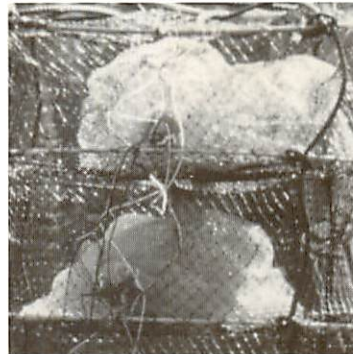


A Question of Balance

ALASKA SEA GRANT SEEKS THE ANSWERS



1992-1993 Alaska Sea Grant College Program Report



Acknowledgments

Sea Grant is a unique partnership with public and private sectors combining research, education, and technology transfer for public service. This national network of universities meets changing environmental and economic needs of people in our coastal, ocean, and Great Lakes regions. Sea Grant programs are located in each ocean and Great Lakes coastal state and Puerto Rico. Alaska Sea Grant is based at the University of Alaska Fairbanks, School of Fisheries and Ocean Sciences, and draws on academic and professional expertise throughout Alaska. Alaska Sea Grant is supported by the University of Alaska with state funds and by the U.S. Department of Commerce, NOAA Office of Sea Grant and Extramural Programs, grant no. NA90AA-D-SG066, project no. A/75-01. The University of Alaska is an affirmative action/equal opportunity educational institution.

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SCHOOL OF FISHERIES AND OCEAN SCIENCES



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Table of Contents

2	Introduction
4	Fisheries Oceanography 4 Oceans of understanding: Scientist studies salmon's life at sea
6	Resource Biology 7 Where are the sea lions?
8	Resource Economics 9 Salmon prophets bat 1.000
10	Technology & Seafood Science 11 Creating tomorrow's seafoods today
12	Marine Advisory 13 There are oysters in Alaska's future
14	Information Services 15 Building kiosks and partnerships in marine education
16	Education & Training 17 Alaska's Knauss Fellow makes waves on national marine scene
18	The Rest of the Story 18 Publications 1992-1993 20 Symposia, Conferences, and Workshops Research Projects 21 Media Summary 24 Budget 1992-1993

Introduction

Beachfront property. Alaska has more of it

than any other state. From our coastal shores, we gaze upon two oceans and three seas. With their natural beauty and seemingly endless bounty, these waters beckon. Answering the call are men and women whose harvests of crab, salmon, halibut, pollock, and other delicacies help feed a hungry world.

For the past 23 years, Alaska's Sea Grant Program has helped Alaska wisely use the bounty of its coastal and ocean waters while endeavoring to understand the natural systems that sustain it.

Each year, Alaska's fishers net a catch worth more than \$1.5 billion, making seafood harvesting and processing the state's largest private employer and second largest revenue industry after oil. More than half the nation's seafood production comes from Alaska's waters. And since much of the catch is exported, Alaska seafood helps the U.S. trade balance

with countries like Japan.

Our state's breathtaking coasts also beckon tourists. In ever-increasing numbers, visitors come to witness our awesome panoramas and glimpse abundant wildlife. In 1992 more than 750,000 visitors came, far more than the half-million people who live in

the state year-round.

But Alaska's shores are not just a mecca for those who seek fortune and adventure. Scientists come in pursuit of knowledge. Their discoveries help us expand the state's economic base, while providing the tools to conserve our marine ecosystem for future generations.

In the 1970s, we helped hatcheries culture and restore depleted salmon runs. Today these runs are among the world's most productive. As Alaska's seafood catch increased, Sea Grant researchers pioneered new technologies that made the industry more efficient and gave consumers the products they demand. And along the way, Sea Grant economists kept industry abreast of changing global markets.

Alaska's coastal resources attract people in everything from kayaks to cruise ships, which helps make tourism the state's third largest industry.

PHOTO BY KURT BYERS



Scientists use the University of Alaska Fairbanks research vessel *Alpha Helix* to examine Alaska's marine ecosystem.

PHOTO BY KURT BYERS

Sea Grant also endeavored to understand and safeguard Alaska's marine ecosystems. As plans moved ahead to build the trans-Alaska oil pipeline 20 years ago, we convened a scientific conference to plan research needed to protect against a major oil spill in Prince William Sound. And when the *Exxon Valdez* ran aground in 1989, we moved quickly to assess the environmental damages caused by the spill. In years since, we've co-hosted an international conference on the spill's controversial impacts, and helped lawmakers frame laws aimed at preventing future spills.

Our accomplishments have been many, yet new challenges are emerging. Populations of several species of marine mammals and seabirds are in jeopardy. Sea Grant scientists seek to find out why. Fish stocks, although still abundant, are under increasing pressure. Our fisheries scientists are studying ways to improve management to both protect fisheries from over-exploitation and ensure their health.

In the following pages you will learn more about how we've spent the previous

two years and what we're planning for the next two. Along the way you will meet some of the many dedicated people who have helped us achieve our goal to conserve and wisely develop Alaska's natural resources.



Fisheries scientists and oceanographers once

pursued their interests separately. These days, they combine their efforts to reveal the "big picture" of what's going on in the ocean.

Alaska Sea Grant has been at the front of this emerging discipline, called fisheries oceanography.

In Prince William Sound, our scientists and graduate students study the effect of ocean conditions on the growth and survival of young salmon. Their findings have shed new light on how the ocean nurtures young salmon, and have given fisheries managers

new information that has improved forecasts of salmon returns.

Other researchers are endeavoring to understand how climate and oceans help determine herring abundance in Sitka Sound, the site of a major Alaska herring fishery. Information gleaned from this study will help conserve herring stocks and perpetuate the herring fishery. Sea Grant researchers also are at work making sense of large-scale fisheries changes that occur in our oceans. Using advanced modeling techniques, scientists are able to predict the effects of harvesting on Alaska's important fish stocks.

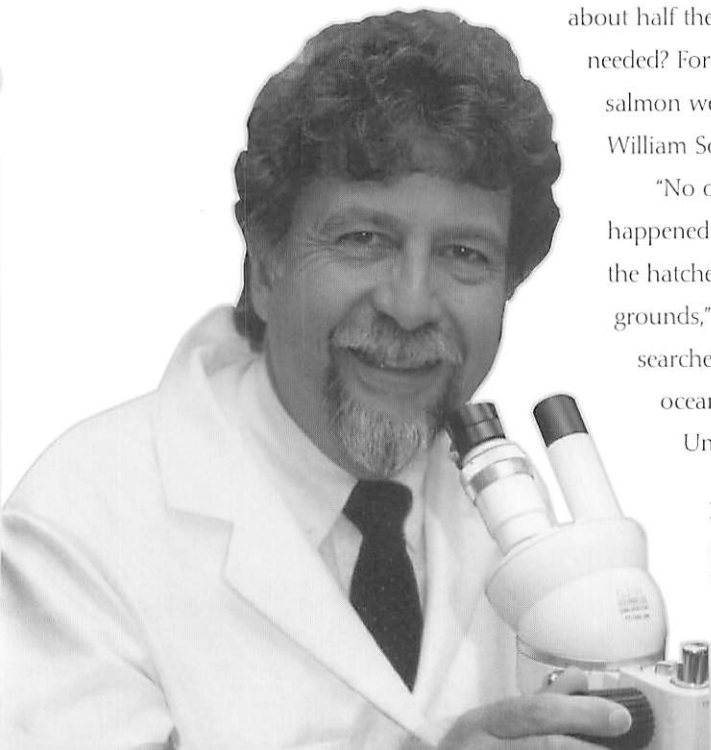
Oceans of understanding: Scientist studies salmon's life at sea

Ever had to make a decision with only about half the information you really needed? For years, that's how salmon were managed in Prince William Sound.

"No one really knew what happened to salmon after they left the hatcheries and spawning grounds," says Sea Grant researcher Ted Cooney, a fisheries oceanographer at the University of Alaska

Fairbanks Institute of Marine Science. "A salmon's life at sea was in many ways a mystery to us." To unravel the mystery, Cooney in 1991 launched a five-year, multi-agency cooperative research project to understand how ocean conditions influence growth and survival of wild pink salmon. What he discovered has helped to better manage an economically important fishery and has served as a model for future studies elsewhere along Alaska's coast.

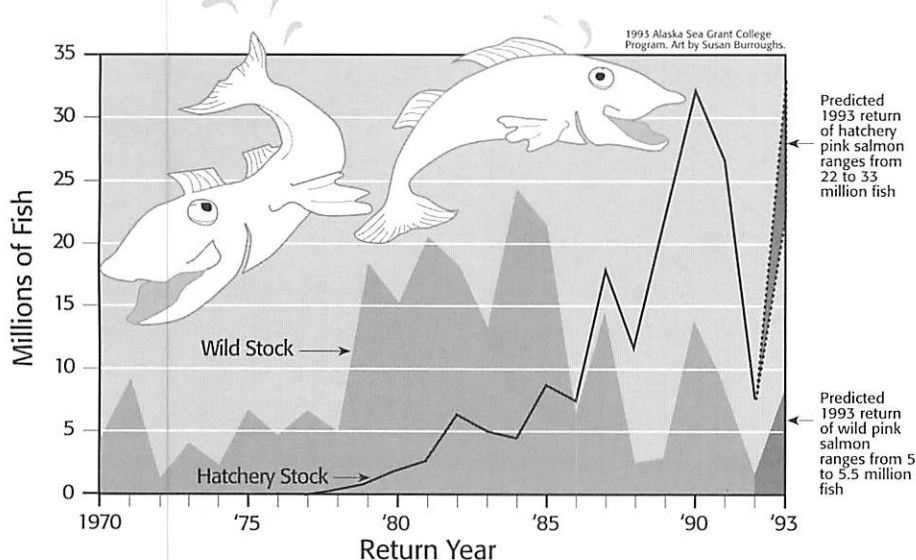
"Whether a salmon survives to adult-



Ted Cooney studies the marine environment and its links to salmon growth and survival in Prince William Sound.

PHOTO BY CAL WHITE

Pink Salmon Returns Prince William Sound 1970-1993



This chart was produced by Alaska Sea Grant and used by the news media along with a story that highlighted Ted Cooney's work.

hood depends on the conditions young salmon find when they first arrive at sea," says Cooney. "To a great extent, these ocean conditions determine the size of our salmon runs."

In 1992, not long after he began his research, Cooney predicted smaller runs of salmon in the sound. When his prediction proved true, he caught the attention of the Prince William Sound Aquaculture Corporation and the Alaska Department of Fish and Game. They now use his research to more accurately predict salmon returns to the region.

"We're getting better information, and

that helps us make better forecasts," says Sam Sharr, a biologist with the Alaska Department of Fish and Game. And better forecasts will help fishers make better business plans.



Alaska's economy depends on its natural resources. Whether the resource is oil, timber, minerals, seafood, or the panoramic vistas that attract tourists, maintaining a healthy economy demands stewardship of the environment. Alaska Sea Grant researchers help us understand our complex and fragile marine environment. They have:

Steller sea lions, their health considered a barometer of a vibrant ecosystem, are in serious, unexplained decline.

- Initiated long-term studies of the cause of Steller sea lion declines. Sea Grant research linked declines to the physiological health of juvenile Steller sea lions.

These declines must be reversed to return the ecosystem to normal, and to head off additional prohibitions against fishing in areas inhabited by sea lions.

- Probed at the molecular level the causes of paralytic shellfish poisoning. Early

detection of the sometimes deadly toxin that causes PSP is an important health question that has far-reaching economic implications.

- Sought to understand chemical and physiological changes in the brains of salmon. Discoveries have already led to new theories about how salmon find their way home. And future studies of how salmon regenerate nerve tissue could help treat human nerve damage.

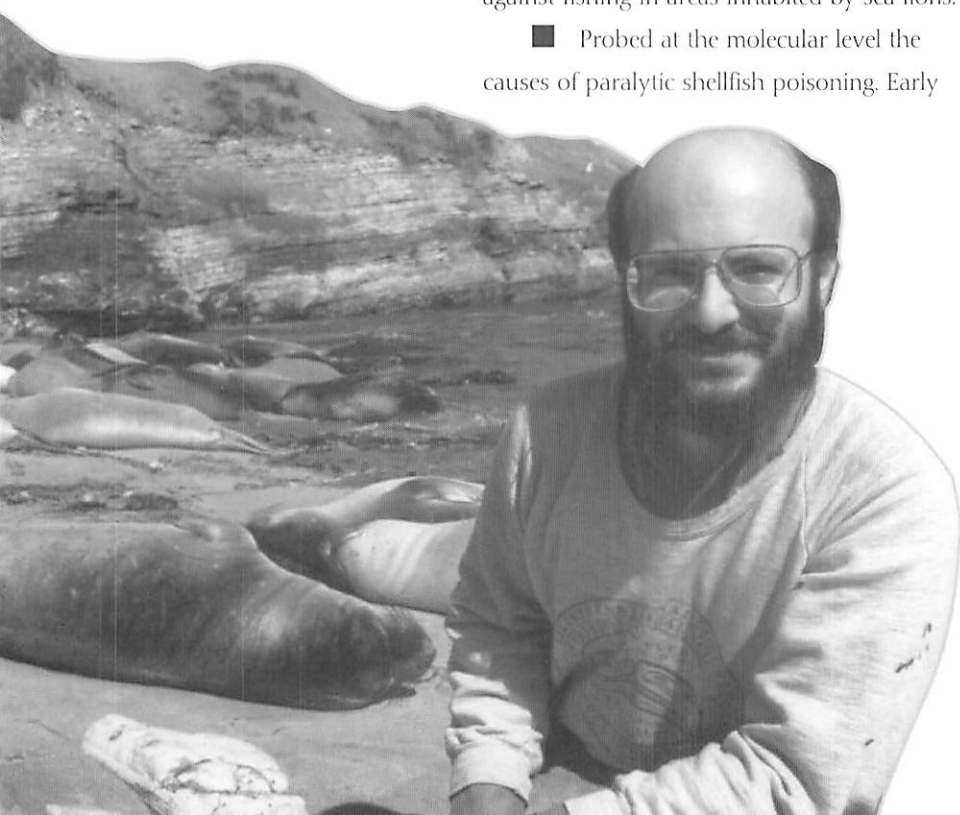
- Studied the hormonal and physiological events in seals that resemble heart attacks. While stoppage of the heart beat is normal in seals, knowledge of this physiological phenomenon will advance our understanding of cold water near-drowning and may lead to improved care for human heart-attack patients.

- Investigated the feasibility of culturing sea cucumbers to protect wild stocks and foster new coastal economic development. An Alaska-based sea cucumber culturing industry would broaden Alaska's diverse seafood offerings, creating jobs and income in coastal communities.

- Furthered scientific knowledge of the life history of Tanner crabs in ways that may put more crabs in fisher's pots without hurting future production of the state's most commercially important shellfish.

Michael Castellini is part of a state and federal team searching for the causes of Steller sea lion declines in Alaska.

PHOTO BY MAGGIE CASTELLINI



Where are the sea lions?

Like the canary in the mine shaft that warns coal miners when poison gas reaches unsafe concentrations, Steller sea lions may be telling us that the North Pacific Ocean is in trouble.

Over the past 20 years, numbers of Steller sea lions in western Alaska have plummeted. And recently, scientists have documented declines in harbor seals and several species of seabirds. Sea Grant scientist Michael Castellini at the University of Alaska Fairbanks Institute of Marine Science is part of the state and federal team charged with determining the cause of the Steller declines.

"We've examined just about everything there is to examine," says Castellini. "The only thing left seems to be food. We think there may be a food problem at a critical stage in a young sea lion's life."

With support from Alaska Sea Grant, Castellini conducted medical exams on 60 adult and 20 pup sea lions in areas hard-hit by the declines. But so far, he has not found anything to suggest the young sea lions suffer from any health-related problems.

In 1994 Castellini will turn his attention to juvenile sea lions. Juveniles are difficult to monitor because they forage far out at sea and often do not return to rookeries until they reach adulthood. Since Castellini isn't seeing many sea lions just out of their juvenile stage returning to rookeries and haul-outs, he believes they may be dying before they are

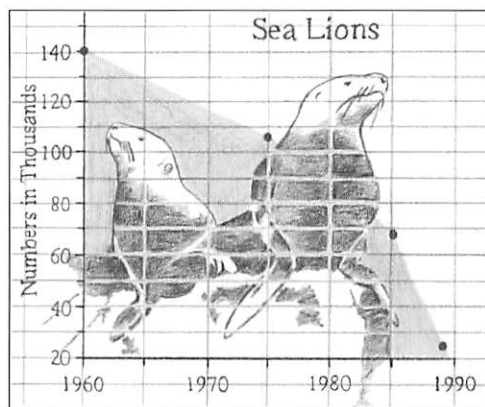


ILLUSTRATION BY SUSAN BURROUGHS, ALASKA SEA GRANT

old enough to come ashore.

Castellini hopes to learn more about the life history and health of juvenile sea lions. That knowledge may yield new clues to the species' decline. In the meantime, he predicts that Steller sea lions, already listed as threatened, will likely be declared an endangered species. Should that prediction come true, fishers will face additional restrictions. Fishers currently are prohibited from areas deemed crucial to sea lion survival, and must report contact with marine mammals. In the most extreme cases, some fishing vessels must carry on-board observers to monitor interactions with marine mammals.

"It's not just an environmental problem," says Castellini. "It's a problem that has serious economic implications to the fishing industry."





t's the economy, stupid." That battle cry

echoed in a recent campaign, propelled a certain Arkansas governor to the Oval Office, and focused a nation's attention on the need for jobs, infrastructure, and sustained economic development.



Understanding seafood markets ensures steady jobs for Alaskans.

COURTESY OF ALASKA SEAFOOD MARKETING INSTITUTE

In Alaska, where more than half the nation's annual seafood catch is harvested, talk of sustained development inevitably turns to seafood. No doubt, many of the state's future jobs will be anchored in seafood. Keeping Alaska's seafood industry healthy in a rapidly evolving global economy requires a keen knowledge of world seafood markets.

Alaska Sea Grant takes seriously the task of educating fishers and processors about what's happening in their markets. In 1990 we helped launch the fisheries economics program at the University of Alaska Fairbanks School of Management. These days, four

economists in the program carefully scrutinize developments in Alaska and world seafood markets.

Alaska Sea Grant economists:

- Accurately predicted the rise of farmed salmon in foreign countries during the 1980s and its effect on Alaska seafood markets.
- Anticipated the erosion of Alaska salmon markets and prices in the late 1980s and 1990s.
- Warned fishers and policy makers of the increasing competition from Russian fisheries.
- Urged fishers and processors to improve seafood quality as a way to boost prices, instill consumer confidence, and win back lost markets.
- Recommended a self-imposed tax on fishers and processors to be used in marketing efforts aimed at expanding Alaska's market share.
- Supported funding of an aggressive domestic marketing program to boost sales of Alaska seafood.
- Voiced the need for improved roads, ports, shoreside facilities, and other coastal infrastructure to improve seafood quality and delivery, and open new markets.
- Assessed possible impacts of continued state funding of pink salmon hatcheries, and the effect of such support on prices paid to fishers and on volatile world markets.

Salmon prophets bat 1.000

Like a burr under a bronc's saddle, Norway's foray into salmon farming in the 1980s kicked off a rough ride that has kept Alaska's commercial salmon fishers fighting to stay in the saddle.

Not coincidentally, it was during the 1980s that Alaska Sea Grant fisheries economists predicted a rise in the popularity of farmed salmon and the potential erosion of Alaska's salmon markets. The predictions weren't good news to fishers. Still, if Alaska's salmon industry was to survive and prosper, industry would have to hear it.

"In the '80s we told them that farmed salmon was going to have a dramatic impact on their markets, and that they better start now if they were going to compete," recalls Mark Herrmann, who at the time was a Sea Grant graduate student studying world salmon markets at Washington State University. Herrmann now is a Sea Grant economist at the University of Alaska Fairbanks School of Management.

In 1990, he warned that a worldwide oversupply of salmon, both farmed and wild, would likely force down the price of salmon. Not long after, Alaska's salmon markets collapsed amid a global glut of salmon.

These days, Herrmann's attention is

focused on Russia, where a new sense of openness has led to a dramatic expansion of fisheries exports and Western investment. Last year, he cautioned that Russia's potential for growth posed a serious threat to Alaska salmon markets.

"We were right about Norway in the '80s, we were right about salmon prices in the '90s. It's looking like we were right about Russian fisheries," says Herrmann.

Herrmann and other Sea Grant economists don't expect to be right all the time, but it does help when they are.



"We've given fishers a lot of very good advice about salmon markets over the years," says Herrmann.

Mark Herrmann predicted changes that affected Alaska fishermen.

PHOTO BY DOUGLAS SCHNEIDER



A dding value to Alaska's seafood used to mean

stuffing salmon-bones and all-into a tin can. No more.

Consumers today want choice. Alaska Sea Grant seafood scientists develop new products and technologies in concert with

industry. They also help fishers and processors improve seafood quality control and handling to ensure that the seafood is safe, nutritious, and wholesome.

Much of Sea Grant's seafood research and development dollars is put to work at the University of Alaska Fairbanks Fishery Industrial Technology Center. FITC is the state's only seafood R&D facility.

Alaska Sea Grant has:

- Developed and tested new seafood products such

as microwaveable entrees, ready-to-eat dinners and snacks, and salmon surimi that appeal to changing consumer needs and lifestyles.

- Helped processors streamline operations to reduce waste, save energy, and boost product quality.

- Developed new packaging that preserves flavor and quality, giving consumers better value.

- Identified and corrected critical quality control points in processor operations to improve seafood quality.

- Found new uses for seafood processing by-products, which has opened new markets for Alaska fisheries.

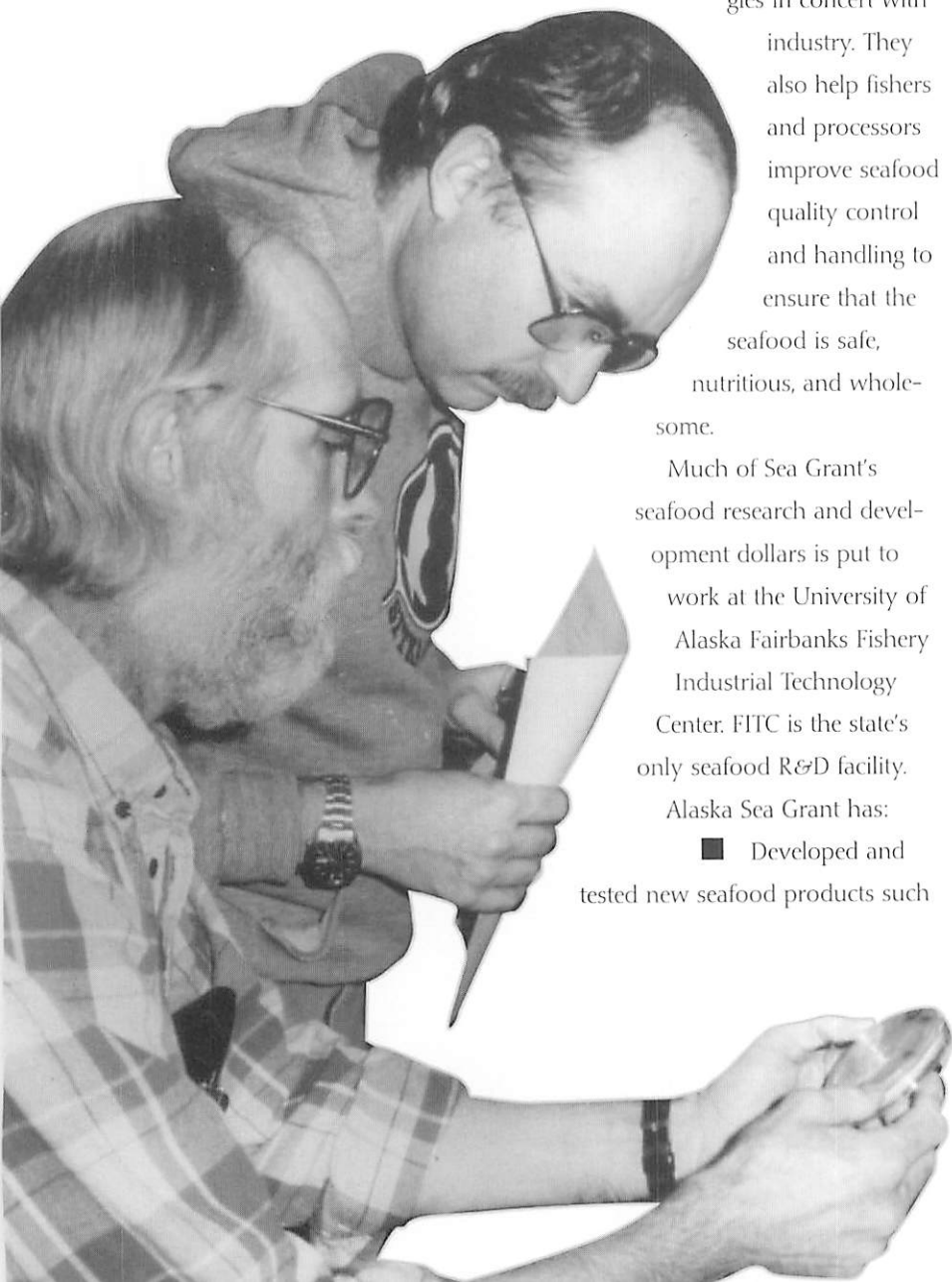
- Helped entrepreneurs test their products for quality and consumer appeal.

- Conducted taste-tests of new products to gauge consumer interest and acceptability.

- Developed new seafood harvesting and processing technologies that are passed to the private sector.

- Improved the nutritional value of seafoods made with surimi, including imitation crab.

- Helped identify sources of water quality problems in salmon hatcheries.



Chuck Crapo (Top) and Bob Pfitzenreuter developed new seafood products.

PHOTO BY KURT BYERS

..... **Creating tomorrow's seafoods today**

New edibles made from the state's smallest and most abundant salmon soon may be all the rage in your grocer's frozen-food section. They've already whetted the appetites of patrons at one Alaska McDonald's restaurant.

For several days in September '93, the McDonald's restaurant in the fishing community of Kodiak made seafood history when it served up burgers made from locally caught pink salmon. Our seafood quality specialist, Chuck Crapo, helped Western Alaska Fisheries, a local seafood processor, make the salmon burgers at the University of Alaska Fairbanks Fishery Industrial Technology Center in Kodiak.

"It's a nice pink color flesh that's shaped like a hamburger patty," said Crapo. "It's cooked like a hamburger. I had one. It had good firm texture, but didn't taste fishy."

The salmon burgers were made at FITC using a process called flaking. Flaking separates the flesh into small pieces that can be reformed into a variety of new foods, including burgers and steaks. The process is used extensively in the red meat and poultry industries to make such products as chicken nuggets and restructured foods like beef rolls and veal cutlets. Consumption of these easy-to-fix foods is growing at 20 percent by volume annually.

Flaking is just one of the methods being tested to produce new seafoods from salmon.

Other new products made from the state's most abundant salmon include microwaveable entrees and surimi. The products may help absorb the worldwide glut of pink salmon, while adding value to salmon and jobs to the Alaska economy.

"There is a lot of potential for this technology," says Crapo. "But we're not looking at this as a savior of Alaska's salmon industry. We are looking at it as one of several ways to expand product forms for pink salmon."



"Developing new seafoods requires that industry and government work together," says Crapo.

The heart of any successful applied

research program is the ability to get pertinent information and technology into the hands of people who can use it. This is the task of the Marine Advisory Program.

A grass-roots effort, MAP agents are

located in eight communities along Alaska's 55,000 miles of coast. In each case, the agents are members of the community. They know most everyone on the waterfront, and if there's something afoot, chances are the local MAP agent will have heard about it.

Alaska Sea Grant agents have:

- Worked with fishers to reduce harmful interactions with marine mammals.
- Tested new fishing gear and safety equipment.
- Organized response to coastal disasters such as oil spills.
- Researched information on all aspects of the fishing industry to answer constituent questions.
- Conducted workshops to bring the products of research and technology development to industry.
- Assisted communities in developing tourism, recreation, and other enterprises along their coasts.
- Helped fishers understand and comply with regulations.
- Produced publications and videos that help marine users understand and enjoy the natural marine world.



Ray RaLonde helped entrepreneurs launch aquaculture ventures.

PHOTO BY DON KRAMER

There are oysters in Alaska's future

Alaska oyster growers aim to cash in on our love for bivalves in the state's newest and most promising cottage industry.

"Aquaculture these days doesn't necessarily mean salmon farming. In Alaska it means shellfish farming," says Ray RaLonde, aquaculture specialist with the Alaska Sea Grant Marine Advisory Program. "Oyster farming is growing rapidly here. There is a lot of potential."

Indeed, oyster farms have sprung up in places like Kachemak Bay, Prince William Sound, and Southeast Alaska's Prince of Wales Island. Statewide, shellfish earned growers \$500,000 in 1992 on the sale of some two million oysters.

But to improve those numbers, Alaska oyster growers need a reliable supply of seed oysters, called spat. Working with a task force headed by the Kenai Peninsula Regional Economic Development District, RaLonde helped assess the economic potential of aquaculture in the region and designed a plan to meet development goals. Central to the plan's success was establishing an in-state spat hatchery.

"Ray played a key role explaining the technical side of the industry and advising us throughout the process," says Stan Steadman, executive director of the economic development district. "He brought shellfish growers, agencies, and expertise that exists around the

state into our efforts."

Aided by a grant from the Alaska Department of Commerce and Economic Development, the task force built an oyster nursery in Kachemak Bay. "Ray designed an upwelling system that brings nutrients up from the bottom to provide seed oysters with food," explains Steadman.

"We think this will be a breakthrough in helping farmers get good spat."

The task force report paints a rosy future for Alaska oyster growers. But a lot of things must fall into place, officials say.

"We have a place to get seed oysters," says Steadman. "The challenge now is to get standards for the industry and to establish a business plan and marketing plan for growers. Ray will be there helping us with that, too."



"Aquaculture has taken on entirely new meaning in Alaska since the salmon farming ban," says RaLonde.

Information transfer is the crucial link that

connects the pursuit of knowledge (research) with its dissemination (education). Sea Grant information specialists work with scientists, advisory agents, educators, and resource users to provide information about the marine environment.

Alaska Sea Grant communicators:

- Developed and coordinated scientific conferences and produced pre- and post-conference publications on such important topics as the decline of marine mammals, fish and shellfish genetics, seafood by-products development, seafood quality, resource

management, coastal disasters, and aquaculture.

- Produced books, pamphlets, and other useful information products which were distributed to thousands of people worldwide.

- Led three coastal communities in development of interpretive displays that highlight their respective commercial fishing industries.

- Revitalized the University of Alaska Fairbanks Seward Marine Education Center.

- Publicized through local, state, and national media results of scientific conferences, Sea Grant research findings, and opinion pieces that address coastal issues

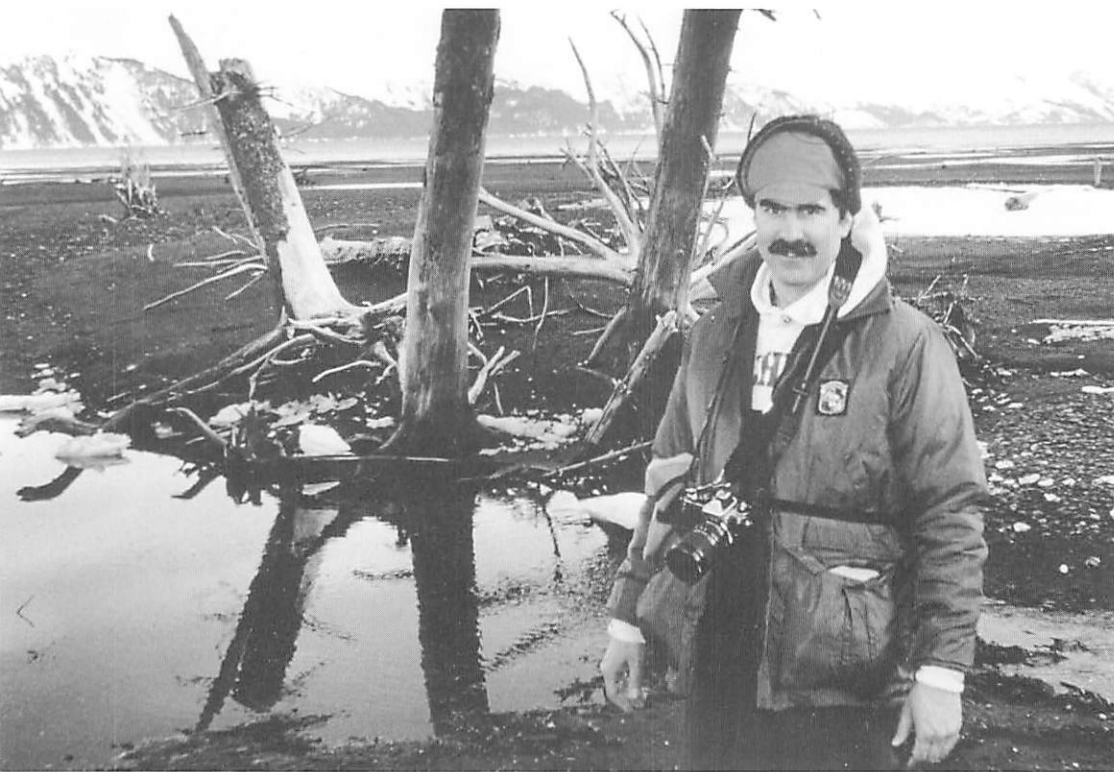
important to marine users.

- Began an internship in science writing that allows promising undergraduate students opportunities to interview scientists and write news articles for the popular press.

- Participated in the Alaska Natural Resource and Outdoor Education Association, which provides direct links to the state's environmental and science educators.

Kurt Byers led projects that highlighted the importance of Alaska's commercial fishing industry.

PHOTO BY SUSAN JENSEN



..... **Building kiosks and partnerships in marine education**

Alaska's fishing communities are busy, colorful places. Gillnetters, seiners, trawlers, and other fishing vessels of all sizes and shapes come and go amid the dockside bustle of activity. These picturesque coastal fishing towns also are magnets for tourists who come by the thousands each year to soak up the beauty and experience the communities' unique lifestyles.

To help visitors and locals understand what goes on along the docks, Alaska Sea Grant recently worked with three coastal fishing towns to design and build interpretive signs that depict the fish and shellfish harvested locally, and the vessels used by the fishing fleet.

The interpretive project is the brainchild of Doug Coughenower, the Sea Grant Marine Advisory Program agent in Homer. Kurt Byers, Alaska Sea Grant communications manager, took up the idea, expanded the scope, and made it happen.

"The process was interesting because it began as one idea that evolved very differently in each community," says Byers. "Each town had a unique vision of what they wanted."

Byers met with community planners, historians, fishers, and harbormasters in the three towns, and worked with Sea Grant artists to tailor each sign to suit the needs of

the individual communities. Sea Grant donated the staff time to research, write, and design the signs, while each community paid production and installation costs.

Ray McGurk, a Wrangell businessman and chairman of the city's transient tax committee, spearheaded the sign project in his community. He says the interpretive signs have helped residents and tourists alike understand the variety of activities that take place down on the city docks.

"Everybody has been real pleased with it," McGurk says. "It's straightforward, easily understood, and professionally done. It's been an additional attraction that has gone over real well."



"Aided by the signs, visitors to Seward, Wrangell, and Ketchikan now can better enjoy and appreciate their visits to coastal Alaska," says Byers.

Sea Grant's legacy will be the skills and

knowledge it passes to young people through its programs of student assistantship and training.

Over the last 20 years, Sea Grant graduate students have gone on to become scientists, policy makers, congressional aides, teachers, administrators, lawyers, and business executives, and have pursued a host of other worthwhile careers. In Alaska, over half the Sea Grant students supported during the 1980s are now employed in state and federal

resource agencies. The rest work in academia or private industry.

During the last two years Alaska Sea Grant supported 23 students on 13 projects.

Alaska Sea Grant students:

- Offered fresh and innovative ideas, and brought alternative viewpoints to Sea Grant research.

- Received high quality education from academic and industry professionals in an atmosphere that fosters creativity and learning.

- Competed favorably in national academic and professional competitions.

- Graduated and currently pursue related fields in government, industry, and academia.

- Contributed to furthering the understanding, wise use, and development of coastal resources for present and future generations.



Ashley Evans, shown with Alaska Sea Grant Director Ron Dearborn, is pursuing an environmental law degree.

PHOTO BY SUZANNE BISHOP

Alaska's Knauss Fellow makes waves on national marine scene

Ashley Evans didn't anticipate a career in national environmental policy. Yet there she was, working in the U.S. Congress, helping conservationists and developers solve environmental problems.

"It was the last thing I expected to be doing until I heard of the Sea Grant Knauss Fellowship," says Evans.

In 1991, Evans was one of the first two Alaska college students ever selected for the National Sea Grant Program's Dean John A. Knauss Marine Policy Fellowship. For more than a year, she worked as an aide to U.S. Representative William Hughes, D-New Jersey. Hughes is a majority member of the House Committee on Merchant Marine and Fisheries, the committee that sets the nation's ocean and fisheries policies.

Evans recalls the difficulty getting environmentalists and land developers to cooperate in protecting the state's Maurice River and Great Egg Harbor under the National Wild and Scenic Rivers Act.

"Each side had its own interests and concerns," Evans says. "Getting everyone on board wasn't easy, but it was satisfying because we got some important things accomplished."

Evans also assisted in the creation of an aquaculture research, development, and education center. The center is helping to re-establish a once-thriving sea bass and oyster

fishery along a coast rich with fishing tradition.

"Ashley was extremely helpful crafting bills to protect our coastal resources," says Rep. Hughes. "Her training in marine sciences helped bridge the gap between science and federal policy-making"

Evans recently entered law school at Dalhousie University in Nova Scotia. Dalhousie is an internationally recognized center for marine and environmental law.

"My long-term goal now is to become involved at the governmental level with international ocean policy," says Evans. "I'd like to become involved in trans-boundary marine policy issues that affect the United States and Canada."



"The fellowship opened up a whole new world of things to do with my science background," says Evans. "Most importantly it helped me define my career goals."

The Rest of the Story

Publications 1992-1993

■ Education Publications

Education Publications are books and pamphlets serving the lay public and K-12 educators.

Encountering Marine Mammals

SG-ED-13, brochure, A/71-01, A/75-01

Alaska Coastal Calendar

SG-ED-14, A/75-01

Hypothermia

SG-ED-15, 20 pp., A/71-01, A/75-01

■ Marine Advisory Bulletins

Marine Advisory Bulletins are outreach books and how-to manuals written for the fishing industry, educators, and the general public.

Care and Handling of Salmon: The Key to Quality

J.P. Doyle, MAB 45, 70 pp., A/71-01

Planning Seafood Cold Storage

E. Kolbe and D. Kramer, MAB 46, 54 pp., A/71-01, A/75-01

Beating the Odds on the North Pacific: A Guide to Fishing Safety

S. Jensen, MAB 41, 210 pp., A/71-01, A/75-01

Hazardous Materials on Board

C. Hild, MAB 43, 40 pp., A/75-01

Guide to Marine Mammals of Alaska

K. Wynne, MAB 44, 80 pp., A/75-01

■ Sea Grams

Sea Grams are 2- to 4-page fact sheets targeting the fishing industry and lay public.

Family Boating

D. Garza, ASG-31, 4 pp., A/71-01, A/75-01

■ Administrative Publications

The audience for Administrative Publications is public officials, lay people, and faculty and staff throughout the national Sea Grant network.

1970-1990 Alaska Sea Grant Report

AK-ADMIN-25, 10 pp., A/75-01

1991-1992 Publications Catalog

AK-ADMIN-26, 40 pp., A/75-01

1992-1993 Project Directory

AK-ADMIN-27, 36 pp., A/75-01

Mini-catalogs

1992-93, 7 brochures, A/75-01

■ Technical Reports

Technical Reports and proceedings are books written for scientists, economists, and other professionals.

Proceedings of the International Herring Symposium

AK-SG-91-01, 684 pp., A/75-01

Phytoplankton, Zooplankton, and Ichthyoplankton in Resurrection Bay

A.J. Paul, J.M. Paul, K. Coyle, and R. Smith, AK-SG-91-02, 24 pp., RR/87-05, RR/87-08, A/75-01

Training and Technology for Safety at Sea

AK-SG-92-01, 54 pp., A/75-01

■ Journal Reprints

Journal Reprints are reprints of articles published by Alaska Sea Grant investigators in peer-reviewed journals.

Practical and Theoretical Guidelines for Genetically Marking Fish Populations

A.J. Gharrett and J.E. Seeb, American Fisheries Society Symposium 7:407-417, 1990, RP-91-03, R/02-05 (Alaska Sea Grant), R/A-50 (Washington Sea Grant)

Migratory Catch-Age Analysis

T.J. Quinn II, R.B. Deriso, and P.R. Neal, Canadian Journal of Fisheries and Aquatic Sciences 47(12):2315-2327, 1990, RP-91-02, R/06-28

Rates of Oxygen Consumption of Yellowfin Sole (*Limanda aspera* [Pallas]) Relative to Body Size, Food Intake, and Temperature

A.J. Paul, J.M. Paul, and R.L. Smith, Journal du Conseil International pour l'Exploration de la Mer 47:205-207, 1990, RP-91-01, R/06-23

Genetic Marking of an Alaskan Pink Salmon Population, with an Evaluation of the Mark and Marking Process

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A.J. Paul, J.M. Paul, and R.L. Smith, *CES Journal of Marine Science* 49:413-416, 1992, RP-93-01, R/06-30

■ **Symposia, Conferences, and Workshops**

As part of its public service mission, Alaska Sea Grant supports public meetings on marine and coastal issues of importance to the residents of Alaska, the Pacific Northwest, and the United States. During the 1992-1993 cycle Sea Grant has in part or in whole supported the following meetings:

International Symposium on Management Strategies for Exploited Fish Populations

October 1992, Anchorage, AK, 140 participants

Exxon Valdez Oil Spill Symposium

February 1993, Anchorage, AK, 600 participants

Sea Grant distributes information to marine user groups and educators at industry trade shows and career fairs.

PHOTO BY KURT BYERS

Northwest Pink and Chum Workshop

February 1993, Juneau, AK, 100 participants

National Seafood Forum on Safety and Quality

April 1993, Arlington, VA, 85 participants

International Fisheries Genetics Symposium

May 1993, Juneau, AK, 100 participants

5th Alaska Aquaculture Conference

November 1993, Anchorage, AK, 105 participants

■ **Research Projects**

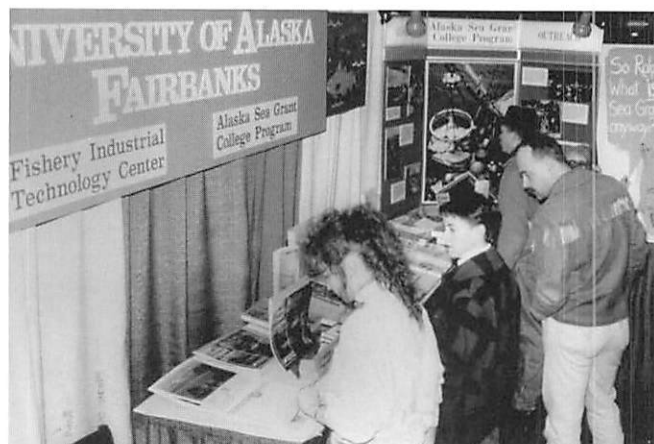
Alaska Sea Grant focuses its research attention on Alaska's largest renewable resource: fisheries. Research project results are the basis for many of our publications and outreach activities. Following is a list of 1992-1993 research projects and the university faculty who carried them out:

R/07-13

Cooperative Fisheries and Oceanographic Studies (CFOS), R.T. Cooney

R/02-17

Development Rate and Instream Survival of Early and Late Run Pink Salmon, A.J. Gharrett and W.W. Smoker



R/07-15

Modeling Long-term Changes in Multispecies Fisheries, J.S. Collie

R/07-16

Analysis of Time Series of Fisheries and Oceanographic Variables, T.J. Quinn II and H.J. Neibauer

R/08-04

Resistance to Hypoxia in the Seal Heart, R. Elsnor and S.O.E. Ebbesson

R/08-02

Neural Basis of Olfactory Imprinting in Salmon, S.O.E. Ebbesson

R/06-33

Larval Culture of the Sea Cucumber, *Parastichopus californicus*, to Remedy Overfishing, S. Smiley

R/08-05

Molecular Biology of Paralytic Shellfish Poisoning: Dinoflagellate-bacterial Interactions, F.G. Plumley

R/08-03

Physiological Health Status of Steller Sea Lions: Ecological Implications, M.A. Castellini

R/14-12

Optimal Allocation of Groundfish in the Fisheries off Alaska: A New Estimation Approach, T.P. Smith and K.R. Criddle

R/14-13

An Economic Analysis of World Markets for Wild and Farmed Salmon, M.L. Herrmann and J.A. Greenberg

R/26-02

Attaining Suitable Water Supplies for Salmon Hatcheries, R.A. Johnson

R/35-13

Enhanced Recovery and Functionality of Protein Enriched Products, J.S. French

R/35-14

Opportunities for Flaked Products from Pink Salmon, C. Crapo

R/35-15

Changes in Function and Structure of Minced Fish Products During Storage, J.S. French

R/06-32

Maturity and Molting in Tanner Crab, A.J. Paul

Media Summary

Alaska Sea Grant works with the popular press and industry media to distribute information about Alaska's marine resources and coastal environments. The following tables illustrate the tools used to reach print, radio, and television media during the 1992-1993 funding cycle.

Media Outreach Production and Use

	Number Produced	Number Used	Stories Generated
News Release	44	41	223
NewsTips	32	16	44
Editorials	6	6	16

Outlets That Used Sea Grant Materials

Print	72
Radio	30
Television	4

Average Circulation*

News releases	93,419
NewsTips	34,000
Editorials	60,783

* ALASKA'S TOTAL POPULATION IS JUST OVER 550,000 PEOPLE.

NewsTips³

NewsTips Titles	Outlets ¹	Circulation/ Listenership ²
It's trash fish no longer	1	4,700
Is there life for crabs after the fishing stops?	1	4,000
New net may reduce by-catch	1	4,700
Seafood R&D center offers new degree	8	110,000
UAF names new director for seafood R&D center	1	4,000
Salmon cheese spread, anyone?	5	20,000
Heat-and-eat almost ready to heat and eat	7	112,000
MAP/FITC conclude salmon quality road show	1	3,000
Icebreaker design proceeds with NSF grant	1	11,000
Salmon: From Russia with love	7	215,000
Sea Grant symposium to discuss fisheries management	1	1,750
Genetics symposium slated for 1993	3	9,750
Steller sea lions found healthy, confusion over decline continues	1	4,000
Development rate and in-stream survival of early and late run pink salmon	1	4,700
Feds authorize more money for Alaska Sea Grant	3	31,000
Researchers study effects of farmed salmon	1	4,000

¹ MEDIA OUTLETS INCLUDE NEWSPAPERS, TELEVISION, MAGAZINES, RADIO, NEWSLETTERS, AND TRADE PUBLICATIONS.

² CIRCULATION AND LISTENERSHIP NUMBERS COME FROM THE AUDIT BUREAU OF CIRCULATION OR THE CIRCULATION DEPARTMENT OF THE MEDIA OUTLET.

³ INCLUDES ONLY NEWSTIPS USED BY MEDIA. NEWSTIPS IS A COMPILATION OF SHORT NEWS ITEMS AND ANNOUNCEMENTS DISTRIBUTED SEVERAL TIMES A YEAR.

■ News Releases

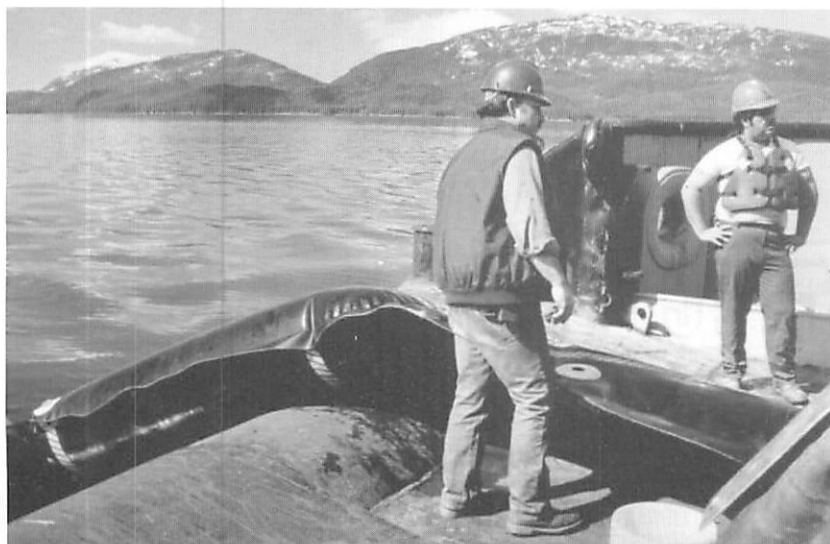
Title	Outlets¹	Circulation/ Listenership²
Salmon burgers to debut at McDonald's	9	198,000
Business experts to discuss aquaculture at Anchorage conference	17	232,000
Species declines top public meeting on Bering Sea	1	4,000
Ecosystem studies needed to understand fisheries collapse	6	87,000
Hatchery and wild pink salmon trade genes in Prince William Sound	11	103,194
New salmon hybrid may help ailing pink industry	25	321,000
Alaska Sea Grant wins writing, publication awards	2	25,000
Fish, shellfish gene research the focus of international symposium	11	218,750
Harbor seal pups rushed to rehab center	7	162,000
Alaska drinking waters are safe, but risk of Milwaukee-style outbreak exists	3	4,700
Alaska Sea Grant marine mammal specialist to be stationed in Kodiak	3	154,000
Biologists to discuss research, exchange ideas at Juneau salmon workshop	1	80,000
Russian pink salmon Alaska's next major competition	1	4,000
Ocean litter still a serious environmental problem	1	4,000
Flatfish fest to kick off ComFish trade show	1	4,000
UAF study recommends state curb hatchery funding	11	263,000
Scientists say Alaska oil spill will have lasting effects on wildlife, fisheries	3	51,494
New marine research board chooses science director	5	34,783
Seafood industry forum to address seafood safety and quality	6	31,000
Scientist predicts only slightly better '93 wild pink run in Prince William Sound	14	145,000
Fishing still most dangerous job, safety experts say training key to survival	1	51,494
NOAA to dedicate new search and rescue facility	18	496,000
Oil spill and changing ocean conditions cause weak PWS salmon runs	21	715,000
RATNET to broadcast subsistence special	0	0
Seward Marine Education Center opens	1	2,000
Marine Research Board to boost Alaska science	4	31,000
FITC researchers create new salmon edibles in wake of pink glut	1	4,000
Sea lions on their way to endangered species list, researchers continue studies	1	4,000
Researchers look for genes that cause Paralytic Shellfish Poisoning	2	6,000
Russian salmon looms as threat to Alaska markets	1	4,000
UAF scientists study seal hearts for clues to human heart disease	5	28,000
Scientists study Prince William Sound, predict smaller pink salmon run	3	21,000
UAF scientists report bacteria counts on Alaska fish	12	157,000
Knauss Fellowships	1	4,000

■ Editorials

Title	Outlets ¹	Circulation/ Listenership ²
Gaps in scientific knowledge as much to blame as oil for Sound's fisheries collapse – R. Ted Cooney	5	113,250
Fishermen must challenge ignorance and face the issues – Ron Dearborn	1	4,000
Let's move beyond bean counting in Prince William Sound – Ron Dearborn	4	90,000
Oil spill settlement, an eye toward the future – John French	3	86,000
Not all UAF facilities are land-locked – Kurt Byers	1	11,000
Kiosks are cooperative effort with Alaska communities – Kurt Byers	1	4,700

■ Magazine Articles

Title	Outlets ¹	Circulation/ Listenership ²
Fishermen given mostly bad news at <i>Exxon Valdez</i> oil spill symposium	1	10,000
Alaska's unsound salmon fishery	1	10,000
University plans nation's first ice-capable Arctic research ship	1	20,000
Improved quality key to salmon industry recovery	1	11,000
Communities eye Southcentral port development	1	11,000
UAF designs nation's first Arctic research vessel	1	n/a
Oil spill hits seabirds hard: scientists say recovery for some species may be slow	1	30,000



The public was educated about the effects of the *Exxon Valdez* oil spill through newspaper and magazine articles written by Sea Grant. Here a crew deploys an oil slick containment boom.

PHOTO BY KURT BYERS

Budget 1992-1993

■ Program Activity	1992 NA86AA-D-SG041		1993 NA90AA-D-SG066	
	Federal	State Match	Federal	State Match
Information and Advisory	647,731	884,539	563,500	867,174
Management	125,245	203,301	108,211	204,172
Education and Training	195,900	0	135,900	0
Research	473,155	114,294	456,389	113,508
Total	\$1,442,031	\$1,202,134	\$1,264,000	\$1,184,854

■ Cost Category	1992 NA86AA-D-SG041		1993 NA90AA-D-SG066	
	Federal	State Match	Federal	State Match
Salaries	658,127	587,226	548,047	602,287
Benefits	153,236	187,466	150,708	180,087
Permanent Equipment	38,240	0	9,000	0
Expendable Supplies	44,700	7,500	49,885	7,500
Travel	122,835	14,000	113,875	14,000
Contractual Services	255,806	11,230	192,791	11,230
Indirect	169,087	400,712	149,694	363,750
Total	\$1,442,031	\$1,202,134	\$1,264,000	\$1,184,854

UNIVERSITY OF ALASKA FAIRBANKS
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