

Re-specifying Annual Catch Limits for the Hawaii non-Deep 7 Bottomfish Management Unit Species

*160th Meeting of the Western Pacific Regional Fishery Management Council
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The Council's Task

At the 160th Meeting of the Western Pacific Regional Fishery Management Council (Council), Council members are tasked to re-specify the Annual Catch Limits (ACLs) for the Hawaii non-deep 7 bottomfish MUS. The initial specification completed in 2012, was only for one year. The catch time series was updated in 2012 with data up to 2011 and recalculated the potential ABC. The SSC set the ABC at 140,000 lbs based on the updated time series from the initial ABC of 135,000 lbs. The Council then set the ACL equals to ABC. This specification was good for 2 years (fishing year 2013 and 2014). ACL will need to be re-specified for the 2015 fishing year and may consider a multi-year specification similar to the coral reef management unit species. The SSC had reviewed the updated catch data (up to 2013) at its 116th meeting. The SSC considered setting the ABC using the Biomass-Augmented Catch-MSY approach (Sabater and Kleiber 2014). An MSY value of 265,000 lbs was generated for the non-deep 7 bottomfish stock complex. The P* analysis determined the appropriate risk of overfishing for the Hawaii non deep 7 bottomfish to be at 32% rounding down to 30% since the risk tables are in 5% increment. The ABC was set at the corresponding catch level associated with this risk is 187,100 lbs.

The three options that the Council will consider in specifying the ABC for fishing year 2015-2018 include:

Option 1 – No Action – Maintain the ABC at 140,000 lbs based on the 2012 specification

Option 2 – Set the ACL equal to the new ABC at 187,100 lbs

Option 3 – Set the ACL less than the new ABC from the SEEM analysis at 177,745 rounded up to 178,000

Current Catch Information

The catches of the Hawaii non-deep 7 bottomfish had been increasing in recent years primarily due to increased landing of uku (*Aprion virescens*). During the TAC management period, the non-deep 7 bottomfish serves as a substitute for the deep 7 when the fishery closed due to reaching of the TAC. The concurrent with the improvements in the deep 7 bottomfish management is the dissociation of the non-deep 7 bottomfish fishery and had evolved to be its own fishery. This fishery needs to be closely monitored. At the 157th Council Meeting, the Council reiterated its request to NMFS to conduct a stock assessment on uku. Preliminary studies using length-based data to estimate fishing and natural mortality showed that uku may be below the 30% spawning potential ratio (Nadon pers.comm.; manuscript in review). The ACL for 2013 was at 140,000 lbs and the 2013 landing is 158,169 lbs exceeding the ACL by 18,169 lbs. This catch level corresponds to 30-35% risk of overfishing using the MHI Deep 7 Bottomfish risk table by analogy.

Table 1. Reported commercial catch of MHI non-Deep 7 (2000-2013)

Fishing Year	Uku	Butaguchi	Black ulua	White ulua	Yellowtail kalekale	Total (lb)
2000	83,318	2,947	73	4,044	0	90,382
2001	58,436	1,814	122	4,199	5	64,576
2002	57,155	1,659	421	4,183	1	63,420
2003	45,704	1,635	1,180	12,873	0	61,391
2004	76,815	1,394	1,034	14,112	43	93,399
2005	63,505	1,493	453	11,213	25	76,688
2006	59,569	298	267	9,076	32	69,241
2007	68,953	880	773	26,722	0	97,328
2008	92,872	1,193	405	15,856	6	110,331
2009	87,175	1,083	549	13,794	35	102,636
2010	123,250	772	3,348	17,986	27	145,383
2011	109,497	1,385	1,554	18,904	51	131,391
2012	101,758	742	827	12,368		90,013
2013	138,822	1,028	1155	17,240		158,169

For the purpose of ACL specifications for Hawaii non-Deep 7 bottomfish, taape (*Lutjanus kasmira*) and kahala (*Seriola dumerili*) are not included as they were specifically excluded from the NMFS Hawaii bottomfish stock assessment parameters. Instead, ACLs for these species are being considered under the ACL specification for Coral Reef Ecosystem (CRE) MUS currently in development. Specifically, catches of taape would be included in the CRE ACL specification for the family Lutjanidae (coral reef-associated snappers) while catches of kahala would be included in the CRE ACL specification for the family Carangidae (coral reef-associated jacks).

SSC's ABC determination

MSY was estimated for the Hawaii non-deep 7 bottomfish using the catch-MSY approach originally developed by Martell and Froese (2012) where it implemented a Monte-Carlo simulation to generate a biomass project using a range value of rate of population increase, r , and carrying capacity, k , minus the catch at any step in the time series. This approach was augmented by adding biomass information as one of the priors (Sabater and Kleiber 2014a). The augmented approach is useful if there is a biomass estimate. In the absence of the biomass estimate, the model defaults to running the original routine as described by Martell and Froese (2014). An MSY value of 265,000 lbs was generated for the non-deep 7 bottomfish stock complex (Sabater and Kleiber 2014b).

There were previous recommendations to remove uku from the non-deep 7 complex because of recent changes in the fishery whereby uku is no longer a substitute fish when the MHI deep 7 bottomfish fishery closes. The uku fishery had evolved on its own and is now a regular targeted fishery. If a separate ACL were to be specified for uku, an FEP amendment is required to

establish uku as a different management unit. The working group members agreed to keep uku under the non-deep 7 but to also to treat uku as an indicator species to be monitored as a separate species and as a complex.

Using the biomass-augmented catch-MSY approach, the method-B MSY estimate for the non-deep 7 bottomfish is 265,000 lbs (Sabater and Kleiber 2014b). Applying the same stock status determination methodology in the P* analysis, the stock status dimension score is 2.5. The P-S dimension yields a score of 7.5 (see table below for details). Combining all the dimension scores yield a score of **18** and a corresponding P* value of **32**. The risk table is shown below.

Hawaii Coral Reef Ecosystem (Mullidae-Goatfish) (non-FSSI)

Species Name	Scientific Name	Prod.	Susc.	Sum	Ave	Justification
UKU	<i>Aprion virescens</i>	7.5	7.5	15	7.5	Long lived (26 years); slow growing; highly targeted; takes 5 years to reach maturity; average length 50 cm from an Lmax of 81 cm

Risk table for the non-deep 7 bottomfish

risk table – k-revise b									
5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
112.2	129.9	144.5	158.1	172.3	187.1	203.7	221.2	239.9	259.2

The corresponding catch level associated with this risk is **187,100 lbs.**

Summary of options

The table below shows the summary of options for the Council:

Management Unit Species	Most recent catch (2013) (lbs)	Option 1: Status quo/Roll over (lbs)	Option 2: ACL = ABC _{updated}	Option 3: ACL < ABC (by 5%)
MHI non-deep 7 bottomfish	158,169	140,000	187,100	178,000

Pros and Cons for the Council ACL Setting Options

Option 1: Maintain status quo and roll over the 2014 ACLs to fishing year 2015-1019

PROS	CONS
<ul style="list-style-type: none"> Environmental and socioeconomic analysis has already been done but may need to be updated with more current numbers Minimizes administrative burden on respecting numbers especially for changes that are insignificant 	<ul style="list-style-type: none"> The specification is still based on an ad-hoc approach combining three different methods Non-deep 7 bottomfish ACL has been exceeded in 2013 and would trigger accountability measures

<ul style="list-style-type: none"> Minimizes public confusion on the new ACLs 	<ul style="list-style-type: none"> High potential for ACLs could be exceeded if the uku fishery continues to develop
<ul style="list-style-type: none"> Remains precautionary due to the low numbers and promotes conservation at the same time 	
<ul style="list-style-type: none"> 	

Option 2: Set ACLs equal to the new ABCs based on the Biomass-Augmented Catch-MSY Approach

PROS	CONS
<ul style="list-style-type: none"> Complies with National Standard 2 in using the best scientific information available 	<ul style="list-style-type: none"> There is no buffer between ACLs and ABCs hence following the accountability measure recommended at the 159th CM (AM will be triggered if the average catch exceeded the ABC)
<ul style="list-style-type: none"> Incorporates other information than catch only data 	<ul style="list-style-type: none"> If there is a relationship between the non-deep 7 catch and the deep 7 catch based on the risk of overfishing analogy, this level of catch corresponds to 45-50% risk of overfishing
<ul style="list-style-type: none"> Increases the ACL from the previous specification with analysis specific for the stock 	
<ul style="list-style-type: none"> P* analysis was conducted based on information from the dominant species in the complex 	
<ul style="list-style-type: none"> Risk tables generated are from information specific to the stock and not by analogy 	
<ul style="list-style-type: none"> Would minimize triggering the accountability measures 	

Option 3: Set ACLs less than the new ABCs based on the biomass augmented catch-MSY approach by 5% from existing SEEM analysis

PROS	CONS
<ul style="list-style-type: none"> Complies with National Standard 2 in using the best scientific information available 	<ul style="list-style-type: none"> The ACL will be reduced by 5%
<ul style="list-style-type: none"> Applied the process specified in the FEP using the SEEM process 	<ul style="list-style-type: none"> The existing SEEM analysis was specific to coral reef fisheries and may not be applicable to the non-deep 7 bottomfish fishery
<ul style="list-style-type: none"> ACLs for Hawaii non deep 7 bottomfish will still be higher than status quo even 	

with the reduction by 5%	
<ul style="list-style-type: none"> • More precautionary and increases the buffer between ABC and ACL especially if there are indications that the uku is below the 30% SPR 	
<ul style="list-style-type: none"> • May not trigger accountability measure if ACL is exceeded as long as it is below the ABC as per recommendation at the 159th CM 	
<ul style="list-style-type: none"> • If there is a relationship between the non-deep 7 catch and the deep 7 catch based on the risk of overfishing analogy, this level of catch corresponds to 40-45% risk of overfishing 	