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ALASKA FISHERIES POLICY

ECONOMICS, RESOURCES, AND MANAGEMENT

Edited by

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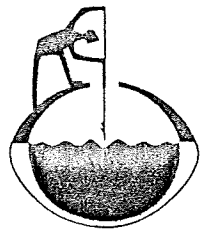

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INTRODUCTION: ECONOMICS AND POLICY IN ALASKA FISHERIES

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Readers should not expect this volume to provide a few general yet powerful truths that would unravel the complex reality of Alaska's fisheries. These industries are not now in any sense a coherent whole. Nor does this report conclude with a package of recommendations that add up to a rational and consistent policy for development and management of the fisheries. However, there is one theme that recurs both in the various papers of this report and in most recent discussions of fishery policy: license limitation. The present study is intended in part to serve as a reference in the current deliberations over the objectives, scope, and details of license limitation in the various fisheries of Alaska.

Overview of This Report

The papers in this report are arranged into sections, each of which deals with an important aspect of the fisheries industry in Alaska. Together, they cover a broad range of issues.

Section I, *Fisheries Economics*, contains a paper by James A. Crutchfield, "Economic Aspects of Fishery Management," that summarizes the economic analysis of "common property" fisheries,

and outlines the range of management policies available to cope with the economic irrationality implied by open access to fish stocks. Salvatore Comitini develops these concepts further in his paper, "The Influence of Management Regimes on the Availability of Capital for Fishery Development," and elaborates particularly on the advantages of transferable quotas as a tool of fishery management. Both of these papers were originally prepared for meetings on fishery policy sponsored by the Food and Agriculture Organization of the United Nations. Their arguments are generally formulated in terms of the fishery development problems of low income countries, but most of the principles elaborated are quite applicable to Alaska.

Section II, *Fish Stocks*, surveys the resources potentially available for harvest in Alaska and its adjacent seas. The first paper of the section, "Fish Stocks and Fisheries of Alaska and the Northeast Pacific Ocean," has several authors; the largest single contribution is that of John A. Gulland, but his work and that of several others at FAO were combined, revised, and updated by Arlon R. Tussing, who should receive credit for any errors that appear. Three short technical papers by John A. Gulland ("Natural Factors Determining Potential Productivity of Northeast Pacific Fisheries"), Vera Alexander ("Phytoplankton Primary Productivity as an Indicator of Biological Status in Alaskan Freshwater Environments"), and Arthur C. Simpson and John C. Chang ("Paralytic Shellfish Poisoning") survey in turn the factors that limit the ultimate biological productivity of marine and freshwater fisheries in Alaska, and one factor that inhibits the harvest and marketing of Alaska's substantial clam resource.

The first paper of Section III, *Commercial Fisheries*, was prepared in 1969 by staff members of the Bureau of Commercial Fisheries (now the National Marine Fisheries Service) for an early seminar in the economic study of Alaska fisheries. According to its authors, Darrel A. Nash, Adam A. Sokoloski, and Donald P. Cleary, many of the quantitative estimates in this essay ("Elements Crucial to the Future of Alaskan Commercial Fisheries") are now out of date, but the paper has been reproduced here in a slightly revised form because its outline of the opportunities for fishery development in Alaska is still generally valid. In "Alaska's Shrimp Industry," John Wiese presents a description and case study of the problems of the most rapidly growing sector of the state's fishery industry.

Section IV, *Fisheries Law*, is made up of a detailed paper by Esther Wunnicke on "The Legal Framework Governing Alaska Fisheries." This essay sets out the issues of federal and state jurisdiction over fishery management, the legal background to the current consideration of license limitation, and those questions of international law and international relations that affect fisheries and fishery policy in Alaska.

Section V, *Fisheries Management*, contains four papers directed at concrete problems of fishery policy, and particularly the problems in devising and implementing a system of license limitation. In the first essay, "Politics and Management: The Problem of Limited Entry," Thomas A. Morehouse and Jack M. Hession trace the history of federal and state management policies in the salmon fishery, and describe the economic perceptions and political forces that currently influence the development of policy. George W. Rogers, in "Fisheries Management: The Cook Inlet and Bristol Bay Cases," analyzes the labor force and income characteristics of fishermen in the Cook Inlet and Bristol Bay salmon fisheries and draws some important implications for the formulation of a license limitation policy. Thomas A. Morehouse and William C. Herrington present the experience of two widely differing systems of license limitation, in "Limited Entry in the British Columbia Salmon Fisheries" and "Operation of the Japanese Fishery Management System," respectively.

Section VI, *Marine Education*, is a paper by Arlon R. Tussing, "Marine Education in Alaska: Demand and Supply Considerations," that surveys the general future of Alaska's fisheries and other ocean industries, their prospective manpower demand, and the implications of this outlook for public education in the state.

Complexity of Fish Stocks and Fishery Institutions

There are literally hundreds of different "fisheries" operating in Alaska and nearby seas, based upon stocks of fish, shellfish, or marine mammals of different natural characteristics, having varying degrees of interaction as predators, prey, or competitors. Many individual fish stocks are harvested by two or more different techniques, at the same or different points in their life cycles or patterns of migration, and many fishermen harvest their catch from

more than one stock or species. Among the fishermen, processors, and others associated with the fish products industries, there are dozens of economic, cultural, and sentimental interests in the harvest and use of these stocks.

The Place of Fisheries in Alaska's Economy

At their seasonal peak the fisheries employ more persons than any industry in Alaska other than government. There is no satisfactory single index of labor input to fishing, but in 1969, 18,927 commercial fishing licenses were issued to individuals and 9,972 vessels were licensed; in July, the peak month of that year, 6,995 persons were employed in 125 canning and preserving establishments out of a reported total statewide employment of 111,990. Adding the number of commercial fishing licenses to the peak monthly employment in processing gives the figure of 23.2 per cent of the state employment total for the same month. This figure exaggerates the proportional contribution of the fisheries to the state's total economy because of the extreme seasonality of the industry together with double counting, a large proportion of transients in the labor force, and the low wage levels in the processing industry compared to other industries in Alaska. In addition, the numbers for fishermen include many individuals who participate in the fisheries only on a casual or recreational basis; moreover, it is known that a substantial number of licenses were purchased mainly to establish "grandfather" rights under some future system of license limitation. Although it would seem that more than one-fifth of the state's employed labor force (including transients) were directly engaged in the fisheries either as fishermen or as workers in the processing plants, only 2.8 per cent (at most) of the 1970 personal income of Alaska residents originated directly in fishing or seafood processing activities.

In another respect, however, all the foregoing figures underestimate the proportion of Alaskans involved in the fisheries in one way or another. The fisheries sector includes harvesting, processing, and distribution; the production of boats, gear, fuel, and supplies; utilities; repair, port, and business services; and the government agencies responsible for regulation, conservation, management, and development of the resource of the industry. Almost every Alaskan involved directly or indirectly with any of

these activities perceives some personal interest in fishery issues and probably has an opinion on them. Perhaps as many as one-fifth of the adult population is in this category. There are in addition substantial nonresident interests—fishermen, processor corporations, and others—that have an intense concern over particular aspects of Alaska fishery policy. For this reason there are few areas of public policy which generate more passion and more public participation in the state than do those associated with the fisheries.

Alaska fisheries today overwhelmingly concentrate on a few species with very high unit value such as salmon and crab. For these species, Alaska's high costs of labor, materials, and services are not a limiting factor, and the size of each year's catch is ultimately determined by the physical productivity of the fish stocks and by the seasons, quotas, area restrictions, and other regulations of the Department of Fish and Game.

The salmon fisheries as a group comprise the most important part of this complex group of industries in and near Alaska. Any attempt to generalize even about salmon alone faces a kaleidoscope of relevant facts, relationships, institutions, and interests. These fisheries are based upon five species, each divided into hundreds of "races" corresponding to individual spawning streams and their tributaries. The size of these races varies from just a few fish annually in each of hundreds of coastal creeks to millions in the main run of red salmon in the Kvichak River system. And the year-to-year productivity of any one run may fluctuate by a factor of two, ten, or even hundreds.

Salmon are caught in the estuaries, rivers, and creeks on their spawning runs and, as either adults or "feeders," in the U.S. and Alaska territorial sea (within 3 miles offshore), in the U.S. contiguous fisheries zone (3 to 12 miles), and on the high seas. They are taken by drift nets, seines, and set nets; by trolling, fishwheels, and traps; and by a variety of other commercial "subsistence," and recreational gear. They are taken regularly (and legally) by Japanese distant water fleets; incidentally (and sometimes illegally) from Japanese, Korean, Russian and Canadian vessels; from shore and by fixed gear; but principally from an indescribable variety of boats based in Alaska and in other Pacific Coast states.

Domestic salmon fishermen include residents and nonresidents of the fishing areas and of Alaska; Eskimos, Indians, and others; vessel owners and co-owners; and laborers for wages or for a share of the catch. They include those for whom some kind of fishing is a year-round profession, others who fish only seasonally yet for whom fishing is a principal or only source of income, and a continuous gradation from these categories to casual, sporadic, and purely recreational fishermen.

Alaska salmon are sold to their ultimate consumers in cans or smoked; in the round, as fillets or steaks; fresh, frozen, or thawed; and the roe are prepared and marketed separately in a variety of forms. Processing and marketing institutions range from individual fishermen and Eskimo village cooperatives to vertically integrated enterprises owned by giant U.S. and Japanese food industry conglomerates.

None of the other groups of existing Alaska fisheries (for example, those for king and tanner crabs, shrimps, or halibut), nor any of the potential fisheries based upon stocks that are now principally exploited by foreign fleets (for example, herring, pollack, or Pacific Ocean perch) is quite as convoluted, biologically or institutionally, as the salmon fisheries. However, the potential productivity and biological characteristics of many of these stocks are still poorly understood, and each of the fisheries exploiting them adds new technical, economic, and political dimensions to any analysis or policy study regarding "Alaska fisheries" generally.

In addition to the resources which are presently exploited domestically, large stocks of low-value fish, both pelagic and bottom-dwelling, exist in the Gulf of Alaska and the Bering Sea; some of these stocks are heavily fished by foreign vessels, but so far have been of almost no commercial interest to American fishermen based in Alaska. This situation is largely a result of cost factors that will probably not change soon: industrial fisheries, whether engaged in reduction to fish meal, or in producing blocks of white fish for human consumption, must process vast quantities of low-value raw material on board or in nearby ports. Such an operation is highly sensitive to the costs of capital, labor, fuel, and other materials.

Alaska's relative position in respect to all of these costs may improve somewhat over the next decade, and extension of U.S. territorial waters or fisheries jurisdiction may relieve the pressure from foreign fleets, but it is very improbable that Alaska will rapidly become the base of major industrial fisheries.

Developments in marketing, processing, and transportation are likely to have a greater significance for Alaska's seafood industries than changes in the volume of fish and shellfish harvested. The demand for fresh and frozen fillets, blocks, and fish products is substantially more sensitive to increases in consumer income than is the demand for traditional products like canned salmon, and this tendency certainly will affect the future disposition of Alaska's fish catch. New technology in freezing, refrigeration, and transportation, and a shift toward more elaborate processing and packaging, also point to a relative decline in canning compared to other processing operations. Federal and state sanitary and quality regulation is becoming more rigorous, as is consumer discrimination; also, the quality of frozen products is more sensitive to the condition of the raw fish or shellfish than are canned products. All these factors will combine to increase the costs and hence the value added in processing compared to the landed value of raw fish. Moreover, ton-mile transport costs will continue to fall in relation to the prices of both raw fish and fishery products, so that the location of processing will be more sensitive to local cost factors than has been the case in the past. One result could be the shipping of an increasing proportion of raw or semi-processed seafood to the Puget Sound area, Japan, or elsewhere for further processing or packaging.

It follows that, from the standpoint of economic development opportunities, development policy toward fisheries in Alaska should direct more attention to the problems of the processing and distribution sector than has been customary in the past.

Expansion of the industry in the foreseeable future will most likely proceed along the lines of the recent past: that is, the more complete exploitation of those stocks which now bring high prices and for which demand increases as people's incomes increase. These resources are salmon, king crab, and halibut, in each of which there is little if any room for expansion; Dungeness crab, whose landings might perhaps be doubled; and Tanner crab, for which there may also be substantial room for expansion (depending upon its still

incompletely known interaction with king crab); and scallops, whose ultimate significance will not be so great as the foregoing, may be in a similar category. Other potentially high-value species, as yet hardly exploited, are clams and sablefish.

The shrimp fishery deserves special attention because it is the closest approximation in Alaska to an industrial fishery and has accounted for the most rapidly growing component of Alaska's total catch. Landings, which averaged only about 3,000 tons per year in 1955-60, will probably be on the order of 45,000 tons in 1972. Shrimp command very high consumer prices, but because of high rates of spoilage, a very low recovery factor, and high processing costs in Alaska, the total landed value to fishermen has been only about four cents a pound. Shrimp landings will continue to grow as new grounds are developed, provided that serious overfishing is avoided in the presently exploited areas, but the economic importance of shrimp in the state will remain considerably less than that of salmon or crab.

The Critical Policy Issue: License Limitation

Over the last 15 years, economists have developed a body of analysis that predicts a wasteful pattern of exploitation for fish or any other resource treated as "common property." There is now a substantial literature, both theoretical and in the form of case studies, showing that expected rates of return to *individual* fishing enterprises with "open access" to a fish stock tend to attract investment and labor long after their returns in the industry *as a whole* are negative. One implication of this insight is that reducing the number of fishermen and gear will usually increase the income of those enterprises that remain by more than it will reduce the incomes of those that are excluded. In principle, at least, a system that transferred part of the gains from the first group to the second could leave both of them better off than they had been, while the rest of society would benefit from the labor and capital freed for other useful activity. In specific instances, various additional benefits can be shown from license limitation, such as better quality control, more effective conservation of the biological resource, or less costly conservation administration.

Until the very recent past, the economists' analysis was vehemently rejected by almost all parts of the industry, including the biologically oriented personnel of resource management agencies. The formal economic theory was easy to fault; its assumptions do not realistically describe any particular fishery. Moreover, current levels of biological understanding regarding most marine fish stocks, together with the imprecision of available management tools, makes it misleading to regard "optimizing" the level of fishing effort in order to "maximize" the present value of net income from fishing, as more than an abstract ideal (The same is of course true of the traditional goal of "maximum sustained yield."). Finally, it can be questioned whether the labor of technically unnecessary fishermen who have limited work alternatives is really wasted. Nevertheless, reducing and controlling labor and capital inputs clearly can produce a substantial increase in net fishing income, and is a meaningful policy objective, but one whose specific legislative and management implications are far from precise.

One additional implication of the analysis of open entry fisheries, which has not however been developed in the literature, is their inducement to excess capacity in processing as well as in fishing wherever port markets are not perfectly competitive. The impact of this tendency is apparent in many of the world's major fish products industries, for example, anchoveta reduction in Peru and shrimp packing on India's Malabar coast, and is particularly conspicuous in Alaska salmon canning.

The alternative means for controlling fishing effort are not confined to "license limitation" in the narrowest sense. They include the leasing or sale of rights to an entire fishery, to one operator who would then have a private interest both in preserving the fish stock and in avoiding the waste of capital and labor. They also include systems in which catch quotas (in numbers or tons or fish) are granted or sold, and in which quota holders presumably would then determine the most economic methods, and level and mix of inputs, to catch their respective shares. Each of these systems, however, faces most of the same issues as does license limitation.

The economic theory of open access fisheries is still not accepted by some processor interests who may have a material interest in the redundancy of fishermen. But elsewhere—including Alaska—it has lately become a part of the conventional wisdom, to

the point that license limitation is occasionally advocated as if it were a panacea for all the problems of fishermen and fishing communities.

The growing acceptance of the principle that fishing effort should be limited has not yet generally led to significant institutional reform, at least in the United States. Nor have the economists who contributed the analysis of common property resources, or the resource management officials who have adopted their views, been notably productive of practical legislative proposals. Instituting a program of license limitation in most fisheries constitutes a literally revolutionary reform, involving substantial redistribution of fishing income, of wealth in the form of rights to the resource and in the value of existing vessels and gear, and of management and regulatory power. Such a revolution does not proceed simply out of a bio-economic model or a cost-benefit analysis.

Issues in Establishing a License Limitation Program

It is not possible to limit access to a fish stock without determining at the same time who shall fish and who shall not, what the right to fish will be worth, and how, if at all, those who are excluded will be compensated. There are any number of principles on which the right to licenses (and thereby to future income) may be allocated initially. Once a system of license limitation is put into effect, there are a variety of alternative principles on which it can provide for transfer of licenses or for changes in their number. For example, should the initial allocation be by auction, or reflect seniority, "need," skill, or some combination of them? Arriving at the working measure of any one of these principles will raise controversy as bitter as choosing it: if a ruling principle is seniority, how many years fishing experience is necessary for a license; must they be consecutive years; must they be in the same fishery; what about years in which a license was purchased (perhaps with a mind to obtaining a "grandfather" right), but in which the applicant did not actually fish? Criteria for residence, need, or skill each raise other knotty equity, political, and administrative problems.

Does the license inhere in the fisherman or in the vessel? Is it limited to a certain area, a specific place, to use of a particular type of gear, or to catching a certain number of fish or weight of fish? May the same party hold more than one license? How, if at all, may

licenses be transferred: by sale, only by bequest, only with a specific vessel? May a license be held only by a natural person, or also by a local government, a cooperative, or a business corporation?

Should the income created by license limitation (and thereby the capital value created in the license) be an unrestricted grant to license holders, or should all or part of that income and wealth be captured by the state by means of the license fee or in higher taxes? How and how much, if at all, should those excluded from fishing be compensated, and on what principle are they identified; what about those who have not yet fished, but might do so in the future in the absense of license limitation? Are there groups of fishermen who genuinely have no alternative employment alternatives, and what will displaced fishermen in this category do with themselves, even if they get adequate money compensation?

Each of the foregoing issues has to be faced in attempting to control effort in any developed fishery. The peculiarities of individual fisheries and of specific groups of fishermen give special emphasis to one or another of these issues, and add other questions. How are sport fishing and "subsistence" harvest to be accommodated? Where the fish stock is wholly or partly outside the state's jurisdiction, what prevents nonresidents or foreigners from capturing the benefits of the residents' abstention? How can license limitation be reconciled with the huge year-to-year fluctuations in the number of fish available in instances like the Bristol Bay red salmon fishery? If effort is limited in one fishery, will not the displaced fishermen and vessels be likely to converge on other stocks where fishing effort is already excessive? Other complexes of issues arise in trying to prescribe a license limitation system for developing fisheries that have not yet overexpanded, or in which technical change is exceptionally rapid. Any reader who is familiar with particular fisheries can list other potential issues that are peculiar to each.