

# *the Breakwater*

Fall 2011

300 Breakwater Avenue  
PO Box 705 Cordova, AK 99574

## Hydroacoustic surveying

Adult herring spawn in late-April/early-May and lay their eggs on vegetation along the shorelines of Prince William Sound. After a short incubation period the herring hatch and in their tiny larval stage (less than 2 cm in length) they are swept around the Sound by the currents and eventually transported to protected bays and fjords where they will spend the first 1-2 years of their lives. By August, they are approximately 2 months old and have grown to 4-5 cm in length. For the second year in a row the Science Center conducted summer hydroacoustic surveys in the eastern portion of Prince William Sound to look for these juvenile herring. Aboard the survey cruise on the research vessel, *Auklet*, were Dick Thorne, Michele Buckhorn, Bobby Hsu, James Thorne and Capt. Dave Janka.

The purpose of the hydroacoustic surveys is to find where these extremely young juvenile herring are in the nursery bays, how many there are, and to test out a transducer that can be towed at the water's surface. Typical surveys for larger juveniles and adults use a transducer that is lowered about 1.5 meters below the water surface.

We suspect these 2 month old herring may be hanging out closer to the surface than their older cohorts, so we wanted to compare the surface transects to the subsurface (1.5 meters) transects. The surveys were conducted in three bays historically known to be juvenile herring nursery bays: Simpson Bay, Sheep Bay and Windy Bay. During the hydroacoustic transects, Bobby surveyed birds and monitored their foraging behavior in relation to herring abundance for Research Ecologist Mary Anne Bishop; she is investigating seabird predation on juvenile herring.



Over 100 age-0 (2 month old) herring caught in one castnet throw in Cordova Harbor.  
Photo by Dave Janka.

One other activity that occurs along with the surveys is the deployment of a gillnet to capture the fish we are seeing on the hydroacoustic monitor.  
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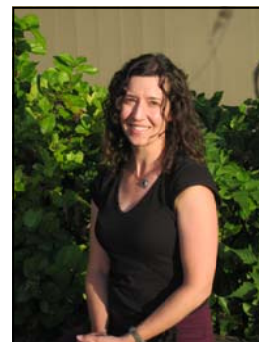


Picking fish out of the gillnet the morning after a 9-hour deployment.  
Photo by James Thorne.

## Hoffman appointed President and Executive Director

The Prince William Sound Science Center is pleased to announce the appointment of Katrina Hoffman as President and C.E.O. effective Dec. 1, 2011. Hoffman will also serve as the Executive Director for the PWS Oil Spill Recovery Institute. She replaces Nancy Bird who resigned to pursue other interests in Cordova and spend more time with her family.

Hoffman earned a Master's degree in Marine Policy at the University of Washington and most recently worked for Washington Sea Grant on Puget Sound and West Coast shoreline management issues. She is an experienced science teacher and has also worked as a researcher at the Monterey Bay Aquarium Research Institute and the University of California at Berkeley.



For the past two years, Hoffman served as Chairperson of the Sustainable Coastal Communities Action Coordination Team for the West Coast Governors' Agreement on Ocean Health. She facilitated discussions among representatives with very diverse interests. Their work resulted in a policy action plan for the three states of Washington, Oregon and California to jointly focus on economic development, sustainable aquaculture and fisheries, non-consumptive tourism and recreation, and ports and clean marinas.

"I'm excited to be joining the PWSSC and OSRI," said Hoffman. "I'm interested in the connections between scientific research, ecosystems, and community priorities. A key feature of that is establishing partnerships and securing funding that enables researchers to investigate compelling issues and develop technologies that creatively solve problems and ultimately benefit both ecological sustainability and human enterprises."

"I am looking forward to facilitating the research and education programs at the institutes. The diversity of the education programs alone are impressive and have great value in Cordova and beyond."

Established in Cordova in 1989, the PWS Science Center works to promote a sustainable future for the world's richest waters. Science Center research programs focus on the oceanography, fisheries and wildlife of Prince William Sound and the Copper River Delta. Education programs serve a diverse audience of school-age children to adults in the Prince William Sound region.  
*Cont'd on page 11.*

## Detecting spills under ice

by W. Scott Pegau, Ph.D.

With the increasing interest in oil exploration and development in the ice covered seas of the arctic, it has become important to improve our abilities to recover oil in those waters. The first issue will be in the detection and tracking of spilled oil. The standard approach is to fly over the spill region and visually look for the presence of oil on the water. With ice present the oil is likely to be encapsulated in the ice or trapped under it and thus undetectable based on the traditional approaches.

This summer OSRI started funding a technology evaluation program aimed at technologies to detect oil from autonomous underwater vehicles that would fly below the ice. The concept being that it may be easier to find the oil from below because the system won't have to penetrate through snow and a large portion of the ice to reach the oil. The cost of autonomous underwater vehicles and remotely operated vehicles has now come down to the point where it is economically feasible to use a large number of these assets to map the underside of the ice for oil. The important thing is to have sensors that can be deployed on these vehicles that can detect the oil from a distance of a few meters.

The work is being conducted by investigators at the Woods Hole Oceanographic Institute and the Scottish Association of Marine Sciences. They plan to test the ability of acoustic and optical systems to detect oil under ice using a test tank at the Cold Regions Research and Engineering Laboratory in Hanover, NH. Testing is scheduled for the spring of 2013 and we hope to be able to use the results to guide future detection and tracking efforts.

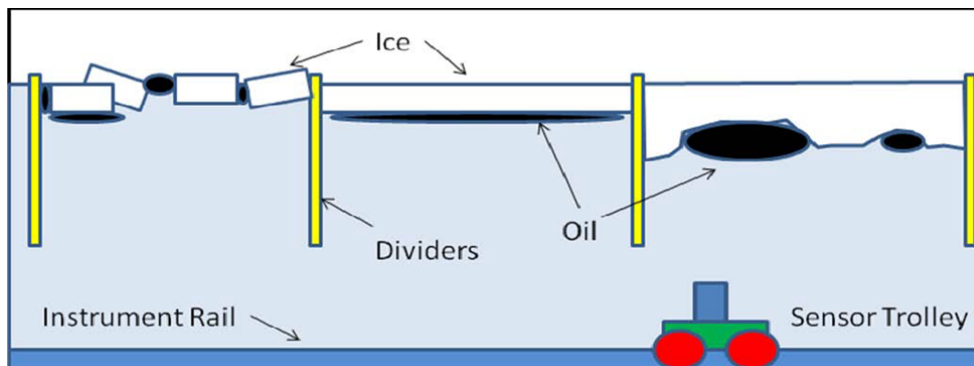


Figure. Shown is a schematic of the planned testing scenarios for use in evaluating underwater sensor capabilities to detect oil.

## OSRI outreach effort

Locally, OSRI conducted an outreach effort to inform the fishing fleet about OSRI and the work it does. It also looked to gain insight from the fishermen on ways to reduce small spill and keep the Cordova Harbor cleaner. To achieve these goals we worked with many partners in Cordova to develop a fact sheet about OSRI and ways to dispose of oily waste and attached the sheet to a bilge boom as a gift for people responding to our question about keeping the harbor cleaner. This summer an intern walked the docks between fishing openers to talk to fishermen and distribute the bilge booms. The most common request for helping keep the harbor clean was to get an antifreeze disposal location near the harbor. This was followed by deploying small absorbent cleaning materials along the dock to allow people to clean up small spills on their own.

Another outreach effort is the development of an OSRI blog which can be found on the home page of the OSRI website or at [new.pws-osri.org/](http://new.pws-osri.org/). We intend the blog to be used to provide news and announcements about funding opportunities. We also expect it will be used to discuss projects OSRI is funding and basic information about spill response.

For more information about current and past projects, visit [www.pws-osri.org](http://www.pws-osri.org). OSRI's annual report can be found at [www.pws-osri.org/publications/reports.shtml](http://www.pws-osri.org/publications/reports.shtml).



Bilge Pillow



## Support abundant at Copper River Nouveau dinner & auction by Signe Fritsch

Copper River Nouveau 2011 was a great success. We raised a net profit of \$60,000 through corporate sponsorships, tickets sales, auction revenues, and the education paddle pledge. Thank you to all our sponsors, donors and attendees!

This year we honored Steve Moffitt with the Fisheries Achievement Award. He received recognition for his dedication to the understanding of the herring and salmon populations in Prince William Sound.

Be sure to mark your calendars for next year's event scheduled for Saturday June 9, 2012.



Senator Lisa Murkowski presents the Fisheries Achievement Award to Steve Moffitt of ADF&G.

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### PADDLE PLEDGE FOR EDUCATION



\$2,500.00	Joe & Belen Cook
\$1,000.00	RJ & Barclay Kopchak
\$1,000.00	Meera Kohler
\$1,000.00	Cordova Telephone Cooperative
\$500.00	Jim & Patti Kallander
\$500.00	Chuck Meacham
\$500.00	Joe Bundrant
\$500.00	Howard & Jean Baumann
\$500.00	Andrew Smallwood
\$250.00	Jeff & Molly Welker
\$250.00	Sen. Lisa Murkowski & Verne Martell
\$250.00	Riki Lebman & Dave Mesiar
\$250.00	Caryn Rea
\$250.00	John Garner

Thank you to all the generous supporters of our Education Program during our annual fundraiser.



Their contribution is vital to our success in providing our hands-on, award winning education programs. For our youth, we provide K-12 programs during and after school, underwater robotics, science summer camps for children, and adventure based oceanography and watershed education programs for young adults. Our "Field Notes" radio programming and science lecture series serve all ages. In 2010 we began developing computer-based science education tools for Alaska's teachers and home school families called Headwaters to Ocean, or H<sub>2</sub>O.

## Hydroacoustic surveying *by Michele Buckhorn, Ph.D. cont'd from page 1*



Juvenile fish caught in the net. The herring are most likely 1-year olds based upon their size. Photo by Michele Buckhorn.

This provides validation of the acoustic data and provides samples to the energetics and disease projects that are coordinated with the acoustic surveys. We set out a 120' variable mesh gillnet (alternating 20' panels of 1/4" and 3/8" mesh size—much smaller mesh than a commercial gillnet) after we've completed the transects and leave it to fish overnight.

During the day, herring tend to stay close to the bottom but at night they move to the surface and closer inshore which gives us a better chance of catching them. The net is retrieved in the morning and the catch is carefully picked out and placed in ziplock bags to be frozen for transport back to the Science Center. Unfortunately, while these mesh sizes are suitable for catching larger juveniles (8-10 cm in length) during our November and March cruises, these 2 month old fish may have been too small or don't swim fast enough to be snagged in it. Our catches consisted mostly of 1 year old herring.

The day after our return our Captain, Dave Janka, was seeing the 2 month old juvenile herring in the harbor and we were able to catch these using a cast net. The next hydroacoustic survey will be conducted in November and we'll be able to see how many have survived since August and how much they've grown before they enter the harsh overwinter period.

The experimental surface transducer being towed between the Auklet and the Zodiac. Photo by Dave Janka.



## Inspiring expeditions *by Kara Johnson*

The **Wetlands Ecology Media Expedition** engaged students from Alaska, Vermont, Louisiana, and Alabama in an active exploration of wetland communities on the Copper River Delta. Participants collected video footage and compiled movies about their experiences studying the delta. These movies can be viewed on the Chugach Children's Forest YouTube channel at: <http://www.youtube.com/user/ChugachChildForest#p/u/9/whLH8UzbE8U>. This expedition is part of the Chugach Children's Forest initiative, and is run in partnership by Alaska Geographic, the U.S. Forest Service and the PWSSC.

*Continued on page 8*

Aviva Hirsch, Alex Naquin and Lindsey Kleuber pose in a hole in the vegetation where they removed shrubs and moss that was replanted on a USFS nest island on the Copper River Delta. The students spent 5 days of their 10 day trip stationed at the USFS's Pete Dahl research camp. They traveled around the delta on foot and by canoe, poke boat and air boat.



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- As Alaskans begin to think about their Permanent Fund
- Dividend payments for next year, so does the Prince William
- Sound Science Center, a 501 (c) (3) non profit. Our
- organization can now receive donations of dividends thru the
- **Pick.Click.Give.** Program. When you go online to annually
- apply for your dividend between January 1st -March 31<sup>st</sup>, you
- will see the option called **"The Gift of Giving."** Once you've
- made your pledge, please take the extra step to provide your
- contact information to us, so we can acknowledge and
- recognize your generous support. If you have questions,
- please feel free to call us at 907-424-5800 x 221.



## Plant growth in Gulf limited by iron availability *by Caitlin McKinstry, M.S.*

In the Gulf of Alaska, single-celled plants called phytoplankton comprise the base of the food web. Just like terrestrial plants, microscopic phytoplankton photosynthesize, grow, and supply food to their respective predators. Marine animals such as zooplankton feed on phytoplankton and are in turn eaten by herring, salmon, other various fishes, whales, and seabirds. Also just like terrestrial plants, phytoplankton need nutrients to grow. Nitrate, phosphate, silicate, and iron are all important nutrients required by these tiny plants. Near the coast, such productivity is generally controlled by the availability of nitrate. However, in the open Gulf, phytoplankton growth is limited by the availability of iron.



November 2006 NASA satellite image of dust blown offshore into the Gulf of Alaska near Middleton Island.

There are many different ways nutrients are deposited into the Gulf each year from land. During the spring snow/ice thaw, nutrients and minerals are washed off the mountains that ring the northern Gulf. This nutrient rich runoff enters the Gulf all along its periphery with Copper River being the largest single point source. Additionally, wind storms during autumn and winter transport iron-rich dust offshore into the Gulf.

The amount and frequency of glacier related nutrient influx into the Gulf of Alaska is likely to change in response to regional climate changes. As glaciers melt and recede due to increasing global temperatures, the amount of nutrients deposited into the Gulf of Alaska will also change: the amount of iron-containing glacial dust will initially increase, followed by colonizing plants (many of which are “nitrogen fixers” that pull nitrogen from the air to make their own nitrate) who will help bind up the dust into the soil. To investigate this, Dr. Rob Campbell of the PWS Science Center has partnered with Drs. John Crusius and Andrew Schroth from the United States Geological Survey (USGS). Together, they are currently monitoring nutrient inputs into the Gulf of Alaska during the spring and summer months.

For the past two years, monthly oceanographic cruises during the spring and summer were carried out onboard the F/V Montague and M/V New Wave to collect water samples for nutrient analyses. At five stations, spaced from the Copper River plume to 80 miles offshore, samples for nitrate, phosphate, silicate, iron, and chlorophyll (a proxy for phytoplankton abundance) were collected at several depths. Preliminary data from 2010 suggested an influx of nitrate and silicate in the spring (April) that corresponded to an increase in chlorophyll throughout the area. These nutrients and chlorophyll were not observed in such high quantities later and seemed to dissipate throughout the rest of the sampling period.

In August 2011, a Partisol particulate sampler was installed on Middleton Island (a small island located 70 miles offshore at the edge of the continental shelf). This sampler will collect the dust blown offshore by autumn wind storms, and the samples will be analyzed for their iron content, how well (and quickly) iron dissolves from the dust, and what kinds of iron is present (there are different “species” of iron, some more useful to phytoplankton than others). These data combined with the nutrient analyses will help us understand this dynamic ocean system as well as help us predict how climate change may affect the marine organisms that make this area one of the most productive on the planet.

The Partisol particulate sampler installed on Middleton Island to collect dust for iron content analyses. Photo courtesy of R. Campbell.



## Dissolving iron and its effects on biodiversity *by Allen Marquette*

The Gulf of Alaska holds one of the richest ecosystems in the world. Scientists have been studying the various components of this unique ecosystem for years trying to understand how both the physical and biological components may affect each other. Dr. John Crusius, a Research Geochemist, and Dr. Andrew Schroth a Research Geologist both with the USGS Coastal Marine Geology program located in Woods Hole, Massachusetts, are conducting research as part of a long term study in the Gulf of Alaska to better understand what controls biological productivity and possibly resident fish populations.

In spring and summer, melting glaciers discharge large amounts of fresh water along with glacial flour sediments into the rivers and ocean. In the fall and winter when glacier melting slows down, river levels recede and fine sediments and glacial flour are exposed on land surfaces. When winds occur during low water levels along the Copper River Delta, they pick up the exposed fine glacial flour and blow it several miles out onto the Gulf of Alaska, releasing large amounts of iron and nutrients onto the ocean surface.

The Gulf of Alaska is typically an “iron limited” region of the ocean where phytoplankton productivity is limited by iron, a micronutrient which affects phytoplankton growth, the base of the food web. Glacier melt might also perturb the ecosystem in the Gulf of Alaska in a number of ways that researchers do not yet fully understand. Glacier melting may be increasing the amount of iron delivered as glacial flour in rivers or in dust storms.

Researchers are also studying the Copper River Plume, a large area in the Gulf of Alaska that is fed by the mighty Copper River. As fine glacial silt and sediments are carried into the Gulf of Alaska by the Copper River, dissolved iron and other micro-nutrients feed the phytoplankton blooms that occur there. Detecting minute amounts of iron in seawater is tricky when oceanographers have to collect water samples from a ship made predominately of iron. Contamination is always a major consideration when sampling seawater for iron, especially when sampling for just a few parts per trillion!

Because of these factors, an elaborate system was developed to consistently collect and sample seawater on board ship while avoiding contamination. The first step of the process required collecting water samples from prescribed depths at various stations in the Gulf of Alaska.

Plastic sampling devices called Niskin bottles were attached in series to a line and lowered to specific depths by a winch. Several water samples were collected at the same time using this method.

A separate sample of seawater was removed from each Niskin bottle and processed on board by Caitlin McKinstry, a Biological Technician for the Prince William Sound Science Center. Each water sample was forced through a filter to collect biological material where it would later be analyzed by Dr. Rob Campbell at the Science Center's lab in Cordova. The preserved samples collected by Drs. Crusius and Schroth were transported back to their lab at Woods Hole, where the samples were further processed.



Processing samples of seawater onboard, biological technician Caitlin McKinstry.

Dr. Crusius states “We seek to understand these changes, and to begin to understand how this might affect not only the base of the food chain but also upper trophic levels, including fish.” The Copper River is the single largest freshwater source to the Gulf of Alaska and the site of several important fisheries. The research and fieldwork being done in this part of the Gulf of Alaska is just scratching the surface in understanding the processes of melting glaciers and climate change.

Funding for this research was provided by the United States Geological Survey's National Climate Change and Wildlife Science Center, the Coastal Marine Geology Program and the National Aeronautics and Space Administration.

*Allen Marquette, Community Education Coordinator for over 6 years, may be reached at [allen@pwssc.org](mailto:allen@pwssc.org) or by calling 907-429-4444.*



## Caspian Terns breeding on the Copper River Delta: *by Mary Anne Bishop, Ph.D.*



*Caspian Tern arriving at the Copper River Delta colony with a Pacific herring. Photo by Adam Peck-Richardson, Oregon State University.*

Take a walk along Cordova's Hartney Bay in August and you will usually hear and see a loud and raucous gray and white bird with a black capped head and bright red bill calling over the water while it searches and plunge dives for fish. Meet the Caspian Tern – a relatively new species to Alaska.

Along the Pacific coast, the Caspian Tern breeding population has more than doubled since the 1980's. They first appeared in Prince William Sound in 1983. Despite numerous attempts to locate Caspian tern nests, it was not until June 2005 that local fishers first discovered a breeding colony on Kokinhenik Bar, a barrier island at the mouth of the Copper River.

The Prince William Sound Science Center and Oregon State University began monitoring the Copper River Delta colony in 2008. Every June and again in July we make a 1 or 2 day trip to document the colony size and nesting chronology. Over the past four seasons the number of nests has fluctuated between 180 and 243. We have also searched for birds previously banded at other colonies and observed four terns from the Columbia River's East Sand Island colony and one tern from a San Francisco Bay colony.

We predict that in the near future, the Copper River colony will continue to grow as a result of intensive management practices being used to displace birds at Oregon's East Sand Island, the largest colony in North America. On a longer time scale, effects of climate change such as an increase in storm activity and flooding as well as a rise in sea level may negatively impact the suitability of Kokinhenik Bar as a colony site.

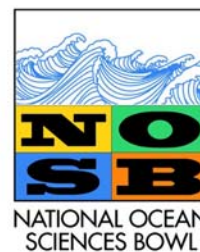
## Building two teams *by Kara Johnson*

PWSSC Education staff is coaching two teams for the National Ocean Sciences Bowl regional competition (Tsunami Bowl) to be held in Seward the first weekend in March 2012. We will have a mock contest during the Cordova Iceworm Festival at the beginning of February. This is an excellent opportunity for our teams to get real-life practice as well as bolster community support for them.

The Inglorious Dawgsharks (James Allen, Ben Americus, Keegan Crowley, Sophia Myers, Adam Zamudio) bring together veteran NOSBowlers who are anxious to build on their past successes and possibly take the title this year; they will be presenting a paper on the importance of including cold water corals to ecosystem-based management of Aleutian fisheries.

The Urchin Queens (Gabrielle Brown, Sarah Hoepfner, Lindsay Hammer, Robin Pegau) are all brand new to NOSB and are dedicated to learning more about oceanography despite their very busy schedules. Both teams are committed to expanding their knowledge and competing with peers at such an exciting event.

Our teams pay their own way to the Tsunami Bowl and will be doing quite a bit of fundraising in the next couple of months. We will have a concessions stand at the Cordova PTA carnival November 12 as well as at the Alaska Ocean Film Festival December 3. Like last year, Harborside Pizza has generously agreed to sponsor the team and allow us to sell pizza coupons. Talk to any of the NOSBowlers to get your coupons today. They make great stocking stuffers!!!



## Full steam ahead with the Discovery Room *by Kara Johnson*



Kate Alexander of CRWP and Cordova third graders Skyping with their sister classroom in Kenny Lake to share weather data.

### Inspiring expeditions *cont'd from page 4*

PWSSC educator Erica Thompson joined the **Prince William Sound Expedition** as a guest presenter to teach lessons on Pacific Herring to the junior high students participating in the boat-based exploration of the sound. This expedition is part of the Chugach Children's Forest initiative, and is run in partnership by Alaska Geographic and the U.S. Forest Service. PWSSC was able to deliver herring-based programming with support from the Exxon Valdez Oil Spill Trustee Council.

Erica Thompson leads students in a herring dissection aboard the M/V Babkin. Other topics covered included the life cycle of Pacific herring, the history of the herring fishery in Prince William Sound, and the integrated herring research program at PWSSC.



Nine teens from Alaska, California, Mississippi, Alabama and New York traveled to Cordova to be part of this year's **Ocean Science and Leadership Expedition**. The students spent 10 days learning concepts in oceanography and methods of oil spill response used in marine environments. The group traveled to Valdez where they hiked on Worthington Glacier, kayaked from Shoup Bay back to the Valdez harbor, and spent a day working through a mock oil spill scenario. The expedition was lead by the PWSSC with support from Pangaea Adventures, the PWS Regional Citizen's Advisory Council and the Mississippi-Alabama SeaGrant



Students pause at the mouth of Shoup Bay to watch seine boats fish for pink salmon in Valdez Arm before resuming their paddle to the Valdez harbor. One participant said of the course: "I would just like to tell you that the whole experience changed my life completely and you'll be happy to hear that I am planning on going into environmental law in college! Thank you so much for the entire trip! It was fantastic!"

The Discovery Room curriculum has been redesigned to be more comprehensive and better connect with current research conducted by PWSSC staff and partners.

Collaborating with the Copper River Watershed Project (CRWP), our 3rd grade class series focuses on weather and salmon biology and will continue the successful Skype sessions with the Kenny Lake 3rd grade class. The students are eager to talk to their watershed neighbors to compare weather reports and discuss similarities and differences they observe.

4th graders are learning about fresh-water monitoring of salmon habitat and climate change with Eyak Lake as their study site. Already we have seen differences in our two sites at Eyak Lake which have led to animated discussions with the students. They love being out in the field and using the scientific monitoring equipment. We are starting Skype-Pals this year with students in Valdez and Yakutat. This project also partners us with CRWP and the Prince William Soundkeepers.

In 5th grade we are studying oceanographic monitoring, climate change, and herring. Students conduct sea-water monitoring of Orca Inlet, learn about the biology of herring, and analyze how changing oceanographic conditions affect herring. This project provides a great opportunity for us to use data from our staff scientists directly in the classroom as well as partner with AK Department of Fish and Game (ADF&G).

Our 6th graders are discovering how we can use ocean technology to address oil spill responses. Students have a better understanding of water properties such as pressure, density, and buoyancy and their impact on the construction of underwater tools like Remotely Operated Vehicles (ROVs). The students are excited to build their own ROVs in the spring and conduct a mock oil spill response.

We are incredibly thrilled to work with CRWP, Cordova School District, ADF&G, and Orca Adventure Lodge to bring in a salmon tank which will be housed in the elementary school Mango Room. The tank will be populated with salmon eggs from Fleming spit and grades 3-6 will take turns caring for the fish. Students will share their observations with Skype-Pals in Kenny Lake, Valdez, and Yakutat who have their own salmon tanks. We will provide updates on our blog and in the next newsletter.



## It's a fish eat fish world *by Jordan Watson, M.S.*

For nearly two decades, Pacific herring populations in Prince William Sound have been suppressed. A team of Science Center researchers are examining a suite of potential factors that are perpetuating this problem, including predation by other fish (known as "piscivory"). As part of a multi-vessel field effort, we conducted two consecutive sets of November and March cruises (2009 – 2011). We used a combination of longlines and gillnets to capture piscivorous fishes in near-shore regions around the Sound where juvenile herring were observed during acoustic surveys.



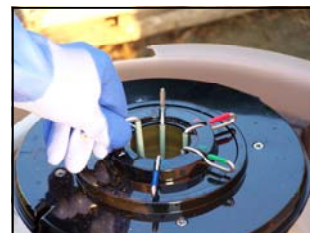
Skates (primarily big and longnose) are among the many potential predators of herring in Prince William Sound. Seventy skates have been caught during our four cruises and we look forward to analyzing the remaining stomachs to determine if more of them contain herring, like the one seen above. Unfortunately, many of the diet contents are not so easy to discern as these ones and the analysis is a time consuming one.

Forty-six species of potential herring predators were caught during our surveys; gadids (Pacific cod, walleye Pollock, saffron cod, Pacific tomcod) accounted for 53% of the 1,600 fish caught. Pacific cod in particular accounted for 28% (442 fish) of the total fishes caught. Early analyses (95 fish stomachs) have found Pacific herring in 18% of the Pacific cod stomachs examined to date (56 fish), accounting for as much as 16% of the weight of fish matter found in cod stomachs. Pacific cod are among the most abundant predators that share habitat with juvenile herring in Prince William Sound and they may account for significant amounts of herring consumed each year. We still have lots of fish stomachs to analyze however, and we are heading out once again in the upcoming November and March.

## Investigating diversity of avian influenza *by Mary Anne Bishop, Ph.D.*

Infectious diseases that can be transmitted or shared by animals and humans are known as zoonotics. Look them up and you quickly realize they create an alphabet soup: anthrax, brucellosis, cat scratch disease, and so on. One zoonotic that has been in the news lately is bird flu, or avian influenza. Birds can host many strains of influenza, but luckily only a few strains pose a risk to humans. Gulls, terns and shorebirds are vectors for influenza reassortment - that is they can develop new influenza strains by recombining genetic material.

Bird dropping samples are shipped in a special dry shipper that keeps them frozen for avian influenza analysis.



Since 2009, Dr. Mary Anne Bishop of PWSSC has been working with Dr. Jon Runstadler of the Massachusetts Institute of Technology to conduct a surveillance study of the shorebirds and gulls near the Copper River Delta. Their objectives are to examine the prevalence and diversity of influenza viruses. Sampling begins in mid to late April to coincide with spring migration and ends in early September when most gulls head south for the winter. Fresh gull and shorebird droppings are picked up on the nearby mudflats of Odiak Slough and Hartney Bay, as well as on the breakwater and city dock.

Droppings are preserved in a special viral transport media, frozen, and then sent in a special shipper to Dr. Runstadler's lab where they are screened for influenza. Initial results, published June 15 2011 in the online journal PLoS One, took six gull virus sequences obtained from samples collected in Cordova and analyzed them along with other gull virus sequences from the Americas and Eurasia.

They found that in the Americas there is a high frequency of reassortment in gull viruses. However, this intercontinental gene mixing is not found in viruses isolated from gulls in Eurasia. While not all reassortments lead to influenza that is highly contagious to humans, the tendency of gull viruses to reassort merits continued monitoring.

For more information see peer-reviewed science research article PLoS ONE 6(6): e20664 and/or contact Mary Anne Bishop, Research Ecologist, at [mbishop@pwssc.org](mailto:mbishop@pwssc.org) or 424-5800 x228.

## Ph.D.s present at American Fisheries Society *by Michele Buckhorn, Ph.D.*

An important aspect of conducting scientific research is sharing your work and results with other scientists and one way to do this is presenting at conferences. Conferences are also an opportunity to network and build future collaborations with scientists with similar interests but with a different area of expertise to build a more robust research project.

Three staff scientists from PWSSC, Dick Thorne, Tom Kline, and myself presented their herring research projects conducted in Prince William Sound at the American Fisheries Society 141<sup>st</sup> Annual Meeting held in Seattle, WA this September. One of the Science Center's illustrious Board Members and former President of the Western Division of AFS, Eric Knudsen, was the fundraising chair for this event. This year's meeting has been determined to be the largest fisheries meeting ever held to date. According to the organization's website ([afs2011.org/](http://afs2011.org/)): "Over 4,300 people from 32 countries attended the meeting, which featured over 400 posters and 600 oral presentations organized into 95 symposia that collectively addressed issues related to fisheries, habitats, and fisheries science."

What is not mentioned is the amazing range of career levels (undergraduates to retired professors), career types (academic, government, industry, etc.), and topics (marine, freshwater, toxicology, foodweb dynamics, etc.). It was quite the whirlwind week trying to attend all the talks of interest, running into former colleagues, and developing new contacts – plus, a bonus for this recent Cordova inhabitant, a week of sun!

The presentations were:

- Dick Thorne: "Prince William Sound Herring Assessment: A 19-Year Hydroacoustic Series" and "The Exxon Valdez Oil Spill and the Collapse of the Prince William Sound Herring Stock"
- Michele and Dick: "Evaluation of a Floating, Two-Vessel Towed Transducer System for Detection of Near-Surface Fishes (Poster)" and "Juvenile Herring Assessment in Prince William Sound"
- Tom Kline: "Estimating Overwinter Mortality of Age-0 Pacific Herring Based on Loss of Energy and Implications for Recruitment"



Photo courtesy of  
American Fisheries Society  
([www.flickr.com/photos/americanfisheriessociety/](http://www.flickr.com/photos/americanfisheriessociety/))



Michele interprets the poster  
for interested passersby.  
Photo by A. Dowling.

## Valdez kids & adults learning about science *by Kara Johnson*

A recent Discovery Outreach trip to Valdez allowed us to bring hands-on experiments about ocean technology and water properties to almost 100 5<sup>th</sup> and 6<sup>th</sup> graders at the Hermon Hutchens Elementary School.

Students performed experiments and learned how oil and water have different densities which affect how we clean up an oil spill. They also experimented with air pressure using different size soda pop cans which resulted in imploded cans much to the students delight and cheers.

Later that evening we presented at the 2<sup>nd</sup> Annual Science Night at the Valdez Civic Center. Visitors had the chance to explore a technology used in oil spill clean-up and ran Remotely Operated Vehicles (ROVs) to complete several challenges. Additionally, they investigated animal tracks of various animals and were able to make a plaster cast of their favorite animal track to take home with them.

In all, about 300 adults and kids came to the event to learn how much fun science can be through hands on exploration. We were also successful in signing up a number of Valdez community members to expand our email list in that area.



Students operate ROVS to  
complete different  
challenges during the 2<sup>nd</sup>  
Annual Science Night.

Pictured at right: Valdez 5<sup>th</sup>  
graders are fascinated by  
the effects of pressure as  
demonstrated by Allen  
Marquette.



## Staff highlights



**Jessica Lueders-Dumont** is a biological technician working for Dr. Rob Campbell's lab focusing on identification, age interpretation, and growth analysis of juvenile fishes in the Copper River Plume project. Jessica graduated from Colby College (Waterville, ME) with degrees in Biology and STS (Science, Technology, and Society). Since graduating, Jessica has worked on projects investigating climate change, nutrient cycling, and salmon biology in Idaho and Washington rivers. She has also worked in the Gulf of Maine as a research assistant on harmful algal bloom monitoring in Blue Hill Bay, and on juvenile cod nursery grounds on Cashes Ledge. Most recently, she completed a summer semester of graduate studies at the University of Iceland's marine research program. You may reach her at [jleuders-dumont@pwssc.org](mailto:jleuders-dumont@pwssc.org).



**Marita Kleissler** joins the education program as a specialist coordinating the Discovery Room programming. Marita received a BA in Dance with teacher certification in theater at Montclair State University and a MA in Dance Education from Teachers College, Columbia University. She lived and taught at The Rectory School in Pomfret, CT for the past twelve years and is excited to teach children science with the hopes of moving their science ideas. Recently, she attended an EARTH Workshop at the Kasitsna Bay Laboratory, Kachemak Bay, Alaska. You may reach her at 907-424-5800 x 238 or [mkleissler@pwssc.org](mailto:mkleissler@pwssc.org).



**Caitlin McKinstry, M.S.**, is a biological technician working with Dr. Rob Campbell. She received her B.S. and M.Sc. in marine biology from the University of North Carolina at Wilmington. Her Master's thesis focused on the energy and lipid content of zooplankton from the Bay of Fundy, Canada. Before joining the PWSSC, Caitlin worked extensively with researchers from the Grand Manan Whale and Seabird Research Station (Grand Manan, NB Canada) on various projects including at-sea pelagic bird captures, the harbor porpoise release program, and Atlantic herring conditional assessment. You may reach her at [cmckinstry@pwssc.org](mailto:cmckinstry@pwssc.org).



**Kara Johnson, M.Phil.**, joins our staff as the new Science Education Director. She received a BS in Oceanography and another in Conservation Biology from the University of Washington; she completed a Masters of Philosophy at College of the Atlantic focused on marine mammal ecology and marine education. She has extensive informal education experience working with groups of all ages and is excited to further develop the outreach programs at the Science Center. You may reach her at 907-424-5800 x237 or [kjohnson@pwssc.org](mailto:kjohnson@pwssc.org)

## Hoffman by Nancy Bird cont'd from page 1

Hoffman also holds a Bachelors of Arts from Oberlin College with a double major in Biology and Environmental Studies, and she earned teaching credentials from Chapman University. She says coastal environments have generated the most important formative experiences of both her personal and professional life.

"My respect for the ocean and understanding of its value has developed through so many experiences in my life—from childhood vacations spent exploring the shores of the Outer Banks of North Carolina, to studying marine biology on the Baltic Sea; from teaching marine science to thousands of students to conducting oceanography research in the equatorial Pacific. I have traveled to over thirty countries on six continents and can't think of a single place that took my breath away the way Prince William Sound did the first time I flew over it. I can't wait to get started."



## Upcoming Events

- **Pacific Marine Expo booth** hosted by PWSSC in Seattle November 17-19
- **Alaska Ocean Film Festival** in Mt Eccles Elem. Cordova Dec 3, 2011
- **Community Education Lectures** in Cordova weekly
- **Alaska Marine Science Symposium** in Anchorage, January 16-20, 2012
- **Alaska Forum on the Environment** in Anchorage, February 6-10, 2012
- **OSRI Advisory Board Meeting** in Anchorage February 10, 2012
- **Ocean Sciences** in Salt Lake, February 20-24, 2012
- **PWSSC Board Meeting** in Anchorage March 4, 2012
- **Copper River Nouveau** in Cordova June 9, 2012

*The PWS Science Center will be at the Pacific Marine Expo in Seattle—November 17-19, 2011*

**Join us!** Friday, November 18th at 11:00 for a presentation on our current Pacific Herring research and our Headwaters to Ocean (H<sub>2</sub>O) education efforts. Located in media room 1D01

Stop by **booth #125** to learn more about our research, monitoring, and education programs.



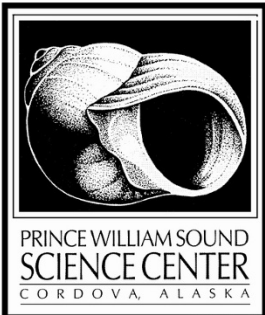
### **CenturyLink Field Event Center**

November 17-19, 2011

Thurs and Fri 10-5; Sat 10-3

Register in advance for free admission at [www.pacificmarineexpo.com](http://www.pacificmarineexpo.com)

Ocean Science & Leadership Expedition campers are seen here sporting Science Center hoodies that can be purchased from our gift shop. Stroll down the dock to peruse our selection of merchandise. New and renewing members of the Science Center receive a 10% discount on all purchases.



*Research and education promoting a sustainable future for the world's richest waters*

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