MEMORANDUM

State of Alaska
DEPARTMENT OF FISH AND GAME

TO: Southeast Alaska Chinook Technical Team Members

DATE: May 24, 1985

FILE NO.: Chinook Tech Team

THRU:

TELEPHONE NO.: 465-4160

SUBJECT: Project Proposal Materials Review

FROM: Jerry L. Madden
Salmon Rehabilitation and Enhancement Coordinator
PNP Hatchery Program
Division of FRED
Department of Fish and Game

Enclosed for your review and comment are draft materials for evaluation of project proposals to mitigate the number of chinook salmon in southeast Alaska in relation to the U.S./Canada Salmon Treaty. Also enclosed is a revised page 12 of the "Notes on the Chinook Technical Team Meeting," April 24-25, 1985. The enclosures were prepared by the writing groups named at the April meeting. Enclosures include:

(1) "Chinook Hatchery Proposal Design/Cost Questionnaire," developed by Ben Pollard, Gary Freitag, and Bruce Bachen;

(2) "Survival Tables and Rationale for Chinook Fish Culture Strategies," developed by Alex Wertheimer, Gary Freitag, and Johnny Holland;

(3) "Evaluation Process and Criteria for Natural Stock Interaction and Harvest Considerations (Objectives)," developed by Mel Seibel and Paul Kissner and adapted to computer by Chris Pace;

(4) "Evaluation Process and Criteria Facility Production," developed by the team and adapted to computer by Chris Pace, Alex Wertheimer, and Johnny Holland;

(5) "--Risk Factor Analysis -- Chinook Enhancement Alternatives," developed by Chris Pace.

(6) "Lightyear," a functional description of computer software.

As is noted above, numbers (3) and (4) criteria are displayed in an evaluation mode produced by Lightyear.

At the April meeting, five sets of evaluation criteria were established. They are:

(1) Operating Cost/Unit Produced
(2) Capital Cost/Unit Produced
(3) Cultural Flexibility (referred to as "Production Design" in the enclosed Lightyear materials).
(4) Harvest Considerations
(5) Natural Stock Interactions

The team discussed using Lightyear and the computer to aid in proposal evaluation. Various opinions were given as to how effective the software would be given the team's charge from the Commissioner's Office. The team agreed that manipulation of criteria sets 2, 3, and 4 would lend itself to the Lightyear method, with the possibility of incorporating into the computerized system data from set 1 when projects are actually evaluated.

The enclosure, "Cultural Flexibility" or "Production Design" is formatted according to Lightyear. This was done as a joint effort among Chris Pace, Alex Wertheimer, and Johnny Holland. The criteria included in "Harvest Considerations and Natural Stock Interactions" appears in two forms. Chris developed the evaluation matrix on Lightyear. Also enclosed is a draft, dated May 14, 1985, prepared by Mel Seibel and Paul Kissner, that does not conform exactly with Lightyear. Mel and Paul want the team to review all the evaluation materials and make final judgement on quantitative formulas, formats, etc.

The team could not reach a decision at the April meeting on how to evaluate "risk." Alex said the paramount risk issue would probably be associated with experimental versus proven technology (i.e., zero-check versus yearling releases).

Enclosed is a copy of a matrix, entitled "--Risk Factor Analysis -- Chinook Enhancement Alternatives." It sets up a theoretical, annual, smolt production scenario with technology alternatives with incumbent production, based on survivals, and capital and operational cost assumptions. The example used will provide a tangible example for consideration of risk.

These are the pieces available to construct a project evaluation system. The team must determine whether more pieces are needed or something should be discarded. Please review the enclosures and make comments to me by June 10, 1985. When I receive comments, I will consider them and draft an evaluation tool which you will have an opportunity to review and comment upon before it is sent to those with projects to propose. If you have questions, contact me.

Thanks for your continuing cooperation.

Enclosures

cc: S. Pennoyer
Gear Groups
NSRPT
SSRPT
Fishery Division Directors

Enclosure 2

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Auke Bay Laboratory
P. O. Box 210155, Auke Bay, Alaska 99821
907 789 7231
Western Union Telex II (TWX) 5101000492

May 16, 1985

Mr. Jerry L. Madden
Alaska Department of Fish and Game
FRED Headquarters
1255 West 8th Street
P. O. Box 3-2000
Juneau, Alaska 99802-2000

Dear Jerry:

Enclosed are the tables that Johnny Holland, Gary Freitag and myself developed, summarizing available data on the various fish culture strategies we discussed at the S. E. Alaska Chinook Technical Team meeting, April 24-25. Table 5 is not yet complete; Gary will fill in the missing data points for Neets Bay when the tables are circulated for review by the Technical Team as a whole.

I also attempted to write a rationale for our use of the available data for assigning survival assumptions to different culture strategies. This text is also enclosed for review by the Technical Team.

Sincerely,

Alex C. Wertheimer
Fishery Research Biologist

Enclosures

DRAFT

APPENDIX 1. DOCUMENTATION OF SURVIVAL ASSUMPTIONS.

The culture of chinook salmon in southeast Alaska, utilizing stocks native to the region, is a relatively recent activity. The first releases of these stocks were in 1976. This short history, coupled with the long life span of these fish, results in a paucity of information on which to base survival assumptions for the various culture strategies proposed for chinook salmon enhancement. This appendix summarizes what data are available for estimating and comparing survival rates associated with different culture strategies.

In their natural environment in southeastern Alaska, juvenile chinook salmon generally spend a winter in their native rivers before emigrating in the spring to marine waters as a age-1 (yearling) smolt. The standard approach to the culture of these fish is to raise them to smolt in freshwater and release them to the marine environment at a time consistent with the wild smolt emigration pattern. In the formulation of survival assumptions, the technical team decided that the FRED standard assumptions for freshwater hatchery survival from egg to fry, and fry to smolt, were reasonable and acceptable without further documentation here.

I. Return Rates Of Yearling Smolts

The proportion of fish returning to catch and escapement is the most critical assumption affecting the estimated production of a smolt facility. Return rates to date for southeast Alaska chinook salmon, combined across stock and facility for the brood years for which we have complete returns, have averaged 3.0% for yearling smolts (Table 1). We therefore used this rate as our standard assumption for yearling smolts. We recognize that inclusion of returns (or lack of returns) from the initial releases from Snettisham and from releases of Situk stock fish may cause a downward bias to this estimate. Stock selection and facility upgrade will presumably eliminate such poor returns. Conversely, the very high returns of the 1976 brood may have been anomolous, and be

DRAFT

Table 1. Return to catch and escapement of age-1 hatchery smolts from southeast Alaska stocks. Data are for smolts cultured in freshwater and released in mid- to late May.

Brood Year	Facility	Stock	Release Date	Size (g)	Percent Return (1)
1976	Little Port Walter	Unuk	5/10/78	64.7	10.2
		Chickamin	5/11/78	64.2	12.1
1977	Little Port Walter	Unuk	5/15/79	37.1	1.4
		Unuk	5/15/79	12.1	0.6
	Deer Mtn.	Unuk	5/15/-30/79	28.1	1.2
	Snettisham	Situk	5/09/79	7.4	0
		Andrew Cr.	5/09/79	7.9	<0.1
1978	Little Port Walter	Unuk	5/15/80	31.4	2.5
		Unuk	5/15/80	10.0	1.0
		Situk	5/15/80	35.6	0.1
	Deer Mtn.	Unuk	5/15/80	16.0	3.9
Average across brood years, facilities, and stocks					3.0

(1) Recoveries of fish returning the same year as release (mini-jacks) were not included in the computation of return rates.

DRAFT

causing an upward bias to the estimate. If we exclude the Snettisham and Situk stock releases, and the 1976 brood returns, the average return rate is 1.8%. We have used this figure as a "worst case" assumption for yearling smolt production.

Timing of release of yearling smolts can have a significant effect on return rates. In our compilation of yearling smolt returns, we listed in Table 1 returns for releases in mid-to late May. In comparisons of the effects of release timing on survival of yearling smolts at Little Port Walter, releases in mid-April had 2-6 fold lower returns than that of similar fish released in mid-May (Table 2). Because of these results, we consider it necessary that projects considering yearling smolt releases have facilities for retaining the yearlings to at least the mid-May time window. Such facilities could involve either freshwater or estuarine holding.

II. Age-0 Smolt Production and Return Rates

We found that the data available for determining a survival estimate for age-0 smolts were scattered and confusing. There have been releases of age-0 smolts that have been very successful, ranging from 1.1 to 6.5% (Table 3). Unfortunately, there were no releases of age-1 smolts in 1976 and 1977 to compare with the successful releases of age-0 smolts from Crystal Lake Hatchery in those years. In the 1978 release year, age-0 smolts had 20-100 fold lower survival rates than yearling smolts (Table 3). In the 1979 release year, one release of age-0 smolts did as well as the yearling smolts; the other releases had 2-10 fold lower survival than did the yearling smolts (Table 3). If we define a successful release as >1.0% return, then the successful releases of age-0 smolts had certain characteristics in common: 1) the fish were released prior to the summer solstice; 2) the fish exceeded 10 g at release; and 3) heated water was required to attain the large size. All other releases of age-0 smolts, with one exception, had return rates of 0.5 or less, and most had return rates of <0.1 (Table 3). The one

DRAFT

Table 2. Comparison of different release timing on return to catch and escapement of age-1 (yearling) smolts, reared in freshwater and released from Little Port Walter.

Brood Year	Stock	Size (g)	Release Date	Percent Return (1)
1976	Chickamin	72.2	4/12/78	3.1
		64.2	5/11/78	12.5
	Unuk	64.8	4/12/78	2.1
		64.7	5/10/78	10.2
		82.8	6/07/78	7.4
1977	Unuk: large smolts	37.1	4/17/79	0.6
		37.1	5/15/79	1.4
	Unuk: small smolts	11.2	4/17/79	<0.1
		12.1	5/15/79	0.6
		17.3	6/16/79	0.6

(1) Recoveries of fish returning the same year as release (mini-jacks) were not included in the computation of return rates.

DRAFT

Table 3. Return rate to catch and escapement of age-0 smolts from southeast Alaska stocks, compared (where data exists) to the return rate of age-1 smolts released in the same year.

Release Year	Facility	Stock	Smolt Age	Release Date	Size (g)	Percent Return (1)
1976	Crystal Lake	Chickamin	0	6/15	15.1*	1.2**
		Nakina	0	6/17	19.2*	1.5**
1977	Crystal Lake	Andrew Cr.	0	6/20	11.4*	6.5
	Little Port Walter	Chickamin	0	8/21	36.0	1.2
1978	Little Port Walter	Unuk	1	5/10	64.7	10.2
			1	5/13	64.5	12.1
			1	6/07	82.8	7.4
			0	5/09	6.5*	0.4
			0	6/04	8.0*	0.4
			0	7/02	4.7	<0.1
			0	7/02	5.8	<0.1
			0	7/31	12.0*	<0.1
			0	8/31	25.3*	0.1
			0	9/28	36.4*	<0.1
	Crystal Lake	Andrew Cr.	0	5/22	7.8*	0.5
1979	Little Port Walter	Unuk	1	5/15	37.1	1.4
			1	5/15	11.8	0.6
			1	5/15	12.3	0.5
			1	6/16	17.1	0.6
			0	5/15	11.5*	1.1
			0	5/15	6.3*	0.3
			0	5/15	3.8*	<0.1
			0	5/15	2.7*	<0.1
			0	6/18	4.8*	<0.1
			0	7/09	3.6	<0.1
			0	8/02	6.4	<0.1
	Crystal Lake	Andrew Cr.	0	5/15	4.2*	<0.1

(1) Recoveries of fish returning the same year as release (mini-jacks) were not included in the computation of return rates.

* Heated water used during fry to smolt rearing.

** Rack returns only; no fishery data available.

DRAFT

exception to this generalization was the 1.2% return from large (36 g) fish released from Little Port Walter in late August. All other releases after the solstice, however, have been failures.

Based on this information, we think that releases by the summer solstice of age-0 smolts averaging at least 10g should have return rates of 1.0% or higher. We think that the survival of yearling smolts will be higher than age-0 smolts released in the same year; this has been the case for coho salmon in experiments in Alaska and Canada. Because of the variation in the return rates of age-0 and age-1 fish released in the same year, it is difficult to estimate relative survival assumptions. We arbitrarily assigned age-0 survival as 0.4 of yearling smolt survival, or 1.2% as the standard assumption for age-0 smolts. Because of the high failure rate for various experimental releases of age-0 smolts documented in Table 3, we selected a "worst case" assumption of 0.1%.

As noted above, to attain a 10g or larger smolt in the appropriate time window required the use of heated water during freshwater rearing of the fry. Heating large quantities of water is prohibitively expensive. Over the last few years, an alternate approach has been developed, whereby the fry are transferred from freshwater to estuarine netpens at a size of 4-5 g, and cultured in the warmer estuarine waters for the final 2-4 weeks prior to release. This approach has been applied for two years at Deer Mountain hatchery and one year at Neets Bay hatchery (Table 4). The minimum criteria for size and time at release of age-0 smolts were not attained for the 1983-brood release at Deer Mountain, and were only marginally reached for the 1982-brood release at Deer Mountain and the Neets Bay release (Table 4). There are refinements to this culture strategy that may increase the feasibility of growing adequate age-0 smolts, such as early ovulation of spawners using hormones and photoperiod control, low-volume heating of recycled incubation water to speed embryo development, and earlier transfer to seawater. We present the data in Table 4 not to discourage continued research into the culture of age-0 smolts, but to underscore that there is a degree of uncertainty as to the potential productivity of this strategy.

DRAFT

Table 4. Size and date of releases of age-0 smolts from facilities using short-term rearing in estuarine netpens for increasing growth relative to ambient freshwater rearing.

Facility	Brood Year	Stock	Size At Release (g)	Release Date
Deer Mountain	1982	Unuk	9.23	6/20/83
	1983	Unuk	6.50	6/29/84
	1983	Unuk	5.90	6/29/84
Neets Bay	1983	Unuk	11.0	6/25/84

III. Culture Of Subyearlings To Smolt In Estuarine Net Pens

Another culture strategy that has been discussed as an alternative to freshwater husbandry of yearling smolts is the rearing of subyearlings in estuarine netpens overwinter, until release as smolts the following spring. For five experimental groups of subyearlings held overwinter in the estuary at Little Port Walter, survival to smolt ranged from 80%-92%, and averaged 87.3% (Table 5). Survival of comparable groups in freshwater averaged 95.5%. Although survival was higher in freshwater, survival in the netpens is acceptable, considering the low cost for implementing this culture strategy. The estuary at Little Port Walter has a physical configuration that constricts the dispersal of freshwater flowing into the estuary, so that a layer of low salinity water is usually present. We also have survival data for this culture strategy from Neets Bay, where there is not as distinct a natural layer of low-salinity water. Survival of 1981 brood chinook salmon at Neets Bay was 71% for fish overwintered in netpens (Table 5). However, since the 1981 brood, freshwater has been piped to the pen site to moderate salinities. Although no additional chinook subyearlings have been held overwinter at Neets Bay, survival of coho salmon subyearlings increased from 55% for the 1981 brood to 92% for the 1982 brood. This increase in survival emphasizes the importance of the availability of low salinity water, either due to natural occurrence or modification by piping freshwater, for the successful rearing of subyearlings to smolt in estuarine net pens.

We assumed that the marine survival of yearling smolts released from estuarine netpens would be equivalent to that of yearling smolts released from freshwater. In fact, the return rates for smolts released from netpens was 10-20% higher than freshwater smolts for two stocks of 1976 brood chinook salmon (Table 5); therefore our assumption can be considered conservative.

DRAFT

Table 5. Survival of subyearling chinook salmon held overwinter in estuarine netpens, compared with fish reared overwinter in freshwater. Overwinter survival data for 1981 and 1982 brood coho salmon at Neets Bay are included to demonstrate the low survivals associated with this culture strategy where salinities are not modified by either natural freshwater flow or piping freshwater. Subsequent to the 1981 brood, salinities at the Neets Bay pen-rearing site have been modified by piping freshwater to the net complex.

Brood Year	Stock Strategy	Overwinter Culture Date	Transfer of Subyearlings	Size at Smolt Release (g)	Overwinter Survival %	% Return (1)
			Little Port Walter			
1976	Unuk	Estuary	33.4	65.5	92.2	12.1
		Freshwater	33.6	64.7	94.1	10.2
	Chickamin	Estuary	35.7	84.6	91.7	13.8
		Freshwater	36.0	64.2	96.9	12.5
1981	Chickamin	Estuary	7.4	26.0	80.0	
		Freshwater	7.4	14.7	91.1	
		Estuary	14.7	44.9	89.1	
		Freshwater	15.7	25.7	100.0	
1982	Chickamin	Estuary	16.7	54.1	85.1	
		Freshwater	16.7	27.2	95.6	
	Unuk	Estuary	82.3	275.7	85.9	
			Neets Bay			
1981	Unuk	Estuary	?	9/1	152.0	71.0
		Freshwater	?	?	?	?
1981	Coho	Estuary	?	9/1	?	55.0
		Freshwater	?	?	?	?
1982	Coho	Estuary*	14.0	9/1	?	92.0
		Freshwater	?	?	?	?

(1) Recoveries of fish returning the same year as release (mini-jacks) were not included in the computation of return rates.

*Salinities at pen site moderated with freshwater.

DRAFT

IV. Stocking Fry In Lakes And Streams

The final culture strategy we considered was the stocking of chinook salmon fry into lake and stream systems, where the fry presumably utilize unexploited habitat, grow to smolt, and emigrate volitionally. Because hatcheries can produce larger numbers of fry than they can grow to smolt, stocking of 'extra' fry could be a cost-effective way to increase hatchery productivity. Because all hatcheries have the potential to grow fry for stocking in excess to their smolt capability, we limited crediting additional production potential by stocking to facilities designed with incubation and rearing modules for culture of specific stocks in isolation from the general hatchery fish populations. Such isolation culture permits a wider variety of stocking opportunities in terms of minimizing the possibility of spreading hatchery diseases via stocking and in terms of the stocks that can be considered for stocking.

Research into the effectiveness of stocking is in progress for both stream and lake watersheds. The paucity of data from which to assign survival assumptions underscores the critical need for such research. There is so little information available on the survival of juvenile chinook salmon in southeast Alaska streams or rivers, for either wild or stocked populations, that we considered this category completely experimental, and assigned no survival values or stocking densities for stream stocking. Such is also the case for stocking chinook salmon fry into lakes with complex endemic fish communities, although we did arbitrarily assign a value of 11% in our survival table, at a stocking density of 500 fish per acre. This survival figure is based on the standard FRED survival assumption of 10% for chinook from fry to smolt in wild habitat, adjusted upward for the higher survival in the hatchery from emergent fry to fed fry. The stocking density is a conservative application of the lake stocking research for barriered lakes with simple or no endemic fish populations.

DRAFT

For such barriered lakes, there are some data available for chinook salmon, and some analogous data for coho salmon. Chinook salmon stocked at relatively high densities (1847-1908/acre) in 4-acre Tranquil Lake and 8-acre Larry Lake had survival rates to smolt of about 40% (Table 6). Coho salmon stocked an even higher density (3500/acre) in Tranquil Lake survived at a similar rate. However, 38-acre Ludvik Lake could not sustain the high stocking density. Of the coho salmon stocked in Ludvik Lake at 2500/acre, only 6.5% survived to smolt (Table 6). Coho salmon stocked at low or moderate densities (600-1170/acre) have survived to smolt at rates of 53-78%, except for Elfendahl Lake (Table 6). Although the fish were stocked at a density of only 145/acre, they were heavily infested by a cestode parasite, and only 6.7% survived to smolt.

Current research on 1983 brood chinook salmon stocked in Osprey Lake indicates the chinook salmon can utilize the food resources of the lake effectively. Survival to smolt of 50% at stocking densities of 600-800 per acre should be attainable. However, cestode infestation is causing significant mortality of the chinook salmon juveniles in Osprey Lake. Until we determine what the factors are that control whether and when a particular lake is "hot" for cestodes, we also most assume a "worst case" survival of 7%, comparable to the Elfendahl Lake situation, may also occur.

Table 6. Survival to smolt of chinook and coho salmon fry stocked in lakes in barriered lakes in southeastern Alaska.

Lake	Surface Area (acres)	Species	Stocking Density (Fry per acre)	Survival To Smolt (%)
Tranquil	4	Coho	3500	37.4
		Chinook	1908	41.9
Larry	8	Chinook	1847	37.9
Ludvik	38	Coho	2700	6.5
Osprey	235	Coho	1170	53.0
Sea Lion Cove	19	Coho	800	78.2
Banner	160	Coho	600	67.6
Elfendahl	795	Coho	145	6.7

Enclosure 3

DRAFT
5-14-85

GENERAL CRITERIA - PROJECT DESIGN MINIMIZES NEGATIVE IMPACT ON ALASKA NATURAL STOCKS

WEIGHT - (HIGH)

NOTE: Impacts of project alternatives should be assessed individually and cumulatively for enhancement projects in the same area.

PROJECT DESIGN	RATING	IMPACTS ON NATURAL STOCKS (Examples of impacts)
Excellent	100	Negligible . Negligible harvest impact . Negligible biological impacts
Good	75	Minimal . Occasional harvest impact but only slightly hinders achievement of escapement goals of important stocks (excluding transboundary stocks) or significant impact on marginal, small stocks . Biological impact minimal to negligible
Intermediate	50	Moderate . Occasional harvest impact on natural stocks affecting escapement goal achievement but not chronic problem; opportunity for occasional rehabilitation of affected natural stocks if necessary . No significant impact on transboundary stocks . Occasional biological impact on natural stocks but no chronic loss of natural production
Poor	25	High . Occasional to frequent harvest impact on important natural stocks significantly hindering achievement of escapement goals . Significant harvest or biological impact on transboundary stocks . Significant biological interaction and potential impact on natural stocks including juvenile interactions in early marine areas
(Unacceptable)	0	Extreme . Frequent to continuous harvest impact which could threaten biological viability of important natural stocks . Frequent to continuous harvest impact on natural stocks with no opportunity for rehabilitation and hence significant loss of natural production . Significant impact on transboundary natural stocks . Significant biological impact on important natural stocks with probable loss in natural production

RULE - Ratings below 'average' exclude alternative.

DRAFT
5-14-85

SUB-CRITERIA - BIOLOGICAL IMPACTS

SUB-CRITERIA - PROJECT DESIGN MINIMIZES POTENTIAL BIOLOGICAL IMPACT ON NATURAL STOCKS VIA ADULT STRAYING

Considerations: Genetic dilution, disease, etc.

Project Design	Rating	Impact on natural stocks
Excellent	100	Negligible
Good	75	Minimal
Intermediate	50	Moderate
Poor	25	High
Unacceptable	0	Extreme

RULE: Ratings below average reject alternative.

SUB-CRITERIA - PROJECT DESIGN MINIMIZES POTENTIAL BIOLOGICAL IMPACT VIA JUVENILE INTERACTIONS

Considerations - Density dependent early marine competition;

Project Design	Rating	Impact on Natural Stocks
Excellent	100	Negligible
Good	75	Minimal
Intermediate	50	Moderate
Poor	25	High
Unacceptable	0	Extreme

RULE: Ratings below average reject alternative.

Lightyear

SUBJECT: Harvest Object
VERSION: 1st Draft

cf 5/23/85

CRITERIA	MODE	WEIGHT
troll mix-stock	V	50
troll near-term	V	100
net terminal	V	35
high-seas inter	V	25
canadian inter	V	25
gear conflicts	V	35
troll terminal	V	35

SUBJECT:Harvest Object
VERSION:1st Draft
CP 5/23/85

CRITERION: troll mix-stock

ALTERNATIVES	WORDS
Alternative A	excellent
Alternative B	poor
Alternative C	unacceptable

Harvestibility	
excellent	50 *
good	38
average	25
poor	13
unacceptable	0

CRITERION: troll near-term

gf 5/23/85

ALTERNATIVES	WORDS
Alternative A	average
Alternative B	good
Alternative C	average

Harvestibility	
excellent	100*
good	75
average	50
poor	25
unacceptable	0

CRITERION: net terminal

SP 5/23/85

ALTERNATIVES	WORDS
Alternative A	poor
Alternative B	average
Alternative C	good

Harvestibility	
excellent	35 *
good	26
average	18
poor	9
unacceptable	0

Lightyear

SUBJECT:Harvest Object
VERSION:1st Draft

CRITERION: high-seas inter

CP 5/23/85

ALTERNATIVES	WORDS
Alternative A	Negligible
Alternative B	Negligible
Alternative C	Moderate

Impact	
Negligible	25*
Minimal	19
Moderate	13
Significant	6
Extreme	0

SUBJECT:Harvest Object
VERSION:1st Draft
CP 5/23/85

CRITERION: canadian inter

ALTERNATIVES	WORDS
Alternative A	Moderate
Alternative B	Minimal
Alternative C	Minimal

Impact	
Negligible	25 *
Minimal	19
Moderate	13
Significant	6
Extreme	0

Lightyear

SUBJECT:Harvest Object
VERSION:1st Draft

CRITERION: gear conflicts

cp 5/23/85

ALTERNATIVES	WORDS
Alternative A	Negligible
Alternative B	Moderate
Alternative C	Negligible

Impact	
Negligible	35 *
Minimal	26
Moderate	17
Significant	9
Extreme	0

CP 5/23/85

CRITERION: troll terminal

ALTERNATIVES	WORDS
Alternative A	poor
Alternative B	poor
Alternative C	unacceptable

Harvestibility		
excellent	35	*
good	26	
average	18	
poor	9	
unacceptable	0	

RULE NAME	RULE
TROLL HARVEST	IF troll mix-stock LESS THAN average THEN troll near-term SHOULD NOT BE LESS THAN excellent (WEIGHT = 100)

DRAFT
5-14-85

CRITERIA - PROJECT DESIGN MAXIMIZES ACHIEVEMENT OF PRIMARY HARVEST OBJECTIVES

NOTE: As total abundance of north-migrating stocks increases, chinook fishing time for Southeast Alaska major mixed stock troll fishery will be primarily July and August (major coho season) and the winter fishery.

SUB-CRITERIA - PROJECT DESIGN MAXIMIZES HARVEST OPPORTUNITY IN MAJOR MIXED STOCK TROLL FISHERY; WT = (MED.)

Project Design	Rating	Harvest Opportunity
Excellent	100	Excellent
Good	75	Good
Intermediate	50	Intermediate
Poor	25	Poor
Unacceptable	0	Unacceptable

SUB-CRITERIA - PROJECT DESIGN MAXIMIZES TROLL HARVEST OPPORTUNITY IN NEAR TERMINAL AREAS; WT = (HIGH)

Project Design	Rating	Harvest Opportunity
Excellent	100	Excellent
Good	75.	Good
Average	50	Average
Poor	25	Poor
Unacceptable	0	Unacceptable

SUB-CRITERIA - PROJECT DESIGN MAXIMIZES TROLL HARVEST OPPORTUNITY IN TERMINAL AREA

Project Design	Rating	Harvest Opportunity
Excellent	100	Excellent
Good	75	Good
Intermediate	50	Average
Poor	25	Poor
Unacceptable	0	Unacceptable

RULE: Troll harvest opportunities in total below intermediate reject proposal.

DRAFT

5-14-85

SUB-CRITERIA - NET HARVEST OPPORTUNITY FOR TERMINAL SURPLUS; WT = (MED.)

Project Design	Rating	Harvest Opportunity
Excellent	100	. Fully adequate opportunity to harvest surplus return . Negligible or no impact on natural stocks via incidental harvest
Good	75	
Average	50	
Poor	25	
Unacceptable	0	. Insufficient opportunity to fully harvest surplus return . Significant impact on natural stocks via incidental harvest

SUB-CRITERIA - PROJECT DESIGN MINIMIZES HIGH SEAS HARVEST

Project Design	Rating	High seas harvest opportunity
Excellent	100	Negligible
Good	75	
Average	50	
Poor	25	Highest (relative to S.E. stocks high seas availability)
Unacceptable	0	

DRAFT
5-14-85

SUB-CRITERIA - PROJECT DESIGN MINIMIZES CANADIAN HARVEST; WT. = (LOW)

NOTE: Opportunity for Canadian harvest generally decreases with placement of hatcheries /releases from south to north.

Project Design	Rating	Opportunity for Canadian harvest
Excellent	100	Negligible Canadian harvest
Good	75	
Average	50	
Poor	25	Highest relative to other Southeast stocks
Unacceptable	0	

SUB-CRITERIA - PROJECT DESIGN MINIMIZES CONFLICTS BETWEEN TROLL FISHERY HARVESTING PROJECT STOCKS AND OTHER GEAR GROUPS

Project Design	Rating	Conflicts between troll and other gear groups
Excellent	100	No conflicts anticipated
Good	75	
Average	50	Occasional conflicts, generally available solutions
Poor	25	
Unacceptable	0	Continuous, direct contact conflicts

DRAFT
5-14-85

GENERAL FACTORS TO BE CONSIDERED FOR RATING PROPOSED CHINOOK ENHANCEMENT PROJECTS FOR POTENTIAL IMPACTS ON NATURAL STOCKS

1.) Proximity of facility (or release) to natural spawning systems.

2.) Relative size of proposed releases/returns relative to size of adjacent natural systems.

3.) Projected sizes of releases/returns for all facilities in a specific area relative to natural stocks in the same area.

4.) Ability to protect by regulation natural mature spawning chinook (e.g. well defined corridor and terminal areas).