WESTERN
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COUNCIL

DRAFT CHAPTER 3
from the:
Omnibus Amendment for the Western Pacific Region to Establish a Process for Specifying Annual Catch Limits and Accountability Measures

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3.0 Description of the Alternatives

This section describes the alternatives considered to implement the three major components to the proposed action described in Section 2.1.

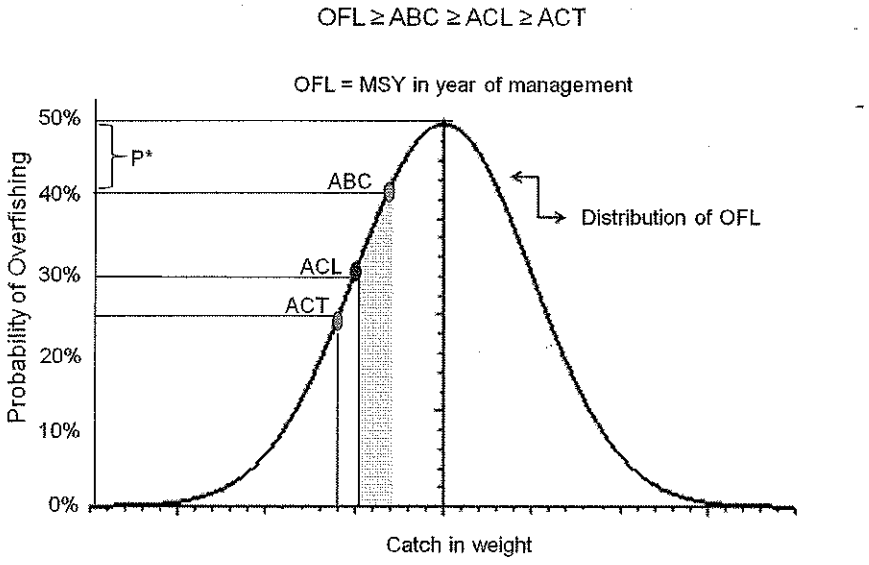
3.1 Action 1: Mechanism for Specifying ACLs, including ABCs and AMs

There are three required elements in the mechanism for specifying ACLs. The first requires the calculation of an ABC that is set at or below the OFL. The ABC is determined by the SSC using an ABC control rule developed by the Council. The ABC control rule accounts for scientific uncertainty in the estimate of the OFL and when possible, an acceptable level of risk (as determined by the Council) that catch equal to the ABC could actually exceed the OFL and result in overfishing. NS1 guidelines clarify that the acceptable risk of overfishing, or P*, cannot exceed 50% and should be a lower value. If P* is considered, the Council must inform the SSC of the acceptable P* value which the SSC must apply in the ABC control rule to calculate the ABC that is recommended to the Council.

The second element requires the Council to determine an ACL that may not exceed the SSC-recommended ABC. An ACL set below its ABC further reduces the probability that actual catch will exceed the OFL and result in overfishing. NS1 guidelines do not mandate any specific approach or method for determining an ACL.

The third and final element in the ACL mechanism is the inclusion of AMs. AMs must be included in the ACL mechanism to prevent ACLs from being exceeded, and to correct or mitigate overages of ACLs if they occur. NS1 guidelines provide that annual catch targets (ACT) may be used in the system of AMs so that an ACL is not exceeded. The relationship between ABC, ACL and ACT are shown in relation to the probabilities of exceeding the OFL in Figure 1.

Figure 1. Relationship of the expected values of the long-term average MSY, OFL, ABC, ACL and ACT.



The OFL in Figure 1 is normally distributed for illustration, whereas in reality the distribution could be skewed, flatter, or more peaked. The percentages and corresponding ABC, ACL, and ACT presented on the graph are provided as an example and do not represent the values for any particular stock. It must also be noted that the probability of overfishing is only accounted for at the ABC step. ACL and ACT (which account for management uncertainty) are included on this distribution curve only to illustrate how the use of an ACL and ACT further decreases the probability that actual catch will exceed the OFL.

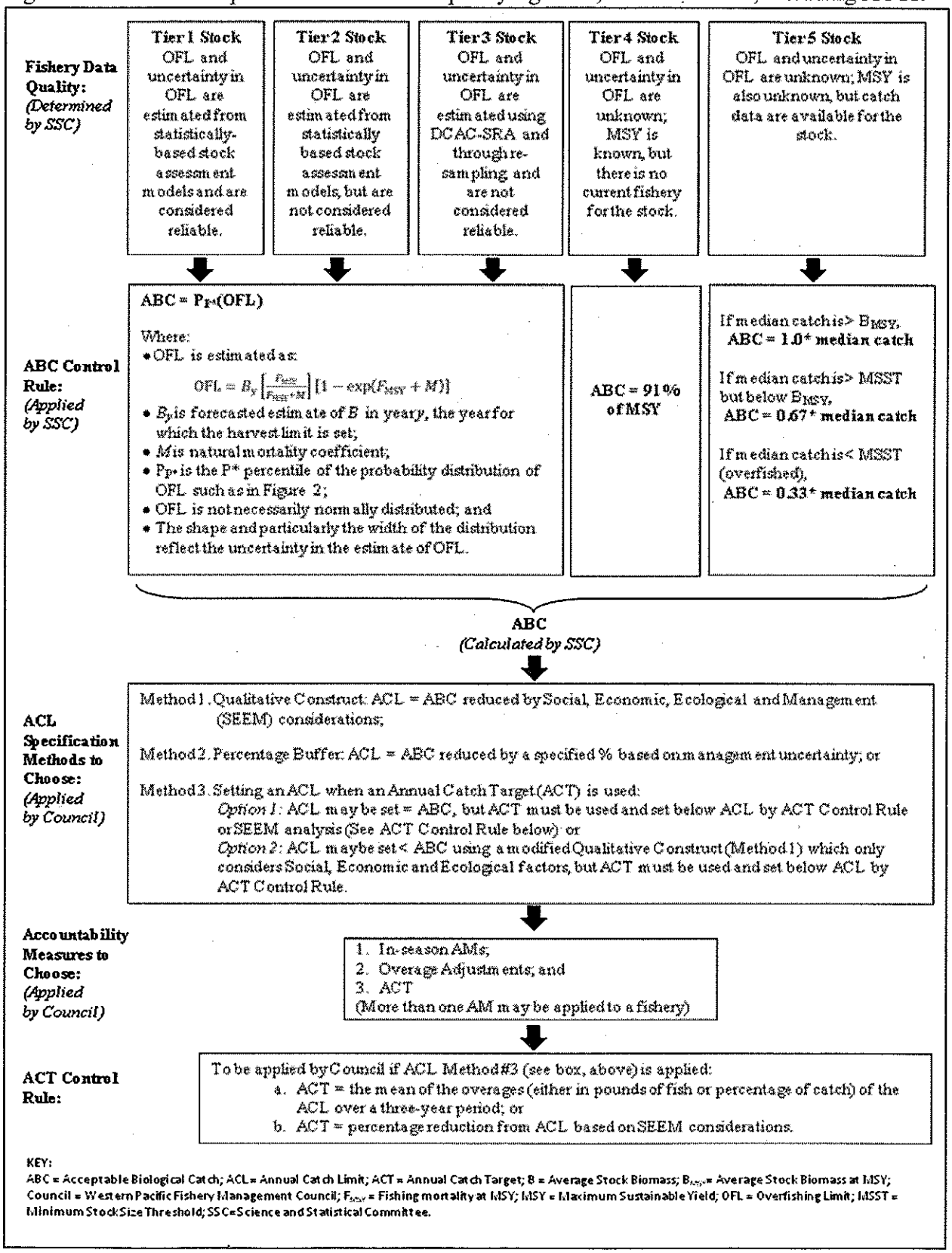
Alternative 1: No Action

Under this alternative, no western Pacific FEP would be amended and there would not be any mechanism developed for specifying ACLs, nor would methods be developed for calculating ABCs or setting ACLs and AMs for western Pacific fisheries.

Alternative 2: Establish a Mechanism for Specifying ACLs, including ABCs and AMs *(preferred)*

Under the preferred alternative, a mechanism for specifying ACLs would be established in the FEPs for American Samoa, Hawaii, the Mariana Archipelago, the Pacific Remote Island Areas, and western Pacific Pelagic fisheries. The ACL mechanism would include a tiered system of ABC control rules that the SSC will apply to calculate ABC. Included in this is a qualitative method the Council will employ to determine an appropriate P* value for each fishery. The ACL mechanism also includes methods for determining ACLs and AMs for stocks and stock complexes in the fishery. If approved by NMFS, ACLs and AMs developed by the Council will be specified by the agency prior to the start of each fishing year. Figure 2 illustrates the preferred method for specifying ACLs, including the procedures for calculating ABC and setting ACL and AMs that are all described in this section.

Figure 2. Schematic of preferred method for specifying ABC, ACL and AMs, including ACTs.



3.1.1 Calculation of the Acceptable Biological Catch

This section describes how the ABC will be calculated and set compared to the OFL using ABC control rules that account for the level of scientific knowledge about the stock or stock complex, scientific uncertainty in the estimate of OFL, and other scientific information. This section also discusses how the acceptable risk of overfishing (P*) is factored into the ABC control rule and how P* is determined.

3.1.1.1 Tiered System of ABC Control Rules

Under the preferred alternative, for stocks and stock complexes required to have an ABC, the Council will utilize a five-tiered system of ABC control rules that allows for different levels of scientific information to be considered when calculating ABC. The control rules are organized from data rich down to data poor, with Tier 1 being the highest (data rich) and Tier 5 being the lowest (data poor). Tiers 1-2 involve data rich to data moderate situations and include levels of uncertainty derived from model-based stock assessments. Tiers 3-5 involve data poor situations and include levels of uncertainty derived from ad-hoc procedures including simulation models or expert opinion.

When calculating an ABC for a stock or stock complex, the SSC must first evaluate the information available for the stock and assign the stock or stock complex into one of the five tiers. The SSC must then apply the control rule assigned to that tier to determine the ABC. The SSC may recommend an ABC that differs from the result of the control rule calculation based on factors such as data uncertainty, recruitment variability, declining trends in population variables, and other factors determined relevant by the SSC, but must explain their rationale. The tiered system of ABC control rules are described below.

Tier 1. Model-Based Probabilistic Approach to Estimating ABCs

In this tier, the data used are reliable and complete enough to be able to utilize statistical-based stock assessment models (e.g., Stock Synthesis 2 (or 3), Multifan-CL (MFCL), C++ Algorithmic Stock Assessment Laboratory (CASAL), and Bayesian production models). From these stock assessments, reliable estimates of MSY, F_{MSY}, B_{MSY}, and B_t are available. Of special relevance to being included in this tier, measures of the uncertainty of F_{MSY}, B_t and B_{t+k} and OFL_{t+k} must be available directly.

In plain English:

> ABC is the maximum value for which the probability "p" of exceeding OFL is less than P*.

Or, in conceptual mathematical terms:

$$ABC = \max (x \mid p(x > OFL) < P^*)$$

Or, as commonly estimated:

$$ABC = P_{P^*}(OFL)$$

Where:

- OFL is estimated as $OFL = B_y \left[\frac{F_{MSY}}{F_{MSY}+M}\right] [1 - \exp(F_{MSY} + M)]$;
- B_y is forecasted estimate of B in year y, the year for which the harvest limit is set;
- M is natural mortality coefficient;

- P_{P*} is the P* percentile of the probability distribution of OFL such as in Figure 2;
- OFL is not necessarily normally distributed; and
- the shape and particularly the width of the distribution reflect the uncertainty in the estimate of OFL.

The Council must advise the SSC on the acceptable P* (see section 3.1.1.2 for a discussion on determining P*) to use prior to calculating and recommending the ABC. If the SSC determines that the uncertainty of OFL is underestimated (due to underestimating the uncertainty of F_{MSY} and/or the forecasted estimated B_t), the SSC could appropriately rescale the width of the OFL distribution.

Tier 2. Quasi-Probabilistic Approach to Estimating ABCs

The key difference between assessments in Tier 1 and Tier 2 is that in Tier 2, measures of uncertainty of OFL are not as reliable or are not available from a single, integrated stock assessment model. Reliable data must still be available to be in included in this tier, but those used are obtained through some separate analysis or analyses. The methods often involve re-sampling or ad hoc methods. While the statistical-based model characteristic of Tier 1 can occur here, the common assessments are Yield-per-Recruit (Y/R) and Spawning-per-Recruit (SPR). Such assessments involve the use of F_{MSY} proxies, usually $F_{30\%}$ and $F_{60\%}$. The data in Tier 2 may not be as reliable or complete as in Tier 1, though still of sufficient quality to provide fully usable stock assessments.

$F_{30\%}$ = Fishing at the rate that reduces spawning biomass per recruit to 30% of the unfished value. Used as a substitute for F_{MSY} when using Y/R and SPR stock assessments. $F_{60\%}$, as well as others, has also commonly been used.

ABC is estimated using the equation in Tier 1 above, with the uncertainty estimates coming from re-sampling (i.e. method for estimating and re-estimating probability distributions such as bootstrapping). The Council must advise the SSC on the acceptable P* (see section 3.1.1.2 for a discussion on determining P*) to use prior to calculating and recommending the ABC.

Tier 3. Data-poor Probabilistic Approach to Setting ABCs

In this tier, the available data are not sufficient for the use of model-based assessment tools. Data are sufficient to apply the Depletion-Corrected Average Catch – Stock Reduction Analysis (DCAC-SRA) (McCall 2009) with information on the biology of the stock, or DCAC, in which there is some estimate of natural mortality (M), but other life history information is lacking. In these circumstances, the uncertainty of OFL (the probability distribution of OFL) can be estimated using the Monte Carlo simulation (i.e. a technique that uses algorithms that rely on repeated random sampling to compute results) . These tools are to be applied to long-lived species where the natural mortality coefficient M should be less than 0.20 and recruitment should not be highly episodic.

ABC is estimated using the equation in Tier 1 above, with the uncertainty estimates established by the Monte Carlo simulation. Again, the Council must advise the SSC on the acceptable P* (see section 3.1.1.2 for a discussion on determining P*) to use prior to calculating and recommending the ABC.

Tier 4. ABC Control Rule for Species without Current Harvest
This ABC control rule is for species or species assemblages with stock assessments and/or MSY estimates, but no current harvest, such as deepwater shrimp (*Heterocarpus*). The ABC is set at 0.70 F_{MSY} (= yield 91% OFL = 91% MSY = ABC; see Walters et al. 2005) as a precautionary measure to maximize yield while minimizing biomass impacts and accounting for scientific uncertainty. An alternative target fishing mortality value may be specified if additional data or modeling is available to support it, or the Council chooses to be more precautionary.

Walters et al. (2005) provided an example through the modeling tool, ECOSIM, in which k = 0.7 represents a precautionary factor in setting the target fishing mortality (F_{MSY}), which is predicted to have little impact on yield. When k = 0.7, the ECOSIM simulations implied a sustainable yield of around 0.9 MSY. "k" is a factor that a fishery modeler can vary to represent varying levels of precaution for F_{MSY} within the ECOSIM model. Similarly, NMFS Technical Guidance on implementing NS1 by Restrepo et al. (1998) recommended a default fishing mortality target of 25% below MFMT, or 0.75 F_{MSY}, which results in an equilibrium yield of 94% MSY or higher. This Tier 4 control rule adopted by the WPFMC is more precautionary than the control rule recommended by Restrepo et al. (1998) and in line with the results of Walters et al. (2005). As Tier 4 involves a fishery with no current harvest, this ABC control rule does not include consideration of P*; however if harvest occurs, the fishery may be moved into higher tier where P* would be need to be considered.

Tier 5. Data-poor Ad-hoc Approach to Setting ABCs
In this tier, catches may be small and/or the catch history may contain gaps or be too variable. Catch history may also be lacking in consistently stable periods or periods with consistent trends for using DCAC-SRA or DCAC. Hence, there is no basis for estimating a reliable MSY or OFL.

For these data poor fisheries, a multiplier of the long-term median catch history will be used. The multiplier will be determined by the biological knowledge of the stock or stock complex, in light of the guidance provided by Restrepo et al. *(Section 2.2.2: Data Poor Situations)*. The guidance recommends that the default control rule be implemented by multiplying the average catch from a time period where there is no quantitative or qualitative evidence of declining abundance ("Recent Catch") by a factor based on a qualitative estimate of relative stock size. The following guidelines were provided:

Above B_{MSY}	Limit catch = 1.00*Recent Catch
Above MSST but below B_{MSY}	Limit catch = 0.67*Recent Catch
Below MSST (i.e. overfished)	Limit catch = 0.33*Recent Catch

However, Restrepo et al. (1998) advises that because it will probably not be possible to analytically determine stock status relative to B_{MSY} for data poor stocks, an approach based on informed judgment will be necessary. The authors further state (*Section 3.3.1: Data Poor Defaults*) that "in cases of severe data limitations, qualitative approaches may be necessary, including expert opinion and consensus-building methods." As Tier 5 involves data poor situations, this ABC control rule does not include consideration of P*.

3.1.1.2 Determining the Acceptable Probability of Overfishing used in the ABC Control Rule

The ABC control rule for Tier 1-3 fisheries requires the Council to advise the SSC on the acceptable probability of overfishing (P*) in order for the SSC to calculate and recommend the ABC. As discussed above, P* refers to the acceptable probability or risk that actual catch equal to the ABC would exceed the OFL and thus, result in overfishing. NS1 guidelines require that the probability that overfishing will occur cannot exceed 50% and should be a lower value. Consequently, the Council adopted a maximum P* value of 50%; however, under the preferred alternative, where adequate scientific information is available on the stock or stock complex, the Council will utilize a qualitative method for determining an appropriate P* that is lower than the maximum of 50%. This qualitative approach is described below.

Qualitative Analysis for Determining P*

The Council developed a process by which the risk of overfishing can be reduced from the 50% maximum P*. This approach, based on the approach developed by the South Atlantic FMC, is a qualitative method of determining P* that considers the amount of information available on the stock or stock complex, including scientific uncertainty, for the following dimensions: 1) assessment information, 2) assessment uncertainty, 3) stock status, and 4) productivity and susceptibility. Information on the four dimensions will be complied and analyzed by a team that may include Council and SSC members, Council staff, and other individuals knowledgeable in the fishery, including stock assessment experts. Team members will use their knowledge and expertise to assign a single score for each dimension based on the criteria below. The maximum value for each dimension is 12.5 and the sum of the four dimensions has a maximum value of 50. The scores for each dimension will be added together for a final score, then be reduced from the maximum risk of overfishing (P^*_{MAX}) of 50. The team's analysis will be vetted through the Council process with the Council ultimately deciding the final P* value. The Council-approved P* would then be utilized in the calculation of the recommended ABC. An example of the qualitative analysis is provided below, but the exact criteria and scoring values used may change as deemed appropriate by the team for each assessed stock.

1) Assessment Information

Criteria	Score	
Quantitative assessment provides estimates of exploitation and B; includes MSY-derived benchmarks	0.0	
Reliable measures of exploitation or B, no MSY benchmarks, proxy reference points	2.5	X
Relative measures of exploitation or B, absolute measures of stock unavailable, proxy reference points	5.0	
Reliable catch history	7.5	
Scarce or unreliable catch records	12.5	

2) Assessment Uncertainty

Criteria	Score	
Complete. Key determinant – uncertainty in both assessment inputs and environmental conditions included	0.0	
High. Key determinant – reflects more than just uncertainty in future recruitment	2.5	
Medium. Uncertainties are addressed using statistical techniques and sensitivities, but full uncertainty is not carried forward in projections	5.0	X
Low. Distributions of F_{MSY} and MSY are lacking	7.5	
None. Only single point estimates; no sensitivities or uncertainty evaluations	12.5	

3) Stock Status

Criteria	Score	
Neither overfished nor overfishing. Stock is at high B and low exploitation relative to benchmark values	0.0	
Neither overfished nor overfishing. Stock may be in close proximity to benchmark values	2.5	X
Stock is either overfished or overfishing is occurring	5.0	
Stock is overfished and overfishing is occuring	7.5	
Either status criterion is unknown	12.5	

4) Productivity and Susceptibility

Criteria	Score	
Low risk. High productivity, low vulnerability, low susceptibility	0.0	
Medium risk. Moderate productivity, vulnerability, and susceptibility	5.0	X
High risk. Low productivity, high vulnerability, high susceptibility	12.5	

SCORE SUMMARY

Dimensions	Score
Assessment information	2.5
Assessment uncertainty	5.0
Stock status	2.5
PSA	5.0
Total Score	**15.0**
Risk of overfishing: **(P*=50 minus Total Score, where 50 equals P^*_{MAX})**	**35**

In the example above, the resulting P* of 35 could then be used in the ABC control rule equations available for stocks in any of the tiers 1 through 3, presented in section 3.1.1.1. Benefits of this alternative include the following: 1) it brings together multiple experts to

determine the risk of overfishing based on their diverse knowledge; 2) it can be applied in both data rich and data poor situations, i.e. whether formal stock assessments can be conducted or not; and 3) it need not be repeated annually unless information suggests that circumstances have changed significantly.

Other Options Considered but Rejected for Determining P*

Two other methods for determining P* were discussed but ultimately rejected by the SSC and Council, including a graphical approach that plots B/B_{MSY} ratios against the probability of overfishing, and a tabular approach using catch from which the Council could see the resulting ABCs and the associated levels of risk. These two approaches were not agreed upon because they are more appropriate for tier 1 situations and possibly tier 2, but data quality may call into question the results in the 3rd tier.

3.1.2 Setting the Annual Catch Limit

NS1 guidelines require the Council to determine an ACL that may not exceed the SSC-recommended ABC; however, NS1 does not provide guidance on how to set an ACL below the SSC-recommended ABC. This section describes the methods the Council will use to set ACLs starting in 2011.

Under the preferred alternative, ACL will be set by the Council after considering the ABC provided by the SSC, as well as social and economic factors, pertinent ecological considerations, and management uncertainty. Management uncertainty stems from insufficient information about true catch (e.g. late reporting, underreporting and misreporting of landings), lack of management precision, and/or the ability to close a fishery before a catch limit is exceeded. NS1 guidelines suggest management uncertainty be accounted for during the establishment of AMs for a fishery, including ACTs; however, nothing precludes the Council from accounting for management uncertainty at the ACL step.

Method 1: Qualitative Construct for Setting an ACL

The ACL qualitative construct uses an approach similar to the P* qualitative construct outlined in Section 3.1.1.2. While the P* qualitative construct considers the amount of biological information (scientific uncertainty) available on the stock or stock complex, the ACL qualitative construct considers the amount of socio-economic information (management uncertainty) on the fishery that targets the stock or stock complex. Specifically, the dimensions that will be used for the ACL qualitative construct would include the following factors: 1) Social; 2) Economic; 3) Ecological; and 4) Management uncertainty (SEEM). Aspects of the SEEM dimensions could include the importance of the fishery both socially and economically; consideration of the ecological importance of the stock or stock complex targeted by the fishery (e.g., is the stock a key indicator species of ecological health of the ocean), and whether managers can effectively constrain catch to planned levels.

Information on the SEEM dimensions will be compiled and analyzed by a team that may include Council and SSC members, Council staff, and other individuals knowledgeable in the fishery. This team will also be responsible for developing the criteria and scoring values regarding the quality and completeness of the information for each dimension. Like the P* qualitative construct, the scores for each dimension will be added together so that the total score is

subtracted from a default value of 100% ABC (i.e., 100). Because SEEM analyses will be unique for each fishery, there are no specifics given at this time for the criteria or scoring values within the dimensions.

Method 2: Percentage Buffer for Setting an ACL

Under this method, the ACL would be set as a percentage of the ABC (e.g., ACL = 10% to 100% of the ABC) with the actual percentage dependent upon the amount of management uncertainty that exists in the fishery. For example, if management uncertainty is low, the ACL would be set close to 100% of the ABC. Alternatively, if management uncertainty is high, ACL would be set as a lower percentage. Factors that the Council will consider when selecting the percentage include late reporting, underreporting, and misreporting of landings in the fishery, as these factors contribute to the possibility that the true catch may actually exceed the ABC and ultimately the OFL of a fishery, thus resulting in overfishing. The justification for using this method over method 1 would need to be clearly identified by the Council when setting the ACL, as it is not a quantitative decision. However, it is useful to note that the ACL is a management decision for the Council to make, not necessarily a numerically-derived limit.

Method 3: Setting an ACL when an ACT will be Utilized

An ACT is an amount of annual catch of a stock or stock complex that is the management target of the fishery, and accounts for management uncertainty in controlling the actual catch at or below the ACL. When an ACT is used, it should be set lower than the ACL with a large enough buffer between the two reference points such that risk of exceeding the ACL is low. NS1 guidelines recommend ACTs in the system of accountability measures so that ACL is not exceeded. See Section 3.1.3 for a description of setting the ACT.

If the Council decides to use an ACT as a means to ensure an ACL is not exceeded, there are two options the Council may use in setting an ACL. Under the first option, the Council could simply set the ACL equal to the ABC. If this option is taken, management uncertainty will be accounted for at the ACT level using the ACT control rule described in Section 3.1.3. Under this option, in addition to management uncertainty, the Council could also consider social, economic and ecological factors to set the ACT and thus could apply the entire SEEM analysis described under Method 1 to set the ACT below the ACL. While NS1 guidelines do not require social, economic or ecological factors to be considered in setting the ACT, nothing precludes the Council from doing so, although the resulting ACT would be more precautionary than NS1 intends.

Under the second option, the Council would set the ACL less than the ABC using a modified Method 1 (Qualitative construct for setting ACLs) described above whereby the analysis for setting the ACL will only consider sociological, economic, and/or ecological factors. Under this option, management uncertainty will be accounted for at the ACT level using the ACT control rule (3-year running average) described in Section 3.1.3.

As a performance measure for all ACL managed fisheries, if landings exceed the ACL for any stock or stock complex more than once in a four year period, the Council will re-evaluate the system of ACLs and AMs for the fishery and modify the system as necessary to improve its performance and effectiveness.

3.1.3 Suite of Accountability Measures

In addition to ACLs, the MSA also requires NMFS and the Councils to implement AMs (MSA §303(a)(15)). NS1 guidelines (74 FR 3178; January 16, 2009) explain that AMs are management controls to prevent ACLs from being exceeded and to correct or mitigate overages of the ACLs if they occur. The guidelines recommend FMPs describe AMs and how those measures are triggered. NS1 guidelines also suggest that management uncertainty be accounted for in establishing the AMs for a fishery, including uncertainty in the ability of managers to constrain catch and uncertainty in quantifying the true catch amounts. Since the purpose of ACLs and other harvest controls is to prevent overfishing, AMs are triggered at the ACL level to ensure the ABC and OFL are not exceeded and overfishing does not occur.

Under the preferred alternative, in fisheries for which in-season monitoring of catch is possible (i.e. fisheries with federal logbook reporting and State of Hawaii commercial fisheries, including MHI bottomfish), tracking of catch landings towards the ACL would be initiated at the start of each fishing year. When the ACL is projected to be reached, the commercial and non-commercial fishery sectors will be closed in federal waters for the remainder of the fishing year. For fisheries that rely on non-federal creel survey programs conducted by local marine resource management agencies, in-season tracking of catch landings may not be fully possible because availability of catch data is dependent upon local agencies workload and priorities. For these fisheries, the Council may employ overage adjustments as an accountability measure. If the Council determines at the end of a fishing year that total catch has exceeded the specified ACL for any fishery, the Council may reduce the ACL for the subsequent fishing year by the percentage or absolute value of the overage. However, one crucial aspect of this is that overages are typically factored into the subsequent year's stock assessment, as are any underages. For this reason, the Council will need to decide whether to include an overage adjustment if the overage has already been considered in a stock assessment, although stock assessments are typically not performed annually. However, as a performance measure for all ACL managed fisheries, if landings exceed the ACL for any stock or stock complex more than once in a four year period, the Council will re-evaluate the system of ACLs and AMs for the fishery and may modify the system as necessary to improve its performance and effectiveness.

As explained in Section 3.1.2 in Method 3, ACTs may also be utilized as an accountability measure to ensure a fishery does not exceed its ACL. Under the preferred alternative, the Council has recommended two approaches for setting an ACT for western Pacific fisheries.

The first approach utilizes an ACT control rule based on a 3-year running average of overages of a specified catch limit (e.g. TAC, quota, ACL, or ACT). The percentage or absolute value of the overage of a catch limit over a three year period will be reduced from the ACL in the following year. With this approach, if an ACL is not exceeded, a zero (0) percentage or absolute value will be attributed for that year. For example, assuming a static ACL of 100,000 pounds has been set annually for three consecutive years, and total catch exceeded the ACL in year 1 by 2,000 pounds (or 2%), year 2 by 6000 pounds (6%), and in the third year was 3000 pounds short (or 97,000 pounds), the ACT reduction would be calculated as a percentage as follows (2% + 6% + 0%)÷3 = 2.67%. In this example, ACT will be reduced by 2.67% (or 2,667 pounds) from the next 100,000 ACL, resulting in an ACT of 97,330 pounds in that following year.

Alternatively, absolute values instead of a percentage could also be utilized. For example, using the same 100,000 pound ACL, the ACT would be calculated as follows: (2000 pounds + 6000 pounds + 0 pounds) ÷ 3 = 2,667 pounds, which results in that amount being reduced from the 100,000 pound ACL in the following year, or an ACT of 97,330 pounds. It is important to note, however, that assuming a static ACL for a number of years sequentially is unrealistic. More likely the ACL will vary annually due to fishery dynamics; therefore, using the percentage approach would likely be employed in these situations because this method allows the value of any overages to be standardized.

The second approach for setting an ACT is based on a percentage reduction from ACL using the SEEM analysis. This approach could be used regardless of whether an ACL is set equal to or less than the ABC. Under this approach, instead of applying the 3-year running average approach, the Council could apply the full SEEM analysis described under Method 1 to set the ACT below the ACL when the ACL equals the ABC. If ACL is set lower than the ABC because the social, ecological, and economic factors have already been taken into account, then the ACT can be set by using the 3-year running average approach described above or based on factors related to management uncertainty (i.e. the M part of the SEEM analysis).

3.1.4 Administrative Process for Setting the ABCs and ACLs

This section describes the administrative timelines and procedures for calculating ABCs, and specifying ACLs and AMs. For each stock or stock complex that requires an ACL, the Council and SSC shall compile relevant scientific information from the Pacific Islands Fishery Science Center and other scientific bodies, including but not limited to, Pelagic Fisheries Research Program, University of Hawaii, Western and Central Pacific Fisheries Commission (WCPFC), and the Inter-American Tropical Tuna Convention (IATTC) and local marine resource management agencies. The SSC will then evaluate the information and determine whether such data are the best available scientific information. Based on this information and with guidance from its SSC concerning which tier the stock qualifies for (described in section 3.1.1.1), the Council will form a team to conduct the qualitative analysis for determining P* (if the stock is in tiers 1-3) as described in Section 3.1.1.2. The resulting P* will be vetted through the Council's advisory bodies and if adopted by the Council, will be provided to the SSC. Upon receipt of the Council's recommended P* values, the SSC will apply the associated control rule from the appropriate tier to determine the ABC.

The SSC may also utilize any other information deemed useful to establish the ABC and may recommend an ABC that differs from the results of the control rule calculation based on factors such as data uncertainty, recruitment variability, declining trends in population variables, and other factors determined relevant by the SSC. However, the SSC must explain its rationale. The SSC shall recommend the ABC to the Council prior to the start of the fishing year with sufficient time for the Council to determine the ACL and AM(s).

Upon receipt of the SSC's recommended ABC, the Council will determine an ACL for the fishery that is equal to or less than the SSC's recommended ABC based on one of the methods described in Section 3.1.2 and whether an annual catch target (ACT) is also utilized. The specification of an ACL and AM(s) must be implemented by NMFS prior to the start of the fishing year. An ACL may remain valid for no longer than 4 years unless the ACL has been

exceeded more than once in that four year period, the Council chooses to revisit the ACL to improve performance and effectiveness of the fishery, or a stock assessment or best scientific information determines that the ACL is not sufficient to prevent overfishing.

3.2 Action 2: Ecosystem Component Classification

The MSA requires each Council to prepare and submit a fishery management plan for each fishery that requires conservation and management. A Council determines which specific target stocks and/or non-target stocks to include "in the fishery" and must establish reference points, harvest controls, ACLs and AMs for all stocks included "in the fishery." In many cases, for data collection purposes and to integrate ecosystem considerations in the management operations, Councils have included stocks that are not generally targeted or retained in their FMPs. In the western Pacific, the management unit species (MUS) identified in each FEP include both target and non-target stocks, including species of fish that are incidentally caught but not generally retained. The Council chose to include these species in its FEPs for data collection purposes and to integrate ecosystem considerations in the management regime of the FEPs. For example, the Council recommended and NMFS approved the inclusion of all western Pacific coral reef ecosystem resources under the MSA as a proactive measure so that data could be collected on these resources should coral reef fisheries expand from local waters into the U.S. EEZ. While fishery management reference points have not been established for the vast majority of these species, their inclusion under National Standard 3 allows information to be collected so that reference points such as MSY may be developed should fisheries expand into the EEZ. As a default, NS1 treats all stocks included in a fishery management plan as "in the fishery" unless they are identified as Ecosystem Component (EC) species. Since EC species are not considered to be in the fishery, they do not require specification of reference points, ACLs, or AMs. Councils must show rationale for classifying stocks as an Ecosystem Component based on criteria specified in NS1 [50 CFR §600.310(d)(5)].

Alternative 1: No action

Under this alternative, all stocks or stock complexes in the FEPs (Appendix 1) would remain in the fishery and all will have ACLs and AMs specified (except those that qualify for statutory exceptions from the requirements as described in Section 3.3).

Alternative 2: Utilize the Ecosystem Component Classification ***(preferred)***

Under the preferred alternative, the Council would utilize the ecosystem component classification system, and in subsequent actions, would classify certain stocks listed in each FEP as EC species based on the criteria outlined in NS1 (§600.310(d)(5)). NS1 states that an EC species should be: 1) a non-target species; 2) a stock that is not determined to be subject to overfishing, approaching overfished, or overfished; 3) not likely to become subject to overfishing or overfished; and 4) generally not retained for sale or personal use. NS1 (§600.310(d)(5)(ii)) also clarifies that occasional retention of the species would not, in and of itself, preclude consideration of the species under the EC classification, and allows for species to be included in the EC classification for data collection purposes, for ecosystem considerations related to specification of OY for the associated fishery, and/or to address other ecosystem issues. EC species should be monitored such that if new pertinent scientific information becomes available to determine changes in their status or their vulnerability to the fishery and if necessary, they

may be reclassified "as in the fishery." Even if categorized as an ecosystem component, the stock/stock complexes will still be managed under the purview of the MSA.

While the Council intends to utilize the EC classification, specific criteria that are consistent with NS1 Guidelines would be developed when specific species are considered (in subsequent actions). Until the time when a stock/stock complex is categorized as an ecosystem component, it would remain in the fishery and subject to ACL/AM requirements (unless receiving a statutory exception (see Section 3.3)).

Various methods have been discussed thus far for categorizing species as ecosystem components. These include, but are not limited to, a state/federal split, percent of total catch, number of years occurring in catch, and combinations thereof. Particularly for coral reef species utilizing the EC classification will be essential.

3.3 Action 3: Utilize Statutory Exceptions

Unless identified by the Council as an EC species, NS1 guidelines require the mechanism for specifying ACLs and AMs described in Section 3.1 to be applied to all stocks and stock complexes listed in each FEP. However, the MSA provides two exceptions to these requirements. First, ACL and AM requirements shall not apply to a fishery for a species that has a life cycle of approximately one year unless the Secretary has determined the fishery for that species is subject to overfishing. Second, the requirements do not apply to stocks or stock complexes subject to management under an international agreement to which the United States is a party. NS1 guidelines requires the Council to describe the stocks or stock complexes listed in their fishery management plans that have statutory exceptions from ACLs.

Alternative 1: No action

Under this alternative, the Council would not identify any stocks or stock complexes that have statutory exceptions to ACLs and the mechanism for specifying ACLs would be applied to all stocks and stock complexes listed in each FEP in fishing year 2011.

Alternative 2: Utilize Statutory Exceptions ***(preferred)***

Under this alternative, the Council would identify those western Pacific MUS that have a life cycle of approximately one year or are subject to management under an international agreement to which the United States is a party. Although these stocks have statutory exceptions from ACLs, the MSA does not preclude the Council from determining ACLs or other catch limits to the stock, if such actions are deemed appropriate and consistent with MSA and other statutory mandates.

Stocks with an Annual Life Cycle

Upon examination of available life history information for western Pacific MUS, the Council has determined that only three FEP managed species have a life cycle of approximately one year. They are the diamondback squid (*Thysanoteuthis rhombus*), neon flying squid (*Ommastrephes bartrami*), and the purpleback flying squid (*Sthenoteuthis oualaniensis*). All three species are managed under the Pacific Pelagic FEP and their life history information is described in Amendment 15 to the Pelagic FMP (in Yatsu et al. 1997; Nigmatullin et al. 1995; and Nesis

1993) and incorporated into the Pacific Pelagic FEP. None of these pelagic squid species have been determined by the Secretary of Commerce to be subject to overfishing or overfished.

Stocks Subject to International Fishery Agreements

In the western Pacific, two international fishery agreements have been ratified by Congress and are applicable to pelagic species listed in the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific. The international fishery agreements are:

(1) The Convention on the Conservation and Management of Highly Migratory Species in the Western and Central Pacific (WPCFC); and

(2) The Inter-American Tropical Tuna Convention (IATTC).

Article 2 of the WCPFC Convention states **"The objective of this Convention is to ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stocks in the western and central Pacific ..."** Article 1 defines highly migratory fish stocks as **"all fish stocks of the species listed in Annex 1 of the 1982 Convention [United Nations Convention on Law of the Sea] occurring in the [WCPFC] Convention Area, and such other species of fish as the Commission may determine, except sauries"** (See Appendix 3 for a copy of Annex 1 of the United Nations Convention on Law of the Sea). Similarly, Article 1 of the IATTC Antigua Convention, which entered into force on August 27, 2010, defines fish stocks covered by this Convention as **"stocks of tunas and tuna-like species and other species of fish taken by vessels fishing for tunas and tuna- like species in the Convention Area."**

In evaluating the application of the criteria "subject to management under an international agreement," the Council considered the following factors:

- Whether the international agreement applies to the species and/or to vessels managed under the Pacific Pelagic FEP that fish for and retain tuna and tuna-like species;
- Whether there are relevant international conservation and management measures in place for the species;
- Whether there is an existing international stock assessment for the species; and
- Whether there is intent by the members of international agreement to undertake a stock assessment for the species.

Based on these factors, the Council has determined that all finfish listed under the Pacific Pelagic FEP meet the criteria for a statutory exemption from ACLs and AMs. Although the MSA does not preclude the Council from applying the ACL mechanism on just the U.S. portion of the catch of these stocks, the Council believes that doing so would unfairly penalize U.S. fishermen while having no beneficial impact to the conservation of these stocks throughout their range because the "relative impact" of vessels managed under the Pacific Pelagic FEP to the mortality of the stock is minimal when compared to contribution of international fishing fleets. This can be easily demonstrated by evaluating the relative impact of the U.S longline fleet on its primary target species, bigeye tuna. According to the WCPFC (CCM 2008-01), during the period between 2001 and 2004, the total average reported catch of bigeye tuna in the WCPFC Convention Area by all fishing nations was 97,294 mt. Of this amount, the U.S. contribution was just 4,181, or 4%, of the total mortality of the stock.

Table 1Table 1 lists all species managed under the western Pacific Pelagic FEP and provides the rationale for applying the criteria for a statutory exception to ACLs for these species. As explained in Table 1, the vast majority of pelagic species fall under the management purview of the WCPFC except for opah, wahoo, and oilfish. However, these species would meet the criteria of stocks managed under the IATTC as these species are "taken by vessels fishing for tunas and tuna-like species in the Convention area of the IATTC." Figure 3 shows the catch from 2004 to 2007 of opah, wahoo, and oilfish. These three species are taken by the Hawaii longline fisheries, which target bigeye tuna and swordfish.

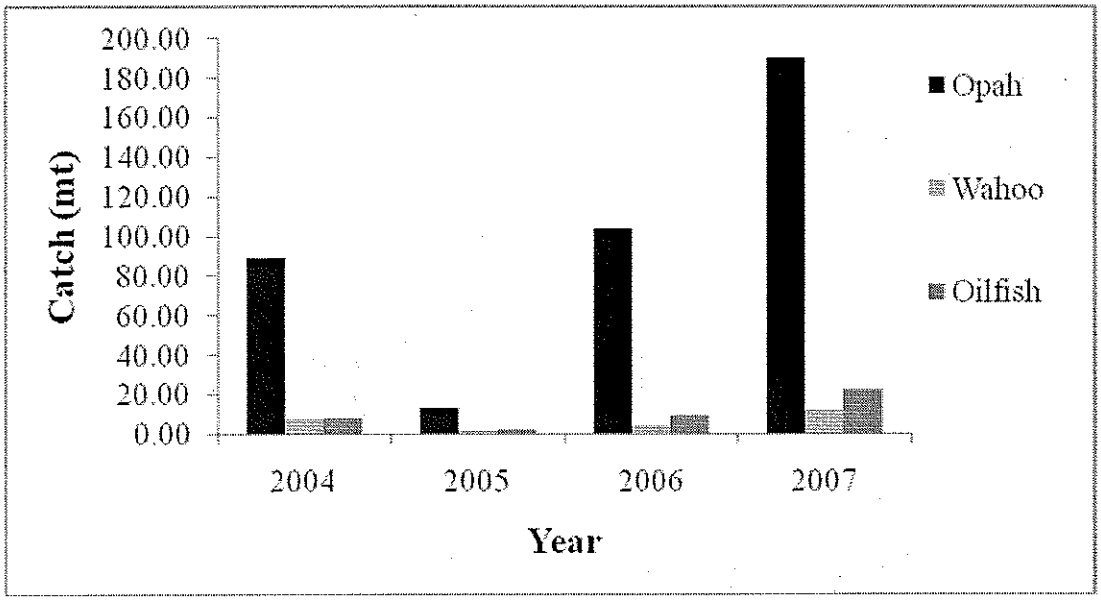


Figure 3. Hawaii longline catch of opah (moonfish), wahoo, and oilfish from the Eastern Pacific Ocean, 2004-2007. Source: NMFS PIFSC.

The Pacific Fishery Management Council (PFMC) took final action in June 2010 to apply the international exception to all MUS in its Highly Migratory Species Fisheries Management Plan (HMS FMP) after reclassifying selected MUS as EC species (Decisions of the PFMC, June 12-17, 2010). Applying the international exception to all western Pacific Pelagic MUS would be consistent with the PFMC's approach.

Currently no other western Pacific MUS (bottomfish, crustaceans, coral reef ecosystem species, precious corals) meet the statutory criteria for exceptions from ACLs and AMs. However, the United States is a Participating State in the negotiations to establish an international agreement for the management of high seas bottomfish fisheries in the northwestern Pacific Ocean. If any international agreement, convention, or treaty is established and ratified by the United States, other western Pacific MUS may meet the criteria for a statutory exemption from ACLs and AMs.

Table 1. Western Pacific pelagic MUS with statutory exceptions from ACL requirements

Scientific Name	Common Name	Rational for Applying Statutory Exception			
		Applicability of WCPFC or IATTC	*Conservation and Management Measure*	*Stock Assessment*	*Annual Life Cycle*
TUNAS					
Thunnus alalunga	albacore	Subject to WCPFC (Annex 1 listed)	WCPFC (CCM-2005-03 limited fishing effort for north Pacific albacore at 2005 levels	S. Pacific completed in 2009; N. Pacific completed in 2006; new assessment planned for 2011	Not Applicable
Thunnus obesus	bigeye tuna	Subject to WCPFC (Annex 1 listed)	WCPFC (CCM-2008-01) established an annual catch limit for bigeye tuna for 2009-2011.	WCPO completed in 2010 and EPO completed in 2009	Not Applicable
Thunnus albacares	yellowfin tuna	Subject to WCPFC (Annex 1 listed)	WCPFC (CCM-2008-01) requires no increase in fishing mortality for this species.	Completed in 2009 (WCPO)	Not Applicable
Thunnus thynnus [Note: species has been renamed by scientific community as *Thunnus orientalis*]	northern bluefin tuna	Subject to WCPFC (Annex 1 listed)	WCPFC (CCM-2009-07) limits fishing effort to the 2002-2004 levels for 2010 north of 20 degrees, including reduction of effort on juveniles.	Completed in 2009; new assessment planned for 2012	Not Applicable
Katsuwonus pelamis	skipjack tuna	Subject to WCPFC (Annex 1 listed)	None	WCPO and EPO completed in 2010	Not Applicable
Euthynnus affinis	kawakawa	Subject to WCPFC (Annex 1 listed)	None	None	Not Applicable

Scientific Name	Common Name	Rational for Applying Statutory Exception			
		Applicability of WCPFC or IATTC	***Conservation and Management Measure***	***Stock Assessment***	***Annual Life Cycle***
Auxis spp. *Scomber* spp. *Allothunus* spp.	other tuna relatives (bullet or frigate tuna, mackerels and slender tuna, respectively)	Subject to WCPFC (Annex 1 listed)	None	None	Not Applicable
BILLFISHES					
Tetrapturus audax [Note: species has been renamed by scientific community as *Kajikia audax*]	striped marlin	Subject to WCPFC (Annex 1 listed)	None	Completed in 2006; new assessment planned for 2011.	Not Applicable
Tetrapturus angustirostris	shortbill spearfish	Subject to WCPFC (Annex 1 listed)	None	None	Not Applicable
Xiphias gladius	swordfish	Subject to WCPFC (Annex 1 listed)	WCPFC (CCM-2009-03) established limit on the number of allowable swordfish vessels and establishing maximum total catch limit for the species south of 20 deg. S. lat.	Completed in 2010.	Not Applicable
Istiophorus platypterus	sailfish	Subject to WCPFC (Annex 1 listed)	None	None	Not Applicable

Scientific Name	Common Name	Rational for Applying Statutory Exception			
		Applicability of WCPFC or IATTC	*Conservation and Management Measure*	*Stock Assessment*	*Annual Life Cycle*
Makaira mazara [Note: species has been renamed by scientific community as *Makaira nigricans*]	blue marlin	Subject to WCPFC (Annex 1 listed)	None	Completed in 2002, new assessment planned for 2012	Not Applicable
M. indica [Note: species has been renamed by scientific community as *Istompax indica*]	black marlin	Subject to WCPFC (Annex 1 listed)	None	Taiwan to conduct assessment.	Not Applicable
SHARKS					
Alopias pelagicus	pelagic thresher shark	All species of the family *Alopiidae* are subject to WCPFC (Annex 1 listed)	WCPFC (CCM 2009-04) requires implementation of FAO International Plan of Action for the Conservation and Management of Sharks.	None	Not Applicable
Alopias superciliousus	bigeye thresher shark	All species of the family *Alopiidae* are subject to WCPFC (Annex 1 listed)	WCPFC (CCM 2009-04) requires implementation of FAO International Plan of Action for the Conservation and Management of Sharks.	None	Not Applicable

Scientific Name	Common Name	Rational for Applying Statutory Exception			
		Applicability of WCPFC or IATTC	***Conservation and Management Measure***	***Stock Assessment***	***Annual Life Cycle***
Alopias vulpinus	common thresher shark	All species of the family *Alopiidae* are subject to WCPFC (Annex 1 listed)	WCPFC (CCM 2009-04) requires implementation of FAO International Plan of Action for the Conservation and Management of Sharks.	None	Not Applicable
Carcharhinus falciformis	silky shark	All species of the family *Carcharhinidae* are subject to WCPFC (Annex 1 listed)	WCPFC (CCM 2009-04) requires implementation of FAO International Plan of Action for the Conservation and Management of Sharks.	None	Not Applicable
Carcharhinus longimanus	oceanic whitetip shark	All species of the family *Carcharhinidae* are subject to WCPFC (Annex 1 listed)	WCPFC (CCM 2009-04) requires implementation of FAO International Plan of Action for the Conservation and Management of Sharks.	None	Not Applicable
Prionace glauca	blue shark	Member of the *Carcharhinidae* family. All species of the family *Carcharhinidae* are subject to WCPFC (Annex 1 listed)	WCPFC (CCM 2009-04) requires implementation of FAO International Plan of Action for the Conservation and Management of Sharks.	Completed in 2009	Not Applicable

Scientific Name	Common Name	Rational for Applying Statutory Exception			
		Applicability of WCPFC or IATTC	*Conservation and Management Measure*	*Stock Assessment*	*Annual Life Cycle*
Isurus oxyrinchus	shortfin mako shark	All species of the family *Isurida* (aka *Lamnidae*) are subject to WCPFC (Annex 1 listed).	WCPFC (CCM 2009-04) requires implementation of FAO International Plan of Action for the Conservation and Management of Sharks.	None	Not Applicable
Isurus paucus	longfin mako shark	All species of the family *Isurida* (aka *Lamnidae*) are subject to WCPFC (Annex 1 listed).	WCPFC (CCM 2009-04) requires implementation of FAO International Plan of Action for the Conservation and Management of Sharks.	None	Not Applicable
Lamna ditropis	salmon shark	All species of the family *Isurida* (aka *Lamnidae*) are subject to WCPFC (Annex 1 listed).	WCPFC (CCM 2009-04) requires implementation of FAO International Plan of Action for the Conservation and Management of Sharks.	None	Not Applicable
OTHER PELAGIC FISHES					
Coryphaena spp.	mahimahi (dolphinfish)	Subject to WCPFC (Annex 1 listed)	None	None	Not Applicable
Lampris spp.	moonfish	This species is commonly taken by Hawaii longline tuna fishing vessels and thus is subject to IATTC.	None	None	Not Applicable

Scientific Name	Common Name	Rational for Applying Statutory Exception			
		Applicability of WCPFC or IATTC	***Conservation and Management Measure***	***Stock Assessment***	***Annual Life Cycle***
Acanthocybium solandri	wahoo	This species is commonly taken by Hawaii longline tuna fishing vessels and thus is subject to IATTC.	None	None	Not Applicable
Gempylidae	oilfish	Species in this family are commonly taken by Hawaii longline tuna fishing vessels and thus are subject to IATTC.	None	None	Not Applicable
Bramidae	pomfret	Subject to WCPFC (Annex 1 listed).	None	None	Not Applicable
SQUID					
Thysanoteuthis rhombus	diamondback squid	Not Applicable	None	None	One year life cycle. Source: Yatsu et. al (1997) in Amendment 15 to the Pelagic FMP
Ommastrephes bartrami	neon flying squid	Not Applicable	None	None	One year life cycle. Source: Nigmatullin et. al (1995) in Amendment 15 to the Pelagic FMP
Sthenoteuthis oualaniensis	purpleback flying squid	Not Applicable	None	None	One year life cycle. Source: Nesis (1993) in Amendment 15 to the Pelagic FMP