Superintendent's Message

The last six months have been an exciting time for the Coastal Oregon Marine Experiment Station. Our strong research programs continue in fishery ecology (page 2), marine mammals (pages 3 and 12), aquaculture (pages 4 and 7), fish disease (page 5), fishery genetics (page 6), fishery management and policy (page 10), and seafood safety (page 11). But it is also a time of change and opportunity, if not some uncertainty. In December the Marine Mammal Endowed Program officially became the Marine Mammal Institute. As an Institute, the organization will have significant opportunity to increase its capacity and engage in a wide range of interdisciplinary research with other departments and Colleges. Bruce Mate has developed an exciting and ambitious vision that includes new faculty, projects, and buildings. The Institute will answer directly to the Dean of the College of Agriculture but will work in cooperation with COMES and other groups at HMSC. Scott Baker and Markus Horning are also Institute faculty while remaining part of COMES. Our hope is that by June the organizational and administrative structure of the Institute will be finalized. We will discuss the Institute in greater detail in the next Newsletter.

Congratulations to Michael Morrissey for being hired as the new Superintendent of the OSU Food Innovation Center (FIC) Branch Agricultural Station in Portland (page 3). In one sense it is a loss to COMES and the Seafood Lab given Michael's tremendous work in transforming the "COMES-Astoria" Experiment Station into one of the leading seafood laboratories in the nation. This move, however, will also provide new opportunities for OSU's marine programs and the Oregon seafood industry in partnering with the Center's substantive programs and resources. If managed well, we expect that this transition will broaden and strengthen existing programs including the Community Seafood Initiative and the Seafood Consumer Center. Clearly, Michael's energy, leadership, and partnering skills will create new opportunities. But questions remain about the future administrative structure of the Astoria lab and how this move will impact Comes and Astoria over the longer term. At our next few Board meetings I expect we will be engaged in constructive conversations regarding how we can best manage this change to the mutual advantage of Oregon's "sea" and "terrestrial" food industries.

We also congratulate Chris Langdon for winning the College's Briskey Award for research excellence. The award is offered two out of every three years to off-campus faculty. It is well deserved given Chris's major contributions in almost 25 years of shellfish research and the success and economic impacts of the Molluscan Broodstock Program. The last time the award was offered in 2004 another COMES faculty member, Michael Morrissey, won the Briskey. The awards demonstrate the leadership that COMES faculty provide in marine research.

Finally, I would like to highlight the results and success of the CROOS Project (Cooperative Research on Oregon Ocean Salmon – pages 2, 8,9). COMES, the salmon industry, Sea Grant, NMFS, CSI, and others have partnered to form a unique collaboration in conducting fishery and genetic science. The project combines seven disciplinary sciences and six different sub-projects. The salmon industry and Oregon Salmon Commission were valuable collaborative partners and made major contributions to every element of the project. We trained and contracted with almost 80 different salmon vessels to collect tissue samples, oceanographic, and vessel data. The results have been impressive – maybe even profound in developing protocols, collaborative partnerships, and real time data. I would venture that this project will provide the foundation for a multimillion dollar West coast project. If successful it will change the way we do salmon management and function as a model for real time ecosystem science and management. It demonstrates the unique contributions that COMES can make in conducting collaborative, interdisciplinary, and cutting edge science for improving management of our valuable fishery resources.

Marine Fisheries Ecology — Jessica Miller

It was a busy summer for the Marine Fisheries Ecology program! We had a full lab this summer including an undergraduate, Stefanie Gera, who was part of the National Science Foundation's research experience for undergraduates (NSF-REU). Stefanie worked to recreate migratory patterns of juvenile steelhead collected off the Oregon coast using otolith chemical and structural analyses.

There were also two graduate students working in the lab, Abby Nickels and Pam Archer. Abby, who is a M.S. student in the Department of Fisheries and Wildlife, will work on a collaborative project with NOAA-NMFS and her research will focus on the early life history of Chinook and coho salmon in the Columbia River. Pam, a Marine Resource Management M.S. student, will be examining the ecological effects of efforts to re-establish the native oyster, Ostrea conchaphila, in Netarts Bay for her thesis.

I am participating in the Collaborative Research on Oregon Ocean Salmon project (Project CROOS) to identify the stock origins of Chinook salmon in the commercial fishery off Oregon. I will determine if information stored within the otoliths, i.e., elemental and isotopic ratios, can provide insight into the migratory history of individuals within and among different stocks.

A related project with the Port Orford Ocean Resources Team (POORT) will determine if otolith elemental chemistry (i.e., strontium isotopes) can be used to identify the relative proportion of wild Sixes River Chinook in the Elk River fall fishery. If successful, the information could be used to increase the harvest of the currently under-exploited hatchery fish.

Additionally, I am continuing to combine analytical chemical techniques, i.e., elemental analysis of fish otoliths, with field and laboratory experiments to provide information on mixing and dispersal in black and canary rockfish. Estimates of exchange among coastal populations are important for the development of management and rebuilding plans.

A component of that effort involves a laboratory experiment, currently underway at HMSC, to examine temperature effects on the incorporation of elements in juvenile rockfish otoliths. Although otolith elemental composition has proven to be a powerful tool in studies of mixing and migration in fishes, controlled, experimental studies are needed in order to accurately interpret otolith chemistry data from field collected fish.

Project CROOS Update

Project CROOS was initiated in June 2006, primarily to improve salmon management and avoid harvest of weak salmon stocks by identifying — in real time — movement/location of individual stocks and relationship with oceanographic conditions. It also is geared toward improving markets for Oregon salmon through use of bar codes and digital technologies.

During the last several months, Project CROOS has trained more than 100 Oregon salmon fishermen in sampling protocols. Almost eighty of these fishermen have provided more than 4,300 samples, and more than 2,200 salmon have been analyzed to determine river basin of origin.

Also, through this program, which is funded by the Oregon Watershed Enhancement Board, fishermen have received $440,000 in compensation.

Scott Boley working with data logger.

The website, http://www.projectcroos.com/, which will provide a secure data site for scientists and fishermen, currently offers a brief public overview of the program, with additional information soon to come.

Leadership of this program is a coalition of nine fishermen and eight scientists, and partners include several local, state and federal organizations.

Marine Mammal Program — Bruce Mate

The MMP expanded tremendously this year with the hiring of two additional principal investigators: Scott Baker and Markus Horning. Both are currently at HMSC and in the process of establishing their new laboratories, which includes bringing on their own staff and graduate students.

Scott Baker is the new Associate Director of the Marine Mammal Program, and also holds the title of Associate Professor of Cetacean Ecology. He arrived in Oregon from the University of Auckland and convinced his Faculty Research Assistant, **Debbie Steel**, to relocate from New Zealand to continue her work with him. Scott is internationally respected for his pioneering research in whale genetics, and is probably best known in the popular press for his genetic analysis of whale meat sold in Japanese and Korean food markets. His research has shown that when it comes to whale meat, what you see on the sign is not always what you get: Products from endangered species of whales are still being sold under the names of more common whales.

Markus Horning is the Assistant Professor of Pinniped Ecology, and came to the MMP from Texas A&M University (TAMU). He recruited **Lisa Petrauskas** from the Alaska SeaLife Center to aid him as his Faculty Research Assistant, and together they are establishing the new Pinniped Ecology Applied Research Laboratory (PEARL) within the Marine Mammal Endowed Program. Markus is currently in Antarctica working with Weddell seals; he has also done significant research on endangered Steller sea lions.

The recent hirings and future growth are part of the Marine Mammal Program's new vision: to grow into a multi-disciplinary Marine Mammal Institute, dedicated to understanding not just where whales go, but how entire marine ecosystems work in which whales and other marine mammals are (or were) an integral part. The Institute will develop an experienced faculty which will contribute expertise in such areas as genetics, behavior, physiology, habitat assessment, ecosystem dynamics, and conflicts between marine mammals and human activities. In collaboration with faculty at other OSU colleges and scientists around the world, the Institute will provide greater outreach and public education, working with communities and industry to ensure that the important knowledge we gain is made available to every stakeholder in the future of marine mammals.

The academic procedure for acquiring institute status has been initiated and is currently in process.

Michael Morrissey moves to Portland as Director, FIC

Michael Morrisey has accepted a new position as Superintendent of the OSU Food Innovation Center (FIC) in Portland. Michael will begin work at the FIC in January while also continuing as director of the Seafood Lab. This is an exciting opportunity for him, and his expertise in working with a wide variety of folks and organizations will be one of his strengths in this new role.

To quote Michael: "I have had mixed feelings about leaving the seafood lab and all the people I have worked with over the past 15 years. It's been a wonderful learning experience and is a great place to work. The seafood lab has an excellent track record to doing good research while having a positive impact on the seafood industry and other stakeholders – as well as being a lot of fun."

The FIC, established in 1999, is OSU's newest experiment station and has a mission of serving the food industry in the Pacific Northwest through product development and innovation. It partners with Oregon Department of Agriculture (ODA) and they share the building which is located in the Pearl District in downtown Portland.

Aquaculture — Chris Langdon

June 2006 — Over the last four months, both Thom Gilbert and Brendan Clack successfully defended their Master's theses on different aspects of larval fish culture. Thom worked on the culture of rockfish species in collaboration with the Oregon Coast Aquarium and Brendan worked on developing lipid-spray beads for feeding amino acids and other water-soluble nutrients to marine fish larvae. Chris Langdon is continuing work of developing lipid-spray beads for rearing larval cod while on sabbatical at the Institute of Nutrition and Seafood, Bergen, Norway, and graduate student Ephraim Temple is examining the potential of using lipid-spray beads to deliver antibiotics to treat bacterial diseases of marine fish larvae.

The Molluscan Broodstock Program (MBP) has completed analysis of the performance of progeny from broodstock subjected to two cycles of selection. Results indicate that there is an average 43% improvement in yields of progeny from MBP selected broodstock compared with that of progeny from unselected broodstock; furthermore, yields of top-performing families suggested for commercial production are about twice those of progeny from unselected broodstock. Most of the improvement in yields is due to higher survival of MBP families during grow-out. These results were presented in May by Chris Langdon at the annual meetings of the National Shellfisheries Association, Monterey, CA, and the World Aquaculture Society in Florence, Italy.

Student presentations at the National Shellfisheries annual meeting in Monterey, CA, were given by Paul Lang and David Stick. Paul has successfully applied microarray technnolgy to identify differences in gene expression between high and low surviving MBP families. David Stick presented his work on developing microsatellites for study of population genetics of native oysters on the West Coast. David's work will be useful in identifying appropriate broodstock for numerous native oyster restoration efforts currrently underway on the West coast. MBP has also focused attention on the production of our 20th cohort of families selected for improved yield. A total of 60 full-sibling families were produced in early April and we plan to initiate field trials of this cohort beginning in July.

Work has also continued examining the inheritance of oyster shell pigmentation. Results thus far indicate that shell pigmentation is a highly heritable trait, suggesting that lighter or darker oyster strains could be developed through selective breeding.

Over the Spring quarter we have also received needed assistance in the lab and in the field from two OCCC Aquarium Science students. Kiril Chang-Gilhooly has been working for us part-time and Maria Hargard is receiving OCCC practicum credits. Both students are assisting us in all aspects of shellfish and algae culture.

Congratulations to Chis for receiving the Briskey Award for Faculty Excellence. This award, a well-deserved honor, recognizes faculty achievement within the College of Agricultural Sciences at Oregon State University, and is awarded based on program excellence, merit, and achievement.

Visit the MBP website at: http://hmsc.oregonstate.edu/projects/mbp/index.html

New Study: Parasite Causing Whirling Disease Could be Transmitted Via Fishing Waders

10/26/06 Media Release

Newport, Ore. – A new study has found that a parasite that causes deadly "whirling disease" in juvenile trout and other salmonids may be transmitted from one fishing hole to another – and from one stream to another – on fishing boots and waders.

The spread of whirling disease within the United States over the past half century has primarily been through the movement of infected fish through hatcheries, researchers say. But increasingly whirling disease has begun to show up in streams not stocked with infected fish and researchers have discovered that its transmission is not accomplished directly from fish to fish.

"The bottom line is that we've found that the spores that eventually infect the fish and lead to whirling disease can survive out of water for eight hours on the soles of waders," said Paul Reno, a microbiologist with the Coastal Oregon Marine Experiment Station at Oregon State University. "In laboratory tests, we found that these spores can indeed attach themselves to the bottom of boots and waders, and become viable when reintroduced into clean water containing trout."

Whirling disease is a neurological disorder caused by the parasite, myxobolus cerebralis, which primarily affects juvenile trout causing severe deformities of the skeleton and skull – and can lead to mortality rates as high as 100 percent. It also can affect Atlantic salmon, steelhead and possibly other salmonids, though there have been fewer impacts on those species.

"Characteristically, it affects little fish – the fry – which then swim around in circles and, if the infection is severe enough, eventually most will die," Reno said. "After the spores enter through the skin, the parasite eventually works its way through the fish and imbeds into their skulls and skeleton, degrading the cartilage. Originally, it was thought to affect the equilibrium of the fish, but a few years ago an anatomist found that the degraded cartilage was actually pinching their nerves and causing deformities.

"If the fish are big enough, they seem to be able to withstand the effects," added Reno, who is a professor in OSU's College of Agricultural Sciences. "That may explain why it hasn't caused as many problems with salmon and steelhead."

The disease was first recorded in U.S. waters in the mid-1950s in Pennsylvania, and it slowly made its way west, appearing in Colorado in the early 1980s, and in Montana's blue-ribbon trout rivers in the mid-1990s.

In Oregon, whirling disease has been identified over the past two decades in tributaries of the Grande Ronde system in the northeastern part of the state, and more recently in Clear Creek on the Clackamas River system.

The life cycle of the parasite causing whirling disease is complex, Reno said. Once established in the skull of an adult fish, myxobolus cerebralis, which is only about 10 microns, or .01 Millimeters in size, is released into the water after the fish dies and decomposes. These microscopic parasites are then devoured by tubifex worms that live in the mud of freshwater streams and lakes, he added.

"These worms act as a second host for the parasite, which metamorphoses into these 300-micron monsters that are shaped like a river anchor," Reno said. Then known as triactinomyxon, or "tams," the parasites remain in the mud-dwelling worms until they are excreted into the lower water column. Nearby trout redds are particularly vulnerable to the parasite, which can attach to the skins and shoot spores into the juvenile trout, penetrating their skin and beginning the cycle once again.

Interestingly, the tams only live in certain strains of host tubifex worms.

"Susceptible strains of tubifex worms are found pretty widely across the state, as are strains that are more resistant," said Jerri Bartholomew, a microbiologist with OSU's Center for Fish Disease Research. "There is no obvious reason why whirling disease hasn't become established in other places in Oregon, except that tubifex densities are often fairly low."

In their studies, Reno and his colleagues at OSU's Hatfield Marine Science Center in Newport wore waders and stepped into a water tank that contained mud with tubifex worms at the bottom. They found that stepping in the mud containing infected worms released

Whirling Disease, continued

the spores, which then attached to the waders. Wearing the waders into a separate clean tank, with healthy rainbow trout, was enough to infect the fish.

Conversely, when dead, infected trout were used as a source of the parasite, the spores adhering to the bottom of the waders could infect the worms. Even after the waders were left to dry for several hours, enough infectious material remained to infect new hosts.

Reno said the OSU researchers also tested whether the parasite could be passed through birds – especially mergansers, mallards and crows – that might feed on the juvenile fish or worms, but results were inconclusive.

Rainbow trout appear most susceptible to whirling disease, Reno said, and European researchers are developing strains of fish that are more resistant to infection.

The OSU study was funded by Montana State University.

[Article by Mark Floyd, OSU News & Communications Service. This article, or portions of it, has been reprinted in several newspapers around the region.]

Marine Fisheries Genetics Lab

The Marine Fisheries Genetics Lab has seen several changes in the last few months:

Isabelle Meusneier and Greg Moyer, post docs, completed their work and have moved on. Isabelle has accepted a position at the Canadian Centre for DNA Bar-Coding, Biodiversity Institute of Ontario. Greg has accepted a research position with the US Fish and Wildlife Service in Georgia.

Graduates Daniel Gomez-Uchida and Jeremiah Bernier are also looking toward new futures. Daniel will be working as a post doc with the Canada Research Chair in Marine Conservation, Dalhousie, Halifax, and Jeremiah has moved into a PhD Program at Lausanne, Switzerland.

For those still in Newport, their major projects continue. Marc Johnson has recently finished his analysis of Oregon Coho microsatellite diversity and is now sequencing gene-encoding DNA for this species.

Renee Bellinger is working on compiling the final data set and data base as well as working with Chris Romsos of COAS to develop web-based information portals for ProjectCROOS.

Lorissa _____ is genotyping and working on database management with both ProjectCROOS and Project POORT (Port Orford Ocean Resources Team), the latter for Jessica Miller.

Mattias Johansson is currently finishing up the writing for a population genetics study on copper rockfish. The paper will shortly be submitted to Molecular Ecology and is entitled "Habitat discontinuity and geographic distance are more influential than oceanography on fine-scale population genetic structure of copper rockfish (Sebastes caurinus) along the Oregon coast." This will be chapter one of his dissertation.

Kathleen O'Malley is using candidate (functional) genes to characterize the genetic variation among Chinook salmon populations divergent for run timing

Rebecca Baldwin's research focuses on identifying stocks of Pacific sardines along the west coast by two different approaches: macroparasite community analyses and parasite microsatellites.

As for Michael, he's currently leading an analysis of the statistical power of the coast-wide Chinook microsatellite baseline used for stock ID in programs such as Project CROOS.

This baseline supported by NOAA's Chinook Technical Committee funds has more than 150 population samples distributed from California through SE Alaska and has involved over ten different genetics labs.

In other news, the lab is currently recruiting for two positions here in Newport – one post doctorate opening and an assistant professorship, to nuture academic and program development. And the Marine Fisheries Genetics website, at http://marineresearch.oregonstate.edu/genetics, has been redone.

OSU Researchers Looking at 'Designer Oysters' Bred to Consumer Tastes

07-27-06, Media Release

NEWPORT, Ore. – Oregon State University researchers think they can selectively breed oysters that will boast deeper shells and more uniform color – traits they believe will fetch a premium price in Oregon's growing half-shell oyster market.

In an era when a single bluefish tuna sold in Tokyo in 2001 for a record $172,000, it pays to keep an eye on consumer trends.

It isn't likely that oysters will ever reach that level of demand, acknowledges Ford Evans, a research associate at OSU's Hatfield Marine Science Center. But that doesn't mean that consumers won't pay more for seafood products with traits they really prefer.

"In the last few years, more of the West Coast oyster producers are shifting to the half-shell market," Evans said. "Traditionally, the industry has focused on shucked oyster meat. But with more and more restaurants and seafood markets emphasizing oysters served on the half-shell – either raw or cooked on the barbecue – the growers are responding to the demand.

"We think we can take the oyster to the next level," Evans added.

With its Molluscan Broodstock Program at the Hatfield Marine Science Center, OSU has been a significant contributor to the growth of the West Coast oyster industry. OSU researchers began cultivating families of Pacific oysters from different parts of the West Coast in the 1990s, and selectively breeding them in cohorts. They have been able to increase the yield of oyster weight by 41 percent in just two generations over unselected oysters.

The OSU program shares its broodstock with growers throughout the West Coast.

"Breeding programs are a long-term proposition," Evans said. "Plants take eight or nine generations to develop a new strain, and corn just went through its 100th year of selective breeding targeting oil content. In some cases, it's simple. The pigmentation in Labrador retriever dogs, for example, is simply inherited, involves only one or two genes and can be done in a generation.

"Oyster yield and growth rate are traits that are polygenic, involving many genes," he added. "It has taken time to breed those traits. But we think we can selectively breed for shell depth and color – and color in particular appears to be a highly heritable trait."

Color is important for a variety of reasons, Evans says, pointing out that consumers use visual cues in selecting – and paying for – food.

"It isn't just the color of the shell that is important," Evans said. "It is the mantle. Northwest oyster growers have a difficult time selling Pacific oysters on the East Coast because the pigments tend to leak out when cooked and give a gray color to oyster stew."

Evans and Chris Langdon, the director of the Molluscan Broodstock Program, believe that selecting

for genetic traits is the key to producing a lighter, more uniform color in Pacific oysters. Genetics and the right growing environment will produce a deeper shell.

Just how much consumers are willing to pay for "designer oysters" is a question that needs to be answered, Evans said. The OSU researchers are seeking funding for a consumer study, as well as the work on the oysters.

"Oysters aren't for everyone," Evans said. "But there are people who love them and will pay for quality. How much they'll pay, and how much it costs to breed for those characteristics remains to be seen."

About OSU's Hatfield Marine Science Center: The center is a research and teaching facility located in Newport, Ore., on the Yaquina Bay estuary, about one mile from the open waters of the Pacific Ocean. It plays an integral role in programs of marine and estuarine research and instruction, as a laboratory serving resident scientists, as a base for far-ranging oceanographic studies and as a classroom for students.

[By Mark Floyd, OSU News & Communications Service. This article, or portions of it, has been reprinted in several newspapers around the region.]

Scientists Team with Fishermen and Use Genetics to Trace Origins of Ocean Chinook

08-02-06 Media Release

NEWPORT, Ore. – Oregon State University scientists are teaming with commercial fishermen on a new research effort to rapidly identify the home river basin of Chinook salmon found in the Pacific Ocean using genetic testing.

Their goal is to learn more about offshore schooling behavior and stock composition of salmon and ultimately to prevent coast-wide fishing closures. The closures aim to protect weak stocks like those of the Klamath River basin that may constrain an otherwise healthy fishery.

Funded by the Oregon Watershed Enhancement Board, and managed by the Oregon Salmon Commission, the pilot project is called the Cooperative Research for Oregon's Ocean Salmon, or CROOS. Already it is paying dividends.

During the June 4 opener, fishermen caught Chinook salmon off the Oregon coast between Newport and Florence and OSU scientists were able to positively match the DNA from the fins of 71 of the fish to establish their origin from river systems in California, Oregon, British Columbia and Alaska.

An ongoing project coordinated and funded by the National Oceanic and Atmospheric Administration involving 10 labs from California to Alaska – including OSU's Hatfield Marine Science Center in Newport – has identified unique genetic profiles for 110 different salmon populations based on their home river basin. Scientists and resource managers previously were unable to identify stock composition of both wild and hatchery fish originating from the Pacific Northwest, Canada and Alaska.

Project leaders say that this new technology allows scientists to assess the origin of an individual fish with remarkable accuracy.

"This was the key for us to utilize the technology," said Michael Banks, an OSU geneticist and director of the Cooperative Institute for Marine Resources Studies, a joint Oregon State-NOAA research collaborative. "Having a bank of DNA profiles allows us to approach 'real-time' identification of fish. What used to take months, or even years, we've been able to pare down to about 48 hours."

During the June field testing, participating fishermen caught Chinook salmon off the Oregon coast between Newport and Florence and collected a fin-clip from each fish for DNA analysis. OSU scientists were able to match genetic profiles of fish from river systems as far south as Battle Creek in California, and from as far north as the Babine River in Alaska.

Traditional efforts to identify the origin of ocean-caught salmon came from coded wire tags inserted into the snouts of a small percentage of hatchery fish. Those tags were useful for determining broad-scale distributions of stocks caught in fisheries, but revealed only the origin of select tagged fish. The time and location of these tagged fish also have been too general – reported by week and catch area.

The coded wire tag data weren't usually available until several months after the season ends.

Using DNA testing, however, will allow the scientists to rapidly assess the origin of any Chinook salmon caught off the West Coast – not just coded wire-tagged hatchery fish – and identify with about 95 percent accuracy its home river system. In theory, researchers say, they could test several salmon in schools from different locations to see what percentage of them originate from a weak run.

"This could lead to the introduction of some degree of in-season harvest management," said Gil Sylvia, an OSU economist and superintendent of the Coastal Oregon Marine Experiment Station. "Having accurate information could lead to reducing access to some stocks in certain areas at certain times. But it is just as likely that it could result in decisions to open areas of the coast where higher concentrations of harvestable fish populations are."

The researchers will compare their genetic assessment with coded wire-tagged fish to test the efficacy of the project.

Many of Oregon's commercial fishermen, who have been shut down from pursuing their livelihood this summer, say they are excited by the research.

"I started fishing in 1970 and this is the most optimistic I've been about any kind of research relating to salmon," said Paul Merz, who fishes out of Charleston. "I'm still a cynic when it comes to management decisions. But this is the science that has been missing in all of the policy arguments – and it's something where you can see the immediate results."

Jeff Feldner, a fisherman from Logsden, Ore., said that seasons are designed to minimize the impact on the weakest runs.

"The problem," he pointed out, "is that we haven't known enough about the fish that are out there. Using information gathered over the summer to help predict where the fish will be next year doesn't help the fishermen. We haven't had a way of knowing in 'real time' where the fish are and where they've come from. Now we do."

Scientists Team with Fishermen, continued

The Oregon Watershed Enhancement Board has funded this pilot study for one year with a $586,391 grant, which will allow 50 Oregon commercial vessels to make a total of 200 fishing trips, and allow the scientists to run 2,000 DNA samples. As many as 90 vessel owners have expressed an interest in participating.

"We need additional funding to continue the research," said Nancy Fitzpatrick, lead administrator of Project CROOS and an employee of the Oregon Salmon Commission. "One year just begins to give you information, but it isn't enough to determine all you need to know about salmon. Fish have fins, as they say, and they tend to move from one location to another.

"Where you find them one year isn't necessarily where you'll find them the next."

Fitzpatrick says any changes in how the oceans are managed for salmon would come from the Pacific Fishery Management Council, a regional council with members from Oregon, Washington, Idaho and California, that recommends fishery management measures to the National Marine Fisheries Service.

The OSU researchers are keeping track of the salmon through an onboard electronic traceability system developed by the university over the past several years. This innovative barcode system allows commercial fishermen to log the location, date and time of the capture, as well as onboard handling techniques, for every fish captured. Each fish harvested by a participant receives a metal tag with a unique number and bar-code. A website under construction will eventually allow a consumer to access basic information about the salmon: where and when it was harvested, by whom, and from which river it originated.

Eventually, such a tool may play a major role in marketing, according to Michael Morrissey, director of the OSU Seafood Laboratory in Astoria, and a principal investigator in the CROOS project.

"By identifying the river system through genetics, and being able to accurately label a fish as 'wild,' the potential exists for fishermen to brand their product and increase the value to consumers," Morrissey said. "One such example is Copper River salmon, which often command twice the market price of similar fish, because of the attributes attached to it."

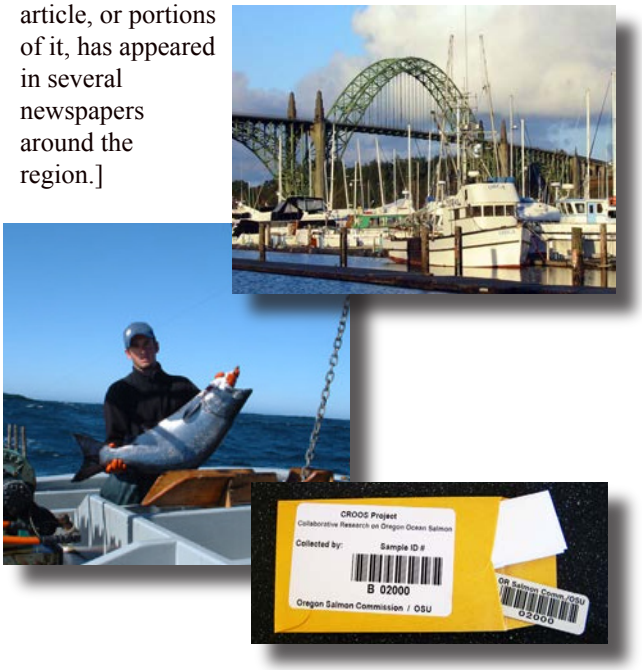
As part of the study, local salmon processors and buyers are returning some of the heads from the specially marked fish to the OSU Hatfield Marine Science Center, where scientists will conduct tests on their otoliths. Otoliths are crystalline structures located in the inner ear and act like growth rings in trees, recording not only age, but chemical elements that provide clues to the environment in which the fish lived.

Some of the fish stomachs will be retained by participating fishermen and given to scientists to reveal clues about the salmon's diet, including how the proportion of baitfish consumed might vary by season and between areas. The fishermen involved in the project will contribute data on oceanographic conditions where the fish were caught, including depth and temperature. Some of the fishermen participating in the project say they are fascinated by the science and hope it will help them locate fish more effectively, as well as keep the season opened.

"Every year, it seems like the challenges for commercial fishermen keep getting worse with restricted limits followed by complete closures," Merz said. "A lot of fishermen have packed it in. But this project gives me some hope. If it works the way it seems like it can, and if management is adjusted accordingly – and that's a big if – then it might be enough to keep me going. If not, I'll be looking for a new line of work and get on with my life."

More information on this project is available at www.projectCROOS.com

[By Mark Floyd, OSU News & Communications Service. This article, or portions of it, has appeared in several newspapers around the region.]



Marine Fisheries Management & Policy — Susan Hanna

Susan's work in this time period covered a number of areas: fishery management tools, ocean science advice, stock recovery and ecosystem management, fishery management education, fishing communities, and investment in social science research.

In the area of fishery management tools, Susan gave an invited presentation in October at the Political Economy Forum "Evolving Approaches to Managing Marine Recreational Fisheries," sponsored by Environmental Defense and the Property and Environment Research Center, Montana State University.

The presentation is "Evolution of Property Rights: Lessons of Process and Potential for Pacific Northwest Recreational Fisheries."

In her ocean science advisory work, Susan was appointed to two new committees: the Scientific and Technical Advisory Committee (STAC) of the Oregon Ocean Policy Advisory Council (OPAC), and the Science Advisory Committee of the Joint Ocean Commission Initiative (JOCI), which is the combined implementation effort of the US Commission on Ocean Policy and the Pew Ocean Commission. She continued to chair the Independent Experts Panel (IEP) for the development of the trawl individual quota program of the Pacific Fishery Management Council, although this committee has had very light engagement in an advisory capacity. Once the analytical documents are completed for Council consideration the IEP will provide review and comment. On an ad hoc basis, Susan provided technical advice to the Oregon Department of Fish and Wildlife on the applicability of market-based management tools in the sardine fishery. She finished her last term on the NOAA Science Advisory Board in July.

In the area of stock recovery and ecosystem management, Susan is working with Gil Sylvia, Mike Dickerson, Patty Burke and Ralph Brown on developing a concept plan for an Oregon Nearshore Fisheries Institute. She is also serving on the steering committee of the Oregon Sea Grant conference "Pathways to Resilience: Preserving Pacific Salmon in a Changing World," to be held in Portland in April 2007. Graduate student Branka Turcin is nearing completion of her Sea Grant funded dissertation "Predicting the Spatial Behavior of Fishermen in the Oregon Groundfish Fishery: Application to Fishery Management." She will probably defend this winter.

In the area of fishery management education, Susan is working with Chris Dewees, U.C. Davis, to develop a Sea Grant extension education program on fishery management tools and policy. The idea for this originated in the request from the Port of Astoria for information on individual transferable quotas, a subsequent seminar given by Hanna, and ensuing discussions with Jay Rasmussen and Chris about the broader educational needs on fishery management. Susan has developed a number of fishery management "one-pagers" describing the range of fishery management tools and their properties.

In the area of communities and fisheries, Susan organized and chaired the special session: "Community Fishing Rights and Economics" at the July 2006 conference of the International Institute of Fisheries Economics and Trade (IIFET), Portsmouth, U.K. As part of that session she gave a presentation: "Integrating Fishing Communities into Fishery Management: The Influential Economics of Organization," describing structural mechanisms for community management approaches. She continued writing the book manuscript Sustaining Fishing Communities in an Environment of Change. The book is targeted at fishery managers and highlights research and outreach conducted under the Sea Grant "Adapting to Change" project, summarizing the "so what?" of social science and fisheries management. Susan also has a manuscript in development on community fisheries management for the UNESCO-EOLSS Encyclopedia of Life Support Systems.

In the area of social science research investment, Susan gave a presentation "Social Science Needs for Oregon's Ocean" at the October 2006 Oregon Ocean Conference, the "Heceta Head Conference," in Florence, outlining unmet social science research needs for existing and emerging uses of Oregon's coastal ocean. Also pertaining to social science research, Susan was appointed Chair of the NOAA Science Advisory Board Social Science Working Group (SSWG), a committee of external social scientists evaluating the investment and integration of social science research within NOAA.

Seafood Microbiology & Safety — Yi-Cheng Su

In July 2006, an unexpected outbreak of Vibrio parahaemolyticus infections associated with raw oyster consumption occurred in the Pacific Northwest. More than 150 consumers, including at least 103 Washington and 14 Oregon residents, were sickened by V. parahaemolyticus after eating raw oysters harvested from the Puget Sound in Washington. This unexpected outbreak caused forbidden sale of most oysters from the Hood Canal and the South Puget Sound for raw consumption and triggered a recall of raw oysters in 23 States. Oyster farms in both Oregon and Washington were hammered by this surprise with loss of million dollars in sale.

Dr. Yi-Cheng Su at the OSU Seafood Laboratory continued to conduct research to identify effective means for reducing vibrios in raw oyster for safe consumption. He studied potential application of electrolyzed oxidizing (EO) water depuration as a post-harvest process to reduce V. parahaemolyticus contamination in raw oysters and found that a depuration process with EO water at room temperature could reduce 90% of V. parahaemolyticus and V. vulnificus in oysters in 6 to 8 hours. This finding was recently published in the Journal of Food Protection. More research is being conducted by Dr. Su and his graduate student, Min Jung Chae from South Korea, to investigate low temperature (5-15°C) depuration for reducing V. parahaemolyticus in oysters. Preliminary results showed that depuration of oysters in artificial seawater at low temperatures significantly decreased V. parahaemolyticus populations in oysters. Further studies will be conducted to identify an optimal low-temperature depuration procedure for reducing V. parahaemolyticus in oysters.

In addition to post-harvest processes, Dr. Su also looked into wine consumption as a potential natural means to inactivate V. parahaemolyticus in oysters. He completed studies of bactericidal effects of wines against V. parahaemolyticus in oysters and found that both red and white wines were more effective in inactivating V. parahaemolyticus in oyster meat homogenate than in whole oyster. Populations of V. parahaemolyticus in oyster meat homogenate (7,800 MPN/g) decreased rapidly to non-detectable level (<3 MPN/g) after 30 min of mixing with wine at 25°C. This finding suggests that chewing oysters before swallowing might result in greater inactivation of V. parahaemolyticus if wine is consumed with raw oysters. These results were published in the August's issue of Journal of Food Protection. More studies will be conducted to determine the bactericidal effects of wine against V. parahaemolyticus in the complicate stomach environment.

Other than Vibrio research, Dr. Su and his M.S. student, Sureerat Phuvasate from Thailand, are working on development of electrolyzed oxidizing (EO) water process as a post-harvest means for inactivating histamine-producing bacteria in fish and reduce scombroid poisoning associated with seafood consumption. Initial studies have demonstrated that EO water was very effective in inactivating histamine-producing bacteria. Populations of histamine-producing bacteria, including Enterobacter aerogenes, Enterobacter cloacae, Proteus hauseri, Proteus vulgaris, Klebsiella pneumoniae, and Morganella morganii, all decreased quickly in EO water by greater than 6.0 log CFU/ml within 60 seconds. Experiments are being conducted to determine the effectiveness of EO water on reducing histamine-producing bacteria on processing surfaces and in fish samples.

Advisory Board Meeting - February 13, 2007

The next Advisory Board meeting will be held on Tuesday, February 13, 2007, 10:00-4:00 pm, in the Guin Library, at the Hatfield Marine Science Center. For more information, contact us at 541 867-0230.

The draft Agenda is:

10:00 Call to Order

10:15 Information Updates

To include: Briskey Award, Marine Mammal Institute, Strategic Fisheries Summaries, OSU/ College Budget, OIC-CSI Proposal, CROOS Project, Highlights, Other Items

11:00 Future of Astoria Laboratory and Relation with the Food Innovation Center

12:45 Working Lunch

1:00 Proposal for an Oregon Institute for Pacific Nearshore Fisheries

2:30 COMES Future Staffing

4:00 Wrap-up, final issues, time/location of next meeting, adjournment

OSU Graduate Helping Out as a Legislative Fellow

01-24-07 Media Release

CORVALLIS, Ore. - How does knowledge matter in politics? Oregon Sea Grant's new legislative fellow, Ephraim Temple, is in the process of finding out.

Throughout the 2007 Oregon legislative session, Temple, who recently completed an Oregon State University graduate degree in fisheries and wildlife (with a minor in marine resource management), is offering technical expertise on marine and coastal issues to legislators. He works specifically with the bipartisan Coastal Caucus.

At the same time, he's learning about the legislative process and is developing the skills to work with various levels of Oregon government and with private and state resource organizations. Temple is hosted by Rep. Deborah Boone of Cannon Beach, chair of the Coastal Caucus.

While Temple's master's degree has equipped him with the latest academic perspectives on coastal issues, he also brings real-world experience from living in Hawaii, Tonga, Australia, and California, as well as Oregon since 2004. He's worked on coastal policy issues, knows his way around a conversation with both fishermen and resource managers, but the legislature is something new.

When the fellowship is over at the end of this session, Temple will produce a scholarly report to the sponsoring organization, Sea Grant, analyzing the progress and final outcome of marine and coastal issues dealt with during the session.

Oregon Sea Grant, based at OSU, has been supporting the legislative fellowship since 1987.

[By Joseph Cone, Asssistant Director, Oregon Sea Grant]

A Closer Look: Scott Baker and Markus Horning

Excerpt from a Media Release by Mark Floyd, OSU News & Communications Service.

For the past 13 years, Baker has been at the University of Auckland in New Zealand, following stints at Victoria University in Wellington and the University of Hawaii. He gained international attention in 1994 when he published the results of the first molecular monitoring of whale meat markets in Japan, providing direct evidence for the exploitation of protected species of whales.

During the next 10 years, he continued monitoring markets in Korea and Japan, documenting the unregulated sale of products from humpback, Asian or western gray, fin, sei, Bryde's and sperm whales. His investigation into the whale meat markets led to the development of a web-based program for molecular taxonomy and from that comprehensive database, a new species of beaked whales – Mesoplodon perrini – was discovered.

It was the first mammalian species recognized primarily from genetic characteristics and the first new species of cetacean identified in 15 years.

Baker began his career studying wild bottlenose dolphins in Florida's Sarasota Bay, then conducted research into the social organization and population structure of humpback whales in the waters off Alaska, California, Hawaii and Mexico.

Horning already is busy establishing the Pinniped Ecology Applied Research Laboratory, or PEARL, within the Marine Mammal Program at OSU. His specialty is the ecology and biology of pinnipeds, especially seals and sea lions. He brings with him nearly $1 million in grants from the National Science Foundation in projects that look at aging and adaptation of Weddell seals and three-dimensional tracking of pinnipeds in remote locations.

Horning also is part of a major project called the Steller Sea Lion Research Initiative. Funded by NOAA, the long-term project will use special "life history transmitters" to study endangered Steller sea lions. These newly designed tags will stay within the body cavity of the sea lions throughout their life span, and record a variety of data, then float to the surface of the ocean after the animal has died. A radio signal, beamed via satellite, will alert Horning, who will retrieve the data.

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