PRINCE WILLIAM SOUND SCIENCE CENTER

the Breakwater

Fall 2012 *A publication of the Prince William Sound Science Center*

History of Science Center facility development

by RJ Kopchak

In April of 1989 the Cordova City Council designated City Manager Don Moore and Vice Mayor RJ Kopchak to represent city interests in creating a research institute. The Prince William Sound Science Center was incorporated two weeks later.

Soon after, research scientists and community leaders looked for a location to serve as an institutional home that could grow over time. The current harbor location was chosen because seawater access could be developed to support wet labs needed for long-term research.

By 1992 concepts to expand into a new facility included a community auditorium and interpretive center. In support of the concept, the Cordova City Council proposed that the community develop a multipurpose science, education and cultural center to support Science Center growth. Lack of funding

A derelict icehouse was the original home of the Science Center in 1989

meant a slow development schedule, but by early 1995 the science research lab and office needs were defined and conceptual drawings were circulating throughout town.

Recognizing the economic impacts that expanded research programs would have on the year round economy, the City Council designated the area

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President's Corner

by Katrina Hoffman

The past few months have been incredibly dynamic for PWSSC—change has manifested itself in many ways since our spring edition of the *Breakwater*. June zipped by in boisterous fashion as our incredible supporters made sure that Copper River Nouveau was the most successful fundraiser in the history of our organization. That support—from volunteers to major donors—confirms the value of our bioregional research and education initiatives and allows us to maintain high impact programs. Thank you!

Seasons change rapidly around Cordova; a rainy summer quickly turned into a cold and snowy fall.

In July, thanks to the dedication of Dr. Michele Buckhorn, Dr. Tom Kline, Dr. Eric Knudsen, RJ Kopchak, Tory O'Connell and many others, PWSSC successfully received a multi-year, multi-million dollar contract from the Alaska Department of Fish and Game to conduct research on the interactions between hatchery and wild salmon stocks in Prince William Sound and Southeast Alaska. We are pleased to announce a new partnership with the Sitka Sound Science Center to carry out this research program. Together, our field crews will intensively sample over 60 streams and hundreds of ocean sampling sites to generate the data desired by the state.

Watching the salmon field crews leap into action

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within a month of receiving the ADF&G contract was impressive. The Prince William Sound stream team safely surveyed salmon habitat while enduring a deluge that makes the phrase "coastal rainforest" seem like an understatement. Over 50 inches of rain accumulated during the month of September; our field crew's passion for their work was palpable when they returned from the research cruise in high spirits and eager to accomplish more. Summer 2013 will herald a multi-month sampling effort; you can learn about the project in Dr. Buckhorn's article in this newsletter.

As Autumn arrived, we were thrilled to experience another positive change when we were awarded a Tier 1 grant from the Rasmuson Foundation. This grant has empowered our efforts to upgrade our laboratory research and safety facilities. Our proposal was truly a team effort, with many staff contributing input. Research Assistant Caitlin McKinstry has shepherded this project along, making sure that fabrication and implementation of the improvements are progressing on schedule.

Meacham accepts AFS award.

We have recently bid adieu to some wonderful staff members while welcoming others aboard. I invite you to get familiar with those changes through the staff updates in this newsletter. Something that has not changed: the high caliber research and education programs that our staff implement every day.

Speaking of high caliber, in October I attended a meeting of the American Fisheries Society (AFS) in Kodiak. I was pleased to witness the Alaska chapter acknowledge PWSSC board member Chuck Meacham with the Wally Noerenberg Award for Fishery Excellence, the highest honor they bestow on individuals who have made great and outstanding contributions to Alaska fisheries. Please join me in extending hearty congratulations to Chuck.

Herring Research Programs

by Scott Pegau, Ph.D.

Herring research continues to be an important component of research at the Prince William Sound Science Center (PWSSC.) We are currently in the synthesis phase of the PWS Herring Survey Program and beginning research associated with the Herring Research and Monitoring Program. Both programs are funded by the *Exxon Valdez* Oil Spill Trustee Council.

The last of the field work associated with the Herring Survey Program was completed in September. This program included ten projects that examined the issues that may be preventing recovery and identifying juvenile rearing bays. The program included investigators from PWSSC, NOAA, USGS, USFW, Flying Fish Inc., and the University of South Alabama.

The focus of the program was on the overwintering survival during the herring's first year of life. This period has been identified as one of the largest mortality events during the herring's life. We examined the oceanographic conditions, food availability, prevalence of disease, the impact of predation, and the change in body condition through the winter. We also conducted aerial and acoustic surveys to identify where and how many juvenile fish exist. Fishermen associated with Cordova District Fishermen United provided assistance with collection of fish around Prince William Sound.

We are now examining all the pieces of information collected to improve our knowledge about factors that influence survival during the critical overwintering period. Look for reports on the findings coming out in April of 2013.

A new five-year Herring Research and Monitoring program began this year with a possible series of extensions that could allow the program to continue

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in some form for the next twenty years. This program builds off the previous research and is designed to improve our predictive modeling of herring populations. This will be achieved through a combination of monitoring projects that track changes in population factors over time and focused research projects that address assumptions in the existing population model or are needed to determine if new modeling approaches can provide a better understanding of herring populations.

There are still large gaps in our understanding of factors that influence herring populations. Through these herring research efforts, we intend to provide better tools and information for fisheries managers.

Scott Pegau throws a cast net during the March survey.

Wild and Hatchery Salmon Interactions Study

by Michele Buckhorn, Ph.D.

The Prince William Sound Science Center (PWSSC) has been awarded a major contract by the Alaska Department of Fish and Game (ADFG) for a 4-year study entitled "Interactions of Wild and Hatchery Pink and Chum Salmon in Prince William Sound and Southeast Alaska." The overarching questions that need to be addressed for the State of Alaska are:

(1) What is the extent and annual variability in straying of hatchery pink salmon in Prince William Sound (PWS) and chum salmon in PWS and Southeast Alaska (SEAK)?

Taking samples from spawned out salmon in SE Alaska.

(2) What is the impact on fitness (productivity) of wild pink and chum salmon stocks due to straying of hatchery pinks and chum salmon?

The PWSSC has been contracted primarily to collect the large amount of field data to support scientific analyses and answer these questions. The study was designed by a Science Panel (organized by ADFG) consisting of experts on salmon biology and management, genetics, hatchery issues, and experimental statistics.

Preliminary field work began in September 2012 with stream sampling and mapping in southeast Alaska and Prince William Sound. The ocean test fishery has also started in Prince William Sound. The majority of the project will begin in Spring 2013.

Results from this study will help ADFG salmon managers make informed decisions about hatchery and wild salmon management.

Setting the gillnet in Hinchinbrook Entrance in Prince William Sound during a test fishery.

***Facilities**, continued from page 1*

around the Science Center as a "Special Economic Development Zone" for science and education. The area was reserved to fulfill the needs of the Science Center to expand its facilities. The City of Cordova and the Prince William Sound Science Center continued requests for Exxon Oil Spill Trust funding for facility development.

$900,000 in facility renovations have allowed the Science Center to remain in its original location

Funding for development of the project continued to challenge both the City of Cordova and the Science Center. To get a comprehensive development plan completed, the City and the Science Center agreed to collaboratively develop what was being called the "Cordova Center." In addition to the significant planning funds expended to date, the Science Center provided $19,000 to support the partnership. The comprehensive planning process, conducted by Rise Alaska, resulted in a conceptual design for a 32,750 sq ft facility; 22,250 sq ft for a city library, museum and conference center and 10,500 sq ft for the Science Center research offices and laboratory.

It took another two years to get the project development underway. In 2000, the Science Center and City of Cordova co-sponsored a $200,000 US-EDA grant for Cordova Center planning and development. The City of Cordova identified the current science center location as the best site for the development, and the partnership continued to seek funding for the Cordova Center to serve both community and science.

In 2002, in an attempt to get funding for breakwater improvements that would develop the site for a new facility, the Science Center and City of Cordova proposed to add sheet pile and fill the area around the Science Center. The city submitted a federal funding proposal for the Harbor Improvement Plan.

From 2002 to 2005 the Cordova Center project evolved. Through a series of public meetings, the community decided to build the Cordova Center on Main Street, keeping the library and museum close to Mt. Eccles Elementary school. The location was intended to strengthen the business center of Cordova and provide a walking transportation link between the center of the community and the harbor. As a result of the public process, the Cordova Center project diverged from the original proposal to include the Science Center and replaced the space with city hall administrative offices.

PWSSC would still benefit from the Cordova Center through the addition of classroom space for delivery of Science Center education programs as well as conference and meeting space for research symposiums. The community recognized the need to develop Science Center facilities at the site that had been originally agreed upon in order to maintain seawater access.

Conceptual drawing of the new Science Center facility - east elevation

It was obvious that a new Science Center facility would have to wait until the Cordova Center project was well underway. The Science Center agreed that this strategy would prevent confusion among funding agencies as to our community priorities for facilities development. Collaboratively, the City and the Science Center continued to lobby on behalf of the Cordova Center project with the *Exxon Valdez* Oil Spill Trustee Council (EVOSTC.) The Cordova

Center project was necessary for the community and the proposed auditorium and meeting spaces would benefit both the community and Science Center. Eventually the City, Science Center, community, and fishing industry communications with Trustees were successful. In May 2008, the EVOSTC committed $7 million for construction of the Cordova Center.

Phase I (the exterior) of the Cordova Center is now complete. Science Center staff continue to work with the City on private foundation funding strategies to complete the interior of the building. In addition to supporting the Cordova Center project, the Science Center is pursuing new facility development around its current location. Multiple concepts for facility development have been presented to both the Cordova Planning and Zoning Commission and City Council.

In 2010, the City of Cordova received funding for breakwater improvements. The approved design did not include fill, so in 2011 the Science Center again partnered with the City of Cordova and paid for engineering and design work to expand the breakwater project to create an upland area that would provide part of the land needed for Science Center facility development.

The fill project is scheduled for completion in November 2012. The Science Center is poised to begin a capital campaign for new facility development. The first step is to acquire title to the land from the City of Cordova. Then the work to develop funding for new facilities can begin.

Conceptual drawing of the new Science Center facility - south elevation

Oil Spill Recovery Institute joins partnership to evaluate Arctic oil spill response

by Scott Pegau, Ph.D.

The Oil Spill Recovery Institute (OSRI) joined forces with the Arctic Research Commission, the American Petroleum Institute, the Bureau of Ocean Energy Management, and the Marine Mammal Commission to fund the National Research Council (NRC) within the National Academy of Sciences to conduct an evaluation of the ability to respond to oil spills in Arctic environments. The NRC is in the process of identifying members of an ad hoc committee with expertise in oil spill response and recovery, physical oceanography, Arctic ecology and natural resources, marine engineering, maritime transportation, and maritime safety and risk assessment. Membership in the committee will be sought from universities, government laboratories, industry and nongovernmental organizations.

The committee will develop a report examining the existing decision tools and approaches that use a variety of spill response technologies under the conditions and spill scenarios encountered at high latitudes. This report will also review the state of research activities, identify opportunities and constraints for advancing oil spill research, describe promising new concepts and technologies for improving the response, recommend strategies to advance research, and fill information gaps.

OSRI anticipates that this effort will provide a useful guide for planning future research priorities, similar to the 2001 "Advancing Oil Spill Response in Ice Covered Waters" that OSRI sponsored. That report can be found at:

http://www.pws-osri.org/publications/reports.shtml

An Alaska Clean Sea spill response vessel operating in light ice in Prudhoe Bay.

Discovery Room is back in session at Mt. Eccles Elementary School

by Marita Kleissler and Megan Milligan

In September we returned to the classroom teaching monthly science lessons. Supported by a grant from the North Pacific Research Board, the fourth grade students will learn water monitoring techniques. The fifth graders will study our ocean through a grant from the *Exxon Valdez* Oil Spill Trustee Council: Herring Monitoring and Research Program. The Prince William Sound Regional Citizens' Advisory Council and Oil Spill Recovery Institute support our sixth grade study of oil and ocean technology. Each session begins with a focus question, that guides the students to learn through lectures, labs, dance and games.

September focus questions:

Fourth Grade: What equipment do scientists use to monitor changes in the water?

Students in Mrs. Davis' class learned how to use various tools to monitor changes in our freshwater. After using a Niskin bottle to collect water, students tested the water for turbidity, dissolved oxygen, pH, phosphates and nitrates. With their new-found skills, students were excited to head out to Eyak Lake in October to test the water.

Students collecting water at Eyak Lake

Fifth Grade: What do scientists monitor to observe changes in the ocean?

Ms. Roemhildt's and Mrs. Lane's students were excited to start the Discovery Room again and remembered many of last year's topics such as weather, data from Eyak Lake, turbidity, salmon life cycles, photosynthesis, and glaciers. They learned how to use tools to monitor different qualities of the ocean such as temperature, dissolved oxygen, pH, nitrate, phosphate, iron and ammonia.

Sixth Grade: How can we explore the ocean and why is it important?

In Mr. Bednarz's class, students have Discovery Room twice a month. In this year's first meeting, they learned about water properties: density, pressure and buoyancy. To demonstrate pressure, a heated can was placed in cold water, causing the can to implode. In the second meeting, students learned about different kinds of ocean technology such as diving bells and

Students pouring different liquids into a cylinder.

remotely operated vehicles. Students conducted experiments to learn about the density of different substances by layering corn syrup, water, rubbing alcohol and vegetable oil in a cylinder. By using convection tubes to explore density, they learned that saltwater is denser than fresh and hot water is denser than cold. Why do we need to know this? It is important for us to know how the circulation of nutrients and oxygen in our oceans affect productivity.

Cordova Ocean Science Festival a Big Hit!

by Allen Marquette for PWSSC

On September 15, over 200 science enthusiasts attended the PWSSC's Ocean Science Festival. Half the attendees were school age children who explored and discovered the world of ocean science through the exhibits. Highlights of the event included a presentation by Dr. Richard Lee of the Skidaway Institute of Oceanography in Savannah, Georgia, on oil dispersants use during large oil spills. There were also many other hands-on activities to explore ocean sciences in both the school gym and several classrooms.

PWSSC researchers and educators presented hands-on demonstrations, fun activities, and informative displays including Autonomous Underwater Vehicles, mini Remotely Operated Vehicles, and a station where budding scientists could build their own plankton to float in a tank of water. Tables highlighting the physical properties of water, including adhesion and cohesion, were also very popular.

Scott Pegau shows off the AUV to a group of curious onlookers at Ocean Fest.

Katrina Hoffman, CEO and President of the PWSSC shared information about the Long Term Monitoring Program called "Gulf Watch Alaska." The project is funded by the *Exxon Valdez* Oil Spill Trustee Council (EVOSTC) and is a five-year, $12 million monitoring program. The Science Center involvement includes looking at the Gulf of Alaska region affected by the 1989 oil spill.

Folks from the Regional Citizens' Advisory Council were on hand to talk about the Shore Zone Mapping Project by NOAA. Shore Zone coastal mapping data is used for oil spill contingency planning, conservation planning, habitat research, site development evaluation, and recreational opportunities. The Alaska Ocean Observing System (AOOS) demonstrated how anyone can pull up the web-cameras and weather data from over 3,000 sensing stations throughout Alaska to determine up-to-date temperature, wind speed, direction, and live images of what the area looks like.

Attendees watched short videos on plankton adaptations, the life cycle of salmon, whale/long-line fishing interactions, and saw how scientists use acoustic sonar to measure and track fish populations like herring.

Funding for the Cordova Ocean Science Festival was provided in part by the Prince William Sound Science Center, the Regional Citizens' Advisory Council, the Oil Spill Recovery Institute, Alaska Ocean Observing System and the EVOSTC.

Visitors to the Ocean Science Festival observe live plankton under microscopes.

Analytical Instrumentation Upgrades in the Laboratory

by Rob Campbell, Ph.D.

PWSSC recently received an Agilent model 7100 capillary electrophoresis system. Capillary electrophoresis (CE) is a technique that separates ions and other charged molecules by applying a high voltage across an extremely narrow glass capillary tube (generally 50 to 100 microns wide – about the width of a human hair). Our particular system has also been fitted with an aftermarket contactless conductivity sensor manufactured by Innovative Sensor Technologies Inc., which allows for detections at extremely low concentrations – in the parts per billion and parts per trillion range.

This system will be used to measure nutrients in seawater samples collected during surveys in Prince William Sound and the coastal Gulf of Alaska, as part of the *Exxon Valdez* Oil Spill Trustee Council's Long Term Monitoring efforts in the region (aka Gulf Watch Alaska). Nutrients are important to monitor because they become limiting to plankton production by early summer; monitoring the amount of nutrients used up tells us something about how much production occurred.

Charlayna and Agilent technician Chris Kline set up the CE system in the PWSSC lab.

Up until now, we have measured nutrients by hand with traditional wet-chemical methods. This CE system is a considerable upgrade requiring much less effort, as well as being faster, more flexible, and more cost-effective.

Technician Charlayna Cammarata has been hard at work setting up the system and developing nutrient analysis methods. Once Charlayna completes testing and validation of the nutrient analysis protocols, she will begin working through the backlog of samples collected during the 2012 field season.

The Prince William Sound Science Center recently purchased a new reel and a mid-water trawl for the long-term juvenile herring monitoring program being sponsored by the *Exxon Valdez* Oil Spill Trustee Council. The new trawl will be used to confirm the species and length frequency of targets observed during hydroacoustic surveys for juvenile herring. Herring samples collected will also be used for ongoing studies of juvenile herring body condition and disease.

Staff and Board Updates

We extend a huge thank you to the following staff who departed PWSSC after years of hard work and dedication. Good luck in your new endeavors!

Shelley Grant, Bookkeeper, 2003 - 2012
Bobby Hsu, Avian Ecologist, 2011-2012
Jenn Todd, Field Biologist & Lab Technician, 2009-2012
Jordan Watson, Fisheries Research Assistant, 2011-2012

New Staff, from left to right:

Megan Hess, Field Biologist and Lab Technician, joined our staff in June after completing her B.S. in Marine Science and Geology (with honors) at the University of Hawaii, Hilo. Megan is originally from northern Idaho.

Megan McKinzie, Fisheries Research Assistant, joined us in May after completing her M.S. in Biology at California State University--Long Beach with Dr. Chris Lowe.

Megan Milligan, Americorp Member, serves in our Education Department. Originally from southern New Mexico, Megan previously taught experiential and science education programs in Juneau.

Kelly Sarnowski, Bookkeeper, joined PWSSC in September. Originally from Western NY, she has a B.S. in Accounting from Canisius College and moved to Cordova with her family in 2010 through the US Coast Guard.

Charlayna Cammarata, Research Technician, is a recent graduate of Alaska Pacific University. Prior to arriving at PWSSC she was using genetics to survey for paralytic shellfish poisoning as an intern at the NOAA Kasitsna Bay Lab.

Allie Russo, Executive Assistant, arrived in August from Maryland, although she spent most of 2012 living in Tanzania working for Frontier/Society for Environmental Exploration as the Assistant Research Officer.

Not pictured:

Jessica Stocking joined PWSSC in October after completing her M.S. is Biology at North Carolina State University with Dr. T.R. Simons. She has extensive bird research experience.

New Board Member

Douglas Causey, Ph.D., joins our board. He is a professor of Biological Sciences at the University of Alaska--Anchorage. Dr. Causey is an expert in avian disease ecology and has held positions at many institutions during his distinguished career, including serving as a program director at the National Science Foundation, a professor at the University of Kansas, and a senior fellow at Harvard University.

Did you know....

…the Prince William Sound Science Center

...has 25 year-round staff on payroll and is one of the top wintertime employers in Cordova?

...has seven staff members on the Cordova Volunteer Fire Department, including one volunteer medic (Penny Oswalt, EMT 2)?

--has seven children of staff in Cordova public schools, with three more soon to enroll?

...has employed over 170 people since 1990, of which 55 currently live in Cordova?

The Prince William Sound Science Center would like to thank all of our sponsors, donors and volunteers for making this year's Copper River Nouveau the most successful yet! On the night of June 9, 2012, your support generated a net profit of $79,000! All proceeds support our education and research programs.

In particular, we would like to ackowledge the folks who made a donation during our Raise the Paddle portion of the night.

$10,000

Anonymous match made in memory of local fisherman Sean Johnson

$2,500

John Garner

$1,000

Jim Harvey, Mary K. Hughes and Andrew Eker, RJ and Barclay Kopchak, Bert Stammerjohan

$500

Alyeska Pipeline Service Co., Thomas and Sheila Barrett, John and Toni Bocci, Cordova Wireless Communications, Kent and Jenny Dawson, Hatch Associates Consultants, Inc., Katrina Hoffman, Jim Kacsh, Jim and Patti Kallander, Mike Mahoney, Chuck Meacham, Galen Meyer, Sen. Lisa Murkowski and Verne Martell, Charlie and Kathleen Nalen, Caryn Rea, Rep. Bill Thomas, Todd Telesz, Trident Seafoods

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Allison Bidlack and Rich Brenner, Brennan and Rebecca Cain, Michael Clutter, Bill and Diane Cobb, Kate Dugan, Clay and Lila Koplin, Dixon and Cathy Sherman, Lt. Gov. Mead Treadwell

$100

Becky Andersen, Eric Knudsen, Natalie Lowman, Brock Taylor

$50

Haisman Photography, Monika Reghetti

$25

Buck Meloy

Photos by Haisman Photography

A special thank you to all our supporters who donated a portion of their 2012 Permanent Fund Dividend to the Science Center. We raised a total of $1175.

Mary Anne Bishop, Janet Clarke, Jessica Daniels, Signe Fritsch, Shelley Grant, Steve Moffitt, Penny Oswalt, Lauren Padawer, Joy Rawlins, Steffan Scribner, Cathy Sherman, Lisa Sparrell, James Thorne, Lt. Gov. Mead Treadwell, Lisa Von Bargen, plus eight anonymous donors.

Your support is making a difference in the quality of our research and education programs.

Pick. Click. Give.

The Science Center is eligible to receive donations through the 2013 Pick.Click.Give. Program. When you file for your PFD between January 1 and March 31, consider making a donation to support our work. Once you have made your pledge, please take the extra step to provide your contact information so we can acknowledge and recognize your generous support! By making a donation, you will be enrolled in our annual membership program starting in late October 2013, when names are released to us.

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Three ways to pay:

1. Mail this form, along with a check to: PWS Science Center, PO Box 705, Cordova, AK 99574
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All memberships include the Basic Package: a Science Center decal, a subscription to our *Breakwater* newsletter, 10% off all merchandise in our gift shop, plus other special mailings!

	Rates	Premiums
Copepod	up to $50	basic package
Razor Clam	$50-$99	basic package and a mug
Halibut	$100-$249	basic package, mug and a $1 coupon for our gift shop
Bald Eagle	$250-$499	basic package, mug and a $3 coupon for our gift shop
King Crab	$500-$999	basic package, mug and a $5 coupon for our gift shop
Brown Bear	$1,000-$4,999	basic package, mug and a $15 coupon for our gift shop
Humpback	$5,000-$9,999	basic package, mug and a $50 coupon for our gift shop
Northern Lights	$10,000+	basic package, mug and a $75 coupon for our gift shop

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ATTENTION: This will be our final printed version of the *Breakwater* newsletter.

Starting in 2013, we will issue quarterly e-newsletters. To ensure uninterupted service, please email:

sfritsch@pwssc.org to sign up for the e-version of the *Breakwater*.

Happy Holidays

from all of us at the

Prince William Sound Science Center!

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