WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

PRELIMINARY DRAFT

Specifying 2016 and 2017 Acceptable Biological Catch for the Bottomfish Management Unit Species in American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands

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1 Introduction

Fisheries for bottomfish management unit species (BMUS) in federal waters of the exclusive economic zone (EEZ; generally 3-200 nmi) around the U.S. Pacific Islands are governed by one of four fishery ecosystem plans (FEP) developed by the Western Pacific Fishery Management Council (Council) and implemented by the National Marine Fisheries Service (NMFS) under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act or MSA). Three of the FEPs are archipelagic-based and include the American Samoa Archipelago FEP, the Hawaii Archipelago FEP, and the Mariana Archipelago FEP (which covers federal waters around Guam and the Commonwealth of the Northern Mariana Islands or the CNMI). The fourth FEP covers federal waters of the U.S. Pacific remote island areas (PRIA) which include Palmyra Atoll, Kingman Reef, Jarvis Island, Baker Island, Howland Island, Johnston Atoll, and Wake Island.

In accordance with the Magnuson-Stevens Act, the FEPs and their implementing regulations at 50 CFR 665.4, NMFS must specify, an annual catch limit (ACL) and implement accountability measures (AM) for BMUS, as recommended by the Council, and in consideration of the best available scientific, commercial, and other information about the fishery for that stock or stock complex. The ACL may not exceed the acceptable biological catch (ABC) recommended by the Council's Science and Statistical Committee (SSC).

1.1 New Information

In June 2015, NMFS Pacific Islands Fisheries Science Center (PIFSC) completed a new stock assessment update for bottomfish in American Samoa, Guam and the CNMI (Yau et al., in press). The 2015 stock assessment applies the same production modeling as the previous 2007 assessment (Moffitt et al., 2007) and 2012 assessment update (Brodziak et al 2012) and uses data through 2013. A Bayesian statistical framework is applied to estimate parameters of a production model fit to a time series of annual catch per unit effort (CPUE) statistics. This approach provides direct estimates of parameter uncertainty for status determination. The surplus production model includes both process error in biomass production dynamics and observation error in the CPUE. For these island areas, the PIFSC 2015 stock assessment updates also included stock projection results for a range of bottomfish catches that would produce probabilities of overfishing in fishing year 2016 and 2017 ranging from 0 percent to 50 percent at five percent intervals. This assessment update had been reviewed by the WPSAR Tier 3 panel last August 11-12, 2015. The panel found the assessment update adequate for management use (Franklin, Chaloupka, and Kobayashi 2015). The SSC held a special session (120^{th} meeting) on September 16, 2015 at the Council Office and via teleconference/WebEx to receive the WPSAR review comments. The SSC concurred with the panel recommendation and determined that the 2015 Territorial Bottomfish Stock Assessmet Updates (Yau et al. in press) is the best available scientific information available for the Council.

1.2 The SSC's Task

Setting the Acceptable Biological Catch

The task for the SSC is to specify a new ABC for bottomfish in American Samoa, Guam, and the CNMI. The ABC may not exceed the project overfishing limit (OFL). The Council's ACL process described in the FEPs includes methods by which the ABC may be reduced from the OFL based on scientific uncertainties by way of the Risk of Overfishing Analysis[1] (P* Analysis). Given the 2015 stock assessment updates cover the two year period 2016 and 2017, the SSC may choose to specify the ABCs that cover both fishing years. The choice of P* level will be applied to the second fishing year since the risk is higher on the second year than the first for the same catch level.

2 Summary of New Bottomfish Fishery Information

2.1 American Samoa Bottomfish MUS

2.1.1 Estimation of OFL

According to the PIFSC 2015 bottomfish stock assessment update (Yau et al., in press), the long-term MSY for American Samoa bottomfish is estimated to be 76,740 ± 14,060 lb, which is higher than the previous MSY estimate of 76,200 ± 14,300 lb reported in the 2012 assessment update by Brodziak et al. (2012). Stock projection results, which assume that a two-year bottomfish catch limit would be harvested in its entirety in 2016 and again in 2017, indicates that an ACL set at approximately 115,000 lb would result in a 30.2 percent probability of overfishing in 2016, rising in 2015 to a 50 percent probability of overfishing (Table 1). The maximum risk allowable under Federal law (74 FR 3178, January 9, 2011) is 50 percent. Therefore, while 76,740 lb is the long-term estimate of MSY, 115,000 lb is considered to be the OFL proxy for the two year period. As a reference, estimated average annual total catch during the period 2011-2013 was 21,005 lb with 23,630 lb landed in 2013, the most recent year for which complete data (i.e., total catch and commercial catch) are available (Table 2). This suggests that the current fishery is substantially below the overfishing limit and below the MSY by a factor of three.

Table 1. American Samoa probability of overfishing in 2016 and 2017

ACL (lb)	% Probability of Overfishing (2016)	% Probability of Overfishing (2017)
50,000	1.0	1
69,000	4.2	5
80,000	7.7	10
87,000	10.9	15
92,000	13.5	20
97,000	16.6	25
101,000	19.3	30
102,000	19.9	31

[1] P* Analysis is conducted to quantify scientific uncertainties in the data and model used in the assessment.

ACL (lb)	% Probability of Overfishing (2016)	% Probability of Overfishing (2017)
103,000	20.7	33
104,000	21.5	34
105,000	22.3	35
106,000	22.9	37
107,000	23.7	38
108,000	24.5	40
109,000	25.4	41
110,000	26.1	42
111,000	26.9	44
112,000	27.8	45
113,000	28.6	47
114,000	29.4	48
115,000	30.2	50

Source: Yau et al. (in press)

2.1.2 Stock Status

Under all the western Pacific FEPs, overfishing of bottomfish occurs when the fishing mortality rate (F) is greater than the fishing mortality rate that produces MSY (F_{MSY}) for one year or more. This threshold is termed the maximum fishing mortality threshold (MFMT) and is expressed as a ratio, $F/F_{MSY} = 1.0$. Thus, if the F/F_{MSY} ratio is greater than 1.0 for one year or more, overfishing is occurring. A stock is considered overfished when its biomass (B) has declined below the level necessary to produce MSY on a continuing basis (B_{MSY}). This threshold is termed the minimum stock size threshold (MSST) and is expressed as a ratio, $B/B_{MSY} = 0.7$. Thus, if the B/B_{MSY} ratio is less than 0.7, the stock complex is considered overfished. Whenever possible, status determination criteria (SDC) of MFMT and MSST are applied to individual species within the multi-species stock complex. When that is not possible, SDCs are applied to indicator species for the multi-species stock complex. With current data, neither approach is possible; therefore, for all island areas, SDCs are applied to the entire bottomfish multi-species complex as a whole.

In 2013, the most recent year for which stock status information is available, $F_{2013}/F_{MSY} = 0.17$ while $B_{2013}/B_{MSY} = 1.98$ (Table 6 in Yau et al., in press). The production model results indicate that the American Samoa bottomfish complex was not overfished and did not experience overfishing at any point between the periods 1986 and 2013 (Figure 1). Based on stock projections, an annual catch of 102,000 lb in 2016 and again in 2017 would be necessary to produce an F/F_{MSY} ratio of 1.0 (i.e., overfishing) for year 2.

Table 2. Annual estimated catch of BMUS in American Samoa 2000-2013

Year	Estimated Total Catch (lb)[1]	Estimated Commercial Catch (lb)[2]
2000	19,816	13,319
2001	37,847	21,439
2002	34,149	16,603
2003	19,199	4,645
2004	17,206	11,469

Year	Estimated Total Catch (lb)[1]	Estimated Commercial Catch (lb)[2]
2005	16,329	5,649
2006	7,913	5,252
2007	21,874	13,092
2008	34,812	24,585
2009	47,458	34,360
2010	9,509	8,667
2011	26,277	15,413
2012	13,110	3,389
2013	23,630	7,833
Ave. Catch 2011-2013	**21,005**	**8,878**

[1]Source: Table 3 in Yau et al., (in press)

[2] Source: NMFS WPacFIN website http://www.pifsc.noaa.gov/wpacfin (accessed 09/17/2015)

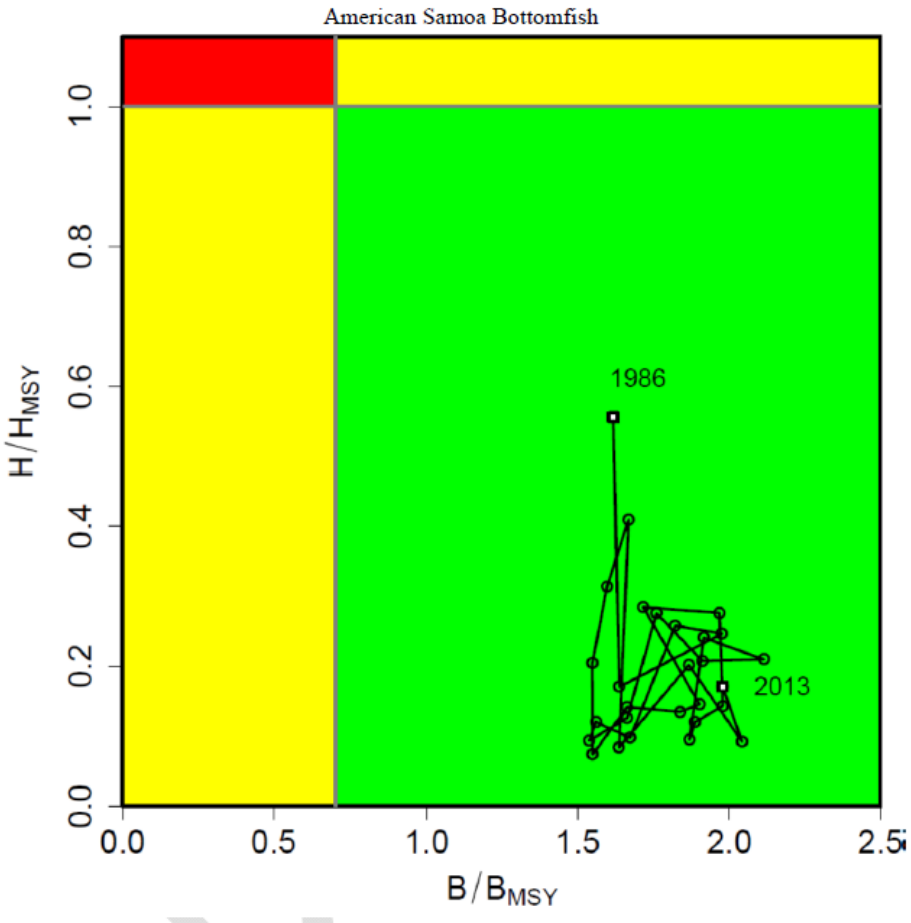

Figure 1. Kobe plot of relative biomass and relative exploitation rate from the best fitting production model for American Samoa, 1986-2013 (Source: Yau et al., in press, Figure 15)

2.2 Guam Bottomfish MUS

2.2.1 Estimation of OFL

According to the PIFSC 2015 bottomfish stock assessment (Yau et al., in press), the long-term MSY for Guam bottomfish is estimated to be 56,130 lb ± 7,790 lb, which is slightly higher than the previous MSY estimate of 55,000 lb ± 7,900 lb reported in the 2012 assessment update by Brodziak et al. (2012). Stock projection results, which assume that a two-year bottomfish catch limit would be harvested in its entirety in 2016 and again in 2017, indicates that an ACL set at approximately 71,000 lb would result in a 32.1 percent probability of overfishing in 2016, rising in 2017 to approximately a 49 percent probability of overfishing (Table 3) 1 percent below the maximum risk allowable under Federal law (74 FR 3178, January 9, 2011). Therefore, while 56,130 lb is the long-term estimate of MSY, 71,000 lb is considered to be the OFL proxy for the two year period. As a reference, estimated average annual total catch during the period 2011-2013 was 37,183 lb with 29,848 lb landed in 2013, the most recent year for which complete catch data (i.e., total and commercial catch) are available (Table 4). This suggests the fishery would need to harvest nearly 33 percent more based on the recent average catch to reach MSY. However, in order for overfishing to occur, the fishery has to harvest more than twice the recent average catch in 2016 and again in 2017.

Table 3. Guam probabilities of overfishing in 2016 and 2017

ACL (lb)	% Probability of Overfishing (2016)	% Probability of Overfishing (2017)
33,000	1.2	1
45,000	5.0	5
51,000	8.9	10
55,000	12.3	15
58,000	15.2	20
61,000	18.6	25
62,000	19.8	26
63,000	21.0	29
64,000	22.3	31
65,000	23.7	33
66,000	25.0	36
67,000	26.4	38
68,000	27.8	41
69,000	29.2	44
70,000	30.7	46
71,000	32.1	49

Source: Yau et al., (in press)

2.2.2 Stock Status

In 2013, the most recent year for which stock status information is available, $F_{2013}/F_{MSY} = 0.356$ while $B_{2013}/B_{MSY} = 1.63$ (Table 8 in Yau et al., in press). The production model results indicate that during the period 1982 through 2013, the Guam bottomfish complex has not been overfished and has not experienced overfishing, except perhaps in 2000 (Figure 2) Based on stock

projections, an annual catch of 71,000 lb in 2016 and again in 2017 would be necessary to produce an F/FMSY ratio of 1.0 (i.e., overfishing) for year 2.

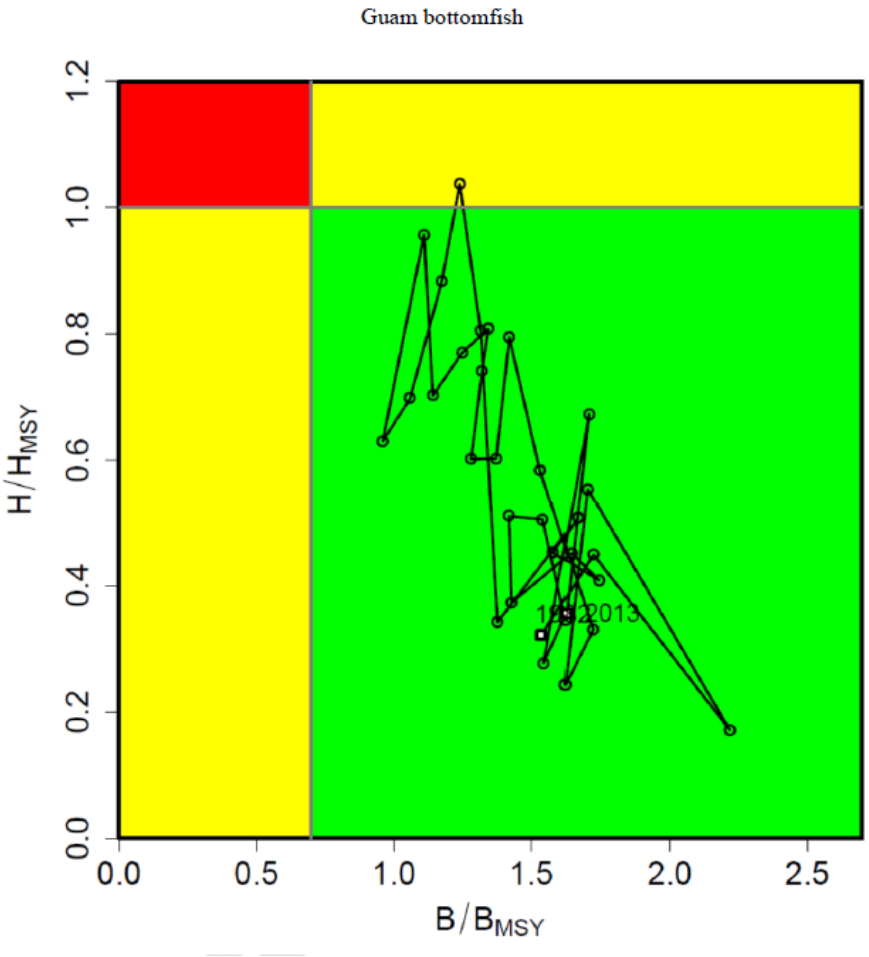

Figure 2. Kobe plot of relative biomass and relative exploitation rate from the best fitting production model for Guam, 1982-2013 (Source: Yau et al., in press, Figure 21)

Table 4. Annual estimated catch of BMUS in Guam (2000-2013)

Year	Estimated Total Catch (lb)[1]	Estimated Commercial Catch (lb)[2]
2000	66,000	20,371
2001	54,352	23,690
2002	24,044	17,561
2003	43,253	10,841
2004	36,915	24,947
2005	36,529	23,002
2006	38,054	17,100
2007	27,459	16,074
2008	37,316	11,484

Year	Estimated Total Catch (lb)[1]	Estimated Commercial Catch (lb)[2]
2009	40,222	15,867
2010	28,958	13,810
2011	59,618	15,985
2012	22,085	10,000
2013	29,848	4,891
Ave. Catch 2011-2013	**37,183**	**10,292**

[1]Source: Table 3 in Yau et al., (in press).
[2] Source: NMFS WPacFIN website http://www.pifsc.noaa.gov/wpacfin (accessed 09/17/2015)

2.3 CNMI Bottomfish MUS

2.3.1 Estimation of OFL

According to the PIFSC 2015 bottomfish stock assessment update (Yau et al., in press), the long-term MSY for CNMI bottomfish is estimated to be 173,100 ± 32,190 lb, which is higher than the previous MSY estimate of 172,900 ± 32,200 lb reported in the 2012 assessment by Brodziak et al. (2012). Stock projection results, which assume that a two-year bottomfish catch limit would be harvested in its entirety in 2016 and again in 2017, indicates that an ACL set at approximately 250,000 lb would result in a 31.2 percent probability of overfishing in 2016, rising in 2017 to approximately a 50 percent probability of overfishing (Table 5) the maximum risk allowable under Federal law (74 FR 3178, January 9, 2011). Therefore, while 173,100 lb is the long-term estimate of MSY, 250,000 lb is considered to be the OFL proxy for the two year period. As a reference, estimated average annual total catch during the period 2011-2013 was 20,009 lb with 29,848 lb landed in 2013, the most recent year for which complete catch data (i.e., total and commercial catch) are available (Table 6). This suggests the fishery would need to harvest nearly eight times the recent average catch of 20,009 lb more than MSY in 2013 and again in 2014 for overfishing to occur.

Table 5. CNMI probabilities of overfishing in 2016 and 2017

ACL (lb)	% Probability of Overfishing (2016)	% Probability of Overfishing (2017)
78,000	1.0	1
134,000	4.7	5
162,000	8.5	10
180,000	12.1	15
208,000	18.7	26
212,000	19.7	28
214,000	20.2	29
218,000	21.3	31
220,000	21.9	32
224,000	23.1	34
228,000	24.2	36
230,000	24.9	37
232,000	25.6	38
236,000	26.8	41

ACL (lb)	% Probability of Overfishing (2016)	% Probability of Overfishing (2017)
240,000	28.1	43
242,000	28.7	45
246,000	30.0	47
248,000	30.6	48
250,000	31.2	50

Source: Yau et al., (in press)

2.3.2 Stock Status

In 2013, the most recent year for which stock status information is available, $F_{2010}/F_{MSY} = 0.088$ while $B_{2010}/B_{MSY} = 1.85$ (Table 7 in Yau et al., in press). The production model results indicate that the CNMI bottomfish complex was not overfished and did not experience overfishing at any point between the periods 1986 and 2013 (Figure 3). Based on stock projections, an annual catch of 250,000 lb in 2016 and again in 2017 would be necessary to produce an F/F_{MSY} ratio of 1.0 (i.e., overfishing) on the second year.

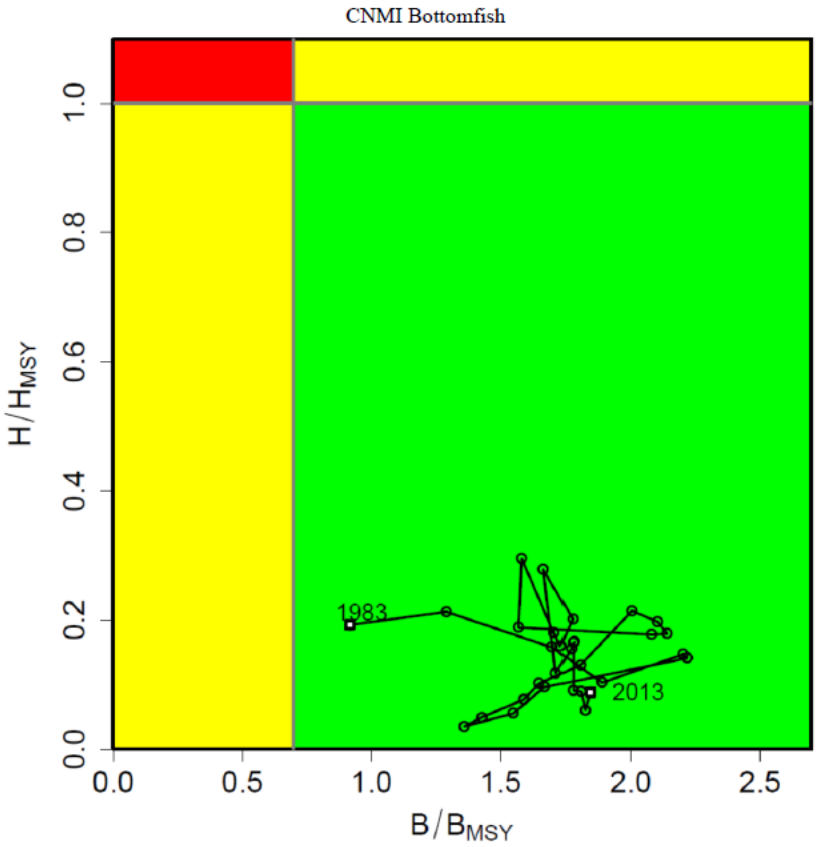

Figure 3. Kobe plot of relative biomass and relative exploitation rate from the best fitting production model for CNMI, 1983-2013 (Source: Yau et al., in press, Figure 18)

Table 6. Annual estimated catch of BMUS in CNMI (2000-2013)

Year	Estimated Total Catch (lb)[1]	Estimated Commercial Catch (lb)[2]
2000	45,258	14,968
2001	71,256	25,303
2002	46,765	18,816
2003	41,903	18,063
2004	54,475	12,973
2005	70,404	16,538
2006	29,340	12,262
2007	39,476	18,606
2008	42,070	18,389
2009	41,176	20,418
2010	22,395	14,729
2011	22,487	16,930
2012	15,302	11,746
2013	22,510	17,796
Ave. Catch 2011-2013	**20,099**	**15,491**

[1]Source: Table 3 in Yau et al., (in press).
[2] Source: NMFS WPacFIN website http://www.pifsc.noaa.gov/wpacfin (accessed 09/25/2015)

2.4 ABC Alternatives for Bottomfish MUS in 2016 and 2017

2.4.1 Alternative 1: No Action – Do not specify ABCs for fishing year 2016 and 2017

Under Alternative 1, the SSC would not specify an ABC for the bottomfish fishery in American Samoa, Guam, and CNMI for the 2016 and 2017. However, this alternative would not comply with the Magnuson-Stevens Act or the provisions of the American Samoa and Marianas FEP, which require NMFS to specify an ABC for all stocks and stock complexes.

2.4.2 Alternative 2: Status Quo – retain existing ABC based on the 2012 Stock Assessment Update

In a final rule published on March 13, 2013 (78 FR 15885), January 1, 2014 (79 FR 4276), and August 31, 2015 (80 FR 52415) NMFS specified the 2013, 2014, and 2015 ACLs for BMUS in American Samoa, Guam and the CNMI. Under this alternative, the ACL for 2016 and 2017 would be identical to the 2013-2015 specifications. The science used for this alternative will remain to be Brodziak et al 2012. The data, methods, and procedures considered by NMFS, the Council and its SSC in developing the ABC specifications are described in a 2013 environmental assessment (NMFS, 2012). The ABCs under the status quo alternative and their associated probabilities of overfishing in 2016 and 2017 are presented in Tables 7

For American Samoa bottomfish, the 2016 and 2017 ABC would be specified again at 101,000 lb and is associated with a probability of overfishing in 2016 of 19.3 percent, rising in 2017 to a probability of overfishing of 30 percent.

For Guam bottomfish, the 2016 and 2017 ABC would be specified again at 66,800 lb and is associated with probability of overfishing in 2016 between 25 and 26.4 percent, rising in 2017 to probability of overfishing between 36 and 38 percent.

For CNMI bottomfish, the 2016 and 2017 ABC would be specified again at 228,000 lb and is associated with a probability of overfishing in 2016 at 24.2 percent, rising in 2017 to a probability of overfishing of 36 percent.

These levels of catches are no longer considered based on best-available scientific information. In 2015 , the PIFSC completed a draft 2015 stock assessment update for the bottomfish management unit species in American Samoa, Guam, and CNMI using data through fishing year the 2013 (Yau et al. in press). The 2015 stock assessment update uses the previous 2012 stock assessment's methods for data analysis, modeling, and stock projections. With three year of additional data, the MSY reference points slightly increased (Table 5 from Yau et al. in press). The Tier 3 WPSAR panel reviewed the stock assessment update on August 11-12, 2015 and concluded that the 2015 updates are adequate for management decisions. The SSC, at its 120th meeting on September 16, 2015, recommended that the 2015 assessment updates are the best scientific information available for Council management decision.

Hence, Alternative 2 would not comply with National Standard 2 in using the best scientific information available for fishery management decision.

2.4.3 Alternative 3: Specify ABCs with a probability of overfishing less than 30%

Under Alternative 3, SSC would specify the 2016 and 2017 ABC at a level that is associated with less than 30 percent probability of overfishing according to most recent NMFS PIFSC stock assessments. The range of possible ABCs under Alternative 3 and their associated probabilities of overfishing in 2016 and 2017 are presented in Table 7.

For American Samoa bottomfish, the upper limit of the ABC would be 100,000 lb and is associated with a 18.6 percent probability of overfishing in 2016, rising to a 29 percent probability of overfishing in 2017.

For Guam bottomfish, the upper limit of the ABC would be 63,000 lb and is associated with a 21 percent probability of overfishing in 2016, rising to a 29 percent probability of overfishing in 2017.

For CNMI bottomfish, the upper limit of the ABC would be 214,000 lb and is associated with a 20.2 percent probability of overfishing in 2016, rising to a 29 percent probability of overfishing in 2017.

2.4.4 Alternative 4: Specify ABCs with a probability of overfishing between 30-39%

Under Alternative 4, SSC would specify the 2016 and 2017 ABC at a level that is associated with a probability of overfishing between 30 and 39 percent according to most recent NMFS PIFSC stock assessments. The range of possible ABCs under Alternative 4 and their associated probabilities of overfishing in 2016 and 2017 are presented in Table 7.

For American Samoa bottomfish, the 2016 and 2017 ABCs would be set between 101,000 lb and 107,000 lb. An ABC set at 101,000 lb is associated with a 19.3 percent probability of overfishing in 2016, rising to a 30 percent probability of overfishing in 2017. An ABC set at 107,000 lb is associated with a 23.7 percent probability of overfishing in 2016, rising to a 39 percent probability of overfishing in 2017.

For Guam bottomfish, the 2016 and 2017 ABC would be set between 64,000 lb and 66,000 lb. An ABC set at 64,000 lb is associated with a 22.3 percent probability of overfishing in 2016, rising to a 31 percent probability of overfishing in 2017. An ACL set at 66,000 lb is associated with a 26.4 percent probability of overfishing in 2016, rising to a 38 percent probability of overfishing in 2017.

For CNMI bottomfish, the 2016 and 2017 ABC would be set between 216,000 lb and 232,000 lb. An ACL set at 216,000 lb is associated with a 20.8 percent probability of overfishing in 2016, rising to a 30 percent probability of overfishing in 2017. An ACL set at 232,000 lb is associated with a 25.6 percent probability of overfishing in 2017, rising to a 38 percent probability of overfishing in 2017.

2.4.5 Alternative 5: Specify ABCs with a probability of overfishing between 40-45%

Under Alternative 5, SSC would specify the 2016 and 2017 ABC at a level that is associated with a probability of overfishing between 40 and 45 percent according to most recent NMFS PIFSC stock assessments. The range of possible ABCs under Alternative 4 and their associated probabilities of overfishing in 2016 and 2017 are presented in Table 7.

For American Samoa bottomfish, the 2016 and 2017 ABC would be set between 108,000 lb and 112,000 lb. An ABC set at 108,000 lb is associated with a 24.5 percent probability of overfishing in 2016, rising to a 40 percent probability of overfishing in 2017. An ABC set at 112,000 lb is associated with a 27.8 percent probability of overfishing in 2016, rising to a 45 percent probability of overfishing in 2017.

For Guam bottomfish, the 2016 and 2017 ABC would be set between 67,000 lb and 69,000 lb. An ABC set at 67,000 lb is associated with a 27.8 percent probability of overfishing in 2016, rising to a 41 percent probability of overfishing in 2017. An ABC set at 69,000 lb is associated with a 29.2 percent probability of overfishing in 2016, rising to a 44 percent probability of overfishing in 2017.

For CNMI bottomfish, the 2016 and 2017 ABC would be set between 234,000 lb and 242,000 lb.

An ABC set at 234,000 lb is associated with a 26.2 percent probability of overfishing in 2016, rising to a 41 percent probability of overfishing in 2017. An ABC set at 242,000 lb is associated with a 28.7 percent probability of overfishing in 2016, rising to a 45 percent probability of overfishing in 2017.

2.4.6 Alternative 6: Specify ABCs with a probability of overfishing between 46-50%

Under Alternative 6, SSC would specify the 2016 and 2017 ABC at a level that is associated with a probability of overfishing between 46 and 50 percent according to most recent NMFS PIFSC stock assessments. An ABC associated with a 50 percent probability of overfishing is the maximum level allowable under federal law. The range of possible ABCs under Alternative 6 and their associated probabilities of overfishing in 2016 and 2017 are presented in Table 7.

For American Samoa bottomfish, the 2016 and 2017 ABC would be set between 113,000 lb and 115,000 lb. An ABC set at 113,000 lb is associated with a 28.6 percent probability of overfishing in 2016, rising to a 47 percent probability of overfishing in 2017. An ABC set at 115,000 lb is associated with a 30.2 percent probability of overfishing in 2016, rising to a 50 percent probability of overfishing in 2017.

For Guam bottomfish, the 2016 and 2017 ABC would be set between 70,000 lb and 71,000 lb. An ABC set at 70,000 lb is associated with a 30.7 percent probability of overfishing in 2016, rising to a 46 percent probability of overfishing in 2017. An ABC set at 71,000 lb is associated with a 32.1 percent probability of overfishing in 2016, rising to a 49 percent probability of overfishing in 2017.

For CNMI bottomfish, the 2016 and 2017 ABC would be set between 244,000 lb and 250,000 lb. An ABC set at 244,000 lb is associated with a 29.3 percent probability of overfishing in 2016, rising to a 45 percent probability of overfishing in 2017. An ABC set at 250,000 lb is associated with a 31.2 percent probability of overfishing in 2016, rising to a 50 percent probability of overfishing in 2017.

3 Scientific Uncertainty Characterization – P-star Working Group Recommendation

At its 163rd meeting, the Council directed staff to convene a P* and SEEM Working Group meeting to re-evaluate the scientific and management uncertainties in order for the Council to specify the Annual Catch Limits at its 164th meeting in October 2015. The P* Working Group meeting was held at the Council Office and via teleconference/WebEx on September 23-24, 2015. The group re-evaluated the scientific uncertainties associated with the new information (Yau et al. in press) and the BMUS complex (see 2015 P* working group report for details). After scoring the various criteria for the four P* dimensions, the working group recommended a 13.1 point reduction for American Samoa, 14.2 for Guam, and 13.9 for CNMI. This resulted in a risk of overfishing recommendation of 37 percent for American Samoa, 36 percent for Guam, and 36 percent for CNMI. These percentages fall under alternative 4 of this options paper. **The SSC can either accept the recommended P* of the Working Group and specify the ABCs with the catches associated with those P* recommendations or choose other risk levels but provide justification for the selection.**

Table 7. ACL Alternatives and Probabilities of Overfishing Bottomfish Stock Complexes in American Samoa, Guam and the CNMI in 2016 and 2017

	American Samoa Bottomfish			**Guam Bottomfish**			**CNMI Bottomfish**		
MSY Estimate	***76,740 ± 14,060 lb***			***56,130 lb ± 7,790 lb***			***173,100 lb ± 32,190 lb***		
OFL Estimate	***115,000 lb***			***71,000 lb***			***250,000 lb***		
	ABC (lb)	*Probability of Overfishing in 2016 (%)*	*Probability of Overfishing in 2017 (%)*	***ACL (lb)***	*Probability of Overfishing in 2016 (%)*	*Probability of Overfishing in 2017 (%)*	***ACL (lb)***	*Probability of Overfishing in 2016 (%)*	*Probability of Overfishing in 2017 (%)*
Alternative 1 *(No Action)*	**N/A**	N/A	N/A	**N/A**	N/A	N/A	**N/A**	N/A	N/A
Alternative 2 *(Status Quo)*	**101,000**	19.3	30	**66,800**	26.4-27.8	38-41	**228,000**	24.2	36
Alternative 3 (<30%)	**50,000**	1.0	1	**33,000**	1.2	1	**78,000**	1	1
	69,000	4.2	5	**45,000**	5	5	**134,000**	4.7	5
	80,000	7.7	10	**51,000**	8.9	10	**162,000**	8.5	10
	87,000	10.9	15	**55,000**	12.3	15	**180,000**	12.1	15
	92,000	13.5	20	**58,000**	15.2	20	**194,000**	15.2	20
	97,000	16.6	25	**62,000**	18.6	25	**206,000**	18.1	25
	100,000	18.6	29	**63,000**	21	29	**214,000**	20.2	29
Alternative 4 (30-39%)	**101,000**	19.3	30			30	**216,000**	20.8	30
	102,000	19.9	31	**64,000**	22.3	31	**218,000**	21.3	31
			32			32	**220,000**	21.9	32
	103,000	20.7	33	**65,000**	23.7	33	**222,000**	22.5	33
	104,000	21.5	34			34	**224,000**	23.1	34
	105,000	22.3	35			35	**226,000**	23.6	35
			36	**66,000**	25	36	**228,000**	24.2	36
	106,000	22.9	37			37	**230,000**	24.9	37
	107,000	23.7	38	**67,000**	26.4	38	**232,000**	25.6	38
			39			39			39
Alternative 5 (40-45%)	**108,000**	24.5	40			40	**234,000**	26.2	40
	109,000	25.1	41	**68,000**	27.8	41	**236,000**	26.8	41
	110,000	26.1	42			42	**238,000**	27.4	42
			43			43	**240,000**	28.1	43
	111,000	26.9	44	**69,000**	29.2	44			44
	112,000	27.8	45			45	**242,000**	28.7	45
Alternative 6 (46-50%)			46	**70,000**	30.7	46	**244,000**	29.3	46
	113,000	28.6	47			47	**246,000**	30	47
	114,000	29.4	48			48	**248,000**	30.6	48
			49	**71,000**	32.1	49			49
	115,000	30.2	50			50	**250,000**	31.2	50

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