

Buoyancy and bailing to keep afloat over 30 years: a case study of the South Slough National Estuarine Research Reserve (Charleston, OR, USA)

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ABSTRACT

Estuarine tidal channels, marshes, and coastal forest habitats encompassed by the 5,000 acre South Slough National Estuarine Research Reserve (NERR) constitute the first estuarine MPA afforded permanent protection under Section 315 of the US Coastal Zone Management Act (1972). With a 30-year record of support from a diverse portfolio of federal-state partnerships, grant funds, and contributions from citizens and non-governmental organizations, the South Slough NERR provides a successful model of long term economic MPA sustainability.

As the founding member of the existing network of 26 National Estuarine Research Reserves, South Slough NERR draws its principal financial support from a long-term partnership between the state of Oregon and the federal government's National Oceanic and Atmospheric Administration (NOAA). Through this partnership agreement, the South Slough NERR receives an annual operations award (interagency co-operative agreement) that is a mixture of 70% federal and 30% state dollars. Federal support (70%) for essential operations at the South Slough NERR has grown from initial assistance awards of about \$60-400K per year during the period of major land acquisitions and start-up (1974-1980), to annual allocations of about \$100-185K during the period of program establishment (1981-2000), and to about \$375-415K per year during the recent period of program growth (2001-2005). Likewise, matching contributions from the state of Oregon (30%) have kept pace and allowed the South Slough NERR to develop robust programs in research, monitoring, education, stewardship, volunteerism, maintenance, and administration. Aggressive recruitment of external grant funds has enabled South Slough NERR to further engage in innovative research and resource management projects. In addition, a group of dedicated citizen volunteers has formed an independent non-governmental organization (Friends of South Slough) whose members are active in fundraising and promotion activities in support of the mission of the Reserve. Finally, a generous estate contribution left to South Slough NERR has demonstrated the exciting possibility of supporting MPA sustainability through legacy donations. In summary, the South Slough NERR's navigational compass and essential buoyancy is provided by the federal/state partnership, while periodic bailing (grant writing) provides secondary stability and citizen advocates put wind in the sails.

I. Background on the National Estuarine Research Reserve System

The United States currently administers a diverse patchwork of Marine Managed Areas (MMAs), some of which meet the U.S. legal definition for Marine Protected Areas (MPAs). The network of MPAs formally designated as the National Estuarine Research Reserve System (NERRS) qualify for recognition as a special category of MPAs that focus on estuaries and coastal embayments (Figure 1). Creation of the NERRS was authorized by Section 315 of the Coastal Zone Management Act of 1972 as amended. The network of NERR sites are united by a common mission to ensure:

the establishment and management, through federal-state cooperation, of a national system of estuarine research reserves representative of the various regions and estuarine types in the United States. National Estuarine Research Reserves are established to provide opportunities for long-term research, education, and interpretation (National Oceanic and Atmospheric Administration 2004a).

The NERR system operates purposefully as a voluntary partnership program between the National Oceanic and Atmospheric Administration (NOAA) and participating coastal states. The NOAA – Office of Ocean and Coastal Resource Management (OCRM) provides national leadership and federal administration for the program, essential funds for operations, guidance and oversight for core programs, and technical assistance with the site designation process. Coastal states nominate appropriate locations for new reserve sites, provide matching funds, and in many cases provide administrative support. Collectively, NERRS sites encompass more than one million acres of estuarine and coastal lands in 26 separate reserves spanning 21 states (National Oceanic and Atmospheric Administration, 2004a).

The collection of NERR sites represent a wide range of geographically diverse coastal areas from which to conduct regionally-relevant research on fundamental and applied topics in estuarine ecology, and they contribute to a nationwide understanding of long-term trends in the status of estuarine habitat conditions. The NERR system also provides a framework through which research results and techniques for estuarine education and interpretation can be shared throughout the region and across the nation (Donnelly 1994). The guiding philosophy behind the NERRS program is to encourage Reserve to serve as a “living laboratory” where scientists conduct research and stewardship activities, and professional educators communicate the results from scientific studies to the public (National Estuarine Research Reserve Association, 2002). Program priorities are guided via nationally-adopted initiatives that support graduate-level scientific research, ambient monitoring of estuarine environmental status and trends, marine science education, and technical training for coastal managers.

II. Overview of the South Slough National Estuarine Research Reserve

Estuarine tidal channels, marshes, and coastal forest habitats encompassed by the 4,779 acre (18.2 square kilometers) South Slough National Estuarine Research Reserve (NERR) constitute the first estuarine MPA afforded permanent protection under the US Coastal Zone Management Act of 1972 (Figure 1). The South Slough NERR was established in 1974 as the founding member of the network of 26 National Estuarine Research Reserves, and is recognized by the U.S. MPA Center as the 4th oldest designated MPA in the U.S. (G.Moretti, personal communication, January 3, 2005). Dedicated to research, education, and environmental stewardship, this outstanding natural area encompasses roughly 800 acres of water and tidally influenced habitat, 115 acres of riparian habitat and 3,850 acres of steep coastal forest (National Oceanic and Atmospheric Administration, 2004b).

South Slough NERR exists as a federal:state partnership between the US National Oceanic and Atmospheric Administration and the state of Oregon Department of State Lands (ODSL). Under the terms of this longstanding administrative partnership, NOAA provides operational funds for several staff positions, program costs, and support for participation in system-wide initiatives, while the ODSL provides funds for other staff positions, administrative support, oversight via an appointed Management Commission, and partial funding for Reserve operations.

III. Financial History of the NERRS and South Slough NERR

A. Programmatic Growth and Financial History of the NERRS

Designation of the South Slough NERR in 1974 was accompanied by an initial federal appropriation of \$4M that was used primarily for the purposes of land acquisition and start-up costs associated with the new NERR program. During the start-up period of 1974 to 1980 the entire NERRS program grew quickly to include nine designated Reserves, and annual NOAA appropriations became established at a level of about \$3M (Figure 2). New Reserves were added to the system at a particularly rapid rate between 1977 and 1980, followed by a steady increase in the number of participating NERRs from 1981 to 2004 (when the system grew to its present size of 26 NERRs (and several proposed sites) at the rate of one new NERR site about every 16 months). Annual appropriations increased gradually from about \$2.8M to \$6.5M during 1981-2000, and the costs for system-wide programs and projects (funds that are not available for NERR site-based operations) varied between 25 to 35% of the annual appropriation. These system-wide programs and projects include competitive funds allocated directly to outside scientists (NERRS research grant program), funds for data archival and web-based access services, funds awarded to outside contractors to pay for system-wide educational projects (posters, brochures, promotional materials, etc.), travel costs, annual meetings, and program administration fees. In accordance with the concurrent increases in federal appropriations and in the growing number of eligible NERR sites, the level of federal support made available per Reserve for NERR site-base operations remained generally stable over a period of about 18 years (from about \$124K in 1982 to about \$172K by 2000). The annual NOAA appropriation for the NERRS program increased markedly to over \$14M in 2001, and the level of federal support available per Reserve increased concomitantly to over \$394K per year in 2001-2004.

After the change to the new millennium, the increase in federal funds awarded to both: (a) the NERRS as a network of estuarine MPAs, and (b) individual Reserve sites, has allowed for development of new system-wide initiatives and for significant and substantial growth of the site-based programs. These system-wide initiatives include the NERR Graduate Research Fellowship Program (GRF / which provides annual financial support for over 50 graduate students per year as they conduct thesis research within the NERR estuaries), the NERR System-Wide Monitoring Program (SWMP / a multi-disciplinary estuarine monitoring program that collects spatially-explicit measurements of short-term variability and long-term change in a suite of water quality parameters, nutrients, and meteorological conditions), the NERR Estuary-Live Program (E-Live / an annual web-based live broadcast by speakers who address a variety of estuarine topics for a target audience of school children), and the NERR Coastal Training Program (CTP / an adult-education and technical-transfer program aimed at an audience of resource stakeholders and coastal managers). The increased availability of federal funds has also allowed the individual Reserves to develop robust habitat assessment programs that utilize remote sensing imagery and Geographic Information System technology, initiate progressive actions to restore and enhance degraded estuarine habitats, enter into cooperative resource management agreements, build research laboratories, construct interpretive centers with interactive exhibits and outstanding visitor services, provide opportunities for participation in Reserve activities by volunteers, and take other steps to address the broader NERR mandate to contribute to increased understanding, appreciation, and improved management of the nation's estuaries.

B. Financial History and Maturation of the South Slough NERR

The essential buoyancy that allows for sustained financial solvency of the South Slough NERR is provided by the statutory requirement of the Coastal Zone Management (s. 315) that obliges the state of Oregon to provide matching funds for Reserve operations. Since its inception in 1974 as the founding member of the NERRS network, South Slough NERR has drawn its principal financial support from the long-term administrative partnership between the NOAA / Office of Ocean and Coastal Resource Management and the State of Oregon / Department of State Lands. Through this partnership agreement, the South Slough NERR receives an annual operations award (interagency co-operative agreement) that is a mixture of 70% federal and 30% state dollars. Federal support (70%) for essential operations at the South Slough NERR has grown from initial assistance awards of about \$60-400K per year during the period of major land acquisitions and start-up (1974-1980), to annual allocations of about \$100-185K during the period of program establishment (1981-2000), and to about \$375-415K per year during the recent period of program growth (2001-2005; Figure 3 and Table 1). In this regard, the financial history of the South Slough NERR over the past 30 years has closely mirrored the historical maturation of the National Estuarine Research Reserve System as a whole. Likewise, matching contributions from the state of Oregon (30%) have kept pace with the level of federal support (Figure 3) and allowed the South Slough NERR to develop robust programs in research, monitoring, education, stewardship, volunteerism, maintenance, and administration.

Table 1. Three major periods of programmatic maturation and the increases in federal and State support for basic operations at the South Slough NERR

PERIOD	YEARS	Federal / NOAA (70%)	State / ODSL (30%)
Acquisition & Start-up	1974-1980	\$ 60,000 - \$400,000	\$ 25,700 – 171,440
Program Establishment	1981-2000	\$ 100,000 - \$185,000	\$ 42,860 - \$79,290
Program Growth	2001-2005	\$ 375,000 – \$415,000	\$ 160,720 - \$177,870

Aggressive solicitation of outside grant funds has provided a source of secondary buoyancy (or bailing) to help keep the South Slough NERR afloat. Receipt of these grant funds has enabled South Slough NERR to further engage in a series of innovative research, experimental restoration, and resource management projects. The combined revenues from research grants totaled about \$1.2M for 1991-2005, and these external grants contributed about 20% toward the overall financial support of the South Slough NERR during the past 14 years (Figure 4). Support for the research grants has been derived from a diverse group of federal and state agencies (i.e. US Fish and Wildlife Service, US Environmental Protection Agency, US Department of Agriculture / Western Regional Aquaculture Center, NOAA / Coastal Ocean Program, Oregon Department of Land Conservation and Development, Oregon Department of Environmental Quality), and from non-governmental organizations (i.e. National Fish and Wildlife Foundation, Oregon Wetlands Joint Venture, Bisbee Foundation). Security of these grant funds as a secondary source of revenue is highly variable and opportunistic, and the success of outside fundraising depends on the abilities of South Slough NERR staff members to recognize and respond rapidly to competitive requests for proposals, partnerships, and other solicitations with innovative, cost-effective, and convincing proposals that garner collective approval and merit

financial support. Examples of the types of grant-supported science projects include: (a) habitat inventories and assessments of estuarine channels and coastal forests, (b) experimental restoration of degraded tidal wetlands, (c) determination of best management practices for oyster mariculture, (d) establishment and monitoring of surface elevation tables, (e) determinations of sources of bacterial water contamination, (f) interannual, seasonal, and spatial comparisons among eelgrass beds, (g) retrospective analysis of the extent of estuarine habitat alteration and loss, and (h) colonization patterns by estuarine invasive species.

C. Favorable Winds – Funds from Other Financial Support Mechanisms

In addition to utilizing the well-established state/federal partnership program as the primary mechanism to secure operational funds, South Slough NERR has also benefited greatly from other non-governmental avenues of financial support. In general, as the number and area encompassed by MPAs grow over time, non-governmental sources of funds are likely to become increasingly critical to support the MPA objectives for stewardship, public education, and outreach. In the specific case of the South Slough NERR, two non-governmental funding mechanisms have had significant positive impacts: (1) work conducted by a local citizen volunteer organization, and (2) donation of a private estate to the Reserve.

1. Volunteer Organization - Friends of South Slough

The Friends of South Slough (FOSS) is a 501(c)3 non-profit organization formed in 1988 by a group of dedicated local citizens. The primary mission of FOSS is “to provide educational and interpretive services for, and to enhance the development of, the South Slough National Estuarine Research Reserve.” FOSS members work on behalf of the reserve strictly as volunteers, and implement a broad variety of actions to support and enhance reserve programs. Activities undertaken by FOSS that benefit South Slough NERR fall into three general categories: (a) fundraising; (b) grant administration; and (c) donation of goods and volunteer labor.

The principal goal of FOSS is to raise funds in support of the South Slough NERR’s highest priority education and interpretive initiatives. Through the hard work and dedication of its members, the group has been quite successful implementing fundraising strategies. For example, FOSS successfully raised \$140,000 in cash and contributions to support construction of a new public auditorium located within the South Slough NERR Interpretive Center. These funds were raised through a combination of securing construction grants as well as through generous personal contributions. Addition of the new auditorium now provides an excellent venue to host seminars and lectures, hold workshops, meetings and training sessions, show movies, accommodate special events, and provide an attractive location for other public education/outreach activities. In addition, FOSS is currently in the process of raising \$85,000 to help pay for the design, construction, and installation of new educational exhibits within the Reserve Interpretive Center. Fundraising techniques employed by FOSS include public raffles, sales of educational books and gift items, collection of visitor donations and fees for interpretive programs, grant writing, approaching foundation donors, and direct solicitation of private donations from local citizens.

FOSS also plays an increasingly important role in support of the South Slough NERR as a grant administrator for special projects. This administrative role enables FOSS to leverage significantly greater funds than they could raise solely through donations, and increases the breadth and depth of services that South Slough NERR is able to provide to the public sector. For example, FOSS recently received a grant to publish an educational booklet on estuarine invasive species for distribution to the public, and they also purchased high-resolution digital photographic equipment

that will allow Reserve staff to properly document and format submissions to the national photo library and database for aquatic invasive species. It is noteworthy that as an independent non-profit organization, FOSS is in a position to potentially pursue targeted funds (particularly foundation support) that is not typically available to government agencies. In this capacity, the existence of this complimentary volunteer organization provides an avenue for a broader financial base from which to implement the mission of the South Slough NERR. This locally-based non-governmental organization also has the ability to co-sponsor mutually beneficial projects that may not be adequately funded nor prioritized by government administrators.

In addition to the significant contributions provided by FOSS to the South Slough NERR via fundraising and grant administration efforts, FOSS members also donate a great deal of labor and goods. Examples of these contributions include operation of a small bookstore at the Reserve Interpretive Center, donation of trail maintenance tools and sea kayaks, hosting special events, compilation of a quarterly public newsletter, and provision of interpretive services to tour groups and visitors. While this level of volunteer commitment to the South Slough NERR carries much more importance than can be measured in strictly economic terms, it is still helpful to quantify the monetary value of this contribution in order to evaluate the financial benefit enjoyed by the Reserve. In 2004 alone, time donated by volunteers was valued at \$14,400, and the monetary value contributed by volunteer hours totaled \$41,900 during the three year period from 2002-2004 (P. Kylstra, personal communication, February 9, 2005). Direct contribution of this supplemental personnel effort greatly expands the ability of the South Slough NERR to provide reliable interpretive services and education activities for local schools, families, and tourists. In addition, the monetary value of donated volunteer time can also be claimed as a matching contribution when applying for external grant funds.

2. Estate Donation – The Gustafson Bequest

In 1987, the South Slough NERR was named as the primary beneficiary in the will of Mr. Chalmer Gustafson. The bulk of Mr. Gustafson's estate was bequeathed to the Reserve upon his death in 1995 for the specific purpose of acquiring additional land (or interests in land) to be added to the ownership of South Slough NERR. The value of the initial estate donation was \$1,625,333. Trustees for the bequest placed the funds in short-term treasury investments, where they earn approximately 5% interest on the basis of a monthly accrual. To date, South Slough NERR has used the Gustafson inheritance funds to purchase two land parcels totaling 10 acres with a small portion of the money (Fishman Environmental Services, 1999). Since 1994, the value of the Gustafson legacy donation to the South Slough NERR has grown to over two million dollars (M.Graybill, personal communication, February 10, 2005). South Slough NERR has completed a strategic planning process that prioritizes areas for acquisition, and articulated this vision through publication of a Cooperative Plan for Watershed Conservation (1999). Due to legislative constraints and political impediments, however, the acquisition plan has not yet been successfully implemented. We believe that the general concept of utilizing legacy donations to support MPA planning, designation, acquisition, and stewardship should be more fully explored as a potentially powerful fundraising tool.

In the case of nearshore and estuarine MPAs (such as the South Slough NERR), non-governmental financial support mechanisms can be viewed as naturally-evolving elements that will tend to develop when the MPA is well integrated and accepted into the character of the local community and highly-valued by members of the public. In contrast, it is likely to pose greater challenges to secure and sustain private sector financial support for fully marine and high-seas MPAs where major sectors of the public are removed from an active experience in the MPA habitats. It has been suggested that partial funding for fully marine and high-seas MPAs could be

derived from the private sector in the form of private endowments, conservation trust funds, taxes on marine commercial uses, and payments for environmental services (Morling, 2004).

IV. Conclusions: Key Elements to Support Economic Sustainability of South Slough NERR

A. Consistent Institutionalized Federal Funding

Stable core funding provided by the federal government (NOAA) has been the single most important financial asset to ensure financial solvency of the South Slough NERR. This base of support has remained intact through changing national economic priorities and political administrations for several reasons:

1. South Slough NERR is an active member of the national formally-designated MPA network (NERRS) that is united by a clear mission, purpose, and dedicated administrative framework.
2. The MPA network (NERRS) is structured to benefit the larger coastal management community by providing information on the national-level status and trends of estuarine habitats and through communication of regionally-relevant research insights to adjacent coastal areas.
3. The NERRS network employs a dedicated coordinating/lobbying non-governmental organization (National Estuarine Research Reserve Association) to represent its long-term interests, programs, and financial stability.
4. Statutory language obliges participating coastal states to provide significant matching contributions to the federal investment, thus both levels of government (federal and state) appreciate that their funds are being effectively leveraged.
5. The NERRS program enjoys bi-partisan political support.

B. Consistent State Funding/Support

The State of Oregon has provided both consistent administrative services as well as financial backing for the South Slough NERR. The ability of state funds to leverage considerable federal money provided a strong incentive for the state to continue its financial support of the Reserve. The mission of the South Slough NERR is also highly-complimentary to the activities of numerous state natural resource agencies with responsibilities for coastal management, fish and wildlife, wetland conservation, and watershed enhancement.

C. Staff Ability to Secure Additional Grant Funds

Staff members from South Slough NERR have taken an aggressive approach to pursuing and securing additional grant funds in order to expand the scope and effectiveness of the Reserve's programs and facilities.

D. Community Advocates

The Friends of South Slough volunteer organization has been instrumental in generating matching contributions to attract foundation money, providing supplemental personnel to staff reserve programs, and conducting fundraising initiatives.

V. Recommendations and Future Directions

A. Build Creative Partnerships

As illustrated in this case study, a promising avenue by which to expand funding for MPAs beyond government budget allocations is to build partnerships with supporters in the private sector. Foundations with a focus on marine conservation or preservation of biodiversity have a key interest in the success of MPA networks. Volunteer groups and conservation organizations can be powerful fundraising allies. Private citizens willing to donate their estate assets upon their death could provide capital needed for MPA management costs, and/or private donations could be pooled into larger endowment funds.

B. Strengthen Linkages between MPAs and Local Community Economies

The South Slough NERR has been a successful MPA in part due to its recognition as an integral element of the natural and social character of the local community. Oregon's initial proposal to designate South Slough as the nation's first estuarine sanctuary was accepted by the federal government in part because the concept enjoyed widespread and outspoken community support (National Oceanic and Atmospheric Administration, 2004c). However, even with a local constituency of supporters, it is important to make the larger community aware of the financial benefits that the presence of the Reserve has on the local economy. A direct demonstration of the monetary benefit is realized by utilizing local businesses to the greatest extent possible for purchasing goods and services relating to the work of the reserve.

While opponents to MPA designations are often concerned about negative economic impacts that may result to local businesses, the positive economic benefits that can result are often not well understood. Therefore, it is important that quantifiable data that demonstrate the economic benefits of an MPA to the local economy can be effectively communicated. South Slough NERR is pursuing this opportunity in 2005 by conducting an analysis of the economic impact that the reserve has had on the local economy during the 30 years since designation. Results of the analysis will be strategically communicated to reach a broad audience of coastal decision-makers, businesses, and citizens. This analysis should provide timely information to decision-makers in Oregon who are currently charged with establishing a limited network of marine reserves within the state's coastal zone and territorial sea.

When possible, partnering with community groups, local government, and local businesses are tangible ways to promote MPAs as valued ecological and social assets in both economic and quality-of-life measures. The current partnership between South Slough NERR and the Charleston Merchants Association (a local economic stimulus and promotional organization) provides a promising example of this mutually-beneficial strategy as they work to co-locate new Reserve administrative office space with a public visitor's center at the entrance to the town of Charleston. This partnership would provide additional visibility to the MPA while promoting local businesses to visiting tourists. Given time and trust, governmental and private sector partnerships can change the public perception of a local MPA designation from one of a bureaucratic regulatory burden, to a key asset for the community's economic and social well being.

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FIGURE 1. The National Estuarine Research Reserve System

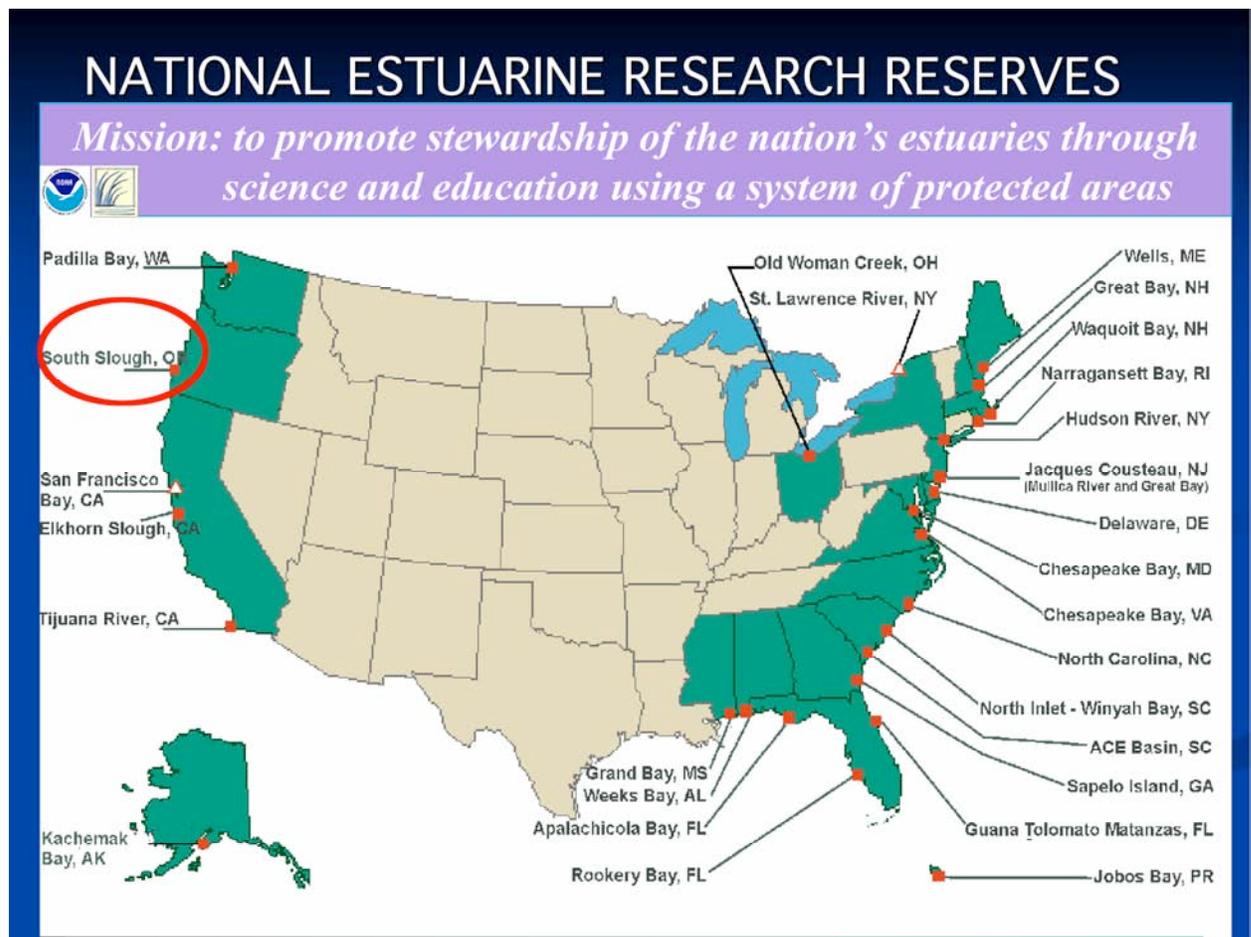


FIGURE 2. Programmatic and Financial Growth of the National Estuarine Research Reserve System (1972-2004)

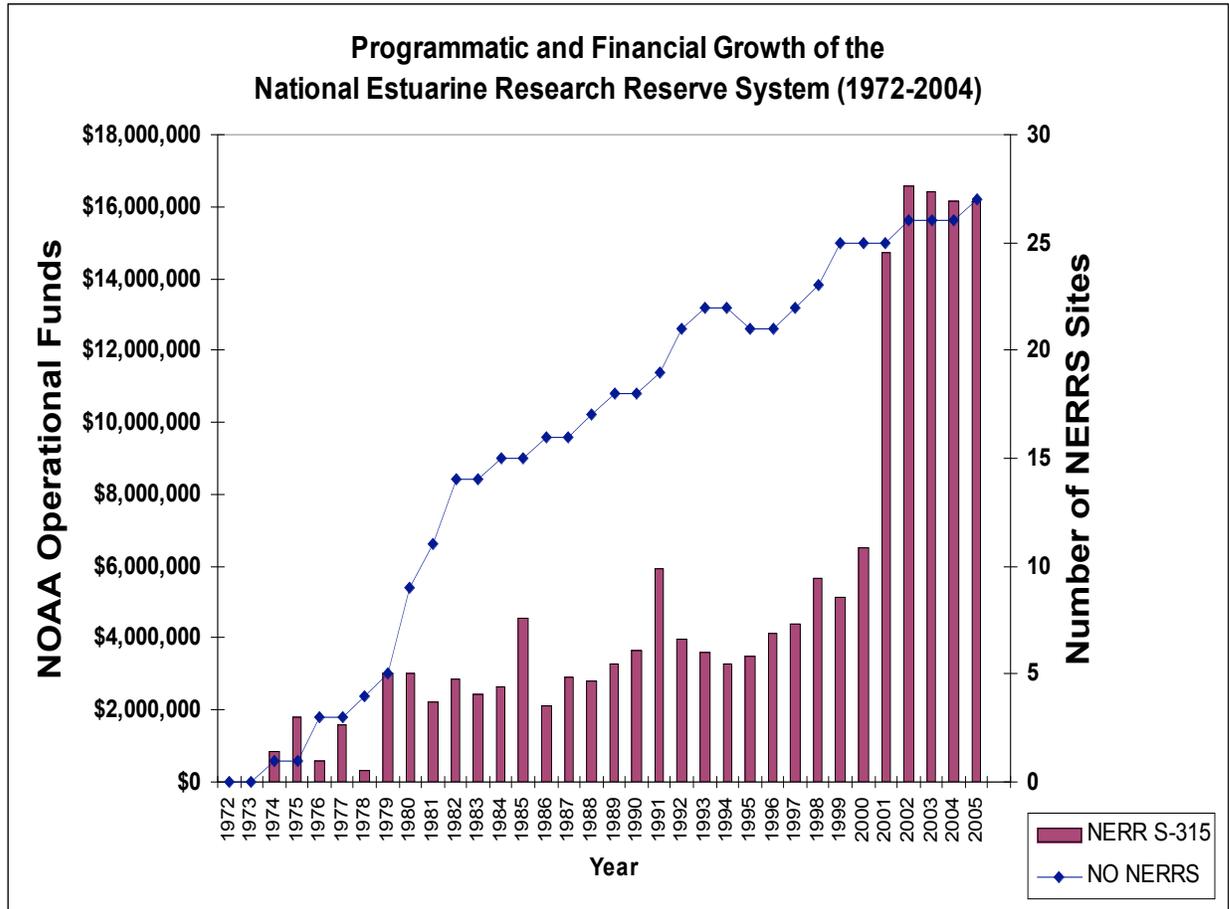


FIGURE 3. Financial History of the South Slough NERR

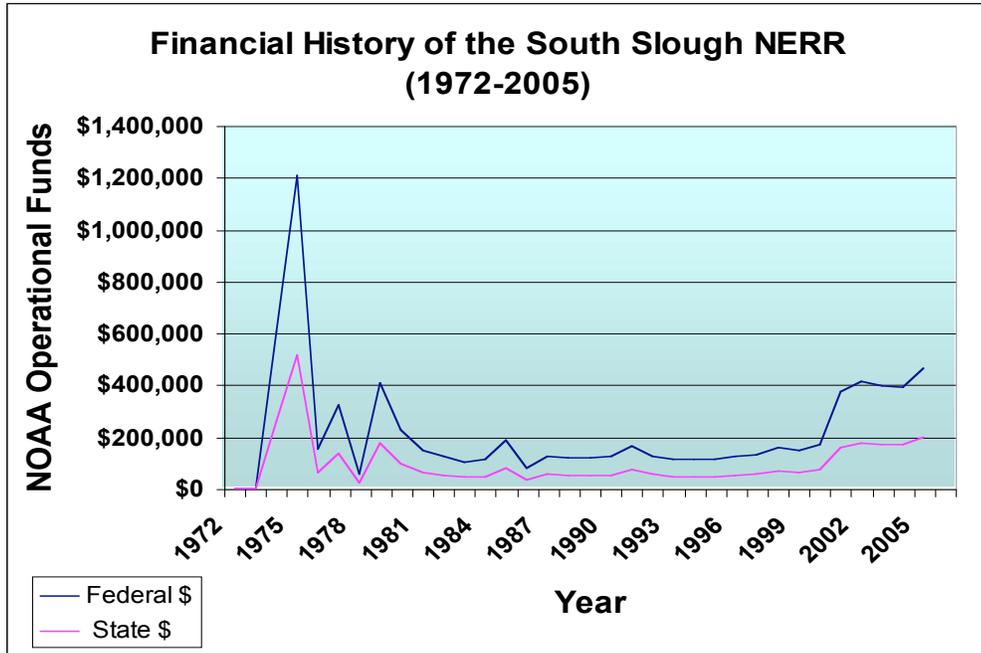


FIGURE 4. South Slough NERR: Financial Support From NOAA, ODSL, and Research Grants (1991-2005)

South Slough NERR: Financial Support from NOAA, ODSL, and Research Grants (1991-2005)

