

CHAPTER 2: ALTERNATIVES

Chapter 2 presents the alternatives being considered in this DSEIS to end bottomfish overfishing in the Hawaii Archipelago. As indicated in NMFS' notification of bottomfish overfishing in Hawaii, the MHI are where the overfishing problem primarily occurs and reducing fishing mortality in the MHI would be the most effective means to end bottomfish overfishing in the archipelago.

2.1 Alternatives Considered But Not Analyzed in Further Detail

2.1.1 The Entire Hawaii BMUS Complex

Numerous options were considered regarding the range of the species to be included in this management action. Although the overfishing control rule is applied to the entire BMUS list (see Table 1), consideration was given to a narrow range of species that are of particular concern to minimize potential unnecessary impacts of this action. BMUS include species that are harvested using the hook-and-line method of fishing where weighted and baited lines are lowered and raised with electric, hydraulic, or hand-powered reels. The Bottomfish FMP applies to the U.S. Western Pacific Region and therefore includes species that are harvested in Hawaii, American Samoa, and the Mariana Islands. A number of BMUS do not occur in Hawaii.

Three separate species complexes were initially considered in this management action including the full list of species under BMUS, BMUS excluding uku, and the complex of seven deep slope species managed by the State of Hawaii (onaga, ehu, gindai, kalekale, hapuupuu, lehi, and opakapaka). The two complexes, BMUS and BMUS without uku, are not included in the alternatives to be further analyzed.

Onaga and ehu have been the BMUS of primary concern due to reduced local abundance in the MHI. Prior to adoption of the current overfishing and overfished definitions, the Bottomfish FMP overfished threshold was set at 20 percent spawning potential ratios (SPR) on an archipelagic basis, and no overfishing definition existed. Using species specific, targeted catch rates, SPRs for onaga and ehu have been, and remain, well under 20 percent in the MHI for those species. The state's BRFA and recreational catch limits were implemented in 1998 with the intent of rebuilding the local abundance of onaga and ehu resources in the MHI. The list of prohibited species was expanded to include other deep slope bottomfish commonly caught while targeting onaga and ehu such as gindai, kalekale, hapuupuu, lehi, and opakapaka. The primary rationale for including the additional deep-slope species was due to high mortality rates generally associated with embolism while bringing the fish to the surface. Bottomfish fishermen are now familiar with the seven deep slope species managed by the state through the BRFA and bag limits. The Council, its advisors, and the public have suggested that any new federal bottomfish management action in the MHI should be consistent with the bottomfish species managed under the state's regime.

BMUS such as taape (*Lutjanus kasmira*) and kahala (*Seriola dumerili*) are abundant and often considered a nuisance species by fishermen. White ulua, one of the most culturally and socially

important species in the MHI, is targeted by a variety of gear types, including shore-based fisheries. Including these species in potential management measures to address concerns regarding deep slope bottomfish species would not be appropriate.

For example, taape was introduced from French Polynesia nearly fifty years ago to enhance nearshore fisheries. Taape has adapted well and spread rapidly throughout the archipelago (introduced in MHI and now found in the NWHI) and is commonly harvested in abundance by numerous gear types. Because of its dense populations, fishermen often raise concerns that taape competes with other important food and sport fish for prey and habitat. At numerous Council public meetings and hearings regarding bottomfish, fishermen and other interested members of the public routinely request that the state or federal fishery agencies develop a program to eradicate the species. However, recent studies have shown taape not to compete directly with bottomfish species and concluded that taape did not generally share the same depth range and feeding habits and is not a frequent predator or prey of native species (Parish et al. 2000).

Preventing the harvest of taape through the implementation of any of the alternatives considered is not scientifically warranted nor would it be well received by the fishermen or public who perceive this species as over abundant and a nuisance.

Kahala is a species that is often associated with a high incidence of ciguatera fish poisoning. Kahala was harvested commercially in Hawaii for decades prior to 1980. Peak landings (over 150,000 lbs/year) were recorded in the early 1950s. During the 1960s and early 1970s, kahala remained a significant bycatch in the handline fishery targeting high-value deep-sea snappers, like opakapaka, onaga, and uku. Landings averaged 70,000 pounds per year during this period. Although the price for kahala was low (\$0.50–0.70/lb), it could be harvested in sufficient quantities to offset fishing costs when the more valuable snappers were hard to catch. Kahala landings varied seasonally, generally reaching their peak in the December– May period of the year. The full-time bottom fishermen who frequented the Penguin Bank area during the 1970s report that kahala comprised 20 to 30 percent of their annual catch. Kahala bites so aggressively on handline gear that they were often forced to fish it out of an area before they could effectively target on deep sea snappers. Since 1980–1981, kahala has been shunned by seafood marketers due potential ciguatera toxicity, and most commercial fishermen discard it when caught. Kahala is caught in the recreational fishery where fishermen can purchase a simple ciguatera test kit to determine if the fish is ciguatoxic. The test kit, distributed by Oceanit Testing Systems, Inc., can be purchased at retail outlets for about five dollars a test.

White ulua (*Caranx ignobilis*) is included in the BMUS complex and is one of the most important species targeted by shore based and small boat based fishermen. White ulua has assumed a pivotal role in ancient and contemporary Hawaiian culture. Gaffney (2000) noted that the strength of the ulua, particularly large species such as the white ulua (*Caranx ignobilis*) were greatly admired by ancient Hawaiians, and that they were used as a substitute in Hawaiian religious rites when a human sacrifice was unavailable. More recently, ulua have become an important target for shoreline recreational fishermen, and was a driving force behind the founding of several sports fishing clubs in Hawaii in the early part of the twentieth century (Gaffney 2000). White ulua is targeted with a variety of gears including shore casting, slide bait, spear, whipping, and handline. Commercial landings of ulua were as high as 600,000 pounds at

the turn of the twentieth century, but have declined considerably since then (Friedlander and Dalzell 2004). Like kahala, large ulua are a concern for ciguatera poisoning and have not been largely marketed since the early 1980s.

Including the full list of BMUS under the proposed management measures is not appropriate as BMUS other than the Deep 7 such as taape and kahala are believed to be healthy and their inclusion under the proposed measures will not help rebuild deep slope bottomfish stocks, namely onaga and ehu which are of most concern in the MHI.

2.1.2 Gear Restrictions

Limiting use of fishing gear (e.g. reels, hooks) on bottomfish fishing vessels could include creating limits on the number of stations or reels each vessel can use, the type of reel (electric, hydraulic, hand), the number of hooks on each line (between 5 and 12 hooks are typically used), and so forth. Such measures could attempt to control the fishing power of each vessel and therefore limit fishing effort. However, implementation of such controls in the bottomfish fishery would likely be ineffective and difficult to enforce.

Bottomfish vessels typically operate between two to four reel stations while fishing. The number of reels and hooks per line is not dependent on the size of the vessel. Small vessels can use up to four stations while large vessels can operate two. The specific configuration of the gear and number of stations used is dependent on a number of variables, including the number of fishermen, overall ocean conditions, wind speed and direction, current, tide, depth of water, topography of the fishing grounds, location of the fish, and if the vessel is drifting or anchored. Such variables make it difficult to use gear restrictions to control effort in this fishery. In addition, bottomfish reels are also used to target pelagic species at fish aggregation devices and seamounts. Therefore, prohibiting the use of this gear will impact non-bottomfish fisheries.

2.1.3 Limited Entry

Limiting access in the MHI bottomfish fishery would provide direct control over the total number of fishery participants. However, only a small percentage of commercial fishermen target and land bottomfish as their primary fishing activity. The majority of Hawaii commercial fishermen switch between the bottomfish fishery and other fisheries and land less than 1,000 pounds of bottomfish per year. Therefore, establishing a limited entry program without implementing additional output controls (landing limits) would not prevent fishing mortality from increasing through an increase in participant activity.

The State of Hawaii established a control date in 1998 when their BRFA, recreational bag limits and bottomfish registration program were implemented. The state has not used the control date to further manage the fishery. The Council recommended, at its 127th meeting in June 2005, to implement a federal control date that was established in August 2005. Either of these control dates could be used if considering a limited entry or quota based management regime.

Criteria to establish initial limited entry participants would likely be based on historical participation in the MHI bottomfish fishery. Commercial participation would be based on official

State of Hawaii commercial marine license and catch reporting history. Recreational participation would be more difficult to determine. The state's 1998 bottomfish management regime requires any person who may fish for bottomfish (any of the seven species) to register their vessel with the Hawaii Division of Aquatic Resources (HDAR) and display the letters "BF" on their boat. This rule applied to all vessels used for bottomfish fishing, whether the owner is a recreational, subsistence or commercial fisherman. Of the 3,600 vessels registered with the HDAR, about 40 percent have declared themselves as recreational. Because recreational fishermen are not required to report their catches, the number of recreational vessels used for bottomfish fishing since 1998 is unknown. As indicated in public scoping meetings for this DSEIS, establishing a MHI limited entry program is supported by many full-time commercial fishermen; however, part-time commercial and recreational fishermen do not seem to support limited entry.

2.1.4 Rolling Closures

During several Council advisory group meetings, it was suggested that the Council consider using short, continuous, alternating open and closed fishing periods to minimize potential impacts to commercial fishermen and the markets which depend on a continuous supply of bottomfish product. The concern is that a typical three or five month seasonal closure would allow foreign imports to replace the local supply of bottomfish to retail markets and restaurants. There is concern that foreign suppliers of bottomfish, which for example often market their fish as onaga and opakapaka could make permanent inroads and shut out local suppliers.

The proposal to use rolling closures could help to minimize direct fishing and market impacts by allowing fishermen to deliver product on a consistent basis. Two variants were explored under this option. The first would call for rotating closures on a weekly basis. For example, fishermen could fish the first week of January and not fish the second, fish the third week and not the fourth, and so on. The second option would assign each state-registered fisherman an odd or even number. Fishermen would then be allowed to land fish only during their assigned even or odd weeks. The BF registration numbers or trailer license plates were suggested as means to identify fishermen.

There were a number of concerns raised with each of these variants. The primary concern for both variants would be the increased administrative burden of monitoring and enforcing such complex programs. Enforcement could be conducted dockside and in the markets. However, the 3,600 registered bottomfish fishermen primarily use trailers to launch their vessels. Vessel size ranges from 12 to 60 feet with an average of about 21 feet in length. The potential sites for ports of entry where bottomfish can be landed are numerous and would therefore be very difficult to enforce. In addition, fishermen who fish during a closed week could easily hold the fish for delivery to market the following week because of the long shelf life of most bottomfish species. If an alternating number system were to be used, fishermen could easily partner with others allowing them to switch off and rotate vessels so that they could fish continuously.

The main reason why these options are not considered in detail is because after meeting with many fishermen throughout the state during public hearings, meetings, and forums, the majority of fishermen repeatedly indicated that they would prefer a block (i.e. summer 3-month closure) during a period when other fishing opportunities are available.

2.1.5 Closure of NWHI Bottomfish Fishery

The bottomfish species complex in the entire Hawaiian Archipelago is evaluated under MSA as a single archipelagic-wide multi-species stock complex. Management criteria, such as whether overfishing is occurring on the stock complex; apply to the stock complex rather than to the three sub-area management zones or to individual species either on an archipelagic basis or within the sub-areas. However, the status of the species complex can be further evaluated at finer scales based on the management sub-areas, and based on the evaluation at finer scales, management actions have historically been taken to address issues within the sub-areas or zones. Under the National Standard 1 guidelines, Hawaii's archipelagic bottomfish multi-species stock complex is not overfished (the biomass standard using catch per unit effort [CPUE] as a proxy). The current CPUE ratio is 0.82, above the threshold value of 0.7 established as the MSST.

However, overfishing (the fishing mortality standard using fishing effort as a proxy) on an archipelagic wide basis is occurring. The 2003 archipelagic effort ratio (proxy for F/F_{MSY}) is 1.13, above the threshold value of 1.0 established as the MFMT. Looking further at the effort ratios by zone, the MHI is at 1.88, well above the targeted ratio of 1.0. Mau and Hoomalu Zone ratios are below this target level at 0.96 and 0.39, respectively (see Appendix 2 for PIFSC's most recent report on the status of Hawaii's bottomfish stocks). Therefore, reducing fishing mortality in the MHI is likely the most effective means to end overfishing in the Hawaiian Archipelago (70 FR 34452, June 14, 2005).

The overfishing problem is closely linked to excessive fishing mortality (where effort is used as a proxy) in the MHI. The contribution of each zone to the archipelagic effort ratio can be calculated by multiplying the effort ratios by the weighting factors (e.g. habitat area) for each zone. For example, using 2002 Hawaii bottomfish data, the weighted MHI F ratio contribution by itself was 1.04, above the archipelagic overfishing threshold (MFST) of 1.0 (see Section 1.3). During the same year, the weighted F ratio contributions for the Mau and Hoomalu Zones were 0.147 and 0.158, respectively. The weighted contributions to the archipelagic effort ratio in 2003 by zone were 0.84 for the MHI, 0.12 for the Mau zone (a drop from 0.147 in 2002) and 0.17 for the Hoomalu zone. At this time, there is no reason to believe that the fishing mortality metrics for the NWHI will change significantly with 2004 information. The overfishing condition in the Hawaiian archipelago bottomfish species complex is largely attributable to the MHI, not the NWHI, and therefore closing the NWHI bottomfish fishery is not believed by NMFS to not be a viable alternative that addresses the overfishing problem, excess rate of fishery mortality, observed in the MHI. Furthermore, reducing or eliminating effort in the NWHI could further exacerbate the excessive fishing mortality (or effort) in the MHI due to market demand and/or from displacing the NWHI fishing effort towards the MHI. For these reasons, closure of the NWHI bottomfish fishery is not viewed as a viable solution to end the overfishing of Hawaii's archipelagic bottomfish multi-species stock complex.

Although the small NWHI bottomfish fishery is believed to have little impact on Hawaii's bottomfish overfishing problem, as well as minimal impact to the greater NWHI coral reef or deep slope ecosystems, NOAA is currently contemplating the amount fishing, if any, is appropriate for the pending NWHI National Marine Sanctuary. An environmental impact statement is being prepared for this NWHI initiative, thus the NEPA analysis for this initiative is

not available at this time. Based on a January 19, 2006 letter from Vice Admiral (Ret.) Conrad Lautenbacher, NOAA Administrator, the Council was provided an opportunity to recommend commercial and recreational fishing regulations under the MSA for bottomfish and pelagic fisheries that operate within the boundaries of the proposed NWHI sanctuary. At its 131st meeting (March 13 to 16, 2006), the Council recommended a limit of 14 commercial bottomfish permits for the NWHI (seven for the Mau Zone and seven for the Hoomalu zone), and a bottomfish harvest limit of 391,850 pounds, which represents 85 percent of the NWHI bottomfish maximum sustainable yield.

2.2 Alternatives Considered in Detail

Under all the alternatives, HDAR's bottomfish management regime would remain in place, including bag limits for the recreational harvest of onaga and ehu (unless recreational fishing activities are closed as in some alternatives), bottomfish vessel registration, and its existing or proposed network of RFAs. To end the bottomfish overfishing through reducing fishing effort by 15 percent within the MHI, the Council considered in detail the following management alternatives.

2.2.1 Alternative 1: No Action

Alternative 1 is to take no federal action; that is, no federal management measures would be recommended by the Council at this time.

Under this and all other alternatives, the State of Hawaii's bottomfish management measures, which were established in 1998 under Department of Land and Natural Resources (DLNR) administrative rule (HAR Chapter 13-94) may remain in place or could be changed by DLNR. The state's current bottomfish management regime includes: (i) 19 Bottomfish Restricted Fishing Areas (BRFAs) throughout the MHI, (ii) a recreational bag limit of 5 ehu and/or onaga per trip per person, (iii) required bottomfish vessel registration, and (iv) prohibited use of bottom longline, nets, traps, and trawls to take bottomfish. Seven species, including deep-slope snappers and a grouper, were identified for management under the state regulations. According to HDAR, the state's current BRFAs were delineated according to bottom topography, location of reported bottomfish landings, proximity to access points and points of observation for ease of enforcement, and recommendations from fishermen, with the primary purpose being to protect critical bottomfish habitat and presumed spawning and nursery habitat areas.

This alternative would also allow continued open access for entry into the MHI fishery, and commercial fishermen would continue to be required to submit catch reports. Recreational fishermen would continue not to be required to submit catch reports, and the recreational catch component would continue to be unknown.

Based on new mapping information of bottomfish habitat, Division of Aquatic Resources, State of Hawaii (HDAR) is in the process of reviewing its bottomfish management regime, with a focus on the BRFAs. Currently proposed changes to the BRFAs by HDAR include reducing their number, modifying their locations, standardizing their boundaries to corresponding minutes of latitude and longitude, and increasing their size. Factors being considered by HDAR include

facilitating GPS navigation around BRFAs, locating BRFAs close to shore to facilitate monitoring and enforcement, increasing habitat protection, and supporting larval transport and recruitment between banks and islands. Also under consideration are modifications to HDAR's existing Commercial Fisheries Statistical Area reporting grids to allow for better evaluation of the effectiveness of existing and new BRFAs.

2.2.2 Alternative 2: Area Closures

2.2.2.1 Alternative 2a: Closure of Penguin Bank and Middle Bank (Secondarily Preferred)

Under Alternative 2a, all recreational and commercial fishermen would be prohibited from targeting, possessing, landing, or selling any of the Deep 7 species (onaga, opakapaka, ehu, lehi, gindai, kalekale and hapuupuu) in or from federal waters around Penguin Bank and Middle Bank (see Figure 3). All vessel operators (both commercial and recreational) targeting bottomfish in the MHI would be required to register their vessels on an annual basis and would be required to obtain permits as well as to complete and submit catch reports including their catches, fishing effort, and area fished. To facilitate recognition of bottomfish registered vessels from the air, each vessel would be required to be marked on an unobstructed upper surface with its registration number. The effectiveness of the closed areas in increasing the stock biomass of the Deep 7 species would be monitored and analyzed through a combination of fishery dependent (i.e. catch reports) and fishery independent data. Fishery independent data would be collected via controlled sampling experiments, submersible surveys, remote cameras (e.g. "Bot-Cam") and other methodologies. If the State of Hawaii does not commit to adopting seasonal closure alternative (Alternative 3), the Council recommended the adoption of Alternative 2a. Alternative 2a does not require parallel State of Hawaii regulations, as the vast majority of both Penguin and Middle Banks occur in federal waters.

2.2.2.2 Alternative 2b: Overlay Federal Closures on Proposed HDAR Restricted Fishing Areas

Alternative 2b would overlay federal closures on the State of Hawaii's proposed Bottomfish Restricted Fishing Areas (BRFAs) in federal waters (3 to 200 nm offshore; see Figures 2-4). In other words, federal closed areas would apply to those portions of the proposed BRFAs that extend in to the EEZ. All recreational and commercial fishermen would be prohibited from targeting, possessing, landing, or selling any of the Deep 7 species (onaga, opakapaka, ehu, lehi, gindai, kalekale and hapuupuu) from the proposed BRFAs. The state's current BRFAs were delineated with the purposes and objectives as described in Section 2.2.1.

Recently, HDAR has undertaken a review of their management program. Although their review and final recommendation is not yet complete, the state has proposed to modify its statewide network of BRFAs. According to HDAR, the state is proposing to establish 12 BRFAs that are generally larger than the existing 19 BRFAs, and are based on comprehensive bottom mapping and sonar data that provide a detailed view of bottomfish Essential Fish Habitat in the 100 to 400 m depth range. It is estimated by HDAR that the proposed BRFAs will reduce fishing mortality (landings) by at least 17 percent (see Appendix 3).

All vessel operators (both commercial and recreational) targeting bottomfish in the MHI would be required to register their vessels on an annual basis and would be required to complete and submit reports of their catch, fishing effort, and area fished.

Prior to the establishment and after the implementation of the proposed BRFA's, state and federal partners will develop and implement monitoring methodology that will allow them to determine how fishing mortality, biomass and size distribution of bottomfish are affected by the BRFA's. This monitoring will include both fishery-dependent (i.e. catch reports) and fishery-independent components.

Regarding fishery-independent monitoring, new technology will allow the state to monitor a grid of stations within appropriate bottomfish habitats throughout the main Hawaiian Islands, using baited and unbaited video cameras to directly assess species and size-distribution at selected. Some catch sampling will be needed within closed areas and consideration is being given to developing a monitoring effort that may include experimental fishing.

In order for area closures to be effective, it is important to have effective enforcement. Enforcement of the existing BRFA's by DOCARE has not been adequately conducted due to poor funding levels resulting in a lack of staffing and assets. According to HDAR the proposed BRFA's have been moved closer to shore to facilitate shore side enforcement, to the extent possible, and are designed with straight-line boundaries, making it easier for both fishermen and enforcement officers to determine whether fishing takes place inside or outside the closed areas. Federal closed areas would require at sea and air surveillance by the USCG and NMFS OLE. A comprehensive and properly resourced enforcement plan, including a Joint Enforcement Agreement between state and federal enforcement agencies, would need to be developed to adequately enforce the area closures.

Figure 3: Existing and Proposed BRFAs around Oahu, Penguin Bank, Molokai, and Maui.

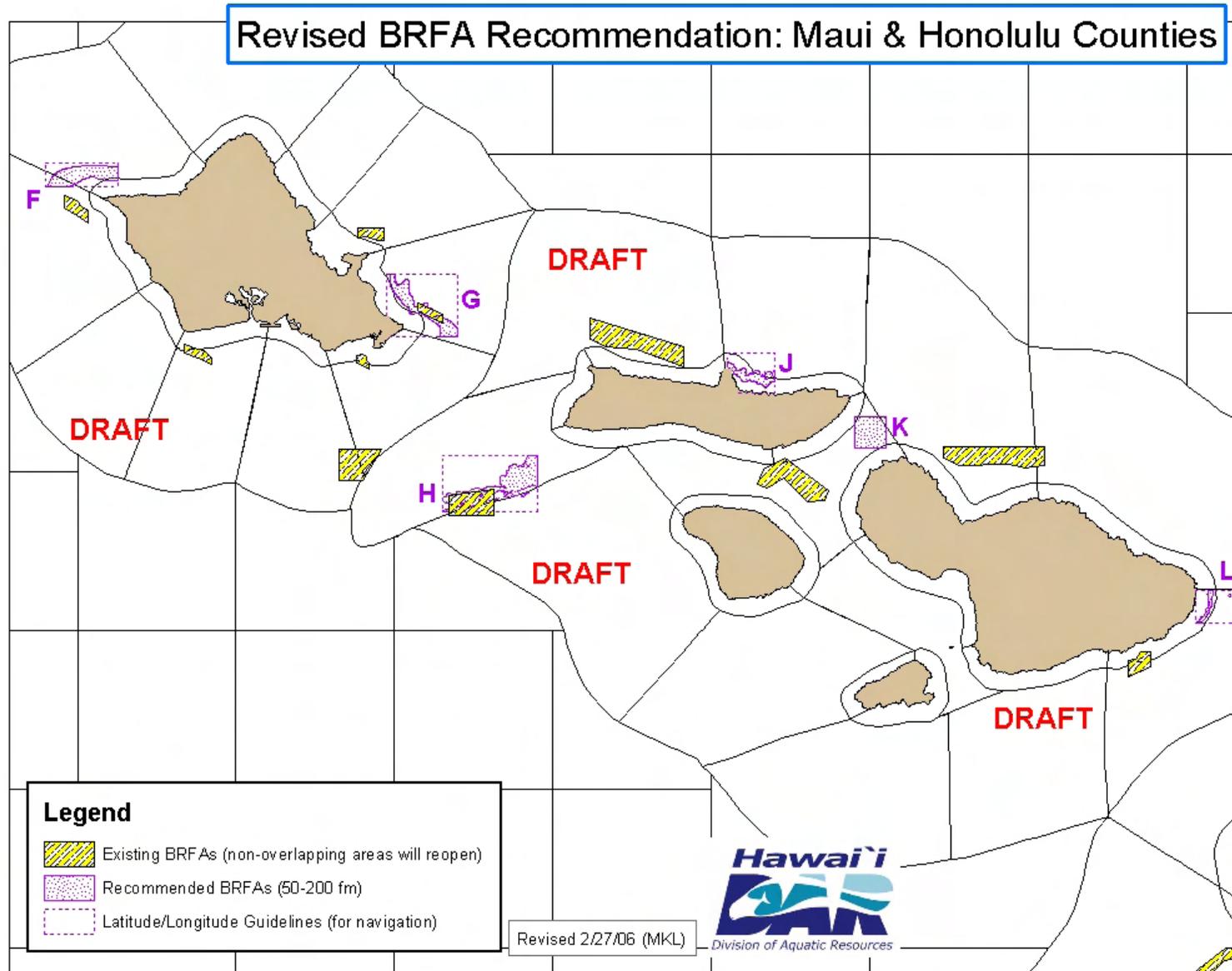
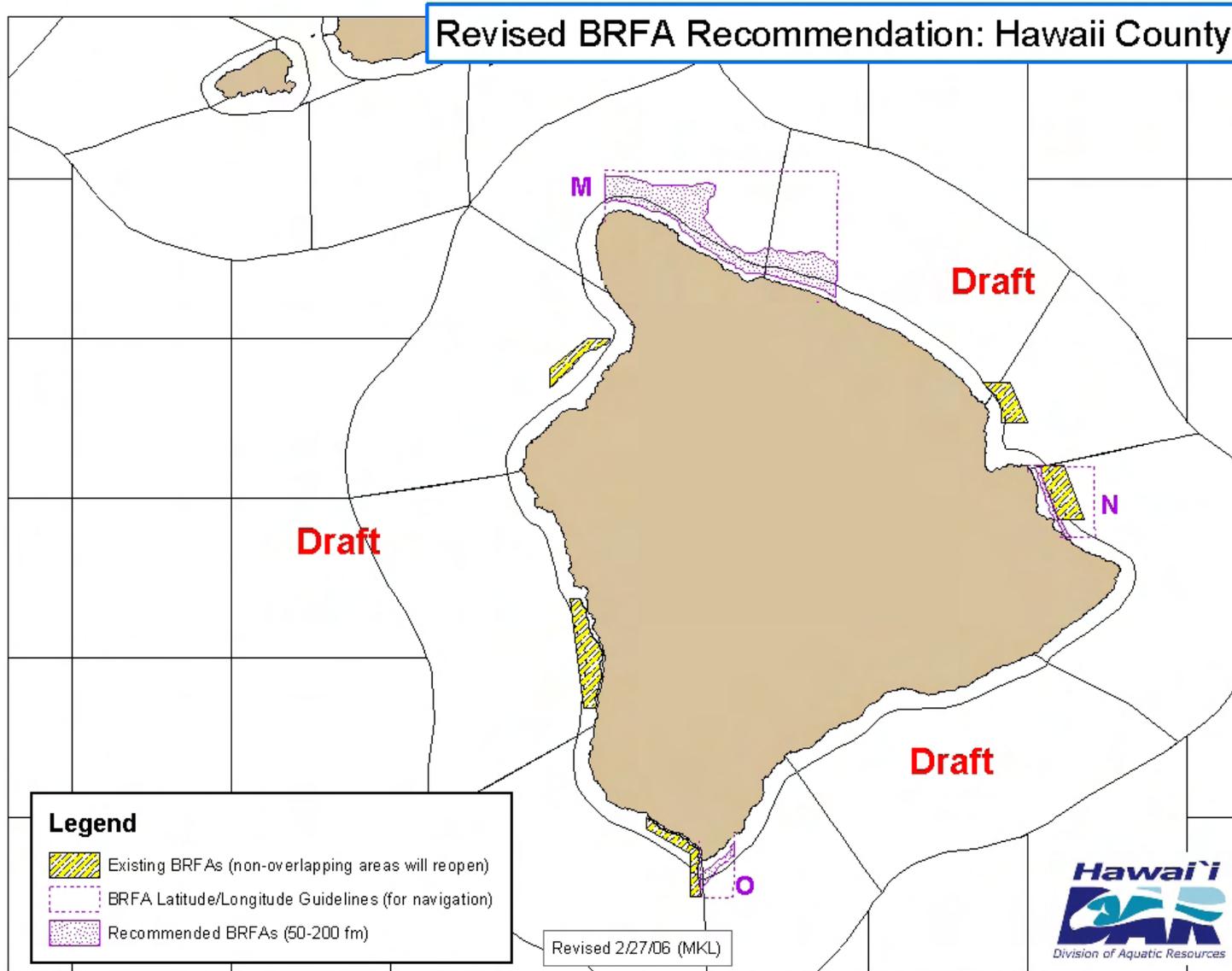


Figure 4: Existing and Proposed BRFAs around Hawaii Island.



2.2.3 Alternative 3: Seasonal Closure (Primarily Preferred)

Under Alternative 3, an annual summer closure would be implemented from May 1 to August 31 of each year for the entire MHI bottomfish fishery (both commercial and recreational vessels). Targeting, possessing, landing, or selling MHI Deep 7 species would be prohibited during the closed season; however, the NWHI bottomfish fishery would remain open. All vessel operators (both commercial and recreational) targeting bottomfish in the MHI would be required to register their vessels on an annual basis and would be required to complete and submit reports of their catch, fishing effort, and area fished. In addition, each vessel would be required to be marked on an unobstructed upper surface with its registration number. To achieve the needs and objectives of this action (i.e. a 15 percent in MHI fishing mortality), the State of Hawaii would need to establish a concurrent summer closure for state waters. Recognizing that parallel state and federal seasonal closure regulations must be promulgated in order for a seasonal closure to be effective, the Council requested that the State of Hawaii notify the Council by April 15, 2006 of its commitment to adopt seasonal closure regulations. If the State of Hawaii does not commit to adopting seasonal closure regulations, the Council recommended the adoption of Alternative 2a (Closure of Middle and Penguin Banks). The effectiveness of the seasonal closure in reducing bottomfish fishing mortality would be monitored through recreational and commercial reporting as well as enforcement activities, which mostly would be conducted shore side. At sea enforcement or air surveillance may also occur during the closed season.

2.2.4 Alternative 4: Catch Limits

Alternative 4 includes two variations that would limit the commercial catch of MHI bottomfish. Alternative 4a would establish a fleet-wide total allowable catch (TAC) of bottomfish for all commercial fishing vessels in the MHI, while Alternative 4b would establish vessel-specific individual fishing quotas (IFQs) for Deep 7 bottomfish for all commercial fishing vessels in the MHI. Once either quota was reached, no targeting, possessing, landing or selling of MHI Deep 7 bottomfish (commercial or recreational) would be permitted. The NWHI bottomfish fishery would remain open.

Under both variations, all vessel operators (both commercial and recreational) targeting bottomfish in the MHI would be required to register their vessels on an annual basis and to obtain permits, as well as to complete and submit catch reports including their catches, fishing effort, and area fished. To facilitate recognition of bottomfish registered vessels from the air, each vessel would be required to be marked on an unobstructed upper surface with its registration number.

To achieve the needs and objectives of this action (i.e. a 15 percent in MHI fishing mortality), the State of Hawaii would need to establish a parallel requirement as both State and federal waters would have to be closed once the limit was reached. The effectiveness of the catch limits in reducing bottomfish fishing mortality would be monitored through recreational and commercial reporting as well as enforcement activities.

Alternative 4a: TAC

Under Alternative 4a, a TAC of 198,484 pounds of the Deep 7 species (all species combined), representing a 15 percent reduction from the 2003 fleet-wide MHI bottomfish catches of these species (Kawamoto et al. 2005), would be applied to the entire MHI commercial bottomfish fishery. The bottomfish fishing year would start on October 1 and continue until the TAC was reached. Thereafter, no fishing for Deep 7 bottomfish (commercial or recreational) would be permitted in the MHI. The NWHI bottomfish fishery would remain open.

Alternative 4b: IFQs

Under Alternative 4b, IFQs would be established for each MHI commercial bottomfish fisherman, allowing them to catch 85 percent of their 2003 catch of the Deep 7 species, based on reported landings. The bottomfish fishing year would start on January 1. The number of participants would likely be limited to past participation in the fishery and quota amounts would likely be determined based on individual historical catches. Once a commercial fisherman had landed his respective IFQ, that person would not be permitted to fish for, possess, or sell any bottomfish until the following year. The recreational fishery would remain open.

Each MHI commercial bottomfish participant with an IFQ would be issued a set of bottomfish stamps, with each stamp representing a certain number of pounds of bottomfish and all the stamps totaling the fisherman's total IFQ. The fisherman would be required to submit a stamp to the dealer at the point of sale. If the fisherman sold fish in excess of the number of bottomfish pounds for one stamp, he would be required to surrender a second stamp to the dealer. Once all the stamps were submitted the fisherman would be prohibited from fishing until the next open season. As is the case with other IFQ fisheries, the bottomfish stamps would be non-transferable.

Under this alternative, fishermen would be required to continue reporting their catches and to stop fishing when their individual quota was reached. Fishery data would need to be analyzed in real time to ensure that fishermen did not exceed their quota and to penalize those that did.

IFQs could be implemented in a number of ways, two methods are outlined here:

1. Provide equal quotas (totaling 85 percent of the fleet-wide 2003 catch) to all historical participants. Under this alternative, historical highliners would get the same quota as part-time fishermen, and vice versa. Variations could provide equal quotas to a subset of all historical participants, such as those most active in recent years.
2. Provide individual quotas that are equal to 85 percent of each and every fisherman's historical catch. Under this alternative, fishermen's quotas would be relative to their individual historical catches. Variations could provide similar quotas to a subset of all historical participants, such as those most active in recent years.

2.2.5 Alternative 5: Combination Measures

Alternative 5 would mitigate the potentially negative impacts of the above stand-alone alternatives above by combining modifications of them. Alternative 5 includes two variations: Alternative 5a would combine a seasonal bottomfish closure with bottomfish IFQs for a limited number of MHI commercial fishing vessels during the seasonal closure, while Alternative 5b would combine a seasonal MHI closure with a year-round closure of the southern portion of Penguin Bank.

Under both versions of Alternative 5, all vessel operators (both commercial and recreational) targeting bottomfish in the MHI would be required to register their vessels on an annual basis and would be required to obtain permits as well as to complete and submit catch reports including their catches, fishing effort, and area fished.

To achieve the needs and objectives of this action (i.e. a 15 percent in MHI fishing mortality), the State of Hawaii would need to establish parallel requirements as fishing limits and closures would be required in both state and federal waters. The effectiveness of the combined measures in reducing bottomfish fishing mortality would be monitored through recreational and commercial reporting as well as enforcement activities.

The effectiveness of Alternative 5b's closed area in increasing the stock biomass of the Deep 7 species would be monitored and analyzed through a combination of fishery dependent (i.e. catch reports) and fishery independent data. Fishery independent data would be collected via controlled sampling experiments, submersible surveys, remote cameras (e.g. "Bot-Cam") and other methodologies.

Alternative 5a: Seasonal Closure and IFQs

Under Alternative 5a, the MHI bottomfish fishery would be closed during an expanded seasonal closure from May 1 to September 30 of each year, except for a small number of full-time commercial bottomfish fishermen. The exempt fishermen would each receive IFQs for the Deep 7 species that they could use during the otherwise closed season (May–September). Once each exempted fisherman's quota was landed, he would be required to stop fishing until the next open season. The combined total of all IFQs would equal 23,946 pounds of the Deep 7 species (all species combined) as this is the amount that could be made available for harvest during the otherwise closed season and still maintain the overall annual reduction of 15 percent from the 2003 baseline for the entire MHI (Table 47).

Table 3: Estimated Reductions and Available Pounds under Alternative 5a.

Target Reduction	MHI Closure Months	Estimated Reduction in MHI Landings due to May-September closure	Pounds Available to Harvest and Still Meet 15 Percent Target Reduction
15 percent 35,027 pounds	May–September	25.25 percent 58,973	23,946

Source: Kawamoto et al. 2005.

Each MHI commercial bottomfish fisherman exempted from the summer closure would be issued a set of bottomfish stamps, with each stamp representing a certain number of pounds of bottomfish and all the stamps totaling the vessel’s IFQ for the otherwise closed season. The fisherman would be required to submit a stamp to the dealer at the point of sale. If the fisherman sold fish in excess of the number of bottomfish pounds for one stamp, he would be required to surrender a second stamp to the dealer. Once all the stamps were submitted the fisherman would be prohibited from targeting, possessing, landing or selling MHI Deep 7 bottomfish until the next open season.

As in Alternative 4, IFQs could be calculated and provided in equal amounts to all qualifying fishermen, or they could be calculated and provided such that each qualifying fisherman’s quota was proportionate to his historical catch. However, in either case, the sum of the IFQs would not exceed the 23,946 pounds available.

Alternative 5b: Seasonal Closure and Area Closure

Alternative 5b would combine a seasonal closure from June 1 to August 31 of each year for the MHI with a year-round partial closure of Penguin Bank. All MHI bottomfish fishermen would be prohibited from targeting, possessing landing or selling the Deep 7 species from the MHI during the summer closure. However, the year-round partial closure of Penguin Bank would enable the length of the summer closure to be reduced as compared to other alternatives. Based on historical MHI landings of deep-slope bottomfish, a summer closure from June through August would reduce landings by up to 11 percent as compared to the 2003 baseline (Kawamoto et al. 2005). Based on 1998 to 2004 historical data indicating that federal waters around Penguin Bank are the source of 16 percent of MHI Deep 7 catches as compared to the 2003 baseline (Kawamoto et al. 2005) and lacking spatially detailed catch and effort data for this area, the closure of the southwestern quarter of Penguin Bank would be estimated to further reduce landings by an additional 4 percent. Thus the combination of the seasonal and area closures under Alternative 5b would be expected to achieve the 15 percent reduction target.

Table 4 provides a summary comparison of the alternatives regarding their various requirements.

Table 4: Summary Comparison of Alternatives.

	Alt. 1: No Action	Alt. 2a: Closure of Penguin and Middle Banks	Alt. 2b: Overlay Federal Closures of State BRFAs	Alt. 3: May– August MHI Closure	Alt. 4a: Fleet-wide Commerci al TAC	Alt. 4b: IFQ for Some or Most	Alt. 5a: May– September MHI Closure w/select IFQ exemptions	Alt. 5b: June– August MHI Closure Year- Round Partial PB Closure
Continues state’s bag limit, bottomfish vessel registration and BRFAs	✓	✓	✓	✓	✓	✓	✓	✓
Continues commercial catch reporting requirement	✓	✓	✓	✓	✓	✓	✓	✓
Requires catch reporting by recreational bottomfish fishermen		✓	✓	✓	✓	✓	✓	✓
Requires at-sea enforcement and aerial surveillance markings on bottomfish vessels		✓	✓	✓			✓	✓
Requires state and federal mirror regulations			✓	✓	✓	✓	✓	✓
Requires shore- based enforcement of landings and/or monitoring by		✓	✓	✓	✓	✓	✓	✓

	Alt. 1: No Action	Alt. 2a: Closure of Penguin and Middle Banks	Alt. 2b: Overlay Federal Closures of State BRFAs	Alt. 3: May– August MHI Closure	Alt. 4a: Fleet-wide Commerci al TAC	Alt. 4b: IFQ for Some or Most	Alt. 5a: May– September MHI Closure w/select IFQ exemptions	Alt. 5b: June– August MHI Closure Year- Round Partial PB Closure
dealers plus certification and tracking of NWHI and imported bottomfish								
Requires fishermen to report their catches on a per-trip basis						✓	✓	
Requires issuance of bottomfish stamps							✓	