

Fall  
2007

# SOUTH SLOUGH News

The Newsletter of South Slough  
National Estuarine



Research  
Reserve  
and the  
Friends of  
South Slough  
Reserve, Inc.

Charleston, Oregon

## South Slough NERR Develops an Energy Management Plan

By John Bragg

Rising sea levels may affect people, wildlife and habitat, especially in an estuary, where a few inches of tidal elevation, gained or lost, can have drastic and wide-ranging effects. Human activity—most importantly the combustion of fossil fuels for energy—is changing the chemical composition of the atmosphere and the degree to which it traps and stores solar radiation as heat. Carbon dioxide and other greenhouse gasses that result from burning fossil fuels accumulate in the atmosphere, where they have been linked to the warming of Earth's climate. One of the consequences of global heating is an increase in sea levels.

Several factors can affect sea level, including the melting of continental ice sheets in Greenland and Antarctica. Also, the volume of water in the ocean can expand as the water becomes warmer. On the south-central Oregon coast, a long-term rise in sea level has been mostly offset by tectonic activity that is slowly lifting the edge of the continent at a pace nearly equal to that of the rising sea level. That could change if the rates of warming and sea level rise were to increase.

At the South Slough National Estuarine Research Reserve, a growing awareness of the consequences of global warming is changing the way the South Slough

Management Commission thinks about producing and using energy.

In 2006, the commission directed staff to evaluate how the reserve uses energy to operate buildings and facilities. This includes assessing the energy needs of the reserve's research and education programs, and quantifying alternative sources of energy, including solar radiation, wood fiber and methane extracted from coal deposits that underlie portions of the South Slough reserve.

Completing these tasks is the responsibility of Eva Gitzes, a graduate student from University of Texas at Austin (See New Staff, page 6). Gitzes will complete her work during a ten-week internship funded by a grant from Methane Energy Corp., an Oregon-based, wholly-owned subsidiary of Torrent Energy Corp., which is a Colorado-based company exploring and developing natural gas from the coal deposits.

The South Slough Reserve also received a grant from the National Oceanic and Atmospheric Association (NOAA) to upgrade energy sources for the interpretive center, the ECOS laboratory, the maintenance facility and the Spruce Ranch guest house, and to develop an energy management plan for future needs.

Gitzes presented an outline of the energy plan to the commission during its regular meeting in July.

Currently she is determining the availability of technical assistance and incentive programs, the status of state and federal energy legislation, and the feasibility of alternative energy management strategies, such as renewable energy purchasing options and energy audits.

In recent weeks Gitzes has been meeting with contractors who may bid on constructing or installing the energy improvements to the reserve's offices and laboratories.

"I'm also studying forest biomass and carbon sequestration methods currently being tried in the Pacific Northwest," she said.

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# RESEARCH AND STEWARDSHIP NEWS

## SLOUGH TEAM STUDIES OCEAN-ESTUARY CONNECTIONS

By Steve Rumrill

Twice each day, the flood and ebb cycle of the tides fills the channels and replenishes the waters of Coos Bay and the South Slough estuary. Nearly 40 percent of the waters of the South Slough are exchanged with each tide. Such a large exchange of water between bay and ocean twice each day ensures that the conditions in the South Slough strongly reflect water conditions that occur in the near shore Pacific Ocean, particularly in the spring and summer months, when the discharge of fresh water from streams and creeks is low.

For example, South Slough Reserve's system-wide monitoring program has often documented episodes of low concentrations of dissolved oxygen in the tidal channels. These conditions are known as hypoxia, and they are physiologically harmful to the marine and estuarine organisms that inhabit the tidal channels but are unable to move rapidly enough to avoid being stranded when the water turns hypoxic. Scientists are unsure about the cause of the hypoxia.

We asked: 'Are the hypoxic waters generated within the South Slough itself? Or do they occur due to the flooding of low dissolved oxygen waters that originate along the Oregon continental shelf?'

To better understand the physical and biological connections between the estuary and the ocean, our team of South Slough researchers and others recently completed an oceanographic survey aboard the

NOAA research vessel McArthur II.

The McArthur departed from Astoria at the mouth of the Columbia River on 15 May. For four days the team, which included graduate students from the Oregon Institute of Marine Biology as well as South Slough staff, collected water and plankton samples between Tillamook Head and the mouth of Coos Bay in an effort to characterize



*McArthur II: NOAA research vessel*

nearshore water conditions along the Oregon continental shelf. The cruise occurred prior to development of seasonal upwelling that occurs each summer off the Oregon coast, and prior to the development of hypoxic areas that have appeared annually off the Oregon coast for the past several years. These hypoxic areas were mostly unknown along the Oregon coast prior to 2002.

Upwelling is related to wind circulation. During summers, north winds force surface waters away from the shore, and that allows nutrient-rich waters that are the basis of food webs in the eastern Pacific to well up along shore in response. In recent years the upwelling cycle has also brought hypoxic waters to the surface along portions of the central Oregon coast. If there is insufficient dissolved oxygen in the upwelling water, the effects on marine creatures living close to shore can be detrimental.

We wanted to characterize pre-upwelling conditions seaward, from

the mouth of the Coos Bay estuary out to the continental shelf.

On the first leg of the cruise, we collected water samples from various depths at 12 reference stations located along the 300-meter depth contour between Tillamook Head and Cape Blanco. We collected the samples using a device known by its initials – CTD – which stand for conductivity, temperature and depth, three parameters that collectively tell scientists much about basic conditions in ocean waters. On this trip we added an extra sensor to the device to measure dissolved oxygen.

At each reference station, our crew 'cast' the CTD into the ocean, using a winch and cable that also provided an electronic data link between the probes on the device and the ship's computer.

The computer allowed our science team to monitor the CTD's

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# RESEARCH AND STEWARDSHIP NEWS

*NOAA Studies continued from page 2*  
descent in real time, noting on a computer screen depth locations where ocean conditions changed, as indicated by the CTD's sensors.

After the CTD reached the bottom, it was winched back to the surface. The researchers stopped the winch at the points where they earlier noted changes and collected water samples, including three from the surface, three from the bottom and three from each of two arbitrary points in between. Once the CTD was back on board, they retrieved the water samples for processing in the McArthur II's laboratory. They evaluated the samples' oxygen content, acidity, salinity, temperature and nutrient characteristics.

While the water samples were being processed, other team members collected samples of plankton. Each sample was identified and stored for later processing. The samples were collected using neuston nets, which trawl the surface waters, and sub-surface nets. The nets use an extremely fine mesh to collect zooplankton, the tiny microscopic organisms that drift freely with the ocean currents.

"At times, the waves were so big that it was difficult for us to pull in the nets," said Alicia Helms, a South Slough staff member. Helms kept a keen eye out for invertebrate larvae captured among the biological samples.

"You can imagine the importance of the wind, the waves, and the current in transporting the tiny zooplankton along the shelf and back to their adult habitat," she said.

"We thought that the waves were big, but just imagine how an organism less than a millimeter in

size might have to adapt to deal with Oregon's waves and currents."

On the second leg of the cruise, the science team collected additional water and nutrient samples at 12 more ocean stations located along a line from the mouth of the estuary seaward to a distance of 50 miles offshore. Their object was to explore how conditions found within the estuary extend out to sea.

We assembled a team including South Slough staff (Alicia Helms, Adam DeMarzo, Ben Grupe, Tim O'Higgins, Tom Elledge and John



*McArthur II: Science crew*

Bragg); the Oregon Department of State Lands (Derek Sowers), and graduate students Alix Laferriere, Juan Marin-Jarrin, Erin Cooper, Christina Geierman, Maya Wolf, and a high school student (Lester Rumrill) from Hidden Valley High School, Grants Pass.

The science team was divided into three groups that worked round the clock to deploy and retrieve the CTD meter, collect water samples from different depths, tow zooplankton nets through the surface and sub-surface waters, and analyze the samples in the laboratory.

Research cruises present a tremendous opportunity for the South Slough Reserve to gain a

better picture of the near shore and continental shelf waters that deliver nutrients, oxygen, zooplankton, and larval fish and invertebrates into Coos Bay, but the key to that is successfully competing for ship time, given all the other demands for oceanographic research. Our hats go off to NOAA for their continued recognition of the importance of the near shore ocean to ecological dynamics within Oregon's estuaries.

During the cruise, Tim O'Higgins of South Slough compiled data generated by the 24 CTD casts to demonstrate how water conditions varied from point to point and at various depths along the lines. South Slough posted the data on the hypoxia research section of the Oregon Coastal Ocean Observing System's data monitoring website, [www.OrCOOS.org](http://www.OrCOOS.org).

The cruise also presented an excellent training opportunity for graduate students who have interests in oceanography, regional ecosystem processes, and the broader characterization of Oregon's marine environment.

During a pre-dawn shift on the McArthur II's work deck, South Slough staff member Ben Grupe smiled as he peered into a jar of swimming crab larvae.

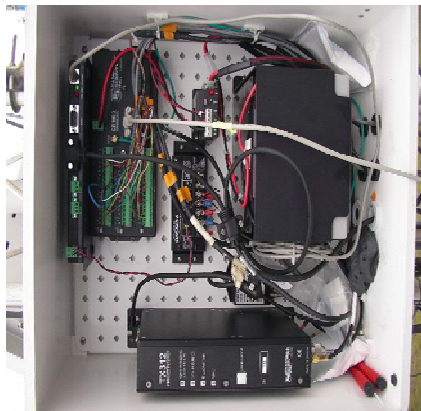
"Comparing daytime and nighttime plankton tows, I can really understand the dramatic role that vertical migration plays in marine food webs," Grupe said.

"There are a great number of free-swimming organisms, including copepods, shrimp, fish, and other creatures, that hang out in the deep water during the day. They only migrate to the surface at night, so it is after-hours when the ocean feels most alive."

## TROUBLESHOOTING TELEMETRY, A TRICK OF THE SWMP TRADE

By *Alicia Helms*

Bright and early on June 4, two telemetry experts arrived at the Estuarine and Coastal Science laboratory for a long overdue visit to help troubleshoot two water quality stations and a weather station that are critical components of South Slough's System Wide Monitoring Program (SWMP).



*Inside telemetry box*

Jay Poucher, telemetry project coordinator for the National Estuarine Research Reserve System, and Jeff Jefferson, information technology specialist, are based at the NERR Centralized Data Management Office at the University of South Carolina-Columbia, although they travel extensively to meet the telemetry needs of 27 research reserves located around the coasts.

The word telemetry is derived from the Greek roots “tele,” which means remote, and “metron,” meaning measure. For estuarine researchers, the old terms represent new technology that allows staff to gather data from remote areas automatically.

The specialists also helped install new telemetry equipment for two additional stations. Once these stations are up and running, the South Slough Reserve will be the first national estuarine research reserve with all four

of its water stations transmitting near real-time data—every 15 minutes.

Poucher's and Jefferson's accomplishments included diagnosing problems with a faulty antenna for one of the telemetry stations. It was corroded with aluminum oxidation. A fully functional antenna is vital because it transmits the data in real-time to a series of orbiting satellites.

Data from the water quality and weather stations are transmitted to a Geostationary Operational Environmental Satellite that remains fixed above the same spot on Earth. The satellite relays the data to the Wallops Island Command and Data Acquisition Facility in New Jersey, which in turn passes it to a local satellite for further distribution.

The direction and angle of the antenna are very important in order for the satellite to “hear” the antenna. It seems South Slough's antenna was barely whispering to the satellites.

After Poucher cleaned away the corrosion, checked the position of the satellite with a compass, and re-oriented the antenna, the problem was corrected and the satellite was hearing the antenna loud and clear.

The crew weatherproofed two of the reserve's water quality monitoring stations, one located at the Charleston Bridge and the other at Valino Island, as well as the weather station located on the University of Oregon's campus at the Oregon Institute of Marine Biology.

My focus during the week was troubleshooting the weather station.

The weather station includes a CR1000 data logger, a solar panel, a Yagi antenna, and a lightning rod. Several sensors, including a temperature/relative humidity sensor, a sensor to measure photosynthetically-active solar radiation, a rain gauge, and a wind speed-and-direction indicator, collect the weather data.

The tricky part to the sensors is that

each one has to be wired appropriately, and you can imagine how complicated it becomes when each sensor has from three to eight wires. Now imagine all of this equipment on a small platform at the top of a 30-foot tower.

It is exciting to put on a safety harness and climb the tower to troubleshoot and calibrate the weather station sensors. The view is spectacular! We were fortunate to have good weather for most of the week, although the first day we were working under tarps, as all of the equipment has to be weather- and water-proofed.

When all of the upgrades were complete, the weather station was connected to my laboratory computer network. Now I can pull up the current weather station data, near real-time, and show it off. This is a great application for visiting scientists and knowledge-thirsty students.

The data that is being generated is proving to be equally useful to local oyster growers, who depend on accurate assessments of water quality.

Oysters feed by filtering out whatever organic materials may be in the water. Accurate and current data help the shellfish growers identify potential problems with oyster health that can result from low oxygen, high temperatures and other factors.

Telemetry updates at national estuarine research reserves in Alaska and Washington are making it possible for shellfish growers throughout the region to share information, using a web site jointly sponsored by the NERRS and the Northwest Association of Networked Ocean Observing Systems (NANOOS) [www.nanoos.org](http://www.nanoos.org).

The website is designed so that the growers can gain near real-time access to several important water quality parameters including tide height, temperature, salinity, dissolved oxygen, turbidity, and pH.

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*Telemetry continued from page 4*

Funding for the telemetry upgrades was provided by NOAA's Coastal Services Center, the National Estuarine Research Reserve Association and NANOOS. The Pacific Coast Shellfish Growers Association and the Pacific Shellfish Institute provided technical assistance.

For more information about the system-wide monitoring program, or water quality and weather stations, contact me at (541) 888-2581, or by email at [Alicia.R.Helms@state.or.us](mailto:Alicia.R.Helms@state.or.us).

## **SOUTH SLOUGH SLEUTHS USE SOUND WAVES AND ORANGES TO DETERMINE THE MOVEMENT OF BACTERIA IN SUNSET BAY**

*By Ben Grupe*

The beach at Sunset Bay State Park is one of the most popular recreational areas on the southern Oregon coast, but it has been the site of occasional water contact advisories over the past several years. Many area residents have their own ideas about the source of the bacteria that led to the advisories; from geese in the wetlands, to dogs on the beach, or perhaps even sea lions at Simpson's Reef. In an effort to locate the most likely source of the bacteria, and to determine the residence time of the bacterial contaminants in Sunset Bay, the South Slough NERR is collaborating in a research partnership with Oregon State University Extension Service and the Oregon Department of Environmental Quality.

For much of the summer, research coordinator Steve Rumrill and I have been intent on one portion of the project: Investigating the

hydrodynamics in Sunset Bay. In July, aided by South Slough reserve's research assistant, Adam Demarzo, and volunteer Bob Sleeth, we deployed an acoustic doppler current profiler (ADCP) in the center of Sunset Bay.

The ADCP is anchored to the bottom with 150 pounds of lead. A small buoy marks its location. The ADCP emits pulses of sound at various frequencies that bounce off particles in the water and are reflected back to the ADCP where they are picked up by three transducers.

From the echoes, the ADCP is able to calculate the current velocity and direction at various depths.

Steve and I are confident that the time-series datasets will adequately characterize surface and sub-surface currents in Sunset Bay. In particular, we hope that the measurements of current direction and velocity will help explain local differences in the concentrations and movement of waterborne bacteria.

The ADCP will record tidal amplitude, which will be coupled with volume estimates from a 3-D bathymetric map, to determine how much water flows into and out of Sunset Bay during the flood and ebb of the tides.

On another calm, sunny day, Bob Sleeth and I, using kayaks, followed floating oranges around the bay.

We use the oranges to find out how the top-most layer of water moves in Sunset Bay. Some evidence suggests that high bacteria counts are related to freshwater runoff. If this is the case, bacteria are most likely to be found near the surface. So if we know how the surface water is moving, we can take a guess as to how the bacteria are moving.

"The data sets and information generated by this project are of keen

interest to a variety of local and regional stakeholders. Our effort to sleuth out the possible causes of high bacteria numbers should help Oregon State Parks and the resource management agencies to make the best decisions regarding beach advisories and public safety during their visits to Sunset Bay."

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## **VOLUNTEER OPPORTUNITIES**

Interpretive Center Greeter – Greet visitors when they arrive at the Interpretive Center. Help explain nature exhibits, distribute trail maps and brochures, and answer questions about the reserve. Answer the phone and assist staff as needed. Training will be provided.

Friends of South Slough Board – The general mission of the Friends of South Slough Reserve, Inc., as a volunteer nonprofit organization, is to promote and assist the Reserve in its educational and research activities.

The principal mission of the Friends is to raise funds, in addition to those provided by State and Federal budgeting, through the involvement of anyone, anywhere who is interested in the National Estuarine Research Reserve System. The FOSS Board generally meets on the second Tuesday afternoon of each month.

School Programs – With so many schools signed up for the busy spring season, we are looking for volunteers who can help with the following fun programs:

· Hike Leader – Lead visiting groups of students along the 3 mile-long Hidden Creek Trail. Provide interpretation of the surroundings along the way. Training provided.

· Education Program Aide – Assist South Slough Education Program Specialist Joy Tally in development and delivery of educational activities.

*Continued on page 7*

# EDUCATION NEWS

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## **SOUTH SLOUGH EXHIBIT DEDICATION AND ART DEBUT**

On Saturday, July 21, South Slough Reserve celebrated the completion of the new exhibits and the final work on contracts with Interpretive Exhibits Inc. (fabricators) and One + Two (designers). The project was completed within budget and within the timeline designated in a grant extension to NOAA that will conclude December 2007.

“Explore your estuary” was the

theme for the day, said Education Coordinator Tom Gaskill. He hopes the exhibits will inspire and educate visitors, and generate interest in South Slough activities.

The dedication began with an exhibit tour, followed by the introduction of Newport artist Bruce Koike. Koike’s show of fish-printing in the *Goyotako* tradition will be featured in the auditorium until fall.

“It was a perfect opportunity to browse through the exhibits, enjoy the

art, or walk a hiking trail.

“Many stayed to enjoy a potluck dinner featuring grilled tuna and salmon,” Gaskill said.

“Despite a little bit of rain, it was indeed a celebration, and an opportunity for discovery.”

The interpretive center is open during summers on Monday through Saturday, from 10am to 4:30pm.

South Slough’s trails are open every day from dawn until dusk.



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## **SUMMER SCIENCE CAMPS**

South Slough education staff hosted 38 children in a series of three summer science camps during the months of July and August. Each camp was on a Tuesday-Friday daytime schedule and incorporated lessons about estuaries and their surrounding habitats.

The students designed tee shirts

with an estuary theme, using images of tracks of local wildlife. Both the junior camp (ages 5-7) and the senior camp stayed overnight Friday for a barbecue and potluck dinner, evening hike and a camp out in the auditorium with their parents.

A third camp, the Summer Science Institute, was added this year to provide activities for 12 - 15 year olds.

The Summer Science Institute took a more hands-on, in-depth approach to learning. Students spent more of their time on the new North Creek Trail, which is not yet open to general use. Participants received technical instruction in botany, map-reading, and practical methods for examining the natural world.



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## **SOUTH SLOUGH WELCOMES NEW STAFF**

### **Eva Gitzes**

Eva Gitzes is South Slough’s first energy planning intern. Eva will begin her second year of study in Austin, Tex., where she is earning her masters degree in public affairs from the Lyndon B. Johnson School of Public Affairs at the University of Texas.

Eva is specializing in natural resources and the environment. She expects to graduate next May. Last spring she completed an internship at the University of Texas’ Clean Energy Incubator, where she studied public, private and university-partnered research parks around the country, with an eye toward developing a similar park in the near future in central Texas.

Eva is active in several environmental organizations. She helped inaugurate the first

sustainability group at her university. At times, Eva refers to herself as an “eco-nut.”

South Slough recently received funding from the National Oceanic and Atmospheric Administration (NOAA) to develop a plan for energy use and potential production from resources found in, or under, the South Slough reserve.

The NOAA funds are augmented by a grant from Methane Energy Corp. (see related story on Page 1). As part of her duties, Eva is helping staff identify technical assistance programs, state and federal energy legislation, incentive programs, energy technologies, renewable energy purchasing options, and energy audits that may be useful.

She has requested bids from contractors to develop the energy-saving improvements. In developing the energy management plan she is

studying forest biomass and carbon sequestration methods currently employed in Pacific Northwest forests. She hopes to establish a tangible measure for South Slough NERR and southern Oregon coast.

Eva enjoys having an opportunity to reduce energy consumption at the reserve and even to reduce global warming.

“It’s an empowering feeling to not only help make the world a little cleaner and cooler, but to also share that knowledge with people like Mike Graybill, whom I know will continue to seek out sustainable energy practices.”

Back in Texas, Eva lives with Roxy, her 8 1/2 year old fawn boxer.

“I miss her like crazy,” Eva said.

Eva enjoys hiking, camping, barbecuing, surfing the Internet and listening to music.

*Continued on page 7*

# FOSS NEWS

## FOSS SAYS FAREWELL TO JEANNINE HUFFMAN, MYRNA ROSE AND JEANNINE FILSINGER

In July, the Friends of South Slough Reserve accepted the resignations of three board members: Myrna Rose, Jeannine Huffman and Jeannine Filsinger. All will be greatly missed.

**Jeannine Huffman** took over as bookstore manager, after various others tried their hand at it, following the departure of FOSS members Charlotte Skinner and Pearle Affholter several years ago.

Jeannine had graciously delayed her resignation until a suitable replacement was on board. A great big thank you, Jeannine, for all of your hard work and productive efforts.

Jeannine sent the following farewell note:

"I am writing this as we prepare to sell our home and move closer to

family. I have turned my duties as bookstore manager over to board member David Lunde. He will be joined by Charlis Meador." (See story below).

"It has been my joy to serve you during my tenure. I know you will continue to support our little bookstore, which in turn supports the South Slough and its many projects."

**Myrna Rose** served the South Slough Management Commission for many years as both a member and volunteer, then as a member of the FOSS board of directors.

Myrna's most recent accomplishment, as FOSS historian-archivist, was to collect and collate many unsorted FOSS records from various sources and organize them into a recognizable file system.

Much to the dismay of all, Myrna's failing eyesight has forced her to resign.

**Jeannine Filsinger** is also

resigning due to health concerns. A member of the FOSS board of directors, she felt unable to develop her full potential in supporting the organization. The support she has provided thus far is appreciated and we wish her a speedy recovery.

\* \* \*

**Charlis Meador** found our ad for a "FOSS Bookstore Assistant" on our web page. She is a retired nurse and is interested in serving on the board of directors and assisting David Lunde with the bookstore. Charlis is interested in photography, education and research activities.

**Boat raffle fund raiser** The Friends will raffle a small boat to raise funds for construction of the North Creek trail. Tickets are available at the interpretive center. Only 350 tickets will be sold. The winner will be announced Feb. 28 or sooner if all tickets are sold.

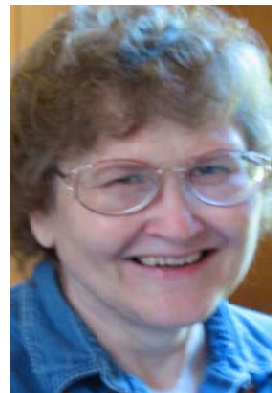
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*New staff continued from page 6*

"I'm also a diehard Longhorn football fan," Eva said.



### Faye Newman



Faye Newman came to the reserve via the Experience Works Program. She works 20 hours per week greeting visitors and assisting staff at the Interpretive Center.

Experience Works is a valuable resource for South Slough reserve, as well as for the people who are involved in the work training program.

Participants receive on-the-job

training and other assistance to ease their re-entry into the job market.

Faye enjoys website design, horses, working with children, writing, gardening and reading.



### Cris Hernandez

Cris Hernandez began working for the Friends of South Slough this summer helping visitor part time at the Interpretive Center.

Each summer the Friends hire a worker to help during the busy season.

Cris is an honors student at North Bend High School. He enjoys track



and cross country, basketball, music and taking road trips with his friends.



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*Volunteer! continued from page 5*

These include interpretive programs such as Tide of the Toddlers and Estuary Explorers.

"Volunteers have a unique opportunity to learn more about South Slough and other Oregon estuaries; develop skills; or join in special events for staff and volunteers," said Public Involvement Coordinator Deborah Rudd.

"To become a volunteer, or for more information about how you can be involved in South Slough activities and events, contact me at (541) 888-5558, ext. 58, or email [deborah.rudd@state.or.us](mailto:deborah.rudd@state.or.us)."



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### **TRAIL AND MAINTENANCE WORK PROJECTS**

South Slough hosted a six member work crew from the Oregon Youth Conservation Corps, led by Jay Andrews of Coos Bay. The crew worked with Nate Damewood, Don Smith, Tom Gaskill, Craig Cornu, and others on a variety of projects, including:

- Trail building (North Creek trail extensions);
- Trail maintenance (mainly spiffing up the North Creek trail);
- Repairing the geotextile fabric fences between the research cells at the site of the Kunz March restoration project;
- Controlling invasive species. The crew joined forces with a work crew from the Belloni Boys Ranch (see below) to remove noxious weeds in the southwest portion of the reserve, including Scotch broom, gorse, Himalayan blackberry, cotoneaster, thistle and biddy-biddy.

A crew from the Bob Belloni Boys' Ranch is also working at South Slough this summer. Led by Chris Ginsler, the Belloni Boys crew is helping to remove noxious weeds along Seven Devils Road, Hinch Road and the trails leading to the Anderson Creek and Cox Canyon restoration projects, where many species of noxious weeds have taken root. Nate Damewood is coordinating the weeding.