can be identified to species. As snapper and grouper larvae have been rarely collected in plankton surveys, it is extremely difficult to study their distribution. Because of the scientific uncertainty about the distribution of the eggs and larvae of bottomfish, the Council designated the water column extending from the shoreline to the outer boundary of the EEZ to a depth of 400 m as EFH for bottomfish eggs and larvae.

The life histories and distribution patterns of seamount groundfish are also poorly understood. Data are lacking on the effects of oceanographic variability on migration and recruitment of individual management unit species. Based on the best available data at the time of EFH designation, the Council designated EFH for adult life stage of the seamount groundfish complex as all waters and bottom habitat bounded by latitude 29 degrees-35 degrees North and longitude 171 degrees East – 179 degrees West between 80-600 m. EFH for eggs, larvae and juveniles is epipelagic zone (~200 m) of all waters bounded by latitude 29 degrees-35 degrees North and longitude 171 degrees East – 179 degrees West. This EFH designation encompasses the Hancock Seamounts, part of the northern extent of the Hawaiian Ridge, located 1500 nautical miles northwest of Honolulu.

Option 2 for Bottomfish EFH.

Option 2 retains the overall EFH designation for the bottomfish but breaks down the 14 species complex into three sub-complexes and provides individual life history

definitions for each species. The three sub-complexes include: Shallow, Intermediate and Deep-water Complexes.

Species	EFH
Shallow sub-complex	
Uku (<i>Aprion virescens</i>)	Eggs: the water column extending from the shoreline out to 50 miles down to a depth of 240 m. Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 240 m. Post Settlement/Sub-Adult/Adult the water column and all bottom habitat between 0 and 240 m
Taape (<i>Lutjanus kasmira</i>)	Eggs: the water column extending from the shoreline out to 50 miles down to a depth of 240 m. Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 240 m. Post Settlement/Sub-Adult/Adult the water column and all bottom habitat between 0 and 240 m
Ulua (<i>Caranx ignobilis</i>)	Eggs: the water column extending from the shoreline out to 50 miles down to a depth of 200 m. Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 200 m. Post Settlement/Sub-Adult/Adult the water column and all bottom habitat between 0 and 200 m
Intermediate sub-complex	
Lehi (<i>Aphareus rutilans</i>),	Eggs: the water column extending from the shoreline out to 50 miles down to a depth of 280 m. Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 280 m. Post Settlement/Sub-Adult/Adult the water column and all bottom habitat between 40 and 280 m.
Opakapaka (<i>Pristipomoides filamentosus</i>)	Eggs: the water column extending from the shoreline out to 50 miles down to a depth of 280 m. Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 280 m. Post Settlement/Sub-Adult: the water column and all bottom habitat between 40 and 100 m. Adults: the water column and all bottom habitat between 40 and 280 m.
Hapuupuu (<i>Epinephelus quernus</i>)	Eggs: the water column extending from the shoreline out to 50 miles down to a depth of 320 m. Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 320 m. Post Settlement/Sub-Adult/Adult the water column and all bottom habitat between 40 and 320 m.
Black trevally (<i>Caranx lugubris</i>)	Eggs: the water column extending from the shoreline out to 50 miles down to a depth of 320 m. Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 320 m. Post Settlement/Sub-Adult/Adult the water column and all bottom habitat between 40 and 320 m.
Thicklip trevally (<i>Pseudocaranx dentex</i> /))	Eggs: the water column extending from the shoreline out to 50 miles down to a depth of 280 m. Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 280 m. Post Settlement/Sub-Adult/Adult the water column and all

Species	EFH
	bottom habitat between 40 and 280 m.
Amberjack (<i>Seriola dumerili</i>)	Eggs: the water column extending from the shoreline out to 50 miles down to a depth of 320 m. Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 320 m. Post Settlement/Sub-Adult/Adult the water column and all bottom habitat between 40 and 320 m.
Deep sub-complex	
Ehu (<i>Etelis carbunculus</i>),	Eggs: the water column extending from the shoreline out to 50 miles down to a depth of 400 m. Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m. Post Settlement/Sub-Adult/Adult the water column and all bottom habitat between 80 and 400 m.
Onaga (<i>Etelis coruscans</i>),	Eggs: the water column extending from the shoreline out to 50 miles down to a depth of 400 m. Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m. Post Settlement/Sub-Adult/Adult the water column and all bottom habitat between 80 and 400 m.
Yellowtail kalekale (<i>P. auricilla</i>)	Eggs: the water column extending from the shoreline out to 50 miles down to a depth of 400 m. Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m. Post Settlement/Sub-Adult/Adult the water column and all bottom habitat between 80 and 400 m.
Kalekale (<i>P. sieboldii</i>),	Eggs: the water column extending from the shoreline out to 50 miles down to a depth of 400 m. Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m. Post Settlement/Sub-Adult/Adult the water column and all bottom habitat between 80 and 400 m.
Gindai (<i>P. zonatus</i>)	Eggs: the water column extending from the shoreline out to 50 miles down to a depth of 400 m. Post Hatch Pelagic: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m. Post Settlement/Sub-Adult/Adult the water column and all bottom habitat between 80 and 400 m.

Option 2 keeps the overall bottomfish EFH designation of 0-400m. This option further refines the bottomfish complex into three sub-complexes instead of the two sub-complexes as currently described. The three proposed bottomfish sub-complexes included in this option are shallow, intermediate, and deep.

Option 2 also provides an EFH description for each species, provides a more accurate descriptor of the water column zone each species is generally found in at different life stages, and adds an additional species, *Seriola rivoliana* to the bottomfish species list. The rationale for these changes is based on the following:

- a) Existing species complexes each have depth ranges in their descriptions, which are confusing since these are not EFH designations but are often mistaken to be. These depth ranges do not take into account egg and larval stages of the

deeper species. Furthermore, over 90% of recently analyzed depth records for three of the shallow complex species (*P. dentex*, now renamed to *P. cheilio*, *C. ignobilis*, and *S. dumerili*) were below the lower depth limit for the shallow complex. Their inclusion in this complex is therefore inconsistent with existing data.

- b) Based on new and existing data, the depth ranges of the 15 species of Hawaiian bottomfish exhibit considerable overlap. However, the adults of three shallow species (*L. kasmira*, *C. ignobilis*, and *A. virescens*) have rarely been recorded together and at the same depth as the adults of 5 deeper species (*E. carbunculus*, *E. coruscans*, *P. auricilla*, *P. sieboldii*, and *P. zonatus*). The adults of each of the remaining 7 species (*C. lugubris*, *S. dumerili*, *S. rivoliana*, *P. cheilio*, *E. quernus*, *A. rutilans*, and *P. filamentosus*) have all been recorded together with members of the shallow group, members of the deeper group, or both.
- c) Creating a third "intermediate" complex is a reasonable way to respond to these observations and has the advantage of providing greater resolution to the EFH descriptions which is a priority stated in the guidance document.
- d) Overall complex EFH depth ranges for all life stages combined in each of the three new complexes would be 0-240m for the shallow complex, 0-320m for the intermediate complex, and 0-400m for the deep complex.
- e) Complex EFH descriptions for the 4 different life stages would be the similar to those above for the egg and larval stages on the basis that these stages are presently believed to reach surface waters with regularity. Juveniles and adults however are proposed to be 0-240m (shallow), 40-320m (intermediate), and 80-400m (deep) on the basis that there is no evidence the juveniles or adults of the intermediate and deep complexes reach surface waters with any regularity. The lower and upper depth limits for each complex and life stage are based on published and non-published data. The latter is primarily a new analysis of over 18,000 records from Pisces submersible dives, BotCam drop camera deployments, and DLNR-funded fishing surveys. These limits encompass approximately 95% of the observations for each species, not the entire range of existing data, which was purposely done to allow for outliers. These ranges are still "conservatively broad" because of the lower sampling effort by submersible, fishing, or drop camera surveys in depths shallower than 100m or greater than 350m.
- f) The terms pelagic, benthic, and benthopelagic were added to each of the EFH descriptions to capture more accurately the water column zone for each life stage based on existing information. This change again provides greater resolution to the descriptions since there are clearly differences in zone preference between the eggs, juveniles, and adults as well as between the juveniles and adults of different species. For example, all of the bottomfish species are believed to be broadcast spawners that release eggs into the pelagic zone. Like many species of fish, settlement close to the substrate occurs after the completion of the pelagic phase. Juveniles of many bottomfish species, particularly non-schooling species, will remain close to the bottom until they are too large for predators that consume their prey

whole. This behavior, which has been documented with some but not all bottomfish, is captured by using the term benthic in the juvenile EFH descriptions. The expression “benthic or benthopelagic” is used when juvenile behavior has not yet been documented and is therefore unknown or, in the case of *P. filamentosus*, the juveniles are known to school above the bottom. Adults of large schooling species such as *P. filamentosus* and *E. coruscans* are almost always observed much higher in the water column than the adults of the smaller, non-schooling species and this is captured by using the terms benthopelagic and benthic for their respective descriptions.

- g) The justification for adding *S. rivoliana* is that the catch data for *S. dumerili* almost certainly includes catches of *S. rivoliana* due to the similarity of their appearances. Backing off to *Seriola sp* may be misleading since *S. dumerili* appears to range deeper than *S. rivoliana*. Also, *S. rivoliana* is now being cultured in Hawaii which justifies more attention be spent on this species.

Option 3 for Bottomfish EFH.

Option 3 is essentially the same as Option 2 above except that species level EFH definitions are only created for the “Deep 7” species which include *A. rutilans*, *E. carbunculus*, *E. coruscans*, *P. filamentosus*, *P. sieboldii*, *P. zonatus*, and *E. quernus*.

- a) This is the alternative completely consistent with the recommendations of the SSC committee when presented the options for revising the bottomfish EFH definitions in October, 2009.
- b) Only *A. rutilans* has less than 700 observations per species, with all of the other six species exceeding this number. There has been considerable sampling in the 100-280m portion of its proposed 40-280m EFH depth range. The lower number of observations for this species (93) is believed to be due to its apparent lower abundance compared to other deep 7 species coupled with the lower sampling effort at 40-100m. *A. rutilans* has not been recorded in Hawaii at depths shallower than 40m in either published or non-published sources and only 0.2% of the existing records were obtained at depths below 280m. The proposed 40-280m therefore appears to be a reasonable EFH depth range for this species.

Complex	Species	Eggs	Post Hatch Pelagic	Post Settlement and Sub Adult	Adults
Bottomfish All - 0-400m	All Species	pelagic out to EEZ - 0- 400m	pelagic out to EEZ - 0-400m	benthic or benthopelagic 0-400m	benthic or benthopelagic 0-400m
Bottomfish Shallow 0-240m	Shallow Species	pelagic out to EEZ - 0-240m	pelagic out to EEZ - 0-240m	benthopelagic 0-240m	benthopelagic 0-240m
Bottomfish Intermediate 0-320m	Intermediate Species	pelagic out to EEZ - 0-320m	pelagic out to EEZ - 0-320m	benthic or benthopelagic 40-320m	benthic or benthopelagic 40-320m
	<i>Aphareus rutilans</i>	pelagic out to EEZ - 0-280m	pelagic out to EEZ - 0-280m	benthic or benthopelagic 40-280m	benthopelagic 40-280m
	<i>Pristipomoides</i>	pelagic out to	pelagic out to	benthopelagic	benthopelagic

	filamentosus	EEZ - 0-280m	EEZ - 0-280m	40-280m	40-280m
	Epinephelus quernus	pelagic out to EEZ - 0-320m	pelagic out to EEZ - 0-320m	benthic 40-320m	benthic 40-320m
Bottomfish Deep 0-400m	Deep Species	pelagic out to EEZ - 0-400m	pelagic out to EEZ 0-400m	benthic 80-400m	benthic or benthopelagic 80-400m
	Pristipomoides sieboldii	pelagic out to EEZ - 0-320m	pelagic out to EEZ 0-320m	benthic 80-320m	benthopelagic 80-320m
	Pristipomoides zonatus	pelagic out to EEZ - 0-320m	pelagic out to EEZ 0-320m	benthic 80-320m	benthic 80-320m
	Etelis coruscans	pelagic out to EEZ - 0-360m	pelagic out to EEZ - 0-360m	benthic 80-360m	benthopelagic 80-360m
	Etelis carbunculus	pelagic out to EEZ - 0-400m	pelagic out to EEZ - 0-400m	benthic 80-400m	benthic 80-400m

Seamount Groundfish EFH

Three Options presented for refining EFH designations for seamount groundfish species in the Hawaii Archipelago include:

1. No Action – EFH for groundfish remain the same
2. Define EFH for specific life stages and add area specific boundary designations for groundfish at Cross Seamount
3. Define species specific EFH for life stages and remove the area specific designation for groundfish

Option 1 - No Action for Seamount Groundfish EFH.

Complex	Species	EFH Designation
Seamount Groundfish	Armorhead (<i>Pseudopentaceros richardsoni</i>), Ratfish/butterfish (<i>Hyperoglyphe japonica</i>), Alfonsin (<i>Beryx splendens</i>)	Eggs and Post Hatch Pelagic: the (epipelagic zone) water column down to a depth of 200 m (100 fm) of all EEZ waters bounded by latitude 29°–35° and longitude 171° E–179° W. Post Settlement/Sub-Adult/Adult all EEZ waters and bottom habitat bounded by latitude 29°–35° N and longitude 171° E–179° W between 80 and 600 m (40 and 300 fm)

The overall groundfish EFH designation of 100-600m remains the same as it has been for the last 10 years (Table 1). This is based on the following assumptions and data:

- a) Eggs and larvae of the three groundfish species reach surface waters but do not extend below 200m.
- b) Juveniles and adults do not regularly come up to depths above 200m or below 600m.
- c) None of the life stages of any groundfish species can be found in significant numbers below the latitude 29°.

Option 2 for Seamount Groundfish EFH

Complex	Species	Eggs	Post Hatch Pelagic	Post Settlement Sub-Adults	Adults
Groundfish 0-600m	Groundfish species All	pelagic out to EEZ 0-600m	pelagic out to EEZ 0-600m	benthic or benthopelagic 120-600m	benthopelagic 120-600m

Option 2 keeps all three species in a single groundfish complex as with the no action alternative. However, it 1) add area specific EFH designations around Cross Seamount, 2) changes the overall depth range to 0-600m, 3) changes the post settlement, sub-adults and adult depth ranges to 120-600m, and 4) provides a more accurate descriptor of the water column zone each species is generally found in at different life stages. These changes are based on the following assumptions and data:

- At least one species of groundfish, *B. splendens*, has been positively identified as being present and in large numbers at Cross seamount. The other two species have also been recorded below latitude 29° although not nearly as far south as *B. splendens*.
- If spawning takes place below 200m, the egg stage depth range is incorrect. A large portion of the adults of these species have been recorded well below that depth suggesting at least some spawning may be taking place in deeper water.
- The existing literature provides references where the adults of all three species have been recorded at depths above 200m.
- Due to the uncertainties regarding these species and the relatively low number of recent observations, broader EFH depth ranges would seem to be warranted.

Option 3 for Seamount Groundfish EFH

Complex	Species	Eggs	Post hatch Pelagic	Post Settlement Sub-Adult	Adults
Groundfish 0-600m	Groundfish species All	pelagic out to EEZ 0-600m	pelagic out to EEZ 0-600m	benthic or benthopelagic 120-600m	benthopelagic 120-600m
	<i>Beryx splendens</i>	pelagic out to EEZ 0-600m	pelagic out to EEZ 0-600m	benthic or benthopelagic 120-600m	benthopelagic 120-600m
	<i>Pseudopentaceros wheeleri</i>	pelagic out to EEZ 0-600m	pelagic out to EEZ 0-600m	benthic or benthopelagic 120-600m	benthopelagic 120-600m
	<i>Hyperoglyphe japonica</i>	pelagic out to EEZ 0-560m	pelagic out to EEZ 0-560m	benthic or benthopelagic 160-560m	benthopelagic 160-560m

Option 3 keeps the changes proposed in Option 2 but removes the area specific designations and also provides EFH definitions for individual species. However, this alternative is difficult to justify given the comments made under Option 1.

Habitat of Particular Concern

HAPC Designation

In addition to EFH, the Council identified habitat areas of particular concern (HAPCs) within EFH for all FMPs. HAPCs are specific areas within EFH that are essential to the life cycle of important bottomfish species. In determining whether a type or area of EFH should be designated as an HAPC, one or more of the following criteria established by NMFS should be met: (a) the ecological function provided by the habitat is important; (b) the habitat is sensitive to human induced environmental degradation; (c) development activities are, or will be, stressing the habitat type; or (d) the habitat type is rare. However, it is important to note that if an area meets only one of the HAPC criteria, it will not necessarily be designated an HAPC.

Three options are presented for refining and/or designating HAPC for bottomfish and seamount groundfish.

Bottomfish

1. No-Action – Current Designations
2. Sixteen Defined HACP Areas – Review Recommendations
3. Seven Defined HAPC Areas – WPSAR Recommendations

Seamount Groundfish

1. No Action
2. WPSAR Recommendation

Bottomfish

Option 1 No Action: HAPC for Bottomfish

On the basis of the known distribution and habitat requirements of adult bottomfish, the Council designated all escarpments/slopes between 40–280 meters throughout the Western Pacific Region, including the Hawaii Archipelago, as bottomfish HAPC. In addition, the Council designated the three known areas of juvenile opakapaka habitat (two off Oahu and one off Molokai) as HAPC. The basis for this designation is the ecological function that these areas provide, the rarity of the habitat, and the susceptibility of these areas to human-induced environmental degradation. Off Oahu, juvenile snappers occupy a flat, open bottom of primarily soft substrate in depths ranging from 40 to 73 meters. This habitat is quite different from that utilized by adult snappers. Surveys suggest that the preferred habitat of juvenile opakapaka in the waters around Hawaii represents only a small fraction of the total habitat at the appropriate depths. Areas of flat featureless bottom have typically been thought of as providing low-value fishery habitat. It is possible that juvenile snappers occur in other habitat types, but in such low densities that they have yet to be observed.

The recent discovery of concentrations of juvenile snappers in relatively shallow water and featureless bottom habitat indicates the need for more research to help identify, map, and study nursery habitat for juvenile snapper.

Option 2 for Bottomfish HAPC

Option 2 proposes 16 candidate HAPCs located throughout the main Hawaiian islands. The detailed rationale and recommendations can be found in the HAPC Justification report provided by Dr. Chris Kelley under contract to NMFS PIRO. The 16 areas recommended include:

- | | |
|------------------------|-------------------------|
| 1) Middle Bank | 9) North Molokai |
| 2) Kaula Rock | 10) Pailolo Channel |
| 3) East Niihau | 11) Hana, Maui |
| 4) Northwest Kauai | 12) North Kahoolawe |
| 5) Kaena Point, Oahu | 13) South Kahoolawe |
| 6) Kaneohe, Oahu | 14) Kohala, Hawaii |
| 7) Makapuu Point, Oahu | 15) Hilo, Hawaii |
| 8) Penguin Bank | 16) South Point, Hawaii |

The specific rationale and associated map delineating the location and size of each proposed HAPC area is included in the HAPC Justification document. In summary, the proposed locations in Option 2 were based on the following assumptions:

- 1) Bottomfish habitat is generally found well offshore and as a result is far less susceptible to disturbance from development than other near shore fisheries habitats.
- 2) Rarity was based on the presence of unusual physical or biological characteristics in the context of the current state of knowledge of bottomfish habitats.
- 3) The topography of these habitats is well-known as a result of a nearly complete multibeam coverage of bottomfish depths in the Main Hawaiian Islands.
- 4) Unusual topography in some bottomfish habitat areas was considered to meet the rarity criterion.
- 5) Ecological importance was evaluated with respect to modeled larval dispersal characteristics or the presence of critical life history stages (i.e., juveniles and spawning adults).
- 6) Sensitivity was evaluated with respect to the habitats vulnerability to disturbance from either fishing or non-fishing activities. These would include the risk of significantly depleting the targeted bottomfish species or presence of substantial invertebrate beds (i.e., corals or sponges) that could be impacted by fishing gear and anchors.

Based on the criteria above, the Table below summarizes how the 16 proposed areas met the NMFS HAPC criteria of ecological importance, sensitivity, susceptibility and rarity.

HAPC	Location	Importance	Sensitivity	Susceptibility	Rarity
1	Middle Bank	X	X	n/a	
2	Kaula Rock		X	n/a	X
3	E Niihau		X	n/a	X

4	NW Kauai	X		n/a	X
5	Kaena Pt	X		n/a	
6	Kaneohe	X		n/a	
7	Makapuu Pt	X	X	n/a	X
8	Penguin Bank	X		n/a	
9	N Molokai	X		n/a	X
10	Pailolo	X	X	n/a	X
11	Hana	X	X	n/a	X
12	N Kahoolawe	X		n/a	X
13	S Kahoolawe	X	X	n/a	
14	Kohala	X		n/a	X
15	Hilo	X		n/a	X
16	South Pt	X	X	n/a	

Option 3 for Bottomfish HAPC

Option 3 proposes seven (7) of the sixteen candidate HAPCs (as recommended by Dr. Chris Kelley) be considered as Hawaii Bottomfish HAPC. The WPSAR Working Group recommends the following sites with proposed modifications/notations:

Proposed HAPC Area	Modifications/Notations
1) Kaena Point, Oahu	<ul style="list-style-type: none"> As proposed
2) Kaneohe Bay, Oahu	<ul style="list-style-type: none"> Exclude encompassing the 2 pinnacles, and the HAPC should delineate the nursery area as well as best available science allows.
3) Makapuu, Oahu	<ul style="list-style-type: none"> Exclude encompassing the coral beds or pinnacles, and suggests delineation of the onaga and ehu nursery area as well as best available science allows. Exclude delineation of the opakapaka nursery area because it does not appear to be of critical ecological importance, due to its small size and proximity to the Kaneohe nursery ground.
4) Penguin Bank, South Molokai	<ul style="list-style-type: none"> Note: While supportive of the location and size of this HAPC, the Working Group realizes that its large size may be of concern. With that in mind, the Working Group in particular notes the importance of the first finger as a <i>P. filamentosus</i> nursery ground and the observation of potentially pre-spawning behavior of <i>E. coruscans</i> on the second finger. Also, the three fingers and nearby habitat collectively comprise one of the most important fishing grounds in the islands.
5) Pailolo Channel, Maui	<ul style="list-style-type: none"> As proposed
6) North Kahoolawe, Kahoolawe	<ul style="list-style-type: none"> As proposed

The rationale for endorsing the seven areas as candidates for HAPC for Hawaii bottomfish was based on the criteria as developed by and specified in the WPSAR Working Group Final Report for Hawaii Bottomfish EFH and HAPC.

Nine of the 16 candidate HAPCs developed and proposed by Dr. Chris Kelley were not endorsed by the Working Group. The nine locations are:

- 1) Middle Bank
- 2) Kaula Rock
- 3) East Niihau
- 4) Northwest Kauai
- 5) North Molokai
- 6) Hana, Maui
- 7) South Kahoolawe
- 8) Kohala Coast, Hawaii
- 9) South Point, Hawaii

The rationale for not including the 9 areas as HAPC is detailed in the WPSAR Working Group report but were generally based on the following findings:

- 1) Over interpretation of the connectivity results between the NWHI and MHI and other zones;
- 2) Reliance on the rarity of the habitat alone as rationale;
- 3) Reliance on the occurrence of certain corals, gorgonians, other benthic sessile invertebrates as the sole rationale; or
- 4) Reliance on the patterns of fishing as habitat importance.

Seamount Groundfish

Option 1 - No Action for Seamount Groundfish

Habitat of Particular Concern has not been defined for Seamount Groundfish. The no-action option is maintain the absence of the definition within the FEP.

Option 2 - WPSAR Recommendation for Seamount Groundfish

Option 2 is based on the WPSAR Working Recommendation to develop HAPC designations for areas encompassing Hancock Seamount and Cross Seamount summits and slopes. Under this option, the HAPC designation is proposed to be congruent with the Option 2 EFH designations for Seamount Groundfish. This Option keeps all three species in a single groundfish complex. However, it 1) add area specific EFH designations around Cross Seamount, 2) changes the overall depth range to 0-600m, 3) changes the post settlement, sub-adults and adult depth ranges to 120-600m, and 4) provides a more accurate descriptor of the water column zone each species is generally found in at different life stages.