

EXCERPTS FROM PACIFIC COAST SALMON FISHERY MANAGEMENT PLAN  
UPDATED THROUGH AMENDMENT 18

The entire Salmon FMP may be viewed at: <http://www.pcouncil.org/salmon/fishery-management-plan/current-management-plan/>

### 3.1 STATUS DETERMINATION CRITERIA

*“Any fishery management plan . . . shall . . . specify objective and measurable criteria for identifying when the fishery . . . is overfished . . . and, . . . contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery;”*

*Magnuson-Stevens Act, ' §303(a)(10)*

*“Overfishing (to overfish) occurs whenever a stock or stock complex is subjected to a level of fishing mortality or annual total catch that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis”*

*NSIGs (600.310 (e)(2)(i)(B))*

*“Overfished. A stock or stock complex is considered “overfished” when its biomass has declined below a level that jeopardizes the capacity of the stock or stock complex to produce MSY on a continuing basis.”*

*NSIGs (600.310 (e)(2)(i)(E))*

*“Approaching an overfished condition. A stock or stock complex is approaching an overfished condition when it is projected that there is more than a 50 percent chance that the biomass of the stock or stock complex will decline below the MSST within two years.”*

*NSIGs (600.310(e)(2)(i)(G))*

In establishing criteria by which to determine the status of salmon stocks, the Council must consider the uncertainty and theoretical aspects of MSY as well as the complexity and variability unique to naturally producing salmon populations. These unique aspects include the interaction of a short-lived species with frequent, sometimes protracted, and often major variations in both the freshwater and marine environments. These variations may act in unison or in opposition to affect salmon productivity in both positive and negative ways. In addition, variations in natural populations may sometimes be difficult to measure due to masking by hatchery produced salmon.

#### 3.1.1 General Application to Salmon Fisheries

In establishing criteria from which to judge the conservation status of salmon stocks, the unique life history of salmon must be considered. Chinook, coho, and pink salmon are short-lived species (generally two to six years) that reproduce only once shortly before dying. Spawning escapements of coho and pink salmon are dominated by a single year-class and Chinook spawning escapements may be dominated by no more than one or two year-classes. The abundance of year-classes can fluctuate dramatically with combinations of natural and human-caused environmental variation. Therefore, it is not unusual for a healthy and relatively abundant salmon stock to produce occasional spawning escapements which, even with little or no fishing impacts, may be significantly below the long-term average associated with the production of MSY.

Numerous West Coast salmon stocks have suffered, and continue to suffer, from nonfishing activities that severely reduce natural survival by such actions as the elimination or degradation of freshwater spawning and rearing habitat. The consequence of this man-caused, habitat-based variation is twofold. First, these habitat changes increase large scale variations in stock productivity and associated stock abundances, which

in turn complicate the overall determination of MSY and the specific assessment of whether a stock is producing at or below that level. Second, as the productivity of the freshwater habitat is diminished, the benefit of further reductions in fishing mortality to improve stock abundance decreases. Clearly, the failure of several stocks managed under this FMP to produce at an historical or consistent MSY level has little to do with current fishing impacts and often cannot be rectified with the cessation of all fishing.

To address the requirements of the MSA, the Council has established criteria based on biological reference points associated with MSY exploitation rate and MSY spawning escapement. The criteria are based on the unique life history of salmon and the large variations in annual stock abundance due to numerous environmental variables. They also take into account the uncertainty and imprecision surrounding the estimates of MSY, fishery impacts, and spawner escapements. In recognition of the unique salmon life history, the criteria differ somewhat from the general guidance in the NS1 Guidelines (§600.310).

### **3.1.2 Overfishing**

A stock will be considered subject to overfishing when the postseason estimate of  $F_t$  exceeds the MFMT, where the MFMT is generally defined as less than or equal to  $F_{MSY}$ . Stock-specific estimates of  $F_{MSY}$  based on spawner-recruit data will be used if available. Otherwise, a species-specific proxy value of  $F_{MSY} = 0.78$  for Chinook based on species-specific meta-analyses, will be used (PFMC and NMFS 2011). Stock-specific overfishing determinations will be made annually and are based on exploitation during a single biological year.

#### **3.1.2.1 Council Action**

Because salmon are exploited in multiple fisheries, it is necessary to determine fishery specific contribution to the total exploitation rate to determine the actions necessary to end and prevent future overfishing. As the Council has no jurisdiction over river fisheries and ocean fisheries north of the U.S./Canada border, it also may be necessary for other responsible entities to take action to end ongoing and prevent future overfishing.

The STT will report postseason exploitation rates in the annual SAFE document, and when overfishing occurs, the Council shall:

- 1) notify the NMFS NWR administrator of the STT's findings;
- 2) direct the STT to assess the mortality rates in fisheries impacting the stock of concern and report their findings;
- 3) immediately take action to ensure Council area fisheries are not contributing to overfishing, and;
- 4) notify pertinent management agencies of the stock's status and the contribution of various fisheries to the total exploitation rate.

### **3.1.3 Approaching an Overfished Condition**

An approaching overfished determination will be made if the geometric mean of the two most recent postseason estimates of spawning escapement, and the current pre-season forecast of spawning escapement, is below the MSST. Stock-specific approaching overfished determinations will be made annually following development of the pre-season spawning escapement forecasts.

#### **3.1.3.1 Council Action**

When a stock is approaching an overfished condition the Council shall:

- 1) notify the NMFS NWR administrator of this situation;
- 2) notify pertinent management entities, and;
- 3) structure Council area fisheries to avoid the stock becoming overfished and to mitigate the effects on stock status.

### 3.1.4 Overfished

*“For a fishery that is overfished, any fishery management plan, amendment, or proposed regulations... for such fishery shall (A) specify a time period for ending overfishing and rebuilding the fishery that shall:(i) be as short as possible, taking into account the status and biology of any overfished stocks of fish, the needs of the fishing communities, recommendations by international organizations in which the United States participates, and the interaction of the overfished stock within the marine ecosystem; and (ii) not exceed 10 years, except in cases where the biology of the stock of fish, other environmental conditions, or management measures under an international agreement in which the United States participates dictate otherwise....”*

*Magnuson-Stevens Act, §304(e)(4)*

A stock will be considered overfished if the 3-year geometric mean of annual spawning escapements falls below the MSST, where MSST is generally defined as  $0.5 * S_{MSY}$  or  $0.75 * S_{MSY}$ , although there are some exceptions (Table 3-1). Overfished determinations will be made annually using the three most recently available postseason estimates of spawning escapement.

#### 3.1.4.1 Council Action

When the overfished status determination criteria set forth in this FMP have been triggered, the Council shall:

- 1) notify the NMFS NWR administrator of this situation;
- 2) notify pertinent management entities;
- 3) structure Council area fisheries to reduce the likelihood of the stock remaining overfished and to mitigate the effects on stock status;
- 4) direct the STT to propose a rebuilding plan for Council consideration within one year.

Upon formal notification from NMFS to the Council of the overfished status of a stock, a rebuilding plan must be developed and implemented within two years.

The STT’s proposed rebuilding plan shall include:

- 1) an evaluation of the roles of fishing, marine and freshwater survival in the overfished determination;
- 2) any modifications to the criteria set forth in section 3.1.6 below for determining when the stock has rebuilt,
- 3) recommendations for actions the Council could take to rebuild the stock to  $S_{MSY}$ , including modification of control rules if appropriate, and;
- 4) a specified rebuilding period.

In addition, the STT may consider and make recommendations to the Council or other management entities for reevaluating the current estimate of  $S_{MSY}$ , modifying methods used to forecast stock abundance or fishing impacts, improving sampling and monitoring programs, or changing hatchery practices.

Based on the results of the STT’s recommended rebuilding plan, the Council will adopt a rebuilding plan for recommendation to the Secretary. Adoption of a rebuilding plan will require implementation either through an FMP amendment or notice and comment rule-making process. Subject to Secretarial approval, the Council will implement the rebuilding plan with appropriate actions to ensure the stock is rebuilt in as short a time as possible based on the biology of the stock but not to exceed ten years, while taking into consideration the needs of the commercial, recreational and tribal fishing interests and coastal communities. The existing control rules provide a default rebuilding plan that targets spawning escapement at or above  $MSY$ , provided sufficient recruits are available, and targets a rebuilding period of one generation (two years for pink salmon, three years for coho, and five years for Chinook). If sufficient recruits are not available to achieve spawning escapement at or above  $MSY$  in a particular year, the control rules provide for the potential use of *de minimis* exploitation rates that allow continued participation of fishing communities while minimizing risk of overfishing. However, the Council should consider the specific circumstances

surrounding an overfished determination and ensure that the adopted rebuilding plan addresses all relevant issues.

Even if fishing is not the primary factor in the depression of the stock, the Council must act to limit the exploitation rate of fisheries within its jurisdiction so as not to limit rebuilding of the stock or fisheries. In cases where no action within Council authority can be identified which has a reasonable expectation of contributing to the rebuilding of the stock in question, the Council will identify the actions required by other entities to recover the depressed stock. Due to a lack of data for some stocks, environmental variation, economic and social impacts, and habitat losses or problems beyond the control or management authority of the Council, it is possible that rebuilding of depressed stocks in some cases could take much longer than ten years. The Council may change analytical or procedural methodologies to improve the accuracy of estimates for abundance, harvest impacts, and MSY escapement levels, and/or reduce ocean harvest impacts when it may be effective in stock recovery. For those causes beyond Council control or expertise, the Council may make recommendations to those entities which have the authority and expertise to change preseason prediction methodology, improve habitat, modify enhancement activities, and re-evaluate management and conservation objectives for potential modification through the appropriate Council process.

In addition to the STT assessment, the Council may direct its Habitat Committee (HC) to work with federal, state, local, and tribal habitat experts to review the status of the essential fish habitat affecting the overfished stock and, as appropriate, provide recommendations to the Council for restoration and enhancement measures within a suitable time frame. However, this action would be a priority only if the STT evaluation concluded that freshwater survival was a significant factor leading to the overfished determination. Upon review of the report from the HC, the Council will consider appropriate actions to promote any solutions to the identified habitat problems.

### **3.1.5 Not Overfished-Rebuilding**

After an overfished status determination has been triggered, once the stock's 3-year geometric mean of spawning escapement exceeds the MSST, but remains below  $S_{MSY}$ , or other identified rebuilding criteria, the stock status will be recognized as "not overfished-rebuilding". This status level requires no Council action, but rather is used to indicate that stock's status has improved from the overfished level but the stock has not yet rebuilt.

### **3.1.6 Rebuilt**

The default criterion for determining that an overfished stock is rebuilt is when the 3-year geometric mean spawning escapement exceeds  $S_{MSY}$ ; the Council may consider additional criteria for rebuilt status when developing a rebuilding plan and recommend such criteria, to be implemented subject to Secretarial approval.

Because abundance of salmon populations can be highly variable, it is possible for a stock to rebuild from an overfished condition to the default rebuilding criterion in as little as one year, before a proposed rebuilding plan could be brought before the Council.

In some cases it may be important to consider other factors in determining rebuilt status, such as population structure within the stock designation. The Council may also want to specify particular strategies or priorities to achieve rebuilding objectives. Specific objectives, priorities, and implementation strategies should be detailed in the rebuilding plan.

### 3.1.6.1 Council Action

When a stock is determined to be rebuilt, the Council shall:

- 1) notify the NMFS NWR administrator of its finding, and;
- 2) notify pertinent management entities.

### 3.1.7 Changes or Additions to Status Determination Criteria

Status determination criteria are defined in terms of quantifiable, biologically-based reference points, or population parameters, specifically,  $S_{MSY}$ , MFMT ( $F_{MSY}$ ), and MSST. These reference points are generally regarded as fixed quantities and are also the basis for the harvest control rules, which provide the operative guidance for the annual preseason planning process used to establish salmon fishing seasons that achieve OY and are used for status determinations as described above. Changes to how these status determination criteria are defined, such as  $MSST = 0.50 * S_{MSY}$ , must be made through a plan amendment. However, if a comprehensive technical review of the best scientific information available provides evidence that, in the view of the STT, SSC, and the Council, justifies a modification of the estimated values of these reference points, changes to the values may be made without a plan amendment. Insofar as possible, proposed reference point changes for natural stocks will only be reviewed and approved within the schedule established for salmon methodology reviews and completed at the November meeting prior to the year in which the proposed changes would be effective and apart from the preseason planning process. SDC reference points that may be changed without an FMP amendment include: reference point objectives for hatchery stocks upon the recommendation of the pertinent federal, state, and tribal management entities; and Federal court-ordered changes. All modifications would be documented through the salmon methodology review process, and/or the Council's preseason planning process.

## 3.2 SALMON STOCK CONSERVATION OBJECTIVES

*"To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination"*  
*Magnuson-Stevens Act, National Standard 3*

To achieve OY, prevent overfishing, and assure rebuilding of salmon stocks whose abundance has been depressed to an overfished level, this plan establishes conservation objectives to perpetuate the coastwide aggregate of salmon stocks covered by the plan (Chapter 1). The Council's stock conservation objectives (to be achieved annually) and other pertinent stock management information are contained in Table 3-1. Specific objectives are listed for natural and hatchery stocks that are part of the Council's preseason fishery alternative development process (Chapter 9), including all relevant stocks listed under the Federal ESA. The objectives may be applicable to a single stock independently or to an indicator stock or stocks for a stock complex. Stocks that are not included in the preseason analyses may lack specific conservation objectives because the stock is not significantly impacted by ocean fisheries or insufficient information is available to assess ocean fishery impacts directly. In the latter case, the stock will be included in a stock complex and the conservation objective for an indicator stock will provide for the conservation of closely related stocks unless, or until, more specific management information can be developed.

### 3.2.1 Basis

The Council's conservation objectives for natural stocks may (1) be based on estimates for achieving MSY or an MSY proxy, or (2) represent special data gathering or rebuilding strategies to approach MSY and to eventually develop MSY objectives. The objectives have generally been developed through extensive analysis by the fishery management entities with direct management authority for the stock, or through joint efforts coordinated through the Council, or with other state, tribal, or federal entities. Most of the objectives for stocks north of Cape Falcon have been included in U.S. District Court orders. Under those orders for

Washington coastal and Puget Sound stocks (Hoh v. Baldrige No. 81-742 [R] C and U.S. v. Washington, 626 F. Supp. 1405 [1985]), the treaty tribes and WDFW may agree to annual spawner targets or other objectives that differ from the FMP objectives. Details of the conservation objectives in effect at the time the initial framework FMP was approved are available in PFMC (1984), in individual amendment documents (see Table 1 in the Introduction), and as referenced in Table 3-1. Updated conservation objectives and ESA consultation standards are available in Appendix A of the most recent Preseason Report I, and Table 5 of the most recent Preseason Report III produced each year by the STT (PFMC 2012d).

The Council's conservation objectives are generally expressed in terms of an annual fishery or spawning escapement estimated to be optimum for producing MSY over the long-term. The escapement objective may be (1) a specific number or a range for the desired number of adult spawners (spawner escapement), (2) a specific number or range for the desired escapement of a stock from the ocean or at another particular location, such as a dam, that may be expected to result in the target number of spawners, or (3) based on the exploitation rate that would produce MSY over the long-term. Objectives may be expressed as fixed or stepped exploitation or harvest rates and may include spawner floors or substantially reduced harvest rates at low abundance levels, or as special requirements provided in the Pacific Salmon Treaty or NMFS consultation standards for stocks listed under the ESA.

### **3.2.2 Changes or Additions**

Conservation objectives generally are fixed quantities intended to provide the necessary guidance during the course of the annual preseason planning process to establish salmon fishing seasons that achieve OY. Changes or additions to conservation objectives may be made either through a plan amendment or notice and comment rulemaking if a comprehensive technical review of the best scientific information available provides evidence that, in the view of the STT, SSC, and the Council, justifies a modification. Insofar as possible, proposed changes for natural stocks will only be reviewed and approved within the schedule established for salmon estimation methodology reviews completed prior to the preseason planning process. The Council may change conservation objectives for hatchery stocks upon the recommendation of the pertinent federal, state, and tribal management entities. Federal court-ordered changes in conservation objectives will also be accommodated without a plan amendment. The applicable annual objectives of Council-adopted rebuilding programs and the requirements of consultation standards promulgated by NMFS under the ESA may be employed without plan amendment to assure timely implementation. All of these changes will be documented during the Council's preseason planning process.

The Council considers established conservation objectives to be stable and a technical review of biological data must provide substantial evidence that a modification is necessary. The Council's approach to conservation objectives purposely discourages frequent changes for short-term economic or social reasons at the expense of long-term benefits from the resource. However, periodic review and revision of established objectives is anticipated as additional data become available for a stock or stock complex.

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The Council considers established conservation objectives to be stable and a technical review of biological data must provide substantial evidence that a modification is necessary. The Council's approach to conservation objectives purposely discourages frequent changes for short-term economic or social reasons at the expense of long-term benefits from the resource. However, periodic review and revision of established objectives is anticipated as additional data become available for a stock or stock complex.

### 3.3 HARVEST CONTROLS

Control rules are used to manage the harvest of stocks to achieve optimum yield while preventing overfishing. Control rules specify the allowable harvest of stocks based on their abundance and are predicated on meeting conservation objectives in addition to relating those objectives to biological reference points such as MSY, MFMT, OFL, MSST, ABC, and ACL. For stocks with escapement based conservation objectives, the control rule limits exploitation to achieve escapement objectives. For stocks with exploitation rate-based conservation objectives, escapement targets vary annually depending on stock abundance.

Reference points defined by the MSA and/or NS1 Guidelines are used as benchmarks within the control rules. They are useful for evaluating and comparing control rules, and in some cases are triggers for management actions. There are several formulations of control rules for different stocks in the FMP, using various combinations of reference points. These stock-specific control rules are applied consistently from year to year.

#### 3.3.1 Relationship to ESA consultation standards

The ESA requires federal agencies whose actions may adversely affect listed salmon to consult with NMFS. Because NMFS implements ocean harvest regulations, it is both the action and consulting agency for actions taken under the FMP. To ensure there is no jeopardy, NMFS conducts ESA consultations with respect to the effects of ocean harvest on listed salmon stocks. In cases where the biological consultation results in a “no jeopardy” opinion, NMFS issues an incidental take statement which authorizes a limited amount of take of listed species that would otherwise be prohibited under the ESA. In cases where a “jeopardy” opinion is reached, NMFS develops reasonable and prudent alternatives to the proposed action which authorizes a limited amount of take.

The constraints on take authorized under incidental take statements and reasonable, prudent alternatives are collectively referred to as consultation standards. These constraints take a variety of forms including FMP conservation objectives, limits on the time and area during which fisheries may be open, ceilings on fishery impact rates, and reductions from base period impact rates. NMFS may periodically revise consultation standards and the annual NMFS guidance letter reflects the most current information. Consultation standards that were in place in 2011 when Amendment 16 was completed are shown in the table of conservation objectives (Table 3-1), which is reproduced each year in the latest annual addition of Preseason Report I (PFMC 2012b).

ESA consultation standards represent another form of fishery control rule. Although NMFS consultation standards and recovery plans may not by themselves recover listed populations to historic  $S_{MSY}$  levels, they are sufficient to stabilize populations until freshwater habitats and their dependent populations can be restored and estimates of MSY consistent with recovered habitat conditions can be developed. As species are delisted, the Council will establish conservation objectives and associated reference points consistent with the MSA.

#### 3.3.2 Relationship to the Pacific Salmon Treaty

Pacific salmon stocks subject to fisheries in both the US and Canada are managed under the provisions of the Pacific Salmon Treaty (PST). Natural stocks managed under the provisions of the PST include: (1) Puget Sound pink salmon stocks, (2) most non-ESA-listed Chinook stocks from the mid-Oregon coast to the US/Canada border, and (3) all non-ESA-listed coho stocks except Willapa Bay natural coho. For these stocks, the PST annually places overall limits on fishery impacts and allocates those impacts between the US and Canada. It allows the US and Canada to each manage their own fisheries to achieve domestic conservation and allocation priorities, while remaining within the overall limits determined under the PST.

The MSA provides an exception to the requirement for a fishery management plan to specify ACLs and Accountability Measures (AMs) for stocks managed under an international agreement in which the United States participates. Because of these provisions of the PST, and the exception provided by the MSA, it is unnecessary for the FMP to specify an ACL or associated reference points for these stocks. The PST also includes measures of accountability which take effect if annual limits established under the Treaty are exceeded, and further reduce these limits in response to depressed stock status. However, it is still necessary to specify MSY and SDC reference points for these stocks.

### 3.3.3 Acceptable Biological Catch

Specification of ABC is required for all stocks or stock complexes in the fishery that are not managed under an international agreement, listed under the ESA, or designated as hatchery stocks. For salmon, ABC is defined in terms of spawner escapement ( $S_{ABC}$ ), which is consistent with the common practice of using spawner escapement to assess stock status for salmon.  $S_{ABC}$  is determined annually based on stock abundance, in spawner equivalent units,  $N$ , and the exploitation rate  $F_{ABC}$ .

$$S_{ABC} = N \times (1 - F_{ABC}).$$

The ABC control rule defines  $F_{ABC}$  as a fixed exploitation rate reduced from  $F_{MSY}$  to account for scientific uncertainty. The degree of the reduction in  $F$  between  $F_{ABC}$  and  $F_{MSY}$  depends on whether  $F_{MSY}$  is directly estimated (tier 1 stock) or a proxy value is used (tier 2 stock). For tier 1 stocks,  $F_{ABC}$  equals  $F_{MSY}$  reduced by five percent. For tier 2 stocks,  $F_{ABC}$  equals  $F_{MSY}$  reduced by ten percent.

Tier-1:  $F_{ABC} = F_{MSY} \times 0.95$ .

Tier-2:  $F_{ABC} = F_{MSY} \times 0.90$ .

The STT will apply the ABC control rule on an annual basis by making preseason forecasts of  $N$ , and applying the fixed  $F_{ABC}$ . Stock abundance forecasts and the resulting  $S_{ABC}$  estimates will be reported in Preseason Report I, and presented to the SSC at the March Council meeting. Following its review, the SSC will recommend stock abundance forecasts and  $S_{ABC}$  estimates to the Council in an oral and written statement provided at the March meeting.

The SSC will have an ongoing role in evaluating ABCs through their annual review of stock abundance forecasts and their prerogative to initiate re-evaluation of the ABC control rule. Abundance forecast methods are periodically revised and these revisions are evaluated by the SSC through the salmon methodology review process. The SSC could revisit the ABC control rule as needed during the salmon methodology review.

### 3.3.4 Annual Catch Limits

ACLs and OFLs, in addition to ABCs, are required for all stocks or stock complexes classified as in the fishery that are not managed under an international agreement, listed under the ESA, or designated as hatchery stocks. For salmon, these reference points are defined in terms of spawner escapement ( $S_{ACL}$ ,  $S_{OFL}$ ).

$S_{ACL}$  and  $S_{OFL}$  are calculated annually, both as preseason estimates and postseason values. Preseason estimates of these reference points are used for development of annual fishery management measures. Postseason values are used to identify whether accountability measures (AMs) are to be triggered, and to assess management performance.

$S_{ACL}$  and  $S_{OFL}$  are determined based on stock abundance, in spawner equivalent units, ( $N$ ) and the corresponding reference point exploitation rates  $F_{ACL}$  and  $F_{OFL}$ , where the exploitation rates are fixed values that do not change on an annual basis.  $F_{OFL}$  is defined as being equal to the MFMT, which generally corresponds to and  $F_{MSY}$ , and

$$S_{OFL} = N \times (1 - F_{OFL}).$$

$F_{ACL}$  is equivalent to  $F_{ABC}$  and

$$S_{ACL} = N \times (1 - F_{ACL}),$$

which results in  $S_{ACL} = S_{ABC} > S_{OFL}$  for each management year.

#### 3.3.4.1 Preseason ACLs

During the annual preseason salmon management process,  $S_{ACL}$  will be estimated using the fixed  $F_{ACL}$  exploitation rate and the preseason stock abundance forecast ( $N$ ). Fishery management measures must result in an expected spawning escapement greater than or equal to this  $S_{ACL}$  estimate. In many years, the targeted exploitation rate will be lower than  $F_{ACL}$  as a result of stock-specific conservation objectives and the control rule used to specify  $F$  on an annual basis. Under the condition where  $F < F_{ACL}$ , the forecast escapement would exceed the estimated  $S_{ACL}$ .