# Modifying the bigeye catch limit for Hawaii-based longline vessels in the Eastern Pacific Ocean

## I. Introduction

Bigeye tuna in the Western Central Pacific Ocean (WCPO) and Eastern Pacific Ocean (EPO) has been subject to over-exploitation for the past two decades from harvesting adults and sub-adults and juveniles in the respective longline and purse seine fisheries.

The juvenile catch is a consequence of the proliferation of fishing around Fish Aggregating Devices (FADs) in the mid-1980s, which concentrate schools of the target skipjack and yellowfin tunas, but which also aggregate substantial volumes of juvenile bigeye tuna.

Catches in the WCPO and EPO, including US longline catches, have been subject to conservation and management measures (CMMs) or resolutions promulgated by the Western and Central Pacific Fishery Commission (WCPFC) and Inter-American Tropical Tuna Commission (IATTC)

The Hawaii longline fleet, by virtue of its location (Figure 1)[1], is able to fish in both the Eastern Pacific Ocean (EPO) and the Western and Central Pacific Ocean (WCPO). Apart from one US longliner operating from California, all US longliners operating in the EPO are from Hawaii. US longline effort and Hawaii longline effort are thus more or less the same in the North Pacific.

**Figure 1. Map of the Pacific Ocean showing the boundary between the WCPO and EPO**

[1] The US EEZ around Hawaii is < 100 nm from the EPO

Recent bigeye catch history for the EPO and for the US fleet in the EPO indicates that overall BET mortality in the EPO is below the stock's MSY and that many countries are harvesting the stock below established catch limits. As such, bigeye in the EPO is no longer considered to be experiencing overfishing[2]. At the same time, the EPOP has become an important fishing ground for the Hawaii longline fleet.

As the agency responsible for drafting fishery management policy for federally managed fisheries, the Council has a responsibility to explore measures which would maintain the stability of the Hawaii-based longline fishery and ensure the sustainable supply of bigeye to Hawaii's seafood markets. Further, given the chronic overfishing condition of WCPO bigeye, transfer of fishing effort from the WCPO to the more healthy EPO bigeye stock would relieve fishing pressure on the WCPO stock and is therefore consistent Magnuson Stevens Act National Standard 1.

Taken together, these developments indicate that the US should seek a revision of the catch limit for the Hawaii-based longline fleet which reflects this greater exploitation of EPO bigeye.

## II. Bigeye Catches in the EPO

Based on data from (IATTC 2013a), bigeye catches in the EPO between 1983 and 2012 are shown in Figure 2. Catches are taken principally with purse seines and longlines, with small volumes (< 0.1%) caught by other methods (based on data in IATTC 2013a). Catches from 1983 to 2002 varied between 100,000 to 200,000 mt with a means of about 150,000 mt. After 2002, catches have declined steadily to about 100,000 mt in 2012.

Both purse seine and longline fisheries show catch declines from 2002 onwards, however, the decline in longline catches is particularly marked with a decline of about two thirds between 2002 and 2012.

[2] While the most recent EPO bigeye stock assessment (Aries Da Silva & Maunder 2013) indicates that this stock is not being overfished nor subject to overfishing, NMFS has not yet concurred with the this evaluation.

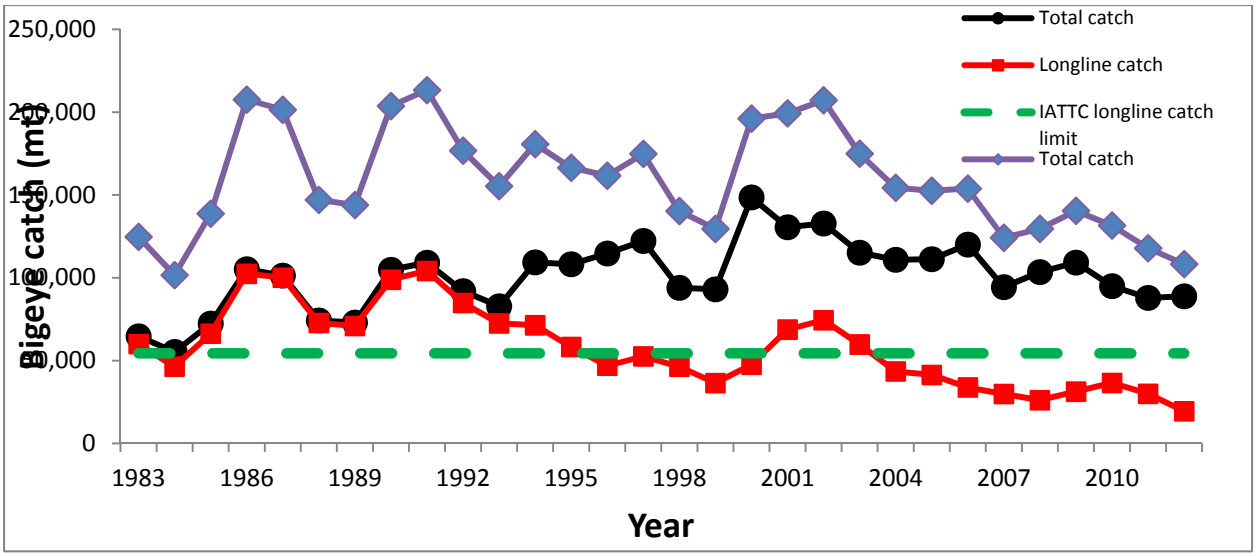


**Figure 2. Time series of bigeye tuna catch in the EPO between 1983 and 2012. Source IATTC (2013)**

The scale of the longline bigeye tuna decline is apparent when evaluated against the catch limits established for the four Asian longline fleets (China, Korea, Taiwan and Japan) in Resolution C-13-01 (see Table 1). These catch limits are based on recommendations of the IATTC scientific staff and collectively amount to about 54,000 mt of bigeye, of which just over 19,000 mt or 35% was caught in 2012 by the four Asian longline fleets.

**Table 1. EPO annual bigeye catch limits for the Asian longline fleets. Source IATTC (2013b)**

| Country | Bigeye Catch Limit (mt) | 2012 catch (mt) | % catch limit |
|---|---|---|---|
| China | 2,507 | 1,993 | 79.5 |
| Japan | 32,372 | 7,424 | 22.9 |
| Korea | 11,947 | 6,892 | 57.7 |
| Chinese Taipei | 7,555 | 2,937 | 38.9 |
| Total | 54,381 | 19,246 | 35.4 |

A time series of bigeye catches by Hawaii-based longline vessels is shown in Figure 3. Catches by the Hawaii fleet remained lower than 500 mt until 2005. However, between 2004 and 2006, the Hawaii longline fleet was subject to a catch limit of 150 mt stemming from a 2004 IATTC Resolution (IATTC 2004). From 2007 onwards the Hawaii-based longline fleet has been subject to a 500 mt bigeye catch limit (IATTC 2006). This initially applied to all longline vessels but in 2009 (IAATC 2009) the catch limit was set for longline vessels > 24 m which comprise 15% of the US longline fleet based out of Hawaii.

From 2005 onwards, the Hawaii longline fleet has caught increasing amounts of bigeye tuna in the EPO, with catches exceeding 1,000 t in 2008 and 2000 mt in 2013. In 2013, NMFS closed the fishery on November 11, when it judged that the 500 mt limit had been reached by US Hawaii-based longline vessels > 24 m in length[3].

The Hawaii-based longline fleet continues to catch the majority of its bigeye in the WCPO, which is subject to a WCPFC-established catch limit. Between 2006 and 2008, the WCPO bigeye limit for the Hawaii-based fleet was 4,121 mt, the total caught in 2004 (WCPFC 2005). This was modified to 90% of the 2004 bigeye longline catch in the WCPO or 3,763 mt (WCPFC 2008), and remained in place from 2009-2013. This catch limit will be reduced by a further 10% in two 5% increments between 2014 and 2017 to 3,297 mt (WCPFC 2013).

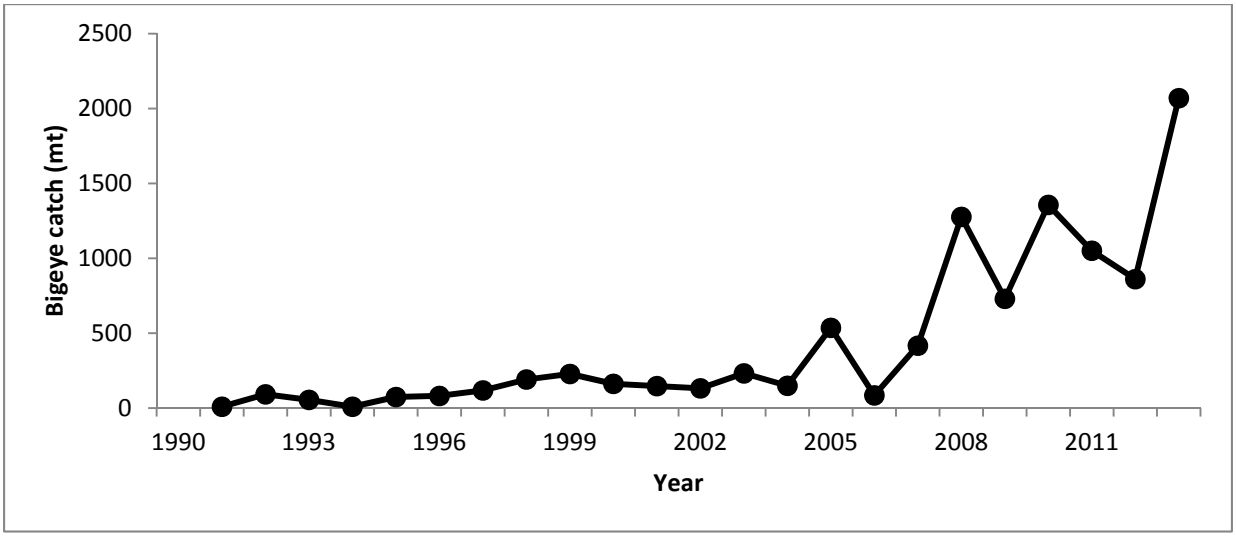


**Figure 3. Time series of bigeye tuna catches between 1991 and 2012. Source IATTC (2013) and NMFS PIFSC unpublished data**

The WCPFC and EPO have been closed to catching bigeye tuna at various times on account of the Hawaii fleet exceeding its WCPFC or IATTC allotted catch limits. The Hawaii-based fleet is capable in a given year of catching upwards of 5,500 mt of bigeye tuna. As such, the EPO and WCPO catch limits the Hawaii-based fleet from attaining historical annual catch levels, although vessels < 24 m may continue to fish in the EPO following a closure. The EPO limit does not match vessel capacity or the stock's capacity to support higher exploitation, and could serve to increase catches in the WCPO whereby bigeye is considered to experiencing overfishing.

[3] Federal Register (2013) 78 (213) 65887-65888

Further, the Hawaii-based longline fleet has entered into arrangements with the US territories to obtain additional bigeye tuna above the 3,763 mt quota once the annual limit is reached in a given year.

## III Status of EPO Bigeye Tuna

The following summary of the stock status of bigeye tuna in the EPO is freely adapted from IATTC (2013), which summarizes the most recent stock assessment conducted up to 2012 (Aries da Silva and Maunder 2013).

According to the base case stock assessment model results, the most recent estimate indicates that the bigeye stock in the EPO is likely not overfished (Spawning Stock>Spawning $Stock_{MSY}$) and that overfishing is not taking place (Fishing Mortality<Fishing $Mortality_{MSY}$) (Figure 4). In fact, the current exploitation is very close to the MSY target reference points. Likewise, interim limit reference points (0.5 $SS_{MSY}$ and 1.3 $F_{MSY}$) have not been exceeded under the current base case model (Figure 5). These interpretations, however, are subject to uncertainty. They are also strongly dependent on the assumptions made about the steepness parameter of the stock-recruitment relationship, the assumed levels of adult natural mortality, and weighting assigned to the size-composition data.

The results of this assessment indicate a recent recovery trend for bigeye tuna in the EPO (2005-2010), subsequent to IATTC tuna conservation resolutions initiated in 2004. However, a decline of the spawning biomass began at the start of 2011, persisted through 2012 and reduced both summary and spawning biomasses to their lowest historic levels at the start of 2013. This decline may be related to a series of recent below-average recruitments which coincide with a series of strong la Niña events. However, at 2012-2013 levels of fishing mortality, and if recent levels of effort and catchability continue and average recruitment levels persist, the SBR is predicted to stabilize at about 0.21, very close to the level corresponding to MSY.

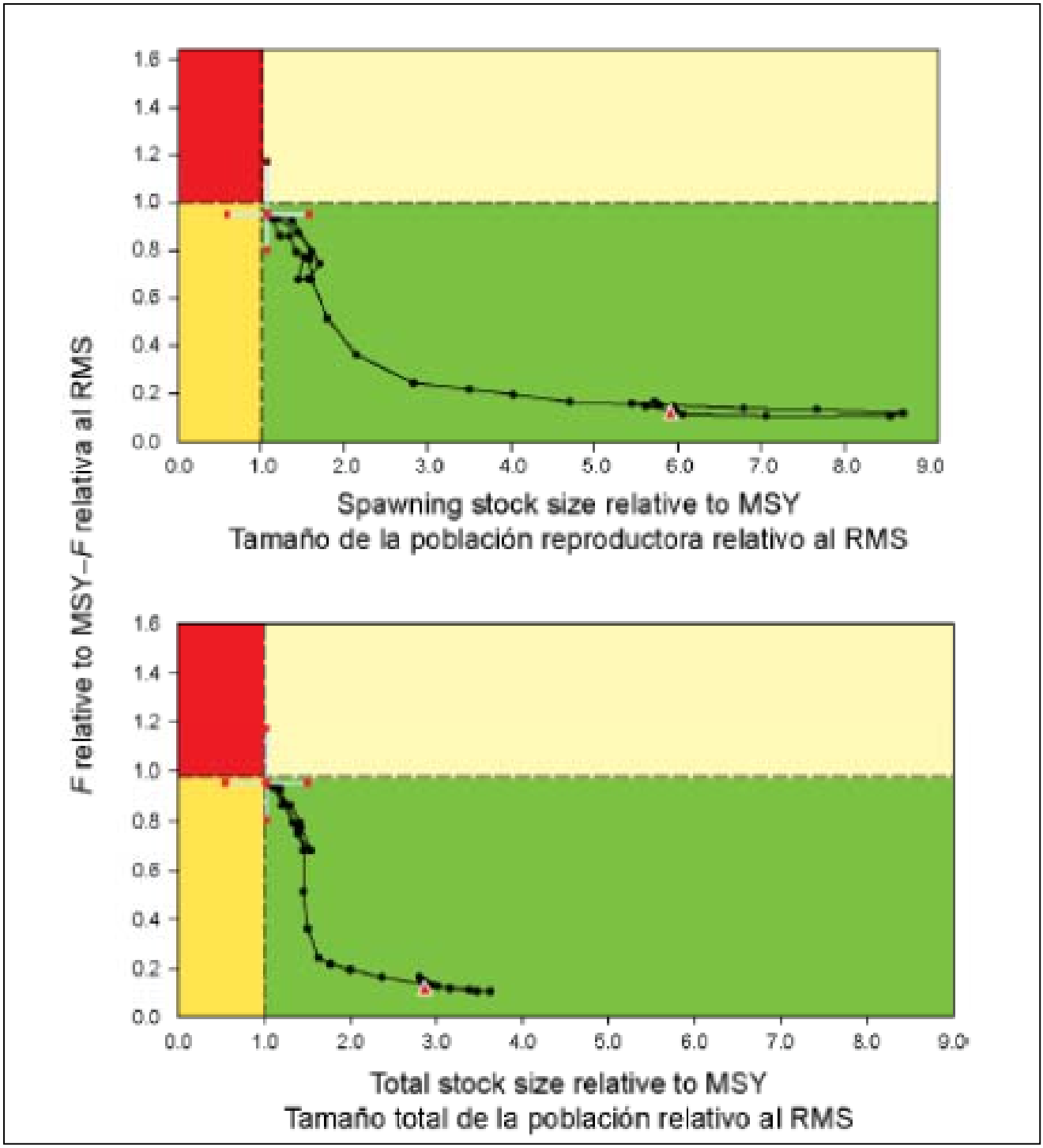


**Figure 4. Kobe plots of spawning stock (top) and total stock (biomass) for bigeye in the EPO**

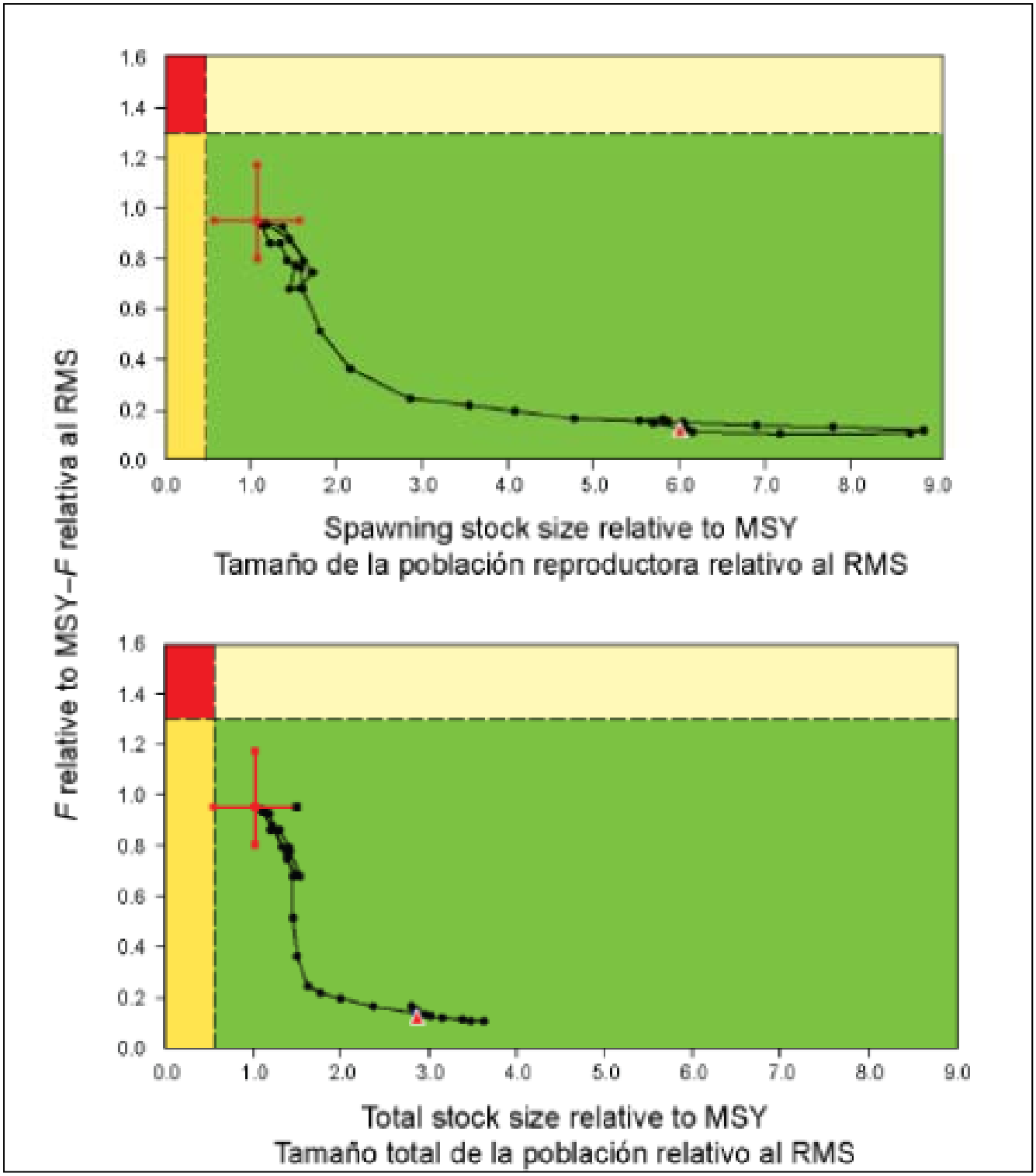


**Figure 5. Kobe plots of spawning stock (top) and total stock (biomass) for bigeye in the EPO relative to limit reference points, 0.5 $SB_{MSY}$ and 1.3 $F_{MSY}$.**

## IV. Options for modifying the US EPO longline bigeye tuna allocation

A range of options for modifications of the US EPO longline bigeye allocation is given in Table 2. These options are not intended for amending the Council's Pelagics Fishery Ecosystem Plan (PFEP), but for the US to advocate for inclusion in the next IATTC Resolution for a Multiannual Program for the Conservation of Tuna in the EPO.

Longline measures have since 2007 been applicable to vessels > 24 m, which is the minority of vessels in the Hawaii longline fleet, and which has been limited to 500 mt. However, in most years, the majority of catch is taken by vessels < 24 m.

Application of conservation resolutions measures to vessels > 24 m creates inequity since larger vessels may be forced back into the WCPO when good fishing conditions obtain in the EPO. Moreover, fishing in the WCPO is more stringently regulated since catch limits for bigeye apply equally to all vessels regardless of size. The basis of the 24 m specification is unknown and may be based on the notion that longline fishing capacity and fishing power is related to vessel size. While this may be true to some extent, especially for freezer longliners, the relationship is much looser for fresh fish longliners like the Hawaii fleet (WPRFMC 1993).

Currently the Asian longline fleets are catching a third of their historical catch levels based on their catches relative to their catch limits (see table 2). Most of this reduction has been driven by the Japanese fleet which is now catching between one fifth and one quarter of its potential catch volume. It is possible that the Asian fleets may re-expand back into the EPO, and they still account for over 90% of the total bigeye longline catch. However, should this occur, the IATTC has in place catch limits for each of these fleets, based on the advice of the IATTC scientific staff. Furthermore, the large-scale freezer longline model pioneered by Japan is no longer economical.

Expansion of a catch limit or removal of a catch limit for the Hawaii longline fleet would not mean unfettered expansion of bigeye catches by the Hawaii fleet. The maximum bigeye catch taken by the Hawaii fleet is 5,857 mt in 2008, which is a mix of WCPOP and EPO catches. The Hawaii longline limited entry program has a finite total of 164 permits available, with current fleet size of about 135 vessels. However, expansion is finite unless the Council re-amended the (PFEP to allow for more permits.

If the IATTC maintain the US bigeye allocation as at present, with a 500 mt limit for vessels > 24 m, and unlimited catch for vessels < 24 m then this may inequitable for the larger longline vessels. They may have to retreat into the WCPO when good fishing conditions prevail in the EPO, while smaller vessels may continue fishing. The same is true under any limit which is vessel size related, but may be less of a burden with a larger limit of 2,000 or 5,000 mt.

Ultimately, it may be simpler to operate under a fleet wide total allocation or no limit at all, since the Hawaii fleet bigeye catch cannot and will not increase indefinitely. Moreover, in most years it is likely that the Hawaii fleet may continue to catch most of its bigeye in the WCPO, notwithstanding the recent trend of the fishery to increase operations in the EPO. However, any such initiative will also need to consider the aspirations of IATTC coastal states like Peru which have aspirations to develop their tuna fisheries (IATTC 2013b)

**Table 2. Options for future allocations of bigeye tuna for US longliners in the EPO for consideration by the IATTC**

| Option | Pros | Cons |
|---|---|---|
| No Action (maintain 500 mt for longline vessels > 24 m) | Maintains same measure and existing administrative burden for NMFS | Creates disparity between vessels in the Hawaii longline fleet. Vessels > 24 m that must stop fishing, while smaller vessels can continue fishing when 500 mt limit is reached<br><br>Vessels > 24 m must return to fishing on WCPO stock which is still experiencing overfishing |
| Limit of 2000 mt for longline vessels > 24 m in length | Provides for expanding Hawaii longline effort in the EPO and allows for greater catch by longline vessels > 24 m<br><br>Allows Hawaii fleet to catch unused allocations to Asian fleets<br><br>Japan has indicated that it may be amenable to having other countries such as China fish its unused bigeye quota | Creates disparity between vessels in the Hawaii longline fleet. Vessels > 24 m that must stop fishing, while smaller vessels can continue fishing when 500 mt limit is reached<br><br>Vessels > 24 m must return to fishing on WCPO stock which is still experiencing overfishing<br><br>If Asian fleets return to former EPO levels of catch then BET stock status may return be subject to overfishing |
| Limit of 5,000 mt for vessels > 24 m | Provides for expanding Hawaii longline effort in the EPO and allows for greater catch by longline vessels > 24 m<br><br>Permits Hawaii fleet to catch unused allocations to Asian fleets<br><br>Japan has indicated that it may be amenable to having other countries such as China fish its unused bigeye quota | Creates disparity between vessels in the Hawaii longline fleet. Vessels > 24 m that must stop fishing, while smaller vessels can continue fishing when 500 mt limit is reached<br><br>Vessels > 24 m must return to fishing on WCPO stock which is still experiencing overfishing<br><br>If Asian fleets return to former EPO levels of catch then BET stock status may return be subject to overfishing. Hawaii fleet may have to be subject to limitations again |
| Limit of 5,000 mt for all vessels | Provides for expanding Hawaii longline effort in the EPO. Equitable to all vessels | If Asian fleets return to former EPO levels of catch then BET stock status may return be subject to overfishing. Hawaii fleet may have to be subject to |

| Option | Pros | Cons |
|---|---|---|
| | Permits Hawaii fleet to catch unused allocations to Asian fleets<br><br>Japan has indicated that it may be amenable to having other countries such as China fish its unused bigeye quota | limitations again |
| No limit for Hawaii longline fleet | Provides for expanding Hawaii longline effort in the EPO. Creates no disparity between different vessels size classes<br><br>Permits Hawaii fleet to catch unused allocations to Asian fleets<br><br>Japan has indicated that it may be amenable to having other countries such as China fish its unused bigeye quota<br><br>Reduces administrative burden for NMFS | If Asian fleets return to former EPO levels of catch then BET stock status may return be subject to overfishing. Hawaii fleet may have to be subject to limitations again |

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