

SOUTH SLOUGH RESERVE MANAGEMENT COMMISSION

AGENDA

South Slough National Estuarine Research Reserve
South Slough Interpretive Center
61907 Seven Devils Road - Charleston, Oregon

March 15, 2012

133rd REGULAR MEETING 1:00-4:00 P.M.

- I. Call-to-Order
- II. Introductions
- III. Approval of the 131st and 132nd regular meeting minutes
- IV. Public Input*
- V. Old Business
 - 1. Energy Plan
 - 2. Other
- VI. New Business
 - 1. 2011 Volunteer recognition awards (L. Solliday, D. Rudd)
 - 2. State and Federal Budget Update
 - 3. Commission Vice Chair
 - 4. Other
- VII. Informational Items
 - Administration updates
 - 1. State and Federal Performance Measures
 - 2. Personnel/Research Coordinator position
 - Education programs
 - Science programs updates
 - Other
- VIII. Adjourn

* This meeting is being held in a facility that is accessible for persons with disabilities. If you need some form of assistance to participate in this meeting due to a disability, please notify Robin Elledge at 541-888-8270 ext. 314 at least two working days prior to the meeting.

*Limited to 5 minutes each unless arranged in advance of the meeting.

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**SOUTH SLOUGH NATIONAL ESTUARINE RESEARCH RESERVE
MANAGEMENT COMMISSION**

South Slough Reserve Interpretive Center
Charleston, Oregon

DRAFT Minutes of the 131st Regular Meeting

July 21, 2011

Commission members present:

Nicole Jackson

Louise Solliday, Chair

Craig Young

James Fereday

George Boehlert

Commission members not present:

Kevin Stufflebean

Mark Ingersoll

Robert Emmett

Ron Stuntzner

South Slough NERR staff present:

Mike Graybill

Robin Elledge

Pam Wilson

Steve Rumrill

Deborah Rudd

Craig Cornu

John Bragg

Others present:

Nina Gee

Howard Crombie

The meeting was called to order at 1:00 p.m. by the Chair of the Commission, Louise Solliday.

INTRODUCTIONS

Everyone present at the meeting introduced themselves. Nicole Jackson was introduced as a new member of the Management Commission representing the public.

APPROVAL OF THE MINUTES OF THE PREVIOUS MEETING

Chair Solliday asked if there was a motion to approve the minutes of the previous meeting. **Commissioner Fereday moved to approve the minutes of the previous meeting and Commissioner Young seconded the motion. The minutes were approved.**

PUBLIC INPUT

There was no public input.

OLD BUSINESS

Unauthorized Activities

The Commission was notified of a letter from Jim Oxford addressed to Mike Graybill on July 17 that acknowledged receipt of the correspondence sent by the Commission to Mr. Oxford on July 5, 2011 regarding alleged trespass activities on State-owned land. In the letter, Mr. Oxford indicated that he would be in contact with the Commission in the near future to further address the concerns of the State.

The Commission thanked Ron Stuntzner for the survey work he donated to the Reserve.

NEW BUSINESS

Volunteer Recognition

Volunteers at the Reserve were recognized for their service by the Management Commission.

ADJOURNMENT

Chair Solliday adjourned the meeting at 1:15 p.m. The Management Commission then participated in a paddling tour on South Slough with staff in the new canoe purchased by the Friends of South Slough for the Reserve. The Commission also toured the Port Orford cedar restoration plot, the Spruce Ranch, and the new administrative offices for Reserve staff at OIMB in Charleston.

**SOUTH SLOUGH NATIONAL ESTUARINE RESEARCH RESERVE
MANAGEMENT COMMISSION**

University of Oregon Institute of Marine Biology
Charleston, Oregon

DRAFT Minutes of the 132nd Regular Meeting
December 7, 2011

Commission members present:

Nicole Jackson

Louise Solliday, Chair

James Fereday

George Boehlert

Commission members not present:

Ron Stuntzner

Craig Young

Kevin Stufflebean

Mark Ingersoll

South Slough NERR staff present:

Mike Graybill

Robin Elledge

Deborah Rudd

Pam Wilson

Craig Cornu

Tom Elledge

Kathy Andreasen

Jenna Kulluson

Tom Gaskill

Ali Helms

Kileen Mitchell, VISTA

John Bragg

Others present:

James Oxford, Oxford Ranch

Summer Naugle, AC NCCC

Kathy Wall, Port of Coos Bay

Casey McGowan, AC NCCC

Jessica Montana, AmeriCorps NCCC

Roy Garcia, AC NCCC

Andrew Kane, AC NCCC

The meeting was called to order at 1:05 p.m. by the Chair of the Commission, Louise Solliday.

INTRODUCTIONS

Everyone present at the meeting introduced themselves. Chair Solliday introduced the “Silver 7” AmeriCorps National Civilian Conservation Corps (NCCC) Team that was working at the Reserve. Kileen Mitchell, a VISTA volunteer who will be working at the Reserve for a year was also introduced.

APPROVAL OF THE MINUTES OF THE PREVIOUS MEETING

The motion to approve the minutes of the July 2011 meeting was suspended by Chair Solliday until the next meeting, due to the absence of a quorum.

PUBLIC INPUT

There was no public input.

OLD BUSINESS

Unauthorized Activities

Mike Graybill presented some background material on the potential trespass issue from the previous meeting in July. Stuntzner Engineering conducted a legal survey on the area in question and copies of the correspondence between the State and Mr. Oxford were included in the briefing packet. Mike Graybill gave a verbal report on what he observed during a site visit to the area in question on November 29, 2011. A slideshow of images was also shown which included an aerial photograph of the Reserve boundaries. Mr. Oxford provided photos of an electric fence he used for livestock. Mr. Graybill distributed written comments from Commissioner Young who was not present at the meeting. Chair Solliday said that all of the deed and easement documentation was needed from the County before proceeding with any further action.

Mr. Graybill said that previous recommendation by the Commission directed staff to clearly mark the points of entry onto Reserve land. Chair Solliday asked if signage will be placed on the Menasha end of the Reserve and she asked if boulders or tank traps will be placed to prevent people from driving on the South Slough owned portion of the road to

prevent further damage. Mr. Graybill indicated that staff would be doing these things. She said that Coos County is not open range for livestock. Therefore, running livestock on state property without explicit land owner consent constitutes a trespass.

Climate/Energy Plan

Mike Graybill asked the Commission for feedback and comments on the current draft of the South Slough NERR Climate and Energy Plan. He said that staff will incorporate the document into the Reserve's Management Plan once it is adopted by the Commission. Commissioner Boehlert commented that the current draft is much improved. Chair Solliday said that the first and third goals lack the detail of the second goal to *operate the Reserve as an experimental model for climate conscious decision making*. She also recommended turning the *Coordination with Other Programs* section into a fourth goal. Commissioner Boehlert asked in regards to goal two, if the current Management Plan addresses energy conservation at the Reserve. Mr. Graybill replied that the facilities section specifies safe and efficient structures, but energy conservation in regards to communication or transportation are not addressed in the current Management Plan. He added that staff are doing more teleconferencing.

Commissioner Fereday commented that the workload at the Reserve seems to be increasing as the number of staff decreases. Chair Solliday said there are opportunities to find staff through special grant funding. Mr. Graybill said he would bring the Energy and Climate Plan back to the Commission for possible adoption.

NEW BUSINESS

Commission Meeting Schedule

Chair Solliday asked that everyone put the 2012 meeting dates on their calendars. Mr. Graybill reminded that the regular meetings are scheduled on the third Thursday of the months March, July, and November.

INFORMATIONAL PRESENTATIONS

OCEP – Oregon Coast Education Program

Jenna Kulluson gave an informational presentation highlighting some of the goals and accomplishments of the OCEP. The program has been successful in providing professional development workshops and following up with distance learning opportunities. To date the OCEP has provided formal training to over 75 educators and supported field experiences to over 1250 students.

Partnership for Coastal Watersheds

Craig Cornu gave an update on the Partnership for Coastal Watersheds. The goals of the Partnership are to anticipate and respond as needed to local changes in the South Slough and Coastal Frontal watersheds, and to establish a public forum that facilitates community collaboration and decision making.

South Slough NERR and Coos Watershed Association staff are currently collecting ecological and socioeconomic data to evaluate performance measures associated with the project's vision statements. The community vision describes future conditions members of the Partnership would like to see in 20 years in quality of life, environment and economy.

AmeriCorps

Summer Naugle presented some of the highlights of the work the “Silver 7” AmeriCorps team has been doing for the Reserve for six weeks in November and December. The 10-person team has been assisting with many projects, including planting 700 Port Orford cedar seedlings, building a boardwalk along the 10 minute trail near the interpretive center. The Crew has also helped the Partnership for Coastal Watersheds by conducting person-to-person surveys in Charleston.

Native Oyster Research

Ali Helms and Matt Gray

Matt Gray, a Graduate Research Fellow funded by NOAA presented some of the results of his PhD research project “Feeding Physiology of Native Oysters”. The primary emphasis of the study is to evaluate feeding efficiencies for two species of oysters, native Olympia (*Ostrea lurida*) and introduced Pacific oysters (*Crassostrea gigas*) under different field conditions, and to determine the likelihood of competition for food resources.

ADJOURNMENT

Chair Solliday adjourned the meeting at 3:15 p.m.

Old Business

Subject:

A climate and energy plan for the South Slough Reserve

Issue:

Commission review and comment on a revised draft version of the plan. Possible adoption of the plan by the Commission as an amendment to the SSNERR management plan.

Background.

The SSNERR Management Commission directed staff to develop a plan to address energy use and climate. The Commission reviewed and commented on a first draft version of a plan at their July 2010 meeting.

The staff has worked to revise the plan and incorporate the comments of the Commission. A revised draft energy and climate plan is attached as a separate document to this briefing packet.

Staff Recommendations

1. The Commission should read and provide comments and further direction to the staff on the revised draft plan.

2. If the Commission finds the current version of the plan to be acceptable, the Commission should formally adopt the plan as an addendum to the management plan governing the operation of the Reserve.

Energy and Climate Strategy

South Slough National Estuarine Research Reserve

March 2012 Draft

Introduction

Climate has always had a profound and defining influence on natural and cultural systems. Our understanding of climate and the factors that drive climate is changing. Within a generation, the widespread view of and orientation to climate has changed from climate as a stable and predictable condition on the scale of a human lifetime to climate as a dynamic, and potentially unstable or unpredictable condition. The prospect that climate is unstable or rapidly changing also holds the prospect that the influence of climate is likely to be even more profound than previously thought.

Communities around the globe are asking how changes linked to climate will influence their lives and their communities. Among the changes linked to climate, the possibility that sea level, ocean chemistry and wave height are changing is of particular interest to coastal communities. Some climate-influenced factors – such as sea level and ocean chemistry – are both measurable and predictable. Other factors such as the intensity and frequency of ocean storms are also measurable, though less predictable ([IPCC, 2007](#); Feely *et al.*, 2008).

While atmospheric conditions and climate have always influenced life on earth and living things have also influenced the atmosphere and climate, the past 100 years can be distinguished from the rest of earth's history by the unprecedented rate at which human civilization has altered the chemistry and climate-regulating characteristics of the atmosphere. Energy use, principally the combustion of carbon-based fuels, is the principle driver of these changes. The links between the combustion of carbon-based fuels and climate are becoming increasingly clear. Understanding the complex and potentially inseparable relationships between carbon energy use and climate has prompted the development of this energy and climate plan.

Carbon dioxide is one of several important atmospheric gases that regulate earth's climate. This plan articulates a new and unprecedented focus on carbon and carbon dioxide at the South Slough NERR. While the human mediated atmospheric discharge of other gases such as methane also influence climate, increasing concentrations of atmospheric carbon dioxide identify it as the primary compound contributing to the observed changes in the average global temperature and the chemical composition of the ocean.

Purpose of this plan

In keeping with the South Slough National Estuarine Research Reserve's mission of improving the stewardship and understanding of Pacific Northwest estuaries and coastal watersheds, the South Slough Management Commission has adopted this climate and energy plan as an approved element of the management plan guiding the overall operations of the Reserve (Bacchieri, 2006). South Slough's energy and climate plan is intended to guide all aspects of Reserve operations including the facilities, stewardship, research, and education programs at the Reserve.

This plan introduces a carbon-conscious approach to the management of the South Slough National Estuarine Research Reserve. The plan focuses the attention of the Reserve on the causes and consequences of change linked to climate. This includes developing a better understanding of the flux of atmospheric gases, particularly carbon dioxide, which is processed by the natural systems of the South Slough and as a result of the programs and activities of the Reserve. Through the experience and understanding gained by implementing this plan, the Reserve will be better positioned to help coastal communities, particularly those near estuaries, develop strategies that anticipate and address changes linked to climate.

This strategy will enable the Reserve to focus on sustaining the health and viability of the natural and cultural systems associated with estuaries that are linked to climate. We will work to improve our understanding of how estuaries and their associated coastal watersheds process and store carbon dioxide and other atmospheric gasses linked to climate. We will use the Reserve as an experimental site to examine if and how estuaries respond to change linked to climate, and if and how coastal systems in the Pacific Northwest could be managed to adapt to and mitigate the buildup of climate altering gasses. We also plan to use the Reserve as a platform to test and evaluate regionally appropriate strategies for adapting natural and cultural communities to changes linked to climate.

Recognizing that human energy use contributes climate-altering gasses to the atmosphere, the Reserve will also implement a program to monitor how all aspects of Reserve management produce or take up greenhouse gases. The goal is to minimize or possibly eliminate the climate altering emissions that the Reserve and its programs contribute to the atmosphere. In addition to tracking emissions associated with transportation, facilities operations, and the programs offered by the Reserve, staff will also work to better understand how the South Slough estuary's waters, wetlands and uplands, produce and sequester carbon dioxide and other greenhouse gases.

The Reserve will work to address the broad range of changes that living in a carbon-enhanced world imply for coastal communities. We will work to develop a system designed to track energy use and carbon flux as part of the day-to-day operation of the Reserve. We will use this tracking system to identify and implement actions that reduce the amount of energy used whenever possible. For example, the Reserve will use Web-based teleconferencing when practicable to reduce the fuel consumed for travel. We will prioritize increasing the efficiency of facilities and equipment, and wherever possible shift to renewable or non-carbon emitting energy sources.

The South Slough Reserve will undertake a program of research and monitoring aimed at better understanding how the Reserve's natural communities process carbon dioxide and other climate altering gasses. We will work to better understand how estuarine and coastal habitats can be managed to maximize the carbon storage potential of these habitats. This work will provide a better understanding of how various species, and the natural processes of estuaries and coastal watersheds, process and store carbon dioxide.

The efforts of the Reserve to better understand the carbon-sequestering potential of estuaries and coastal watersheds will position the state to better understand and possibly gain value from the carbon-storage capacity of coastal ecosystems in Oregon. This plan will help to clarify carbon-storage processes and functions in a variety of relatively undisturbed and degraded estuarine and coastal habitats, thereby helping to better understand the links between habitat restoration and climate processes. Carbon sequestration studies at the South Slough Reserve hold potential to help Oregon develop new long-term carbon storage strategies. This experimental approach may even provide an opportunity for the state to sell carbon credits derived from estuaries and coastal watersheds as part of the emerging carbon marketplace.

Climate and energy oriented goals and objectives for the South Slough Reserve:

1. *We will improve understanding of how of Pacific NW estuaries and coastal systems respond to changes in climate and how estuaries and coastal watersheds can be managed to adapt to and mitigate climate related stressors. This will be accomplished through a practice of learning and teaching by doing.*
 - 1.1. We will encourage and conduct research and monitoring in the South Slough Reserve and Pacific Northwest estuaries to better understand how estuarine and coastal systems will respond to changes linked to climate.
 - 1.1.1. Improve understanding of the causes and effects of variations in acidity and alkalinity inside estuaries, and their relationship to the acidification of coastal ocean waters.
 - 1.1.2. Monitor and project trends in sea level in the Coos watershed and Southern Oregon.
 - 1.1.3. Monitor physical and biological systems in the South Slough to detect and anticipate changes linked to climate
 - 1.2. We will incorporate the best scientific information available on energy use and climate change into training and education programs and instructional materials whenever and wherever appropriate. We will strive to be a trusted, objective source of information related to energy management and climate.
2. *We will operate the Reserve as an experimental model for climate conscious decision making by actively and publicly tracking and managing emissions attributable to the operation and management of the Reserve.*
 - 2.1. We will adopt and incrementally refine and expand an emissions tracking program for the Reserve including emissions attributable to the facilities, programs, and natural systems managed by the Reserve.
 - 2.2. We will strive to minimize energy consumption, and the amount of climate altering emissions added to the atmosphere by the Reserve's facilities, programs and daily operations.
 - 2.2.1. We will prioritize use of energy produced by low- or no-emission sources.
 - 2.2.2. As a means of offsetting South Slough Reserve's unavoidable climate altering emissions, we will work to quantify the carbon storage potential of natural

communities in the Reserve with the initial goal of managing the Reserve and its programs as a climate neutral operation.

- 2.3. We will plan habitat restoration and management projects that anticipate and respond to changing climate conditions and provide experimental, long-term carbon storage while meeting the conservation objectives of the NERR program, including the needs of rare, threatened, and endangered species.
3. *We will strive to form partnerships with coastal communities and management organizations by supporting their efforts to understand, prepare for, and adapt to changes linked to climate and energy use.*
 - 3.1. We will work to identify and support the efforts of a key coastal community willing to serve as a regional climate change/energy management demonstration site to develop, test, and implement promising strategies designed to minimize the impacts of changes linked to energy use and climate.
 - 3.2. We will assist land management entities by determining the carbon-storing potential of coastal ecosystems, and develop and test strategies for managing carbon storage assets on public lands, including estuaries.
 - 3.3. We will participate in and actively support the implementation of the NERRS climate change initiative (see attachment #1 this document).

Coordination with Other Programs

South Slough Reserve's energy management plan is intended to complement and extend similar work being planned and implemented by other organizations:

This plan considers Oregon's sustainability goal as a step toward developing a new perspective for living in a carbon rich world. (Oregon Sustainability act 2001)

This plan also is designed to complement and support the NERRS-wide Climate Change Initiative adopted by the NERRS program in January 2011 (See attachment 1; this document) We will work to identify a coastal community to serve as a regional climate adaptation case study.

This plan is also designed to complement the Oregon Climate Change Adaptation Framework adopted in October 2010.

(http://www.oregon.gov/ENERGY/GBLWRM/docs/Framework_Final_DLCD.pdf?ga=t) We will contribute regionally relevant information to this recently adopted framework.

Counting Carbon

Developing an accounting system aimed at characterizing climate altering emissions and the carbon-sequestration potential of natural systems are essential elements of programs designed to reduce or offset the release of CO₂ into the atmosphere from energy sources that cannot be reduced or replaced.

South Slough Reserve offers several opportunities to test emissions tracking systems, to evaluate the carbon sequestration potential of coastal habitats, and to explore how carbon sequestered by these systems might interface with the emerging carbon offset/credit market.

The South Slough forest management and restoration plan (Robinson, 2009) is designed to evaluate and track carbon uptake by forest habitats treated by restorative actions. We anticipate that as forest habitats within the Reserve mature, they will sequester and store significant volumes of atmospheric carbon dioxide. We expect that our plan to test various strategies to optimize carbon-sequestration by trees and forest soils over time will contribute to the understanding carbon storage by trees and coastal forest habitats and will serve as a model for other forest management entities.

Similarly, we intend to encourage and conduct monitoring and experiments designed to evaluate the capacity of South Slough's salt marshes, eelgrass beds and tide flats and open water systems to capture and store carbon. In this fashion the South Slough Reserve will assist NOAA and the Department of State Lands in evaluating the long-term carbon-sequestering capacity of estuarine and coastal habitats.

Our efforts to understand the carbon sequestration potential of estuaries and coastal watersheds may provide additional incentives to restore estuary habitats. The Reserve will consider selling CO₂ credits as a means of financing restoration projects. Revenue generated in excess of restoration costs may also provide matching funds for further grant supported restoration work or contribute to Oregon's Common School Fund.

Carbon Conscious Decision-making

Carbon conscious decision-making takes into account the CO₂-production and uptake of the broadest possible range of activities. The potential of various activities to produce or reduce atmospheric carbon dioxide emissions will be among the factors considered in designing and undertaking projects sponsored by the Reserve. Staff at South Slough Reserve will practice carbon-conscious decision-making by considering the likelihood of various activities to either take up or release carbon dioxide, including:

Carbon accounting

Staff will develop a climate emissions tracking system for SSNERR facilities, programs and ultimately the South Slough ecosystem including the potential of the Reserve's tidally influenced systems, wetlands and forests to take up and store carbon. We will build this tracking system in stages starting with simple compilations of utility and fuel expenses leading to more detailed evaluations of purchasing decisions and program offerings, followed by more detailed and comprehensive assessments of the natural systems in the Reserve and its watershed. We expect that it will take up to ten years to develop a robust, program-wide, accounting system.

Managing emissions

Travel and Transportation

Staff will consider alternatives such as web conferencing, where appropriate, to reduce their production of travel-related emissions. The Reserve will continue to rely on low-emission vehicles for a portion of its regional business commuting, and will work to replace the existing fleet with low-emission or zero emission vehicles and vessels when practical. The Reserve will adopt a practice of using the lowest emission vehicle or vessel available.

Place of business

The Reserve will move its administrative headquarters to Charleston to reduce commuting distances/emissions produced by SSNERR staff and our business associates.

Partnership activities

When appropriate, staff working on joint projects will encourage our partners to be aware of their own emissions and take steps to reduce their production of CO₂. South Slough Reserve staff will continue to work with partners, including state and federal agencies, ports, tribal nations, schools, universities, non-profits and local governments and, to explore options to reduce the production of carbon dioxide in the Southern Oregon coastal region;

Communication and data transfer

Staff will continue to develop wireless data links throughout the reserve to enhance communication and reduce energy use linked to transportation. Education and training programs will place additional emphasis on remote learning and web based approaches to instruction. Staff will work to design site-based programs that minimize emissions associated with transportation.

Community assistance and partnerships

South Slough Reserve will work to help coastal residents and visitors to the Reserve increase their understanding of how energy use and carbon dioxide can affect coastal communities by sponsoring carbon-conscious interpretive displays at community festivals and events; demonstrating how energy is used at the Reserve; and by helping residents and organizations calculate their personal, family, or business carbon budgets.

The Reserve will work with community leaders to undertake demonstration projects including adopting policies and practices designed to mitigate carbon dioxide emissions, and that help coastal community prepare for and adapt to unavoidable changes linked to climate.

Conclusion

Estuarine habitats and the human communities located near estuaries will experience changes linked to climate and energy use. The enhanced release of carbon dioxide and other climate

altering gases into the atmosphere is of concern for those charged with protecting the health, safety, and well being of coastal residents and of Oregon's natural coastal environments. Changes linked to the continued production of carbon dioxide through human activity, and its absorption by the atmosphere and ocean warrant increased attention and action.

Issues such as sea level rise and ocean acidification present incredible challenges, but they also offer unparalleled opportunities to assess the potential of Oregon's forests, salt marshes, tide flats, soils and forests to process and store carbon, potentially mitigating the effects of change linked to climate.

The South Slough National Estuarine Research Reserve's commitment to conservation and advancing the understanding of estuaries, offers a unique resource to explore how changes linked to climate will influence estuaries and coastal communities. The Reserve is an ideal platform to test methods designed to adapt to climate-induced change and to explore and refine methods designed to reduce or mitigate climate-altering emissions and the consequences of unavoidable change linked to climate.

Staff will explore innovative ways to limit the amount of greenhouse gases produced in the day-to-day management of the Reserve and will offer carbon-conscious education and decision support to individuals, communities, local governments, estuary managers, state agencies and the National Estuarine Research Reserve System. By testing and evaluating promising approaches, the Reserve will help Oregonians develop new policies and strategies designed to avoid the negative consequences of living in a carbon-rich world, and adapt to the changes that cannot be avoided.

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Glossary

Acid, acidity

Acids are compounds that contain hydrogen and when dissolved in water, increase the concentration of hydrogen ions (H⁺). (The term acid derives from the Latin *acidus*, meaning sour. Pure water dissociates into hydroxide ions (OH⁻) and hydrogen ions according to the equilibrium reaction H₂O ↔ OH⁻ + H⁺. In pure water, there are equal numbers of hydroxide and hydrogen ions, so it has a neutral pH value of 7. A pH value less than 7 indicates an acidic solution, and a pH value more than 7 indicates a basic, or alkaline solution. See alkaline.

Alkaline, alkalinity

Alkaline compounds (bases) are compounds that when dissolved in water, increase the concentration of hydroxide ions. See acid.

Carbon

Carbon is a naturally abundant nonmetallic element that occurs in many inorganic and in all organic compounds. It exists freely as graphite and diamond and as a constituent of coal, limestone, and petroleum. Carbon is capable of chemical self-bonding to form an enormous number of chemically, biologically, and commercially important molecules. (Atomic number 6; atomic weight 12.011; sublimation point above 3,500°C; boiling point 4,827°C; specific gravity of amorphous carbon 1.8 to 2.1, of diamond 3.15 to 3.53, of graphite 1.9 to 2.3; valence 2, 3, 4).

Carbon dioxide

Carbon dioxide (CO₂) is a gas consisting of one atom of carbon and two atoms of oxygen. It is the end product of combustion in many energy-producing processes. CO₂ is especially important in animal respiration and in the decay or combustion of animal and vegetable matter. CO₂ is absorbed from the air by plants during photosynthesis. It dissolves in water to form carbonic acid. In the atmosphere it traps heat produced by energy from the sun. In this plan the term carbon dioxide or CO₂ is used for references to carbon, unless free carbon in a solid state is being discussed specifically.

Ocean acidification

The oceans absorb about a quarter of the carbon dioxide added to the atmosphere from human activities each year, greatly reducing the impact that this greenhouse gas has on climate. When CO₂ dissolves in seawater, carbonic acid is formed. This phenomenon, called ocean acidification, is decreasing the ability of many marine organisms to build their shells and skeletal structure. Field studies suggest acidification is already affecting some important marine shell-building animals. Ocean acidification is easily measured and predictable (Feely *et al.*, 2006). Over the past 200 years this natural ocean process has absorbed nearly half of the carbon dioxide emitted through human industrial activity. That significantly reduces the level of this greenhouse gas in the atmosphere and minimizes some impacts of global warming. However, the ocean's daily uptake of 22 million tons of carbon dioxide is starting to alter the chemistry of seawater. Some marine environments with naturally high levels of CO₂ are exhibiting major ecological shifts, following trends expected from laboratory experiments. The full impacts of ocean acidification, and how these impacts may propagate through marine ecosystems and affect fisheries, remains largely unknown (UNESCO-IOC, 2004).

Sea level rise

The International Panel on Climate Change (IPCC) estimates that the global average sea level will rise between 0.6 and 2 feet (0.18 to 0.59 meters) in the next century. The principle factors responsible for sea level rise are expansion of ocean water as a result of warming, and increase in ocean volume resulting from the melting of continental glaciers. Climate models, satellite data and hydrographic observations demonstrate that sea level is not rising uniformly around the world. Depending on the region and prevailing geologic

processes, local apparent sea level is rising several times the global mean, or is falling as a result of rapid land uplift processes. ([IPCC, 2007](#)).

In the central Pacific Ocean, residents of the island nation of Kiribati are trying to protect their homeland from the effects of climate-related sea level rise. Thirty three low-lying atolls comprise Kiribati, which is home to 90,000 people, nearly half of whom live on South Tarawa Island, less than three meters above sea level. In 2000 the World Bank Regional Economic Report estimated that by 2050, sea level rise will have erased at least a third of Kiribati's 1998 gross domestic product, unless steps were taken. (World Bank, 2010.)

SSNERR Draft Energy and Climate Strategy
Attachment #1

**National Estuarine Research Reserve Climate Change Initiative:
(Final 27 Jan 2011)**

NERRS Climate Change Initiative

Goal: to understand, mitigate, and adapt to climate change impacts on estuaries and coastal communities.

Introduction

Climate has a profound and defining influence on coasts. Estuaries, where rivers meet the sea, integrate climate influences from the land, the ocean and Great Lakes. Climate change will alter and intensify these influences and may exacerbate other stresses on estuaries such as coastal pollution and habitat loss. Climate experts predict that coastal areas will experience various changes depending on the region of the country. Rainfall will come in stronger, wetter events in some regions and drought will become more extreme and pervasive in other regions. Storms like hurricanes may become stronger and more frequent. Sea level is rising at an accelerated rate along many parts of the U.S. coast and Great Lakes levels likely will fall. Ocean temperatures will continue to warm and the pH will continue to become more acidic.

The regional expression of climate on estuaries is well represented in the National Estuarine Research Reserve System (NERRS). The mission of the reserve system is to *“practice and promote stewardship of coasts and estuaries through innovative research, education, and training using a place-based system of protected areas.”* This climate change initiative will capitalize on all the strengths and capabilities of the reserve system. The NERRS can serve as living laboratories where our understanding of the climate-driven dynamics of estuaries and coasts can be developed and tested. Further, NERRS are well positioned to translate our understanding of these processes and impacts to coastal communities and help them adapt to the impending changes. As the managers of coastal places, reserves also have hands-on experience with adaptive resource management. Reserves, therefore, are well positioned to develop and test best practices for ecological adaptation to climate change and greenhouse gas (GHG) mitigation, and translate the information to natural resource managers, federal, state, and local coastal decision makers, teachers, students, and residents of coastal communities.

The reserve system is making a strong, focused commitment to invest expertise and resources to:

- **Understand** the impacts of climate change and vulnerabilities of estuaries and coastal communities,
- **Adapt** to these changes, and
- **Mitigate** impacts through greenhouse gas reduction and carbon sequestration.

This is not the sole focus of the reserve system, but a primary focus both now and in the future. Existing reserve funding, staff, and programs will be more tightly focused and directed to carry out the three elements of the initiative. In addition, we will seek partnerships and resources to help implement the initiative.

Understand Climate Change Impacts

A changing climate is expected to impose multiple stressors on coastal environments, and reserves can help improve our understanding of climate-driven stressors on estuary ecosystems and communities. The International Panel on Climate Change defines vulnerability as a function of the sensitivity of a particular system to climate changes, its exposure to those changes, and its capacity to adapt to those changes. The NERRS can bring locally and regionally relevant science to the understanding of ecological and community vulnerability. In addition, reserves can improve understanding of their own greenhouse gas emissions and carbon sequestration at NERRS estuaries. Reserves will take the following actions to enhance understanding of coastal climate change impacts, vulnerability, and mitigation opportunities.

Actions:

1. Ecological Vulnerability Assessment

- The NERRS will conduct a national-level synthesis of relevant climatic, geomorphic, and ecological information that can be coupled with regional climate change forecasts to organize the NERRS into different categories of ecological climate change vulnerability. Based on the categorization scheme, a focused analysis of NERRS System-wide Monitoring Program (SWMP) data can be conducted to further detect climate-induced stresses at reserves. This will provide a deeper understanding of reserve estuary sensitivity and susceptibility and inform future research.
- The NERRS will implement enhanced monitoring, including sentinel site protocols for sea level change impacts to coastal wetlands, and habitat and elevation mapping.
- Conduct discrete research and assessment to identify user needs and understand climate change impacts, including refining models of coastal wetland sensitivity and change due to climate induced stressors.

2. Community Vulnerability Assessment

- The NERRS will conduct a national level synthesis of existing socio-demographic information to provide an understanding of reserve communities and their vulnerability to climate change impacts.
- NERRS will train staff in community and ecological vulnerability assessment.

- Reserves will facilitate a collaborative process with key audiences and decision-makers in their communities to understand their awareness of climate change impacts and evaluate the risk and vulnerability of the community.

3. Greenhouse Gas Audit

- Reserves will establish a baseline including the electricity and gas used in facilities and work-related transportation by reserve staff. The audit will identify emission producing activities that can be reduced or avoided at reserve facilities and in reserve programs and operations.

Based on sound science and improved understanding, the NERRS will provide relevant and useful information and products on coastal climate stressors and their impacts on estuaries and communities to enable meaningful adaptation and mitigation strategies.

Adapt to Climate Change

Climate-related changes will occur at landscape scales while land use and site management decisions are typically made at the local level. Adaptation planning must take into account both scales. Working through partnerships, the NERRS will develop adaptation strategies for reserves, coastal protected areas, and communities based on ecological and community vulnerability assessments. The general principles for these partnerships are:

- **Adaptation strategies will be based on locally relevant science-based information** from reserves and partners that incorporates natural and built landscape vulnerability assessments.
- **Coastal communities, local decision-makers, and other resource managers are at different stages** in terms of awareness and willingness to take action in response to climate related risks and reserves must have the flexibility to meet these audiences where they are and build awareness and understanding as appropriate.
- **Coastal communities and reserves face different stressors** related to climate change and reserves must work with partners to identify priority risks and develop locally to regionally relevant adaptation responses.

Many reserves currently are working with communities to foster climate change awareness and adaptation planning by conducting workshops, providing community education, supporting formal education opportunities, and providing technical assistance to communities. Fewer reserves are engaged in ecological adaptation planning for their own sites or in partnership with other resource managers. There are many opportunities to partner with other agencies and programs, including the NOAA Coastal Services

Center and Climate Program Office, Landscape Conservation Cooperatives, National Parks and Refuges, and National Estuary, Sea Grant, and Coastal Management Programs. The NERRS will take the following actions to strengthen system-wide capabilities and foster adaptation planning:

Actions:

1. Adaptation Planning and Implementation

- Reserves will develop or enhance partnerships with their communities and other resource managers to take steps to develop adaptation plans at the most appropriate scale.
- Reserves will initially pilot adaptation planning at select reserves, including developing reserve-specific plans, plans for regional networks of protected areas, and/or comprehensive plans for communities and ecological resources, and exchange lessons learned for additional adaptation planning at all reserves.
- Reserves will use local and regional partnerships to implement adaptation strategies.

2. Climate Change Literacy and Capacity Building

- Reserves will develop or use formal and informal climate change education materials that are locally relevant to enhance climate literacy.
- Reserves will initiate or expand local and regional partnerships to train others and exchange climate adaptation lessons learned and best practices.

Mitigate Climate Change Impacts

The NERRS are concerned with atmospheric gases that contribute to climate change (including carbon dioxide, methane, nitrous oxide, hydrofluorocarbons), and will strive for “climate neutrality” to the extent possible. Achieving climate neutrality requires programs and organizations to identify and account for activities that produce greenhouse gas emissions as well as those that sequester or offset those emissions. Using a climate conscious business model, the NERRS will strive to reduce GHG emissions in all program aspects including: facilities development, renovation, and operation; selection and use of boats and vehicles; and conduct of programs and meetings. Reserves will strive to offset GHG emissions through strategies such as habitat restoration or enhancement; land acquisition and protection; and where appropriate purchasing carbon credits. The NERRS will take the following actions to improve “climate neutrality” for the system:

Actions:

1. Develop Mitigation Plan

- Reserves will develop comprehensive plans to reduce their GHG emissions over a set period of time. Reductions across the system can be measured and reported. (See Environmental Management System (EMS) (<http://www.gdrc.org/sustdev/concepts/09-ems.html> for more information).

2. Implement Mitigation Plan

- Based on the plans, reserves will limit energy use and emissions, and begin to obtain energy from non-emitting sources where possible.
- Where possible, reserves can offset GHG emissions through actions that sequester carbon such as wetlands or forest restoration or possibly purchasing carbon offsets in conjunction with meetings or other activities.

3. Evaluate

- After the first cycle, the NERRS will evaluate and communicate the results. Lessons learned can be shared with other organizations, agencies, and communities, and incorporated into the future mitigation actions.

Next Steps - Implementation

The next steps are to begin implementing the three elements of the initiative. Appendix A includes a list of near term and longer term actions. By refocusing NERRS financial and human resources, many actions can be taken. Through partnerships and additional resources, NERRS can move forward more quickly or undertake actions that would not be possible in the near term.

The NERRS will take a phased approach to implementing the initiative. Individual reserves are each starting from a different place in terms of the climate stressors they encounter; the level of awareness, engagement, and capabilities of their staff and communities; and their capacity and resources to implement the initiative. The initiative will be implemented in phases; however, reserves may begin at different places along the path and may proceed at different rates. The first phase is to have a base level of capability at all reserves in sentinel site monitoring; synoptic information on ecological and community sensitivity to climate change impacts; local needs assessment for and access to information and education materials on climate change; access to information and tools for energy audits; and training for staff in vulnerability assessment and adaptation planning methods (for both ecological and community vulnerability and adaptation). The next phase is for reserves to develop vulnerability assessments, followed by adaptation and mitigation plans, and finally implementation and evaluation.

The ultimate goal is to have all reserves able to implement adaptation and mitigation strategies in the next 10 years.

APPENDIX A - Annual Implementation Actions FY 2011-15

FY 2011		
Understand	Adapt	Mitigate
<p>Conduct a national-level synthesis of relevant environmental data and meteorological forecasts to determine current conditions and relative susceptibility and sensitivity of NERRS to multiple climate change stressors</p> <p>Implement geomorphic and emergent vegetation components of SWMP (sentinel sites) at eligible reserves</p> <p>Fund discrete research efforts to understand climate change impacts on NERRS</p> <p>Conduct a national-level synthesis of relevant socio-economic data and risk information for reserve communities</p> <p>Assess current local and state planning efforts and available climate vulnerability information</p> <p>Assess local and state needs for climate information, including education, training, and technical assistance needs</p> <p>Train NERRS Staff in ecological and community vulnerability assessment methods</p>	<p>Revise NERRS Management Plan Guidance to incorporate climate change considerations</p> <p>Develop formal and informal education materials for climate change education</p> <p>Deliver education programs and teacher trainings that include climate change content</p> <p>Engage in Coastal Landscape Conservation Cooperatives and other agency coastal adaptation efforts (e.g., National Estuary Programs)</p>	<p>Revise NERRS construction and land acquisition guidance to prioritize proposals for renewable energy and energy efficiency-related projects and land acquisition that would support climate adaptation and carbon sequestration</p> <p>Develop guidance for NERRS Greenhouse Gas Inventory and Energy Audits and Plans</p> <p>Conduct pilot partnerships in reserves to initiate mitigation planning and implementation</p>

FY 2012		
Understand	Adapt	Mitigate
<p>Conduct discrete social science research necessary to assist in development and implementation of local and regional mitigation and adaptation strategies</p> <p>Expand NERRS coastal-climate change science capabilities through focused graduate research fellows projects, NERRS Science Collaborative and other partnerships</p> <p>Conduct pilot projects at reserves for vulnerability assessment in partnership with communities and other resource managers</p>	<p>Conduct reserve pilot projects to initiate adaption planning with communities and resource managers</p> <p>Establish reserve-based climate teams to bring in expertise and networking connections that advance local community goals</p> <p>Each reserve establishes a community partnership to initiate adaption planning</p> <p>Work with local community councils, utility providers, and municipalities to build capacity for adaptation planning</p> <p>Work with formal and informal education and outreach audiences to foster greater understanding of climate change impacts and appropriate adaptation actions</p>	<p>Conduct greenhouse gas inventory and energy audits at reserves</p> <p>Establish reserve-based community partnership with a coastal community to initiate mitigation planning and implementation</p> <p>Work with formal and informal education and outreach audiences to foster greater understanding of climate change impacts to coasts and estuaries and appropriate mitigation actions</p> <p>Select competitive NERRS construction and land acquisition projects to increase use of renewable energy and improve energy efficiency at reserves and land acquisition projects that support carbon sequestration</p>
FY 2013-2015		
Understand	Adapt	Mitigate
<p>Conduct vulnerability assessments at all reserves in partnership with communities and other resource managers</p> <p>Use geospatial habitat inventories and vertical accretion mapping to develop an estimate of carbon storage currently represented within the NERRS</p>	<p>Revise reserve management plans to incorporate climate change</p> <p>Conduct adaptation planning with reserve communities and other resource managers</p> <p>Use community partnerships to translate lessons learned and best practices in adaption more broadly through existing networks at local, regional, and national scales</p>	<p>Develop reserve plans for reducing and offsetting GHG emissions</p> <p>Conduct carbon sequestration projects</p> <p>Engage communities in locally-relevant climate change mitigation projects</p>

NERRS Climate Change Team

Mike Deluca, Manager Jacques Cousteau Reserve, NJ
Angela Doroff, Research Coordinator, Kachemak Bay Reserve, AK
Heather Elmer, Coastal Training Program Coordinator, Old Woman Creek Reserve, OH
Kristen Goodrich, Coastal Training Program Coordinator, Tijuana River Reserve, CA
Mike Graybill, Manager, South Slough Reserve, OR
Alison Krepp, Estuarine Reserves Division
Rich Langan, NERRS Science Collaborative, University of New Hampshire
Gary Lytton, Manager, Rookery Bay Reserve, FL
Laurie McGilvray, Chief, Estuarine Reserves Division
Steve Miller, Coastal Training Program Coordinator, Great Bay Reserve, NH
Bree Murphy, Estuarine Reserves Division
Forrest Penny, Stewardship Coordinator, Guana Tolomato Matanzas Reserve, FL
Dave Ruple, Manager, Grand Bay Reserve, MS
Jessica Ryan, Education Coordinator, Kachemak Bay Reserve, AK
Erica Seiden, Estuarine Reserves Division
Erik Smith, Research Coordinator, North Inlet-Winyah Bay Reserve, SC
Chris Snow, Stewardship Coordinator, Chesapeake Bay-MD Reserve
Kit Van Wagner, Education Coordinator, Narragansett Bay Reserve, RI

SUBJECT:

Contributions of Volunteers

ISSUE:

Annual SSNERR Management Commission recognition of South Slough Volunteers

BACKGROUND:

At their 114th regularly scheduled meeting held in November 2005, the SSNERR Management Commission initiated a process to formally recognize the service of volunteers. The Commission agreed to recognize the contributions of volunteers by taking the following actions.

- Each person who has contributed more than 10 hours during the previous year shall receive a thank you letter signed by the Chair of the Commission.
- People who have volunteered at the Reserve for one year or more will be given certificates marking their ongoing contribution of time measured in three-year increments. In addition, the names of volunteers with three or more years of service should be added to a volunteer recognition plaque displayed in the Reserve's Interpretive Center.
- Volunteers who have made unique and significant contributions as recommended by the Reserve staff should also receive special recognition at the meeting.

Listed below are the names of individuals meeting one or more of the above criteria for volunteer recognition. Though every effort was made to be as inclusive as possible in compiling the following list we recognize that the voluntary contributions of some may have been omitted. South Slough Reserve is grateful for all who have donated their time and care for this special place over the years whose name(s) may not be noted in this report.

Volunteer Service Award Nominees for 2011

* = SSNERR Commission member

** = FOSS Board member

Each person who has contributed more than 10 hours during the previous year will receive a thank you letter signed by the Chair of the SSNERR Commission.

The following people have volunteered at the Reserve for one year or more and will be given certificates marking their ongoing contribution of time measured in three year increments.

Casey Broderick, Thomas Carpenter, Emily Wright, Kileen Mitchell.

The following individuals have volunteered for three or more years. Their names will be added to the volunteer recognition plaque displayed in the Reserve's Interpretive Center:

Anterra, Susan Brawnlyn, Judy Brown, George Boehlert, Sue Cameron**, Sharon Cawley, Lois Christensen**, Curt Clay, Valerie Cooley**, Nina Gee, Harriet Egby, Robert Emmet*, James Fereday*, Richard Hamel, Ralph Helske, Mark Ingersoll*, Nicole Jackson** *, Andrea Knutsen, Dan Krossman, Steve Larsen, Jan Long, David Lunde**, Anne Matthews, Phillip Matthews, Laura Mays, Lonnie Mays**Patricia McKillip**, Joe Neill, Heather Pedersen**, John See, Mary Ann Sherlock, Bob Sleeth, Karen Sparks, Janet Stoffel, Ron Stuntzner*, Sarita Southgate, Lora Wehner, Dick Vigue, Louise Whitehead, Craig Young*, Tom Younker**.*

Volunteers who have made unique and significant contributions in 2011 as recommended by the Reserve staff

Joanna Choi, Summer Sea Grant Scholar whose OLY-ROCS project consisted of work on a new kind of artificial breeding structure for oysters at the South Slough National Estuarine Research Reserve.

Dan Abel in recognition of valuable contributions of time and effort building the equipment shed for the new aquaria exhibits and for building numerous bird and bat houses for SSNERR education programs.

Lonne Mays in recognition of valuable contributions of his time and effort to further the work of the Friends of South Slough. Especially for designing and building the awesome National Estuaries Day 2011 education maze!

In Memory of,

Ida Mae Bone

(June 9, 1923-January 6, 2012)

Ida Mae was a founding member of the Friends of South Slough Reserve, Inc and also prepared the early versions of the South Slough Newsletter, the South Slough Soundings and edited "South Slough Adventures" the first book published by the Friends of South Slough . Ida Mae was a longtime member of St. Monica Catholic Church, the North Bayside Grange, Order of the Runneberg, and the Coos Bay Garden Club. She worked at Bay Area Hospital. She and her husband Evan raised rhodies and azaleas. They enjoyed the outdoors, gardening and gatherings at their home with family and friends.

Ellen Holbert Ellen

(June 10, 1931 - June 10, 2011)

Ellen lived her entire life with deep dedication of service to others through civil activities and personal contact. She served in numerous capacities with the Friends of South Slough, Girl Scouts of America, 4H, Oregon State Extension Services, Coos County, Englewood Garden Club, Optimist International, and Coos Bay Sister City Association.

Ellen most enjoyed gardening, wild mushroom hunting, picking blueberries, blackberries, red huckleberries, wild plums, crabbing off the docks, clamming, fishing, and then taking the bounty home to cook a gourmet meal or putting up wonderful preserves for her family.

Dennis James Phillips

(December 9, 1942 - January 1, 2012)

Dennis was born and raised in Baltimore, Md. He graduated from the University of Maryland and attended graduate school at the University of Oregon, earning his teaching certification. He taught in Maryland, Ecuador, Siletz, Coos Bay and North Bend.

Dennis volunteered at South Slough for the past 10 years and spent many hours helping Reserve staff collect and mark plants and field data, identifying invasive plants and helping Reserve staff implement eradication methods to keep the Reserve as free of these as possible. Dennis was responsible for creating the South Slough Reserve herbarium, a "library" containing hundreds of dried and pressed plant specimens collected from Reserve habitats. Dennis also contributed to the Reserve a vascular plant database he created earlier in his professional career as a biologist. Reserve staff have adopted the database which stands as our primary record of plant species found in South Slough and surrounding watersheds.

Subject:

Election of Management Commission vice Chair

Issue:

The position of vice Chair of the SSNERR Management Commission, formerly held by Rich Hamel is currently vacant.

Background:

Section 1. of South Slough NERR’s enabling legislation (ORS 273.554) directs the Management Commission to elect a vice chairperson. The relevant section of the statute reads as follows:

“The commission shall select one of its members as vice chairperson. The chairperson and vice chairperson shall have duties and powers necessary for the performance of the functions of such offices as the commission determines. The vice chairperson shall act as the chairperson of the commission in the absence of the chairperson. The vice chairperson shall serve for a term of one year, subject to reelection by the commission.”

Staff recommendation:

The Commission should elect a member to serve as vice Chair.

Informational

Subject: Performance Measures

Issue: Status Performance measurement activities at the South Slough NERR.

Background:

SSNERR personnel have created and report on key measures of performance at the state and national level. In addition to the goals and objectives outlined in SSNERR's adopted management plan, staff have developed performance measures as required by SSNERR's state and federal sponsors that focus on the SSNERR's Education, Volunteer, Research, Stewardship Training and Operations. The following is a summary of the current status of performance measurement activities at the South Slough NERR.

Performance measurement in Oregon

Oregon has used some form of performance measurement system since the late 1960s. Performance initiatives varied widely between the late 1960s and the 1980s, and there were no legal statutory requirements governing performance reporting during this period.

The initiation of the "Oregon Shines" program in 1989 was the basis for development of the Oregon Benchmarks in the early 1990s. The current legal framework governing performance measures for state agencies was passed by the 1993 Legislative Assembly. These statutory requirements promote developing performance measures in state agencies and making connections to the Oregon Benchmarks.

Performance measurement efforts prior to 1989 were primarily initiated by the executive branch with little involvement by the Legislature. During the 2001-03 legislative session, a Performance Measures Advisory Group was convened to establish guidelines to be used by all state agencies when developing, reviewing, and reporting their performance results. The advisory group created a set of guidelines that established a standardized approach to identifying and reporting agency key performance Measures (KPM). The goal was to have a measurement system that was based on legislative expectations, that was linked to the Oregon Benchmarks. The guidelines also made performance measurement review a part of the budget development process.

In 2007 the KPM processes and administration changed hands, moving from the Oregon Progress Board to be jointly managed by the Department of Administrative Services' Budget and Management Division and the Legislative Fiscal Office.

Since 2001, all Oregon agencies must report on a set of key performance measures (KPM) that are reviewed and approved as part of Oregon's budget development process. Each biennium, state agencies have the opportunity to propose additions or deletions to their approved KPM when making their formal budget request. Agencies are to work with Budget and Management and Legislative Fiscal Office budget analysts prior to making a formal change request. Approval for proposed changes is ultimately made by the Joint Ways and Means Committee of the Oregon Legislature. This past year the SSNERR staff worked with personnel from the Legislative Fiscal Office and the Budget and Management Division to revise one of SSNERR's key performance measures.

The Department of State Lands Key Performance Measures that currently relate to the South Slough NERR are as follows:

KPM # 13 Customer Service – Percent of customers rating their satisfaction with the agency's customer service as "good" or "excellent": overall customer service, timeliness, accuracy, helpfulness, expertise and availability of information. *Target: 93%*

KPM # 15 South Slough National Estuarine Research Reserve Operation Costs Leveraged – Percent of SSNERR operations funded from sources other than the CSF, including leverage from grants, fees, program revenues and gifts. *Target: 10%*

KPM # 16 South Slough National Estuarine Research Reserve Education Actions – Percentage of SSNERR education programs that use a structured assessment process (surveys) to provide information and decision support services responsive to audience needs. *Target: 2012 – 37.5%; 2013 – 37.5%*

Update on Performance Measures at NOAA's Estuarine Reserves Division

South Slough NERR's federal partner at NOAA instituted a performance indicators measurement program in 2006. Since that time SSNERR has also been required to compile and report performance measures related to the South Slough NERR program to NOAA.

In late 2011, NOAA's Office of Coastal Resources Management created a new Performance Monitoring Database for the entire NERR system. The goal was to create a central location for NERRS performance data and to facilitate use of the data to produce performance reports. The database is internet accessible and combines all of the performance data collected under the Coastal Zone Management Act (CZMA).

NOAA also recently made several changes to the NERRS performance measures reporting system. Some of the existing NERRS performance measures have been revised, eliminated, or archived. A few new measures have been added. The new measures are being phased in. Reports on some of the new measures will be optional in FY2011; other new measures are required starting January 2012.

Summary of information reported to NOAA's Performance Measures program

- | | |
|---|----------------------|
| 1. Volunteer Hours (every 6 months) | Required for FY 2012 |
| 2. Research Measures (at 12 month report) | Required for FY 2012 |
| 3. Education Outputs (every 6 months) | Required for FY 2012 |
| 4. Education program description | Optional for FY 2011 |
| 5. Education success stories | Optional for FY 2011 |
| 6. Education program results | Optional for FY 2011 |
| Info on purpose, audience, scale, partners, literacy principles for | |
| Professional Development Programs | |
| Student Programs | |
| Public Outreach Programs | |
| Community Education Programs | |
| 7. Coastal Training Program Training Activities | Required for FY 2012 |
| 8. Technical Assistance | Optional for FY 2011 |
| 9. Coastal Training Program Success Stories | |
| (one story for FY11) | Required for FY 2012 |
| 10. CTP Outcomes (reported as they happen) | Optional for FY 2011 |

Update on Performance Measures associated with NOAA's 312 program evaluation program.

In addition to the performance measures listed above, NOAA's Office of Ocean and Coastal Resource Management (OCRM) is currently working with individual reserves to establish NERR-specific performance metrics to be used as part of OCRM's required Coastal Zone Management Act Section 312 evaluations of reserves. Section 312 evaluations are meant to review progress of reserve-specific program implementation and to better understand and evaluate a reserve's unique context, local relevance, and performance as a partner in the national system. Specific targets and measures provide an additional source of data to help inform the overall evaluation of a reserve. These targets and measures will provide a quantitative reference for each reserve about how well it is meeting the goals and objectives it has identified as important to the program. The metrics should be useful in demonstrating program progress to partners, state agencies, a Governor's office, and the public.

To meet this evaluation objective NOAA is requiring each Reserve to identify three objectives from which to derive performance measures. It is acceptable to use one goal with three objectives, two separate goals with a combination of three objectives, or three separate goals with one objective for each, so long as three measures, each with an associated target, are established. These goals and objectives should reflect important priorities at the SSNERR or help to highlight SSNERR's unique identity. The corresponding measures will be used during Section 312 evaluations to illustrate the progress of individual reserves.

The three performance measures adopted to support the NERRS 312 program evaluations are to include targets that relate to the identified goals and objectives. The quantitative targets should cover a period of five years, the time period corresponding to the time period of NOAA's Section 312 evaluations.

Informational Items

Administration updates

Personnel/Research Coordinator position

Staff Departures: After serving for more than 22 years as the first research program coordinator at the South Slough NERR, Dr. Steve Rumrill resigned his position on October 24th 2012. Steve has taken the State Shellfish program leader position with the Oregon Department of Fish and Wildlife in Newport Oregon.

Ali Helms, SSNERR's Estuarine Monitoring Coordinator, is currently serving as the Acting Research Program Coordinator. SSNERR personnel are working with finance and Human Resources staff at the Department of State Lands to revise the position description and set out a national recruitment strategy to find a qualified candidate to fill this key staff position.

Staff Arrivals: The Friends of South Slough and the staff of SSNERR are hosting a VISTA volunteer; Kileen Mitchell who will be working to develop a work experience program at South Slough over the coming year. She began her one year assignment in November 2011, and will work until sometime in October, 2012.

Kileen graduated with distinction with a Master's degree in Community and Regional Planning from the University of New Mexico. Her degree emphasis was Natural Resource/Environmental Planning. Her undergraduate degree is in Communication. She has previously served in the Peace Corps (Nicaragua).

Killeen will help the Reserve develop the recruitment and training elements of a work experience internship program aimed at students seeking real-world job skills in a variety of career paths including scientific research, nature and ecology based education, customer service, retail sales, landscape maintenance, habitat restoration, and non-profit work.

CELCP program update

SSNERR staff are working with personnel at the Oregon Department of State lands and the Department of Justice to transfer stewardship responsibilities for 312 acres of forested habitats in the eastern portion of the reserve from the Oregon Department of Forestry to the SSNERR Management Commission. The transfer is scheduled to be finalized sometime prior to July 2012.

SSNERR Education Program update

November 16, 2011 through March 9, 2012

The Reserve typically experiences low public visitation and reduced program demand during the winter months. Winter weather complicates field experience scheduling and dissuades visitors from walking the trails. This winter the interpretive center hours of operation were reduced in order to complete scheduled maintenance and repair work. This work resulted in lower than normal winter education program participation.

Education program staff work during this period emphasized proposal development, curriculum development, and facility related improvements to exhibits and trails. Staff also participated in planning and educator workshops that provided valuable opportunities to advance SSNERR's education program outlook for the coming year.

Education Program Totals

For the period from November, 2011 to March 10, 2012, a total of 33 educational activities were conducted for 495 participants. 88.5 contact hours and 65 hours of preparation were recorded. These totals include all types of education, interpretation, training, and outreach. Staff worked to modify the education program tracking system to better align it with NOAA's Performance Measures Database. This work involved modifying definitions historically used by South Slough's education program to address the definitions of audience types used by NOAA's newly revised performance tracking system.

Including visitors to the South Slough Interpretive Center, a combined total of 957 people learned about estuaries and coastal watersheds through South Slough educational programs during this period.

Visitation and Visitor Services

During this period, 462 people visited the interpretive center: an average of 7 visitors per day. The period covered by this report spanned 66 days when the South Slough Interpretive Center was open to the public. Typical public hours for the building remain 10am – 4:30pm, Tuesday through Saturday throughout the year.

One state-wide mandatory furlough day closure occurred on a Friday in November. During furlough closure weeks the interpretive center is closed to the public on Friday and on the Saturday immediately following furlough days. The interpretive center was also closed for a period of two weeks in late November and early December to conduct maintenance and building repairs.

Formal Education & Training

During the period from November to March, 7 formal education programs were offered for 203 participants. A total of 24 contact hours and 13 hours of preparation time were recorded.

These programs included work with elementary, high school, and college classes and instructors. Specifically, staff worked with classes from the University of Oregon, Southwestern Oregon Community College, Williams Mystic Maritime Studies Program, Madison Elementary, and Kennedy Alternative High School.

Teacher education activities were conducted for five 3rd grade instructors from Madison Elementary to support upcoming field experiences at the reserve. In addition, a planning meeting with 6th grade teacher Adria Malcolm at Sunset School was held to facilitate the development of the “Coast to Classroom” distance learning activities associated with the Oregon Coast Education Program.

A new grant proposal was submitted to the Oregon Community Foundation requesting \$30,000 to support the work of the Oregon Coast Education Program in furthering teacher professional development and field experiences for students. Proposal review will take place during April with award notifications expected by June. If funded the proposal will support a series of teacher training workshops in late summer and fall of 2012.

We also submitted a \$60,000 proposal to NOAA’s Bay Watershed Education and Training (B-WET) program. NOAA has ranked proposals but funding was for the FY11 B-WET program was not confirmed until recently. Recent information suggests that a funding award for FY12 may be possible.

Oregon adaptation of Estuaries 101 High School curriculum

South Slough staff is working to develop an Oregon-specific, on-line adaptation of an Estuaries 101 activity. Estuaries 101 is a national curriculum developed by the NERR educators. The activity is designed to highlight the form and diversity of Oregon’s estuaries using Google Earth as a platform. This work is being conducted on behalf of the Oregon Coast Aquarium under the direction of Sea Grant Education Director Nancee Hunter. Work is expected to be completed by early April.

Community Education, Interpretive & Outreach Activities

Interpretive programs continue to be offered for a diverse public audience of children, adults, and families. A total of 14 interpretive programs were offered and 157 people attended activities ranging from guided walks to workshops. 30 hours of contact and 16 hours of preparation were recorded. Community education activities accounted for 12 activities and an additional 135 participants and 34.5 contact hours. 36 hours of preparation time were recorded.

“Watershed to Oyster Beds” exhibit

A new exhibit has been installed at the SSNERR Interpretive center. The work included the construction of an equipment shed, life support system, and installation of two aquaria and a terrarium. Ko-Kwow Arts and Exhibits of North Bend has completed the mural, cabinets and associated diorama providing the artistic backdrop for the tanks.

All construction will be complete prior to the April 21st debut of the exhibit planned to coincide with Earth Day. This will include the introduction of live animals and plants into the tanks. Current work involves water conditioning, installation of stream features in the terrarium and monitoring the life support system. Once a regular schedule of daily, weekly, and monthly maintenance and animal husbandry is established, a volunteer training program will be designed and an intern will be recruited to assist with this work.

Public Involvement

Volunteers

From January to February 2012 SSNERR volunteers logged in 619.5 hours valued at \$13,232.52. Contributions included 46.5 hours in support of education programs, 12.5 hours in support of research and stewardship, 479.25 in support of administration, and 81.5 hours in support of other programs. The significant contribution of volunteer hours attributed to administration represent the volunteer work of the Friends of South Slough board of directors and AmeriCorps and VISTA volunteers. The “other” category contributions included carpentry work for the aquarium shed and a 13 person service learning work crew from the community college recruited by the VISTA volunteer.

Since beginning the formal volunteer training program, several training modules have been offered including; visitor services, working with children, trail interpretation, plant identification, guiding hikes, and paddle safety training. Through these courses, we have recruited 4 new volunteers and our current volunteers are exploring different areas of service. This summer we plan to implement four more volunteer training modules focused on outreach, interpretive program delivery, and biological monitoring. We also plan to repeat our front desk training module.

SYSTEM-WIDE MONITORING AND RESEARCH PROGRAM UPDATE

December 2011-March 2012

NERRS System-wide Monitoring Program (SWMP)

Ali Helms and Adam DeMarzo continued to operate the water quality, weather and nutrient components of SWMP.

We completed monthly field and lab work associated with the water quality, weather, and nutrient long-term monitoring stations. We completed quarterly data submissions on time and will complete the 2011 annual submissions for water quality by March 15, 2012, for weather by April 15, 2012, and for water column nutrients by May 15, 2012. Data submissions require staff to subject the data gathered to several quality assurance and control procedures and to compile metadata, and lab calibration and field logs before sending the reports to the Centralized Data Management Office (CDMO).

We are replacing the 6600 EDS water quality sondes used in the SWMP program with new V2 models recently purchased with funds from the Northwest Association of Networked Ocean Observing System (NANOOS). The V2 sondes are replacing aged instruments and allow collection of optical Dissolved Oxygen, which is an improvement over the older style membrane oxygen sensors.

We also purchased a second set of meteorological sensors using NANOOS funds. This purchase will make the annual/biannual sensor calibrations more efficient than the current situation.

As a participant in the US Integrated Coastal Ocean Observing System, we operate telemetry systems at three of the four water quality stations and the weather station to provide real-time data available at www.nerrsdata.org.

In Feb 2012, Acting Research Program Coordinator Ali Helms attended the annual SWMP Technician Training Workshop hosted by the CDMO in South Carolina. This workshop provides information on all elements of SWMP.

Additional Research and Monitoring Projects

Bacteria Monitoring

We continued monthly monitoring of fecal indicator bacteria at the SWMP nutrient monitoring stations. Water born bacteria levels are of interest to the Partnership for Coastal Watersheds project, are used by the Oregon Department of Environmental Quality to calculate Total Maximum Daily Load standards for permit purposes and to the Oregon Department of Agriculture as they conduct commercial and recreational shellfish contaminant assessments. Volunteers from the Surfrider Foundation continued to use the lab for their routine monitoring of fecal indicator bacteria at local beaches.

Eelgrass Monitoring

Ali Helms and Adam DeMarzo completed quarterly eelgrass sampling at Valino Island using the SeagrassNet sampling protocol. SeagrassNet is an international monitoring program established to document the status and health of seagrasses. Preliminary data analysis from 2004-2010 showed eelgrass spatial cover and density were increasing slightly at SSNERR's sampling locations.

Northwest Association of Networked Ocean Observing System (NANOOS)

South Slough is a participant in a partnership project that provides real-time water quality data for shellfish growers in Oregon, Washington, and Alaska. <http://www.nanoos-shellfish.org>

Restoration and Recovery of Native Olympia Oysters

A collaborative approach to address larval supplies and settlement as critical early life-history issues during restoration of native Olympia oysters is a research project funded by the NERRS Science Collaborative aimed at determining the fecundity and timing of reproduction, larval supplies, dispersal, and settlement of Olympia oysters in Coos Bay and the South Slough. Project partners are South Slough, University of Oregon, and Oregon Sea Grant Extension Program.

As part of the project requirements, the first Olympia Oyster Recovery Advisory Committee meeting, led by Steve Rumrill, was held Feb 28, 2012. The team of co-investigators participated along with others to integrate the perspectives from agency, academic, mariculture practitioner, and recreational stakeholders to discuss the three graduate research projects and to begin thinking about longer term strategies to assist the recovery of native oyster populations.

Proposals

South Slough submitted a proposal in Oct 2011 to Coastal and Ocean Climate Applications/ NERRS Partnership on Coastal Adaptation and is waiting for review decisions by the NOAA Climate Program Office later in March 2012. South Slough's project proposal is to conduct climate vulnerability assessments in the Coos and Coquille estuaries.

Graduate Research Fellowships

NOAA / Estuarine Reserves Division provides financial support for NERR Graduate Research Fellowship grants awarded to graduate students who conduct their thesis work at the South Slough NERR. The current GRFs are Matthew Gray (Ph.D. candidate Oregon State University) and Kira Treibergs (MS Candidate University of Oregon – Oregon Institute of Marine Biology).

Matt's GRF proposal is titled "Interspecific competition between native Olympia oysters (*Ostrea lurida*) and introduced Pacific oysters (*Crassostrea gigas*)." He is supported for up to three years to compare and contrast the feeding biology of Olympia and Pacific oysters in South Slough and Yaquina Bay.

Kira's GRF proposal is titled "Evaluating the presence and physiological tolerances of invasive fouling organisms in South Slough, Charleston, OR." She is supported by a one year grant to monitor settlement and fouling community development on artificial substrata at six locations in South Slough.

Stewardship Program Update

Quarterly Stewardship Program Activities – November 2011 through March 2012

I. Watershed Activities

A. Reserve staff made site visits to the location of two planned timber harvests along and above 1 km reach of the west fork Winchester Creek in the Coos County forest. This stream reach is the only coho salmon spawning habitat remaining in the Winchester Creek system. Participating in the visits were: Coos County Forester, Lance Morgan; county forester, Scott Nichols; ODFW's Habitat Protection Biologist, Chris Claire; ODF's Stewardship Forester, Delos Devine; and SSNERR's Craig Cornu. The participants walked the boundary of the proposed timber sales, identified the location and extent of the coho salmon spawning reach, and discussed options to maintain, and enhance salmon spawning habitat in the west fork Winchester Creek's over the near and long term. Examples of option discussed included the possibility of using the timber sales as opportunities to place additional spawning gravel in the steam and options to convert alder-dominated riparian areas to conifer-dominated stands. The Coos County Department of Forestry plans to put these timber sales up for bid soon with the harvests to be completed in 2012.

These meetings have led to ODFW and SSNERR to identify finding stream reaches in other Winchester Creek tributaries with conditions that may sustain a spawning gravel enhancement effort. ODFW, Coos County, and SSNERR staff are working to identify programs that may provide funding for such efforts. Establishing and enhancing additional spawning reaches in the Winchester system would help enhance the resiliency of the existing coho salmon run.

B. SSNERR is starting to use GIS mapping tools to characterize a suite of conditions in the South Slough watershed (see attached map). As a test case we mapped the Oregon Department of Forestry activity notices we receive by subscription. When shapes on the GIS map are selected, details about the associated activity become visible. Details

include hyperlinks to scanned copies of the notices so we can review the original source of the information. We plan to expand this effort to include other activities in the watershed. The maps will enable staff members to more effectively track activities in the watershed. This project is made possible by coordination between SSNERR's monitoring, stewardship and administrative staff (Kathy Andreasen).

II. Watershed Monitoring

- A. Partnership for Coastal Watersheds Project: Implementation of the \$216K Cooperative Institute for Coastal and Estuarine Environmental Technologies (CICEET)-supported project made the following progress over the past several months (in partnership with the Coos Watershed Assn.):

South Slough NERR and CoosWA staff have continued to collect new data (see list below) and compile existing data describing various attributes of the project area. This effort is keyed to the community vision statements developed by partner members that articulate desired conditions for our project area 20 years from now. We are compiling the new and existing data into a series of "State of the Watersheds" summaries to help the Partnership group develop a common understanding of the current social, environmental and economic conditions here. We plan to use these status summaries to create a prioritized action plan designed to help our community work towards its vision, and as the basis of an indicators-based watershed and community monitoring framework (see below).

Attached to this document is the first draft of the Status of the Watersheds summary table. Each of the watershed attributes summarized in the table includes a brief data summary which will form the foundation of a Status of the Watersheds document that will be made available on the project web page.

Work on compiling the summaries is in progress and involves aggregating a lot of information from a variety of sources. We presented example summaries at the January 2012 the Partnership Steering Committee meeting and have organized technical advisory groups to help us identify, compile, and interpret relevant socioeconomic and bio-physical data of interest to the group.

Once the 1-3 page data summaries are compiled the Partnership advisory group members will be invited to comment on our approach, the interpretation of the

data and the conclusions drawn. We are currently working to finalize the advisory group meeting dates.

In January 2012, SSNERR staff submitted a pre-proposal to the NERRS Science Collaborative requesting \$550,000 to develop the next phase of the Partnership project and expand the project's geographic scope to the Coos estuary and associated sub basins. We have proposed to expand on the environmental and socioeconomic monitoring framework established during the initial "demonstration" phase of the Partnership for Coastal Watersheds project to develop robust and meaningful indicators that will allow the community to track environmental and socioeconomic conditions in the lower Coos Watershed for the purpose of informed community decision making. Included in the proposed project budget is full or partial support for three existing SSNERR positions, one formerly existing but key position (data manager), and one assistant position designed to be filled by an at-risk community member recruited through the program being developed by our Vista volunteer.

- B. NOAA Restoration Center-funded reference site monitoring project (in partnership with Wells NERR (Maine), Narragansett NERR (Rhode Island), North Carolina NERR, and the Chesapeake (VA) NERR): This multi - site NERR project is nearing completion. As reported previously, SSNERR has submitted our final report to the grantor and other members of the project team. SSNERR staff have recently provided comments to the Wells Maine NERRS staff tasked with writing the overall project report which synthesizes the five site reports and summarizes field-tested recommendations for improving restoration effectiveness monitoring using reference site comparisons. Once the final text is completed, SSNERR staff will prepare the report's executive summary and design a report format suitable for NOAA-wide distribution. The summary will include highlights of site-specific project results from the report. The final report will be completed before the end of May 2012.

The final South Slough NERR site report is available here:

<https://www.onlinefilefolder.com/2seYMECSi0uKI5>

III. Meetings / Presentations

South Slough NERR Coordinator of Monitoring Programs, Craig Cornu:

- December 2011- Participated in the third meeting organized by DSL staff with representatives from a variety of natural resource agencies and organizations with interest in wetland issues to work on the development of an Oregon Wetland Monitoring & Assessment Strategy.
- December 2011 and January 2012- Organized timber sale site visits with County, ODFW and OFD representatives along the west fork Winchester Creek coho spawning reach (see above).
- January 2012- Delivered State of the Watersheds report presentation at the Partnership for Coastal Watersheds Steering Committee meeting.
- February and March 2012- Met with final year University of Oregon architecture students to provide local information and programmatic guidance for their design studio projects focused on developing interpretive and overnight retreat facilities for the South Slough NERR. Also provided extensive support by way of CAD and GIS maps and data layers.
- February 2012- Presented SSNERR's estuarine wetland restoration projects via PowerPoint presentation and field visits to 16 members of Scott Bridgham's University of Oregon estuarine ecology and management class.
- February 2012- Met with Irene Ulm (ODOT), Ali Helms and Mike Graybill to discuss on-going monitoring associated with the SSNERR-ODOT agreement for the Siuslaw River eelgrass transplant project initiated and implemented by Steve Rumrill prior to his departure.
- February 2012- Participated in three meetings of the Southwest Oregon Coast Region Ford Institute Leadership Program. The Ford Institute Leadership Program this year is targeted towards people interested in taking to the next step the community visioning concepts outlined in the Sustainable Design Assessment Team (SDAT) report that was developed by an American Institute of Architects group for Coos County last year (SSNERR staff- Mike Graybill was on the SDAT steering committee).
- March 2012- Participated in a project design review as a member of the Waite Ranch Restoration project advisory group organized by the Siuslaw Watershed Council and McKenzie River Trust.

- March 2012- Met with Steve Denny, of the Nature Conservancy to discuss channel restoration issues and fish habitat requirements associated with a complicated 400+ acre estuarine wetland restoration project planned for the Coquille Valley. This project will likely involve additional advisory meetings and probably a site visit to the SSNERR estuarine wetland restoration project sites.
- March 2012- Met with Cathy Pennington, director of Shama House, a local mental health facility that works to train and place at-risk community members in productive work environments. Meeting was one of several over the past 6 months to check in on their training of one of SSNERR's long time volunteers with the ultimate goal of finding part-time work at SSNERR or similar science-based organization.
- March 2012- Participated in a meeting with representatives of the city of Coos Bay, Coos Bay Schools, Oregon International Port of Coos Bay, CH2M Hill, ODFW, US Department of Agriculture and Audubon Society to discuss options for addressing the dramatically increasing nutria population (and related property/marsh damage/alterations) and associated decline in beaver population at Millicoma Marsh. SSNERR has a long-standing relationship with the Millicoma Marsh, having been involved in enhancing the freshwater wetland habitat there in the early 1990's. We have also been involved in developing interpretive panels for the Millicoma Marsh trail and have been part of its stewardship group for many years.