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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).

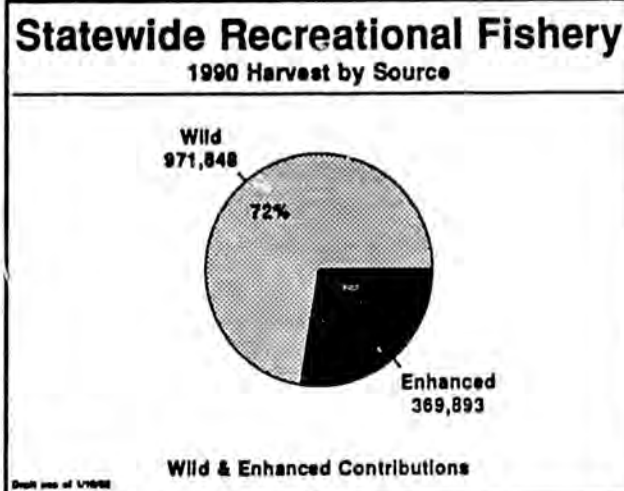


Figure 1

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 enhanc	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.

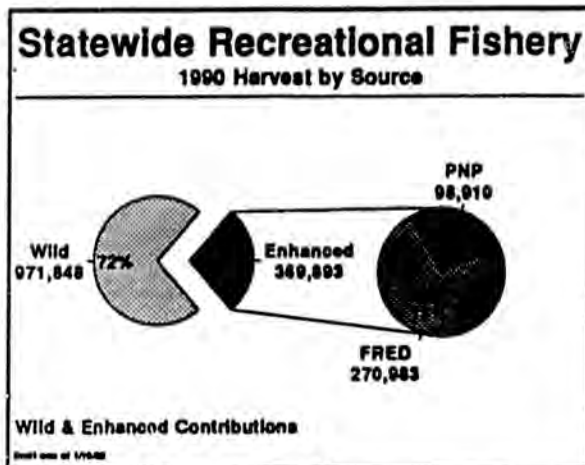


Figure 2

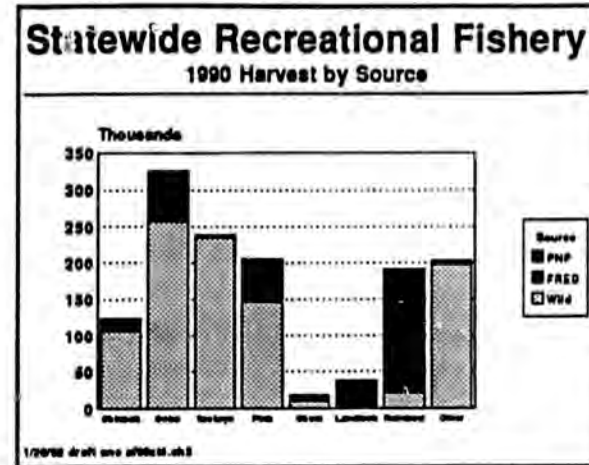


Figure 3

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

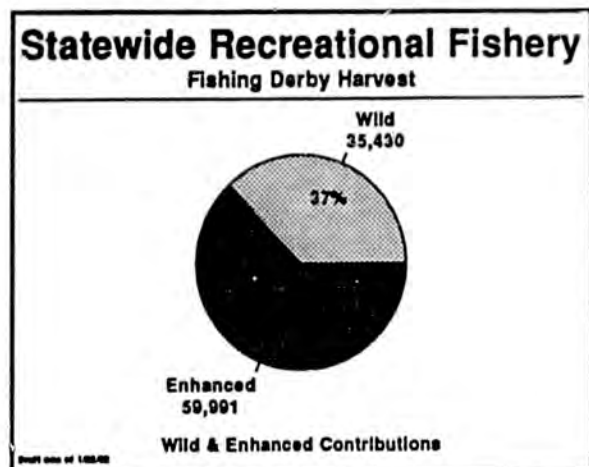


Figure 4

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 No. (1991) ^a	Chinook	Juneau	136	522	26.0%
	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 12/05/91

^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.

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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).

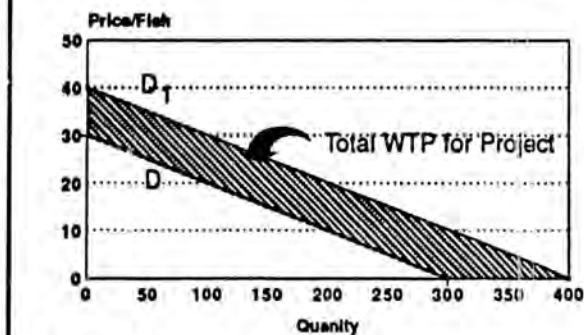
⁴ Also, they are referred to as secondary effects, secondary impacts, and regional economic impacts.

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

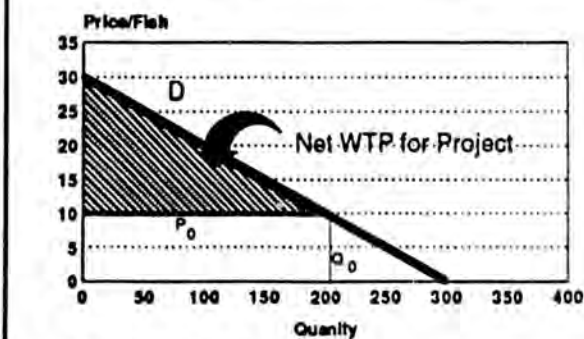
Total Willingness To Pay (WTP) For An Enhancement Project



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Figure 5

Net Willingness To Pay (WTP) For An Enhancement Project



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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.

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

Statewide Recreational Fishery Full Time Jobs From Enhanced Sport Fish

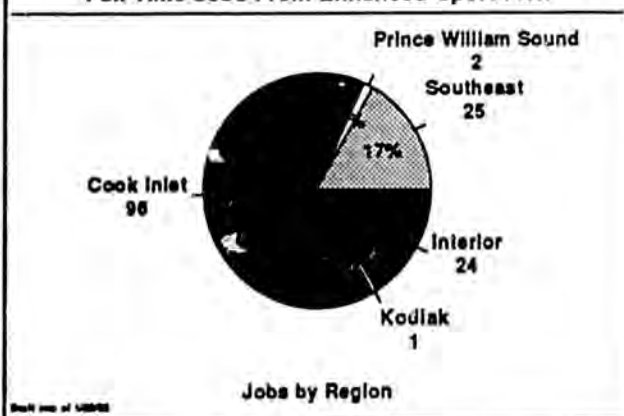


Figure 7

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.

SCOMM

74:45

Alaska State Legislature

Representative Carl E. Moses



CHAIRMAN
HOUSE RULES COMMITTEE

CHAIRMAN
HOUSE SPECIAL FISHERIES COMMITTEE

MEMBER
FINANCE SUBCOMMITTEES
FISH AND GAME
PUBLIC SAFETY

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FOR IMMEDIATE RELEASE

MARCH 3, 1993

HOUSE FISHERIES COMMITTEE TO TAKE UP HATCHERY REVIEW

JUNEAU--Representative Carl Moses, Chair of the House Special Committee on Resources, announced today that his committee will take up the Legislative Review of the Alaska Salmon Enhancement Program that was begun in 1991 under the leadership of Senator Dick Eliason.

That review included a report prepared by Senator Eliason's Special Committee on International and Domestic Commercial Fisheries which was the first comprehensive examination of the entire salmon enhancement program since its inception 20 years ago. The draft report went out for public review in 1992. The Legislature followed up on one of the report's recommendations by incorporating a wild fish stock policy into statute in May, 1992. A final version of the legislative review, incorporating public comments was issued in January of 1993.

The senate's review also included contracting a benefit-cost analysis of the enhancement program from the University of Alaska Fairbanks. That report has also just been released, but has not yet undergone peer review or public comment.

"My intention is to make sure the economic studies in particular get the thorough review they deserve," Representative Moses said. "The Department of Fish and Game is contracting for an independent technical review of the study, and I invite other interested groups to do the same. We need to have all the relevant information before us before making any policy decisions on the enhancement program."

Moses pointed out that since the benefit-cost analysis was developed using innovative computer modelling, it was especially important that the methodology and data used be reviewed by other economists.

"In fact, the researchers themselves admit that there were limitations to the modeling capabilities and the scope of the study, and that certain assumptions had to be made in order to make the project manageable," Moses said. "It may not be possible to judge if the results of this study are statistically significant."

"Additionally, due to funding constraints, the analysis only measured direct benefits of the program to the commercial fishermen themselves. To fully analyze the program, you really need

to examine the indirect impacts and benefits to communities and the other user groups, such as sport and subsistence fishermen."

"The state's salmon enhancement program has worked well for us in the past," Moses said. "We are now producing record numbers of salmon. It should come as no surprise that we need to put more effort into marketing our fish."

Moses said he planned to begin hearings in April on the entire salmon enhancement program. Due to its preliminary nature however, Moses said he would not take public testimony on the economic benefit-cost analysis until the full technical review is completed.

The committee's contact for the review will be Molly McCammon, staff to the House Special Committee on Fisheries. McCammon is staff to the Senate Fisheries Committee for its review and one of the authors of the Senate study. She can be reached at 465-6848.

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STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

DIVISION OF FISHERIES REHABILITATION,
ENHANCEMENT & DEVELOPMENT (FRED)

WALTER J. HICKEL, GOVERNOR

P.O. BOX 25526
JUNEAU, ALASKA 99802-5526
PHONE: (907) 465-4160
FAX: (907) 465-4168

February 4, 1993

Senate Special Committee on
Domestic and International Fisheries
Alaska State Legislature
State Capitol
Juneau, AK 99801-1182

Dear Senators:

Thank you for the opportunity to comment on the 1 February 1993 version of Chapter IX, Economics Section. I have provided specific review comments as you requested. I would like to express my appreciation to Ms. Molly McCammon and Ms. Mary McDowell for including the Alaska Department of Fish and Game (ADF&G) in the review of Chapter IX. They have patiently interacted with us in numerous meetings and phone calls while finalizing the *Legislative Review of the Alaska Salmon Enhancement Program* into a clear preamble to the University of Alaska-Fairbanks (UAF) study on *A Benefit-Cost Analysis of the Alaska Salmon Enhancement Program*. I and my staff have summarized our previous comments on the UAF cost-benefit analysis (CBA) and have included recommendations that I have been asked to provide to the commissioner of ADF&G regarding the studies. In the process of our review, we have revisited the entire model and broader policy concerns related to the review and release of the study. ADF&G reviewers have expressed a growing concern over the release of the studies prior to a proper review of the work products and the completion of critical work products.

Comments on Preface and Text for Chapter IX

The preface and text of Chapter IX have become far more readable since our initial review. We have additional comments on the following areas in the text:

1. Under *Other Significant Findings* in Chapter IX:

- Findings regarding each of the individual models need to be reordered according to which statements pertain to the demand model, the cost model, the population model, and the overall CBA.
- It should be indicated for each of the finding statements for isolated models that we do not at this time know how the findings for the individual models affect the net benefits of the program.

Disclaimer in preface and in Chapter IX:

Please expand the disclaimer in the preface to include ADF&G and the Commercial Fisheries Entry Commission. The revised disclaimer should read: "It should also be clearly understood that the economic benefit-cost analysis is solely the product of the university researchers who were authors of the contracted studies. The committee, ADF&G, and CFEC have not taken a position on any of the study findings." We would also suggest that this disclaimer also appear at the bottom of paragraph 1 on page 2 of Chapter IX.

3. Footnote missing on page 5 in Chapter IX:

Suggested text for the missing footnote is as follows: "The 'planned' production level was by far the largest catch level tested and represented the level of production that operators said they would like to be permitted and funded at."

4. Under *Options for Possible Consideration* in Chapter IX:

At this time, it would probably be best to not include this section in Chapter IX. We would not encourage that many of the program management and financing options be presented until they are thoroughly studied. This section may appear as an agenda that is not adequately related to the technical findings of the studies.

Summary of Comments on the UAF report, *A Benefit-Cost Analysis of the Alaska Salmon Enhancement Program*

1. The decision to deviate from the original RSA requirement for a 10-, 15- and 20-year mean for background wild catches in the nonintensively modeled fisheries has left numerous unanswered questions on how the models would behave under the likely range of future salmon population sizes.
2. The lack of confidence limits in the models, as noted by the authors, makes it difficult to determine if net benefits cited for the scenarios run are significantly different from zero.
3. The lack of thorough and properly bracketed sensitivity testing of important economic and biological variables is a critical step that must precede drawing any conclusions from the CBA.
4. Many of the technical reports that are clearly required as work products in the RSA are not completed at this time, even though the overall CBA report (December 1992) is referred to as a "Final." ADF&G remains very uneasy that we have not been able to carry out a thorough review of these work products.
5. Regrettably, the final CBA report is still poorly written and in need of further editing. We do not believe that even well-seasoned scientists, who are familiar with the statewide

enhancement program, will be able to gain a sufficient understanding of what was carried out in the combined portion of the model without further clear descriptions and appendices.

6. Because the CBA report is so poorly documented, we did not discover, until well into the review process, that there is a major flaw in the Product Surplus Estimate. This problem, identified in our previous comments, has not been corrected. Fishing costs are double-counted and accounted for incorrectly for the cost recovery fish. We believe that private nonprofit (PNP) operators will rightly be concerned that the authors have allowed this significant flaw to stand.
7. The final CBA report lacks output tables or files that summarize the results annually. This makes it extremely difficult to error check the models. These should have been included as appendices in the final report.

For example, John Boyce, the primary author of the UAF CBA report, supplied a set of annual revenue tables for the CBA simulations that were helpful in understanding how the production numbers relate to the time series of projected benefits and costs. We understood that these tables would appear in an appendix to the final CBA report. Since the 17 policy cases have been reestimated, it would be helpful to include this appendix with the new values.

8. There is no reporting of the algorithms used in the overall CBA, which makes it difficult for the reader to determine if the net benefits are computed correctly.
9. The hatchery production input data is not printed in any of the tables with enough detail so that we can determine whether ADF&G and PNP data are correctly aggregated in the CBA models. These annual tables of harvests of enhanced fish and associated costs of production should appear as an appendix to the CBA report.
10. ADF&G was given a relatively short review window for many of the draft technical work products produced for the UAF CBA report and, in particular, we have not had time to sufficiently review the draft population/exploitation model.
11. One additional concern expressed in our most recent review was the real potential for doing serious and irreversible damage to confidence levels of lending institutions, fishermen, and to our very efforts to manage, restore, and maintain state control over Alaska's salmon fisheries. If, upon further study and review, the point forecasts turn out to be unwarranted, the industry may regret that a more patient approach to finalizing, reviewing, and testing these work products did not occur.

Recommendations

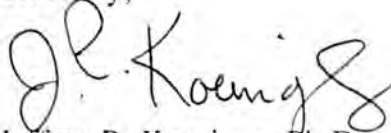
It is with these ongoing concerns still in mind that I make the following recommendations to the commissioner of ADF&G:

February 4, 1993

1. That the CBA report written by UAF and Chapter IX should not be released until all final work products are completed and technically reviewed, even if it requires additional resources. Completion means that the supporting technical reports, relevant software, input and output files, and tables are sufficiently clear so that independent reviewers, ADF&G, and CFEC can completely understand the studies.
2. A well-known fishery economist, with a strong technical background in the new techniques used by UAF, should be selected for an independent review of the studies. It is suggested that this review emphasize the readiness of the models and current analysis to be relied upon for making serious and irreversible policy changes to Alaska's salmon fisheries (see enclosed list of potential candidates).
3. Since the RSA clearly identifies that the study is the property of the Alaska State Legislature, the draft study should be given to legislators with a sincere interest in fishery issues to determine what they want to do with it. We would also suggest a public review of the draft study before releasing it as a final product.

Again, I appreciate the opportunity to comment.

Sincerely,



Jeffery P. Koenings, Ph.D
Director

cc: Carl L. Rosier
Charles P. Meacham
Bob Burkett
Jeff Hartman
Molly McCammon
Mary McDowell

Enclosure

Extended Peer Review for the Technical Studies and Overall Cost-Benefit Analysis

The Alaska Department of Fish and Game (ADF&G) believes that there are compelling reasons for an independent review of the models and work products in the cost-benefit analysis (CBA). The primary reason is that the economists in charge of the review for the models acknowledge that they have not been exposed to some of the very new and highly novel techniques and statistical procedures used in these models. There are only a handful of economists in the country who are well-versed in some of the procedures used. This review should begin only after the work products are finalized to the point that a detailed technical reviewer will have what he/she needs to begin.

Some economists who are qualified to carry out an independent review include:

James Wilen, University of California-Davis
Biing-Hwan Lin, University of Idaho
Ron Mittelhammer, Washington State University
Jim Anderson, University of Rhode Island
Ira Strand, University of Maryland
Gardner Brown, University of Washington
Terrence Smith, ISER, University of Alaska-Anchorage

The primary question that we should ask in this review is whether the models and existing simulations are sufficient to evaluate the economic consequences of major directional changes in Alaska's salmon management and enhancement policies.

there will be no way to stop them from entering in the long run. However, by maintaining some hatchery production, prices may remain depressed enough to prevent expansion in those areas. As long as the price is not driven down to the level that it would reach if those areas do enter the market, the hatchery dollars spent on prevention of entry may be well spent. However, this is not a strategy which can remain viable over the long run.

Another area that appears to be fruitful for future exploration is the allocation among gear groups. In the cost study we observed that the different gear groups have vastly different levels of producer's surplus. The gear group that does the best is the set net fleets. This is mainly because these fleets have such low capital costs. The bottom line is it is more efficient to let the fish come to the fisherman than to have the fisherman go to the fish.

Finally, let us emphasize that our estimates of net benefit are based on parameters estimated from relatively short time periods and were extrapolated well beyond the time horizon for which accurate estimates may be obtained. There are also a number of exogenous factors, such as what is happening in the rest of the salmon suppliers' markets, that have changed far too rapidly over the last decade to allow precise estimates of where the industry will be in one, two or three decades. In spite of this, given our predictions of trends in the rest of the markets, the economic indications are that the enhancement program, and especially the pink salmon program, should be scaled back. Our estimates suggest that to do so could result in an increase of net benefits to the state on the order of almost a four-hundred million dollars over thirty years relative to current and planned production levels.

To Molly
Fr McWhorter

MAX H
474-5064
474-5018

VFA Thurs
5:30-7:30
35

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

DIVISION OF FISHERIES REHABILITATION,
ENHANCEMENT & DEVELOPMENT (FRED)

WALTER J. HICKEL, GOVERNOR

FEB 16 1993

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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.

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.

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

DIVISION OF FISHERIES REHABILITATION,
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February 11, 1993

James Wilen, Ph.D.
Professor
Department of Agricultural Economics
University of California-Davis
116 Voorhies Hall
Davis, CA 95616

Re: Technical Review of Cost-Benefit Analysis

Dear Dr. Wilen:

The Alaska Department of Fish and Game (ADF&G) has received permission from the Alaska State Legislature to send you work products from a recent cost-benefit analysis of the statewide enhancement program. We are interested in a comprehensive review of the economic techniques and validity of the case studies used in this endeavor for application to potentially large policy changes in the management of the Alaska salmon industry.

These studies have been the source of some controversy during the technical review process. The issues involve (1) the level of completeness of the work products in the Reimbursable Services Agreement, (2) the uncertainty surrounding the validity of the estimations and point estimates generated in the simulations, and (3) the potential for irreversible policy actions that might be taken by state government and private parties if point estimates turn out to be wrong. The first two issues are exacerbated by a lack of exposure of the technical review team which consisted of Ms. Ginny Fay, Mr. Jeff Hartman, Mr. Ben Muse, Dr. Kurt Schelle, and me to some of the new statistical procedures used when estimating the demand model.

For these reasons, the legislature has requested that the Commercial Fisheries Entry Commission (CFEC) select an independent contractor to carry out a technical review of the studies. Jeff Hartman believes that you are the best candidate for the technical review. Since the professional services contract would be through CFEC, they would, of course, have final authority over who was chosen and how the questions would be framed.

To help us decide how to proceed, it would be helpful if you could answer the following questions about the technical review. Because many of these studies are in draft form, I would, however, like to request that they not be distributed. The questions I pose to you follow:

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 have enclosed the following manuscripts and preliminary work products for your review.

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.
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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.

If you are selected to carry out the technical review, I would obtain the final versions of the work products from the researchers prior to initiating the review. This would probably not be

February 11, 1993

before March. Also, there are a number of comments and some reply memos that have previously been developed on the manuscripts which we would sort through and provide you with.

If you have any further questions about the study, please contact Jeff Hartman at 465-6155. Thank you for your assistance.

Sincerely,

Jeff Hartman for
Jeffery P. Koenings

Jeffery P. Koenings, Ph.D.
Director

Enclosures

cc: Geron Bruce
Bob Burkett
Johnny Holland
Molly McCammon

DRAFT

FOR IMMEDIATE RELEASE

Contact Douglas Schneider, science writer, (907) 474-7449, Mark Herrmann, resource economist, (907) 474-7116, or John Boyce, resource economist, (907) 474-5199.

UAF study says hatcheries a bad state investment

FAIRBANKS, Alaska—A worldwide glut of salmon and low fish prices have made investing in hatcheries, especially pink salmon hatcheries, a money-loser for the state, according to economists at the University of Alaska Fairbanks.

In a cost-benefit study of the state's Salmon Enhancement Program, UAF economists compared state funding of hatcheries with revenues of fishermen who harvest hatchery-reared salmon. The study found that, given present market trends and salmon production levels, Alaska will spend far more on salmon hatcheries than fishermen will make in profits during the next 30 years.

"It basically says that hatcheries may no longer be a wise investment of state money," said Mark Herrmann, a resource economist at the UAF School of Management Fisheries Economics Center, and an author of the study. "The state is pumping millions more into the enhancement program than fishermen make in net profits from those fish."

According to the UAF study, hatcheries might generate just \$147 million in net revenues to fishermen over the next 30 years, while state spending on enhancement programs is expected to cost from \$300 to \$500 million.

Pink salmon hatcheries may be the state's biggest money-loser, the study found. If pink salmon production were to stop immediately, fishermen actually would make more money, as much as \$147 million more during the next 30 years. And if the entire state-run and private non-profit hatchery programs were eliminated, fishermen might earn \$292 million more over the next 30 years.

"Right now there's just too much salmon, especially pink salmon, on the market," said Herrmann. "The surplus has brought the prices way down. If that extra production were eliminated, prices would go back up and fishermen may earn more."

Not surprisingly, private non-profit aquaculture corporations, funded in part by grants and loans from the state, disagree with the study's findings. While there may be too much salmon around, they say closing hatcheries isn't the answer.

"There's a lot this study didn't consider," said Heather McCarty, a spokesperson for the Prince William Sound Aquaculture Corporation, the state's largest producer of hatchery salmon.

McCarty said the study did not consider a domestic marketing program or the new products being made from salmon. Nor did the study foresee Tyson Foods' entry into the seafood industry. Tyson, a major chicken producer, recently announced plans to aggressively market Alaska salmon in it's U.S. markets.

quote (waiting to talk with Heather again.)

Fisherman-supported aquaculture corporations operate 25 hatcheries in Alaska, and produce one-quarter of the fish harvested in the state's commercial fisheries. Since the salmon enhancement program began in 1972, Alaska has provided \$71 million in loans and \$12 million in outright grants to private non-profit hatcheries. The loans remain largely unpaid in part because of a six year grace-period extended to help hatcheries become self-sufficient. The state also has spent more than \$210 million to operate its 12 hatcheries during the last 20 years.

In recent years, huge worldwide salmon surpluses and fierce competition from foreign salmon farmers have eroded Alaska markets and sent prices paid to fishermen into a tailspin, the study said. Also mentioned were inroads being made into Alaska markets by Russian salmon.

Also not mentioned were hatchery's indirect benefits, such as providing processing employment and money brought into the state through support services. Rick Lauber, the Alaska manager of the Pacific Seafood Processors Association, said closing down hatcheries probably won't have much effect on processing employment because wild stocks have rebounded from record low levels seen in the 1970s.

"There is a role for hatcheries," said Lauber. "When Alaska got into the hatchery business, wild stocks were on the downside, and hatcheries filled the void. Now the natural runs are back, except for places like Prince

William Sound, and we have huge runs of both wild and hatchery salmon. All those salmon have really loaded the system and drove prices down."

The study, begun in 1991 at the request of the state's now-defunct Senate Special Committee on Domestic and International Commercial Fisheries, was turned over to the House Special Committee on Fisheries last month.

Among the findings of the UAF study:

- Current pink salmon production levels may be too high. Production of sockeye salmon also has approached a level where statewide revenue gains from increased production will be small.
- Changes in enhanced production in one region of the state may have significant positive and negative impacts on the revenues of other salmon-producing regions of the state through their effects on market prices.
- Small changes in supplies of wild or farmed salmon have more of a price-depressing effect on Alaska fisheries.
- Seafood buyers and consumers believe farmed salmon is a close substitute for the higher-valued Alaska salmon species.
- Increasing production to levels currently planned by the enhancement facilities appears to result in net losses statewide because of losses in Western Alaska, Kodiak, and Southeast Alaska.



Alaska Sea Grant
College Program

news release

UNIVERSITY OF ALASKA FAIRBANKS

School of Fisheries and
Ocean Sciences

Fairbanks, AK 99775-5040

Phone: (907) 474-7086

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*Darlene Komisar
Pres. Komisar*

*Louis Proenza
dir of research -*

FOR IMMEDIATE RELEASE

474-7311

Ron Dearborn -
2/19/93

Alaska Sea Grant News Release 0104

Contact Mark Herrmann, resource economist, (907) 474-7116; John Boyce, resource economist, (907) 474-5199; Joshua Greenburg, resource economist, (907) 474-7189; or Douglas Schneider, science writer, (907) 474-7449.

no recommendations.

UAF study recommends state curb hatchery funding

FAIRBANKS, Alaska—A worldwide excess of salmon and low fish prices have prompted University of Alaska Fairbanks economists to recommend the state scale back funding to pink salmon hatcheries.

consider scaling

In a cost-benefit study done as part of a wide-reaching legislative review of the state's salmon enhancement program, UAF economists compared state funding of state-run and private non-profit salmon hatcheries with revenues of fishermen. The study recommends the state scale back funding to Alaska pink salmon hatcheries, a move that might reduce world salmon supplies and push up prices paid to fishermen during the next 30 years.

being we hired a study.

all funding, not just state

Curbing state hatchery funding also would free-up state money that could be spent elsewhere, or applied to any future state budget shortfall, the study's authors said.

"It basically says that some hatcheries may no longer be a wise investment of state money," said Mark Herrmann, a resource economist at the UAF School of Management Fisheries Economics Center, and an author of the study. "The state is pumping millions more into the enhancement program than fishermen make in net profits from those fish."

- MORE -

*Al Tyler
Assoc dir of School of Fisheries*

*implied
state funding?*

Fisherman-supported aquaculture corporations operate 25 hatcheries in Alaska, and produce nearly one-quarter of the fish harvested in the state's commercial fisheries. Since the salmon enhancement program began in 1972, Alaska has provided \$71 million in loans and \$12 million in grants to private non-profit hatcheries. The loans remain largely unpaid in part because of a six-year grace period extended to help hatcheries become self-sufficient. The state also has spent more than \$210 million to operate its own 12 hatcheries during the last two decades.

But in recent years, Alaska hatcheries have produced record returns of salmon, especially pink salmon. The production has contributed to huge worldwide salmon surpluses, at a time when fierce competition from foreign salmon farmers have eroded Alaska markets and sent prices paid to fishermen into a tailspin. Increased salmon production expected from Russia may have additional negative effects on the value of Alaska salmon exports, Herrmann said.

"Right now there's just too much salmon, especially pink salmon, on the market," said Herrmann. "The surplus has brought the prices way down."

According to Herrmann, eliminating state funding of pink salmon hatcheries would save the state money while helping to shore-up salmon prices. About \$147 million would be saved over the next 30 years, according to the study. The savings would come in the form of reduced hatchery operating costs and increased net revenues to fishermen. The numbers used in the study reflect the present value of future earnings.

"If that extra production were eliminated, we believe prices would start to go back up and fishermen would earn more," said Herrmann. "Of course, if Alaska really wants to increase revenues, it should combine these cuts with an aggressive marketing strategy."

But the study also found important regional differences in how fishermen would be affected by state cuts to enhancement programs. If pink salmon production were eliminated throughout the state, Prince William Sound fishermen, who depend on hatchery salmon for much of their catch, would lose \$114 million in net revenues over the next 30 years. By contrast, eliminating hatchery pink production in Alaska would benefit fishermen in Southeast, where stocks are mostly wild. Southeast fishermen would earn \$122 million in additional net revenues under this scenario.

While the economists stand by their conclusion that overall hatchery funding should be scaled back, they caution that the study is based on complex economic models that may not hold true in ever-changing world salmon markets. Molly McCammon, staff assistant to the House Special Fisheries Committee, agrees.

"The findings are just not that absolute," McCammon said. "The numbers are based on some cutting edge computer models and a lot of assumptions that may not turn out to be the case."

Not surprisingly, private non-profit aquaculture corporations, funded in part by grants and loans from the state, disagree with the study's findings. While there may be too much salmon around, they say reducing state funding to hatcheries isn't the answer.

"There's a lot this study didn't consider," said Heather McCarty, a spokesperson for the Prince William Sound Aquaculture Corporation, the state's largest producer of hatchery salmon.

McCarty said the study did not examine the effect a planned domestic marketing program would have on prices, or the effect new salmon products would have on markets. Nor did the study foresee Tyson Foods' entry into the seafood industry. Tyson, a major chicken producer, recently announced plans to aggressively market Alaska salmon in the United States.

The study also did not consider hatcheries' indirect benefits, such as providing processing employment and support services. Rick Lauber, the Alaska manager of the Pacific Seafood Processors Association, said scaling back hatcheries probably won't have much effect on processing employment because wild stocks have rebounded from record low levels seen in the 1970s.

"There is a role for hatcheries," said Lauber. "When Alaska got into the hatchery business, wild stocks were on the downside, and hatcheries filled the void. Now the natural runs are back, except for places like Prince William Sound, and we have huge runs of both wild and hatchery salmon. All those salmon have really loaded the system and drove prices down."

The study, begun in 1991 at the request of the Alaska Senate Special Committee on Domestic and International Commercial Fisheries, was turned over to the House Special Committee on Fisheries last month. Rep. Carl Moses, AI, Unalaska, chairs the committee.

UAF economists could not reach firm conclusions on the future profitability of hatcheries that raise chum, sockeye, king, and coho salmon.

Among the conclusions of the UAF study:

- If a region wants to continue with a hatchery program, the most cost effective and marketable production level and composition would result if the program were entirely funded by the local user groups rather than subsidized by the state.
- Current pink salmon production levels may be too high. The findings suggest that production of sockeye salmon also has approached a level where statewide revenue gains from increased production will be small.
- Changes in enhanced production in one region of the state may have significant positive and negative impacts on the revenues of other salmon producing regions of the state through their effects on market prices.
- Small changes in supplies of wild or farmed salmon have more of a price-depressing effect on Alaska fisheries than previously reported in other research on salmon demand.
- Farmed salmon is a close market substitute for the higher-valued Alaska salmon species.
- Increasing production to levels currently planned by the enhancement facilities appears to result in net losses statewide because of losses in Western Alaska, Kodiak, and Southeast Alaska.

Fax Sheet

From:

Name:

Phone Extension:

ALASKA SEA GRANT COLLEGE PROGRAM

304 Eielson Building

University of Alaska Fairbanks

Fairbanks, AK 99775-5040

PHONE: 907-474-7086

FAX: 907-474-6285

Name:

Dept/Company:

Fax #:

Number of pages
including this cover sheet:

5



MESSAGE:



2-19-93

1pm

Here's the final story. It goes
to the media at 3pm. Please call me before
then if you have major concerns, otherwise
I'll assume it's okay. Thanks for your help.

Regards,

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 McCammonDate: 2-24From: Jeff HartmanNo. Pages 5
(following this page)

Message:

Molly: Update on technical review from Nihon.
Also, did you send work product request to researchers
If not, and you still intend to, dates should be advanced as
I have with the Commission on the Fish.

UNIVERSITY OF CALIFORNIA, DAVIS

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SANTA BARBARA • SANTA CRUZ

Address reply to:
DEPARTMENT OF AGRICULTURAL ECONOMICS
DAVIS, CALIFORNIA 95616-8512
Administrative Office - (916) 752-1514
FAX - (916) 752-2014

COLLEGE OF AGRICULTURAL AND
ENVIRONMENTAL SCIENCES
AGRICULTURAL EXPERIMENTAL STATION

February 23, 1993

Jeff Hartman
FRED Division
Dept. of Fish and Game
State of Alaska
Juneau, Alaska

Dear Jeff:

I have had a chance to briefly review the materials you sent me relating to the University of Alaska Fairbanks cost benefit analysis of the Salmon Enhancement Program. My quick review suggests several components of the study which appear to contain either questionable assumptions or methods whose confidence needs further examination. It is my opinion that the implications of some of the conclusions are too far reaching to motivate major policy changes without a serious independent review of the whole study. If you would like to discuss this further please feel free to phone me at (916) 752-6093.

James E. Wilen

Dept. of Agricultural Economics
University of California, Davis
Davis, California 95616

Wilen seemed to think that he could carry out a review between April 1 + 31st. Actual review would take about 5 working days. No overhead charges would be made. Review start + end dates depend on when technical Reports are provided in Final form by contractors + other materials.

Letter
ALASKA STATE LEGISLATURE
Representative Carl Moses

to: John R. Boyce, Ph. D. and
Mark Herrmann, Ph. D.

Center for Fisheries Economics
Department of Economics
University of Alaska, Fairbanks
Fairbanks, AK 99775

from: Ms. Molly McCammon
Special Assistant
Representative Carl Moses
Alaska State Legislature
State Capitol, Room 204
Juneau, AK 99801

I will be acting as the contact for the Legislature to receive the final work products covered under the Reimbursable Services Agreement on A Benefit-Cost Analysis of the Alaska Salmon Enhancement Program. While the Final Report for the overall benefit-cost study has been distributed, the RSA calls for some additional work products that have not been received in final form by our office. The purpose of this transmittal is to describe the missing work products and due dates as I understand them, discuss and reach agreement with you on a description, and a final due date for each one. Some of the work products which are inappropriate to keep in the Legislative archives may be housed with the Commercial Fishery Entry Commission.

The following list describes the work products and due dates for various input and output data files, computer code, documentation and technical reports that we have not received. The list is as complete as possible, but there may be some additional information requests that I cannot anticipate at this time. The summary tables and technical reports should be mailed and not sent by fax.

Summary of work products requested by the Alaska State Legislature.

1. Overall CBA Model: While the RSA calls for the overall CBA software in SAS, ADF&G has received the copy in GAUSS and will be reviewing it over the next 2 weeks to determine if it is sufficient in lieu of the more familiar software. I understand that you encountered some difficulty in reprogramming the GAUSS code into SAS. By the ~~end of February~~ *2nd week in March* they will inform us if it is useable. In the interim we request that you assist ADF&G with answering any questions about the GAUSS version of the model.

2. Overall CBA Model: I understand that there are comment statements and some operating instructions in the recent CBA simulation model that you sent to Mr. Hartman. If ADF&G can operate the model, and edit the files without a hands on tutorial then the existing software and

documentation will be sufficient. If they cannot unravel the documentation sufficiently we request a (1/2 or 1 day) hands on tutorial for the overall CBA simulation model at Juneau or Fairbanks. ADF&G would consider to paying travel costs for a tutorial and I would not ask that any travel costs be born by the researchers. If for some reason, the GAUSS version turns out to be totally unworkable, I will reserve the right to ask for a SAS version at some reasonable date set ~~after the end of February 1993.~~ *early in March 1993.*

3. Overall CBA Model: Input files and tables for the CBA simulations in the 17 cases.

-Include a hardcopy of annual tables for hatchery production (harvest) in numbers of fish and pounds by species and region used in the simulations. We do not want just the aggregated wild and enhanced catch. The only production input data I have seen so far are a fax of aggregate production numbers in the output tables for the Thirty year Present Values by Region, by Cases sent to Ginny Fay on November 2, 1992.

-Hardcopy of all other annual input variables such as production costs for state and pnp hatcheries for each year not listed in the CBA report.

4. Overall CBA Model: Output files for the CBA simulations in the 17 cases.

-Include a readable hardcopy of the final version of the Thirty year Present Values by Region, by Case sent to Ginny Fay on November 2, 1992. This set of tables summarized gross benefits, gross costs, and net benefits. I believe that the earlier version was supplanted by a later simulation. If this is not the case, I still need a clean version to be mailed.

5. Demand Model: Detailed technical report for the demand model. Mark Herrmann stated in his memo of December 16, 1992 to Ginny Fay that the technical report for the demand model would be completed by Mid February. I will assume that it can be sent by February ~~15~~²⁸, 1993, but the Legislatures primary interest is in receiving a completed and clear technical report, within the next month. Please let me know if the completion date of February ~~15~~²⁸, 1993 is workable.

5. Fishing Cost Model: Detailed final technical report for the model. It is my understanding that the author was going to make further editorial changes in this report and provide us with a final also by mid February. Please let me know if the completion date of February ~~15~~²⁸, 1993 is workable.

6. Demand Model: We would like to have a hardcopy of the file that you used to convert numbers of wild and enhanced fish in non-intensely modeled sites to pounds. We want to see the mean weights used for these and know where they came from.

7. Demand Model: A cleaner copy of the response memo from Mark Herrmann to Ginny Fay of December 6, 1992. The fax that I have is not readable.

8. Demand Model: The Legislature should have access to the GAUSS code and SAS log file for the estimation procedures used in the demand model. I may not ultimately need to ask you for the estimation code if the Final Technical Report provides sufficient information on the estimation

procedures. Any estimation code for models and functional forms that Mark tested, and did not work, would not be requested. At this time, I want to reserve our rights to the final model estimation procedures only if needed. I am happy to discuss this further.

9. Demand Model: Mark Herrmann's memo of December 6, 1992 states that he will be working on a final simulation model over the next 6 months. I assume that it would be completed in May 1993. The memo also says that he plans to provide us with a more user friendly version of the simulation model at that time. Since the existing software that you sent to Jeff Hartman does not have sufficient comment statements or documentation for ADF&G SAS users to easily duplicate, I would like to accept your offer for the more thoroughly documented version that you indicate will be available in May. Would this be available by May 31, 1993?

10. Demand Model: ADF&G will be reviewing the SAS code for the simulation models and trying to get them to run in the first 2 weeks of March. We request that you assist them by answering any questions that are generated during that review. Prior to the review ADF&G would like to obtain a copy of the SAS log print out from one simulation of the model.

11. Demand Model: If you are going to be rewriting the simulation software to be more user friendly anyway, it would help if there were clearer comment statements in the SAS code for the simulation model. The comments are mostly difficult to read handwritten notes.

12. Demand Model: Please give a rough estimate of the amount of time required to run 1 case with the demand model simulation software, and note the speed of the computer that you are using.

13. Please supply the remaining files for data required to run remaining 11 simulations. The Base case was previously sent. It would be helpful to receive this by mid March.

14. Demand Model: In lieu of a detailed users instructions for the SAS simulation model, we request a 1 day hands on tutorial for the Demand model in Fairbanks or Juneau. ADF&G would like to arrange for this following the completion of the more user friendly version in May (the completion date that Mark Herrmann noted in His December 6, 1992 memo).

15. Fishing Cost Model: Please send an electronic file of the GAUSS code used to edit the fish ticket file into daily observations for the final regressions used in the fishing cost study. This does not need to have comment statements. This should be sent by March 31, 1993.

16. Fishing Cost Model: Electronic copies of aggregated and final datasets for the cost model need to be sent to CFEC. ADF&G has expressed interest in paying for reasonable file transfer, storage and shipping costs for this data. Please contact me for an estimate.

Finally, my intent here is to make sure that all of the requirements of the RSA funded by the Alaska State Legislature are completed. Our requests for the final work products should, however be reasonable for the researchers to respond to. I need to be contacted by February 23, 1993 to discuss any questions you may have about the final the work products or associated due dates.

March 1,

cc:

Dianne Bischak
Joshua Greenberg
Keith Criddle
Jeff Koenings
Kurt Schelle

Alaska State Legislature

Representative Carl E. Moses



CHAIRMAN
HOUSE RULES COMMITTEE

CHAIRMAN
HOUSE SPECIAL FISHERIES COMMITTEE

MEMBER
FINANCE SUBCOMMITTEES
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UNALASKA, ALASKA 99685
PHONE: (907) 581-1234
FAX: (907) 581-2875

February 25, 1993

John R. Boyce, Ph.D.
Mark Herrmann, Ph.D.
Center for Fisheries Economics
Department of Economics
University of Alaska Fairbanks
Fairbanks, AK 99775

Dear Drs. Boyce and Herrmann:

I would first of all like to thank you both for your efforts in assisting the Legislature with its review of the state's salmon enhancement program. Those of us directly involved in the project, realize --and appreciate-- how much work it has entailed.

I will be acting as the contact for the Legislature to receive the final work products covered under the Reimbursable Services Agreement on A Benefit-Cost Analysis of the Alaska Salmon Enhancement Program. While the Final Report for the overall benefit-cost study has been distributed, the RSA calls for some additional work products that have not been received in final form by the Legislature. Without them, our accounting division will not authorize final payment. The purpose of this transmittal is to describe the missing work products and due dates as I understand them, and discuss and reach agreement with you on a description and final due date for each one. Some of the work products which are inappropriate to keep in the Legislative archives may be housed with the Commercial Fisheries Entry Commission.

The following list describes the work products and due dates for various input and output data files, computer code, documentation and technical reports that we have not received. The list is as complete as possible, but there may be some additional information requests that we cannot anticipate at this time. The summary tables and technical reports should be mailed and not sent by fax.

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information on the estimation procedures. Any estimation code for models and functional forms that Mark tested, and did not work, would not be requested. At this time, we want to reserve our rights to the final model estimation procedures only if needed. I would be happy to discuss this further.

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Finally, my intent here is to make sure that all of the requirements of the RSA funded by the Alaska State Legislature are completed. Our requests for the final work products should, however, be reasonable for the researchers to respond to. I need to be contacted at 465-6848 by March 1, 1993 to discuss any questions you may have about the final work products or associated due dates.

week of March, they will inform us if it is usable. In the interim, we request that you assist ADF&G with answering any questions about the GAUSS version of the model.

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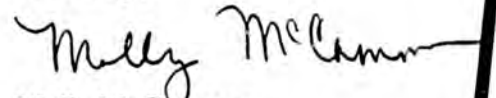
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The House Special Committee on Fisheries, chaired by Representative Carl Moses, is to hold hearings on your report in early April. However, we would also like to see technical and peer reviews completed before that time, and these will probably depend on how soon we can get all of the above products. I would appreciate your assistance with this. Please let me know as soon as possible if you foresee any problems with this. Again, thank you for all your efforts in this project.

Sincerely,


Molly McCammon

cc: Dianne Bischak
Joshua Greenberg
Keith Criddle
Jeff Koenings
Kurt Schelle

Alaska State Legislature

Representative Carl E. Moses



CHAIRMAN
HOUSE RULES COMMITTEE

CHAIRMAN
HOUSE SPECIAL FISHERIES COMMITTEE

MEMBER
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FAX: (907) 465-3445

INTERIM:
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UNALASKA, ALASKA 99685
PHONE: (907) 581-1234
FAX: (907) 581-2875

MEMORANDUM

TO: Mark Herrmann

FROM: Molly McCammon *Molly*

DATE: March 2, 1993

RE: Enhancement review study

Thank you for responding to my letter so promptly. I will get back to you as soon as I can regarding the questions you have on several of the requests. In the meantime, I wanted to assure you that you are not **required** to re-write any reports following peer review. In fact, we would have liked to have sent the report out for technical review before it was released except for 1) an earlier draft had been given to a reporter who indicated he was intending to do a story on it. We didn't want to see a press story on something that wasn't a final copy of the report. and 2) we had an increasingly awkward situation with the old legislature - and legislative committee - having been disbanded, and Senator Eliason having retired.

I have been told that to do an adequate technical review, we need work products #3 - 8. I'll look into your questions regarding 5, 7 and 8 and get back to you as soon as possible.

Thanks for your help, Mark.



UNIVERSITY OF ALASKA FAIRBANKS

School of Management
Fairbanks, Alaska 99775-1070

March 2, 1993

Molly McCammon
Alaska State Legislature
Capitol Building, Room 204
Juneau, Alaska 99801-1182

Dear Molly McCammon

Thank you for the memo of February 25, 1993. First, I would like to state that this memo is for the purpose of exchanging information between us and that it is in no way contractual in nature. I appreciate the amount of work that you are putting into this project and any antagonistic tone this memo may take is not directed at you. First, I did not receive your memo until March 2, 1993. I was out of town the prior week delivering a paper at the Western Regional Science Association Conference. I will produce documentation of the meeting if needed. Therefore, I could not respond to you by yesterday, your due date for verbal comment. In fact, if it was not for the urgency of the response I would not be writing this letter since all of my salmon work is at my house where I did the modeling.

I cannot tell you how much time this project has taken. I believe we more than fulfilled the spirit of the contract. If it had not been for additional Sea Grant funding the project would not have been possible. As it was the out of pocket expenses for me, personally, far exceeded the amount of salary I took. Nonetheless, since the letter of the RSA seems to be binding here I will try to fulfill it the best I can. Because I do not have the RSA in front of me I will not be able to, at this time, comment explicitly on any of the points you made in your requests, and because of the line, "the RSA calls for some additional work products that have not been received in final form by the Legislature. Without them, our accounting division will not authorize final payment.", I will make some general comments.

Boyce has decided to take comments 1, 2, 3, 4, 5, 6, 16, and 17. I have decided to take the remainder. When I say I below it means Greenberg and myself. However, I absolve Greenberg from any further responsibility in this matter.

Specific Comments

5) I sent a copy to Ginny Fay before the mid-February deadline. I was promised comments by Kurt Schelle and Jeff Hartman well in advanced of this due date. I talked to Kurt on the phone and his comments were minimal. Jeff Hartman did not send me his comments until March 1 1993. He specifically told me, well in advance of the due date for the complete report, that he, would get them to me. He did not make the due date. He also had promised me earlier an article on forecasts of aquacultured salmon numbers. I was going to update the model with them. I asked him three times for these. He never sent them. Given that one of the criticism of this study was that it was not peer-reviewed I find it very disturbing that the FRED division would not follow up on their promise for an initial peer review after it was offered. It would have been helpful to have their review before our report went out, as promised. I am not now willing to incorporate FRED's criticisms and redo the report. I have delivered the final report, despite the

lack of cooperation by FRED, and now consider it finished. I would like to add that Ginny Fay was a real pleasure to work with throughout the process and always kept her part of the contract. She acted with extreme competence and professionalism. The same goes for the State Legislature.

7. I am unclear what you want. Do you want to see a stream of numbers? What do you mean by mean weights? The Alaska numbers come from the State's hatchery survey and the wild ones from CFEC.

8. First, I do not know if I have a copy of this. I thought this memo was just going to be used to make our subsequent phone conference easier. I did not know that it was to become part of the required product.

9. We will need to discuss this further. I will be happy to send the code but I do not have the time to document it now unless it is required in the RSA. This package was mainly written by Mittelhammer, with input from myself. As far as I am concerned he has complete property rights to it, just as SAS has property rights to their package.

10 - 12. I need to find a copy of the memo to see if I really made a binding offer. The biggest problem here is that my SAS account ran out. Actually, I was borrowing SAS from another agency to finish a project I was doing for them. I do not currently have enough money to purchase PC SAS myself. Therefore, although I could write in code by memory I cannot produce a log file. I have not had time to make the model more user friendly. Instead, I am in the middle of completely overhauling the model to include all the individual regions in Alaska and will continue to do so when I am able to purchase SAS. This bypasses the necessity in the earlier version to have a "rest-of-Alaska" region. I will reread the RSA and fulfill the letter of the contract as far as the documentation goes. I will try my best to answer your questions but you should realize that I am currently teaching 9 units (5 days a week) and other phases of my University work have suffered because of the intense nature of this project.

13. This depends, it probably takes about 10 minutes for one simulation to run on a 486 33mhz 16 ram computer but probably an hour to get the data into shape to run on Boyce's B/C program. I could fix this to make it faster and easier to get the data but cannot do so in a timely fashion (this is not an offer at this point).

14. I will although, again, without SAS verification, I cannot guarantee that they are absolutely the correct files. It will, however, be easy for you to verify.

15. Again, I did not know that this memo was binding. I will need to get a ruling on this.

Again, I apologize for not being able to more fully answer your concerns. If I have erred in any statement because I did not clearly remember the RSA then I apologize. I wanted to answer you quickly since I am past the deadline. This weekend I will gather up the RSA and any paper work that I can find on this project to try to ascertain the requirements. I am committed to fulfilling the RSA but at this time I am not committed to going beyond the letter of the contract. I am concerned that you expect reports to be written after you receive peer review. I do not believe that this is part of the contract. (If I am required to rewrite after peer review is in then I will need to mention that I believe I was too generous with the pink scenario because the Russian factor was not taken into account. This would not seriously affect the other species.) I am also concerned of any continued FRED participation in this project. I have just heard that they widely distributed a long list of criticisms of the project. If this is the case then they have clearly displayed a bias about the project. I would find it extremely difficult to work with them and to remain unbiased about the results, as we have throughout the study.

What I suggest is that after I read the RSA that we write up a new contract for the remaining portion of the work that you feel has not been done. I request that Ginny Fay is present throughout the negotiations. (If necessary, I can solicit the university lawyer to make matters go more smoothly, although I would rather forego the hassle) In this way we will both be protected. Let me know what you think.

Again, I really appreciate the work that you are doing. Good Luck.

Sincerely,


Mark Herrmann

cc. John Lehman
Dean, School of Management

Carol Lewis,
Chair, Natural Resource Department

Bob Logan
Chair, Department of Economics

Dianne Bischak
Joshua Greenberg
Keith Criddle
John Boyce

**UNIVERSITY OF ALASKA FAIRBANKS****School of Management**
Fairbanks, Alaska 99775-1070

March 3, 1993

Molly McCammon
Alaska State Legislature
Capitol Building, Room 204
Juneau, Alaska 99801-1182

Dear Molly McCammon

Thank you for the response memo of March 2, 1993. I would like to request a favor. I cannot find the original RSA for the demand portion of the study. I would appreciate it if you could fax it to me then send me a clean copy. I have found the proposal that I wrote which was accepted by the state. I am told by University officials that this is the contract that is binding since it was accepted by the state. However, I was also told that I would need a legal ruling on it. I have not yet done so and will not be able to do so until I see the RSA. I will comment on what I believe are the unleft tasks in my (and Greenberg's) accepted proposal after I see the RSA. I also believe that I am under no obligation to answer to FRED or deal with them under any situation. I believe that the contract is with the State Legislature and you are now in charge. Am I correct? Again, I cannot do unbiased work with an agency that is so extremely biased that the only answer they will find acceptable is the one they desire.

I am faxing a copy of the cover letter I sent to Ginny Fay which accompanied the final report.

Also, I am perfectly happy to help you on with our project (areas not covered under our contract and within reason) after the contract has been fulfilled under my role as a public servant and because I enjoy and take pride in the work. I have always done this and never had a problem with any project that I have been involved with. I am always willing to answer questions or testify. However, until this contract is fulfilled I am not comfortable with doing anything on this project that is not explicitly covered under the terms of the contract. You will understand that the withholding of payment has put me in a very awkward situation in my school. Especially since the school had already forwarded the uncollected money to me to defray the costs of the project.

Thanks again for you help.

cc. John Lehman
Carol Lewis
Bob Logan
Diane Bischak
John Boyce
Keith Criddle
Joshi GreenbergA handwritten signature in dark ink, appearing to read "Mark Herrmann".
Mark Herrmann

**UNIVERSITY OF ALASKA FAIRBANKS**

School of Management
Fairbanks, Alaska 99775-1070

DATE: February 1, 1993
TO: Ginny Fay
FROM: Mark Herrmann and Josh Greenberg
Re: Finishing the Salmon Marketing Grant

I have enclosed the final report for the demand portion of the State's salmon grant entitled "An International Marketing Model for Alaskan Salmon." I believe that this fulfills all the requirements of the grant. I would appreciate a letter stating that Mark Herrmann and Joshua Greenberg have completed the demand portion of the state's salmon grant and any more information they provide on this proposal is strictly voluntary. I would appreciate it if you would send a copy of the letter to the FRED division.

I never did receive the comments that Jeff Hartman promised me on this manuscript.

Thank you for your help on this project. Good luck on future endeavors.

to: Mark Herrmann

fr: Molly McCammon

Thank you for your prompt response to our request for further clarification of final work products. I would like to restate that my request is only aimed at obtaining the necessary reasonable information that we need to quickly close out the contract. I certainly do not have any interest in a verification of your schedule as mentioned in your letter. My letter probably did not arrive with sufficient time for you to react by the March 1, and I apologize for this.

The potential for scrutiny of this RSA is greater than most, so I want to be sure to have some record that it has been appropriately completed and closed out. I think that this will be in all of our best interest. The State of Alaska is required to provide the results of the research, and any other data, notes and materials acquired from the study under the freedom of information act. At this time I am anticipating many more requests for the various study work products.

For the purposes of closing out the contract I am most concerned with obtaining final technical reports and sufficient assurance that you will work with the Legislature to get the other data and materials that have been discussed in the RSA and its attachments, and in your correspondence with Ginny Fay. I do not consider that your suggestion to involve legal council in an RSA to be an example of "working with the legislature".

In finishing these last steps I want to emphasize that I am willing to be very flexible. I am not, as your letter states, strictly enforcing the letter of the RSA. For example, my February letter conditionally relaxes some of the requirements of the RSA. For example ADF&G believes that the GAUSS software and documentation provided to them by Dr. John Boyce will probably be sufficient in lieu of the SAS software requested in the RSA. ADF&G indicated that they will notify me when this can be verified. They have a GAUSS software problem that is currently preventing the full program from running.

I believe that to our informal correspondence showing that some agreement is made regarding a description and delivery date of the remaining information would be vastly more efficient than a second contract. We have no further funds to finance such steps (with the exception of ADF&G's expressed interest in financing modest disk storage costs for the fishing cost model data files).

I also want to clarify what appears to be 2 other misunderstandings.

- o Near the end of your March 2 letter to me you refer to the possible rewriting of your manuscript after a technical review that the State is planning to obtain. I just wanted you to

know that you are under no obligation what-so-ever under this contract to carry out any further re-writes related to that review. We are simply trying to get further clarification of some methodological and statistical procedures used in the studies, that the in-house technical review team was not able to fully understand.

- o The other possible misunderstanding is which work products are needed soon for the technical review, and what can wait till later. The following work products needed soon from my February 25 letter are: 3,4,5,6,7, and 8.

Specific Comments (corresponding with your letter of March 2, 1993.

5.

A. I do not see that Hartman response to your request for comments has any bearing on my current request for the final report completion date. My letter did not indicate any link with other professional reviewers comments, or requirement for you to update the models. I simply wanted to know when you could reasonably complete and send a final report? I was not aware that you sent a final report to Ginny Fay in February, and it would be helpful to obtain another copy. We have had a number of requests for it.

B. My February letter did not indicate that we expected you to make any further updates of the estimation or simulation models prior to producing a final report. Mr. Hartman sent me a page from the article that he referred to during the formal technical review process some months earlier. He mentioned that he has not faxed the article because he had not been able to locate the other pages, thought you knew which periodical and issue it came from, and was not told that it was holding up any of your further work.

7. Mean weights

A. for hatchery fish.

Are you saying that you projected total weight for each aggregation of enhanced fish in the non-intensely modeled sites is the product of the mean weight number and number of fish reported in the electronic files of the survey data? If so, many operators are interested in seeing the actual production numbers and mean weights used. If you have a spreadsheet, or other file that identifies what the production numbers (by species) and mean weights that were that made it into the final simulation we would like to have a copy of it.

B. for the wild stocks

Your note says that the numbers for the wild stock projections (non-intensive production) came from CFEC. CFEC, however is not in the business of projecting future mean weights of salmon. If you used some mean from historical catch and lbs data, all that I am asking for is actual number for each of 5 salmon species in each region that you used. I believe that this is only 25 numbers. If the projected harvest was computed from a historical CFEC series that was expressed in pounds, then we would like to have a file of the total pounds by species and region.

8. The memo is not cited by name in the RSA as a work product, we are only asking as a courtesy, for you to send us a clean copy. The memo, and its several attached pages, has important clarifying information about the study results that are not in the reports.

9. The documentation of the estimation procedure code (not to be confused with simulation procedure) is not required by us, and was not indicated as a requirement in my letter to you. We only want to have a record of the code being produced as a work product that was paid for by the State of Alaska. We do not have any intention of obtaining any exclusive rights to any part of the code (or any other part of the study). We were not made aware that any part of the code or software used to produce this project was proprietary. We do not plan to distribute the code beyond the State of Alaska, unless someone requests it under the freedom of information act. If the Stat package in GAUSS is truly proprietary we need to know this, and also need to know how to legally obtain it.

With respect to the SAS log file, if you do not have one available from a previous simulation and it is too difficult to provide another one in the next 3 weeks then ADF&G will carry out their review of the simulation model without it.

10-12 and 15. The memo of Dec 6 does indicate that you are going to send the final version of the SAS model to the Legislature following further refining and making a more user friendly software. From page 2 "I do plan to make the model much more user friendly, I also plan to rewrite the larger report with the new model's results for Sea Grant. I would be willing to give you the new models which should be immensely easier to run. I plan to have it done in the next six months or so." Your letter indicates that you would be carrying out these refining steps subsequent to this project. It has been the Legislatures stated intention throughout this study that useable simulation software would be constructed for the CBA simulation model and Demand model as part of the contract. The CBA simulation model, however, is not much use to anyone without the ability to vary the production variables in your demand model and create new price output files.

If something has changed, and you must withdraw your offer to follow through with the transmitting of updated and clearly commented then please let me know. All I am looking for is a commitment to provide the final simulation program when you would have time to complete it, with good comment statements, and a tutorial if necessary. A timetable for the completion would be appreciated.

13. Thank you for the estimate. ADF&G thought it would take several hours to complete a simulation for a single case.

14. Question answered, thank you.

Final Comments:

I do not know how to respond to your reservations about working with FRED Division. I think that FRED Division is genuinely interested in your research, and is committed to experimenting further with the simulation models. It would be far easier to achieve the stated goals of this contract if you would continue to interact with them.

cc:

John Boyce

Keith Criddle

Joshua Greenberg

Memo

to: Bruce Twomley
Commissioner
Commercial Fishery Entry Commission
8800 Glacier Hwy. Suite 109
Juneau, Alaska 99801

from :Ms. Molly McCammon
Special Assistant
Representative Carl Moses
Alaska State Legislature
State Capitol, Room 204
Juneau, AK 99801

I would like to first express my appreciation for your assistance in carrying out the RSA on the economic analysis of the Alaska Enhancement program. Dr. Kurt Schelle, and Dr. Ben Muse of your staff has been very helpful in reviewing the work products. The efforts of other CFEC staff who supplied the data to the contractors are also appreciated.

Due to the nature of the findings, and the uncertainty surrounding some of the techniques and point estimates, the Alaska State Legislature feels that it would be advisable to solicit further technical comments. Since CFEC is the formal contracting agency for the study, and you are not likely to be affected by the results, we would again like to impose on you to administer a small Professional Services Contract to obtain an impartial review. ADF&G will be paying for the review, as they feel that the studies need further attention.

I want to clarify that we want a high quality and impartial technical review and that the selection of the contractor and framing of the final questions would be up to you. So that the burden of the work for you is minimized, the attached Draft Authority to Seek Professional Services has been attached. This PSA draft seemed to frame the questions to the contractor in a manner that seems reasonable. Again, please substitute any final wording for the document that you feel is appropriate. ADF&G has made contact with one potential contractor James Wilen who has expressed interest in carrying out the technical review. Some of the draft technical documents have been forwarded to him with the attached letter. Your further consideration of our proposal would be appreciated. I may be contacted at 465-6848.

cc:
Jeff Koenings



UNIVERSITY OF ALASKA FAIRBANKS

School of Management
Fairbanks, Alaska 99775-1070

March 9, 1993

Molly McCammon
Alaska State Legislature
Capitol Building, Room 204
Juneau, Alaska 99801-1182

Dear Molly

Thank you for sending me the copy of the original RSA for the salmon demand portion of the study. It was very useful in answering my questions as to what is left to be finished on the rest of the demand portion of the salmon enhancement project. As promised, I spent this weekend reviewing the paper work on the grant. I would like to address your concerns for the fulfillment of the contract in the following sections.

1) The contract that I had and continue to have on the salmon enhancement project is with the Alaska State Legislature.

This is clearly stated on the last paragraph of page 2 of the RSA. In addition, it states that the contacts are Ginny Fay and Molly McCammon. The initial State contacts, until the beginning of 1993, were exclusively with Ginny Fay. Now I believe the working contact with the State is Molly McCammon. Therefore, we are not, in any way, bound to answer to the Fisheries Research and Enhancement Division of ADF&G (or what ever form it has taken) and any attempt on FRED's part to negotiate or alter the remainder of this contract is unethical and illegal. As a point of fact, I believe that I have never had any dealings with Jeff Koenings or Bob Clasby since the contract was granted. However, Jeff Hartman of FRED was very involved in the development and direction of the study. I want to state that despite FRED's lack of jurisdiction in the project that we were very liberal with the amount of influence that FRED had in the project including using their suggestions on how to form future estimates of wild salmon harvests, etc. Realizing now that they had preconceived results that they wished to have confirmed by the study, and that this is in serious conflict with the scientific method and unbiased research, I feel it was a mistake to let the FRED Division have so much influence in this study.

2) The remaining contract that is binding is the November 4th, 1991 proposal written by Herrmann and Greenberg entitled "An International Supply and Demand Equilibrium Model for Alaska Salmon."

Two proposals were written in response to the State's RSA on the four parts of the study: the demand portion; the cost portion; the cost/benefit portion; the biological model portion. The first proposals were written in cooperation with ISER. At a meeting in Juneau with ISER, CFEC, FRED, and the State the proposed joint research with ISER fell apart when it became apparent that the economists from UAF and ISER were not going to be able to cooperate on this study. Subsequently, the State asked both the economists at UAF and ISER to submit separate proposals. (Please see the enclosed proposal from Greenberg and Herrmann for the demand portion). This was the proposal that the State accepted for the demand portion without revision or comment.

As part of this proposal the project's objectives, 1-13, were clearly laid out on pages 1-2. These are the objectives that we submitted and the ones that we stated that we would fulfill if we were granted the project. They **do not** include all of the objectives of the original RSA and, because of this, we were at risk of not receiving the grant. (It should be noted that ISER's proposals also did not include all of the terms of the original RSA.) However, since this is the proposal the State accepted, this is the proposal that is binding for the contract.

There are two additional pieces of evidence that the intent of this proposal was to alter the wording of the original RSA. On page 12 there is a section entitled "Deviations from the original RSA/RSP)". This heading clearly indicates that this proposal, if accepted by the State, did not strictly follow the letter of the original RSA. While this section does not include all changes, it points out some of the more important ones that I had discussed with Ginny Fay and Jeff Hartman. Again, the projects objectives on pages 1-2 include the products that I promised.

The second piece of evidence is the cover letter accompanying the proposal dated November 4th 1991 (see attached to the proposal). The third line first paragraph states that "This proposal will attempt to meet as many of the demands laid forth in the October 3rd request as possible." The line is further evidence that the proposal was the binding contract (if accepted) and that the original RSA was not. Further, the first line of the third paragraph states "I am also pleased that the legislature will consider the extension of the original time deadline for the completed work." This is evidence that the original RSA had already been altered.

With the state accepting this proposal, clearly the binding contract is the proposal written by Herrmann and Greenberg. Additionally, Senator Eliason's office sent a letter explaining why this proposal was chosen over ISERs. This is evidence that there were two separate proposals and ours was chosen.

3) Given that the binding contract can be defined in terms of the proposal's projects objectives on pages 1 and 2, there is only one area that has not been completed

I will review the project's objectives one by one. I will start with the ones that have been fulfilled.

1) To update the existing international econometric salmon model as published in a work by Mittelhammer, Herrmann, and Lin for the National Marine Fisheries Service entitled An Economic Analysis of World Salmon Markets: Effects of Salmon Farming, with 1989 and 1990 data added (and possibly 1991). Quarterly variables would again be used (Also see Herrmann 1990).

This was done. Most of the equations used data up to 1991.

2) To examine the possibilities of changing the functional form of the relevant equations in the above models to linear (or log-linear) instead of double-log to allow for changing elasticities along the demand curve.

This was done. This was a major improvement in the exvessel equation specifications.

3) To disaggregate the salmon species into chinook, sockeye, chum, pink, and farmed Atlantic salmon. An effort will also be made for coho salmon but coho salmon was not separated out in the U.S. export statistics until 1986 and may not be possible to model successfully. If coho salmon cannot be modeled successfully as an internationally traded commodity, an approach similar to Boyce's "A comparison of Demand Models for Alaska Salmon" will be undertaken for coho.

This was done in bloc 2. Also, there was no problem with coho salmon.

4) To expand the model to include canned pink salmon, and if possible, canned chum and/or sockeye

Canned pink and chum were included directly, canned sockeye indirectly.

5) From the existing model to separate out Canada and the U.S. as separate salmon producing regions

This was accomplished for farmed salmon. For wild salmon the model performed better when the two countries were aggregated in bloc 1. However, separation was made in the simulations where an individual countries supply was needed to be simulated separately. In fact, the distinct regions were Alaska, the rest of the U.S., and Canada. This was the intent of objective 5 and it was fully satisfied.

6) Report all relevant own-price, cross-price, and income elasticities. Cross-price elasticities will be between relevant Pacific and farmed salmon species.

Done. (See final report)

7) To do this modeling at the exvessel and export levels. If the data looked reasonable, the wholesale level would also be modeled. At the very least the factors affecting the wholesale level would be included in the reduced form exvessel equations.

Done. (See final report)

8) To perform sensitivity analyses over the historical time period to validate the models and to answer questions as to the effects of Cases 1-9 and 11 over the historical time period. Case 10 would be examined if the coho salmon demand could be modeled successfully. Sensitivity analysis would also be done on various market factors such as changing exchange rates tariff rates, income levels, etc. This sensitivity analysis may be performed independently of the entire demand, cost, and biological model, or may be done exclusively as a part of the final integration of the three models.

Done, including coho salmon (case 10) (See final report)

9) To relate the aggregate North American price of salmon to the regional prices of salmon in Alaska through correlation analysis in an attempt to locate regional price changes.

Done for the specified regions of Prince William Sound, Cook Inlet, Kodiak, and Southeast Alaska. In addition, the rest of Alaska was modeled. (See final report).

10) To predict Alaskan salmon prices for as long as the model seems reliable. These predictions would be made on assumed levels of market variables and would also be presented with sensitivity analysis.

This was done for the 15 years specified although I note that the last 2 years of predictions may be of lesser reliability than the first 13. (See final report).

11) Cases 1-9 and 11 would then be examined in regard to future prices.

In actuality I did cases 1-11 (see final report). I reported that all cases went well with the exceptions of cases 2-4 in which I deemed the results to be so unreliable that they should not be used.

13) To write a final report as specified by the RSA/RFP

Done, (see attached cover letter). Again this was done by the agreed upon data with Ginny Fay. To reach the agreed upon completion date we could not use the promised FRED's peer review which had been promised several months earlier on the draft.

4) There is only one objective that has not been met.

12) To Program the past and future simulation programs into SAS and document it for easy use

There has been a good faith attempt on our part to meet this objective. After the project was finished I realized that the SAS simulations were unbelievably complicated. I also realized that they were very difficult to run. I was worried that, under the current situation, it would be very difficult to document them, as they existed, into "easy use". Therefore, I suggested to Jeff Hartman that I send him the programs for the Base scenario and see if I could verbally walk him through a simulation to match the simulation I sent him on hard copy. I also jotted down some hand written notes. This exercise was not met to substitute for (12) above but was meant to facilitate an initial smooth transition of the simulation program to FRED. I wanted to make sure that the data sets I created were compatible with their computer systems since SAS can be a little tricky sometimes.

Jeff and I agreed that this would be OK for a start. Once again, it was like send sending part of the project into a back hole. I never did hear if the programs I sent were ran. When I finally did hear from Jeff, well after I sent him the computer files, he suggested that he might come to Fairbanks to video tape me running the models on my computer in lieu of the written documentation. At the time I thought this was a good idea and I agreed to it. However, I did not realize that the rest of the money on the contract would be held back until this was completed, not did I realize that additional demands (in addition to the proposal) would be put on the project. I also did not know at the time that the FRED division would take such an adversarial position to the research, distancing themselves from the research in which, to a large extent, they directed and oversaw. I now do not believe that it is possible to work directly with them due to the conflict of interest that I mentioned in my last letter. I withdraw my offer to let Jeff Hartman video tape the model runs.

I also realize that I am in a difficult position on this matter. I had verbal commitments with FRED but they were in no way the legal contractors. So any commitments I had with the FRED division are legally invalid. In essence, the solution to promise #12 was delayed by FRED but the researchers at UAF are now responsible for the consequences.

5) The solution to objective 12 (page 2 enclosed proposal) is the only contractual obligation in the demand portion of the salmon demand proposal which has not been satisfactorily met.

This is not going to be an easy task. We have been placed way behind schedule on this objective because of lack of cooperation on FRED's part and a lack of understanding on our part on who we were suppose to answer to. I will take some responsibility for this.

After the phone conference with CFEC, FRED and the State in December, 1992 Ginny Fay warned me that I no longer had to talk to or answer FRED's demands. Unfortunately, I continued to allow FRED's interference in the project. For that I am responsible. For this reason, I am willing to come to a mutual agreement on the best way to fulfill objective number 12 that will be agreed upon by the State and ourselves.

6) A satisfactory solution to objective #12 must be specified.

It will be up to both parties to find the best way to meet objective 12. I am willing to meet the objective exactly as it is stated. I am in the process of spending my own money to purchase SAS. I can start to write documentation that will allow the SAS user to run the simulation models exactly as I ran them up to the point that the data is ready to be used in the cost/benefit simulations. I will need to assume that the user is as familiar with SAS as I am. I believe this is a reasonable assumption to make. This will make the program "easy to use". However, it will be extremely time consuming to do anything with it.

I would rather take the time to reprogram the simulation to be more time efficient and straightforward. However, this will take a lot of time on our part and I would not have time to look into it until school was let out in May. I did not promise this in the proposal but would be willing to do it to help the ease of running the model. However, I am not willing to wait on the money to be forwarded to the University as I am now personally responsible for it. In addition to rewriting the model, I would document it and be willing to personally show a non-FRED individual how to run it in Fairbanks or Juneau as long as the trip was paid for. I would also be willing to lend additional support for as long as it takes.

In absence of receiving additional time to do this and in receiving the rest of the grant money I assume that the first solution of me now writing documentation to what I currently have is the preferred solution. My understanding is that once cases 1-11 can be duplicated from my directions, and the data can be put into a form to run the cost/benefit analysis, then objective 12 would be satisfied and I would be released from any further obligation from the state on the demand portion of the study since it would be fully satisfied. If this is the solution you want, let me know and I will fulfill it.

7) Because of your memo dated February 25, 1993 I desire a new contract, that voids my old proposal, stating the terms to fulfilling objective #12 and, therefore, the demand portion of the analysis.

I believe this is best for the protection of both parties. When this is drawn up I will exercise my right to run it by the University lawyer.

8) Until the salmon enhancement contract is fulfilled and the money is paid I am not willing to do any additional work or answer any additional questions regarding the project which was not specified on the accepted proposal.

This is, again, a protectionary measure and should not be viewed as the unwillingness on my part to cooperate. I am very proud of the work that we did and want the State to be able to fully examine it and use it if so desired. I have never had a problem with a granting agency before this. I have successfully performed 6 previous grants and 2 consulting projects before this one. In every case the relationships between myself and the granting agency has been extremely friendly and courteous. In all cases I answered questions well after the final papers had been signed off. Josh and I have had a very good working relationship with ADF&G (commercial fisheries division) examining potlifts for crab vessels. This working relationship has been mutually beneficial and cordial. I do not understand why this contract degenerated so quickly and into such a legal matter. Although I had always planned to work on the project, free of charge, long after it was concluded I am not at this time able to do so or willing to make any promises as such.

9) Finally, I hope that once the legal portion of this contract is fulfilled that we can enter a period of cooperation where the issue of salmon enhancement take precedence over our individual concerns and that we can examine this problem in a spirit of friendship and mutual respect among all parties.

I hope, once the legal matters of this contract are fulfilled, that the parties will be able to again establish a working relationship and that we will be free to continue to work with the state in providing useful information on the salmon enhancement project. I have never let my involvement with a project end after a contract expired. It is very important for me to continue work on important issues that have end-user groups. That is why I am in this profession. However, I am personally responsible for the money that has not been received by the School of Management and feel insulted that after all this work we have done and the obstacles we faced which were put in place by FRED, that the State is claiming we are negligent in fulfilling the contract. I also take exception to the additional demands placed by the State on the project that were not on the original contract but were stated needed to be accomplished before the rest of the money is paid. Again, I may be happy to answer the additional questions but not under the threat of not receiving payment for work performed.

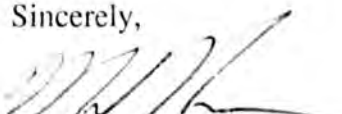
Finally, I want to thank all the wonderful people that have made the work possible and that I look forward to a continued working relationship with them. Ben Muse, Kurt Schelle and Elaine Dinneford are extremely pleasant and helpful people to work with and Alaska is lucky to have them. Ginny Fay is one of the most intelligent people that I have ever met and always operated under a atmosphere of complete professionalism. And finally, if it had not been for the funding from Alaska Sea Grant this work would have not been made possible. I look forward to future work with all these people and the

competent employees of ADF&G. Finally, I would like to thank you on your taking over this project and getting the dialogue started again. After Ginny's involvement was finished I felt like there was a long period of no communication and I was very uncomfortable with the fact that FRED was acting as if it were the contractors.

10) In Conclusion.

I believe we can move forward when you respond to #7 above. Thanks for you efforts.

Sincerely,



Mark Herrmann

cc. Diane Bischak
John Boyce
Keith Criddle
Josh Greenberg
John Lehman
Carol Lewis

APPENDIX A

I wanted to continue this discussion, which is not really pertinent to the contract itself, because I am a little worried about what you expect you will get from the computer SAS program. I would like to make the following points.

First, you should realize that the computer program is extremely complicated and was done in a very short time. When I was doing my dissertation I had roughly one year to program a much simpler simulation model. For this project the simulation took about one month for a far more difficult problem. Because of this the program that I wrote is geared towards cases 1-11 and resulting in cases 1, and 5-11 performing satisfactorily.

The simulation program is extremely tricky in that it involves being able to simultaneously simulate 24 or 30 endogenous equations for 60 future time periods. The fact that Josh and I got it to simulated at all, in the extremely short time we had for the project, is almost miraculous. There is absolutely no guarantee that the model will simulate when any exogenous variable is changed. Many times I had to personally play games to "trick" the program into simulation. Much of this problem is because there are natural log operators within the program. During the intermediate gradient search steps, a variable may take on a value of less than zero. In this case, the program will crash. There is no way to document how to get a program of this nature running. It takes someone who knows what is going on to spend time sometimes many hours adjusting it.

Because of the problem that I had simulating the farmed portion of the model the future farmed values are hardwired into the final simulation. This means that changes to the farm salmon supplies cannot be examined in the simulation model. To change their values I need to run another historical simulation model noting the change in relevant farmed salmon prices. I then need to rewrite the final simulation model to accept the new farm prices. Then the final simulation model needs to be rerun. This was the only way, in this period of time, that I was able to get the final simulation model to work. I have discussed this problem with Jeff Hartman at length and gave a lecture on it when Jeff and Ginny came to Fairbanks. He will be able to verify that I told him that in the final model the farm salmon numbers could not be altered. (I can still do them myself with time but the process is a difficult and lengthy one). Bottom line, you will not be able to use this model to examine changes in farmed quantities.

For many variables, such as consumer price indices, altering the model is not as simple as finding the new consumer price indexes and plugging them in. This is because, over the model's time period, the consumer price indices (and others) changed base years. So my numbers will not match the numbers in the publications. What is necessary is to take the percentage changes each year and adjust the stream of exogenous variables. Again, this adds a further complication into the model that is not as easy as just writing a final documentation of the simulation model.

I am extremely worried about the potential misuse of the model. For instance, as we have mentioned many times that these models are only good for reasonable changes of

the exogenous variables (hence the written warnings about interpreting case 5 too literally). As you know, the regressions are based upon historical data and a casual relationship is established between endogenous and exogenous variables. Future values of endogenous variables can be extrapolated into the future from these relationships. If the values of future exogenous variables differs significantly from past values the model would be predicting endogenous variables on observations that never historically took place and are so far from reality that the predictions would be of little value. For instance, if I were to triple the sockeye landings in 1993 and ask what the price would be the answer I would get would be simply useless. The changes in the exogenous variables have to be "reasonable". What is reasonable is best known by the modeler, many times after running the simulation models and examining the predictions of all the endogenous variables to make sure that there is no bizarre behavior being observed. The unfortunate fact is that for every simulation it takes several hours (days), and sometime several iterations (with several more hours of examination for each run), to make sure that it ran smoothly. It can be very dangerous to take the results at face value. It was after about a month of intense examination that I discovered the problem in cases 2-4 in the way the model was set up. With more time I might have been able to resolve it but our time had run out.

You should also realize that this model is going to have a very short life span of usefulness. It was modeled to answer the specific questions that the State laid out as of the end of 1992. Because the salmon markets are changing so rapidly the estimated behavioral equations will quickly become out of date. They were estimated from 1982 to 1991. Already, we are seeing an unbelievable change in the markets. For instance, Chile has just become the second leading exporter of salmon to Japan. I could not develop a historical relationship between Chile and Japan (I did between Chile and the U.S) so the model can not simulate this incredible situation. I can trick the model into some kind of Chilean-Japanese scenario, by assuming that Chilean coho exports are identical to U.S. coho exports, with some work. It would be better to reestimate the Japanese equations in another year to see if a relationship could be established. In any regard, the model has already underestimated the production from Chile. (I should mention that the first criticism of the model was that I way overestimated the Chilean supply- in fact, it is just the opposite). A even more astounding fact is that Russia has just passed Canada as the world's third largest supplier of salmon to Japan. In addition Russia showed its potential to produce huge amounts of pink salmon when it produced 476 million pounds in 1991. In this model the effects of Russian salmon were completely ignored because it was not even a major factor until the model was being completed. In the future, this may have major ramifications on the pink markets depending what Russia can do in the export markets. This does not make our predictions invalid, it just states the obvious which is that our predictions are based on the historical structure of the market from 1982 to 1991 and the best available information about future market factors taken in 1992¹.

Finally, the reason that this model is so tricky to use was because the entire modeling time for the project was ridiculously short. I can't tell you how many sleepless nights I

¹Although, there are dynamic components to the model which will pick up trends such as growing or decreasing demand etc.

spent worrying if I could make the model simulate at all. The final simulations were being completed the week that the report was due. Not only did this make documentation impossible, but it also meant that the simulations were written in a way to get them to work for this particular problem only. They were not written to work for a more general set of possible simulations scenarios as I would have done if there were time. You should realize that this is one of the largest economic simulations models in the world. We were asked to do it in an extremely short period of time and for very little money. I worked every night and weekend for a year on this. We simply did not have the resources to make a model that would be easy to use and be flexible enough to use for a wide variety of simulations the way I would have liked. That is the sort of project I could have done if it had been my sole responsibility and Josh and I (along with a research assistant) would have had about three years apiece to accomplish it and a had several hundred thousand dollars. With this amount of resources, peer reviews and testing of models would have been done as the project was being accomplished. Yet, the State, although spending in excess of \$200 million on the enhancement project since the early 70s, was willing to put out very little for this study. This is even more ludicrous when it is noted by ISER that the value of Alaska salmon production is nearly \$1 billion a year. Yet we were originally asked to accomplish the terms of the RSA for \$20,000 to predict revenues for every salmon species and regions for 15 years under several alternative scenarios! We did the best anyone could have done under the circumstances, using overhead waivers, Sea Grant and University of Alaska Faculty grants to subsidize the project. I am not sure what more you could have wanted.

Alaska State Legislature

Representative Carl E. Moses

CHAIRMAN
HOUSE RULES COMMITTEE

CHAIRMAN
HOUSE SPECIAL FISHERIES COMMITTEE

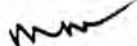
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MEMORANDUM

TO: Bruce Twomley
Commissioner
Commercial Fisheries Entry Commission

FROM: Molly McCammon 
Professional Assistant to Representative Carl Moses

DATE: March 10, 1993

RE: Request for assistance with RSA

I would like to first express my appreciation for your assistance in carrying out the RSA on the economic analysis of the Alaska enhancement program. Dr. Kurt Schelle and Dr. Ben Muse of your staff have been very helpful in reviewing the work products. The efforts of other CFEC staff who supplied the data to the contractors are also appreciated.

Due to the nature of the findings, and some uncertainty surrounding some of the techniques and point estimates used, the Department of Fish and Game feels that it would be advisable to solicit further technical comments. As staff to both the Senate Fisheries Committee that originated this project, and to the House Fisheries Committee that will be continuing on with it, I support that position. Since CFEC is the formal contracting agency for the study, and you are not likely to be affected by the results, I believe it would be very beneficial if CFEC would be the agency to administer the Professional Service Contract to obtain an impartial review. The contract would be paid for by ADF&G.

I believe that a high quality, impartial technical review is essential. The selection of the contractor and the framing of the final questions would be up to you. However, I have attached a Draft Authority to Seek Professional Services as a possibility for your use, but feel free to substitute any final wording for the document that you feel is appropriate. ADF&G has contacted one potential contractor, James Wilen, who has expressed interest in carrying out the technical review. Some of the draft technical documents have been forwarded to him with the attached letter. I would appreciate hearing from you on this as soon as possible.

cc: Jeff Koenings, ADF&G

State of Alaska

AUTHORITY TO HIRE PROFESSIONAL SERVICES

1. Agency Reference Number

2. ASPS Number

3. Date Required for Service Execution

If required by the State Administrative Manual, this form must be executed prior to seeking PROFESSIONAL SERVICES CONTRACTS. The completed form must be part of the contract file.

4. Department <i>Commercial Fishery Entry Commission</i>		Dept. No. <i>11</i>	5. Division	Division No.
6. Service Code(s)	7. Name of Program, Project or Service		8. Statutory Authority (If Applicable)	
9. Amount this ASPS \$	10. Last Total ASPS Amount \$	11. Total Estimated Amount for Project Completion \$ <i>3,000</i>		
12. Total Projected Period of Performance (Include All Multi-Year Phases and Optional Renewals) From: <i>4-1-93</i> To: <i>4-25-93</i>				
13. Phases(s)				
14. Project Director's Name <i>Kurt Schelle</i>		Phone <i>789-6160</i>	15. Preparer's Name <i>Kurt Schelle</i>	
			Phone <i>789-6160</i>	
16. Purpose(s) of Contract (Continue on Additional Pages If Necessary) <i>See Attached:</i>				

If a solicitation effort other than competitive-sealed proposals or small procurement is anticipated, Form 02-100, Request for Alternate Procurement, must be attached and approved by the Department of Administration prior to proceeding with procurement.

CONTRACTING DEPARTMENT

Approval of this Authority is contingent upon use of the 10% evaluation point and the 5% price based Alaskan vendor preference.

17. Department Head/Authorized Representative Name	Signature
Department Head/Authorized Representative Title	Date

16. Purpose(s) of Contract

a. Project description (what is required of the contractor)

In 1991 the Alaska State Legislature commissioned a detailed economic study of the statewide salmon enhancement program under contract with the University of Alaska, Fairbanks, School of Management. The study resulted in several technical work projects and models. The primary report produced by UAF is A Benefit-Cost Analysis of the Alaska Salmon Enhancement Program. The Commercial Fisheries Entry Commission (CFEC) was requested by the Legislature to administer a Reimbursable Services Agreement with the University to complete the studies. CFEC was the preferred agency to carry out the RSA because (1) they were impartial and would not be effected by the findings, and (2) they had the best capability for producing the special computer sorts and summaries from the fish ticket file data base. As CFEC are the official owners of the numerous technical reports and other work products from the UAF studies, they are the logical agency to conduct a technical review of the studies. The legislature has asked CFEC to select a competent, independent fisheries economist to obtain a technical review of certain econometric procedures, economic theory, reports, and other review comments (developed by the technical review team for the Alaska State Legislature) for the study.

The contractor conducting the technical review will provide a comprehensive review of the economic techniques and validity of the case studies completed as part of the obligations of the UAF RSA. The contractor, for the review, will complete the following tasks:

- o Identify significant errors in the theory and methodology of the Demand, Cost, and overall CBA models.
- o Determine whether the net benefit computations in the case studies have been carried out properly and appropriately utilized the data in the demand and cost models.
- o Identify any problems with the technical reports.
- o Identify any potentially significant problems with the CBA report, such as the proper level of caution in the findings and recommendations.
- o What additional steps should be taken to verify and test the models.
- o Suggest the best approach for the State of Alaska to take to provide reliable ongoing net benefit projections for future enhancement options.
- o Answer the question: Do you think that these case studies should be relied upon for making major directional changes in the State's investment in enhancement and possibly management of salmon fisheries?
- o Review the overall comments developed by the technical review team (CFEC, ADF&G, and Legislature) from in previous reviews of the CBA, and verify which ones appear to be valid or invalid.
- o Supply any other comments or recommendations that pertain to the studies, and Alaska's use of them.

b. Why the project is needed

It is customary and prudent, in technically challenging econometric studies, or where there are significant policy implications from studies, that contracting agencies seek independent technical reviews. It is also appropriate to seek independent technical review, where the in house reviewers of the work products 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 33Mhz. 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 thoroughly comment on certain new techniques used in the demand model. The technical review team spent several hours trying to unravel the block 1 and 2 estimates, and could not confidently say that the methods are or are not technically sound approaches to generating long run projections of price response. None of the economists had ever reviewed a fishery econometric model that was this nested, or used such novel statistical procedures.

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 affect on Government policy on the enhancement program, fishery management, loans to fishermen, bycatch of salmon, marketing of seafood and the Pacific Salmon Treaty. Perceptions of private lenders and fishermen might also be impacted, along with limited entry permit markets.

In consideration of the preceeding issues it is clear that a specialized and independent technical review should occur.

c. Objectives

The objective of this techinal review is to determine if there is sufficient technical support within the various work products and case studies, for making major directional programs in enhancement and possibly management investment?

d. Tangible (measurable) benefits

The technical review will aid the Legislature and other policy makers in determining what level of confidence they should have in these models at this time. What additional steps should be taken to verify and test the models. What additional steps the state should undertake to evaluate economic consequences of changed harvest levels from enhancement or other activities.

e. Cost/benefit description.

It would be inappropriate and technically impossible to compute a quantitative net benefit from generating this review. The benefits, of the review would be the increased probability that government will not misuse information that they have received. We think that the information gained from the review will provide an important check and balance for the State of Alaska's near term decisions on commercial fishery enhancement.

f. Project schedule.

- Feb 15 Send out draft study materials to potential contractors for preliminary cost estimate.
- March 15 Receive final work products from UAF researchers (relevant to this review).
- April 1 Send out final versions of all work products and comments that the contractor requires for the technical review.
- April 15 Draft review comments to be received by CFEC
- April 19 CFEC questions (on review comments) communicated to Contractor.
- April 25 Final report. Contract complete.

Alaska State Legislature

Representative Carl E. Moses

CHAIRMAN
HOUSE RULES COMMITTEE

CHAIRMAN
HOUSE SPECIAL FISHERIES COMMITTEE

MEMBER
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March 10, 1993

Mark Herrmann
School of Management
University of Alaska Fairbanks
Fairbanks, AK 99775-1070

Dear Mark:

Thank you for your March 2 response. I have FAXED and sent hard copies of the RSA and your proposal for your use. You should have them by now. According to Ginny Fay, these are the documents that have been relied upon for this project. I really don't believe we need to negotiate a new contract for any new materials. Instead, I think between us, we can figure out what other materials we can reasonably except from you and Dr. Boyce to complete the entire project. The RSAs for the entire project will quite possibly be closely scrutinized. Under the Freedom of Information Act, the Legislature would be required to provide the results of the research and any other data, notes and materials acquired from the study.

I also want to assure you that we are not holding up final payment on the contract. In fact, I don't believe a final bill has yet been submitted by the University. However, in order to expedite that payment, I want to make sure that all parties are satisfied that the terms of the contract have been completed.

Also, I apologize about the misunderstanding on delivery of the final demand report. Ginny had not yet delivered it to us. We are now in receipt of that document. As I mentioned in the March 2 memo I FAXED to you, there is absolutely no requirement to re-write any of your reports.

Fish and Game has provided me with further information concerning the requests in my February 25 memo. As I mentioned before, in order to do an adequate technical review, I have been told that we need work products #3 - 8 as indicated in that memo. ADF&G believes that the GAUSS software and documentation provided to them by Dr. John Boyce will probably be sufficient in lieu of the SAS software requested in the RSA. They will notify me when this can be verified. They apparently have a GAUSS software problem that is currently preventing the full program from running.

Apparently there was some confusion about the article you referred to on forecasts of aquacultured salmon numbers. Mr. Hartman mentioned that he had not sent you that article because he had not been able to locate the other pages, but thought you knew - or might know - which periodical and issue it came from. He was not aware it was holding up any work. Anyway, that issue is moot since your final report is completed.

#7 Mean weights

- for hatchery fish.

Are you saying that you projected total weight for each aggregation of enhanced fish in the non-intensely modeled sites is the product of the mean weight number and number of fish reported in the electronic files of the survey data? If so, many operators are interested in seeing the actual production numbers and mean weights used. If you have a spreadsheet, or other file that identifies what the production numbers (by species) and mean weights that were made into the final simulation we would like to have a copy of it.

- for the wild stocks.

Your note says that the numbers for the wild stock projections (non-intensive production) came from CFEC. CFEC, however, does not project future mean weights of salmon. If you used some mean from historical catch and lbs data, what is the actual number that you used for each of the 5 salmon species in each region? If the projected harvest was computed from an historical CFEC series that was expressed in pounds, could we have a file of the total pounds by species and region?

#8. You're right, this memo is not considered a work product. However, it apparently has some important clarifying information about the study results that are not in the reports, and it would be helpful to have a clean copy.

#9. Documentation of the estimation procedure code (not the simulation procedure) is not required. Apparently, all that is needed is to have a record of the code being produced as a work product for the state. There is no intention to obtain exclusive rights to the code, and no one at Fish and Game knew that the code or software might be proprietary. If the Stat package in GAUSS is proprietary, could you please let us know, and how it might be legally obtained? Again, if there are any problems with this request, I would be happy to discuss it with you.

With respect to the SAS log file, if you do not have one available from a previous simulation or it is too difficult to provide another one in the next three weeks, then ADF&G will review the simulation model without it.

#10-12 and 15. The memo of December 6 indicates that you were intending to send the final version of the SAS model to the Legislature following further refining and making it a more user friendly software. In your memo, you stated: "I do plan to make the model much more user friendly. I also plan to rewrite the larger report with the new model's results for Sea Grant. I would be willing to give you the new models which should be immensely easier to run. I plan to have it done in the next six months or so." Your letter to me indicates that you may no longer be doing this refining. It's my understanding that in order for the CBA simulation model to be used by someone else, they would need to have the ability to vary the production variables in your demand model and create new price output files. If this is not a reasonable request, or you have some other thoughts, please let me know.

#13. Thank you for the estimate. ADF&G thought it would take several hours to complete a simulation for a single case.

#14. Question answered, thank you.

I'm not quite sure how to respond to your reservations about working with the FRED Division. Unfortunately, Ginny Fay was the person who acted as the intermediary between all of us involved in the

economic studies, and she is no longer on contract with us. I'm not really in a position to assign blame for what appears to be a breakdown in communication. However, I can assure you that the Legislature - and ADF&G - are still very interested in your research and in continued work with the simulation models. I would urge you to somehow resolve, if at all possible, whatever problems have developed during the course of this project. If I can be of help, please let me know. I feel like I'm very much caught in the middle on this. However, I remain committed to the entire enhancement review project, and want to make sure that all of the information we have contracted for is easily understood and is in a form for current and future use. I appreciate your help with this effort, Mark.

Sincerely,

A handwritten signature in cursive script, appearing to read "Molly".

Molly McCarron

cc: Jeff Koenings
John Lehman
Carol Lewis
Bob Logan
Dianne Bischak
Joshua Greenberg
Keith Criddle
John Boyce