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Other changes affecting the chemical composition in the otolith have been to expose the fish to a specific trace element or isotope from a wide variety of chemicals with a specific atomic structure which can be chemically identified in the bone structure. The problem with the technique is that it can require some very sophisticated and sensitive equipment such as tube excited X ray fluorescence or atomic absorption spectroscopy, neutron activation analysis, inductively coupled argon plasma atomic emission spectrometry, or other mass spectrometry methods to detect what can be minute concentrations of the marking or tagging element (Brothers 1990).

The most common otolith mark technique may be to simply make a change in water temperature or to change the feeding pattern. Thermal marking is achieved by causing a rapid drop in water temperature. This technique has been successfully used in the hatchery environment to mark approximately 33 million pink salmon eyed eggs. This was achieved with no mortality or stress loss when water temperature was increased by 3.5°C to 3.7°C from an ambient temperature of 1.3°C to 1.5°C. Temperature control was maintained to $\pm 0.1^\circ\text{C}$ with 48 hour periods of heated water followed by 24 hours of water at ambient temperature to create one distinct ring in the otolith. This cycle was repeated to create a unique series of distinct rings in the otolith (Munk et al. unpublished).

Another technique used to lay down distinct rings is a simple matter of alternating periods of feeding and starvation of juvenile fish. Each day of starvation creates a ring of low optical density material. Subjecting fish an alternating series of days of starvation followed by and days of feeding creates areas of high and low density in the otolith which correspond directly to the periods of starvation and feeding.

Recovery and reading of the otolith mark or tag is very similar to the process used for coded wire tag recovery and reading. However there are some specific and note worthy differences. The coding process for the coded wire tag is a manufacturing process occurring some time before tagging and generally not considered a part of the tagging, recovery or reading operation. While the coding process for the otolith is the tagging operating. It is the preparation of the otolith for reading that may be

considered a production process not unlike manufacturing coded wire tags but occurring between the recovery and reading steps in the process.

The current standard procedure for preparation of otoliths for reading involved removing the bone from the fish, properly arranged in a mold and set in a polyester resin. The resin block with the enclosed otolith bone is then ground and polished on a Buehler Ecomet 3 lapping machine with a Texmet cloth and 1.0 μm alumina abrasive to a point that provides a clear view of the primordia of the otolith. The polished end of these block of plastic is then mounted with epoxy on glass slides and cut on a Buehler Isomet diamond saw to remove all but 0.5 mm of the otolith resin block. This is then polished on a Logitech LP-30 precision lapping and polishing machine to a thickness of between 50 and 150 μm depending on the specimens being prepared (Volk et al. 1990). The rings can then easily be read with a common microscope at 400 power.

Draft

Proposed Section for the Hatchery Research Study on: The Scope, Importance and Economic Value of the Fishery Enhancement Program to the Recreational Fishery in Alaska

Introduction.

The importance of enhancement program to the recreational fishery.

Many projects in the statewide enhancement program produce fish that are highly valued by sports fishermen, primarily chinook, coho, pink, sockeye, and chum salmon, steelhead, rainbow trout, grayling, and arctic char. Fish targeted for sport fisheries are released in over 350 locations around the state. Many of the projects in the state operated portion of the program (FRED Division) are entirely dedicated to improving recreational fishing opportunities.

This chapter summarizes the size and distribution of enhanced harvests, type of economic effects that result from the harvests, other non-market values associated with tourism, and to the extent possible, magnitude of these effects on Alaska's economy. Additionally, a discussion of some of the issues and conflicts relevant to the enhancement of recreational fisheries are presented.

Sport fishing has been growing in Alaska since Statehood. This is evidenced by the increase in the growth in the number of licensed anglers fishing in Alaska from 1977 (200,000 total license sales) to 1990 (425,000 total license sales) (Mills 1991).

The explosive growth in sport fishing participation in Alaska can be attributed to many factors, including changes in Alaskan population, real per capita income of resident and non-resident visitors, and the opportunity to have a good quality fishing experience. A major component of a high quality fishing experience, particularly for resident anglers is the probability of catching a fish during an angling experience (called the harvest per angler day) (Jones and Stokes 1991). The economic value of fishing experiences are directly related to higher harvests per angler day. The statewide enhancement program has been a key factor in maintaining and augmenting these catches in the presence of increasing fishing effort.

Magnitude of recreational fishing from the Enhancement Program.

The statewide salmon enhancement program has grown in recent years to the point of supporting a significant portion of the total Alaska fin fish harvest. Total finfish harvests in 1990 in the Alaska Recreational fishery were 1,995,360 (Mills 1991)¹. Total finfish harvest of trout, salmon, grayling, and arctic char and steelhead was 1,341,741. The enhancement program contributed over 28 percent of the harvest of salmon, trout, grayling, arctic char, and steelhead (Table 1.)(Fig. 1)(McKean 1991 and Mills 1991).

The state operated enhancement program produced 270,983 salmon, trout, grayling, char and steelhead in 1990, while PNP operators contributed 98,910 salmon to the recreational harvests for a Total of 369,893 fish (Table 1) (Fig. 2). The total recreational harvest from enhancement in 1991 is estimated to be 357,370 (Holland and McKean 1992).

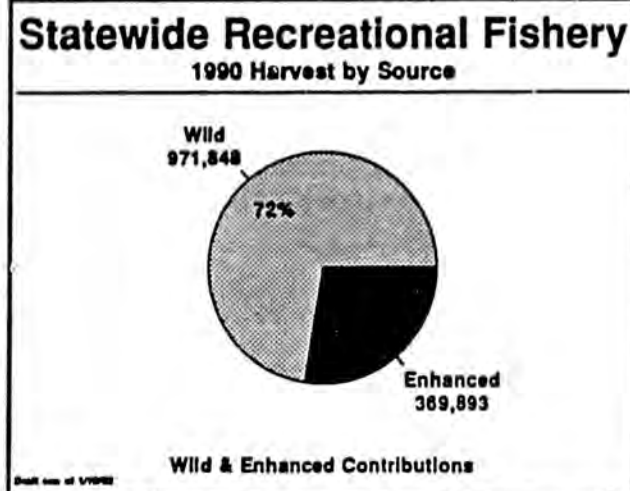


Figure 1

Table 1. Number and Percent of Enhanced Salmon, Trout, and other enhanced species harvested in 1990 in comparison with total harvest in the recreational fishery.

Species	king	searun coho	sockeye	pink	chum	landlocked coho/chin	rainbow	other	total
FRED harvest	16,100	33,447	3,550	3,900	0	37,831	170,283	5,872	270,983
PNP harvest	1,517	34,754	0	54,867	7,772	0	0	0	98,910
Enhance total	17,617	68,201	3,550	58,767	7,772	37,831	170,283	5,872	369,893
Wild totals	106,291	257,735	235,568	146,835	6,753	0	21,526	197,140	971,848
Grand Total	123,908	325,936	239,118	205,602	14,525	37,831	191,809	203,012	1,341,741
% harvest enhance	14.22%	20.92%	1.48%	28.58%	53.51%	100.00%	88.78%	2.89%	27.57%

¹ Over 1 million razor clams were also harvested in 1990 in non-finish fisheries.

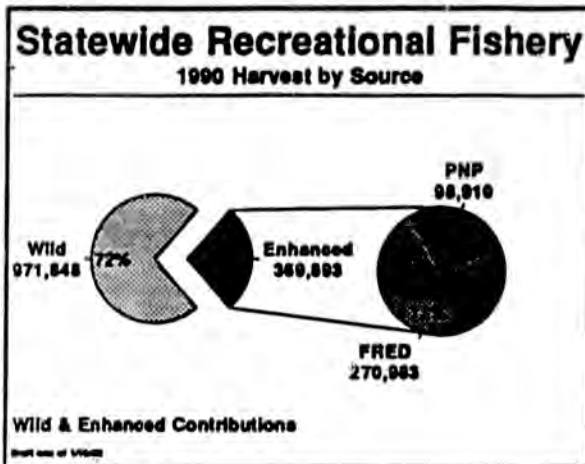


Figure 2

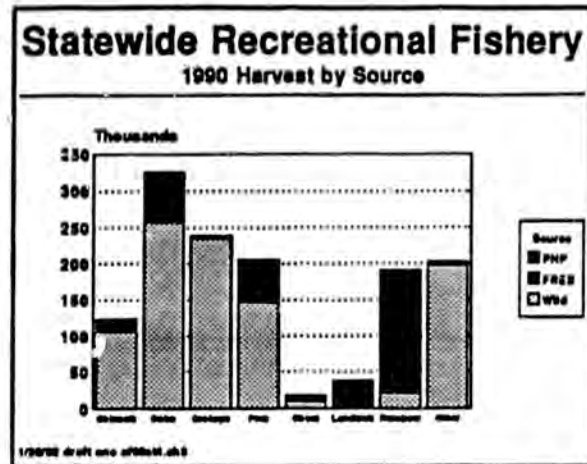


Figure 3

List of selected enhancement projects that have dramatically increased recreational catches.

- o Eighty nine percent of the 192,000 rainbow trout harvested by sport fishermen in Alaska in 1990 originated from state operated hatcheries (Fig. 3)(McKean 1991, and Mills 1991)².
- o Of 37,831 coho and chinook landlocked sport harvests, 100% were produced by state hatcheries in 1990 (McKean 1991, and Mills 1991).
- o Between 1987 and 1990, 47% of the coho salmon harvested in the popular Resurrection Bay sport fishery originated from enhancement projects at Elmendorf Hatchery, Trail Lakes Hatchery, and Bear Lake rearing Facility. The average sport harvest of enhanced fish was 9,910 (McKean 1991).
- o Harvests of coho salmon from enhancement projects in the Juneau area increased by 21 fold (2,166%) between 1990 and 1991 from 1,174 to 21,664 fish (McKean 1991). Most of the increased harvests in 1991 were estimated to originate from Gastineau Hatchery operated by Douglas Island Pink and Chum (Holland and McKean 1992).
- o In 1991 the Homer Spit recreational fishery produced 10,000 coho salmon, 3,500 chinook salmon, and 500 pink salmon entirely from enhancement releases from Crooked Creek Hatchery.

² While enhanced harvest statistics are available for recreational fisheries in 1991, statewide harvest statistics for wild and enhanced fish are produced on a one year lag, so 1990 is the most recent year that total and enhanced harvests may be contrasted.

- o Southeast chinook salmon production in 1991 totaled almost 38 thousand adult fish returning with another 5 thousand pan-sized fish harvested in stocked lake fisheries. Over six thousand adults and 5 thousand sub-adults were harvested in marine and freshwater sport fisheries.
- o The Elmendorf and Crooked Creek Hatchery increased the harvests of king salmon by 4,800 and coho salmon by 1,655 in the 1990 Kasilof River Recreational Fishery.

Contribution of enhancement program to community fishing derbies.

Dozens of fishing derbies are conducted each year in Alaska. Fishing interest groups and vendors, and municipalities are the major organizers of these events. Approximately one dozen of these derbies produce large harvests of fish into the recreational fishery (Table 2). The major reason that communities hold derbies is to increase the amount of economic activity in an area or to collect revenue for charity.

Retail businesses in some communities depend upon the angler related spending that occurs during a derby to sustain a large portion of their annual gross receipts. The ability of a derby to attract the angling public depends largely on the ability of the fishery to supply a good fishing experience with acceptable catch levels.³ The enhancement program augments catch opportunities and in some cases is the primary source of fish harvested during the derby. In Alaska some derbies would not be able to exist without fishery enhancement (i.e. Valdez coho derby pers. comm. Paul McCollum) others would not attract nearly as many participants without the acceptable catch rates offered by fishery enhancement. Approximately 82% of the salmon harvested in Alaska's major fishing derbies have originated from the statewide enhancement program (Fig. 4).

List of major fishing derbies in Alaska, augmented by enhancement

1. Juneau sport fish Derby
2. Ketchikan sport fish Derby
3. Wrangell/Petersburg
4. Sitka Derby
5. Seward Coho derby.
6. Valdez Derby
7. Big Lake Derby
8. Seldovia
9. Community of Houston

³ Weather conditions, income, and substitute recreational activities, and the opportunity to compete for prizes, are also known to affect participation in fishing derbies.

10. Assorted Kodiak derbies

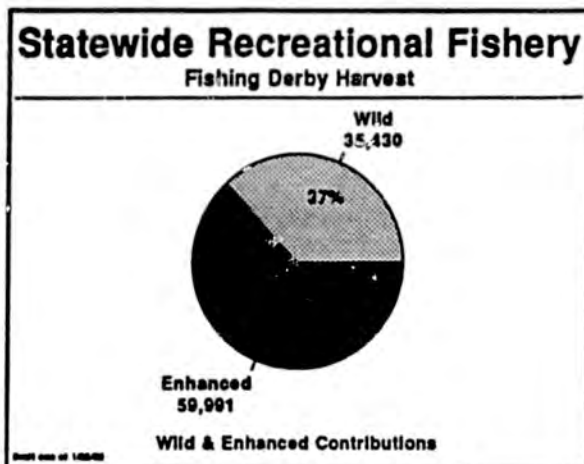


Figure 4

Table 2. Fishing Derby Harvests, including numbers of enhanced fish by species, percent of enhanced fish by species for 1991 and other selected years.

Derby Name	Species	Location	Enhanced Harvest	Wild Harvest	% Enhanced
Golden North(1991) ^a	Chinook	Juneau	136	522	26.0%
^b	Coho	Juneau	173	2,567	15.8%
Petersburg(1991) ^a	Chinook	Petersburg	228	422	35.1%
Wrangell(1991) ^a	Chinook	Wrangell	48	173	21.7%
Sitka(1991) ^a	Chinook	Sitka	270	980	21.6%
Seward(1989) ^c	Coho	Seward	9,280	5,581	62.4%
Valdez(1991) ^d	Coho	Valdez	10,000	500	95.2%
Valdez(1991) ^d	Pink	Valdez	30,000	500	98.4%
Total			50,135	11,655	81.7%

^a Memo from Paul Suchanek to Fred Gaffney 12, 5/91

^b Karen Crandall, Pers Comm. 1-15-91

^c Doug Vincent-Lang Sport Fish Division Anchorage, pers comm. 1-91

^d Paul McCollum, Valdez Fisheries Development Corporation, pers comm 1-91

Valuation and economic impacts of the recreational fishing that result from the statewide enhancement.

What is a recreational benefit, and how does it differ from an expenditure and an economic impact?

The salmon, steelhead, trout, grayling, and Dolly Varden resource in Alaska provides at least two distinct forms of recreation. It provides an extensive saltwater and freshwater sport fishery, as well as non-consumptive recreation such as watching a run of salmon migrate and spawn. The same basic economic principles apply to determining the value of both forms of recreation in terms of how benefits are generated. However, the data bases differ for each kind of recreation and the methodologies developed for the sport fish evaluations will not be suitable for evaluating the non-consumptive forms of recreation.

Consumptive values from harvests and catches of fish could be likened to property values, in that they vary from location to location. Also, they vary in quality, just as a piece of property with a beautiful view or superior amenities may have a higher market value than an equal sized piece of property with a view of a city dump, and poor amenities.

In the context of a salmon or trout fishery, enhancement changes these consumptive values by increasing the abundance of fish available to anglers. This results in a larger catch which increases the harvest expectations of both current and prospective anglers. This will either cause a greater number of fishermen to go fishing, the current number of fishermen to spend more time fishing, or cause fishermen to receive a higher valued experience for the current amount of fishing effort. Since these angler decisions can occur simultaneously, economic models that estimate the value of these experiences may be quite complex. This chapter includes a short discussion of the methods used for valuing sport fishing benefits from enhancement projects and some analytical results of economic studies on enhancement.

When anglers expend more effort catching fish from an enhancement project they may spend a greater portion of their income in harvesting. For policy makers and fishing interest groups, expenditure data reported by anglers is frequently mistaken for the "value" of recreational fishing. The net economic value of a recreational fishing experience is what fisher's are willing to pay over and above their costs. These expenditures, however, are a "cost" to the consumer and must be subtracted from the total consumer surplus. While these expenditures are an unambiguous cost, they do produce economic activity in communities. This economic activity is referred to as "indirect effects" ⁴ in economics, and is further discussed in the impact section of this chapter.

Consumptive Values and economists use of the term "value".

Given the virtual free and open access to fisheries that are augmented by enhanced fish, the largest part of the incremental recreational benefits generated by FRED Division and the PNP program will accrue directly to recreationists in the form of consumer surplus. Consumer surplus is a measure of the satisfaction people enjoy from their consumption of a commodity. It is defined by what they would be willing to pay for it.

If charges could be levied for the rights to harvest enhanced fish, each individual would be willing to pay some maximum fee for the opportunity to participate in any particular type of fishing or other recreational opportunity. Further, the angler would choose to buy a certain number of units of that recreation at each unit price below that maximum. Of course recreationists do not buy angler days or days of salmon viewing as they do other commodities. None-the-less, this price quantity relationship does exist for each individual and forms his or her demand curve for fishing, viewing etc. The sum of all the individual demand curves forms the aggregate demand curve over all those willing to pay to participate in the recreation (Fig. 5).

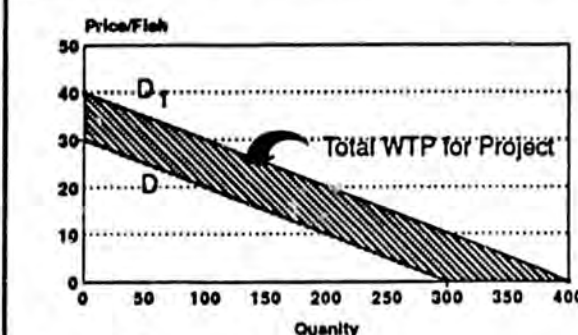
⁴ Also, they are referred to as secondary effects, secondary impacts, and regional economic impacts.

In Fig. 5, the line D represents the aggregate demand curve for some particular recreational activity associated with the salmon, trout or other resource. The area under the curve is the total willingness to pay of all recreationists. It is a measure of the total satisfaction gained from consumption of the recreation if it is offered at no charge. This demand curve is influenced by many factors such as the price of complementary goods, by incomes and by the expectations and perceptions of those who participate. The availability of more fish as a result of the enhancement program causes the quality of the product to change, thus, shifting the demand for salmon and steelhead recreation from D to D1. The expectations of fishermen are raised over the prospect of improved catch success and this, in turn, improves what they are willing to pay for the experience. This increase in willingness to pay results in the consumption of more fish at each price. The shaded area between D and D1 is the increase in consumer surplus that results from an enhancement project.

The total willingness to pay differs from the net willingness to pay in that net WTP considers the additional cost of catching fish. In (Fig. 6), the net willingness to pay for a recreational experience is demonstrated by the difference between the total willingness to pay and the cost of fishing at a given price per fish. The consumer surplus is the shaded area above the price line and below the demand curve. This graph represents the net willingness to pay for a project that creates a new fishery, and does not represent an increment in catch for an existing fishery.

In addition to generating consumer surplus by increasing the abundance of fish in existing fisheries, the statewide enhancement program can generate consumer surplus by opening new sport fisheries. Enhancement projects which rehabilitate a diminished stock have been credited with re-opening sport fishing areas, and with expanding bag limits in a recreational fishery. The reopening of a sport fishing statistical area, or relaxing of

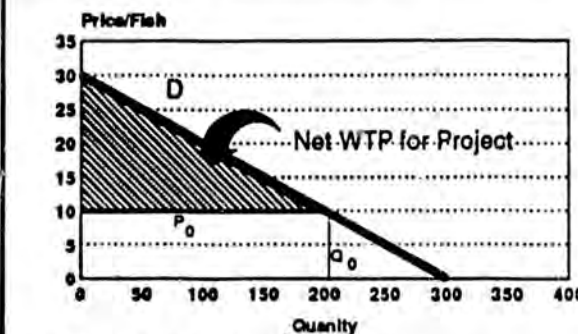
Total Willingness To Pay (WTP) For An Enhancement Project



Draft of 1/22/92 SF90ln1.ch3

Figure 5

Net Willingness To Pay (WTP) For An Enhancement Project



Draft of 1/22/92 SF90ln2.ch3

Figure 6

bag limits will often produce greater consumer surplus values than simply increasing catch rates during an existing opening.

Finally, there may be non-consumptive and nonuse values associated with the fishery. These values include existence, option or bequest values. People may gain satisfaction from the fishery not because they make use of it, but for other reasons. Viewing and education associated with fishery enhancement projects motivate tens of thousands of visits to state and PNP facilities each year. A discussion of some of the tourist visitation statistics are included in this chapter. Persons who never fish may still place a value on the continued existence of the fishery. Fishery rehabilitation projects have been applied to several streams with salmon populations that would be otherwise too small to sustain themselves in the future. Although nonuse values associated with fisheries in Alaska may be significant, they are not treated here.

Valuation Statistics on Enhancement of Recreational Fisheries

The State of Alaska is fortunate to have some of the finest economic models in the North America for valuation of recreational fishing. Three studies by the consulting firm of Jones and Stokes, have been carried out since 1986 (Jones and Stokes 1987, 1989, and 1991). The work, which clearly represent the state of the art in recreational demand modeling cover the regions of South Central Alaska, Juneau, and Southeast Alaska. Areas not covered by the analysis include the Arctic, Yukon, Kuskokwim regions, Alaska Peninsula, Kodiak, and Bristol Bay. The State of Alaska has expended over \$600,000 in the development of the current models with Wallop-Breaux funds. The two valuation techniques applied in these studies are (1) a modified travel cost model approach and (2) contingent valuation procedures. While the methods for these two techniques cannot be described in detail here, some of the major findings of the studies, as well as difficulties with the models are summarized.

While enough cannot be said about the analytical quality of the three Jones and Stokes studies, several obstacles exist in actually applying some of the models to policy questions related to the Statewide fishery Enhancement Program.

1. The report for the South Central studies, and Juneau area studies do not include an analysis of current enhancement projects. Some net willingness to pay values are cited in the reports that are unfortunately, not relevant to evaluation of enhancement projects. The economic models created for the studies must actually be operated on a computer program to precisely estimate sport fishing values for policy analysis (unless a relevant policy analysis simulation was carried out under the contract). In fact, the estimates of average value for a day of fishing effort will be overestimates of the marginal value of an enhanced fish by a few percent to more than an order of magnitude. This is demonstrated in the Southeast economic study where average angler willingness to pay per king salmon harvested of \$616 was nearly three times the marginal angler willingness to pay

per fish of \$210 from a king salmon enhancement project (Jones and Stokes 1991). Thus, use of the average willingness to pay figures from the reports, could produce grossly distorted and spurious results when applied to policy questions requiring marginal or incremental values.

2. The South Central Economic Study (Jones and Stokes 1987) is extremely complex, and the models created in this study required initial calibration on a Cray super computer, during their formulation. The cost of carrying out simulations on the mainframe computer is prohibitive for day to day policy analysis. Furthermore, only the staff at Jones and Stokes and a few other economists in the U.S. are capable of operating the South Central Region discrete choice models.

3. Even if the computer simulation models were operated in their current state, many of the site/species statistical areas, that are sampled in the studies are not the sites in which enhanced fish are produced. Enhanced sites must be matched with similar site/species combinations in the surveys to approximate the value of a project. This would require some ADF&G Sport Fish Division staff time to carry out the site/species matches.

4. Applied cost benefit analysis with the Jones and Stokes models require the projection of some fairly detailed catch and effort information from the Department of Fish and Game. The logit Travel Cost models and Contingent Valuation models require detailed information on probable harvests and fishing effort (angler days) for each proposed project. This information must be projected by specific statistical area and by week of harvest.

5. The Jones and Stokes models produce valuation estimates for years between 1986 and 1988. To run simulations on present day policy questions requires some updating of the models. These updates would require some ADF&G staff time and some contractual resources for economic analysis.

For the proceeding reasons (1-5), a comprehensive study of the net benefits of the statewide fishery enhancement program to the recreational fishery has not been carried out. Such a study would be of critical importance for investment and allocation purposes and would complement the economic modeling that the Legislature is now undertaking on the value of enhancement to the commercial fishery. The costs of creating the necessary software to evaluate all projects in South Central region, would require approximately \$20,000. Additional running of simulations would require approximately 1 full year of work in a cooperative effort with FRED Division and the Division of Sport Fish. The simulation of the net benefits for projects in Southeast Alaska could be undertaken with fewer resources, since the computer software was produced as part of the contract. Both the South Central and Southeast Region fishery enhancement could be evaluated with an additional \$30,000 in contractual services, and with the better part of

a year of staff time from the FRED Division economist and 1/3 year of staff time from the Biometrics section of the Division of Sport Fish.

Selected statistics for the enhancement produced Southeast Alaska king salmon fishery.

The Southeast Alaska Sport Fishing Economic Study (Jones and Stokes, 1991) does produce some analytical results that are applicable to estimating the value of proposed king salmon enhancement actions.

- They are:
- (1) An estimate of the net willingness to pay estimates for a proposed increase in hatchery operations for king salmon enhancement of 20%, and
 - (2) A policy analysis question involving the estimation of an increasing in the opening for the Juneau Statistical Area for Chinook salmon fishing.

In brief, the first analysis applies direct survey questions about what amount anglers would be willing to pay for a fishing stamp to charge for improved chinook salmon fishing from the hatcheries in Southeast Alaska. The survey relates these proposed access fees to a 20 increase in production costs from the enhancement facilities. This in turn, was estimated to yield approximately a 30% increase in the average sport harvest of Chinook salmon in Southeast Alaska. While the production costs are not exact estimates, a special simulation of the models revealed that the increase of 8,900 harvests would result in an annual net willingness to pay of approximately 1.9 million dollars annually (1988 dollars) (Table 3). The average value for a chinook salmon in this scenario is approximately \$210 per harvested adult.

Table (3) Total Annual Willingness to Pay of Resident Angler Households in Southeast Alaska for a 20% increase in the King Salmon Harvest from Hatcheries

Harvest Area	Hatchery Operations
Ketchikan	\$380,688
Prince of Wales	340,958
Kake/Petersburg/Wrangell/Stikine	352,287
Sitka	362,983
Juneau-Haines/Skagway	<u>439,104</u>
Total	\$1,876,020

The second economic statistic results from a proposed opening of the Juneau statistical area for King salmon fishing during the months of April, May, and June. This policy question focuses on a recent decision to open a portion of the Juneau Statistical area to early season king salmon fishing (from April 24 to June 18). During a previous opening of this statistical area over 1,130 king salmon were harvested, and a large increase in the number of days of effort were recorded. Angler net willingness to pay for this alteration was estimated using the travel cost, and contingent valuation methodologies. The change in the willingness to pay for the increased catch for this management action was between \$303,500 (from the results of the logit model) and \$398,000 (from results of the CV model) annually and from \$268 to \$352 per harvested fish respectively.

This simulation is similar to the approach that would be applied to computing the value of a Chinook enhancement project that increased the abundance of fish sufficiently to extend the length of the opening in a prime fishing area. For several reasons, the net willingness to pay for an identical increment in chinook harvests from a typical enhanced chinook fishery may be less than the WTP amounts cited in this example⁵, but they are probably within a similar magnitude.

While these valuation results must be offered with a note of caution, they probably provide an upper bracket for the marginal value of a Chinook salmon, produced by enhancement, and caught by recreational fishers in Southeast Alaska. The lack of updated computer software, designed to apply the Jones and Stokes models, is the major restraint to a comprehensive economic assessment of recreational net benefits for the statewide enhancement program.

Visitation Statistics for Hatcheries.

In aggregate, State and PNP hatcheries generate nearly one half million visitor days from resident and non residents per year. Visitation statistics have been compiled for the following hatcheries.

Table (4) Public and PNP facilities with visitor facilities and visitation records.

	Visits
Deer Mountain	150,000
Elmendorf	65,000
Ft. Richardson	1,200

⁵a. Most enhancement projects increase the catch per unit of effort in an established fishery opening, but do not result in outright extensions of area/time openings.

b. Harvests in this example consist of both enhanced and non-enhanced salmon. The Jones and Stokes models have demonstrated a small WTP premium for wild fish in the Southeast marine chinook salmon fishery.

Gastineau Hatchery (DIPAC)	100,000
Trail Lakes Hatchery (CIAA)	25,000 (20,000 to 30,000)
Bear Lake Rearing Facility (CIAA)	12,500 (10,000 to 15,000)
Crooked Creek Hatchery	80,000
Valdez Hatchery (VFDA)	8,541
Total	442,241

The tourism generated by hatchery visitation is one example of a non-consumptive value that is created by the statewide enhancement program. Non-consumptive recreational benefits generated by the enhancement program are in many ways more difficult to estimate than the benefits of sport fishing itself. Baseline information on the demand for such forms of recreation is scarce, but visitation itself is an indicator that people derive consumer surplus from these experiences. The value of a visit to a salmon enhancement facility can be compared with the value of visits to attractions such as Aquaria or a private zoo. The willingness to pay for entrance to the facility is a proxy for the minimum consumer surplus derived.

The visits vary in quality and time from facility to facility. Some facilities have extensive visitor amenities and visitation may consist of an hour or more in length. Other facilities have minimal visitor amenities and visitation may consist of a few minutes of viewing of migrating and rearing of salmon. The states largest and most extensive hatchery visitor center is at Gastineau Hatchery, in Juneau. In 1991 the facility charged \$2.25/visit (walk in fee) and recorded nearly 100,000 visits.

While a total value cannot be computed from the existing visitor information available from these facilities, total visitation suggests that benefits to Alaska are on the order of hundreds of thousands of dollars annually.

Indirect economic effects of the statewide enhancement program (employment and income effects from tourism and resident expenditures)

As previously explained, an enhancement project that increases non-market benefits of a fishery will often compel anglers to spend additional fishing effort and make additional expenditures to compete for improved fishing. Thus, fishery enhancement can compel anglers pay more for boats, moorage, lodging, transportation, food and beverages, guiding, and other fishing related items. It is these out of pocket expenditures that lead to "economic impacts" and result in increased employment and income in the Alaska economy. Businesses that provide goods and services to anglers hire and pay employees and buy inventory from other businesses, which in turn hire and pay employees and buy from still other businesses. Multiplier effects turn these expenditures into gross business revenues in Alaska. The magnitude of these revenues can be projected with economic impact models.

DRAFT

Two economic impact models exist in Alaska that are suitable for computing changes in changes in expenditures and employment resulting from fishery enhancement of recreation. One is input-output model developed for Jones and Stokes 1987,1989, and 1991). The second is a model called SALMOD, developed by the Institute of Social and Economic Research. In the Jones and Stokes, I-O models angling expenditures are computed for anticipated change in fishing effort (angler days), and in turn, the direct, indirect, and induced economic income for a fishery may be estimated. A major advantage of this model is that short run expenditures for a given project are empirically estimated in the behavioral models. Thus, the expenditure estimates conform more closely to the amount of additional spending resulting from a management, or enhancement action. Many impact models must use average expenditure data which can produce greatly overstated estimates of marginal expenditures.

As in the case of the Jones and Stokes non-market models, economic impacts for the statewide enhancement program could not be estimated without the creation of practical computer software, and additional fishery effort projections for enhanced sites (for South Central Alaska). Impact assessments would be possible for enhancement projects in Southeast Alaska with the soon to be completed impact models, and with additional work on fishing effort estimates for all enhancement projects. An example of an employment and personal income estimate is provided in Jones and Stokes (1991) for an expansion of recreational fishing opportunities for chinook salmon fishing in the Juneau area. An additional catch of 1,130 harvested adults is estimated to produce approximately \$13,000 in personal income and less than 1 full time job (Jones and Stokes 1991).

Results of Economic impact Assessment of Statewide Enhancement program with ISER Model.

Estimates of employment in the Alaska economy can also be made with SALMOD, an economic impact model created by the Institute of Social and Economic Research (ISER). This model was created specifically for the evaluation of the state wide enhancement program. Several revisions of the economic base model have been completed between 1986 and 1990. The model produces estimates of the expenditures of recreational fishing created by the enhancement program. Employment is expressed in full and part time jobs. The documentation for this model is in progress through a contract with Scott Goldsmith of ISER (pers comm Jeff Hartman FRED Division 1991).

The preliminary results of the FRED recreational impacts, from SALMOD, project personal income to Alaska residents of \$2.0 million to \$7.0 million annually, with a point estimate of \$4.3 million⁶. The full time employment that would result from this

⁶ Income and employment impacts vary greatly depending on what assumptions are used in this model for the expenditures that would occur in the absence of the recreational fishing opportunity. Net expenditures in this simulation are equal to 1/2 of the average expenditures for

increased personal income is approximately 150 jobs. The PNP hatchery personal income impacts from recreational fishing are estimated to be approximately \$400,000. These impacts result from the eggs taken in broodyear 1988, that were projected to return between the years 1990 and 1997 (Hartman, 1988) Memo of July, 20, 1988, to Distribution. These employment and income impacts occur primarily in the Cook Inlet region, Southeast, and Kodiak regions (Table 5) (Fig. 7).

Table 5 Personal Income and Employment Impacts from 1988 simulation of SALMOD impact model for FRED Division enhancement projects by region of impact.

	Total Statewide Impacts	South east	Prince Willia Sound	Cook Inlet Mat/Su	Kodiak AK. Pen.	Interior
Personal Income (\$ 1,000'S)	\$4,309	\$731	\$59	\$2,786	\$37	\$696
Employment	148	25	2	96	1	24

Issues and Conflicts relating to Enhancement of Salmon, Trout, and other species.

1. Allocation between competing users.

Intense competition between users exists for most of the salmon fishery in Alaska as is the case in most of North America. This competition is observed by the Alaska Board of Fisheries, and ADF&G fisheries managers who are under constant pressure to deliver more fish to each of the various interest groups in the state. Within the commercial fishery, sport fishery, personal use and subsistence fisheries of Alaska, there are a multitude of insistent claims to enhanced fish, all asserting equal validity but in total, exceeding the available supply.

The source of the conflict and divisiveness over allocation of enhanced fish is often misunderstood. The primary reason for the competition lies in the large economic value of the



Figure 7

an angler day, as approximated from Jones and Stokes (1987) and Mike Mills pers comm 1988.

salmon resource that has been created in Alaska. If the resource created by enhancement were of little economic value, fishers would not spend so much of their time trying to seek out larger shares of the available harvest.

Since enhanced fish are often harvested along with wild stocks, allocation conflicts involving recreational fish are complex and intertwined. In Southeast Alaska, the allocation conflicts are additionally complicated by U.S./Canada treaty constraints. This treaty sets strict limits on harvests of non-enhanced chinook salmon in the region. Reduced quota's have generated a recent Board of Fish decision to hold special hearings that consider a range of restraints on the sport harvest of chinook salmon.

The economic costs of further restraints on the recreational fishery may be greater than the economic costs of producing additional chinook salmon to targeted commercial or recreational fisheries. Thus, the fishery enhancement program may be a tool to help reduce conflict in this dispute.

2. Funding of enhancement for recreational fisheries.

While anglers in Alaska have clearly become dependent on the statewide fishery enhancement program for sustaining a valuable fishing experience, the prognosis for sustained financing of fishery enhancement in the state is much less certain.

The existing funding for statewide fishery enhancement program is highly dependent on the continuation of Federal funding through an excise tax and distribution program called Wallop-Breaux. This amendment in the federal Register, represents somewhat of a windfall for Alaska. While Alaska fisher's contribute a trivial amount the tax receipts to the total fund, the current funding formula provides an amount to the state which is not commensurate with population or licensed fishermen in Alaska. Should the funding formula for distributing tax receipts to Alaska change, most of the states enhancement production would be affected.

Additionally, in the FY 93 Governors Budget, two state owned hatcheries that produce important recreational fisheries, are not funded. They are Deer Mountain Hatchery in Ketchikan, and Big Lake Hatchery in Wasilla. Deer Mountain Hatchery produces several hundred chinook salmon harvests in the recreational fishery, and over 1,000 chinook harvests annually in the commercial fishery. It also produces a significant harvest of coho salmon in the recreational fishery. While the economic value of the permanent loss of the production from this hatchery has not been computed, it would be possible to produce an estimate by creating a simulation from the newly completed Southeast Economic Study.

3. Genetic and Management Conflicts and Issues.

To be inserted by Jeff Koenings and Sport Fish Division

For 1991 Juneau DJ coho 1,445; Gastineau 20,219

Juneau Derby from tag lab Coho 1991 Juneau 173 fish catch 2567
Coho 1990 Juneau 18 fish catch 1914.

Table (X) Public and PNP facilities with visitor facilities and visitation.

	Visits	
Deer Mountain	195,000	
Elmendorf	65,000	('91-47,000; '90-65,000;
Ft. Richardson	1,200	'89-60,000)
Gastineau Hatchery (DIPAC)	100,000	
Trail Lakes Hatchery (CIAA)	25,000	(20,000 to 30,000)
Bear Lake Rearing Facility (CIAA)	12,500	(10,000 to 15,000)
Kasilof Hatchery	80,000	
<u>Valdez Hatchery (VFDA)</u>	<u>8,541</u>	
Total	478,200	

Furthermore, the two policy questions produce WTP results that are comparable in units of harvest. The CV hatchery simulation produces an incremental value of ____ per harvested salmon, the

Notes:

For Gastineau Hatchery, in 1991 84,000 cruise ship, 10,000 travelers, 5,000 school students. Salt water aquaria, 5,000 gallons, several small aquaria 100 species, museum like display of bear and eagle habitat, mocked wheel house of fishing vessel, viewing window in the fish ladder, displays outside. In full swing, 6 full time and 6 part time positions. Facility used for conferences, meetings and receptions, research. Fee for independent i.e., 2.25 educational commentary cruise ship contract with operators. Reecia Wilson DIPAC. Tourism Manager. Visitor Fishing Pier.

D. Impact Statistics.

LEGISLATIVE RESEARCH AGENCY
130 Seward Street, Suite 218
Juneau, Alaska 99801-2196
(907) 465-3991
(907) 463-3351 (FAX)

DATE

2/3/92

TO

FAX NUMBER:

4928

FROM:

Glenn Gray

Transmission of the following number of pages including this page 3

MESSAGE:

I called Bill Smoker and he reaffirmed
that this resolution is only proposed.
Mr. Smoker is chair of the resolutions
committee of the Alaska Chapter of the
American Fisheries Society. The committee
is still accepting comments on the proposal.

of "A Tongass Treasure: The Cave Resources of Southeast Alaska," by Jim Baichtal, a geologist with the U. S. Forest Service.

Immediately following the meeting, there were tours for interested members at the fish processing facilities of Silver Lining Seafoods, the FRED hatchery at Deer Mountain and the SSRAA hatchery at Beaver Falls.

Chapter Comments on Tongass Forest Management Plan

The Alaska Chapter has sent a letter to the U. S. Forest Service in response to the Forest Service's request for public comment on the Supplement to the Draft Environmental Impact Statement (DEIS) for the Tongass National Forest Land Management Plan (TLMP). The letter was reviewed by the Environmental Concerns Committee and approved by the Executive Committee. The Chapter had previously gone on record supporting regulations requiring 100 foot wide buffer

strips along fish-producing streams in areas of the Tongass that are to be logged. The Supplement to the DEIS does now include those requirements, as mandated by the Tongass Timber Reform Act. In our comments on the Supplement, the Chapter emphasized that such buffers should be considered minimums, and that habitat biologists should be granted wide discretion to extend the width of the buffer as needed to protect particularly sensitive riparian habitats and valuable fish populations. The Chapter recommended the Forest Service reject the Plan Alternative that did not use the most conservative riparian habitat management prescription.

The Chapter also commented on the inadequacy of the DEIS and the Supplement in addressing the impacts of upland uses, such as roading and logging, on spawning populations of salmon, especially pink salmon. The DEIS and Supplement acknowledge "greater risk" to populations in impacted watersheds, but assume no effect on productivity of these fish in comparing alternative forest management strategies.

Proposed Resolution on Yukon River Wild Stock Management Zone

The following draft resolution was identified at the Annual Meeting, and the membership present voted to have it publicized for informational purposes in the next issue [this one] of *Oncorhynchus*. **IT HAS NOT BEEN APPROVED BY THE MEMBERSHIP**; it does not represent an official position of the Chapter. Background material that was provided by the author of the resolution follows the resolution itself.

The Chapter also received a draft of the "United States Proposal for Establishing a Cooperative Yukon River Salmon Wild Stock Restoration Program." This draft was prepared by the U.S. delegates, including members of both Alaska and National agencies, to the Joint Technical Committee considering Yukon River salmon policy with respect to the U.S./Canada Salmon Treaty. The draft proposal provides insight into the current planning process to establish cooperative management policy for the Yukon. This current process anticipates two outcomes: 1) the establishment of a Regional Planning Team for RPT's in Alaska are representative public bodies for salmon enhancement and management and which will be given responsibility for designating game refuges; and 2) participation in a joint US/Canada plan for the Yukon River watershed.

The proposed resolution **WAS NOT** offered in the meeting document, the proposed resolution would be subject to comment by the Chapter on the policy prior to the planners.

A Resolutions Committee has been formed to consider this resolution and to recommend to the Executive Committee 1) whether the resolution should be presented to the membership as it is written for approval or disapproval, 2) whether an alternate resolution should be offered, or 3) whether the proposed resolution should be tabled. The following material is being presented to inform the membership about the resolution and to solicit comments on the resolution.

Particularly useful would be comments on the scope of the Chapter's recommendation.

The Yukon is home to a unique group of Pacific salmon, subarctic animals adapted to near arctic conditions. They deserve special care. Should, therefore, resource users of the Yukon be denied any enhancement of salmon production beyond the capacity of wild spawning habitat? There is of course widespread current debate of whether artificial enhancement ever can increase production over that supported by wild

spawning habitat, and perhaps that is the core of the proposed resolution's author's concern.

Alaska has a long established mechanism (RPT's) for public participation in the controlled development of salmon enhancement and Alaska has strong genetic and disease policies that are applied in all salmon enhancement projects. Does the Chapter anticipate that this process will be inadequate to the difficult task of protecting the Yukon's stock diversity? Perhaps that anticipation is also at the core of the proposed resolution.

The Chapter in 1988 in a similar resolution supported establishment of genetic sanctuaries (or refuges) in which harvests but not enhancement could occur and this proposed resolution seeks establishment of a large sanctuary in the Yukon. Is the present protection offered by national parks and refuges inadequate? Will the entire Yukon have to be set aside in order to provide adequate protection?

Please send your comments to W. W. Smoker, Resolutions Committee Chair, University of Alaska Fairbanks, Juneau Center for Fisheries and Ocean Sciences, 11120 Glacier Highway, Juneau, AK 99801 (789-4441) (FFWWS@Alaska). To encourage frank discussion the Committee promises to keep confidential the identities of comment authors.

Proposed Resolution Yukon River Wild Stock Management Zone

WHEREAS, the Yukon River is one of the largest producers of wild chum and chinook salmon in North America; and

WHEREAS, supplemental hatchery production is being considered as a means to increase harvest levels of Yukon River salmon; and

WHEREAS, increased harvest levels have a potential to severely impact the many small wild stocks included in the mixed stock and mixed species fishery; and

WHEREAS, available scientific literature suggests that hatchery produced salmon can stray and interbreed with wild stocks altering the wild gene pool, reducing stock fitness and threatening the survival of wild populations;

BE IT RESOLVED, the American Fisheries Society, Alaska Chapter, urges the governments of Canada, United States and Alaska to manage the Yukon River as a Wild Stock Management Zone and to implement the following resolutions:

1. Rebuilding of depressed wild salmon stocks should be accomplished with proper management of the resources and not

accomplished through increased hatchery production;

2. Management of the mixed stock fisheries should be governed by the least productive stock with regulations set to insure that these small stocks do not become extinct;

3. In no instance should hatcheries be used as a means to increase harvest levels;

4. As a last resort, aquaculture techniques may be necessary if a specific stock would become extinct without direct intervention.

BACKGROUND

(Statement prepared by author of the proposed resolution)

The Yukon River is one of the largest producers of wild "unenanced" chum and chinook salmon in North America. Nearly all salmon spawning and rearing habitat remain intact. The fishery is mixed stock and mixed species in nature with commercial and subsistence harvest of salmon taking place from its mouth upstream almost 1,400 miles. The 1978-1986 average annual drainage-wide harvest was 185,000 chinook, 1,161,000 summer chum, 442,000 fall chum and 61,000 coho salmon (Alaska Department of Fish and Game, 1986). The demand placed on Yukon River chinook and fall chum salmon exceeds the capacity of wild stocks to satisfy all user groups and, consequently, several stocks have become depressed.

Supplemental hatchery production is seriously being considered by many managers, fishermen and politicians as a quick-fix means of alleviating the ever-growing demand placed upon the Yukon River salmon resource. Proposals include expansion of the Clear Hatchery near Fairbanks (Tanana River), increasing funding for artificially enhanced Canadian stocks through treaty stipulations, and developing small-scale aquaculture 4-H projects throughout U.S. waters. The necessary public involvement process has not been initiated for Yukon River enhancement projects, even though the effects may be substantial.

Available scientific literature suggests hatchery produced salmon can negatively impact wild populations by decreasing genetic diversity, reducing stock fitness and reducing effective population size. Foreign diseases can also be introduced from hatchery salmon. The salmon stocks of the Pacific Northwest should exemplify what happens when hatcheries are used to "mitigate" for declining wild salmon stocks. Some salmon stocks

are currently being considered for listing under the Endangered Species Act largely due to the ineffectiveness and misuse of salmon hatcheries.

Nehlsen et al. (1991) identified the status of Pacific salmon, steelhead and cutthroat stocks in the Pacific Northwest which included 214 naturally spawning depleted stocks, 101 of which were at a high risk of extinction. A review of 18 quantitatively evaluated supplementation projects in the Pacific Northwest, British Columbia, Alaska and New England found that none had rebuilt wild runs to self-sustaining levels (Miller et al. 1990). In a comprehensive review of supplementation programs, Smith et al. (1985) concluded that supplementation should not be initiated in wild fish only streams and that populations in these streams are best enhanced by habitat protection and harvest control.

Supplemental hatchery production will only further complicate mixed stock fisheries management. Many wild stocks are relatively small which make them extremely vulnerable to overharvest in an intensive fishery. Consequently, should mainstream harvest levels increase in response to hatchery production of salmon, then small stocks risk reduction or elimination. The status of many of these stocks have never been assessed. Management of a mixed stock fishery requires protection of the weak stocks.

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Deadline for materials for the Spring issue of *Oncorhynchus* is March 10.

22550 A
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1990

CHAIRMAN'S REPORT: THE SALMON STRATEGY TASK FORCE

By Commissioner Glenn A. Olds

Salmon is Alaska's showcase fishery resource. It is the common denominator among the sportsman, tourist, commercial fisherman, subsistence villager, and fish processor in Alaska. When the salmon industry is in trouble, all Alaska suffers. When it prospers, everyone wins. The salmon industry is in trouble. New players have entered the world market with abundant supply, new technologies, and rival market strategies. Alaska's striking success in fishery renewal, hatcheries, habitat management, production, and harvest have contributed to a dramatic increase in the world supply. However, world demand, marketing sophistication, and new products have not kept pace. This disparity between supply and demand has driven prices down, leaving heavily mortgaged boats and equipment at risk, and resulted in outmigration of Alaskan control of its own resources and industry. This is the salmon crisis, which the Chinese describe as "dangerous opportunity." Governor Hickel, recognizing the urgency of this crisis, established a statewide, representative task force, to discover the sources of the crisis and to recommend solutions. Some things could be done at once, others require more time. The committee set to work in September, exploring popular "myths" that surround the industry—discussing simplistic solutions, quick fix, and the oldest game in the world, "passing the buck." Their analysis was incisive and inclusive. The Task Force report includes specific recommendations in certain areas. In other areas, the task force indicated a range of options for consideration by policy makers.

RECOMMENDATIONS

Immediate Steps

1. Marketing and product development are the most urgent requirements. Production and processing on the supply side have prospered through state and private initiative. Alaska Seafood Marketing Institute (ASMI) must

- concentrate on a focused and sustained effort, with renewed state and industry support on current inventory and the 1992 catch. Commitment of new and hard dollars are required.
2. The Department of Commerce and Economic Development (DCED), Division of Investments, and the Commercial Fishing and Agriculture Bank should initiate and accelerate accommodation of loan extensions and other measures to ease the financial crisis on fishermen.
3. The Limited Entry Commission should be urged to increase efforts to protect and accelerate Alaska-based permits to authentic Alaskans.
4. Processor and fishermen groups should initiate early market commitments to introduce dependable planning and early preparation for next season.
5. The University of Alaska, State Department of Fish and Game, DCED, and appropriate organizations and agencies should mount an early and sustained information/education service to the fishermen and industry on world market conditions, product change and opportunity, and all elements essential to realistic planning.
6. The salmon processing capacity situation analysis in Prince William Sound, in light of the 1991 season, should be undertaken early by the DCED for early action concerning next season.
7. The Governor should encourage and promote early and sustained collaboration and trust between all segments of the fishing industry. Important consideration should be given to appropriate organization and tools to effect this.
8. The Alaska Science and Technology Foundation, the University of Alaska's Fisheries Industrial Technology Center, and the Marine Advisory Board should concentrate on expanding their efforts in salmon product diversification and market development, coordinated with the Alaska Fisheries Development Foundation.

9. Special attention should be given by every appropriate agency to the domestic U.S. market, especially for high volume, lower-cost salmon.
10. Quality standards and controls for Alaska salmon must be developed and maintained. Department of Fish and Game should reexamine management policy and practices to guarantee quality:
 - A) Southeast Alaska and Prince William Sound fishermen, processors, and Department of Fish and Game should develop a plan for timing to optimize quality.
 - B) Fishermen, managers, and industry operators should cooperate to devise a program of training in "management for quality" at every level of the

(Continued on page 11)

DED SUPPORTS YUKON RIVER FISHERIES INITIATIVE

Governor Hickel's Rural Development Sub-Cabinet unanimously endorsed a resolution presented by the Alaska Department of Commerce and Economic Development supporting the Clear Hatchery Expansion/Yukon River Drainage Fisheries Initiative. The Rural Development Sub-Cabinet is also recommending, to the governor, that he approve the planning and design phase through a commitment of financial resources in the FY93 capital budget.

The poor fish runs of the past few years have had devastating impacts on both the cash and subsistence economies of the area. Through this initiative, the expansion at Clear Hatchery would allow incubation and rearing of up to 20 million chum fry and 3.3 million chinook smolts which would be placed at various Yukon River sites. The expected annual adult return would be 200,000 chums and 100,000 chinook salmon.

The Division of Economic Development is working with the Yukon River Drainage Fisherman's Association to help set up an aquaculture association in support of this project.

FOREST PRODUCTS

SOCIOECONOMICS DRIVES STATE'S RESPONSE TO TONGASS PLAN

By F. A. Seymour

Governor Hickel has called for a total "restudy and rewrite" of the Environmental Impact Statement for the Draft Tongass National Forest Plan because it had "been prepared without adequate regard for either the social or economic impacts of its provisions and conclusions on the people of Southeast Alaska." In his December 6 letter to Michael Barton, Regional Forester for the U.S. Forest Service in Alaska, the governor rejected the Forest Service analysis of the Tongass Management Plan alternatives pointing to the deficiencies in the socioeconomic evaluation and in the underlying philosophy of the plan.

Congressional land allocations on the Tongass have whittled the nation's largest national forest to a land base where subtle shifts in management allocations can now dictate major changes in the regional economy. Over 5 million acres of the 17 million acre Tongass are permanently dedicated to wilderness and the recent Tongass Timber Reform Act placed an additional .7 million acres in a LUD II (wild land) status.

The Forest Service's preferred alternative (Alternative "P") included allocation of an additional 4+ million acres to primitive and semi-primitive management. The plan would further reduce an economically limiting timber

supply base; "dramatically impede the growth of the emerging mining industry; and threaten transportation and utility corridors, as well as roaded recreation opportunities." The governor boldly called for "effective multiple-use management of the Tongass National Forest which is crucial to the future of the Southeast Alaska region and the very survival of the people and communities dependent upon the region's resources."

This position marks an important shift in the state's Tongass posture. Supporting information produced by the the Division of Economic Development and the Alaska Department of Natural Resources, Division of Forestry, provided the basis for the strong socioeconomic stance taken by the governor. Agency staff investigations into the forest products markets, timber supply and demand, the plans implications for mining in southeast, the region's timber industry and dependent communities were pivotal in developing the governor's response.

"While maintaining a strong commitment to caring for the wildlife values, the beauty and the recreation opportunities enjoyed by our people and those who visit the region," the state's Tongass position demands: evaluation of an additional alternative with an annual allowable net sawlog volume of 520 million board feet; analysis and display of the effect of permanent closure of



Tongass plan threatens jobs.

existing mill(s) that may result from any existing alternatives; expansion of the area covered by a favorable minerals prescription; increased emphasis on back-country, roaded, and destination oriented recreation; reconciliation of management standards with operational expectations; and preservation of opportunities for regional transportation corridors into Canada and cost effective electrical corridors between communities.

Tok Timber Fire Disposal

Major timber fires in the Tok area during the summer of 1990 have generated a large volume of wood fiber that needs to be harvested soon - very soon! Preliminary inventory information suggests that as much as 250 million board feet of timber is dead or dying as a result of the fires. Part of the damaged timber is

owned by three Native village corporations and part is owned by the state and other government agencies.

A conference on this subject was held in Tok on December 19. DED forest products specialist Frank Seymour, along with several representatives from the Departments of Natural Resources and Community and Regional Affairs, attended the meeting. About thirty persons in total participated in the all day session, including land owner representatives and local wood processors.

Seymour and U of A forestry researcher and instructor Ed Packey provided technical information on market mechanics, wood fiber values, and the need and methods for clearing the land and causing regeneration to occur. Transportation cost factors and the recommendation to put all their timber into one collective pot were also discussed. Seymour, Packey, and others present stressed to the land owners that immediate harvest of the fire-killed timber is essential to maintain any existing value that may be recovered.

INFO TO SAVE FOR USE IN CHAPTER ON BIOLOGICAL ISSUES:

Successful hatchery development may actually cause further depletion of already suffering natural stocks, some to the point of extinction. This ironic effect is due to several factors:

1. The extent of habitat and other environmental damage can be camouflaged by hatchery production so it may go unrecognized and unchecked, impeding survival of natural runs.
2. A large influx of hatchery fish may compete with natural stocks for food and other survival necessities. There has been considerable debate about the question of "ocean carrying capacity." While it is not too difficult to determine how many fish can survive or spawn in a stream or hatchery tank, data is not yet available to show just how many salmon can be adequately sustained in the ocean environment. For example, when the average body weight of pink salmon throughout Alaska was significantly lower in 1991 than normal, there was speculation that massive hatchery production of pink salmon may have pushed populations beyond what the ocean can adequately sustain. If indeed there is such a threshold, over-production of hatchery fish could potentially harm natural stocks.
3. Fisheries management decisions and allowed harvest levels are based on total amounts of fish available. If only a small percentage of total fish population in an area is natural fish, the percentage mandated to be left for escapement may be high enough to sustain hatchery stocks but insufficient to sustain the declining natural runs.

Ironically, the success of hatcheries, and the associated decline of natural runs, may eventually even spell trouble for the future of **hatchery** stocks. This is because the genetic diversity found in natural runs, and introduced into hatchery stocks through broodstock from wild fish stocks, is important to the long-term health and adaptability of all stocks including hatchery fish. After a number of generations, hatchery fish can lose their genetic diversity and thus lose their ability to adapt to changes and survive.

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Seattle P.I.
1-22-92

Saving state's salmon

Bills seek to protect dwindling fish runs

P-I Staff and News Services

Warning that "Washington without salmon would be like Hawaii without beaches," a state panel yesterday proposed broad legislation designed to save Washington's declining salmon, steelhead and trout stocks.

Rep. Dick King, D-Everett, chairman of the House Task Force on Salmon and Steelhead Survival, told a news conference that the Legislature has "an obligation to be ahead of the curve" in stemming the depletion of wild fish stocks.

House leaders created the panel last summer to study the dwindling of salmon stocks. Yesterday, the task force introduced bills to develop recovery plans for troubled wild fish runs, study hatchery impacts on them, regulate farm practices on state lands, promote water conservation, screen irrigation ditches and set up a new education program.

King said he wasn't aware of any concerted opposition to the bills.

"Salmon are very important to the state of Washington," said King, who chairs the Fisheries and Wildlife Committee. "Salmon impacts everybody in the state in one way or another."

The task force was formed after the National Marine Fisheries Service proposed that three salmon runs on the Columbia and Snake rivers be listed as threatened or endangered under the U.S. Endangered Species Act. One run, the Snake River sockeye, has since been listed as endangered. Federal officials are beginning to plan for recovery of several Columbia-Snake Basin runs.

The primary goal of King's bills is to help avert a similar crisis in scores of other Washington stocks of wild salmon, steelhead and trout that are said to be in trouble. These are among 214 stocks of salmon, steelhead and trout that an American Fisheries Society panel found to be in trouble along the U.S. Pacific Coast.

"If we waited five years we would be facing the same problems we see on the Columbia River," King said.

The package's core proposal would direct the Fisheries and Wildlife departments to set up a panel of experts to study wild fish runs outside the Columbia River

Salmon: Bills seek to protect state fish runs

From Page B1

Basin. The panel would be charged to produce a recovery plan and to determine whether hatchery-bred fish are depressing wild-fish stocks, which are considered stronger and more genetically diverse than hatchery fish.

The bills also would:

- Allow Columbia River fishermen who refrain from fishing under a Northwest Power Planning Council program — designed to reduce fishing pressure on troubled stocks — to resume fishing after four years. Current state law requires commercial fishermen to fish every year or lose their licenses.

- Regulate farm practices on state lands to ensure that fish runs aren't harmed by silt and other farm runoff.

- Require that water pipelines and other agricultural irrigation channels meter their water withdrawals from the Columbia system and install fish screens within four years. About 6,000 are exempt from current screening mandates. The screens keep migrating fish out of irrigation canals, where they cannot successfully spawn.

- Encourage water suppliers to set rates rewarding water conservation by users.

- Set minimum stream flows for fish migration on the Tahuya, Dewatto, Dungeness, Cowlitz, Wenatchee, Okanogan, Methow and Entiat rivers.

- Establish a privately funded state program to teach elementary and high school students about fish and wildlife preservation.

See SALMON, Page B2

Other Issues

Do. A: Use of hatcheries as Enviro. Mitigation

E. Enviro. Regs - are there some?

enuf?
effective?

D. Use of water as tool for
local economic devel.

Enviro. Regs:

And. Fish Act

Fishways Act

Gen. Policy

Siting Regs

Clean Water Regs

Checks on carcass dumping

Hatchery Statutes

le for parole, which term shall be at
the maximum sentence imposed by the

takes effect on the day after its passage
day it becomes law without approval.



LAWS OF ALASKA

1974

Source

CSHB 830 am S

Chapter No.

111

AN ACT

Authorizing the operation of private nonprofit salmon hatcheries.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. INTENT. It is the intent of this Act to authorize the private ownership of salmon hatcheries by qualified nonprofit corporations for the purpose of contributing, by artificial means, to the rehabilitation of the state's depleted and depressed salmon fishery. The program shall be operated without adversely affecting natural stocks of fish in the state and under a policy of management which allows reasonable segregation of returning hatchery-reared salmon from naturally occurring stocks.

* Sec. 2. AS 16.10 is amended by adding new sections to read:

ARTICLE 8. SALMON HATCHERIES.

Sec. 16.10.400. PERMITS FOR SALMON HATCHERIES. (a) The commissioner or his designee may issue a permit, subject to the restrictions he considers desirable or that are imposed by statute or regulation under secs. 400 - 470 of this chapter, to a nonprofit corporation organized under AS 10.20, for the construction and operation of a salmon hatchery.

(b) The application for a permit under this section shall be on a form prescribed by the department and be accompanied by an application fee of \$100.

(c) A hatchery permit is nontransferable. If a permit holder sells or leases a hatchery for which a permit is issued under this section, the new operator shall apply for a new permit under this section.

(d) Permits are renewable on terms prescribed by the

Sec. 16.05.827. Sale of subsistence salmon roe. [Repealed, § 4 ch 99 SLA 1975.]

Sec. 16.05.830. Wanton waste. [Repealed, § 1 ch 73 SLA 1968.]

Sec. 16.05.831. Waste of salmon. (a) A person may not waste salmon intentionally, knowingly, or with reckless disregard for the consequences. In this section, "waste" means the failure to utilize the majority of the carcass, excluding viscera and sex parts, of a salmon intended for

- (1) sale to a commercial buyer or processor;
- (2) consumption by humans or domesticated animals; or
- (3) scientific, educational, or display purposes.

(b) The commissioner, upon request, may authorize other uses of salmon that would be consistent with maximum and wise use of the resource.

(c) A person who violates this section or a regulation adopted under it is punishable by a fine of not more than \$10,000, or by imprisonment for not more than six months, or by both. In addition, a person who violates this section is subject to a civil action by the state for the cost of replacing the salmon wasted. (§ 3 ch 99 SLA 1975; am § 18 ch 132 SLA 1984)

Revisor's notes. — This section was enacted in section 3 of both ch. 89 and ch. 99, SLA 1975. Chapter 99 had an immediate effective date (May 30, 1975), so the section was already in effect when ch. 89, enacting identical language, took effect on August 20, 1975.

Effect of amendments. — The 1984 amendment substituted "a salmon in-

tended for" for "salmon which are to be" at the end of the introductory paragraph, substituted "sale" for "sold" at the beginning of paragraph (1), and deleted "utilized for" from the beginning of paragraphs (2) and (3).

Collateral references. — 35 Am. Jur. 2d, Fish and Game, § 51.

Sec. 16.05.835. Maximum length of salmon seine vessels. A salmon seine vessel may not be longer than 50 feet, official Coast Guard register length, and 58 feet overall length except vessels that have fished for salmon with seines in waters of the state before January 1, 1962, as 50-foot, official Coast Guard register length vessels. (§ 1 ch 252 SLA 1970)

Sec. 16.05.840. Fishway required. If the commissioner considers it necessary, every dam or other obstruction built by any person across a stream frequented by salmon or other fish shall be provided by that person with a durable and efficient fishway and a device for efficient passage for downstream migrants. The fishway or device or both shall be maintained in a practical and effective manner in the place, form and capacity the commissioner approves, for which plans and specifications shall be approved by the department upon application to it.

Fishways
Act

§ 16.05.840

[Repealed, § 4 ch 99

ch 73 SLA 1968.]

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§ 16.05.850

FISH AND GAME

§ 16.05.860

The fishway or device shall be kept open, unobstructed, and supplied with a sufficient quantity of water to admit freely the passage of fish through it. (§ 30 art I ch 94 SLA 1959)

NOTES TO DECISIONS

Stated in Southeast Alaska Conserva- No. 2662 (File No. 5855), 665 P.2d 544
tion Council, Inc. v. State, Sup. Ct. Op. (1983).

Sec. 16.05.850. Hatchery required. If a fishway over a dam or obstruction is considered impracticable by the commissioner because of cost, the owner of the dam or obstruction, in order to compensate for the loss resulting from the dam or obstruction shall, at the owner's option

(1) pay a lump sum acceptable to the commissioner to the state fish and game fund;

(2) convey to the state a site of a size satisfactory to the commissioner at a place mutually satisfactory to both parties, and erect on it a fish hatchery, rearing ponds, necessary buildings and other facilities according to plans and specifications furnished by the commissioner, and give a good and sufficient bond to furnish water, lights and necessary money to operate and maintain the hatchery and rearing ponds; or

(3) enter into an agreement with the commissioner, secured by good and sufficient bond, to pay to the fish and game fund such an initial amount of money and annual payments thereafter as the commissioner considers necessary to expand, maintain, and operate additional facilities at existing hatcheries within a reasonable distance of the dam or obstruction. (§ 30 art I ch 94 SLA 1959)

Sec. 16.05.860. Penalty for violating fishway and hatchery requirements. (a) The owner of a dam or obstruction who fails to comply with AS 16.05.840 or 16.05.850 or a regulation adopted under AS 16.05.840 or 16.05.850 within a reasonable time specified by written notice from the commissioner is guilty of a misdemeanor, and is punishable by a fine of not more than \$1,000. Each day the owner fails to comply constitutes a separate offense.

(b) In addition to the fine, the dam or other obstruction managed, controlled, or owned by a person violating AS 16.05.840 or 16.05.850 or a regulation adopted under AS 16.05.840 or 16.05.850 is a public nuisance and is subject to abatement. (§ 30 art I ch 94 SLA 1959; am § 29 ch 14 SLA 1987)

Effect of amendments. — The 1987 amendment in subsection (a) inserted "or a regulation adopted under AS 16.05.840 or 16.05.850" in the first sentence and in

subsection (b) inserted "or a regulation adopted under AS 16.05.840 or 16.05.850" and made minor punctuation changes.

unable to agree upon the terms and conditions of such interconnection, including compensation therefor, the District Court for Alaska, or its successor in jurisdiction under the laws of this State, shall, upon petition of the parties, or either of them, establish such terms and conditions, which shall be reasonable and non-discriminatory.

Sec. 35. Construction of Act. This Act is complete in itself and shall be controlling. The provisions of any other law of this State relating to the organization of a corporation, except as provided in this Act, shall not apply to a cooperative organized under this Act. The enumeration of any object, purpose, power, manner, method or thing shall not be deemed to exclude like or similar objects, purposes, powers, manners, methods or things.

Sec. 36. Act Extended to Existing Cooperatives. The provisions of this Act shall apply to all non-profit cooperatives organized under any other law of Alaska for the purpose of supplying electric energy and power, or telephone service, to its members, or for the purpose of promoting and extending the use thereof, and such cooperatives shall become subject to this Act with the same effect as originally organized under this Act.

Sec. 37. Defectively Organized Cooperatives. In the event any cooperative has filed defective articles of incorporation, or has failed to do all things necessary to perfect its corporate organization, it may, nevertheless, file corrected articles of incorporation, or amend the original articles, and do and perform all acts and things necessary in the premises for the correction of such defects. Any action so taken shall be valid and binding upon all persons concerned, and the capacity of such cooperative to file corrected articles of incorporation or amendments to the original articles, or to do and perform all acts and things necessary in the premises, shall not be affected.

Sec. 38. Separability of Provisions. If any provision of this Act, or the application of such provision to any person or circumstances is held invalid, the remainder of the Act and the application of such provision to other persons or

circumstances shall not be affected thereby.

Sec. 39. Repealer. Chap. 38, SLA 1955, is hereby repealed.

Sec. 40. Effective Date. This Act shall take effect immediately upon its passage and approval, or upon its becoming law without such approval.

Approved April 16, 1959

CHAPTER 94

AN ACT

Relating to the fish and game resources of Alaska; providing for a Department of Fish and Game and its organizational structure; providing a code of laws relating to fish and game; providing for licensing and prescribing fees thereof; providing penalties for violations; repealing certain laws relating to the fish and game resources of the State; and providing for an effective date.

(H.B. 201)

Be it enacted by the Legislature of the State of Alaska:

Article I

The Department of Fish and Game

Section 1. Title of the Act. This Act shall be known and may be cited as the "Fish and Game Code of Alaska".

Sec. 2. Definitions. For the purposes of this Act, the following shall be construed respectively to mean:

- (a) "State": the State of Alaska.
- (b) "Department": the Alaska Department of Fish and Game.
- (c) "Board": the Alaska Board of Fish and Game.
- (d) "Commissioner": the Commissioner of the Alaska Department of Fish and Game.
- (e) "Person": the singular or the plural, including individuals, associations, partnerships, or corporations unless the context otherwise requires.
- (f) "Fish": all species of marine, anadromous, and fresh-water fish; amphibians, shellfish, and other invertebrates; or any of the foregoing that may be found or that may be introduced in the State of Alaska.
- (g) "Game": all species of birds and mammals, including feral domestic animals, found or that may be introduced in Alaska, except domestic birds and mammals; provided, however, that

"game" as herein defined may be classified by regulation as big game, small game, fur bearers or such other categories as may be deemed essential for carrying out the intention and purposes of this Act.

(h) "Take": taking, pursuing, hunting, fishing, trapping, or in any manner disturbing, capturing, or killing or attempting to take, pursue, hunt, fish, trap, or in any manner capture or kill fish or game.

(i) "Sport fishing": the taking of or attempting to take for personal use, and not for sale or barter, any freshwater, marine, or anadromous fish by spear or underwater gun or by hook and line held in the hand, or by hook and line with the line attached to a pole or rod which is held in the hand or closely attended, or by other means defined by the Board.

(j) "Resident": a person who for the immediately preceding year has maintained a permanent place of abode within the State and who has continually maintained his legal residence in the State; and in the case of a partnership, association, joint stock company, trust, or corporation, "resident" shall mean one that has its main office or headquarters in the State of Alaska; provided, however, that any member of the military services stationed in the State for a period of twelve consecutive months shall be considered a resident for the purposes of this Act, and the dependents

Sec. 30. Fishways or Hatcheries Required. Every dam or other obstruction built by any person across any stream frequented by salmon or other fish shall be provided by such person with a durable and efficient fishway and a device for efficient passage for downstream migrants if deemed necessary by the Commissioner, which fishway or device or both shall be maintained in a practical and effective manner in such place, form and capacity as the Commissioner may approve, for which plans and specifications shall be approved by the Department upon application to it, and which shall be kept open, unobstructed, and supplied with a sufficient quantity of water to freely admit the passage of fish through same.

In the event that a fishway over any dam or obstruction is considered by the Commissioner to be impracticable because of cost, then the owner of such dam or obstruction, in order to compensate for the loss resulting from such dam or obstruction shall, at his option: (1) pay a lump sum acceptable to the Commissioner to the State Fish and Game Fund; (2) convey to the State a site of a size satisfactory to the Commissioner at such place as may be mutually satisfactory to both parties, and erect thereon a fish hatchery, rearing ponds, necessary buildings and other facilities according to plans and specifications to be furnished by the Commissioner, secured by good and sufficient bond, to furnish all water and lights and necessary sums of money to operate and maintain said hatchery and rearing ponds; or (3) enter into an agreement with the Commissioner, secured by good and sufficient bond, to pay to the Alaska Fish and Game Fund such initial money and make such annual payments of additional money as the Commissioner may determine are necessary to expand, maintain, and operate additional facilities at existing hatcheries within a reasonable distance of such dam or obstruction.

The owner of any dam or obstruction who shall fail to comply with the provisions of this section within a reasonable time as specified by written notice from the Commissioner shall be guilty of a misdemeanor, punishable by a fine

not to exceed \$1,000.00, and each day that the owner fails to comply shall constitute a separate offense.

In addition to the penalty above provided, if any such person be convicted of violating any of the provisions of this section, the dam or other obstruction managed, controlled or owned by such person is hereby declared a public nuisance and shall be subject to abatement as such.

Sec. 31. Protection of Fish and Game. In the event that any person or governmental agency desires to construct any form of hydraulic project or to use any equipment that will use, divert, obstruct, pollute or change the natural flow or bed of any river, lake or stream or that will utilize any of the waters of the State or materials from any river, lake or stream beds, such person or governmental agency shall notify the Commissioner of such intention prior to the commencement of construction, and the Commissioner shall acknowledge receipt of such notice by return mail. If the Commissioner so determines, he shall, in said letter of acknowledgment, require such person or governmental agency or submit to him full plans and specifications of the proposed construction or work, complete plans and specifications for the proper protection of fish and game in connection therewith, and the approximate date when such construction or work is to commence, and shall require such person or governmental agency to obtain the written approval of the Commissioner as to the sufficiency of such plans or specifications before construction is commenced. If any person or governmental agency commences construction on any such works or projects without first providing plans and specifications subject to the approval of the Commissioner for the proper protection of fish and game in connection therewith and without first having obtained written approval of the Commissioner as to the adequacy of such plans and specifications submitted for the protection of fish and game, he is guilty of a misdemeanor. If any such person or government agency be convicted of violating any of the provisions of this section and continues construction on any such work or projects without ful-

ly complying with the provisions hereof such works or projects are hereby declared a public nuisance and shall be subject to abatement as such. The cost of restoring any river, lake or stream to its original condition shall be borne by the violator and shall be in addition to any penalty imposed by the court.

Provided, that in case of an emergency arising from weather or stream flow conditions, the Department, through its authorized representatives, shall issue oral permits to a riparian owner for removing any obstructions or for repairing existing structures without the necessity of submitting prepared plans and specifications.

Sec. 32. Assumption of Administration and Management by Alaska. Upon assumption of administration and management of the fish and game resources of Alaska by the State, the Commissioner and Board shall assume their respective controls on behalf of the State of Alaska.

Sec. 33. Violations: Misdemeanor Penalty. Any person violating any of the provisions of this Act or any rule or regulation promulgated thereunder shall be deemed guilty of a misdemeanor and, upon conviction thereof, shall be punished as provided in Article II of the Constitution of this State, or Article III of this Act, whichever is applicable as determined by the nature of the offense.

Sec. 34. Continuation of Regulations, Agreements, Employees, Etc. All regulations, procedures, policies; contracts, agreements; employees' positions, accounts, assets, liabilities, benefit conditions and amounts, whether vested or contingent, established in manner under any Act repealed by provisions of this Act are hereby continued except where inconsistent with the provisions of this Act. Divisions, together with all employees shall continue in their respective positions at the pleasure of and until removed by the Commissioner created herein, or designee.

Sec. 35. Intent and Application of Act. It is the purpose of this Act to further implement the provisions of the State Organization Act of 1959 relating to fish and game. However, in

Sec. 16.05.865. Transplanting of musk oxen. The board may transplant surplus musk oxen from Nunivak Island to appropriate areas on the mainland of the state, when good management practices dictate the action. The board shall determine which transplant sites are appropriate and whether a surplus of animals exists. (§ 1 ch 220 SLA 1975)

Sec. 16.05.868. Fish health inspections. Fish health inspections determined to be necessary by the department shall be performed by a professional fish health specialist certified by the fish health section of the American Fisheries Society. (§ 3 ch 110 SLA 1980)

*Anadromous
Fish
Act* → **Sec. 16.05.870. Protection of fish and game.** (a) The commissioner shall, in accordance with the Administrative Procedure Act (AS 44.62), specify the various rivers, lakes and streams or parts of them that are important for the spawning, rearing or migration of anadromous fish.

(b) If a person or governmental agency desires to construct a hydraulic project, or use, divert, obstruct, pollute, or change the natural flow or bed of a specified river, lake, or stream, or to use wheeled, tracked, or excavating equipment or log-dragging equipment in the bed of a specified river, lake, or stream, the person or governmental agency shall notify the commissioner of this intention before the beginning of the construction or use.

(c) The commissioner shall acknowledge receiving the notice by return first class mail. If the commissioner determines that the following information is required, the letter of acknowledgement shall require the person or governmental agency to submit to the commissioner:

(1) full plans and specifications of the proposed construction or work;

(2) complete plans and specifications for the proper protection of fish and game in connection with the construction or work, or in connection with the use; and

(3) the approximate date the construction, work, or use will begin.

(d) The commissioner shall approve the proposed construction, work, or use in writing unless the commissioner finds the plans and specifications insufficient for the proper protection of fish and game. Upon a finding that the plans and specifications are insufficient for the proper protection of fish and game, the commissioner shall notify the person or governmental agency which submitted the plans and specifications of that finding by first class mail. The person or governmental agency may, within 90 days of receiving the notice, initiate a hearing under AS 44.62.370. The hearing is subject to AS 44.62.330 — 44.62.630. (§ 31 art 1 ch 94 SLA 1959; am § 1 ch 180 SLA 1960; am

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Revisor's notes. — Former subsection (c) of this section was redrafted and reorganized into present subsections (c) and (d) in 1983.

Opinions of attorney general. — The purpose of this section is to protect and conserve fish and game and other natural resources. 1964 Op. Att'y Gen. No. 10.

Alaska has jurisdiction to enforce its fish and game laws in national forests. 1964 Op. Att'y Gen. No. 10.

Alaska's protective fish and game laws, especially this section, complement rather than conflict with federal government functions in national forests and should be enforced by both federal and state officials. 1964 Op. Att'y Gen. No. 10.

The Department of Fish and Game has permit jurisdiction over activities affecting anadromous streams, over activities in streams "frequented by fish" if those latter activities will result in the physical obstruction of that stream, and over all land use activities within the state refuge system. March 4, 1982 Op. Att'y Gen.

This section gives the Department of Fish and Game jurisdiction over nonpoint pollutant sources adjacent to classified anadromous streams or their tributaries which, absent sufficient mitigating measures, would create a direct and substantial threat to pollution of the anadromous stream itself. March 4, 1982 Op. Att'y Gen.

The commissioner of the department of fish and game has the power to adopt procedural rules to implement this section and to establish by regulation the standards under which permits will be issued under this section. March 4, 1982 Op. Att'y Gen.

When the Department of Fish and Game or Boards of Fisheries and Game have established a general policy of requiring plans and specifications in all instances involving specific types of activities, that policy can and perhaps must be codified by regulation. March 4, 1982 Op. Att'y Gen.

The Department of Natural Resources, under the authority of AS 41.17.900(d), cannot preempt the regulatory authority of the commissioner of fish and game under this section over nonpoint source pollution of anadromous streams caused by logging activities. March 4, 1982 Op. Att'y Gen.

There is no statutory basis in either AS 46.03 or AS 41.17 for implying that the Department of Fish and Game's authority over "non-point source pollution" under this section is limited by the § 208 program of the 1972 Federal Water Pollution Control Act (PL 92-500). March 4, 1982 Op. Att'y Gen.

This section would seem to allow that the applicant submit, essentially, two permit applications — the first to determine whether a more detailed inquiry will be made, and the second to obtain the needed authorization. March 4, 1982 Op. Att'y Gen.

The phrase "pollution" in subsection (b) should be viewed as a jurisdictional incident distinct from the other listed results or activities in that subsection and not as a specific enumeration which is to be construed to modify and limit the more general phrases. March 4, 1982 Op. Att'y Gen.

The fundamental question concerning when a permit is required is whether the nature of the construction or work is such as to constitute a "desire to pollute," and not what the individual hopes will or will not happen. March 4, 1982 Op. Att'y Gen.

When read together, this section and AS 16.05.880 are a licensing statute. March 4, 1982 Op. Att'y Gen.

There is no conflict between this section and AS 16.10.010. March 4, 1982 Op. Att'y Gen.

This section has not been impliedly repealed by anything in Title 46. AS 41.17 or AS 16.10.010. March 4, 1982 Op. Att'y Gen.

NOTES TO DECISIONS

Procedure for gaining permission to ford controlled river or stream. — A person seeking to ford a controlled river or stream must first give notice to the com-

missioner and include in his notice sufficient "plans and specifications" so that the commissioner will know what he intends to do, when he intends to do it, what risk

he foresees from his activities to fish in the vicinity, and what steps he intends to undertake for their protection. The commissioner will then review the notification and either grant the request, reject the application, or request "full" plans and specifications requiring the actor to go into greater detail and answer specific questions. *Schnabel v. State, Ct. App. Op. No. 250 (File No. 7273), 663 P.2d 960 (1983).*

Rejection of a request to ford need not be preceded by a request for full plans and specifications unless the commissioner lacks sufficient information to make a determination on the application. *Schnabel v. State, Ct. App. Op. No. 250 (File No. 7273), 663 P.2d 960 (1983).*

Stated in Southeast Alaska Conservation Council, Inc. v. State, Sup. Ct. Op. No. 2662 (File No. 5855), 665 P.2d 544 (1983).

Sec. 16.05.880. Construction without approval prohibited. If a person or governmental agency begins construction on a work or project or use for which notice is required by AS 16.05.870 without first providing plans and specifications subject to the approval of the commissioner for the proper protection of fish and game, and without first having obtained written approval of the commissioner as to the adequacy of the plans and specifications submitted for the protection of fish and game, the person or agency is guilty of a misdemeanor. If a person or governmental agency is convicted of violating AS 16.05.870 — 16.05.895 or continues a use, work or project without fully complying with AS 16.05.870 — 16.05.895, the use, work, or project is a public nuisance and is subject to abatement. The cost of restoring a specified river, lake, or stream to its original condition shall be borne by the violator and shall be in addition to the penalty imposed by the court. (§ 31 art I ch 94 SLA 1959; am § 1 ch 180 SLA 1960; am § 1 ch 132 SLA 1962; am § 2 ch 89 SLA 1966)

Opinions of attorney general. — this section are a licensing statute. March 4, 1982 Op. Att'y Gen.
When read together, AS 16.05.870 and

NOTES TO DECISIONS

Procedure for gaining permission to ford controlled river or stream. — A person seeking to ford a controlled river or stream must first give notice to the commissioner and include in his notice sufficient "plans and specifications" so that the commissioner will know what he intends to do, when he intends to do it, what risk he foresees from his activities to fish in the vicinity, and what steps he intends to undertake for their protection. The commissioner will then review the notification and either grant the request, reject

the application, or request "full" plans and specifications requiring the actor to go into greater detail and answer specific questions. *Schnabel v. State, Ct. App. Op. No. 250 (File No. 7273), 663 P.2d 960 (1983).*

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MEMORANDUM

To: Molly McCammon
From: Doug Rickey
Date: January, 1992
Re: Hatchery legal issues

DELETED

You have asked me to provide a review of the legal questions that appear to be making it difficult for the Board of Fisheries to make decisions regarding the management of hatchery salmon, and to discuss potential statutory changes the legislature might consider during this session.

In preparing this response, I reviewed a letter from the chairmen of the board of fisheries, pertinent constitutional, statutory, and regulatory provisions, and four recent legal opinions concerning a number of issues relating to the requirements for the management of hatchery fish.

I have divided this memorandum into three sections. The first is a brief summary of the powers and duties of the Board of Fisheries ("board"), and regulations governing private nonprofit hatcheries. The second reviews the concerns of the board as expressed in a May 6, 1991, letter from Chairman Michael Martin to Senator Richard Eliason. The third summarizes several recent legal opinions concerning the state's duty, or lack thereof, to manage fisheries for broodstock and cost recovery by hatcheries.

I. Powers and duties of the board/PNP hatchery regulations.

The board was created "for purposes of the conservation and development of the fishery resources of the state . . .". AS 16.05.221 (a). In order to carry out that charge, the board may "adopt regulations it considers advisable in accordance with the Administrative Procedures Act (AS 44.62)." AS 16.05.251(a).¹

¹/AS 16.05.251 (b) lists the purposes for which the board may exercise this power, including

- . . . (2) establishing open and closed seasons and areas for the taking of fish;
- (3) setting quotas, bag limits, harvest levels, and sex and size limitations on the taking of fish;
- (4) establishing the means and methods employed in the pursuit, capture and transport of fish; . . .
- (6) classifying as commercial fish, sport fish, personal use fish, subsistence fish, or predators or other categories essential for regulatory purposes;

The statutes governing the private nonprofit hatchery system are found at AS 16.10.375 - AS 16.10.470. They provide for: regional salmon plans; regional associations; criteria for the issuance of hatchery permits; public hearings prior to permit issuance; permit conditions; criteria for permit alteration, suspension or revocation; board regulation authority; department assistance and cooperation for permit applicants and holders; salmon egg sources; salmon egg sales; hatchery inspection; and an annual report to the department by permittees.

The board has adopted a number of regulations relating to private nonprofit hatcheries. Codified at 05 AAC 40.005 - 05 AAC 40.900, they include: delegating to the commissioner the authority to specify gear type and fishing periods for hatchery cost recovery; requiring hatchery permit holders who harvest salmon to comply with fish purchaser reporting requirements; allowing hatchery permit holders who harvest salmon for broodstock exemptions from the salmon "waste" statute, regulations concerning "closed waters" and vessel area registration; designating special harvest areas; procedures for permit application, application review, public hearings, review and determination, and reconsideration; establishing regional comprehensive planning teams and procedures to be followed by them; prohibiting permit transfers; requiring hatchery management plans, inspections, and performance reviews; establishing criteria for the sale of surplus salmon eggs.

II. Board concerns.

In a May 6, 1991 letter to Senate President Richard Eliason, Fisheries Board Chairman Michael R. Martin stated the following:

In managing fisheries that involve hatchery raised salmon, the Board of Fisheries has encountered problems due to ambiguities in the current Alaska statutes. These problems commonly arise when the management of hatchery stocks conflicts with either the health of wild stocks or with the opportunity of fishermen to harvest wild stocks. Essentially,

(7) watershed and habitat improvement, and management, conservation, protection, use, disposal, propagation and stocking of fish;

(8) investigating and determine the extent and effect of disease, predation, and competition among fish in the state, exercising control measures considered necessary to the resources of the state;

(9) prohibiting and regulating live capture, possession, transport, or release of native or exotic fish or their eggs; . . .

(12) regulating commercial, sport, subsistence, and personal use fishing as needed for the conservation, development, and utilization of fisheries...

AS 16.05.251(b).

establishing open and closed seasons

the statutes are not clear on the status of wild stock management.

State statutes are also not clear about the state's duty to provide fish for hatchery broodstock and cost recovery, and about hatcheries' obligations to contribute to the common property fisheries. We perceive that the development of state policy toward hatcheries may create a conflict of interest. On the one hand, the state manages fisheries as a common property resource for the benefit of all user groups. On the other hand, the state loans money to hatcheries with the expectation that the hatcheries will receive enough fish to be able to repay these loans.

While Chairman Martin went on to note other concerns,² the overall problem for the board appeared to be the perceived statutory ambiguities which lead to conflict between wild stock protection and broodstock/cost recovery.

The only direct statutory reference to the protection of wild stocks from harm due to hatchery operations is found at AS 16.10.400(g):

During the development of a comprehensive plan for a region, no permit may be issued for a hatchery unless the commissioner determines that such an action would result in substantial public benefits and would not jeopardize natural stocks. (emphasis added)

The concern the board has is that the statute requires the department to make a judgment concerning the potential harm to wild stocks prior to the issuance of a hatchery permit; the inference being that once that judgment is made and a hatchery permit is issued, there is no statutory "protection" for wild stocks that are jeopardized by hatchery-related dangers that arise after a permit is issued.³ This raises the possibility that a protective wild stock management regime, unsupported in statute, would conflict with, and might be overridden by, existing statutes that indicate the state must manage hatchery fish for broodstock and cost recovery. These statutes will be more fully discussed in the following section.

III. Recent legal opinions.

A. Hatchery fish and "sustained yield".

Article VIII, section 4 of the Alaska Constitution states:

²/These included

³/See Martin letter, p. 2.

Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial users.

The general rule is clear that wild salmon, while they are in the natural waters of the State, "belong" to State and must be managed on the sustained yield principle. Metlakatla Indian Community, Annette Island Reserve v. Egan, 362 P.2d 901, 915-915 (Alaska 1961). Whether hatchery-reared salmon enjoy the same status is less clear, and has been the subject of disagreement among attorneys who have recently written on that issue. The issue is important in the context of Chairman Martin's concerns because if hatchery fish must be managed on the sustained yield principle, that implies the Board of Fish must provide hatcheries with broodstock, and possibly cost recover fish, even if that may cause some harm to the wild stocks.

In an August 1990 letter to Fish & Game Commissioner Don Collinsworth, Assistant Attorney General Steve White concluded that the Department of Fish & Game and the Board of Fish had the legal authority, and were in fact directed by law, to manage fisheries so that salmon hatcheries receive broodstock and cost recovery fish for their operations. He based these conclusions in part on the assumption that the above quoted section of the Alaska Constitution mandates that hatchery fish be managed in the same manner as wild stocks. Two other attorneys, George Utermohle of the Legislative Affairs Agency's Legal Services Division, and Juneau attorney Michael Stanley, later called that assumption into question. Sometime after that, Anchorage attorney A. William Saupe analyzed the three prior opinions and concluded that Mr. White's initial assumption was correct.⁴ What follows is a summary, extracted from the four opinions, of the arguments on both sides of the proposition that the sustained yield management requirement of art. VIII, sec. 4 applies to hatchery raised fish:

First is the issue of "ownership." On its face, sec. 4 of art. VIII applies only to resources "belonging" to the state. Are hatchery raised fish in that category? Stanley and Utermohle argue that they may not be.

Stanley points out that the framers of our constitution did make distinctions between resources "occurring in their natural state" and those that are "subject to intensive culture," at least for the purpose of exempting the latter from the requirements of art. VIII, sec. 3 (the "common use clause").⁵ Because humans play a substantial role in the growth and

⁴/Copies of the four legal opinions are attached to this memorandum.

⁵/art. VIII, sec. 3 provides

development of hatchery fish, Stanley reasons that they may not be the "natural resources" the drafters of article VIII had in mind.

George Utermohle points to the fact that the legislature, when it created the private nonprofit hatchery system, used the following language to provided for the common use of hatchery fish:

Fish released into the natural waters of the state by a hatchery operated under AS 16.10.400 - 16.10.470 are available to the people for common use and are subject to regulation under applicable law in the same way as fish occurring in their natural state until they return to the specific location designated by the department for harvest by the hatchery operator.

AS 16.10.440 (a).

Utermohle finds the above language significant in a number of respects: first, while the statute provides for the common use of hatchery fish, it is silent as to state ownership and makes no mention of sustained yield; second, the fact that hatchery fish are to be treated "in the same way" as fish occurring in their natural state "until they return to the specific location. . ." suggests that the legislature did not consider them a common property resource belonging to state, but merely felt they should be treated as if they were until they returned to the hatchery for harvest; finally, Utermohle suggests that the provision for harvest by the hatchery operator indicates "some lingering private property interest in the hatchery fish by the hatchery," another indicator that these fish may not "belong" to the state for purposes of the sustained yield section of art. VIII.

In his lengthy memorandum to PWSAC President John McMullen, attorney A. William Saupe disagreed with the arguments made by Stanley and Utermohle that the sustained yield clause may not apply to hatchery fish.

Initially, Saupe relies on legislative history to refute the "ownership" argument. He quotes this passage from Linda J. Snow July 31, 1991 memorandum to Senator Eliason:

Consensus is that the legislature had always intended that the fish from PNP hatcheries belong to the common property fishery until such time as they return to the hatchery, and then they belong to the hatchery for broodstock and cost recovery. Testimony by Senator Dick Eliason at a 1975 Senate Resources Committee hearing on SB 180 indicates that the initial concept of a private hatchery system considered profit-making corporate ownership. However, a profit-making corporation might advance a claim to exclusive ownership of everything it produced. Thus, it was felt that private, nonprofit ownership of hatcheries would be more consistent with with

the concept of publicly owned hatchery fish. This opinion is echoed by former Representative Terry Gardiner.

At a March 7, 1977 House Resources Committee hearing, Jack Milnes, Executive Director of Southern Southeast Regional Aquaculture Association testified: "I wish to recognize the fact that these are common property fish, that they belong to the state of Alaska and to the people of Alaska and therefore they should be protected by the representatives of the people of the state of Alaska." At a 1979 Senate Resources Committee hearing on HB 48, Don Clocksin, and attorney with Alaska Legal Services discussed the question of ownership of hatchery fish. In his testimony, he asked "When are fish no longer common property fish?" He felt that constitutionally, they were to be considered common property fish at all times. Consequently, it appears there was never any question that hatchery fish were common property of the people of the state while in Alaska waters, and they may or not be the property of the PNP hatchery operator at the hatchery, but that he allowed to harvest a sufficient number for broodstock and cost recovery.

(Emphasis his).

Saupe also relies on certain portions of the commentary of the Committee on Resources of the Alaska Constitutional Convention. The first concerns the common use clause:

Game fish, wildlife, fisheries, and water are recognized as belonging to the state so long as in a natural state. These resources are subject to a private right only when they have been acquired or utilized as provided by law. (emphasis his).

Saupe asserts that this passage indicates the framers' belief that fish reserved for common use "belonged" to the state. Because hatchery fish are reserved for common use by AS 16.10.440 (a), Saupe reasons that they must be owned by the state and be subject to the sustained yield principle.

The second commentary the sustained yield clause itself:

Sustained yield is recognized as a principle applicable to the administration of plant and animal life subject to the immediate authority of the state. (emphasis his).

Because hatchery fish are subject to the authority of the state by AS 16.10.440(a), Saupe reasons, they are subject to the sustained yield clause. This conclusion, he asserts, "also comports with common sense" because

[i]f they did not belong to the State, it could not reserve hatchery fish for use by others without paying for them. Moreover, if the

mere expectation that a hatchery will later be allowed to harvest some unidentified fraction of the returning fish constitutes an ownership interest in all of its fish, then every other limited entry permit holder could be said to have the same "lingering property interest," leading to the false conclusion that none of the fish in Alaska's waters ever belong to the State or are subject to the sustained yield principle of management.

A more reasonable interpretation of these related statutory and constitutional provisions is that, once released, hatchery fish become like wild stocks in every legal respect. They belong to the state, are reserved to the people for common use and must be managed for sustained yield. . .

Saupe, pp. 10-11.

Initially, I agree with Saupe on the "ownership" issue. When it created the hatchery system the legislature made a number of policy choices: first, the hatcheries would be operated by private nonprofit, rather than profit making, entities, apparently because it was feared that profit making entities would make ownership claims to their fish; second, the statutes governing hatchery operations place a tremendous amount of control in the hands of the Department of Fish & Game and the Board of Fish, including the power to revoke a hatchery permit, and to designate where and when hatchery operators may harvest; third, hatchery fish, until they reach a designated operator harvest area, are a "common property resource," a designation associated with state dominion and control. In my view, these are all persuasive indicators of state ownership.

However, even if the state "owns" the hatchery fish, it does not automatically follow that the state must manage those fish on a sustained yield basis. As George Utermohle notes, the sustained yield requirement is always subject to "beneficial uses". the Commentary on Article on State Lands and Natural Resources , at page 98, states:

This principle [sustained yield] is qualified in terms of "the highest beneficial public use" in recognition of its not being in the public interest to preserve certain parasitic or predatory organisms destructive of more beneficial plant and animal life

And, during the debate on the sustained yield clause, Delegate Riley explained

. . . we have in mind no narrow definition of "sustained yield," as is used for example, in forestry, but the broad premise that insofar as possible a principle of sustained yield shall be used with respect to administration of those resources which are susceptible of sustained yield, and where it is desirable. For

example, predators would not be maintained on a sustained yield basis.

Alaska Constitutional Convention Proceedings, p. 2451.

Utermohle argues that

the delegates understood that the concept of preferences among beneficial uses would allow the state to make reasoned decisions to prefer certain renewable resources over other renewable resources to achieve a more beneficial public purpose. The authority to establish preference among beneficial uses may permit the state to harvest hatchery fish without providing for a sustained yield from the hatchery, provided that those who have vested rights in hatchery fish are compensated for those rights that are taken by the state.

The ability of the state to establish preferences among beneficial user is reflected in AS 16.10.430(b) which allows the commissioner of fish and Game to terminate the operation of a hatchery in the best interests of the public, if the adverse effects of the operation of the hatchery are irreversible and cannot be mitigated.

Utermohle memo, pp. 3-4.

Saupe, on the other hand, argues that AS 16.10.430(b) is not merely a reflection of the state's ability to establish preferences among beneficial uses but is in fact the only basis upon which a hatchery permit may be terminated. He also argues that the contribution made by PWSAC to the growth of the commercial fishing industry in Alaska demonstrate its beneficial use to the state, and that "short of the extreme situation envisioned by AS 14.10.430(b) it is hard to conceive how denial of a reasonable hatchery harvest in favor of other beneficial uses could achieve a greater public purpose." Saupe memo, p. 14.

In my view, the arguments made and conclusions reached by Micheal Stanley, George Utermohle and A. William Saupe on this issue all have merit. It is unfortunate that our supreme court has never defined "sustained yield," much less taken up the question whether hatchery raised fish must be managed on that principle. Suffice to say that knowledgeable people disagree on this issue and it would probably take a constitutional amendment to guarantee an unassailable legal conclusion one way or the other.

My own view is that art. VIII, sec. 4 probably does require that hatchery reared fish, after they are released and until they are allowed to be harvested by the hatchery operator, be managed on a sustained yield basis unless the state finds that such management would cause significant

harm to the wild stocks. No one would seriously argue that the preservation of wild stocks is not a "beneficial use" of the fishery resource, and there apparently is a concern that managing hatchery fish for broodstock and cost recovery may, in some instances, be harmful to that beneficial use. The difficulty with such a conclusion is that it probably raises more questions than it answers. How significant must the harm be? Can it be clearly substantiated? Isn't the continued health and development of hatchery raised fish also a "beneficial use" of the resource?

I have included the above arguments, conclusions and question for the purpose of demonstrating that there is no clear answer to the question whether there is a constitutional mandate that hatchery fish be managed on a sustained yield basis. That is not to say, however, that the legislature should not exercise its constitutional law making authority in this area. As Chairman Martin's letter makes clear, the Board of Fisheries is struggling with statutory ambiguities, and the board is obviously looking for legislative action.

B. Statutory basis for broodstock and cost recovery.

As noted earlier, assistant attorney general Steve White concluded that the board and the department are authorized and directed by law to allocate fishery resources for broodstock. He also concluded that the board has the authority, but is not required, to manage for cost recovery. White memo., p. 7. Going a step further, Mr. Saupe reached the conclusion that the board and the department must manage for both broodstock and cost recovery. Saupe memo., p. 16. In reaching their conclusions, White and Saupe both rely on the notion that hatchery fish must be managed on the principle of sustained yield, discussed above, and on a number of statutes and court decisions which point to legislative approval for such activity.

(1) Broodstock.

As noted above, the board is to provide for "the conservation and development of the fishery resources of the state." AS 16.05.221(a). The supreme court, in Kenai Peninsula Fishermens Coop Ass'n v. State, 628 P. 2d 897, 903 (Alaska 1981), defined "conservation" as "controlled utilization of a resource to prevent its exploitation, destruction or neglect." Steven White argues that, since managing for broodstock helps to perpetuate the fishery resource (i.e., prevents its "exploitation, destruction or neglect"), managing for broodstock is analogous to managing for escapement of wild fish. Therefore, the board has the power to adopt regulations that will provide for hatchery broodstock. White memo., p. 2. I believe White is correct. The board does have the statutory authority⁶ to so provide, and has promulgated regulations to that end.⁷

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(2) Cost recovery.

Whether the board has the authority to manage for cost recovery is less clear than it is for broodstock. The board does have the authority to allocate fish to various user groups.⁸ However, private nonprofit hatcheries are not specifically designated in law as a user group. Nevertheless, Steve White has concluded that private nonprofit hatcheries could be considered a "subgroup" of commercial users. Because our supreme court has upheld the board's power to allocate among subgroups (e.g., drift gillnetters and set gillnetters),⁹

IV. Conclusions.

1. There is no statutory "priority" for wild stocks.
2. Article VIII, sec. 4 of the Alaska Constitution, and existing statutes, strongly indicate that hatchery fish are required to be managed on the sustained yield principle, unless the state finds that such management causes significant harm to the wild stocks (i.e., that the protection of the wild stocks is a more "beneficial use" of the fishery resource than managing for broodstock).
3. The board has the power to adopt regulations for hatchery broodstock management, and probably has the same for cost recovery.

V. Recommendations.

1. That the legislature make a policy choice as to the priority of wild stock fish and express that choice by statutory amendment.

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DRAFT

LEGAL ISSUES SUMMARY

The Board of Fisheries ("board") has expressed to the legislature its concern over perceived ambiguities in the Alaska statutes relating to wild stock and hatchery fish management. One problem is that there is no clear statutory policy for the board to follow when it must make decisions that would favor wild stocks over hatchery fish or vice-versa. An additional problem is that the statutes are unclear about the state's duty to provide for hatchery broodstock and cost recovery, and about the hatcheries' obligation to contribute to the common property fisheries.

The Alaska Statutes contain only two direct references to wild stock protection from hatchery-related dangers: AS 16.10.400(g), which requires the commissioner, during the development of a comprehensive regional plan and before a hatchery permit is issued, to determine that such an action would not jeopardize wild stocks; and AS 16.10.420(10), which directs the department to require, as condition of a permit, that the hatchery be located in an area where a "reasonable segregation" from wild stocks occurs.

The board is concerned that these statutes protect wild stocks only prior to the start of a hatchery operation. This raises the inference that, once a regional plan is completed and/or a hatchery permit is issued, wild stocks no longer enjoy a statutory protection from hatchery operations.

Article VIII, sec. 4 of the Alaska Constitution ("Sustained Yield") states:

Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses.

The board was created "for purposes of the conservation and development of the fishery resources of the state." AS 16.05.221. The Alaska Supreme Court has stated that "'conserving' implies controlled utilization of a resource to prevent its exploitation, destruction or neglect" and that "'development' connotes management of a resource to make it available for use." Kenai Peninsula Fishermen's Coop. Ass'n v. State, 628 P.2d 897, 903 (1981).

In August 1990 opinion letter to the commissioner of the Department of Fish & Game, assistant attorney general Stephen White concluded that the board had the authority, and was in fact directed by law, to manage for hatchery broodstock. He further concluded that the board had the power to manage for cost recovery, but that it was not required to do so. He based these conclusions in part on the unstated assumption that the constitutional "sustained yield" requirement applied to hatchery fish. This assumption, coupled with the board's statutory charge to "conserve" the

fishery resource, formed the basis for White's conclusion that the board was required to manage for broodstock.

White's conclusion that the board had the authority to manage for cost recovery was based on the board's statutory authority to "develop" the resource and to allocate among various user groups. Although hatchery operators are not specified on the list of user groups for which the board may allocate, AS 16.05.251(d), White concluded that the board had the power to make such an allocation by treating hatchery operators as a "subgroup" of commercial users. He noted that the Alaska Supreme Court, in Meier v. State, 739 P.2d 172, 174 (1987), has upheld a board allocation between two subgroups of commercial users.

The White opinion spawned two critical responses. The first was from Juneau attorney Michael A.D. Stanley, in a February 1991 letter to the Southeast Alaska Seiners. Stanley argued that the "sustained yield" clause may not apply to hatchery fish for a number of reasons. First, because humans play such a significant role in the development of hatchery fish, there is some question whether the framers of the constitution would have considered them "natural" resources "belonging to the state" as those terms is used in article VIII. Stanley then points to AS 16.10.440(a), which provides that hatchery fish are to be treated "in the same way as fish occurring in their natural state until they return for harvest by the hatchery operator." He argues that the "in the same way" language indicates the legislature did not view hatchery fish as already subject to article VIII.

Stanley also takes issue with White's conclusion that hatchery operators could receive an cost recovery allocation as a subgroup of commercial users. He asserts that the definition of "commercial fishing," AS 16.05.940(5), would have to be "strained" to include hatchery operators, and that such a broad reading would allow other inappropriate users (such as salmon derby operators) to be considered as a subgroup. He also notes that the definition of "commercial fisherman," AS 16.10.940(4), contemplates a "natural person," not a nonprofit corporation.

Finally, Stanley asserts that only the department, not the board, may make an allocation of fish for hatchery operators. He argues that AS 16.10.440(a), quoted above, allows for harvest only at an area designated by the department, and only after the hatchery fish have travelled through the common property fisheries. Stanley argues that for the board to decide otherwise would be a circumvention of the existing statute.

The second opinion that questioned ass't attorney general White's conclusions was from Legislative Counsel George Utermohle, in an April 8, 1991 letter to Sen. Dick Eliason. He argues that, if the legislature had intended for hatchery fish to be managed on a sustained yield basis, it would have used the phrase "belonging to the state" when it wrote AS 16.10.440(a), quoted above. Utermohle reasons that the legislature intended

hatchery fish to be treated as if they were a part of the common property resource, but only until they return to the designated harvest location; at that point the hatchery operator may harvest the fish. Utermohle asserts that this language "suggests some form of lingering private property interest in hatchery fish by the hatchery operator," and indicates that the fish do not "belong" to the state for purposes of sustained yield.

Utermohle also argues that if hatchery fish belong to the state, it does not mean they necessarily must be managed for sustained yield. He points out that the sustained yield principle is always "subject to preferences among beneficial uses." Citing commentary and minutes from the Alaska Constitutional Convention, Utermohle asserts that the delegates understood this qualification to mean that the state "could make reasoned decisions to prefer certain renewable resources over other renewable resources to achieve a more beneficial public purpose. He concludes that this "may permit the state to harvest hatchery fish without providing for sustained yield;" and points to AS 16.10.430(b), which allows the termination of a hatchery operation "in the best interest of the public, if the adverse effects of the operation are irreversible and cannot be mitigated."

The Stanley and Utermohle opinions generated a vigorous and lengthy response from Anchorage attorney A. William Saupe, contained in an October 17, 1991 opinion letter to the president of the Prince William Sound Aquaculture Corporation (PWSAC). Saupe concluded that any regulation significantly restricting PWSAC's broodstock and cost recovery practices would be inconsistent with existing statutes and with the Alaska Constitution. He further concluded that legislative history suggests the board was never intended to have the power to limit hatchery production.

Saupe points to the legislative history compiled by Linda J. Snow of the Legislative Research Division as evidence that the legislature intended to assert state ownership of hatchery fish, and relies on statements made by several legislators and lobbyists to that effect. He also cites commentary from the framers of the constitution which states that the sustained yield principle is applicable to "plant and animal life subject to the immediate control of the state." Saupe argues that hatchery fish are so subject and therefore must be managed for sustained yield.

He answers the "beneficial use" argument by asserting that article VII, sec. 15, which speaks to the "efficient development of aquaculture in the state," indicates the importance and value of hatchery operations to the state; he also argues that hatcheries, specifically PWSAC's, would be seriously harmed if broodstock harvest was curtailed.

Saupe also points to "an extensive web of statutory provisions that evidence an unwavering legislative intent to sustain and expand hatchery operations through hatchery harvest," as evidence of the legislature's belief that harvests are necessary and beneficial. Among these provisions: AS 16.10.443, which requires the department to assist permit holders in the

operation of their hatcheries; AS 16.10.450(a), which contains certain expenditure requirement for hatcheries that sells salmon or salmon eggs after harvest; AS 16.43.420, which allows for the sale of fish caught under the authority of a special harvest area entry permit; and AS 16.10.430(b), which allows sale, but not release, of fish during the period of time that a hatchery operation is being terminated; AS 16.05 020, which requires the commissioner to "improve and extend" the fisheries of state. Saupe concludes that the cited statutes, and legislative history, demonstrate the legislature's intention that cost recovery harvests be the primary method of funding private nonprofit hatchery operations.

Saupe also takes issue with Michael Stanley's questioning of the board's authority to allocate for cost recovery. Saupe argues that the language of AS 16.05.440(a), quoted above, applies only to the time and location of a special harvest and not to allocation. He points to legislative history indicating approval of board authority to regulate hatchery harvests, as well to provisions of the Limited Entry Act that subject entry permit holders to board regulations, to also support his conclusion.

On the question of board restrictions on local hatchery production, Saupe is less certain. He cites evidence to the effect that the legislature did not consider such restrictions during the time the private nonprofit hatchery system was put in place; and he takes the position that AS 16.10.440(b), which allows the board to amend hatchery permit terms relating to source and numbers of salmon eggs was intended by the legislature to relate only to harvests and not to limiting hatchery production. On the related question of the board's ability to limit hatchery production on a regional basis, Saupe acknowledges that the answer is unclear but he asserts that such a policy would conflict with many statutes already cited, and with the constitutional provisions relating to sustained yield and promotion of aquaculture.

Conclusions.

1. There is no specific statutory mandate directing the board to give wild stocks preferential management treatment relative to hatchery raised fish.

2. The Alaska Constitution may require that hatchery fish be managed to allow for broodstock and cost recovery by the hatcheries, but that requirement may be vitiated by a determination that the sustained yield of hatchery fish is not as "beneficial" a "use" of the fishery resource as that of protecting the health of the wild stocks.

3. Existing statutes appear to allow the board to allocate fish to hatcheries for broodstock, but are less clear as to the authority for cost recovery.

BACKGROUND: DECLINING SALMONIDS IN WASHINGTON

Columbia River Salmon and the Endangered Species Act (ESA)

In April and June of 1990 petitions were filed by the Shoshone-Bannock tribe in Idaho, Oregon Trout and five other organizations, under the federal Endangered Species Act (ESA) to list five wild stocks of Columbia River salmon as threatened or endangered. These stocks were: Snake River sockeye, Snake River spring, summer, and fall chinook, and lower Columbia River coho. The National Marine Fisheries Service (NMFS) is the federal agency with jurisdiction over endangered fish species. In April and June of 1991, NMFS proposed that three of the five stocks of salmon be listed under the Endangered Species Act. These stocks are the Snake River sockeye salmon (proposed as endangered), the Snake River fall chinook (proposed as threatened) and the Snake River spring/summer chinook (proposed as threatened). On November 14, 1991, NMFS officially listed the Snake River sockeye as endangered. Decisions on the other two stocks are expected shortly.

Wild Stocks Under the Endangered Species Act

An important part of the NMFS decision was their determination of what the definition of stock would be that would constitute a "species" for purposes of the ESA. The agency determined that an "ecologically significant unit", or ESU, would constitute a species for the purposes of the ESA. Another key point in application of the ESA to fish is that the wild stocks were recognized and being genetically and biologically important and merit protection, or stocks that have not been intermixed with hatchery stocks and that still spawn naturally, are considered.

Salmon in the Columbia River System and Reasons for Decline

Approximately one-third of the Columbia River drainage that historically supported salmon populations is not currently accessible to these fish because of dam construction without fish passage facilities. Alterations in river flow and velocity, adjacent habitat changes, irrigation diversions, commercial and recreational harvest, and hatchery practices have resulted in fewer "returns" of spawning adults from the ocean than historically. In the mid-19th century, anadromous fish runs in the Columbia River basin numbered up to 16 million adult fish. Anadromous fish include salmon, steelhead, and sea-run cutthroat trout. Juveniles migrate from freshwater to the ocean, where they take between one and five years to mature. They return as adults to their streams of origin to spawn. Salmon and steelhead numbers on the Columbia have been reduced to about 15 percent of historic run sizes.

Dams: The U.S. Army Corps of Engineers, the U.S. Bureau of Reclamation, and the state's public utility districts operate water projects in the Columbia and the lower Snake Rivers. The Bonneville Power Administration, part of the U.S. Department of Energy, markets the power generated by these hydroelectric facilities. There are hindrances to both upstream and downstream fish migration that can occur because of dams. The impoundments that are associated with dams alter natural water flow, sometimes preventing downstream migration of juvenile fish. Power turbines without adequate screening can cause fish mortality when fish do attempt to migrate downstream. Five of eight Army Corps of Engineers projects have juvenile fish bypass systems. Facilities at the Lower Monumental, Ice Harbor, and the Dalles dams are not yet in place. For successful upriver migration of adult salmon, dams are equipped with fish

The final EIS is expected to be released in March of 1992.

The Salmon Summit

The Salmon Summit was convened at the urging of Senator Mark Hatfield by agencies and organizations in the Pacific Northwest to develop a management and recovery program for the Columbia and Snake River salmon. This effort concluded in March 1991 and the participants failed to reach a consensus on major recovery methods. However, the task of continuing these efforts was subsequently undertaken by the Northwest Power Planning Council (NWPPC).

The Northwest Power Planning Council Amendments

In 1980, Congress passed the Northwest Power Act. The Act created the NWPPC and directed it to determine how much energy the region would require over the next twenty years and to develop an electric power plan to meet those needs; and to develop a program to protect, mitigate, and enhance fish and wildlife and related habitat in the Columbia River basin. The NWPPC develop a Fish and Wildlife Program (FWP) to accomplish this. In response to the declining salmon on the Columbia and Snake Rivers, the NWPPC is amending its FWP. The amendments are in four phases. Phase I identified immediate measures to assist in salmon recovery. Phase II, completed on December 12, 1991, recommends the following actions, as well as many others not listed below:

- mainstem passage improvements on the Snake and Columbia by increasing flows for juvenile salmon migrating downstream and by improving screens so that juveniles don't experience as much mortality in dam turbines;
- reductions in commercial harvest;
- implementation of a temporary commercial salmon license leaseback program;
- adoption of water conservation measures including the placement of instantaneous flow meters on all diversions from anadromous fish streams tributary to the Snake and Columbia;
- improvement of hatchery management practices;
- development of habitat management standards for salmon protection.

NMFS will use this Phase II Amendment as the basis for their recovery plan for the endangered sockeye salmon. Phase III and IV are watershed level planning, and resident fish and wildlife protection, respectively. The NWPPC has just begun to develop these phases.

CORRECTION

**THIS DOCUMENT
HAS BEEN REPHOTOGRAPHED
TO ASSURE LEGIBILITY**

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ladders. There are no ladders at the Chief Joseph or Grand Coulee Dams, blocking upstream spawning in the Columbia River at Bridgeport.

Habitat Alteration Out of River: Activities such as timber harvest, mining, agricultural drainage, livestock grazing and point source pollution can alter fish habitat conditions. Increased sediment, increased water temperatures, loss of riparian (adjacent to the watercourse) habitat, and reduced oxygen can negatively affect fish.

Harvest: Both recreational and commercial salmon fishing occur on the Columbia River. Salmon fishing in Washington and Oregon state waters is regulated by the Washington Department of Fisheries and by the Oregon Department of Fish and Wildlife, respectively. The two states coordinate their commercial fishing regulation development through the Columbia River Compact. Recreational fishing is regulated by the Washington Department of Wildlife (steelhead trout and resident game fish), Washington Department of Fisheries (salmon and marine fish), and the Oregon Department of Fish and Wildlife (all species of fish).

Fish Production: 80-90% of salmon returning to the Columbia River from the ocean are produced in hatcheries. There is an ongoing debate over the role of hatchery practices in preservation of wild stocks of fish. Deterioration of wild stocks of salmon and steelhead can occur through poor hatchery management practices. Hatchery practices have begun to explore the use of wild stock in breeding programs, to avoid deterioration of hatchery stocks.

Water Use: There are several large users of water in Washington, including municipal, industrial, irrigation, hydroelectric generation, and instream. Municipal water use includes water supplied by public water systems for domestic, commercial, and fire protection. Industrial use includes process and cooling water. Irrigation accounts for the majority of water use in Washington. Water is diverted from water sources. Diversions must be screened to prevent fish from entering the irrigation system, unless the area of the diversion is under the management authority of the Department of Wildlife and the diversion existed prior to 1947. Water storage for irrigation, power production or flood control affects timing of peak flows that under natural conditions coincide with juvenile anadromous fish migration downstream.

The American Fisheries Society Endangered Species Committee Report

According to a report by the Endangered Species Committee of the American Fisheries Society, entitled Pacific Salmon at the Crossroads, 214 stocks of wild salmon, steelhead, and cutthroat trout are in decline in the Pacific Northwest. 52 of these are in the Columbia River basin. In the coastal and Puget Sound areas of Washington, outside of the Columbia River basin, 41 stocks are in jeopardy. There are currently no mandated recovery efforts for these stocks, other than for the Snake River sockeye salmon.

Other Efforts to Recover the Columbia River Salmon

Columbia River Salmon Flow Measures

The Army Corps of Engineers, Bureau of Reclamation, and the Bonneville Power Administration are conducting an Environmental Impact Statement (EIS) to examine water management actions to help both juvenile and adult salmon. These actions will be taken in 1992, for a one year period, on an experimental basis. The alternatives include various combinations of reservoir drawdown and flow augmentation to assist juvenile salmon migration.

The final EIS is expected to be released in March of 1992.

The Salmon Summit

The Salmon Summit was convened at the urging of Senator Mark Hatfield by agencies and organizations in the Pacific Northwest to develop a management and recovery program for the Columbia and Snake River salmon. This effort concluded in March 1991 and the participants failed to reach a consensus on major recovery methods. However, the task of continuing these efforts was subsequently undertaken by the Northwest Power Planning Council (NWPPC).

The Northwest Power Planning Council Amendments

In 1980, Congress passed the Northwest Power Act. The Act created the NWPPC and directed it to determine how much energy the region would require over the next twenty years and to develop an electric power plan to meet those needs; and to develop a program to protect, mitigate, and enhance fish and wildlife and related habitat in the Columbia River basin. The NWPPC develop a Fish and Wildlife Program (FWP) to accomplish this. In response to the declining salmon on the Columbia and Snake Rivers, the NWPPC is amending its FWP. The amendments are in four phases. Phase I identified immediate measures to assist in salmon recovery. Phase II, completed on December 12, 1991, recommends the following actions, as well as many others not listed below:

- mainstem passage improvements on the Snake and Columbia by increasing flows for juvenile salmon migrating downstream and by improving screens so that juveniles don't experience as much mortality in dam turbines;
- reductions in commercial harvest;
- implementation of a temporary commercial salmon license leaseback program;
- adoption of water conservation measures including the placement of instantaneous flow meters on all diversions from anadromous fish streams tributary to the Snake and Columbia;
- improvement of hatchery management practices;
- development of habitat management standards for salmon protection.

NMFS will use this Phase II Amendment as the basis for their recovery plan for the endangered sockeye salmon. Phase III and IV are watershed level planning, and resident fish and wildlife protection, respectively. The NWPPC has just begun to develop these phases.

HOUSE BILL ANALYSIS

HB 2626

AN ACT RELATING TO WILD STOCKS OF SALMONIDS

Brief Description: Conserving and enhancing wild stocks of salmonids.

Committee: Fisheries & Wildlife

Sponsor(s): Representatives R. King, May, Orr, Rust, Belcher, Fraser, Hochstatter, Horn, Morris, R. Meyers, Basich, Jones, Sheldon, Leonard, Franklin, Zellinsky, Valle, Pruitt, O'Brien, Nelson, Bowman, Brough, Jacobsen, Haugen, Rasmussen and J. Kohl

Background:

Recovery Planning

The Northwest Power Planning Council, in their Phase II Amendment process, developed a management plan for salmon on the Columbia and Snake Rivers, which will be used by the National Marine Fisheries Service as a basis for their recovery plan for sockeye salmon. The Snake River sockeye salmon was listed as endangered under the Endangered Species Act in November of 1991.

There is currently no mandatory or ongoing recovery effort for wild stocks of salmon, steelhead and cutthroat trout that have not been petitioned for listing under the Endangered Species Act. There are many other wild salmon, steelhead, and sea-run cutthroat trout stocks that have been identified as declining by the American Fisheries Society. Forty-one of these are in Washington, outside of the Columbia River Basin.

Management Techniques for Increasing Wild Fish Runs

The Department of Wildlife regulates the recreational harvest of resident fish including steelhead trout and sea-run cutthroat trout. The Department of Fisheries regulates the harvest of the commercial and recreational salmon fisheries for non-treaty fishers. Both agencies coordinate with the tribes in developing commercial harvest regulations. Regulations are designed to provide harvest opportunities and sustain fish runs.

The Northwest Power Planning Council, in their Phase II Amendment, proposed a reduction in harvest of fall chinook in the Columbia river. Part of the mechanism for accomplishing this will be by providing for a commercial license leaseback program. The federal government will assist in paying to temporarily lease back commercial fishing licenses. Current Washington law requires that a commercial fisher, in order to renew a salmon license, catch one fish. The director of the Department of Fisheries has the authority to waive this requirement if the fisher has not had the opportunity to catch fish, such as would occur if a fisher participated in the leaseback program.

Marking and Catch and Release

Where a distinction between wild and hatchery stocks needs to be made for the purpose of allowing wild fish, if caught, to be released, the hatchery fish may be marked by clipping the adipose fin, using a coded wire tag, or using a newer ocular marking technique. The Department of Wildlife has marked most of its hatchery raised steelhead and sea-run cutthroat trout and is therefore able to implement catch and release regulations for recreational fishers. For almost all of the steelhead and sea-run cutthroat stocks identified by the American Fisheries Society as stocks of concern, these regulations are already in place. The Department of Fisheries has not marked all hatchery fish. Even if all were marked, the utility in returning wild fish caught commercially with current techniques is low, since these fish, caught in nets are usually dead shortly after the nets are hauled in. The recreational fishery could be managed for catch and release if all hatchery raised salmon were marked.

Hatcheries

The Department of Fisheries operates 39 major hatcheries and 19 satellite facilities. The Department of Wildlife operates 32 hatcheries. The tribes and the U.S. Fish and Wildlife Services also operate hatcheries, and there are hundreds of cooperative production facilities operated by volunteers and coordinated by the state Departments of Fisheries and Wildlife.

Captive Broodstock and Wild Stock Supplementation:

Wild salmonids spawn in river gravel. Their progeny reside in freshwater until ready to go to the ocean, where they mature. As adults, they return to their natal streams to spawn. Fish produced in hatcheries are artificially spawned by removing eggs from the female and raising the young fish and releasing them to travel downstream as smolts. New technologies are being developed to use artificial production means to supplement wild populations of salmonids with fish that are genetically of the same wild stock. One technique, called captive broodstock rearing, raises the fish from egg to mature adult, rearing in saltwater if necessary by using saltwater net pens. That adult is spawned artificially. Wild stock supplementation is the process of using eggs from the wild stock that one wants to supplement, by taking the fish out of the wild, rearing the progeny, and releasing the progeny back into the natal stream from which the parents originated. The Department of Wildlife has sea-run cutthroat captive broodstock programs in Shelton and Aberdeen, which have been implemented in the last five years. Many stocks of sea-run cutthroat on coastal streams have been identified by the American Fisheries Society as being stocks of concern.

Summary of Bill:

The Departments of Fisheries and Wildlife are directed to establish a review and recovery team to recommend recovery methods for salmonid stocks outside of the Columbia River Basin. The review and recovery team is to develop a definition of the term "stock", determine the status of all wild salmonid stocks in Washington, set escapement objectives for these wild stocks, and where escapement objectives are not currently being met, develop a recovery plan for each subbasin containing the wild stock. Priorities for recovery are to be, in descending order, natural production, supplementation using hatcheries, and captive broodstock technology. The team shall evaluate the role of existing hatcheries in recovery, and shall evaluate methods of

harvest that have less impacts on wild stocks. The recovery plan shall be submitted to the appropriate legislative committees by June 30, 1993.

By January 1, 1993, the Department of Wildlife is directed to implement an experimental captive broodstock program on a coastal river to be selected by the Department for wild sea-run cutthroat trout.

The Department of Fisheries, by December 31, 1992, is to determine the cost of marking all hatchery fish at all Department operated hatchery facilities.

The director of the Department of Fisheries is directed to use authority granted under existing law to waive requirements for commercial fishing license renewal, in order to accomplish the goals of the license leaseback program of the Northwest Power Planning Council, described in the Council's Phase II Amendment.

*Prepared by Keithlyn Watson, Research Analyst (786-7310)
House Fisheries and Wildlife Committee
Office of Program Research
January 23, 1992*

SECTION BY SECTION SUMMARY: H-2626
Conserving and enhancing wild stocks of salmonids

Section 1. Legislative findings.

Section 2. The Departments of Fisheries and Wildlife are directed to establish a review and recovery team to recommend recovery methods for salmonid stocks outside of the Columbia River Basin. The review and recovery team is to develop a definition of the term "stock", determine the status of all wild salmonid stocks in Washington, set escapement objectives for these wild stocks, and where escapement objectives are not currently being met, develop a recovery plan for each subbasin containing the wild stock. Priorities for recovery are to be, in descending order, natural production, supplementation using hatcheries, and captive broodstock technology. The team shall evaluate the role of existing hatcheries in recovery, and shall evaluate methods of harvest that have less impacts on wild stocks. The recovery plan shall be submitted to the appropriate legislative committees by June 30, 1993.

Section 3. By January 1, 1993, the Department of Wildlife is directed to implement an experimental captive broodstock program on a coastal river to be selected by the Department for wild sea-run cutthroat trout, using existing facilities where possible.

Section 4. The Department of Fisheries, by December 31, 1992, is to determine the cost of marking all hatchery fish at all Department operated hatchery facilities.

Section 5. Amends existing law to require the director of the Department of Fisheries to use authority granted under existing law to waive requirements for commercial fishing license renewal, in order to accomplish the goals of the license leaseback program of the Northwest Power Planning Council, described in the Council's Phase II Amendment.

HOUSE BILL 2626

State of Washington

52nd Legislature

1992 Regular Session

By Representatives R. King, May, Orr, Rust, Belcher, Fraser, Hochstatter, Horn, Morris, R. Meyers, Basich, Jones, Sheldon, Leonard, Franklin, Zellinsky, Valle, Pruitt, O'Brien, Nelson, Bowman, Brough, Jacobsen, Haugen, Rasmussen and J. Kohl

Read first time 01/22/92. Referred to Committee on Fisheries & Wildlife.

1 AN ACT Relating to wild stocks of salmonids; amending RCW
2 75.30.120; and creating new sections.

3 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON:

4 NEW SECTION. Sec. 1. The legislature finds that wild stocks
5 of salmonids in the state of Washington are in a state of decline.
6 Stocks of salmon on the Columbia river are proposed for listing as
7 threatened and endangered, the Snake river sockeye has been officially
8 listed as endangered, and the American fisheries society has indicated
9 that there are two hundred fourteen other stocks of salmonids in the
10 Pacific Northwest that are in decline or possibly extinct. Many of
11 these are within Puget Sound or the coast, and therefore are not within
12 the jurisdiction of the Northwest power planning council. The
13 legislature recognizes that to lose these wild stocks would be
14 detrimental to the genetic integrity of the fisheries resource and the

1 economy, and will represent the loss of a vital component of
2 Washington's aquatic ecosystems. The legislature further finds that
3 to postpone the recovery of stocks that are on the decline but that are
4 not yet listed as threatened or endangered is short-sighted, and that
5 it will be less costly to act now to save this important resource.

6 NEW SECTION. Sec. 2. (1) The departments of fisheries and
7 wildlife shall establish a wild salmonid review and recovery team
8 consisting of fisheries biologists and geneticists. The purpose of the
9 team shall be to review and recommend recovery methods for salmonid
10 stocks outside of the Columbia river basin. The departments shall
11 invite representatives of the Northwest Indian fisheries commission and
12 the national marine fisheries service to participate on the team.

13 (2) By June 30, 1993, the review and recovery team shall:

14 (a) Develop a meaningful definition of stock. The definition shall
15 be formulated to allow preservation of genetic integrity of the wild
16 fish resource and to avoid future federal listings under the endangered
17 species act. The team shall consider the national marine fisheries
18 service's species definition as well as the American fisheries society
19 definition of stock;

20 (b) Determine the status of all wild salmonid stocks in Washington;

21 (c) Set escapement objectives for all wild salmonid stocks in
22 Washington; and

23 (d) Where escapement objectives are not currently being met,
24 develop a recovery plan for each subbasin containing the wild stock,
25 attempting to achieve escapement objectives within two generations.
26 The recovery plan shall identify baseline conditions as well as
27 recommend actions. Priorities for recovery shall be, in descending
28 order, natural production, supplementation using hatcheries, and
29 captive broodstock technology. The recovery plan shall include an

1 evaluation of the role of existing hatcheries in wild salmonid
2 recovery, as well as of methods of harvest that have less impact on
3 wild stocks.

4 (3) By June 30, 1993, the review and recovery team shall provide
5 a recovery plan to the appropriate legislative committees. The plan
6 shall include:

7 (a) A definition of stock;

8 (b) A state-wide list of wild stocks, with status of and escapement
9 objectives for each;

10 (c) A summary of data management needs; and

11 (d) A range of recovery alternatives for wild stocks outside of the
12 Columbia river basin, with accompanying time frames for implementation,
13 time frames for expected recovery, costs, and risk assessments.
14 Alternatives shall consider actions in the areas of water quality and
15 quantity, flow management, hatchery management, captive broodstock
16 programs, harvest, and land management. Costs shall be developed in
17 consultation with an advisory committee of appropriate membership to
18 be appointed by the departments.

19 (4) This section shall expire January 1, 1994.

20 NEW SECTION. Sec. 3. By January 1, 1993, the department of
21 wildlife shall implement experimental captive broodstock programs on
22 a coastal river to be selected by the department, for wild sea-run
23 cutthroat trout. Existing facilities shall be used where possible.

24 NEW SECTION. Sec. 4. By December 31, 1992, the department of
25 fisheries shall determine the cost of marking all hatchery fish at all
26 department of fisheries operated hatchery facilities.

1 **Sec. 5.** RCW 75.30.120 and 1983 1st ex.s. c 46 s 146 are each
2 amended to read as follows:

3 (1) A commercial salmon fishing license issued under RCW 75.28.110
4 or salmon delivery permit issued under RCW 75.28.113 may be issued only
5 to a vessel:

6 (a) Which held a state commercial salmon fishing license or salmon
7 delivery permit during the previous year or had transferred to the
8 vessel such a license, and has not subsequently transferred the license
9 or permit to another vessel; and

10 (b) From which food fish were caught and landed in this state or
11 in another state during the previous year as documented by a valid fish
12 receiving document.

13 Where the failure to obtain the license or permit during the
14 previous year was the result of a license or permit suspension, the
15 vessel may qualify for a license or permit by establishing that the
16 vessel held such a license or permit during the last year in which the
17 license or permit was not suspended.

18 (2) The director may waive the landing requirement of subsection
19 (1)(b) of this section if:

20 (a) The vessel to which an otherwise valid license is transferred
21 has not had the opportunity to have caught and landed salmon; and

22 (b) The intent of the commercial salmon vessel limitation program
23 established under this section is not violated.

24 (3) The director shall exercise his or her authority under
25 subsection (2) of this section to accomplish the goals of the Northwest
26 power planning council's phase two amendment to its fish and wildlife
27 program, dated December 11, 1991, concerning a temporary commercial
28 salmon fishing license leasing program. The director may adopt rules
29 to accomplish the goals of the leasing program.

- 1 (4) Commercial salmon fishing licenses and salmon delivery permits
- 2 are transferable.

SCOMM

74:40

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

DIVISION OF FISHERIES REHABILITATION,
ENHANCEMENT & DEVELOPMENT (FRED)

WALTER J. HICKEL, GOVERNOR

P.O. BOX 3-2000
JUNEAU, ALASKA 99802-2000
PHONE: (907) 465-4160
FAX (907) 465-4168

RAPIFAX TRANSMITTAL SHEET

To: Molly Mc CarmonDate: 2-11-93From: Jeff HartmanNo. Pages 5
(following this page)

Message: I will be sending out 300 pages of
draft report and data to Jim Wiken today.
I will be sending a draft letter requesting data + final
technical notes from the researchers. Thanks.

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

DIVISION OF FISHERIES REHABILITATION, ENHANCEMENT & DEVELOPMENT (FRED)

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February 10, 1993

Ms. Molly McCammon
c/o Representative Carl Moses
Alaska State Legislature
State Capitol, Room 204
Juneau, AK 99801-1182

Dear Molly:

Following our February 8 conversation, I understand that I have permission from the Legislature to send some of the preliminary and final work products from the University of Alaska-Fairbanks' cost-benefit analysis to Dr. James Wilen at the University of California-Davis. I will ask Dr. Wilen not to distribute any copies he receives. He will be asked the following questions:

1. Are the work products analytically sound enough to be worth the effort of carrying out a technical review?
2. How long will it take to complete a quality review of the technical aspects of the cost-benefit analysis model and report, demand model, cost model, and simulations that would stand some scrutiny?
3. How much will it cost for you to carry out a good, quality review?
4. What are your initial impressions of the studies?

I will be sending Dr. Wilen the following manuscripts and preliminary work products and provide you with a copy of the cover letter to Dr. Wilen.

1. *Legislative Review of the Alaska Salmon Enhancement Program*, January 1993, Draft Chapter IX - Economics. Alaska State Senate Special Committee on Domestic and International Commercial Fisheries.
2. *A Benefit-Cost Analysis of the Alaska Salmon Enhancement Program*, December 1992, final report by Boyce, Herrmann, Bischak, and Greenberg.

Ms. Molly McCammon

-2-

February 10, 1993

3. Cost-Benefit Analysis (CBA) annual and aggregated net benefit output tables, November 1992, draft by John Boyce.
4. *An International Marketing Model for Alaskan Salmon*, November 1, 1992, draft by Herrmann and Greenberg.
5. Executive Summary, *An International Marketing Model for Alaskan Salmon*, December 15, 1992, draft by Herrmann and Greenberg.
6. Demand Model Simulation Model Code in SAS, December 1992, draft by Mark Herrmann.
7. Demand model output prices by species, year, policy case, region, and aggregated regions, December 1992, Mark Herrmann.
8. Using Participation Data to Estimate Fishing Costs for Commercial Salmon Fisheries in Alaska, November 1992, draft by John Boyce.
9. ADF&G technical comments to Senate Special Committee on Domestic and International Fisheries from Jeffery P. Koenings, February 4, 1993.
10. Reimbursable Services Agreement Contract Specifications and Request for Proposals for Software Development and Policy Analysis of a Benefit-Cost Analysis of the Statewide Enhancement Program.

Thank you for your interest in this matter.

Sincerely,



Jeff Hartman
Economist

cc: Geron Bruce
Bob Burkett
Johnny Holland
Jeff Koenings

Justification for Technical Review of UAF CBA Model

by Jeff Hartman, 2-10-93

It is customary in technically challenging econometric studies, or where there are significant policy implications from studies, that contracting agencies seek independent technical reviews. It is also a prudent action when the reviewers of the contracts express some uncertainty about their own ability to interpret the findings. The UAF CBA meets and exceeds all three of these criteria.

The demand model by Herrmann and Greenberg has over 50 equations and requires about 16 hours to estimate on a 486 33Mh. Some of the econometric techniques used in the "block 1" estimates are new, and few economists have extensive experience with them.

Two of the four economists reviewing the contracts, Kurt Schelle and Ben Muse, possess a Ph.D. in economics and have extensive experience in fisheries economics. They have expressed reservations about their abilities to interpret certain new techniques used in the demand model. Though I have spent several hours trying to unravel the block 1 and 2 estimates, I also cannot confidently say that the methods are or are not technically sound approaches to generating long-run projections of price response. I have never reviewed an econometric model that is this nested or uses such novel statistics.

Other technical questions, both theoretical and methodological, have been raised about the fishing cost and population models used in the studies. Finally, the net benefit algorithms, the summarizations of input data, and statistical significance of the net benefit point projections have been questioned.

All of these issues, by themselves, lead to the need for some independent, technical review. However, the timing of the review with respect to whether it occurs before or after the studies are released appear to be a critical concern because of possible policy implication and the high potential of misinterpreting the model implications.

A study that had severely negative implications about the future for Alaska's salmon industry could, at this time, have a strong impact on private and public sector decisions. The study could have an effect on Government policy for the enhancement program, fishery management, loans to fishermen, bycatch of salmon, marketing of seafood, and the U.S./Canada Pacific Salmon Treaty. Perceptions of private lenders and fishermen may also be impacted, along with limited entry permit markets.

With these issues in mind, I am supportive of the proposal to develop an independent, technical review of the full cost-benefit analysis. I would suggest that this review begin only after the work products are finalized to the point that a detailed technical review can actually occur. The primary question that we should be asking in this review is if the models and existing simulations are sufficient for making major directional changes in Alaska salmon management and enhancement policies.

Additional discussions on the proposed technical review.

1. On 2-3-92, I contacted CFEC (Kurt Schelle) and asked if CFEC would be willing to act as the contracting agent for a technical review of the CBA studies. He said that he would consider it, but would have to discuss it with others at the Commission. I felt that since they have technical ownership of all of the materials and work products of the study (they were the contracting agency for the original modeling), that CFEC would be the best group to contract through for an impartial review. I believe that CFEC should be given the full authority to choose the contractor and the questions to be asked. I trust them to make sure that the questions to the contractor should be framed in an objective manner.
2. I talked with our contract people to see how difficult it would be to A/E \$2,500 over to CFEC to carry out a review. They said that it would be fairly straightforward.
3. I contacted James Wilen, my first choice as a technical reviewer. Wilen is extremely knowledgeable about salmon demand models and fishing cost models. He is familiar with the work of Mark Herrmann, Ron Mittelhammer, and John Boyce which gives him a considerable head start in being able to carry out an efficient review. He has worked for the AG's office on the oil spill economic damage assessment, specializing in commercial fisheries. He is a long-time friend of Don Collinsworth and knows much about how Alaska fish politics work. He has a current background in econometrics and is familiar with the Bayesian bootstrapping and other new econometric techniques used in the demand models.

Wilen believes that it is a good idea to get the studies reviewed if they could have important policy implications. He said that it would probably take a week of intense work, but if he could see some of the draft reports, he would be able to give us a more precise time estimate. I have received permission to send him some of the draft copies.

If it is alright to ship them to him, I would ask him:

1. Would it be worth investing the time to review the studies?
2. How long would it take?
3. How much would it cost?
4. What are your initial impressions?

My impressions about other possible researchers for a Technical Review include:

Ron Mittelhammer is probably not impartial since he put Herrmann onto these techniques in the first place. Also, he is a co-author and major professor of Herrmann on the publications that initially resulted in the block I estimates. I understand he is a very good econometrician, but don't know him personally.

Biing-Hwan Lin is not really available. He now works for the federal government on other issues, and also has been a co-author on related studies with Herrmann.

I have not yet contacted Jim Anderson. He may be interested and probably has sufficient skills. I do not know him very well. Also, I do not know if he could be trusted to write a good summary. I was not that impressed with a piece he did for Commerce a few years ago.

ISER is probably out because they competed for the original contract. I do not feel that they would be very objective, since there seems to be some competition between the campuses.

Terrence Smith is now at Woods Hole. He would probably have a good overall understanding of the technical aspects of the CBA, but I doubt would have specific knowledge about the new techniques used in the demand model.

Ira Strand worked on commercial fisheries damage assessment for the feds after the *Exxon Valdez* oil spill. I understand that he is a strong theorist. I do not know about his other skills and have not contacted him.

Gardner Brown is not known for his econometrics, which may be a real problem in the review. He is very opinionated, understands Alaska fish politics, and is known to be very practical. He is also a clear writer, all of which would probably be an advantage.

Lou Querillo is probably not quite strong enough in the newest wave of econometrics techniques to be a prime contender. I do not believe that he would have many new comments that Ben, Kurt, or I would not have identified. I also doubt that he would have the time. I also do not know what is involved for transferring review funds to NMFS.

Jim Wilen is as close to perfect for the job as I can imagine. He has a strong reputation as an impartial reviewer and seems to have a significant amount of prior knowledge of Boyce and Herrmann's work. He says that he is interested in doing the job, would be impartial and fair, but not pull any punches. He clearly has the econometric skills to do the work. I know him to be an excellent communicator and writer.

MEMORANDUM

DEPARTMENT OF FISH AND GAME
GENETICS PROGRAM

TO: Molly McCammon

DATE: February 5, 1992

SUBJECT: Chapter VIII

FROM: Jim Seeb, Principal Geneticist, FRED 267 3385

I'm in meetings and don't have a lot of time. I'll review the document tonight if you still need comments. The document is damn good, by the way--especially the "options".

Pg 2, para 1. I don't understand "success of crossbreeding." Do you mean the "effects of interbreeding?" I have some concern about this paragraph--may we talk?

Pg 3

Policy para 2. Perhaps delete "importance" in sent. 1. Delete the last sentence "The policy also includes considerations . . ." This sentence overstates the importance of a trivial research agenda item

Policy para 3, sent 2. replace "into wild or enhanced" with "between."

Pg 4 para 2

replace "is" with "was" twice in sentence 1. Perhaps add a sentence at the end that says something like "The Commissioner is attempting to clarify some of the flexible guidelines in the revised policy by incorporating some of the knowledge gained from recent studies of the population genetics of salmonids."

I'm sorry I don't have more time today. Please call if you have any questions. I feel that the document is fine as it stands. I hope that these comments help, and I would be glad to give you more input if given the chance.

Do you have a copy of our draft genetics document from the Cordova meeting?

FRED Special Report

Alaska Department of Fish & Game

GENETIC POLICY

by

Genetic Policy Review Team

Bob Davis - ADF&G, FRED, Chairman



Alaska Department of Fish & Game
Division of Fisheries Rehabilitation,
Enhancement and Development

Alaska Department of Fish & Game
GENETIC POLICY

by

Genetic Policy Review Team
Bob Davis - ADF&G, FRED, Chairman

Other Team Members:

Brian Allee - PWSAC, Cordova
Don Amend - SSRAA, Ketchikan
Bruce Bachen - NSRAA, Sitka
Bill Davidson - SJC, Sitka
Tony Gharrett - UAJ, Juneau
Scott Marshall - ADF&G, Comm. Fish
Alex Wertheimer - NMFS, Auke Bay Lab

Approved:



Don W. Collinsworth, Commissioner
Alaska Department of Fish and Game

Date: 6.11.85

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INTRODUCTION

Alaska's valuable salmon industry relies on production from wild systems and, increasingly, on fish produced by aquaculture programs. The importance of maintaining healthy wild stocks and implementing successful enhancement activities underlies the need for an effective genetic policy. The genetic guidelines created to steer Alaska's aquaculture efforts were established in the mid-70's and have been reviewed to ensure that they reflect current knowledge, and goals. A revised genetic policy has been established that contains guidelines, supporting information and recommendations.

The genetic policy contains restrictions that will serve to protect the genetic integrity of important wild stocks. Certainly in Alaska where wild stocks are the mainstay of the commercial fishery economy, it is necessary to protect these stocks through careful consideration of the impacts of enhancement activities. Another important aspect of the genetic policy is the orientation towards increasing the productivity of enhancement programs in the state. Adherence to the guidelines will help maintain adequate genetic variability ensuring that the enhanced stock will be able to adapt to changing environmental conditions. The policy also includes considerations for selective breeding for desirable characteristics.

Due to the limited amount of information available on the genetic impacts of salmon enhancement on wild stocks, much of the basis for these guidelines is theoretical or based on work done with other species. Consequently, the most important considerations used in writing the guidelines are presented as a mechanism for illustrating the intent of the policy. An understanding of the rationale behind the policy is imperative to its effective application to individual cases under the very diverse conditions found in Alaska.

The importance of the genetic guidelines will continue to increase as aquaculture activities expand their production. This policy represents a consensus of opinion and should continue to be periodically reviewed to ensure that the guidelines are consistent with current knowledge. By doing so, we will be able to meet the goal of greater fish production through enhancement while maintaining healthy wild stocks.

POLICY STATEMENT

I. Stock Transport

- A. Interstate: Live salmonids, including gametes, will not be imported from sources outside the state. Exceptions may be allowed for trans-boundary rivers.*
- B. Inter-regional: Stocks will not be transported between major geographic areas: Southeast, Kodiak Island, Prince William Sound, Cook Inlet, Bristol Bay, AYK and Interior.*
- C. Regional: Acceptability of transport within regions will be judged on the following criteria.*
 - 1. Phenotypic characteristics of the donor stock must be shown to be appropriate for the proposed fish culture regions and the goals set in the management plan.*
 - 2. No distance is set or specified for transport within a region. It is recognized that transplants occurring over greater distances may result in increased straying and reduce the likelihood of a successful transplant. Although the risk of failure affects the agency transporting the fish, transplants with high probability of failure will be denied. Proposals for long distance transport should be accompanied by adequate justification for using nonlocal stock.*

II. Protection of Wild Stocks

- A. Gene flow from hatchery fish straying and intermingling with wild stocks may have significant detrimental effects on wild stocks. First priority will be given to protection of wild stocks from possible harmful interactions with introduced stocks. Stocks cannot be introduced to sites where the introduced stock may have significant interaction or impact on significant or unique wild stocks.
- B. Significant or unique wild stocks must be identified on a regional and species basis so as to define sensitive and nonsensitive areas for movement of stocks.
- C. Stock Rehabilitation and Enhancement
 - 1. A watershed with a significant wild stock can only be stocked with progeny from the indigenous stocks.
 - 2. Gametes may be removed, placed in a hatchery, and subsequently returned to the donor system at the appropriate life history state (eyed egg, fry or fingerling). However, no more than one generation of separation from the donor system to stocking of the progeny will be allowed.
- D. Drainages should be established as wild stock sanctuaries on a regional and species basis. These sanctuaries will be areas in which no enhancement activity is permitted except gamete removal for broodstock development. Use of such reservoirs for broodstock development should be considered on a case-by-case basis, and sliding egg take removal schedules applied to such systems should be conservative.

- E. Fish releases at sites where no interaction with, or impact on significant or unique wild stocks will occur, and which are not for the purpose of developing, rehabilitation of, or enhancement of a stock (e.g., release for terminal harvest or in landlocked lakes) will not produce a detrimental genetic effect. Such releases need not be restricted by genetic concerns.

III. Maintenance of Genetic Variance

A. Genetic diversity among hatcheries

1. A single donor stock cannot be used to establish or contribute to more than three hatchery stocks.
2. Off-site releases for terminal harvest rather than development or enhancement of a stock need not be restricted by III.A.1, if such release sites are selected so that they do not impact significant wild stocks, wild stock sanctuaries, or other hatchery stocks.

B. Genetic diversity within hatcheries and from donor stocks

1. A minimum effective population (N_e) of 400 should be used for broodstock development and maintained in hatchery stocks. However, small population sizes may be unavoidable with chinook and steelhead.
2. To ensure all segments of the run have the opportunity to spawn, sliding egg take scales for donor stock transplants will not allocate more than 90% of any segment of the run for broodstock.

GUIDELINES AND JUSTIFICATIONS

I. Stock Transport

- A. Interstate: It is generally accepted that population of salmonids which have existed over many generations in a given watershed have evolved traits that make them best adapted for survival in that environment. The greater the distance that a population is transferred from its native environment or the greater the difference in environmental conditions between the donor and transplant stream, the less likely the genetic characteristics of the population will fit the new environment. If the fitness of the population is indeed reduced in the new environment, then the probability of the transplant succeeding would be affected. In addition, interbreeding of a transferred stock with indigenous stocks could transfer gene traits that would reduce the fitness of the native populations. In many states, discrete stocks cannot be identified because excessive movement and interbreeding have already occurred. The State of Alaska, therefore, desires to protect and develop local stocks by restricting the movement of live fish or eggs into the state. There are, however, several trans-boundary rivers penetrating British Columbia, Canada, that flow into the state of Alaska. In some instances, donors from these stocks might fit a well-designed management plan.
- B. Inter-regional: The environment can vary greatly from one region to another in a state as large as Alaska. For similar reasons given in I.A. above, the transfer of fish from one region to another is restricted. Consideration may be given to regional border areas, especially when no suitable donor stock is available within a region.