REPORT.

"AN ANALYSIS OF THE ALASKAN SALMON FISHERY"

AN ANALYSIS OF THE ALASKAN SALMON FISHERY

PREPARED FOR:

THE AQUACULTURE POLICY STUDY GROUP
OF THE
ALASKA STATE LEGISLATURE

BY THE FIRMS OF:

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August 30, 1979.

CONTRACT REPORT

The 1978 session of the Alaska State Legislature established the Aquaculture Policy Study Group as an advisory body to examine a number of policy matters relating to the Alaska Salmon Resource Development Program. Membership in the Study Group includes representatives from the several regional non-profit aquaculture associations, the Alaska Departments of Fish and Game, Commerce and Economic Development and Revenue, the U.S. Forest Service and Department of Agriculture, the University of Alaska Sea Grant program and members of the Alaska legislature.

In March, 1979 the Aquaculture Policy Study Group retained the consulting services of a consortium of three firms. Miller and Associates, Inc., Olympia, Washington; Leonard Lane and Associates, Anchorage, Alaska; and Mr. William Wilkerson, Attorney, law firm of Eisenhower, Carlson, Newlands, Reha, Henriot & Quinn, Tacoma, Washington.

The consulting services to be provided by the team of consultants was defined to include four basic tasks each of which are briefly described as follows:

TASK #1 - Search for Goals

The consulting team was required to research and examine Alaska state constitutional provisions, statutes and

other documentation to determine the extent to which goals for an Alaskan Salmon Resource Development Program had been established. The consulting team was further instructed to examine existing goals and present possible alternative goals to the Study Group for their consideration.

TASK #2 - Institutional and Policy Analysis

The consulting team was required to examine the roles and missions of existing institutions involved in the Salmon Resource Development Program, define existing problems, and recommend alternative institutional arrangements which would be more suitable for obtaining the goals set forth in Task #1.

TASK #3 - Economic Evaluation Techniques

The consulting team was requested to inventory micro and macro economic evaluation techniques, economic factors and methods of analysis and recommend an effective means for making economic evaluations of evaluating Salmon Resource Development Projects.

TASK #4 - Financial Planning

The consulting team was requested to examine the present means of financing salmon development programs, define problems and recommend a model financial planning framework.

The consulting team prepared analytical information for presentation to the Study Group in meetings held in March, May and July.

A fourth meeting was held in late July. At the meeting, discussions and plans were focused upon initiating alternative financing strategies as a result of the State Superior Court ruling in Wayne Alex, etal., v. Southern Southeast Aquaculture Association, etal. As a result of the redirection received during the July meeting, project research priorities were altered. Increased emphasis was to be placed upon developing alternative financing mechanisms to the unconstitutional mandatory assessment.

The consulting team held up preparation of the final report to the Study Group pending the receipt of clarifications to the court decision and to discuss with the Office of the State Attorney General possible alternative organizational as well as financial strategies which might be available to the regional aquaculture associations in light of the court ruling.

This final report incorporates the effect of this late development and attempts in greater detail than originally planned to provide the Study Group with alternatives and recommendations which expressly recognize the severe impact on regional aquaculture programs from the ruling for their further review and analysis. We emphasize that considerable further work and analysis of financial and institutional

alternatives will be required prior to the 1980 session as a result of present legal uncertainties.

The consulting team wishes to express its deep appreciation to members of the Aquaculture Policy Study Group, Mr. John Sund and legislative staff for their interest and valuable assistance in conducting the studies which are contained in this report.

Sincerely,

WALLACE G. MILLER
President

MILLER & ASSOCIATES, INC.

PREFACE

It may be helpful to the reader to understand why the sequence of subject matter is arranged in this report as it is.

Rather than begin this report with a discussion on goals and proceeding on with a discussion of organizational arrangements, economics and financing, it seemed more appropriate to the consulting team to address these subjects in their natural order of occurrence.

In terms of their natural order, the foremost concern about salmon aquaculture is whether it is or can become economically feasible. If aquaculture programs are not or cannot become economically attractive, then there would seem to be little point in carrying the analysis through the remaining subjects, therefore the economic issue is contained in Chapter I.

If salmon aquaculture is or can become economically attractive, it seems the next most appropriate question to raise is who pays for the program and how can this be accomplished, particularly in light of the recent State Superior Court ruling. Financing issues are discussed in Chapter II.

Assuming that salmon aquaculture is economically sound and a method of financing can be developed and implemented, the question of how to organize to carry out salmon aquaculture seemed appropriate for Chapter III.

If the economic, financing and organizational hurdles can be cleared, only then does it seem appropriate to talk about both existing and potentially new goals as well as other measures which could be adopted to ensure the long term success of the State salmon resources development program, which is covered in Chapter IV.

Finally, in the interest of readibility, we have prepared this report in such a manner so as to eliminate almost all mathematical equations and formulas.

INTRODUCTION

The objectives of this introductory section is to provide a brief recapitulation of the events and circumstances which led to the formation of the Aquaculture Policy Study Group and explain why, at this late date, it is necessary to raise some very fundamental questions about the Alaska Salmon Resource Development Program.

Much has been written elsewhere, and in greater detail about the size of historic salmon runs in Alaska. In recent years, the 1950's to the mid-1970's, and for a variety of reasons, Alaskan salmon runs declined precipitously. This decline in the fishery with its resulting loss of income, employment, subsistence and recreation was a common concern among commercial, sports and subsistence fishermen. The fishing industry (including salmon, shellfish and bottom-fish) was and is the largest private sector employer in Alaska. In addition, fishing had become so ingrained into so much of Alaskan culture and lifestyle that alternative choices were both distasteful and unrealistic for the many small communities and villages in Southeast and other parts of Alaska.

While the propagation of salmonoid species was initiated in western coastal states and British Columbia in the late 1800's, no similar long-term resource development steps were taken in Alaska. In 1971, the Alaska legislature

created the Division of Fisheries Rehabilitation, Enhancement and Development (F.R.E.D.) (Chapter 113 SLA 1971) of the Alaska Department of Fish and Game. The legislature, among other duties, charged F.R.E.D. with the responsibility to "develop and continually maintain a comprehensive, coordinated long-range plan for the orderly present and long-range rehabilitation ... of all aspects of the state's fishery ..." In addition, the legislation authorized the new division to "encourage the investment by private enterprise in the technological development and economic utilization of the fisheries resources."

The creation of F.R.E.D. was the first expressed statutory authorization for the state to enter into programs to rehabilitate, enhance and develop its salmon fishery, notwithstanding that the framers of the Constitution in 1959 (Article VIII, Section 5) authorized the legislature to "provide for facilities, improvements and services ... to assure further utilization and development of the fisheries."

In 1972, the Alaska legislature proposed and the citizens passed a constitutional amendment which provided the state with a constitutional basis for limiting entry into the fishery (resouce conservation) and carrying out aquaculture programs in the state. Clearly, restoring the salmon fishery to higher historic harvest levels was and is a high priority in the state.

Through these and other constitutional and statutory provisions two potentially powerful tools had been created which could be used to restore the fishery: (1) limited entry, combined with improved biological data, management, enforcement and stock regulation; and, (2) the rehabilitation, enhancement and development authority of the F.R.E.D. Division. Both were viewed as complementary means for restoring the salmon fishery.

These tools were soon employed in the restoration of the fishery. Stringent restrictions were placed on harvesting to allow natural brood stocks to increase and build run strength. The F.R.E.D. division began the long, arduous process of acquiring technical expertise, enhancement sites and capital funds to design, develop and place into operational status the facilities, rehabilitation projects and similar activities associated with restoring or creating new salmon runs.

Hindsight suggests that regardless of the methods employed, restoration of salmon runs requires a great deal of time, even under the best of circumstances. Two to four years, depending upon the salmon species involved, is the smallest increment of time which can elapse before improvements can be noticeable. Given variations in climatic conditions, the difficulty in regulating escapement needs, and problems attendant to finding suitable sites for construction of propagation facilities and constructing the facilities

under extremely difficult conditions, delays were inevitable and encountered in the anticipated salmon recovery time table.

In 1974 the State legislature enacted what is commonly known as the "Private Non-Profit Hatcheries Act" (Chapter III, SLA 1974), which authorized the private ownership of salmon hatcheries by qualified non-profit corporations for the purpose of contributing by artificial means to the rehabilitation of the state's depleted and depressed salmon fishery. (Emphasis added by underlining.)

It is difficult at this point to accurately gauge all of the factors which motivated the enactment of this legislation. In part the act reflected a declaration of a choice between private for-profit aquaculture and private non-profit aquaculture. Beyond this, a strong motivating factor was the desire to see if less bureaucratic and costly means of restoring the salmon fisheries' stocks could produce the desired result.

While subsequent legislation during the 1976 and 1978 sessions provided a major financing basis for F.R.E.D. division capital facilities, and for further refinements to the Private Non-Profit Hatcheries Act, the stage was being set in 1974 for the addition of private non-profit hatcheries as yet a third potentially powerful tool to the two already established and at work in restoring the salmon fishery.

Results from the improvement management of natural stocks became noticeable in 1976 and by 1978 and 1979 statewide harvest levels reached approximately 80 million salmon. F.R.E.D. artificial production facilities in 1978 provided several hundred thousand additional returning salmon. With the exception of the Prince William Sound Regional Association, the new regional non-profit aquaculture corporations were in the beginning stages of production development and did not contribute significantly to the almost record level returns of 1978 and 1979.

The recent near record level salmon harvests, when coupled with the planned increased production capability of the F.R.E.D. division and the limitations imposed by the court decision on the Private Non-Profit Aquaculture Associations, could combine to produce some curious effects on future development of the fishery. A question exists whether, given the current near record levels of harvest, affected fishermen will be willing to re-impose a mandatory assessment or royalty on their harvest income now that the years of deprivation appear to be behind them? On the other hand, are fishermen willing to absorb the cost of resource expansion if regulation of natural stocks is the only tool to be utilized to achieve this goal for Alaska's renewable salmon resource?

One of the present policies of Alaskan state government is for production facilities to become economically

self-sufficient over a reasonable period of time. Thus, a major issue to be addressed by policymakers over the next few years is the level of fisheries development program costs to be borne by primary benefactors or users. For example, if the F.R.E.D. division continues with its planned expansion of operational facilities, who is to pay for the operating cost of the facilities, all of the taxpayers of the state or those who primarily benefit from the development of the resouce?

Another major issue to be resolved is whether a satisfactory working arrangement can be established among the now competing salmon restoration tools: natural production, state artificial production and regional non-profit corporation production?

Finally, is it possible to effect a timely solution to the financial dilemma of the non-profit regional associations which will pass muster by the court, thus avoiding the need for state subsidies or state collected mandatory assessments which will allow these organizations to continue to contribute to the restoration of the fishery?

Clearly there are a number of additional major and unresolved issues affecting the state's Salmon Resource Development Program. While the original scope of the work planned for this report was somewhat limited, we have attempted to broaden its scope to reflect the possible effects current harvest levels and other issues could have in the considera-

tion and selection of alternative courses of action by the Aquaculture Policy Study Group. Moreover, at the direction of the study group, we have addressed organization of fisheries development activities in the context of a holistic program, identifying the reasons why and means for addressing multi-species development which we believe is in the best interest of the citizens of Alaska.

Chapter I - SALMON AQUACULTURE ECONOMIC EVALUATION TECHNIQUES

Micro Economic Evaluation Techniques

The need to have one or more objective means for evaluating in a micro economic sense, the value of a salmon aquaculture project has two primary sources. First, regional non-profit aquaculture associations need a uniformly applicable methodology for assessing whether or not a planned aquaculture project will provide a satisfactory return on the capital investment and expenses of operating the facility.

Regional associations have borrowed millions of dollars, and will borrow more, for capital facility investments and operating expenses. These monies must be repaid. In addition, start-up expenses must be incurred for a minimum of two to four years, depending upon the species, prior to any returning adults being available for fishermen to harvest. Moreover, if required, a terminal area harvest could be implemented with the income from the terminal area harvest used to help defray facility operating costs and to provide a source of funds for repaying the borrowed capital and related interest charges.

A second objective means for evaluating the value of an aquaculture project is required by government agencies. This measure is somewhat different than the valuation measurement needs of regional associations or the private sector.

Whereas the primary concern of regional associations must by necessity be limited to narrow regional financial and economic criteria, government agencies are often charged with performing socially beneficial acts which are seldom, if ever, accorded a value in the traditional financial market places.

In these private markets, a financial/economic evaluation system for salmon propagation facilities would be concerned only with the income produced from the harvest and sale of adults returning to the facility by association members or as necessary to pay the costs associated with the facility.

Because of the more encompassing responsibilities of government agencies, the value of government sponsored salmon propagation facilities must be extended beyond the boundaries established by the traditional financial/economic evaluation system. For example, salmon harvested by sports and subsistence fishermen, which must be considered "losses" in a traditional financial/economic model, should be valued by government agencies whose responsibilities extend beyond pecuniary returns.

Another example is the "value added" to the salmon through processing. This does not directly enure income to fishermen of regional associations; consequently, this societal benefit is not a factor affecting the economic and financial decisions of fishermen or regional associations. The "value added" of processing, however, can and should be

considered by government agencies in valuing the benefits to be derived from a government sponsored propagation facility.

At a more theoretical level at least, the value of the employment provided by the propagation facility as well as indirect employment (the additional clerk at the grocery store who serves fishermen or the attendant who fuels their boats) could also be considered as benefits to values added by aquaculture projects.

The "value added" micro economic model has some practical limitations. If one attempts to be too precise in using the cost benefit analysis micro economic system for valuing government sponsored propagation projects, it obviously becomes difficult and costly to obtain the necessary financial and economic information needed for evaluating each project under consideration. Similar technical measurement problems also plague the traditional financial/economic evaluation system, in its application to salmon propagation facilities. The discounting of future revenues and expense streams, the proper selection of the discount rate, and similar technical considerations, while professionally satisfying, provide for a level of refinement which may be excessive when compared with the value of obtaining information relating to other formula elements such improving as the state of the art in predicting the number of returning adult salmon. In other words, the choice of the parameters or factors and the degree of refinement to be used in both the traditional

financial/economic evaluation model and the government oriented socio-economic evaluation model, should be generally tempered by the cost and availability of financial and economic information as well as the existing capability to estimate the number of adult returns to a propagation facility.

After carefully weighing all of the factors, parameters and methodologies which could be utilized in valuing the benefits to be derived from a salmon resouce development project, and after giving equal consideration to the availability and cost of acquiring data and taking into account the many unknowns which limit the state of the art in predicting run size, the contracting team recommends the following models, factors and parameters be used to meet the evaluation needs of regional associations and government agencies.

I. Financial/Economic Evaluation Model for Regional Aquaculture Associations.

Because of the private sector orientation of aquaculture development in Alaska and the need to attract increased amounts of investment capital to provide for the orderly growth and development of this means of developing Alaska's salmon resources, the most appropriate micro economic model for evaluating salmon propagation project is the use of a return on investment model.

The use of a return on investment model by the

regional aquaculture associations meets several critically important needs. First, each aquaculture project developed by the non-profit corporations must pay its own way, or in the alternative be financially supported from excess revenues available from other aquaculture projects of the corporation. It is amply clear from recent events that a major concern of lending institutions (including state and federal agencies) is whether or not specific aquaculture projects are sound investments. Moreover, the state legislature needs such information to monitor on a continuing basis the worth of this program. Given the current absence of any mutually acceptable return on investment model, lending institutions and others have no objective basis for considering the relative merits of requested loans and now must use more subjective and arbitrary criteria in approving or disapproving a loan request.

Additionally, fishermen belonging to a regional aquaculture association are critically concerned about the overall soundness of an investment in an aquaculture project and need to know whether or not borrowed funds can be repaid by the project without requiring higher levels of assessment against the fishermen. Fishermen are also concerned about the net benefit to them from the investment in an aquaculture project. They need to know, or have a believable estimate of the number of salmon which can be harvested by them as a result of their investment in an aquaculture project.

Professional managers of the regional associations also need to have an established and accepted means for evaluating alternative investment opportunities, securing the necessary financing for selected opportunities and being reasonably assured that the returns from the investment will be adequate to pay for the cost of the project.

In summary, the use of a return on investment (ROI) model is the most appropriate means for satisfying the financial assessment needs of lending institutions, the legislature and fishermen and to evaluate the financial risks and rewards to managers and members of regional aquaculture associations.

II. Considerations in the Development of a Return on Investment Model for Salmon Aquaculture Projects.

The standard formula for computing return on investment can be stated as follows:

$$\text{Return on Investment} = \text{'s } \frac{\text{Total Revenues Less Costs}}{\text{Total Investment}}$$

While the ROI formula can be stated in quite simple terms, substantial work can be involved in identifying total revenues, total costs, and the total investment.

Total revenues, for example, are a product of the number of returning adult salmon which can be harvested multiplied by the going ex-vessel price paid to fishermen for a particular species in each of the various geographic areas of Alaska.

The single most difficult part of the revenue equation involves the accurate estimate of the number of adult salmon which will return from a particular given brood year. Rates of return, which can be expressed in terms of the percentage of adult survivors to the number of eggs deposited, vary significantly from brood year to brood year for the same species, vary significantly among species and vary greatly among the various means for artificially and naturally propagating salmon. To further compound the problem of accurately estimating returns, run strengths or survival rates for the same species can vary significantly between broad geographic regions as well as between adjoining watersheds.

Notwithstanding, the severe difficulty in accurately estimating salmon survival rates, the F.R.E.D. Division of the Alaska Department of Fish and Game has developed some standard assumptions on salmon survival rates. These rates are shown in Table I, in a somewhat different format than set forth in the ADF&G directive.

Table 1

AN ANALYSIS OF ARTIFICIAL & NATURAL SALMON PROPAGATION METHODS

		STAGE I			STAGE II				STAGE III			
	FECUNDITY	Survival-Egg Take to Emerge Stage by Propagation Method(2)			Survival Emerge to Migrant Stage by Propagation Method (3)				Marine Survival by Propagation Method (4)			
		Natural	Hatchery	Incu. Box	Natural	Hatchery	Lk. Fert.	Incu. Box	Natural	Hatchery	Lk. Fert.	Incu. Box
PINK	Ave. 1600	160	1360	720	-	1224	-	-	5	25	-	7
SOCKEYE	Ave. 3000	300	2550	1350	60	170	-	98	5	11	-	14
CHUM	Ave. 2200	220	1870	990	-	1683	-	-	6	11	-	14
COHO	Ave. 2800	280	2380	-	56	1666	-	-	4	100	-	-
CHINOOK	Ave. 6500	650	5525	2925	130	3868	-	293	4	77	-	1

(1) Survival rates for artificial production based on F.R.E.D. Division Directive.
Natural production estimated by contractor.
All percentages rounded to nearest whole percent, where possible.

(2) Survival - Egg Take to Emerge Stage
Percentile Estimates (10% estimate is shown in the Table)

	Natural	Hatchery	Incu. Box
PINK	7-10%	85%	45%
SOCKEYE	7-10%	85%	45%
CHUM	7-10%	85%	45%
COHO	7-10%	85%	-
CHINOOK	7-10%	85%	45%

(3) Survival Emerge to Migrant Stage
Percentile Estimates

	Natural	Hatchery	Lk. Fert.	Incu. Box
PINK	-	90%*	-	-
SOCKEYE	2-3%	75%**	-	7%
CHUM	-	90%*	-	-
COHO	2-3%	70%	-	-
CHINOOK	2-3%	75%	-	10%

*To fingerling size
**Lake reared as resident fry
***Because of their high value chinook would be Hatchery reared rather than placed in an incubation box.

(4) Marine Survival Estimates

	Natural	Hatchery	Lk. Fert.	Incu. Box
PINK	4%	23%	-	1%
SOCKEYE	6%	6%	-	1%
CHUM	1%	2%	-	1%
COHO	8%	6%	-	-
CHINOOK	1%	2%	-	1%

Table I suggests that there are at least three distinct stages in the life cycle of a salmon where artificial means can be employed to change the rate of survival of adult returning salmon. In addition, within each stage there are a variety of alternative propagation choices which can enhance survival, each of which have different cost characteristics and yield different rates of return on their associated investment.

As indicated in Table I (Stage I), the basic economic attractiveness of artificially propagating salmon results from the fact that under natural spawning conditions only 7 to 10 percent of the green eggs deposited by spawning salmon produce emergent fry. Under the more controlled conditions of a hatchery, survival rates from the green egg stage to the emergent fry stage of 85% are estimated to be achievable. This 8 to 10 times greater Stage I survival rate provides a major economic justification for artificially propagating salmon. This reasoning is based upon the assumption that the more salmon which are initially produced, the greater the number that will survive to be available for harvest. This should lead to increased fishermen's incomes and provide sufficient economic benefits (e.g. terminal harvests) to pay for the cost of constructing and operating the propagation facility.

There are other alternatives in Stage I to simply choosing between natural production and hatcheries. For

example, incubation boxes, which involve a mere fraction of the cost of hatcheries, under certain circumstances can be considered as an attractive financial and biological alternative to either natural or hatchery propagation methods. Stream rehabilitation (not shown in Table I), a method for improving natural runs, is another example of the type of biological and economic choice which could be made to increase the size of a salmon run or improve survival rates. (Note: In Chapter III we discuss a variety of research activities to be undertaken to improve survival rates at each state.)

The important point to recognize is that survival rates vary with the type of propagation method, which in turn vary significantly in terms of cost. By combining survival rates and the costs associated with the methods for achieving those survival rates in a return on investment model, a means is available for objectively analyzing and determining which sets of biological and economic considerations will produce the better return for the required investment.

Stage II deals with a second set of economic choices and survival rates from those contained in Stage I. During Stage II for example, emergent fry can be reared to a larger size in a hatchery, which improves their survival rate, but again, certain costs are incurred which have to be carefully weighed against the estimated increase in the number of returning salmon. It is important to recognize

that Stage II economic choices and survival rates may be largely independent of the choices made during Stage I. For example, during Stage I, it may be economically desirable to release unfed pink and chum fry without incurring further costs associated with Stage II types of activities. Alternatively, it may be economically desirable in Stage I, to incur no propagation costs on sockeye salmon by depending upon natural spawning but during Stage II use the newly developing lake fertilization technique as a means of increasing Stage II survival rates.

Another highly interesting Stage II method for improving survival rates is the predation control program established by the Alaska Department of Fish and Game in the Wood River Lake System. Arctic chum are impounded in a holding pen to reduce their predation on outmigrating smolt. According to estimates, up to one million smolts are saved each season by the control project.

Again, the point is made that both Stage I and Stage II propagation methods involve a series of often independent economic choices and differing survival results. The current inability (or limited ability) to clearly distinguish the costs and benefits (increased survival) associated with each stage substantially limits the useability of such data for economic analysis purposes.

Table I, Stage III depicts a very limited series of possible marine survival rates. These rates are largely

predicated upon the current methology in which Stage I and Stage II propagation methods are assumed to be interdependent, which as we discussed earlier, is not always the case. For example, no assumptions or estimates are included which indicate the potential increase in the marine survival of Stage I natural spawning sockeye resulting from lake fertilization during Stage II.

Stage III, Marine Survival also offers an opportunity, quite independently of Stages I and II, to increase the number of returning adults. Methods for reducing predation by beluga whales (or sea lions) in the marine environment, and techniques for reducing shaker (coho, chinook) mortality are but two means which could be used to increase the number of returning adult salmon. The implementation of either or any of these techniques during Stage III, like Stages I and II, depends both upon the expected increase in survival rates as well as the costs to be incurred.

Five critically important observations about salmon survival rates which are apparent from the information contained in Table I need to be made at this point prior to further defining the elements to be included in a return on investment model for salmon aquaculture projects. These are:

(1) There are an increasing variety of opportunities within each of these three stages in the life cycle of salmon to employ artificial methods which will increase salmon survival rates.

(2) The mission of regional aquaculture associations, the F.R.E.D. division and the Salmon Resource Development Program (ASRDP) as a whole, should not be limited to Stage I types of choices (i.e., natural production v. hatcheries v. incubation boxes) but should instead encompass the entire range of biological and economic choices available to them in order to allow the maximum return on investments to be realized.

(3) Too little emphasis has been placed on doing research on improving survival rates and there is a lack of data which corresponds to the alternative economic choices within and across the various life cycle stages. This severely limits the current capability to develop reliable financial estimates of the potential economic benefits to be derived from almost any given salmon propagation endeavor.

(4) Let us assume for a moment, at least, that the F.R.E.D. division were adequately funded to perform the necessary data gathering and research and development of alternative means for increasing salmon survival rates. Let us further assume that such data and means were used in a wide variety of ways by regional associations to increase Stage I, Stage II and Stage III survival rates (in independent as well as an interdependent fashion). As a result of the possible interactions and combinations of propagation techniques, in many instances there may not be a separately identifiable, artifically propagated run which could be

subjected to a terminal area harvest as a means of recovering the capital and operating costs associated with achieving the increased survival rate. A simple example of this dilemma occurs when a regional association incurs costs to rehabilitate a stream bed to improve natural spawning conditions. Because no artificial run was created no terminal area harvest can be employed to recover the investment. Regional associations now regard such projects as non-revenue producing and absorb the attendant costs of the project within available funds. If future aquaculture developments make Stage I - II hatchery type operations economically less attractive then other choices, and at the same time the regional associations are placed in a position of developing and operating new hatcheries simply because they are dependent upon terminal area harvests for a major source of operating revenue it would be indeed unfortunate. Given the growing technological developments in salmon enhancement, it is important that the selected financing mechanisms not lock regional associations into less attractive propagation methods because of harvest considerations.

(5) The bulk of information critical to a return on investment model is biological. Lending institutions must have the capability to evaluate this critical information, or alternatively the lending authority must be placed with those who have the biological expertise to evaluate such proposals (See Chapter III).

III. Elements of a Return on Investment Model for Salmon Aquaculture Projects.

Notwithstanding the present limitations on the availability of reliable information upon which to estimate the number of returning adult salmon, the following propagation factors must be reflected in a return on investment model for salmon aquaculture projects.

A. Salmon Propagation Factors.

1. The Number of Eggs to be Propagated.

If green eggs are used for the initial planning basis it will in turn (together with an estimate of the average number of eggs available per female spawner) provide a basis for estimating the number of salmon required for egg taking purposes as well as the estimated number of adult returns.

2. Stage I Estimated Survival Rates by Species - (Green Egg to Emerge Stage).

(a) Natural production;

(b) Natural production rehabilitation (i.e., stream bed rehabilitation);

(c) Hatchery production;

(d) Incubation box;

(e) Other.

3. Stage II Estimated Survival Rates by Species (Emergent Fry to Migrant Stage).

(a) Natural production;

(b) Natural production rehabilitiation;

(c) Hatchery production

(1) Fed fry;

(2) Fingerling;

(3) Smolt.

(d) Hatchery production (out-station plants)

(1) Fed fry;

(2) Fingerling;

(3) Smolt.

(e) Incubation box;

(f) Lake fertilization (In combination with 2(a), (b), (c) or (d), above);

(g) Other.

4. Stage III Estimated Survival Rates - by Species (Marine Survival).

(a) Natural survival (no human intervention directed at increasing the survival rate of the particular run);

(b) Enhanced survival (human intervention i.e., predator controls applied).

5. Estimated Total Returns - by Species.

Estimate of the number of adult salmon which will return to the area of harvest as a result of propagation methods and any enhanced survival techniques employed.

6. Number of Spawning Stock Required for Run Maintenance - by Species.

Estimate of the number of male and female spawners required to maintain the initial run.

7. Number of Spawning Stocks Required - by Species.

Estimate of the number of additional male and female spawners required to increase initial run size. The decision to increase a run size should reflect the lost opportunity costs (to fishermen) represented by the value of the additional spawners required to build the level of the run).

8. Hatchery or Other Surplus - by Species.

There are often surplus male salmon which are not needed for spawning purposes, therefore an estimate of the amount of the return which cannot be harvested nor is required for spawning purposes needs to be made if the surplus can be sold. (Any value of spawned out carcasses should also be included).

9. Estimated Total Number of Harvestable Salmon - by Species.

The estimated total number of harvestable salmon is the estimated total return less spawning stock required and any surpluses.

B. Salmon Revenue Factors.

Salmon revenue estimates for the return on investment model should be based upon the estimated total number of harvestable salmon and estimates of the ex-vessel prices being paid for the salmon. Salmon revenue should also include any revenues received from the sale of spawned-out carcasses and spawning surpluses.

Considerable variations occur in Alaskan salmon ex-vessel prices by region. The quality of the fish harvested as well as the supply of salmon which is available also affect ex-vessel prices.

In addition to the regional price variations, total project revenues can be based upon a constant dollar basis or on a current dollar basis. A constant dollar basis for estimating revenues would, for example, be 1979 ex-vessel prices extended for the expected life of the project. The current dollar basis would be based upon estimates of future ex-vessel prices during the life of the project. There are advantages and disadvantages to both.

The use of a constant dollar basis works well for short-term projects where the returns tend to be immediate. It works less well when long term (20-30 years) pay-outs on investments are required and inflation is increasing operating costs at a rate which may or may not be commensurate with increases in the market price for salmon.

The use of the current dollar basis attempts to adjust for the effect of inflation on operating costs and to reflect future market prices for salmon based upon inflationary trends as well as the effects of supply and demand at various production levels. While the main advantage of the current dollar basis is that it is an attempt to take future prices and costs into consideration in evaluating the return on investment potential of a particular aquaculture project. A

primary disadvantage of the current dollar basis is the lack of reliable forecasts of future costs and prices for the salmon industry. A further disadvantage is that the relative merits of a project (in relation to an alternative investment choice) can become so obscured by price and cost change assumptions, which may or may not be reliable, that short-term choices tend to be selected over longer-term projects simply because of the uncertainty over future costs and prices.

Despite the advantages and disadvantages of both the constant dollar basis and current dollar basis for estimating costs and revenues, each can be effectively used in a return on investment model.

The following general guidelines may be helpful in selecting whether to use a constant dollar basis or a current dollar basis for use in a return on investment analysis.

1. During times of high rates of cost inflation and high levels of salmon production and where market prices are not increasing at a rate commensurate with inflation, the use of a current dollar basis in the return on investment model will help ensure that spiraling operating costs together with stable production and market prices do not create a future situation whereby all of the salmon production from a propagation project is required to pay operating costs, with no harvest allowance provided to fishermen.

2. If a choice is being made from among like projects (i.e., approximately the same level of capital investment, return timing, operating costs, depreciable facility life and etc.) the use of a constant dollar basis would be suitable for inclusion in the return on investment model.

3. Short-term capital projects which require little or no continuing operating expense can be comparatively evaluated using the constant dollar basis.

4. When in doubt about which basis is more appropriate and the amount of the investment at risk is significant, use both the constant dollar basis and the current dollar basis and make any decisions on the set of data which indicates the least favorable return on investment.

The salmon revenue factors to be taken into consideration are as follows:

1. Estimated Total Number of Harvestable Salmon (as derived earlier).

2. The Value or Price Per Pound of the Salmon.

The regional ex-vessel price expressed in terms of constant dollars or current dollars over the useful life of the project.

3. The Estimated Weight Per Fish.

4. The Total Value of the Estimated Numbers of Harvestable Salmon.

Item 1, multiplied by item 2 multiplied by item 3.

5. The Value of Surplus and Spawners.

The estimated revenues resulting from the sale of spawned out carcasses and hatchery or other surpluses.

6. The Total Estimated Value of the Run.

Add item 4 and item 5.

C. Cost Factors.

There are a variety of categories of costs incurred by regional associations, not all of which are fully allocable nor attributable to a propagation project or facility. These cost categories, their allocability, and other characteristics are discussed as follows:

1. Regional Association Administration.

Regional Association Administration includes all expenses related to the selection of and expenses incurred by the directors of the regional association. Other allocable expenses (see 2 below) related to operating and maintaining the regional association belong in this category. Under the financing plan presented in Chapter II, none of the costs of Regional Association Administration would be charged to a propagation facility or project.

2. Administrative and Supportive Services.

Included in this cost category are the salaries and wages of the executive director, clerical and secretarial personnel and such expenses as newsletters, assessment bookkeeping activities, accounting, purchasing and payroll services, general planning (consulting) services, office

rent, office utilities and equipment. These costs are fully allocable to Regional Association Administration as well as to Technical Services, Full Production Hatchery Operations and other cost categories. The division in Administrative and Supportive Service Costs between Regional Association Administration and other cost categories should be based upon the proportion of payroll and other expenses attributable to the support of each activity.

3. Technical Services.

This cost category includes the salaries and wages of regional biologists and other technical personnel who perform regional planning activities, conduct stream surveys, conduct tagging and other research activities, plan and conduct egg takes and similar technical activities not involved with the day to day operation of hatcheries or other production enhancement activities. A portion of the Administrative and Supporting Service overhead costs should be allocated to this category in porportion to the services received or expenses incurred. The rental of aircraft, marine vessels and other similar expenses associated with egg takes, stream surveys and other related activities should be direct charges to the Technical Services category of expenses.

4. Full Production Hatchery Operations.

This category includes the direct salaries and wages of hatchery supervisory and operating personnel, fish

food utilities and other expenses attendant to operating a hatchery or other propagation facility once that full returns are being realized. Also included in this cost category are costs attendant to performing a terminal area harvest.

5. Hatchery & Enhancement Projects Start-Up Costs.

This cost category includes all hatchery or enhancement project costs similar to those listed for 4 above or 6 below which are incurred or must be paid during the period of time between initial start-up and when full returns are being realized. Recurring expenses related to a rehabilitation project, lake fertilization project or similar production improvement activity, occurring prior to the full returns being realized should be recorded as a direct start-up charge to each such project.

6. Capital Investment Program.

This cost category includes all capital investments for hatcheries and other propagation facilities as well as such one-time enhancement projects as stream rehabilitation. Costs included for each facility include land, buildings, utilities installation, architect's fees interest and similar costs relating to the projects. One-time salaries and wages and other direct costs attributable to a stream rehabilitation or similar enhancement project should be recorded as a direct charge to each project.

7. Total Cost.

Includes all costs for cost categories 1-6.

8. Total Propagation Facility (Project) Cost.

Includes allocated administrative and supporting services overhead charges to categories 4 and 5 as well as direct charges to categories 4 and 5 plus the appropriate capital and interest charges from category 6.

D. Economic Analysis Factors.

Based upon the revenue resulting from a salmon propagation project and the project costs as previously defined, it is possible to identify the estimated net revenue (gross revenue less allocable costs), either on an annual basis or for the estimated total useful life of the facility. Net revenue divided by the total investment in the propagation facility (cost category 6) will provide an estimate of the percent return on investment resulting from the project.

E. Propagation Facility Run Breakdown Analysis Factors.

The final element of a Return on Investment Model for salmon aquaculture projects is an analysis of who harvests the runs from the facility. There are three main elements contained in the run breakdown analyses. These include: That part of the run required for spawning stocks; that part of the run harvested by fishermen; and, that part of the run harvested in the terminal area which is used to pay a portion of the facility operating costs.

In summary, the elements which need to be considered in a return on investment model for salmon aquaculture

projects are: Salmon Propagation Factors; Salmon Revenue Factors; Cost Factors; Economic Analysis Factors and Propagation Facility Run Breakdown Analysis Factors. Table II provides an example of how the return on investment model can be applied in evaluating a potential aquaculture propagation project.

TABLE II

Example Return on Investment Analysis

(25 Million Egg Facility).

Analysis of Annual Costs - 25 Year Facility Life

	Reference Section	Constant Dollars (1)	Current Dollars (2)
SALMON PROPAGATION FACTORS	(A)		
Eggs Propagated	(A-1)	25 Million	25 Million
Estimated Total Returns	(A-5)		
Number Spawning Stock	(A-6)		
Hatchery or other surplus	(A-8)		
Estimated No. Harvestable Salmon	(A-9)		
SALMON REVENUE FACTORS	(B)		
Regional Expressed price per pound	(B-2)		
Estimated Average Weight per fish	(B-3)		
Value of Harvestable Salmon	(B-4)		
Value of Surplus and spawners	(B-5)		
Total Estimated Value of run	(B-6)		

TABLE II
(Continued)

	Reference Section	Constant Dollars (1)	Current Dollars (2)
COST FACTORS	(C)		
Full production of operations	(C-4)		
Hatchery start-up costs	(C-5)		
Capital Investment (3)	(C-6)		
Total propagation Facility Cost	(C-8)		
ECONOMIC ANALYSIS FACTORS	(D)		
Gross Income	(B-6)		
Total Cost	(C-8)		
Net Income			
Return on Investment			
RUN BREAKDOWN ANALYSIS FACTORS	(E)		
Spawners			
Fishermen			
Annual Costs			

IV. Elements of a Cost Benefit Analysis Model for Salmon Aquaculture Projects.

Earlier in this Chapter in the general discussion about micro-economic evaluation techniques, it was pointed out that cost benefit models, like return on investment models can be designed to include some very complex refinements.

In a cost benefit analysis model, for example, such refinements as adding certain operating costs incurred by fishermen to the cost side of the equation as well as adding allowances for direct and indirect secondary employment effects beyond the fish processing activity to the benefit side of the equation, while technically correct, involve estimates which are so speculative that their inclusion would severely strain the credibility of the cost benefit analysis.

While cost benefit analysis models can be made overly complex, at the other end of the spectrum the current practices of using ex-vessel prices paid to fishermen and excluding interest costs on capital investments results in an equally inaccurate statement of costs and benefits.

It is also important to recognize that while some of the factors included in a return on investment model can be used in a cost benefit model, other return on investment factors do not apply. While both models can be used to measure the "value" of an aquaculture project, the term "value" has different meanings in each model.

Again, the value of an aquaculture project to a regional non-profit aquaculture corporation must be expressed in terms of ex-vessel prices paid to association fishermen for the salmon provided as a result of the project and harvested by association members if the corporation is to remain financially solvent. Prior interceptions by non-association fishermen and terminal area harvests to pay hatchery operating costs must be regarded as "losses" because they reduce the amount of revenue accruing to the fishermen.

A cost benefit analysis model, unlike the return on investment model, does not have a narrowly defined regional income criterion. Hence, the term value in a cost benefit analysis model is more encompassing. The value of a government sponsored aquaculture project should include for example, consideration of prior interceptions by other domestic commercial and sports fishermen. (The term domestic for a federal agency would include all American fishermen. Alaska state departments may wish to define domestic to include only Alaska's resident fishermen.)

The use of ex-vessel prices, while appropriate in a return on investment model for regional non-profit corporations, is not appropriate in a cost benefit analysis model. If the objective of a cost benefit analysis is to measure the domestic value of a salmon aquaculture project, the "value" must not only include money paid to fishermen but also the value added to the domestic economy as a result of

producing the run and processing the harvest. In other words, the salaries and wages paid to hatchery operating personnel, cannery workers and employees of firms who process fresh and frozen salmon are part of the value to the domestic economy from the aquaculture project which must be recognized in the cost benefit analysis model.

It might appear strange to include the salaries and wages of hatchery operating personnel in both the cost and benefit sides of an equation. Clearly such costs belong in computing the "cost" of an aquaculture project. It is equally clear that the employment of hatchery personnel is as valuable an addition to the domestic economy as the employment of fishermen or others, regardless of the fact that the form of compensation differs.

As can be demonstrated in the following simple example, it is not only important to include the salaries and wages of hatchery personnel as both a cost and a benefit, but further that these costs/benefits do not cancel out and therefore cannot be excluded from both sides of the equation.

Cost Benefit Analysis Example

Costs:	
Hatchery operators salaries and wages:	$20,000
Other costs:	10,000
Total costs:	$30,000

Benefits:

Hatchery operators salaries and wages:	$20,000
Other benefits:	80,000
Total benefits:	$100,000

Cost Benefit Ratio: 3.33:1

If the $20,000 in hatchery operators salaries and wages is excluded from the perceived benefits to the domestic economy from the aquaculture project, and the benefits were valued at $80,000, the cost benefit ratio would be 2.67:1. Alternatively, if the hatchery operators salaries and wages were excluded from both sides of the equation leaving a cost of $10,000 and a benefit of $80,000, the resulting ratio would be 8:1 rather than the correct amount of 3.33:1.

A most difficult issue in defining value in a cost benefit analysis has to do with predation. Some would argue that the salmon from an aquaculture project harvested by bears, eagles and other predators should be valued as a means of recognizing the social goal of preserving wildlife which is often a stated goal of some government agencies. While there is a certain amount of attractiveness to such a proposal, it presents several problems which are difficult to resolve.

First, the amount of predation is so uncertain and speculative that its explicit recognition would severely strain the credibility of the cost benefit analysis. Second, the value recommended for measurement in the cost benefit

analysis model is the contribution made to the domestic economy by the aquaculture project. This definition would generally exclude consideration of imputing a value to predation except under unusual circumstances. It is conceivable that predators might be attracted to an artificially propagated run, thus providing a greater harvest opportunity on an adjacent natural run. To the extent that such a circumstance might occur, and further to the extent that the harvesters of the natural run benefit from the substitution, an argument could be developed for adding the number of additional natural salmon harvested to the predator reduced artificial run. Again, such technical refinements, though intellectually attractive, are so difficult to accurately quantify that the credibility and cost of the analysis would be highly questionable.

To conclude, perhaps the most difficult choice is establishing a readily available "price" per pound for salmon to be used in the cost benefit analysis model. As was discussed earlier, the ex-vessel price only partially recognizes the contribution to the domestic economy from a salmon run. A substantially greater "price" per pound can be quoted for sport caught salmon while salmon used for domestic consumption are often not accorded a "price".

After weighing all of the possible "price" choices, the most representative price which should be used in the cost benefit model is the first level wholesale price for

canned or frozen salmon, by species, by region in Alaska. Such an index is not now currently available for Alaskan salmon. However, such an economic valuation index could be regularly published by the Alaskan Department of Fish and Game (or the National Marine Fisheries Service) for use in economic planning by ADF&G and other state and federal agencies. By having a state agency prepare such an economic valuation index, the confidentiality of individual financial records can be maintained. Failure to develop such an index will force the state to assume value added for fish processed at ratios consistent with other industries. The most common estimate of this ratio is 2:1 over ex-vessel prices.

In summary, the factors contained in a cost benefit analysis model are somewhat different from those contained in the return on investment model. The reason for these differences largely results from the varying objectives each serve. The objective of the return on investment model is to provide a means for private non-profit corporations to make economic choices based upon their need to be economically self-sufficient. The cost benefit analysis model on the other hand is directed at measuring the total domestic economic benefits to be derived from an aquaculture project.

A. Salmon Propagation Factors.

1. The Number of Eggs to be Propagated.

If green eggs are used for the initial planning basis, it will in turn (together with an estimate of the

average number of eggs available per female spawner) provide a basis for estimating the number of salmon required for egg taking purposes.

2. Stage I Estimated Survival Rates by Species - (Green Egg to Emerge Stage).

(a) Natural production;

(b) Natural production rehabilitation (i.e., stream bed rehabilitation);

(c) Hatchery production;

(d) Incubation box;

(e) Other.

3. Stage II Estimated Survival Rates - by Species (Emergent Fry to Migrant Stage).

(a) Natural production;

(b) Natural production rehabilitation;

(c) Hatchery production

(1) Fed fry;

(2) Fingerling;

(3) Smolt.

(d) Hatchery production (out-station plants)

(1) Fed fry;

(2) Fingerling;

(3) Smolt.

(e) Incubation box;

(f) Lake fertilization (In combination with 2(a), (b), (c) or (d) above);

(g) Other.

4. Stage III Estimated Survival Rates - by Species (Marine Survival).

(a) Natural survival (no human intervention directed at increasing the survival rate of the particular run);

(b) Enhanced survival (human intervention i.e., predator controls applied).

5. Estimated Total Returns - by Species.

Estimate of the number of adult salmon which will return to the area of harvest as a result of propagation methods and any enhanced survival techniques employed.

6. Estimated Prior Interceptions by Domestic Fishermen by Species.

Include estimates of prior interceptions by domestic sports and commercial and domestic consumption fishermen.

7. Estimated Total Run Adult Run Strength - by Species.

Add together items 5 and 6.

8. Number of Spawning Stock Required for Run Maintenance - by Species.

Estimate the number of male and female spawners required to maintain the initial run size.

9. Net Total Adult Run Strength - by Species.

Item 7 less item 8.

10. Hatchery or Other Surplus - by Species.

Often there are surplus male salmon not needed for spawning purposes, therefore, an estimate of the amount of the return which cannot be harvested nor is required for

spawning purposes needs to be made if the surplus can be sold or used in domestic consumption. (Any value of spawned out salmon carcasses can also be included.)

B. Salmon Revenue Factors.

The salmon revenue price considerations for use in the cost benefit analysis model are similar to those for the return on investment model except that wholesale rather than ex-vessel prices are used.

The discussion on the use of the current dollar basis and constant dollar basis for evaluating projects using the return on investment model apply equally as well to the cost benefit analysis model.

The salmon revenue factors to be taken into consideration in the cost benefit analysis model are as follows:

1. Net Total Adult Run Strength.

As derived earlier.

2. The Value or Price Per Pound of the Salmon.

The regional wholesale price expressed in constant dollars or current dollars over the life of the project. If a portion of the run is to be destined for the frozen market, the wholesale price for frozen salmon should be used. If the market is largely for canning purposes, the canned wholesale price should be used.

3. The Estimated Weight Per Fish.

4. The Value of the Net Total Adult Salmon Run.

Item 1 multiplied by item 2 multiplied by item 3.

5. The Value of Surplus and Spawners.

Add in any value in terms of domestic consumption or revenue from this source.

6. The Total Estimated Value of the Run.

Add items 4 and 5.

C. Other Benefit Factors.

As discussed earlier, the salaries and wages associated with creating a salmon run are as economically beneficial as the salaries paid to fishermen and processing personnel. (An estimate of the hatchery personnel salaries and wages and other similar benefits should be made and included in Table III, Other Benefit Factors).

D. Cost Factors.

There are several categories of costs to be included in a cost benefit analysis. These are as follows:

1. Project Planning and Surveys.

Included in this category are all the costs associated with performing stream surveys, site research and selection, preliminary design and other work preceding construction.

2. Construction.

This category includes all of the costs to construct the facility, perform the stream rehabilitation or similar work.

3. Imputed or Actual Interest Expense.

If interest expense is being paid through a bond issue, for example, the bond interest rate should be applied

to the amount of capital funds used for the project. If the project is being funded through a cash appropriation, a cost of capital rate should be included for the project. A typical state rate might be the going rate on state general obligation bonds. A typical federal rate might be the going rate on long term treasury notes.

4. Facility Operation.

This would include all salaries and wages, utilities, fish food and other expenses associated with operating the facility from inception of the operation through full production.

Table III, as follows, is an example of how a cost benefit analysis can be applied to an aquaculture project.

TABLE III

An Example Cost Benefit Analysis

(25 Million Egg Facility)

Analysis of Annual Costs - 25 Year Facility Life

Factors	Reference Section	Constant Dollars	Current Dollars
SALMON PROPAGATION FACTORS	(A)		
Estimated Adult Run Strength	(A-7)		
Number Spawning Stock	(A-8)		
Net Total Adult Run Strength	(A-9)		
Hatchery or other surplus	(A-10)		
SALMON REVENUE FACTORS			
Regional Wholesale Price Per Pound	(B-2)		
Estimated Average, Weight Per Fish	(B-3)		
Value of the Net Total Adult Salmon Run	(B-4)		
Value of Surplus and Spawners	(B-5)		
Total Estimated Value of the Run	(B-6)		
OTHER BENEFIT FACTORS			
Total Estimated Benefits			

TABLE III
(Continued)

Factors	Reference Section	Constant Dollars	Current Dollars
COST FACTORS			
Project Planning and Surveys			
Construction Costs			
Imputed/Actual Interest Expense			
Total Propagation Facility Costs			
Cost to Benefit Ratio			

MACRO ECONOMIC EVALUATION TECHNIQUES

The return on investment and cost benefit analysis models are micro-economic evaluation techniques that are applicable to measuring the economic value of individual salmon aquaculture projects. While these models are useful in making economic choices on a project by project basis, equal attention should be given to the economic value of all such projects, collectively, as well as the overall economic value of the salmon fishery. There are several reasons why it is important to develop an economic understanding of the salmon industry as a whole. First, the salmon fishing and processing industry employs more people than any other element of the private sector with the total value of the salmon harvest in 1978 exceeding 230 million dollars at ex-vessel prices.

Secondly, Alaska is currently overly dependent upon revenues from non-renewable resources, and the full development of the salmon fishery could aid in redressing the current disparity in tax revenues from renewable and non-renewable resource sources.

There are other perhaps more critical reasons to assess the economic benefits of the fishery from an overall state perspective. Alaska has a life-style which is in part characterized by the independence desired by its citizens. The capability to maintain this life-style is for many

people dependent upon earning all or part of their income as fishermen or working in seasonal fish processing jobs. Salmon fishing and/or processing provides the major source of income to communities like Ketchikan, Petersburg, Dillingham, Cordova and others. Without a strong, healthy fishery, many of these communities would suffer because their citizens would not have an alternative way of earning an income. Manufacturing and agriculture, which are the mainstays of many similar communities in the lower 48 states, are simply not an option open to citizens in these Alaskan communities.

Finally, if the state is to maintain its current prosperity, it must move out of the current raw material resource exploitation state of economic development to one which is more favorable to the state and its citizens in terms of the income to be realized from increasing the direct and secondary benefits derived from processing, marketing and consumption of salmon.

For these and other reasons, it is critically important that the state have the economic tools necessary to plan and administer its economic future. Currently, however, few economic planning tools are available and the capability to perform macro-economic analyses in Alaska is severely limited. The information and tools needed to perform the proposed macro-economic analysis are rather straight forward. These include:

1. State Tax Revenue Collection Reports Coded by the Standard Industrial Code and Geographic Region.

One of the best ways of measuring changes in economic conditions is through the state tax collection system. The change in the number of corporate and individual tax payers as well as changes in their earning status is critically important information for economic planning.

2. Development of a State Input/Output Economic Model.

An input/output model is a planning tool which can be used to identify the economic or employment multiplier effect of the various segments of industry. It can also be useful in examining the relative balance between imports and exports by industry segment.

3. Employment/Unemployment Reports by Standard Industrial Code.

In order to perform economic analysis it is important to know employment by type of industry within a region. Employment and unemployment characteristics should also include information on the age, sex and household dependency status.

With the development of at least these three economic planning tools, it would be possible to perform the following types of macro-economic analysis:

1. Assume that the State of Alaska is willing to invest some of its non-renewable resource tax revenue into producing future recurring income streams both as a means

for financing state and local government as well as providing a healthy economic climate for its citizens. Assume further that the interest rate on investment opportunities in the major capital money markets outside of Alaska or government securities is nine percent (9%). An investment in an in-state economic development project which yields an interest rate of only seven percent (7%) could be more financially attractive to the state than an out of state investment because of the additional revenue generated from the added in-state employment, personal and corporate taxes.

2. The State of Washington in 1972 received voter approval to invest 415 million dollars of state funds in a statewide capital investment program. Federal and local matching funds were expected to bring the total investment to approximately 1.5 billion dollars. According to the economic planners (Washington State Budget, 1972 Volume II, page 63) "... the construction impact alone will generate 240,000 full-time equivalent years of employment ... and help meet the projected employment needs of 23,000 net new labor force entrants each year." The budget document goes on to report that, "the Washington futures program will not require new taxes ... the expenditures on construction projects ... together with the turnover of those expenditures through suppliers and payrolls will provide additional state sales, and business and occupation tax revenue. Second, the new industries which can be established as a result of these

Washington future projects will also provide new state revenue." The Washington Futures Program represents the type of economic planning capability which the State of Alaska needs if it is to make informed economic choices on investment opportunities.

In summary, the consulting team makes the following findings and recommendations regarding the development of macro-economic evaluation tools for the State.

1. A key ingredient in evaluating the economic value of the salmon fishing to the State of Alaska is the ability to reasonably and accurately estimate the total tax revenue which annually accrues to the State from this industry.

2. Currently, the only information available on State tax receipts from the fishery is the raw fish tax. Personal and corporate income tax information for residents and non-residents is not available in a readily usable form.

3. Input/output analyses which identify the direct and secondary multiplier effect of employment and income from in the fishing industry, need to be conducted.

4. Based upon the current lack of reasonably accurate macro-economic information, the State of Alaska is not in a position to evaluate its investment opportunity in the fisheries. Moreover, the current lack of this information effectively precludes the State from explicitly formulating an economically sound fisheries development policy.

5. The State Departments of Revenue, Commerce and Economic Development and Labor should be authorized to develop the necessary macro-economic analysis information and tools so that the state can appropriately assess the economic value of its salmon fishery and formulate an economically sound fisheries development policy.

Chapter II - SOURCES AND METHODS FOR FINANCING SALMON AQUACULTURE PROGRAMS

Mandatory Assessments

Prior to discussing some of the other considerations involved with developing a stable financial basis for salmon aquaculture, the most critical financial issue currently pressing on the regional aquaculture associations is the recent Superior Court ruling in Wayne Alex etal., v. Southern Southeast Aquaculture Association etal. in which the court held that Alaska Statute 16.10.530, which establishes the funding mechanism for private aquaculture, is unconstitutional.

In a letter to Governor Hammond, as a result of the court ruling, the State Attorney General identified five "potential legislative alternatives to the now-unconstitutional statutory scheme for your consideration." These are as follows:

1. Regional aquaculture association programs could be funded through direct appropriation. We believe there would be no legal difficulties with this approach.

2. A statewide tax on the sale of salmon could be imposed, with proceeds of the tax deposited in the state's general fund and regional aquaculture association programs funded through annual appropriations in amounts based on the amounts collected in each region. While such a scheme conceivably could be challenged on the basis that it

violates the constitutional prohibition on the dedication of state tax revenues, we believe such a statute could be drawn artfully enough to pass constitutional scrutiny.

3. Regional taxes could be imposed on the sale of salmon to become effective only upon a majority vote of commercial fishermen in each region, proceeds of the tax would be deposited in the State's general fund and the regional association's programs would be funded through annual appropriations in amounts based on the amounts collected in the region. In addition to the dedicated fund problem, such a scheme could be challenged on the ground that it violates equal protection (treating commercial fishermen differently depending upon the region in which they are fishing) and on the ground that it constitutes an unconstitutional delegation of the power to levy a tax. While there are good arguments that such a program does not violate equal protection and does not constitute an unconstitutional delegation of the power to tax, we cannot predict with certainty how the issue would be resolved by the Alaska courts.

4. The program could be restructured to take advantage of the constitutional authorization of "service areas" -- in effect, utility districts. This approach would require agreements between the state and municipalities in each region, but would avoid the dedicated fund problem and (probably) the delegation problem as well.

5. The Fisheries Rehabilitation and Enhancement Division (F.R.E.D.) in the Department of Fish and Game could be restructured and directed to be more responsive to the concerns of the user groups in the various

regions. Under this scheme, the Department of Fish and Game (through F.R.E.D.) would have primary responsibility for implementing any aquaculture program established for any given region. There are no legal obstacles to such an approach to the problem.

The following comments are directed at each of the alternatives suggested.

1. It would be possible to fund the regional associations for a limited period of time through direct appropriations. The use of this approach must be regarded as a short term measure for several reasons. One of the major policies of Alaska state government is to require that programs which benefit primarily a group of resource users shall become, to the extent possible, economically self-sustaining. If the regional aquaculture programs, and the fishermen who benefit from the expanded harvests, are to operate in a manner which is consistent with this policy, some alternative means of financing fisheries development projects must be found. We discuss further the problems related to this option in Chapter III.

2. A statewide mandatory tax on the sale of salmon could be imposed with the proceeds from the tax appropriated to each region in proportion to their contribution to the taxes collected. A major problem with such a course of action is that several of the major fishing areas now operate in a satisfactory manner on voluntary assessments. Others would vigorously oppose the tax. Whether or not such tax

receipts could be dedicated raises serious legal questions. To subject the program to further legal uncertainties at this time should be avoided at all cost.

3. Again, the legal complexities of alternative number three present risks which may not be necessary or appropriate to take.

4. Alternative #4, suggests that regional associations might be restructured into service districts based upon agreements between the state and the boroughs. This alternative seems to find considerable constitutional support and is discussed in detail in Chapter III.

The implementation of special service districts for regional aquaculture has several attractive features. Regional aquaculture, if it is to grow and make a significant contribution to the fishery, requires two characteristics which are not now present in their organizational make-up. The regional associations need a stable source of financing and a stable organizational structure.

The inherent financial structure of private non-profit corporations has several characteristics which severely limit the use of this form of organization for fisheries development. First, because the corporations are non-profit, they have little capability to raise private venture (risk) capital which is vitally needed to meet reasonable production goals. While it is true that the non-profit corporations can borrow substantial sums from government,

unless that government is very knowledgeable about the investment risks, is willing to undergo long periods of initial start-up costs without a pay back, and is very committed to maintaining its support, the non-profit corporations will not have an adequate financial structure upon which they can develop and grow.

Secondly, just as the non-profit corporations have none of the financial strengths of a private sector for profit corporation, such as the capability to attract risk capital, neither do they have any of the financial strengths of a unit of government such as an assured tax base. They must now depend upon voluntary contributions for their subsistence.

The private non-profits not only suffer from the lack of a stable source of financing, they also suffer from the lack of a stable organizational structure such as those structures found either in the private sector or in government.

For example, members of the boards of directors of private sector corporations often have a major financial interest in seeing the corporation succeed, and offer considerable expertise relevant to the fixing of sound corporate policy. It is difficult for the regional associations to educate their boards while at the same time expecting them to fix sound policy. Moreover, many of the associations are organized on the foundation of an active board. The goals and programs of the associations are ambitious and there

have been frustrations. It may be difficult for enough fishermen to maintain such an active role or interest without adequate renumeration or status.

Neither the financial rewards associated with service on a board of directors of a for-profit corporation, nor the status conferred in an elective public position are currently present in the regional association. Currently, members of the boards of directors of regional aquaculture corporations regard their service on the board as a "civic duty" or because of a personal commitment to the fishery. Few board members expect to see any significant financial return to themselves as a result of the aquaculture program for a long time, if ever. In essence the sense of "civic duty" or sense of personal commitment to the fishery must be strengthened so that increased organizational stability can be achieved for the regional aquaculture associations.

The use of the special service district could provide a means for achieving both a stable financial base and a more stable organizational base than presently exists. For a further discussion of this option, see Chapter III.

5. The fifth alternative means of resolving the loss of the mandatory assessment would be to restructure the F.R.E.D. division of ADF&G into a regional aquaculture program.

While this type of change on the surface has some attractiveness in that it may offer the possibility of a

somewhat improved financial base (presumably through state appropriations), the same long-term financial problems that are present in alternative #1 are present in #5. That is to say, if one of the major policies of Alaska state government is for the users of government service to pay their fair share for the service and for programs to become economically self-sufficient, ultimately a fair share of the cost of operating a regionalized F.R.E.D. division will have to be shifted to the user groups. Many of the pros and cons of the state's assumption of an active role in funding the program are addressed in detail in Chapter III.

The F.R.E.D. division will have in operational status by the mid-1980's, hatchery production capacity in excess of 600 million eggs being incubated. At some point in time, it is possible that the significant costs incurred in operating these state salmon production facilities will need to be offset by an adequate income stream (e.g. terminal harvest or user assessments). In essence, selection of alternative #5 would be inconsistent not only with current Alaskan state policy, but would mean ever greater costs to the state in the future for operation and maintenance of facilities, this at a time when state revenues (e.g. oil taxes) may be on the decline.

6. A sixth alternative not suggested by the Attorney General would be an Amendment to the Alaska Constitution expressly providing for such regional economic develop-

ment as aquaculture. The drafters of the Alaska Constitution eliminated the junior taxing districts which "plague" government operations in most of the lower 48 states. They limited the general taxing powers to the state and boroughs and expressly authorized boroughs to set up special service districts to provide for services required in the borough. If the state legislature acting on behalf of the unorganized boroughs and the boroughs acting on behalf of themselves, are unable to create a special service district whose boundaries encompass areas included in both the organized and unorganized boroughs, as suggested in alternative number 4, then it would be impossible to create a regional aquaculture association with boundaries comparable to those which currently exist. If we accept the argument that broad regional areas are a logical geographic feature required by regional aquaculture associations, a constitutional amendment may be required to provide the associations with a taxing authority which encompasses a service district which includes area in both the organized and unorganized boroughs (or perhaps two boroughs).

While the framers of the Alaska Constitution expressly intended to avoid the nuisance of junior taxing districts, it may be time to reassess the wisdom of a policy which entirely eliminates any mechanism for infrastructure development in Alaska except as it might exist in an organized borough or through state appropriations. If special service

districts cannot be created to extend beyond the boundaries of the organized borough, a constitutional amendment could be offered to allow this type of infrastructure development. The difficulties of obtaining necessary constitutional amendments are addressed in Chapter III.

In summary, the loss of the capability to have mandatory assessments by the regional aquaculture associations is a severe shock to their already inadequate financial structure. Six alternative methods of making up for the financial loss have been discussed. Two alterations, the creation of special service districts or an amendment to the Alaska Constitution allowing for junior taxing districts or service districts to be created which extend into adjacent boroughs or the unorganized borough, are the most attractive alternatives. Both of these alternatives can be consistent with the goal of ultimate economic self-sufficiency of program. Secondly, these alternatives provide the opportunity to create a more stable regional aquaculture organization as well as provide a more stable source of financing.

Other Financing Issues

Through a series of legislative acts, beginning in 1971, the Alaska Legislature has established a number of mechanisms for supporting or financing the Salmon Resource Development Program (ASRDP). These are each separately discussed as follows:

1. Creation and State Tax Support of the F.R.E.D. Division of ADF&G (1971).

As indicated earlier, one of the expressed purposes of the F.R.E.D. division is to rehabilitate Alaska salmon runs through enhancement or propagation of hatchery runs. By the mid-1980's the F.R.E.D. division will have a salmon egg rearing capacity in excess of 600 million eggs. Major facilities at Klawock (78 million egg capacity), Hidden Falls (65 million), Main Bay (65 million), Snettisham (73 million) Prince Williams Sound (39 million), Kodiak Island (50 million), Cold Bay (52 million), and Moose Pass (84 million) will become operational within the next few years. The State of Alaska will incur a heavy financial burden during the entire decade of the 1980's as these facilities go through expensive start-up periods and achieve stable production. Current state tax revenues from the fishery as well as revenues which could be derived from a terminal area harvest may not equal operating and maintenance costs, in the aggregate, until very late in the decade. The question which will soon confront the citizens of Alaska and the State Legislature, is, who should ultimately pay the operating costs of these facilities? If the strong, current state policy for economic self-sufficiency is continued, either a higher tax would have to be imposed or a terminal area harvest implemented with the proceeds of either or both used to pay the costs.

While there is inadequate information to develop anything approaching reasonable cost standards for hatchery operations which cover all species, a very rough guide is that the cost of running a hatchery which is in full production, and does not require expensive off-site egg take or equally as expensive off-station plants, should be about equal to the harvest value of 1/3 of the run. (An analysis of current operating costs of existing regional facilities has been partially hampered because of the lack of information. Sufficient financial data was collected, however, to indicate that if such costs as Regional Association Administration, Administrative and Supportive Services, Technical Services and Start-up Costs which have been previously defined were only allocated to hatchery operations as would be appropriate, the cost of hatchery operations would be roughly 1/3 of the value of the run in Southeast Alaska. Because operating costs in Central and Western Alaska are as high or higher than those in the Southeast and because the ex-vessel prices paid to fishermen in these regions are much lower than those paid in Southeast, this ratio will not hold for hatcheries in Central and Western Alaska. However, if the changing patterns currently occurring in the marketing of salmon continue, regional price variations should diminish over the next few years and then this rough guide could also apply to these areas.)

If a tax of 33% (which would be the dollar equivalent of harvesting 1/3 of the run to pay hatchery operating costs) were imposed on state hatchery returns, it is unlikely that fishermen would choose to harvest hatchery runs if other choices were available. Given this likely circumstance, the most probable method of recovering the costs of F.R.E.D. division hatchery operations (and for the regional associations) will be through a terminal area harvest. If the choice is made to finance hatchery operations through such a mechanism, there would be little to distinguish between a state operated facility and those operated by regional associations (so long as they are reasonably successful producers).

It is also important to recognize that the F.R.E.D. division's responsibilities extend substantially beyond those of the regional associations, but to the extent that there is an overlap in duties with those of the regional associations as they pertain to the operation of facilities in full production suggests that consideration must be given to shifting the financial and management burden of operating these facilities from the state tax base to a user pay, regional association basis. (Other criteria besides financing must be considered including the managerial and technical capability of the regional associations to manage such facilities.)

The shifting of the cost of managing and operating state salmon production facilities to the regional associations should not be construed to mean that the State of Alaska should lessen its commitment of state financial resources to development of the fisheries. These state financial resources should be commensurately shifted to the far more pressing needs for a comprehensive fisheries research and development program and harvest management systems improvements. Additionally, there may be hatchery facilities, stream clearance and habitat improvement projects, and the like, which can or should occur for a variety of reasons, but which cannot be undertaken by the associations on an economic basis.

2. State Loans to Regional Aquaculture Associations.

Current legislation provides for 25 year loans to regional aquaculture associations of up to 3 million dollars per facility with a maximum interest rate of 8% with deferred payments for six years.

There are several problems with this legislation. First, the 3 million dollar loan ceiling can be artificially restrictive on the choice and size of the facility. Secondly, while returns on pink salmon may be achieved within the six year deferred payment period on the loan, there is little likelihood that this period will be adequate for other species. Difficulties in obtaining sufficient brood stock, initial production and similar problems can and should be expected. A ten year maximum deferment period would seem to

be much more realistic. Additional provisions should provide for an additional time extension of five years (with an approval procedure specified) as well as an early payment clause, should stable production be achieved earlier than the ten year period.

If a ten year deferment period were established, the loan repayment period should be set for a maximum of twenty years after the deferment period, otherwise the capital recovery period will be so compressed it will require an excessive terminal area harvest during the capital recovery period.

Finally, the loan should be for capital investment costs and should not include start-up costs. As will be discussed more fully later on, start-up costs should be expensed against the current period. This will help avoid the need for excessive terminal area harvests during the capital recovery period as well as avoid unnecessary interest expense associated with capitalizing these costs.

3. <u>The Existing Assessment Program (if Re-enacted) Does Not Provide Sufficient Revenues to Pay Administrative Costs, Regional Technical Expertise and Hatchery Start-up and Operating Costs for More Than One Large Facility at a Time</u>.

This financial issue has been partially addressed in a variety of legislative enactments. These include:

(a) The provision of organizational and planning grants to qualified associations of up to $100,000 with a second $100,000 to be matched on a 50/50 basis.

(b) The provision of an appropriation in the State FY 1980 budget to the F.R.E.D. division for allocation to the regional associations in the amount of $400,000 for regional planning activities.

(c) The passage of Senate Bill 232 which provides that 20% of the revenues realized from the measure are to be allocated to the boroughs for local salmon enhancement and related projects; 60% of the revenues are allocated the state general fund; the remaining 20% of the revenues are to be allocated to the Commercial Fishing and Agriculture Bank which in turn can be loaned or used as a loan guarantee for regional aquaculture projects.

(d) The establishment of the Renewable Resources Corporation of Alaska and Development Fund into which not less than 5% of the receipts of certain revenues will be deposited to be used to enhance and develop renewable resource programs.

The creation and state financing of the F.R.E.D. division, the creation and revision of loans to private non-profit regional aquaculture corporations, as well as these additional acts by the Alaska Legislature evince a continuing interest and struggle to find an acceptable solution to re-establishing the salmon fishery and developing other renewable resources.

While it is also understandable how these various legislative actions have evolved over a number of years, it

is equally clear that the pieces do not fit as well together as necessary. If, however, the variety of programs were to be restructured along the lines described, we believe adequate financial resources could be available to substantially accomplish a Salmon Resource Development Program (or as recommended in the organizational analysis in this report a Fisheries Resource Development Program).

Establish Regional Entities Responsible for Fisheries Development

Through either the creation of special service districts or appropriate constitutional amendment it would be possible to provide regional structures which have the capability to make mandatory salmon harvest assessments. Voluntary assessments could be continued in those areas where they are selected as the financing means.

Establish Regional Aquaculture Program Source and Applications of Funds Model

As our earlier analysis indicated, there are six distinct cost categories for activities associated with regional aquaculture. These are:

Regional Association Administration

Administrative and Supporting Services

Technical Services

Full Production Hatchery Operations

Hatchery and Enhancement Start-up Costs

Capital Investment Program

The costs associated with administering the regional association could be funded from the regional assessment or like funding mechanism. Administrative and Supporting Services, while a budget category, would be allocated to the other categories (i.e. Regional Association Administration, Technical Services, etc.).

Technical Services could be financed through a redirection of the proceeds from Senate Bill 232. The cost of full production hatcheries would be borne by remaining funds from the regional assessment, and through the operation of terminal area harvests.

Hatchery and Enhancement Start-up costs could be financed through the redirected funds from Senate Bill 232 and any assessment royalty not required for Full Production Hatchery Operations or the Capital Investment Program. The payment of capital and interest costs would be financed from a combination of remaining assessments and terminal area harvests.

Finally, and to the extent that local fisheries development priorities indicate the need, non-revenue producing projects such as stream rehabilitation for natural runs could be financed with a combination of assessment revenues and Senate Bill 232 funds together with any federal and state funds that may be received for such a project. (This

procedure avoids the necessity of having terminal area harvests on natural runs as a means of recovering the cost of non-revenue producing projects.) Regional associations could perform such projects on a contract basis on behalf of the state.

This proposed Source and Applications of Funds Model accomplishes several objectives. First, it can be used as a means for guaranteeing to the State that repayment of State loans will be accorded a preferred position for assessment and terminal area harvest revenues equal to that of paying the costs associated with Full Production Hatchery Operations.

Secondly, the redirection of Senate Bill 232 funds to the regional associations provides a continuing stable revenue base for financing Technical Services and Hatchery and Enhancement Start-up Costs which are highly interrelated activities. The inclusion of start-up costs, to be funded from this source would also eliminate the present practice of capitalizing start-up costs within the present loan program. If the present loan program were modified to include only capital facilities, loan decisions could be more easily made because it would be unnecessary to make speculative or arbitrary determinations about whether the regional associations were properly spending their other income as a part of the loan approval process. The determination of the adequacy, over-abundance or inadequacy of other

income, as well as judgments about how wisely these resources are utilized should be the responsibility of the local borough assembly and the legislature.

According to financial information supplied by the Southern Southeast and Northern Southeast Regional Aquaculture Associations, for calendar years 1978 and 1979, the annual average operating expenditures (excluding capital investments) would have amounted to approximately 1.0 million dollars in these two regions had the assessment revenue been fully realized.

Under the proposed plan, had it been in effect in 1978, and based upon a 3% assessment rate, assessment revenues would have been approximately 1.7 million dollars. In addition, had Senate Bill 232 been in effect in 1978, it could have provided (depending on the percentage of revenue redirected) an additional 2.0 million dollars. Both sources together would have provided almost four times the amount which would have been expended. Had these funds been available, the two Southeast regional associations could have begun developing the necessary capital reserves required to pay future facility start-up costs; conducted the necessary stream surveys; performed stock enumerations and similar activities; and proceeded to develop the fishery in a comprehensive and organized manner through an integrated system of production and financial planning.

Establish Regional Long Range Production and Financial Plan

A third key element to the development of an economically and financially sound regional aquaculture program is the establishment of a production and financial management system consistent with the proposed organizational structure and financing mechanisms.

Once the regional associations have an assured and reasonably adequate revenue base, they should begin the development of ten year and perhaps longer range Production and Financial Plan. (The ten year plan is the minimum necessary to cover the deferred payment period prior to reaching full production and capital repayment.) The implementation of a long range production and Financial Plan by each regional aquaculture association is critically necessary if these associations are to approach the development of the salmon fishery in a comprehensive manner. Currently, because of the limited financial resources available to them, regional associations have tended to limit their production planning activities to a few projects. Current financial planning practices, because of financial uncertainties, tend to be very much oriented toward short term considerations.

If the organizational structure and the financing mechanism recommended in this report are implemented, it must be accompanied by a major change in the current "hand to mouth" type of planning now dictated by the fiscal constraints. For example, because of the substantial streams

of stable revenues which this report would direct at the regional associations, each regional association must begin to develop a comprehensive list of production alternatives. Enough information about each production alternative must be obtained to provide the capability to evaluate each project using the recommended return on investment model. Once a list of economically attractive projects is developed, the regional association will have to develop a time phased production plan which optimizes the use of the revenues flowing to the association. The corresponding financial plan, which will include a ten year annual forecast of revenues by source (i.e. assessment revenue, Senate Bill 232 revenue) should identify for each category of cost included in the recommended Source and Applications of Funds Model, the estimated level of activity which can be supported by each revenue stream. Because of the long duration between the initial start-up of a facility and the time when the facility reaches full production status, the regional associations will have to very carefully consider and plan for the costs to be incurred during this period so as to avoid over-committing available revenues and having a facility completed without the funds with which to operate it. As recommended in the Source and Applications of Funds Model, Technical Services, Hatchery and Enhancement Start-up costs and non-revenue producing projects could all be financed from the same source of funds, namely the redirected proceeds from

Senate Bill 232. If a regional association were to expend all of its annual revenues from this source on Technical Services and/or non-revenue producing projects and not create a substantial capital reserve to be used for projects during their start-up phase, the association would substantially limit its capability to place more than a few projects in start-up status. (Capital reserves are also necessary as a hedge against periods of low harvest levels.)

While it will require some experience developing the financial trade-offs between current expenditures for Technical Services and non-revenue producing projects with building capital reserves for future facility start-up costs or times of low returns, this type of activity will lead to an optimized and integrated production and financial plan.

Relative Balance Between Operating and Capital Funds

It is difficult to ascertain at this point whether the availability of capital investment funds to the regional associations are in balance with their need for operating and start-up funds. Given the state commitment to a 200 million dollar loan program for aquaculture, the availability of loans through the Renewable Resources Corporation and the Fisheries and Agriculture Bank, capital funds may be available in excess of those required. If there is an imbalance between capital and operating funds, and the operating funds

are found to be inadequate, it may be desirable to merge the Renewable Resources Corporation Development Fund with the Fisheries and Agriculture Bank and redirect the 20% portion of Senate Bill 232 proceeds from the Fisheries and Agriculture Bank to the regional associations to be used for Technical Services and Hatchery and Enhancement Start-up costs.

The diversion of Senate Bill 232 revenues to regional aquaculture plus the assessment income should provide for a substantially greater build-up of necessary capital reserves to be expended during future periods when the regional associations have a number of facilities in the start-up phase of operations as well as provide a more satisfactory means of financing some short term non-revenue producing projects.

Chapter III - INSTITUTIONAL PROBLEMS AND POTENTIAL REFORMS

Introduction

In Chapters I and II we have discussed methodologies for evaluating the economic viability of certain types of resource enhancement activities which are a critical element of Alaska's salmon fisheries resource development program, and several means for assuring the financial stability for such a program. We recognize that the Alaska salmon resource development program (ASRDP) is a relatively new endeavor. Its major elements, the private non-profit hatchery program (PNP) and the division of Fisheries Rehabilitation, Enhancement and Development (F.R.E.D.) within the Alaska Department of Fish and Game, are each less than 10 years old. ASRDP has come a long way in a short period of time toward achieving a basic goal of expanding the available harvest of salmon for Alaska's fishermen. We also recognize the program's potential has not been reached and positive program results can be expanded if present financial, legal and institutional barriers are overcome.

In this discussion, we will be addressing problems with ASRDP and means of achieving program improvements. The natural tendency of consultant studies to concentrate on program deficiencies is not intended. We believe that the managers of regional associations and the Alaska Department

of Fish and Game have many successes to point to in their implementation of this ambitious and important program.

While achieving stable financing for economically sound ASRDP programs is essential to meet established statutory and program goals, our analysis indicates that revisions to the institutional arrangement of Alaska's fisheries development program are required if the goals enunciated in statutes and regulations by the state, and in program goals and statements of regional associations are to be met. The detailed institutional review contained in Appendix A to this report indicates that there are a large number of programs, each of which can and does affect ASRDP, which are not centrally coordinated. The wide variety of government agencies and private activities impacting on ASRDP presents a critical need for greater horizontal coordination and cooperation among such programs, greater coordination with federal and local agencies, and increased cooperation between the private and public sectors. This discussion concentrates on some of the potential institutional reforms which could be implemented to positively impact those programs with primary responsibility for achievement of fisheries resource development goals and objectives for Alaska. We do not suggest all of the detailed reforms relating to improved coordination among regulatory agencies, financing agencies, construction entities, and other programs affecting ASRDP should be the responsibility of the Aquaculture Policy Study Group. The study group should, however, focus

their attention on necessary reforms in those agencies having primary responsibility affecting fisheries resource development.

We have identified a number of federal institutions and programs which have significant impact on overall fisheries development in the United States. Many of these programs impact on Alaska fisheries development, and it has been suggested to the study group that, to date, the State of Alaska may not have received its "fair share" of benefits from federal programs impacting on Alaskan fisheries. We offer the observation that there are many federal agencies which enjoy special working relationships within Alaska who provide positive support to ASRDP. Noteworthy is the U.S. Forest Service, which has established cooperative agreements with the Alaska Department of Fish and Game, and informal arrangements with many of the regional associations to maximize the effectiveness and impact of its programs on the important Alaska salmon fisheries resource.

We briefly identify in outline form other federal institutions affecting ASRDP (Appendix B). We will discuss means of improving relationships between key federal and state agencies affecting ASRDP.

Finally, perhaps the most critical element to the success of an Alaska fisheries development program is the commitment of the legislative and executive branches. A major reason why this study has been conducted is the concern

shared among persons within executive and legislative branches that the salmon fisheries development program is not producing satisfactory results as measured against the original goals of primary programs. This concern was reflected in the most recent legislatively approved budget for the F.R.E.D. division and for regional associations. The members of the study group were well aware in formulating this study that the key programs in ASRDP could be the subject of ever greater scrutiny in the future, particularly in the face of projected tight budgets and declining revenues.

Among the general program recommendations which have evolved from our analysis of existing institutions and policies are the following:

1. There is a need for increased cooperation and coordination among major program elements of ASRDP;

2. ASRDP should be expanded or altered to include consolidation and coordination of programs affecting the development of species other than salmon, i.e., establishment of an Alaska Fisheries Resource Development Program (AFRDP);

3. There is a need for improved and expanded research, data and information affecting AFRDP;

4. Region-specific planning, programs and institutional arrangements which will maximize the benefits of the program consistent with area needs should be established;

5. There is a need to identify the appropriate level of activity for individual program elements within

AFRDP; this should be done on a continuing basis and not merely through established budget processes;

6. Improved relationships with federal, local and private sector programs affecting or having potential impact on AFRDP is necessary;

7. There is a need to develop institutional reforms which ensure greater financial stability for existing and new programs; and

8. There is a need to develop an information base sufficient to evaluate program successes and failures in the future.

(Note: Because of the present financial difficulties of the regional association program, the consulting team was directed when the study was nearing completion to spend more time evaluating institutional arrangements which could affect the future of the regional association program. We suggest that further more detailed analysis by the study group of financial and institutional alternatives affecting the regional association program will be required prior to the 1980 legislative session.

Identification of Primary Programs to be Included in Alaska Fisheries Development Program (AFRDP)

In the series of meetings with the Aquaculture Policy Study Group the consulting team sought to identify those programs primarily involved in fisheries development

activities at the state level. As indicated in Appendix A, there are a number of other programs which have an impact on fisheries development activities in Alaska, but the study group has designated the following programs and activities as includable in the primary program category:

A. Alaska Department of Fish and Game.

1. Fisheries Rehabilitation, Enhancement and Development Division (F.R.E.D.);

2. Commercial Fisheries Division;

3. Sport Fisheries Division;

4. Shellfish Program.

B. Private Nonprofit Hatchery Program/Regional Associations.

C. Office of the Governor/Bottomfish Coordinator.

D. Department of Commerce and Economic Development (Division of Business Loans).

E. Department of Transportation (construction of facilities).

F. Alaska Commercial Fisheries Entry Commission.

G. Department of Community and Regional Affairs.

Because the initial focus of this project was to be on the salmon fisheries development program, major concentration on reforms affecting programs involved in this arena resulted. This is consistent with the goals, makeup and interests of the study group. However, we strongly believe that the salmon development program and its major elements cannot be planned or managed independent from other fisheries and that in the future it becomes critically important to

integrate the salmon development program with those for shellfish and bottomfish.

Statement of Project Findings and Needs

A. There is a Need for Increased Cooperation and Coordination Among Major Program Elements of AFRDP.

1. General Statement of Problems and Needs.

The detailed program outlines included in Appendix A indicate a need for greater horizontal coordination among a wide variety of programs and agencies in Alaska having impact on the successful operation of AFRDP. There is a need for clear direction as to the relative roles and responsibilities of each such entity: (a) as they relate to the overall goal of fisheries development; (b) as they relate to interrelationships of such programs in achieving established goals for the total fisheries development program; and, (c) as necessary to ensure that such programs and activities are not operating at cross purposes from one another. Increased coordination can be provided through the Office of the Governor or the State Legislature. Some lead agency could be assigned this responsibility by the Governor or the Legislature.

Following are a number of specific issues which must be addressed to increase cooperation and coordination among major program elements of AFRDP. These include improved relationships among:

(a) ADF&G Commercial Fish, Sport Fish and F.R.E.D. divisions.

(b) ADF&G and regional associations.

(c) ADF&G, DCED and regional associations.

(d) All Regional Associations.

(e) ADF&G salmon and shellfish program elements, regional associations, and the Office of the Governor/Bottomfish Coordinator.

Increased coordination and cooperation are necessary for a variety of reasons. In some instances, improved relationships among these entities is absolutely essential to the future success of ASRDP. For instance, policies adopted by ADF&G regarding egg take and brood stock could effectively eliminate any prospect of success for individual hatchery programs or other activities undertaken by the regional associations.

In some instances, existing laws infer that coordination of activities among AFRDP entities is required or should occur. However, we suggest that there are situations where this legislative mandate is not strong enough. For example, legislation establishing the fisheries enhancement loan program, A.S. 16.10.500 et seq., provides authority in the Department of Commerce and Economic Development (DCED) to make loans and grants to regional associations for fisheries enhancement. There is no provision in the statute requiring or defining the necessary relationship between DCED and ADF&G regarding any aspect of the program. While

these agencies have undertaken certain steps to communicate and coordinate program activities, the regional associations have indicated dissatisfaction with the level and quality of those relationships. This matter could be resolved, in part, through legislative action.

In certain cases, relationships among program activities have not even been addressed by the legislature or the executive branch. For example, the newly established activities within the Office of the Governor relating to bottomfish development have evolved to date without identification of potential and necessary relationships between that office and fisheries development activities by ADF&G and the regional associations. If the legislature considers expanding the authority of regional associations to include other species, coordination with development activities of the Bottomfish Coordinator will be required.

Finally, there are situations where the legislature may wrongfully presume that coordination and cooperation among such entities is established and routinely occurring. One such instance involves the relationships among divisions within ADF&G. Testimony during study group meetings and a number of previous studies have indicated that the relationships among the F.R.E.D. division and the Commercial and Sport Fish divisions are less than fully cooperative. While considerable effort in recent years has been made to establish coordinated goals and objectives for these programs, it does

not appear that such activities have produced a result wherein each is working in as coordinated fashion as possible toward a common fisheries resource development goal.

2. Need for Improved Relationships Between ADF&G Commercial Fish, Sport Fish and F.R.E.D. Divisions.

There are a number of indications that despite considerable efforts in recent years to establish policies and practices which will effect improved relationships between the state's resource development program and management activities of the commercial and sport fish divisions, there remain areas of conflict between these divisions. As hatcheries come on line, the need for coordination and communication among such divisions will become all the more important. Management to maximize harvest and protect viable natural runs is all the more complex with the interjection of hatchery runs.

Relationships between harvest and hatchery managers are affected by statutes and policies protecting natural runs. A.S. 16.10.420(10) provides:

> A hatchery (shall) be located in an area where a reasonable segregation from natural stocks occurs, but when feasible, in an area where returning hatchery fish will pass through traditional salmon fisheries.

The existing policy of the Alaska Department of Fish and Game (see Alaska Fishery Management Policy Manual, Policy #1, (1974) provides as follows:

> The management of naturally occurring wild stocks will not be unduly hampered by locating the hatchery at the proposed site . . . . If complexities arise in managing mixed stocks, including both hatchery fish and wild fish, it will be the state's policy to manage the collective resource in a manner that favors protection of the wild stocks. (Emphasis added.)

As indicated at page 25 of the proposed Policy and Procedures, even "minor runs of salmon" must be given first priority consideration when a massive supplementally produced salmon run is imposed in fishing areas where wild fish are harvested. ADF&G acknowledges that this policy may lead to larger than required returns to the production sites. Over-protection of certain weak natural stocks at the expense of harvest of productive hatchery runs seems inconsistent with goals of the PNP hatchery program.

The department states that "long-term and continuing analysis will be conducted to assess benefits and disbenefits resulting from the fish cultural activity prior to any decision to sacrifice or overharvest wild stocks." (C.F. AK. Fish. management policy #7, page 4). The issue of protection of natural runs in areas where hatchery stocks have been introduced (e.g., Washington) is one of great controversy. This is in part because of failure of fisheries managers to address the potential problem prior to the evolution of major hatchery programs. At this time, the

State of Washington is struggling with the definition of "viable natural run" at a time when as much as half of the state-wide production of salmon is through artificial propagation. This has occurred in part because of the lack of imposed relationships and some conflict between harvest managers and hatchery managers at the outset of the resource development program. Alaska should make every effort to avoid repeating this experience.

A review of Washington's 1979 proposed salmon management plan is illustrative of a major change in approach to harvest-hatchery management patterns. The plan suggests harvest of certain natural runs prior to full production from planned facilities in the same area. In some instances, this "writing off" of natural runs is occurring before construction of a facility has even started. We do not begin to suggest this policy for Alaska. However, it does indicate the potential significant changes that may evolve in terms of harvest management practices as the hatchery program evolves.

The present policy regarding natural runs can also impact on the necessary development of brood stocks and egg takes for existing and planned hatcheries. At page 26f of the draft Policy and Procedures, ADF&G proposes the following:

> It is recognized that an objective of salmon fisheries harvest management is the attainment of an appropriate magnitude and distribution of brood stock to drainages in all management

> units. It is not always possible through management of mixed stock fisheries to ensure the appropriate escapement to a specific stream or stream segment, but generally, desired escapement ranges can be obtained over larger geographical units. Hatchery brood stock goals, as an additional part of the desired escapement [sic]. Where possible, brood stock development plans will include harvest management procedures or recommendations which will enhance the potential for achieving hatchery brood stock requirements without significantly reducing harvest from other stocks. Where restrictions on mixed stock fisheries to create additional donor escapements are requested, Board of Fisheries approval will be required, unless the Commissioner determines that no substantial impacts on established fisheries would occur.

The proposed brood stock policy of ADF&G further states that hatchery egg take schedules will be formulated to realistically provide for brood stock while "minimizing impact on natural recruitment."

This policy may present problems even now as the demand for eggs and brood stock for hatcheries coming on line is immediate (particularly during bad run years). A policy of "long-term and continuing analysis" prior to any decision to sacrifice or overharvest wild stocks not only impacts on the ultimate harvest on hatchery stocks by Alaska fishermen, it also may affect the front-end potential and timing of ultimate production by state and regional association hatcheries. Definition of "viable natural runs" is not a matter which should be deferred any longer than

necessary. Legislative direction regarding alteration of harvest management and brood stock policies may be necessary to resolve this problem.

A second problem reflected in the draft Policy and Procedures is the lack of guidance regarding the interface between the resource development and management divisions within ADF&G as they might affect regional association resource development activities. Appropriate alteration to the above policies will require joint research stream surveys, site selection and planning by these divisions and the associations. The regional comprehensive planning process should be instituted in a fashion which more directly requires effective interface between harvest management and resource development programs. Representation of each activity on regional planning teams is suggested by ADF&G Policies and Procedures; inter-divisional cooperation can be further achieved by assuring development of harvest management plans in concert with hatchery planning activities (which can positively improve relationships with regional associations as well).

At page 26a of ADF&G's proposed Policy and Procedures, it is stated: "There is a need to clarify the relationships between the management of hatchery returns and the issuance of a private nonprofit hatchery permit." ADF&G proposes development of a basic harvest management plan before a private nonprofit hatchery permit is issued or approved by

the commissioner and the Board of Fisheries. The basic plan would be developed by department area biologists in consultation with the applicant. The regional planning team would review the plan as p rt of the application review process to determine the proposed hatchery's compatibility with finalized or preliminary "comprehensive regional plans" required under A.S. 16.10.375. Ultimately, the basic harvest management plan would be part of the "regional comprehensive plan". Why should harvest management plans be formulated separately and in a different manner than other elements of a comprehensive plan? Are basic harvest management plans merely to be developed on a project-by-project basis and then incorporated into regional plans?

We believe that the comprehensive regional planning process must be upgraded to develop a multi-species harvest plan for the region which will allow hatchery locations to maximize harvest. This will require much new data as to existing and planned runs by species. Establishment of a comprehensive harvesting plan as part of the regional salmon plan is not to suggest that regional associations should in any way be involved in actual management of salmon stocks (i.e. delegation of regulatory authority). It is to suggest that policies which in any way segregate harvest and hatchery management and planning activities should be changed to ensure fuller coordination.

3. Need for Improved Relationships Between Regional Associations and ADF&G.

We have indicated that past relationships between regional associations and ADF&G have been less than cooperative, and improvements are still necessary. Lack of cooperation and coordination among these entities can jeopardize the future success of all programs.

Regional association managers have stated that in many cases they have had difficulties with ADF&G regarding methods selected to enhance the resource. They have had problems in obtaining state approval to take brood stock and eggs for existing facilities and proposed new facilities and the quality of relations during the evolution of the regional planning activity has varied. These factors indicate little evidence of clear commitment by ADF&G officials to assure on a priority basis the successful evolution of the regional association program or vice versa.

A.S. 16.10.375 provides that the Commissioner of ADF&G shall have developed regional plans for salmon enhancement. The plans are to be developed by regional planning teams consisting of ADF&G personnel and representatives of qualified regional associations. Ultimately, a state-wide plan is to be developed. Regional plans have been developed in some regions and not in others pursuant to this statute. Some are more comprehensive than others. No state-wide plan has been completed.

Legislative recognition of the need for comprehensive regional planning with input by regional user groups is a most progressive policy. In fact, this fisheries development planning effort appears more sophisticated than those existing in other states. However, the legislature needs to address means of upgrading this process to achieve express goals and effect improved relations between ADF&G and the associations.

First, at present, regional plan approval is the exclusive prerogative of the Commissioner of ADF&G. This level of control has been the subject of some criticism. Association representatives and others have indicated that while their voices are exercised through this process, whether they are heard or not is by no means assured. We believe that ultimate management authority should reside at the professional management or state agency level. However, it may be that the level and quality of association input into the planning process will better reflect the legislative policy of regional input if a dispute resolution mechanism, or at least a discussion process, were developed to satisfactorily air differences of opinion with regard to adopted plans.

Second, we question whether comprehensive planning in the various regions should be allowed to run at a pace which depends exclusively on the commitment of local users to establishment of regional associations and approval by ADF&G of same. To date, the basic thrust of the planning

process has been that regional plans themselves can be as simple or complex as those individuals involved choose to make them. Likewise, the amount of time, effort and money which is spent in developing comprehensive plans varies by region. Differentiation between short-term planning necessary to start a reasonable number of development projects and long-range planning must occur.

If there is truly a need for comprehensive planning with user participation on a regional basis, and we think there is, tying the level and quality of planning to the progress a particular region makes in organizing regional associations makes no sense. In fact, a decision whether a regional association is a necessary entity in a particular region may well depend in part on the findings of a comprehensive planning activity. The voluntary aspects of the hatchery development program are appropriate; however, comprehensive resource development plans for a region are necessary regardless of the election to establish regional associations. While this point is moot in certain regions from an organizational standpoint, it is not in others. Moreover, if the legislature expands regional association activities to include projects relating to other species, short and long-range planning to define new goals and programs will be necessary. Finally, we suggest throughout this report means of upgrading the planning process. This contemplates a <u>long-range</u> planning effort, with commitment to

development of necessary data and information. Recent efforts to speed the development of regional plans based on this year's appropriation to existing associations is inconsistent with this proposal (see below).

Third, relationships between ADF&G and the regional associations are affected by the quality and content of comprehensive salmon resource development plans. As the regional associations improve their management and technical skills, and this is occurring, they will be frustrated by present limits in the quality of planning.

We believe establishment of a truly effective comprehensive salmon resource development plan will necessitate substantial technical support services, research, stream surveys tagging and other activities by or on behalf of the planning teams. This is particularly true if the management plan is to include those elements suggested as necessary below. It should be noted that the planning process cannot be carried out without adequate financing, region-by-region, in budgets of both ADF&G and the regional associations.

The quality of regional plans is also affected by present state policies protecting all natural runs. The proposed Policy and Procedures by ADF&G establish long-range and short-term objectives to be included in the regional comprehensive plan. Present policies may not apply over the long-term, and long-range planning which does not reflect likely changes in such policies will not be adequate. This

further states the need to address the issue and to begin to identify viable runs now.

ADF&G defines the focus of long-range comprehensive planning to include determination of public needs by species and user groups, proposal of numerical objectives by species to meet these needs, determination of numerical goals for natural stock maintenance and rehabilitation, determination of numerical goals for enhancement strategies by species, and integration of long-term user group needs with technical considerations on the biological potential of the resource. Short-term objectives involve essentially the same analysis for incremental time periods within the long-range (17 year) plan. We do not believe these objectives for comprehensive resource development plans, particularly for the long-term, are sufficient. While the establishment of numerical objectives may make some sense, it is the road map to establishment and achievement of those numerical objectives which should be the basic content of the comprehensive salmon resouce development plans for each region and for the state.

Establishment of a comprehensive management plan might include at least the following basic elements:

1. Establish guidelines for salmon production.
2. Identify program objectives (it appears that this is the primary area of concentration presently contemplated for the regional planning process).
3. Describe and assess present natural production.

4. Determine and assess present artificial production.

5. Determine potential natural production.

6. Identify viable stocks and nonviable stocks that have potentially valuable characteristics.

7. Determine appropriate regional stocks by species.

8. Identify acceptable enhancement possibilities. These must be consistent with harvest management strategies.

Further consideration must be made for short-term and long-term policies for egg availability and development of brood stock. These policies must reflect the goals of maintaining reasonable fisheries and protecting viable natural runs during program implementation. All proposed projects in a region must be measured against the goals, policies or standards which will result from this analysis. This may require establishment of a construction and operating review process to ensure program activities consistent with approved plans.

Another major aspect affecting relations between ADF&G and regional associations involves the duplicity of roles to be assumed by the department. On the one hand, ADF&G is to help organize and help maintain viable regional associations. A.S. 16.10.380 provides that the Commissioner of ADF&G shall assist in and encourage the formation of qualified regional associations for the purpose of enhancing salmon production. On the other hand, the legislature has

also authorized the Commissioner to issue permits for salmon hatcheries to regional associations organized as non-profit corporations under A.S. 10.20 and regulate many operational aspects of the program. Thus, not only is the Commissioner the superseding authority over all regional planning activities as discussed above, he is also directed to assist regional associations and at the same time regulate all efforts pertaining to enhancement of salmon by the association-private non-profit corporation. Achievement of cooperation and assistance between ADF&G and the regional associations will be difficult, at best, given the nature and diversity of relationships presently existing. It will take strong management direction by both the state and the associations to recognize and deal with these sometimes conflicting roles. Establishment of clear biological, economic and management standards against which performance can be measured, and upgrading of the planning process may help offset the fact of these conflicting roles.

A.S. 16.10.443 states that the department shall make every effort "within the limits of time and resources" to advise and assist applicants in the planning, construction and operation of salmon hatcheries. The level and quality of assistance by the department to regional associations has varied from region to region and is affected by personalities and budget. Most association managers have indicated that relationships with local ADF&G officials at the technical

staff level have been quite positive and they have received considerable assistance from such persons. However, they have received less cooperation and support from the central office as a general rule. Procedures to clearly delineate reporting relationships and for expediting decision making on issues of concern to the associations need to be improved. Establishment of policies and procedures involving interrelationships between ADF&G and the associations should be developed with the cooperation of the associations. Moreover, top level management control and commitment to the success of both regional association and F.R.E.D. programs is essential. Association managers must have clear access to the director of the F.R.E.D. division, the commissioner and board members.

A third major issue and necessary element to improve on relationships between ADF&G and the regional associations involves clarification of the activities to be undertaken by both. We have suggested in Chapter II the evolvement of defined roles and responsibilities over a ten year period. Of course, it is difficult at this point to finally determine the types of projects and programs which should be undertaken by regional associations other than planning until their financial viability and organizational stability is secured. However, assuming that problems relating to financing can be resolved on a satisfactory basis, clear definition of roles and responsibilities of ADF&G and the associations for both short-term and long-term

operations is essential. Specific program activities to be undertaken by ADF&G and regional associations in a particular region can and should be addressed, in part, in the development of comprehensive regional plans. However, guidance from the legislature as to the division of responsibilities is also appropriate. The study group and/or the Fisheries Council should be continued to assist the legislature and the Governor in continuing to define these roles.

To date, regional associations have built hatcheries and other artificial propagation projects, performed habitat rehabilitation, conducted (region-specific) research, they have created greater public awareness of the need for salmon resource development, participated in regional planning activities, and institutionalized themselves to varying degrees. At the same time, ADF&G has built hatcheries and other artificial propagation projects, performed habitat rehabilitation, conducted research, created greater public awareness of the need for salmon resource development, and participate in regional planning. Again, ADF&G exercises considerable regulatory authority over regional association projects and programs and controls the regional planning process. Based on present mandates, there is considerable potential for duplication of activities between the regional associations and ADF&G, and unhealthy competition between these entities for limited dollars and projects: The Potential for the operation of certain programs at cross purposes from

one another, and perpetuation of adversary relationships are equally serious problems resulting from the lack of clear guidelines, priorities and authorities for each program.

The legislature can direct a phasing-in of operational authorities (or segregation of same) over a reasonable period of time, with final program assignments reflecting the relative maturity, skills, interests and financial capacity of each. Regional associations could over time become responsible for operation of production facilities operating at full or near full capacity consistent with approved comprehensive plans. This would reflect the legislature's goal of continuing to attract reasonable sums of private monies, to maintain user group participation in ASRDP, and would avoid long-term commitment of budget for operation and maintenance of hatcheries at a time of projected declining revenues. Projects of higher risk and supportive of the production program, but presenting costs or risks which would not naturally be borne by the private sector, would in large part be undertaken by ADF&G. For example, research operations and facilities would also be ADF&G's responsibility. Stream surveys might be the responsibility of the state, but conducted by associations on a contract basis. Joint participation in planning for production facilities and support services, including clear assignment of tasks can occur as institutions mature and obtain the financial commitments consistent with evolving assignments

which will further contribute to an improved and coordinated program.

Another element critical to the joint success of ADF&G and regional association programs, discussed in Chapter II, is assurance over time that financial resources will be sufficient to support a program which will begin to achieve established numerical production goals as part of an upgraded comprehensive regional plan. At present, it appears that the regional associations and ADF&G are strictly limited by statute and available financial resources as to the number and types of production projects they may undertake, regardless of the final outcome of the assessment litigation. Review of proposed long-range association plans reflects a fairly conservative approach to expansion of existing programs. While this may make sense under present circumstances, we suggest that Alaska will not begin to reach appropriate production goals in a reasonable period of time if it is unwilling to assume greater risk and undertake projects more aggressively than indicated by its present course. Improved planning, research and data, and coordination of program activities are steps that will minimize risk over time. The legislature and the Governor must recognize, however, that legitimate expansion of AFRDP consistent with its established goals will require approval of actions and management decisions that involve some yet unanswered questions. ADF&G and the associations cannot achieve reasonable production goals within the present financial, budget and statutory limits.

4. Need for Improved Relationships Between or Alteration of Roles of ADF&G and DCED.

A.S. 16.10.500 et seq. provides authority for a fisheries enhancement loan program. The Commissioner of the Department of Commerce and Economic Development (DCED) is authorized to make loans to qualified regional associations holding permits pursuant to A.S. 16.10.400-470 for the planning, construction, and operation of hatchery facilities. Thus, the financing of regional association activities largely within the authority of DCED. We have indicated above an apparent lack of an appropriate cooperative relationship between ADF&G and DCED by statute. The proposed Policy and Procedures by ADF&G, at page 60, infers that coordination between ADF&G and DCED is necessary for orderly review and approval of permit applications and loan applications. Members of the study group have indicated that relationships between the two agencies are not well coordinated.

DCED operates a number of financial assistance programs and conducts other activities related to the economic development policies of the State of Alaska. It is perhaps for this reason that the financing program for the regional association hatchery program was originally assigned to that agency. We do not believe this assignment of authority for financing of regional association projects is appropriate.

As noted above, the financial viability of proposed artificial propagation is directly related to a number of

biological factors and harvest management strategies, among other things. We have suggested guidelines for evaluation of the economic feasibility of artificial production projects from both a micro- and macro-economic perspective. Again, many of the criteria involved in the evaluation of individual projects, or a broad-based regional program, involve consideration of a number of factors which require the expertise of persons familiar with the science of fisheries production. Further the bulk of analysis related to the financing of regional association projects, not to mention those to be undertaken by ADF&G, involves information not traditionally considered by lending officers. In fact, association grant and loan decisions presently made by DCED are more akin to hatchery program budget analysis than traditional lending practices.

A further point related to ADF&G, DCED and regional association relationships involves recent problems by the Southern Southeast Regional Aquaculture Association in obtaining a final installment of its loan for a major hatchery facility. This failure to make a scheduled installment payment by DCED would effectively have stopped construction at a very late stage of the project, thus rendering the investment in the facility to date as wasted. Concerns of the financial officer might have been alleviated if he had a better understanding of fisheries related aspects of such projects and if project risks were not to be evaluated

within the context of traditional lending practices. Even if financial concerns at this stage of the project were legitimate, it is suggested that holding a loan officer blameworthy for the failing of a project of this magnitude and kind and for a program in a relatively early stage of public experimentation would be most inappropriate. It is (or should be) widely understood that there are technical risks inherent in these programs which may dictate training and experience not common to persons with traditional financial backgrounds.

Finally, the state has not established sufficient standards, guidelines or criteria to evaluate the potential rate of return on investment for its salmon production programs or to evaluate the relative cost and benefits of such programs. This expertise can and should be developed within ADF&G. With this accomplished, transfer of authority for financing of fisheries enhancement facilities from DCED to ADF&G would clearly be desirable. We see no justification for continuing the financial aspects of the program under DCED authority.

5. Need for Improved Relationships Among All Regional Associations.

Regional associations are at varying levels of maturation, and in some instances, have not been formed to the point of approval by the Commissioner of ADF&G. We have

observed in recent meetings with the study group a growing inclination for association managers to discuss among themselves various problems and potential solutions. Communication as to research and planning results, means of operation of facilities, and other activities is occurring. However, members of the study group and others have reported and our own observations have indicated the need for improved relations among the associations. Some of the improvement is necessary because of differences in personalities, and in other cases a misguided spirit of competition among the associations appears to exist.

There is good reason for allowing associations to establish resource development programs at their own respective paces within each region, although in some instances the pace of program and project development has unnecessarily been slowed because of regulatory problems, obtaining necessary approvals, and the like. The experiences of the more mature organizations will be most helpful to those in the beginning stages of development. Much research, data and information has been performed and compiled by some regional associations. The sharing of such information should occur as a matter of course, and it may be necessary to establish a system among the associations to ensure that this occurs. This could be mandated by the state legislature.

It is critical for each association to understand what the others are doing. The potential for duplication of

tasks unnecessarily among the associations exists without a clearly established system of communications. It is suggested that the study group or perhaps an upgraded Fisheries Council be continued into the future, perhaps with a specific mission to ensure continued communication and improved relationships among association representatives (and state agencies).

6. Need for Improved Relationships Among Salmon, Shellfish and Bottomfish Development Program Elements.

We have suggested that the development of Alaska's abundant fisheries resources be viewed and organized as a single program (AFRDP). Competition for research, management, development and investment dollars among program elements at federal, state and local government levels and from the private sector is presently unavoidable among salmon, shellfish and species development activities. This competition among species has been heightened by new opportunities available as a result of enactment of the Fisheries Conservation and Management Act (FCMA).

Assuming the goal for development and utilization of fisheries resources off the shores of Alaska is to maximize potential benefits to the citizens of the state consistent with principles of sound conservation and enhancement, establishment of programs and activities to achieve that goal based upon treating each fishery independent of one another and on a haphazard basis makes no sense. Certainly salmon, shellfish and bottomfish species are at varying

stages in terms of development, utilization, management sophistication, market potential and value, industrial development, and understanding of resource status and potential. All such factors will be reflected in the ultimate budget commitment and programs of the state to affect reasonable maintenance, development and utilization of these renewable resources. However, the organizational and professional disciplines to be applied to proper utilization of all species of fish are relatively the same. The fixing of sound state policies, budgets and management principles for each fishery with maximum avoidance of conflicts, and the sharing of information, expertise and program experiences to maximize effectiveness of each is essential.

In the development of its "Alaska Fisheries Plan," ADF&G acknowledged that salmon stocks can and need to be rehabilitated. Numerical objectives were established by ADF&G to provide minimum annual harvests of 40 million salmon at the end of seven years and 100 million salmon at the end of eighteen years. These goals would be achieved through a combination of enhancement, rehabilitation, management, development research and habitat protection at a cost of 300 million dollars over fifteen years according to the proposed plan. ADF&G acknowledged that implementation of the plan would "require a major effort on the part of fishermen, industry and government alike . . ."

The level and quality of government and private sector planning, management and development activities for shellfish and bottomfish lag far behind those for salmon. The maturity of programs and dedication of state resources to maintenance and proper utilization of these important species differ as well, largely because the legal and economic opportunities affecting the harvesting and production of each has varied.

The study group is well aware that salmon harvests will no longer predominate fisheries development activities because of these newly available opportunities and the economic reality of need for diversified harvesting activities by fishermen formerly able to target primarily on salmon. There has been much talk, and considerable study, planning, and now, pilot projects related to necessary economic development activities to maximize benefits to Alaskans of utilization of offshore fisheries. Most representatives of the industry, fishermen, processors, bankers, public officials and other participants at regional and national conferences on 200-mile limit fisheries (despite differing findings from a variety of consultant reports), indicate that by necessity this new industry will not develop separate and apart from existing fisheries and industry. This reality further establishes the need for a holistic fisheries development and utilization policy and program.

As noted above, responsibility for development activities relating to these fisheries presently resides in a number of different agencies and offices. The need for program activities and budget for each have not been addressed in the context of a single program or policy, priorities affecting each have not been established nor have relationships or coordination among them been imposed. We have been directed by the study group to assess on a preliminary basis alternative means of converting ASRDP programs to the broader program context of AFRDP. Our review is not only to include potential organizational arrangements affecting state activities, but also alteration of the missions and structure of regional associations. To this latter point we will now briefly speak.

It is our view that an altered regional association form (already necessary) which allows such associations to become involved in diversified activities necessary to the development of all fish resources consistent with local priorities and needs is appropriate. This suggested diversity and expansion of authority may seem odd at a time when the financial arrangements for the program are directly threatened by legal extinction. However, certain features of the existing program are most applicable to development needs and opportunities in other fisheries. These include:

1. There is a clear need for involvement of fishermen and other sectors of the industry

in the protection, utilization and development decisions affecting all fisheries.

2. There is a need for fishermen and other sectors of the industry to participate in the financing of all fisheries development activities (the legislature's recent re-enactment of A.S. 43.75, which taxes all species harvested in Alaska waters to finance fisheries development indicates support for this rationale).

3. There are varying needs and interests by region with regard to fisheries development. For example, salmon fisheries development may be a priority to fishermen in Southeast Alaska, while projects related to bottomfish development may be more relevant in the Aleutian Chain.

4. The more flexible the regional association structure is in terms of meeting clear regional needs and reacting to priority development activities, the greater the likelihood of financial and institutional stability.

5. A feature of the regional associations is their clear mandate and need as an organization to be responsive to the variety of interests among local fishermen. We believe that over time, a balanced approach to fisheries produc-

tion will evolve as a result of this program, and that this will occur on a multi-species basis if the mandate and membership of such associations is broadened to include development of and planning for other fisheries.

6. The need for a holistic fisheries approach, if appropriate for state programs, is also necessary for regional associations. This is especially true if the role of user groups in regional fisheries planning (regional planning teams) is to be upgraded.

7. Regional fisheries planning can and should address potential gear and harvest conflicts on a multi-species basis.

Certain other features will need to be built into the regional fisheries development program as a result of the recent Superior Court decision and the need for a secure income and financing stream. If the program assumes more of a local quasi-governmental character than at present (e.g., borough or municipal fisheries development service areas), assumption of a more diverse economic development program may be appropriate. The legislature should address whether newly instituted associations could finance, construct and operate needed infrastructure, marina space, processor facilities (for lease) and other activities much as do port facilities, economic development districts or other local

governmental entities. However, care must also be taken to preserve certain of the private sector features of the present associations in deciding what activities they might undertake.

Assuming that the appropriate institutional arrangements for regional associations necessary to expand their basic authority can be made, necessary relationships will need to be established between such associations and the existing Office of the Governor/Bottomfish Coordinator. Governor Hammond has created a bottomfish task force, whose membership includes state legislators, agency commissioners, and private sector representatives, to define specific goals for the state and to design a work plan for industry development relating to the state's bottomfish development opportunity. In a draft report by the bottomfish program coordinator, dated May, 1979, a program management and organization structure which would have all bottomfish program elements operate at the direction of the bottomfish coordinator, with advice from the bottomfish task force, was proposed. This program proposal suggests that the Department of Commerce and Economic Development would pinpoint areas of industrial weakness and offer strategies and guidelines to strengthen the economic incentive for harvesting bottomfish. The Department would also provide capitalization to the industry through state loan programs, the Commercial Fishing and Agriculture Bank, and the Alaska Industrial Development

Authority. ADF&G would monitor the biological characteristics of the bottomfish resource to provide information for managing the resources for optimum sustainable yield and to assess harvest potential. ADF&G would sample commercial harvest efforts and identify areas of potential conflict between bottomfish fisheries and those of traditional salmon and shellfish fisheries. The Department of Community and Regional Affairs would draw up strategies to assist local communities in alleviating specific local physical and social-economic impediments to development.

While relationships with other fisheries development activities at federal, state and local levels are suggested by the Bottomfish Coordinator's report, establishment of a holistic fisheries development program is not. The proposed program plan to achieve bottomfish development goals and objectives is an impressive start toward the establishment of specific program activities to achieve the state's bottomfish resource utilization goals. However, only limited program budget monies are committed to the resource management aspects of the proposed program. Resource development and enhancement is only vaguely referred to and the relationship between salmon and shellfish fisheries development programs and that for bottomfish is not seriously addressed. The concept of top-level management control over all elements of the Alaskan fishery with provision for coordination among agencies and programs is essential to the success of AFRDP.

B. There is a Need for Improved Information, Data and Research Results for AFRDP.

1. Introduction.

We have discussed the clear need for improved data and information regarding fisheries development activities from economic, financial and biological perspectives, by both state agencies and regional associations, if financing for expansion of the fisheries resources of the state is ever to be secure. Lack of information and proof of success of existing programs has affected budget reductions and instability which makes short- and long-range planning very difficult.

We have also described the likely prospect of competition for dollars among salmon, shellfish and bottomfish development program activities, and have suggested that lack of a holistic of the fishery and an understanding of its needs will make it difficult for the Governor and the legislature to make proper budget decisions. Not only is a methodology for assessing potential returns on investment and relative program costs and benefits necessary, provision of technical data and information upon which to base such assessments will be required.

Finally, we have referred to the need for greater coordination and expansion of research activities related to AFRDP. This section will describe certain non-financial data and information needs for both ADF&G and regional

associations as well as the expanded research and development requirements associated with development goals for the Alaska fisheries. This section will also describe alternative institutional arrangements which are necessary to meet the goal of improved information, data and research.

2. Need for Improved and Expanded Research for AFRDP.

While there is a major need for improvement of data and information for budget purposes, increased biological information regarding existing and proposed projects and to accomplish the objectives of AFRDP also are necessary. A first step in improving Alaska's research program is establishment of categories of research which will afford biologists a common basis to fix research priorities and goals.

For salmon, we would place federal, state and private sector research into three categories. The first category would include evaluation of the potential for maintaining and enhancing artificial and wild salmon. The second would include development of improved techniques to increase the numbers and quality of artificially propagated salmon. A third category would involve assessment of environmental factors causing variations in the abundance of anadromous species. A further description follows:

Category 1: Evaluation of Potential for Maintaining and Enhancing Artificial and Wild Salmon.

Evaluation should extend to existing wild and artificially produced populations as well as proposed new

production because of the need to monitor the Alaska salmon production system as a whole. Priorities and areas of investigation will need to be continuously re-assessed as information is gathered.

The following specific areas are suggested for priority investigation:

(a) Evaluate the economics of enhancement - benefits versus cost or return on investment to improve knowledge about the economics of fisheries.

(b) Determine population levels and behaviors of wild and artificially produced stocks, and population interactions for the purpose of reducing negative impacts. This would include determination of catch distribution and migratory routes for mixed stock fisheries.

(c) Assess environmental limits for productive capacity of wild and artificially produced stocks.

(d) Determine and solve disease problems as they relate to stocking policies.

(e) Identify valuable stocks, including measures of isolation or inbreeding, and examine opportunities for new introductions both in nature and artificial facilities.

Category 2: Improved Techniques to Increase the Numbers and Quality of Artificially Propagated Salmon.

Research should be aimed at improving the cost effectiveness of artificial propagation systems through

modification of existing technology or the development of new culture techniques, including increased survival of artificially propagated salmon. It follows that newly developed techniques must ultimately be shown to contribute significantly to the fishery under carefully controlled pilot-scale rearing and/or release experiments. Examples of recommended research are given under the five following headings:

1. Physiology: Development of physiological, biochemical, and endrocrinological measures to assess the effect of the rearing environment on smolt quality. Development of smoltification indices as a tool to predict optimum time for release and techniques to enforce, advance, or delay smoltification.

2. Genetics: Development of brood stock management and breeding regimes to identify and enhance those characteristics of salmon that produce the greatest benefit to the fisheries. Develop strain of disease-resistant, fast-growing, early-maturing salmon. Test the application of various brood stock techniques and breeding regimes to particular artificial propagation strategies.

3. Disease: Development of new methods for diagnosis and prevention of hatchery diseases.

4. Nutrition: Development of cost-effective feeds using new or under-utilized nutrient sources.

5. Behavior: Development of a technology to control migratory and homing patterns in appropriate circumstances.

Category 3: Environmental Considerations.

Enhancement, which is defined as all means of increasing production--both natural and artificial--of anadromous salmon, not only is dependent upon the successful rearing of the animal, but also the ability of the animal to survive in its total environment. Information is required to assess the effect of habitat alterations on the fish. Emphasis should be given to delineating environmental factors, good and bad, causing variation in the abundance of anadromous species.

1. Habitat Maintenance.

Studies to be directed toward improving existing habitat, including in-stream flow and temperature requirements and barrier passage.

2. Evaluation of the Animal and its Habitat.

To assess environmental changes, it is necessary to measure the response of the animal to such changes.

Establishment of these research categories suggests the need for a long-range research program in Alaska to improve salmon resource development activities for natural and artificially produced salmon from the point of egg take or implantation (including improved incubation methods) to

the emerge stage, to survival through the full migratory pattern of the fish. Research related to the stages of a salmon's survival and growth should be undertaken on a cooperative basis with the federal government, University of Alaska, and others with research capabilities consistent with the jurisdictional interests of each. For example, assessment of the salmon in the ocean environment, which is within the jurisdiction of the federal government should be a priority of the National Marine Fisheries Service. It appears that research relating to environmental concerns are now a priority of the U.S. Fish and Wildlife Service, and to a lesser degree the U.S. Forest Service. Research relating to hatchery operations and performance and that relating to the natural environment in fresh waters, including certain research relating to environmental considerations, would appropriately be the priority of the state. Discussions with study group members indicate that this division among federal and state research activities is evolving on an informal basis.

Biological standards for construction and operation of hatcheries and other artificial propagation projects need to be established as part of the comprehensive planning process. ADF&G has done some work in this area. However, the adoption of final standards will require further research and analysis on the impact of such projects on existing natural runs; the viability of projects in the face of

competing beneficial uses of watersheds, and a wide variety of other critical biological issues will also require additional research before final standards can be established.

The establishment of guidelines to evaluate potential areas for the construction and operation of hatcheries and other projects, and evaluation of performance of such projects will necessarily require improved data and information regarding stock identification (i.e. tagging, scale studies and various other marking methods), and stock assessment through improved means of counting salmon in various stages of the life cycle. Such data and information will be necessary in order to make improved management decisions, including those related to the development program.

For bottomfish, the draft report to the bottomfish program coordinator of May, 1979, describes a role for ADF&G in the development of fisheries management plans for offshore fisheries. While the management authority over such resources largely resides within the North Pacific Fisheries Management Council, ADF&G is recommended as the state entity responsible for overseeing the activities of the Council and recommending sound management practices to ensure protection of bottomfish resources. Data and information and research activities relating to both shellfish and bottomfish lag behind that available and presently being conducted for salmon. Included among those proposed activities to be undertaken by ADF&G for bottomfish which relate to the above research, data and information goal, are the following:

1. Coordinate research activities and cooperate in the design of needed projects with other research agencies.
2. Sample commercial harvests for biological, effort and technical data in a manner and volume which is statistically significant.
3. Assess resource independently of the commercial harvest (survey, tagging) and analyze data collected.
4. Collect and distribute to the public relevant biological and technical information generated by resource agencies, including ADF&G.
5. Identify areas of conflict between the bottom-fish fishery and present historical fisheries and recommend measures to resolve these conflicts in a manner resulting in optimum yield from these interacting fisheries.

Discussions with a number of persons in the industry, federal and state policymakers, and others, indicate that the single most important effort to be undertaken by government in the next few years to ensure the appropriate development of off-shore fisheries is related to the research and data goal. The concern has been expressed that investments in some fisheries may be lost because so-called under-utilized species may already be on the decline as a result of over-harvesting by foreign fleets. Mistakes of the past regarding

other species which allowed overharvesting without consideration of resource impact should not be repeated. The potential to enhance presently depressed species needs to be evaluated. The role of the state in protecting resources off its shores cannot be minimized. If new industry or benefits are to accrue to Alaska by development of off-shore fisheries, there is a legitimate state interest in doing that which is necessary to protect these resources. The state can best accomplish this by preparing to be an effective advocate before and assistant to the federal resource manager.

While research relating to shellfish management and development is in a more advanced stage than for most bottomfish species, this may not be true on a world-wide basis. Accessing foreign data and information developed with regard to off-shore fisheries may begin to offset some of the information gaps.

The proposed research, data and information program to be undertaken by ADF&G pursuant to the report of the bottomfish coordinator is an ambitious one. Priorities will need to be established between this and other fisheries research and information development programs. Clearly, ADF&G will need adequate funding if it is to begin to accomplish the suggested goals.

2. <u>There is a Need to Coordinate Research and Development and Information Systems Among Federal and State Agencies and Regional Associations</u>.

We have sought to identify certain research cate-

gories and information needs which over time must be met in order to maximize the productivity of AFRDP. Another factor necessary to the accomplishment of this goal is improved coordination among federal, state and private sector research activities. Avoidance of unnecessary competition for dollars among state agencies and duplication of activities among all research entities, as well as the establishment of priorities for research consistent with guidelines and criteria, can and should be accomplished with or without legislative action. However, a legislative mandate for improved research coordination may be required.

Perhaps the single most important means for ensuring greater coordination of research would be the establishment of a comprehensive joint research facility in Alaska. As has been previously discussed, Alaska may not be receiving its fair share of fisheries research benefits when compared to other states. Particularly in view of the fact that it produces as much as eighty percent of the nation's bottomfish resources, is the largest producer of salmon, and is a major source for shellfish. In Washington, a joint research facility is being funded in large part by the federal government and is to include state, tribal and university research facilities as well. Justification for the joint facility included the obvious need for improved research coordination, increased information and greater likelihood of joint projects, an expanded skill base for research as a result of centraliza-

tion of research staffs in a single facility, and the avoidance of unnecessary duplication. Such a facility may be more appropriate for Alaska and is necessary to attract quality research staffs, appropriate levels of funding for state-federal projects, and to respond to the major research requirements evolving from development of new off-shore fisheries. Such a facility could be jointly funded by federal and state governments.

A second major step at improving coordination among research entities is to clarify research responsibilities among programs within AFRDP itself. As previously indicated, a major thrust of an improved AFRDP will require clearer definition of the roles and responsibilities of state agencies and regional associations. It has been suggested that a long-term policy could be established to specifically provide that research activities by or in behalf of the state be the responsibility of ADF&G. Were this accomplished, assurances must be provided that regional association needs will be met, possibly by legislative mandate. Establishment of a comprehensive regional plan for salmon fisheries development and other species can and should include fixing research priorities for the region. Of course, continuous upgrading of the comprehensive plan based on experience and information developed over time will be required.

A third means of improving coordination among research activities may be found in action already undertaken

by the legislature. The Science and Technology Act of 1978 established a statutory framework for the creation of the Alaska Council on Science and Technology (ACST), a comprehensive planning mechanism to guide important research activities in support of state objectives and to ensure the efficient transfer of resulting data and information. This act reflects legislative recognition of the importance of the role of science and technology in public policy and decision making.

The Council's activities are to include:

1. Objective evaluation of the need for specific research;

2. Set priorities for state research requirements;

3. Identify and evaluate immediate and future options available to solve a particular problem or implement an idea; and

4. Coordinate data and information exchange among research organizations to avoid unnecessary and costly duplication of effort.

The Council's authority is not limited to fisheries research activities. Additionally, its involvement in evaluating and coordinating priorities for research by the private sector, the federal government, and others, appears somewhat limited.

We believe ACST can provide an appropriate model for ensuring coordination and fixing of appropriate research priorities for fisheries in Alaska. It might be possible to

establish a sub-committee to ACST to deal specifically with fisheries research activities. (Note: That Council membership includes representatives with fisheries-related research backgrounds from the University of Alaska, the U.S. Department of Commerce and ADF&G.)

An alternative approach might be establishment through legislation or executive order of a fisheries research council or work group, to perform many of the fisheries related tasks of ACST. A council would be responsible for establishing cooperative agreements with federal research agencies and private research laboratories; reviewing and incorporating research priorities established by regional associations through proposed regional planning processes; and, working with the state legislature in the development of budget proposals to fund an improved and expanded research program. The committee could also oversee the funding, design and construction of a joint research facility. Membership on the committee might include representatives from the U.S. Forest Service, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the Bureau of Indian Affairs, ADF&G, the Legislative Affairs Agency, the Alaska Department of Transportation, the Office of the Bottomfish Coordinator, and representation from the Regional Associations and Native Corporations, among others.

A fourth means for improving research is the establishment of cooperative agreements between federal and

state agencies to ensure research consistent with the needs and priorities of AFRDP. ADF&G has in effect a cooperative agreement with U.S. Forest Service, although this agreement does not significantly address research coordination as discussed above. There is considerable interest and precedent at the federal level in providing for coordination with state activities through interagency agreement.

The legislature can mandate that the regional associations and the state negotiate cooperative agreements with all appropriate federal agencies. These agreements should not necessarily be limited to fisheries agencies or affect the research function alone. Research conducted by environmental agencies, industrial development agencies, economic planning programs, and others will occur and coordination is appropriate if AFRDP is to achieve its lofty goals.

A fifth important means of upgrading the research and information development elements of AFRDP is establishment of a uniform reporting and accounting system for each association. State agencies (DCED and ADF&G) and legislators have to date been relatively critical of the level and quality of information available to them regarding internal activities of the associations. While an annual report by the regional associations is required, a more sophisticated budget and accounting system by which the legislature can evaluate individual regional programs and ADF&G projects will be

helpful. Economic data and financial information consistent with the methodology described in Chapter I should be required.

In analyzing economic and biological projections, as well as total program results over the long-term, it will be necessary for regional associations and ADF&G to work from much common data. This is necessary to compare the effectiveness and efficiency of different programs and approaches to resource development undertaken by the associations and federal and state agencies. Any improved system must be simple and yet report out information necessary not only to evaluate the programs, but also to reduce and minimize administrative burdens and costs to the associations. Obviously, the regional associations must participate in any program effort at information and data system development. The state-wide comprehensive planning process might be an appropriate vehicle for accomplishing this.

C. There is a Need to Improve Relationships With and Expand the Contribution of Federal, Local and Private Sector Programs Affecting or Having Potential Impact on AFRDP.

1. Introduction.

We have identified in outline form a number of federal fisheries programs which have direct and indirect impact on achievement of the goals of AFRDP (see Appendix B for outline presented to the study group), and have discussed the need for federal and state research coordination. Improved relationships with local governments have been

discussed during the last two years because of the enactment of the FCMA. A number of commentators have indicated the need for local governments to develop infrastructure, processing capabilities, and other necessary support services to the growing bottomfish industry if Alaska is to maximize the benefits to be obtained from this important resource. We have suggested that local government involvement in the development of all fisheries resources is growing in importance as a result of the recent decision by the Superior Court affecting the authority of regional associations to raise revenues for salmon production and the reenactment of A.S. 43.75 relating to fisheries taxes on all species harvested in Alaska waters or off its coast. The new law provides for sharing a proportion of such revenue with local governments after the end of fiscal year 1980. This will necessitate greater interaction between state program elements of AFRDP and local governments. Finally, the considerable efforts of the state through regional planning processes and the regional association program to increase the input and stake of various elements of the fishing industry in AFRDP have been identified.

Alteration of the regional association institutional form to better assure financial and organizational stability, upgrading of the association's role in regional planning, and expansion of the ASRDP program concept to AFRDP provide the means for increasing private sector and local government

involvement in AFRDP. This section will concentrate on the need for improvement of federal and state relations.

2. There is a Need to Build a Case for a More Equitable Federal Contribution to AFRDP.

Although it was impossible to obtain detailed budget statements regarding commitment of federal dollars to programs and activities relating to AFRDP, we would suggest that a number of factors indicate that Alaska may not be obtaining a fair share of federal research monies commensurate both with its resource availability and potential when compared with other states. While the overall federal presence in Alaska is perhaps greater than in any other state, competition for limited dollars is again a fact of life among the states when it comes to monies which would contribute positively to accomplishment of the goals of AFRDP. A first reality when exploring possible reasons for less than appropriate federal expenditures relating to Alaska's fisheries than may be justified is the state's comparative lack of presence at congressional and federal agency levels. Alaska's Congressional delegation is small, and in recent years has been forced to concentrate the bulk of its efforts to the D_2 lands issue.

A second reality is that Alaska is not perceived as conveniently located by most persons in the lower forty-eight states. Federal regional offices and major district offices for the Western region are located in large part in

Seattle and Portland. Fisheries policy is generally made in these offices or in Washington D.C. Most of the major regional and local fisheries research facilities are located outside the State of Alaska. These and other factors may have tended to reduce Alaska's input into federal decision making.

An expanded federal contribution to AFRDP is clearly justified. First, the federal presence in Alaska is greater than in any other state in the union. Second, considerable degradation of fisheries resources in Alaska occurred during years in which the federal government was responsible for management of the resource (before statehood). Third, a major proportion of the nation's fisheries resources are off the shores of Alaska. Fourth, with enactment of legislation affecting native claims to fisheries, and the trust responsibility of the United States over such claims, the need for expansion of fisheries resources to meet subsistence and other needs of Alaska natives will be heightened in coming years. Finally, the State of Alaska is among the most economically dependent of any of the states on its fisheries.

Research needs related to Alaska's unique fisheries problems (e.g., weather, methods of stream classification to be applied to the large number of Alaska streams, migration patterns, etc.), dictate establishment of research priorities to achieve the goals of AFRDP. An articulation of these

needs will help Alaska better justify expanded federal and state expenditures. Coordination of research activities with federal agencies through cooperative facilities and agreements will be a further important step towards justifying increased contributions to meet the goals of AFRDP.

3. There is a Need for Greater Federal-State Regulatory Coordination.

We have identified a number of federal requirements and regulations which can (and do) significantly increase costs and reduce the productivity for AFRDP. The regional associations have experienced the need to obtain an excessive number of permits from federal agencies merely to begin their operations. These requirements are also imposed on ADF&G. Regulations affecting the development of the bottom-fish industry are perhaps even more difficult because of the broad jurisdictional authority of the federal government over coastal zones outside three miles. While many and perhaps all of the permit requirements are justified, the process for obtaining necessary approvals can be greatly simplified. The first step should be a concerted effort by the state to consolidate its permit requirements, eliminate duplication, and provide services which may include a one-stop licensing process for AFRDP activities.

Alaska has already enacted legislation for a one-stop licensing program, and this program could serve as a vehicle to minimize regulatory impacts on AFRDP. The state

program could reasonably be applied specifically to fisheries resource development projects on a priority basis. A necessary next step would be the expansion of this program to include federal regulatory activities. AFRDP activities, including the development of salmon hatcheries, other enhancement projects, infrastructure development, and necessary support services for a growing bottomfish industry, could also provide an appropriate model means for bringing about coordinated and consolidated non-fishery related federal and state regulatory processes.

Because Alaska has not yet developed its coastal zone management program to the point of full implementation, and because coastal zone management is viewed by the federal government as a potential vehicle to achieve rational development through simplified processes, monies are available to incorporate measures of regulatory reform and coordination into this process. As part of a special AFRDP program effort (perhaps to be undertaken by the study group or Fisheries Council at the direction of the legislature), policies, processes and initiatives which will ensure improved coordination by federal and state regulatory activities should be developed.

It is noteworthy that most existing fisheries statutes, not to mention upland regulatory activities, specifically authorize coordination, and in some cases, the federal government has appropriated funds for the establish-

ment of such processes through programs other than coastal zone management. Yet, implementation of model programs for specific interest areas (e.g., fisheries development) are in effect only on a limited basis to date. Impetus towards development of off-shore fisheries can be utilized as a further rationale for incorporating a model permitting project for AFRDP, which could be funded in large part by the federal government.

4. There is a Need to Identify Federal Programs Which May Contribute to Accomplishment of the Goals of AFRDP.

Most states have difficulty identifying on a continuing basis the many federal programs which may be utilized to contribute to accomplishment of broad state policies. The State of Alaska can and should make special efforts to identify federal activities and funding sources, not to mention those in the private sector, which can be utilized to contribute to the accomplishment of the goals for AFRDP.

A major argument against seeking federal financing for fisheries development programs is a legitimate concern over the "strings attached" to such funds. Given the level of federal presence in Alaska, this concern is clearly justified. Thus, in the framing of an overall Alaska fisheries resource development program, attention must be paid to the true cost of federal funding. It is suggested that loss of resource management authority or local government

planning control over development activities is hardly worth the sacrifice for additional federal dollars.

The legislature can mandate identification of information and data needs for effective intergovernmental advocacy and relations, coordination with the federal government as discussed above, and a continuous monitoring of federal programs to ensure maximum support for AFRDP. Because working with the federal government can involve considerable time and effort, any monitoring and fund seeking activity should be measured by the legislature, over time, on a cost-benefit basis. Building the expertise in working with the federal government is a necessary element of this program.

5. <u>There is a Need to Evaluate AFRDP Program Goals in Relation to the President's Recently Announced National Policy on Fisheries</u>.

In May, President Carter announced a national fisheries policy aimed essentially at increased utilization by Americans of fisheries resources off the shores of the United States. The attractiveness of the development of off-shore fisheries has led to what can be termed a reversal of existing federal policies relating to fisheries activities. As indicated in prior study group meetings, the U.S. Office of Management and Budget has indicated in the past no special treatment of fisheries related programs is justified and all such programs must be considered as in competition with

other resource and economic development projects. While this reversal in policy indicates greater federal interest in fisheries development, the study group must understand that the impetus for the change in policy is not salmon fisheries development.

We are aware of considerable national interest in the proper development of Alaska's fisheries consistent with this new policy. While the state is taking a number of actions to take advantage of the national policy, this is not a coordinated or priority activity at this time. We suggest that a major state effort be undertaken to upgrade AFRDP and effective presentations of state oriented proposals to federal policymakers are essential to achieving a more appropriate federal contribution to the state program.

Alternative Institutional Arrangements for Consideration by the Study Group and the Alaska State Legislature

A. Introduction.

We have discussed a number of potential reforms to AFRDP which we believe are necessary to accomplishment of the broad fisheries development goals and objectives established by the state legislature and the executive branch for expansion and utilization of all the state's fisheries resources to the maximum benefit of its citizens. We have directed attention to the need for sound economic evaluation of AFRDP projects and programs prior to and during the course of

tneir operation, means of achieving greater financial stability for AFRDP program elements, and evaluation of institutional needs to achieve broad program goals. This review suggests a number of alternative institutional arrangements and possible reforms which should be considered by the legislature during the 1980 session. It is the purpose of this section to assist the study group in addressing certain alternative approaches to reform of AFRDP.

Alternative approaches include:

1. Options to assure greater central management control and horizontal coordination among all programs directly and indirectly involved in the development of Alaska's fisheries;

2. Options which reflect the need for planning and program implementation on the basis of identified regional needs; and

3. Options responsive to the particular organizational needs and problems extant within the present regional association program.

B. Options Relating to Centralized Management of Alaska's Fisheries Development Program.

We have identified a number of institutions at the state level directly involved in or impacting on AFRDP. Additional to those are a number of specific programs which indirectly affect accomplishment of fisheries development goals of various programs. (See Appendix A.) The needs and

missions of these many programs or offices must be also considered in the development of any proposed alternative organizational structure for AFRDP.

Option 1 - Maintain Present Organizational Structure, With Firm Legislative Mandate for Inter-Agency Cooperation and Coordination of Activities, and With Reforms to Individual Programs Responsive to Above Findings and Conclusions.

This approach would contemplate no alteration of the organizational structure of AFRDP as it presently exists, but would require legislative and executive action on a program-by-program basis to effect coordination and many of the necessary reforms. Authorities of various program activities would be altered or expanded to allow the programs to perform in a manner consistent with approved recommendations.

Legislative mandates to coordinate program activities already exist in a number of cases. In many instances, however, effective implementation of enacted programs has not occurred. Thus, a weakness of this approach is the lack of assurance that coordination among the wide variety of AFRDP activities will occur through clearer direction from the legislature.

Specific identification on a program-by-program basis of each activity which must be coordinated may be difficult from a legislative perspective because it would require a large number of amendments and detailed definition

of agency relationships. Certain of the program elements (e.g., office of the bottomfish coordinator, division level program activities, etc.), are not specifically established by state legislation. In other cases, reorganization deemed appropriate by the executive branch may be inhibited by legislation which specifically authorizes and refers to division and office level activities.

While we have proposed a number of reforms which could require legislation affecting the various programs of AFRDP, we doubt that the goal of centralized coordination and consolidation of program as has been suggested can be achieved without some stricter mandate and clearer form of direction to the executive branch. A lack of accountability for such coordination, except on an individual program basis, would imply that AFRDP program results can be achieved through piecemeal management and without significant centralized direction. We do not believe this can be realistically achieved.

Option 2 - <u>Present Structure, but Defined Through Executive or Legislative Action, With Lead Agency Responsibility for Certain Program Activities Within AFRDP</u>.

This organizational alternative contemplates establishment of a lead agency which would be responsible for directing implementation and coordination of all activities related to AFRDP. While the basic authority of each individual

program, division or other activity would not be altered except as pursuant to accepted recommendations, their responsibility to respond and work cooperatively with the lead agency in establishment and implementation of AFRDP would be clearly established either by legislation or executive order.

This alternative will help elevate the priority of fisheries development within Alaska's government, provide greater visibility to fisheries development goals and programs, and should assure greater horizontal coordination and efficiency and improved management. While there will be debate as to which program or activity most appropriately would serve as lead agency, it is suggested here that there is a best choice among the candidates. Clearly, fisheries development involves more than just an understanding of salmon and other species. A lead agency must have or <u>be able to draw expertise</u> on such issues as the economics of fisheries, infrastructure development, construction of capital facilities, administration projects, project financing, among other things. No single agency presently has this broad capability.

However, we believe that the agency with the clearest mission and most relevant skill base to the task of over-seeing AFRDP is the Alaska Department of Fish and Game. We have discussed the problems of separating financial and operational aspects of the regional association program and recommended transfer of the financing program from DCED to

ADF&G. Such a consolidating action would not be necessary in other instances. What is necessary is establishing that by statute a lead agency be provided with sufficient management authority and control over various agencies and program elements to achieve and direct cooperation and support for AFRDP.

We believe that ADF&G is best suited to serve as lead agency because their understanding of resource issues is critical in the development of management, conservation and enhancement strategies for all species. As noted in our discussion relating to establishment of a methodology for economic evaluation of programs and assessment of financing needs of such programs, most proposed criteria or standards are clearly related to accurate assessment or projection of biological factors. However, a typical weakness of state fisheries management agencies is that they are dominated at mid-level and top management levels by persons who have worked themselves up through the ranks. In many cases, such persons lack the broad range of professional and management skills necessary to oversee the variety of disciplines involved in a major resource development program. Thus, if ADF&G is to assume a lead agency role, evaluation of existing talent within that agency and its capacity to perform in a managerial capacity consistent with the goals of AFRDP should occur.

We are impressed with the institutional arrangement

in effect for Alaska's bottomfish development program. While we do not believe it is essential for a program coordinator to reside within the office of the Governor, it would appear that this has contributed to greater visibility and attention to the off-shore fisheries opportunity than might have occurred had the program been located within a single department at the outset. Over time, and particularly if ADF&G or some other department is established as a lead agency for AFRDP, it will make sense to remove the office to that lead agency.

A second feature of the state's bottomfish development activity is the establishment of a bottomfish task force, comprised of individuals within and without state government. The task force serves in an advisory capacity to the bottomfish coordinator and the Governor. Establishment of a similar advisory task force to work with the lead agency in the evaluation of AFRDP options, to offer new ideas and proposed actions, and to assist in the oversight of program activities makes sense. Such a task force would be primarily involved in the evaulation of centralized or state-wide management aspects of the program with regional associations and regional planning teams being primarily involved in dealing with local problems and interests. The legislature has already mandated that a comprehensive state-wide salmon development plan be established. This planning process should be expanded to include other species

consistent with proposals for AFRDP, and a top level task force could be involved in the development and evaluation of this comprehensive plan. A primary goal would of course be to ensure the integrity and protection of regional plans unless they are inconsistent with approved state-wide policies. Finally, we have suggested herein a continuation of the study group or the Governor's Fisheries Council. The functions defined for a task force could be assigned either of these groups if they were reorganized and properly funded. This would help avoid unnecessary duplication and possible competition.

Option 3 - Maintain Present Structure, but Establish Within the Office of the Governor an Alaska Fisheries Resource Development Coordinator.

This organizational alternative contemplates top level oversight and policy management of the wide variety of AFRDP programs from the Office of the Governor. This process would in many ways mirror Alaska's bottomfish development program. With the many agencies involved in fisheries development, the exercise of special top level management to ensure coordination and effective prioritization of the use of limited funds would be most helpful. Moreover, a coordinator's office within the Office of the Governor would elevate the level of public visibility for the fisheries development program, it would offer the opportunity for greater policy direction and control from that office, and

it would provide an office responsible for ensuring that agencies not operate at cross-purposes. Again, an AFRDP task force could operate in a manner consistent with the bottomfish program.

If this option were elected, the coordinator would need sufficient staff and direction either by executive order or from the state legislature to clearly define its functions, powers over existing agencies, program goals and priorities. This is not to suggest establishment of a new bureaucracy, but merely a coordinating office with sufficient staff to perform assigned tasks consistent with established goals for AFRDP.

Some negative aspects of this option include the appearance of establishment of a new super agency or "czar" responsible for operation of fisheries programs at the expense of powers of other agencies. Moreover, it would be difficult for this office to maintain control over a wide variety of program elements with only indirect day-to-day oversight and incidental involvement in program operations. The potential for conflict between the office of the AFRDP coordinator and mid-level and top-level management in the various agencies is considerable.

Establishment of an AFRDP coordinator within the Office of the Governor could also be subject to the vicissitudes of politics. The legislature may be hesitant to place necessary powers in such office, and may tend to limit

necessary powers.

Finally, creation of an AFRDP coordinator within the Office of the Governor for any long-term period may tend to remove further centralized management and state-wide policy and planning activities from those proposed to be accomplished at regional levels. Line agencies have local staffs and experience or responsibility for close relations with regional entities. An AFRDP coordinator would not (unless his office was to be expanded to include field representation) participate in development of local plans and policies. A major new bureaucracy may have to be developed to deal with fisheries development activities if the new office were to expand its operations and involvement into regional development and planning activities.

Option 4 - Establish a Separate Fisheries Development Agency or Office Through Executive Reorganization Authorized or Approved by the State Legislature.

Establishment of a fisheries development agency or office under the Governor, with assignment of existing programs from a wide variety of agencies to such new agency or office is a possibility. (For example, assignment of all salmon, shellfish, and bottomfish development activities, loan programs and facilities construction programs, within a single agency might be possible.) This agency would have the specific responsibility to work directly with regional associations in a manner consistent with newly established

policies. Positive aspects of this alternative include clear high-level visibility for AFRDP by establishment of a special program and agency; single agency control over budget and responsibility for all elements of AFRDP; and, separation of major development and management activities. This organizational option may more clearly separate development and management from a regional association perspective, with key association relationships evolving with the development agency rather than the harvest management agency.

Negative aspects include likely competition for dollars between fisheries development and fisheries management agencies, perhaps greater difficulties in coordinating fisheries development and management activities which are necessary to the success of both programs, and the possibility of a larger bureaucracy with increased program costs. Moreover, it would be impossible to include all program development activities within a single agency. For example, activities pertaining to infrastructure development, data collection applicable to both management and development programs, a wide variety of state regulatory activities, and the like, would not likely be included in this "umbrella agency."

C. Organizational Alternatives Affecting Greater Regional Coordination Between State Agencies and Regional Associations.

It is our view that the peculiar needs of the many diverse regions of Alaska must continue to be addressed by

the study group and the state legislature. We have already suggested a number of reforms to affect improved relationships between the state and regional associations. Among major recommendations are:

1. Expansion of regional association authority to become involved in development activities related to species other than salmon (i.e., an active role in AFRDP);
2. Upgrading the regional planning process and regional association involvement in that process;
3. Upgrading of data and information and benefits of research to be available to regional associations and establishment of procedures to ensure sharing of information and research among regional associations and state agencies;
4. Consolidation of regional association financing and operational programs within a single agency;
5. Establishment of clear biological, economic and management guidelines against which all development projects and their performance can be measured;
6. Establishment of a one-stop model permit program for fisheries development activities;
7. Mandatory cooperation between ADF&G and

regional associations regarding specified activities;

8. Establishment of a coordinated research program, including construction of a joint or consolidated research laboratory and coordinated research planning mechanisms and methods to fix research priorities consisten' with AFRDP program goals;

9. Mandatory coordination of AFRDP activities through development of cooperative agreements between ADF&G, regional associations and appropriate federal and state agencies;

10. Establishment of a ten-year operations plan which ensures development and clear delineation of responsibilities of regional associations and state agencies to be assumed over the long-term, and which seeks to build requisite skills in such associations and state agencies to ensure accomplishment of AFRDP goals; and,

11. Alteration of the regional association form to include greater local government involvement, this to ensure stability of financing and improved operations.

Options relating to regionalization of Alaska's boards of fish and game were embodied in house bill 193, introduced during the 1979 legislative session. While we

have reviewed this proposed legislation, and would expect the study group to focus on this or similar approaches, we have directed our attention to alternative institutional arrangements relating specifically to the operations of regional associations and ADF&G, including those outlined above. For purposes of this discussion, we assume a basic goal of facilitating greater responsiveness of AFRDP to regional development needs. Alternative institutional arrangements would appear to include:

1. No alteration in ADF&G or regional associations (this option would assume that the financing problems for regional associations might be resolved without altering the regional association form);
2. Expansion of ADF&G regional staffs to better address local development needs and implement a coordinated program to include increased support services to regional associations;
3. Legislative establishment of regional offices, empowering a regional administrator to fix ADF&G regional policies and implement approved programs--such legislation would include clear definition of relative roles and responsibilities of ADF&G regional offices and regional associations.
4. If an AFRDP coordinating office is established

in the office of the Governor, somewhat similar to establishment of an office of the bottomfish coordinator, it may be appropriate to establish regional offices to ensure a direct link between regional associations, fisheries development program staffs, and the Office of the Governor.

5. If development activities are in any way separated out from fisheries management activities, regional relationships between these functions would have to be established for purposes of regional planning and program implementation and operation.

In assessing institutional arrangements to further improve the level and quality of consideration of regional interests and increased coordination among regional associations and development program staffs, certain key issues must be addressed. Included are:

1. Assessment and identification of roles, responsibilities and powers of both regional associations and program staffs in planning and in the development of policies and implementation of programs. Again, we have suggested that the evolvement of AFRDP, including final institutional arrangements consistent with goals and recommendations herein, will involve

approximately a ten-year planning and implementation cycle. Assignments of responsibilities and powers will be dependent upon the maturation of various program elements and their relative capacity to perform assigned tasks. In many instances, experimentation will be required on a model project basis (e.g., regional association involvement in development projects related to species other than salmon).

2. Appropriate assignment of technical staff support on the basis of needs of each particular region;
3. Arrangements to ensure resolution of disputes and conflicting policies among the regions;
4. Establishment of a methodology for implementation of state-wide policies region-by-region;
5. Establishment of a methodology for making responsible and equitable budget decisions as they affect each particular region;
6. Establishment of means to assure coordination between regional officials and all programs directly or indirectly involved with AFRDP; and,
7. Identification of means to establish relationships between regional officials and external activities (e.g., federal, private) affecting

fisheries development activities in the region.

We have not focused on developing a detailed institutional arrangement related to the organization of regional agency staffs. This is a matter which may appropriately be addressed by the study group prior to the 1980 session, at least to determine necessary first steps to be considered and reviewed during the course of the proposed ten-year reorganization plan. While we have developed a number of concepts regarding the regional organization structure, these have not been sufficiently tested or evaluated to be included in this report.

D. Organizational Alternatives Affecting Regional Associations.

1. Introduction.

As discussed in Chapter II, the recent Superior Court decision ruling that A.S. 16.10.530 is unconstitutional forces us to consider a number of alternative institutional arrangements to the present regional association program. This would have been necessary in any event because of the need for greater financial and organizational stability for the program.

The State Attorney General has suggested the need for legislation and has identified five "potential legislative alternatives to the now unconstitutional statutory scheme" in a letter to the Governor dated July 20, 1979. We have

suggested a sixth option which would require alteration of certain constitutional provisions and have elaborated on alternative options pertaining to establishment of service areas. We also explore alternative approaches to financing regional associations in the future.

2. Potential Institutional Arrangements, Assuming No Constitutional Revision.

Option 1 - Active Legislative Involvement in Regional Association Program.

Article VIII, Section 5 of the Alaska Constitution provides:

> The legislature may provide for facilities, improvements, and services to assure greater utilization, development, reclamation, and settlement of lands, and to assure fuller utilization and development of the fisheries, wildlife, and waters.

The legislature could on an annual basis approve specific facilities and services (or appropriate funds on a more general basis) and directly appropriate funds to the associations for specified purposes. The level of funding of approved projects and services could be established with or without reference to fisheries taxes collected by legislature, but an appropriation would be required (see Article IV, Section 7 of the Alaska Constitution prohibiting dedicated funds). Any taxes collected for fisheries development would be by the state, assessments as declared unconstitutional in Alex v. SSRAA would not occur.

This option suggests legislative control of all activities to be undertaken by regional associations, much as if they were individual state agencies. Funds for planning have been appropriated this past year for regional associations, and appropriations to DCED's loan fund for the program also occur.

More direct legislative involvement in the program than at present arguably presents problems. First, subjecting the program to the vicissitudes of the appropriations process on an annual basis offers limited financial stability. Second, the concept of user pay is not present and commitment to the program may be limited because of the heavy front end investment in both the F.R.E.D. and regional association programs without special arrangements to offset this burden with contributions from those who would achieve the primary benefits. Third, regional associations would have to annually lobby for financial support. Fourth, there would be excessive competition for limited dollars among the associations and F.R.E.D. Fifth, this financial plan does not provide for any reduction in operating and maintenance costs to the state over time. Because of these problems, we suggest that this option be considered only as an interim funding source.

Option 2 - <u>Establishment of Special Service Districts Consistent With Constitutional Provisions</u>.

Article X, Section 5 of the Alaska Constitution

provides that a borough assembly may establish service areas to provide special services within its boundaries, and authorize "the levying of taxes, charges or assessments within a service area to finance the special services." Article X, Section 6 provides that the legislature may do the same for unorganized boroughs. We have suggested in Chapter II that alteration of the regional association program to conform with the service area concept could provide greater organizational and financial stability than does the present form.

Conversion of the regional associations to a service district, however, presents some problems. The first problem is the obvious alteration of the regional corporations to a quasi-governmental arm of local government. This may present a philosophical problem for legislators, association members and local governments themselves who may not be pleased with so strong a user controlled form of governance. Additionally, some may not accept this arrangement as an acceptable alternative to private non-profit or for-profit aquaculture.

Second, borough boundaries do not conform with those presently established for the associations. The legislature can likely fix relatively the same service area boundaries as for regional associations in the unorganized boroughs. It will be more difficult for organized boroughs to extend service areas beyond their boundaries (see Article

X, Section 5 of the Constitution). Article X, Section 13 of the Constitution authorizes cooperative agreements for joint administration of any functions or powers among local government units. Extending jurisdiction of a service area to parts of another organized borough, but perhaps not all of it presents obvious problems. Reaching agreements among these local boroughs will not be easy, as powers to be divided among the governments will be the subject of dispute. Pressures for changes of governmental roles and controls could be a constant as local interests become concerned with their perceived share of program benefits. Cooperative agreements can be broken or altered under difficult circumstances. There is a valid question whether persons outside the borough but included in the service area will be satisfied that they are truly being represented by borough officials whom they do not elect.

The present association boundaries are founded for good reason. Fishermen are licensed to fish in specific areas in Alaska and the benefactors of the program (and those to be assessed) are easily defined. Borough boundaries, if used, may also present a special "free rider" problem for the regional association program. To the extent boroughs represent smaller districts and are not drawn to reflect where fish are hatched or harvested, aquaculture by such a small service area may inhibit investment in the resource because there is less assurance of returns to the investor

(payers of the assessment).

Another critical issue in the establishment of service areas will be to preserve to a reasonable degree the level and quality of input and control user-benefactors are to exercise for both development and planning activities. The organization and functions of the service area are again a matter for the legislature. It is likely that local officials will expect a greater role in the operation and management of the service area, as they are ultimately accountable for performance. Moreover, to the extent these entities are to provide financing for construction and operation of local port facilities and infrastructure, the impact of such programs on other municipal and borough functions must be considered.

A special effort to resolve problems related to this service area option is necessary, as it offers a number of positive benefits. First, the legislature may be more inclined to accept greater risk and fund more liberally activities of a local government entity. Legislators are used to dealing with such entities; they recognize that accountability for failures or success will exist; local agencies will be able to offer certain services, administrative assistance, and data and information more easily to service districts than to the associations; and, service areas present a more mature organizational form with a wider experience base than do the organizations of existing

regional associations.

Expansion of the authority of the regional associations consistent with the concept of AFRDP fits especially well with this possible alteration of the association form. Many of the development activities related to utilization of off-shore fisheries involve funding for infrastructure, port facilities, marina and dry-dock space, etc. These activities are often funded in large part by local government entities (e.g., port districts). Additionally, attraction of federal and state matching funds for such purposes will be easier for local government entities than the present associations, and the local citizenry can be taxed to the extent they may benefit from local development activities. Local government permits will be easier for approved service area actions than perhaps is the case at present for the associations.

Finally, there are some specific legal questions regarding the service area option which need to be considered prior to the 1980 legislative session. First, does the legislature have authority to establish service districts or areas within the organized borough? If so, can the legislature extend such service area bourdaries into another organized borough or the unorganized borough? A positive determination as to these questions would make it possible to establish service area boundaries consistent with those for existing and planned regional associations more easily, and without

Sixth, in the face of the Superior Court's holding that "an incorporated non-profit association may not become a 'service area', either by inference or express legislative declaration," and that the "hybrid creature legislatively conceived cannot survive the constitutional infirmities and defects present at its birth . . .," is it realistic to assume that the regional associations can maintain any of their private or corporate characteristics? Further, is it even possible for some new agency to assess and collect taxes in behalf of or pass through state taxes a regional association which retains these characteristics? Could such monies be collected by or through to Salmon Authorities established by A.S. 16.10.600 et. seq.?

3. Potential Institutional Arrangements, Assuming Constitutional Revision.

Potential constitutional revisions to resolve the legal problems affecting the regional association assessment problem and to affect greater organizational stability include:

(a) Amendment to Article X, Section 5, which allows for establishment of service areas, to allow extension of the boundaries for provision of special services beyond those of an organized borough.

(b) Amendment to Article IX, Section 7, which prohibits dedication of the proceeds

constitutional amendment.

Second, can the legislature mandate that organized boroughs establish service areas for fisheries development and further require that the borough reach cooperative agreements with other boroughs for extension of the service area into their area of jurisdiction? Again, a positive determination will resolve in part boundary problems relating to the service area option.

Third, can the legislature authorize organized boroughs to levy taxes, charges or assessments within a service area (perhaps beyond its boundaries) in behalf of a fisheries development service district established by state legislation and performing most of its functions (other than taxation or assessments) separate and apart from the organized borough? This issue arises if the legislature seeks to separate the regional fisheries development program authority from the taxing authority, with the local government entities (organized boroughs) passing tax or assessment receipts directly through to the program. The problem of dedicated funds from a local government entity needs to be addressed if a positive determination is made that such separation can occur. A related and similar question involves what level of control or authority over fisheries development activities must be exercised by borough officials if the service district concept is adopted?

Fourth, in the case of the unorganized borough,

what entity would be responsible for taxing or assessing fishermen in behalf of the association or service district established by the legislature? Additionally, in the case where a borough service area is extended into the adjacent borough or unorganized borough, who collects taxes or assessments from fishermen licensed to fish in areas outside the borough, but in the service area?

Fifth, we are concerned about preserving the voluntary assessment aspects of the existing program. Presently, fishermen in a given region must elect to form regional associations and assess themselves for aquaculture development activities. We have discussed the possibility of diverting a portion of state-wide fish taxes (A.S. 43.75) to the regional association or its predecessor organization. Another possibility is to increase this tax, in lieu of an assessment or separate local or state-wide tax for aquaculture. Regional fishermen might then have the option to elect <u>not</u> to pay a certain percentage of the state tax (e.g., that percentage added to the existing tax). Will a state-wide tax, with provision that a service district exercise an option either for or against an additional tax for purposes of fisheries development, stand the constitutional test under the due process and equal protection doctrine? A related question involves who must be represented in the organization of the service district and who must be taxed to pass this constitutional test?

of any state tax or license to any special purpose, to allow for dedication of fisheries tax monies (e.g., A.S. 43.75) to regional associations for construction and operation of fisheries development facilities (Article IX, Section 13 requiring appropriations to withdraw monies from the Treasury may also have to be amended).

(c) Amendments to Article X, Sections 1 and 2, which seek to limit potential duplication of taxing authority by allowing the State to delegate its taxing authority to organized boroughs and cities only, to allow assessments or levies by associations established by law for a public purpose. Again, any amendment to the Constitution could be difficult, particularly if its purpose is limited to a single interest or program.

The first of these amendments would be helpful to resolve potential boundary problems discussed above if the regional association form were to be altered to conform to the service area concept.

The second of these amendments would allow the state to collect a tax on fish harvests and direct those

taxes back to the regional association for use in a manner consistent with the present assessment and without an appropriation by the legislature.

The third of these amendments would allow for significant alteration of the regional association form and increase capability to finance its operations. It contemplates the establishment of "junior" taxing districts in any variety of forms. There are many examples in the lower 48 states which might serve as appropriate models for an altered regional association program. We have suggested that port authorities in Washington and Oregon provide an excellent model for "junior" governmental economic development activities similar to those of AFRDP. Port authorities operate pursuant to statute, elected officials administer them, they have bonding and taxing authority (with ceilings on each), and are subject to considerable voter controls.

Economic development districts have been formed pursuant to federal and state statutes to perform a variety of tasks and are somewhat less visible, more limited in authority and political accountability, and largely have been formed in major centers of commerce. METRO, a local authority in King County, is an example of an organization formed for specific purposes (e.g. transportation, sewage control) to deal with governmental problems shared across jurisdictional lines.

While infrastructure development and other economic

development activities may well be inhibited in Alaska as a result of present constitutional prohibitions, the framers obviously felt strongly that the spectre of junior taxing authorities presented more ominous concerns for Alaska's citizens. This may or may not still hold true, but we wonder if the regional association financing problem and the 200 mile limit fisheries opportunity are sufficient impetus to reverse so strong a policy. This is particularly true if there are alternative legislative remedies to deal with this problem.

To conclude, amendment to the Constitution could affect greater flexibility than presently exists for the legislature to alter the basic form of regional associations and to provide greater organizational and financial stability. However, the process to amend the Constitution is by no means an easy one, and to amend certain of the above provisions for the purposes stated herein may not be realistic. We suggest this is an option which may ultimately have to be considered if further legislative attempts fail to achieve a fisheries development program consistent with the constitutional mandate contained in Article VIII, Section 15, that the powers of the state not be restricted to prevent economic distress in the fishery or promotion of the "efficient development of aquaculture in the state".

Chapter IV - SEARCH FOR GOALS

Introduction

We have discussed in the previous chapters a variety of program reforms which may be necessary to achieve the basic goal articulated in Article VIII, Section 15 of the Alaska Constitution: "... to prevent economic distress among fishermen and those dependent upon them for a livelihood and to promote the efficient development of aquaculture in the State." Article VIII, Section 5 of the Constitution further provides: "The legislature may provide for facilities, improvements, and services... to assure fuller utilization and development of the fisheries..." These provisions indicate the high priority the citizens of Alaska attach to responsible fisheries development. (Note: These provisions do not single out any single species of fish for such development.)

A second series of goals articulated in the Constitution involves the role of local government units in economic development activities. Article X, Section 5 authorizes the borough assembly to establish "service areas to provide special services within an organized borough." Article X, Section 6 authorizes the legislature to do the same in the unorganized borough. The legislature, pursuant to this latter section is to allow "for a maximum of local participation and responsibility." Article X, Section 2 articulates the strong policy of the state against junior taxing districts. The State may "delegate taxing powers to organized boroughs and cities only."

Finally, Article X, Section 13 provides for intergovernmental cooperation or joint administration among local, state and federal governments. These provisions reflect the legitimacy of local involvement in fisheries development activities, but also suggest constraints as to the form such involvement is to take.

We have discussed in detail the financial, economic and institutional implications of these clearly articulated constitutional provisions. It is suggested here that these constitutional goals are sufficient to justify a major expenditure of effort to maximize the effectiveness of all program elements in AFRDP. In fact, our detailed review of studies, program plans and reports, legislation, regulations and policies indicates perhaps too great concentration among fisheries policymakers on the fixing of numerical or other resource development goals, and not enough concentration on the "road map" to achievement of those goals.

Recommendations

With this in mind, we offer little in the way of alteration of State goals affecting AFRDP. We have read the goals articulated in ADF&G's "Alaska Fisheries Plan" for salmon, i.e.,

Short-Term (7 years) - A minimum annual harvest of 40 million salmon.

Long-Term (18 years) - A minimum annual harvest of 100 million salmon.

We have indicated the apparent concentration of regional planning team efforts on the fixing of like goals on a region specific basis and our dissatisfaction with this approach to planning.

The proposed reforms discussed in Chapters I-III suggest that the legislature, the Governor and their constituents should concentrate on a number of improvements to the existing fisheries development program. The basic framework for a solid development program has been developed (with the notable exception of a framework which will assure financial stability to key program elements). Improvement of the program, consistent with the above stated constitutional goals will require in general terms at least the following:

(1) Establishment of a program approach to fisheries development on a multi-species basis (AFRDP);

(2) Improved direction, fixing of program and financial priorities, and coordination among AFRDP program elements;

(3) Establishment of methodologies for the biological, social and economic evaluation of program activities;

(4) Significantly improved and expanded resource data and information;

(5) Expansion of fisheries research in Alaska and improved coordination among federal, state, university and private research activities;

(6) Increased financial stability for state and regional fisheries development programs;

(7) Upgraded planning which addresses region-specific fisheries development needs with input from local user interests and adequate technical support from state agencies;

(8) Establishment of a financial support base and income streams to ensure economic self-sufficiency of development program elements, as appropriate, over a reasonable period of time;

(9) Phasing in of all proposed actions over a ten-year program development cycle, with continued monitoring of progress and reevaluation of priorities and needs; and,

(10) Absolute commitment of the Office of the Governor and the Alaska Legislature to the effective implementation of approved program reforms, recommendations or initiatives.

Each of the above goal statements is directed at improvement of the existing fisheries development program. Each addresses basic needs identified by the study group and the contractors. While there will be disagreement in different circles with some or all of the recommendations addressed in this report, it is our hope that we have articulated a series of program initiatives which will contribute to the accomplishment of the basic goal of the Aquaculture Policy Study Group: to improve on the considerable effort by the State of Alaska to date to provide for the "efficient development of aquaculture in the State," and to "assure fuller utilization and

development of the fisheries." The Constitutional framers and citizens of Alaska have fixed these goals, it is for the Governor and the legislature, with help from their constituents, to effectively implement necessary programs and activities to achieve them.