

APPENDIX 1. REPORT FORMAT AND DESCRIPTION OF METHODOLOGY FOR DETERMINING OVERFISHING AND OVERFISHED STATUS

The format of this report has been modified since the 2002 report, although the basic criteria for listing has remained the same. Information related to necessary management actions to be taken and progress being made in rebuilding overfished stocks is provided in the supporting tables, accessible by internet, and is not included in the printed copy. Determinations are presented separately for those stocks where overfishing is occurring, i.e., the fishing mortality rate is above an identified threshold; and for those stocks that are overfished, i.e., the biomass of the stock is below an identified threshold. Data concerning each of these categories are not additive and could result in double counting if added together to determine the combined status of the stocks. The categories not overfished and approaching an overfished condition are mutually exclusive. Any stock listed as approaching an overfished condition (because it is estimated that it will become overfished within 2 years) is not included in the not overfished category, even though it is currently not overfished. This listing eliminates the double-counting of stocks analyzed in this report. Overfishing and overfished definitions are listed in Appendix 2.

Determining Status of Stocks

If the fishing mortality rate (F) is above the threshold, then overfishing is occurring. If the stock size is below the minimum threshold, then the stock is overfished. The overfishing and overfished categories are separate determinations and should not be added together, because this would result in double-counting for many of the stocks.

In addition, if a stock size is expected to fall below the minimum stock size threshold within 2 years, then it is listed as approaching an overfished condition. Determinations are based on the criterion in the FMP or other official document for the overfished (biomass or B) component and trends in various indicators relative to that criterion. For some stocks, pre-SFA definitions, including proxy MSYs and minimum stock size threshold, were used as a basis in determining whether a stock was approaching an overfished condition.

For salmon stocks contained in the Pacific Coast Salmon Plan (Salmon FMP), determining whether a stock is approaching a condition of being overfished is based on a different, albeit analogous, set of criteria. A conservation alert is triggered during the annual pre-season process if a natural stock or stock complex is projected to fall short of its conservation objective (MSY, MSY proxy, MSP₂, or floor, in the case of some harvest rate objectives) for one year. The criteria used by the PFMC is more conservative than recommended under the National Standard Guidelines, and a one-year departure from the MSY/MSP₂ spawner objectives does not necessarily mean that the stock will be unable to produce MSY in the long-term.

Stock assessments may be based on fully approved overfishing definitions that specify both a maximum fishing mortality rate (F) threshold and a minimum stock size threshold, or assessments may be based on partially approved or fully disapproved definitions. If a partially

approved definition exists in the FMP, the determinations were made using the approved portion of the definition and the pre-SFA definition in the FMP for the disapproved portion of the definition, if available. Many of these pre-SFA definitions have been contained in their respective FMPs for years, were approved prior to the SFA amendments, and remain the operative definition, if the proposed SFA definition was disapproved. In some cases, a pre-SFA definition is not available to base a determination on, causing undefined to be noted in the appropriate column. For fully disapproved definitions, this year's report again uses the pre-SFA definition. If neither post- nor pre-SFA overfishing and overfished definitions are contained in the FMP, the stock will be listed as *undefined* in both of these categories.

Pre-SFA and Post-SFA Definitions

This report divides the overfishing and overfished columns of the supporting tables into pre- and post-SFA overfishing definitions to make the basis for the determinations as clear as possible. The approaching an overfished condition column does not make a distinction between pre- and post-SFA. Since a stock is considered to be approaching an overfished condition if it is likely to become overfished in two years, it is generally based on stock level indicators and trends in fishing effort. The type of overfishing definition (pre- or post-SFA) used to determine if a stock is approaching an overfished condition is based on the criteria associated with the biomass (overfished) component of the definition and trends in fishing effort. The printed copy does not distinguish between pre- and post-SFA determinations.

Final Conclusions

Because the overfishing definitions used to assess stocks contained in this report have changed over the years, it is difficult to make year-to-year comparisons of stocks. Removal of the third column (overfished) that was used in reports prior to 2000 also makes direct comparisons difficult. Nevertheless, the determinations in the fishing mortality rate column in previous year's reports can be compared with the determinations in the overfishing column this year. Likewise, the determinations in previous year's biomass column can be compared to the overfished column in this year's report.

Rebuilding Progress

Information is provided in the supporting tables about those stocks for which rebuilding programs are required. By identifying the type of management action required when overfishing is occurring or when a stock is overfished, it is possible to correctly note which stocks require reduction of the fishing mortality rate and which stocks actually require rebuilding plans. The progress of each rebuilding plan is indicated in the last column of the table, giving information about the number of years the program has been in place, and the total number of years the program is expected to exist. Some plans were approved prior to the SFA amendments and are footnoted accordingly, and those for which there is no defined time line are also noted. For purposes of this report, December 2003 is used as the cutoff date for determining the year in which the rebuilding plan is currently in.

Any stock that has previously been listed, or is currently listed, as overfished is required to have a rebuilding program until the stock has been rebuilt to levels that are consistent with supporting MSY on a sustainable basis. Stocks that are overfished that do not have a rebuilding program are listed as *rebuilding program* in the Management Action Required column, which indicates that a rebuilding program is required for this stock. Overfished stocks that are listed as *continue rebuilding* in the Management Action Required column are currently rebuilding under an approved rebuilding program. Stocks that are listed as *not overfished - rebuilding* were previously below the minimum stock size threshold, are now above that level, but have not been rebuilt to the target levels specified in their rebuilding plans. These stocks are currently rebuilding under an approved rebuilding plan, and are listed as *continue rebuilding* in the Management Action Required column. It is important to note that the status of rebuilding stocks should not be considered as healthy until they have been fully rebuilt. Stocks that are listed as *to be developed* are stocks that have recently been declared overfished. These stocks are footnoted to indicate when the Council was notified of their overfished status, and the Council has one year from that date to submit a rebuilding plan.

METHODOLOGY FOR STATUS DETERMINATIONS

Basis for Determining Status of Overfishing

As required by section 304(e)(1) of the Magnuson-Stevens Act, the status determination for those stocks managed under a FMP or international agreement was based on the criteria (i.e., the overfishing definition) specified in the FMP or agreement, whenever possible (see Appendices 2-5). Prior to requirements under the SFA, most existing overfishing definitions were based wholly or in part on either a fishing mortality rate (F) or stock biomass (B), but not both. The SFA requires that status determination criteria must specify both a maximum fishing mortality threshold or reasonable proxy thereof, and a minimum stock size threshold or reasonable proxy thereof. Thus, stocks must be assessed according to whether the maximum fishing mortality threshold is being exceeded and whether the stock is below the minimum stock size threshold. Overfishing is determined to be occurring for those stocks for which the fishing mortality rate (F) exceeds the fishing mortality rate or level required to produce the maximum sustainable yield (MSY) on a continuing basis. Overfished stocks are those whose biomass (B) is below the minimum stock size required to produce MSY on a continuing basis.

In conformance with SFA requirements, this report identifies the status determination of stocks based on both the fishing mortality rate and stock biomass, wherever possible. The National Standard Guidelines require NOAA Fisheries to determine whether the fishing mortality rate threshold is being exceeded or the biomass is below the established threshold for each stock. If either overfishing is occurring or a stock is being overfished, management action is required. For stocks in which overfishing is occurring, fishing mortality must be reduced so that stocks can produce MSY on a continuing basis; for stocks that are overfished, rebuilding plans must be implemented so that stocks can be rebuilt to the level necessary to produce MSY on a continuing basis. The following is a description of the basis for status determinations under a variety of scenarios associated with fully approved, partially approved, or fully disapproved definitions.

Fully Approved Definitions under the SFA: For those stocks contained in FMPs for which overfishing definitions were fully approved, status determinations were based on assessments using both the fishing mortality rate and biomass definitions, wherever possible. If the fishing mortality rate exceeded the established fishing mortality rate threshold, the stock was listed as *overfishing* occurring. If the biomass was below the established biomass threshold, the stock was listed as *overfished*. Stocks listed as *unknown* are those for which there is an approved overfishing definition, but for which no determination can be made because of insufficient information.

Partially Approved Definitions under the SFA: For those stocks contained in FMPs for which overfishing definitions were partially approved (i.e., for which only one of the two necessary criteria was approved), status determinations were based on the definitions that are currently in the FMP. For some stocks, determinations were made using a combination of the SFA approved definition, such as the fishing mortality rate, and the pre-SFA definition, such as stock level size. For other stocks, the only overfishing definition contained in the FMP is one component (fishing mortality or biomass) that meets SFA requirements. For these stocks, determinations were made using the SFA approved criterion, and the other component was listed as *undefined*. Stocks listed as undefined are those for which there is no status criterion by which to make a determination.

Definitions under the SFA That Are Fully Disapproved or Still under Review: For those stocks contained in FMPs for which the overfishing definitions were fully disapproved or are still under review, status determinations were based on previously existing definitions, and were assessed under pre-SFA guidelines. Similar to partially approved definitions, the overfishing or overfished determination was based solely on the status criterion that is available. When a status criterion is not available the stock is listed as *undefined*.

Stocks Contained in Federal FMPs for Which Definitions Do Not Apply: Some stocks contained in federal FMPs have never had an overfishing or overfished definition. Such stocks are usually minor and are contained in federal FMPs in which overfishing definitions exist, but the definitions do not apply to these stocks. The status of such stocks are listed as *undefined*.

Fully or Partially Approved Definitions Contained in Non-federal FMPs Managed by Interstate Fishery Management Commissions: While there are no SFA requirements for stocks contained in non-federal FMPs to have both a fishing mortality rate and biomass definition, some may contain one or both of these components. For stocks in which both components were approved, the status determination is based on these definitions. For stocks in which there is only one component to make a determination (either overfishing or overfished criteria), the status determination is based on the approved criteria, and the other component is listed as *undefined*. Pacific halibut, which is managed through an international treaty between the United States and Canada is listed according to these same guidelines. Management measures are coordinated jointly by the PFMC and NPFMC in U.S. waters, and it is likely that this regime will continue.

Stocks Not Contained in Federal FMPs, Stocks Contained in Federal FMPs under Development, and Stocks Contained in Non-federal FMPs Managed by Interstate Fishery Management

Commissions for Which There Are No Definitions: For these cases, if overfishing definitions are available for either component, they will be used to make the status determinations. If definitions are not available the stock will be listed according to the status determination in OLO. If there is no basis for making a determination listed in OLO, the stock is listed as *unknown*. One notable exception is five salmon stocks under the management jurisdiction of the PFMC, which are not contained in a federal FMP. They are not listed according to OLO because it would be inaccurate to do so, due to the fact that some stocks are listed under the Endangered Species Act (ESA), while OLO lists the status of some of these stocks as no overfishing occurring and not overfished. Therefore, they have been listed as *undefined* because no definition of overfishing and overfished exists for them.

The 1999 edition of OLO was used to determine the status relative to overfishing for stocks (1) for which there are no FMPs or international agreements and there are no overfishing definitions, but that are under the Councils' geographic area of authority (see exception noted above) or under the Secretary's management authority for Atlantic highly migratory species; (2) that are contained in FMPs under development and do not have overfishing definitions; and (3) that are contained in non-federal FMPs managed by an Interstate Fishery Management Commission and there are no overfishing definitions. In OLO, the terms overfished and overfishing are not used, but similar concepts are. Long Term Potential Yield (LTPY), as used in OLO, is analogous to MSY. Thus, the conclusions reached in OLO approximate the conclusions that would be drawn if an assessment had been made using the SFA's definition of *overfished*. Stocks that are listed in OLO as below stock levels necessary to produce LTPY are considered *overfished*, and those listed as "near" and "above" stock levels necessary to produce LTPY are considered *not overfished*. In determining whether overfishing is occurring, the existing fishing effort or fishery utilization level was compared to the level necessary to achieve LTPY. Stocks that are listed in OLO as "over" are stocks for which *overfishing* is occurring, and those that are listed as "under" or "fully" are stocks for which *no overfishing* is occurring. Because OLO does not make a determination of whether the stock is approaching an overfished condition, that determination could not be made for those stocks assessed using OLO. For stocks not contained in FMPs that have no overfishing definition or for which there is no determination of stock status in OLO, the overfished status is listed as *unknown*.

Many of the stocks listed as overfished in this report have experienced excessive levels of fishing effort in recent years, and appropriate measures have been taken to reduce fishing mortality on these stocks. Other stocks listed as *overfished* may be due to prevailing environmental conditions, habitat degradation, or natural fluctuations in the stocks. These factors may have reduced the stock biomass to levels below that which is necessary to produce MSY on a continuing basis. Sometimes, management measures have little impact on the status of the stocks. For example, many of the Pacific salmon stocks under the PFMC jurisdiction are not significantly impacted in fisheries within the Council's jurisdiction. Other stocks are listed as threatened or endangered under the ESA and management for these stocks is conducted under the ESA. Fishing effort has been appropriately reduced or eliminated, but the stocks remain overfished due to factors beyond the Council's control. While the Councils, NOAA Fisheries, and any management regime will make every effort to implement appropriate management

measures, rebuilding programs may not necessarily restore some stocks to a healthy level, until these other factors are effectively dealt with.

Information regarding the status of stocks is continually evolving and additional information has become available for some stocks since the most recent publication of OLO. For those stocks for which there is updated information in a citable form, that information was used to determine the status of that stock in this report. It is recognized that this approach does not include all “preliminary” information for each stock. However, this approach has been taken to minimize potential confusion as conclusions about stock conditions change with changes in “preliminary” information.

APPENDIX 2. OVERFISHING DEFINITIONS CONTAINED IN FEDERAL FISHERY MANAGEMENT PLANS

The following definitions are as contained in the Fishery Management Plans, with minor editing changes to maintain consistency of terms. See **Appendix 5** for definitions of acronyms used in this appendix.

Atlantic Sea Scallop – The following overfishing definitions have been fully approved under SFA guidelines and were used to make the assessments contained in this report. The definitions contain both an F and a B component.

Overfishing occurs when one of the three conditions apply: F exceeds F_{MAX} (proxy for F_{MSY}) when the stock biomass is equal to or greater than B_{MAX} (proxy for B_{MSY}); fishing mortality exceeds the level that has a 50 percent probability of achieving B_{MAX} in 10 years when the stock biomass is below B_{MAX} but above $\frac{1}{4}B_{MAX}$; or F is greater than zero and the stock biomass is below $\frac{1}{4}B_{MAX}$. The best available estimate of F_{MAX} is 0.24

The scallop stock is overfished when the scallop biomass is below $\frac{1}{4}B_{MAX}$. The best available estimate of B_{MAX} for the combined scallop resource is 5.6 kg/tow.

Atlantic Salmon - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing is currently not defined (fishing mortality is set equal to zero).

A stock is overfished when the stock biomass falls below B_{MSY} (54,000 spawning salmon is set as a proxy for B_{MSY}). The estimate of B_{MSY} has not been revised since the 2000 report.

Northeast Multispecies

*For the Northeast multispecies fishery, the values for the most recent fishing mortality rates and biomass levels that were used to determine the status of the stocks in the Northeast Multispecies Fishery Management Plan (with the exception of silver hake, red hake, and offshore hake) are those indicated in the document titled “Re-Evaluation of Biological Reference Points for New England Groundfish” (Northeast Fisheries Science Center Reference Document 02-04). The Northeast multispecies fishery is currently being managed under a Federal Court order, and a Settlement Agreement among various parties. In light of these circumstances, the biomass and fishing mortality thresholds utilized for determinations in this report were those contained in the above document, and not the approved Amendment 9 parameters. Unless otherwise noted, biomass thresholds were 50% B_{MSY} and fishing mortality thresholds were F_{MSY} (or proxies).

***Cod** - The following overfishing definitions have been fully approved under SFA guidelines and were used to make the assessments contained in this report. The definitions contain both an F and a B component.

***(Gulf of Maine)** - Overfishing occurs when F exceeds F_{msy} . The best available estimate of F_{msy} is 0.23.

A stock is overfished when the total stock biomass is less than $\frac{1}{2} B_{msy}$. The best available estimate of B_{msy} is 82,800 mt.

***(Georges Bank)** - Overfishing occurs when F exceeds F_{msy} . The best available estimate of F_{msy} is 0.18.

A stock is overfished when the total stock biomass is less than $\frac{1}{2} B_{msy}$. The best available estimate of B_{msy} is 216,800 mt.

***Haddock** – The following overfishing definitions have been fully approved under SFA guidelines and were used to make the assessments contained in this report. The definitions contain both an F and a B component.

***(Gulf of Maine)** - Overfishing occurs when the relative exploitation index (catch/autumn biomass index) exceeds 0.23 (F_{msy} proxy).

A stock is overfished when the total stock biomass is less than the survey proxy for $\frac{1}{2}B_{msy}$ (11.09 kg/tow).

***(Georges Bank)**- Overfishing occurs when F exceeds $F_{40\%}$ (0.26).

A stock is overfished when the spawning stock biomass is less than $\frac{1}{2} B_{msy}$ (The best available estimate of B_{msy} is 250,300 mt.

***American Plaice** – The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when F exceeds $F_{40\%}$. The best available (current) estimate of the F_{msy} proxy is 0.17.

A stock is overfished when the spawning stock biomass is less than $\frac{1}{2} B_{msy}$. The best available estimate of B_{msy} is 28,600 mt.

***Redfish** - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F

and a B component.

Overfishing occurs when F exceeds $F_{50\%}$. The best available estimate of the F_{msy} proxy is 0.04.

A stock is overfished when the spawning stock biomass is less than $\frac{1}{2}B_{msy}$. B_{msy} is based on total biomass. The best available estimate of the B_{target} is 236,700 mt.

***Witch Flounder** – The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when F exceeds the F_{msy} proxy ($F_{40\%}$). The best available current estimate of the F_{msy} proxy is 0.23.

A stock is overfished when the total stock biomass is less than $\frac{1}{2} B_{msy}$. B_{msy} is estimated at 25,200 mt

***Yellowtail Flounder¹** – The following overfishing definitions have been fully approved under SFA guidelines and were used to make the assessments contained in this report. The definitions contain both an F and a B component.

***(Georges Bank)** – Overfishing occurs when F exceeds F_{msy} . The best available (current) estimate of F_{msy} is 0.33 (biomass weighted, ages 1+).

A stock is overfished when the total stock biomass is less than $\frac{1}{2} B_{msy}$. The best available (current) estimate of $\frac{1}{2} B_{msy}$ is (29,400 mt)(GARM, 2002).

***(Southern New England/Mid-Atlantic)** - Overfishing occurs when F exceeds the F_{msy} proxy ($F_{40\%} = 0.26$).

A stock is overfished when the total stock biomass is less than $\frac{1}{2} B_{msy}$. The best available current estimate of B_{msy} is 69,500 mt.

***(Cape Cod/Gulf of Maine)** – Overfishing occurs when F exceeds the F_{msy} proxy ($F_{40\%} = 0.17$).

A stock is overfished when the total stock biomass is less than $\frac{1}{2}B_{msy}$. The best available current estimate of B_{msy} is 12,600 mt.

***White Hake** – The following overfishing definition has been fully approved under SFA

¹Stock definitions for yellowtail flounder were changed as a result of the 36th SAW. The Cape Cod stock is more broadly defined to include areas in the southern Gulf of Maine and is now called the Cape Cod/Gulf of Maine stock. The previously separate Southern New England and Mid-Atlantic stocks were combined into a single stock.

guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when F exceeds F_{msy} . The best available estimate of F_{msy} is 0.29 (biomass weighted).

A stock is overfished when the total stock biomass is less than $\frac{1}{2} B_{msy}$. The best available estimate of B_{msy} is 14,700 mt or 7.70 kg/tow (total stock biomass for fish ≥ 60 cm).

***Pollock** – The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when F exceeds the F_{msy} proxy, a relative exploitation index (catch/survey biomass index). The best available estimate of the F_{msy} proxy is 5.88.

A stock is overfished when the total stock biomass is less than the survey proxy for $\frac{1}{2} B_{msy}$. The best available estimate of the B_{msy} is 3.0 kg/tow.

***Ocean Pout** – The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when F exceeds F_{msy} proxy. The best available estimate of the F_{msy} proxy is 0.31 catch/survey index.

A stock is overfished when the total stock biomass is less than $\frac{1}{2} B_{msy}$ proxy. The best available estimate of the B_{msy} proxy is 4.9 kg/tow.

***Atlantic Halibut** - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when F exceeds the F_{msy} catch-YPR proxy, currently estimated as 0.06. Maximum rebuilding time is undefined for this stock. No fishing mortality is permitted ($F = 0$) until the stock is rebuilt (provisional control law).

A stock is overfished when the total stock biomass is less than the biomass threshold of $\frac{1}{2} B_{MSY}$. The best available estimate of B_{MSY} is 5,400 mt (total biomass) .

***Windowpane Flounder** – The following overfishing definitions have been fully approved under SFA guidelines and were used to make the assessments contained in this report. The definitions contain both an F and a B component.

***(Gulf of Maine/Georges Bank)** - Overfishing occurs when F exceeds F_{msy} proxy of a relative exploitation index. The best available estimate of the F_{msy} proxy is 1.11 catch/survey index.

A stock is overfished when the total stock biomass is less than $\frac{1}{2}B_{msy}$. The best available estimate of the B_{msy} proxy is 0.94 kg/tow.

***(Southern New England/Middle Atlantic)** – Overfishing occurs when F exceeds F_{msy} proxy of a relative exploitation index. The best available estimate of the F_{msy} proxy is 0.98 catch/survey index.

A stock is overfished when the total stock biomass is less than $\frac{1}{2} B_{msy}$. The best available estimate of the B_{msy} proxy is 0.92 kg/tow.

***Winter Flounder** - The following overfishing definitions have been fully approved under SFA guidelines and were used to make the assessments contained in this report. The definitions contain both an F and a B component.

***Winter Flounder (Gulf of Maine)** - Overfishing occurs when F exceeds F_{MSY} . The best available current estimate of F_{msy} is 0.43.

A stock is overfished when the stock biomass is less than $\frac{1}{2} B_{msy}$. The best available current estimate of B_{msy} is 4,100 mt.

***(Georges Bank)** - Overfishing occurs when F exceeds F_{MSY} . The best available estimate of F_{MSY} is 0.32 (biomass weighted).

A stock is overfished when the total stock biomass is less than $\frac{1}{2}B_{MSY}$. Best available estimates of B_{MSY} is 9,400 mt (total biomass).

***(Southern New England)** - Overfishing occurs when F exceeds F_{MSY} . Best available estimates of F_{MSY} is 0.32.

A stock is overfished when the total stock biomass is less than $\frac{1}{2} B_{MSY}$. Best available estimates of B_{MSY} is 30,100 mt.

Silver Hake - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

(Gulf of Maine/Northern Georges Bank, Southern Georges Bank/Middle Atlantic) - Overfishing occurs when F exceeds F_{MSY} , the proxy for which is $F_{0.1}$. The best available estimates of $F_{0.1}$ are 0.41 for Gulf of Maine / Northern Georges Bank Silver Hake, and 0.39 for Southern Georges Bank / Middle Atlantic Silver Hake.

B_{MSY} proxies are estimated at 3.31 (Northern), and 0.89 (Southern) (SAW-32, 2000).

Offshore Hake - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessment contained in this report. The definition contains only a B component.

Offshore hake is in an overfished condition when the 3-year moving average weight per individual in the autumn survey falls below the 25th percentile of the average weight per individual from the autumn survey time series 1963-1997 (0.236) *and* when the 3-year moving average of the abundance of immature fish less than 30 cm falls below the median value of the 1963-1997 autumn survey abundance of fish less than 30 cm (0.33).

[Note: The above overfishing definition is the approved definition from Amendment 12 to the NE Multispecies FMP; however, there is an error in this definition which needs to be corrected by the New England Fishery Management Council in the next FMP amendment. The overfishing definition in the FMP should read that “overfishing is occurring when . . .” not that offshore hake is overfished. Thus, the approved overfishing definition contains a B component but not an F component. In this case, overfishing, per se, is undefined. In practice, the correct overfishing definition should contain an F component, leaving the B component undefined.]

Red Hake (Gulf of Maine/Northern Georges Bank) - The following overfishing definitions have been fully approved under SFA guidelines and were used to make the assessments contained in this report. The definitions contain both an F and a B component.

Overfishing occurs when F exceeds F_{MSY} . The best available estimate of F_{MSY} is 0.65.

A stock is overfished when the biomass is less than $\frac{1}{2}B_{MSY}$ proxy. The best available estimate of B_{MSY} proxy is 1.6 kg/tow.

Red Hake (Southern Georges Bank/Middle Atlantic) - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessment contained in this report. The definition contains only a B component.

The southern stock of red hake is in an overfished condition when the 3-year moving average weight per individual in the autumn survey falls below the 25th percentile of the average weight per individual from the autumn survey time series 1963-1997 (0.12) *and* when the 3-year moving average of the abundance of immature fish less than 25 cm falls below the median value of the 1963-1997 autumn survey abundance of fish less than 25 cm (4.72).

[Note: The above overfishing definition is the approved definition from Amendment 12 to the NE Multispecies FMP; however, there is an error in this definition which needs to be corrected by the New England Fishery Management Council in the next FMP amendment. The overfishing definition in the FMP should read that “overfishing is occurring when . . .” not that the southern stock of red hake is overfished. Thus, the approved overfishing definition contains a B

component but not an F component. In this case, overfishing, per se, is undefined. In practice, the correct overfishing definition should contain an F component, leaving the B component undefined.]

Northeast Skate Complex

The following overfishing definitions have been fully approved under SFA guidelines and were used to make the assessments contained in this report. These definitions contain both an F and a B component. For all stocks, the reference points and selected time series may be re-specified through a peer-reviewed process and/or as updated stock assessments are completed.

Winter Skate, Thorny Skate - Overfishing occurs when the three-year moving average of the autumn survey mean weight per tow declines 20% or more, or when the autumn survey mean weight per tow declines for three consecutive years.

The stock is in an overfished condition when the three-year moving average of the autumn survey mean weight per tow is less than one-half of the 75th percentile of the mean weight per tow observed in the autumn trawl survey from the selected reference time series.

Little Skate - Overfishing occurs when the three-year moving average of the spring survey mean weight per tow declines 20% or more, or when the spring survey mean weight per tow declines for three consecutive years.

The stock is in an overfished condition when the three-year moving average of the spring survey mean weight per tow is less than one-half of the 75th percentile of the mean weight per tow observed in the spring trawl survey from the selected reference time series.

Barndoor Skate - Overfishing occurs when the three-year moving average of the autumn survey mean weight per tow declines 30% or more, or when the autumn survey mean weight per tow declines for three consecutive years.

The stock is in an overfished condition when the three-year moving average of the autumn survey mean weight per tow is less than one-half of the mean weight per tow observed in the autumn trawl survey from 1963-1966 (currently 0.81 kg/tow).

Smooth Skate, Clearnose Skate- Overfishing occurs when the three-year moving average of the autumn survey mean weight per tow declines 30% or more, or when the autumn survey mean weight per tow declines for three consecutive years.

The stock is in an overfished condition when the three-year moving average of the autumn survey mean weight per tow is less than one-half of the 75th percentile of the mean weight per tow observed in the autumn trawl survey from the selected reference time series.

Rosette Skate - Overfishing occurs when the three-year moving average of the autumn survey

mean weight per tow declines 60% or more, or when the autumn survey mean weight per tow declines for three consecutive years.

The stock is in an overfished condition when the three-year moving average of the autumn survey mean weight per tow is less than one-half of the 75th percentile of the mean weight per tow observed in the autumn trawl survey from the selected reference time series.

Atlantic Herring - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

If the stock biomass is equal to or greater than B_{msy} , overfishing occurs when F exceeds F_{msy} . If the stock biomass is less than B_{msy} , overfishing occurs when F exceeds the level that has a 50-percent probability of rebuilding the stock biomass to B_{msy} in 5 years ($F_{threshold}$). The best available estimate of F_{msy} is 0.30.

The stock is overfished when stock biomass is less than $\frac{1}{2} B_{msy}$. The best estimate of B_{msy} is 1.07 million mt.

Deep-Sea Red Crab - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing is defined as any rate of exploitation such that the ratio of current exploitation to an idealized exploitation under MSY conditions exceeds a value of 1.0 (the actual measure of exploitation used is determined by the availability of suitable data).

The stock is overfished when one of the following three conditions is met:

Condition 1 – The current biomass is below $\frac{1}{2} B_{msy}$ in the management unit.

Condition 2 – The annual fleet average CPUE, measured as marketable crabs landed per trap haul, continues to decline below a baseline level for 3 or more years. The baseline level = $\frac{1}{2}$ CPUE under virgin stock conditions (not currently specified).

Condition 3 – The annual fleet average CPUE, measured as marketable crabs landed per trap haul, declines below a minimum threshold level in any single year. The minimum threshold level = $\frac{1}{4}$ CPUE under virgin stock conditions (not currently specified).

Monkfish - The following overfishing definitions have been fully approved under SFA guidelines and were used to make the assessments contained in this report. The definitions contain both an F and a B component.

Northern Stock: Overfishing occurs when F exceeds $F_{\text{threshold}}$, which is set equal to F_{MAX} , which is currently estimated to be $F=0.2$.

A stock is overfished when the survey index is less than $B_{\text{THRESHOLD}}$, which is set equivalent to $\frac{1}{2} B_{\text{TARGET}}$. Thus, $B_{\text{THRESHOLD}}=1.25$ kg/tow for the southern stock.

Southern Stock: Overfishing occurs when F exceeds $F_{\text{threshold}}$, which is set equal to F_{max} , which is currently estimated to be $F=0.2$.

A stock is overfished when the survey index is less than $B_{\text{THRESHOLD}}$, which is set equivalent to $\frac{1}{2} B_{\text{TARGET}}$. Thus, $B_{\text{THRESHOLD}}=0.93$ kg/tow for the southern stock.

Spiny Dogfish -The following overfishing definition was partially approved under SFA guidelines and was used to make assessments in this report. The approved portion of the definition contains an F component. The biomass (B) target proposed in the FMP was disapproved because it was specified at 90 percent of SSB_{MAX} , rather than SSB_{MAX} .

Overfishing occurs when F exceeds $F_{\text{THRESHOLD}}$, the mortality rate that stabilizes the population at SSB_{MAX} when recruitment is at 27.5 inches (70cm). The current estimate of $F_{\text{THRESHOLD}}$ is 0.11.

A stock is overfished when the biomass is less than $\frac{1}{2}SSB_{\text{max}}$. The current estimate of $B_{\text{THRESHOLD}}$ is 100,000 mt female biomass.

Summer Flounder, Scup, and Black Sea Bass

Summer Flounder - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when F exceeds the threshold of F_{MAX} (F_{MAX} is used as a proxy for F_{MSY}). The best available estimate of F_{MAX} is 0.26.

A stock is overfished when total biomass falls below the minimum biomass threshold of $\frac{1}{2}B_{\text{MSY}}$. The best available estimate of B_{MSY} is 106,400 mt (SAW-31, 2000).

Scup - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when F exceeds the threshold F_{MAX} (F_{MAX} is used as a proxy for F_{MSY}). The best available estimate of F_{MAX} is 0.26.

A stock is overfished when the minimum biomass index for rebuilding is less than $B_{\text{THRESHOLD}}$, which is the maximum value of a 3-year moving average of the Northeast Fisheries Science Center's spring survey catch per tow of spawning stock biomass (SSB). The best available estimate of $B_{\text{THRESHOLD}}$ is 2.77 kg/tow, the average of 1977-1979.

Black Sea Bass - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when F exceeds the threshold F_{MAX} (F_{MAX} is used as a proxy for F_{MSY}). The best available estimate of F_{MAX} is 0.32.

A stock is overfished when the minimum biomass index for rebuilding is less than $B_{\text{THRESHOLD}}$, which is the maximum value of a 3-year moving average of the Northeast Fisheries Science Center's spring survey exploitable biomass index (fish >22 cm). The best available estimate of $B_{\text{THRESHOLD}}$ is 0.9 kg/tow.

Bluefish (except Gulf of Mexico) - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when F exceeds the threshold F_{MSY} . The best available estimate of F_{MSY} is 0.4.

A stock is overfished when the minimum biomass is less than $\frac{1}{2}B_{\text{MSY}}$. The best available estimate of B_{MSY} is 107,600 mt.

Surfclams and Ocean Quahogs

Surfclam - The following overfishing definition was approved under SFA guidelines and was used to make the assessments contained in this report. This definition contains an F component and a B component.

The overfishing definition for surfclams is the fishing mortality rate of $F_{\text{MSY}} = M$ (the natural mortality rate). The best current available estimate of F_{MSY} is 0.15.

A stock is overfished when the current biomass estimate is less than $\frac{1}{2}$ of the B_{MSY} proxy ($\frac{1}{2}$ of the B_{1999}). The best available current estimate of the B_{MSY} proxy is 730,250 mt (meat weight).

Ocean Quahog – The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when the overfishing target is exceeded, which is $F_{\text{TARGET}} = F_{0.1}$ for the exploited region and $\frac{1}{2}$ the virgin biomass. The best available estimate of $F_{0.1}$ is 0.02.

A stock is overfished when the minimum biomass is less than the biomass threshold of $\frac{1}{2}B_{\text{MSY}}$ or $\frac{1}{4}$ of the virgin biomass. The best available estimate of B_{MSY} is 1 million mt (SAW-31, 2000).

Atlantic Mackerel, Squid, and Butterfish

Illex Squid - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when F exceeds the fishing mortality threshold of F_{MSY} . The best available estimate of F_{MSY} is 1.22.

A stock is overfished when the minimum biomass is less than $\frac{1}{2}B_{\text{MSY}}$. The best available estimate of B_{MSY} is 39,300 mt.

Loligo Squid - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when F exceeds the fishing mortality threshold of F_{MAX} (F_{MAX} is a proxy for F_{MSY}). Current estimates for $F_{\text{MAX}} = 0.7$ and 1.2 for winter and summer cohorts, respectively.

A stock is overfished when the minimum biomass is less than the biomass threshold of $\frac{1}{2}B_{\text{MSY}}$. The best available estimate of B_{MSY} is 80,000 mt (SAW-19, 1999).

Atlantic Mackerel – The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when F exceeds the fishing mortality threshold of F_{MSY} (0.45). To avoid low levels of recruitment, the threshold F decreases linearly from 0.45 at 890,000 mt SSB to zero at 225,000 mt SSB ($\frac{1}{4}B_{\text{MSY}}$).

A stock is overfished when the SSB is less than 890,000 mt. The estimates of the component parts of this overfishing definition were not re-estimated from past levels and therefore remain the best available estimates (SAW-30, 2000).

Butterfish (Atlantic) – The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when the catch associated with a threshold F of F_{MSY} is exceeded. F_{MSY} is currently estimated at 1.01, and has not been re-estimated since the 2000 report.

A stock is overfished when the minimum biomass is less than the biomass threshold of $\frac{1}{2}B_{msy}$. Estimates of B_{MSY} are unknown.

Golden Tilefish - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing occurs when the catch associated with a threshold F of F_{MSY} is exceeded. The current estimate of F_{MSY} is 0.22.

A stock is overfished when the total stock biomass falls below the minimum biomass threshold ($B_{THRESHOLD}$) of $\frac{1}{2}B_{MSY}$. The current estimate of $B_{THRESHOLD}$ is 4,200 mt.

Golden Crab of the South Atlantic - The following overfishing definition was partially approved under SFA guidelines and was used to make the assessments contained in this report. This definition contains both an F and a B component; however, the estimate of MSY was rejected.

Overfishing occurs when the F associated with the fishing mortality rate that produces maximum sustainable yield (F_{MSY}) is exceeded.

A stock is overfished when the current biomass ($B_{CURRENT}$) is less than $MSST$. The $MSST$ is defined as a ratio of current biomass ($B_{CURRENT}$) to biomass at MSY or $(1-M) * B_{MSY}$, where $1-M$ should never be less than 0.5.

Shrimp Fishery of the South Atlantic - The following overfishing definition was approved under pre-SFA guidelines and was used to make the assessments contained in this report. This definition contains both an F and a B component.

White Shrimp – The South Atlantic white shrimp resource is overfished and overfishing occurs when the overwintering white shrimp population within a state’s water declines by 80% or more following severe winter weather resulting in prolonged cold water temperatures.

Rock Shrimp – The South Atlantic rock shrimp resource is overfished and overfishing occurs when the annual landings exceed the value which is two standard deviations above mean landings for the period 1986-1994.

Brown Shrimp and Pink Shrimp – The South Atlantic brown and pink resources are overfished and overfishing occurs when annual landings fall below two standard deviations below mean landings for the period 1957-1993 for 3 consecutive years.

South Atlantic Snapper-Grouper - For the following overfishing definitions, the F component has been approved under SFA guidelines, and was used to make the assessments contained in this report. The B component was approved under SFA guidelines for **Black Sea Bass** and **Red Porgy**. For all other stocks except **Vermilion Snapper** and **Yellowtail Snapper**, Spawning Potential Ratio (SPR) was used to determine the overfished status, and was approved under pre-SFA guidelines.

Goliath Grouper (Jewfish), Nassau Grouper - Overfishing is defined as an F in excess of the fishing mortality rate corresponding to a 40% Static SPR.

Overfished is defined as SPR less than 40%. Based on qualitative information, it is believed that these stocks are severely overfished due to a lack of occurrence in sampling and catches (prior to moratorium).

Gag, Red Snapper, Speckled Hind, Snowy Grouper, Warsaw Grouper, Golden Tilefish, Red Grouper, Black Grouper, Mutton Snapper, Greater Amberjack, Wreckfish, Yellowedge Grouper, Scamp, White Grunt, Gray (Mangrove) Snapper, Lane Snapper, Gray Triggerfish, Queen Triggerfish, Ocean Triggerfish, Yellow Jack, Blue Runner, Crevalle Jack, Bar Jack, Lesser Amberjack, Almaco Jack, Banded Rudderfish, Spadefish, Black Margate, Porkfish, Margate, Tomtate, Smallmouth Grunt, French Grunt, Spanish Grunt, Cottonwick, Sailors Choice, Blue Stripe Grunt, Hogfish, Puddingwife, Black Snapper, Queen Snapper, Schoolmaster, Blackfin Snapper, Cubera Snapper, Mahogany Snapper, Dog Snapper, Silk Snapper, Blueline Tilefish, Sand Tilefish, Bank Sea Bass, Rock Sea Bass, Rock Hind, Graysby, Coney, Red Hind, Misty Grouper, Yellowmouth Grouper, Tiger Grouper, Yellowfin Grouper, Sheepshead, Grass Porgy, Jolthead Porgy, Saucereye Porgy, Whitebone Porgy, Knobbed Porgy, Longspine Porgy, Scup - Overfishing is defined as an F in excess of the fishing mortality rate corresponding to a 30% Static SPR.

Except for black sea bass and red porgy, overfished is defined as SPR less than 30% based on pre-SFA criteria.

Red Porgy - Overfishing is defined as an F in excess of the fishing mortality rate corresponding to a 35% Static SPR (F=0.43).

Overfished is defined as a stock size less than the minimum stock size threshold (7.34 million pounds).

Black Sea Bass - Overfishing is defined as an F in excess of the fishing mortality rate

corresponding to a 30% Static SPR (0.72).

Overfished is defined as a stock size less than the minimum stock size threshold (3.72 million pounds).

Vermilion Snapper - Overfishing is defined as an F that exceeds $MFMT = F_{MSY}$. The best estimate of $F_{MSY} = 0.38$; current $F = 0.60$ (from the base run of the forward projection model).

Overfished is defined as a stock size less than the minimum stock size threshold ($MSST = (1 - c)B_{msy}$, where c is the lesser of M or 0.5 . $M = 0.25$; the best estimate of $MSST$ is $0.75B_{msy}$).

Yellowtail Snapper - Overfishing is defined as an F that exceeds $MFMT = F_{MSY}$. The best estimate of $F_{MSY} = 0.33$; current $F = 0.24$ (from the Fleet Specific model run of the stock assessment).

Overfished is defined as a stock size less than the minimum stock size threshold ($MSST = (1 - c)B_{msy}$, where c is the lesser of M or 0.5 . $M = 0.2$; the best estimate of $MSST$ for vermilion snapper is $0.8B_{msy}$).

Atlantic Coast Red Drum - For the following overfishing definition, the F component has been approved under SFA guidelines, and was used to make the assessment contained in this report. Spawning Potential Ratio (SPR) was used to determine the overfished status, and was approved under pre-SFA guidelines.

Overfishing is defined as an F in excess of the fishing mortality rate corresponding to a 30% Static SPR.

Overfished is defined as SPR less than 30%.

Coral, Coral Reefs, and Live / Hard Bottom Habitats of the South Atlantic Region - The following overfishing definition was approved under pre-SFA guidelines and was used to make the assessments contained in this report. This definition contains only an F component.

Fire Corals, Hydrocorals, Octocorals, Stony Corals, Black Corals - Overfishing is defined as an annual level of harvest that exceeds optimum yield (OY). OY for coral reefs, stony corals, hydrocorals, black corals, seafans, and live rock is zero, except as may be authorized for scientific and educational purposes. Harvest of allowable octocorals in the EEZ is specified by the South Atlantic Council each year.

Overfished is not defined.

Pelagic Sargassum Habitat of the South Atlantic Region - Both the overfished and overfishing definitions were approved under SFA guidelines and were used to make the assessment contained in this report. However, the overfishing threshold (MFMT) was not approved.

Overfishing is defined as the rate of harvest which compromises the stocks's ability to produce MSY.

A stock is overfished when the stock is reduced below MSST. The MSST is 25,000 mt, which would be $B_{MSY}/2$, where B_{MSY} is defined as one-half the carrying capacity (MSY) of the harvest area.

Coastal Migratory Pelagics of the South Atlantic and Gulf of Mexico - The overfishing definitions for the following South Atlantic stocks have been fully approved under SFA guidelines, and were used to make the assessments contained in this report. The definitions contain both an F and a B component.

Atlantic group King Mackerel and Atlantic group Spanish Mackerel - Overfishing occurs when the fishing mortality rate is in excess of the F corresponding to a 30% Static SPR.

A stock is overfished when the stock size is less than the minimum stock size threshold (MSST).

For the following stocks, the F component of the overfishing definition has been approved under SFA guidelines, and was used to make the assessments contained in this report. Transitional Spawning Potential Ratio (SPR) was used to determine the overfished status, and was approved under pre-SFA guidelines.

Gulf group King Mackerel, Gulf group Spanish Mackerel, and Dolphin - Overfishing occurs when the F is in excess of the F corresponding to a 30% Static SPR.

A stock is overfished when the transitional SPR is less than 20%.

Cobia, Cero, Little Tunny, Bluefish (Gulf of Mexico only) - Overfishing occurs when the F is in excess of the F corresponding to a 30% Static SPR.

A stock is overfished when the transitional SPR is less than 30%.

Spiny Lobster Fishery of the South Atlantic and Gulf of Mexico - For the following overfishing definition, the F component has been approved under SFA guidelines, and was used to make the assessment contained in this report. Transitional Spawning Potential Ratio (SPR) was used to determine the overfished status, and was approved under pre-SFA guidelines.

Spiny Lobster - Overfishing is defined as an F in excess of the fishing mortality rate corresponding to a 20% SPR.

The stock is overfished when the SPR is less than 20%.

Slipper Lobster - No overfishing definition exists in the FMP.

Stone Crab Fishery of the Gulf of Mexico - For the following overfishing definition, the F component has been approved under SFA guidelines, and was used to make the assessment contained in this report. The pre-SFA definition was used to make the assessment of overfished status.

Overfishing occurs and a stock is overfished when the realized egg production per recruit is reduced below 70% of potential production. This will be avoided when there is a minimum claw length (length of prodopus) that assures survival of the crabs to achieve 70% egg production per recruit potential.

Shrimp Fishery of the Gulf of Mexico - For the following overfishing definitions, the B component has been approved for **Brown Shrimp**, **Pink Shrimp**, and **White Shrimp** under SFA guidelines, and was used to make the assessments contained in this report. For **Royal Red Shrimp**, there is no B component of the overfishing definition to make an assessment. For the F component, the pre-SFA definitions were used to make the assessments for all of the shrimp.

Brown Shrimp - Overfishing is occurring and the stock is overfished when the parent stock levels are reduced below 125 million shrimp (MSST). This value is slightly lower than the 1983 level of parent stock, which is the lowest observed value since 1960. Parent stock is defined for brown shrimp as the number of age 7+ (months) shrimp during the November through February period.

Pink Shrimp - Overfishing is occurring and the stock is overfished when parent stock levels are reduced below 100 million shrimp (MSST). Parent stock is defined for pink shrimp as the number of 5+ (months) shrimp during the July through June period. Pink shrimp in the western U.S. Gulf were not included in this definition because mixed catches of brown and pink shrimp are not separated and are landed, sold, and statistically treated as brown shrimp.

White Shrimp - Overfishing is occurring and the stock is overfished when parent stock levels are reduced below 330 million shrimp (MSST). Parent stock is defined for white shrimp as the number of age 7+ (months) shrimp during the May through August period.

Royal Red Shrimp - Overfishing is occurring and the stock is overfished when landings exceed optimum yield (OY). OY is set at MSY (maximum sustainable yield), which was estimated to

be 392,000 pounds of tails over 1,290 days fished. Royal red shrimp differ from penaeid shrimp in that they are not estuarine dependent but exist in a relatively constant environment in the deeper waters of the Gulf of Mexico (100 to 300 fathoms). Thus, they conform more closely to a classical Schaefer-type fishery.

Overfished is undefined.

Rock Shrimp and Seabob Shrimp - No overfishing or overfished definitions exist in the FMP.

Coral and Coral Reefs of the Gulf of Mexico - The following overfishing definition was approved under pre-SFA guidelines and was used to make the assessments contained in this report. This definition contains only an F component.

Fire Corals, Hydrocorals, Octocorals, Stony Corals, Black Corals - Overfishing is defined as an annual level of harvest that exceeds optimum yield (OY). OY for coral reefs, stony corals, hydrocorals, black corals, seafans, and live rock is zero, except as may be authorized for scientific and educational purposes. Harvest of allowable octocorals in the EEZ is not to exceed 50,000 colonies per year (Gulf and South Atlantic EEZ combined).

Overfished is undefined.

Reef Fish of the Gulf of Mexico - For all of the following stocks except **Red Snapper**, the F component of the overfishing definition has been approved under SFA guidelines, and was used to make the assessments contained in this report. For the F component for **Red Snapper**, the pre-SFA definition was used to make the assessments. For all stocks except **Red Grouper, Vermilion Snapper, and Yellowtail Snapper**, Spawning Potential Ratio (SPR) was used to determine the overfished status, and was approved under pre-SFA guidelines.

Red Snapper - Overfishing occurs when the fishing mortality rates exceeds that associated with a 20% static SPR.

The stock is overfished when the transitional SPR is less than 20%.

Red Grouper - Overfishing is defined as a fishing mortality rate that exceeds $MFMT = F_{MSY}$. The best estimate of $F_{MSY} = 0.306$; current $F = 0.315$ (assuming a stock-recruitment curve steepness of 0.7. If it were 0.8, $F_{MSY} = 0.364$ and $F_{curr} = 0.316$).

Overfished is defined as a stock size less than the minimum stock size threshold ($MSST = (1-c)B_{MSY}$, where c is the lesser of M or 0.5. $M = 0.2$, $MSST = (1-c)SS_{msy}$ (spawning stock in metric tons of gonad weight, rather than just simply biomass, which ignores the immature fish and all but the gonads of mature fish). Specifically SS_{msy} was 840 MT gonad weight for a

steepness of 0.7, resulting in an MSST of 672 MT gonad weight. If steepness was 0.8, SSmsy was 715 MT gonad weight, resulting in an MSST of 572 MT gonad weight.

Nassau Grouper, Goliath Grouper (Jewfish) - The maximum fishing mortality threshold is the rate corresponding to a 40% static SPR. Overfishing occurs when the fishing mortality rates exceeds that associated with a 40% static SPR.

A stock is overfished when the transitional SPR is less than 20%. Qualitative information suggests that these stocks are severely overfished due to a lack of occurrence in sampling and catches (prior to moratorium).

Greater Amberjack, Gag, Gray Triggerfish, Lesser Amberjack, Almaco Jack, Banded Rudderfish, Queen Snapper, Mutton Snapper, Schoolmaster, Blackfin Snapper, Cubera Snapper, Gray (Mangrove) Snapper, Dog Snapper, Mahogany Snapper, Lane Snapper, Silk Snapper, Wenchman, Goldface Tilefish, Blackline Tilefish, Anchor Tilefish, Blueline Tilefish, Tilefish, Rock Hind, Speckled Hind, Yellowedge Grouper, Red Hind, Misty Grouper, Warsaw Grouper, Snowy Grouper, Black Grouper, Yellowmouth Grouper, Scamp, Yellowfin Grouper, Hogfish, Dwarf Sand Perch, Sand Perch - The maximum fishing mortality threshold is the rate corresponding to a 30% static SPR. Overfishing occurs when the fishing mortality rates exceeds that associated with a 30% static SPR.

A stock is overfished when the transitional SPR is less than 20%.

Vermilion Snapper - Overfishing is defined as a fishing mortality rate that exceeds MFMT = F_{MSY} . The best estimate of $F_{MSY} = 0.32$; current $F = 0.64$, or 1.99 times F_{MSY} (from the base case surplus production model).

Overfished is defined as a stock size less than the minimum stock size threshold (MSST) = $(1-c)B_{MSY}$, where c is the lesser of M or 0.5. $M=0.25$; the best estimate of MSST $0.75B_{MSY}$.

Yellowtail Snapper - Overfishing is defined as a fishing mortality rate that exceeds MFMT = F_{MSY} . The best estimate of $F_{MSY} = 0.33$; current $F = 0.24$ (from the Fleet Specific model run of the stock assessment).

Overfished is defined as a stock size less than the minimum stock size threshold (MSST) = $(1-c)B_{MSY}$, where c is the lesser of M or 0.5. $M=0.2$; the best estimate of MSST for vermilion snapper is $0.8B_{MSY}$.

Red Drum (Gulf of Mexico) - For the following overfishing definition, the F component has been approved under SFA guidelines, and was used to make the assessment contained in this report. Transitional Spawning Potential Ratio (SPR) was used to determine the overfished status,

and was approved under pre-SFA guidelines.

The maximum fishing mortality threshold is the rate corresponding to a 30% static SPR. Overfishing occurs when the fishing mortality rates exceeds that associated with a 30% static SPR.

A stock is overfished when the transitional SPR is less than 20%.

Spiny Lobster (Caribbean) - The following overfishing definition was approved under pre-SFA guidelines and was used to make the assessments contained in this report. This definition contains both an F and transitional Spawning Potential Ratio (SPR) component.

When a spiny lobster stock or stock complex is overfished, overfishing is defined as the harvesting rate that is not consistent with a program that has been established to rebuild the stock or stock complex to the 20% SPR. When a spiny lobster stock or stock complex is not overfished, overfishing is defined as a harvesting rate that, if continued, would lead to a state that would not allow harvest at OY on a continuing basis. The SPR for spiny lobsters is measured in terms of eggs per recruit. For monitoring the SPR, the method described by Gregory *et al.* (1982) will be used to compare female fecundity by length class within fished areas to that in unfished areas.

A spiny lobster stock or stock complex is overfished when it is below the level of 20% of the Spawning Potential Ratio (SPR).

Queen Conch Resources of Puerto Rico and the U.S. Virgin Islands - The following overfishing definition was approved under pre-SFA guidelines and was used to make the assessments contained in this report. This definition contains both an F and a B component.

Queen Conch - When a queen conch stock is overfished, overfishing is defined as harvesting at a rate that is not consistent with a program that has been established to rebuild the stock to the 20% SSBR level. When a queen conch stock is not overfished, overfishing is defined as a harvesting rate that, if continued, would lead to a state of the stock or stock complex that would not at least allow a harvest of OY on a continuing basis.

A queen conch stock is overfished when it is below the level of 20% of the spawning stock biomass per recruit (SSBR) that would occur in the absence of fishing.

Atlantic Triton's Trumpet, Cameo Helmet, Caribbean Helmet, Caribbean Vase, Flame Helmet, Green Star Shell, Hawkwing Conch, Milk Conch, Roostertail Conch, True Tulip, West Indian Fighting Conch, Whelk (West Indian Top Shell) - No overfishing definition exists in the FMP.

Reef Fish Fishery of Puerto Rico and the U.S. Virgin Islands - The following overfishing definition was approved under pre-SFA guidelines and was used to make the assessments contained in this report. This definition contains both an F and transitional Spawning Potential Ratio (SPR) component.

Goliath Grouper (Jewfish), Nassau Grouper - Overfishing occurs when the fishing mortality rates exceeds that corresponding to a 20% SPR level.

A stock is overfished when the transitional SPR is less than 20%. Qualitative information suggests that these stocks are severely overfished due to a lack of occurrence in sampling and catches (prior to moratorium).

Ocean Surgeonfish, Doctorfish, Blue Tang, Frogfish, Flamefish, Conchfish, Trumpetfish, Scrawled Filefish, Queen Triggerfish, Whitespotted Filefish, Ocean Triggerfish, Black Durgon, Sargassum Triggerfish, Redlip Blenny, Peacock Flounder, Yellow Jack, Blue Runner, Horse-eye Jack, Black Jack, Bar Jack, Greater Amberjack, Almaco Jack, Longsnout Butterflyfish, Foureye Butterflyfish, Spotfin Butterflyfish, Banded Butterflyfish, Redspotted Hawkfish, Flying Gurnard, Atlantic Spadefish, Neon Goby, Rusty Goby, Royal Gramma, Porkfish, Margate, Tomtate, French Grunt, White Grunt, Bluestriped Grunt, Squirrelfish, Longspine Squirrelfish, Blackbar Soldierfish, Cardinal Soldierfish, Spanish Hogfish, Creole Wrasse, Yellowcheek Wrasse, Yellowhead Wrasse, Clown Wrasse, Puddingwife, Pearly Razorfish, Green Razorfish, Hogfish, Bluehead Wrasse, Black Snapper, Queen Snapper, Mutton Snapper, Schoolmaster, Blackfin Snapper, Gray Snapper, Dog Snapper, Mahogany Snapper, Lane Snapper, Silk Snapper, Yellowtail Snapper, Wenchman, Vermilion Snapper, Blackline Tilefish, Sand Tilefish, Yellow Goatfish, Spotted Goatfish, Chain Moray, Green Moray, Goldentail Moray, Batfish, Goldspotted Eel, Yellowhead Jawfish, Dusky Jawfish, Spotted Trunkfish, Honeycomb Cowfish, Scrawled Cowfish, Trunkfish, Smooth Trunkfish, Cherubfish, Queen Angelfish, Rock Beauty, Gray Angelfish, French Angelfish, Sergeant Major, Blue Chromis, Sunshinefish, Yellowtail Damsel, Dusky Damsel, Beaugregory, Bicolor Damsel, Threespot Damsel, Bigeye, Glasseye Snapper, Midnight Parrotfish, Blue Parrotfish, Striped Parrotfish, Rainbow Parrotfish, Princess Parrotfish, Queen Parrotfish, Redband Parrotfish, Redtail Parrotfish, Redfin Parrotfish, Stoplight Parrotfish, High-hat, Jackknife-fish, Spotted Drum, Scorpionfishes, Rock Hind, Graysby, Yellowedge Grouper, Coney, Red Hind, Red Grouper, Misty Grouper, Butter Hamlet, Swissguard Basslet, Yellowfin Grouper, Tiger Grouper, Creole-fish, Greater Soapfish, Orangeback Bass, Lantern Bass, Tobacconfish, Harlequin Bass, Chalk Bass, Caribbean Tonguefish, Sea Bream, Jolthead Porgy, Sheepshead Porgy, Pluma, Seahorses, Pipefishes, Sand Diver, Sharpnose Puffer, Porcupinefish - Overfishing occurs when the fishing mortality rates exceeds that corresponding to a 20% SPR level.

A stock is overfished when the transitional SPR is less than 20%.

Corals and Reef Associated Invertebrates of Puerto Rico and the U.S. Virgin Islands -The following overfishing definition was approved under pre-SFA guidelines and was used to make the assessments contained in this report. This definition contains only an F component.

Hydrocorals, Soft Corals, Gorgonian Corals, Hard Corals, Black Corals, False Corals, Sponges, Hydroids, Anemones, Colonial Anemones, Annelid Worms, other Gastropods, Bivalves, Cephalopods, Crustaceans, Bryozoans, Feather Stars, Sea Stars, Brittle and Basket Stars, Sea Urchins, Sea Cucumbers, Tunicates - Overfishing is defined as an annual level of harvest that exceeds OY. OY for stony corals, octocorals, live-rock and seagrasses is set at zero, except as may be authorized for scientific research, education and restoration purposes.

Green Algae, Red Algae, Seagrasses - No overfishing or overfished definitions exist in the FMP.

West Coast Salmon - The following overfishing definition was approved under post-SFA guidelines and was used to make the assessments contained in this report. This definition was used to make determinations for both the fishing mortality rate and stock level.

CALIFORNIA CENTRAL VALLEY CHINOOK (includes Sacramento River Fall, Sacramento River Spring, and Sacramento River Winter), NORTHERN CALIFORNIA COAST CHINOOK (includes Eel, Mattole, Mad, and Smith Rivers, Klamath River Fall, and Klamath River Spring), OREGON COAST CHINOOK (includes Southern Oregon, and Central and Northern Oregon), COLUMBIA RIVER BASIN CHINOOK (includes North Lewis River Fall, Lower River Hatchery Fall, Lower River Hatchery Spring, Upper Willamette Spring, Mid-River Bright Hatchery (Fall), Spring Creek Hatchery (Fall), Klickitat, Warm Springs, John Day, and Yakima Rivers (Spring), Snake River Fall, Snake River Spring / Summer, Upper River Bright (Fall), Upper River Summer, and Upper River Spring), WASHINGTON COAST CHINOOK (includes Willapa Bay Fall (natural), Willapa Bay Fall (hatchery), Grays Harbor Fall, Grays Harbor Spring, Quinault Fall, Queets Fall, Queets Spring / Summer, Hoh Fall, Hoh Spring / Summer, Quillayute Fall, Quillayute Spring / Summer, and Hoko Summer / Fall), PUGET SOUND CHINOOK (includes Eastern Strait of Juan de Fuca Summer / Fall, Skokomish Summer / Fall (Hood Canal), Nooksack Spring (early), Skagit Summer / Fall, Skagit Spring, Stillaguamish Summer / Fall, Snohomish Summer / Fall, Cedar River Summer / Fall (Lake Washington), White River Spring, Green River Summer / Fall, and Nisqually River Summer / Fall (South Puget Sound)), SOUTHERN BRITISH COLUMBIA CHINOOK (includes Coastal Stocks, and Fraser River), OREGON PRODUCTION INDEX AREA COHO (includes Central California Coast, Northern California, Oregon Coastal Natural, Columbia River Late (Hatchery), Columbia River Early (Hatchery), and Columbia River (Natural)], WASHINGTON COASTAL COHO (includes Willapa Bay (Hatchery), Grays Harbor, Quinault (Hatchery), Queets, Hoh, Quillayute Fall, Quillayute Summer (Hatchery), and Western Strait of Juan deFuca), PUGET SOUND COHO (includes Eastern Strait of Juan de Fuca, Hood Canal, Skagit, Stillaguamish, Snohomish, South Puget Sound (Hatchery)),

SOUTHERN BRITISH COLUMBIA COAST COHO (includes Coastal Stocks, and Fraser River) and PINK (ODD-NUMBERED YEARS) (includes PUGET SOUND, and Fraser River) - With NOAA Fisheries approval of Amendment 14 to the Pacific Coast Salmon Plan (Salmon FMP) on September 27, 2000, the Pacific Fishery Management Council's (PFMC) criteria for an overfishing concern are met if, in three consecutive years, the post-season estimates indicate a natural stock has fallen short of its conservation objective (MSY, maximum sustainable production (MSP₂), or spawner floor as noted for some harvest rate objectives) as listed in Table 3-1 of the Salmon FMP. It is possible that a failure to meet conservation objectives for three consecutive years could result from normal variation, as has been seen in the past for several previously referenced salmon stocks which were reviewed under the PFMC's former overfishing definition. However, the occurrence of three consecutive years of reduced stock size or spawner escapements, depending on the magnitude of the short-fall, may signal the beginning of a critical downward trend which may result in fishing that jeopardizes the capacity of the stock to produce MSY over the long term if appropriate actions are not taken.

Chinook salmon (*Oncorhynchus tshawytscha*) and coho salmon (*O. kisutch*) are the main species caught in PFMC-managed ocean salmon fisheries. In odd-numbered years, catches of pink salmon (*O. gorbuscha*) can also be significant, primarily off Washington and Oregon. Therefore, while all species of salmon fall under the jurisdiction of this plan, it currently contains conservation objectives only for chinook, coho, pink (odd-numbered years only), and any salmon species listed under the Endangered Species Act (ESA) that is measurably impacted by PFMC fisheries. To the extent practicable, the Council has partitioned this coastwide aggregate of chinook, coho and pink salmon into various stock components with specific conservation objectives. A detailed listing of the individual stocks or stock complexes managed under the Salmon FMP, along with pertinent stock information and conservation objectives, is provided in Chapter 3 of the Salmon FMP.

The Salmon FMP contains no fishery management objectives for **even-numbered year pink salmon, chum (*O. keta*), sockeye (*O. nerka*), steelhead (*O. mykiss*), or sea-run cutthroat (*O. clarki*)**. The PFMC does not manage fisheries for these species and incidental catches are inconsequential (low hundreds of fish each year) to very rare. Stocks without specified goals in the FMP are also provided significant protection against overfishing because the PFMC bases its management on the stock which is first reduced to its annual specified goal level by the fisheries. Such a stock could be the weakest stock or an abundant stock that is heavily impacted by ocean salmon fisheries.

To achieve optimum yield, prevent overfishing, and assure rebuilding of salmon stocks whose abundance has been depressed to an overfished level, the Salmon FMP establishes, to the extent practicable, conservation objectives to perpetuate the coastwide aggregate of salmon stocks covered by the Salmon FMP. The PFMC's stock conservation objectives (to be achieved annually) and other pertinent stock management information are contained in Table 3-1 of the Salmon FMP. Specific objectives are listed for natural and hatchery stocks that are part of the PFMC's preseason fishery option development process, including all stocks listed under the federal ESA. The objectives may be applicable to a single stock or a complex of interrelated

stocks (those sharing similarities in life-history traits, geographic distribution, habitat preferences and genetic characteristics). 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 management information is available from which to assess ocean fishery impacts directly. In the latter case, the conservation objective for a managed stock may serve to provide for the conservation of a closely related stock unless, or until, more specific management information can be developed.

The PFMC's conservation objectives for natural stocks may (1) be based on estimates for achieving MSY, an MSY proxy, or MSP_2 , or (2) represent special data gathering or rebuilding strategies to approach MSY, which could be used to eventually develop MSY or MSP_2 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 PFMC, or with other state, tribal or federal entities. Details of the conservation objectives are available in PFMC (1984), in individual amendment documents, and as referenced in Table 3-1. Most of the objectives for stocks north of Cape Falcon, Oregon, have been included in U.S. District Court orders. Under those orders for Washington coastal and Puget Sound stocks (U.S. v. Washington, 626 F. Supp. 1405 [1985] and Hoh v. Baldrige No. 81-742 [R] C), the treaty tribes and Washington Department of Fish and Wildlife may agree to annual spawner targets that differ from Salmon FMP objectives.

The Salmon FMP contains three exceptions to the application of overfishing criteria and subsequent PFMC actions for stocks or stock complexes with conservation objectives in Table 3-1: (1) hatchery stocks, (2) stocks for which PFMC management actions have inconsequential impacts, and (3) stocks listed under the ESA.

Salmon stocks important to ocean fisheries and comprised exclusively of hatchery production generally have conservation objectives expressed as an egg-take or the number of spawners returning to the hatchery rack to meet program objectives. The Salmon FMP recognizes these objectives and strives to meet them. However, these artificially produced stocks generally do not need the protection of overfishing criteria and special PFMC rebuilding programs to maintain long-term production. Because hatchery stocks can generally sustain significantly higher harvest exploitation rates than natural stocks, ocean fisheries rarely present a threat to their long-term survival. Therefore, hatchery stocks that meet this criteria are the first exception to the application of overfishing criteria.

Several natural stock components identified within the Salmon FMP are subject to minimal harvest impacts in PFMC fisheries because of migration timing and/or distribution and therefore are exceptions to the application of overfishing criteria. As a result, the PFMC's ability to affect the overall trend in the abundance of these components through harvest restrictions is limited. Components in this second exception are identified by a cumulative adult equivalent exploitation rate of less than 5% in ocean fisheries under PFMC jurisdiction during base periods utilized by the fishery regulation assessment models (1979-1982 for chinook and 1979-1981 for coho).

The PFMC regards stocks listed as endangered or threatened under the ESA as a third exception to the application of overfishing criteria of the Magnuson-Stevens Act. The ESA requires federal agencies whose actions may jeopardize listed salmon to consult with NOAA Fisheries. Because NOAA Fisheries implements ocean harvest regulations, it is both the action and consulting agency for actions taken under the Salmon FMP. To ensure there is no jeopardy, NOAA Fisheries conducts internal consultations with respect to the effects of ocean harvest on listed salmon. The PFMC implements NOAA Fisheries' guidance as necessary to avoid jeopardy, as well as in recovery plans approved by NOAA Fisheries. As a result of NOAA Fisheries' consultation, an incidental take statement may be issued which authorizes take of listed stocks under the FMP that would otherwise be prohibited under the ESA. The PFMC believes that the requirements of the ESA are sufficient to meet the intent of the Magnuson-Stevens Act overfishing provisions. Those provisions are structured to maintain or rebuild stocks to levels at or above MSY and require the PFMC to identify and develop rebuilding plans for overfished stocks.

Coastal Pelagics Species - The following overfishing definitions have been fully approved under SFA guidelines and were used to make the assessments contained in this report. For Pacific (Chub) Mackerel, Pacific Sardine, and Market Squid, the definition contains both an F and a B component. For Jack Mackerel and Northern Anchovy (Central subpopulation), the overfishing definition contains only an F component. There are no overfishing and overfished definitions for Northern Anchovy (Northern subpopulation).

Pacific (Chub) Mackerel, Pacific Sardine - In operational terms, overfishing occurs whenever catch exceeds ABC, which is the annual value of the MSY control rule adopted for Pacific mackerel and Pacific sardine, which are actively managed species under the Coastal Pelagic Species FMP.

A stock is overfished when the biomass level is low enough to jeopardize the capacity of the stock to produce MSY on a continuing basis. For Pacific (Chub) Mackerel, the stock is overfished if the stock biomass is 18,200 mt or less. For Pacific Sardine, the stock is overfished if the 1+ stock biomass on July 1 is 50,000 mt or less.

Market Squid - In operational terms, overfishing occurs when market squid are harvested at a rate or level that results in egg escapement falling below 30 percent of the potential maximum level. The fishery is monitored real time and the catch is examined to estimate the reproductive output of the harvested population and compare it to the output of the population in the absence of fishing.

A stock is overfished when the ratio of egg escapement compared to the potential maximum level results in a ratio below 30 percent. If a stock is declared overfished, fishing ceases until the next year.

Jack Mackerel, Northern Anchovy (Central subpopulation) - In operational terms,

overfishing occurs whenever catch exceeds ABC, which, based on the default MSY control rule used for monitored species, is set at 25% of estimated MSY.

There is no threshold level of stock biomass defining overfished.

Northern Anchovy (Northern subpopulation) - No overfishing or overfished definitions exist in the FMP; however, the PFMC has developed Amendment 10 to the Coastal Pelagics Species FMP, which defines overfishing criteria for market squid.

Washington, Oregon, and California Groundfish - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Lingcod, Pacific Ocean Perch, Bocaccio, Canary Rockfish, Cowcod, Darkblotched Rockfish, Widow Rockfish, Yelloweye Rockfish, Bank Rockfish, Shortspine Thornyhead, Longspine Thornyhead, Yellowtail Rockfish, Pacific Whiting, Sablefish, Dover Sole, English Sole, Petrale Sole, Chilipepper Rockfish, Shortbelly Rockfish, Arrowtooth Flounder, Black Rockfish (North), Silvergrey Rockfish, Pacific Cod, Butter Sole, Curlfin Sole, Flathead Sole, Pacific Sanddab, Rex Sole, Rock Sole, Sand Sole, Starry Flounder, Aurora Rockfish, Black-and-Yellow Rockfish, Blackgill Rockfish, Blue Rockfish, Bronzespotted Rockfish, Brown Rockfish, Calico Rockfish, China Rockfish, Copper Rockfish, Dusky Rockfish, Flag Rockfish, Gopher Rockfish, Grass Rockfish, Greenblotched Rockfish, Greenspotted Rockfish, Greenstriped Rockfish, Harlequin Rockfish, Honeycomb Rockfish, Kelp Rockfish, Mexican Rockfish, Olive Rockfish, Pink Rockfish, Quillback Rockfish, Redbanded Rockfish, Redstripe Rockfish, Rosethorn Rockfish, Rosy Rockfish, Rougheyeye Rockfish, Sharpchin Rockfish, Shortraker Rockfish, Speckled Rockfish, Splitnose Rockfish, Squarespot Rockfish, Starry Rockfish, Stripetail Rockfish, Tiger Rockfish, Vermilion Rockfish, Yellowmouth Rockfish, Leopard Shark, Soupfin Shark, Spiny Dogfish, Big Skate, California Skate, Longnose Skate, Rattfish, Finescale Codling, Pacific Rattail, Cabezon, Kelp Greenling, California Scorpionfish, Treefish – Overfishing occurs when the catch exceeds the fishing mortality rate needed to produce the maximum sustainable yield (F_{msy}) on a continual basis. The default F_{msy} proxy used for setting acceptable biological catches (ABCs) are as follows: For flatfish and whiting $F_{40\%}$, for rockfish (including thornyheads) $F_{50\%}$, and for other groundfish such as sablefish and lingcod $F_{45\%}$.

A stock is overfished if its current biomass is less than 25% of the unfished biomass level or if the current biomass is less than 50% of the biomass that would produce the maximum sustainable yield (MSY).

Overfishing and overfished parameters cannot be estimated for all species because of the wide range of knowledge available for the species managed under the FMP. Three categories of species are identified. The first includes the few species for which a quantitative stock

assessment can be conducted on the basis of catch-at-age or other data. The second category includes a large number of species for which some biological indicators are available, but a quantitative analysis cannot be completed. The third category includes minor species that are caught, but for which there is, at best, only partial information on landed biomass.

Crustaceans of the Western Pacific - The following overfishing definitions have been fully approved under SFA guidelines. The definitions contain both an F and a B component.

Lobster (Red and Green spiny lobster and Common, Chinese, and Giant slipper lobster) of the Northwestern Hawaiian Islands - The lobster stocks are assessed as multi-species stock complexes or as individual species, depending on the data and stock assessment tools available.

Overfishing occurs when F is greater than $F_{MSY} B / B_{MSY}$ if the stock biomass (B) is less than or equal to B_{MSY} , or when F is greater than F_{MSY} if the stock biomass (B) is greater than B_{MSY} . The fishery in the EEZ for these stocks is closed.

A stock is overfished when stock biomass (B) is less than $c B_{MSY}$, where c is equal to the greater of 1 minus the natural mortality rate (M) and 0.5. The best estimates of M are published annually in the SAFE report; no estimates have yet been published.

Kona Crab - No overfishing or overfished definitions exist in the FMP.

Western Pacific Precious Corals - The following overfishing definitions have been fully approved under SFA guidelines and were used to make the assessments contained in this report. The definitions contain both an F and a B component. Assessments are made for individual coral beds. These definitions apply only to “Established” beds, as specified in the FMP, of which there is one, the Makapuu Bed.

Pink Corals (*Corallium secundum*, *Corallium regale*, *Corallium laauense*), **Gold Corals** (*Gerardia* spp., *Callogorgia gilberti*, *Narella* spp., *Calyptrophora* spp.), **Bamboo Corals** (*Lepidisis olapa*, *Acanella* spp.), **Black Corals** (*Antipathes grandis*, *Antipathes dichotoma*, *Antipathes ulex*) – Overfishing occurs when F is greater than 0.066. There has been no fishing for precious corals since 2001.

A stock is overfished when the ratio of the total spawning stock biomass for all species combined to the estimated unfished total spawning stock biomass for all species combined (SPR) is less than 0.3, based on cohort analysis of the pink coral, *Corallium secundum*.

Bottomfish and Seamount Groundfish of the Western Pacific - The following overfishing definitions have been fully approved under SFA guidelines. The definitions contain both an F and a B component.

Bottomfish: Seabass (*hapu upuu*), Squirrelfish Snapper (*ehu*), Red Longtail Snapper (*onaga*), Silver Jaw Jobfish (*lehi*), Gray Jobfish (*uku*), Blueline Snapper (*taape*), Yellowtail Snapper (*yellow tail kalekale*), Crimson Jobfish (*opakapaka*), Yelloweye Snapper (*yelloweye opakapaka*), Von Siebolds snapper (*kalekale*), Oblique-banded snapper (*gindai*), Giant Trevally (*white ulua*), Black Trevally (*black ulua*), Thick Lipped Trevally (*pig ulua*), Amberjack (*kahala*), Blacktip Grouper, Lunartail Grouper, Ambon Emperor (*mafuti*), Redgill Emperor (*mafuti*) - The bottomfish stocks are assessed as multi-species stock complexes, one complex for each of American Samoa, the Northern Mariana Islands, Guam, and the Hawaiian Islands.

Overfishing occurs when F is greater than $F_{MSY} B / c B_{MSY}$ if the stock biomass (B) is less than or equal to $c B_{MSY}$, or when F is greater than F_{MSY} if the stock biomass (B) is greater than $c B_{MSY}$, where c is equal to the greater of 1 minus the natural mortality rate (M) and 0.5. The best estimates of M are published annually in the SAFE report; no estimates have yet been published.

A stock is overfished when stock biomass (B) is less than $c B_{MSY}$, where c is equal to the greater of 1 minus the natural mortality rate (M) and 0.5. The best estimates of M are published annually in the SAFE report; no estimates have yet been published.

Seamount Groundfish: **Pelagic Armorhead, Alfonsin, Ratfish** - The seamount groundfish stocks are assessed using pelagic armorhead as an indicator species.

Overfishing occurs when F is greater than $F_{MSY} B / c B_{MSY}$ if the stock biomass (B) is less than or equal to $c B_{MSY}$, or when F is greater than F_{MSY} if the stock biomass (B) is greater than $c B_{MSY}$, where c is equal to the greater of 1 minus the natural mortality rate (M) and 0.5. The best estimates of M are published annually in the SAFE report; no estimates have yet been published.

A stock is overfished when stock biomass (B) is less than $c B_{MSY}$, where c is equal to the greater of 1 minus the natural mortality rate (M) and 0.5. The best estimates of M are published annually in the SAFE report; no estimates have yet been published. **It should be noted that although this definition has been fully approved under SFA guidelines, no assessment has yet been made relative to this criteria. The most recent assessment is based on pre-SFA criteria, which is as follows: A stock is overfished when its SPR is equal to or less than 0.20.**

Pelagic Fisheries of the Western Pacific - The following overfishing definitions have been fully approved under SFA guidelines. The definitions contain both an F and a B component.

Yellowfin Tuna (Central Western Pacific), Yellowfin Tuna (Eastern Tropical Pacific), Albacore (South Pacific), Albacore (North Pacific), Skipjack Tuna (Central Western Pacific), Skipjack Tuna (Eastern Tropical Pacific), Bigeye Tuna (Pacific), Striped Marlin, Swordfish (North Pacific), Blue Marlin (Pacific), Shortbill Spearfish (Pacific), Wahoo (Pacific), Mahimahi (Pacific), Moonfish, other tuna relatives (Auxis spp., Scomber spp.,

and Allothunnus spp.), Black Marlin, Pomfret, Sailfish (Pacific), Oilfish, Pelagic Sharks - Overfishing occurs when F is greater than $F_{MSY} B / c B_{MSY}$ if the stock biomass (B) is less than or equal to $c B_{MSY}$, or when F is greater than F_{MSY} if the stock biomass (B) is greater than $c B_{MSY}$, where c is equal to the greater of 1 minus the natural mortality rate (M) and 0.5. The best estimates of M are published annually in the SAFE report; no estimates have yet been published, but determinations could nevertheless be made in some cases. The latest estimates of F/F_{MSY} are as follows: Yellowfin Tuna (Central Western Pacific) ($F_{2002}/F_{MSY} = 0.36-0.61$), Albacore (South Pacific) ($F_{2002}/F_{MSY} = 0.05$), Skipjack Tuna (Central Western Pacific) ($F_{2002}/F_{MSY} = 0.12$), Bigeye Tuna (for Central Western Pacific only) ($F_{2002}/F_{MSY} = 1.11-2.0$), Swordfish (North Pacific) ($F_{2001}/F_{MSY} = 0.06$), Blue Marlin (Pacific) ($F_{1997}/F_{MSY} = 0.5$).

A stock is overfished when stock biomass (B) is less than $c B_{MSY}$, where c is equal to the greater of 1 minus the natural mortality rate (M) and 0.5. The best estimates of M are published annually in the SAFE report; no estimates have yet been published, but determinations could nevertheless be made in some cases. The latest estimates of B/B_{MSY} are as follows: Yellowfin Tuna (Central Western Pacific) ($B_{2002}/B_{MSY} = 1.5-2.9$), Albacore (South Pacific) ($B_{2002}/B_{MSY} = 1.3$), Skipjack Tuna (Central Western Pacific) ($B_{2002}/B_{MSY} = 3.1$), Bigeye Tuna (for Central Western Pacific only) ($B_{2002}/B_{MSY} = 1.35-1.72$), Swordfish (North Pacific) ($B_{2001}/B_{MSY} = 1.3$), Blue Marlin (Pacific) ($B_{1997}/B_{MSY} = 1.4$).

Alaska Salmon - For the following overfishing definitions, both the F and the B components were approved under SFA guidelines, and were used to make the assessments contained in this report.

Salmon Fisheries in the EEZ off the Coast of Alaska - These overfishing definitions separate the salmon stocks caught in the southeast Alaska (SEAK) EEZ into three tiers. Tier 1 stocks are chinook stocks covered by the Pacific Salmon Treaty (PST)². The overfishing definition is based on a harvest based on a relationship between a pre-season relative abundance index generated by the Pacific Salmon Commission's Chinook Technical Committee and a harvest control rule specified in the PST. Tier 2 are coho salmon stocks. Tier 3 stocks are coho, pink, chum, and sockeye salmon stocks managed as mixed-species complexes, with coho salmon stocks as indicator stocks.

Tier 1: Chinook stocks

- 1) Under the PST, the MSY control rule consists of a segmented linear relationship between catch and relative abundance.
- 2) The fishing mortality rate for these stocks is expressed as cumulative catch per generation

²Chapter 3 of Annex IV of the Pacific Salmon Treaty (PST) as amended June 30, 1999 (also referred to as the US/Canada bilateral agreement for the Southeast Alaska all-gear chinook catch)

time.

- 3) The maximum fishing mortality threshold is 1.075 times the fishing mortality rate associated with the MSY control rule.
- 4) Should the fishing mortality rate exceed the MFMT in any year, it will be determined that the stocks are being subjected to overfishing.
- 5) The productive capacity of a stock group is measured as the sum of the indicator stocks' escapements from the most recent generation.
- 6) The minimum stock size threshold for a stock group is equal to one-half the sum of the indicator stocks' MSY escapement goals from the most recent generation, where each MSY escapement goal is set at the midpoint of the respective escapement goal range established by the Chinook Technical Committee.
- 7) Should a stock group's productive capacity fall below the MSST in any year, it will be determined that the stock group is overfished.

Tier 2: Coho stocks managed as individual units

- 1) The MSY control rule is of the "constant escapement" form. Specifically, the catch corresponding to the control rule in any given year is equal to the amount that would result in a post-harvest run size equal to the MSY escapement goal, unless the pre-harvest run size fails to exceed the MSY escapement goal, in which case the catch corresponding to the control rule is zero.
- 2) The fishing mortality rate for these stocks is expressed as an exploitation rate, and is computed as a weighted average of run-specific exploitation rates observed in the stock from the most recent generation.
- 3) The maximum fishing mortality threshold for these stocks is computed as a weighted average of run-specific exploitation rates corresponding to the MSY control rule from the most recent generation.
- 4) Should the fishing mortality rate exceed the MFMT in any year, it will be determined that the stock is being subjected to overfishing.
- 5) The productive capacity of a stock is measured as the sum of the stock's escapements from the most recent generation.
- 6) The minimum stock size threshold for a stock is equal to one-half the sum of the stock's MSY escapement goals from the most recent generation.

7) Should a stock's productive capacity fall below the MSST in any year, it will be determined that the stock is overfished.

Tier 3: Coho, sockeye, pink, and chum salmon stocks managed as complexes

The MSY control rule is of the "constant escapement" form. The difference with respect to Tier 2 is not the *form* of the control rule, but rather the level of aggregation at which it is applied. Using the same definitions and criteria described under Tier 2, a determination that one or more indicator coho stocks is being subjected to overfishing or is overfished will constitute a determination that the respective stock complex is being subjected to overfishing or is overfished, except that overfishing of one or more stocks in a stock complex may be permitted, and will not result in a determination that the entire stock complex is being subjected to overfishing, under the conditions set forth in 50 CFR §600.310(d)(6).

Pink Salmon, Sockeye Salmon, Chum Salmon, Coho Salmon - A stock is overfished if it falls below MSST in any year, which is equal to one-half the sum of the indicator coho stocks' MSY escapement goals from the most recent T coho years.

Chinook Salmon - A stock is overfished if it falls below MSST in any year, which is equal to one-half the sum of the indicator stocks' MSY escapement goals from the most recent Tchin years, where each MSY escapement goal is set at the midpoint of the respective escapement goal range established by the Chinook Technical Committee under the Pacific Salmon Treaty.

Gulf of Alaska Groundfish - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. All stocks are covered, either directly or indirectly, by a definition containing an F component. For a stock managed individually, coverage is direct (i.e., the definition applies to the stock itself. For stocks managed jointly, as members of a complex, coverage is indirect (i.e., the definition applies to the complex as a whole, not to the member stocks separately).

Western/Central Walleye Pollock, Pacific Cod, Sablefish, Shortspine Thornyhead, Arrowtooth Flounder, Western Pacific Ocean Perch, Central Pacific Ocean Perch, Eastern Pacific Ocean Perch, Northern Rockfish, Eastern Walleye Pollock, Atka Mackerel, Alaska Plaice, Butter Sole, Deepsea Sole, Dover Sole, English Sole, Flathead Sole, Greenland Turbot, Rex Sole, Northern Rock Sole, Southern Rock Sole, Sand Sole, Starry Flounder, Yellowfin Sole, Dusky Rockfish, Yelloweye Rockfish, Bocaccio, Chilipepper, Darkblotched Rockfish, Greenstriped Rockfish, Harlequin Rockfish, Pygmy Rockfish, Redbanded Rockfish, Redstripe Rockfish, Roughey Rockfish, Sharpchin Rockfish, Shortraker Rockfish, Silvergrey Rockfish, Splitnose Rockfish, Stripetail Rockfish, Vermilion Rockfish, Yellowmouth Rockfish, C-O Sole, Curlfin Sole, Pacific Sanddab, Petrale Sole, Slender Sole, Widow Rockfish, Yellowtail Rockfish, Canary Rockfish, China Rockfish, Copper Rockfish, Quillback Rockfish, Rosethorn Rockfish, Tiger Rockfish, Longspine Thornyhead, Alaska Skate, Aleutian Skate, Sandpaper Skate, Big Skate, Roughtail Skate, Commander Skate,

Longnose Skate, Mud Skate, Whiteblotched Skate - Overfishing is defined as any rate of fishing in excess of the maximum fishing mortality threshold (MFMT). The catch corresponding to fishing at a rate equal to the MFMT is referred to as the “overfishing level” (OFL). This MFMT is prescribed through a set of six tiers [which are listed in Appendix 5] in descending order of preference, corresponding to descending order of information availability. The SSC will have final authority for determining whether a given item of information is “reliable” for the purpose of this definition, and may use either objective or subjective criteria in making such determinations. For tier 1, a “pdf” refers to a probability density function. For tiers 1-2, if a reliable pdf of B_{MSY} is available, the preferred point estimate of B_{MSY} is the geometric mean of its pdf. For tiers 1-5, if a reliable pdf of B is available, the preferred point estimate is the geometric mean of its pdf. For tiers 1-3, the coefficient α is set at a default value of 0.05, with the understanding that the SSC may establish a different value for a specific stock or stock complex as merited by the best available scientific information. For tiers (2-4), a designation of the form “ $F_{X\%}$ ” refers to the F associated with an equilibrium level of spawning per recruit (SPR) equal to $X\%$ of the equilibrium level of spawning per recruit in the absence of any fishing. If reliable information sufficient to characterize the entire maturity schedule of a species is not available, the SSC may choose to view SPR calculations based on a knife-edge maturity assumption as reliable. For tier 3, the term $B_{40\%}$ refers to the long-term average biomass that would be expected under average recruitment and $F=F_{40\%}$.

Western/Central Walleye Pollock, Eastern Walleye Pollock, Pacific Cod, Sablefish, Shortspine Thornyhead, Arrowtooth Flounder, Western Pacific Ocean Perch, Central Pacific Ocean Perch, Eastern Pacific Ocean Perch, Northern Rockfish - The following definition, while not contained in the FMP, is contained in the Stock Assessment and Fishery Evaluation (SAFE) Report, and is the definition used to make the determinations contained in this report: A stock is overfished when it falls below its minimum stock size threshold (MSST), defined as whichever of the following is greater: $\frac{1}{2}$ the MSY stock size, or the minimum stock size at which rebuilding to the MSY level would be expected to occur within 10 years if the stock were exploited at the MFMT. The MSY level is interpreted as B_{MSY} in Tiers 1-2 and $B_{35\%}$ in Tier 3.

Atka Mackerel, Alaska Plaice, Butter Sole, Deepsea Sole, Dover Sole, English Sole, Flathead Sole, Greenland Turbot, Rex Sole, Northern Rock Sole, Southern Rock Sole, Sand Sole, Starry Flounder, Yellowfin Sole, Dusky Rockfish, Yelloweye Rockfish, Bocaccio, Chilipepper, Darkblotched Rockfish, Greenstriped Rockfish, Harlequin Rockfish, Pygmy Rockfish, Redbanded Rockfish, Redstripe Rockfish, Roughey Rockfish, Sharpchin Rockfish, Shortraker Rockfish, Silvergrey Rockfish, Splitnose Rockfish, Stripetail Rockfish, Vermilion Rockfish, Yellowmouth Rockfish, C-O Sole, Curlfin Sole, Pacific Sanddab, Petrale Sole, Slender Sole, Black Rockfish, Widow Rockfish, Yellowtail Rockfish, Canary Rockfish, China Rockfish, Copper Rockfish, Quillback Rockfish, Rosethorn Rockfish, Tiger Rockfish, Longspine Thornyhead, Blue Shark, Brown Cat Shark, Pacific Sleeper Shark, Salmon Shark, Bluntnose Sixgill Shark, Spiny Dogfish Shark, Alaska Skate, Aleutian Skate, Sandpaper Skate, Big Skate, Roughtail Skate, Commander Skate,

Longnose Skate, Mud Skate, Whiteblotched Skate, Armorhead Sculpin, Bigmouth Sculpin, Dusky Sculpin, Great Sculpin, Red Irish Lord, Ribbed Sculpin, Roughspine Sculpin, Spinyhead Sculpin, Tadpole Sculpin, Thorny Sculpin, Yellow Irish Lord, Giant Pacific Octopus, Smoothskin Octopus, Flapjack Devilfish, Squid *Berryteuthis magister*, Boreopacific Armhook Squid, Squid *Gonatopsis makko*, California Market Squid, Squid *Moroteuthis robusta*, Squid *Onychoteuthis borealijaponicus* - No MSY level, and therefore no MSST, can be specified for Tiers 4-6.

Bering Sea/Aleutian Islands Groundfish - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. All stocks are covered, either directly or indirectly, by a definition containing an F component. For a stock managed individually, coverage is direct (i.e., the definition applies to the stock itself). For stocks managed jointly, as members of a complex, coverage is indirect (i.e., the definition applies to the complex as a whole, not to the member stocks separately).

Eastern Bering Sea Walleye Pollock, Aleutian Islands Walleye Pollock, Bogoslof Walleye Pollock, Pacific Cod, Yellowfin Sole, Greenland Turbot, Arrowtooth Flounder, Rock Sole, Flathead Sole, Eastern Bering Sea Sablefish, Aleutian Islands Sablefish, Pacific Ocean Perch, Atka Mackerel, Alaska Plaice, Squid *Berryteuthis magister*, Longspine Thornyhead, Shortspine Thornyhead, Northern Rockfish, Bering Flounder, Kamchatka Flounder, Sharpchin Rockfish, Shortraker Rockfish, Rougheyeye Rockfish, Arctic Flounder, Butter Sole, Deepsea Sole, Dover Sole, English Sole, Longhead Dab, Rex Sole, Roughscale Sole, Sand Sole, Starry Flounder, Black Rockfish, Darkblotched Rockfish, Dusky Rockfish, Gray Rockfish, Harlequin Rockfish, Redbanded Rockfish, Redstripe Rockfish, Silvergrey Rockfish, Broad Banded Thornyhead, Antlered Sculpin, Armorhead Sculpin, Bigmouth Sculpin, Butterfly Sculpin, Crested Sculpin, Great Sculpin, Plain Sculpin, Red Irish Lord, Ribbed Sculpin, Scissortail Sculpin, Shorthorn Sculpin, Spinyhead Sculpin, Tadpole Sculpin, Thorny Sculpin, Yellow Irish Lord, Alaska Skate, Aleutian Skate, Sandpaper Skate, Big Skate, Roughtail Skate, Commander Skate, Deepsea Skate, Golden Skate, Longnose Skate, Mud Skate, Okhotsk Skate, White-Blotched Skate, Whitebrow Skate, Pacific Sleeper Shark, Salmon Shark, Spiny Dogfish Shark, Giant Pacific Octopus, Flapjack Devilfish - Overfishing is defined as any rate of fishing in excess of the maximum fishing mortality threshold (MFMT). The catch corresponding to fishing at a rate equal to the MFMT is referred to as the “overfishing level” (OFL). This MFMT is prescribed through a set of six tiers [which are listed in Appendix 5] in descending order of preference, corresponding to descending order of information availability. The SSC will have final authority for determining whether a given item of information is “reliable” for the purpose of this definition, and may use either objective or subjective criteria in making such determinations. For tier 1, a “pdf” refers to a probability density function. For Tiers 1-2, if a reliable pdf of B_{MSY} is available, the preferred point estimate of B_{MSY} is the geometric mean of its pdf. For Tiers 1-5, if a reliable pdf of B is available, the preferred point estimate is the geometric mean of its pdf. For Tiers 1-3, the coefficient α is set at a default value of 0.05, with the understanding that the SSC may establish a different value for a specific stock or stock complex as merited by the best available scientific

information. For Tiers 2-4, a designation of the form “F_{X%}” refers to the F associated with an equilibrium level of spawning per recruit (SPR) equal to X% of the equilibrium level of spawning per recruit in the absence of any fishing. If reliable information sufficient to characterize the entire maturity schedule of a species is not available, the SSC may choose to view SPR calculations based on a knife-edge maturity assumption as reliable. For Tier 3, the term B_{40%} refers to the long-term average biomass that would be expected under average recruitment and $F=F_{40\%}$.

Eastern Bering Sea Walleye Pollock, Pacific Cod, Yellowfin Sole, Greenland Turbot, Arrowtooth Flounder, Rock Sole, Flathead Sole, Eastern Bering Sea Sablefish, Aleutian Islands Sablefish, Pacific Ocean Perch, Atka Mackerel, Alaska Plaice - The following definition, while not contained in the FMP, is contained in the Stock Assessment and Fishery Evaluation (SAFE) Report, and is the definition used to make the determinations contained in this report: A stock is overfished when it falls below its minimum stock size threshold (MSST), defined as whichever of the following is greater: ½ the MSY stock size, or the minimum stock size at which rebuilding to the MSY level would be expected to occur within 10 years if the stock were exploited at the MFMT. The MSY level is interpreted as B_{MSY} in Tiers 1-2 and B_{35%} in Tier 3.

Aleutian Islands Walleye Pollock, Bogoslof Walleye Pollock, Squid *Berryteuthis magister*, Longspine Thornyhead, Shortspine Thornyhead, Northern Rockfish, Bering Flounder, Kamchatka Flounder, Sharpchin Rockfish, Shortraker Rockfish, Rougheye Rockfish, Arctic Flounder, Butter Sole, Deepsea Sole, Dover Sole, English Sole, Longhead Dab, Rex Sole, Roughscale Sole, Sand Sole, Starry Flounder, Black Rockfish, Darkblotched Rockfish, Dusky Rockfish, Gray Rockfish, Harlequin Rockfish, Redbanded Rockfish, Redstripe Rockfish, Silvergrey Rockfish, Broad Banded Thornyhead, Antlered Sculpin, Armorhead Sculpin, Bigmouth Sculpin, Butterfly Sculpin, Crested Sculpin, Great Sculpin, Plain Sculpin, Red Irish Lord, Ribbed Sculpin, Scissortail Sculpin, Shorthorn Sculpin, Spinyhead Sculpin, Tadpole Sculpin, Thorny Sculpin, Yellow Irish Lord, Alaska Skate, Aleutian Skate, Sandpaper Skate, Big Skate, Roughtail Skate, Commander Skate, Deepsea Skate, Golden Skate, Longnose Skate, Mud Skate, Okhotsk Skate, White-Blotched Skate, Whitebrow Skate, Pacific Sleeper Shark, Salmon Shark, Spiny Dogfish Shark, Giant Pacific Octopus, Flapjack Devilfish - No MSY level, and therefore no MSST, can be specified for Tiers 4-6.

Bering Sea/Aleutian Islands King and Tanner Crabs - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Blue King Crab (Pribilof Islands, Saint Matthew Island, Saint Lawrence Island), Golden King Crab (Aleutian Islands, Pribilof Islands, Northern District), Red King Crab (Bristol Bay, Norton Sound, Pribilof Islands, Aleutian Islands-Adak, Aleutian Islands-Dutch Harbor), Scarlet King Crab (Aleutian Islands, Eastern Bering Sea), Bering Sea Snow Crab,

Tanner Crab [Eastern Bering Sea, Eastern Bering Sea Triangle, Eastern Bering Sea Grooved, Eastern Aleutian Islands, Eastern Aleutian Islands Triangle, Eastern Aleutian Islands Grooved, Adak (Western Aleutians), Western Aleutian Islands Grooved] -

Overfishing is defined as any rate of fishing mortality in excess of M , where $M = 0.2$ for all species of king crab and $M = 0.3$ for all *Chionoecetes* species.

Blue King Crab (Pribilof Islands, Saint Matthew Island), Red King Crab (Bristol Bay, Pribilof Islands), Bering Sea Snow Crab, Tanner Crab (Eastern Bering Sea) - A stock is overfished when it falls below the minimum stock size threshold (MSST), which is equal to $\frac{1}{2}$ the MSY stock size. MSY stock size equals the average mature biomass observed from 1983-1997.

Alaska Weathervane Scallops - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Overfishing is a level of fishing mortality that jeopardizes the long-term capacity of a stock or stock complex to produce MSY on a continuing basis. MSY is defined as the largest long-term average catch that can be taken from a stock under prevailing ecological and environmental conditions. Amendment 6 to the scallop FMP established MSY for weathervane scallops at 1.24 million lbs of shucked meats based on the average catch from 1990-1997 excluding 1995. Optimum Yield (OY) was defined as 0-1.24 million lbs, and the overfishing control rule was defined as a fishing rate in excess of the natural mortality rate, which has been estimated as $F_{\text{overfishing}} = M = 0.13$ (12% per year) statewide.

A stock is overfished when it falls below the minimum stock size threshold (MSST), which is equal to $\frac{1}{2}$ MSY stock size = 4.76 million pounds. The most recent assessment (2003) estimated abundance for only two of the nine registration areas and a determination of MSST could not be made. The fishery is managed conservatively with harvest levels well below MSY (39 to 66% of MSY since establishment of MSY in 1996).

Atlantic Billfishes - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Blue Marlin (North Atlantic), White Marlin (North Atlantic), Sailfish (West Atlantic), Spearfish (West Atlantic) – Overfishing occurs when the MFMT exceeds F_{MSY} . The relative fishing mortality rates are as follows: Blue Marlin (North Atlantic) ($F_{99}/F_{\text{MSY}} = 4.0$), White Marlin (North Atlantic) ($F_{00}/F_{\text{MSY}} = 8.28$), Sailfish ($F/F_{\text{MSY}} = \text{not estimated}$), and Spearfish ($F/F_{\text{msy}} = \text{not estimated}$).

A stock is overfished when the stock biomass level falls below the MSST, which is set at (1-

$M)B_{MSY}$, where M is the instantaneous natural mortality rate. The relative biomass levels are as follows: Blue Marlin (North Atlantic) ($B_{2000}/B_{MSY} = 0.4$), White Marlin (North Atlantic) ($B_{01}/B_{MSY} = 0.12$), and Sailfish / Spearfish (West Atlantic) ($B/B_{MSY} = \text{not estimated}$).

Atlantic Tunas, Swordfish, and Sharks - The following overfishing definition has been fully approved under SFA guidelines and was used to make the assessments contained in this report. The definition contains both an F and a B component.

Bigeye Tuna (Atlantic), Albacore (North Atlantic), Yellowfin Tuna (West Atlantic), Skipjack Tuna (West Atlantic), Bluefin Tuna (West Atlantic), Swordfish (North Atlantic), Sandbar Shark, Blacktip Shark, Dusky Shark, Spinner Shark, Silky Shark, Bull Shark, Bignose Shark, Narrowtooth Shark, Galapagos Shark, Night Shark, Caribbean Reef Shark, Tiger Shark, Lemon Shark, Sand Tiger Shark, Bigeye Sand Tiger Shark, Nurse Shark, Scalloped Hammerhead Shark, Great Hammerhead Shark, Smooth Hammerhead Shark, Whale Shark, Basking Shark, White Shark, Atlantic Sharpnose Shark, Caribbean Sharpnose Shark, Finetooth Shark, Blacknose Shark, Smalltail Shark, Bonnethead Shark, Atlantic Angel Shark, Shortfin Mako Shark, Longfin Mako Shark, Porbeagle Shark, Thresher Shark, Bigeye Thresher Shark, Blue Shark, Oceanic Whitetip Shark, Sevengill Shark, Sixgill Shark, Bigeye Sixgill Shark - Overfishing occurs when the MFMT is exceeded, which is set at $F_{\text{limit}} = F_{MSY}$. The relative fishing mortality rates (F_{year}/F_{MSY}) are as follows: North Atlantic Swordfish ($F_{01}/F_{msy} = 0.75$), West Atlantic Bluefin Tuna ($F_{01}/F_{MSY} = 2.35-4.64$, low vs high recruitment), Bigeye Tuna ($F_{01}/F_{MSY} = 1.15$), North Atlantic Albacore Tuna ($F_{99}/F_{MSY} = 1.10$), Yellowfin Tuna ($F_{01}/F_{MSY} = 0.87-1.46$), Skipjack Tuna ($F_{02}/F_{msy} = \text{not estimated}$), Blacktip Shark ($F_{01}/F_{MSY} = 0.42-0.82$ (SPM)), Sandbar Shark ($F_{01}/F_{MSY} = 1.08-1.68$ (SPM)), Large Coastal Sharks ($F_{01}/F_{MSY} = 0.89-4.48$ (SPM)), Pelagic Sharks ($F/F_{msy} = \text{not estimated}$), Small Coastal Sharks ($F_{00}/F_{MSY} = 0.24-0.78$), Atlantic Sharpnose Sharks ($F_{00}/F_{msy} = 0.14-0.42$), Bonnethead ($F_{00}/F_{msy} = 0.35-0.56$), Finetooth Shark ($F_{00}/F_{msy} = 3.42-4.13$), and Blacknose Shark ($F_{00}/F_{msy} = 0.61$).

A stock is overfished when the stock level biomass falls below MSST, which is set at $MSST = B_{\text{limit}} = (1-M)B_{MSY}$ when $M < 0.5$; $MSST = B_{\text{limit}} = 0.5B_{MSY}$ when $M \geq 0.5$. For Yellowfin Tuna, $MSST = 0.5B_{MSY}$. The relative biomass levels are as follows: (B_{year}/B_{MSY}) for North Atlantic Swordfish ($B_{02}/B_{MSY} = 0.94$), West Atlantic Bluefin Tuna ($SSB_{01}/SSB_{MSY} = 0.31-0.06$, low vs high recruitment), Bigeye Tuna ($B_{02}/B_{MSY} = 0.81-0.91$), North Atlantic Albacore Tuna ($B_{99}/B_{MSY} = 0.68$), Yellowfin Tuna ($B_{01}/B_{MSY} = 0.73-1.10$), Skipjack Tuna ($B_{02}/B_{msy} = \text{not estimated}$), Blacktip Shark* ($N_{01}/N_{MSY} = 1.20-1.45$ (SPM)), Sandbar Shark* ($N_{01}/N_{MSY} = 0.77-2.22$ (SPM)), Large Coastal Sharks* ($N_{01}/N_{MSY} = 0.46-1.18$ (SPM)), Pelagic Sharks ($B/B_{msy} = \text{not estimated}$), Small Coastal Sharks ($B_{01}/B_{MSY} = 1.38-2.39$), Atlantic Sharpnose Shark ($B_{01}/B_{msy} = 1.69-3.16$), Bonnethead ($B_{01}/B_{msy} = 1.46-2.78$), Finetooth Shark ($B_{01}/B_{msy} = 1.39-2.37$), and Blacknose Shark ($B_{01}/B_{msy} = 1.92-3.15$).

*N is the number of fish, rather than biomass or yield in weight.

Iceland Cat Shark, Smallfin Cat Shark, Deepwater Cat Shark, Broadgill Cat Shark, Marbled Cat Shark, Blotched Cat Shark, Chain Dogfish, Dwarf Catshark, Japanese Gulper Shark, Gulper Shark, Little Gulper Shark, Kitefin Shark, Flatnose Gulper Shark, Portuguese Shark, Greenland Shark, Lined Lanternshark, Broadband Dogfish, Caribbean Lanternshark, Great Lanternshark, Smooth Lanternshark, Fringefin Lanternshark, Green Lanternshark, Cookiecutter Shark, Bigtooth Cookiecutter, Smallmouth Velvet Dogfish, Pygmy Shark, Roughskin Spiny Dogfish, Blainville's Dogfish, Cuban Dogfish, Bramble Shark, American Sawshark, Florida Smoothhound, Smooth Dogfish- Although these stocks are no longer contained in the management unit, they are retained in the FMP for data collection only purposes. There is currently no directed fisheries for these species and they are protected from being finned under the Shark Finning Prohibition Act. In the event that a directed fishery commences, NOAA Fisheries will evaluate data available to see if an FMP amendment or other regulatory measures are warranted.

APPENDIX 3. OVERFISHING DEFINITIONS FOR SPECIES NOT CONTAINED IN FEDERAL FISHERY MANAGEMENT PLANS

American Lobster - The following overfishing definition was approved under pre-SFA guidelines and the assessments contained in this report are based on this definition. This definition contains only an F component.

The American lobster resource is considered recruitment overfished when, throughout its range, the F, given the regulations in place at that time under the suite of regional management measures, results in a reduction in estimated egg production per recruit to 10% or less of a non-fished population (F 10%).

Atlantic Menhaden - The overfishing definition contained in the FMP has F-based and SSB-based benchmarks. The F-based benchmarks are $F_{\text{threshold}} = 1.3$ and $F_{\text{target}} = 1.0$, and the SSB-based benchmarks are $SSB_{\text{threshold}} = 20,570$ mt and $SSB_{\text{target}} = 37,400$ mt.

Northern Shrimp - There is currently no approved ASMFC overfishing definition, however, the SARC has recommended an interim management target $F(1999-2000) = 0.34 = F40\%$.

Striped Bass - Amendment 6 to the Interstate FMP for Atlantic Striped Bass contains an approved definition for both F and B.

Overfishing occurs when F exceeds the fishing mortality threshold F_{msy} , which is currently estimated to be 0.41. The fishing mortality target is set equal to $F=0.30$, and $F=0.27$ for the Chesapeake Bay and the Albemarle Sound/Roanoke River stock.

A striped bass population is considered overfished when the female spawning stock biomass falls below the threshold spawning stock biomass level of 30.9 million pounds (14,000 mt). The female spawning stock biomass target is set at 38.6 million pounds (17,500 metric tons).

Amendment 6 establishes a biomass target and threshold based on the sexually mature females in the striped bass population. Using a threshold only slightly greater than the restoration level, Amendment 6 sets the female spawning stock biomass threshold at 30.9 million pounds (14,000 mt). The female spawning stock biomass target is set at 125% of the spawning stock biomass threshold. This equates to a target of 38.6 million pounds (17,500 metric tons).

Tautog - The overfishing definition is contained in the ASMFC Tautog FMP and was used to make the assessment contained in this year's report. This definition contains only an F component.

Overfishing occurs when F exceeds the threshold, or the interim, fishing rate of 0.24. The FMP established a target fishing rate equal to that of natural mortality ($F=M=0.15$).

Weakfish - Amendment 4 to the Interstate FMP for Weakfish contains an approved definition for both F and B.

Overfishing occurs if the fishing mortality threshold is greater than $F_{\text{threshold}} = F_{20\%} - 0.5$. The fishing mortality target of $F_{\text{target}} = 0.31$. The ASMFC assessment for Weakfish through 2000, found that the fishing mortality rate for weakfish was between F 0.31 and F 0.45.

A stock is overfished when the biomass is less than B_{MSY} . The best available estimate of B_{MSY} proxy is 53,6000 mt.

Pacific Halibut - A rate of fishing that exceeds the constant exploitation yield. The constant exploitation yield is computed using a harvest rate of 0.20 of the exploitable biomass (8-year+ Pacific halibut).

APPENDIX 4. SIX TIERS COMPRISING THE OVERFISHING DEFINITION FOR GULF OF ALASKA AND BERING SEA /ALEUTIAN ISLANDS GROUND FISH

See Appendix 5 for definitions of acronyms used in this appendix.

- 1) Information available: Reliable point estimates of B and B_{MSY} and reliable pdf of F_{MSY} .
 - 1a) Stock status: $B/B_{MSY} > 1$
 $F_{OFL} = \mu_A$, the arithmetic mean of the pdf
 $F_{ABC} \leq \mu_H$, the harmonic mean of the pdf
 - 1b) Stock status: $\alpha < B/B_{MSY} \leq 1$
 $F_{OFL} = \mu_A \times (B/B_{MSY} - \alpha) / (1 - \alpha)$
 $F_{ABC} \leq \mu_H \times (B/B_{MSY} - \alpha) / (1 - \alpha)$
 - 1c) Stock status: $B/B_{MSY} \leq \alpha$
 $F_{OFL} = 0$
 $F_{ABC} = 0$
- 2) Information available: Reliable point estimates of B, B_{MSY} , F_{MSY} , $F_{35\%}$, and $F_{40\%}$.
 - 2a) Stock status: $B/B_{MSY} > 1$
 $F_{OFL} = F_{MSY}$
 $F_{ABC} \leq F_{MSY} \times (F_{40\%}/F_{35\%})$
 - 2b) Stock status: $\alpha < B/B_{MSY} \leq 1$
 $F_{OFL} = F_{MSY} \times (B/B_{MSY} - \alpha) / (1 - \alpha)$
 $F_{ABC} \leq F_{MSY} \times (F_{40\%}/F_{35\%}) \times (B/B_{MSY} - \alpha) / (1 - \alpha)$
 - 2c) Stock status: $B/B_{MSY} \leq \alpha$
 $F_{OFL} = 0$
 $F_{ABC} = 0$
- 3) Information available: Reliable point estimates of B, $B_{40\%}$, $F_{35\%}$, and $F_{40\%}$.
 - 3a) Stock status: $B/B_{40\%} > 1$
 $F_{OFL} = F_{35\%}$
 $F_{ABC} \leq F_{40\%}$
 - 3b) Stock status: $\alpha < B/B_{40\%} \leq 1$
 $F_{OFL} = F_{35\%} \times (B/B_{40\%} - \alpha) / (1 - \alpha)$
 $F_{ABC} \leq F_{40\%} \times (B/B_{40\%} - \alpha) / (1 - \alpha)$
 - 3c) Stock status: $B/B_{40\%} \leq \alpha$
 $F_{OFL} = 0$
 $F_{ABC} = 0$
- 4) Information available: Reliable point estimates of B, $F_{35\%}$, and $F_{40\%}$.
 $F_{OFL} = F_{35\%}$
 $F_{ABC} \leq F_{40\%}$
- 5) Information available: Reliable point estimates of B and natural mortality rate M.
 $F_{OFL} = M$
 $F_{ABC} \leq 0.75 \times M$
- 6) Information available: Reliable catch history from 1978 through 1995.
 OFL = the average catch from 1978 through 1995, unless an alternative value is

established by the SSC on the basis of the best available scientific information.
 $ABC \leq 0.75 \times OFL$

APPENDIX 5. ACRONYMS USED IN THE TEXT AND APPENDICES

α - The relative stock size at which the overfishing level falls to zero, set at a default value of 0.05 with the understanding that the SSC may establish a different value for a specific stock or stock complex as merited by the best available scientific information.

ABC - Allowable Biological Catch - A term that refers to the range of allowable catch for a species or species group. It is set each year by a scientific group. The ABC estimates are used to set the annual total allowable catch (TAC). This term is also referred to as Acceptable Biological Catch.

ASMFC - Atlantic States Marine Fisheries Commission - Serves as a deliberative body of the Atlantic coastal states, coordinating the conservation and management of nearshore fishery resources, including marine, shell, and anadromous species.

B - The weight (biomass) of a group of fish.

B_{MSY} - The weight (biomass) of a group of fish necessary to produce MSY on a continuing basis.

CFMC - Caribbean Fishery Management Council.

CPUE - Catch Per Unit of Effort - The number of fish caught by an amount of effort. Typically, effort is a combination of gear type, gear size, and length of time gear is used. Catch per unit of effort is often used as a measurement of relative abundance.

EEZ - Exclusive Economic Zone - All waters from the seaward boundary of coastal states out to 200 nautical miles.

EPR - Eggs-Per-Recruit - The average number of eggs produced by an individual fish that has been recruited, i.e., that moved into a certain class, such as the spawning class or fishing-size class. Used as an index of abundance.

ESA - Endangered Species Act.

F - Fishing Mortality Rate - A measurement of the rate of removal of fish from a population by fishing. Fishing mortality rate can be reported as either discrete or instantaneous. Discrete mortality is the percentage of fish dying in one year. Instantaneous mortality is the rate at which fish are dying at a point in time

F_{ABC} - The level of fishing mortality that results in the allowable biological catch.

F_{MAX} - The level of fishing mortality that results in the greatest yield from the fishery.

F_{MSY} - The level of fishing mortality that results in the maximum sustainable yield.

F_{OF} - The level of fishing mortality defined as overfishing.

F_{OFL} - The level of fishing mortality associated with overfishing.

$F_{20\%}$ - The level of fishing mortality that results in a spawning potential ratio of 20% of the maximum.

$F_{25\%}$ - The level of fishing mortality that results in a spawning potential ratio of 25% of the maximum.

$F_{30\%}$ - The level of fishing mortality that results in a spawning potential ratio of 30% of the maximum.

$F_{35\%}$ - The level of fishing mortality that results in a spawning potential ratio of 35% of the maximum.

$F_{40\%}$ - The level of fishing mortality that results in a spawning potential ratio of 40% of the maximum.

$F_{0.1}$ - The point on the spawning per recruit curve at which the level of spawning per recruit is 35% of 40% of the maximum.

$FAKR$ - NOAA Fisheries, Alaska Region.

FMP - Fishery Management Plan - A plan to achieve specified management goals for a fishery.

$GMFMC$ - Gulf of Mexico Fishery Management Council.

$GSMFC$ - Gulf States Marine Fisheries Commission - Serves as a deliberative body of the Gulf of Mexico coastal states, coordinating the conservation and management of nearshore fishery resources, including marine, shell, and anadromous species.

HMS - Highly Migratory Species Management Division - Develops fishery policies designed to manage any highly migratory species (tuna species, marlins, oceanic sharks, sailfishes, and swordfish) fishery that is within the geographical authority of more than one Council.

$LTPY$ - Long-Term Potential Yield - The maximum long-term average catch that can be achieved from a resource.

$MAFMC$ - Mid-Atlantic Fishery Management Council.

$MFMT$ - Maximum Fishing Mortality Threshold - The level or rate of fishing mortality, that if

exceeded, constitutes overfishing because it jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis.

MSP₁ - Maximum Spawning Potential - See SPR.

MSP₂ - Maximum Sustainable Production - The adult spawning population that will, on average, maximize the biomass of juvenile outmigrants with average environmental conditions. Conservation objectives for specific salmon stocks managed under the Pacific Coast Salmon Plan are currently based on either MSP principles for stocks managed primarily for natural production or upon hatchery escapement needs for stocks managed for artificial production.

MSST – Minimum Stock Size Threshold – The minimum size of the stock or stock complex that is required to produce MSY, the size below which the stock or stock complex is determined to be overfished. The threshold should equal whichever of the following is greater: ½ the MSY stock size, or the minimum stock size at which rebuilding to the MSY level would be expected to occur within 10 years if the stock or stock were exploited at the maximum fishing mortality threshold.

MSY - Maximum Sustainable Yield - The largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions.

NEFMC - New England Fishery Management Council.

NEFSC - NOAA Fisheries, Northeast Fisheries Science Center.

NPFMC - North Pacific Fishery Management Council.

OLO - *Our Living Oceans* - A report on the status of U.S. living marine resources.

OY - Optimum Yield - The amount of fish that: (1) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems; (2) is prescribed on the basis of the MSY from the fishery, as reduced by any relevant economic, social, or ecological factors; (3) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the MSY in such fishery.

pdf - Probability Density Function - A description of the probability that a variable takes a specified value.

PFMC - Pacific Fishery Management Council.

SAFE - Stock Assessment and Fishery Evaluation - A document or set of documents that provides Councils with a summary of the most recent biological condition of species in the fishery management unit, and the social and economic condition of the recreational and

commercial fishing interests and the fish processing industries. It summarizes, on a periodic basis, the best available scientific information concerning the past, present, and possible future condition of the stocks and fisheries being managed under Federal regulation.

SAFMC - South Atlantic Fishery Management Council.

Salmon FMP - Pacific Coast Salmon Plan.

SARC - Stock Assessment Review Committee.

SEDAR - Southeast Data, Assessment and Review.

SEFSC - Southeast Fishery Science Center.

SFA - Sustainable Fisheries Act - Amended the Magnuson-Stevens Fishery Conservation and Management Act, on October 11, 1996.

SPR - Spawning Potential Ratio - The number of eggs that could be produced by an average recruit in a fished stock, divided by the number of eggs that could be produced by an average recruit in an unfished stock. SPR can also be expressed as the spawning stock biomass per recruit (SSBR) of a fished stock divided by the SSBR of the stock before it was fished.

SSB - Spawning Stock Biomass - The total weight of the fish in a stock that are old enough to spawn.

SSBR - Spawning Stock Biomass Per Recruit - The spawning stock biomass divided by the number of recruits to the stock, or how much spawning biomass an average recruit would be expected to produce.

SSC - Scientific and Statistical Advisory Committee - A group of scientific and technical people giving advice to a council.

T coho - The average coho life span that would be expected over the long term in the absence of exploitation. The default of T coho is four years, but the SSC may set T coho at another value without an FMP amendment on the basis of the best scientific information.

TRAC - Transboundary Resources Assessment Committee - A committee established in 1998 to peer review assessments of transboundary resources in the Georges Bank area and thus to ensure that the management efforts of both Canada and USA, pursued either independently or cooperatively, are founded on a common understanding of resource status.

WPFMC - Western Pacific Fishery Management Council.