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Fisheries Research and Education Needs of the Oregon Coast

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FISHERIES RESEARCH AND EDUCATION NEEDS OF THE OREGON COAST

by

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I. Introduction

During early 1978, the Oregon State University Marine Advisory Program (OSU MAP) conducted a survey to identify major problems and opportunities in Oregon fisheries. This survey was performed under contract to the Oregon Department of Economic Development (DED) to provide information needed for the fisheries and seafood processing section of an Oregon Comprehensive Economic Development Plan.

The fisheries and seafood processing plan element focused on the following objectives:

1. to inventory significant barriers to development associated with the Oregon commercial, recreational, and aquaculture fisheries;
2. to recommend possible solutions to the identified barriers to development;
3. to identify possible development opportunities; and
4. to provide background information on the role of the fishing industry in Oregon's economy.

A finished, unpublished report submitted to DED represents the final synthesis of information from the literature, interviews, and review comments from industry, concerned agencies, and other knowledgeable people. The survey examined the supply, harvesting, processing, marketing, and consumer phases of the commercial fishing industry; the ocean charter industry; both saltwater and freshwater recreational fisheries; and various types of aquaculture in Oregon. The study inventoried significant barriers to development; identified possible solutions to the identified barriers; and identified possible development opportunities.

The survey also briefly summarized the barriers to development and associated possible solution(s) most frequently identified by information sources as being the most significant.

During the course of this fisheries economic development plan survey, numerous suggestions for research and educational program topics evolved. The report summarizes the topics suggested for economic, biological, and technological research as well as topics for workshops or other public education efforts. Most of the topics suggested in this report have received, or are now receiving, some level of attention from the several responsible agencies. Most notable of these are the Oregon Department of Fish and Wildlife, the National Marine Fisheries Service, and OSU -- through the Sea Grant and other programs. The scope of this special report does not allow a detailed listing of this present and past work, so direct contact with these agencies is encouraged for those interested in specific activities.

Although the interviewees and reviewers of the DED report were aware of the past and present activities, they felt that additional efforts were needed to facilitate the development of commercial fishing, recreational fishing, and aquaculture in Oregon. The order of listing does not imply any priority listing for the projects. For additional information about these topics, please contact your local University Extension or Sea Grant Marine Advisory Program agent.

II. Biological Research Topics

The following list represents biological research topics suggested for new or continued work:

1. Early life history of salmon in saltwater including migration patterns, interactions between hatchery and wild stocks, and interactions between different salmon species.
2. Increased stock assessment of commercially harvested target species and potential targets to include location, size distribution, habits, migration routes and mortality rates that differentiate between density dependent and non-density dependent mortality factors to help evaluate impact on the ocean's carrying capacity.
3. Investigate species interaction patterns to help address concerns that expanded fisheries on species that are food for other target species may have negative economic or ecological impacts.
4. Investigate the extent of salmon "shaker" mortality and recommend possible changes in gear or technique to reduce these mortalities.
5. Investigate the environmental impact of large scale private aquaculture releases.
6. Conduct needed oceanographic research on flushing capabilities, then estimate the ability of areas near concentrations of seafood processing plants to absorb untreated organic wastes from the plants.
7. Investigate the magnitude of losses of salmon to seals and sea lions.
8. Investigate alternative ingredients for the Oregon Moist Pellet that permit the highest potential for survival of salmon smolts (i.e. maximum smolt quality) at lowest cost.
9. Investigate cost effective methods to grow algae for feed in oyster aquaculture.
10. Investigate the feasibility of adapting oyster hatchery technology to a clam hatchery.
11. Continue investigation of post-incubation strategies for private and public salmon hatcheries such as holding smolts longer before release, time release to coincide with predator and food situations (status of upwelling), immunization prior to release, and phasing of releases to minimize pressure on limiting life support factors.
12. Investigate the feasibility of using algae or fish production as a form of

secondary waste treatment, and the potential use of waste heat from various industrial processes as part of freshwater or marine aquaculture activities.

13. Continue long range research on genetics, nutrition, larval development, stock improvement, and pathology for all types of aquaculture.

III. Economic Research Topics

The following list represents economic research topics suggested for new or continued efforts:

1. Costs and benefits of alternative interpretations of the Indian share of harvestable salmon on the Columbia River including an evaluation of the costs and benefits of abrogation of the treaties.
2. Identification of the beneficiaries, losers and economic impact of various limited entry management strategies (including the proposed moratorium) especially for trollers, charterboats and gillnetters.
3. Investigate the economic impact of the current Division of State Lands' public tidelands leasing program on private industry.
4. Conduct economic feasibility studies for demonstration fisheries on currently underutilized species (by domestic fishermen) and on the feasibility of processing and marketing new seafood products or new forms of traditional products.
5. Investigate whether or not commercial fishing is actually a high risk industry compared to various land-based industries.
6. Conduct port-specific economic research on the impact of commercial fishing activities on the local economy (Port District) beyond just the value of landings -- include value of transient commercial fishing business, estimate of loss of revenue from deteriorating or inadequate facilities.
7. Do cost-benefit analysis of new cold storage facilities along the coast, including combination with ice production, alternative off-season uses of the facilities, and benefits such as increased capability to supply transients and the reduction of losses in harvest capability due to ice shortages.
8. Conduct feasibility study on the costs, benefits, time requirements and model specifications for a state input-output model.
9. Update and expand the Giles, Ball and York survey (OSU) on the scale and impact of charterboat operations in Oregon.
10. Determine the socio-economic characteristics of charterboat customers and the types of media most effective in reaching potential customers.
11. Determine the number, types, scale of operations, ownership patterns, and distribution of support industries for recreational fishing.
12. Determine the levels and differences in expenditure patterns for the different types of recreational fishing.

13. Estimate the economic impact of private trout and salmon aquaculture.
14. Investigate the production economics for public salmon hatcheries.
15. Develop criteria to guide financial institutions in evaluating the feasibility of private aquaculture ventures.
16. Investigate the potential savings from contracting some of the public hatchery activities out to private operators.
17. Conduct cost-benefit study of the feasibility of ODF&W adopting various post-incubation strategies for the salmon hatcheries.
18. Conduct market research on potential aquaculture species.
19. Investigate the economic relationships between potential aquaculture activities and the various inputs required for production.
20. Investigate the relationships between various scales of operations for existing and potential aquaculture projects and required inputs.
21. Estimate the economic impact of losses of salmon to sea lions and seals; execute a cost-benefit analysis of possible changes in the Marine Mammal Protection Act to allow selected harassment or limited commercial harvest.

IV. Workshop - Public Education - Task Force Topics

The following list represents workshop, public education, and task force topics suggested for new or continued emphasis:

1. Workshop on the allocation process in fisheries management including the issues, facts, laws, problem areas, historical user and treaty rights, and basis for court decisions.
2. Workshop on boat insurance to determine if there are ways to reduce costs and to recommend any needed research.
3. Workshops on advanced small marine business management techniques (risk management, investment strategy, use of computers).
4. Workshop on waste handling procedures for waterfront development such as alternatives for seafood processing waste disposal, sewage disposal from pumpout stations, recommended levels of service and alternatives for petroleum waste disposal.
5. Workshop on techniques and/or technology from other commodities that may adapt to the seafood industry.
6. Workshop on the care and handling of charterboat customers with presentations by marketing and customer relation specialists.
7. Continued workshops on boating safety, emphasizing bar crossing procedures, navigation and seamanship in foul weather, avoidance of conflict with large marine commercial vessels in main navigation channels.

8. Workshop on artificial reefs.
9. Workshop for distributors and retailers on proper storage, handling and display of seafood products.
10. Workshop on the balance of public and private funding for aquaculture research to set research priorities and to coordinate public and private aquaculture research efforts.
11. Increased education of consumers on the selection, care, preparation and serving of seafood; and efforts to increase awareness of the nutritional and health benefits of seafood.
12. Public education efforts to encourage proper reburial of undersized clams.
13. Public education efforts to encourage the shift of recreational clamming efforts to mussels and soft shell clams as alternatives to traditional target species.
14. Public education efforts on proper techniques for range management and stream bank protection to help protect water quality and provide habitat.
15. Development of video, film or pictorial education programs on techniques for efficient hand-shucking of oysters for use by processors to train employees.
16. Establishment of a state level taskforce on dredge spoil disposal to develop a plan of action to help local communities and planners solve this problem -- possible actions could include:
 - a. Conduct a review of relevant literature.
 - b. Fund research on ways to improve the cost effectiveness of dredging and dredge spoil disposal techniques.
 - c. Publish information for local use on procedures for on-land use of dredge spoils (tap the extensive Corps of Engineers research on this topic).
 - d. Investigate the feasibility of modifying new technology developed by private industry for manganese nodule mining to dredging and spoil disposal.

V. Technological Research Topics

The following list represents technological research topics suggested for new or continued emphasis:

1. Development of improved production technology for trout aquaculture that reduces water consumption or allows low-cost recycling of water.
2. Development of mechanized oyster shucking equipment that does not use heat and adjusts to shell size variations.
3. Development of equipment to clean oyster shell exteriors prior to shucking.
4. Development of gear for fishing mixed fishery stocks when some of the stocks are out of season or endangered runs (example -- gear to fish shad when mixed with sockeye and summer Chinook on the Columbia River).
5. Development of increased secondary processing capabilities for seafood products

within the state through the use of more cost efficient methods of quick freezing, portion control, increased utilization of "trash" fish, new product development and diversification of current product forms.

6. Development of improved processing technology such as shrimp peelers that use less water, peel fresher shrimp and have a higher recovery rate.
7. Development of alternative production techniques for oysters and clams such as tray culture and out of bay culture.
8. Development of more cost efficient production facilities and techniques for all forms of aquaculture.
9. Investigate why shrimp peel better off ice than off refrigerated sea water.
10. Investigate changes in recovery rate of shrimp peelers from changes in pH and temperature of processing water.

VI. Directory of West Coast Sea Grant and Marine Advisory Program Offices

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VII. Notes on Related Sea Grant and Other Research in Progress

By William Q. Wick, Director, Sea Grant College Program
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Most of the opportunities and needs identified in this Special Report are subjects of investigation to some degree at one institution or another, but not necessarily to the degree that would assure timely achievement of the economic development goals the authors cite. The following notes are intended to clarify the extent to which current research complements or supports the problems cited.

Biological Research Topics (II, pages 4-5)

1. Howard Horton (OSU Department of Fisheries and Wildlife) is doing some research work on these questions right now, in connection with Weyerhaeuser.
2. Sea Grant is approaching this through project R/OPF-1, "Pleuronectid Production System and Its Fishery." We realize there are many more problems to solve; the question will never be satisfactorily answered. We are proposing to address another element of the question, beginning July 1980, in the project, "Biotic and Hydrologic Influences on Fishery Sustainability."
3. See response to number 2.
4. The Oregon Department of Fish and Wildlife has been studying this question for a long time, but there is no satisfactory answer yet.
7. The current Sea Grant projects on the Rogue River and at Netarts are examples of work with marine mammals in relation to salmon.
8. Sea Grant continues to conduct research on Oregon Moist Pellet formulations. The current project is R/AQ-30, "Interrelationships of Dietary Lipid and Protein on the Growth Quality and Production of Cultured Cold Water Fish."
9. Wilbur Breese (OSU Department of Fisheries and Wildlife) continues to address the question of algae for oyster feed through Sea Grant project R/AQ-33, "Commercialization of Recent Advances in Oyster Technology." Perhaps a more important question is to determine exactly what food oysters require. We think this will lead to encapsulated microfood.
10. Sea Grant is addressing this subject through project R/AQ-32, "Biological Feasibility of Clam Hatcheries in the Pacific Northwest."
11. A portion of the question is being addressed in two Sea Grant projects: R/AQ-31, "Enhancement of Coastal Chum Salmon Resources," and R/FSD-5, "Detection, Prevention and Control of Diseases in Fishes."
12. A number of East Coast programs are addressing this question; the waste heat question has been studied in relation to geothermal aquaculture and by Weyerhaeuser at the Springfield hatchery.
13. Much work needs to be done. Sea Grant is working in most of these areas--genetics, nutrition, larval development, stock improvement and pathology--especially in salmon, oysters and clams.

Economic Research Topics (III, pages 5-6)

Although Sea Grant and other agencies are doing pieces of the economic research outline, there is not nearly as much direct relationship between ongoing research and the proposed list of 21 subjects. Sea Grant is working on segments of 18 and 21, both national and international aspects. A new project of Bruce Rettig (OSU Department of Agricultural and Resource Economics) will look at elements of 13, 14, and 16. We are proposing to begin a study in July 1980 that impinges on 11.

Technological Research Topics (V, pages 7-8)

We have looked at a number of these questions. Richard Caldwell (OSU Department of Fisheries and Wildlife) addressed number 1 a few years ago in his study of ammonia in hatchery water. We continue to work on 7 through project R/AQ-33, "Commercialization of Recent Advances in Oyster Technology."



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