

ALASKA LEGISLATURE SPECIAL COMMITTEE/SUBJECT FILE 8672

1791 SCOMM 74: SEN. SPEC. COMM. ON DOMESTIC & INTL. FISH., 1991-92...

straying to hundreds of thousands of fish. In evaluating the impacts of salmon enhancement projects, consideration must be given to the potential of detrimental effects from straying and intermingling with wild populations and possible resultant loss of wild production. Such consideration must take into account the benefits of the enhancement activity and the significance of the wild stocks impacted. Designation of criteria for runs of fish that are considered significant would greatly expedite the evaluation process. However, "significance" must be defined not only by the magnitude of the run, but also in the context of local importance and utilization. A small sockeye salmon stock near a village in southeast Alaska may be "significant", whereas the same size population may be too small to be considered a manageable entity in Bristol Bay. Because local utilization is an important concern, a regional planning group such as the Salmon Enhancement Regional Planning Teams, should consider what criteria will be used to determine significant stocks within a region and recommend such stock designations.

C. Stock rehabilitation and enhancement.

1. A watershed with significant wild stocks can only be stocked with progeny from the indigenous stocks. Rehabilitation of a watershed implies that there is insufficient production in habitat that formerly maintained a stock of some magnitude. Unless the indigenous stock has gone to extinction, use of an exogenous stock has potential for genetic damage noted in II.A. This damage will be exacerbated by the imprinting and homing of the transplanted stock to the impacted watershed, and potential displacement of wild

juveniles by the exotics stocked in the rearing habitat.

Enhancement of habitat not naturally accessible to salmon involves stocking eyed eggs, fry, or fingerlings, thus gaining production from this unutilized habitat. Where the inaccessible habitat is located above barriers on watersheds that maintain significant natural populations, stocking nonindigenous populations again has potential for genetic impacts noted in II.A., exacerbated by imprinting and homing of the transplanted stock to the watershed. For both rehabilitation and above barrier stockings, use of the indigenous stock alleviates these concerns.

2. When enhancing a stream using the indigenous stock, the fish used for stocking shall not be removed from the wild system to a hatchery for more than one generation.

Hatchery incubation and rearing select for a limited set of biological and behavioral traits which are not necessarily the most suitable for survival in the wild environment. Because of this potential for such selection, the transfer of hatchery fish to rehabilitate or enhance stocks in depleted or underutilized watersheds runs the risk of altering the genetic character of the wild stock, even if the indigenous stock was the original donor stock for hatchery population. By restricting the separation between the transfer to the hatchery and the stocking to no more than one generation (e.g., eggs taken in a given year are cultured to fry or fingerling release at the hatchery; eggs or fish from the returns to the

hatchery of this donor transplant are used for stocking), the risk of negative effects due to selection in the hatchery are minimized.

D. Establishment of wild stock sanctuaries.

As noted in preceding sections, there is concern that hatchery culture of salmon through their freshwater (and in some cases, initial estuarine) life history phases may select for a limited set of biological traits that are not suitable for wild populations. Loss of genetic variability through intensive inbreeding for domestication and desired traits has often resulted in detrimental genetic effects in agronomy and agriculture, such as reduced resistance to disease or adverse environmental conditions. Original wild strains can provide the genetic variability needed to outbreed domestics and alleviate inbreeding depression. Because there is potential for detrimental impacts due to reduction of genetic variability, there is a need to preserve a variety of wild types for future broodstock development and outbreeding for enhancement programs. Designation of watersheds where hatcheries or hatchery plants are not allowed would allow wild stocks within these watersheds to be subjected to natural selection only, within the life history phases cultured at hatcheries. These watersheds would be "gene banks" of wild-type genetic variability.

III. Maintenance of Genetic Variance

A. Genetic diversity among hatcheries.

There is general agreement that by introducing and maintaining a wide diversity of wild donor stock

populations into the hatchery system that the prospects for long term success of the hatchery program in Alaska will be enhanced. Diversity tends to buffer biological systems against disaster, either natural or man-made. Developing and maintaining hatchery broodstock from a wide variety of donors will buffer the hatchery system against future catastrophes. Agricultural crop production in the U. S. provides a prime example of the dangers of genetic uniformity.

In an effort to increase yield, plant breeders have come to rely on a few highly productive strains. In 1970 approximately 15% of the corn production in the United States was lost to corn blight. The corn blight responsible, a mutant of the normal blight causing fungus, did not attack all strains. Only one strain of corn was vulnerable, but that strain of corn was grown by nearly every farmer in the country. Breeders were able to recover from the corn blight epidemic by replacing Texas cytoplasm with normal cytoplasm. Recovery was rapid because adequate genetic variability was available. There are other examples.

How does this relate to salmonid culture? Salmonid stocks apparently differ in levels of disease resistance, temperature tolerance, acid tolerance, and in their response to artificial selection. It seems imprudent to assume that conditions similar to those found in agriculture will not occur in aquaculture. In addition, the ability to genetically improve hatchery broodstock performance in the future will depend on the availability of genetic variability such as is found among wild salmonid stocks. A hatchery system with a variety of diverse broodstocks will be a valuable resource.

Genetic diversity does not guarantee protection from disaster, but uniformity seems to invite catastrophe. Local failures are inevitable within the hatchery system. It seems prudent to provide the system with a level of insurance by developing and preserving diversity among hatcheries.

Off-site releases for terminal harvest, whether for the commercial fishery or for a put and take sport fishery should have no adverse genetic effect if they are released at sites selected so that they do not impact significant wild stocks, wild stock sanctuaries or other hatchery stocks. The success of this type of release from a genetic standpoint depends on the ability to manage and harvest the return. If returns can not be harvested, increased straying may result which might lead to an impact on wild stocks at a greater than expected distance from the release site.

B. Genetic diversity within hatcheries and from donor stocks.

There is a general consensus among geneticists that fitness (reproductive potential) is enhanced by heterozygosity (genetic variability). Any loss of genetic variation will be accompanied by a concomitant reduction in fitness. Genetic variation allows a population to adapt to a changing environment or to adapt to and colonize a new environment. Available genetic variation determines how rapidly a population will respond to either artificial or natural selection. On the other hand, selection, inbreeding and random genetic drift will reduce genetic variability in a population.

Natural selection, that is selection for fitness, is a continuing process and should not be so intense that it

has a significant effect in reduction of genetic variation, unless the population is in a new and quite different environment. Artificial selection on the other hand can be very intense, but can either be avoided or designed to assure that possible negative effects to fitness are offset by increased production efficiency due to the selection program, and by more efficient culture techniques. Inbreeding due to the deliberate mating of related individuals can be easily avoided in salmon hatcheries. Undoubtedly, in hatcheries and possibly in natural stocks the most important cause of loss of genetic variation is random genetic drift. In hatcheries reduction of genetic variation caused by inbreeding and genetic drift can easily be avoided by using adequate numbers of spawners.

Random genetic drift in general refers to fluctuations in gene frequency that occur as a result of chance. Such fluctuations occur, especially in small populations, as a result of random sampling among gametes. The amount of change but not the direction of change, can be predicted. The rate of this change is related inversely to effective population size (N_e). The smaller the effective population size the greater the fluctuation in gene frequencies. In small populations random genetic drift can result in inadvertent loss of genetic variability which may significantly reduce the fitness of the population.

Effective population size (N_e) is defined as the size of an idealized population that would lose genetic variability at the same rate as the sample population. An idealized population is one in which there is no

mutation or selection, there are equal numbers of males and females, mating is random, etc. Obviously it is very unlikely that any natural population will meet all criteria for an idealized population.

Breeding structure of a population can profoundly affect the rate at which genetic variability is lost. However, we can determine the effective breeding size (N_e) for breeding structures and obtain the rate of inbreeding (ΔF) as

$$\Delta F = 1/2N_e$$

so the consequences of breeding structure can be related to the loss of variation.

Many breeding structure variations can influence the effective population size. Four seem likely to operate in a salmon hatchery population: (1) numbers of males and females in the breeding population; (2) unequal numbers in successive generations; (3) nonrandom distribution of offspring among families; and (4) overlapping generations. These are discussed in greater detail in Appendix A.

Any of these variations in breeding structure may have a marked effect on N_e . Although it may be impossible to control or even to measure variation in family size it is important to keep in mind the relationship to effective population size. Breeding plans that would aggravate or increase the variation of family size should be avoided. The effect of overlapping populations is to increase the effective population number, in that individuals mating in different years contribute to greater diversity. For example, it would

take a larger number of pink salmon each year to maintain $N_e = 400$ than it would sockeye salmon.

The factor having the greatest potential effect in the hatchery and over which we have most control is sex ratio. As the formula indicates (Appendix A) the effective population size is affected most by the numbers of the least frequent sex. It is important to consider this in the breeding plan. In salmon, because a male can be used to fertilize the eggs of a large number of females, there is a temptation to do so. This temptation should be moderated by the necessity to maintain an effective population size which will assure that adequate genetic variation is maintained in the population. A minimum effective population (N_e) of 400 should be maintained. At this size the rate of inbreeding will be 0.125 percent per generation which should not have a significant effect on the long term fitness of the population.

In some cases, for example with chinook and steelhead, small population size may be unavoidable. In such cases a plan should be developed to offset the effects of small population size by infusion of genes from a source outside the hatchery population, such as the original donor source. Help in designing these breeding plans can be obtained from the Principal Geneticist, FRED Division, Alaska Department of Fish and Game.

While developing hatchery stocks from wild donor sources it is important that the genetic variability in the donor stock be protected. Cropping of the early or late run segments of a donor stock can change the timing of that run, which will reduce genetic variability of the population and may be detrimental to the stock's prospects for long term survival. To prevent

such selection, sliding egg take scales for donor stock transplants should allocate no more than 90% of any segment of a run for broodstock.

RESEARCH

The necessity for much of this policy arises from our ignorance of the genetics of wild salmon populations and the effects of their domestication in hatcheries. The policy is based more on extrapolation from other disciplines such as agriculture than from first-hand knowledge of our resource. As a result, the policy is a somewhat conservative interpretation of these data in order to assure the long-term viability of salmon populations. The Committee has identified several areas in which specific knowledge would clarify this policy and contribute to the effectiveness of salmon enhancement. The Committee encourages cooperative research efforts among the university, state, federal and private sectors directed toward the general areas listed below.

1. Development of performance profiles of hatchery stocks and potential for genetic improvement. Information about stocks kept in culture will be useful in several ways. If taken in a standard manner, the data will be useful in determining the extent of variability in the species and will aid in the choice of stock to be used for outplanting or transplanting. The information will also be helpful in maximizing the production of a particular facility.
2. Potential for genetic improvement of cultured stocks. A sequel to the cataloging of the variability within and among stocks will be to experimentally assess the potential for genetic improvement by selective breeding. To do this, it is necessary to determine the heritabilities for traits of interest, that is the part of the phenotypic variability present in a population which results from genetic (heritable) causes as opposed to environmental causes. Traits such as size of adults, age of return and various timing parameters are particularly interesting to industry.

Application of artificial selection is responsible for the enormous advances that have been made in agriculture; the potential also exists in aquaculture.

3. Assessment of the effect of introgression of genes from hatchery fish into wild populations. To examine this effect, one must first have an estimate of the rate of straying and the factors that influence straying. Such factors might include transplant distance, run strength, source of the hatchery stock and year-to-year environmental differences. By using a genetically marked stock, one can monitor the flow of "hatchery genes" into other populations. Because the effect of such introgression may develop over time, it is necessary that such an experiment be conducted over several generations. For this kind of study, it may be necessary to develop a means for marking fish cultured at production levels.

The second part of this problem is to establish the impact of introgression. A range of potential interactions is possible ranging from introgression between two unrelated stocks to the introgression of fish subject to the selective pressures of a hatchery back into the wild stock from which they were derived. Research to examine these effects could best be done in an experimental hatchery where hybrid stocks could be produced and all releases marked. Port sampling and stream walking would be necessary to evaluate survival, straying and other phenotypic effects.

4. The effects of inbreeding and maintenance of inbred lines. Accompanying the artificial propagation of a species is the potential for inbreeding, loss of genetic variability and increased homozygosity. Information pertinent to the extent of inbreeding depression that results from various levels of inbreeding is necessary in determining adequate effective population sizes. This is especially important for species

for which a large effective population size is difficult to maintain. In addition, this information would permit a judgement on the efficacy of enhancing very small remnant populations. This work could be done both by performing crosses designed to accomplish some level of inbreeding, and by the maintenance of small randomly breeding populations. In both cases, it is important to keep careful controls.

APPENDIX A

Appendix A

The relationship of breeding structure, effective population size, and rate of inbreeding.

Breeding structure can profoundly affect effective breeding size (N_e) of a population. We can, at least in theory, determine the effective breeding size for many breeding structures and obtain the rate of inbreeding (ΔF) as

$$\Delta F = 1/2N_e$$

directly relating variation in breeding structure to loss of genetic variation.^{1/}

The following demonstrates the consequence of some breeding structures to effective population size.

Number of males and females: Unequal numbers of males and females in the breeding population reduce effective population size. Sex ratio is related to effective population number (N_e) as

$$N_e = 4N_m N_f / (N_m + N_f)$$

where N_m and N_f refer to the total number of males and females respectively. The effective population size is strongly influenced by the number of the least frequent sex.

Unequal numbers in successive generations: If the numbers of breeding individuals is not constant in successive generations the mean effective number is the harmonic mean of the number in

^{1/} See D.S. Falconer. 1981. Introduction to Quantitative Genetics. Longman Inc., New York.

each generation. Over generations the effective number is approximately,

$$1/N_e = 1/t(1/N_1 + 1/N_2 + 1/N_3 + \dots + 1/N_t).$$

The generation that has the smallest number will have the largest effect.

Nonrandom distribution of offspring among families: When there is large variation in family size the next generation is made up of the progeny of a smaller than expected number of parents. This can be related to loss of genetic variation through effective population number as

$$N_e = 4N/(V_k + 2)$$

where V_k refers to the variance in family size. When variation of family size V_k is equal to 2, then $N_e = N$. When the number of males and females are unequal, the variance of family size may be unequal in the two sexes and

$$N_e = 8N/(V_{km} + V_{kf} + 4)$$

where V_{km} and V_{kf} are the variance of family size for males and females respectively.

Overlapping generations: In species other than pink salmon generations are not discrete, they are overlapping. When generations overlap the effective population size is

$$N_e = 4N_c L/(V_{km} + 2)$$

where L is the generation time and N_c is the number of individuals born in a year, that is the cohort size. The cohort size N_c is related to the total number (N_t) by $N_c = N_t/E$ and E is the mean age at death. As before V_{km} is the variation of family size.

The effect of unequal sex ratio and unequal numbers in successive generations on population size can be easily estimated. On the other hand it will be difficult or perhaps impossible to estimate the variance of family size. Nevertheless, we should keep in mind the relationships of family size and overlapping generations. Overlapping generations will in general increase the effective population number in that individuals mating in different years contribute to greater diversity. Variance of family size can radically reduce effective population size. Procedures that contribute to variance of family size or separation of year classes should be avoided.

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

OFFICE OF THE COMMISSIONER

WILLIAM A. EGAN, GOVERNOR

SUPPORT BUILDING
JUNEAU 99801

DEPARTMENT POLICY

STATEMENT OF POLICY ON PERMITTING NONPROFIT SALMON HATCHERIES IN ALASKA

Approved by:

James W. Brooks
James W. Brooks, Commissioner

Date:

October 3, 1974

STATEMENT OF POLICY ON PERMITTING NONPROFIT SALMON HATCHERIES IN ALASKA

References to Statutory Authority

ALASKA STATUTES:

1. AS 10.10.400-470--Authorizing the operation of private nonprofit salmon hatcheries.
2. AS 10.20--Nonprofit Corporations.

THE NEED FOR POLICY--The way in which privately owned salmon hatcheries develop in Alaska is of significant importance to the managers of the state's common property fishery resources. Spawners or eggs must be obtained from the public's natural resources to stock the private hatcheries; the salmon fry produced in the hatchery will be released from the hatchery operators control into the natural waters of the state to grow, migrate, and mix with wild stocks in a natural manner; and at some designated point near the hatchery site the returning adult salmon surviving the oceanic elements and the traditional fishery will again become the private property of the hatchery owner.

The questions of where the private hatcheries are to be located, which species are to be produced, and how and by whom the returning adults are to be harvested are the central issues of concern to the Alaska Department of Fish and Game. For each proposed hatchery decisions must be made, for example, on (1) where the hatchery should be located so that the management of the state's naturally produced salmon will not become drastically complicated or even impossible because of mixing of wild and hatchery fish; (2) how many spawning fish may be taken from perhaps an already depressed run to stock a private hatchery; (3) whether or not the public's best interests would be served by a private hatchery or public enhancement project at the proposed site; (4) whether or not the private hatchery will preempt from the public the recreational-use fishery potentials near the hatchery site; and (5) how the harvest of the returning run of adult fish--likely mixed with wild stocks--can be best managed.

Policies have been developed to serve as guidelines for determining present and future decisions on how privately owned salmon hatcheries can operate to best serve the interests of the people of Alaska.

These policies will aid in defining which course of action the department should select from a choice of several alternative and perhaps less desirable courses of action. They are to reinforce rather than diminish the need for the managers to use their keenest ingenuity and skill in formulating the numerous complex decisions that must be made in each private hatchery situation. The Department recognizes that the policies must be responsive to a given set of conditions. As conditions change and as hatcheries evolve in Alaska and as they are evaluated, the policies will also change.

Two sets of "statements of policy" are expressed below:

1. The first set deals with the determinations that will be made by the commissioner of ADI&CI in judging whether or not a permit for a private salmon hatchery should be granted to an applicant, and
2. the second set deals more with the operational aspect of private salmon hatcheries.

STATEMENTS OF POLICY FOR GRANTING PERMITS--It is the policy of the State of Alaska to foster the private ownership of salmon hatcheries by qualified non-profit corporations when the following qualifying considerations are satisfied:

1. A determination by the Commissioner of the Alaska Department of Fish and Game that the stream at the proposed hatchery site is either depleted of salmon or is a non-significant producer of salmon and that the stream is unlikely to be restored or enhanced to levels supporting an adequate harvest in a reasonable time by either natural processes or by rehabilitation measures that may be taken by the state.
 - (a) The basis for declaring a stream "depleted" will be the determination that either the stream has been adversely altered to destroy its production potential or that, for whatever reason, the escapement history of the salmon spawning runs in the stream indicated a significantly reduced and consistently low level of production.
 - (b) The basis for declaring a stream a "non-significant producer" will be the determination that the stream's natural productivity of salmon--even at its maximum--is very low because of its physical limitations, e.g. because very-limited spawning area is available. One of the major factors that will be considered in permitting a private nonprofit salmon hatchery on a stream declared a "non-significant producer" will be a judgement as to whether or not substantial increases in salmon production are likely to be achieved by a hatchery. Included in this judgement will be consideration of the quality and quantity of water available and whether or not the stream has an ample egg source for stocking the hatchery.
2. A determination by the commissioner that the nonprofit corporation is both technically and financially qualified and capable of managing a hatchery. That is, a corporation that has been judged as qualified by the Commissioner is one that demonstrates that it has technical advisors with a knowledge of contemporary salmon husbandry practices to assure that seed-stock acquired from the State will not be wasted and is one that is financially capable of paying for necessary monitoring, inspections, and advisory services needed.

3. A determination by the Commissioner that 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 State policy to manage the collective resource in a manner that favors protection of the wild stocks.
4. The Commissioner's assurance that the applicant's plans indicate that operation of the hatchery will be consistent with the State's policies on fish genetics and fish disease control.

The Alaska Department of Fish and Game will restrict its hatchery permit procedures to cover only its own responsibilities as the state's fishery management agency. Thus, an ADFG permit to construct and operate a private non-profit salmon hatchery will not represent approvals, permits, or licenses that a corporation may be required to obtain from other state and federal and local agencies concerned with matters of real estate, water use, taxation, structures in navigable waters, and environmental protection.

As a provisional policy, the state will use the date-of-receipt of the application with the \$100 filing fee as a means for recognizing a proprietary claim to a hatchery site on public lands.

It will be a policy of the department to process only one permit at a time for any private non-profit corporation and to require that the first hatchery show satisfactory progress prior to issuing a permit to construct and operate a second hatchery at another site.

STATEMENTS OF POLICY FOR OPERATION OF PRIVATE SALMON HATCHERIES--

These policy statements apply to the manner in which private hatcheries should operate so that the public interests will be protected. Many of these statements amplify or supplement statements expressed in the Alaska Statutes.

1. Transplantation of Eggs--The department shall closely administer the taking and transplantation of eggs to be used in Alaska salmon hatcheries. Transplantation of eggs is one of the major overriding concerns of the department because this activity can disseminate disease in epidemic proportions and adversely affect important genetic characteristics of both propagated and wild races of fish. The role of fish disease in natural and wild populations is for the most part little understood and remains as one of the major areas of economic risk in management of hatcheries and fish rearing facilities.

-4-

Genetic manipulation of fish stocks through inadvertent management practices and transplants of stocks can disturb the heritable characteristics and thereby materially diminish the homing instinct of major portions of fish runs and affect the timing of egg development and hatching, smolt outmigration, and returns of adults. Transplantation of eggs from one stream to another is potentially one of the major biological risks in Alaska's salmon hatchery practices.

The department will not authorize the importation and introduction of salmon eggs from sources outside the State of Alaska for either public or private hatcheries. During the initial development of private hatcheries in Alaska, the department will be especially cautious about approving transplantation of surplus eggs from one private hatchery to another.

The Department of Fish and Game will not assume responsibility for egg mortalities that may occur during the collection, transportation, and after the eggs are received at the hatchery.

2. Ownership of Hatchery Reared Salmon--Salmon reared by private non-profit hatcheries are declared to be a common property Alaskan natural resource from the time they are released into the natural waters of the state until the time that they segregate from naturally occurring stocks at the specific location designated in this permit by the department. After resumption of control of returning fish by the hatchery, the highest priority use of the mature fish will be to provide hatchery brood stock requirements, and if applicable, to provide the natural spawning requirements of the hatchery water source. These requirements must be met before surplus fish or eggs can be sold or otherwise disposed of by the hatchery. Hatchery fish held under positive control within a closed system are declared to be property of the owners of the hatchery.
3. Fingerling or Smolt from State Hatcheries--The state will lease of fingerling or smolt stock to the salmon hatchery when such stocks are surplus to the hatchery needs. Current chinook and coho salmon stock by Alaska hatchery and rehabilitation program are so great that sales of eggs and smolts in quantities sufficient for commercial operations will not be available in the foreseeable future. The cost of the fish to the purchaser will be determined on a basis of either the pro rata cost of the state's total hatchery operation or on a highest bid arrangement when competitive bidding is expected.
4. Management of Common Property Fishery--By granting a permit for a private hatchery, the department recognizes its obligation to regulate the fishery to achieve escapements to the private nonprofit salmon hatcheries. It will be the policy of ADF&G to manage the commercial and sports fisheries to return adult fish to the hatchery site in the same manner as it regulates fisheries to obtain a return of spawners to natural streams. While the department will not institute any irregular restrictions on the traditional

fishery, it will strive for an escapement of spawners sufficient for stocking the hatchery and for obtaining an optimum number of natural spawners to the hatchery water source stream.

5. Use of Natural Lakes by Private Hatcheries--The department will exercise particular discretionary and cautious judgement before granting the use of natural lakes to private corporations. Among other things, the department must consider to what extent the permit may deny access of the lake to sport fishermen or to other public uses. As a provisional policy, the department will not permit natural lakes of greater size than 10 surface acres to be used solely for rearing of fish by private fish farming or by private nonprofit salmon hatcheries.

Department of Fish and Game
Division of F.R.E.D.

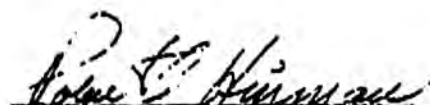
STATEMENT OF POLICY ON CONTROL OF FISH DISEASE

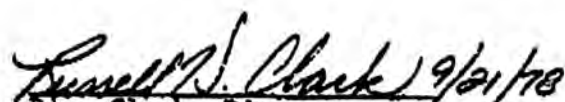
Disease is an important limiting factor in the success of all operations dealing with animal populations. In populations of aquatic animals, diseases may be caused by pathogenic microorganisms, the effects of toxic materials, or general environmental deterioration. It is known that subtle physical changes in aquatic environments may result in stress and lead to the impairment of fish health. However, the role of disease in the dynamics of wild fish populations is for the most part little understood. The health of these populations must not be jeopardized by enhancement and rehabilitation efforts.

Statements of Policy

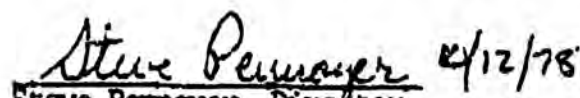
1. Protection of Wild Stocks - Wild stocks of fish and shellfish are one of the most valuable of all Alaskan resources. The health of these populations is an important consideration in disease control efforts and the determination of the status of disease in these populations is a research objective. F.R.E.D. Division's Fish Pathology Section shall monitor and guard against any hatchery practices, effluents, or stocks which pose a threat to the health of wild fish populations.
2. Rearing, Movement and Release of Infected Fish - The rearing, movement or release of infected fish shall be avoided. Apparent disease problems must be treated and controlled prior to release of fish. Regular reports dealing with fish health, site inspections, and examination of lots before release are necessary to accomplish detection and control of fish diseases. In cases where treatment is either impossible or impractical, the Fish Pathology Section will, on an individual basis, recommend either destruction of the lot or release with limitations on uses and release sites. Movement of disease carriers into watersheds without a previous history of this disease will be prohibited. All proposed egg and fish transports will require prior approval using the transfer request form.
3. Stock Selection - Import of fish or eggs from distant watersheds, whether intrastate or interstate, will be strongly discouraged. The use of native or resident stocks in all enhancement projects will be strongly encouraged to avoid importation of new pathogens. If the use of actual or suspected disease carrier stocks is necessary to maintain the genetic integrity of a watershed, the Fish Pathology Section will, if possible, recommend techniques designed to prevent or minimize these potential problems.
4. Hatchery Practices - The Fish Pathology Section will promote the use of hatchery practices designed to prevent disease. Egg disinfection will be required for all transfers between watersheds, regardless of whether or not a hatchery facility is involved. Fish pathology personnel and facility personnel will work closely concerning actions which have significant fish health ramifications.

5. Use of Chemotherapy - The use of vaccines and preventative methods of fish culture are preferable to treatment of epizootics after they occur. For most purposes, chemotherapy will be considered a last resort to be used when cultural and management techniques have failed to prevent disease. Indiscriminant use of any chemotherapy is prohibited. The decision to treat with any non-cleared drugs, on an experimental basis, shall only be with the advice and approval of the Fish Pathology Section.
6. Consistency of Public and Private Aquaculture Disease Policy - Regulations, policies, and hatchery practices related to disease prevention and control shall be consistent for all Public and Private Facilities.

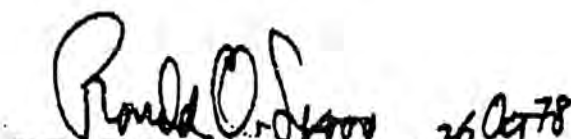

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 Russ Clark, Director
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 8/12/78
 Steve Pernoy, Director
 Commercial Fish Division

 10/25/78
 Robert Andrews, Director
 Sport Fish Division

 26 Oct 78
 Ronald O. Skoog
 Commissioner

ATTACHMENT C
Oregon's Wild Fish Management Policy

Oregon's Wild Fish Management Policy
What is it and what does it do ?

November 5, 1990

The revised Wild Fish Management Policy (WFMP) was passed by the Oregon Fish and Wildlife Commission in January, 1990 with the singular purpose to protect the genetic resources of Oregon's native fish species.

To understand what the WFMP is really all about, there must first be some agreement as to what a "wild fish" is. In addition, the term "genetic resources" and why they are important needs to be clarified.

What is a wild fish ?

The words "wild fish" mean different things to different people. The definition used for Oregon's WFMP may not agree with some of these viewpoints. While a clear understanding of our wild fish definition is crucial to comprehending this policy, other definitions when taken out of the WFMP context, may have equal value and utility.

For the purposes of the WFMP, a wild fish must meet two criteria. It must be a species of salmon, trout, whitefish, or sturgeon native to Oregon. Also included are those non-game native fish that have been placed on the state sensitive species list. Secondly, it must be naturally spawned and descended from a population that was present in the same geographical area prior to the year 1800. For example, naturally reproducing populations of brown trout or largemouth bass (both non-native species) are not wild fish. Neither would be naturally produced Umatilla River spring chinook - the historic Umatilla population went extinct at least 50 years ago. Reintroduction efforts currently underway can not restore this lost genetic heritage, the chain of post-1800 generations has been broken.

An important aspect of our definition is that we assume unique genetic resources exist for each population of wild fish. This is a conservative approach. It is based upon the rationale that if one assumes there are differences between populations, the genetic resources of a particular species are not compromised if this assumption is proven wrong by future scientific evidence.

A riskier approach would be to assume our present level of genetic understanding is adequate to judge that important differences do not exist between certain populations or that hatchery fish have "swamped out" unique features of certain

wild populations. Either way new management activities (hatchery programs or fishery harvest) based upon such assessments would likely follow. However, if the original genetic assessment under this approach had been wrong, it is likely the option of recovering and maintaining these population differences would be lost. One of the main objectives of the WFMP was to avoid the possibility of making this type of error. Therefore, given the lack of knowledge surrounding the genetic characteristics of our native fish we determined the conservative approach embodied in the WFMP was the most responsible path to follow.

What are "genetic resources" ?

The construction and operating instruction for every plant or animal is written in the language of DNA and organized in information packages called genes. Like books in a large library, each gene corresponds with instructions for a specific aspect of a fish's structure, function, or behavior. However, any two fish of the same species rarely have the identical instructions for every gene.

Within a given population the existence of variation (i.e., differences in size, shape, behavior, survival...etc.) due to slight differences in specific genes is not uncommon. In addition, when populations of the same species are compared it is not unusual to find larger scale population patterns as to where certain variants of specific genes are found. In other words, genetic variation occurs at two levels: 1) between individuals of a single population, and 2) between populations of an entire species. This two-level genetic variation we define as the "genetic resource" of a species.

Why is protection of genetic resources important ?

The protection of genetic resources is an important issue to fishery management. First, for fish populations to maximize production potential they must retain genetic characteristics which are conducive to high survival in the specific ecological communities and habitats they occupy. Since these habitats vary throughout the range of a species, it is reasonable to assume that genetic characteristics also vary in a corresponding manner. To disrupt this type of variation may result in populations that are less adapted to survive in their native habitats and as a consequence experience a decline in their production (fewer fish).

Second, habitat and ecological communities are not static. Whether natural or human-caused, changes occur. To give a population (and ultimately a species) the best chance for surviving these changes it must retain the capacity to make the appropriate genetic response. In most cases this response consists of a corresponding genetic change. A

population that contains a large supply of genetic variation among individuals is, in general, best prepared for making such adaptive changes.

In summary, the preservation of sustainable fish production is contingent upon maintaining populations that are adapted to their local habitats, yet flexible enough to respond to future changes in these habitats. The protection of genetic resources facilitates the mechanism by which this adaptive yet flexible capacity is maintained.

Summary of the Wild Fish Management Policy (WFMP)

Why do we have it ?

The purpose of the WFMP is to protect the genetic resources of wild fish (OAR 635-07-525). However, the other intent of this short section is to limit the management scope of the WFMP. By intentional omission, the WFMP does not classify waters of the state as to where hatchery fish can or can not be planted. Nor does the WFMP require that populations of wild fish be managed to maximize the productive capacity of natural habitat. Fishery management issues that fall outside of protecting the genetic resources of wild fish are not addressed by the WFMP. For example, a wild steelhead population that has been depressed from a run size of 5,000 to a stable level 500 fish due to dam mortalities, over-fishing and adverse interactions with hatchery fish might still be consistent with the specific standards of the WFMP and therefore be acceptable from the genetic standpoint. However, such a depressed population would unlikely meet natural production objectives and corrective actions would be taken. The WFMP provides the genetic foundation upon which desired natural production objectives set in basin plans can be built.

What does it direct us to do ?

The general policy statement of the WFMP is contained in OAR 635-07-526. First, it states that for wild fish, protection of genetic resources is job number one. As such it takes management priority over all other economic, commercial, recreational, and aesthetic benefits. However, it also states that sustaining these benefits is the reason for protecting genetic resources. Second, it directs that all populations of wild fish be managed to meet specific conditions spelled out in subsequent portions of the policy unless withdrawn from consideration by direct action of the Commission. Third, it directs the Department to not take a sudden, "meat cleaver" approach in implementing this policy.

It recognizes that the process of bringing all wild populations into compliance with the WFMP standard may take time, however, incremental progress towards this long-term goal is expected.

What is the WFMP standard ?

The operating principles section of this policy (635-07-527) describes in detail the standard that is desired to be met for all wild populations. While a long section, the standard can be generally stated as follows. For a wild population to be consistent with WFMP it must have no fewer than 300 spawners (with some exceptions). In addition, if hatchery fish exist and spawn naturally within the geographical area where a wild population is found a limit is placed on their relative numbers. For most situations, this limit is set so that during the time period wild fish are spawning, hatchery fish may comprise no more than 10% of the total spawning population. However, in those circumstances where the hatchery fish are from a broodstock that is genetically similar to the wild population the limit is raised to 50%.

A more detailed description of the WFMP standard begins with the first paragraph of 635-07-527. This paragraph stresses that there is uncertainty with respect to the standard developed for the WFMP. The criteria used to define the WFMP standard were based upon our best judgement as to what would be necessary to protect the genetic resources of wild fish. A conscious effort was made to take these criteria measurable in order to avoid the ambiguity and difficulty of such phrases as "... to the extent possible" or "...having a minimum impact". However, the danger of providing a measurable standard is that future evidence may suggest that it is scientifically incorrect. Therefore, as new and better information becomes available the WFMP will be revised as appropriate.

Operating principle number 1, relating to the interbreeding of hatchery fish with wild fish, is the most complex of the six operating principles that define the WFMP standard. Under this principle, several options are given concerning the use of hatchery fish. Hatchery fish can either be removed entirely (option a), manipulated such that they will not reproduce (option b) or controlled in some other way such that their assumed genetic impact on the wild population will not be significant (options c and d).

Option (c) consists of using genetically similar hatchery fish in controlled numbers such that they will not outnumber wild fish on the spawning grounds (i.e., hatchery fish comprise less than 50% of the total spawning population). The 50% limitation is specified because it is unknown if a

hatchery can spawn and rear fish from wild broodstock without some genetic change occurring either immediately or in successive generations. Therefore, this limitation is intended to offer some protection should future analyses show that our guidelines for development of hatchery stocks that are genetically similar to specific wild populations do not work.

The concept behind the type of hatchery fish described under option (d) is that they spawn at different locations or times than do wild fish. The objective of this strategy is to reproductively isolate hatchery fish from wild fish. Given this reproductive isolation, it is acceptable if these fish are genetically different from the wild population. For example, if coho salmon released into a particular river all return to the hatchery site as adult spawners, then they will not be able to interbreed with wild fish. Isolation may also occur if the hatchery fish spawn at a much earlier time than do their wild counterparts. The critical issue under option (d) is to prevent hatchery x wild matings in the natural environment.

Finally, a further limitation with respect to hatchery fish is presented in paragraph (e). Particularly for anadromous species, hatchery fish often stray to river systems adjacent to those where they are planted. A high level of straying can seriously impact the genetics of wild populations. In addition, it is not realistic to assume that option (d) hatchery fish will be 100% isolated from wild spawners. Most likely, both option (d) hatchery fish and hatchery strays from adjacent rivers will differ genetically from the wild fish. Therefore, they are lumped together and given a maximum limit in paragraph (e) of 10%. This limit applies only to the time period when the wild fish are spawning. For example a wild population having 900 spawners existing in a watershed which also has 900 naturally spawning hatchery fish may be consistent with WFMP under certain conditions. One of these conditions would be if the hatchery fish spawned so early that only 100 were left during the period wild fish were spawning. This would result in relative numbers that would meet the 10% limit (900 wild fish and 100 hatchery fish) and therefore be acceptable.

During the course of developing the WFMP the 10% limit was a topic of considerable debate. However, based upon the comments received from several geneticists and the output from several different genetic modelling exercises, we feel that the 10% limit provides adequate genetic protection in most situations. The policy does allow for this limit to be reduced when hatchery fish differ substantially from the wild fish.

Operating principles 2, 3, and 4 relate to largely the same genetic concern. A population that has been reduced to a small number of breeding individuals tends to lose genetic variation through a random process geneticists call "genetic drift". Mortality, from any source that suddenly drives a population down to these levels is therefore genetically risky. For each of these three operating principles (each relating to different source of mortality) a boundary of 300 breeding individuals was set as the minimum stable population size that is acceptable under the WFMP standard. In addition, if the population is declining, this decline is only acceptable under the WFMP standard if a breeding population of 300 or fewer fish is not expected within the next 5 years.

The fifth operating principle is a description of special situation that requires an exception from the 300 fish criteria described for principles 2, 3, and 4. A small, trout population isolated by a barrier waterfall best exemplifies this special situation. In such a case there is simply not enough habitat to support a spawning population of more than say 150 adults. However, such a population differs from a population that has been suddenly reduced from 2,000 to 150 fish due to human activities. Because genetic differences between naturally small populations are often great, collectively they represent an important genetic resource. Principle 5 was written to make sure such populations are recognized and that the WFMP accepts them in their natural, below 300 condition.

The last operating principle, number 6, addresses management concerns specific to fisheries operating on aggregates of many different populations. It would be disruptive, for example, to place severe harvest restrictions on a coho salmon fishery in order to bring one or two small populations into compliance with the WFMP when they are aggregated with fish from 50 other populations that are healthy and can withstand harvest. This principle then, is a recognition of the fact that for populations which enter aggregate fisheries extra care must be exercised in bringing them into compliance with WFMP so as to minimize adverse social and economic impacts.

Are there exceptions ?

The WFMP has a provision whereby individual populations may be exempted from ever meeting the WFMP standard (OAR 635-07-528). Although it is hoped this option will be used infrequently under certain conditions the Oregon Fish and Wildlife Commission may take such action.

To exempt a population the Commission must find that social and economic considerations offset the biological

consequences of losing the genetic resources of the population involved. Before making such a decision however, the Department is required to prepare an analysis of the long-term biological implications should the population in question be granted an exemption. The critical issue will be whether such action might cause a serious depletion of the species within Oregon. This analysis will also be made available to the public for comment, 45 days prior to the meeting date the Commission considers the exemption.

How will the WFMP be implemented ?

The last section of the WFMP (OAR 635-07-529) describes the steps that will be taken to implement this policy. In developing this section one of the primary goals was to make it possible for the public to objectively measure if the Department was making progress towards achieving the overall policy goal of meeting the WFMP standard for all populations. In addition, it was intended that this section provide directions for a deliberate and accountable process in making key decisions, which implementation of this policy will require.

The first paragraph of this section directs the Department to develop a list of populations for all species of wild fish by January 1991. This is an extremely significant step, because the WFMP is designed to work on a population by population basis. These populations will become the units by which the policy is implemented and by which progress will be judged.

In many situations it will be difficult to identify individual populations, because we do not have enough information to discern clear population boundaries. In those cases when we are in doubt if a group of fish is isolated enough to be a population, we will err on the side of being too conservative and call them a population. Once developed, this list of populations will be examined one at a time against the WFMP standard.

In general, paragraphs 2, 3, and 4 of this section describe actions that the Department is directed to take during the interim period prior to achieving full compliance with the WFMP. They recognize that while existing basin and species management plans are being rewritten to be in compliance with the WFMP, the WFMP will take preference. For preparation of new basin plans, direction is given that they include for each species at least one strategy that is consistent with the WFMP standard. Finally, the Department is directed to not stock hatchery fish into wild fish populations not currently being stocked. The only exception being if such action is approved in a basin plan or if the wild population has been exempted from the WFMP.

Paragraph 5 of this last section describes the preparation of a status report which the Department is required to do every two years beginning with December, 1991. This report will have five components.

First, for each population a historical and current status summary will be prepared based upon best available information. Past records of hatchery fish introductions, changes in habitat, and harvest patterns will be the focus of the historical portion. The current status portion will require an estimate of the number of wild spawners for each population. In addition, if hatchery fish occur within the geographical boundaries of the wild population, estimates of the proportion of hatchery fish naturally spawning during the time the wild fish spawn and whether they are genetically similar to the wild fish will be necessary.

The second part of the report will describe the results of comparing each wild population, using the information described above, against the WFMP standard. Out of this comparison will come two lists. A "pass" list of populations which that consistent with the WFMP standard, and a "fail" list of populations which are either not consistent with the standard or for that there is insufficient information to make a reasonable determination of compliance. This process is to be repeated for each biennial report (every two years)..

It is envisioned that the number of populations on the fail list will be used as a report card on the progress with which the WFMP is being implemented. The rate at which the size of this list decreases over the next 10 years will provide an accountable and objective basis for measuring our progress in achieving the intent and goal of the WFMP.

An identification and description of problems for each population on the fail list will be presented in the third portion of the report. Again, lack of data may make this assessment difficult, even for populations that are known not to meet the standard. For example, it may be hard to tell if over-harvest or loss of habitat is responsible for depressing a population below the 300 spawner level (recall that a minimum of 300 spawners is needed to pass the WFMP standard). Questions about the potential productive capacity of the existing habitat and spawner-recruit relationships would need to be at least crudely understood to identify the problem that caused the decline.

The next section in the report will describe possible solutions that the Department has developed for each population on the fail list. The intent of these solutions is, that if implemented, they would result in the population eventually being moved from the fail list to the pass list.

An approximate cost for each of these solutions will be included as part this presentation.

At least initially, the "solution" for many populations may be to obtain the data necessary to fill in crucial data gaps required to permit testing the population against the WFMP standard. For other populations, enough information will be available to propose immediate on-the-ground solutions to bring them in compliance with the WFMP standard. For populations that have failed because of having less than 300 spawners, possible solutions might include: 1) habitat restoration, 2) screening of water diversions, 3) improving passage at dams, 4) changing release locations and numbers of hatchery fish to reduce competition and predation, 5) closing of certain areas to fisheries to protect spawners, 6) reducing direct or incidental fishing mortality on juvenile or adult fish.

For other populations which have failed the WFMP standard because hatchery fish are exceeding the natural spawning limit, another range of possible solutions exist. These include: 1) decrease the number hatchery fish that reach the spawning grounds by reducing the number of fish planted or implementing strategies to target increased harvest on hatchery fish, 2) release hatchery fish that are sterile, 3) increase the number of wild spawners through strategies that increase natural production (i.e., habitat restoration) or regulations to reduce fishing mortality, 3) switch to a hatchery broodstock that is genetically similar to the wild population, 4) develop strategies to draw returning adult hatchery fish away from natural spawning areas (e.g., acclimation ponds, changes in time and place of releases, etc.).

Finally, at the end of this report, a list of those strategies that may have significant effect on future management direction, user groups, or funding requests. This list will include a summary of the decision needed in each case and a corresponding assessment of what each of the possible decision outcomes (i.e., accept, reject, or defer) might mean to the resource, the public, and the Department. Where appropriate the Oregon Fish and Wildlife Commission would be asked to take the action necessary to make specific decisions.

The last portion of the WFMP concerns a short paragraph directing the Department to develop a gene conservation policy and associated program to monitor the genetic status of representative populations.

Mark W. Chilcote, ODFW Natural Production Program
November 5, 1990

Wild Fish Management Policy

Purpose of Wild Fish Management Rules

635-07-525 These rules are established to guide the management and conservation of genetic resources of wild fish in Oregon. Although direction with respect to natural production is provided by OAR 635-07-521 through OAR 635-07-524, additional guidance is required to assure that genetic resources of wild fish are protected. f. & ef. 1-24-90

General Policies of Wild Fish Management

635-07-526 (1) Protection of genetic resources shall be the priority in the management of wild fish to assure optimum economic, commercial, recreational, and aesthetic benefits for present and future residents of Oregon.

(2) It is the policy of the Department to implement the Wild Fish Management Rules for all populations of wild fish except those populations specifically exempted by the Commission in accordance with OAR 635-07-528.

(3) It is recognized that management of some populations may not currently be fully consistent with these rules. However, it is the Department's long-term goal to bring these populations into compliance, with the exception of populations specifically exempted by the Commission in accordance with OAR 635-07-528. f. & ef. 1-24-90

Operating Principles for Wild Fish Management

635-07-527 The Department recognizes that the operating principles developed to implement this policy are associated with varying levels of uncertainty. These principles shall be continuously revised as better information becomes available. In addition to the operating principles of the Natural Production Rules (OAR 635-07-521 through 635-07-524), the following operating principles apply to the management of populations of wild fish.

(1) Interbreeding of hatchery and wild fish: The interbreeding of hatchery fish with wild fish poses risks to conserving and utilizing the genetic resources of wild populations. These risks shall be limited by implementing either strategy (a), (b), (c), or (d) listed below, consistent with the further limitation described in (a) below.

(a) Eliminate the release of hatchery fish.

(b) Release hatchery fish that are sterile and that do not attempt to spawn.

(c) Release hatchery fish that are maintained to be genetically similar to the wild population and limit the number of all naturally spawning hatchery fish to no more than 50% of the total number of naturally spawning hatchery and

hatchery fish that are genetically similar to the wild population are:

(A) Use only hatchery fish that originated from the wild population;
(B) Incorporate naturally produced fish in the broodstock in every generation; and

(C) Avoid random and nonrandom genetic change due to failure to maintain a representative sampling of the genes within a population.

(d) Release fish that are demonstrated to be reproductively isolated (spatially or temporally) from the wild population. The Department recognizes that absolute reproductive isolation may not be possible to achieve and therefore these fish shall be included in the limitation of 10% dissimilar fish stated in (e) below.

(e) Except for genetically similar hatchery fish described in (c), hatchery fish that spawn at the same time and place as the wild population, shall comprise no more than 10% of the total number of naturally spawning fish. A more restrictive level may be designated for those situations where the hatchery fish are known to differ substantially from the wild population in their genetic makeup.

(2) Habitat: Degradation of habitat that reduces the potential for fish production or adversely affects fish migration routes poses a risk to conserving and utilizing the genetic resources of wild populations. The Department shall oppose habitat degradation that causes a population to experience a decline in abundance that if continued for an additional 5 years would likely reduce the number of spawners to 300 fish. In addition, the Department shall advocate the restoration of degraded habitat that has depressed a population to a stable level of 300 or fewer spawners.

(3) Competition, predation, and disease: Introductions of fish of the same or different species as those already present may seriously reduce the survival of wild fish through competition for food and space or through predation. Introductions of disease may also deplete a wild population. An extreme level of mortality from these sources poses a risk to conserving and utilizing the genetic resources of wild populations. The Department shall oppose any actions that allow mortality from competition, predation or disease to cause a population to experience a decline in abundance that if continued for an additional 5 years would likely reduce the number of spawners to 300 fish. In addition, where a population has been depressed to a stable level of 300 or fewer spawners, the Department shall support and advocate actions to correct the cause of such population decrease.

(4) Harvest: providing the opportunity for optimum harvest benefits is consistent with wild fish management. However, an extreme level of harvest, or harvest that disproportionately reduces some segment of a population, poses a risk to conserving and utilizing the genetic resources of a wild population. The Department shall oppose harvest strategies that, by themselves, cause a population to experience a decline in abundance that if continued for an additional 5 years would reduce the number of spawners to 300 fish. In addition, the Department shall advocate the termination of harvest strategies that have depressed a population to a stable level of 300 or fewer spawners.

(5) Small populations: It is recognized that even in the absence of changes brought on by human activities, populations of 300 or fewer spawners may exist naturally. Such populations have survived even though random genetic processes, operating over long periods of time, have probably caused a reduction in genetic variation. Often in the process of losing this variation, rare genetic characteristics become established. From an evolutionary

perspective, protection of these small populations is highly desirable because of the unique features they contain. Therefore, these populations shall not be excluded from consideration for wild fish management.

(6) Aggregate stock fishery management: Some fisheries, such as ocean salmon fisheries, target on aggregations of fish belonging to many different populations. In implementing the Wild Fish Management Rules (OAR 535-07-529), the Department shall pursue the most cost effective, least disruptive (in terms of adverse social and economic impacts on those fisheries), and feasible strategy consistent with the policies and operating principles set forth in the rules. To bring individual populations into compliance with wild fish management, priority shall be given to correcting problems as they relate to use of hatchery fish, habitat, competition, predation, and disease before harvest restrictions on any aggregate stock fishery shall be considered. f. & ef. 1-24-90

Wild Fish Management Exemption Procedure

635-07-528 (1) The Commission may decide, at the request of any person, the Department, or on its own initiative, to determine whether a population shall be exempted from wild fish management.

(2) Such exemptions shall be scheduled for consideration through a rule making either at the next meeting at which the Commission adopts or reviews a basin plan for the area where the population is found, or at the next meeting at which the wild fish management progress report, described in OAR 635-07-529(6), shall be presented.

(3) Before scheduling a rule making on a proposed exemption, the Commission shall direct the Department to prepare a written analysis describing the biological significance and long-term implications of losing the genetic resources of the population proposed for exemption. The Department's report shall also assess whether the proposed exemption would cause a serious depletion of the species within Oregon. In addition, the Commission shall request that the proponent of the exemption prepare a written analysis of the social and economic justification for such action.

(4) The analyses described in (3) shall be made available for public review and comment at least 45 days in advance of the rule making on the proposed exemption.

(5) To exempt a population, the Commission shall find that social and economic considerations offset biological consequences, and that such exemption, when considered alone and in light of any other exemptions that have been granted, shall not cause a serious depletion of the species within Oregon. f. & ef. 1-24-90

Implementation of Wild Fish Management Rules

635-07-529 (1) Within one year of the effective date of these rules, the Department shall develop, for approval by the Commission, a provisional statewide list of populations of wild fish. This list shall be made available to the public for review prior to Commission consideration and approval.

(2) It is the intent of the Commission that, to the extent any basin and/or species plan currently adopted plan shall now be governed by these rules. As existing plans are reviewed and new plans are adopted, the Commission intends that they be explicitly brought into conformity with these rules.

(3) Basin plans presented to the Commission after the adoption of the Wild Fish Management Rules shall present at least one alternative strategy per

wild population that is consistent with wild fish management. For those basins with existing hatchery programs, two alternatives consistent with wild fish management shall be presented; one without hatchery supplementation and one with hatchery supplementation.

(4) The Department shall not stock hatchery fish into wild fish populations not currently being stocked, without authorization in a basin plan approved by the Commission or an exemption of the wild population in accordance with OAR 635-07-528.

(5) Progress toward achieving consistency with these Wild Fish Management Rules shall be reported to the Commission during the first six months of each biennium, prior to preparation of the next biennial budget. Beginning in 1991, each biennial report shall include, by species, the following information:

(a) Documentation of the management history of each wild population based on best available information. This shall include the current status of the population and a history of habitat change, harvest, and hatchery introductions;

(b) A list of populations of wild fish not currently managed consistent with the Wild Fish Management Rules;

(c) Identification and description of the problems preventing the Department from achieving consistency with the Wild Fish Management Rules for each of these populations;

(d) A description of the short- and long-term strategies and associated funding necessary to solve these problems; and

(e) A list of Commission actions, as appropriate, necessary to implement strategies identified in (d).

(6) The Department shall develop a gene conservation policy and a program to monitor the genetic status of representative populations. f. & ef. 1-24-90

Definitions

635-07-501 As used in this Division and Division 40:

(18) "Hatchery fish" means a fish spawned and/or reared under artificial conditions regardless of the history of the parent stock.

(23) "Management Plan" means:

(a) A plan which provides the basic framework (goals, policies and objectives) for managing a resource, geographic area, watershed (waterbody) or species adopted by the Fish and Wildlife Commission in public hearing; and

(b) Which may include specific information or alternatives relative to how the goals and policies may be achieved, e.g., techniques and guidance for implementation of the basic plan normally found in operation plans.

(27) "Natural Production" means the maintenance of naturally spawned fishes and their capacity to reproduce and rear in habitats which allow those fishes to fulfill all their necessary life history functions.

(36) "Population" means a group of fish spawning in a particular area at a particular time which do not interbreed to any substantial degree with any other group spawning in a different area or in the same area at a different time.

(43) "Sensitive" means those fishes that have been designated for special consideration pursuant to OAR 635-100-040.

(48) "Stray" means a hatchery fish that spawns naturally in a location different from the location intended when the fish was stocked.

(52) "Wild fish" means any naturally spawned fish belonging to an indigenous population of the following species:

- (A) *Oncorhynchus clarki*, commonly known as cutthroat trout.
- (B) *Oncorhynchus keta*, commonly known as chum salmon.
- (C) *Oncorhynchus kisutch*, commonly known as coho salmon.
- (D) *Oncorhynchus mykiss*, commonly known as steelhead (anadromous form) or Rainbow trout (non-anadromous form).
- (E) *Oncorhynchus nerka*, commonly known as sockeye salmon (anadromous form) or kokanee (non-anadromous form).
- (F) *Oncorhynchus tshawytscha*, commonly known as chinook salmon.
- (G) *Salvelinus confluentus*, commonly known as bull trout.
- (H) *Prosopium williamsoni*, commonly known as mountain whitefish.
- (I) *Acipenser transmontanus*, commonly known as white sturgeon.
- (J) *Acipenser medirostris*, commonly known as green sturgeon.
- (K) All fishes that have been designated as sensitive, pursuant to OAR 635-100-040.

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Salmon Strategy Task Force Recommendations



**Walter J. Hickel, Governor
Commissioner Glenn A. Olds, Chair**

**State of Alaska
Department of Commerce and
Economic Development
Division of Economic Development**

JANUARY 24, 1992

INTRODUCTION

Governor Hickel appointed the Salmon Strategy Task Force on August 15, to investigate the reasons for the 1991 salmon crisis and to review options for industry stabilization and recovery.

Alaskans should be proud of the courage of the people and companies that started this industry years ago. The people and lifestyle of the salmon industry are a fundamental part of Alaska's history, culture and way of life.

Alaska has been the world's leading supplier of salmon. The state's salmon industry now faces strong competition from many other sources and its dominant role is threatened. Traditional markets are no longer dependent on Alaska for their needs.

The entire world is producing salmon at a record rate. For many years, Alaska's salmon industry enjoyed a market strategy based on allocating scarce resources among competing customers. In less than a decade the entire system has changed. Now the competition in both traditional and developing markets is intense, and it's likely to stay that way.

In order to compete, and indeed survive in this new environment, it is essential that all participants in the industry recognize and accept the reality of these competitive changes. The industry is facing a crisis of considerable magnitude, requiring decisive short term action and long term action to prevent the crisis from recurring.

The 1991 salmon season has forced us to recognize that the Alaska salmon industry is at a crossroads. As with many other industries in America, we must recognize that traditional business practices are no longer adequate in the face of global competition. Reevaluation and action are required.

The Salmon Strategy Task Force has made several immediate and long-term recommendations which should alleviate the immediate crisis, help stabilize the industry, and plot a course to regain our leadership role in the marketplace.

The effects of the decrease in salmon prices are profound, putting at risk state loan programs, community stability, and tax revenues to all levels of government. The seafood industry is the state's largest private sector employer, with the largest resident private sector payroll. The failure of the state and the industry to take decisive action will result in continued weakness in this economic sector and put increased demands and safety net programs.

These will not necessarily be easy changes to make. It will take a substantial commitment of time, hard work, and money. We ask that the Administration, the entire salmon industry and the Legislature work together to support the implementation of these recommendations.

Charge to the Task Force

Governor Hickel's charge was to develop a strategy to generate maximum economic return to Alaska fishermen, processors, and the state as a whole, consistent with wise use and conservation of the resource. The Task Force is to make specific recommendations to the seafood industry, the Administration and the Legislature.

The group was to focus on methods to maintain existing markets, develop alternative markets and product forms, promote secondary processing, develop necessary infrastructure, coordinate production and marketing strategies, improve salmon quality control, optimize fish tax policies and improve fish harvesting and processing efficiency. The Task Force also delineated existing salmon markets and collected and distributed information to assist fishermen and processing companies in reaching agreement.

Conditions requiring study

The major factors distressing the industry are greatly increased competition, high inventory levels, low prices, and projections of continuing high production levels. The runup in prices 1986-1988 followed by declining prices since have left many fishermen with debt loads they cannot support. The declining markets have hurt processors, exporters, and end users holding product in a declining market as well. These factors led to serious price disputes and charges of price fixing in some quarters as the 1991 season developed.

The market outlook for the 1992 season may improve somewhat for sockeye, but extremely high inventory levels remain for pinks. These species represent the vast majority of Alaska production value and volume. The early, very tentative prognosis from Fish and Game is for another big production year.

Inventory of issues

An initial questionnaire went out to 350 recipients of the Alaska Fish and Game weekly catch reports in mid July. This was followed by a second mailing of 125 in late July that added all Alaskan salmon fishing organizations, processors and legislators. The mailing solicited opinion on the issues the Task Force should address. Some 70 responses (a 15% response rate) were received. Staff collated the responses and summarized them. These responses were then categorized under nine headings for presentation to the Task Force.

Selection of Task Force

The Governor announced the membership of the Task Force on August 15. It includes broad representation from the salmon industry, appropriate state agencies, and the general public. The group provides a good cross section of the industry and policy makers in state government, while main-

taining reasonable geographic balance and a practical size. The members are:

Honorable Richard Eliason of Sitka,
President of the Alaska Senate,
and a Southeast Alaska fisher;
Honorable Fred Zharoff of Kodiak,
Chairman of the Alaska Senate Rules
Committee and a Bristol Bay fisher;
Honorable Eugene Kubina* of Valdez,
Chairman of the House State Affairs
Committee;
Commissioner Glenn Olds,
Alaska Department of Commerce and
Economic Development;
Commissioner Carl Rosier*,
Alaska Department of Fish and Game;
Mr. Ed Crane*,
President of the Alaska Commercial
Fishing and Agriculture Bank;
Dr. Jerome Komisar,
President, University of Alaska;
Mr. Richard Lauber,
Vice President, Pacific Seafood
Processors Association;
Ms. Hazel Nelson*,
President, Becharof Corporation,
and Bristol Bay fisher;
Mr. Greg Seider*,
Executive Director, United Fishermen of
Alaska;
Ms. Sandra Tavanis*,
Co-owner, Sea Hawk Seafoods, Valdez;
Mr. Bob Van Brocklin,
Prince William Sound Aquaculture
Corporation; and
Mr. Robert Waldrop,
President of the Board, Alaska Seafood
Marketing Institute, and Vice President,
Silver Lining Seafoods, Ketchikan.

* Editorial Committee

Calendar of work

The Task Force met four times, August 29, October 7, November 1, and November 22. Agendas and summaries of the meeting minutes are contained in appendices to the full report.

At the first meeting, the Task Force selected which of the issues raised in the extensive mail-out solicitation to pursue. Five of the original nine survived; product and market development, reducing costs of production, getting reliable information, improving quality, and marketing salmon and ASMI's role. It also became clear there were several myths at work clouding the issues. Staff reworked the five issues passed by the Task Force in the first meeting into problem statements before the second meeting.

The second meeting started with presentations on various myths, including "everyone's making money but me," "it's all just a Japanese conspiracy," and "we should stick to business as usual, the customer just thinks they want something different." The Japanese market, salmon prices, margins and costs at various points in the industry, and ASMI's mission were discussed. The Task Force made changes to the problem statements and staff followed up the second meeting with extensive interviews of Task Force members and other experts to lay out the facts and options available to address the problems. A sixth problem was isolated and addressed in this process, the need for strategic planning. The persons interviewed, the questions asked and the options identified are in the full report appendix.

The third meeting started with presentations of the interview results and options gathered. The interview results form the main body of the full report. The Task Force then ranked the options available at that time. Some options were dropped. Staff reworked the options into general, specific, and detailed lists, and prepared a draft outline for the report.

The fourth meeting consisted of preparing some new recommendations for immediate action, and reworking the options that passed muster at the third meeting into the recommendations that follow. Some items were dropped. An editorial committee was appointed to oversee production of the report (see footnote above), and a schedule established for completion of the report.

Recommendations

The Task Force recommendations take into account budget cycles and priorities. In many cases requiring state agency action, existing budgets are not adequate to perform the recommendations. Additional funding will be required, not reprogramming of existing budgets. The Task Force expects the relevant agencies to prepare the necessary budget information, and respectfully requests full and favorable consideration by the Administration and Legislature.

RECOMMENDATIONS FOR DEALING WITH THE IMMEDIATE CRISIS

1. The Alaska Seafood Marketing Institute (ASMI) should develop a budget for immediate funding to deal with the existing inventory surplus before the 1992 season and projected 1992 production. This must be implemented as soon as possible¹.
2. Processors and fishermen should initiate market discussions early. The Task Force recognizes that the market situation will be uncertain at that time, and that the risk involved will lead to low price suggestions from processors, but recommends early discussions to provide maximum information sharing and opportunity to reach agreement. The Department of Labor (DOL) should be prepared to bring in knowledgeable mediators if necessary.
3. The University of Alaska (U of A), Commerce and Economic Development (DCED), and Fish and Game (ADF&G), should initiate and/or support efforts to expose the broadest possible range of Alaska fishermen to credible and detailed information about recent and ongoing changes, including problems and opportunities, in the world markets for salmon.³
4. The DCED Division of Economic Development should review the processing capacity situation in Prince William Sound, taking into account the outcome of the 1991 season, and make preliminary findings available to the Governor (and the industry) as early as is practicable. The Task Force recognizes that the capacity problems that developed in Prince William Sound were the result of the fishery being late and very concentrated, and the fish being relatively dark and small.⁴
5. The DCED Division of Investments and Alaska Commercial Fishing and Agriculture Bank (CFAB) recognize the crisis caused by low prices and the effect this has on loan payments. The Task Force encourages them to actively seek out fishermen having problems and work with them on loan extensions and other measures to minimize foreclosures.⁵

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1. The immediate ASMI program should be geared to long-term domestic market growth. The Governor could include this amount in his budget request, including a request for exemption from procurement codes for this emergency funding. The Legislature could pass this supplemental funding out as soon as possible in the session. ASMI could reprogram funds to initiate the campaign as soon as possible, prior to release of the funds, consistent with prudent financial management.
 3. Provide reasonably detailed but clearly written information on prices and markets for salmon for widespread distribution in the spring of 1992 and thereafter. The information could be updated in season. A goal should be to establish a clearer understanding of the effects of market conditions and dynamics on prices.
 4. DCED could prepare a supplemental budget to cover the costs of doing the necessary surveys for the PWS capacity determination.
 5. Reinstatement of state funding for the ABDC (Alaska Business Development Centers) program of outreach and business assistance in rural areas has been identified as an important component in dealing with financial hardship. This organization provides one-on-one assistance with loan workouts and dealing with the IRS that is not available elsewhere.

MID-RANGE RECOMMENDATIONS

General

1. The DCED, ADF&G, and Department of Labor (DOL) should consider promoting a closer and more trusting relationship among the interests involved in the issues concerning Alaska's salmon industry. This effort should be closely coordinated with other ongoing educational and consensus building efforts.¹

Product and Market Development

2. The Alaska Science and Technology Foundation (in fisheries area), and the U of A's Fisheries Industrial Technology Center, and Marine Advisory Program should be encouraged to expand their efforts in salmon product and market development and to coordinate their efforts in providing technical assistance and research and development in salmon products through the Alaska Fisheries Development Foundation (AFDF).²
3. The DCED's ability to provide international marketing information and sales assistance should be expanded. The Department's Division of Economic Development and Office of International Trade should work closely with ASMI and the Alaska Center for International Business (ACIB) to reduce risk and costs to the private sector.³
4. The DCED, ASMI and the Marine Advisory Program's ability to assist domestic marketing should be expanded. The Department's Division of Economic Development work closely with ASMI to reduce risk and costs to the private sector.⁴

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1. In the consensus building efforts, the agencies could organize forums and/or participate in existing trade shows and conferences. The issues examined by the Salmon Strategy Task Force could be presented and discussed with the objective of developing a consensus about the direction the state should take in the future regarding the harvesting, management, promotion and marketing of Alaska's salmon.
 2. AFDF has in place a proven industry board and ability to perform, but will require administrative funding to continue operations. Salmon industry representation on their board should be expanded.
 3. Specific projects could include:
 - Work to reduce tariff barriers for Alaska seafood products overseas.
 - Encouragement to foreign reproducers to purchase or joint venture value-added production in Alaska.
 - Continuing investigation of new markets for salmon overseas where disposable income is high enough, and seafood is commonly eaten.
 4. These entities could reduce risk and costs to the private sector of expanding domestic markets through:
 - Working with food service entities in Alaska and other states to promote sales and distribution of Alaska salmon products.
 - Providing start-up technical assistance to new ventures.

Quality

5. The Department of Fish and Game should reexamine management practices with the goal of obtaining the highest quality pack possible without harming the stocks.⁵
6. The Department of Fish and Game should conduct a comprehensive study in Southeast Alaska and Prince William Sound, with the cooperation of fishermen and processors, to determine the degree of risk managers should take in managing for economic efficiency and fish quality. The goal would be to identify the optimum locations for harvest.⁶
7. Industry and the Department of Fish and Game should cooperate on a program to educate fisheries managers, fishermen and industry operators on the physiological changes that occur in salmon (and hence its marketability) to encourage management that provides for the optimum use of the resource.⁷
8. Hatcheries should conduct research to determine the cause for variations in sexual maturity and other quality factors for stocks returning to hatcheries. Based on the research, hatcheries should modify their stocks and practices to optimize quality.

Marketing and ASMI's Role

9. ASMI, the FITC and the Marine Advisory Program (U of A) should expand educational programs on fish handling, cleaning, chilling, and processing for virtually all parts of the industry. Such efforts should focus on providing hands-on training from the fishing boat to the market, and on meeting the needs of the consumer for quality seafood. The effects of quality handling on the ability to market the end product should be emphasized.

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5. The reexamination of management practices could include changes in the length of openings and the timing of fisheries to optimize salmon quality. The Task Force recognizes that Fish and Game may need statutory and regulatory changes to incorporate such considerations in management decisions.
 6. A controlled set of experiments to determine the optimum points of harvest for top quality could include:
 - a. testing the condition of fish to determine rates of deterioration in terminal harvest and outer areas, throughout the duration of the run; and
 - b. identifying the optimum location which will provide the highest quality of salmon with an acceptable risk to the wild stocks.
 7. A study to examine the effects of sexual maturity on finished product quality could include the following:
 - a. samples in each of the categories in ASMI's Color Guide and hatchery broodstock would be collected;
 - b. portions of each category would be processed at least as headed and gutted, filleted and canned products; and
 - c. the end products would then be used in a workshop setting to educate managers on the various aspects of salmon quality.

The Task Force recognizes that a similar program budgeted at \$25,000 was considered and set aside by the ASMI board, and that it may be possible to achieve the same ends using commercially-processed products. ADF&G should prepare a budget item if necessary.

10. The Department of Commerce and Economic Development should initiate and/or encourage efforts to expose all salmon fishermen to organized, accurate and credible data concerning the salmon industry and markets in sufficient form and detail to permit fishermen's consideration of a national salmon marketing council chartered by the U. S. Secretary of Commerce under the Federal Fish and Seafood Promotion Act of 1986.¹⁰

LONG-TERM RECOMMENDATIONS

GENERAL GOAL

The state needs to develop a strategic plan for long term development of the salmon (seafood) resource, using recommendations of this task force as a starting point. This should focus on strengthening the support structure and sustainability of the industry. The goal would be a more rational and efficient system which is less vulnerable to market, production, and financial fluctuations. This would ensure an integrated and uniform state approach to the fishing industry.

OBJECTIVES:

- review and evaluate the institutions and relationships developed in the industry with an eye toward improving competitiveness and economic return to Alaska residents.
- bring together agencies and functions to affect a rational, consistent and sustainable program linking production, harvesting, processing, marketing and financing.
- determine the proper roles for the public and private components of the industry, integrating regulatory and developmental activities.

ACTION ITEMS

General

1. The Department of Commerce and Economic Development, in cooperation with other state agencies and the salmon industry, should organize a group with broad experience and understanding, in aggregate, of food and commodities industries, to:

10. The Federal Fish and Seafood Promotion Act of 1986 provides that species-specific councils (roughly parallel to the National Beef Council, etc.) may be formed only after a rigorous referendum process which must include all salmon harvesters and all primary processors or harvest purchasers and may include other industry participants. If properly organized and chartered, a "National Salmon Council" would have the power to assess the industry participants for funds to be used for salmon promotion and marketing, product research, consumer education, etc. It would also have the power to develop and offer, for Department of Commerce and Economic Development approval, salmon quality standards.

- a. review the functional and procedural workings of the Alaska seafood industry;
- b. identify areas of inefficiency, counter-productivity and resource waste.
- c. review and evaluate research and development capabilities.
- d. recommend what state resources, including statutes, regulations, prestige, etc., can and should be applied to address those areas.

Fish Production

- 2. DCED, ADF&G, and ASMI should develop an integrated production and marketing strategy, which would:
 - a. recognize marketability of the fish as an important management goal.
 - b. recognize that price will be set by overall supply and demand, including the production of farmed salmon.
 - c. coordinate production with wider economic goals, including processing, product development, and markets, based on dependable information and planning.
 - d. better coordinate wild and hatchery production, regionally and by species and market.

Harvesting/Processing

- 3. The Commercial Fisheries Entry Commission, DCED, and DF&G, should develop fishery management and regulatory measures aimed at reducing operating costs, more efficiently utilizing present investments, and promoting a rational sustainable industry. Investigate ways to retain permits in Alaska and rural areas in particular, provide greater stability and enhanced revenues to resident fishermen, and increased shoreside investment consistent with sound financial standards, through:
 - a. reexamination of loan policies and permit use limitations.
 - b. reexamination of Alaska's limited entry system.
- 4. To widen options for Alaskan fishermen, DCED, in cooperation with other state agencies and the industry should consider promoting Alaskan controlled joint venture processing developments linking present investors and industry participants with new technologies and capital, and Pacific Rim and lower 48 markets. Give special attention to rural communities dependent on the salmon resource, smaller plants, local consumption and market needs, infrastructure needs, and current economic development plans.

Marketing

5. DCED should contract a major marketing research firm with proven credentials in food marketing to develop and analyze the "facts" related to salmon market trends, opportunities and weaknesses in major and potential markets. The group should also evaluate the state and industry's marketing efforts, including consideration of changes in the ASMI statute or operations, to permit, if possible, a more effective approach to marketing Alaska seafood.⁵
6. The Governor and Legislature should consider funding ASMI's \$10 million per year proposal for an intensive 5 year domestic marketing campaign. The goal is to raise domestic consumption of salmon from 1 to 1.5 pounds per person annually.
7. DCED, in cooperation with ASMI and DEC, should conduct a study to find the most cost effective ways to improve consumer confidence in Alaska seafood products. The Task Force recognizes that the entire seafood industry must improve the inherent quality of the salmon it processes, the freshness and workmanship of the product, and the consistency of grading to remain competitive, particularly when competing with farmed salmon.⁷

Finance/Other

8. DCED, in cooperation with other agencies and the industry, should readdress the issue of infrastructure including but not limited to improving quality, providing cold storage capacity, and promoting value added production.
9. OMB, in cooperation with state agencies and the industry, should reexamine the policy and implementation of fisheries taxes, including the corporate income and marine fuels taxes. The State must first decide what it wishes to accomplish by taxation. While this is nominally raising revenues, any tax distorts the market in some way, and a review of the current tax structure and various proposed alternatives is in order. Of particular interest is whether targeted tax credits for research and development expenditures is feasible.

Reducing Costs and Regulatory Burdens

1. The Departments of Fish and Game and Revenue should consider combining the appropriate processor annual report forms to simplify reporting requirements for the industry. This should be done at an agency level with the agencies sharing information from each form or integrating them, and may require statutory changes.
-
5. The efforts should take into account what's already been done (Salmon 2000) and focus on those areas outside ASMI's assigned and traditional role, including new product and market development. The results must be produced in a form which will permit evaluation and initiation of strategies to further enhance and stabilize markets.
 7. A great deal of the input the Task Force received identified the lack of consistency in Alaska salmon products as a major marketing problem. Some Alaska product has been described as "low quality" compared to the competition. As Alaska's products become better identified in the marketplace, the Task Force recognizes that "Alaska brand" seafood must be of "good" quality, and meet the customers' expectations if customer satisfaction is to be achieved and advertising dollars well spent. Exactly how to determine those inherent quality standards, and how to ensure that the customer consistently gets the product they have purchased and expect could not be reconciled. The industry is divided on how large a role the state should play in determining quality, ranging from mandatory grading standards to no standards beyond wholesomeness.

2. The Department of Commerce and Economic Development, in cooperation with other affected agencies and the industry, should investigate ways to assist small operators in meeting the myriad regulatory requirements of various agencies. This might range from exempting processors under a specified size from filing certain forms to providing a central clearinghouse for permitting and filing information, technical advisory services and special loans for equipment such as computers and computer software.
3. The relevant state agencies should, in consultation with the Limited Entry Commission, collect child support payments from permit holders at the time of yearly permit renewal. Permit holders will be motivated to pay this fee and it will not unfairly burden processors.
4. The Departments of Revenue and Labor respectively, should relieve the burden of prepayment of the Fishery Business Tax and provision of Labor bond for companies with proven payment records and sufficient assets.

SCOMM

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BACKGROUND: DECLINING SALMONIDS IN WASHINGTON

Columbia River Salmon and the Endangered Species Act (ESA)

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

Wild Stocks Under the Endangered Species Act

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

Salmon in the Columbia River System and Reasons for Decline

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

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

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

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

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

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

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

The American Fisheries Society Endangered Species Committee Report

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

Other Efforts to Recover the Columbia River Salmon

Columbia River Salmon Flow Measures

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

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

The Salmon Summit

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

The Northwest Power Planning Council Amendments

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

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

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

HOUSE BILL ANALYSIS

HB 2626

AN ACT RELATING TO WILD STOCKS OF SALMONIDS

Brief Description: Conserving and enhancing wild stocks of salmonids.

Committee: Fisheries & Wildlife

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

Background:

Recovery Planning

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

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

Management Techniques for Increasing Wild Fish Runs

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

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

Marking and Catch and Release

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

Hatcheries

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

Captive Broodstock and Wild Stock Supplementation:

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

Summary of Bill:

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

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

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

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

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

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

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

Section 1. Legislative findings.

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

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

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

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

HOUSE BILL 2626

State of Washington 52nd Legislature 1992 Regular Session

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7 (a) A definition of stock;

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SCOMM

74:16

SENATE SPECIAL COMMITTEE ON DOMESTIC AND
INTERNATIONAL COMMERCIAL FISHERIES
February 24, 1992
1:38 P.M.

MEMBERS PRESENT

Senator Dick Eliason, Chairman
Senator Sam Cotten
Senator Lyman Hoffman
Senator Lloyd Jones
Senator Fred Zharoff

OTHER MEMBERS PRESENT

Representative Loren Lehman

COMMITTEE CALENDAR

Hatchery Review Project Draft Report and Options for
Legislative Action

WITNESS REGISTER

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Senate Dom/Int
Commercial Fisheries

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Senate Dom/Int
Commercial Fisheries

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John Carter, President
DiPac
Juneau, Alaska 99801

Jerry McCutcheon
Anchorage, Alaska

ACTION NARRATIVE

TAPE 92-2, SIDE A
Number 001

SENATOR ELIASON called the Senate Special Committee on Domestic and International Commercial Fisheries meeting to order at 1:38 p.m. and announced they would consider the Hatchery Review Project Draft Report which he wanted people to look at as a beginning.

JOHN MCMULLEN, President, Prince William Sound Aquaculture Corporation, said they agree with the goal of the state hatchery program which is to produce additional salmon to supplement the existing wild salmon stocks. They realize the question still being asked is what the salmon enhancement program was expected to be - replacement, supplemental, or developmental. They see it as economic development within the guidelines of optimum sustained yield of wild and hatchery stock as described in the State Constitution.

Regarding Chapter 3 on Trends he commented they believe new markets for domestic production can be developed based on competitive pricing and new products. He said they are hearing with increasing frequency that fresh frozen salmon is superior to all but the freshest of salmon.

On Chapter 4 regarding management of mixed stock fisheries, he said there are examples statewide of fisheries that harvest large numbers of salmon without regard for individual stocks.

PWSAC has the most extensive tagging program in the state with the cooperation of ADF&G. The user pay concept is one they urge should be decided.

Number 173

On legal issues they believe the legislature never meant to allow the Board of Fish power to limit hatchery production.

They believe the goals of the Regional Salmon Enhancement

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Commercial Fisheries

Program should be optimum sustained yield of a combination of wild and enhanced stocks with the foremost regard for the maintenance of the wild stocks, Mr. McMullen said.

Composition of the Regional Planning teams should not be changed. He thought the ADF&G should coordinate the statewide planning process. The value of that is the good ideas and procedures arising from individual teams can be shared with other planners.

They disagree with moratoriums on hatchery production which disregard the optimum sustained yield concept.

The carrying capacity of the ocean changes on a continuing basis, Mr. McMullen said. More information is needed for assessment of inshore and offshore growth and survival of salmon.

On funding of private non-profit hatcheries, PWSAC dedicates 70% of returning hatchery fish to the common property fisheries. The remaining 30% is used for brood stocks and cost recovery. Deferment of payment on state loans is necessary to provide for hatchery stock development.

They are concerned that some people seem to believe that hatchery production, not total Alaskan or world production of salmon, is the cause of price declines.

They support the efforts of groups throughout Alaska who use the resources at hand to better their lives and think of enhancement as a tool for economic development.

Mr. McMullen also pointed out enhancement has contributed significantly to king and coho non-commercial fishing.

Number 290

SENATOR COTTEN asked how the Prince William Sound Aquaculture Corporation was doing after a terrible year. MR. MCMULLEN said the Board of Directors authorized him to negotiate contracts for preseason sales of all their fish instead of selling only in season as a way to mitigate bad prices if they happened again in the future.

Number 341

SENATOR JONES asked if he planned on keeping the ratio of pinks to coho, chum, and sockeye the same. MR. MCMULLEN answered the coho and sockeye require a lot more water to rear than pink salmon which are pretty easy. He said their program is at a stable plateau right now.

SENATOR JONES asked how long they figured cost recovery would take. MR. MCMULLEN said it depends on how long it takes to build brood stock which is six years for pink salmon.

Number 400

REPRESENTATIVE LEHMAN asked him to comment on the claim that hatcheries impact the price of other markets. MR. MCMULLEN answered the markets can be developed for use of hatchery fish so their production would be market driven. They are devoting their time and funds to doing this right now.

SENATOR COTTEN brought up "ocean carrying capacity." MR. MCMULLEN said studies show that salmon have not come near to using up their food supply in the Sound. If there are good food supplies young fish can grow faster and thus move through the size at which they are more susceptible to predation quicker.

SENATOR ELIASON asked if they market the fish before they arrive, did that mean they would have a better quality product. MR. MCMULLEN answered yes. He said they have plans to start thermal marking.

Number 504

SENATOR JONES asked if they would expand traditional processing capacity.

DON AMEND, General Manager, Southern Southeast Regional Aquaculture Association, commented that the loans (enhancement loan program of the Department of Commerce & Economic Development) were deferred for too short a period and for too high an interest rate. Holding to the six year deferment period has created the problem of the hatcheries incurring more debt by having to borrow more money to keep going if it takes their brood stock more time to develop.

92-2, SIDE B
Number 001

BART WATSON, Executive Director of Armstrong-Keta, Inc., (a private non-profit hatchery corporation) pointed out they depend on the revolving loan fund for some of their operational funds. This is not an indication of less efficiency. It's just they haven't had the time to build up reserves, particularly now that there are low prices. He said they don't get any of the 3% enhancement money like the associations do or any of the U.S./Canada Mitigation Treaty money, either.

MR. WATSON did not think payments should be forgiven. He thought if interest rates were lowered, they should be lowered for all hatcheries. He agreed with Don Amend saying they should be lowered, as long as the loan fund stays solvent.

He thought there was tremendous potential for new market development. Hatcheries can encourage this by entering into long term contracts with processors who will do value added kinds of processing. He encouraged funding of the Alaska Fisheries Development Foundation.

Tagging pink salmon was important, MR. WATSON said, along with someone to look at the tags. He believes in the concept of the user pay program and it should be a state program.

SENATOR ELIASON asked what percentage of his return he dedicated to the common fishery. Because they don't have tagging on their pink salmon, they have no way of determining what their common property contribution is, MR. WATSON said. They release around 50 million pinks. Their chinook and coho programs are in the development stage.

SENATOR JONES asked how many years he allowed for cost recovery. MR. WATSON said the pink salmon were the quickest cash flow generator. Coho is a three year return and they also spend two years at the hatchery. Chinook comes back at different ages.

Number 460

HENRY MITCHELL, Bearing Sea Fishermen's Assn., Anchorage, said they would like to see increased funding to the FRED Division to develop small scale technological improvements in enhancement which would be beneficial to small communities.

ROBERT GIGLER, Anchorage, said we should utilize fish to the best of our ability.

NANCY HILLSTRAND, Homer, said we need to protect the wild stocks and do more research to find out what is really going on out in the ocean before hatcheries are allowed to expand. Biological and genetic issues need to be studied. She thought small habitat and stream systems should be enhanced rather than hatcheries. The acronym "FRED" does not include a P for production, she commented.

Number 490

JIM BACON, Southeast Seiners Association, commented from his perspective managing a mixed stock fishery was very

complicated. In Southeast the major component of the fisheries is wild stocks. It needs to be the primary focus of our management. He said he would hate to see a situation occur where he would be unable to access a strong run of wild stock fish because of economic concern over a hatchery. He didn't think the actual cost of running the facilities was envisioned either.

TAPE 92-3, SIDE A
Number 001

MR. BACON questioned the meaning of "...non-profit hatchery needs to make a significant contribution to the common property fishery."

SENATOR COTTEN asked if he thought the authority should exist to manage mixed stock fisheries if they could have it both ways. MR. BACON answered he was skeptical there was an ability to do that.

CHRIS CHAVASSE, Homer, recommended giving the Board of Fish clear statutory authority to protect wild stocks until the full impacts of hatcheries is reviewed by the public. He thought wild stock breeding grounds should be candidates for habitat preservation. He was concerned we have already unalterably affected the genetic viability of certain bird species within the Prince William Sound due to direct acts on the forage base by reducing organic outflows associated with the enhancement of runs through optimum escapement goals.

MR. CHAVASSE recommended restricting hatchery rearing and releases to afford all indigenous species ample forage, to provide statutory protections of wild stock, identify depressed stocks, identify genetic adaptability as it relates to climate change, identify depressed wild salmon stocks and identify those stocks impacted by the hatchery program, and the impact of allocation management in the intercept fisheries. Providing statutory authority for emergency actions regarding hatcheries in general, identify areas for possible sterilization should disease become a problem and identify the methods of control, and identify all sources of pollution were other recommendations.

Number 216

FRED FILE, Petersburg, agreed with Mr. McMullen's testimony regarding the salmon planning being done region by region, rather because the regions are so different. He thought more had to be done to rehabilitate the natural stocks.

Number 250

Senate Dom/Int
Commercial Fisheries

DAVE MCFADDEN, Petersburg troller, said the mitigation funds are of concern to trollers. He noted ADF&G was going to shut down Crystal Lake Hatchery which has been a very successful enhancement project. He thought the funds might not be being used for the specific purposes intended. Because the hatcheries are not producing the salmon the trollers were told to expect to compensate for their conservation efforts, there seems to be a trend towards supporting stream enhancement projects with the idea of rehabilitating the wild stocks.

SENATOR ELIASON said the Legislative Research Agency is still involved in tracing the expenditures of the treaty funds.

Number 319

KRIS NOROSZ, Director, Petersburg Vessel Owners Association, thanked everyone for making this project possible. They would like to see a clear wild stock priority put in state statute and a clarification as to whether or not the Board of Fish is required to provide for hatchery brood stocks or for cost recovery fish. She concurred with Jim Bacon's comments.

MS. NOROSZ said increased hatchery production should be restricted until the legislative cost benefit studies are complete. New criteria is needed to show a public benefit exists before granting permits and loans. A workable mechanism should be in place for closing hatcheries which aren't making a significant contribution to common property fisheries.

Purse seiners in Southeast Alaska are paying a disproportionate amount of money for the benefits they receive. They want an analysis of the enhancement program to determine whether costs are distributed in proportion to benefit. They also want to know the impacts of a mechanism allowing specific gear groups to opt out of the program or pay in proportion to the enhancement benefits they receive.

SENATOR ELIASON commented that answers to some of those questions are coming in June or July when the University finishes their studies regarding the economics of hatcheries. These will be included in the final report of the review project.

Number 351

DEBORAH LYONS, Petersburg, who is a member of the Alaska Board of Fisheries, stated that the Board of Fisheries is asking for advice from the legislature and urged the committee to take

advantage of this and give them clear direction. She thanked them for the work they are doing.

PETE ESQUIRO, Northern Southeast Regional Aquaculture Association, Sitka, thought it important to have a consistent tag recovery program. Marking should be required when a mixed stock occurs. He said there was a general understanding that brood stock would have a priority, but had never heard anything about cost recovery being guaranteed. He thought regionalized planning and permitting was the way to go. FRED should follow the permitting procedures all regional and PNP operators are required to do. Regional planning is important enough to receive some level of state funding. He believed the enhancement taxes should be audited regularly. He was against raising the 3% tax to the fishermen.

Number 432

LARRY MALLOY, Kodiak Regional Aquaculture Association, thought the points needing emphasis are a priority for protection of the wild stocks, traditional fishing patterns be recognized and prioritized as an integral part of determining an area's salmon production, where rehabilitation efforts are taking place a primary consideration should be given to a regulatory harvest strategy which clearly says how the rehabilitated stock will be maintained at a natural production level, and a thorough evaluation of the impacts of associated hatchery production on adjacent wild stocks should be made.

Number 483

OLIVER HOLMS, Kodiak Regional Aquaculture Association, said they wanted a wild stock priority. When permitting a PNP, areas being managed for cost recovery and brood stocks should be specified in the plan.

BRUCE EAGLE, Wrangell, attempted to testify, but the reception was bad.

Number 555

TOM MEARS, Cook Inlet Aquaculture Association, Soldotna, thought many of the options listed at the end of the chapters appeared to be reasonable, but were based on incorrect or unsubstantiated assumptions. They believe wild stocks should be protected and therefore enhancement projects are supplemental.

92-3, SIDE B

Number 001

MR. MEARS also thought the term "significant" should be

defined by the legislature as it pertains to contribution to common property fisheries of PNPs. He thought regional planning was preferable to state wide planning.

BRUCE EAGLE, Wrangell, thought it important to protect the wild stocks and also to make sure the hatcheries have brood stock. Planning is extremely important and he thought the regional planning teams should be changed to include gear user groups and the federal government. The planning teams should have the authority to recommend allocations to the Board of Fisheries.

Number 50

PAUL MCCOLLUM, Executive Director, Valdez Fisheries Development Association, supported testimony from the Prince William Sound Aquaculture Corporation. He thought they needed to come up with a program to harvest the hatchery fish aggressively to avoid build up of the fish in the terminal area.

MR. MCCOLLUM said many PNPs can't tag since they don't get economic escapement. He favored amending the PNP policy to make economic escapement absolute upon the granting of a PNP permit. He thought it unproductive to grant the permits if the permittee can't be assured of a chance of survival. He thought there could be a simplified cost benefit model to help determine the real contribution of their time for each project.

They support Representative Kubina's legislation allowing for regional marketing committees although they think it should be on a voluntary assessed tax rather than a direct tax.

Number 120

JOHN CARTER, President, DIPAC Hatchery, Juneau, thought many problems resulted from simple lack of information. He thought they should truly work at getting information on run strength and hatchery contribution. He encouraged funding thermal marking programs. Funding would be needed also to do recovery of the data.

MR. CARTER encouraged work in the area of product development to increase the value of salmon. He didn't object to a moratorium on hatchery production, but didn't want a moratorium on funding of existing programs.

He thought there should be more fishermen on ASMI's Board since what they do affects their product.

Number 192

JERRY MCCUTCHEON, Anchorage, commented too many fish was just a temporary maladjustment between supply and demand. He thought the Japanese would undercut the American price eventually.

He commented that research should be done on rehabilitating crab in Kachemak Bay.

Number 281

SENATOR ELIASON thanked everyone for their testimony and adjourned the meeting at 4:25 p.m.

UNIVERSITY OF ALASKA FAIRBANKS
FAIRBANKS, ALASKA 99775-1080

10 March 1992

Senator Dick Eliason, Chairman
Senate Fisheries Committee
State Capitol Bldg., Rm. 111
Juneau, Alaska 99801-1182

Dear Senator Eliason:

Thank you for the opportunity to review the draft legislative review of Alaska's fisheries enhancement program. It seems clear to me that given the startling successes with ocean ranching observed in Alaska over the past two decades and the potential for adverse wild and hatchery stock interactions, it is high time to evaluate the status of the program as a basis for recommending future direction. I have some acquaintance with the issues having contributed to the Cordova conference on "The Biological Basis for Maintaining Strong Co-Existing Stocks of Natural and Enhanced Salmon Populations in Alaska".

I find your report to be a thoughtful and generally accurate portrayal of the history of salmon enhancement in Alaska and the issues arising from the overall successes with salmon ocean ranching. While I could take issue with how some of the "options" for change are articulated, overall the document presents itself as an objective instrument for program evaluation and future direction. Since my expertise is in the area of marine science and early marine salmon ecology, I will limit my comments to that part of the report.

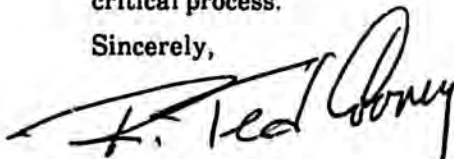
Chapter VII "Biological/Genetic Issues" presents the major topical areas of concern including 1) The genetic effects of hatcheries; 2) Ocean carrying capacity; 3) Disease; and 4) State genetics program and policy. These subjects represent some of the major core issues associated with the biology of mixed stocks in Alaska and elsewhere. As you suggest in your report, more information about these issues will be forthcoming as the result of the Cordova conference. In lieu of that insight I make the following comments relative to your draft report:

1. Alaska is in the enviable position of being able to benefit from the many mistakes characterizing past hatchery practices in the Pacific northwest. This means that Alaska doesn't have to start from scratch, but rather can (and must) exploit the important lessons learned elsewhere.
2. The genetics issues are probably the most straight forward to deal with. The development of a State of Alaska genetics policy is certainly appropriate and steps are being taken to create that posture now. I would think that both the public and private sectors will welcome this move.
3. The issue of carrying capacity is a very critical one that must be addressed. There will be several recommendations about this in the "Cordova report". The near shore and oceanic ecosystem supporting salmon also supports other fishes and shellfishes of commercial importance and many common forage populations as well (zooplankton, micronekton, small fishes and squids). Understanding the impact of increasing salmon production on these other critical elements of the ecosystem is crucial in as much as major system changes could theoretically be forced by upping the food requirements on key forage populations. At the moment there is no evidence that this is occurring, but somewhere down the line it could happen. If ecosystem restructuring does occur, changes in the way that matter and energy cycle could be disadvantageous to commercial species. This kind of problem should be avoided in the first place by trying to determine now what constitutes reasonable limits for salmon production. There are objective ways to approach this matter. Any limitations should be based in science rather than "gut feelings".

4. The major issue facing Alaska in terms of carrying capacity and wild and hatchery interactions is the complete lack of "testable hypotheses" regarding how these interactions might occur. Aside from the matter of differential fishing mortality (a problem apparent in Prince William Sound) on mixed stocks and the genetics issues, nothing has been posed regarding "competition" or other biological interactions that might adversely affect either wild or hatchery stocks (or both). Certainly there are speculations about what might be going on, but in the absence of any hard evidence, this kind of conjecture is more damaging than helpful. I would like you to see if there isn't a way the State can benefit from what has been learned in Prince William Sound under oil spill research that might help formulate the kinds of questions that can be addressed objectively. We understand that all data will soon be released from litigative restriction. A joint state and federally funded workshop on salmon ecology in Prince William Sound, using all the information on hand, would go a long way toward deciding where adverse wild and hatchery interaction might occur. This should be a priority for the near future and something your committee could recommend without the need for a 20-page justification.
5. Newly emerging results of juvenile salmon research being conducted by the University, the State and the private hatcheries suggest that the "black box" of interannual salmon production variability may soon give up some of its secrets. In fact, in Prince William Sound trends in wild stock abundance can now be explained with high accuracy for most years on the basis of growth conditions (fry food and ocean temperature) facing the juveniles during their first 2-4 months of early ocean residence (flyer attached). This consortium study demonstrates that a meaningful cooperative program can produce results on major salmon issues in a very cost effective manner. I am trying to elevate the Prince William Sound pilot study to a statewide level, arguing that a program of long-term low-level surveillance of juvenile salmon growth conditions is crucial to the overall enhancement of fish and shellfish stocks in the state. For years, the University marine science community has been criticized for its lack of attention to state needs. The cooperative study now ongoing demonstrates that oceanographers can provide information that should greatly improve the salmon forecasting procedure and provide information about levels of natural ecosystem variability missing in the past. I recommend that you include this kind of shared programmatic approach as an option for possible consideration under section VII.... "Continue to build on cooperative UAF, ADF&G and hatchery studies of environmental factors affecting regional-level production of salmon in southeast, southcentral and western Alaska".

I hope my comments will help strengthen your document. I appreciate the opportunity to input this critical process.

Sincerely,



R. Ted Cooney
Associate Professor of Marine Science

cc Jerome Komisar; President
University of Alaska

COOPERATIVE FISHERIES AND OCEANOGRAPHIC STUDIES (CFOS): SEEKING NEW ANSWERS TO OLD QUESTIONS ABOUT SALMON PRODUCTION VARIABILITY

Dr. Robert T. Cooney

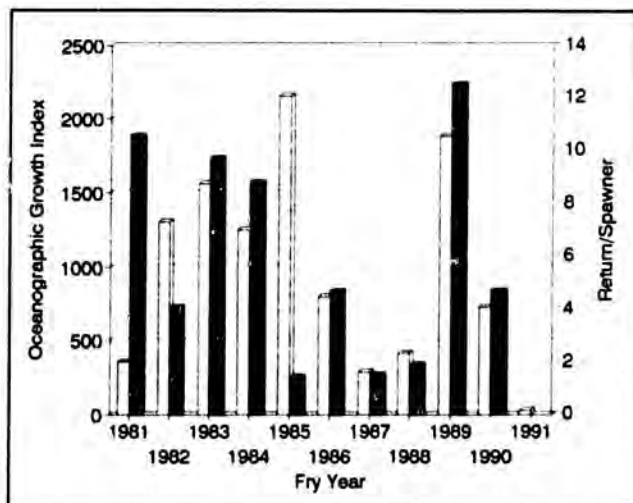
Oceanographers from the School of Fisheries and Ocean Sciences (SFOS) at the University of Alaska Fairbanks (UAF) and state and private fisheries scientists have joined forces to identify the causes of high- and low-production years for Alaska salmon. Members of this newly formed consortium – the Cooperative Fisheries and Oceanographic Studies (CFOS) program – have begun conducting research in Prince William Sound. Within CFOS, oceanographic monitoring is guided by researchers at the UAF Institute of Marine Science (IMS), and studies of salmon growth, production, management, and enhancement are carried out by the State and by private fisheries scientists.

CFOS research focuses on growth conditions experienced by juvenile salmon (fry) during the first two to four months after they migrate to the ocean. Scientific evidence indicates that most salmon mortality is due to predation during this critical growth period. In years with warm ocean temperatures and high food stocks, the rapid growth of salmon fry reduces losses to birds and fishes and produces a larger return of adults to fisheries and spawning grounds. In years with below-average temperatures and low food stocks, fry growth rates are reduced, the period of early risk is extended, and fewer adults return to spawn.

These salmon survival patterns are emerging from a new analysis of historical and contemporary databases provided by CFOS members. Jointly funded through SFOS by IMS and the Alaska Sea Grant College Program, CFOS scientists link time-series statistical analyses of ocean temperatures, local weather patterns, and plankton population levels over the past decade with production histories of wild and hatchery-released pink and chum salmon in Prince William Sound.

Another consortium member, the Alaska Department of Fish and Game (ADF&G), contributes historical catch and escapement data, wild fry population indices, and measurements of temperature, salinity, and zooplankton populations in the deep central basin of the Sound. ADF&G scientists are also examining factors that influence the annual migration of fry to the ocean and rates of fry growth and survival.

Regional salmon hatcheries (Prince William Sound Aquaculture Corporation and Valdez Fisheries Development Association, Inc.) provide records of spring ocean temperature, salinity, and zooplankton stocks. They also support faculty and graduate student experimental studies through contributions of lodging and small boat services. In addition, the corporations attempt to match hatchery releases with optimal growth conditions for salmon fry.



The relationship between growth conditions for fry (open bars) and the survival of adults (solid bars) for wild pink salmon in Prince William Sound. Causes for the 1981 and 1985 deviation from the established trend are currently being studied by Cooperative Fisheries and Oceanographic Studies researchers.

A major CFOS goal is the establishment of predictions for pink and chum salmon production based on coastal ocean conditions.



Dr. R. Ted Cooney (IMS File Photo)

Dr. Cooney joined the University of Alaska in 1970 to assist with the development of marine fisheries studies in the College of Biological Sciences. He obtained his Ph.D. from the University of Washington in 1971. In 1973 he became affiliated with the Institute of Marine Science and began studies of zooplankton in the Gulf of Alaska and the Bering Sea. This led to new understanding of the role of oceanic and coastal populations in marine food webs.

His work on juvenile salmon growth and food dependencies began in 1976 when the first non-profit hatchery in Prince William Sound began releasing fry. This effort eventually grew into the regional-level consortium study of juvenile salmon ecology and oceanography described in this issue of SFOS Highlights.

Related reports may be obtained from:

Publications Office
Institute of Marine Science
School of Fisheries and Ocean
Sciences
201 O'Neill Building
University of Alaska Fairbanks
Fairbanks, Alaska 99775-1080



UNIVERSITY OF ALASKA FAIRBANKS

IMS researchers are analyzing oceanographic variables including sea-surface temperatures and wind-driven currents. They are also describing food requirements of juvenile salmon, growth ecology and energy composition of fry food stocks, and patterns in satellite-determined sea-surface temperature fields. These activities are made

possible in part by funding from the Alaska Science and Technology Foundation, which enabled CFOS to purchase and operate a modern meteorological and oceanographic buoy in Prince William Sound. Designated C-LAB 1, the buoy continuously measures upper-ocean temperatures, plankton stocks, and sea-surface weather. These observations are transmitted hourly to polar-orbiting satellites and retrieved later by phone modem. CFOS is one of the first programs to use this technology in investigations of fisheries enhancement and management.

A major goal of CFOS is to establish predictions for pink and chum salmon production based on coastal ocean conditions experienced by juveniles. This information will help ADF&G develop improved salmon forecasting procedures and assist in the management of important mixed-stock salmon resources in Prince William Sound. Eventually, this information will be applied to other commercially important fish and shellfish populations in Alaska.



A communication-linked automated buoy (C-LAB 1) moored near Smith Island in Prince William Sound continuously monitors weather and oceanographic conditions. Prior to deployment (right), the buoy underwent testing onboard the ADF&G M/V Montague. (Photos: John Smithiesler and Kevin Engle)



Over the past two decades, oceanographers at IMS have produced substantial information about temperature conditions, current patterns, and fry food stocks in the northern Gulf of Alaska. By pooling the resources and expertise of academic research, management, and commercial interests, CFOS provides a means to apply many of these fundamental results to questions about fish and shellfish resource production, management, and enhancement. The consortium approach assures that priority fisheries research is undertaken by acknowledged experts, and that study results are immediately distributed and applied. The resulting cooperative program is much more comprehensive and effective than any one of the single participants could manage alone.

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February 24, 1992

Senator Dick Eliason, Chairman
Senate Special Committee on Domestic and International Fisheries
Alaska State Legislature
P.O. Box V
State Capitol
Juneau, Alaska 99811

Dear Senator Eliason:

Thank you for providing me the opportunity to review and comment on the Executive Summary of the "Draft Report of the Legislative Review of the Alaska Salmon Enhancement Program."

The Special Committee and others who prepared this Report performed a service not only to those directly involved in the Alaska Salmon Enhancement Program but also to the general public in both Alaska and other states and countries impacted by the program. If the achievements and potential of Alaska salmon ranching are to be realized, a better understanding must exist about the intent of the Alaska Legislature in establishing the program, how it has evolved, its current status and options for the future.

In your attachment letter you particularly requested comment on the lists of options following each chapter. My observations are on options and Report discussion of which I am knowledgeable.

I was employed from 1980-90 by the Alaska Department of Fish and Game (ADF&G) Division of Fisheries, Rehabilitation and Enhancement (FRED) as Salmon Rehabilitation and Enhancement Coordinator. In that position I administered the private non-profit (PNP) aquaculture program, regional planning teams (RPT) salmon production planning, and individual state and private hatchery management planning.

My position in FRED involved extensive policy planning for mixed stock fisheries and allocation of enhanced fish. The options developed for Chapter IV, FISHERIES MANAGEMENT, on pp. 6,7 highlight some of the policy issues I addressed. Options and conclusions about mixed-stock fishery management, and responsibility for funding such management tools as tagging have never been fully agreed-upon by either government or the users. Yet, fish tagging, other stock identification programs and the data they supply hold many of the answers about harvest quality and quantity.

The exchange between attorneys, reported in Chapter V, LEGAL ISSUES RAISED BY THE BOARD OF FISHERIES, on the subject of "...perceived ambiguities in Alaska statutes relating to wild stock and hatchery

fish management..." is interesting but too partisan to provide direction, except, maybe, for the August, 1990, letter prepared by Stephen White.

Throughout the development of the PNP hatchery program, protection of the wild stocks has always been the major consideration in permitting hatchery sites. Unfortunately, during the program's early days in the haste to produce fish, both the state and private sectors did not fully grasp the need to plan and control locations and magnitude of releases so that returns would not conflict with wild stock management, conservation and preservation. Until a few year ago when enhancement production from hatcheries or remote release sites took on major fisheries management and economic implications, the PNP and state programs, generally administered by mid-level management except when political considerations dictated higher-level involvement functioned largely without Board of Fisheries or ADF&G top management direct involvement.

Alaska Statute (AS) 16.10.440 was amended in the 1970's to restrain the Board of Fisheries from being involved in the permitting process for PNP hatcheries. However, the Board clearly maintained under statute its authority to regulate hatcheries after they were permitted in order to control those areas about which there is now concern--fish production and harvest.

In my experience, the Board's only made one overt attempt to set policy under its statutory responsibility over the PNP program. During an informal work session, members agreed that PNP hatchery operators could conduct harvest activities in the "special harvest area"(SHA), designated in the PNP hatchery permit, until cost recovery needs were met. This conclusion was never recorded as an official action. So, to this day confusion remains about the aquaculture associations' jurisdiction over the SHA and their ownership of returning fish, even though the Board could have clarified that matter with formal action.

An effort was made in 1984 to address the question of SHA fish ownership and other hatchery-related issues by a joint committee of the ADF&G, the Alaska Department of Commerce and Economic Development, The Alaska Attorney General's Office and the aquaculture associations. This group agreed that the Board could clarify the management, escapement and allocation issues for all hatcheries through the process of setting policy and developing regulations that addressed any ambiguities in the PNP statutes.

Four issues concerning management of returns to PNP hatcheries were identified. They were:

1. Management of common property fisheries for mixed stocks containing hatchery returns;

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2. Management of segregated returns to PNP hatcheries;
3. Priority uses of fish in excess to corporate escapement goals at PNP hatcheries;
4. Methods and gear employed during PNP hatchery special harvest to satisfy corporate economic goals.

An issue paper, proposed policy and regulations to clarify the Board's role in the allocation of enhanced fish were prepared for Board consideration at its winter meeting at Sitka on February 1, 1985. Unfortunately, before they could be considered at the meeting at the meeting, at someone's request the materials were removed from the agenda. Almost five years passed before the issues again surfaced, this time in a crisis mode.

Then in 1989 the Board directed the Prince William Sound Aquaculture Corporation (PWSAC) to develop a plan for allocating all enhanced salmon in the Area E management district. Through this act the Board appears to have delegated enhanced fish allocation planning to a user group association with directions to develop management plans for enhanced fish, even though management planning traditionally and statutorily has been the responsibility of the ADF&G and the Board.

I don't agree that the Board of Fisheries needs "...statutory policy ...to make decisions that would favor wild stocks over hatchery fish or vice-versa..." or that "...statutes are unclear about recovery, and about the hatchery's obligation to contribute to the common property fisheries." I believe the Board and ADF&G have ample authority to manage and allocate hatchery returns if the Board, ADF&G and the aquaculture associations, as representatives of the user groups, cooperated in developing the necessary policies and regulations to clarify and implement existing statutes.

Based on the above observations, in my judgement neither the conclusions or options of Chapter V on pp. 10,11 are valid.

Chapter VI, PLANNING AND PERMITTING PROCESS, addresses the areas with which I am most familiar. I believe all the options listed for this chapter on page 16 have merit except for the following:

- Widening the scope of the RPT review, including recommendations for allocation of enhancement production.
- Exempting the alteration, suspension, or revocation of an enhancement permit for violations from the Administrative Procedures Act.
- Clarifying Board of Fisheries authority to regulate hatchery

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production levels.

My reasons for not supporting the above options, in order of their listing, are:

The user representatives usually control the RPT's. Such has been the case particularly in recent years, as the aquaculture associations have become more financially affluent, and the ADF&G has cut travel funds so that departmental participation in the planning process has been limited. Another reason for spotty ADF&G participation was that the ADF&G administration for some years did not view the RPT as being a key participant in fishery development, production and management.

Depending on what weight the Board would give RPT recommendations on allocation, the general public might view the result of this RPT involvement in allocation decisions as having the "Fox guarding the henhouse," or the users assuming the Board's responsibility for fishery allocation and the ADF&G responsibility for fishery management.

Taking the permit violation review process out of the Administrative Procedures Act could cause an operator to claim lack of due process and open the State to legal action.

Finally, as I said earlier, the Board of Fisheries already has the authority and responsibility to regulate hatchery production levels, at least in matters when they would impact fishery management decisions or endanger conservation or preservation of wild stocks.

I would make one observation on the text in Chapter VI on page 14 under "5. Allocation Issues." The subsection entitled "Problems and Issues" speaks of the allocation plan developed by PWSAC. Actually, what PWSAC produced is an allocation policy which was then translated by the Prince William Sound RPT into a plan to the extent that it "allocates" through management practices portions of the enhanced fish to various user groups.

Such a plan can only peripherally address the problems of management and harvest of hatchery returns that occurred in Prince William Sound in 1991 and to a lesser extent in 1990. Only the Hatchery Basic and Annual Management Plans, developed in cooperation between ADF&G and PWSAC, have the economic and management tools to deal with the difficult issues of terminal harvest, contribution to the common property, and enhanced fish stocks conflicting with wild stocks harvest or conservation.

In fact after thinking about and rereading the Allocation Issues subsection, I find it confusing and in need of clarification and