The FishSource Assessment System for Salmon Fisheries
Version 2 – August 22, 2013

FishSource, an online fisheries database managed by the Sustainable Fisheries Partnership (SFP), is envisioned as "one-stop shopping" for an audience of fish buyers and the general public interested in both fishery sustainability assessments that are accessible to the non-scientist and in descriptive research information. The database feeds two websites with targeted audiences: www.fishsource.com (for fish suppliers and retailers) and www.fisherieswiki.org (for fisheries scientists and the general public).

While both sites feature text-based profiles and graphed datasets, www.fishsource.com also provides sustainability scores of 0–10 for five assessment criteria derived from Marine Stewardship Council's (MSC) Fisheries Assessment Methodology (FAM). Information on ecological impacts of fisheries is also provided in text format in the body of the profiles. This text should include responses to a set of true-false questions ("ecological parameters") that have been specifically adapted to salmon fisheries and are listed at the end of this report.

The five assessment criteria are scored quantitatively for most whitefish fisheries using standard fisheries statistics. When scores cannot be calculated quantitatively, qualitative scoring is conducted using the same benchmark cutoffs (<6, ≥6, ≥8) applied in MSC fishery assessments.

Due to the specificities of salmon fishery management, reflected in MSC's current development of a separate, salmon-specific default assessment tree, FishSource is applying a separate qualitative assessment framework to the assessment of salmon fisheries. Through a peer review process, SFP hopes to maximize correspondence between this draft assessment framework and MSC's forthcoming salmon assessment tree over the coming months.

Due to the specific concerns of open-ocean, predominantly preseason-managed salmon fisheries (e.g., the Southeast Alaskan Chinook troll fishery, the Pacific Northwest Chinook troll fishery, the Russian Far East gill driftnet fisheries, etc.), a slightly modified set of criteria, also included in this document, will be applied to these fisheries, which we are referring to as "mixture-pool management fisheries" (management of these fisheries is focused primarily upon a mixed-stock aggregate rather than achieving objectives for individual stocks).[1]

The Five Assessment Criteria

Criteria #1-3 concern governance quality:
Criterion #1: Is management responsive?
Criterion #2: Are the management guidelines appropriate?
Criterion #3: Are the management guidelines and responses based on adequate data?

Criteria #4-5 examine stock status:

1. The Pacific Salmon Treaty makes a similar distinction between types of salmon fisheries, using the terms "Aggregate Abundance-Based Management" (analogous to our term "mixture-pool management") and "Individual Stock-Based Management" (which we refer to as "stock directed management").

Criterion #4: Has the productivity of the stock been maintained?
Criterion #5: Are hatcheries negatively affecting wild stocks?

Important Definitions

District: A mid-level aggregation of stocks into a larger administrative collection, for which statistics are collected and reported, such as Prince William Sound in Alaska. Each district fishery receives a separate fishery profile in FishSource.

Region: A large-scale collection of stocks for which statistics are produced under a unified management authority, such as those from Japan, Alaska, the Pacific Northwest (of the United States, etc.). Region-scale salmon profiles in FishSource summarize the scores received by nested district fisheries.

Wild Stock: A group of salmon of the same species (excluding aggregations composed of first-generation hatchery fish) that is geographically and temporally related and is managed as a unit. This is the group of fish for which there is (or could be) a single escapement goal (i.e., the part of a fish population that is under consideration from the point of view of actual or potential utilization).[2]

Stock Component: Sub-aggregates of salmon within a *stock* that may not be managed for individually, but are reproductively isolated or have unique life history attributes.

Additional Information

As most salmon fisheries are mixed-stock in nature, the criteria and underlying sub-criteria will be scored separately for each wild stock harvested in the fishery, and then aggregated to the district fishery scale. All wild stocks of the targeted species that originate within the geographic boundaries of the fishery's freshwater habitat will be assessed. The fishery's impact on stocks of other salmon species will be considered in the ecological parameters.

Some distant, potentially transiting stocks that originate outside the geographic boundaries of the fishery's freshwater habitat and are inconsequential contributors to a fishery will not be rated against the five criteria. Ideally, assessors would look at estimated contribution rates to the fishery and harvest rates in the fishery to make a determination as to whether or not the contribution is large enough to be considered consequential. Unfortunately, in most cases these statistics are not available. In the absence of a clear indication that a stock is present in substantial numbers in a fishery over time, the assessors will assume the distant or transiting stock is present (and will include the stock in the criteria assessment) if any regulatory agency has called for regulation or action to limit the harvest of the distant or transiting stock within the fishery.

2. The FishSource definition for "wild stock" is derived from Ricker, W.E. 1975. Computation and interpretation of biological statistics of fish populations. Fisheries Research Board of Canada, Bulletin 191, Ottawa.

FishSource Salmon Fishery Assessment Framework: Stock-Directed Management Fisheries

Criterion #1: Is management responsive?

This criterion will be scored through the use of a qualitative assessment framework that considers three sub-criteria individually for each stock in the fishery. Each sub-criteria will receive a score on a 0–10 scale in alignment with the scoring benchmarks described below,[3] with "8" corresponding to the threshold above which a fishery passes an MSC assessment without conditions, "7" and "6" representing various states of performance that conditionally pass an MSC assessment but require varying degrees of additional work to maintain certification, and scores below "6" representing various states of performance that would not meet MSC certification standards. The overall criterion score will represent the lowest sub-criterion score received by any stock in the district fishery.

Sub-criterion 1. *In-season management responsiveness*

- Over the last decade, has fisheries management exhibited in-season responsiveness to stock status?

1. Yes, in-season management is used to respond to real-time run size, and harvest has been reduced when management objectives are not being met in 100% of these instances: award 10 points.
2. Yes, in-season management is used to respond to real-time run size, and harvest has been reduced in some cases when management objectives are not being met: award 8 points.
3. No, the management approach relies on pre-season regulations only (not in-season management): award 7 points.
4. Yes, but in-season management has been ineffective, and harvest has never been reduced when management objectives are not being met: award 5 points.

Sub-criterion 2. *Multi-year management responsiveness*

- Has fisheries management responded appropriately over the last 15 years if the stock has failed to meet management objectives or maintain yields?

1. (a) Yes, if the stock exhibited a recurring failure either to maintain yield or to meet management objectives over a 6-year period, fisheries management responded with a formal *stock of regulatory concern*[4] designation; a recovery plan was developed and implemented; the effectiveness of the plan was evaluated on a regular basis; and, if the stock did not respond, management took increasingly strong measures over time to bring about stock restoration; or (b) no stocks in the fishery have failed to meet management objectives or maintain yields: award 10 points.

3. Scoring benchmarks in the salmon fishery assessment system are intended to serve as representative guidelines for scoring analysts. In some cases, analysts may find situations not explicitly described in the benchmarks, in which case the benchmarks are to be used as guides in the determination of the score.

4. Species/stocks of regulatory concern are species or stocks for which special conservation measures have been enacted through regulatory and management systems due to their depletion or failure to meet management objectives. Federal and regional designations (e.g., ESA, COSEWIC, SARA, Russian Red Book, Alaskan fish stocks of concern) will always be applied. International designations (e.g., IUCN) may be applied at the discretion of the reviewers if federal and regional designations are deemed inadequate.

2. Yes, if the stock exhibited recurring failure to meet management objectives or maintain yields over a 6-year period, fisheries management responded with increasingly strong measures over time to bring about stock restoration: award 8 points.
3. Partially, if the stock exhibited recurring failure to meet management objectives or maintain yields over a 6-year period, fisheries management responded with identifiable steps to address the failure, but response was slow or the steps were only partially effective: award 6 points.
4. No, there was no response to a failure to meet the stock's management objectives over a 6-year period: award 4 points.

Sub-criterion 3. *Management responsiveness to habitat issues*

- Has management (a government agency or group of government agencies) exhibited responsiveness to concerns regarding the conservation and restoration of the stock's essential freshwater, estuarine, and coastal habitats during the last 10 years?

1. Yes, management has a record of halting or modifying new development projects so as to have substantially slowed the loss of essential salmon habitat and stock productivity, and it has actively restored habitats that were historically impaired: award 10 points.
2. Partially, management has halted or modified some new development projects so as to have partially slowed the loss of essential salmon habitat and stock productivity, and has restored some degraded habitats: award 7 points.
3. Partially, management has made some efforts to regulate development of lands and water necessary for the stock's production, but its responses are slow or ineffective, or its recommendations are often ignored or overruled: award 4 points.
4. No, management has formally encouraged and prioritized development and extractive industry projects over the protection of salmon habitat: award 0 points.

Criterion #2: Are the management guidelines appropriate?

This criterion will be scored through the qualitative assessment of a single question for each stock within the district under assessment. A score of "8" corresponds to the threshold above which a fishery passes an MSC assessment without conditions, "7" and "6" represent various states of performance that conditionally pass an MSC assessment but require varying degrees of additional work to maintain certification, and scores below "6" represent various states of performance that would not meet MSC certification standards. For a fishery that harvests less than four stocks assessed under the FishSource qualitative assessment framework, the overall criterion score will represent the lowest score received for any stock in the district fishery. For a fishery that harvests four or more stocks assessed under this framework, the overall criterion score will represent the 25th percentile of the scores for each stock, thereby capturing poor performance but not failing fisheries due to "outlier" scenarios.

Sub-criterion 1. *There are appropriate management objectives in place for the fishery's wild stock(s)*

- Have appropriate escapement goals been developed and implemented?

1. Yes, science-based escapement goals or operational equivalents that cover all wild components of the stock have been implemented, and they have never been lowered in association with missed management objectives: award 10 points.

2. (a) Yes, escapement goals or operational equivalents that cover all wild components of the stock have been implemented, but they have been lowered once over the last 10 years in association with a missed management objective; or (b) yes, escapement goals or operational equivalents have been implemented and they have never been lowered in association with missed management objectives, but they do not adequately cover all wild components of the stock: award 7 points.
3. No, there are no escapement goals or similar targets and no knowledge of habitat production capacity, and there is no direct fishery on the stock: award 6 points.
4. (a) Yes, escapement goals or operational equivalents have been implemented, but were lowered two or more times over the last 10 years in association with missed management objectives; or (b) no, there are no escapement goals or similar targets and no knowledge of habitat production capacity, and there is a direct fishery on the stock: award 5 points.
5. Yes, there are escapement goals or operational equivalents in place, but the details of the goal-setting process or the goals themselves are not made public: award 4 points.

Criterion #3: Are the management guidelines and responses based on adequate data?

This criterion will be scored through the use of a qualitative assessment framework that considers three sub-criteria individually for each stock in the fishery. Each sub-criteria will have a score on a 0–10 scale, with "8" corresponding to the threshold above which a fishery passes an MSC assessment without conditions, "7" and "6" representing various states of performance that conditionally pass an MSC assessment but require varying degrees of additional work to maintain certification, and scores below "6" representing various states of performance that would not meet MSC certification standards. The overall criteria score will represent the lowest sub-criterion score received by any stock in the district fishery.

Sub-criterion 1. *Illegal, unreported, and unregulated (IUU) fishing*

- Is a portion of the stock's harvest over the last decade attributable to illegal, unreported, or unregulated fishing, resulting in official harvest data that is lower than the actual catch?

1. No, in the past decade there have been no reported occurrences of illegal, unreported, or unregulated harvest; there are enforced legal penalties for misreporting; and there is no obvious incentive for misreporting: award 10 points.
2. Yes, there is some illegal, unreported, or unregulated harvest of the stock (≤12.5% of the legal harvest volume): award 8 points.
3. Yes, illegal, unreported, or unregulated harvest accounts for a more substantial portion of total harvest of the stock (≤25% of the legal harvest volume): award 6 points.
4. Yes, there is substantial illegal, unreported, or unregulated harvest of the stock (>25% of the legal harvest volume): award 5 points.

Sub-criterion 2. *Measurement and reporting of harvest*

- Is the stock's harvest, possibly in aggregation with the harvest of other stocks, adequately and accurately measured and reported?

1. Yes, the vast majority (greater than 90%) of the harvest in fisheries directed at this stock (commercial, sport, and other fisheries) is measured with a catch-tracking system that captures stock-specific information: award 10 points.

2. Yes, the majority (greater than 70%) of the harvest in fisheries directed at this stock (commercial, sport, and other fisheries) is measured with a catch-tracking system or an on-site probability-based survey or census, and very little of the harvest is unmeasured and undocumented on an annual basis: award 9 points.
3. Barely, the majority of the harvest in fisheries directed at this stock (commercial, sport, and other fisheries) is measured with a catch-tracking system or an on-site probability-based survey or census, but an unknown fraction of the harvest is unmeasured; documentation of sale does not always exist or is not verified; or a substantial fraction of the catch is measured with a post-season survey requiring the person filling out the survey to recall catch amounts: award 6 points.
4. No, the majority of the harvest in fisheries directed at this stock (commercial, sport, and other fisheries) is not directly measured: award 5 points.

Sub-criterion 3. *Measurement and reporting of escapement*

- Has the stock's escapement been adequately and accurately measured and publicly reported?

1. Yes, the escapement is directly measured annually (using weirs, sonars, counting towers, or similar methods) in the same units as the catch for the majority of the stock; escapement measures are reported publicly: award 10 points.
2. Yes, the escapement is measured annually either directly or indirectly (using methods appropriate for the species and circumstance) for a portion of the stock, allowing the construction of an escapement index (i.e., a series showing trends but in units not comparable to the catch statistics); escapement measures are reported publicly: award 8 points.
3. Yes, the escapement is measured annually either directly or indirectly (using methods appropriate for the species and circumstance) for a portion of the stock, allowing the construction of an escapement index (i.e., a series showing trends but in units not comparable to the catch statistics); however, there is reason to believe not all components of the stock are adequately represented by the index: award 7 points.
4. (a) Partially, the escapement is measured either directly or indirectly (using methods appropriate for the species and circumstance) for a portion of the stock, allowing the construction of an escapement index (i.e., a series showing trends but in units not comparable to the catch statistics); escapement measures are not reported publicly for some or all of the stocks; or (b) no, the escapement is not measured annually, but the fishery has a low harvest rate and surrogate measures of run strength are publicly reported (e.g., Catch Per Unit Effort): award 6 points.
5. No, the escapement is not measured on an annual basis and there is no surrogate measure for run strength: award 5 points.

Criterion #4: Has the productivity of the stock been sustained?

This criterion will be scored through the qualitative assessment of two questions for each stock in the district under assessment. A score of "8" corresponds to the threshold above which a fishery passes an MSC assessment without conditions, "7" and "6" represent various states of performance that conditionally pass an MSC assessment but require varying degrees of additional work to maintain certification, and scores below "6" represent various states of

performance that would not meet MSC certification standards. For a fishery that harvests four or more stocks assessed under this framework, the score for each sub-criterion will represent the 25th percentile of the scores for each stock, thereby capturing poor performance but not failing fisheries due to "outlier" scenarios.

Sub-criterion 1. *Escapement levels*

- Has the escapement measure been maintained above an escapement goal or threshold, or has the harvest rate has been below the target harvest rate?

1. Yes, the escapement measure has been maintained above the goal or threshold, or the harvest rate has been below the goal, for at least 12 of the last 15 years: Award 10 points.
2. Yes, the escapement measure has been above the goal or threshold (or the harvest rate below the target) at least eight times over the previous 15-year period, and less than five of the missed goals were in the last 7 years of the series: Award 7 points.
3. No, the escapement level has been below the fixed escapement goal or threshold (or the harvest rate above the target) eight or more times over the previous 15-year period or there have been five or more missed goals in the last 7 years of the series: Award 6 points.
4. No, there is no escapement goal, but the trend in the escapement measure has been level or increasing over a 15-year period: Award 9 points.
5. No, there is no escapement goal, but the escapement has declined less than 30% over a 15-year period: Award 8 points.
6. No, there is no escapement goal, but the escapement has declined less than 50% over a 15-year period: Award 6 points.
7. No, there is no escapement goal, but the escapement has declined more than 50% over a 15-year period: Award 5 points.
8. No, the fishery is responsible for the stock's complete extirpation: Award 0 points.

Sub-criterion 2. *Catch levels*[5]

- *Has the catch trend been level or increasing over a 15-year period?*

1. Yes: Award 10 points
2. (a.) No, catch trends for the stock have declined, catch declines are consistent with declines in other stocks in the region, and the declines appear to be related to normal inter-decadal fluctuations in marine productivity; or (b.) No, catch trends for the stock have declined, but the trends result from active management responsiveness to stock declines (e.g. commercial fishery closures): Award 8 points
3. No, the catch trends have declined over the previous 15-year period and the decline has not been explained or observed in other stocks in the region: Award 7 points.
4. The stock is chronically diminished or a stock of regulatory concern, but harvest is occurring at the expense of escapement: Award 5 points.

5. If there has been no harvest of a particular stock in the last 15 years, the stock should receive a score only for sub-criterion 1 and not for sub-criterion 2. If there is not sufficient escapement data to score sub-criterion 1, only sub-criterion 2 will be scored. If there is no stock-specific harvest data, total fishery harvest trends will generate the score for sub-criterion 2.

Criterion #5: Are hatcheries or other enhancement activities[6] negatively affecting wild stocks?

This criterion will be scored through the use of a qualitative assessment framework that considers three sub-criteria individually for each stock in the district fishery, and a fourth sub-criterion for the district as a whole. Prior to assessing the four sub-criteria, the assessors will consider questions 0(a) and 0(b) at the district scale. If results indicate that the assessment should proceed with consideration of the four sub-criteria, then each sub-criterion will receive a score on a 0–10 scale, with "8" corresponding to the threshold above which a fishery passes an MSC assessment without conditions, "7" and "6" representing various states of performance that conditionally pass an MSC assessment but require varying degrees of additional work to maintain certification, and scores below "6" representing various states of performance that would not meet MSC certification standards. The overall criterion score for the district will represent the lowest score awarded to a stock in any of the first three sub-criteria included in the evaluation, or awarded to the district in the fourth sub-criterion.

0(a) There is no hatchery production affecting the fishery

- There is no hatchery production of the species targeted by the fishery occurring anywhere within the freshwater habitat that produces the fishery's target stock(s): award 10 points as the overall criteria score, otherwise proceed to the following questions.

0(b) Hatchery-produced fish are not a potential threat to wild stocks

- Hatcheries account for 10% or less of the fishery's total production, or hatchery-produced fish are not in substantial contact with wild salmon: award 9 points as the overall criteria score, otherwise proceed to the following questions.

Sub-criterion 1. *Managers can and do actively manage for the wild stock*

- Are managers able to manage for the (wild) stock in a fishery that also contains hatchery stocks of salmon?

1. Yes, hatchery fisheries are spatially and temporally separate from the fishery that targets the wild stock, as demonstrated by a technically sound monitoring program: award 8 points.
2. No, there is some spatial and temporal overlap between hatchery stocks and the wild stock, but an ongoing, technically sound monitoring program identifies hatchery-produced fish in the fishery and managers prioritize wild stock management: award 7 points.
3. No, previous studies show mostly temporal and spatial separation, and managers attempt to manage for the wild stock: award 6 points.
4. (a) Managers or hatchery operators believe there is spatial or temporal separation, and managers believe they can manage for the wild stock, but there have been no studies to demonstrate this; or (b) managers or hatchery operators believe that there is spatial or temporal separation and are attempting to manage for the wild stock, but evidence suggests that they are not succeeding: award 5 points.

6. While the language for this criterion refers to "hatchery" stocks for the sake of simplicity, it is also intended to address production of salmon in spawning channels. Stocks produced in spawning channels should be considered hatchery stocks in scoring this criterion.

5. No, there is no attempt to distinguish wild and hatchery-produced fish in the fishery, but managers attempt to manage for the wild stock: award 4 points.
6. No, managers manage for combined wild and hatchery run strength: award 0 points.

Sub-criterion 2. *Hatchery straying is low and adequately measured in the escapement*

- Is there a low quantity of hatchery strays in the escapement throughout the freshwater habitat of the wild stock, and is hatchery straying quantified by means of a technically sound data collection and analysis?

1. Yes, ongoing studies document almost no straying: award 8 points.
2. Yes, limited studies have documented a minor amount of straying into geographically isolated areas: award 7 points.
3. (a) Very limited studies have been conducted, but there is low potential for straying; or (b) more substantial studies indicate more significant straying: award 6 points.
4. (a) Studies have been conducted and there have been high stray rates (e.g., >10% in some cases); or (b) no studies have been conducted, but it is reasonable to expect limited hatchery straying based upon location and magnitude of hatchery releases: award 5 points.
5. Inadequate studies have been conducted, and it is reasonable to expect substantial straying based upon location and magnitude of hatchery releases: award 4 points.
6. No studies have been conducted, and there is potential for substantial straying into major wild-stock producing systems: award 0 points.

Sub-criterion 3. *Intentional stock mixing is prohibited in spawning populations*

- Over the past 10 years, have hatchery strays, hatchery out-plants, or any returning hatchery-produced fish been intentionally allowed to mix with the wild stock during spawning?

1. No, hatchery-wild mixing is never intentionally allowed and there are never any occurrences: award 8 points.
2. Yes, but only 1–2 occurrences (intentional stock mixing in a particular year by a particular hatchery) have been documented, accounting for <3% of wild stock production, and with limited stock rebuilding objectives and controls on stock movement in place: award 7 points.
3. (a) Yes, more than two occurrences (recurring at the same location or in multiple years) have been documented, accounting for <10% of wild stock production; or (b) yes, hatchery-wild mixing commonly occurs as a stock-rebuilding strategy, but there is no direct fishery on the stock: award 6 points.
4. Yes, hatchery-wild mixing commonly occurs, but the management system takes actions to limit its magnitude: award 5 points.
5. Yes, hatchery-wild mixing commonly occurs as a rebuilding strategy for a stock targeted by the fishery, and is reflected in the siting of hatcheries or release sites at wild stock run locations: award 2 points.
6. Yes, hatchery-wild mixing commonly occurs with no restrictions: award 0 points.

Sub-criterion 4. *Policies*[7]

- Are there active and effective policies that (1) establish objectives for the conservation of wild salmon, (2) put into place operational systems that limit hatchery impacts on wild stocks, (3) grant sufficient oversight and authority over individual hatchery programs to management agencies, and (4) establish a hatchery evaluation system that monitors the performance of individual hatcheries against wild salmon conservation objectives?

1. Yes, policies with all four of the above-listed components are in place and are strictly followed throughout the district with almost no exceptions: award 8 points.
2. Yes, policies with all four components are in place and are generally followed with only an occasional exception; or policies with three of the four components are in place and are strictly followed throughout the district with almost no exceptions: award 7 points.
3. Yes, policies with three of the four components are in place and are generally followed with only an occasional exception, or policies with two of the four components are in place and are strictly followed throughout the district with almost no exceptions: award 6 points.
4. Yes, there are polices with 1–4 of the above-listed components in place, but they are frequently ignored or waved; or (b) no, there are no such policies: award 4 points.
5. Yes, there are polices with 1–4 of the above-listed components in place, but they are always ignored or waived: award 0 points.

7. Sub-criterion 4 will generate a single score awarded to all stocks within a district fishery (in contrast with the first three sub-criteria, which can generate differing scores for different stocks).

FishSource Salmon Fishery Assessment Framework: Mixture-Pool Management Fisheries

All sub-criteria will be scored at the district fishery scale rather than stock-by-stock. Each sub-criteria will receive a score on a 0–10 scale, with "8" corresponding to the threshold above which a fishery passes an MSC assessment without conditions, "7" and "6" representing various states of performance that conditionally pass an MSC assessment but require varying degrees of additional work to maintain certification, and scores below "6" representing various states of performance that would not meet MSC certification standards. Overall criteria scores will represent the lowest nested sub-criterion scores received by the fishery.

Criterion #1: Is management responsive?

Sub-criterion 1. *In-season management responsiveness: Part 1*

- Over the last decade, has fisheries management exhibited in-season responsiveness to stock status?

1. Yes, in-season management is used to respond to real-time run size, and harvest has been reduced when run strength is below the forecast in 100% of these instances: award 10 points.
2. Yes, in-season management is used to respond to real-time run size, and harvest has been reduced in some cases when run strength is below the forecast: award 8 points.
3. No, the management approach relies on pre-season regulations only (not in-season management): award 7 points.
4. Yes, but in-season management has been ineffective, and harvest has never been reduced when run strength is below the forecast: award 5 points.

Sub-criterion 2. *In-season management responsiveness: Part 2*

- Has the management system accurately maintained catch within acceptable error limits during the last 15 years?

1. Yes, the catch was within 110% of the target catch for at least 12 of the 15 years and adjustments are made in following years for overages and underages: award 10 points.
2. Yes, the cumulative error did not exceed 15% of the average target catch or adjustments are made in following years for overages and underages: award 8 points.
3. Partially, the cumulative error did not exceed 45% (or average of 3% per year) of the average target catch during the last 15 years: award 7 points.
4. No. the cumulative error exceeded 45% of the average target catch during the last 15 years and no attempt to adjust for overages and underages are made: award 4 points.

Sub-criterion 3. *Multi-year management responsiveness*

- Has fisheries management responded appropriately over the last 15 years if a stock has failed to meet management objectives or maintain yields?

1. (a) Yes, if the stock exhibited a recurring failure either to maintain yield or to meet management objectives over a 6-year period, fisheries management responded with a formal *stock of regulatory concern* designation; a recovery plan was developed and implemented; the effectiveness of the plan was evaluated on a regular basis; and if the stock did not respond, management took increasingly strong measures over time to bring

about stock restoration; or (b) there are no stocks in the fishery that have failed to meet management objectives or maintain yields: award 10 points.
2. Yes, if a stock exhibited recurring failure to meet management objectives or maintain yields over a 6-year period, fisheries management responded with increasingly strong measures over time to bring about stock restoration: award 8 points.
3. Partially, if a stock exhibited recurring failure to meet management objectives or maintain yields over a 6-year period, fisheries management responded with identifiable steps to address the failure, but response was slow or the steps were only partially effective: award 6 points.
4. No, there was no response to a failure to meet a stock's management objectives over a 6-year period: award 4 points.

Sub-criterion 4. *Management responsiveness to habitat issues*

- Has management (a government agency or group of government agencies) exhibited responsiveness to concerns regarding the conservation and restoration of the fishery's essential freshwater, estuarine, and coastal habitats during the last 10 years?

1. Yes, management has a record of halting or modifying new development projects so as to have substantially slowed the loss of essential salmon habitat and stock productivity, and it has actively restored habitats that were historically impaired: award 10 points.
2. Partially, management has halted or modified some new development projects so as to have partially slowed the loss of essential salmon habitat and stock productivity, and has restored some degraded habitats: award 7 points.
3. Partially, management has made some efforts to regulate development of lands and water necessary for the stock's production, but its responses are slow or ineffective, or its recommendations are often ignored or overruled: award 4 points.
4. No, management has formally encouraged and prioritized development and extractive industry projects over the protection of salmon habitat: award 0 points.

Criterion #2: Are the management guidelines appropriate?

- Are the management guidelines appropriate and subject to scientific oversight?

1. Yes, a transparent, science-based model is used in establishing management guidelines, and is subject to scientific oversight: award 10 points.
2. Partially, a science-based model is used in establishing management guidelines, but it is either not entirely transparent or subject to scientific oversight only occasionally: award 7 points.
3. No, there is no scientific oversight of the process that establishes management guidelines, or there is political interference in scientific oversight: award 5 points.

Criterion #3: Are the management guidelines and responses based on adequate data?

Sub-criterion 1. *Illegal, unreported, and unregulated (IUU) fishing*

- Is a portion of the fishery's harvest over the last decade attributable to illegal, unreported, or unregulated fishing resulting in official harvest data that is lower than the actual catch?

1. No, in the past decade there have been no reported occurrences of illegal, unreported, or unregulated harvest; there are enforced legal penalties for misreporting; and there is no

obvious incentive for misreporting: award 10 points.
2. Yes, there is some illegal, unreported, or unregulated harvest resulting in total harvest that exceeds the catch limit by 12.5% or less: award 8 points.
3. Yes, more substantial illegal, unreported, or unregulated harvest results in total harvest that exceeds the catch limit by 25% or less: award 6 points.
4. Yes, substantial illegal, unreported, or unregulated harvest results in total harvest that exceeds the catch limit by more than 25%: award 5 points.

Sub-criterion 2. *Measurement and reporting of harvest*

- Is harvest of the fishery mixture adequately and accurately measured and reported?

1. Yes, the vast majority (greater than 90%) of the harvest in this fishery is measured with a catch-tracking system: award 10 points.
2. Yes, the majority (greater than 70%) of the harvest in this fishery is measured with a catch-tracking system or an on-site probability-based survey or census, and very little of the harvest is unmeasured and undocumented on an annual basis: award 9 points.
3. Barely, the majority of the harvest this fishery is measured with a catch-tracking system or an on-site probability-based survey or census, but an unknown fraction of the harvest is unmeasured; documentation of sale does not always exist or is not verified; or a substantial fraction of the catch is measured with a post-season survey requiring the person filling out the survey to recall catch amounts: award 6 points.
4. No, the majority of this fishery's harvest is not directly measured: award 5 points.

Sub-criterion 3. *Stock identification*

- Have stock identification efforts been undertaken to determine the fishery's stock composition?

1. An ongoing, high-quality, genetic study is determining the stock composition of this fishery's harvest: award 10 points.
2. An ongoing, tag-based study is determining the stock composition of this fishery's harvest: award 8 points.
3. Stock composition estimates are based upon assumptions and modeling that are in line with a prior genetic, tag-based, or other type of study: award 6 points.
4. Stock composition estimates are derived through a non-transparent, technically unsound process: award 5 points.

Sub-criterion 4. *Measurement and reporting of escapement*

- Is escapement measured in a substantial and well-distributed quantity of stocks harvested by the fishery?

1. The escapement is measured for a large number of component stocks of the fishery that are well distributed given the correlation among stock run strengths: award 10 points.
2. The escapement is measured for a moderate number of component stocks of the fishery that are adequately distributed given the correlation among stock run strengths: award 8 points.
3. The escapement is measured for a moderate number of component stocks of the fishery, but their distribution could be improved given the correlation among stock run strengths: award 6 points.
4. The escapement is measured for a small number of component stocks of the fishery that

are poorly distributed given the correlation among stock run strengths: award 5 points.
5. There is no escapement monitoring of component stocks of the fishery: award 0 points.

Criterion #4: Has productivity of the fishery been maintained?

Sub-criterion 1. *Escapement levels*

- Have escapement trends of the fishery's stock aggregate been level or increasing over the last 15 years?

1. Yes, escapement among indicator stocks of the fishery has been level or increasing for the last 15 years, and there is no geographic clustering of declines: award 10 points.
2. (a) Yes, escapement of indicator stocks of the fishery has been level or increasing for the last 15 years, but there is geographic clustering of declines; or (b) no, escapement among indicator stocks of the fishery is declining, but no more than 5% of component stocks have declined by 75%: award 7 points.
3. No, escapement among indicator stocks of the fishery is declining, and more than 5% of component stocks have declined by 75%: award 5 points.

Sub-criterion 2. *Catch levels*

- Has the fishery's catch trend been level or increasing over a 15-year period?

1. Yes: award 10 points.
2. (a) No, catch trends for the fishery have declined, and the declines appear to be related to normal inter-decadal fluctuations in marine productivity; or (b) no, catch trends for the stock have declined, but the trends result from active management responsiveness to stock declines (e.g., commercial fishery closures): award 8 points.
3. No, catch trends have declined over the previous 15-year period and the declines do not appear to be related to normal inter-decadal fluctuations in marine productivity: award 7 points.
4. No, the stock mixture is chronically diminished, but harvest is occurring at the expense of escapement: award 5 points.

Criterion #5: Are hatcheries negatively affecting wild stocks?

0(a) There is no hatchery production affecting the fishery

- There is no hatchery production of the species targeted by the fishery occurring anywhere within the freshwater habitat that produces the fishery's target stocks: award 10 points as the overall criteria score, otherwise proceed to the following questions.

0(b) Hatchery-produced fish are not a potential threat to wild stocks

- Hatcheries account for 10% or less of the fishery's total production, or hatchery-produced fish are not in substantial contact with wild salmon: award 9 points as the overall criteria score, otherwise proceed to the following questions.

Sub-criterion 1. *Identification and quantification of hatchery stocks*

- Are managers able to identify and quantify hatchery fish in the mixed-stock aggregate?

1. Yes, an ongoing, technically sound monitoring program identifies and quantifies hatchery-produced fish: award 8 points.

2. Partially, an ongoing monitoring program identifies and quantifies hatchery-produced fish, but not all hatchery components are adequately marked: award 7 points.
3. Partially, an ongoing monitoring program identifies and quantifies hatchery-produced fish, but significant non-sampling error results in inaccurate estimates of hatchery contribution to the fishery: award 6 points.
4. No, managers cannot identify and quantify hatchery fish: award 0 points.

Sub-criterion 2. *Hatchery contribution and catch limit determination*

- Does hatchery abundance overly influence the determination of the fishery's catch limit?

1. No, wild stock run strength predominantly determines the fishery's catch limit: award 8 points.
2. Wild run strength is a major determinant of the fishery's catch limit; however, hatchery run strength is also influential: award 6 points.
3. Yes, hatchery stock run strength predominantly determines the fishery's catch limit: award 5 points.
4. Yes, hatchery stock run strength entirely determines the fishery's catch limit: award 0 points.

Ecological Parameters: Bycatch[8] of species/stocks of regulatory concern

1. There is substantial bycatch of a species or stock (salmon of a different species) of regulatory concern.
2. Bycatch mortality is implicated in the failure of populations of the species or stock (salmon of a different species) of regulatory concern to rebuild.
3. Bycatch of the species or stock (salmon of a different species) of regulatory concern is monitored.
4. There is a ceiling or other regulatory constraint on bycatch of the species or stock (salmon of a different species) of regulatory concern.
5. The ceiling or other regulatory constraint, if in place, is being met.

Other Bycatch

6. There is substantial bycatch of another species or salmon stock (of a different species) that is not an object of regulatory concern.
7. There is no general bycatch monitoring system in place, i.e., there is no bycatch monitoring, or bycatch monitoring focuses only upon species or stocks (salmon of another species) of regulatory concern.

Retained Harvest[9] of Salmon Stocks of a Different Species

8. There is substantial retained harvest of one or more salmon stock(s) of a different species.

8. Bycatch species or salmon stocks of a different species: Species or stocks that have been taken incidentally and are not retained (usually because they have no commercial value or because they cannot be retained or sold according to management rules).
9. Retained species or salmon stocks of a different species: Species or stocks that are retained by the fishery under assessment (usually because they are commercially valuable or because they are required to be retained by management rules).

9. Retained harvest of a salmon stock of a different species is implicated in that stock's failure to recover from stock declines.
10. If there is substantial retained harvest of one or more salmon stock(s) of a different species, the harvest is monitored, and studies have been undertaken to determine the origins and fishery contribution rate for the stock(s) in question.
11. There is a ceiling or other regulatory constraint in place to reduce or regulate the harvest of the stock(s) in question.
12. Management has undertaken sufficient measures to limit the harvest rates of the stock(s) in question, and all regulatory constraints, if in place, are being met.