Amendment 6
to the Fishery Management Plan for the
Salmon Fisheries in the EEZ off the Coast of Alaska

(1) In Chapter 3 entitled Specification of Harvest Levels, add the following as section 3.1:

3.1 Overfishing Definitions

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)[1]. 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. The PST also provides for an inseason adjustment to the harvest level based on an assessment of inseason data. In addition, decreases in the allowable catch are triggered by conservation concerns regarding specific stock groups. This abundance-based system reduces the risk of overharvest at low stock abundance while allowing increases in harvest with increases in abundance, as with the management of the other salmon species in the southeast Alaska salmon fishery.

Tier 2 and tier 3 are salmon stocks managed by the Board and ADF&G. 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. Management of coho is based on aggregate abundance. Lack of a general coho stock identification technique prevents assessment of run strength of individual stock groups contributing to these early-season mixed stock fisheries. Information available on individual coho indicator stocks is considered in management actions. The southeast Alaska wild coho indicator stocks are Auke Creek coho, Berners River coho, Ford Arm Lake coho, and Hugh Smith Lake coho. The overfishing definitions for tier 2 and 3 are based on the State's MSY escapement goal policies. The present policies and status determination criteria proposed in this amendment would prevent overfishing and provide for rebuilding of overfished stocks in the manner and timeframe required by the Magnuson-Stevens Act.

An MSY control rule, a MFMT, and a MSST are established for each tier. If a stock or stock complex is declared overfished or if overfishing is occurring, the Council will notify the State and request that the State conduct a formal assessment of the primary factors leading to the decline in abundance and report to the Council the management measures the State will implement for rebuilding the fishery. The Council will assess these rebuilding measures for compliance with the Magnuson-Stevens Act, including the national standard guidelines. The State rebuilding program may be adopted without an FMP amendment to assure timely implementation.

<u>Tier 1: Chinook stocks</u>

1) Under the PST, the MSY control rule consists of a segmented linear relationship between catch and relative abundance (Table 1 from PST, appendix 4). Each segment of the relationship is of the form:

$$Y_t = \alpha_{X_t} X_t + \beta_{X_t}$$

[1]Chapter 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)

where t represents time (measured in years), Y_t represents the all-gear catch (measured in number of fish) in year t, X_t represents relative abundance in year t (as established by the Pacific Salmon Commission's Chinook Technical Committee), and α and β represent coefficients whose values depend on X_t. The relationships between X_t, α, and β are as follow:

If X_t is greater than or equal to	and X_t is less than	then α is	and β is
0	0.05	0	0
0.05	1.00	130,000	20,000
1.00	1.25	285,000	-135,000
1.25	1.55	178,495	20,000
1.55	2.25	193,370	20,000

According to the PST, this control rule is "designed to contribute to the achievement of MSY or other agreed biologically-based escapement objectives." The portion of the all-gear catch that is allocated to troll gear can be computed by subtracting 20,000 from Y_t (to exclude the fixed amount allocated to net gear) and multiplying the result by 0.8 (to exclude the 20% allocated to the sport fishery).

The PST identifies one or more "indicator" stocks for each of the eight stock groups that comprise the SEAK chinook fishery. The PST also requires the Chinook Technical Committee to establish biologically-based "escapement goal ranges" for each group's indicator stocks, either individually or in aggregate. If more than one group's indicator stocks exhibit escapements below the lower bound of the escapement goal range for two consecutive years, the PST provides for a specific reduction in the α parameter used in the MSY control rule, subject to various qualifications. The required reduction in α varies with the number of stock groups exhibiting back-to-back escapement failures, as shown in the following table:

Number of stock groups requiring response	Percentage reduction in α
2 stock groups	10%
3 stock groups	20%
4+ stock groups	30%

2) The fishing mortality rate (F) for these stocks is expressed as cumulative catch per generation time:

$$F_t = \sum_{i=t-Tchin+1}^{t} C_i$$

where C_t represents the all-gear catch taken in year t and T_{chin} represents the average chinook lifespan that would be expected over the long term in the absence of exploitation. The default value of T_{chin} is five years, but the Scientific and Statistical Committee may set T_{chin} at another value, without a plan amendment, on the basis of the best scientific information available. It may be noted that the above definition of fishing mortality rate is somewhat different from that commonly used for many other species, for example those managed under the BSAI and GOA groundfish FMPs. The reason for the difference is as twofold. First, for groundfish species, the fishery in any given year has access to the entire stock, whereas for salmon species, the fishery in any given year has access only to the portion of the stock returning in that year. Second, the above definition conforms more closely to the PST.

3) The maximum fishing mortality threshold is computed as follows:

$$\mathrm{MFMT}_t = 1.075 \times \sum_{i=t-Tchin+1}^{t} Y_i$$

(again, Y_t represents the all-gear catch associated with the MSY control rule in year t; it may or may not equal C_t, the catch that was *actually taken* in year t). The 7.5% overage allowance is a current feature of the FMP and is prescribed by the PST (Annex IV, Chapter 3, Paragraph 7).

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 T_{chin} years.

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 T_{chin} years, 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:

$$Y_t = \max\left(0, R_t - G_t\right)$$

where R_t is pre-harvest run size in year t and G_t is the MSY escapement goal in year t. The MSY escapement goal is normally constant across years, but may vary due to changes in environmental conditions. It is specified so that the long-term average catch expected under this strategy is maximized. In cases where the State's "biological escapement goal" consists of a range, the MSY escapement goal corresponds to the lower endpoint of that range. In cases where the State's "biological escapement goal" consists of a single point, the MSY escapement goal corresponds to that point.

2) The fishing mortality rate for these stocks is expressed as an exploitation rate, and is computed as a weighted average of recent run-specific exploitation rates observed in the stock:

$$F_t = \frac{\sum_{i=t-Tcoho+1}^{t} C_i}{\sum_{i=t-Tcho+1}^{t} R_i}$$

where T_{coho} represents the average coho lifespan that would be expected over the long term in the absence of exploitation. The default value of T_{coho} is four years, but the Scientific and Statistical Committee may set T_{coho} at another value, without a plan amendment, on the basis of the best scientific information available.

3) The maximum fishing mortality threshold for these stocks is computed as a weighted average of recent run-specific exploitation rates corresponding to the MSY control rule:

$$\mathrm{MFMT}_t = \frac{\sum_{i=t-Tcoho+1}^{t} Y_i}{\sum_{i=t-Tcoho+1}^{t} R_i}$$

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 T_{coho} years.

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 T_{coho} years.

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

1) 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.

2) Whenever estimates of *F* or MFMT, as defined under Tier 2, are unavailable for each stock in a stock complex managed under this FMP, a list of "indicator" coho stocks will be established by ADF&G.

3) Using the same definitions and criteria described under Tier 2, a determination that one or more indicator coho stocks is being subjected to overfishing will constitute a determination that the respective stock complex is being subjected to overfishing, except as provided in the paragraph below.

4) 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 following conditions (50 CFR §600.310(d)(6)):

a) it is demonstrated by analysis that such action will result in long-term net benefits to the Nation;

b) it is demonstrated by analysis that mitigating measures have been considered and that a similar level of long-term net benefits cannot be achieved by modifying fleet behavior, gear selection/configuration, or other technical characteristic in a manner such that no overfishing would occur; and

c) the resulting rate or level of fishing mortality will not cause any species or evolutionarily significant unit thereof to require protection under the ESA.

In the absence of significant evidence to the contrary, satisfaction of the above conditions will be considered equivalent to the State's establishment of an "optimal escapement goal" lower than the "biological escapement goal" for the same stock.

5) The productive capacity of a stock complex is measured as the sum of the indicator coho stocks' escapements from the most recent T_{coho} years.

6) The MSST for a stock complex is equal to one-half the sum of the indicator coho stocks' MSY escapement goals from the most recent T_{coho} years.

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