Agenda Item G.2.a
Attachment 1
June 2006

PRELIMINARY DRAFT
Pacific Coast Salmon Plan Amendment 15: An Initiative to Provide for *De Minimis* Fishing Opportunity (First Draft for Salmon Amendment Committee and Council Review)

Pacific Fishery Management Council
May 2006

Table of Contents

List of Tables

1.0 INTRODUCTION

This Salmon Fishery Management Plan (FMP) amendment process began in November 2005 for the purpose of initiating scoping of an FMP amendment to consider *de minimis* fisheries associated with impacts on Klamath River fall run Chinook salmon (KRFC) and other stocks that are not exceptions to the Overfishing Criteria in the FMP. The initial interest in the amendment was the result of constraints on the 2005 fishery due to depressed status of KRFC, which precluded access to a record forecast abundance of California Central Valley fall run Chinook salmon. The Council's direction came after Scientific and Statistical Committee (SSC) review of the Salmon Technical Team's (STT) analysis of stock recruitment relationships for naturally spawning KRFC (STT 2005), a recommendation from the Klamath Fishery Management Council (KFMC) to initiate an FMP amendment (PFMC 2005), and National Marine Fisheries Service (NMFS) review of emergency rule implementation and other procedures to facilitate management aimed at meeting annual conservation objectives as specified in Table 3-1 of the FMP. Analyses are provided in the following sections that demonstrate the effects of policy alternatives on the long-term viability of depressed salmon stocks and the economic impacts of those policy alternatives on fishing communities.

1.1 Document Organization

(for next draft)

1.2 Purpose and Need for Action

This action is to consider proposed changes to the Pacific Coast Salmon Plan (FMP) (PFMC 1997), which directs ocean salmon fishery management actions relative to the exclusive economic zone (EEZ) off the coasts of Washington, Oregon, and California. The purpose of this action is to provide for minimal or *de minimis* salmon fishery impacts to Council-managed salmon stocks[1] that currently are managed under conservation objectives that prohibit any salmon fishery impacts in the Council area during times when lower or limiting conservation objectives for those stocks are projected to not be met. This action is needed to prevent a level of fishery restrictions that can lead to severe economic consequences to local communities that target more robust salmon stocks, which are typically available for harvest in the Council area, while ensuring the ability of depressed stocks to produce maximum sustainable yield (MSY) in the long term is not jeopardized. Currently, this can be addressed only through the emergency regulation process as provided in the Magnuson-Steven Fishery Management and Conservation Act (MFCMA) and implemented by the National Marine Fisheries Service (NMFS).

The current status of KRFC includes failure to meet the 35,000 natural adult spawner lower reference point (previously, "escapement floor") for the stock for the past two years, and a projected natural spawner escapement of 29,200 absent any fishing impacts in 2006. A preseason projection that the lower limit reference point will not be met in any single year triggers a Conservation Alert, which, according to the FMP, requires the Council to close all salmon fisheries within its jurisdiction that impact the stock. Council area fisheries in September and October, 2006 harvested approximately 6,100 KRFC, and assuming freshwater tribal fisheries harvested their entitled equal number of KRFC, the natural spawning escapement projection was 25,400. An emergency rule promulgated by NMFS permitted additional Council area salmon fisheries in 2006 that are projected to result in a natural spawning escapement of 21,100 adult spawners. If the stock does not meet its minimum conservation objective in 2006, it will be

[1] Here we define Council-managed stocks as those listed in Table 3-1 of the FMP, excluding stocks listed under the federal Endangered Species Act, hatchery stocks, and natural stocks with minimal impact in Council area fisheries, which are listed as exceptions in FMP section 3.2.4.

the third consecutive year, and will trigger an Overfishing Concern, which will likely result in declaration by the NMFS of the stock being overfished and initiation by the Council of a stock rebuilding plan.

The current FMP objective for KRFC (and other stocks, as explained below) provide for ocean salmon fishing in the Council area only to the extent that the lower limit reference point of 35,000 natural adult spawners will allow. For the 2006 season, the pre-season STT projection for KRFC ocean abundance showed no surplus of natural spawners, which meant no level of ocean salmon fishing impact should be allowed in the Council area, according to the FMP. However, after reviewing the available data on the stock during its March and April meetings, and in collaboration with NMFS, the states, tribes and ocean fishermen, the Council determined that conditions in 2006 would allow for a temporary amendment to the FMP KRFC conservation objective to allow for 21,100 natural adult spawners, which was determined to be acceptable in terms of maintaining the long-term productivity of the stock. NMFS concurred with the Council assessment and implemented the emergency regulations effective May 1, 2006 (see www.pcouncil.org/newsreleases/noaa_pr_04-28-2006.pdf).

The actions that are addressed in the proposed FMP amendment are described in the following:

1. evaluate various alternatives relating to *de minimis* levels of ocean salmon fishing for KRFC,
2. evaluate *de minimis* fishing levels for other Council-managed stocks and/or the adoption of a technical process involving the STT and SSC to establish *de minimis* levels without the need for an FMP amendment,
3. recommend revision to or modification of existing FMP wording relating to a) *de minimis* fishing levels for Council-managed stocks, b) criteria for Council action in response to a Conservation Alert or Overfishing Concern, and c) appropriateness of existing FMP terminology in the context of the amended Plan sections (e.g., change "escapement floor" reference to "lower limit reference point"),
4. initiate the stock rebuilding process for KRFC as specified in the FMP (see: http://www.pcouncil.org/salmon/salfmp/fmpthrua14.pdf) under the expectation that the stock will fail to meet its conservation objective for the third consecutive year, and

Finally, it is possible that the MFCMA may be reauthorized in 2006. Thus, the current amendment proposal must remain flexible in order to incorporate any new provisions that may be required in the final document. At the same time, the final recommendations must be consistent with amending the Salmon FMP as it relates to the management of KRFC in time for adoption of regulations commencing May 1, 2007. The subsections below provide background information on this FMP action and further details on the need to which this proposal responds.

1.3 Plan Development Schedule and Council Advisory Committee Participation

The expectation for this FMP action is that the Council will recommend to the Secretary of Commerce (Secretary) adoption of an amended FMP in time for implementation of regulations affecting ocean salmon fisheries commencing May 1, 2007. However, the exact form and wording of the final recommendations will depend on the results of the analyses and findings that will be presented in the final document. To facilitate this effort an ad hoc Salmon Amendment Committee (SAC) has been appointed to report to the Council on the progress of the overall initiative.

The committee structure includes two subcommittees with specific duties, with the balance of the committee in essentially an advisory role with regard to reviewing and making recommendations on technical approaches or policy considerations, reviewing subcommittee reports, and providing general quality control inputs. One subcommittee is responsible for preparing the draft Environmental Assessment (EA) and Council or public review documents, including modeling and analytical

components and written narratives (Document Subcommittee). The other subcommittee is charged with Federal regulatory streamlining responsibilities, including the Council: NMFS interface and federal internal policies to allow for timely Secretarial review and an approval/disapproval decision of a final Council action at the November 2006 meeting (Regulatory Streamlining Subcommittee). Individual SAC members may be called upon to prepare report sections depending on their particular area of expertise and availability to assist in Council activities. The names of committee members and their affiliations appear in Attachment 1. The proposed schedule for document preparation and finalization appears below.

May 11 2006	Document Subcommittee (DS) meet informally in Portland to initiate development of the amendment alternatives and work tasks to prepare a presentation to the SAC and Council at the June Council meeting.
May 24	Preliminary outline of potential range of amendment alternatives and possible analytical approaches due for inclusion in the Council June briefing book.
June 14	Salmon Amendment Committee (SAC) meets in Foster City, California to review work products of the DS and provide proposed recommendations to the Council.
June 16	Presentation of the SAC report to the Council in Foster City, California for review and direction for further development and refinement.
Wk of June 19 or June 26	DS meets in Portland to review Council action and assign work tasks for development of the amendment and analysis for review by the SAC prior to the September Council meeting.
Second Wk in August	SAC meets in Portland to review DS work products and provide comments and direction for presentation of Draft Amendment 15 at the September Council meeting.
August 23	Preliminary Draft Amendment 15 due for collation into September briefing book.
Wk of September 11	Council reviews Preliminary Draft Amendment 15 and adopts for Public Review at meeting in Foster City, CA. (If schedule cannot be met, a new schedule is identified at this point).
Wk of September 18	DS meets in Portland to review Council action and assign work tasks to complete Draft Amendment 15 for hearings and presentation at November Council meeting.
Wk of October 16	Hearings on Amendment 15 at Santa Rosa, Coos Bay, and Westport
October 25	Draft Amendment due for inclusion in November Council meeting briefing book.
Wk of November 13	Council reviews Draft Amendment 15 at meeting in Del Mar, California and adopts preferred alternative for implementation by NMFS.
December ?	DS completes Amendment 15 and EA and submits to NMFS HQ.
No later than May 1, 2007	Amendment 15 implemented by Final Rule.

1.4 Relevant Issues

(for next draft)

2.0 DESCRIPTION OF ALTERNATIVES

2.1 Alternatives for Klamath River Fall Chinook Salmon Management

At its March 2006 meeting the Council identified three possible alternatives to allow for *de minimis* fishing for KRFC. This would bring to four the number of alternatives for consideration at this time. These alternatives are outlined in Table 1 and described below.

Table 1. De minimis fishing level alternatives for KRFC adopted by the Council at its March 2006 meeting.		
Alternative	**Description**	**Comment**
1 - Status quo (no action)	No *de minimis* rate expressed. Impacts determined by 66-67% annual adult spawner reduction rate[1] except not less than 35,000 natural adult spawners in any year	No *de minimis* fisheries would be allowed if the 35,000 adult spawner lower reference point could not be achieved with a total fishery closure.
2 – Sliding scale	10% to 0% linear spawner reduction rate in the range of 39,000 to zero natural adult spawners	Recommended by the KFMC.
3 – Fixed exploitation rate	The Council has recommended a fixed rate in the range of ≤5% to ≤10% for consideration.	This rate may be substituted when the lower reference point is constraining harvest, but does not replace it for issuing Conservation Alerts or Overfishing Concerns.
4 – Exploitation rate matrix	The Council recommended consideration of an exploitation rate matrix alternative, with consideration for some or all of the following factors: adult stock size, ocean survival conditions, abundance of co-mingled stocks, and data quality.	A similar approach was implemented for Oregon Coastal natural coho salmon in Amendment 13.

[1] Spawner reduction rate as used by the Klamath River Technical Advisory Team is an annual rate computed as the number of potential adult natural spawners (aka: "adult equivalents" or "ocean adults") impacted in ocean and river fisheries divided by the initial number of potential natural adult spawners in the ocean at the start of the biological year for KRFC (September 1). "Impact" includes landed catch plus shaker and drop off mortalities, adjusted for natural mortalities.

2.1.1 Status Quo Alternative

The current exploitation rate management strategy for KRFC was adopted in 1987 and modified in 1993 to allocate, on an annual basis, 50% of the available harvest to the Yurok and Hoopa tribes of the lower Klamath and Trinity rivers, respectively (Pierce 1998). The original exploitation rate plan required the adoption of fixed exploitation rates for ocean and river fisheries over multiple, continuous seasons (KRTT 1986). The court allocation decision led to annual harvest sharing of the available harvest on a 50/50 basis between tribal and non-tribal sectors. This change required that spawner reduction rates objectives be determined on an annual basis. The current escapement goal for the stock is to allow a 66%-67% spawner reduction rate annually except that a minimum of 35,000 naturally spawning adult spawners shall be protected in all years. At the outset, the lower limit reference point ("floor") was specifically protected from modification except by FMP amendment. The exploitation rate approach for KRFC was adopted in 1987 in lieu of sufficient biological information for setting a single number goal for the stock and was expected to generate data over time that could be used for setting a single number goal or other approach for managing the stock.

A considerable amount of stock recruitment data have been collected since comprehensive fishery and resource monitoring of KRFC began circa 1977. Those data will be valuable as part of this process in evaluating the appropriateness of the current management of the stock, including the lower limit reference

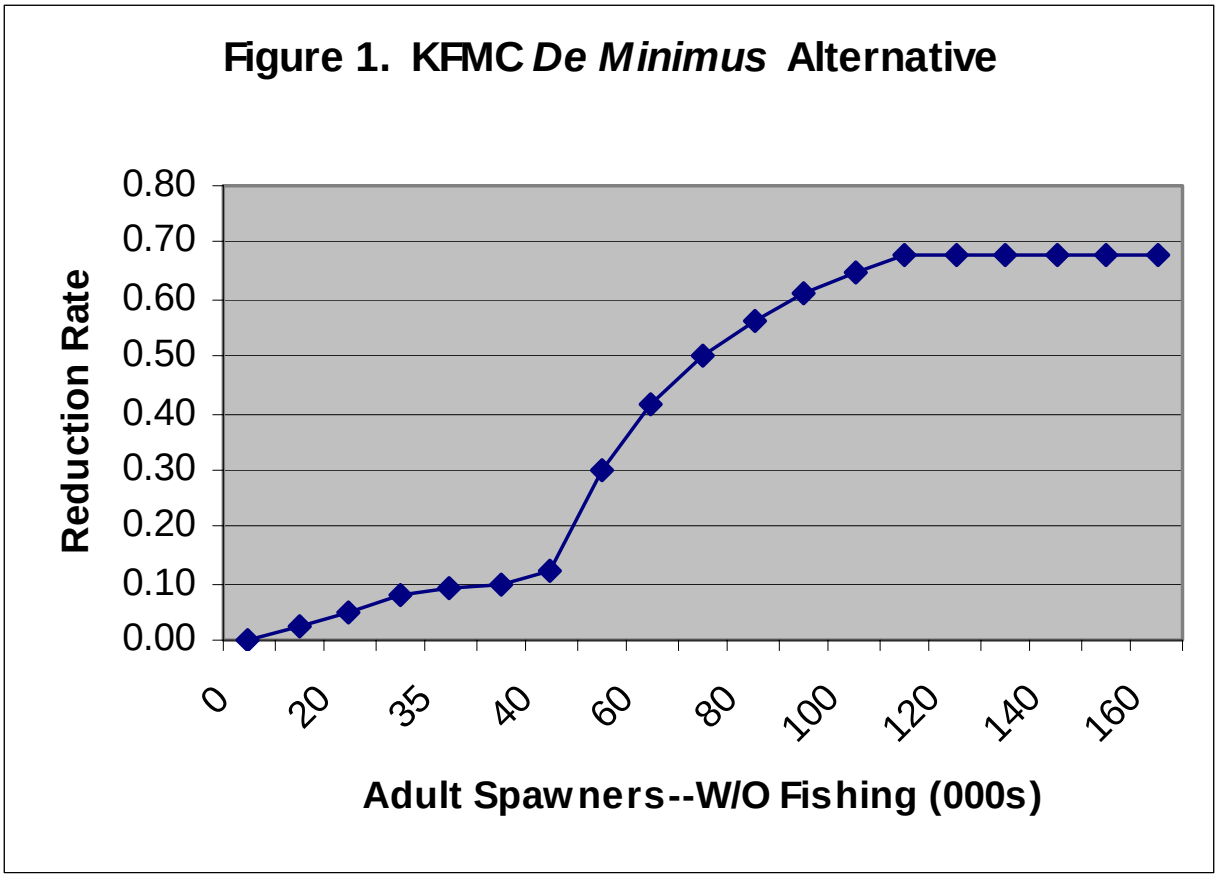
point ("escapement floor")[2]. However, it should be noted that modification of the reference point to some other value would not address the issue of *de minimis* fishing opportunity in low abundance years, which is a primary reason for the current FMP amendment effort.

Adoption of the status quo alternative or cessation of this amendment process places the onus of adopting annual salmon fishing regulations during low stock abundance years on the emergency rule process of the MFCMA as implemented by the NMFS. As experienced in 2006, the NMFS emergency rule process results in considerable uncertainty in the final regulations, which may not be decided by the PFMC and NMFS until the last few days of the annual salmon regulation process, and is likely to deviate from many fishermen's and manager's expectations for the coming season. Looking to the 2007 season and beyond, the expectation is that low abundance of KRFC will persist through 2009. This protracted projection of low stock abundance stems from low flows and associated high water temperatures that occurred in the river through the summer of 2004 (affecting the 2003 brood) coupled with high ocean exploitations rates associated with unusual ocean distribution of KRFC during 2003-2005 (affecting the 2003-2005 broods) (SSC 2006).

2.1.2 Sliding Scale Alternative

The sliding scale alternative was recommended for consideration by the KFMC (PFMC 2006). Their decision was premised on the inability of NMFS to approve *de minimis* fisheries except by emergency rule and provided the FMP amendment is limited in scope to the potential for addressing such fisheries. The KFMC urged that the analysis be based on a prudent, precautionary approach regarding the protection of sub-stocks within the Klamath River basin and that the allowable harvest should be scaled to projected stock abundance. The KRFC stock recruitment study by Prager and Mohr (1999) was used as the basis for their recommendation. They noted that while this study showed no adverse effect of fisheries up to a 20% spawner reduction rate, the authors recommended that if such a fishery was established, a maximum rate of 10% should be adopted to protect substocks, subject to review after a few years of actual fishery experience. The KFMC recommendation, again based on the Prager and Mohr paper, was that *de minimis* fishing rates should be reduced linearly from 10% to 0% when projected natural adult spawners, in the absence of fishing, were in the range of 39,000 to zero fish. Moreover, when such fisheries are conducted, a technical review of the cause for the depressed stock condition should be conducted before the start of the next salmon season. The KFMC sliding scale alternative is illustrated in Figure 1.

[2] Here we propose to use the phrase "lower limit reference point" or "lower reference point" to describe the 35,000 natural adult spawning escapement objective for KRFC, replacing the phrase "escapement floor" if this FMP initiative is successfully implemented.



2.1.3 Fixed Exploitation Rate Alternative

The Council developed and approved the fixed exploitation rate alternative at its March 2006 meeting. The range of possible rates was recommended to be ≤5%-≤10%. There are several ways the rate could be calculated and expressed. However, the method that is most consistent with the current approach for allocating KRFC between the tribal and non-tribal sectors is to calculate the fraction of ages 3-5 fish that are proposed to be harvested based on projected age-specific abundance levels of fish at the start of the biological year on September 1 and taking into account fishery selectivities and minimum size limits. This approach is also consistent with the method used to calculate ocean exploitation rate for age-4 KRFC, which is used in the NMFS jeopardy opinion for California Coastal (CC) Chinook salmon (see Table II-5, Pre-season Report I). The Klamath Ocean Harvest Model (KOHM) (Prager and Mohr 2001) would likely be used by the STT for making the fixed exploitation rate calculation. The fixed exploitation rate alternative is not proposed to replace the lower reference point for the stock of 35,000 natural adult spawners, which would continue as a trigger for issuance of Conservation Alerts and Overfishing Concerns.

The ≤5% alternative appears to be similar to the provision in the FMP at section 3.2.4.2, which specifies that stocks with minimal Council impact are not subject to the FMP Overfishing Criteria and subsequent Council actions. Such stocks are those that are not available to harvest in Council fisheries because of migration timing and/or distribution, and are identified by a cumulative adult equivalent exploitation rate of less than 5% in ocean fisheries under Council jurisdiction in the appropriate fishery regulation assessment model (which, for Chinook salmon, is 1979-1982). The ≤5% standard was developed for stocks that are primarily harvested in the Pacific Salmon Treaty Area and that are outside the purview of

the Council decision process, but suggests that a similar rate, based on total fish harvested, may be an appropriate *de minimis* impact level for Council consideration.

Use of a fixed exploitation rate for age-4 fish would be consistent with the current NMFS ESA consultation standard that is being used for CC Chinook salmon, which is a listed stock under the federal Endangered Species Act (ESA). Due to the absence of stock status data for CC Chinook, NMFS has opted to use age-4 KRFC as a surrogate stock for ESA purposes. The rate was set at ≤16% of age-4 KRFC in ocean salmon fisheries, and may suggest that such a rate should be acceptable for KRFC, which has been determined by NMFS not to be warranted for listing. The rate was based on a recent years' average, which reflected a substantially lower exploitation rate compared to historic levels of over 50%. There is no certainty that the NMFS consultation standard will continue to be based on age-4 KRFC data or that their consultation standard will not be reduced to a lower rate at some future date. Implementation of a CC Chinook monitoring plan might in the future allow for direct measurement of stock status. Such a plan could be based on direct escapement monitoring or an alternate approach such as genetic stock identification monitoring of ocean fishery catches.

Other Council area stocks are subject to ESA consultation standards specifying an exploitation rate allowance, including Rogue-Klamath coho salmon, lower Columbia River natural tule fall Chinook salmon, and Puget Sound Chinook salmon stocks.

To provide context for the impact of pre-season harvest objectives in ocean fisheries, a table for 2002-2006 fisheries has been constructed showing the number of open fishing days in selected ocean fisheries with respective pre-season exploitation and spawner reduction rates during September-August, which corresponds to the biological year currently used for KRFC. The analysis has been narrowed to include only the San Francisco and Coos Bay landing areas as used in the Klamath Ocean Harvest Model (KOHM) because these are the areas that have been most impacted by regulations aimed at meeting KRFC conservation objectives in recent years. The Fort Bragg or Klamath Management Zone fisheries were not included in the analysis because these fisheries have been highly constrained even in years of relatively high KRFC abundance. In addition, because of the unusually high impacts to KRFC in the fall troll fisheries in 2005, an additional comparison is made showing troll fishing days scheduled to be open during March-August of 2006 in the respective fisheries with ocean fishery exploitation and spawner reduction rates for comparison (Table 2).

Table 2. Comparison of open fishing days in the EEZ in the San Francisco (SF) and Coos Bay (CO) port areas with pre-season exploitation and spawner reduction rates for the 2001-2006 biological years for Klamath River fall Chinook salmon including 2006 projected data with fall 2005 troll seasons omitted [1]

Biological year	**Exploitation rate pct.** [2]	**Spawner Reduction Rate**	**Projected natural escapement**	**SF Troll Days**	**CO Troll Days**	**SF Sport Days**	**CO Sport Days**
2001	10.5 (4.6)	n/a	47.0	140	173	214	214
2002	8.2 (4.9)	n/a	35.0	163	177	215	169
2003	10.0 (13.1)	n/a	35.0	167	193	213	231
2004	12.2 (33.9)	51.6	35.0	164	205	207	231
2005	3.0	19.7	35.0	98	117	227	231
2006-actual	8.8	35.2	21.1	77	54	193	231
2006-w/o fall troll fisheries	4.5	17.0	27.7	37	0	193	231

[1] Columns 2-4 were taken from or derived from Table 5 of annual Pre-season Report III. Columns 5-8 were tallied based on tables C-1 thru C-4 of the 2005 Fishery Review. The KOHM was run to produce the estimates shown in columns 204 for 2006 with fall 2005 troll catches excluded.

[2] Post-season estimates, available in Pre-season Report I, are shown in parentheses.

2.1.4 Exploitation Rate Matrix Alternative

This alternative would use multiple data sets to determine the level of fishing that would be appropriate for KRFC in all years, including low abundance years. The variables that have been identified by the Council so far for consideration include: (1) ocean adult stock size, (2) ocean survival conditions, (3) abundance of co-mingled stocks, and (4) data quality. The decision matrix approach is currently used for Oregon Coastal natural (OCN) coho salmon. For OCN coho salmon the matrix variables are aimed at promoting stock rebuilding. The matrix uses general parental stock size status and ocean survival conditions for hatchery jacks to extrapolate an allowable exploitation rate range, which varies from ≤13% under poor conditions to ≤35% under optimal conditions (PFMC 1999). The matrix provides for greater exploitation rate levels when the parental stock size meets or exceeds specified rebuilding criteria. The OCN coho salmon exploitation rate matrix is aimed at rebuilding the stock through habitat improvement in combination with fishery regulation.

A similar matrix could be constructed for KRFC, but would be slightly more complicated because of the multiple age class spawning of the species. However, the status of the stock and ability to accurately project annual stock abundance level is probably comparable to OCN coho salmon. Additional information on the carrying capacity of the various subbasins would help determine appropriate escapement objectives. The OCN matrix approach could also be used as a rebuilding strategy for stocks declared to be overfished.

The following example is an exploitation rate matrix that uses the status of KRFC and Sacramento River fall Chinook (SRFC) to determine the exploitation rate level for the coming season for KRFC (Table 3). The matrix allows for *de minimis* fishing levels at all status levels for the two stocks. SRFC abundance is a reasonable variable to consider in the management of KRFC because of its usually high abundance and relatively high economic importance to ocean fisheries throughout the Council area, but especially off the Oregon and California coasts. Three stock levels are considered for each stock depending on the status of the respective stocks relative to existing stock reference points. In the case of KRFC the three levels are: > 39,000 natural spawning adults before fishing, 20,000-39,000 natural spawning adults before fishing, and < 20,000 natural spawning adults before fishing. These levels were selected because 39,000 is the spawning level below which the KFMC has recommended that *de minimis* fishing opportunity may be appropriate for consideration. The 20,000 abundance level is about 50% of the MSY level recommended for consideration for KRFC natural spawning stocks by the STT, SSC and KFMC (see PFMC 2006). The three levels suggested for SRFC correspond to the current management goal for the stock of an annual range of 122,000-180,000 adult spawners. The selected *de minimis* fishing levels are those that have been suggested for KRFC by the Council of ≤5% and ≤10%, and the NMFS ESA consultation standard for CC Chinook of ≤16% on age-4 KRFC. Oregon coastal Chinook salmon stocks were not included in the matrix because annual ocean abundance projections are not currently made for these aggregate stocks. (Table 3, footnote 2).

Table 3. Decision matrix example for allowable KRFC ocean exploitation rate for adult fish **(draft for discussion only)**			
KRFC natural spawners	Allowable ocean exploitation rate for KRFC		
> 39,000	≤ 10%	≤ 16% [1]	> 16% [1]
20,000-39,000	≤ 5	≤ 10	≤ 16
< 20,000	≤ 5	≤ 5	≤ 10
SRFC projected spawning escapement:	< 122,000	122,000-180,000	>180,000

[1] At these abundance levels the primary harvest rate constraint would be aimed at meeting the limit reference point for the stock of 35,000 natural adult spawners or a 66%-67% spawner reduction rate, whichever produces the lower catch.

2.2 Proposed Interim *De Minimis* Fishing Rates for Other Council-managed Salmon Stocks

There are other Council-managed stocks for which *de minimis* fishing standards do not currently exist and that may be needed in the event of a downturn in productivity in one or all of these stocks. These stocks along with their respective conservation objectives and stock projection methodologies are described in Table 4. It is proposed that an interim *de minimis* fishing rate be proposed as part of this initiative and retained for the purpose of setting annual fishing regulations until such time as an analysis can be completed for each stock and approved by the Council following the procedures and guidelines outlined in Section 2.2.1, below. The interim rate for each stock is proposed to be 10 % ocean exploitation rate for adult fish in fisheries operating within the Council area. The allowable rate would apply in years that the number of potential spawners for a stock is projected to be at or below its minimum conservation goal, as described in Table 4. Adoption of this interim allowance does not alleviate the need for Council response in issuing Conservation Alerts and Overfishing Concerns as described in the FMP.

Table 4. Additional Council-managed stocks for which de minimis fishing rates are needed**.**		
Stock	**Conservation goal**	**Description of pre-season stock projection methodology**
Sacramento River fall Chinook salmon	Goal range of 122,000-180,000 adult spawners, to be met in all years	Regression of Central Valley index on previous year jack return
Oregon coastal Chinook salmon	Goal range of 150,000-200,000 adult spawners in the aggregate, to be met in all years	None at present
Willapa Bay coho salmon	13,090 natural spawners (currently a WDFW goal, not a Council goal)	Smolt production adjusted by recent survival rate average.

2.2.1 Procedure for Adoption or Modification of De Minimis Fishing Rates for Council-managed Salmon Stocks

We propose that *de minimis* fishing rates for the individual stocks identified in Table 4, in addition to KRFC, may be adopted or modified through the Council process and without FMP amendment based upon technical review by the STT and SCC. The expectation is that sponsors of such proposals will generally be state or tribal agencies, who would be responsible for developing and submitting the necessary analyses in time for final adoption at the November Council meeting. Such proposals must

address the impacts on long-term production of the stock and economic importance of the stock and co-mingled stocks to local communities.

2.3 Initiation of Stock Rebuilding Process for Overfished Klamath River Fall Chinook Salmon

(for next draft)

2.4 Council Process for Setting or Modifying *De Minimis* Fishing Levels Applicable to Overfished Salmon Stocks

(for next draft)

3.0 AFFECTED ENVIRONMENT

(for next draft)

3.1 History of the Salmon Fishery Management Plan

It may be instructive to examine *de minimis* fishing opportunities that have been approved for other Council salmon fisheries. Prior to the adoption of Salmon Plan Amendment 11, Oregon coastal natural (OCN) coho salmon were managed to meet an annual escapement of 200,000 adult spawners, except that an incidental catch rate of 20% was allowed when ocean stock size was estimated to be below 240,000 adults (see PFMC 1999). Salmon Plan Amendment 13 changed the approach used for OCN coho salmon to one based on adult exploitation rate depending on parent stock size and ocean survival conditions. It reduced the maximum allowable exploitation rate for the stock under poor ocean survival conditions and low parent stock size to 15%, except that the rate could be reduced to below 13% under extremely adverse production and survival conditions (PFMC 1999). It is difficult to compare management criteria for Chinook and coho salmon because of their substantially different life history patterns, but the OCN coho salmon example shows that some level of *de minimis* fishing is already allowed for Council stocks.

(more for next draft)

3.2 History of Klamath River Fall Chinook Salmon Management

(for next draft)

4.0 ANALYSIS OF ALTERNATIVES

4.1 Biological Impacts of De Minimis Fishing

Stock and recruitment data for KRFC will be important to use for evaluating the effect of various *de minimis* fishing alternatives on the long-term production potential of the stock. Some work has been done to date with the data set by the Klamath River Technical Advisory Team (KRTAT) and STT, but additional work will be needed to evaluate the specific alternatives that will be developed as part of the current FMP initiative. However, interpretation of the analysis needs to account for likely differences in production potential of the diverse sub-stocks within the basin, as recently described and recommended by the KFMC.

Stock and recruitment data for naturally spawning KRFC have been generated for the 1979-2000 broods. The STT has recently analyzed the data for estimating stock size at sustainable equilibrium production (S_{EQ}), maximum sustainable production (S_{MSP}) and maximum sustainable yield (S_{MSY}) for naturally-spawning KRFC. They used three different models in the analysis: Model 1 was based on a single co-variate, adult stock size; Model 2 incorporated data on juvenile early life history survival rates as a second co-variate (as indicated by hatchery fish survival data); and Model 3 used a watershed size-based approach currently under development by Canadian biologists (STT 2005) (Table 5).

Table 5. Spawner reference points for Ricker stock-recruitment Models 1,2,3 (Reference: STT 2005)

Spawner Reference Point	**Model 1 (parent spawners)**	**Model 2 (parent spawners, survival)**	**Model 3 (watershed area)**
S_{EQ}	101,300	112,300	185,000
S_{MSP}	39,700	56,900	111,200
S_{MSY}	32,700	40,700	70,900

A previous analysis of a shorter but comparable data set was made for the 1979-1993 broods. In this analysis the KRTAT (1999) reported slightly higher production estimates than those shown for Model 1 in Table 5. For example, S_{MSP} was reported to be 43,000 adult spawners compared to 39,700 in Table 5. They did long-term simulation modeling and found that reducing the lower reference point to less than 35,000 adult spawners reduced the long-term catch production from the stock and that the median yield from the resource was relatively insensitive to the lower limit reference point, except at higher values. They found that reducing the lower reference point resulted in more fishery stability, but also provided less of a safety margin against poor recruitment events. They also commented that a provision for *de minimis* fishing in low abundance years could eliminate the need for fishery closures entirely and would be a more constructive management approach than reducing the lower reference point, which appeared to be near optimal in terms of maximizing long-term catches in ocean and river fisheries (see pages 30-31 of report).

We propose to use available stock recruitment data to evaluate the alternatives developed for this initiative that are described in the previous section. We propose to develop a stochastic, age-structured, life-cycle model that will include a stock recruitment relationship and incorporate fishery selectivity data for ocean and river fisheries that currently are used in the KOHM. The fishery model structure and input variables in the KOHM are described by Prager and Mohr (2001). Allowable fishery catches are proposed to be allocated consistent with current legal requirements for tribal:non-tribal shares and Council policies or actions relative to non-tribal shares. Sensitivity analysis is proposed to be used to relate the relative importance of the various input parameters such as the Ricker curve α and β parameters. Considerations will be given to using a conservative overall stock productivity parameter for the basin to address the issue of likely/possible differences in sub-basin stock productivities.

4.2 Economic Analysis of De Minimis Fishing

(under development)

5.0 CONSISTENCY WITH OTHER APPLICABLE LAW

(for next draft)

6.0 PROPOSED MODIFICATIONS TO SALMON FISHERY MANAGEMENT PLAN VERBIAGE RELATED TO *DE MINIMIS* FISHING LEVELS FOR COUNCIL-MANAGED SALMON STOCKS

(for next draft)

7.0 LITERATURE CITED

KRTAT (Klamath River Technical Advisory Team). 1999. Population dynamics of Klamath River fall Chinook salmon: stock-recruitment model and simulation of yield under management. Technical Report to Klamath Fishery Management Council. U.S. Fish and Wildlife Service, Yreka Fish and Wildlife Office, Yreka, CA.

KRTT (Klamath River Technical Team). 1986. Recommended spawning escapement policy for Klamath River fall-run Chinook. Technical report to Klamath River Salmon Management Group. U. S. Fish and Wildlife Service. Yreka CA 96097. 73p.

PFMC (Pacific Fishery Management Council). 1994. Klamath River fall Chinook review team report. PFMC, Portland OR 97201. 24p. (see: http://www.pcouncil.org/salmon/salother/krfcrtr1294.pdf).

_____. 1997. Pacific Coast Salmon Plan. PFMC Portland OR (see: http://www.pcouncil.org/salmon/salfmp/fmpthrua14.pdf).

_____. 1999. Final amendment 13 to the Pacific Coast salmon plan. PFMC, Portland OR. 84 p. (see: http://www.pcouncil.org/salmon/salfmp/finala13.pdf).

_____. 2005. November Meeting Minutes, Agenda Item G.3.d: Report of Fishery Management Council. (see: http://www.pcouncil.org/minutes/2005/1105min.pdf).

_____. 2006. Klamath Fishery Management Council report on the Klamath River fall Chinook conservation objective. Agenda Item C.7.a. Attachment 1. March 2006. PFMC, Portland OR. 2p.

Prager, M. H., and M. S. Mohr. 2001. The harvest rate model for Klamath River fall chinook salmon, with management applications and comments on model development and documentation. North American Journal of Fisheries Management 21(3):533-547.

Pierce, R.M. 1998. Klamath salmon: understanding allocation. U.S. Fish and Wildl. Yreka CA. 35 p. (see: http://www.fws.gov/yreka/KFMC-Docs/KlamSalUndAlloc.pdf).

Prager, M. H., and M. S. Mohr. 1999. Population dynamics of Klamath River Fall Chinook salmon stock-recruitment model ad simulation of yield under management. Klamath Fishery Management Council. Yreka CA. (see: http://www.fws.gov/yreka/KFMC-Rpts/KSREPORT.

SSC (Scientific and Statistical Committee). 2006. Scientific and Statistical Committee report on the supplemental National Marine Fisheries Service report. PFMC, Agenda Item E.2.g, supplemental SSC report, April 2006. PFMC. Portland OR 97220. 2p.

STT (Salmon Technical Team). 2005. Klamath River Fall Chinook Stock-recruitment analysis. Agenda Item G.1.b, Sept 2005. PFMC, Portland OR 97220. 36p. (see: http://www.pcouncil.org/salmon/salother/G1b_KlamathConsObj_STT_Rpt.pdf)

APPENDIX A - NAMES AND AFFILIATIONS OF SALMON AMENDMENT COMMITTEE AND SUBCOMMITTEE MEMBERS

Document Subcommittee

L.B. Boydstun, CDFG, retired	Primary role for document drafting and construction
Ray Beamesderfer, Cramer Fish Sci.	Primary role for population dynamics modeling
Larrie LaVoy, WDFW	Primary role for population dynamics modeling
Corinne Pinkerton, NMFS SWR	Primary role for fishery economic analysis
Chuck Tracy, Council staff	Document subcommittee staffing
Mike Burner, Council staff	Document subcommittee staffing

Regulatory Streamlining Subcommittee

Eric Chavez, NMFS HQ, and SWR
Peter Dygert, NMFS HQ, and NWR
Chris Wright, NMFS HQ
Kit Dahl, Council staff

Remainder of Full Committee (in addition to above members)

Alan Grover, CDFG	Fishery management and policy analysis
Michael Mohr, NMFS-SWFSC	Population dynamics analysis
Robert Kope, NMFS-NWFSC	Population ecology analysis
Gary Morishima, STT	Population dynamics and fishery management
Pete Lawson, NMFS-NWFSC	Population dynamics analysis
George Kautsky, Hoopa Tribe	Fishery management and policy analysis
Dave Hillemeier, Yurok Tribe	Fishery management and policy analysis
Cindy Thomson, NMFS-SWFSC	Fishery economic analysis
Duncan MacLean, SAS, Troll Fisheries	Fishery management and policy analysis
Dan Wolford, SAS, Sport Fisheries	Fishery management and policy analysis
Environmental rep (vacant)	Fishery management and policy analysis
Jim Seger, Council staff	Economic analysis