



**CATALOGUE OF FEDERAL
WATER-RELATED PROGRAMS
AND ORGANIZATIONS:**

**SUPPORT FOR DECENTRALIZED
AND INTEGRATED WATER
RESEARCH AND
INFRASTRUCTURE**

2006 EDITION

**Coalition for Alternative Wastewater
Treatment**

I) Acknowledgements

This Resource Catalogue was made possible by the support of multiple organizations. The Joyce Foundation, in addition to the Electric Power Research Institute (EPRI), the National Rural Electric Cooperative Association (NRECA), and East Kentucky Power Cooperative, provided the funds to conduct research on federal policies and programs in the water resources and infrastructure sector.

The 2006 Catalogue was assembled by Frank Shepard of Woods Hole Data Base, Inc. and Claire Nelson of the Coalition for Alternative Wastewater Treatment. With the resources available, Mr. Shepard and Ms. Nelson did an admirable job of identifying and describing a vast number of federal water-related programs and organizations, and of

examples of decentralized and integrated water resource projects funded. It is hoped that in the future, this resource, and corresponding online database, will grow and become an increasingly comprehensive Catalogue of water-related programs and organizations.

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II) Introduction to the Resource Catalogue

The purpose of the Catalogue is to provide an easily-accessible description of a wide range of national public and private programs that conduct and/or provide financial assistance for projects relating to decentralized and integrated water quality, wastewater, storm water, and watershed research, technology development, and management. The majority of programs fall under Cabinet Departments, but there are also relevant initiatives and funding sources found in the White House Offices, Executive Agencies, intergovernmental, and nonprofit organizations. The Catalogue is meant to serve as a supplemental document to the report; *A Soft Path Water Paradigm Shift: Federal Policies To Advance Decentralized and Integrated Water Resource Infrastructure*. While the report describes broad future policy options and innovation strategies for the soft path water infrastructure field, this Catalogue provides concrete examples of programs that *currently* exist to advance knowledge and implementation of soft path infrastructure.

For the purposes of the report, programs are listed alphabetically and described by agency or organization. Where available, examples of funded research or projects which are particularly relevant to soft path technologies are provided as well. Further, programs are identified, where applicable, under three larger designations:

- Research and Development (R&D)
- Education and Outreach (E&O)

- Federal Funding of Local Infrastructure (FFLI).

This appendix aims to provide the reader with a brief outline of the work being sponsored by the federal government in the decentralized water resource field, as well as opportunities for funding. Through the descriptions, web portals and extensive internet links, the interested reader should have access to the majority of programs in the United States. It must be emphasized that this is only the first edition of what is hoped will be an ongoing effort by CAWWT to catalogue an increasingly comprehensive list and database of water-related programs. As such, the reader should be aware that this Catalogue is, and is designed to be, a work in progress.

Notwithstanding the above, the responsibility for errors, omissions, or skewed selectivity rests solely with the compilers of this Catalogue. If any reader has authoritative affiliation with a source, and has comments or suggestions (or complaints or corrections), please convey them to CAWWT through Valerie Nelson (email: valerie508@aol.com).

Note: Most of the text for the descriptions of programs has been taken directly from the websites of the programs themselves or from related publications. In some cases, descriptions have been slightly modified from their original form by the author for consistency, but for the most part, the text is from the program itself. The source of the text is listed below the description, with a link to the website used, or a citation to the document used.

FORMAT:

DEPARTMENT

Program*

Sub Program*

➤ **Project/Funding Examples**

*(Programs followed by R&D, E&O, or FFLI designation where applicable)



III) Programs of Particular Interest for Decentralized and Integrated Water Research and Infrastructure

A wide range of programs in federal departments and agencies are catalogued in this report, along with examples of projects in decentralized and integrated water research and infrastructure that they have funded. The programs that currently offer the greatest promise for expanded support include:

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DEPARTMENT OF AGRICULTURE

(1) Agricultural Research Service (USDA-ARS)

This in-house research arm of the USDA had a \$1.1 billion budget in 2005. The mission of the Agricultural Research Service is to conduct research to develop and transfer solutions to agricultural problems of high national priority and provide information access and dissemination to, among other things, sustain a competitive agricultural economy and enhance the natural resource base and the environment.

ARS employs approximately 2200 permanent full-time scientists who conduct research in over 1200 projects (funded by Congressional appropriations) at over 100 locations. Research projects are grouped into 22 National Programs under four broad categories: animal production and protection; nutrition, food safety and quality; natural resources and sustainable agricultural systems; and crop production and protection.

ARS looks for opportunities to partner with businesses, other federal agencies, state and local governments, and universities. These partnerships are designed to augment research programs, expedite research results to the private sector, exchange information and knowledge, stimulate new business and economic development, enhance U.S. trade, preserve the environment, and improve quality of life.

Source/reference:

<http://www.ars.usda.gov/main/main.htm>.

(a) North Appalachian Experimental Watershed Unit - USDA-ARS R&D

The North Appalachian Experimental Watershed Unit (NAEW) conducts research on hydrology, surface runoff, groundwater quality, and erosion in an agricultural context. Conservation tillage, filter strips, crop rotations, manure management, input of high runoff generating areas, reduced input management practices, and pasture management systems are evaluated using watersheds and monolith lysimeters. Quantification of runoff and water quality risks through analysis of data and precipitation and weather investigations are also a component of the research.

A 67-year data base of measurements from rain gages, watershed flumes and weirs, along with

automated monitoring and soil and climatology data, provide the long-term frame of reference essential to the evaluation of current experimental data. Research is designed to develop knowledge of basic water, sediment, and chemical movement, and to develop practical procedures and models describing their transport. Objectives are to develop safe pesticide and nutrient management strategies while maintaining high agricultural productivity levels, and to develop practical management tools.

Source/reference: www.ars-grin.gov/ars/MidWest/Coshocton. J.V. Bonta, Research Hydraulic Engineer (740-545-6349), P.O. Box 488, Coshocton OH 43812.

(b) Pasture Systems and Watershed Management Research Laboratory - USDA-ARS R&D

The Pasture Systems and Watershed Management Research Laboratory (PSWMRL), headquartered at Penn State University, conducts research leading to the development of land, water, and plant management systems while maintaining the quality of ground and surface waters.

Current research includes developing and evaluating technology for improving forage use in integrated cropping and grazing systems that reduce off-farm inputs of feed, fuel, and chemicals; quantifying the effects of land management on water quality and quantity; and integrating plant production and resource management components into prototype systems for field testing. Research results provide the basic knowledge needed to implement economically and environmentally sound agricultural production systems in the northeastern U.S. and provide new or enhanced production, nutrient cycling, and transport models that extend beyond the region.

Source/reference:

<http://pswmru.arsup.psu.edu/>. Building 3702, Curtin Road, University Park, PA 16802-3702; Phone: 814-863-0939; Fax: 814-863-0935.

(c) Southeast Watershed Research Laboratory - USDA-ARS R&D

Senate Document 59 stated that special attention should be given to hydrologic research on agricultural watersheds. The Document recommended the establishment of watershed centers in Idaho, Arizona, Oklahoma, Missouri, Pennsylvania, and Georgia. The Southeast Watershed Center was authorized and organized in 1966 in the recognition that there was an urgent need for information on rainfall-runoff

relationships for the various soils and land uses in the Coastal Plain of the southeast.

The mission of the Southeast Watershed Research Laboratory (SEWRL) is to develop the scientific understanding and associated technologies of watershed systems essential to maintaining/enhancing the environmental and natural resource base upon which a viable, sustainable, and productive agricultural economy depends.

Specific objectives are to develop: (a) conceptual understanding of responses in natural resource and environmental systems based on physical, chemical, and biological processes; (b) methodologies to direct optimal use of soil and water resources in the production of quality food and fiber while maintaining short- and long-term productivity requirements, ecosystem stability, and environmental quality; and (c) models and information-based systems to guide responsible management decisions for action and regulatory agencies at field, farm, and watershed scales. Focus is on the problems offered by low-gradient drainage systems and extensive nearstream riparian areas.

As with other ARS programs, the SEWRL looks for opportunities to partner with both public and private entities to augment research programs, facilitate technology transfer, stimulate new business and economic development, and preserve the environment.

Source/reference:

<http://www.ars.usda.gov/saa/tifton/sewrl>. T.C. Strickland, Research Leader; 229-386-3664; 2316 Rainwater Road, P.O. Box 748, Tifton GA 31793.

(d) Southwest Watershed Research Center - USDA-ARS R&D

The mission of the center is to understand and model the effects of changing climate, land use, and management practices on the hydrologic cycle, soil erosion processes, and watershed resources; to develop remote sensing technology and apply geospatial analysis techniques; to develop decision support tools for natural resource management; and to develop new technology to assess and predict the condition and sustainability of rangeland watersheds. Research is conducted in four major program areas: erosion and sedimentation, hydrology, decision support systems, remote sensing.

Source/reference:

http://www.ars.usda.gov/main/site_main.htm?modecode=53424500. 2000 E. Allen Rd., Tucson, AZ 85719; phone 520-670-6381; fax 520-670-5550.

(e) Water Conservation Laboratory - USDA-ARS R&D

The mission of the U.S. Water Conservation Laboratory (USWCL) is to conserve water and protect water quality in systems involving soil, aquifers, plants, and the atmosphere. Research thrusts involve developing more efficient irrigation systems, improving the management of irrigation systems, developing better methods for scheduling irrigations, developing the use of remote sensing techniques and technology, protecting groundwater from agricultural chemicals, commercializing new industrial crops, and predicting the effect of future increases of atmospheric CO₂ on climate and on yields and water requirements of agricultural crops.

Source/reference:

<http://www.ars.usda.gov/pwa/phoenix/uswcl>. A.J. Clemmens, Director; T: 602-437-1702; USWCL, USDA-ARS, 4331 E. Broadway Rd., Phoenix AZ 85040.

(2) Cooperative State Research, Education, and Extension Service (CSREES) – USDA R&D, E&O

Congress created CSREES through the 1994 Department Reorganization Act. The former Cooperative State Research Service (CSRS) and the former Extension Service (ES)—two unique USDA agencies—were combined that year into a single agency. This move united the research, education, and extension portfolios of both agencies and consolidated their expertise and resources under one leadership structure. In 2004, CSREES observed its 10th anniversary with the launch of its new Web site. CSREES is one of four USDA agencies that make up its Research, Education, and Economics (REE) mission area.

CSREES' unique mission is to advance knowledge for agriculture, the environment, human health and well-being, and communities by supporting research, education, and extension programs in the Land-Grant University System and other partner organizations. CSREES doesn't perform actual research, education, and extension but rather helps fund it at the state and local level and provides program leadership in these areas.

Within CSREES, integrated is defined as bringing the three components of the agricultural knowledge system (research, education, and extension) together around a problem area or activity. Integration may be done at the project level or more generally at the program level mixing research, education, and extension project work. A project or program is optimally integrated if the

components complement one another and are truly necessary for the ultimate success of the project or program. Integrated Programs additionally support multifunctional, multi-institutional, and multi-state programs to better realize research, education, and extension needs and objectives. In turn, the advantage of integrating the research, education, and extension functions of a project or program is to speed up the process of generating, translating, and transferring new technology and knowledge into practical applications for adoption by a wide range of producers and the general public.

CSREES administers federal appropriations through the three basic funding mechanisms:

Competitive Funding. Programs administered through competitive programs are awarded based upon the recommendations of proposal review panels. CSREES requests proposals from eligible entities, and a panel of subject-matter experts reviews each proposal and prioritizes projects for funding. CSREES' competitive programs include the National Research Initiative, the Small Business Innovation Research Program, the Biotechnology Risk Assessment Program, and Outreach for Socially Disadvantaged Farmers and Ranchers.

Formula Funds. CSREES provides support for research and extension activities at land-grant institutions through federal funds that are appropriated to the states on the basis of statutory formulas. CSREES' formula-funds are directed to state experiment stations, the Cooperative Extension System, and Cooperative Forestry Programs. In most cases, the states are required to match the federal formula dollars they receive with nonfederal contributions.

Congressionally Directed Funding. Each year Congress directs CSREES to fund and administer certain state or commodity-specific programs through the Special Grant and Federal Administration appropriations accounts. These funds may be awarded to individual investigators at universities or consortia of universities or further distributed on a competitive basis by the recipient institution. In general, the Executive Branch does not support the inclusion of these programs in its annual budget submission to Congress.

➤ **Water Use Efficiency and Water Quality Enhancements – Georgia**

The Committee provides \$500,000 for water use efficiency and water quality enhancements in Georgia. The goal of this research is to develop and

expedite the implementation of new technologies to improve water use efficiency and water quality at both a state and watershed scale. Detailed information on three variable rate irrigation systems was collected on three Georgia farms, and water quality data on several sites has been collected with the goal of optimizing yield, water quality, and field cropping patterns with a minimum of water use. The project has developed and aided in the commercialization of a first generation commercial variable rate center pivot system and 25 of these have been installed with a 16 percent reduction in water consumption and improved crop productivity.

Design of a next generation sensing system using wireless internet tools and solar power is complete, and work on integrating the sensors with the pivot controller is underway. Water quality monitoring has been installed on several sites, and results of a dissertation funded by this project have led to recommendations for riparian buffers as crucial landscape Best Management Practices for reducing herbicide runoff from agricultural production on Georgia's coastal plain. In fiscal year 2002, approximately \$337,000 was provided in non-federal matching funds. These funds were contributed by state agencies and non-profit organizations. Similar amount of matching funds were provided for fiscal years 2003, 2004, and 2005. It is anticipated that matching funds for 2006 will be similar.

Description of Program from: House of Representatives. Committee on Appropriations. Report 109-463. May 16, 2006. http://www.nasulgc-bac.com/documents/FY2007/Rpt_109-463_Excerpts.pdf

(a) Integrated Research, Education, and Extension Competitive Grants Program

R&D E&O

The Integrated Research, Education, and Extension (IREE) Competitive Grants Program was authorized in Section 406 (7 U.S.C. 7626) of AREERA to fund integrated, multifunctional agricultural research, education, and extension activities. While the overall approach to solving critical agricultural issues, priorities, or problems will be through an integration of research, education, and extension activities, within IREE individual programs may request applications that are research, education, or extension only, or a combination thereof. Program areas include the National Integrated Water Quality (NIWQ)

program, the National Integrated Food Safety Initiative (NIFSI), and the Integrated Pest Management programs which include Crops at Risk (CAR), Risk Avoidance and Mitigation Program (RAMP), the Regional IPM Centers, Methyl Bromide Transitions (MBT), and Organic Transitions. CSREES administers IREE by determining priorities in U.S. agriculture through Agency stakeholder input processes in consultation with the National Agricultural Research, Extension, Education, and Economics Advisory Board (NAREEEAB).

Description of Program from:

<http://www.csrees.usda.gov/about/about.html>,
http://www.csrees.usda.gov/about/fed_asst.html,
http://www.csrees.usda.gov/funding/integrated/integrated_synopsis.html

Programs of IREE:

National Integrated Water Quality Program (NIWQ) - R&D

Legislative Authority: Agricultural Research, Extension, and Education Reform Act (AREERA) of 1998 (PL105-185)

The National Integrated Water Quality Program provides funding for research, education, and extension projects aimed at improving water quality in agricultural and rural watersheds through the CSREES/USDA 406 Water Quality Initiative Competitive Grants Program. The goal of the Program is to improve the quality of our Nation's surface water and groundwater resources through research, education, and extension activities. The CSREES Program is working through a coordinated regional structure to: a) Link state and regional projects and their network of research, extension and education professionals, b) Facilitate information and resource exchange regionally and nationally, c) Establish effective communication linkages both internally and externally and d) Develop and strengthen important partnerships.

The CSREES National Integrated Water Quality Program brings university scientists, instructors, and extension educators into more effective and efficient partnerships with Federal interagency priority programs, all while addressing water quality issues in U.S. agriculture. This program provides the flexibility necessary for CSREES to bring the resources of researchers, instructors, and extension educators into national initiatives and programmatic partnerships that target evolving water quality needs.

Projects funded through this program will facilitate achieving this goal by advancing and disseminating the knowledge base available to agricultural and rural communities. Funded projects should lead to science-based decision-making and management practices that improve the quality of the Nation's surface water and groundwater resources in agricultural and rural watersheds. The NIWQ Program has identified eight "themes" that are being promoted in research, education and extension. The eight themes are (1) Animal manure and waste management (2) Drinking water and human health (3) Environmental restoration (4) Nutrient and pesticide management (5) Pollution assessment and prevention (6) Watershed management (7) Water conservation and agricultural water management (8) Water policy and economics. Awards are made in four program areas - National Facilitation Projects, Regional Coordination Projects, Extension Education Projects, and Integrated Research, Education and Extension Projects. Please note that funding is only available to universities.

2006 Program Budget: Estimated at \$10.18 million. FY 2005 allocated \$11.9 million in funds.

Description of Program from:

<http://www.csrees.usda.gov/fo/fundview.cfm?fonum=1134>, <http://www.usawaterquality.org/about.html>,
http://www.usawaterquality.org/about/natl_pubs/national_poster_Feb06.pdf

Examples of CSREES Extension Projects under National Integrated Water Quality Program:

➤ **Cooperative Extension @ URI Water Quality Program**

New England Onsite Wastewater Training Program @URI E&O

The New England Onsite Wastewater Training Program is located at the University of Rhode Island in Kingston, RI. The program offers classroom and field training experience for wastewater professionals, regulators, municipal and state officials, watershed groups, and homeowners. A primary component of the program is the Onsite Wastewater Training Center ("OWTC") located at the University's Peckham Farm. It is a demonstration and field training facility for both conventional and innovative and alternative septic system technologies. The OWTC is one of eight regional centers in the nation and has been in operation since 1993. It is operated in

partnership with over 40 private sector contractors, the RI Department of Environmental Management, the USEPA and others. We have twenty-two full scale systems constructed above ground for hands-on learning at the OWTC. Additionally, there are over fifty demonstration and research systems installed in six Rhode Island communities. Monitoring data from these systems are currently being reviewed to help evaluate system performance.

Examples of Current Projects of OWTC:

1. Wastewater Manual Series E&O

“A Creative Combination: Merging Alternative Wastewater Treatment with Smart Growth”

“Alternative Wastewater Treatment for Individual Lots”

“Choosing a Wastewater Treatment System”

Manuals can be downloaded at:
<http://www.uri.edu/ce/wq/mtp/html/publications.html#wastemanuals>

2. “RHODE ISLAND AQUA FUND.”

Construction and Evaluation of Innovative On-Site Wastewater Treatment Systems in Narragansett Bay Coastal Communities R&D

In conjunction with the partnership communities and agencies, the University of Rhode Island Cooperative Extension On-site Wastewater Training Center constructed twelve innovative septic systems in the three Narragansett Bay partner communities to remediate failed systems. Approximately thirty-one percent of Rhode Islanders depend upon septic systems for treatment of domestic wastewater. In many cases septic systems provide a safe and economical means to treat wastewater. Documented water quality impairment has resulted due, in part, to septic system failures and/or improper treatment. Water quality degradation from nitrogen and bacterial contamination has occurred within the Narragansett Bay National Estuary which impacts fin and shellfish production and harvests.

As part of this project installations of innovative septic systems were performed to remediate four failed systems in each of the target communities. The technologies selected were designed to remove nitrogen and pathogens. Training for participating Contractor Association members occurred during construction and post-construction community-based training has begun

for installers, designers, regulatory agencies, municipal officials and board members, and homeowners. Installations were documented so that information can be delivered at future workshops at the Training Center on the Kingston campus and at regional and national conferences.

Municipal outreach activities with town/city planning, public works, zoning and building official staffs are being coordinated through the URI Cooperative Extension Municipal Training Program. Homeowner outreach activities are being done by the University of Rhode Island Home*A*Syst Program and the Cooperative Extension Education Center. On-site Wastewater Training Center staff is working jointly with staff from the Municipal Training and Home*A*Syst Programs to deliver neighborhood and community-based septic system workshops within the target communities.

System construction oversight, instrumentation, sampling, monitoring, performance evaluation, and operation and maintenance needs documentation is being conducted by On-site Wastewater Training Center personnel. This information is being disseminated at formal Center workshops and regional/national conferences; and through such forums as news releases/articles in local newspapers and national newsletters, and fact sheets which has been made available to town/city conservation commissions, zoning and planning boards, building officials, and state regulatory programs to distribute.

Description of Program from:

http://www.uri.edu/ce/wq/owtc/html/owtc_aquafund.html

(i) The National NEMO (Nonpoint Education for Municipal Officials) Network E&O

NEMO originally was conceived as a pilot project to assist local officials in 3 Connecticut coastal towns address the issue of nonpoint source pollution, and therefore help to better protect the water quality of Long Island Sound. The original stimulus for NEMO was the creation of a land cover database for the state of Connecticut, for the purposes of estimating nonpoint source loadings of nitrogen to the Sound. Recognizing the educational potential of the land cover information, and with funding from the USDA/CRSEES Water Quality Initiative, NEMO was created in 1991-1992 as a collaboration between 3 branches of the University of Connecticut: the Cooperative Extension System, the Natural Resources Management and Engineering Department, and the Connecticut Sea Grant College Program. It took about a year to

develop the initial NEMO educational program, Linking Land Use to Water Quality, that is built around geographic information system (GIS) images of natural resources and remote sensing-derived images of land cover. After a year of development and a second year of operation in the pilot towns, interest in the NEMO educational program began to spread to other towns, and our Connecticut initiatives began to widen in scope. By about 1995, colleagues in other states began to express interest in adapting NEMO, and our National work was initiated. In 1999, both the Connecticut and National efforts got a technical shot in the arm from the formation of the **NAUTILUS** Regional Earth Sciences Applications Center, a partnership between NEMO and the Laboratory for Earth Resources Information Systems (**LERIS**) remote sensing lab at UConn. At present (circa 2000), NEMO has worked with almost two-thirds of the 169 municipalities in Connecticut, and the National NEMO Network has funded projects in 19 states. NEMO staff conduct about 150 educational workshops a year.

Description of Program from:
<http://nemo.uconn.edu/about.htm>

Examples of Projects Funded under NEMO in CT:

1. Workshops:

Connecticut Stormwater Quality Manual

The Connecticut Stormwater Quality Manual provides guidance on the measures necessary to protect the waters of the State of Connecticut from the adverse impacts of post-construction stormwater runoff. This manual focuses on site planning, source control and stormwater treatment practices and is intended for use as a planning tool and design guidance document by the regulated and regulatory communities involved in stormwater quality management. The program also held a series of workshops throughout the 2005.

Description of Program from:
http://nemo.uconn.edu/workshops_initiatives/stormwater.htm

Linking Land Use to Water Quality

The Linking Land Use to Water Quality workshop addresses the relationship of **land use to natural resource protection** with an emphasis on water quality. It explains the concepts of nonpoint source pollution and watersheds as well as reviewing the impacts of land use on water resources. Natural resource-based planning is

introduced as a framework for dealing with land use issues.

Description of Program from:
http://nemo.uconn.edu/workshops_initiatives/linkinglwq.htm

Natural Resource Based Planning for Watersheds

The NEMO Team has found there are two major stumbling blocks to local watershed efforts, an inability to get started and an overload of maps/information. This workshop and its companion publication "Natural Resource-Based Planning for Watersheds - A practical Starter Kit For Watershed Projects" will outline a process that will help people get started! In the program, participants will learn about NEMO's recommended 6-step process to watershed planning:

Assemble a core group of local leaders & resource experts.

Determine the land in the watershed still available to be developed.

Determine priority water, land and cultural resource areas.

Formulate an Action plan, based on the comparison of priority resource areas to developable lands.

Educate the populous, especially key private and public land use decision makers, on the key findings and recommendations of the Action Plan.

Realize the Action Plan through well-crafted recommendations and continuing education.

Description of Program from:
http://nemo.uconn.edu/workshops_initiatives/watersheds_community.htm

2. Municipal Initiatives:

"Pursuing 'Low Impact Design' for Residential Subdivisions." Waterton, CT

Inspired by the "distributed infiltration," or "low impact development" techniques highlighted during the *Reducing Runoff* workshop, the town has applied these techniques in several new subdivisions. The Breezy Knoll subdivision is sited on a high elevation site that formally served as an agricultural field. The site drains to a local lake and associated wetlands, and consists of areas of steep slopes, shallow depth-to-bedrock soils and wetlands. The subdivision was originally approved and partially completed in the 1970's. As a

consequence of the difficult site conditions, significant sedimentation of the lake occurred and the developer incurred clean up costs in excess of \$20,000. Phase II of the subdivision was approved in the late 1980's, but after ten years of inactivity the approval was set to expire. The developer came back to the Planning and Zoning Commission to renew the approval soon after the NEMO presentation. The ensuing discussion resulted in an agreement to incorporate several NEMO techniques into the new subdivision.

Driven partly by these successes and the interest to codify these principles into their regulations, the Planning and Zoning Commission made significant changes to their planning and regulatory documents. Prior to the NEMO workshops, the Planning and Zoning Commission required the use of a mechanical stormwater treatment device. At present, they will allow alternative methods to provide sediment removal (i.e. swales, bioretention) if the engineer supplies back-up documentation that the alternative will work. These vegetation-based alternatives have been shown to be more effective, and generally easier to maintain, than mechanical devices. Current subdivision regulations lay out a seven-step approach to site design, based on NEMO principles, that includes such considerations as fitting the development to the natural grade, preserving and replicating the natural hydrology of the site, minimizing impervious surfaces and developing a stormwater management plan.

Description of Program from:

http://nemo.uconn.edu/publications/impact_reports/watertown_impact.pdf

“Ramping Up for the Stormwater Phase II Program.” Stonington, CT

In the fall of 2002, the Town of Stonington asked NEMO to provide the *Linking Land Use to Water Quality* workshop as part of their Plan of Conservation and Development (POCD) update. Soon after this workshop, the town applied and was accepted into the Municipal Initiative, using the existing POCD steering committee as its NEMO Task Force. The town set out on an ambitious work plan: a resource inventory and buildout analysis; a significant update to the POCD focusing primarily on stormwater management; revisions to zoning, subdivision and inland wetland regulations; and, where practical, finding demonstration sites for stormwater best management practices. NEMO's *Open Space Planning, Reducing Runoff* and *Economic Development* workshops were presented to the land use commissions and the general public in several sessions. NEMO Team members have also reviewed existing plans and regulations.

The NEMO Task Force was broadened to become the town Stormwater Management Study Group, comprised of members from the Planning and Zoning, Inland Wetland and Watercourse, Conservation and Shellfish Commissions as well as town staff, CT DEP's Office of Long Island Sound and Stonington's state representative. The Study Group identified a number of key issues with their existing regulations. They recommended a number of strategies that would reduce the amount of impervious surface created during new construction, and called for flexibility in determining requirements for parking, road standards, driveway widths and other impervious elements of the landscape. The Study Group's recommendations are being incorporated into the town's POCD. Key among these proposals is an increased focus on water quality, stormwater management, open space preservation and the conservation of the community's cultural and natural resources. The POCD calls for development that both considers and respects the land's natural capability to support the proposed new use. Two methods of accomplishing this goal are proposed, a “buildable land regulation” that excludes lands with severe limitations (steep slopes, wetlands or floodplains) from development, or “soil-based zoning,” which matches the amount of development to the capacity of soils on the site to accept that development. In addition to these stormwater and water quality strategies, the POCD calls for a number of new strategies to preserve open space: the establishment of a Stonington Land Trust, requiring “open space developments” in certain areas of town and acquiring land to connect existing preserved areas and to provide coastal access.

Description of Program from:

http://nemo.uconn.edu/publications/impact_reports/stonington_impact.pdf

➤ **Utah State University Water Quality Extension E&O**

The Water Quality Extension program provides variety of information and programs that help the public protect the quality of Utah's streams and rivers, lakes, and reservoirs, and groundwater. The Program offers a variety of programs, presentations, fact sheets, publications, and trainings for anyone interested in learning about how our activities can affect water quality. It provides materials and other support, including training and workshops for teachers, watershed coordinators, volunteers etc. on different water quality issues. Topics include: agriculture and water quality; educational programs; homeowners and your water; urban stormwater; volunteer

monitoring, watershed management; and a kid's page.

Description of Program from:

<http://extension.usu.edu/cooperative/waterquality/>

Urban Stormwater – Water Quality Extension Program Topic

Publications:

"Identifying Risks to Water Quality in Urban Areas using Impervious Surface Analysis."

"Community Actions to Reduce Water Quality Impacts of Stormwater"

Publications can be obtained at:

<http://extension.usu.edu/cooperative/waterquality/index.cfm/cid.815/tid.1235/>

➤ **CSREES/USDA 406 Water Quality Initiative Competitive Grants Program R&D, E&O**

Legislative Authority: Water Quality Initiative of 1990

This program is targeted directly to the identification and resolution of agriculture-related degradation of water quality. The program is composed of 3 major funding categories:

- Integrated Projects (Research/Extension/Education)
- National Facilitation Projects
- Regional Coordination Projects are managed by State Water Quality Coordinators to promote regional collaboration, enhance delivery of successful programs and encourage multi-state and multi-region efforts to protect and restore water resources in 10 regions consistent with the EPA.

Eligible proposals will provide watershed-based information that can be used to assess sources of water quality impairment in targeted watersheds; develop and/or recommend options for continued improvement of water quality in targeted watersheds; and evaluate the relative costs and benefits associated with cleanup to all responsible sectors. This program favors proposals that have a clear problem statement and are place-based. In addition, preference is given to projects that coordinate targeted research, education, and cooperative extension activities to minimize any adverse impacts that agricultural, forest, and range management practices, food and agricultural

product processing, and/or livestock production systems might have on the nation's water quality.

Eligible Applicants: Educational Institutions, Federal Government, State Government, Local Government, and Private Corporations.

FY 2006 Budget: N/A

Examples of Funded Projects in 2005:

"Facilitation of 1890 Institutions' Water Resource Education, Extension and Research Efforts." \$320,000 over 48 months. Tennessee State University.

"Agriculture, Land Use and Water Quality Reporting and Evaluation by Great Lakes Radio Consortium." \$300,000 over 48 months. University of Michigan- Ann Arbor.

"Water Resource Degradation in the Boone Watershed: Integrating Stakeholder Knowledge and Preferences with Economic and Watershed Models." \$590,000 over 36 months. Iowa State University.

Description of Program from:

<http://www.csrees.usda.gov/about/about.html>.

<http://www.usawaterquality.org/projects/default.html>

(b) National Research Initiative Competitive Grants Program R&D

The National Research Initiative Competitive Grants Program (NRI) is the office in the Cooperative State Research, Education and Extension Service (CSREES) of the USDA charged with funding research on key problems of national and regional importance in biological, environmental, physical, and social sciences relevant to agriculture, food, the environment, and communities on a peer-reviewed, competitive basis. To address these problems, NRI advances fundamental scientific knowledge in support of agriculture and coordinates opportunities to build on these scientific findings. The resulting new scientific and technological discoveries then necessitate efforts in education and extension to deliver science-based knowledge to people, allowing informed practical decisions.

The NRI was established in 1991 in response to recommendations outlined in Investing in Research: A Proposal to Strengthen the Agricultural, Food and Environmental System, a 1989 report by the National Research Council's (NRC) Board on Agriculture. This publication called for increased funding of high priority

research, funded by USDA through a competitive peer-review process, directed at:

- Increasing the competitiveness of U.S. agriculture.
- Improving human health and well-being through an abundant, safe, and high-quality food supply.
- Sustaining the quality and productivity of the natural resources upon which agriculture depends.

The NRI supports a spectrum of research that bridges the basic and applied sciences and results in practical outcomes. From its inception, the NRI supported projects for fundamental and applied research, and in FY 2004, CSREES was given the authority to use up to 20% of the available NRI funds to carry out a competitive grants program for projects combining research, education, and/or extension, termed “integrated projects.”

2006 Budget: \$166,788,575.

(i) Water and Watersheds

Legislative Authority: Agricultural Research, Extension, and Education Reform Act of 1998 (PL105-185)

The goals of the Water and Watersheds program are to protect and enhance the natural resource base and environment by improving and maintaining healthy watershed habitat and water supply protection; enhance economic opportunities by reducing economic liability from water contamination; improve the quality of life in rural America through adequate clean water supplies; and protect food safety through clean irrigation and livestock drinking water supplies. Applicants are strongly encouraged to read the entire Program Description section for current priorities and additional information relative to the programs of interest.

The Watershed Processes program sponsors basic and mission-linked research that address two areas: (1) Understanding fundamental processes controlling a) source areas and flow pathways of water, b) the transport and fate of water, sediment, nutrients, dissolved matter, and organisms (including water-borne pathogens), within forest, rangeland, and agricultural environments as influenced by watershed characteristics and contaminant origin, and c) water quality. (2) Developing appropriate technology and management practices for improving the effective use of water (consumptive and non-consumptive) and protecting or improving water quality for

agricultural and forestry production, including the evaluation of management policies that affect the quantity and quality of water resources. The program does not fund wastewater infrastructure projects on private property.

Priorities for Research in 2006: 1)

Understand the source, fate and transport of pathogens such as bacteria, protozoa and viruses in soil and water systems; with special emphasis on *Salmonella*, *Cryptosporidium*, and rotaviruses; and 2) Identify producer management behaviors and/or economic and policy incentives and strategies for producers that improve agricultural water conservation, including livestock and poultry production and crop water use efficiency.

Eligible Applicants: Educational institutions, federal laboratories, private labs and institutions.

2006 Budget: \$5.2 million. FY 2005 budget was \$4.3 million. Grants for this program will not exceed \$400,000 (including indirect costs) for research projects for project periods of 2-4 years. The total amount of support available for this program will be approximately \$5.3 million.

Description of Program from:

http://cfpub.epa.gov/fedfund/program.cfm?prog_num=96,
<http://www.csrees.usda.gov/fo/fundview.cfm?fonum=1135>

(c) Regional Water Quality Coordination Programs – CSREES

The Regional Water Quality Coordination Program, one component of the CSREES National Water Quality Program, seeks to ensure the integration of water quality efforts within the jurisdiction of each of the ten regions established by the U.S. Environmental Protection Agency (EPA). The Program is designed to make research, education, and extension resources of the university system more accessible to Federal, State, and local water quality improvement efforts, thus enhancing opportunities for agricultural producers and agriculturally impacted communities to adopt voluntary approaches for the improvement of water quality.

Program provides leadership for water resources research, education, and outreach to help people, industry, and governments across the region prevent and solve current and emerging water quality and quantity problems.

The Regional Water Quality Coordination projects funded by the USDA-Cooperative States Research, Extension and Education Service

(CSREES) are one mechanism of the National Water Quality Program to provide access to safe drinking water to every citizen.

The CSREES Regional Water Quality Programs:

Great Lakes (EPA Region 5 - Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin): Regional activities focus on animal waste management, drinking water and human health, environmental restoration, nutrients & water quality, water policy & economics, watershed management, and various flagship projects.

Heartland (EPA Region 7 - Iowa, Kansas, Missouri, and Nebraska): Regional activities focus on animal manure management, nutrient and pesticide management, and community involvement in watershed management.

Mid-Atlantic (EPA Region 3 - Delaware, Maryland, Pennsylvania, Virginia, and West Virginia) Regional activities focus on nutrient management, watershed management (public policy & economics), small and underserved audiences, and residential environment & landscape management.

New England (EPA Region 1 - Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont) Regional activities focus on agricultural nutrient & pest management, animal waste management, Non-point Education for Municipal Officials (NEMO), Private Well Initiative, river & stream restoration, sustainable landscaping, and volunteer water quality monitoring.

New York - New Jersey - Puerto Rico - Virgin Islands (EPA Region 2), Regional activities focus on animal waste management, drinking water and human health, nutrient management, and watershed management.

Northern Plains and Mountains (EPA Region 8 - Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming) Regional activities focus on water management & conservation, watershed/rangeland management, education, participatory research, manure/nutrient management, and precision agriculture/geospatial tools.

Pacific Northwest (EPA Region 10 - Alaska, Idaho, Oregon, and Washington) Regional activities focus on animal waste management, drinking water and human health, pollution assessment and prevention, and watershed management.

Southern (EPA Regions 4 & 6 - Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, New Mexico, North Carolina, Oklahoma, Tennessee, Texas, and South Carolina) Regional activities focus on waste management, drinking water & human health, environmental restoration, nutrient and pesticide management, pollution assessment & prevention, watershed management, and water quantity & policy.

Southwest States and Pacific Islands (EPA Region 9 - Arizona, California, Nevada, and Hawaii & Pacific Islands) Regional activities focus on animal manure & waste management, drinking water & human health, water conservation & agricultural water management, and watershed management.

Description of Program from:

<http://www.usawaterquality.org/regional/default.html>

(3) Forest Service - USDA

(a) Community Forestry Financial Assistance Program - Urban Forestry Grants R&D E&O

Beginning in 1991 a major new initiative was created in urban forestry. The focus was a nationwide program designed to improve the awareness, management, conservation and care of the tree resource in and around our communities. The purpose of the Community Forestry Financial Assistance Program is to:

- Improve the understanding of the benefits of tree cover in communities,
- Provide educational programs and technical assistance to communities and state and local organizations in maintaining forested individual trees in community settings and identify appropriate tree species and sites for expanding forest cover,
- Promote volunteerism and involvement of nonprofit organizations, agencies, and the private sector in implementing community programs,
- Develop sustainable community forestry programs at the local level,
- Improve strategic community forestry planning efforts of city administrators, municipal tree departments and tree boards, and

- Enhance the technical skills of individuals involved in planning, development and maintenance of community forests.

Eligible Applicants: Grants may be awarded to municipal and county government, state agencies, and approved non-profit organizations. Grantees must comply with all federal regulations pertaining to federal grants.

Cost Share Requirements: This is a 1-to-1 reimbursable, cost-share grant program. The non-federal share of such support may be in the form services, or in-kind contributions. Sources of the non-federal match must not be used as a match from any other cost share project.

Funding Availability: Grants are awarded on a competitive basis. The recommended federal funding range for proposals is between \$1,000-\$10,000. Noteworthy proposals greater or less than the amount in this range will be considered. For proposals significantly above this range, the amount should be divided into phases where possible, to allow for partial funding.

Description of Program from:
<http://www.state.sc.us/forest/ucgrantbr.pdf>

(b) Northeastern Research Station R&D

The mission of the Northeastern Research Station is to develop and deliver knowledge and innovative technology to manage and protect, use and sustain the natural resources of the region's forests. The Northeastern Station has provided the scientific leadership to improve forested watersheds; guide management on millions of acres of productive public, private, industrial, and urban forest; protect forests from insects and diseases; and improve utilization of the region's wood resources.

The Northeastern Research Station is one of 6 regional field units of the USDA Forest Service. The Station is headquartered in the Philadelphia suburb of Newtown Square and serves the land and people of 13 northeastern states: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont and West Virginia.

The Northeastern Research Station investigates scientific problems across broad dimensions of space and time: we explore molecules and mountainsides, producing knowledge and exciting new technologies that are relevant today and across generations.

Description of Program from:

http://www.fs.fed.us/ne/newtown_square/aboutus/mission.shtml,
http://www.fs.fed.us/ne/newtown_square/research/pdfs/strategic_2000.pdf

➤ **Baltimore Ecosystem Study R&D**

The BES is a long-term ecological research project funded by the **National Science Foundation**, the **Environmental Protection Agency**, and the USDA Forest Service. Beginning in 1997, the Forest Service's Northeastern Research Station has contributed nearly \$1.8 million over the past three years through staff, equipment, and financial support. Scientists working on the project come from Syracuse Urban Forestry Unit, Burlington Ecological & Social Sciences Unit, and Newtown Square's Global Change and Forestry Inventory & Analysis (FIA) units. Further, the Forest Service has two staff permanently located at the BES office at the University of Maryland, Baltimore County.

The geographic scope of the BES is the Baltimore Metropolitan Region. However, the initial focus of the BES has been on the Gwynns Falls Watershed. The Northeastern Research Station's commitment adds vital expertise to studies about the integration of hydrology, soils, vegetation, atmosphere, meteorology, and human activities.

Some examples of these studies include the relationship among: *riparian areas and water quality in urban areas; soil disturbance and forests regeneration; abandoned lots and community stability; urban sprawl, water quality, and biodiversity; vegetation and air quality; and street trees and air temperature and quality.*

Products from this research result in scientific articles, consultation with community groups, non-profit organizations and public agencies, in the development of decision support models useful for local governments, and in data and information that can be used by the City and local communities for policy, planning and resource management.

Description of Program from:
<http://www.fs.fed.us/na/morgantown/frm/water/pubs/Baltimore.pdf>

(c) Revitalizing Baltimore R&D

RB is a model of urban forest management and restoration funded by the Forest Service and managed by the Parks and People Foundation in

cooperation with the Maryland DNR Forest Service. The project involves many interests including non-governmental organizations, federal, state, and local agencies, community and watershed groups, businesses, and academic institutions. The goals of RB are to demonstrate human and natural system connections, to equip people to care for their local environment, and to empower them to revitalize their neighborhoods. Since 1993, the Forest Service has invested nearly \$2.5 million in RB.

The project actively reaches out to culturally diverse communities employing highly visible, immediate results oriented projects including planting trees along streets and streams, returning vacant lots to community green space, and improving neighborhood parks. They use watersheds as an organizing geography due to their manageable size and because of the shared human and natural resource relationships. Active support is provided to citizen-led organizations based in the Gwynn's Falls, Herring Run, and Jones Falls Watersheds. The Revitalizing Baltimore partnership is about connecting people and the place they live to make a difference. This is an approach that the Forest Service seeks to support and replicate in other urban centers around the country. State and Private Forestry has provided technical and financial assistance.

Key Components:

Community Forestry – Mobilizes community residents to plan and carry out restoration projects to expand forests and plant trees to solve urban problems. Examples are “Baltimore Tree Tribe” and “Garden to Market” programs.

Watershed Organizing and Restoration – Assists watershed associations to organize and energize citizens.

Environmental Education and Stewardship – Education programs to connect kids with the natural world in their city. Programs include: Kids Grow, Natural Connections, CORE, and EnviroKids.

Description of Program from:

<http://www.fs.fed.us/na/morgantown/frm/water/pubs/Baltimore.pdf>

(d) Urban and Community Forestry Research R&D

Urban Forestry Research provides information to efficiently maintain and restore urban and community ecosystems used by large segments of the U.S. population. This research includes studies

that (1) assess the effectiveness of urban forest ecosystems in mitigating air pollution, slowing water infiltration rates and transpiring water, and (2) identify values of forests to urban populations. In addition, this research includes development of technology to improve urban housing durability and design of urban housing landscapes to reduce energy and water consumption.

To facilitate this research and disseminate it to the wider community, the Center on Urban Forest Research was created in 1992. Research undertaken by the Center can be categorized in nine main sections, one of which is water resources. One study of particular interest, titled “Investigation into hydrologic modeling and the effect of urban forests on runoff quantity and quality” by E.W. Larsen, J. Fleckenstein and E.G. McPherson, explored the ways in which vegetation can increase the quality and quantity of urban water supplies. The report also discussed methods of using vegetation to enhance storm water runoff systems. Another ongoing study, titled “Measuring and Modeling Hydrologic Processes at the Residential Level” is researching the effectiveness of various stormwater techniques on the residential level, including tree canopies. In addition to many studies that it has piloted relating urban forestry to healthy watersheds, the Center has developed rainfall interception models for single open-grown trees, and most recently for trees in urban watersheds.

Description of Program from:

<http://www.fs.fed.us/research/rvur.html>,
<http://www.fs.fed.us/psw/programs/cufr/>

(4) National Agroforestry Center (NAC) – USDA R&D

The National Agroforestry Center (NAC) is a partnership of the USDA Forest Service, Research & Development (Rocky Mountain Research Station) and State & Private Forestry and the USDA Natural Resources Conservation Service. The Center's purpose is to accelerate the development and application of agroforestry technologies to attain more economically, environmentally, and socially sustainable land-use systems. To accomplish its mission, the Center interacts with a national network of partners and cooperators to conduct research, develop technologies and tools, establish demonstrations, and provide useful information to natural resource professionals.

(a) Newsletter: Inside Agroforestry E&O

NAC's quarterly newsletter covers the latest agroforestry news and information.

➤ **Summer 2001 Issue: “Green Infrastructure: Reconnecting Communities and Agriculture”**

The Summer 2001 newsletter discusses the importance of “green infrastructure” in the development of communities. NAC Director Greg Ruark, defines “green infrastructure as “a strategically planned and managed interconnected network of green spaces that include: conserved natural areas and features, public and private conservation lands, and private working lands of conservation value. In particular, the newsletter looks at how techniques used by agroforestry can be applied to infrastructure projects in communities as they grow and expand, to mitigate negative impacts of the surrounding environment. The newsletter features articles highlighting “green infrastructure” strategies where they have worked and how they can be broadly applicable to communities all over the U.S. One segment in particular, discusses the use of hybrid poplar trees used to treat wastewater effluent and the positive externalities the project has brought to the community: a successful wastewater disposal technique, logs that can be harvested in 10 to 12 years, and enhanced water quality and wildlife habitat.

Newsletter can be found at:

<http://www.unl.edu/nac/ia/summer01/summer01.pdf>

All archived newsletters can be accessed at:

<http://www.unl.edu/nac/ia.html>

(5) Natural Resources Conservation Service (NRCS) – USDA

<http://www.nrcs.usda.gov/about/images/knight.jpg> Since 1935, the Natural Resources Conservation Service (originally called the Soil Conservation Service) has provided leadership in a partnership effort to help America's private land owners and managers conserve their soil, water, and other natural resources. NRCS employees provide technical assistance based on sound science and suited to a customer's specific needs. It provides financial assistance for many conservation activities. Participation in its programs is voluntary.

Description of Program from:

<http://www.nrcs.usda.gov/about/>

(a) Watershed Protection and Flood Prevention R&D

Legislative Authority: Watershed Protection and Flood Prevention Act, Public Law 83-566 Flood Control Act of 1944, Public Law 78-534

Also known as the 'Watershed Program' or the 'PL 566 Program,' this program provides technical and financial assistance to address water resource and related economic problems on a watershed basis. Projects related to watershed protection, flood mitigation, water supply, water quality, erosion and sediment control, wetland creation and restoration, fish and wildlife habitat enhancement, agricultural water conservation, and public recreation are eligible for assistance. Technical and financial assistance is also available for planning new watershed surveys.

Eligible Applicants: Individuals, state governments, local governments, partnerships, private landowners, public landowners, special districts, and tribal agencies.

2006 Budget: Funding for 2006 is \$111 million (funding levels for 2007 have been reduced significantly to \$15 million). Funding Level FY 2005 was \$ 75 million. Typical lowest amount awarded \$ 25,000 Typical highest amount awarded \$ 10 million Typical median amount awarded \$ 400,000.

Description of Program from:

<http://www.sc.egov.usda.gov/>,

<http://www.whitehouse.gov/omb/expectmore/detail.10020030.2005.html>

(6) Rural Development Program – USDA FFLI

The USDA Rural Development Program supports essential public facilities and services as water and sewer systems, housing, health clinics, emergency service facilities and electric and telephone service. It promotes economic development by supporting loans to businesses through banks and community-managed lending pools. It offers technical assistance and information to help agricultural and other cooperatives get started and improve the effectiveness of their member services. And it provides technical assistance to help communities undertake community empowerment programs. It has an \$86 billion dollar portfolio of loans and it

will administer nearly \$16 billion in program loans, loan guarantees, and grants through its programs.

Description of Program from:

<http://www.rurdev.usda.gov/>

(a) Rural Development Housing and Community Facilities Programs (HCFP) [FFLI]

The Housing and Community Facilities Programs (HCFP) is an agency of the U.S. Department of Agriculture (USDA). Located within the Department's Rural Development mission area, HCFP operates a broad range of programs to provide: homeownership options to individuals; housing rehabilitation and preservation funding; rental assistance to tenants of HCFP-funded multi-family housing complexes; farm labor housing; help to developers of multi-family housing projects, like assisted housing for the elderly and disabled, or apartment buildings; and community facilities, such as libraries, child care centers, schools, municipal buildings, and firefighting equipment to Indian groups, nonprofit organizations, communities and local governments.

HCFP administers direct loans, loan guarantees and grants. Direct loans are made and serviced by USDA staff; loan guarantees are made to banks or other private lenders, and grants are made directly to a person or organization.

Description of Program from:

<http://www.rurdev.usda.gov/rhs/faqs/faq.htm>

➤ **Rural Home Repair Loan and Grant Program**

Legislative Authority: USDA Rural Development Section 504.

Rural Housing Repair and Rehabilitation Loans are loans funded directly by the Government. These loans are available to very low-income rural residents who own and occupy a dwelling in need of repairs. Funds are available for repairs to improve or modernize a home, or to remove health and safety hazards. This loan is a 1% loan that may be repaid over a 20-year period. Water supply and sewage disposal systems should normally meet HCFP requirements. Not all the health and safety hazards in a home must be removed with Section 504 funds, provided that major health and safety hazards are removed. All work must meet local codes and standards.

Eligible Applicants: Homeowners who earn less than 50% of the area median income and who have favorable credit are eligible for loans. Projects

must be to improve housing with the goal of removing health and safety hazards. Grants are only available to homeowners who are 62 years old or older and cannot repay a Section 504 loan.

Funding Levels: Loans of up to \$20,000 and grants of up to \$7,500 are available. Loans are for up to 20 years at 1 percent interest. A real estate mortgage and full title services are required for loans of \$7,500 or more. Grants may be recaptured if the property is sold in less than 3 years. Grant funds may be used only to pay for repairs and improvements resulting in the removal of health and safety hazards. A grant/loan combination is made if the applicant can repay part of the cost. Loans and grants can be combined for up to \$27,500 in assistance.

Description of Program from:

http://www.rurdev.usda.gov/rhs/sfh/brief_repairloan.htm

➤ **Single Family Housing Program**

USDA Rural Development Section 502.

Section 502 loans are primarily used to help low-income individuals or households purchase homes in rural areas. Funds can be used to build, repair, renovate or relocate a home, or to purchase and prepare sites, including providing water and sewage facilities. Under the Section 502 program, housing must be modest in size, design, and cost. Houses constructed, purchased, or rehabilitated must meet the voluntary national model building code adopted by the state and HCFP thermal and site standards. New Manufactured housing must be permanently installed and meet the HUD Manufactured Housing Construction and Safety Standards and HCFP thermal and site standards. Existing manufactured housing will not be guaranteed unless it is already financed with an HCFP direct or guaranteed loan or it is Real Estate Owned (REO) formerly secured by an HCFP direct or guaranteed loan.

Eligible Applicants: Applicant families must: Have an acceptable credit history; Have an adequate and dependable source of income not exceeding 80% of the county median income; Have repayment capacity to service any existing obligations and the home loan request; Be without adequate housing; Be a citizen or non-citizen admitted to the United State of America for permanent residence or on indefinite parole; Have the ability to personally occupy the home on a permanent basis; Be located in a community with a population of 10,000 or less (selected communities with a population between 10,000 - 20,000 are also eligible).

Description of Program from:

http://www.rurdev.usda.gov/rhs/sfh/brief_rhguar.htm
http://www.rurdev.usda.gov/rhs/sfh/brief_rhguar.htm

**(7) Rural Utilities Service (RUS) –
USDA**

Water and Environment Programs

The USDA Rural Utilities Service was created in 1994, replacing the Rural Development Administration and the Farmers Home Administration and is one of the main federal funding sources for water and wastewater projects and development. In the years between 1991 and 2000, RUS provided \$12.5 billion in funding through its Rural Community Advancement Program. In FY 2000, RUS allocated \$704.8 million in water and wastewater loans, \$75 million in loan guarantees, \$366 million in grants and \$86.7 in congressional earmarks.

Description of Program from:

<http://www.gao.gov/new.items/d02134.pdf>

**(a) Solid Waste Management Grant
Program** **FFLI**

The objectives of the Solid Waste Management Grant Program are to: reduce or eliminate pollution of water resources in rural areas; improve planning and management of solid waste sites in rural areas. Solid Waste Management grants may be used to: evaluate current landfill conditions to determine threats to water resources; provide technical assistance and/or training to enhance operator skills in the operation and maintenance of active landfills; provide technical assistance and/or training to help communities reduce the solid waste stream; provide technical assistance and/or training for operators of landfills which are closed or will be closed in the near future with the development and implementation of closure plans, future land use plans, safety and maintenance planning, and closure scheduling within permit requirements.

Eligible Applicants: Non-profit organizations and public bodies including local governmental-based multi-jurisdictional organizations.

2006 Budget: \$3.5 million. FY Budget 2005 was \$3,472,000.

Example of a Funded Project:

➤ **Antioch New England Institute (NH)**
R&D

\$99,800. The grantee will develop and implement a recycling based, integrated solid waste management plan in New Hampshire. This integrated waste management plan will emphasize both reducing the volume and toxicity of waste through recycling, waste reduction, reuse, composting and proper management of household hazardous waste and residuals. They will also develop a guide book on how to develop a model recycling-based integrated solid waste management plan for other regions that are transitioning to a recycling and waste reduction based economy.

Description of Program from:

<http://www.usda.gov/rus/water/swm05.htm>

**(b) Technical Assistance and Training
Grants** **E&O**

The objectives of the Technical Assistance and Training Grant Program are to: identify and evaluate solutions to water and waste disposal problems in rural areas; assist applicants in preparing applications for water and waste grants made at the State level offices; improve operation and maintenance of existing water and waste disposal facilities in rural areas.

Technical Assistance and Training grants may be used to: Identify and evaluate solutions to water problems of associations in rural areas relating to: source, storage, treatment, distribution; identify and evaluate solutions to waste problems of associations in rural areas relating to: collection, treatment, disposal; assist associations that have filed a pre-application with the Agency in the preparation of water and/or waste loan and/or grant applications; provide training to association personnel that will improve the management, operation and maintenance of water and waste disposal facilities; pay expenses associated with providing technical assistance and/or training.

Eligible Applicants: Private non-profit organizations (excluding universities).

Example of Funded Project:

➤ **The National Rural Water Association**

The National Rural Water Association of Duncan, Oklahoma has operated the Wastewater Technician Program under the T A T program since 1988 when they contracted with their State-affiliate Rural Water Associations to employ full-time wastewater technicians in 15 States. The program has

expanded over the years to provide full-time wastewater technical assistance and training in all of the 48 contiguous States and in Puerto Rico. These technicians provide technical assistance and training to system operators in the areas of water or wastewater treatment, facility operations and maintenance, system financial management, regulatory compliance, and conservation issues. They also provide liaison support for interactions with regulatory and funding agencies.

2006 Budget: \$18.1 million. In FY 2005, grants totaled \$18,114,274.

Description of Program from:

<http://www.usda.gov/rus/water/tatg.htm#Technical%20Assistance%20and%20Training%20Grant%20Recipients%20FY03>

(c) Water and Waste Disposal Loan and Grant Program FFLI

Legislative Authority: Consolidated Farm and Rural Development Act, section 306, Public Law 92-419, 7 U.S.C. 1926

This USDA Rural Utilities Service program provides monies to provide basic human amenities, alleviate health hazards, and promote the orderly growth of the rural areas of the nation by meeting the need for new and improved rural water and waste disposal facilities. Funds may be used for the installation, repair, improvement, or expansion of a rural water facility including costs of distribution lines and well pumping facilities. Funds also support the installation, repair, improvement, or expansion of a rural waste disposal facility, including the collection and treatment of sanitary waste stream, stormwater, and solid wastes. Rural Utilities Service also guarantees water and waste disposal loans made by banks and other eligible lenders.

DIRECT AND GUARANTEED LOANS

Direct loans may be made to develop water and wastewater systems, including solid waste disposal and storm drainage, in rural areas and to cities and towns with a population of 10,000 or less. Funds are available to public entities, such as municipalities, counties, special-purpose districts, and Indian tribes. In addition, funds may be made available to corporations operated on a not-for-profit basis. Priority will be given to public entities, in areas with less than 5,500 people, to restore a deteriorating water supply, or to improve, enlarge, or modify a water facility or an inadequate waste facility. Also, preference will be given to requests which involve the merging of small facilities and those serving low income communities. Applicants

must be unable to obtain funds from other sources at reasonable rates and terms. The maximum term for all loans is 40 years; however, no repayment period will exceed State statutes or the useful life of the facility.

GRANTS

Reduce water and waste disposal costs to a reasonable level for users of the system. Grants may be made, in some instances, up to 75 percent of eligible project costs.

2006 Budget: Grants: \$380.5 million; Loans: \$1 billion; Guaranteed Loans: \$75 million

Eligible Applicants: Community/watershed groups, nonprofit groups, conservation districts, local governments, tribal agencies.

Description of Program from:

<http://www.usda.gov/rus/water/programs.htm>,
<http://www.usda.gov/rus/water/docs/fact2.pdf>,
<http://www.usda.gov/rus/water/docs/wwfact.doc>

DEPARTMENT OF COMMERCE***(1) Economic Development
Administration (EDA) – Commerce***

Legislative Authority: Public Works and Economic Development Act of 1965, as amended; 42 U.S.C. 3141, Section 201, Public Law 105-393; 112 Stat. 3596.

***(a) Public Works and Economic
Development Program FFLI***

The Economic Development Administration (EDA) provides grants to economically distressed areas under its Public Works Program to revitalize, expand, and upgrade their physical infrastructure—including water and sewer facilities. Projects must: promote economic development; create long-term jobs; and/or benefit low-income persons or the long-term unemployed. The basic grant rate may be up to 50 percent of the project cost. Severely depressed areas may receive supplementary grants to bring the Federal contribution up to 80 percent of the project cost; recognized Indian tribes may be eligible for up to 100 percent assistance. Additionally, eligible areas located within and actively participating in the operations of Economic Development Districts are, subject to the 80 percent maximum Federal grant limit, eligible for a 10 percent bonus on grants for public works projects. On average, EDA's investment covers approximately 50 percent of project costs. Between 1991 and 2000, the EDA allocated \$1.1 billion in grants for sewer and drinking water projects. In FY 2000, \$72.8 million was awarded for wastewater projects and \$33.7 million was awarded for water projects.

Description of Program from:
<http://efc.boisestate.edu/search.asp?mode=summary&programid=1525>,
<http://www.gao.gov/new.items/d02134.pdf>

Eligible Applicants and Selection Criteria: Grant applications are invited from intergovernmental groups, local government, non-profits, state governments, and tribal bodies. Project proposals must be located within an economically distressed EDA eligible area and be in conformance with a Comprehensive Economic Development Strategy (CEDS) for the eligible area. Projects must also contribute to long-term economic development of the area by creating or retaining permanent jobs and raising income levels.

Grant Program Description for FY 2006: Funds in the amount of \$250,741,104 have

been appropriated for FY 2006 and shall remain available until expended. The Public Works and Economic Development Investments Program has been appropriated \$158,088,957 for 2006. The average funding level for a Public Works investment in FY 2005 ranged from \$70,000 to \$4,000,000. However, these averages are informational only and are not intended to restrict the size of future awards. EDA will provide Public Works investments to support the construction or rehabilitation of essential public infrastructure and facilities necessary to generate or retain private sector jobs and investments, attract private sector capital, and promote regional competitiveness, including investments that expand and upgrade infrastructure to attract new industry, support technology led development, redevelop brownfield sites, provide eco-industrial development, and support heritage preservation development investments such as those promoted by the Preserve America initiative.

Description of Program from:
http://www.eda.gov/ImageCache/EDAPublic/documents/pdfdocs/edapfo2006_5ffinal_2epdf/v1/edapfo2006_5ffinal.pdf

***(2) National Estuarine Research
Reserve (NERR) – Commerce R&D***

Legislative Authority: Section 315 of the Coastal Zone Management Act of 1972 as amended.

The National Estuarine Research Reserves System is a network of 26 areas representing different biogeographic regions of the United States that are protected for long-term research, water-quality monitoring, education and coastal stewardship. Established by the Coastal Zone Management Act of 1972, as amended, the reserve system is a partnership program between the National Oceanic and Atmospheric Administration and the coastal states. NOAA provides funding, national guidance and technical assistance. Each reserve is managed on daily basis by a lead state agency or university, with input from local partners.

Reserve staff work with local communities and regional groups to address natural resource management issues, such as non-point source pollution, habitat restoration and invasive species. Through integrated research and education, the reserves help communities develop strategies to deal successfully with these coastal resource issues. Reserves provide adult audiences with training on estuarine issues of concern in their local communities. They offer field classes for K-12

students and support teachers through professional development programs in marine education. Reserves also provide long-term water quality monitoring as well as opportunities for both scientists and graduate students to conduct research in a “living laboratory.”

The Reserves also have a partnership with the Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET). Many academic researchers conducting research in the reserve system are supported by CICEET. The projects are on subjects ranging from restoring eelgrass habitat to developing technologies to monitor nutrients. In addition, researchers from universities and other institutions are engaged in projects within the reserve system on topics like nutrient loading, invasive species or habitat restoration.

Description of Program from:

http://nerrs.noaa.gov/Background_Overview.html
<http://nerrs.noaa.gov/Research.html>

Example of a Funded Project:

- **“Autotrophic biological denitrification with hydrogen or thiosulfate for complete removal of nitrogen from a septic system wastewater.”**

Management Issue: Reducing nitrogen inputs to estuaries

Project Summary: Like many other water bodies in the US, Cape Cod, MA estuaries suffer from excessive nitrogen, which contributes to algae blooms, oxygen depletion and habitat degradation. In southern MA, the primary source of nitrogen is septic tanks, which remove about 23% (at best) of the nitrogen from the incoming wastewater. Managers recognize the need for better onsite wastewater treatment to achieve higher nitrogen removal. This project will evaluate the use of bacteria to transfer the nitrate into harmless atmospheric nitrogen through the process of denitrification. A combination of bench-scale lab work, as well as field work at the Waquoit Bay NERR will be employed to develop a low-cost, reliable and environmentally friendly technology for better removal of nitrogen from septic tanks.

NERR Site: Waquoit Bay (MA)

Investigators: S. Sengupta (University of Massachusetts), S. Ergas (University of Massachusetts)

Two Year Budget: \$212,762

Description of Program from:

<http://www.ciceet.unh.edu/>

(a) Waquoit Bay National Estuarine Research Reserve R&D

The Waquoit Bay NERR is part of the National Estuarine Research Reserve System, which presently includes 25 sites in 20 states, and Puerto Rico. Each site represents a different coastal region. The Waquoit Bay Reserve is representative of the Northern Virginian biogeographic region, from Chesapeake Bay to Cape Cod. WBNERR is co-funded and co-managed by the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management, Estuarine Reserves Division and by the Massachusetts Department of Conservation and Recreation.

Examples of Publications Funded by WBNERR Relating to Wastewater:

- Hoover, M.T., 1997. “A Framework for site evaluation, design, and engineering of on-site technologies within a management context.” Marine Consortium, Waquoit Bay National Estuarine Research Reserve, and *ad hoc* Task Force for Decentralized Wastewater Management, Marine Studies Consortium. 400 Health St. Chestnut Hill, MA 02167. 99 pp.
- Nelson, V.I. and F.C. Shephard. 1998. Accountability: Issues of Compliance with Decentralized Wastewater Management Goals. Waquoit Bay National Estuarine Research Reserve and *ad hoc* Task Force for Decentralized Wastewater Management. Waquoit, MA. 112 pp.

Description of Program from:

<http://www.waquoitbayreserve.org/pubs.htm>

(3) National Oceanic and Atmospheric Administration (NOAA) – Commerce

NOAA is a federal agency focused on the condition of the oceans and the atmosphere. It plays several distinct roles within the Department of Commerce:

A Supplier of Environmental Information Products. One of the most important resources in our society is information. NOAA supplies information to its customers that pertains to the state of the oceans and the atmosphere. This is clearly manifest in the production of weather warnings and forecasts through the National Weather Service, but NOAA's information products extend to climate, ecosystems and commerce as well.

A Provider of Environmental Stewardship Services. NOAA also is the steward of national

coastal and marine environments. In coordination with federal, state, local, tribal and international authorities, NOAA manages the use of these environments, regulating fisheries and marine sanctuaries as well as protecting threatened and endangered marine species.

A Leader in Applied Scientific Research.

NOAA is a trusted source of accurate and objective scientific information in four particular areas of national and global importance:

Ecosystems: Ensure the sustainable use of resources and balance competing uses of coastal and marine ecosystems, recognizing both their human and natural components.

Climate: Understand changes in climate, including the El Niño phenomenon, to ensure that we can plan and respond properly.

Weather & Water: Provide data and forecasts for weather and water cycle events, including storms, droughts and floods.

Commerce & Transportation: Provide weather, climate, and ecosystem information to make sure individual and commercial transportation is safe, efficient and environmentally sound.

Source/reference: <http://www.noaa.gov/about-noaa.html>

(a) Cooperative Institute For Coastal And Estuarine Environmental Technology (CICEET) R&D

CICEET was established in 1997 as a national center for the development of innovative environmental technologies for the monitoring, management and prevention of contamination and degradation in estuaries and coastal waters. The institute is a partnership between NOAA and the University of New Hampshire, and promotes collaboration among academia, government and the private sector. It is located on the UNH campus.

Its demonstration projects use facilities at the university, as well as the Great Bay National Estuarine Research Reserve in New Hampshire. However, CICEET projects have been undertaken at all 25 NERRs, and currently active CICEET projects are taking place at 22 reserves.

Technology: CICEET aids the reserves in fulfilling their function of providing research, education and stewardship to their respective regions, and many of its inventions, innovations,

methods and techniques have been adapted for use elsewhere, or even commercialized.

Much of its development concerns instrumentation and remote sensing techniques to measure change in estuarine water quality, habitat and land use, and to plan for mitigation or future sustainability.

One of its most well-developed initiatives concerns stormwater runoff, in order to meet new standards promulgated by the EPA. It "...has built a Storm Water Management Center (only one of its kind) in the country, and communicates its findings to communities throughout the Northeast in order to improve water quality and reduce runoff. Presently eleven stormwater treatment devices are operating on-site at the research center. These include manufactured systems (infiltration devices, filtration devices, manhole retrofits, etc), a sand filter, a bioretention system, a gravel wetland, a detention pond, a swale, and investigations into porous parking lots and street vacuuming." It turns out that LID systems are the top performers in terms of protecting water quality and reducing the volume of stormwater runoff.

Instruments and tools developed wholly or partially with CICEET support that are either commercially available or patented and available for licensing include:

Reactive Phosphate Cap (In situ capping technology that uses phosphates to form a "reactive" barrier, sealing contaminants such as heavy metals in the sediments and preventing them from being released to the water column where they can be transferred up the food chain)

In-situ Nutrient Analyzer (Measures nitrate, nitrite and phosphorus concentrations in-situ)

SubChemPak Analyzer (A rapid response, submersible chemical analyzer designed for high-resolution, real-time measurements of selected nutrients and other environmentally important chemicals)

Other projects include:

- Wastewater treatment to minimize phosphorous delivery from dairy farms to receiving waters
- Autotrophic biological denitrification with hydrogen or thiosulfate for complete removal of nitrogen from a septic system wastewater
- Reducing nitrogen inputs to estuaries (A combination of bench-scale lab work, as well

as field work to develop a low-cost, reliable and environmentally friendly technology for better removal of nitrogen from septic tanks)

- Effectiveness of Reactive Barriers for reducing N-loading to the coastal zone

This last project involves the use of patented technology involving nitrate and phosphorus reactive media that convert nitrate to inert nitrogen gas (denitrification) and binds phosphorus without sludge production. The reactive media is contained in a prefabricated tank or, for larger installations, in an engineered excavation or permeable reactive barrier. The Runoff filter can be used to remove nitrogen and phosphorus in surface and subsurface water such as stormwater runoff, agricultural runoff, and groundwater.

The Runoff reactive media may be placed in a lined excavation, and the water allowed to gravitationally percolate through the reactive media or placed in a subsurface trench as a permeable reactive barrier.

The very low nitrogen and phosphorus effluent from the Runoff filter is simply discharged to a subsurface dispersal system or receiving water body. Compared to other technologies, the filter is passive and essentially maintenance free. It provides up to 97% nitrogen and phosphorus removal in a low-cost easy-to-install process.

Technology Transfer, Outreach: CICEET is also exploring strategies for involving outreach personnel and potential end users in the research from the inception of each project.

A recently released Web module, the CICEET Project Explorer, is a pivotal step in allowing the CICEET staff to quickly disseminate new data and information. Project Explorer is the virtual stage where researchers, resource managers, planners and private consultants can quickly get information on areas of interest.

Outreach and incentive efforts include BMP Technology Demonstration Workshops, training sessions, student awards for the National Low Impact Development (LID) Student Design Team competition...

... Science translation for non-point source pollution control -A cultural models approach with municipal officials

CICEET also encourages technology transfer through a "Technology Transfer RFP."

Budget: Its annual budget is around \$6.5 million.

(i) Environmental Technology Development Program R&D

CICEET invites proposals to its Environmental Technology Development (ETD) Program for funding in FY 2006-2007. Through this program, CICEET makes grants to develop and apply technology to monitor, manage, and prevent the contamination and degradation of coastal and estuarine waters and habitats. The RFP is open to U.S. scientists and innovators from academia, private industry, and the public sector who seek to develop tools that meet the priority needs of coastal management [and in some circumstances to other federal agencies or departments.]

Research Focus Areas include:

Area 1: Land Use/Habitat Change:

Develop novel and cost-effective technologies or methods to restore coastal and estuarine habitat, to visualize and predict the outcome of restoration activities; to enhance data acquisition and processing technology to detect habitat change and/or connect it to land use practices to detect, predict, or manage the effects of land use practices on the input of contaminants into estuarine and coastal ecosystems, using, e.g., remote imagery, in situ sensors, GIS, or predictive spatial modeling.

Area 2: Nutrient Enrichment and

Eutrophication: Develop novel and cost-effective technologies or methods: to reduce or eliminate nutrient inputs to watersheds from wastewater, stormwater, and air; to create more effective waste management technologies and strategies to reduce the nutrient impact of agriculture on coastal and estuarine ecosystems; to mitigate the impact of nutrient enrichment on estuarine and coastal habitat; and to detect and quantify nutrients in coastal environments.

Area 3: Microbial Contaminants: Develop novel and cost-effective technologies or methods to: eliminate or reduce microbial contaminants from point and nonpoint sources, such as wastewater treatment facilities, urban stormwater, agricultural runoff, and boats;* identify human and non-human sources of microbial contaminants; and to detect and quantify microbial contaminants in coastal and estuarine waters.

Area 4: Toxic Contaminants: Develop novel and cost-effective technologies or methods to reduce or eliminate toxic contaminant input to coastal watersheds, from wastewater, stormwater, and airborne contaminants.

Develop novel and cost-effective technologies or methods to remediate contaminated sediments

and water. Develop novel and cost-effective technologies (sensors) or methods to detect and quantify toxic contaminants in the environment. This does not include technologies to detect and/or quantify the effects or impacts of toxic contamination. Develop novel and cost-effective technologies or methods to identify sources of toxic contaminants.

Eligible Applicants: This RFP is open to U.S. scientists and innovators from academia, private industry, and the public sector who seek to develop tools that meet the priority needs of coastal management. (Federal agency personnel—including those from NOAA—are eligible, if they can document statutory authority to supplement their appropriations with funds from other federal programs and entities.)

Budget: Up to \$4 million is available to fund new projects under this solicitation. Proposed projects may span one or two years. During CICEET's last competitive funding cycle, annual project awards averaged \$124,000. In previous years, annual awards ranged from \$22,000 to \$185,000.

(b) National Ocean Service – Education Program E&O

NOAA's National Ocean Service (NOS) is dedicated to creating innovative products that enlighten students and educators about the breadth of scientific research, technology, and activities conducted by NOS in the areas of oceans, coasts, and charting and navigation.

Formal educational resources are organized within the Discovery Center, a series of products that have been developed for educators and students at the high school level, but easily adaptable for students at the middle school or undergraduate levels. Discovery Center resources include Discovery Kits, Discovery Stories, and the Discovery Classroom.

Description of Program from:
<http://oceanservice.noaa.gov/education/welcome.html>

(i) Nonpoint Source Pollution Discovery Kit

This Discovery Kit has three sections to help you learn about nonpoint source pollution, which is pollution from diffuse sources that can't be tied to a specific location (city streets, farm fields, etc.) The Kit includes a tutorial, a roadmap to online resources, and formal lesson plans for educators.

The tutorial gives an overview of the history and types of nonpoint source pollution. It discusses

methods used to detect pollutants, and to assess and reduce their damaging effects on the environment. The tutorial is made up of nine "chapters" or pages, and includes many images to enhance the text.

The Roadmap to Resources complements the information in the tutorial by directing you to online data and other pollution-related information from NOAA and other reliable sources.

The lesson plans integrate information presented in the tutorial with online offerings from the Roadmap, and have been developed for students in grades 9-12. The lessons focus on how scientists identify and measure nonpoint pollutants and determine their effects on living organisms using bioassays and chemical analyses.

Source/Website:
<http://oceanservice.noaa.gov/education/kits/pollution/welcome.html>

(c) National Sea Grant College Program (NOAA-SG) R&D

NOAA Sea Grant, founded in 1966, was modeled after the nation's Land Grant program, established in the 19th century. Indeed, the various state Sea Grant programs are often headquartered at Land Grant colleges, and may share staff.

The program is designed to foster science-based decisions regarding the use and conservation of marine and Great Lakes resources. Its Research and Outreach divisions go hand in hand. Applied research and development are conveyed to the public by a network of extension agents, educators, and communicators. Sea Grant is marked by numerous activities and programs that vary from state to state. Some of them are listed in entries that follow here.

Recently, the agency recognized that watersheds must be included in its charge, insofar as they all drain to the oceans. Thus investments in watershed management programs have grown significantly in recent years. For example, Sea Grant just initiated a \$1.5 million per year program for coastal community development (cf).

The National Sea Grant budget is about \$60 million, matched by state funding. The federal funds are distributed to the thirty university-based programs. Most of the supported research is conducted by state programs via university-connected principle investigators. The state programs also offer modest external support for a variety of research, outreach and education projects.

Aside from making grants to the state programs, the national office has also established a series of National Strategic Investment grants. These NSI grants are intended to enhance Sea Grant's network-wide (nation-wide) capabilities to respond to high priority issues, and are administered by the national office of Sea Grant. Projects are generally selected through a competitive RFP process.

Source/reference: www.SeaGrant.seagrant.org/. Jamie Krauk, Director of Communications, Jamie.Krauk@noaa.gov; Tel: 301-713-2431; Fax: 301-713-0799. NOAA/Sea Grant, R/SG,SSMC-3, 1315 East-West Highway, Silver Spring, MD 20910.

➤ **Coastal Community Development Program (CCD)**

The Coastal Community Development (CCD) Program is one of NOAA Sea Grant's main 'Theme Areas.' With 33 Sea Grant programs around the country, each idiosyncratic, the focus and implementation of CCD varies widely. Nevertheless, 24 programs have a CCD arm engaged in land use and water quality issues; 15 of them directly assist land use planning efforts, and 8 of them are reviewing land use and planning codes. One thing they all have in common is a project called Nonpoint Education for Municipal Officials (NEMO) for educating local decision-makers.

Source/reference: www.nsgo.seagrant.org/themesnpoa/coastalcomm Amy Zimmerling, Amy.Zimmerling@noaa.gov; tel. 301-713-2431 x187; NOAA/Sea Grant, R/SG,SSMC-3, Eleventh Floor, 1315 East-West Highway, Silver Spring, MD 20910.

➤ **Urban Coasts – Santa Monica Bay Restoration Project**

The University of Southern California, with funds from Sea Grant, has sponsored investigations of ocean processes and biology associated with the White's Point sewage outfall, the largest sewage outfall in the United States, discharging an average of 330 million gallons per day onto the Palos Verdes shelf adjacent to Santa Monica Bay. In several interdisciplinary research projects, Sea Grant scientists have investigated the complex oceanographic processes affecting dispersion of the outfall plume and the resuspension of trace metals and nutrient fluxes from bottom sediments near the outfall.

USC has also organized a workshop with the Santa Monica Bay Restoration project and the Southern California Coastal Water Resource Project about the stormwater runoff from Ballona Creek and Malibu Creek. A package of research

projects aimed at determining the impacts of the stormwater stemmed off the success of the workshop.

Funded research focused mainly on the dangers represented by elevated levels of human bacteria and viruses of the coastal waters surrounding Los Angeles. The project results are valuable for the Los Angeles and Orange County Sanitation authorities that have been working closely with Sea Grant in order to provide state-of-the-art methods for detecting such pathogens. USC is also supporting projects that investigate the effects of human impacts on the urban rocky shores. The growing population in Southern California warrants the need to identify the balance between long-term conservation of living resources and short-term pressures of the humans.

Description of Program from:
<http://www.usc.edu/org/seagrant/UrbanCoasts/summaries.html>

(4) Technology Administration

(a) National Institute of Standards and Technology (NIST) R&D

Founded in 1901, NIST is a non-regulatory federal agency within the U.S. Commerce Department's Technology Administration. NIST's mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life. NIST carries out its mission in four cooperative programs: the NIST Laboratories, the Baldrige National Quality Program, the Manufacturing Extension Partnership, and the *Advanced Technology Program*, which accelerates the development of innovative technologies for broad national benefit by co-funding R&D partnerships with the private sector.

NIST has an operating budget of about \$930 million and operates in two locations: Gaithersburg, Md., (headquarters—234-hectare/578-acre campus) and Boulder, Colo., (84-hectare/208-acre campus). NIST employs about 2,900 scientists, engineers, technicians, and support and administrative personnel. About 1,800 NIST associates complement the staff. In addition, NIST partners with 1,400 manufacturing specialists and staff at nearly 350 affiliated centers around the country.

(i) Advanced Technology Program- NIST

ATP helps industry invest in longer-term, high risk research with payoffs far beyond private profit. By sharing the cost with companies, ATP accelerates the development of early-stage, innovative technologies, helping industry raise its competitive potential while providing Americans with a higher standard of living.

➤ **Project: Development of New Technologies for Treating and Recycling Wastewater from Aquaculture Facilities**

The goals of the program will be to develop innovative and economical waste-water treatment technologies to meet the U.S. aquaculture industry's need to remain competitive with foreign producers and to develop technologies that can easily be adapted to existing aquaculture facilities, enabling better conservation of water, increased productivity, and more effective integration of aquaculture with agriculture.

Project Performance Period: 8/15/1995 - 8/14/1998

Total project (est.): \$3,260,115.00

Requested ATP funds: \$1,996,160.00

Sponsored by: Kent SeaTech Corporation

Description of Program from:

<http://jazz.nist.gov/atpcf/prjbriefs/prjbrief.cfm?ProjectNumber=95-01-0034>, <http://www.nist.gov/>, <http://www.atp.nist.gov/>, <http://www.atp.nist.gov/index.html>

(ii) Building for Environmental and Economic Sustainability (BEES)

The BEES (Building for Environmental and Economic Sustainability) software is a powerful technique for selecting cost-effective, environmentally-preferable building products. Developed by the NIST (National Institute of Standards and Technology) Building and Fire Research Laboratory with support from the U.S. EPA Environmentally Preferable Purchasing Program, the tool is based on consensus standards and designed to be practical, flexible, and transparent. Version 3.0 of the Windows-based decision support software, aimed at designers, builders, and product manufacturers, includes actual environmental and economic performance data for nearly 200 building products.

BEES measures the environmental performance of building products by using the life-cycle assessment approach specified in the ISO

14040 series of standards. All stages in the life of a product are analyzed: raw material acquisition, manufacture, transportation, installation, use, and recycling and waste management. Economic performance is measured using the ASTM standard life-cycle cost method, which covers the costs of initial investment, replacement, operation, maintenance and repair, and disposal. Environmental and economic performance are combined into an overall performance measure using the ASTM standard for Multi-Attribute Decision Analysis. For the entire BEES analysis, building products are defined and classified according to the ASTM standard classification for building elements known as UNIFORMAT II.

Description of Program from:

<http://www.bfrl.nist.gov/oae/software/bees.html>

DEPARTMENT OF DEFENSE AND DEFENSE AGENCIES

(1) Army Corps of Engineers

(a) Water Resources Program **FFLI**

The Army Corps of Engineers' Water Resources Program is under the jurisdiction of the Congressional Subcommittee on Water Resources and Environment. The Subcommittee is also charged with enacting the Water Resources Development Act every two years, which relates to the Corps' activities. The purpose of the Corps' Water Resources Program is to study, design, and implement projects that include navigation, flood control, shoreline protection, hydropower, dam safety, water supply, recreation, environmental restoration and protection, and disaster response and recovery. The process for a Corps project begins with a feasibility study, and once congressionally authorized, follows with a year long study, funded by the federal government, into the water resource problem, the opportunities for improvement, the level of interest from the sponsor and federal government, the potential environmental effects of the project and the economic costs and benefits.

If this study has found that the project is suitable for federal funding, a second feasibility study is undertaken, paid for by equally by the federal government and an outside sponsor. The purpose of this study is to examine alternatives to the project and put forward a project that is technologically, environmentally, and economically sound. The cost for projects is ideally shared between the federal government and the primary outside sponsor. This study is then sent to Congress and if it is forwarded with a favorably report by the Chief of Engineers, it is included in the biennial Water Resources and Development Act, where it may be authorized by the aforementioned Subcommittee in charge of the Act.

In contrast to Corps' projects, for which the majority of funding comes from the federal government, wastewater and water resource projects can also be funded by local sponsors or through loans by State Revolving Funds (SRF), administered by the Environmental Protection Agency (EPA). For the SRFs, loans must be repaid by the local sponsor and must undergo strict environmental impact studies and economic feasibility studies before the funding is allocated. The Corps projects, on the other hand, are not subject to rigorous EPA standards and requirements and are funded based on the

decisions of authorities with general, regional-based knowledge.

Steve Ellis, of Taxpayers for Common Sense, says that Corps projects are not reviewed on an individual basis and "are generally selected and planned according to local development interests, and then funded by Congress." One unfortunate result of the broad based reviews and lack of environmental impact studies, Ellis suggests, is that many Corps projects often enable communities to expand into surrounding open space, contributing to urban sprawl.

Funding for water and wastewater infrastructure between 1991 and 2000 reached \$23.7 million by the Corps. In 2000, \$13.8 million was allocated for environmental infrastructure, which includes drinking and wastewater systems.

Sources/ Description of Program from: Ellis, Steve. "Rolling out the Pork Barrel from New York to Alaska." *Taxpayers for Common Sense*.

The Subcommittee on Water Resources and Environment Hearing on Member Project Requests for the Water Resources Development Act of 2005. <http://www.house.gov/transportation/water/03-16-05/03-16-05memo.html>

General Accounting Office (GAO). "Water Infrastructure; Information on Federal and State Financial Assistance." GAO-02-134 November 2001. <http://www.gao.gov/new.items/d02134.pdf>

(i) Construction of Municipal and Industrial Water Supply Projects **FFLI**

This program provides technical assistance for storage capacity at Corps facilities for water, municipal and industrial use. Eligible projects: Studies and design work to modify existing Corps reservoir or reallocate existing storage capacity. Contract management for construction and design.

Eligible Applicants: State Governments, Local Governments, and Tribal Agencies.

Description of Program from: <http://efc.boisestate.edu/search.asp?mode=summary&programid=126>

(ii) Floodplain Management Services

Section 206 of the Flood Control Act of 1960, as amended, provides the authority for this program. Its objective is to foster public understanding of the options for dealing with flood hazards and to promote prudent use and management of the Nation's floodplains. Land use adjustments, based on proper planning and the employment of techniques for reducing flood damages, provide a rational way to balance the

advantages and disadvantages of human settlement on floodplains. The Floodplain Management Services (FPMS) program provides the full range of technical services and planning guidance needed to support effective floodplain management. Program objective is to reduce flood damages by informing people who live and work in the flood plain of its hazards and what actions they can take to reduce property damage and prevent loss of life caused by flooding.

Eligible Applicants: Intergovernmental Groups, State Governments, Local Governments, Special Districts, and Tribal Agencies.

Website: www.usace.army.mil

(iii) Section 22: Planning Assistance to the States Program (PAS) E&O

Section 22 of the Water Resources Development Act of 1974, as amended, provides authority for the Corps of Engineers to assist the states, local governments, and other non-federal entities in the preparation of comprehensive plans for the development, utilization, and conservation of water and related land resources. The program can encompass many types of studies including water supply, quality, conservation, flood control, floodplain management, erosion, and navigation. Additional planning studies may include but are not limited to: environmental, economic, mapping, hydraulic, and geotechnical. Studies must be in accordance with, or in support of, a state's existing water resources plan or program. Typical studies are of planning level detail only; they do not include detailed design for project construction. They generally involve analysis of existing data, although some data collection is often necessary. One-half of the sponsor's share may be work in-kind. Corps staff will perform the work, or the work will be contracted. Study sponsor and Corps split the study cost 50-50.

Eligible Applicants: Local governments, special districts, state governments, and tribal authorities.

FY 2006 Budget: \$6 million nationally per year. State and tribal allotments from the nationwide appropriation are limited to \$500,000 annually, but typically are much less. Award amounts are typically 50% of total study cost.

Website: www.usace.army.mil

(2) Federal Network for Sustainability – DOD

DOD's Washington Headquarters Services implements a wide range of "green" practices in its installations, which include over 517,000 buildings and structures valued at over \$650 billion. Until recently, policies were consistent with the main thrust of the federal green initiative toward mitigation, compliance, and pollution prevention, in which watersheds benefit but are not the focus. There is little in the vocabulary of the websites to suggest soft path. However, changes are imminent.

It is said that resource scarcity, and open space requirements, will force more holistic and innovative approaches, and that soft path courses will be funded if it can be demonstrated to bring buildings or bases into compliance.

Importantly, the DOD just published, under its "United Facilities Criteria (UFC)", a new 100+ pp document entitled *Design: Low Impact Development Manual* (UFC 3-210-10). The manual is applicable to "all DOD projects". This sustainable approach to infrastructure represents a shift from the traditional focus on first-time construction costs to a focus on life-cycle requirements.

It appears quite possible that we can "expect to see the use of LID techniques ramped up in future DOD developments. Moreover, as various contractors work with the DOD facilities and are directed to use LID techniques in their work, familiarity with the benefits of LID and the various techniques that are available should continue to grow nationwide." (And should see prices for contractors and materials come down.)

U.S. Army Strategy For The Environment: Sustain the Mission, Secure the Future *was just released October 19th, 2005. Insofar as it replaces Environmental Strategy into the 21st Century, published in November 1992, it clearly goes beyond any compliance requirements of that time.*

If fact, the directive says that the "strategy [advances] the Army's compliance-based environmental program to a mission-oriented approach based on the principles of sustainability and builds on the lessons learned from sustainability pilot programs conducted at several Army installations (such as Fort Bragg, NC; Fort Lewis, WA; Fort Hood, TX; Fort Carson, CO; and Fort Campbell, KY) and institutionalizes those efforts."

Sources:

<https://www.asaie.army.mil/Public/ESOH/doc/ArmyEnvStrategy.pdf>

- **Fort Lewis** (A leading example within DOD): Fort Lewis is the home of I Corps, 2d

Calvary Regiment, as well as the Army's first two Stryker Brigades: the 1st Brigade, 25th Infantry Division, and the 3rd Brigade, 2nd Infantry Division. Additionally, the post is home to several I Corps Major Subordinate Commands, and other units.

The base is located in Pierce County, Washington, on Puget Sound, south of Tacoma. It contains 87,000 acres in the "cantonment" proper, and another 324,000 acres in the Yakima Training Center. It also abuts McChord Air Force Base. All these latter are included in Fort Lewis's planning. The base employs over 25,000 soldiers and civilians, and houses many more than that.

The Fort Lewis home page describes the fort as being at the "forefront of the Army's transformation." Fort Lewis works with other western regional federal agencies representing the Federal Network for Sustainability (FNS), whose goal is to achieve sustainable development and business practices within the federal government.

Fort Lewis Installation Sustainability Program (ISP). "Sustainability" can come across as a distant goal or a theoretical ambition. But that is not the case at Fort Lewis. The Installation Sustainability Program's (ISP) 25-year goals are embedded in the ISO 14001 Environmental Management System (EMS) now being implemented. The ISP is built around long term goals, while the EMS offers a mechanism for attaining these goals through short-term objectives.

These objectives take the form of 5-Year Sustainability Implementation Plans (SIP's). The 2002 SIP was regarded as a critical step. The SIP supports the achievement of twelve strategic Installation Sustainability Goals and identifies short-term intermediate objectives. The SIP also describes supporting actions for each goal and links these supporting actions with funding resources and implementing agencies. The idea is to move toward:

"...Irreversible momentum--that synergy of collective initiatives and progress...We plan to launch projects identified in the SIP *as funding is received* [emphasis added]; continue our communication efforts, especially as they relate to environmental awareness and behavior choices; and constantly work toward a higher level of sustainability competence through our trans-disciplinary, collaborative efforts with on- and off-post groups..."

Sustainability Goals. Fort Lewis' Twenty-five Year plan includes the following:

(4) Sustain all on post using renewable energy sources, and generate all electricity on post by 2025,

(5) All facilities will adhere to the LEED/SPiRiT Platinum standard for sustainable facilities by 2025,

(6) Recycle all material to achieve ZERO net waste by 2025,

(9) Zero discharge of wastewater to Puget Sound by 2025,

(10) Reduce potable water consumption by 75% by 2025,

(11) Contribute no pollutants to groundwater and remediate all contaminated groundwater by 2025,

(12) Develop an effective regional aquifer and watershed management program by 2012.

More on Strategic Goal #12. (To develop an effective regional aquifer and watershed management program by 2012.) "The final strategic goal, related to aquifer and watershed management programs, will be achieved long before 2012. The Fort Lewis Environmental Water Quality Team continues to refine and consolidate the various water/ stormwater/ wastewater plans into active documents."

Additionally, Fort Lewis actively participates on the Chambers Creek/Clover Park and Nisqually River watershed planning committees, and is taking an active role in the Central Puget Sound Regional Water Initiative.

Role of Leadership. "The success of the Fort Lewis ISP depends on the guidance and support of its senior leadership. Former Commanding General, Lieutenant General James Hill, and Garrison Commander, Colonel Luke Green had the vision to see the benefit of sustainable planning and development from the beginning. Their support and participation in this program have been critical to the program's success."

(3) National Defense Center for Environmental Excellence (NDCEE) – DOD R&D

Costs for environmental remediation and compliance in the Department of Defense (DOD) are significant—almost \$3 billion per year, even though expenditures have declined in recent years. A very large number of DOD programs are working in the area of remediation and pollution

prevention. They exemplify a new way of thinking (at most, 15 years old, but in important ways only five years old) which indicates that the issues raised are taken seriously, and which opens the way toward more holistic approaches to land- and water management within the DOD, and indeed within the Federal Government generally. The interrelationships among the DOD's overlapping programs are confusing and complex, even given that one service's requirements are somewhat different from another's.

Once the feasibility and utility of a new environmental technology concept has initially been proven by SERDP (cf), the next step in the DOD research and development process is demonstration and validation, commonly called dem/val. ESTCP's functions in this step have already been described (cf).

The National Defense Center for Environmental Excellence (NDCEE), established in 1991, is described in official website literature as being: "separate...[from those of ESTCP], even though both are established to accomplish the same objectives.... the ESTCP and the NDCEE operate in parallel, although they cooperate on some projects." It appears that the main difference is that the ESTCP lets out development contracts, and the NDCEE is a major recipient of them, although this is never explicitly stated.

NDCEE is under the administration of the Office of the Assistant Secretary of the Army (Installations and Environment). However, its activities are subcontracted to "the NDCEE contractor team," headed by Concurrent Technologies Corporation (CTC), but also including ten other large organizations (e.g., Booz Allen Hamilton and the Battelle Institute), and two university programs.

Its focus, along with that of ESTCP, is highly technological; its purpose is to devise remediative, and pollution control measures implementable at military installations, and elsewhere. Or, in its own words: "...the focus is on technologies that safely and economically treat and immobilize hazardous wastes from manufacturing processes, as well as technologies that clean up hazardous waste sites, many of which are associated with base and military installations..."

The NDCEE promotes a life-cycle approach to "environmentally responsible" manufacturing. In addition to productivity, quality, and cost, this life-cycle approach regards health, safety, and environmental protection as integral requirements.

The tools and technologies that NDCEE develops are meant to support pollution

prevention, regulatory compliance, conservation, and cleanup. Such activities remove many of the obstacles and risks of technology transition and open the way to cleaner, safer, cost-effective, and environmentally responsible manufacturing.

NDCEE demonstration projects occur throughout the United States. They have been successful in transferring environmentally acceptable technologies to Army, Air Force, Navy, Defense Logistics Agency, and other DOD-related facilities, as well as other governmental agencies such as the EPA. In recent years it has transferred seven recycle/reuse technologies, five treatment and remediation technologies, and eight environmental management and control systems.

NDCEE's technology transfer efforts largely take place in a 250,000-square-foot Demonstration Factory at CTC. The factory provides a real-life environment where clients can try out, validate, and receive hands on training in new environmentally acceptable processes, materials, and applications before implementing them in full-scale production.

To date, over 180 NDCEE tasks have been completed or are active nationwide. These tangible technologies include manufacturing materials and processes, environmental treatment and control devices, and site assessment and clean-up technologies or techniques.

In addition, over 80 technology "tools" have been developed and deployed. Examples of such tools include training, environment cost analyses, a lessons learned database, geographical information systems (GIS), risk analyses, and information exchanges.

NDCEE projects and activities are structured around 7 thrust areas:

Environmental Management focuses on health and environmental risk assessments, , environmental monitoring and management, and life-cycle environmental assessments.

Treatment and Remediation focuses on technologies that safely and economically treat and immobilize hazardous wastes, as well as technologies that clean up hazardous waste sites.

Recycle/Recovery/Reuse concentrates on technologies that recover, reuse, and recycle in-plant process materials, including water.

Technology Transfer and Insertion emphasizes technology transfer tools and methods.

Cleaning/Coatings Removal focuses on environmentally acceptable ways to clean, refinish and paint.

Organic Finishing addresses alternative processes that reduce solvents, heavy metals, volatile organic compounds, and hazardous air pollutants in pretreatment and paint operations.

Inorganic Finishing focuses on alternative processes that reduce heavy metal and hazardous discharges associated with applying inorganic finishes.

Examples of projects within these areas include:

- Ground-Water Remediation Technologies Analysis
- Nitrogen Removal Demonstration
- Puget Sound Naval Shipyard Wastewater Technology Test
- Managing Army Technologies for Environmental Enhancements
- U.S. Navy Pollution Prevention Plan Preparation
- EMS Technical Support to the Army Environmental Policy Institute
- Navy Environmental Leadership Program Communications Project
- Potable Water: Prevention of Pollution Study
- Electronic Information Services for the EPA
- Adding Environmental Attributes to Federal Procurement Requirements
- Environmental Restoration Demonstration (Fort Ord Landfill)

Outreach, Technology Transfer,

Education: Technology transfer is NDCEE's main mission. At their website there is a Reading Room, which includes an *Annual Technologies* Publication, and a *NDCEE Capabilities* document.

Grants: NDCEE receives grants and contracts, but only rarely issues them.

Source/reference:

<http://www.ndcee.ctc.com/>. Concurrent Technologies Corporation Technical Point of Contact: Frederick J. Mulkey, CTC Program Manager, 814-269-2877, mulkey@ctc.com; Government Point of Contact: Thomas Moran,

Contracting Officer's Representative, 703-602-5523, thomas.moran@hqda.army.mil.

(4) Strategic Environmental Research and Development Program (SERDP) and Environmental Security Technology Certification Program (ESTCP) – DOD

DOD invests in the early stages of research and development on environmental concerns through the highly targeted projects of two sister agencies: SERDP and ESTCP. While funded by the DOD, their activities are planned and executed in partnership with the Department of Energy and the Environmental Protection Agency, and leverage complementary programs found within the branches of the military, as well those within the DOE and the EPA. Many projects are applicable not only to military installations, but to civilian developments as well. Currently over 100 projects, some of them seed startups and some continuing programs, are funded.

SERDP. The Strategic Environmental Research and Development Program (SERDP), the senior of the two, selects projects in seed or early stages. Its FY 2005 appropriation was almost \$60 million. Its activities are steered by a Council comprising military, DOE and EPA representatives., and it consults with a Scientific Advisory Board (SAB), mandated by law to review all proposals requesting \$1M or more for any one year.

ESTCP. The Environmental Security Technology Certification Program (ESTCP) is parallel in structure. ESTCP identifies promising technologies that emerge from SERDP research, and puts them to field testing at DOD sites for rigorous trials documenting their cost, performance, regulatory compliance and market potential. ESTCP's was allocated over \$40 million in FY 2005.

Together, the two programs identify promising research areas or technologies useful to governmental and private organizations involved in any of: energy generation, environmental restoration, waste minimization, hazardous waste substitution, and enhanced carrying capacity. Since 1991, the agencies have funded more than 500 individual projects.

While many of the technologies, techniques, methods, and machinery are indeed innovative, the

focus is more on solving very specific technological problems that address environmental and regulatory constraints, than on the broader questions involving holistic land- and watershed planning or management. Tangentially, however, the latter are addressed through the development of software tools to help with planning, capacity estimations, and the monitoring of environmental variables.

Research and Development Focus. The primary focus is on cross-service requirements, where pursuit of high-risk/high-payoff investigations holds promise for solutions to the DOD's most intractable environmental problems. These include:

- Cleanup,
- Compliance,
- Conservation,
- Pollution Prevention, and
- Unexploded Ordnance.

(a) National Environmental Technology Test Sites (NETTS) Program. R&D

This is ESTCP's comprehensive technology demonstration, evaluation, and transfer program. It is a Tri-Services and EPA effort to reduce the cost and accelerate the pace of remediation technology. Examples of SERDP and ESTCP Projects:

- Land, Watershed, and Ecosystem Management and Planning:
- Strategy for Resource Management on DOD/DOE Lands Combined with Decision Support for Disturbed Ecosystem Renewal.
- Analysis and Assessment of Military and Non-Military Impacts on Biodiversity: Framework for Environmental Management on DOD Lands Using Mojave Desert as a Regional Case Study.
- Ecological Modeling and Simulation Using Error and Uncertainty Analysis.
- Emerging and Contemporary Technologies in Remote Sensing for Ecosystem Assessment and Change Detection on Military Reservations.
- Environmental Restoration and Preservation
- A Decision Support System for Identifying and Ranking Critical Habitat Parcels On and In the Vicinity of Department of Defense Installations.

- Riparian Ecosystem Management at Military Installations: Determination of Impacts and Restoration and Enhancement Strategies.
- Uncertainty Analysis in the Risk Characterization of In-Place Remedial Strategies for Contaminated Sediments.
- Decreasing Toxic Metal Bioavailability with Novel Soil Amendment Strategies.
- Pollutant Control, Stabilization, Removal
- Subsurface Bioremediation Process Monitoring Indicators.
- Inexpensive Chemiresistor Sensors for Real-Time Ground Water Contamination Measurement.
- Low-Volume Pulsed Biosparging of Hydrogen for Bioremediation of Chlorinated Solvent Plumes.
- Assessment and Prediction of Biostabilization of Polycyclic Aromatic Hydrocarbons in Sediments.

Sources/reference: Bradley Smith, Director SERDP; Jeff Marqusee, Director ESTCP. SERDP/ESTCP Combined Program Office, 901 North Stuart Street, Suite 303 Arlington, VA 22203; SERDP Program Office Telephone: (703) 696-2117 Fax: (703) 696-2114; ESTCP Program Office Telephone: (703) 696-2117 Fax: (703) 696-2114. www.serdp.org; www.estcp.org.

(1) Committee on Armed Services - TESTIMONY ... Prepared Statement of Sherri W. Goodman Deputy Under Secretary of Defense for Environmental Security Before the Subcommittee on Readiness March 11, 1998

(b) Partners in Environmental Technology R&D

This annual Technical Symposium & Workshop has become the hallmark of the agencies' solicitation and transfer programs. The workshops highlight the many different partnerships that play a role in the success of federal technology development: DOD's other research and development programs; research and development programs within the DOE, EPA, and other federal agencies; the partnerships among federal agencies, private industry, and academia; and most importantly, the partnerships among technology developers, end users of technology, and environmental regulators or policy developers.

Other Outreach and Technology Transfer Mechanisms.

Partners in Environmental Technology Information Bulletin is distributed quarterly to more than 12,000 people at all levels of private and governmental sectors.

SERDP-ESTCP Information Bulletin can be accessed online. Also online is a listing of SERDP products and publications that is updated annually.

A SERDP traveling display is featured at many of the nation's important environmental R&D meetings throughout the year.

Grants: Initially, RFP's were only solicited from other federal agencies. However, for the past 8 years, the programs have engaged in directly funding the private sector and academia, further widening the spectrum of technological capability and innovation. SERDP is the more likely entry point for new proposers, insofar as ESTCP demonstrations are often follow-ons from work initiated SERDP programs. Nevertheless, ESTCP does solicit RFPs independently of SERDP.

In general, the agencies' interests are confined to their own agenda. Statements of Need (SON) are developed for each RFP solicitation, and only proposals addressing the SONs are reviewed.

There are usually two solicitations annually: a SEED Solicitation and a Core Solicitation. The SEED program is designed to provide initial funding for high-risk but potentially high-payoff projects. They are limited to one year in length, with a maximum of \$100,000 in funding. Projects that are successful may compete in the following year for additional 'Core' funding at levels higher than \$100,000, and may eventually be funded by ESTCP.

There are two announcements for each of the solicitations above: (1) a Call For Proposals to the federal sector, and (2) a Broad Agency Announcement (BAA) for the private sector, which follows later in the year. For FY 2007, RFPs have only been issued for remediation of contaminated groundwater and sediments.
<http://www.serdp.org/funding/index.cfm>.

DEPARTMENT OF ENERGY

(1) Energy Efficiency and Renewable Energy (EERE) – DOE

The Office of Energy Efficiency and Renewable Energy (EERE) works with industry and outside agencies through two mechanisms: financial assistance and procurement. Through financial assistance, EERE provides funding for renewable energy and energy efficiency research and development. Financial assistance awards transfer money, property, or services to a recipient so that it can accomplish a public purpose authorized by federal statute. For example, a financial assistance award might be used to fund research to improve the efficiency of photovoltaic cells. In fiscal year 2004, EERE awarded \$506 million in financial assistance. In addition, financial assistance may be available through other organizations in EERE's funding stream. EERE also works with businesses and outside agencies through procurement. A procurement contract is used to purchase, lease, or barter property or services for the benefit of the federal government. For example, EERE would use a procurement contract to purchase computers for its employees. In fiscal year 2004, EERE procured \$44 million of goods and services.

(a) Federal Emergency Management Program (FEMP)

(i) Water Efficiency

Water efficiency technologies is one area, among other renewable technologies, systems, and operations that FEMP researches in its Technologies R&D work. FEMP considers water efficiency to be an integral part of every comprehensive energy management program. This is because water requires a significant energy input for treatment, pumping, heating and process uses. The information on these pages shows Federal managers how effective water efficiency strategies can:

Save money through cost-effective water efficiency

Save resources including water, energy and labor

Protect the environment thru reduced chemical and sewer usage as well as improved stormwater management.

Description of Program from:

http://www.eere.energy.gov/femp/technologies/water_efficiency.cfm

(ii) Watergy Software

WATERGY is an information resource under the Federal Emergency Management Program. It is a spreadsheet model that uses water/energy relationship assumptions to analyze the potential of water savings and associated energy savings. The spreadsheet allows input of utility data (energy and water cost and consumption data for the most recent twelve months) and facility data (number and kind of water consuming/moving devices and their water consumption and/or flow rates). It then estimates direct water, direct energy, and indirect energy annual savings, as well as total cost and payback times for a number of conservation methods.

Description of the Program from:

http://www1.eere.energy.gov/femp/information/download_watergy.html

(b)Inventions and Innovations Program R&D

Inventions and Innovation (I&I), part of the U.S. Department of Energy's Industrial Technologies Program (ITP), provides grants to independent inventors and small companies with sound ideas for energy efficiency technologies. I&I was established in 1976 as the Energy Related Inventions Program (ERIP). The program received initial funding of \$1,500,000, and over the past 24 years has received cumulative funding of \$116,838,000.

Distinct from other federal grant programs, I&I provides grantees not only with funding, but also with additional resources such as training, market assessments, technical assistance, access to promotional events and materials, and special contacts to aid in commercialization endeavors.

Once or twice each year, I&I solicits proposals from engineers, scientists, and small businesses. These solicitations can attract from 400-500 proposals each, and result in 20-30 awards. Awards are granted on the merit of novel technological solutions. The awards are given in two categories, as follows (the applicant is not required to apply for these in sequence):

Category 1 offers up to \$50,000 for the development of plans from sound ideas.

Category 2 offers up to \$250,000 for the development of working prototypes.

In addition to the financial assistance grant, I&I provides awardees with business planning assistance and networking resources. For grantees who demonstrate a commitment to commercializing their technology, I&I also funds a

market assessment and offers business strategy assistance. I&I recently launched a Web site that offers information tools and valuable network resources for the entrepreneur. Finally, awardees have the option of working with a private organization of past successful grantees that will mentor or otherwise aid new entrepreneurs graduating from I&I. Since I&I's inception, over 34,000 proposals have been submitted, resulting in over 900 projects selected for financial and commercialization assistance. Awardees are monitored annually until their technologies are retired from the market or they abandon their efforts. Licensees are monitored as long as the technology remains on the market.

Description of Program from:

<http://www.eere.energy.gov/inventions/about.html>

(2) Energy-Water Nexus Roadmap Program – The National Laboratories – DOE R&D

The Department of Energy (DOE) manages a significant portion of the Nation's R&D enterprise through its program offices. DOE's Office of Science (SC) is the single largest supporter of basic research in the physical sciences in the United States, providing more than 40 percent of total funding for physics, chemistry, materials science and other areas of the physical sciences. SC also manages research at 10 national laboratories and the world's most diverse portfolio of unique and powerful scientific tools – including particle accelerator centers, neutron sources, high-powered light sources, advanced computational centers, and atmospheric monitoring facilities. In addition DOE, through the Office of Science, funds more than 7,000 individual research projects at universities, national laboratories, U.S. industry and the non-profit sector.

Description of Program from:

<http://www.energy.gov/sciencetech/nationallabs.htm>

The National Energy-Water Roadmap Program is being initiated in 2005, as requested in Congressional appropriations in FY 2005. The Omnibus Spending Bill of 2005 authorized to DOE \$500,000 for a Report to Congress on the interdependency of energy and water focusing on the threat to national energy production resulting from limited water supplies, utilizing where possible the multi-laboratory Energy-Water Nexus Committee."

The multi-laboratory Energy-Water Nexus Committee consists of twelve DOE national laboratories that have joined in an effort to raise awareness within DOE and other agencies and associations of the emerging issues facing future energy production from growing limitations on water resource availability. The Committee was selected by DOE to develop the requested Report to Congress, with a team from Los Alamos National Laboratory, the National Energy Technology Laboratory, and Sandia National Laboratories leading the information collection and report development efforts. The purpose of the Roadmap is to assess the effectiveness of existing programs within the Department of Energy and other Federal agencies in addressing energy and water related issues, and to assist the DOE in defining the direction of research, development, demonstration, and commercialization efforts to insure that:

Energy-related issues associated with providing adequate water supplies, optimal management and efficient use of water, and

Water-related issues associated with providing adequate supplies, optimal management and efficient use of energy are being adequately and efficiently addressed in the future.

The Energy-Water Roadmap is needs-driven. It will be developed by conducting regional and national workshops with participation by representatives from a broad range of user communities including environmental organizations, policy and regulatory groups, economic development organizations, industry/supplier associations, government agencies (federal, state, tribal), key non-governmental organizations, science and technology providers (national laboratories, universities, research institutions), and water and energy resource management and generation and production groups, and other knowledgeable stakeholders from across the country.

Three regional needs workshops are designed to help ensure state and regional participation in identifying major issues: technology, policy, or regulatory gaps, competing energy and water demands and concerns, economic and environmental drivers. The regional needs assessment workshops will be followed by gap analysis and establishment of user-informed prioritization criteria. This will then be followed by a national technology innovation workshop and subsequent establishment of recommended directions and prioritization for technology research, development, and implementation.

The primary product from the Energy-Water Roadmap process will be a report summarizing needs, prioritization criteria, major gaps, innovative technical approaches and associated research needs, R&D priorities and strategies, and associated policy, regulatory, and economic assessments. This is expected to result in a roadmap that includes regional issues and cross-cutting interdependencies. Derivative information will include guidance for regional R&D issues, extramural federal and state agency R&D participation, and guidance for technology transfer and commercialization with industry.

The final report is scheduled to be released in September 2006.

Description of Program from:

http://www.sandia.gov/energy-water/roadmap_process.htm

http://www.sandia.gov/energy-water/congress_overview.htm

DEPARTMENT OF HEALTH AND HUMAN SERVICES

(1) Centers for Disease Control– National Center for Environmental Health (CDC–NCEH) – HHS

As the leading public health agency in the United States, CDC scientifically considers all factors that affect the nation's health. The interaction between people and their environments—natural as well as human-made—continues to emerge as a major issue concerning public health. Health issues that are related to community design and the built environment are a concern of NCEH.

Environmental conditions greatly influence the relation between water and human health. Challenges to the healthfulness of U.S. water include (1) pathogens resistant to standard water treatment methods, (2) chemical and biological contaminants, (3) aging or inadequate water system infrastructure, and (4) emergency- or disaster-related events.

CDC is working to identify, investigate, and track health hazards associated with water, measure exposure of people to these hazards, and prevent health effects from these hazards.

CDC conducts water-related environmental public health activities in the following areas:

Chemical Contaminants in Water: measuring people's exposure to chemical contaminants in water, studying the effect on health of those exposures, and preventing and mitigating adverse effects of those exposures

Concentrated Animal Feeding Operations (CAFOs): investigating migration of contaminants from CAFOs into ground and surface water, and determining effects on health

Emergency Preparedness and Response: investigating human health effects associated with exposure to water contaminated as a result of natural or technological disasters, and preventing and mitigating any adverse health effects

Harmful Algal Blooms: investigating the effects of microscopic algae on health

Water Treatment: studying the effectiveness of household water treatment devices in homes with private wells

DHHS has a nearly \$70 billion discretionary spending budget for 2006, and administers many outreach and education programs in numerous areas of public health. However, few of them are water-related except in terms of emergency disinfection and waterborne disease outbreaks. There are some public education bulletins for drinking water safety and well water safety.

Executive Order 13148 Environmental Management System (EMS) implementation. An environmental management system is the process used by an organization to manage, review, correct, and improve the organization's approach to business. Employees are asked to consider how they affect the environment every day. An EMS offers a structured way to incorporate environmental considerations into day-to-day operations; it promotes continual improvement of the environment and human health. There are currently focus teams working on many of the components of an EMS at NIH. These teams are focused on the areas where the NIH has the greatest potential to impact the environment. Some are:

- Storm Water Management and Grounds Maintenance
- Wastewater Discharge Quantity and Quality
- Waste Minimization and Toxicity Reduction
- Sustainability
- Energy and Water Conservation

The teams will, among other things:

- Examine NIH activities and their potential environmental impacts
- Identify environmental awareness training needs for the NIH community
- Determine operational controls
- Perform EMS audits
- Prepare annual report

Source:

<http://orf.od.nih.gov/Environmental+Protection/Environmental/>

Contact, Citation, Reference Information

CDC/National Center for Environmental Health, Division of Environmental Hazards and Health Effects. 888-232-6789; EHHEin@cdc.gov; <http://www.cdc.gov/nceh/water/>

Sources: <http://orf.od.nih.gov/funds.htm>; Department of Health and Human Services (US). Healthy people 2010. Volume 1. Washington: DHHS; November 2000.

DEPARTMENT OF HOMELAND SECURITY

(1) Federal Emergency Management Agency (FEMA)

(a) Flood Mitigation Assistance Program **FFLI**

Legislative Authority: National Flood Insurance Reform Act of 1994, 42 U.S.C 4101

The Flood Mitigation Assistance (FMA) program helps states and communities identify and implement measures to reduce or eliminate the long-term risk of flood damage to homes and other structures insurable under the National Flood Insurance Program (NFIP). Projects may include (1) elevation, relocation, or demolition of insured structures; (2) acquisition of insured structures and property; (3) minor, localized structural projects that are not fundable by state or other federal programs (erosion-control and drainage improvements); and (4) beach nourishment activities such as planting of dune grass. There are three types of grants available under FMA: Planning, Project, and Technical Assistance Grants. FMA Planning Grants are available to States and communities to prepare Flood Mitigation Plans. NFIP-participating communities with approved Flood Mitigation Plans can apply for FMA Project Grants. FMA Project Grants are available to States and NFIP participating communities to implement measures to reduce flood losses. Ten percent of the Project Grant is made available to States as a Technical Assistance Grant. These funds may be used by the State to help administer the program. Communities receiving FMA Planning and Project Grants must be participating in the NFIP. A few examples of eligible FMA projects include: the elevation, acquisition, and relocation of NFIP-insured structures.

Eligible Applicants:

Community/Watershed Groups, Local Governments, State/Territorial Agencies, and Tribal Agencies. 55 States and territories are eligible to participate in this program. Communities typically apply as sub-grantees through their respective States. Communities in non-participating States can apply directly to FEMA.

2006 Budget: \$20 million.

Description of Program from:
<http://www.fema.gov/fima/fma.shtm>

(b) Pre-Disaster Mitigation Program **FFLI**

Legislative Authority: Section 203 of the Robert T. Stafford Disaster Assistance and Emergency Relief Act (Stafford Act), 42 USC"

The Pre-Disaster Mitigation program will provide funds to states, territories, Indian tribes, communities, colleges, and universities for pre-disaster mitigation planning and the implementation of cost-effective mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations.

In the ten years between 1991 and 2000, FEMA gave out \$45.5 million in grant monies in its Pre-Disaster, or Hazard Mitigation Program specifically for drinking and wastewater infrastructure projects.

* <http://www.gao.gov/new.items/d02134.pdf>

Eligible Applicants: Educational institutions, local governments, state/territorial agencies, and tribal agencies.

FY 2006 Budget: \$50 million. The 2005 budget was \$235 million, signifying a huge decrease in funding abilities.

Description of Program from:
<http://www.fema.gov/fima/pdm.shtm>

(c) Public Assistance Grants **FFLI**

The objective of the Federal Emergency Management Agency's (FEMA) Public Assistance (PA) Grant Program is to provide assistance to States, local governments, and certain Non-Profit organizations to alleviate suffering and hardship resulting from major disasters or emergencies declared by the President.

Through the PA Program, FEMA provides supplemental Federal disaster grant assistance for the repair, replacement, or restoration of disaster-damaged, publicly owned facilities and the facilities of certain Private Non-Profit (PNP) organizations.

The Federal share of assistance is not less than 75% of the eligible cost for emergency measures and permanent restoration. The grantee (usually the State) determines how the non-Federal share (up to 25%) is split with the subgrantees (eligible applicants).

It has allocated \$15.8 billion to public entities and non-profit organizations in its Public Assistance Grants Program. \$2 billion of this went to permanent restoration of eligible utilities, which include drinking and wastewater systems (exact figures on how much went to water related projects is not available).*

➤ **Post-Katrina Hurricane Recovery, Mississippi**

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) awarded \$57.19 million in public assistance grants for south Mississippi between April 6 and April 13.

"The Public Assistance Program provides communities that were devastated by Hurricane Katrina with the necessary funds to repair and improve damaged infrastructure which will support residents and businesses as they rebuild," said Robert Latham, director of the Mississippi Emergency Management Agency.

The funds were obligated to the state for a variety of projects in Hancock and Harrison counties and the cities of Bay St. Louis and Pascagoula as a result of damage to public roads, buildings and utilities caused by Hurricane Katrina on Aug. 29. State and local funds made up the remainder of the \$62.38 million.

A grant also was awarded to Magnolia Electric Power Association for costs associated with restoring power in wide sections of south Mississippi after the hurricane.

The grants will reimburse the counties, cities and power association for work to get sewers operating, roads opened, electric power restored, debris picked up and potable water flowing. That work has allowed other elements of the recovery process to move forward.

(2) The National Homeland Security Research Center

The Environmental Protection Agency is the lead agency of this Research Center. Please see the National Homeland Security Research Center under the EPA Chapter, within the Office of Research and Development.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

The Department of Housing and Urban Development (HUD) has a budget of over \$30 billion per year. Its basic charge is to address the nation's housing needs, fair housing, and community improvement and development, with particular but not exclusive, interest in locations that are economically wanting.

It administers dozens of programs related to these concerns, enabled by dozens of separate federal laws. For example, with so many programs, and with such a large staff, HUD has four different Assistant Secretaries, just in the area of communication (separate offices of Information, Public Affairs, Congressional/Intergovernmental Relations, and Departmental Operations and Coordination).

The main activities relevant to water and wastewater projects are in its divisions of Policy Development and Research (PDR), and Community Planning and Development (CPD). In turn, several different offices within these divisions are directly or indirectly involved in water, wastewater, energy, or environmental issues. For example, CPD, most often in cooperation with the states and other regional or local entities, provides Community Development Block Grants (CDBG) and 'Small Cities' grants to help communities plan and finance their growth and development, including infrastructure. The Small Cities grant program has been replaced by the more general CDBG program in states that have decided to participate in the CDBG program (Hawaii is the only state that has not joined the program to date). Some of these divisions and programs are described more fully in separate entries, below.

There are undoubtedly still other offices within HUD, not described, that have related concerns, as well. For example, one division of HUD is concerned with public, Indian, and 'colonista' housing, where conservation and health concerns touch on water, wastewater and stormwater technologies.

In addition to its development grant and loan programs, HUD also issues RFPs for research, as well as for operational or administrative purposes. A few of HUD's elements, programs, initiatives, etc., not allotted full entries, are listed here.

HUD's Strategic Plan. One element of note in the latest strategic plan is the order to streamline the 'consolidated planning process' for Block Grants (cf). The idea is to reduce time and

paperwork, tailor plans more specifically to local stakeholders, identify better performance measures, and to further consolidate project planning with that of other federal, state and local agencies.

Partnerships. HUD relies extensively on other federal agencies to help accomplish its mission. Federal departments and agencies with which HUD has agreements or arrangements include: the departments of Agriculture, Commerce, Defense, Education, Energy, Health and Human Services, Justice, Labor, Interior, and Transportation. Also, the Veteran's Administration, the Social Security Administration, the Federal Emergency Management Agency, the Government Services Administration, the Office of Management and Budget, the National Corporation for National Community Services, and the Postmaster General. Aside from HUD's involvement with state and local governments and interagency partnerships, it is involved in many public-private partnerships as well. The latter tend to involve companies associated with development, building, and financing industries, but can also involve NGOs and universities. Chief among these is PATH (cf).

Office of Policy Development and Research. This office (PDR) supports the mission and policy agenda of HUD with analyses, surveys, studies, and economic field data; and plays a key role in developing HUD's Strategic Plan. It works through both in-house staff and outside contractors, and is responsible for several of HUD's information databases, such as www.HUDuser.org (an informative and well-organized source of information), and the 'Regulatory Barriers Clearinghouse.' The office also supports international exchange of information on housing and development, and administers grant programs for colleges and universities engaged in community building studies.

Office of Information. There are abundant databases and literature collections available through the HUD website, with many options for navigating and printing, as well as purchasing of material. Basic navigation can be by topic, audience group, or state. Almost a half million documents are on file, arranged under broad categories such as 'Cities/Communities...Environment.' The site that is mentioned immediately above is very useful, as is www.hud.gov/library. HUD's home page also offers many links to particular categories of information exterior to itself.

Source/reference: www.hud.gov/. Tel: 202-708-1422; Department of Housing and Urban Development, 451 7th St. SW, Washington D.C. 20410.

(1) Community Development Block Grant Program (CDBG) – HUD FFL

Legislative Authority: Housing and Community Development Act of 1974, Title I, as amended.

The Department of Housing and Urban Development sponsors this program, intended to develop viable communities by providing decent housing and a suitable living environment and by expanding economic opportunities primarily for persons of low and moderate income. The State must ensure that at least 70 percent of its CDBG grant funds are used for activities that benefit low- and moderate-income persons over a one-, two-, or three-year time period selected by the State. This general objective is achieved by granting "maximum feasible priority" to activities which benefit low- and moderate-income families or aid in the prevention or elimination of slums or blight. Under unique circumstances, States may also use their funds to meet urgent community development needs. A need is considered urgent if it poses a serious and immediate threat to the health or welfare of the community and has arisen in the past 18 months. Recipients may initiate activities directed toward neighborhood revitalization, economic development, and provision of improved community facilities and services. Specific activities may include public services, acquisition of real property, relocation and demolition, rehabilitation of structures, and provision of public facilities and improvements, such as new or improved water and sewer facilities.

HUD distributes funds to each State based on a statutory formula which takes into account population, poverty, incidence of overcrowded housing, and age of housing. Neither HUD nor States distribute funds directly to citizens or private organizations; all funds (other than administrations and the technical assistance set-aside) are distributed by States to units of general local government.

The CDBG is one of the largest sources of federal funding for water projects. Between 1991 and 2000, the CDBG gave \$4 billion in block grants for projects improving drinking water and wastewater systems. An additional \$39.9 million was given to projects set out in the appropriation's process. In the year 2000, CDBG awarded \$45.4 million to entitlement communities (large communities), \$363 million to states for allocation to smaller communities and \$11.8 million for congressional earmarks.

Eligible Applicants: The following entities are eligible for grants: businesses, community/watershed groups, nonprofit groups, educational institutions, private landowners, water and wastewater utilities, local governments, and state/territorial agencies.

2006 Budget: \$3.75 billion

Description of Program from:
www.hud.gov/offices/cpd/communitydevelopment/programs/index.cfm,
<http://www.hud.gov/offices/cpd/communitydevelopment/programs/stateadmin/>

(2) Partnership for Advancing Technology in Housing (PATH) – HUD R&D

PATH is one of the more promising HUD programs with respect to innovative or low-cost solutions to water management infrastructure, including, e.g., communal wastewater systems and runoff. It is organized under HUD's Policy Development and Research Office. The program is a technology oriented public/private partnership, which brings together key federal agencies with leaders of the home-building, product-manufacturing, insurance, and financial industries.

The goal is to identify, develop, and promote techniques for building more affordable, durable, disaster resistant, environmentally benign, and energy efficient housing. It provides the latest information on innovative systems; showcases innovative housing; supports housing research among industry, government, and academic partners.

It also addresses institutional barriers to innovation, which include liability concerns, the lack of a clear national system for the evaluation of new products and innovations, the prescriptive nature of codes and local code approvals, regulatory confusion, inadequate training, and risk aversion. A specific webpage is devoted to such barriers.

Finally, PATH promotes and financially supports the use of new housing technologies through evaluation projects and demonstration programs across the country. And it offers technical assistance and feedback to manufacturers and builders.

FY 2006 Budget: \$5 million.

According to the White House Office of Management and Budget's program assessment,

PATH is not performing adequately and has not demonstrated results. The office cites the following reasons for this poor assessment result: It has too broad of a research agenda to have a significant impact on technology (many studies did not report the impact of their work in a systematic way which could be useful to others in the housing industry). The program has reached out to industry and research partners to develop a more tightly defined mission that centers on the process of technology adoption within housing industries, and the program lacked any short or long-term performance goals or measures and is unable to demonstrate its impact on housing. As a result of this assessment, all funding for the program was cut, beginning in FY 2007, but will likely be restored by the Congress.

Assessment can be accessed at:

<http://www.whitehouse.gov/omb/expectmore/summary.10001166.2005.html>

Examples of Relevant Projects Supported by PATH:

➤ **“The Practice of Low Impact Development”**

This recent report was jointly prepared by PATH and the NAHB Research Center and funded by the Department of Housing and Urban Development’s Office of Policy Development and Research, looks at how Low Impact Development (LID) can utilize innovative technologies and planning strategies to conserve natural resources and lower costs of construction and maintenance. The purpose of the report is to assist public sector officials and private professionals by “1) providing basic conventional and innovative land development technology information, and 2) encouraging the amendment of existing development codes to facilitate the use of those technologies.”

Low Impact Development, as defined by the report, is: “an approach to land development that uses various land planning and design practices and technologies to simultaneously conserve and protect natural resource systems and reduce infrastructure costs. LID still allows land to be developed, but in a cost-effective manner that helps mitigate potential environmental impacts.” In this context, the report extensively explores various low impact stormwater and wastewater systems and technologies that are less environmentally damaging than conventional approaches and are cost-effective. For example, the report includes discussions of infiltration and conveyance systems for stormwater infrastructure and sand filter and aerobic-systems for wastewater

infrastructure. The report also includes case studies of implementation of LID systems.

The text of the report can be found at:

<http://www.huduser.org/Publications/PDF/practLowImpctDevel.pdf>

➤ **“Nitrogen Reducing” Aerobic On-Site Wastewater Treatment Anne Arundel County, Maryland.”**

This project, funded jointly by PATH and HUD’s Office of Policy Development and Research, was undertaken by the National Association of Home Builders (NAHB) Research Center to evaluate the performance of innovative aerobic ‘nitrogen-reducing’ wastewater systems in Anne Arundel County. Many of the wastewater facilities in Anne Arundel County are onsite systems (primarily septic tanks) and because the county is part of the Chesapeake Watershed, which has become increasingly sensitive to nitrogen levels, NAHB and officials from Anne Arundel county, studied how effective various innovative systems were at reducing these levels. Since costs are also a factor in the success of the technologies, the project looked at systems that were no more expensive than traditional septic systems.

Full text of the report and summaries of the performance of two systems can be accessed at: http://www.toolbase.org/Docs/ToolBaseTop/FieldResults/4648_AnneArundelNitrogenReducingNov2004.pdf

Description of Program from:

www.pathnet.org. Contact Mike Hanford, tel: 202-708-4370; HUD-PATH, 451 7th St SW, Room 8134, Washington, DC 20410-0001.

➤ **ToolBase**

ToolBase is sponsored by PATH, HUD, the NAHB, the NAHB Research Center, the National Onsite Wastewater Recycling Association, the Plastics Pipe Institute, and the Steel Framing Alliance. ToolBase Services is the housing industry’s resource for technical information on building products, materials, new technologies, business management, and housing systems. ToolBase provides three primary services:

ToolBase News is a bi-monthly technical newsletter that covers the latest research, trends, and other industry happenings. The newsletter provides practical information that building professionals can use immediately in their businesses. It is available *free* through local and state home builder associations.

ToolBase/PATH E-News, a bi-weekly electronic newsletter, provides a news link between research centers, laboratories, universities, manufacturers, and builders to keep you updated on the latest trends, technologies, and issues in the construction industry, particularly those dealing with information technology.

The **ToolBase Portal** is the web source for information on innovative home building technologies. Along with articles and reports, ToolBase houses the **PATH Technology Inventory** and **PATH Field Results**.

Website and Description of Program from:
<http://www.toolbase.org/index-toolbase.asp>

DEPARTMENT OF THE INTERIOR

(1) Bureau of Reclamation - DOI

Established in 1902, the Bureau of Reclamation is best known for the dams, powerplants, and canals it constructed in the 17 western states. These water projects led to homesteading and promoted the economic development of the West. Reclamation has constructed more than 600 dams and reservoirs including Hoover Dam on the Colorado River and Grand Coulee on the Columbia River.

Reclamation is also the second largest producer of hydroelectric power in the western United States. Our 58 powerplants annually provide more than 40 billion kilowatt hours generating nearly a billion dollars in power revenues and produce enough electricity to serve 6 million homes.

Today, Reclamation is a contemporary water management agency with a Strategic Plan outlining numerous programs, initiatives and activities that will help the Western States, Native American Tribes and others meet new water needs and balance the multitude of competing uses of water in the West. Our mission is to assist in meeting the increasing water demands of the West while protecting the environment and the public's investment in these structures. We place great emphasis on fulfilling our water delivery obligations, water conservation, water recycling and reuse, and developing partnerships with our customers, states, and Indian Tribes, and in finding ways to bring together the variety of interests to address the competing needs for our limited water resources.

Description of Program:

<http://www.usbr.gov/main/about/>

(a) Desalination and Water Purification Research & Development Program R&D

The Desalination and Water Purification Research & Development (DWPR) Program (formerly the Water Desalination Research and Development Program) was authorized by Congress under the Water Desalination Act (Act) of 1996. The Act authorized program funding beginning October 1997 for a six year period, and then extended for an additional two years. Funding for the DWPR program is provided through Reclamation's Office of Research and Natural Resources, Shannon Cunniff, Director. Efforts to reauthorize the program continue.

The Act is based on the fundamental need in the US and world-wide for additional sources of potable water. The primary goal of the DWPR program is to develop more cost-effective, technologically efficient, and implementable means to desalinate water. The two principal thrusts of the program are: 1) perform research on desalination technologies and related issues to push the state-of-the-art forward (research and studies); and 2) conduct development and demonstration activities to test technological advancements, to confirm economics, and to gain public acceptance (development projects). Initially, research and studies will be accomplished: 1) through award of financial assistance agreements and contracts with non-Federal entities; 2) using a competitive, merit-reviewed process for awards; 3) using a recommended cost-sharing of 25 to 50% Federal contribution; and 4) a maximum Federal funding up to \$5 million per year. Within the first three years of the program, the Bureau of Reclamation is to submit a report to Congress recommending demonstration and development projects to further evaluate successful research findings. These development projects will be: 1) accomplished using a recommended cost-sharing of 25 to 50% Federal contribution; and 2) Federally-funded up to \$25 million over four years.

Eligible Applicants: State governments, county governments, city or township governments, special district governments, independent school districts, public and State controlled institutions of higher education, Native American tribal governments (Federally recognized), public housing authorities/Indian housing authorities, Native American tribal organizations (other than Federally recognized tribal governments), nonprofits having a 501(c)(3) status with the IRS, other than institutions of higher education, nonprofits that do not have a 501(c)(3) status with the IRS - other than institutions of higher education, private institutions of higher education, individuals, for profit organizations other than small businesses, small businesses.

Total Program Funding for 2005: \$4 million

Description of Program from:

http://csd.tamu.edu/news/news_item.2004-12-20.2541364515.news,

<http://www.usbr.gov/pmts/water/desal.html>,

<http://www.grants.gov/search/search.do?mode=VIEW&oppId=2832>

**(b) National Xeriscape(tm)
Demonstration Program - River Systems
and Meteorology Group R&D**

The Bureau of Reclamation has entered into cooperative agreements, collectively called the "National Xeriscape(tm)⁽¹⁾ Demonstration Program" (NXDP), to develop data and analyses from the various field projects on the cost, yield and reliability of water use savings from the installation of water-conserving Xeriscape landscapes. Xeriscape is defined as a landscaping approach that uses drought resistant grasses and plants, efficient watering systems, and proper maintenance practices to create an aesthetically pleasing landscape while maintaining desired attributes such as recreation and cooling.

Cooperative demonstration projects of landscape water conservation are being conducted at Austin TX, Phoenix AZ, Las Vegas NV, Denver CO and vicinity, and Fargo ND. The NXDP results will supply municipalities of the western United States with tools to consider the implementation of Xeriscape programs as part of their water supply solutions.

The primary goals of the NXDP are to:

- Conduct consistent investigations at multiple sites in different geographic and municipal settings of the West.
- Conduct a summary evaluation (known as meta-analysis) of demonstration features common to all field projects.
- Develop a computer model that uses local data as inputs, to estimate the benefits of Xeriscape at municipalities of the western United States.

Description of Program from:

<http://www.usbr.gov/pmts/rivers/demand/xeris.html>

**(c) Water Reclamation and Reuse
Program R&D**

Legislative Authority: Reclamation Wastewater and Groundwater Study and Facilities Act, Title XVI, Public Law 102-575, as amended; Reclamation Recycling and Water Conservation Act of 1996, Public Law 104-266; Oregon Public Lands Transfer and Protection Act of 1998, Public Law 105-321; Consolidated Appropriation Act of 2000, Public Law 106-544; Hawaii Water Resources Act of 2000, Public Law 106-566.

This Title gives the Bureau of Reclamation general authority to conduct appraisal and feasibility studies on water reclamation and reuse

projects to investigate and identify opportunities for reclamation and reuse of municipal, industrial, domestic, and agricultural wastewater and naturally impaired groundwater and surface water for the design and construction of demonstration and permanent facilities. It also provides general authority for research and demonstration programs to test water reclamation and reuse technologies. The Bureau may also participate in construction of reuse projects after congressional authorization of the project. The Bureau of Reclamation will place priority on funding projects that are economically justified and environmentally acceptable in a watershed context, not eligible for funding under another Federal program, and that directly address Administration priorities for the Reclamation program, such as providing instream flows for Federally endangered or threatened species, meeting the needs of Native American communities, and meeting international commitments.

In the years between 1991 and 2000, the General Accountability Office reports that the Water Reclamation and Reuse Program allocated \$737.4 million for water infrastructure projects in the 17 Western States. In FY 2000, \$33.2 million was granted for reclamation wastewater and groundwater studies.

Eligible Applicants: Federal government, state governments, local governments, private corporations, non-profits, and tribal agencies in the 17 Western States.

Description of Program from:

<http://www.gao.gov/new.items/d02134.pdf>

Bill Pending: Senate bill to expedite rural water supply loans

The Rural Water Supply Act of 2005 (proposed) is intended to create within the Bureau of Reclamation a loan guarantee program for water infrastructure, and streamlines the process for assessing water infrastructure needs. The program would provide federal backing of loans taken out by eligible small western communities and tribal lands, with populations of 50,000 or less, for municipal and industrial water infrastructure projects. It also expedites the feasibility study process to allow communities more timeliness and flexibility. Language in the bill, which is sponsored by Sen. Robert Bennett (R-UT) and others, expresses interest in environmental benefits, water source protection, watershed focus, integrated resources management and local control.

Source/reference: Sen. Robert Bennett, 2005. Rural Water Supply Act of 2005, S.895. Committee on Energy and Natural Resources, U.S. Senate.

(d) Water 2025 Initiative – DOI FFLI

The Department of the Interior's Water 2025 program is a problem-solving initiative that will help manage scarce water resources, and develop partnerships to nourish a healthy environment and sustain a vibrant economy. Water 2025 will encourage voluntary water banks and other market-based measures, improve technology for water conservation and efficiency, and remove institutional barriers to increase cooperation and collaboration among federal, state, tribal, and private organizations.

The Committee has provided \$14,500,000 for this initiative proposed by the administration. The Committee believes that water resource and efficiency issues, combined with the drought and endangered species listings, make the Rio Grande River in New Mexico the embodiment of the Water 2025 initiative. Therefore, the Committee has included \$2,000,000 to provide for continued efficiency and water improvements related to the Middle Rio Grande Conservancy District. A critical component of reducing tension among multiple water users is collaborative planning and joint operations. Within the funds provided, \$2,000,000 is for the ***Desert Research Institute*** to address water quality and environmental issues in ways that will bring industry and regulators to mutually acceptable answers.

Description of Program from: Senate Report 109-274 - ENERGY AND WATER APPROPRIATIONS BILL, 2007. http://thomas.loc.gov/cgi-bin/cpquery/?&dbname=cp109&sid=cp109Ux7OG&refer=&r_n=sr274.109&item=&sel=TOC_436492&

➤ Water 2025 Challenge Grants:

The objective of the *Water 2025* Challenge Grant Program is to invite irrigation and water districts and state governmental entities with water management authority (e.g., state agencies, departments, boards, etc.), within the 17 Western States, to leverage their money and resources by cost sharing with Reclamation on projects that will result in more efficient use of existing water supplies.

Eligible Applicants: Both irrigation and water districts and state governmental entities are eligible to apply under this RFP.

2006 Budget: Awards may be made with FY 2006 and FY 2007 funding. A total of \$1 million is available for award in FY 2006, and the President's budget requests \$9.7 million for the Challenge Grant Program in FY 2007. Reclamation's share of any one proposed project may be up to 50% of the

total project cost, and shall generally not exceed \$300,000. Meritorious proposals seeking \$100,000 or less may be awarded in FY 2006, whereas proposals requesting more than \$100,000 are not likely to be awarded until FY 2007. During 2004 and 2005, Challenge Grants were awarded to 62 projects, with \$14 million in funds.

Description of Program from:
<http://www.doi.gov/water2025/RFP2006/index.html>,
<http://www.doi.gov/initiatives/water2025.html>

(3) Federal Network for Sustainability - DOI

There is a long history of sustainable building design in America because, historically, sustainability was incorporated by necessity. DOI says that "It is our task now to find our way back, to relearn how to use some of these more tried-and-true sustainable technologies as well as to innovate and incorporate new ones..." Recent DOI bureaus have gained much experience using green building benchmarks but, as yet, have not found one that is applicable as an agency standard, due to the unique and diverse nature of DOI's building portfolio. Nevertheless, DOI plans to develop a *Departmental Sustainable Building Policy* for the full scope of buildings and management activities, using environmental management systems as the framework.

In the meantime, new construction projects under DOI exemplify efforts to achieve greater efficiencies in resource use. They include: NPS's Carl T. Curtis Midwest Regional Headquarters, BLM's Escalante Science Center at Grand Staircase, Escalante National Monument, Rhode Island National Wildlife Refuge Headquarters/Kettle Pond Visitor Center, and the Sandstone Visitor Center at New River Gorge National River.

(4) Land and Water Conservation Fund – DOI FFLI

The LWCF program provides matching grants to States and local governments for the acquisition and development of public outdoor recreation areas and facilities. The program is intended to create and maintain a nationwide legacy of high quality recreation areas and facilities and to stimulate non-federal investments in the protection and maintenance of recreation resources across the United States.
<http://www.nps.gov/lwcf/>.

Over its first 40 years, LWCF has provided more than \$14.4 billion to acquire new federal

recreation lands and as grants to State and local governments. For discussion purposes, the LWCF program can be divided into the "State side" -- that is, grants to State and local governments, and the "Federal side" -- the portion of the LWCF that buys land in new forests, parks, wildlife refuges and other recreation areas owned by the national government.

Since the inception of the program in 1965, annual appropriations to the Fund have ranged from a high of \$369 million in 1979 to four years of zero funding between 1996 and 1999. The LWCF experienced significant increases in Congressional appropriations for State and local grants during the 2000-2002 fiscal years: \$40 million in FY 2000, almost \$89 million in FY 2001, and \$140 million in FY 2002. From FY 2003 through FY 2005, funding was reduced to \$94,383,000, \$91,360,000, and \$88,735,784 respectively.

The President's budget for FY 2006 proposed zero funding for LWCF state grants. However, the FY 2006 Interior Appropriations Act (P.L. 109-55) allocated \$28,278,000 for State grants (after an across-the-board reduction).

(5) National Highway Runoff Water-Quality Data and Methodology Synthesis - USGS and FHWA (DOI)

R&D

Please see the Department of Transportation Chapter for a description of the National Highway Runoff Water-Quality Data and Methodology Synthesis.

(6) National Institutes for Water Resources (NIWR)

Legislative Authority: The Water Resources Research Act authorized by P.L. 101-397 provides for Water Resources Research Institutes in each of the 50 states, the trust territories, and the District of Columbia. Under the Act, these institutes are to:

- plan, conduct, or otherwise arrange for competent research that fosters (A) the entry of new research scientists into the water resources fields, (B) the training and education of future water scientists, engineers, and technicians, (C) the preliminary exploration of new ideas that address water problems or

expand understanding of water and water-related phenomena, and (D) the dissemination of research results to water managers and the public.

- cooperate closely with other colleges and universities in the State that have demonstrated capabilities for research, information dissemination, and graduate training in order to develop a statewide program designed to resolve State and regional water and related land problems.

The state based program focuses on research; information transfer; and education and training and encourages regional cooperation among institutes in research into areas of water management, development, and conservation that have a regional or national character.

RESEARCH: With 69% of their annual budgets targeted to research, the Water Institutes manage research projects addressing a wide range of problems and issues. Representatives of the water interests in each state participate in the research program development. This results in research programs that individually target local, state and regional needs, and that collectively address issues of national priority. Recent high priority research topics focus on issues involving water quality (both ground and surface water) and toxic substances. Over 1,100 projects were funded in FY03, at an average cost of about \$54,000 per project.

INFORMATION TRANSFER: By producing reports and other publications, by conducting seminars, workshops and conferences, and by one-on-one communication with state and local agency personnel, Institutes make sure the results of research are available to those who need the information and can put recommendations into action to improve water resource management. Each year the Institute program produces about 1,000 technical publications related to water resources. Nearly one-fourth of the publications are in refereed scientific journals. In FY03 the institutes conducted more than 132 conferences, seminars and workshops with more than 22,450 participants. In addition thirty-two institutes published newsletters detailing research projects and promoting workshops and conferences. Institute program newsletters had a total circulation of more than 72,000. Nearly every institute maintains a frequently updated internet web site to further enhance the institutes' ability to disseminate water resources throughout the nation and world.

EDUCATION/TRAINING: The Institute Program helps to insure a continuing flow of water scientists and managers to the profession. The training program includes professional and academic training on campus and continuing education off campus. Students receive professional training by participating in Institute-sponsored research and information transfer projects. Seminar and specialized course work for graduate and undergraduate students are also sponsored. In each of the past two years more than 1,300 students received training through the program.

Description of Program from:
<http://niwr.montana.edu/about/purpose.htm> ,
<http://niwr.montana.edu/about/activities.htm>

(a) State Water Resources Research Institute Program (WRII) R&D

Legislative Authority: section 104 of the Water Resources Research Act of 1984.

The State Water Resources Research Institute Program is a Federal-State partnership within the water resources discipline at USGS which:

- Plans, facilitates, and conducts research to aid in the resolution of State and regional water problems
- Promotes technology transfer and the dissemination and application of research results
- Provides for the training of scientists and engineers through their participation in research
- Provides for competitive grants to be awarded under the Water Resources Research Act

The state water resources research institutes authorized by the Act are organized as the National Institutes for Water Resources (NIWR). NIWR cooperates with the USGS in establishing total programmatic direction, reporting on the activities of the Institutes, coordinating and facilitating regional research and information and technology transfer, and in operating the NIWR-USGS Student Internship Program.

Each institute is also directed to "cooperate closely with other institutes and other organizations in the region to increase the effectiveness of the institutes and for the purpose of promoting regional coordination."

Description of Program from:
<http://water.usgs.gov/wrri/>,
<http://water.usgs.gov/wrri/mission.html>

Example of a State Water Resource Institute:

➤ **North Carolina Water Resources Research Institute**

The University of North Carolina Water Resources Research Institute (WRII) was established in 1964 to meet North Carolina's water research needs. It is one of 54 state water institutes that were authorized by the Water Resources Research Act of 1964 to administer and promote federal/state partnerships in research and information transfer on water-related issues. A unit of the University system, the Institute is located in Jordan Hall at North Carolina State University. Institute policy is established by the WRII Board of Directors.

The mission of the Institute is threefold:

- to identify the state's ever-changing research needs,
- to motivate and support research by qualified scientists,
- and to provide for technology transfer.

Findings from research funded by the Institute help local, state, and federal agencies make better decisions in managing water resources. To formulate a research program responsive to state water resources problems, the Institute works closely with the North Carolina Department of Environment, Health, and Natural Resources and other agencies. An Advisory Committee provides guidance and review. A Technical Committee of university faculty representing many disciplines is appointed each year to review research proposals and provide expert advice on the technical merits and usefulness of proposals.

Research projects focus on the following topical areas: Aquatic Weeds; Climate; Drinking Water;

Fish Diseases; Groundwater; History, Economics, Social Issues; Neuse River Estuary Modeling and Monitoring Reports; Stormwater; Surface Water; Wastewater; Water Supply; Wetlands.

Stormwater Projects (selected examples):

- "Evaluation of Wet Ponds for Protection of Public Water Supplies." Report # 311

- “Analysis of Stormwater Infiltration Ponds on the North Carolina Outer Banks.” Report #254
- “Performance Evaluation of Regional Wet Detention Ponds and a Wetland for Urban Nonpoint Source Control.” Report #335

Report summaries can be accessed at:

<http://www2.ncsu.edu/ncsu/CIL/WRRI/reports/storm.html>

Wastewater Projects (selected examples):

- “Treatment of Domestic Wastewater by a Constructed Upland-Wetland Wastewater Treatment System.” Report #277
- “Impact of Wastewater Quality on the Long-Term Acceptance Rate of Soils for On-Site Wastewater Disposal Systems.” Report #316
- “Impacts of Sewage Effluent on Tree Survival, Water Quality and Nutrient Removal in Coastal Plain Swamps.” Report #235

Report summaries can be accessed at:

<http://www2.ncsu.edu/ncsu/CIL/WRRI/reports/waste.html>

Description of Program from:

<http://www2.ncsu.edu/ncsu/CIL/WRRI/about.html>

(7) National Park Service (NPS) – DOI

The NPS was created in 1916 and charged with preserving wildlife, scenery and landscape in the areas that Congress designated for the purpose. The NPS has a clear preservation mission; however, park boundaries do not correspond with watersheds. The Park Service has considerable (albeit lessening) discretion to regulate land uses within park boundaries, but its authority over public and private lands adjacent to the parks (even as uses impact the parks themselves) remains questionable and disputed.

The National Park Service (NPS) is proposing to update the policies that guide the management of the national park system (see Sources below) to improve their clarity and to keep pace with changes in laws, regulations, socio-economic factors and technology. The revised policies are to improve understanding, both among NPS managers, and the NPS and the public, of how decisions are made about protecting park resources and providing opportunities for public use.

In specifically water-related areas, existing NPS policy purports to protect watershed and stream features "by avoiding impacts to watershed and riparian vegetation and by allowing natural fluvial processes to proceed unimpeded." Managers are to attempt to relocate or redesign facilities to avoid conflicts between infrastructure (such as bridges) and streams. "Where stream manipulation is unavoidable, managers will use techniques that are visually unobtrusive" and protective of the natural environment "to the greatest extent practicable."

The Hydrology and Watershed Management Program is one of three programs administered by the Water Operations Branch (WOB) of the Water Resources Division. In addition, hydrologic assessment and monitoring conducted in support of NPS water rights protection issues is administered by the Division's Water Rights Branch. The WOB Hydrology and Watershed Management Program administers programs in the areas of watershed condition assessment, surface water hydrology, floodplain management and compliance, ground water use and protection, stream and riparian management, and environmental assessment and compliance.

The aim is to: provide national consistency in water-related programs; provide specialized analytical or technology support to field-based professionals; assume responsibility for studies requiring specialized technical skills or dealing with significant issues of multi-park, regional, or national scope; and to "assist in integrating principles of good science with complex policy issues."

Beginning in FY03, the **Hydrology and Watershed Management Program** assumed responsibility for designing and administering a new program to assess the conditions of watershed in parks including uplands, wetlands, streams and riparian resources.

Federal Interagency Stream Corridor Restoration Handbook has been developed by the Departments of Agriculture (four branches), Commerce (NOAA-NMFS), Defense (ACE), HUD, Interior (7 agencies and subagencies plus the NPS), the EPA, FEMA, and the TVA. (!)

Watershed Conditions Assessment Through the Natural Resource Challenge: the NPS Water Resources Division received a base increase to conduct Watershed Condition Assessments (WCA) on a system-wide basis, which involves applying a set of descriptive and/or quantitative technical methods to describe ecosystem health at the watershed scale. Over the

past 10-15 years, researchers and managers have developed numerous WCA methods for use in various ecosystems, and for a wide range of purposes. A constant element is the use of watershed areas to define landscape-level scales.

As part of the WCA program mentioned above, a project was recently initiated in cooperation with the Chesapeake Watershed CESU and George Mason University (GMU) to identify, review, clarify, evaluate, and develop a compendium of the many published methods for assessing watershed conditions in general, as well as the broad-scale conditions of various watershed resources such as wetlands, uplands, streams, and riparian resources. The GMU team has created a website to solicit input from natural resource professionals on landscape health assessment methods. WRD is asking anyone who has been involved in these kinds of planning-level assessments to go to <http://ecosurvey.gmu.edu> and complete the survey. Additional information on ecological assessment methods is available on this site. Questions should be addressed to Gary Smillie at 970-225-3522 or Rick Inglis at 970-225-3517.

WRD Technical Report Series is a vehicle to disseminate NPS results of biological, physical, and social technical studies. Natural resources inventories and monitoring activities, scientific literature reviews, bibliographies, and proceedings of technical workshops and conferences are also available here.

The **Technical Information Center (TIC)** is the central repository for NPS planning, design, and construction documents; go to: <http://www.nps.gov/dsc/tic>

In 1998, NPS and the U.S. Geological Survey (USGS) initiated a water quality partnership program with support from the Clean Water Action Plan. Over \$2.1 million per year is allocated for partnership projects. The goal is to develop information on park water quality so the NPS can address its most critical water quality management responsibilities. USGS District Offices and individual parks collaborate to refine project statements from NPS Resource Management Plans. Project proposals selected for funding address the highest priority NPS water quality issues, including:

- nutrient transport in groundwater;
- nutrient, sediment and metal transport and loading in streams;
- atmospheric deposition in streams and lakes;

- microbiological contamination in recreational waters;
- organic contamination in stream and lake sediments;
- and aquatic biological health.

(a) Rivers & Trails – NPS E&O

This program is listed as a grant program, but in reality it provides only advice/counseling on a staff-available basis. It claims to have played a "major role in community conservation and recreation through citizen-led, partnership approaches to river protection, trail development and land conservation." Another such program is "to serve as a national technical resource to support government, industry, and nonprofit partnerships in ongoing consultations and negotiations about applications for hydropower licensing"; to meet outdoor recreation and river conservation needs; and to maintain riparian areas. Again, there is no funding, only advice/counseling, which must be applied for (and be accepted or rejected) just as one would apply for a grant.

Source/references Each state has a contact for the LWCF; (E.g., Massachusetts) Director, Division of Conservation Services, Executive Office of Environmental Affairs, 251 Causeway Street, Suite 900, Boston, MA 02114-2136; Tel: 617-626-1011; State web info on LWCF Program

The Water Resources Division of the NPS is based in Fort Collins, Colorado, and has offices in Denver, Colorado and Washington, D.C. Bill Jackson, NPS Water Resources Division Chief, 1201 Oakridge Drive, Suite 250, Fort Collins, CO 80525; Phone: (970) 225-3500; Fax: (970) 225-9965

See the Comparison edition of the Draft Management Policies To Guide the Management of the National Park System; it is a pdf file on the NPS website and very slow to download, but worth the effort. Comment period ended Jan 19, 2006.

(8) U.S. Geological Survey - DOI

The USGS serves the Nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life. As the Nation's largest water, earth, and biological science and civilian mapping agency, the U.S. Geological Survey (USGS) collects, monitors, analyzes, and provides scientific understanding about natural resource conditions, issues, and problems. The

diversity of our scientific expertise enables us to carry out large-scale, multi-disciplinary investigations and provide impartial scientific information to resource managers, planners, and other customers.

Water Resources Discipline

The Water Resources Discipline is one of four science disciplines of the USGS. The WRD mission is to provide reliable, impartial, timely information that is needed to understand the Nation's water resources. WRD actively promotes the use of this information by decision makers to --

- Minimize loss of life and property as a result of water-related natural hazards, such as floods, droughts, and land movement.
- Effectively manage ground-water and surface-water resources for domestic, agricultural, commercial, industrial, recreational, and ecological uses.
- Protect and enhance water resources for human health, aquatic health, and environmental quality.
- Contribute to wise physical and economic development of the Nation's resources for the benefit of present and future generations.

We are a workforce of 4300 people located in all 50 states at a total of 179 locations, working with 1300 State and local agency cooperators.

Description of Program from:
http://water.usgs.gov/about_WRD.html,
<http://www.usgs.gov/aboutusgs/>

(a) National Research Program – R&D

The NRP had its beginnings in the late 1950's. Since that time, the program has grown to encompass a broad spectrum of scientific investigations. The sciences of hydrology, mathematics, chemistry, physics, ecology, biology, geology, and engineering are used to gain a fundamental understanding of the processes that affect the availability, movement, and quality of the Nation's water resources. Results of NRP's long-term research investigations often lead to the development of new concepts, techniques, and approaches that are applicable not only to the solution of current water problems, but also to future issues that may affect the Nation's water resources. Basic tools of hydrology that have been developed by the NRP include ground water modeling, geochemical modeling, and regional flood frequency analysis. These and other tools developed by the NRP are in common use today

throughout the USGS, in other agencies, and in the private sector.

➤ **USGS Hydrologic and Geochemical Models**

The USGS has been a leader in the development of hydrologic and geochemical simulation models since the 1960's. USGS models are widely used to predict responses of hydrologic systems to changing stresses, such as increases in precipitation or ground-water pumping rates, as well as to predict the fate and movement of solutes and contaminants in water. Today, USGS models are available for free on the internet. See the following website for free access to models:
<http://water.usgs.gov/nrp/models.html>

Description of Program from:
<http://water.usgs.gov/nrp/about.html>

(b) Water Resources Research National Competitive Grants Program R&D

Legislative Authority: Section 104(g) of the Water Resources Research Act, as amended (42 USC Sec. 10303(g)).

The U.S. Geological Survey in cooperation with the **National Institutes for Water Resources** (<http://niwr.montana.edu/default.asp>) requests proposals for matching grants to support research on the topics of water supply and water availability, which are issues of importance nationwide. Proposals are sought in not only the physical dimensions of supply and demand, but also quality trends in raw water supplies, the role of economics and institutions in water supply and demand, institutional arrangements for tracking and reporting water supply and availability, and institutional arrangements for coping with extreme hydrologic conditions.

Eligible Applicants: Any investigator at an institution of higher learning in the United States is eligible to apply for a grant through a Water Research Institute or Center established under the provisions of the Water Resources Research Act of 1984, as amended. Proposals involving substantial collaboration between the USGS and university scientists are encouraged.

2006 Budget: \$1 million

Example of a Funded Project:

- **“Assessing the Effectiveness of Local Water Institutions in Water Management.”** Robert Hearne, North Dakota State University

The objective of this research is to improve local management of water resources by providing policy makers and agencies with an improved understanding of the characteristics of successful local institutions. This research will focus on the Red River of the North basin in Minnesota and North Dakota although some assessment of Manitoba's institutions will be included. The basin is fairly homogeneous in terms of land use and geographic features, but features three completely different sets of water law, which makes it an excellent case study of institutions.

The overall objective of this research is to strengthen local water management institutions so that they may better meet evolving local and basin wide needs, especially the maintenance of water quality. Specific objectives of the research include: 1) Develop a set of objective and subjective criteria and indicators to evaluate local water management institutions; 2) Provide a review of the different governmental and nongovernmental institutions in the basin, classify their goals, activities and chartered purposes, and identify overlaps and functions that are not being addressed; 3) Identify and evaluate the characteristics of local water institutions that have a demonstrated capability to meet local goals and wider goals of the greater river basin; 4) Assess the use of: scientific and technical information; extension education and training programs; and other support provided by governmental and non-governmental agencies; 5) Analyze institutions and agencies likely behavior in a decision-making situation and further develop decision-making support tools; 6) Identify the characteristics of institutions that successfully evolve to meet new challenges; 7) Analyze preferences of a sample of residents and stakeholders toward watershed management issues and the types of institutions that they trust; and 8) Disseminate results to various forums including local workshops and scientific journals.

Website and Description of Program from:

http://niwr.montana.edu/docs/2005_104G_Abstract.pdf,
http://cfpub.epa.gov/fedfund/program.cfm?prog_num=98,
<http://water.usgs.gov/wrri/O5grants/national/2005ND86G.html>

DEPARTMENT OF TRANSPORTATION

The Department of Transportation employs almost 60,000 people across the country, in both the Office of the Secretary of Transportation (OST), and in its operating administrations and bureaus. Each administration and bureau has its own, independent, management and organizational structure. It is hard, in a cabinet department so big, to readily characterize it, but here are excerpts, from the website, or from strategic plans, having to do with environmental interests and priorities.

Environmental Stewardship

Promote transportation solutions that enhance communities and protect the natural and built environment.

Support interdisciplinary research on connections among transportation, energy, and the environment.

Adopt transportation policies and promote technologies that reduce or eliminate environmental degradation.

Work with transportation partners to mitigate the adverse environmental effects of existing transportation systems.

Basis of Policy and Activity:

- The National Environmental Policy Act and the Clean Water Act of 1972, as amended.
- The Coastal Zone Reauthorization Amendment (CZRA). This amendment regulates highway-runoff water quality and its environmental impacts in coastal areas.
- The Transportation Equity Act for the 21st Century (TEA-21), enacted on June 9, 1998, authorized up to \$194.8 million for grants to establish and operate up to **33 University Transportation Centers (UTC)** throughout the U.S. in FY 1998
- The National Pollutant Discharge Elimination System (NPDES).
- The Nonpoint Source (NPS) Management Programs, Title 3, Section 319.
- The Department of Transportation (DOT) National Transportation Policy (NTP), the Federal Highway Administration (FHWA) Environmental Policy Statement (EPS), and the Intermodal Surface Transportation Efficiency Act (ISTEA). These policies and acts specify increased environmental responsibilities for policies and

programs developed by Federal and State transportation agencies.

- Other legislation such as The Safe Drinking Water Act, the Endangered Species Act, the Resource Conservation and Recovery Act, and The National Wild and Scenic Rivers Act also contain provisions that pertain to water quality of highway runoff. (The FHWA wants to check the validity of the existing data and procedures to assess and predict pollutant loadings and impacts from highway stormwater runoff.)
- A series of environmental laws, executive orders, and policies addressing the potential threat of highway runoff to the Nation's water resources heightens the Federal and State transportation agencies' environmental responsibilities for policies and programs. The Federal Highway Administration (FHWA), the U.S. Geological Survey (USGS), the U.S. Environmental Protection Agency (EPA), and many State highway departments and universities have sponsored or conducted research on the nature and impacts of highway runoff on water quality.

EPA Regulatory Text: Stormwater Best Management Practices in an Ultra-Urban Setting (2003)

- Develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into your small MS4. Your program must ensure that controls are in place that would prevent or minimize water quality impacts.
- Develop and implement strategies which include a combination of structural and/or non-structural best management practices (BMPs) appropriate for your community;
- Use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under State, Tribal or local law;
- Ensure adequate long-term operation and maintenance of BMPs.

The Stormwater Phase II rule was published on December 8, 1999, and generally requires operators of small MS4s in urbanized areas to develop and implement a stormwater management program which addresses six minimum control measures.

The Phase II rule describes six minimum control measures which most regulated small MS4s

will need to implement. EPA anticipates that these minimum control measures typically will be implemented by applying one or more BMPs appropriate to the source, location, and climate.

[Click here for more on NPDES Phase 2 regulations](#), or go to www.epa.gov/owm/sw/phase2 to find out more about EPA Stormwater NPDES Phase II regulations directly from the EPA.)

Specific to Wetlands: Highways are a key part of America's transportation system, but they can have negative impacts on wetlands through draining, filling, and runoff of contaminants and eroded soil. Through the Clean Water Action Plan, the Department of Transportation will continue to monitor wetland losses and gains and minimize negative impacts with the goal of replacing 1.5 acres for every acre affected within ten years. The federal highway program achieved a 120% gain in wetlands acres restored in 1998.

Stream Corridor Restoration. Fifteen agencies collaborated on the Stream Corridor Restoration: Principles, Processes, and Practices document (October 1998). The manual provides a sound basis for restoring the natural ecology of streams and rivers. Twelve watersheds in need of restoration were chosen to demonstrate these techniques in 1999.

Water Quality Action Plans, May 28, 1996; this guidance is recommended as a general outline of provisions that may be considered when developing a water quality action plan between Federal Highway Administration and other cooperating agencies such as EPA, State environmental agencies and other resource agencies. FHWA has identified the area of water quality as one of the elements under Objective #1, Environment Goal of our National Strategic Work Plan.

Transportation and Sustainable Communities: Integrate and coordinate existing research agendas to minimize duplication and research gaps while optimizing support for a sustainable transportation system; develop improved technical tools and models to analyze the impacts of transportation activities on both the natural and the social environment.

(1) Federal Highway Administration (FHWA) – DOT

(a) FHWA Office of Planning, Environment and Realty (HEP) R&D, E&O

The HEP serves as FHWA's advocate and national leader for environment protection and enhancement, comprehensive intermodal and multi-modal transportation planning, and for fair and prudent acquisition and management of real property.

In addition to participating in federal projects relating to watershed and water quality, HEP runs the following funding programs relating to the environment under TEA-21:

Environmental Streamlining and Stewardship

Environmental Streamlining and Stewardship requires transportation agencies to work together with natural, cultural, and historic resource agencies to establish realistic timeframes for the environmental review of transportation projects. These agencies then need to work cooperatively to adhere to those timeframes, while they are protecting and enhancing the environment. The efficient and effective coordination of multiple environmental reviews, analyses, and permitting actions is essential to meeting the Environmental Streamlining and Stewardship mandates for highway and transit projects under SAFETEA-LU.

Section 1309 of the Transportation Equity Act for the 21st Century (TEA-21) mandated Environmental Streamlining as the timely delivery of transportation projects while protecting and enhancing the environment. Environmental Streamlining requires transportation and natural, cultural, and historic resource agencies to establish realistic timeframes for transportation and environmental resource agencies to develop projects, and then to work cooperatively to adhere to those timeframes. A key element of Environmental Streamlining is communication with and the gathering of input from the public and stakeholders.

On September 18, 2002, President Bush signed Executive Order 13274, titled Environmental Stewardship and Transportation Infrastructure Project Reviews, which emphasizes the importance of expedited transportation project delivery while being good stewards of the environment. The executive order complements and reinforces the strategic direction that FHWA established in its

Environmental Stewardship and Streamlining Vital Few Goal (see below). FHWA is setting expectations, measures, and methods for advancing an improved and efficient environmental review process and for demonstrating environmental stewardship.

Vital Few Environmental Goal: FHWA's Vital Few Environmental Goal is Stewardship and Streamlining. Environmental Streamlining drives us to improve project delivery without compromising environmental protection. Environmental Stewardship helps demonstrate that we are mindful of the natural and human environment while addressing mobility and safety needs of the public. FHWA promotes actions that show we are responsible stewards of the environment. We take advantage of opportunities to enhance environmental protection and encourage partnerships that promote eco-system conservation or encourage broader mitigation strategies that seek corridor or watershed based approaches. Environmental Streamlining is an outcome or result of a multidimensional complex process; therefore, there is no single self-contained measure that adequately reflects Streamlining progress. Environmental Streamlining solutions must go hand in hand with principles of stewardship.

The Vital Few Environmental Streamlining and Stewardship goal (Environment VFG) sets expectations, measures, and methods for advancing an improved and efficient environmental review process and for demonstrating environmental stewardship. The success of this goal is focused on improving processes that influence outcomes. FHWA oversees how the environmental processes are carried out; the project sponsors and other practitioners determine the final product, i.e., the project. Therefore, the performance objectives for the Environment VFG measure process improvements and benchmark the results of significant stewardship activities.

Description of Program:

<http://environment.fhwa.dot.gov/strmlng/index.asp>
<http://www.fhwa.dot.gov/hep/index.htm>

Projects under Stewardship and Streamlining: Green Highways Initiative; Overview and Objectives of the Environment VFG; Exemplary Ecosystem Initiatives; Eco-Logical: An Ecosystem Approach to Developing Infrastructure; Negotiated Timeframes: Questions and Answers; Integrated Approaches: Tips and Tools; Tool Kit for Integrating Land Use and Transportation Decision-Making.

(i) Green Highways Initiative

The Green Highways Initiative is a voluntary, collaborative, public/private effort designed to identify & promote streamlining and environmental stewardship in transportation planning, design, construction, and/or operation and maintenance through integrated partnerships, flexibility, rewards, and market-based solutions.

The Goal is to foster partnerships for improving upon the natural, built and social environmental conditions in a watershed, while sustaining life-cycle functional requirements of transportation infrastructure (safety, structural & service levels) – providing for conditions that are “better than before”.

The Green Highways Initiative was created to promote innovative streamlining and market-based approaches toward sustainable solutions for transportation and environmental improvements. Partnership development consists of integrated public/private partnerships with federal/state transportation and regulatory/resource agencies, contractors, industry, trade associations, academic institutions, and nongovernmental organizations to develop and champion Green Highways efforts.

Two events were held in 2005 to support and further the Initiative:

On June 2, 2005 the U.S. Environmental Protection Agency (EPA) Region III and the Federal Highway Administration (FHWA) convened the first Mid-Atlantic Green Highways Initiative Planning Charrette, *Designing a Blueprint for Success*.

Over 50 leaders and senior-level executives in industry, trade associations, non-governmental organizations, state transportation and resource agencies, and federal transportation and resource agencies attended the Charrette. Many made presentations about activities and project examples already underway that serve as models for the Green Highways Initiative.

From November 8-10, 2005, The Mid-Atlantic Green Highways Forum was held in College Park, Maryland. The Forum was sponsored by the FHWA, EPA local and headquarters offices, and many other private and public sector organizations.

The Forum was the first national event to focus on the relationships among transportation, safety, and the environment. It provided an excellent opportunity to share information about the Green Highways Initiative — created to promote innovative streamlining and market-based approaches toward sustainable solutions for

transportation and environmental improvements — to both the private and public sector, while receiving feedback and next steps from Forum participants. There was universal agreement from participants that while many discrete successes have been achieved, more can be done to promote green highways by working together. While this conference targeted the Mid-Atlantic States, it is hoped that it will serve as a springboard for forums and discussions around the country.

Description of Program from:

<http://environment.fhwa.dot.gov/strmlng/newsletters/jan06nl.asp>
<http://www.greenhighways.org/>

➤ **“Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects.”**

Abstract: “Infrastructure consists of the basic facilities - such as transportation and communications systems, utilities, and public institutions - needed for the functioning of a community or society. Sometimes the development of these facilities can negatively impact habitat and ecosystems. Techniques have been developed to better avoid, minimize, and mitigate these impacts, as well as the impacts of past infrastructure projects. However, the avoidance, minimization, and mitigation efforts used may not always provide the greatest environmental benefit, or may do very little to promote ecosystem sustainability. This concern, along with a 1995 Memorandum of Understanding to foster an ecosystem approach mobilized an interagency Steering Team to collaborate over a three-year period to write *Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects*.”

“The Steering Team began with a shared vision of an enhanced and sustainable natural environment, combined with the view that necessary infrastructure can be developed in ways that are more sensitive to terrestrial and aquatic habitats. *Eco-Logical* encourages Federal, State, tribal and local partners involved in infrastructure planning, design, review, and construction to use flexibility in regulatory processes. Specifically, *Eco-Logical* puts forth the conceptual groundwork for integrating plans across agency boundaries, and endorses ecosystem-based mitigation - an innovative method of mitigating infrastructure impacts that cannot be avoided.”

Text and Program Description from:

http://environment.fhwa.dot.gov/ecological/eco_index.asp

(b) National Highway Runoff Water-Quality Data and Methodology Synthesis - USGS and FHWA (DOT) R&D

The U.S. Geological Survey (USGS) and the Federal Highway Administration (FHWA) are currently cooperating in a national project to evaluate FHWA's guidelines for highway-runoff quality. The FHWA wants to determine if current guidelines for highway runoff quality are up-to-date and technically supportable, or if additional information is needed to update the guidelines. The FHWA wants a catalog of existing studies and available data. Information collected will be used to determine if available data are sufficient to characterize pollutant loadings and impacts attributable to highway stormwater runoff around the country. The web page will provide a catalogue of reports, and other information as it becomes available.

Existing data, and studies from the FHWA, the USGS, State DOT's, and other sources will be compiled and evaluated to determine whether the information needs of highway managers, practitioners, and researchers are met, and whether this information will meet future needs. The USGS will examine technical issues with input from the FHWA, and once consensus is reached, produce a report that details the adequacy of the existing data, and the existing concepts to characterize and define the water quality of highway runoff. Where data are insufficient, monitoring plans will be developed to address recognized deficiencies.

Continuing FHWA and USGS research identifies and quantifies various pollution sources, resulting in improved runoff management practices to lessen effects of highway runoff on the water quality of receiving waters. Highway management practices have improved with the increased understanding gained from this research; however, over time, more accurate sampling techniques have evolved and some highway characteristics have changed. These changes have generated a need to compile and review previous impact study information, develop a new understanding of the processes involved, and identify information gaps. A review and synthesis of existing work will help assess how highway environmental changes such as new or changed highway construction techniques and materials, pesticides used in highway right-of-way maintenance, motor fuel constituents, engine emissions, and vehicle components affect the water quality of highway runoff. A comprehensive evaluation of available process-oriented research also would identify additional research areas

necessary for continued reduction of unwanted water-quality constituents in highway runoff.

Description of Program from:

<http://ma.water.usgs.gov/fhwa/runpage2.htm>

(c) Surface Transportation Environment and Planning Cooperative Research Program (STEP) R&D

Section 5207, Surface Transportation Environment and Planning Cooperative Research Program (STEP), of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) established a new cooperative research program for environment and planning research in section 507 of Title 23, United States Code, Highways (23 U.S.C. 507). The general objective of the STEP is to improve understanding of the complex relationship between surface transportation, planning and the environment.

The SAFETEA-LU authorized \$16.875 million per year for FY2006-FY2009 to implement this new program. However, due to obligation limitations, rescissions and the over-designation of Title V Research in SAFETEA-LU, \$11.914 million of the \$16.875 million authorized is available in FY2006 with similar amounts anticipated in future years. STEP is also the sole source of funds to conduct all FHWA research on planning and environmental issues in FY2006. In addition, Congress mandated several special studies, and STEP will be the funding source for those projects as well.

Section 5207 of SAFETEA-LU identifies certain characteristics of STEP regarding program contents and administration. Regarding the program content, STEP may include research to:

- Develop more accurate models for evaluating transportation control measures and system designs for use by State and local governments to meet environmental requirements;
- Improve understanding of transportation demand factors;
- Develop indicators of economic, social, and environmental performance of transportation systems to facilitate alternatives analysis;
- Meet additional priorities determined through the transportation research and development strategic planning process identified in section 5208 of SAFETEA-LU;
- Refine the scope and research emphases through outreach and in consultation with stakeholders.

In administering the program, USDOT and FHWA will ensure, to the maximum extent practicable, that:

- The best projects and researchers are selected based on merit, open solicitations, and selection by a panel of appropriate experts;
- Qualified, permanent core staff with ability to manage a large multiyear budget is used;
- Stakeholders are involved in governance of program;
- There is no duplication with the Future Strategic Highway Research Program (section 5210 of SAFETEA-LU), which will be administered by the National Research Council of the National Academy of Sciences.

Description of Program from:

<http://www.fhwa.dot.gov/hep/step/index.htm>

(d) Transportation, Community, and System Preservation Program (TCSP) R&D

The (TCSP) Program is a comprehensive initiative of research and grants to investigate the relationships between transportation, community, and system preservation plans and practices and identify provide sector-based initiatives to improve such relationships. States, metropolitan planning organizations, local governments, and tribal governments are eligible for discretionary grants to carry out eligible projects to integrate transportation, community, and system preservation plans and practices that:

- Improve the efficiency of the transportation system of the United States.
- Reduce environmental impacts of transportation.
- Reduce the need for costly future public infrastructure investments.
- Ensure efficient access to jobs, services, and centers of trade.
- Examine community development patterns and identify strategies to encourage private sector development patterns and investments that support these goals.

Eligible Applicants: States, metropolitan planning organizations, local governments and tribal governments are eligible recipients of TCSP Program grant funds. This would include towns, cities, public transit agencies, air resources boards, and school boards. Non-governmental organizations that have projects they wish to see

funded under this program are encouraged to partner with an eligible recipient as the project sponsor.

FY 2006 Budget: Authorized funding for the TCSP Program is \$25 million in FY 2005 and \$61.25 million per year for FY 2006 through 2009. These funds are subject to the obligation limitation. The Federal share payable on account of any TCSP project or activity shall be 80% or subject to the sliding scale rate [23 USC 120(b)].

Examples of Funded Projects:

Farmington Canal Greenway, Philadelphia Port-Access Enhancement Plan, and Ottawa Master Transportation Plan.

Description of Program from:

<http://www.fhwa.dot.gov/tcsp/index.html>

(e) Transportation Environmental Research Program (TERP) R&D

The goal of the Transportation Environmental Research Program (TERP) is to fund research in transportation and environmental issues. The FHWA hopes that by committing to TERP, the research organization will provide insight on the difficult policy decisions that the FHWA will undertake in the future. Research announcements are expected to fall into specific research topic areas including: Aesthetic Highway Design; Air Quality Policy; Air Quality Conformity; Air Quality Models; Emission Reductions (Transportation Strategies); National Ambient Air Quality Standards; Mobile Source Air Toxics; Community Impact; Environmental Impact; Assessment in Transportation; Environmental Justice, Housing Issues, and Environmental Laws; Global Climate Change; Hazardous Material; Right-of-Way Hazardous Substances Materials, and Waste; Hazardous Materials Generated During Development and Completion of Projects; Historic Bridges; Public Involvement; Stormwater Constituents; Transportation Noise; Transportation Planning; Water Quality; Ecosystem/Watershed Planning; Wetlands.

Eligible Applicants: Educational Institutions.

FY 2006 Budget: TERP grant awards of approximately \$20,000 to \$50,000 will be made based on the responses to TERP research announcements.

Website and Description of Program from:

<http://www.fhwa.dot.gov/terp/index.htm>

(f) Transportation Equity Act for the 21st Century Funding Programs FFLI

Legislative Authority: Transportation Equity Act for the 21st Century; National Economic Crossroads Transportation Efficiency Act of 1997"

The Transportation Equity Act for the 21st Century (TEA-21) funds numerous transportation programs (Surface Transportation Program (STEP), National Highway System, etc.) to improve the nation's transportation infrastructure, enhance economic growth, and protect the environment. States may spend up to 20 percent of the STP dollars used on certain projects to rehabilitate existing transportation facilities for environmental restoration and pollution abatement projects, including the construction of stormwater treatment systems. Additionally, each state sets aside 10 percent of STP funds for transportation enhancement projects, which can include acquisition of conservation and scenic easements and the mitigation of highway stormwater runoff water quality, as well as scenic beautification, pedestrian and bicycle trails, archaeological planning, and historic preservation. These varied project types can be used to protect source water areas during construction of transportation corridors.

Eligible Applicants: Businesses, community/watershed groups, nonprofit groups, and educational institutions.

2006 Budget: Not available for 2006. Budget for 2005 was \$5.06 billion (National highway system), \$5.9 billion (Surface transportation program). Note: program has been under continuing resolution since FY03, allowing expenditure of up to, but not exceeding, the amount obligated in FY03

Description of Program from:

<http://www.fhwa.dot.gov/tea21/>

V) Executive Agencies

ENVIRONMENTAL PROTECTION AGENCY

Prior to 1970 there had been no consistency in the Federal Government's policy with respect to environmental issues. That changed in 1970 with the passing of National Environmental Policy Act that created the Environmental Protection Agency. Presently, the agency has responsibility under at least a dozen laws. Indeed, EPA activity falls under the oversight of more than 40 Congressional committees or sub-committees.

The general charge to the EPA is "protect human health and the environment." It operates ten regional offices, more than a dozen laboratories or centers, employs over 18,000 people, and had a budget of \$7.6 billion for FY 2006.

It is set up to make environmental standards and regulations that follow from laws created by Congress. In reality, through inter-governmental agreements, most regulatory and enforcement issues are left to the various state or tribal governments--while the EPA issues grant money, loans, and advice to aid the local efforts.

In addition, the agency conducts research, assists local government, educational institutions and NGOs in pollution prevention programs, and recommends policy to the White House's Council on Environment Quality (cf).

EPA does not have any kind of consolidated mandate or unified statute, nor at this time is there any general federal mandate on watershed protection. Instead, the laws and the regulations remain entirely fragmented, the EPA left on its own to prioritize, coordinate and integrate the inconsistent hodge-podge of its charges.

Nevertheless, it is often named as lead agency, or coordinator, in federal interagency or inter-governmental environmental initiatives, and contains an abundance of talent, including many who are interested in holistic approaches to watershed management. It could be surmised that, at some time, that talent might be enthusiastically mobilized to more forward thinking. In some ways, it has been.

Strategic Plan, 2004-2008. According to wording in the current plan, it is organized around five key goals:

Clean Air and Global Climate Change;

Clean and Safe Water;

Land Preservation and Restoration;

Healthy Communities and Ecosystems; and

Compliance and Environmental Stewardship.

Water-related elements in the goals are driven by three key themes:

- Prioritize specific improvements *that are possible* within the current time frame and budget,
- Work closely with states, tribes, stakeholders, and the public; and
- Promote, within EPA, the need to cooperate with other federal agencies and to eliminate duplication of work.

Innovation Strategy. Driven in part by previous criticism, in 2002 the EPA laid out a strategy for achieving better environmental results through innovation. The strategy is based upon previous experience with innovative approaches, recommendations from outside policy groups, and discussions with the states and stakeholders.

It focuses on EPA's prioritizing and finding solutions to sticky problems, developing new tools and approaches, strengthening the innovation partnership with states and tribes, fostering innovation through the agency's culture and organizational systems, and integrating environmental management more fully and consistently across all EPA facilities.

Watershed Protection Approach.

Developed in the mid-1990s, the strategy has as its premise that many water quality and ecosystem problems are best solved at the watershed level rather than at the individual water body or discharger level. Central to the approach are the ideas that problems be prioritized, expertise from many authorities is brought to bear, local stakeholders are involved, and that measures of success will be established through monitoring and other data gathering activity.

Because of the locally developed nature of these programs, they may vary from watershed to watershed, but are supposed to all involve a holistic watershed focus, sound science and management, and strong partnerships that consider the economic and social goals of the region as well.

Smart Growth Strategy. Developed in 2003, coordinated by the Office of Policy, Economics and Innovation, this program "changes the terms of the development debate away from the growth/ no growth question to 'how and where should new development be accommodated.' It also emphasizes local decision-making, with EPA's

role being to provide information and analytical tools, finance model programs, work to remove federal barriers which may hinder smart growth by cultivating more flexibility at the federal level, and create incentives for state and tribal governments to pursue smart growth.

The EPA remains the largest source of federal funding for water and wastewater infrastructure projects and in the nineties, allocated \$25 billion to states in grants through the Drinking Water and Clean Water State Revolving Funds (SRF). In 2000 alone, \$1,350 million was given for the Clean Water SRF, \$820 million for the Drinking Water SRF and \$411.7 million was earmarked.*

* United States General Accounting Office. "Water Infrastructure; Information on Federal and State Financial Assistance." GAO-02-134 November 2001.

Programs: To sample a few of exceptional relevance:

Environmental Management Systems (EMS's) - EPA

This recent concept, endorsed by ISO's 14000, is being softly advocated by EPA as a mechanism to properly make environmental plans, and assess their outcomes. It is maintained that environmental management should be practiced with a holistic approach rather than as a series of separate air, water, and waste management tasks. This "systems approach" provides more complete attention to the many issues that affect environmental outcomes, and results in more tailored improvement strategies. EPA and states lately have been using two key mechanisms to advance such approaches.

National Environmental Performance Partnership System - EPA

Under the program, states may develop 'Performance Partnership Agreements' (PPA's) with the appropriate EPA Regional Office. Created in 1995, such collaboration is meant to "bring consistency to the methods and processes used to demonstrate compliance with federal and state radiation regulations." Also to:

- Foster the use of innovative strategies,
- Promote joint planning and priority setting,
- Give states more latitude in how to direct its resources to solve environmental problems,

Improve public understanding of environmental issues.

Joint EPA/State Agreement to Pursue Regulatory Innovation.

Signed by EPA and the Environmental Council of the States in 1998, this agreement addresses the development, testing, and implementation of new regulatory approaches that are tailored more to local needs and conditions, and more flexible bureaucratically.

At laboratories located throughout the nation, the agency works to assess environmental conditions and to identify, understand, and solve current and future environmental problems; integrate the work of scientific partners such as state governments, private sector organizations, academia and other agencies; and provide leadership in addressing emerging environmental issues.

(1) Office of Environmental Education

Environmental education (EE) increases public awareness and knowledge of environmental issues and challenges. Through EE, people gain an understanding of how their individual actions affect the environment, acquire skills that they can use to weigh various sides of issues, and become better equipped to make informed decisions. EE also gives people a deeper understanding of the environment, inspiring them to take personal responsibility for its preservation and restoration.

The Grants Program sponsored by EPA's Office of Environmental Education supports environmental education projects that enhance the public's awareness, knowledge, and skills to help people make informed decisions that affect environmental quality. EPA awards grants each year based on funding appropriated by Congress. Annual funding for the program ranges between \$2 and \$3 million. More than 75 percent of the grants awarded by this program receive less than \$15,000.

Description of Program from:

<http://www.epa.gov/enviroed/>,
<http://www.epa.gov/enviroed/grants.html>

(i) Environmental Education Grant Program - EPA E&O

Legislative Authority: Section 6 of the National Environmental Education Act of 1990

This program provides funding for the following educational priorities: (1) Capacity Building: Increasing capacity to develop and deliver coordinated environmental education programs across a state or across multiple states.

Steps include developing effective leaders and organizations which create strategic plans to implement and link environmental education programs to promote long term programs and to decrease fragmentation of effort and duplication across programs; (2) Education Reform: Utilizing environmental education as a catalyst to advance state, local, or tribal education reform goals; (3) Community Issues: Designing and implementing model projects to educate the public about environmental issues and/or health issues in their communities through community-based organizations or through print, film, broadcast, or other media; (4) Health: Educating teachers, students, parents, community leaders, or the public about human-health threats from environmental pollution, especially as it affects children, and how to minimize human exposure to preserve good health; (5) Teaching Skills: Educating teachers, faculty, or non-formal educators about environmental issues to improve their environmental education teaching skills, e.g., through workshops; or (6) Career Development: Educating students in formal or non-formal settings about environmental issues to encourage environmental careers. Grants awarded by EPA Headquarters range from \$50,000 to \$100,000. Grants for less than \$50,000 are issued by EPA Regional offices and typically range from \$10,000 - \$15,000.

Eligible Applicants: Nonprofit groups, educational institutions, state/territorial agencies, tribal agencies.

2006 Budget: \$3 million

Example of a Funded Project:

➤ **Crook County Soil and Water Conservation District, Oregon.**

Crooked River Watershed Council received \$3,700 for a Monitoring Education and Involvement Project. Through the monitoring project, the Crooked River Watershed Council provides local teachers, students, and landowners instruction and field-based experience in watershed science and policy. The project improves community knowledge of the condition of resources and involvement in watershed stewardship. Two workshops are conducted in photo and water quality monitoring methods and data interpretation. One workshop is for area educators, and the other is for interested members of the community and landowners. Partners in the project with the Crooked River Watershed Council are the Crook County High School, the Central Oregon Intergovernmental Council Work

Education Program, and Oregon State University Extension.

Website:

http://www.epa.gov/enviroed/grants_contacts.html

Description of Program from:

http://cfpub.epa.gov/fedfund/program.cfm?prog_num=25,
<http://efc.boisestate.edu/search.asp?mode=summary&programid=18>

(2) Office of Policy, Education, and Innovation

EPA's Office of Policy, Economics, and Innovation supports the Agency's mission by promoting innovation that achieves greater and more cost effective public health and environmental protection. The Office, in consultation with its different internal and external stakeholders and partners, supports and oversees the testing of new and innovative approaches to environmental protection and related policy changes.

OPEI is the focal point for regulatory analyses, policy development, and economic analyses necessary to support EPA's regulatory development process and changes in today's business conditions. OPEI's role in the regulatory development process is to manage the process and ensure that the underlying policy analyses are sound. OPEI helps strengthen the analytic foundation of the Agency's decision-making processes, working with EPA's Science Advisor to strengthen the integration of scientific and economic analyses.

Description of Program from:

<http://www.epa.gov/opei/about.htm>

(3) Office of Pollution, Pesticides, and Toxic Substances

The Office of Prevention, Pesticides and Toxic Substances plays an important role in protecting public health and the environment from potential risk of pesticides and toxic chemicals for now and for generations to come. We promote pollution prevention through innovative partnerships and collaboration. We evaluate pesticides to safeguard all Americans, including children, ensure pesticides used on food are safe, and protect the environment and ecosystems. Dealing with emerging issues like endocrine disruptors and lead poisoning

prevention are top priorities. More information on OPPTS FY '06-'07 priorities are available.

The **Office of Pesticide Programs (OPP)** regulates the use of all pesticides in the United States and establishes maximum levels for pesticide residues in food, thereby safeguarding the nation's food supply. EPA has expanded access to information on risk assessment and risk management actions to help increase transparency of decision-making and facilitate consultation with the public and affected stakeholders. In addition to its regulatory functions, OPP's programs include providing information and coordination on issues ranging from worker protection to prevention of misuse of pesticides. OPP participates in a variety of partnerships related to pesticide use, including the Pesticide Environmental Stewardship Program⁴, a voluntary private and public partnership dedicated to reducing pesticide use and risk, and Integrated Pest Management (IPM) in Schools.

The **Office of Pollution Prevention and Toxics (OPPT)** promotes the use of safer chemicals, processes, and technologies; promotes life-cycle management of environmental problems such as asbestos; advances pollution prevention through voluntary action by industry. Through the High Production Volume (HPV) Challenge program, for example, OPPT is working voluntarily with industry and others to make basic hazard data available to the public on over 2,200 chemicals used in high volume in the United States, and to identify and evaluate chemicals of particular concern to children's health.

(a) Office of Science Coordination and Policy (OSCP)

The Office of Science Coordination and Policy (OSCP) was created in January 1999 as a third office within the Office of Prevention, Pesticides and Toxic Substances (OPPTS) to provide advice and leadership on cross-cutting science policy issues and emphasize quality science on emerging scientific and technical issues. We aim to assure sound scientific decisions are made regarding safe pesticide and chemical management through the leadership of the Scientific Advisory Panel (SAP). We also coordinate emerging exposure and hazard assessment topics such as endocrine disruptors and biotechnology.

OSCP supports science and advisory functions within OPPTS by:

- Making available a core group of senior science advisors with a wide range of expertise in risk assessment

- Providing a means for scientists to work on short term projects as a growth, training, or sabbatical opportunity
- Centralizing key functions such as peer review implementation, including management of the FIFRA SAP
- Increasing science outreach activities

Description of Program from:

<http://www.epa.gov/opptsmnt/pubs/aboppts.htm>

(i) Green Building Program Workgroup

EPA's Green Building Workgroup was formed in July 2003 to bring together the many programs across the Agency that work with the building and development sectors to improve their environmental performance. Workgroup members strive for a built environment that protects and enhances the health of ecosystems and the public.

The Workgroup seeks to build effective EPA leadership in the green building movement by jointly informing, coordinating, and guiding the development of Agency policies, programs, partnerships, communications, and operations that influence building and development.

The Green Building Workgroup's Management Champion is William H. Sanders III, Acting Director of the Office of Children's Health Protection. The current co-chairs are Ken Sandler [sandler.ken@epa.gov] and Alison Kinn Bennett [kinn.alison@epa.gov], who may be contacted for more information.

Description of Program from:

<http://www.epa.gov/greenbuilding/pubs/about.htm>

(4) Office of Research and Development

The U.S. Environmental Protection Agency (EPA) relies on sound science to safeguard both human health and the environment. The Office of Research and Development (ORD) is the scientific research arm of EPA. ORD's leading-edge research helps provide the solid underpinning of science and technology for the Agency. ORD conducts research on ways to prevent pollution, protect human health, and reduce risk. The work at ORD laboratories, research centers, and offices across the country helps improve the quality of air, water, soil, and the way we use resources. Applied science at ORD builds our understanding of how to protect

and enhance the relationship between humans and the ecosystems of Earth.

ORD's Mission is to:

- Perform research and development to identify, understand, and solve current and future environmental problems.
- Provide responsive technical support to EPA's mission.
- Integrate the work of ORD's scientific partners (other agencies, nations, private sector organizations, and academia).
- Provide leadership in addressing emerging environmental issues and in advancing the science and technology of risk assessment and risk management.

The ORD has initiated a multi-year planning effort to plan the direction of our research program in selected topic areas over five or more years. This approach promotes ORD's focus on the highest priority issues and provides coordination for achieving our long-term research goals. To date, the focus of this effort is the development of Multi-Year Plans (MYPs) for the 16 research topics listed.

Description of the Program from:
<http://www.epa.gov/ord/hm/aboutord.htm>

(a) Federal Technology Transfer Act Program

The EPA seeks opportunities to transfer federal technologies into the marketplace, and collaborate on environmental research and development projects with outside entities, such as industry, consortia, academia, trade associations, and state and local agencies. The Federal Technology Transfer Act (FTTA) provides a mechanism for these cooperative research and development partnerships. Through the FTTA program, federal agencies can conduct joint research with non-federal partners and protect intellectual property that may be developed. The alliance that is formed through the FTTA program supports and improves US competitive positions worldwide, helps remove barriers to collaboration, and encourages cooperative research and development with the goal of commercialization.

EPA FTTA program partners benefit from cooperative research and development agreements (CRADAs) by tapping into EPA's resources and knowledge base to conduct joint research and technology commercialization. Cooperative Research and Development Agreements (CRADAs)

are the primary mechanism for these partnerships. CRADAs are established between the EPA and research partners to exchange personnel, equipment, services, and expertise for a specific research project. The CRADA allows non-federal partners to work directly with federal laboratories in collaborative research and development projects, while also protecting intellectual property that may be developed. Licensing Agreements can also be established so that outside entities can license EPA patented products and methods to make them available to the public in the shortest possible time.

Description of Program and Program Website: www.epa.gov/osp/ftta.htm

(b) National Center for Environmental Innovation (NCEI) - EPA R&D

The National Center for Environmental Innovation promotes new ways to achieve better environmental results. Working in partnership with other EPA programs, States, businesses, communities and other interested parties, NCEI focuses on:

- Creating a results-oriented regulatory system
- Promoting environmental stewardship across society
- Building capacity for innovative problem solving

NCEI is working to bring about the next generation of environmental protection, one that focuses more on results and less on process; emphasizes environmental protection, not just pollution control; and takes a comprehensive rather than piece meal approach to problem-solving. This environmental protection system we envision - and are working toward - would use more market-based incentives that link environmental and economic objectives. It would also provide better information and meaningful opportunities for public involvement in decision-making.

The NCEI also runs the **Gateway to International Best Practices and Innovations**. Through the online Gateway to International Environmental Innovations, NCEI introduces the first global library of its kind, featuring programs, guidelines, databases, case studies, publications, and institutional and government Web sites. The Gateway gathers international best practices both in traditional environmental issue areas, such as water and air, as well as in crosscutting approaches, such as environmental management systems and smart growth. Furthermore, the site highlights research

and exchange opportunities that allow professionals to study these initiatives first hand.

The Gateway can be accessed at:
<http://www.epa.gov/ncei/international/exchange.htm>

NCEI's Offices:

Office of Business and Community Innovation manages a set of multi-media initiatives that strive to improve environmental performance. These programs are managed through four divisions:

Sector Strategies Division - improves environmental performance in industry sectors, by working with industry leaders, trade associations, state and local governments;

Small Business Division - assists small business by providing the information and extra services they need to understand and successfully address environmental issues.

Performance Incentives Division - creates incentives to recognize and encourage top environmental performance and to create a more collaborative relationship between government and business.

Development, Community, and Environment Division - minimizes the environmental impacts of development by working in partnership with States, local governments, developers and nonprofit organizations to create sustainable practices that meet the needs of this and future generations.

Office of Environmental Policy Innovation supports the full cycle of innovation - from identification of new ideas to evaluation to scale up:

Innovative Pilots Division - tests innovative ideas that promise better environmental and public health protection than existing policies;

Evaluation Support Division - evaluates innovative approaches to determine their effectiveness; and

Policy and Program Change Division - promotes adoption of successful innovations so their value can be realized on a broader scale.

Description of Program from:

<http://www.epa.gov/ncei/international/brochure.pdf>

(i) State Innovation Grants Program – EPA R&D

Legislative Authority: Clean Air Act, Section 103 (b)(3) (42 U.S.C. § 7403 (b)(3)); Clean Water Act, Section 104 (b)(3) (33 U.S.C. § 1254 (b)(3)); Solid Waste Disposal Act, Section 8001 (42 U.S.C. § 6981); Toxics Substances Control Act, Section 10 (15 U.S.C. § 2609); Federal Insecticide, Fungicide, and Rodenticide Act, Sections 18 and 20 (7 U.S.C. § 136p and 136r); and Safe Drinking Water Act, Sections 1442 (a) and (c) (42 U.S.C. § 1(a) and (c)).

The EPA National Center for Environmental Innovation (NCEI) is managing the competition for the State Innovation Grants in collaboration with the National Program Offices at headquarters and the EPA Regional offices. This assistance agreement program strengthens EPA's partnership with the States by assisting State innovation that supports the *Strategy*. EPA would like to help States build on previous experience and undertake strategic innovation projects that promote larger-scale models for "next generation" environmental protection and promise better environmental results. EPA is interested in funding projects that: 1) go beyond a single facility experiment to promote change that is "systems-oriented," 2) provide better results from a program, process, or sector-wide innovation, and 3) promote integrated (cross-media) environmental management with high potential for transfer to other States.

The Agency's *Strategy* presents a framework for environmental innovation consisting of four major elements:

(1) Strengthen EPA's innovation partnership with States and Tribes;

(2) Focus on priority environmental issues:-
Reduces greenhouse gases-Reduce smog

-Restore and maintain water quality-Reduce the cost of water and wastewater infrastructure;

(3) Diversify environmental protection tools and approaches:- Information resources and technology

- Environmental technology

-Incentives

- Environmental Management Systems

- Results-based goals and measures;

(4) Foster a more "innovation-friendly" organizational culture and systems.

Eligible Applicants: Only the principal environmental regulatory agency from each State, the District of Columbia and the U.S. Territories are eligible to apply. States are encouraged to partner with recognized American Indian Tribal governments in developing team pre-proposals for this solicitation.

2006 Budget: \$800,000 - \$1,000,000.

Description of Program from:

<http://www.epa.gov/ncei/aboutncei.htm>

<http://www.epa.gov/ncei/stategrants/solicitation2006.pdf>

(c) National Center for Environmental Research (NCER) EPA R&D

The National Center for Environmental Research (NCER) is one of five research organizations that comprise EPA's Office of Research and Development (ORD). NCER's mission is to support high-quality research by the nation's leading scientists that will improve the scientific basis for decisions on national environmental issues and help EPA achieve its goals. NCER is one of three national laboratories and two national centers that mirror the National Academy of Sciences' risk assessment paradigm by focusing on exposure (National Exposure Research Lab), effects (National Health and Environmental Effects Research Lab), risk assessment (National Center for Environmental Assessment) and risk management (National Risk Management Research Lab). NCER supports leading edge, extramural research in each of these areas of national environmental concern.

The technical staff who work for NCER have backgrounds in engineering, ecological and health sciences, communication and information management. NCER is headquartered in Washington, D.C.

Description of Program from:

<http://es.epa.gov/ncer/about/>

(i) Collaborative Science and Technology Network for Sustainability (CNS) – EPA R&D

Legislative Authority: Toxic Substances Control Act, Section 10, 15 U.S.C. 2609; Federal Insecticide, Fungicide, and Rodenticide Act, Section 20, 7 U.S.C. 136r; Clean Air Act, Section 103, 42 U.S.C. 7403; Clean Water Act, Section 104, 33 U.S.C.; Safe Drinking Water Act, Section 1442, 42 U.S.C. 300j-1; Solid Waste Disposal Act, Section 8001, 42 U.S.C. 6901.

To encourage innovative thinking about practical applications of science (including social science) and engineering for sustainability, ORD is funding the Collaborative Science and Technology Network for Sustainability (CNS). CNS projects will bring together diverse sets of partners to explore and learn about new approaches for environmental protection that are systems-oriented, forward-looking, and preventive and also link to economic and social dimensions. The collection of funded projects will inform practical learning on analytical tools, collaborative approaches, and informed decision-making that support progress towards sustainability. The analytical tools developed will draw on a scientific understanding of the consequences of decisions and actions.

CNS aims to assist various stakeholders and the public in learning about and refining the integrated and proactive approaches to environmental protection at a regional scale that form the basis for sustainability. Integrated and proactive approaches to environmental protection that incorporate economic and social dimensions have a long history. The National Environmental Policy Act (NEPA) of 1969 states that "it is the continuing policy of the Federal Government...to use all practicable means and measures... to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." Many of the needs identified by NEPA are still present today. The broad approach articulated by NEPA complements focused and targeted risk assessment and management.

Eligible Applicants: Public nonprofit institutions/organizations (includes public institutions of higher education and hospitals) and private nonprofit institutions/organizations (includes private institutions of higher education and hospitals) located in the U.S.; state and local governments; Federally Recognized Indian Tribal Governments; and U.S. territories or possessions are eligible to apply.

Funding Level: Approximately \$2 million total for all awards

Website and Description of Program from:

http://es.epa.gov/ncer/rfa/2006/2006_star_cns.html#Eligibility

(ii) Small Business Innovation Research

See no. 5 (b) in Chapter VI on U.S. Intergovernmental.

(iii) Science to Achieve Results (STAR) Research Grants

NCER's Science to Achieve Results or STAR program funds research grants and graduate fellowships in numerous environmental science and engineering disciplines through a competitive solicitation process and independent peer review. The program engages the nation's best scientists and engineers in targeted research that complements EPA's own outstanding intramural research program and those of our partners in other federal agencies. In addition, through this same competitive process, NCER periodically establishes large research centers in specific areas of national concern. At present, these centers focus on children's health, hazardous substances, particulate matter, and estuarine and coastal monitoring.

STAR research is funded through Requests for Applications (RFAs) that are derived from the ORD Strategic Plan and from research plans for specific topics developed by ORD. RFAs are prepared in cooperation with other parts of the Agency and concentrate on areas of special significance to the EPA mission. At present, STAR is focusing on the health effects of particulate matter, drinking water, water quality, global change, ecosystem assessment and restoration, human health risk assessment, endocrine disrupting chemicals, pollution prevention and new technologies, children's health, and socio-economic research.

NCER receives approximately 3000-3500 proposals every year for its STAR research and graduate fellowship programs. Each year, STAR awards about 180 research grants, 40 research grants jointly with other federal and private sector partners, and 125 graduate fellowships, in approximately 280 universities and non-profit research institutions in all states, Guam, Puerto Rico, and the District of Columbia. On an annual basis, NCER manages 650-750 active research grants and 300 fellowships. About 10 percent of the applications submitted to STAR are funded after peer review.

Description of Program from:
<http://es.epa.gov/ncer/about/>

(iv) P3 Award: People, Prosperity and the Planet Student Design Competition for Sustainability – EPA R&D

EPA and its partners launched the **P3 Award** in 2003 to promote innovative thinking for moving the world toward sustainability. Through this national student design competition, college students gain new skills and knowledge as they

research, develop, design, and implement scientific and technical solutions to environmental challenges. The competition has two phases. Initially, student teams compete for \$10,000 grants. Recipients use the money to research and develop their design projects during the academic year. Then, in the following spring, all P3 grant recipients are invited to Washington, D.C. to compete for the P3 Award. The National Academies, advisors to the nation on science, engineering, and medicine, convene a panel to evaluate and recommend the award winners. The final award decisions are made by EPA.

The P3 Award is given to the highest-rated student designs. The award includes additional funding up to \$75,000 that gives the students an opportunity to further develop their designs for sustainability, implement their projects in the field, and move them to the marketplace. EPA considers challenges from a wide range of categories, including agriculture, built environment, ecosystems, materials and chemicals, energy, information resources, and water. Challenges related to population growth and medical care, while important, are not included in this competition, other than the delivery or distribution systems of knowledge, goods, and supplies.

Eligible Applicants: Institutions of higher education located in the U.S. are eligible to apply as the recipients of grants to support teams of undergraduate and/or graduate students. Collaboration and partnerships with colleges and universities outside the United States are permitted, but only U.S. institutions are eligible to apply.

Description of Program from:
http://es.epa.gov/ncer/p3/fact_sheet.html

(d) National Decentralized Water Resources Capacity Development Project – R&D

For description of the NDWRCDP, see section 17 in Chapter 8 on Associations and Non Governmental Organizations.

(e) National Homeland Security Research Center – R&D

The NHSRC manages, coordinates, and supports a variety of research and technical assistance efforts. NHSRC develops and delivers reliable, responsive expertise and products based on scientific research and evaluations of technology. Our expertise and products are widely used to prevent, prepare for, and recover from

public health and environmental emergencies arising from terrorist threats and incidents.

The Center provides a management structure that ensures effective design and oversight of research and facilitates interaction with EPA Program Offices and Regions, other federal agencies, the private sector, and research partners. NHSRC's team of world renowned scientists and engineers are dedicated to understanding the terrorist threat, communicating the risks, and mitigating the results of attacks. Guided by the roadmap set forth in [EPA's Strategic Plan for Homeland Security](#)⁵, NHSRC ensures rapid production and distribution of security-related products.

Research and development efforts focus on five primary areas:

- Threat and Consequence Assessment
- Decontamination and Consequence Management
- Water Infrastructure Protection
- Response Capability Enhancement
- Technology Testing and Evaluation

NHSRC products will include methodologies and tools to support contaminant detection and characterization, treatment and decontamination, physical security enhancement, risk assessment and communication, as well as numerous papers and fact sheets covering a variety of topics.

Description of Program from:

<http://www.epa.gov/nhsrc/about.htm>

(f) National Risk Management Research Laboratory (NRMRL)

The United States Environmental Protection Agency (EPA) functions as both a scientific and regulatory agency of the United States. Research conducted under the EPA's Office of Research and Development (ORD) provides the basis for the formulation of environmental policies and programs. ORD's National Risk Management Research Laboratory (NRMRL), plays a vital role in the scientific research mission at EPA.

Our mission is to develop ways to *prevent* and *reduce* pollution of air, land, and water, and to *restore* ecosystems. With headquarters in Cincinnati, Ohio, and divisions in [North Carolina](#); [Oklahoma](#); and [New Jersey](#), our staff of several hundred scientists and engineers shares the

mission to solve a wide range of environmental challenges in seven research areas:

Drinking Water Protection

- Remove contaminants from source water
- Reduce sediments and disinfections byproducts from treated water

Air Pollution Control

- Reduce emissions from industries, power plants and incinerators
- Improve the quality of indoor air
- Understand the sources of greenhouse gases

Pollution Prevention

- Develop recycling, recovery and reuse of products
- Promote "green chemistry" processes in industry
- Promote sustainable development through an understanding of life-cycle impacts of products on the environment

Contaminated Media Remediation

- Clean up hazardous waste sites, leaking underground storage tanks, oil spills and sediments
- Understand the transport and transformation of contaminants in soil and groundwater

Watershed Management & Protection

- Understand the combined impacts to land, water, and air resources of watershed pollution
- Develop good management practices for sediment reduction, stormwater management, and combined overflow sewer treatment and controls

Environmental Technology Verification

- Provide credible performance data for commercial-ready environmental technologies in drinking water treatment, air pollution control, monitoring systems, recycling and waste treatment, and pollution prevention
- Develop partnerships with private testing and evaluation laboratories to verify developer claims for innovative technologies
- Create working relationships with environmental interest groups, government

permitting agencies, developers and vendors, and private and public users of environmental technologies

Technology Transfer & Technical Support

- Communicate information about EPA advancements in risk management, pollution prevention, wastewater treatment, Brownfields monitoring, contaminant controls, and other concerns
- Provide expert advice and assistance to environmental managers at all levels of government
- Produce technology transfer publications, software, multimedia products and technical meetings to inform the regulated community, environmental consultants, and local decision-makers on environmental issues

Description of Program from:

<http://www.epa.gov/ORD/NRMRL/about.html>

(i) Environmental Technology Verification Program (ETV) – EPA R&D

In October 1995, the Environmental Technology Verification (ETV) Program was established by EPA. The ETV Program develops testing protocols and verifies the performance of innovative technologies that have the potential to improve protection of human health and the environment. The goal of ETV is to provide credible performance data for commercial-ready environmental technologies to speed their implementation for the benefit of vendors, purchasers, permittees, and the public. The ETV Program operates as a public-private partnership through cooperative agreements between EPA and private nonprofit testing and evaluation organizations. These ETV verification organizations work with EPA technology experts to create efficient and quality-assured testing procedures that verify the performance of innovative technologies. ETV now operates five centers and one pilot program which cover a broad range of environmental technology categories. Vendors and others in the private sector, as well as federal, state and local government agencies, cost-share with EPA to complete priority ETV protocols and verifications.

In 2005 a new element of ETV is being initiated called “*Environmental and Sustainable Technology Evaluations*” (ESTE), in which the most important technology categories for meeting Agency mandatory and voluntary program needs

are verified under contract with verification organizations.

Under ESTE, the prioritized categories for verification are chosen by the EPA Office of Research and Development (ORD) with program office and/or regional office support. Project managers from ORD will direct the verifications using contractor support. All environmental technology categories are considered under ESTE, with the exception of remediation technologies which are covered under the EPA Superfund Innovative Technology Evaluation (SITE) Program.

Since its inception in 1995, ETV has verified more than 300 environmental technologies and developed more than 80 protocols for technology testing. A survey of participating vendors completed in 2001 showed overwhelming support for the ETV Program and its results. Responses indicated that 73 percent of the vendors were using ETV information in product marketing, and 92 percent of those surveyed responded that they would recommend ETV to other vendors. To date, more than 45 vendors have had multiple products verified by ETV. During 2002 - 2005, ETV conducted verification of monitoring and treatment technologies relevant for the Nation's homeland security.

Description of program from:

<http://www.epa.gov/etv/pdfs/fs/00 fs etv 0605.pdf>,
<http://www.epa.gov/etv/este.html>

➤ Water Quality Protection Center - EPA R&D

The WQP Center addresses technologies for protection of groundwater and surface water from contamination. It includes two components:

Source Water Protection Technologies--verifies the performance of commercial-ready technologies that prevent the contamination and maintain the quality of drinking water supplies from both groundwater and surface water sources. Examples of technology categories include: animal waste treatment-solids separation technologies, biomedical waste treatment technologies, decentralized wastewater treatment technologies, in-drain treatment technologies, in-pipe technologies, mercury amalgam separation technologies, residential nutrient reduction technologies, urban infrastructure (including grout, pipe bursting, and pipe liner technologies), ultraviolet disinfection-secondary effluent/wastewater reuse technologies.

Wet Weather Flow Technologies--verifies the performance of commercial-ready technologies

that control and treat the increased volumes of water as runoff, in sewers, and in wastewater treatment plants during periods of wet weather events. Examples of technology categories include: chemically-enhanced high-rate separation technologies, flow meters, high-rate ultraviolet disinfection, high-rate disinfection (induction mixers), models, non-chemically enhanced/vortex high-rate separation technologies, and source area treatment devices.

Description of program from:

<http://www.epa.gov/etv/centers/center4.html>

(g) Regional Environmental Monitoring and Assessment Program (REMAP) (EPA)

R&D

The U.S. Environmental Protection Agency's (EPA) Environmental Monitoring and Assessment Program (EMAP) is a long-term research program designed to statistically monitor the conditions of our Nation's ecological resources. REMAP, which is a component of EMAP, is a partnership between the Office of Research and Development (ORD), EPA's Regional Offices, other federal agencies, States, local governments, and U.S. tribal nations. It was developed to test the applicability of EMAP's probabilistic approach to answer questions about ecological conditions at regional and local levels. Funding Priority - Fiscal Year 2005: REMAP's goals are to: (1) Evaluate and improve probability based monitoring designs and tools for state and local use; (2) Assess the applicability of indicators at differing spatial scales; and (3) Demonstrate the utility of probability based data for resolving issues of importance to EPA Regions and States.

REMAP funds research projects to meet these goals while focusing on objectives that are consistent with current monitoring needs within the EPA Regions. The primary objectives of the solicited research are to assist the Regions, States, local governments, and tribes in incorporating the latest science on ecological monitoring into their environmental decision-making process. Research projects should address real regional environmental issues where monitoring results will influence decisions, address data gaps, and advance the science of ecological monitoring. Projects must be relevant to Regional, State, and Tribal monitoring needs. Projects must link research outputs and outcomes that are consistent with the EPA's strategic plan and research priorities. The funding priorities for 2005 fiscal year projects include approaches designed to advance integrated monitoring. These would include (but are not limited to): (1) Designs and tools for assessments of great/large rivers,

wetlands, and lakes; (2) Integration of 305 (b) reports and other existing data sources with the 303(d) listing process; (3) Improved development of biological reference conditions for establishing biological criteria; and (4) Approaches to demonstrate the effectiveness of restoration/remediation at the watershed level.

Eligible Applicants: Educational institutions, federal government, intergovernmental groups, local governments, non-profits, state governments, tribal agencies.

FY 2006 Budget: \$1,991,000

Website: <http://www.epa.gov/emap/remap/>

Description of Program from:

<http://efc.boisestate.edu/search.asp?mode=summary&programid=1521>

(5) Office of Water

The Office of Water (OW) is responsible for implementing the Clean Water Act and Safe Drinking Water Act, and portions of the Coastal Zone Act Reauthorization Amendments of 1990, Resource Conservation and Recovery Act, Ocean Dumping Ban Act, Marine Protection, Research and Sanctuaries Act, Shore Protection Act, Marine Plastics Pollution Research and Control Act, London Dumping Convention, the International Convention for the Prevention of Pollution from Ships and several other statutes. Our activities are targeted to prevent pollution wherever possible and to reduce risk for people and ecosystems in the most cost-effective ways possible.

The job is much too big to accomplish alone. OW staff depend on many others, including the ten EPA Regions, other federal agencies, state and local governments, Indian tribes, the regulated community, organized professional and interest groups, land owners and managers, and the public-at-large. OW often provides guidance, specifies scientific methods and data collection requirements, performs oversight and facilitates communication among those involved. As soon as OW and Regional staff have helped the states and Indian tribes to build the capacity, many water programs are delegated to them to implement.

Several organizations make up the Office of Water: Office of Wetlands, Oceans and Watersheds, Office of Science and Technology, Office of Wastewater Management and the Office of Ground Water and Drinking Water. Separate fact sheets are available on them. Policy, communications and budget staff support the

overall operation of the Office of Water. In addition, Water Divisions in all ten regional offices work with stakeholders to implement all programs.

Description of Program from:

<http://www.epa.gov/water/programs/owintro.html>

(a) Office of Ground Water and Drinking Water (OGWDW)

The Office of Ground Water and Drinking Water (OGWDW), together with states, tribes, and its many partners, protects public health by ensuring safe drinking water and protecting ground water. OGWDW, along with EPA's ten regional drinking water programs, oversees implementation of the Safe Drinking Water Act, which is the national law safeguarding tap water in America.

Description of Program from:

<http://www.epa.gov/safewater/index.html>

(i) Drinking Water State Revolving Fund (DWSRF) – EPA FFLI

Legislative Authority: 1996 Amendments to Safe Drinking Water Act (SDWA), section 1452

EPA awards grants to states to capitalize their Drinking Water State Revolving Fund (DWSRF) programs. Recognizing the fact that many public water systems find it difficult to obtain affordable financing for infrastructure improvements which would enable systems to comply with national primary drinking water standards and protect public health, Congress established the Drinking Water State Revolving Fund (DWSRF) as part of the 1996 Safe Drinking Water Act (SDWA) Amendments. The goal of the program is to provide States with a financing mechanism for ensuring safe drinking water to the public. States can use federal capitalization grant money awarded to them to set up an infrastructure funding account from which assistance is made available to public water systems. Loans made under the program can have interest rates between 0 percent and market rate and repayment terms of up to 20 years. Loan repayments to the State will provide a continuing source of infrastructure financing into the next century. The program also places an emphasis on small and disadvantaged communities and on programs that emphasize prevention as a tool for ensuring safe drinking water.

States use a portion of their capitalization grants to set up a revolving fund from which loans are provided to eligible public water utilities (publicly- and privately-owned) to finance the costs of infrastructure projects. States rank projects and offer loans to utilities based on a priority ranking

system. Priority is given to eligible projects that: (1) address the most serious risk to human health; (2) are necessary to ensure compliance with the requirements of the Safe Drinking Water Act; and, (3) assist systems most in need, on a per household basis, according to state-determined affordability criteria. States may also use up to 31 percent of their capitalization grants to fund set-aside activities that help to prevent contamination problems of surface and ground water drinking water supplies, as well as enhance water system management through source water protection, capacity development, and operator certification programs.

Eligible Applicants: Like the CWSRF, the DWSRF first goes to states in the forms of grants, whereupon the following groups can apply for loans from this fund: community/watershed groups, nonprofit groups, educational institutions, conservation districts, water and wastewater utilities, state/territorial agencies, tribal agencies.

2006 Budget: \$837.5 million

Website:

<http://www.epa.gov/safewater/dwsrf.html>

Description of Program from:

<http://www.epa.gov/safewater/dwsrf/dwfact.pdf>,
http://cfpub.epa.gov/fedfund/program.cfm?prog_num=6

(b) Office of Wastewater Management (OWM)

The United States Environmental Protection Agency's Office of Wastewater Management (OWM) oversees a range of programs contributing to the well-being of the nation's waters and watersheds. Through its programs and initiatives, OWM promotes compliance with the requirements of the Federal Water Pollution Control Act.

Cleaning and protecting the nation's water is an enormous task. Under the Clean Water Act, OWM works in partnership with Environment Protection Agency (EPA) regions, states and tribes to regulate discharges into surface waters such as wetlands, lakes, rivers, estuaries, bays and oceans. Specifically, OWM focuses on control of water that is collected in discrete conveyances (also called point sources), including pipes, ditches, and sanitary or storm sewers. OWM is also home to the Clean Water State Revolving Fund, the largest water quality funding source, focused on funding wastewater treatment systems, nonpoint source projects and estuary protection.

(i) Clean Water State Revolving Fund (CWSRF) – EPA FFLI

Legislative Authority: Clean Water Act, secs. 601-607, Public Law 95-217

EPA awards grants to states to capitalize their Clean Water State Revolving Funds (CWSRFs). The states, through the CWSRF, make loans for high-priority water quality activities. As loan recipients make payments back into the fund, money is available for new loans to be issued to other recipients. Eligible projects include point source, nonpoint source and estuary protection projects. Point source projects typically include building wastewater treatment facilities; combined sewer overflow and sanitary sewer overflow correction; urban stormwater control; and water quality aspects of landfill projects. Nonpoint source projects include agricultural, silviculture, rural, and some urban runoff control; on-site wastewater disposal systems (septic tanks); land conservation and riparian buffers; leaking underground storage tank remediation, etc. Estuary protection projects include all of the above point and nonpoint source projects, as well as habitat restoration and other unique estuary projects.

The program website says the CWSRF operates much like environmental infrastructure banks that are capitalized with federal and state contributions. CWSRF monies are loaned to communities and loan repayments are recycled back into the program to fund additional water quality protection projects. The revolving nature of these programs provides for an ongoing funding source that will last far into the future.

The CWSRF is a far more flexible program than its predecessor the Construction Grants program. Under the CWSRF, states have a wide range of options. States may choose from a variety of assistance options, including loans, refinancing, purchasing, or guaranteeing local debt and purchasing bond insurance. States can also set specific loan terms, including interest rates—from zero percent to market rate—and repayment periods—up to 20 years. States have the flexibility to target resources to their particular environmental needs, including contaminated runoff from urban and agricultural areas, wetlands restoration, groundwater protection, brownfields remediation, estuary management, and wastewater treatment.

States may also customize loan terms to meet the needs of small and disadvantaged communities. In 2005, 68 percent of all loans (22 percent of funding) were made to communities with populations less than 10,000. In addition,

some states provide specialized assistance for communities that are disadvantaged or experiencing financial hardship. These states might offer lower or no-interest loans to provide greater subsidies for disadvantaged communities.

Eligible Applicants: Though grants are authorized to states, the following groups may apply for loans from the relevant state agencies: businesses, community/watershed groups, nonprofit groups, private landowners, conservation districts, water and wastewater utilities, local governments, state/territorial agencies, tribal agencies.

FY 2006 Budget: \$5 billion. FY 2005: \$4.9 billion.

Website:

<http://www.epa.gov/owm/cwfinance/cwsrf/>

Description of Program from:

http://cfpub.epa.gov/fedfund/list1.cfm?prog_num=5
<http://www.epa.gov/owm/cwfinance/cwsrf/basics.htm>

➤ **Hardship Grants Program for Rural Communities – EPA FFLI**

EPA developed the Hardship Grants program to help small, disadvantaged rural communities address their wastewater treatment needs. States identify eligible projects and may commit a portion of their grants for technical assistance. Designed to complement the CWSRF loan program, this new program will distribute funds based on: the number of rural communities lacking access to centralized water treatment; and the rural per capita income in each state.

EPA guidelines encourage states to assist rural communities by supplementing CWSRF loans with hardship grant assistance. Fundable projects for qualifying communities include: the planning, design, and construction of publicly owned treatment works; the planning, design, and construction of alternative wastewater services, such as on-site treatment systems—including septic.

States may also use hardship assistance to provide training, technical assistance, and educational programs on the operation and maintenance of wastewater treatment systems.

Eligible Applicants: Any rural community with fewer than 3,000 residents can qualify for hardship assistance from its state program, if the following conditions are met: the community is rural; the community has no access to centralized wastewater treatment or collection systems, or needs improvements to on-site wastewater

treatment systems; the proposed project will improve public health or reduce environmental risk; the community's per capita income rate is less than 80 percent of the national average; and the community's unemployment rate exceeds the national average by one percentage point or more.

2006 Budget: EPA will award grants from a \$50 million funding pool to the states, Puerto Rico, and U.S. territories. They, in turn, will provide hardship assistance to small communities.

Website:

<http://www.epa.gov/owm/mab/smcomm/eparev.htm#7>

Description of Program from:

<http://www.epa.gov/owm/mab/smcomm/eparev.htm#7>

(ii) Small Communities Team – EPA
R&D, E&O

Protecting public health and improving water quality are the major goals of the Clean Water Act. Small Communities, Indian Tribes and Colonias often experience difficulty in achieving these goals. Many communities and tribes could avoid costly construction projects through improved management skills, adequate financing, appropriate technology, and better wastewater treatment system operation and maintenance.

The Office of Wastewater Management provides water and wastewater services to tribal and community leaders through its "Small Communities Team." The team partners with organizations to manage programs of technical assistance, financial assistance, and education & training to small communities and Indian tribes.

Small Community Team members manage the following main program areas:

- **The Rural Community Assistance Program** (RCAP) addresses management, financing, construction, and the Clean Water Act compliance needs of wastewater treatment, collection, and disposal systems in small communities;
- **The On-Site Technical Assistance Program** - 104(g) provides no-cost, over-the-shoulder operation and maintenance, financial, and technical assistance to municipal wastewater treatment plant operators;
- **The National Small Flows Clearinghouse** (NSFC) provides national information on collection and distribution systems, this information helps small communities meet their wastewater treatment needs;

- **The National Environmental Training Center for Small Communities** (NETCSC) supports environmental trainers who work with small communities to improve drinking water, wastewater, and solid waste services;
- **Decentralized Wastewater Systems** are individual on-site septic systems, cluster systems, and alternative wastewater technologies. When properly sited, designed, installed and maintained, on-site/decentralized systems provide a long-term and cost-effective solution to wastewater treatment;
- **The Colonias program** provides assistance to low-income, generally unincorporated communities along the U.S. / Mexico border which lack basic wastewater infrastructure;
- **The Clean Water Indian Set-Aside Grant Program** provides grant funds for the planning, design and construction of tribal wastewater treatment facilities; and
- **The Alaska Native Village (ANVs) Program** help ANVs and rural Alaska communities fund construction of drinking water and wastewater sanitation facilities.

The team's programs help to ensure the attainment of adequate wastewater treatment services by small communities so that their water quality and public health needs are met.

Descriptions of Programs from:

<http://www.epa.gov/owm/mab/smcomm/104g/ar99int.htm#projects>

(ii.i) The National Environmental Services Center - EPA **R&D, E&O**

(Including the National Small Flows Clearinghouse and the National Onsite Demonstration Project (NODP))

For a description of the NODP and the Small Flows Clearinghouse, please see the Program description under the National Environmental Services Center (section 18) in Chapter 8 on Associations and Non Governmental Organizations.

(iii) Water Quality Cooperative Agreements – EPA **R&D**

Legislative Authority: Clean Water Act, Section 104(b)(3), Public Law 92-500, as amended, 33 U.S.C. 1254(b)(3)"

These grants are intended to encourage efforts to improve water quality by promoting the coordination and acceleration of research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution. Projects must attain tangible results. EPA may award grants to fund internships for high school students to work at wastewater treatment plants under the Youth and the Environment sub-program in EPA Regions 1, 2, 3, 5, 6, 7, 8, 9 and 10. In the case of Regional competitions, eligible projects may be limited in geographic scope to benefit the citizens of States, Tribes, or Territories within those Regions. Other specific uses of funds will be described in Requests for Proposals for this program. EPA will not award grants to fund ongoing State, Tribal, or local program activities, construction, or to purchase land. Assistance agreement awards under this program may involve or relate to geospatial information.

2006 Budget: This program was not allocated any funding from congress for 2006. It is unlikely that funding will be available for this program in the future. FY 2005: \$17 million.

Website:

<http://www.epa.gov/owm/cwfinance/waterquality.htm>

Description of Program from:

<http://efc.boisestate.edu/search.asp?mode=summary&programid=1519>

(c) Office of Wetlands, Oceans, and Watersheds (OWOW)

The Office of Wetlands, Oceans, and Watersheds (OWOW) promotes a watershed approach to manage, protect, and restore the water resources and aquatic ecosystems of our marine and fresh waters. This strategy is based on the premise that water quality and ecosystem problems are best solved at the watershed level and that local citizens play an integral role in achieving clean water goals. Through its many programs, OWOW provides technical and financial assistance and develops regulations and guidance to support the watershed approach.

OWOW is one of four program offices within the Office of Water at EPA Headquarters in Washington, DC. The Office provides leadership, policy direction, and technical and financial support to 10 EPA regions and the states, tribes, and territories that implement aspects of our programs. OWOW also collaborates with other federal agencies with related missions as well as

local government, the private sector, and non-profit organizations.

Description of Program from:

<http://www.epa.gov/owow/owow.pdf>

(i) Assessment and Watershed Protection Program Grants (AWPPG) - EPA R&D

Legislative Authority: Section 104(b)(3) of the Clean Water Act (CWA).

Assessment and Watershed Protection Program Grants (AWPPGs) provide eligible applicants an opportunity to conduct projects that promote the coordination and acceleration of research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects (including health and welfare effects), extent, prevention, reduction, and elimination of water pollution.

The goals of this program include supporting a watershed approach to better address water quality problems in the U.S. and building the capacity of all levels of government to develop and implement effective, comprehensive programs for watershed protection, restoration, and management.

Proposals for AWPP Grants for 2006 must fall under one of the three national program areas, and in particular, should address the sub-program topics listed below:

1) *Watershed/TMDL Programs*

- a) Assessment and TMDL Workshops
- b) Impaired Waters Recovery and Results Analysis
- c) Tools, Incentives, and Products Training for the Watershed Approach

2) *Nonpoint Source Program*

- a) Tools and Web-based Decision Support Systems for Watershed Planning
- b) Low Impact Development (LID), Sustainable Development, and Redevelopment Practices to Protect and Restore Water Resources**
- c) Demonstrations and Research to Promote Agricultural Drainage Water Management Practices
- d) Validation of Best Management Practices for Nutrient Pollution Reduction
- e) Conference to Promote Clean Lakes

3) *Monitoring and Assessment Program*

- a) Application of Probability Survey Data
- b) Newsletter for Volunteer Monitoring

A potential project area within the Nonpoint Source Program and the LID focus could be "surveys that result in developing case study summaries from reports or analyses that document or compare the costs and/or performance of decentralized/LID approaches versus conventional wastewater, stormwater, and drinking water treatment and protection approaches."

In the past, award recipients have pursued a wide range of activities, such as developing management tools, advancing scientific and technical tools for protecting watershed health, improving availability of data and information about watersheds, and training watershed managers and the public about watershed management.

Eligible Applicants: Individuals, intergovernmental groups, local governments, nonprofits, state governments, tribal agencies.

FY 2006 Budget: \$1.15 million.

Website:

<http://www.epa.gov/owow/funding.html>

Description of Program from:

<http://efc.boisestate.edu/search.asp?mode=summary&programid=973>

(ii) Non-Point Source Implementation Grants (319 PROGRAM) – EPA FFLI

Legislative Authority: Clean Water Act, section 319(h)

Section 319 was added to the Clean Water Act (CWA) in 1987 to establish a national program to address nonpoint sources of water pollution. The leading cause of water quality degradation in the United States, nonpoint source pollution originates from diffuse or scattered sources rather than a defined point like a pipe outlet. Section 319(h) specifically authorizes EPA to award grants to states with approved Nonpoint Source Assessment Reports and Nonpoint Source Management Programs. The funds are to be used to implement programs and projects designed to reduce nonpoint source pollution. As required by section 319(h), the state's Nonpoint Source Management Program describes the state program for nonpoint source management and serves as the basis for how funds are spent.

Every year section 319 funds are allocated to each state according to a national allocation formula based on the total annual appropriation for the section 319 grant program. The allocation formula is contained in Appendix G of EPA's *1997 Nonpoint Source Guidance* (USEPA, 1996).

Since 1999 section 319(h) funds have been awarded to state nonpoint source agencies in two categories—incremental funds and base funds. **Incremental funds**, a \$100 million portion that EPA has designated for the development and implementation of watershed-based plans and Total Maximum Daily Loads (TMDLs) for impaired waters, should be used to restore impaired waters. **Base funds**, funds other than incremental funds, are used to provide staffing and support to manage and implement the state Nonpoint Source Management Program. Base funds help in implementing projects to identify and address nonpoint source problems and threats, as well as funding activities that involve specific waterbodies in that state or statewide or regional projects. A portion of these funds (up to 20 percent) may be used for planning and assessment activities such as conducting assessments, developing TMDLs, and creating programs to solve nonpoint source problems. EPA has issued supplemental grant guidelines, in addition to the *1997 Nonpoint Source Guidance*, that identify priority activities to be funded with section 319 incremental and base funds.

Nonpoint source pollution reduction projects can be used to protect source water areas and the general quality of water resources in a watershed. Examples of previously funded projects include installation of best management practices (BMPs) for animal waste; design and implementation of BMP systems for stream, lake, and estuary watersheds; basinwide landowner education programs; and lake projects previously funded under the CWA section 314 Clean Lakes Program. States required to provide 40% non-Federal match for whole grant. Recipients within state typically required to provide 40% match for each project, but this may be negotiable with a given state."

Eligible Applicants: Businesses, community/watershed groups, nonprofit groups, educational institutions, private landowners, conservation districts, local governments, state/territorial agencies, tribal agencies, federal agencies.

2006 Budget: \$204 million. FY 2007 Budget: \$194 million.

Website:

<http://www.epa.gov/owow/nps/contacts.html>

Description of Program from:

http://cfpub.epa.gov/fedfund/program.cfm?prog_num=44 "Applying for and Administering CWA Section 319 Grants: A Guide for State Nonpoint Source Agencies."
<http://www.epa.gov/owow/nps/319/319Guide.htm#PurposeGrants1>,
<http://www.whitehouse.gov/omb/expectmore/detail.10000224.2005.html>

(iii) Targeted Watershed Grants Program - EPA

Legislative Authority: Department of the Interior, Environment, and Related Agencies Appropriations Act, 2006 P.L. 109-54"

The program supports competitive grants to watershed stakeholders ready to undertake immediate action to improve water quality, and to improve watershed protection measures with tools, training and technical assistance. Special emphasis is given to projects that promote water quality trading opportunities to more efficiently achieve water quality benefits through market-based approaches.

To build upon the concepts behind the agency's watershed approach, the program focuses on innovative, wide-reaching plans to restore, preserve, or protect the nation's waters. \$10 million is set aside for new regional pilot programs. In 2005, the pilot project targeted the Chesapeake Bay watershed, focusing on helping publicly-owned treatment works reduce nutrient discharges through non-point source projects.

In addition to the pilot program, in FY 2005, EPA received 75 nominations and made awards to over 10 watershed organizations and coalitions that were in the best position to make on-the-ground improvements in water quality with grants ranging from \$300,000 to \$1.3 million, and averaging some \$800,000.

EPA is asking the nation's Governors, Tribal Leaders, and leading watershed organizations to apply for the next round of funding to support collaborative partnerships to protect and restore the nation's water resources. Two separate types of grants will be awarded in 2006. The Agency will select up to 12 watershed organizations to receive grants to implement watershed-based, on-the-ground implementation projects and up to 5 training and educational organizations to receive grants or cooperative agreements to help build capacity of the many grass roots watershed organizations across the country. Both grants will focus on strong stakeholder support and producing

improved environmental change. In a third part of the program, the Agency will also award Targeted Watershed funds to support nutrient management projects in the Chesapeake Bay Watershed.

Eligible Applicants: Community/watershed groups, nonprofit groups, educational institutions, conservation districts, water and wastewater utilities, local governments, state/territorial agencies, tribal agencies.

2006 Budget: \$16.6 million. FY 2005: \$18 million. FY 2004: \$15 million.

Example of a Funded Project:

➤ Huff Run, OH, Rural Action, Inc. This relatively small, 14.7 square mile watershed, is situated in central eastern Ohio. Extensive pre-law coal mining has severely damaged the watershed and subsequently degraded the water quality and aquatic wildlife habitat. The Huff Run Watershed Restoration Partnership proposes to focus on one particular site. The Belden site is one of the two most contaminated sites in Reach Four and has the third largest net acid load in Huff Run. The site is in an upstream location and would positively impact water quality in downstream reaches. Restoration plans include surface reclamation and treatment using passive treatment technologies used to remove metals and increase alkalinity. Targeted Watershed Grant funds will be used to build vertical flow wetlands. This technology uses a series of wetland treatment ponds that have been shown to be effective in removing substantial amounts of aluminum and iron from highly acid waters.

Website:

<http://www.epa.gov/owow/watershed/initiative/>

Description of Program from:

http://cfpub.epa.gov/fedfund/program.cfm?prog_num=95,
<http://www.epa.gov/owow/watershed/initiative/2005/2005projsumm.html>

(iv) Watershed Assistance Grants (WAG) - EPA R&D

EPA and River Network have teamed up to create the highly successful Watershed Assistance Grants (WAG) program. These grants are helping communities help themselves. They empower community-based watershed organizations to:

- Strengthen partnerships among civic organizations, federal agencies, states, municipalities, tribes, landowners, and businesses;
- Boost local economies;

- Preserve cultural heritage;
- Increase citizen participation;
- Leverage funds;
- Facilitate watershed service projects; and
- Gather and assess watershed data and develop comprehensive watershed restoration plans

Helping local watershed partnerships be successful, through programs like Watershed Assistance Grants, is critical for the nation to achieve clean and healthy waters. About 4,000 local groups are currently registered in EPA's Adopt Your Watershed database, evidence of the tremendous enthusiasm at the local level.

This program distributes grants ranging from about \$2,000 to \$30,000 to support watershed partnerships. Mini-Grants (\$4,000 and under) are given for clearly defined, short-term organizational development projects. Larger grants (\$4,000-\$30,000) are given for projects of demonstrable impact.

Projects have included implementing agricultural best practices, conducting streambank restoration, implementing Total Maximum Daily Loads, establishing pollutant credits, and demonstrating innovative nutrient management schemes.

Source/References: Environmental Protection Agency, Ariel Rios Building, 1200 Pennsylvania Avenue, N.W., Washington, DC 20460; tel (202) 272-0167; www.epa.gov/epa. Office of the Administrator, tel 202-564-4700.

(6) Great Lakes National Program-

FFL

Legislative Authority: Clean Water Act, sections 104 and 118

USEPA's Great Lakes National Program Office (GLNPO), located in Chicago, Illinois, has a staff of 46 and a budget of almost \$15 million. GLNPO brings together Federal, state, tribal, local, and industry partners in an integrated, ecosystem approach to protect, maintain, and restore the chemical, biological, and physical integrity of the Great Lakes. The program monitors Lake ecosystem indicators; manages and provides public access to Great Lakes data; helps communities address contaminated sediments in their harbors; supports local protection and restoration of important habitats; promotes pollution prevention

through activities and projects such as the Canada-U.S. Binational Toxics Strategy (BNS); and provides assistance for community-based Remedial Action Plans for Areas of Concern and for Lakewide Management Plans. Each year, GLNPO uses its funding to assist Great Lakes partners in these areas through grants, interagency agreements, and contracts.

The Boundary Waters Treaty of 1909 and the 1987 Great Lakes Water Quality Agreement (GLWQA) with Canada provide the basis for our international efforts to manage this shared resource. Additional responsibilities are defined in Section 118 of the Clean Water Act, Section 112 of the Clean Air Act Amendments, and the Great Lakes Critical Programs Act of 1990. The Great Lakes 5-Year Strategy, developed jointly by EPA and its multi-state, multi-Agency partners and built on the foundation of the GLWQA, provides the agenda for Great Lakes ecosystem management: reducing toxic substances; protecting and restoring important habitats; and protecting human/ecosystem species health.

EPA's Great Lakes Program issues awards to monitor Great Lakes ecosystem indicators; provides public access to Great Lakes data; helps communities address contaminated sediments in their harbors; supports local protection and restoration of important habitats; promotes pollution prevention through activities and projects such as the Canada-U.S. Binational Toxics Strategy; issues awards to address invasive species; and provides assistance to implement community-based Remedial Action Plans for Areas of Concern and for development of Lakewide Management Plans and the reduction of critical pollutants pursuant to those plans. Great Lakes Legacy Act Project Agreements (new in FY 04, and not a grant program) provide another means of addressing contaminated sediments.

Eligible Applicants: Community/watershed groups, nonprofit groups, educational institutions, conservation districts, water and wastewater utilities, local governments, state/territorial agencies, tribal agencies, federal agencies.

FY 2006 Budget: \$50 million. FY 2005: \$28.5 million. FY 2004: \$7.7 million.

Example of a Funded Project:

- **Great Lakes Nonpoint Source Conference: A Post-PLUARG Review**

(GL96523901: \$10,000) Recipient: Great Lakes Commission

The conference brought Great Lakes scientists, agency regulators, landuse managers, and local implementers together to assess the current state of nonpoint source pollution and control programs and changes in land use activities since the commencement of PLUARG in 1972. The conference/workshop also reviewed progress under Annexes 3 and 13 of the GLWQA, involved multiple partners and was planned in conjunction with an important regional event such as a Great Lakes Commission meeting or the 2004 State of the Lakes Ecosystem Conference (SOLEC).

Website: <http://www.epa.gov/glnpo/>

Description of Program from:

<http://www.epa.gov/glnpo/fund/2003/summary.html>,
http://cfpub.epa.gov/fedfund/program.cfm?prog_num=34, <http://www.epa.gov/glnpo/about.html>

(7) Remediation Technologies Development Forum (RTDF) – EPA E&O

The Remediation Technologies Development Forum (RTDF) was established in 1992 by the U.S. Environmental Protection Agency (EPA) to foster collaboration between the public and private sectors in developing innovative solutions to mutual hazardous waste problems. The RTDF has grown to include partners from industry, several government agencies, and academia who share the common goal of developing more effective, less costly hazardous waste characterization and treatment technologies.

The RTDF is one of a few government programs designed to foster public-private partnerships to conduct laboratory and applied field research to develop, test, and evaluate innovative remediation technologies. Through the unprecedented collaboration of the RTDF, companies, government agencies, and universities voluntarily are sharing knowledge, experience, equipment, facilities, and even proprietary technology to address mutual remediation problems. Individual RTDF Action Teams also interact and communicate with other consortia including the Consortium for Site Characterization Technology and the Advanced Applied Technology Demonstration Facility.

The RTDF is dedicated to advancing the development of more permanent, cost-effective technologies for the remediation of hazardous wastes. The RTDF works to achieve this goal by: identifying priority remediation technology development needs; establishing and overseeing

action teams to plan and implement collaborative research projects to address remediation problems; addressing scientific, institutional, and regulatory barriers to innovative treatment technologies.

EPA provides funding for RTDF research activities, as well as support for RTDF and Action Team meetings. Other federal agencies, e.g., DOE and DOD, as well as industrial and academic participants are providing funding, laboratory, and field support for research activities undertaken by the Action Teams. Participants in each Action Team provide funding and/or in-kind support for specific research efforts of the team. RTDF members are jointly supporting research efforts, valued at well over \$20 million, at more than 30 sites throughout the United States (see map on next page for some of the sites where field work is ongoing).

Action Teams currently are active in addressing five priority areas. The activities undertaken by the five active Teams focus on the development, testing, and evaluation of in situ remediation technologies. The priorities and activities of the teams include: Bioremediation Consortium; Permeable Reactive Barriers Action Team; Sediments Remediation Action Team; In-Place Inactivation and Natural Ecological Restoration (IINERT) Soil-Metals Action Team; Phytoremediation of Organics Action Team.

Website and Description of Program from:
<http://www.rtdf.org/default.htm>

(8) EPA Region 1

(i) Center for Environmental Industry and Technology Research – EPA Region 1

Recognizing that New England has a rich supply of innovative ideas and technologies that can benefit both the environment and the economy—if only they find their way to the marketplace—EPA New England established the Center for Environmental Industry and Technology (the Center or CEIT). The mission of the Center is to be a window to resources, people, and programs for the environmental technology industry in New England, and to promote the acceptance of innovative environmental technologies to solve the most significant environmental problems in New England.

Through extensive collaboration and networking with other state and federal agencies, the Center offers services for environmental technology developers in the following areas: access to information, and assistance in

overcoming regulatory and institutional barriers. In order to promote the acceptance of innovative technologies, the Center also provides access to technology information for the regulated and non-regulated community.

Description of Program from:

<http://www.epa.gov/ne/assistance/ceit/pdfs/ceitfactsheetn.pdf>

(9) EPA Region 2

(i) Promoting Green Buildings – EPA Region 2

From construction to operation to demolition, buildings can pose significant impacts to the environment and the people working in or around them. EPA and the New York City Department of Environmental Protection launched a *Green Building Design Competition* in 2003 to establish the city as a leader in America's green building movement. The focus is on showcasing green building principles, developing new ideas, and identifying green building impediments.

The objectives of the competition are:

Innovation: Encourage the development of new ideas in green building design.

Adaptation: Showcase projects that have successfully incorporated green building principles into new and existing New York City building stock.

Assimilation: Highlight projects that incorporate green buildings into the existing fabric of the community.

Projects must fall under one of two categories:

Built - This category seeks to award green buildings that have completed construction/renovation and successfully incorporated an exemplary palette of green building strategies into beautiful designs. Projects must be completed by the date of submission, January 17, 2006.

Design - Due to the recent expansion of the green building market within New York City, this category seeks submissions from projects that are not yet fully constructed. Designs could range from projects that are currently under construction to those that are strictly conceptual. These submissions should include thoughtful schematic designs and development documents.

The Competition was also sponsored by the city EPA, and the American Institute of Architects, Earthpledge, the New York Department of Environmental Protection, and the Museum of the City of New York.

Eligible Applicants: Open Competition.

Description of Program from:

<http://www.epa.gov/innovation/pdf/innovation.pdf> (page 21 of report),
http://www.nyc.gov/html/oec/downloads/pdf/2005%20Design%20Competition9_21_1.pdf

(10) EPA Region 3

(i) Putting the LID on Stormwater Management – EPA Region 3 funded conference. E&O

September 21-23, 2004. Co-hosted by Prince George's County Government and Anacostia Watershed Toxics Alliance.

This was the first national conference held to discuss the benefits of 'low-impact development'. Over 85 papers were presented at the event, which discussed how low-impact development strategies can be used for stormwater management and stream restoration and detailed case studies where LID has been successful across the U.S. and internationally.

One of the common themes at the conference was "that LID is a concept where residential developers, local public planners, engineers, citizens, and environmental groups all can support the idea of using water as a resource, reducing stream erosion, and pretreating storm water before it enters waterways and recharges groundwater aquifers. LID should be more than just new storm water technologies for single lots. LID should be about looking at water resources in a holistic, watershed-based manner, and effectively managing such resources. Such an approach involves conserving water inside and outside a house, using decentralized storm water management BMPs for single lots and larger-scale developments, and identifying the best ways to handle wastewater."

Examples of relevant conference sessions: "The Use of Decentralized Stormwater Management Techniques for LID and Urban Areas", "Communities at a Crossroads: SW, LID and Smart Growth", "Using Federal Programs to Promote LID at the Local Level".

The conference program can be accessed at:
<http://www.mwccog.org/environment/LIDconference/>

Description of Program from ToolBase:
<http://www.toolbase.org/techinv/techDetails.aspx?technologyID=223>

(11) EPA Region 4

(i) Sustainable Environment for Quality of Life (SEQL) – EPA Region 4 R&D

Centralina Council of Governments, along with Catawba Regional Council of Governments, has been awarded a \$275,000 grant from the Environmental Protection Agency to implement and expand regional efforts to protect the quality of life in the bi-state metro Charlotte region in North and South Carolina. The program is called Sustainable Environment for Quality of Life (SEQL). The area is a highly desirable area to live in but faces many challenges: sprawl, air quality problems, and concerns about being the "next Atlanta". The SEQL will address these challenges by: Allowing local governments the opportunity to work across jurisdictional lines in regional cooperation and collaboration, setting a standard for the nation; Providing implementation assistance to local governments on environmental "commitment action items" developed under the Charlotte/Mecklenburg Sustainability Demonstration Project; Analyzing multiple air quality issues simultaneously, including ozone, particulate matter, and air toxics while also addressing transportation, water, land use, energy use, and economic development.

This project will support the region's efforts to develop integrated, long-range plans to ensure economic development and a positive quality of life for its future. The project is structured so that it will be a cooperative undertaking with the Catawba Regional Council of Governments. Centralina and Catawba Regional COGs will work to bring the metro area together. The region will demonstrate that planning developed through the grant will provide an integrated strategy that other local governments across the country could use to address similar quality of life and environmental issues.

This initial process began in the Fall of 2000, under the leadership of Charlotte Mayor Pat McCrory and past Mecklenburg County Board Chairman Parks Helms. The City received a

\$100,000 EPA grant for a Sustainability Demonstration Project to bring together 26 of the region's chief elected officials to learn about air quality, water resource and land-use issues. The group developed and recommended "toolbox commitment action items" relating to air, water, and land-use measures for implementation across the region. In Spring, 2002, EPA approached Charlotte regional and local governments about expanding this partnership to develop a more integrated strategy and refined tools to address air quality, other environmental issues, transportation, land-use planning, energy, and economic development.

On October 30, 2002, EPA Administrator Christine Todd Whitman visited Charlotte to celebrate the closure of the Sustainability Demonstration Project and to announce the continued partnership of the EPA with the regional governments of the Charlotte/Gastonia/Rock Hill metro area. The new project also expands the number of participating jurisdictions from 26 to 75.

The main focuses of the SEQL Program are: water quality; air quality; and sustainable growth. Within the water quality segment, sub-programs include: natural buffer zones; sedimentation and erosion control; wastewater treatment plans; wastewater treatment programs; water supply plans; and watershed impact models.

Description of Program from:
<http://www.seql.org/index.cfm>

TENNESSEE VALLEY AUTHORITY

The TVA was created in 1933 by an act of Congress and charged with providing hydroelectric power, navigation, flood control, and economic development to communities of the Tennessee River and its tributaries. More recent strategic plans redefine the mission as providing affordable and reliable power (of many types), promoting sustainable economic development, and acting as a steward of the Tennessee Valley's natural resources.

The organization is America's largest public power provider. Seeded by the federal government, today it is an entirely self-funded, wholly owned federal corporation, operating through revenues, and capitalized by bond issues. It provides power to eight million consumers in seven southeastern states, and manages 300,000 acres of land, of which almost 200,000 are set aside for conservation. It also manages about 11,000 miles of public shoreline.

The system includes about 50 reservoirs, dam and hydroelectric facilities, 13 fossil fuel plants, and 3 nuclear plants. In 2004, it generated about 155 billion kWh of electricity, and drew revenues of about \$7.7 billion. Some \$87 million was budgeted for "resource stewardship programs."

TVA's dams, locks, and reservoirs were designed specifically to operate as one integrated system that meets several different needs. It is the only federal agency to have all facilities covered by an EIS. Watershed Teams focus on improving water and shoreline conditions. Integrated Resource Management Teams provide a mix of skills for project planning and development—and are available for outside consulting as well.

TVA's policies specifically call for:

- environmental protection and stewardship;
- environmental compliance;
- pollution prevention;
- partnerships/public involvement; and
- innovation in technology.

Stewardship Programs. Some 1% of TVA's revenues (almost \$90 million) is spent on stewardship activities, under the general advice of a "Regional Resource Stewardship Council."

Its restoration efforts in the Copper Basin, an area devoid of vegetation as a result of mining, led to changes in federal law regarding strip-mining that called for the restoration of all such sites. Over 100 miles of shoreline are critically eroded, and are being restored with innovative techniques, including "soil bioengineering," which employs both vegetation and structures to stabilize slopes.

TVA does not regulate wastewater discharges, but does have control of shoreline development, dictated by comprehensive planning that has resulted in a "Shoreline Management Policy." Eleven separate Watershed Teams are responsible for preparing and revising reservoir-specific Land Management Plans, each accompanied by an EIS requiring extensive interagency and public review.

Green Power Switch. This program gives consumers the opportunity to 'elect' renewable sources of electricity generated by the sun, wind, or landfill methane. The TVA has not been able to satisfy the popular demand for these options, but uses the findings to plan the future of its power generation mix. In 2004, Green Power Switch generated power at 16 solar sites, a wind park, and a landfill methane gas facility.

Tennessee Valley Clean Marina Initiative. To help reduce impacts of boating activities on water quality, TVA started this initiative to improve water quality throughout the Tennessee River system.

TVA has taken a leadership role in innovative technology, as well as in watershed enhancement and protection. Its projects require expertise in many different areas, such as constructed wetlands technology for water and wastewater, utilization of waste by-products, and pollutant sensing equipment.

Although investment in electricity research and development throughout the electric utility industry is at a 20-year low, TVA leads the effort to find ways that all utilities can produce power more cleanly and efficiently.

TVA Public Power Institute (PPI). This is the focal point of collaborations with other entities, governmental, such as the Department of Energy and the Environmental Protection Agency; and private such as the Electric Power Research Institute (EPRI), an industry research consortium.

The PPI is regarded as a living laboratory, whose scientists and engineers apply innovative solutions to actual problems in real-life settings. Some examples projects and field demonstrations:

Coal Plant By-Products. These efforts involve the preparation and sale of fly ash, bottom ash, boiler slag and scrubber gypsum.

Carbon Capture and Water Emissions Treatment System. A \$1.3 million project in Muscle Shoals, Alabama, is designed to develop new ways of helping electric power producers capture, or sequester, carbon dioxide.

Hybrid Bioreactor. Same facility uses a patented bioreactor to convert toxic pollutants to nontoxic disposables through microbiological processes.

ReCip, a patented “Reciprocating Water Technology,” under development since the mid-1990s, is in use in demonstrating the high-level treatment of agricultural wastes.

Renewable Energy Policy Project (REPP). Since its inception in 1995, REPP has investigated the interrelationships of public policy, markets, and public demand in order to advance renewable-energy technologies. The group undertakes in-house research projects; collaborates with professional associations, nonprofit groups, national laboratories, and other interested parties; and recommends and fosters strategic paths for long-range planning by the renewable-energy community.

TVA’s educational undertakings are impressive, but mostly internal. It publishes several on-line newsletters or website journals, including the *River Neighbors Newsletter*, which informs the Watershed Teams, *Green Power Switch News*, and *TVA Kids*. It has an “Energy Right” program, which provides online and telephone assistance advising homeowners on energy efficiency; it will do energy audits on request. And it does support conferences and symposia of national interest. For example, it funded a “Biopower” conference in 2001, which brought together stakeholders interested in “green” energy technologies including biomass, geothermal, hydropower, photovoltaic, hydrogen, wind, and solar thermal systems.

Finally, it makes grants, and provides other kinds of support, to outside non-profits. Such support is, however, limited and largely directed at institutions within the river system. See more below.

TVA supports a variety of educational and community goals in the Tennessee Valley by making contributions of cash, equipment, supplies, facilities, and sometimes land.

REPP. The REPP (see above) provides small grants to facilitate external research.

Education. Public education is supported in such areas as energy and environmental education, and vocational and technical training in skill areas meeting TVA’s needs. Contributions are targeted at schools, colleges, other public institutions, and non-profit organizations. Priority consideration is given to programs and organizations within the river system.

Capital Partnerships. TVA partners with other government entities in the distribution of development grants. Along with the Appalachian Regional Commission it administers grants that promote economic development in the Valley. Currently, TVA administers 41 such grants with a value of \$17 million.

Along with the Tennessee Department of Environmental Conservation (TDEC), TVA provides grants for counties to collect waste tires, which TVA burns at its Allen Fossil Plant in Memphis, Tennessee.

Sources/References: Corporate Headquarters: Tennessee Valley Authority, 400 W. Summit Hill Dr, Knoxville, TN 37902-1499. Phone: 865-632-2101, which connects all facilities. Queries can be emailed to: tvainfo@tva.com.

VI) White House

(1) White House Council on Environmental Quality (WH-CEQ)

Congress established the Council on Environmental Quality as part of the National Environmental Policy Act of 1969 (NEPA). Additional responsibilities were provided by the Environmental Quality Improvement Act of 1970.

In enacting NEPA, Congress recognized that nearly all federal activities affect the environment in some way and mandated that before federal agencies make decisions, they must consider the effects of their actions on the quality of the human environment. NEPA assigns CEQ the task of ensuring that federal agencies meet their obligations under the Act.

The CEQ coordinates federal environmental efforts and works closely with agencies and other White House offices in the development of environmental policies and initiatives. The Council's Chair, a presidential appointee, serves as the principal environmental policy adviser to the President.

In addition, CEQ oversees federal agency implementation of the environmental impact assessment process; and acts as a referee when agencies disagree over the adequacy of such assessments.

Source/reference:

<http://www.whitehouse.gov/ceq/>. James L. Connaughton, Chair; 722 Jackson Place, NW, Washington, DC 20503. Tel. 202-395- 5750; fax: 202-456-6546.

(a) Committee on Ocean Policy - WH-CEQ

In 2004, President Bush established the Cabinet-level Committee on Ocean Policy (as part of the Council on Environmental Quality) to coordinate the activities of executive departments and agencies regarding ocean-related matters. The Committee is to advise the President and agency heads on the establishment and implementation of policy.

It includes the following cabinet members: secretaries of State, Defense, Interior, Agriculture, Health and Human Services, Commerce, and Energy. Other members include the Environmental Protection Agency, the Office of Management and Budget, the National Aeronautics and Space Administration, the Office of Science and

Technology Policy, and the National Science Foundation.

To support its work, the Committee has established the following subcommittees: the Interagency Committee on Ocean Science and Resource Management Integration, the NSTC Joint Subcommittee on Ocean Science and Technology, the Subcommittee on Integrated Management of Ocean Resources, the Ocean Research Advisory Panel, and others.

The presidential action was undertaken as an outgrowth of the Oceans Act of 2000, which created the U.S. Commission on Ocean Policy, since disbanded, but still with an archival website.

Source/reference: <http://ocean.ceq.gov>. Interagency Ocean Policy Group, 722 Jackson Place NW, Washington, D.C. 20503.

(2) White House General Services Administration (GSA)

The General Services Administration (GSA) is the White House executive branch agency that provides leadership and management regarding the space, products, and services to and for federal facilities.

GSA's real estate services are provided by its Public Buildings Service, which houses about one million federal employees in 270 million square feet of office space in approximately 8,300 facilities.

There is nothing remarkable in GSA policies except that they are meant to bring federal facilities into compliance with extant federal laws. LID and watershed concerns are barely mentioned at its website.

Nevertheless, it claims it is committed to being a responsible environmental steward through the consideration of the environment in all business practices, compliance with environmental laws and regulation, using environmentally beneficial products and services, and using resources in a sustainable manner.

In short: the policy is to incorporate principles of sustainable design and energy efficiency into all of its building projects, and to locate, design, construct and operate buildings so as to reduce negative impacts on the environment and on the consumption of natural resources.

Incorporated in the policy are the following:

- Optimize site potential,
- Minimize non-renewable energy consumption,
- Use environmentally preferable products,
- Protect and conserve water,
- Optimize operational and maintenance practices.

Such principles are to “serve as the basis for planning, programming, budgeting, construction, commissioning, operation, maintenance, and decommissioning of all new GSA facilities, and for major renovation and alteration of existing buildings and facilities.

Some specifics:

Discharge in Remote Rural Areas. In areas where no public sewers exist, septic tanks and leach fields should be used for sewage discharge. Cesspools are not permitted. Septic systems will have additional land area (in accordance with local and State code requirements) for future expansion of the discharge system.

Environmental Assessment. If an EIS has been prepared, it will constitute the primary guideline for environmental design issues. In those instances where GSA has committed to implementing specific mitigation measures, programmers and designers must ensure that those measures are carried out in the design.

Energy Center of Expertise is a multi-disciplinary team within PBS meant to provide guidance within the federal government for developing contracting mechanisms that procure utility services at the lowest cost to the taxpayer and the greatest value to the agency. Services cover the procurement of electricity, natural gas, water and sewage services.

Energy Conservation. The use of site design to aid energy conservation and sustainability is encouraged. Solar orientation of the building and well placed plant material can be used to increase heat gain in the winter and reduce heat gain during the summer.

Energy Conservation Standards. Legislation directs the federal government to adhere to voluntary Commercial Energy Standards, reflected within the Code of Federal Regulations, 10-CFR 434. Executive Order 13123 establishes a national program goal to reduce building annual energy consumption by 35 percent, using a 1985 baseline. GSA also fully supports the Government’s Energy Star Buildings Program for its existing inventory, achieving metered consumption within the top 25% of involved building categories.

Energy Performance. By Executive Order, GSA’s overall building inventory must have an energy performance goal of 55,000 BTU/GSF/year. Therefore, for new construction, GSA must do better. Each new facility shall have tighter specific energy targets as established by the Office of the Chief Architect.

Energy and Water Conservation. GSA through the Energy Center of Expertise reduces federal utility costs by promoting optimal energy use. Energy management in federal buildings nationwide has long been a focus of GSA. Earlier this year, GSA launched "Planet GSA," a new environmental initiative to increase employee awareness on ways in which they can leverage GSA's mission to help with the environment by "building, buying, driving and saving green."

Environmentally Safe Practices. GSA promotes practices that are friendly to the environment and conserve resources, such as low water and minimum chemical usage, etc. Plant material and landscape designs should reflect regional environmental concerns, such as xeriscaping, where geographically appropriate.

Existing Site Features and Existing Vegetation. Existing natural features on the site should generally be preserved and be used as a starting point for the overall site design. Efforts should be made to preserve existing vegetation, particularly healthy trees and plant specimens. GSA promotes the protection and integration of existing vegetation and natural terrain into site design.

Irrigation for Landscaping. An irrigation system (if required) will provide water to plants only when needed. Drip irrigation should be considered where appropriate. Care will be taken so that water can be conserved through the use of a properly designed irrigation system.

Non-potable water should be used as a source for the irrigation system when it is available.

Reliable performance must be a prime goal in the design of irrigation systems. Materials will be durable and relatively maintenance free. Irrigation systems will be most successful in the long run if local design practices are followed and locally available materials are used.

Leadership in Energy and Environmental Design (LEED) Green Building Rating System of the U.S. Green Building Council; LEED Certification. As a means of evaluating and measuring green building achievements, all GSA new construction projects and substantial renovations must be certified;

projects are encouraged to exceed basic LEED green building certification and to achieve the LEED "Silver" Level.

Rainwater Harvesting. Rainwater harvesting may be considered as an alternative source for such purposes as irrigation, etc. Rainwater harvesting systems must comply with all local codes and standards.

Site, Landscape and Community Design. The quality of the site design and its design will be a direct extension and integration of the building design intent. It represents significant federal investment and should, wherever possible, make a positive contribution to the surrounding urban, suburban or rural landscape in terms of conservation, community design and improvement efforts, local economic development and planning...

Site Analysis and Survey. Successful site planning and design depends on a thorough review and understanding of existing conditions on and around the site. An on-site investigation must be carried out prior to any design effort. A complete site survey is required for all new construction projects and for alterations that involve work outside the existing building lines. Survey requirements are listed in Appendix A: Submission Requirements.

Soil Contamination. The Comprehensive Environmental, Response, Compensation, and Liability Act (CERCLA or Superfund) provides authority and distributes responsibility for cleanup of contaminated soil, surface water and groundwater from inactive hazardous substance disposal sites and from hazardous substances released into the environment that facility permits do not cover. If soil or water contamination is a concern during construction of new buildings, major and minor alterations, and work in historic structures, then the EPA regulations under 40 CFR should be followed

Sustainability and Energy Performance. GSA is committed to incorporating principles of sustainable design and energy efficiency into all its building projects. Objective is to design, construct and operate buildings to reduce negative impact on the environment and the consumption of natural resources. It is an integrated, synergistic approach, in which all phases of the facility lifecycle are considered. The result is a balance of cost, environmental, societal and human benefits.

Storm Drainage. It is GSA policy to separate storm drains from sanitary sewers within the property limits, even in cities where separate public systems are not yet available. A storm drainage

system may consist of an open system of ditches, channels and culverts or of a piped system with inlets and manholes. In most cases building roof drainage will be collected by the plumbing system and discharged into the storm drains; exceptions are small buildings in rural areas where gutters and downspouts may discharge directly onto the adjacent ground surface. Most storm drainage systems will be designed for a 25-year minimum storm frequency, unless local criteria are more stringent.

(3) White House Office of the Federal Environmental Executive (OFEE)

(i) Federal Government Facilities Green Building Initiative

The Green Government federal program is executive led by the White House Office of the Federal Environmental Executive (OFEE). Regulatory detail, coordination, advice and protocol are coordinated by the EPA. The GSA provides overall supervision of civilian federal facilities, and the DOD, of military installations. These are the main players in the federal collaborative of "green" or "sustainable" initiatives. Many federal level decisions are made in MOUs among department and agency players.

General Services Administration (GSA): GSA is the White House executive branch agency that provides management regarding civilian federal facilities. It oversees about 8,300 facilities, containing some 270 million square feet of office space, and occupied by some one million federal employees.

GSA policies are rooted in the need to bring federal facilities into compliance with extant federal laws. Nevertheless, it maintains that it is committed to being a responsible environmental steward through the consideration of the environment in all business practices, compliance with environmental laws and regulation, using environmentally benign products and services, and using resources in a sustainable manner. Instrumental in carrying out these policies are various programs and initiatives:

Environmentally Safe Practices: GSA promotes practices that are friendly to the environment and conserve resources, such as low water and minimum chemical usage.

Energy and Water Conservation: GSA through the Energy Center of Expertise reduces federal utility costs by promoting optimal energy use.

Irrigation for Landscaping: An irrigation system (if required) is to provide water to plants only when needed; drip irrigation is to be considered where appropriate; care is to be taken that water can be conserved through the use of a properly designed irrigation system; non-potable water is supposed to be used as a source when possible; rainwater harvesting should be considered as an alternative source for purposes such as irrigation.

Sustainable Design: Sustainable design seeks to locate, design, construct and operate buildings to reduce negative impact on the environment and the consumption of natural resources; GSA is committed to incorporating principles of sustainable design and energy efficiency into all of its building projects.

LEED Certification: the Leadership in Energy and Environmental Design (LEED, is the Green Building Rating System of the U.S. Green Building Council.

Planet GSA: an initiative to increase employee awareness on ways in which they can leverage GSA's mission to help with the environment by "building, buying, driving and saving green."

Federal Partners MOU: As recently as January 24, 2006, federal partners signed an MOU concerning *Sustainable Buildings*. The agreement was between the EPA and 16 other Federal departments or agencies.

The Federal government owns approximately 445,000 buildings with total floor space of over 3 billion square feet, in addition to leasing an additional 57,000 buildings comprising 374 million square feet of floor space. These signatories are responsible for about 90 percent of all that space.

The MOU "formalizes a commitment to guiding principles for energy performance, water conservation, integrated design and sustainable materials to help foster safe and healthy environments while promoting environmental stewardship."

Over the next few months the Office of Water will be working with the EPA's green buildings workgroup and other Federal agencies to develop technical guidance to help agencies apply the principles of the MOU to their own facilities. Ultimately, the guidance will be incorporated into the Whole Building Design Guideline, a public-private collaborative resource for building professionals.

(ii) The Federal Network For Sustainability (FNS): The Federal Network for Sustainability is a voluntary, collaborative network of Federal agencies in the western United States focused on fostering and furthering the concept of sustainability within the government through individual programs and group initiatives.

It advocates and implements approaches based on Environmental Management Systems (EMS's), justified by the numerous statutory, regulatory, and policy directives for greater emphasis on the use of EMS's by the Federal government.

(Indeed, Executive Order 13148 requires federal facilities to implement EMS's, which contains directives to: implement cost-effective, environmentally sound landscaping practices, and programs to reduce adverse impacts to the natural environment.

The network works closely with the [Office of the Federal Environmental Executive \(OFEE\)](#) to create sister networks elsewhere in the country.

Contact: Barbara J. Lither, USEPA Region 10, (206) 553-1191.

(See the Department of Defense and the Interior Department chapters for descriptions of their FNS Programs.)

(4) White House Office of Science and Technology Policy (WH-OSTP)

Congress established OSTP in 1976 with a broad mandate to advise the President and others within the Executive Office of the President on the effects of science and technology on domestic and international affairs.

The act also authorizes OSTP to lead an interagency effort to develop and to implement sound science and technology policies and budgets—and to work with the private sector, state and local governments, the science and higher education communities, and other nations toward this end.

OSTP is charged to work with the private sector to ensure federal investments in science and technology contribute to economic prosperity, environmental quality, and national security; to build strong partnerships among federal, state, and local governments, other countries, and the scientific community; and to evaluate the scale, quality, and effectiveness of the federal effort in science and technology.

Other components of OSTP include the (1) President's Council of Advisors on Science and Technology (PCAST), which currently consists of 23 members plus the Director of the OSTP who serves as the Council's Co-Chair. The council members, distinguished individuals appointed by the President, are drawn from industry, education, and research institutions, and other nongovernmental organizations. (2) The National Science and Technology Council (NSTC), a Cabinet-level Council that is the principal means for the President to coordinate the diverse parts of the federal research and development enterprise. The President chairs the NSTC. An important objective of the NSTC is the establishment of clear national goals for Federal science and technology investments in areas ranging from information technologies and health research, to improving transportation systems and strengthening fundamental research. The Council prepares research and development strategies that are coordinated across federal agencies to form an investment package aimed at accomplishing multiple national goals.

(a) Subcommittee on Water Availability and Quality

In 2002, the Office of Science and Technology Policy convened representatives of Federal agencies under the NSTC's Committee on the Environment and Natural Resources (CENR) to form the Subcommittee on Water Availability and Quality (Subcommittee). The purpose of the Subcommittee is to advise and assist the CENR and the NSTC on policies, procedures, plans, issues, scientific developments, and research needs related to the availability and quality of water resources of the United States. The Subcommittee focuses on science issues and policy related to needed improvements in technology and research that will advance the goal of ensuring a safe and sustainable supply of water in the United States for human and ecological needs.

Recent report prepared by Subcommittee:
“Science and Technology to Support Fresh Water Availability in the United States.”

From the Report: “The purpose of this report is to state the need for coordinated science and technology efforts to address the growing requirement to understand the supply and demand for fresh water in the United States. In addition, the report attempts to address decision makers’ need to assess current water resources and balance competing demands for water for human and environmental uses in order to ensure that adequate supplies are available for both for present and future generations. It describes high-priority

new science and technology that is needed to improve the factual basis for decision making on these issues.”

Description of Program and Report from:
<http://www.ostp.gov/>. Dr. John H. Marburger, Director, Tel. 202-456-7116, fax 202-456-6021.
<http://www.nap.edu/openbook/0309092582/html/288.html>, Subcommittee on Water Availability and Quality. “Science and Technology to Support Fresh Water Availability in the United States.” **National Science and Technology Council**. Washington, D.C. November, 2004. Website: <http://water.usgs.gov/owq/swaq.pdf>

(5) White House Executive Order 13101 - Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition

This is another in a series of executive orders addressing “Greening in Government,” issued in the mid-1990s by then-President William H. Clinton. While there is no specific emphasis on low impact development, “soft path,” or watershed concerns, there is the implication in this order (and a series of orders, all pre-titled “Greening the Government,”) that clearly commits the federal government, and its installations, to an environmentally friendlier path. Most of the text below follows directly from the order, which was issued in 1998.

“In order to improve the Federal Government’s use of recycled products and environmentally preferable products and services, it is hereby ordered...[that it] is the national policy to prefer pollution prevention, whenever feasible. Pollution that cannot be prevented should be recycled; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner. Disposal should be employed only as a last resort...

“This order creates a Steering Committee, a Federal Environmental Executive (FEE), a Task Force, and establishes Agency Environmental Executive (AEE) positions within each agency, to be responsible for ensuring the implementation of this order. For the purpose of this order, military departments are covered...A Federal Environmental Executive [FEE, assigned to the] the Environmental Protection Agency, shall be designated by the President...[and] shall chair the Task Force...

“There is hereby established a Steering Committee on Greening the Government through Waste Prevention and Recycling (“Steering

Committee”). The Steering Committee shall be composed of the Chair of the Council on Environmental Quality (CEQ), the Federal Environmental Executive (FEE), and the Administrator for Federal Procurement Policy (OFPP)...

“The FEE shall take all actions necessary to ensure that the agencies comply with the requirements of this order...

“Each agency shall establish either a goal for solid waste prevention and a goal for recycling or a goal for solid waste diversion to be achieved by January 1, 2000. Each agency shall further ensure that the established goals include long-range goals to be achieved by the years 2005 and 2010...

“Model Facility Programs. Each executive agency shall establish a model demonstration program incorporating some or all of the following elements as appropriate. Agencies are encouraged to demonstrate and test new and innovative approaches such as incorporating environmentally preferable and bio-based products; increasing the quantity and types of products containing recovered materials; expanding collection programs; implementing source reduction programs; composting organic materials when feasible; and exploring public/private partnerships to develop markets for recovered materials.”

(6) White House Executive Order 13148 - Greening the Government Through Leadership in Environmental Management

General Information: As part of the Clinton Administration's efforts to ensure that agencies improve their performance through more effective management, Environmental Management Systems (EMS's) were demanded of all federal agencies and departments in the year 2000 by Presidential Executive Order 13148.

The order requires all major federal facilities to develop and implement an EMS by December 2005. To date, nearly 200 federal facilities have done so, many of them modeled after (International Standards Organization's) ISO 14001. Many more were still engaged in the process in 2004. Twenty facilities have had their systems third-party certified. The Environmental Protection Agency, the National Aeronautics and Space Administration, and others are developing resources that all agencies can use to implement such systems.

In 2002, the White House Office of Management and Budget revised its budget guidelines to include provisions for EMS implementation¹.

A few examples and illustrations cited (mostly quoted) below will illustrate how wide-reaching the effects of the Executive Order have been. While its thrust is on remediation and compliance, not on 'soft path,' the stage has certainly been set within the Federal Government to heed environmental principles. What follows next are selected excerpts from the order.

By the authority vested in me as President... it is hereby ordered as follows:

Preamble. The head of each Federal agency is responsible for ensuring that all necessary actions are taken to integrate environmental accountability into agency day-to-day decision making and long-term planning processes...

Goals:

Environmental Management. Through development and implementation of Environmental Management Systems, each agency shall ensure that strategies are established to support environmental leadership programs, policies, and procedures...

Environmental Compliance. Each agency shall comply with environmental regulations by establishing and implementing environmental compliance audit programs and policies that emphasize pollution prevention...

Right-to-Know and Pollution Prevention. Through timely planning and reporting under the EPCRA, Federal facilities shall be leaders and responsible members of their communities by informing the public and their workers of possible sources of pollution resulting from facility operations. Each agency shall strive to reduce or eliminate harm to human health and the environment...

Release Reduction: Toxic Chemicals ...Each agency shall reduce its reported Toxic Release Inventory releases and off-site transfers of toxic chemicals for treatment and disposal by 10 percent annually...

Environmentally and Economically Beneficial Landscaping. Each agency shall strive to promote the sustainable management of Federal facility lands through the implementation of cost-effective, environmentally sound landscaping practices and programs to reduce adverse impacts to the natural environment.

Planning and Accountability.

Interagency Environmental Leadership Workgroup. EPA shall convene and chair an Interagency Environmental Leadership Workgroup with senior-level representatives from all executive agencies and other interested independent Government agencies affected by this order. The Workgroup shall develop policies and guidance required...

Annual Budget Submission. Federal agencies shall place high priority on obtaining funding and resources needed for implementation of the [collection of] the Greening the Government Executive Orders, including funding to address findings and recommendations from environmental management system audits or facility compliance audits...

Annual Reports. Each agency shall submit an annual progress report to the Administrator on implementation of this order...

Application of Life Cycle Assessment Concepts. Each agency shall establish a pilot program to apply life cycle assessment and environmental cost accounting principles....The Environmental Protection Agency (EPA), in coordination with the Workgroup shall, to the extent feasible, assist agencies...

Pollution Prevention to Address Compliance. Each agency shall ensure that its environmental regulatory compliance funding policies promote the use of pollution prevention to achieve and maintain environmental compliance at the agency's facilities.

Promoting Environmental Management and Leadership. To attain [these] goals...

Each agency shall conduct an agency-level environmental management system self assessment...

Each agency shall implement environmental management systems through pilot projects at selected agency facilities based on the Code of Environmental Management Principles...

Each agency shall include successful implementation of pollution prevention, community awareness, and environmental management into its position descriptions and performance evaluations for those positions.

Compliance Assistance.

Upon request and to the extent practicable, the EPA shall provide technical advice and assistance...

Within 12 months of the date of this order, the EPA shall develop a compliance assistance center to provide technical assistance for Federal facility compliance with environmental regulations and all aspects of this order.

The EPA may conduct such reviews and inspections as may be necessary to monitor compliance...

To enhance landscaping options and awareness, the United States Department of Agriculture (USDA) shall provide information on the suitability, propagation, and the use of native plants for landscaping to all agencies and the general public by USDA

Policy Ramifications: The policy ramifications of this executive order are, of course, widespread and affect virtually all federal installations. Here are a few quoted examples of the ripple effects:

The Office of the Secretary of Defense of the United States has recognized the potential of the ISO 14001-certified EMS to improve the DOD's environmental programs. After holding a symposium with industry and key Defense officials, the DOD agreed to implement ISO 14001 at approximately 15 installations to determine the benefits of adopting the principles of ISO 14001. (1)

Third US Army/ARCENT in the USCENTCOM AOR: Standard Operating Principles: This SOP provides environmental policy and guidance to all forces assigned to, attached to, or supporting 3rd US Army operations. Wherever we have 'boots on the ground' we have a responsibility to respect and protect the natural resources of our Host Nation. During combat operations environmental concerns will always be subordinate to operational requirements. This does not mean, however, that preservation of the natural environment can be ignored...

...War planning and contingency planning operations must always include an environmental assessment for the countries and regions involved. This assessment will cover governing environmental regulations, known environmental hazards and issues, key historical and cultural sites and endangered animals and plants for each country.

Department of Commerce Strategic Plan to Implement Executive Order 13101 (1999): Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition (2004) requires the Department of Commerce (DOC) to translate the government-

wide strategic plan into an agency-specific plan.
Here are some of the outlined strategies:

Improving and Expanding Waste Prevention
and Recycling Programs;

Identifying Recycled Content and
Environmentally Preferable Products;

Increasing Acquisition of Environmentally
Preferable Products and Services;

Ensuring Federal Facility Compliance and
Establishing Tracking Mechanisms;

Developing and Enhancing Technologies
for...Environmentally Preferable Products;

Executing Outreach and Training Programs;

Establishing Goals for Waste Prevention,
Recycling, and Affirmative Procurement.

Sources/References: ¹Alexander Moutchnik,
Chair of Business Administration, Alfred Weber-Institute

University of Heidelberg, Grabengasse 14, D-69117,
Germany, (at least as recent as 2004 based on his
citations; there is no date on the paper, it's probably
2005).

Federal Register: April 26, 2000 Executive Order
13148--Greening the Government Through Leadership in
Environmental Management

Third (3rd) US Army, ARCENT C7 Atlanta
Environmental Section AFRD-C7-E, 1881 Hardee Ave.
SW Fort McPherson, GA 30330 (404) 464-2908; US
Army Central Command Environmental Standard
Operating Procedures, 3rd US Army/ DSN 367-2908 03,
August, 2004.

VII) National Institutes for Science and Technology

(1) The National Academy of Sciences

The National Academy of Sciences (NAS) is an honorific society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare.

The NAS was signed into being by President Abraham Lincoln on March 3, 1863, at the height of the Civil War. As mandated in its Act of Incorporation, the NAS has, since 1863, served to "investigate, examine, experiment, and report upon any subject of science or art" whenever called upon to do so by any department of the government. Scientific issues would become even more contentious and complex in the years following the war. To keep pace with the growing roles that science and technology would play in public life, the institution that was founded in 1863 eventually expanded to include the National Research Council in 1916, the National Academy of Engineering in 1964, and the Institute of Medicine in 1970. Collectively, the four organizations are known as the National Academies.

Description of Program from:
http://www.nasonline.org/site/PageServer?pagename=A BOUT_main_page

(a) Science and Technology for Sustainability (STS)

The National Academies have established a Science and Technology for Sustainability Program (STS) to encourage the use of science and technology to achieve long term sustainable development - increasing incomes, improving public health, and sustaining critical natural systems. The first two projects under the STS program are the Roundtable on Science and Technology for Sustainability and a workshop series entitled "Strengthening Science-Based Decision Making."

➤ **The Roundtable on Science and Technology for Sustainability**

The Roundtable on Science and Technology for Sustainability provides a forum for sharing views, information, and analyses related to sustainability. Members of the Roundtable on Science and

Technology for Sustainability include senior decision-makers from the U.S. government, industry, academia, and non-profit organizations who are in a position to play a strong role in promoting sustainability. Through its activities, the Roundtable will identify new ways in which science and technology can contribute to sustainability. The Roundtable will not make formal recommendations or produce official reports, but it is anticipated that all members will take good ideas back to their institutions to be acted upon.

The Roundtable will also sponsor workshops to learn more about particular issues critical to sustainability. These are organized by project area.

Description of Program from:
http://www7.nationalacademies.org/sustainabilityroundtable/Sustainability_at_the_Academies.html

http://www7.nationalacademies.org/sustainabilityroundtable/Sustainability_Roundtable_Homepage.html

Projects:

➤ **Exploratory Workshop on Environmental Regulation and its Alternatives June 14, 2004**

The National Academies' Roundtable on Science and Technology for Sustainability convened a 1-day, exploratory workshop on June 14, 2004 to begin the process of developing such a shared vision and cooperative approach to more environmentally sustainable economic development. The exploratory workshop began with presentations of long-term environmental sustainability goals by leaders from industry, government, and the scientific and policy communities. Workshop participants then examined the barriers and opportunities to achieving these sustainability goals in various sectors of the US economy. The purpose of these discussions was to facilitate dialogue among industry, government, policy experts, the scientific community, and other stakeholders so that they can identify opportunities to work together to create future governance systems that would promote more environmentally sustainable economic development.

The overall charge to workshop participants was to identify: 1) legal, regulatory, and science and technology barriers to more environmentally sustainable development, and 2) opportunities for industry, government, policy, and scientific and engineering communities to work together to address these challenges through improved governance systems.

The goal of the workshop is to initiate a broad-based discussion of the issue and to identify specific parts of the problem where further work could lead to progress. Participants also will consider the most appropriate approach for making progress in each area (e.g., workshop series, consensus-building forums, expert panels, etc), including the potential role of the National Academies' Roundtable on Science and Technology for Sustainability. The results of this exploratory workshop were presented to the Roundtable at its annual meeting on June 15th.

Description of Program from:

http://www7.nationalacademies.org/sustainabilityroundtable/Environmental_Regulation_and_its_Alternatives.html

➤ **Linking Knowledge to Action for Sustainable Development.**

The Roundtable on Science and Technology for Sustainability (STS) is establishing a task force to explore mechanisms for effectively connecting research with the needs of policy makers and practitioners in order to better link knowledge to action for sustainable development. The task force will participate in and oversee a series of comparative analyses of decision support systems in order to identify generalizable features of success and failure that might inform initiatives in harnessing S&T for sustainability.

These analyses will take into account a diverse set of integrated research, observation, assessment, and decision support systems and will include comparisons across regions and sectors. The task force will collaborate with and build on other ongoing initiatives related to the subject, with special attention to a cross-sectoral workshop sponsored and hosted by Harvard University's Weatherhead Center for International Affairs (WCFA).

Three workshops for this project were held during the spring of 2004.

Description of Program from:

http://www7.nationalacademies.org/sustainabilityroundtable/Linking_Knowledge_Main.html

➤ **Urban Sustainability Initiative**

The goal of the National Academies program on urban environmental sustainability is to help urban leaders and residents worldwide to use scientific knowledge and technology to help guide their economic growth in ways that will improve livelihoods and protect critical environmental and natural resources. The program will foster a broader understanding of the environmental

consequences of urban development and economic growth and identify ways to act on that knowledge to reduce risks to critical environmental and natural resources, public health and economic progress.

With support from the Gordon and Betty Moore Foundation, the National Academies have been developing a multiyear initiative on urban environmental sustainability in the developing world. As input into the planning process, a series of consultant missions to developing countries were carried out to explore how the National Academies could work collaboratively with its sister academies overseas, local academic and technical organizations, and with networks of city managers and urban planners to solve practical urban environmental problems.

Following the site visits a workshop was held to discuss the teams' findings. Workshop attendees included a number of representatives from China, Mexico, South Africa, and Tanzania as well as collaborators from the University of California, Berkeley Institute of the Environment and the Healthy Communities Foundation (HCF) to discuss opportunities for science and technology to contribute to urban sustainability in the developing world.

Description of Program from:

http://www7.nationalacademies.org/sustainabilityroundtable/Urban_Sustainability_Homepage.html

Examples of Publications Supported by the STS Program:

- "Regional Cooperation for Water Quality Improvement in Southwestern Pennsylvania." <http://fermat.nap.edu/catalog/11196.html>
- "Water Conservation, Reuse, and Recycling: Proceedings of an Iranian-American Workshop." <http://fermat.nap.edu/catalog/11241.html>
- "Water and Sustainable Development: Opportunities for the Chemical Sciences - A Workshop Report to the Chemical Sciences Roundtable." <http://www.nap.edu/catalog/10994.html>
- "Confronting the Nation's Water Problems: The Role of Research." <http://www.nap.edu/catalog/11031.html>
- "Envisioning the Agenda for Water Resources Research in the Twenty-First Century." <http://www.nap.edu/catalog/10140.html>

- "Assessment of the Water Resources Research Agenda for the Twenty-First Century."
<http://www.nap.edu/catalog/10140.html>

(b) Water Science and Technology Board

The Water Science and Technology Board was established in the National Research Council to provide a focal point for studies related to water resources. The Board's studies are accomplished under the aegis of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The board's scope covers all dimensions of water resources, including science, engineering, economics, policy, and social aspects.

Future Projects:

The Science and Practice of Stream Restoration

This study will focus on three broad aspects of U.S. stream restoration initiatives: 1) the scientific bases of stream restoration, 2) a review of stream restoration practices, and 3) institutional and social sciences issues related to stream restoration (e.g., decision making, stakeholder collaboration). This activity will aim to produce a report that summarizes these areas and provides useful guidance to both scientists and practitioners in the field. Partial funding for the study has been procured, and the study will commence when sufficient funding is in hand. For additional information on this project, contact Jeffrey Jacobs at (202) 334-3422 or at jjacobs@nas.edu.

Urban Water Management: Science, Engineering, and Design

The study will address future urban water management and conservation strategies. The study will assess strengths and limitations of the various approaches to urban water management and identify promising efforts for future urban water management initiatives. For additional information about this project, contact Jeffrey Jacobs at (202)334-3422 or at sdparker@nas.edu.

Advancing Desalination Technologies

This study will produce recommendations for action and research to the community of federal, state, and local governmental and private entities concerned with advancing desalination technologies. Specifically, the study will address different aspects of the issue such as, desalination's contribution to the nation's water supplies; the state of technology and setting goals; research strategy; practical aspects of implementation; and institutional resources and roles. For additional information on this project, contact Stephanie Johnson at (202) 334-3422 or at

sjohnson@nas.edu.

Unconventional Options for Provisions of Drinking Water

This study will identify and examine unconventional options for drinking water in developed and developing countries around the world. The technologies to be considered in this study include: point of entry and point of use treatment, dual supply systems, use of bottled water, and other approaches that are different from or additional to the traditional water supply system paradigm of source water, treatment, and distribution by a specific source. For additional information on this project, contact Stephen Parker at (202) 334-3422 or at sdparker@nas.edu.

Description of Program from:

<http://dels.nas.edu/wstb/index.shtml>
http://dels.nas.edu/wstb/future_projects.shtml

(2) The National Academy of Engineering

Founded in 1964, the National Academy of Engineering (NAE) provides engineering leadership in service to the nation. The NAE operates under the same congressional act of incorporation that established the National Academy of Sciences, signed in 1863 by President Lincoln. Under this charter the NAE is directed "whenever called upon by any department or agency of the government, to investigate, examine, experiment, and report upon any subject of science or art."

Description of Program from:

<http://www.nae.edu/nae/naehome.nsf/weblinks/NAEW-4NHMQM?OpenDocument>

Grainger Challenge Prize for Sustainability: Million Dollar Challenge to Provide Safe Drinking Water

The National Academy of Engineering (NAE), supported by The Grainger Foundation, has established the Grainger Challenge Prize for Sustainability. The primary purpose of this "inducement prize" is to accelerate the development and dissemination of technologies to enhance social and environmental sustainability for the benefit of current and future generations. A complementary goal of the prize competition is to increase awareness among the U.S. engineering community of the importance of designing and engineering for sustainability, particularly in an international context, and to encourage and

showcase efforts by U.S. engineers to bring sustainable technologies to the marketplace and to promote green design philosophies.

The specific goal of this competition, which may be followed by future prize competitions in like amounts for comparable goals, will be the development of a household or multiple household scale treatment system to significantly lower the arsenic content in groundwater from tube-wells as found in many developing countries. The system must have a low life cycle cost, be technically robust, reliable, maintainable, socially acceptable and affordable, be capable of being largely manufactured and serviced in a developing country, and must not degrade other water quality characteristics.

Arsenic contamination has affected millions of people, primarily in rural Bangladesh, but also in eastern India, Nepal, and several other countries. In Bangladesh, the arsenic is an unintended consequence of an aggressive international program to control the spread of cholera (prevalent in surface waters) by installing thousands of tube-wells. Unfortunately, the tube wells tapped into aquifers containing hundreds of micrograms per liter ($\mu\text{g/L}$) of naturally occurring arsenic, usually within 100 meters of the surface.

The Grainger Challenge Prizes offered will be \$1,000,000, \$200,000, and \$100,000 for first, second, and third place for the design and creation of a workable, sustainable, economical, point-of-use water treatment system for arsenic-contaminated groundwater in Bangladesh, India, Nepal, and other developing countries.

The first Grainger Challenge Prizes will be awarded in February, 2007. They are now reviewing incoming proposals prior to system testing.

Details of the Challenge can be found at:
<http://www.nae.edu/nae/granger.nsf?OpenDatabase>

Description of Program from: "National Academy of Engineering Announces Million-Dollar Challenge to Provide Safe Drinking Water." February 1, 2005. News Release of the National Academy of Engineering.
<http://www4.nationalacademies.org/news.nsf/isbn/02012005?OpenDocument>,
<http://www.nae.edu/nae/granger.nsf?opendatabase>,
<http://www.nae.edu/nae/granger.nsf/weblinks/NAEW-68PLN8?OpenDocument>

(3) The National Science Foundation (NSF)

The National Science Foundation (NSF) is an independent federal agency created by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense..." With an annual budget of about \$5.5 billion, it is the funding source for approximately 20 percent of all federally supported basic research conducted by America's colleges and universities. In many fields such as mathematics, computer science and the social sciences, NSF is the major source of federal backing.

NSF fulfills its mission chiefly by issuing limited-term grants -- currently about 10,000 new awards per year, with an average duration of three years -- to fund specific research proposals that have been judged the most promising by a rigorous and objective merit-review system. Most of these awards go to individuals or small groups of investigators. Others provide funding for research centers, instruments and facilities that allow scientists, engineers and students to work at the outermost frontiers of knowledge. NSF's goal is to support the people, ideas and tools that together make discovery possible. That's why we say NSF is "where discoveries begin."

(a) Chemical, Bioengineering, Environmental, and Transport Systems

(Formerly known as: Biochemical Engineering/Biotechnology – Bioengineering and Environmental Systems. See note below for explanation)

The Biochemical Engineering and Biotechnology programs deal with problems involved in economic processing and manufacturing of products of economic importance by effectively utilizing renewable resources of biological origin and bioinformatics originating from genomic and proteomic information. The BEB programs support research projects involving single investigators as well as interdisciplinary projects involving multiple investigators consisting of closely collaborating engineers and biological scientists.

The BEB programs emphasize basic engineering research that advances the fundamental engineering knowledge base that contributes to better understanding of biomolecular processes (in vivo, in vitro, and/or ex vivo) and eventually to the development of generic enabling technology and practical application.

Quantitative assessments of bioprocesses and their rates at the levels of gene regulation and expression, signal transduction pathways, posttranslational protein processing, enzymes in reaction systems, metabolic pathways, cells and tissues in cultivation, biological systems including animal, plant, microbial and insect cells, etc. are considered vital to the successful research projects in the BEB program areas.

Research projects supported through the BEB programs include, but are not limited to, fermentation technology, enzyme technology, recombinant DNA technology, cell culture technology, ex vivo and therapeutic stem cell culture technology, metabolic pathway engineering, biosensor development, bioreactor design and bioprocess optimization, bioseparation and purification processes, bioprocess optimization and integration, monitoring and control of bioprocesses, food processing with special focus on the safety of the nation's food supply, tissue engineering, information technology relevant to biotechnology including bioinformatics, nanobiotechnology and biomimetics, and quantitative systems biotechnology.

Description of Program from:

<http://www.nsf.gov/eng/bes/biochembasic.jsp>

➤ **Note: New Organizational Structure at NSF Engineering beginning 10/01/06**

Due to the Reorganization of the NSF Engineering Program, on October 1st, 2006 the Bioengineering and Environmental Systems Division, along with Chemical and Transport Systems, was merged into a new Chemical, Bioengineering, Environmental, and Transport Systems Division (CBET).

Other **disciplinary organizations** include: *Civil, Mechanical, and Manufacturing Innovation (CMMI)* and *Electrical, Communications, and Cyber Systems (ECCS)*.

Cross Cutting Area Organizations will be divided into the following divisions: *Emerging Frontiers in Research and Innovation (EFRE)*, *Engineering Education and Centers (EEC)*, *Industrial Innovation and Partnerships (IIP)*, and Crosscutting areas include: *Biology in Engineering*, *Complexity in Engineered and Natural Systems*, *Critical Infrastructure Systems*, *Manufacturing Frontiers*, *New Frontiers in Nanotechnology*, and others.

For more information on the reorganization, visit: <http://www.nsf.gov/eng/general/reorg/>

➤ **Environmental Sustainability Grant**

The Environmental Sustainability program supports engineering research with the goal of promoting sustainable engineered systems that support human well-being and that also are compatible with sustaining natural (environmental) systems, which provide ecological services vital for human survival. The Environmental Sustainability program supports engineering research with the goal of promoting sustainable engineered systems that support human well-being and that also are compatible with sustaining natural (environmental) systems, which provide ecological services vital for human survival. The long-term viability of natural capital is critical for many areas of human endeavor, including agriculture, industry, and tourism. Research in Environmental Sustainability considers long time horizons and incorporates contributions from the social sciences and ethics.

This program supports engineering research that seeks to balance society's need to provide ecological protection and maintain stable economic conditions. Research is encouraged to advance the next generation of water and wastewater treatment that will decrease material and energy use, consider new paradigms for delivery of services, and promote longer life for engineered systems. Other activities of interest include

- Advancing engineering methods to promote smart growth strategies,
- Integrating economic development and protection of natural resources,
- Regenerating ecological functions of degraded environments,
- Understanding how large complex environmental systems behave, and
- Developing effective principles for adaptive management of such systems.

Eligible Applicants: Unrestricted.

Description of Program and Grant

Application at:

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501027&org=CBET

➤ **Environmental Technology Grant**

The Environmental Technology Program provides support to develop and test new technologies across the range of sub-areas and activities in the field of environmental engineering. These include new devices and systems for more effective pollutant removal from air and water, as

well as new technologies that minimize or avoid the pollutant generation inherent in older commercial and domestic processes and activities. The program also supports research on the development and refinement of sensors and sensor network technologies that can be used to measure a wide variety of physical, chemical, and biological properties of interest in characterizing environmental systems.

Current areas of support include:

- Nanotechnology, environmental, health, and safety implications and applications;
- Environmental cyberinfrastructure;
- Sensor and sensor network technologies; and
- Mitigation of environmental impacts of natural disasters (such as hurricanes).

Environmental Technology is also interested in material accounting techniques as part of environmental reconstruction efforts following natural disasters.

Along with the related Environmental Engineering and Environmental Sustainability Programs, the Environmental Technology Program fosters engineering research with the goals of:

- reducing adverse effects of pollutant discharges from human activities, and
- enhancing the quality and integrity of the natural environment that provides essential ecological services to humans.

Eligible Applicants: Unrestricted.

Description of Grant and Grant Application at:

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501030&org=CBET

(b) CLEANER Initiative

CLEANER is the acronym for **C**ollaborative **L**arge-scale **E**ngineering **A**nalysis **N**etwork for **E**nvironmental **R**esearch.

The CLEANER Project Office was established in July 2005 and funded by the National Science Foundation (NSF) to develop a collaborative large-scale engineering analysis network to enable scientists to better understand human-stressed environmental systems by fundamentally transforming the field of environmental engineering. CLEANER is focusing its initial efforts on water quality, water availability, and forecasting, all of which are of immediate national

concern. Other media, such as air and soils, are also of interest to the extent that they affect pollutant transport and transformation in water.

The goal of CLEANER is to fundamentally transform and radically advance the scientific and engineering knowledge base to address the challenges of large-scale human-dominated complex environmental systems.

CLEANER will:

- Be an integrated system of distributed, networked facilities and researchers to more readily identify knowledge gaps related to environmental quality issues;
- Enable the development of effective engineering approaches to complex, national-scale environmental problems;
- Consist of (a) interacting field sites networked through cyberinfrastructure; (b) groups of investigators studying landscapes stressed by human activities and/or highly urbanized regions; (c) specialized personnel, facilities, and technology that support the investigators, and (d) an analysis network with common modeling platforms and analysis protocols that will serve as the central organizational framework for collaborative investigations;
- Support collection of critical environmental data with advanced sensor array systems and in situ instrumentation;
- Facilitate data mining and aggregation and provide analytical tools for data visualization, exploratory data analysis, and predictive modeling of large-scale dynamic environmental management strategies;
- Enable more effective adaptive management approaches for human-dominated environmental systems based on enhanced observations, experimentation, modeling, engineering analysis, and design;
- Enable participation from a broad engineering and science community, including educators, students, practitioners, and public sector organizations and individuals, who will have access to CLEANER's equipment, data, models, and software; and
- Transform engineering education by engaging the academic community in large-scale and complex real-world problems.

Contaminants are widespread in the 21st century

environment, posing threats to human life, wellbeing, and environmental sustainability at all levels. Even remote areas, such as the Arctic, now are polluted with toxic materials such as mercury and chlorinated organic chemicals, even though the human activities that generate them often are many thousands of miles away. Contaminated water resources are a special concern, with major problems documented in large rivers (e.g., the Mississippi and Hudson), coastal waters (e.g., Gulf of Mexico, Chesapeake Bay), numerous ground-water aquifers, and many lakes of all sizes. For example, despite improvements in wastewater treatment, many surface-water systems are impaired by nutrient enrichment, and pathogenic microorganisms, still common in the nation's waters, threaten recreation and drinking water supplies. Organic chemicals and heavy metals from municipal and industrial sources pose risks to human health and to aquatic organisms. To address the large-scale environmental problems facing the United States in the 21st century, we need fundamental knowledge of (1) the sources of contaminants and how they are linked to different types and levels of human activities; (2) the persistence, transport processes and degradation mechanisms of these contaminants; and (3) the risks they pose to the environment and humans (Ref. NRC Report "Envisioning the Agenda for Water Resources Research in the Twenty-First Century", NAS Press, 2001). Because pollutants move between air, water, and land, we need to understand the interplay between these media and how efforts to control pollutants in one compartment affect environmental quality in other media. In addition, we need more effective ways to select among management strategies (e.g., promoting the use of alternative materials versus developing enhanced waste treatment options) to address complicated environmental problems.

CLEANER has the strategic intent to create a system where theorists, experimentalists, and computational experts collaborate on significant environmental problems, thereby identifying and resolving knowledge gaps related to these problems. This collaboration will operate using an adaptive management framework, in which management strategies are improved over time based on the knowledge gained by studying how environmental systems respond to management actions. Modeling would be the central component for analysis, knowledge synthesis, and design of further experimentation. Modeling for adaptive management would include systems analysis and life cycle assessment (LCA) models that incorporate consideration of economics, uncertainty and risk in decision-making.

CLEANER Timeline:

- Develop research and education agenda (FY 05)
- Develop critical technologies on environmental Sensors and sensor networks (FY 05 – continuing)
- Define technical requirements for system (FY 05)
- Develop model and data standards, protocols, tools and knowledge networks to promote collaborative research (FY 05-07)
- Conduct outreach and consensus building (FY 05-07)
- Develop community consensus on network organization, structure, governance, and operations (FY 05-06)
- Develop project plan (incorporates final network design) (FY 06)
- Develop education and outreach plan (FY 06)

Description of Program from:

<http://aiche.confex.com/aiche/2006/techprogram/P71452.HTM>,
http://cleaner.ncsa.uiuc.edu/home/http://cleaner.nacse.org/workshops/workshop@RPI/NSFCLEANER_overview.htm

(i) Water and Environmental Research Systems Network (WATERS)

Because issues of water quality and quantity are also of interest to the hydrologic research community, the CLEANER Project Office is working with the Consortium of Universities for the Advancement of Hydrologic Sciences, Inc (CUAHSI-imbed weblink to CUAHSI) to plan a dual-purpose network called the **WATER and Environmental Research Systems (WATERS) Network**. The WATERS Network is proposed as a networked infrastructure of environmental field facilities working to promote multidisciplinary research and education on complex, large-scale environmental systems.

Elements of the WATERS Network

The WATERS Network will consist of the following elements:

A **network** of highly instrumented field facilities for acquisition and analysis of environmental data

An environmental **cyberinfrastructure** that provides data archives, collaboration and networking among community members, and

information technology for engineering modeling, analysis, and visualization of data

Multidisciplinary synthesis of research and education to exploit instrumented sites and networked information; formulate engineering and policy options to protect, remediate, and restore stressed environments and promote sustainable environmental resources

A **measurement facility** that assists with and provides training on sensor deployments, measurement campaigns, and sensor development

It is envisioned that the WATERS Network will:

Transform environmental research by providing advanced sensor systems for data collection, advanced informatics tools for data mining, aggregation, analysis, and visualization and predictive modeling of large-scale dynamic environmental management strategies in real time;

Enable more effective adaptive management approaches for human-stressed complex environmental systems based on enhanced observations, experimentation, modeling, engineering analysis, and design;

Promote participation and improve interaction among the broad engineering and science community, including social scientists; and

Transform engineering education by engaging the academic community collaboratively in large-scale and complex real-world problems.

Description of Program from:

<http://cleaner.ncsa.uiuc.edu/home/>
<http://cleaner.ncsa.uiuc.edu/about/>

(c) Integrative Graduate Education and Research Traineeship Program (IGERT)

The Integrative Graduate Education and Research Traineeship (IGERT) program, initiated in 1997 and now comprising approximately 125 award sites, continues into its sixth annual competition. The IGERT program has been developed to meet the challenges of educating U.S. Ph.D. scientists, engineers, and educators with the interdisciplinary backgrounds, deep knowledge in chosen disciplines, and technical, professional, and personal skills to become in their own careers the leaders and creative agents for change. The program is intended to catalyze a cultural change in graduate education, for students, faculty, and institutions, by establishing innovative new models for graduate education and training in a fertile environment for collaborative research that

transcends traditional disciplinary boundaries. It is also intended to facilitate greater diversity in student participation and preparation, and to contribute to the development of a diverse, globally-engaged science and engineering workforce.

IGERT is an NSF-wide endeavor involving the Directorates for Biological Sciences (BIO), Computer and Information Science and Engineering (CISE), Education and Human Resources (EHR), Engineering (ENG), Geosciences (GEO), Mathematical and Physical Sciences (MPS), Social, Behavioral, and Economic Sciences (SBE), the Office of Polar Programs (OPP), and the Office of International Science and Engineering (INT).

This program provides educational opportunities for Undergraduate Students, Graduate Students. This program supports institutions that may provide support to individuals at those institutions.

Description of Program from:

<http://www.nsf.gov/crssprgm/igert/intro.jsp>

Examples of Project Awards:

➤ **Sustainability Initiative in Engineering.**

Award Abstract #0504345

Award to date: \$619,489

Abstract: This Integrative Graduate Education and Research Training (IGERT) award supports the establishment of a multidisciplinary, multi-institutional graduate training program of education and research in sustainable engineering. The intellectual merit and purpose of the program is to provide doctoral students in engineering with the training needed to conduct sustainable design, with specific focus on greening the built environment and the sustainable use of water. The world contains finite resources and an increasing population, and hence tomorrow's engineers must learn to incorporate sustainability, as well as performance and price, as constraints in the design rubric. Research focus areas have been chosen because solutions to problems in these areas require a broad range of disciplines, because projects inherent to these areas are fundamental and long-term, and because technology advances in these areas will benefit quality of life. A curriculum for engineering students interested in sustainability has been created that emphasizes team-based design and truly crosses departmental lines. The program culminates in a two-semester capstone sustainable design course. Research covers the creation of materials that employ less

waste and require less maintenance, the design of control systems that reduce energy input to buildings, and the assessment of the sustainability of new technology. Strategies to eliminate recalcitrant pollution and to purify water in more benign ways are also being investigated. Broader impacts of the proposal include not only the application of the results of the research but also international activities and broadening participation. Sustainability is a global issue, and hence the project is partnering with the University at Campinas in Sao Paulo, Brazil to provide international research rotations for all IGERT graduate students. Partnerships with the University of Puerto Rico-Mayaguez and the University of Texas-El Paso will broaden participation in the program.

➤ **Urban Ecology.**

Award Abstract #0504248

Award to date: \$1,241,570

Abstract: This integrative Graduate Education and Research Training (IGERT) award supports a multidisciplinary graduate training program of education and research in urban ecology at Arizona State University. The primary study site is Phoenix and central Arizona but both historic (through archeology) and comparative approaches are employed. The purpose of the program is to provide doctoral students with enhanced cross disciplinary collaborative training in the natural and social sciences relevant to urban ecology, broadly construed. Training will involve team research through student-originated workshops, interdisciplinary "issues" seminars, dissertation research in urban ecology with an explicitly collaborative component, and an international experience. Broader impacts of the project include close attention to the conduct of research and the engagement of science with law, policy, and the public sphere. Unlike most doctoral programs in the United States that are based on independence, this program will use and investigate the efficacy of interdependence (collaboration, cooperation) as a research mode. The premise is that scientific investigation in important arenas such as cities is increasingly multidisciplinary, yet students commonly receive little direct training or experience in collaborative research strategies and group dynamics necessary for effective communication among disciplines.

➤ **Achieving Environmental, Industrial, and Societal Sustainability via the Sustainable Futures Model.**

Award Abstract: #0333401

Award to date: \$2,205,444

Abstract: A rapidly increasing world population, over consumption of resources, and contamination of the environment in which we live are jeopardizing the ability of future generations to have the same quality of life that we enjoy. A proposed Integrative Graduate Education and Research Traineeship (IGERT) initiative involving Michigan Technological University and Southern University at Baton Rouge addresses this concern by establishing a multidisciplinary, inter-institutional doctoral education program directed at Achieving Environmental, Industrial, and Societal Sustainability via the Sustainable Futures Model. The mission of the Sustainable Futures IGERT is to educate/train and involve graduate students in the development of knowledge, methods, and tools that promote and enable sustainability in terms of society, environment, and industrial activity. Trained doctoral students and research products produced by the IGERT will serve as catalysts for achieving environmental, industrial, and societal sustainability, and institutionalizing sustainability as a performance measure in industry and government. Intellectual Merit. The institutions will collaboratively complement the strengths of each other to instill in each IGERT trainee the multidisciplinary awareness to formulate valid engineering decisions and public policy opinions toward cohesive and sustainable environmental, industrial, and societal futures. This meta-disciplinary development approach will advance the knowledge and understanding of Sustainable Futures (directed at achieving the triple bottom line) with faculty and students participating in an innovative program to educate and train the individual to research, understand, and communicate new technology and new policy. Participants at Michigan Tech and Southern University have demonstrated continuous commitment to accomplishing these goals in their research efforts and educational experiences. Broader Impact. Key features of the program will promote the integration of research, training, and education of IGERT trainees toward the discovery, formulation, and the social diffusion of information through effective research, dissemination, and societal institutionalization (K-gray) of the Sustainable Futures Model. This will be accomplished through collaborative coursework, meetings, and interactive research between the two campuses. International experiences and an internship program will offer IGERT trainees practical and diverse approaches and methodologies to facilitate knowledge growth, put into practice, and information transfer to the larger society. The program will foster a commitment to diversity by insuring that at least one third of the participating students are from underrepresented

groups including women, students of color from Southern University as well as the Mid-western states that Michigan Tech traditionally serves. In addition, an aggressive plan will focus on attracting Native American representation from local and regional Indian Reservations near Michigan Tech.

Description of Program from:

<http://www.nsf.gov/awardsearch/progSearch.do?SearchType=progSearch&page=2&QueryText=&ProgOrganization=&ProgOfficer=&ProgEleCode=1335%2C1328&BooleanElement=true&ProgRefCode=&BooleanRef=true&ProgProgram=&ProgFoaCode=&RestrictActive=on&Search=Search#results>

➤ **Coastal Institute IGERT Program – University of Rhode Island**

The University of Rhode Island Coastal Institute IGERT Program (CIIP) has been awarded a \$3 million grant from the National Science Foundation to develop and administer an integrated, multi-disciplinary graduate curriculum to enrich the education of PhD students who show potential for leadership in solving environmental problems in coastal ecosystems. The fundamental goal of the CIIP is to integrate the traditionally disparate disciplines in the natural and social sciences to form a coherent, multidisciplinary framework for coastal research. This framework will sharpen the focus of basic research in the sciences by identifying the critical questions and information needs of resource managers. Similarly, research in the social sciences will be advanced by bringing scientific literacy to the assessment of economic and social dimensions of coastal environmental problems.

Working closely with each other and with non-academic partner institutions, students from oceanography, the natural sciences (ecology, biology, fisheries, natural resources science) and the social sciences (economics, governance, planning, coastal policy) will acquire competence in developing, implementing, and monitoring programs and policies that promote the vitality of coastal regions. To accomplish this, students must be able to anticipate and negotiate points of conflict among environmental, social, and economic perspectives on issues of coastal science and management. The CIIP uses tools and disciplines in the humanities -- communication sciences, ethics, social equity, aesthetics, leadership -- to provide students with skills and perspectives that are fundamental to bridging science and public policy in practice. The integrated research and training in the CIIP will produce practical solutions to environmental problems that are relevant to much of coastal America.

The National Science Foundation supports each student for two years. Their work with non-

academic partners is paid by the NSF grant. The grant can also cover modest travel expenses for the students in support of their work with CIIP non-academic partners.

Examples of Current Projects:

- RI Bays, Rivers and Watersheds Coordination Team.
- Chafee/HUD Grants of the Partnership for Narragansett Bay -- Developing a Decision-making Process for Narragansett Bay and Watershed.

Description of Program from:

<http://www.ci.uri.edu/CIIP/Documents/CIIP%20Partners%20Overview.pdf>, <http://www.ci.uri.edu/>

(d) Science and Technology Centers

The Science and Technology Centers (STC): Integrative Partnerships program enables innovative research and education projects of national importance that require a Center mode of support to achieve the research, education, and knowledge-transfer goals shared by the partners. STCs conduct world-class research in partnerships among academic institutions, national laboratories, industrial organizations, and/or other public/private entities to create new and meaningful knowledge of significant benefit to society.

The Centers offer the research and engineering community an effective mechanism to undertake long-term scientific and technological research and education activities; to explore better and more effective ways to educate students, and to develop mechanisms to ensure the timely transition of research and education advances made into service in society. STC proposals are encouraged for high quality innovative research projects that undertake important investigations at the interfaces of disciplines, and/or fresh approaches within disciplines. The STC program invests federal funds in areas consistent with the goals of the NSF Strategic Plan to enable the Nation's future through discovery, learning and innovation.

Description of Program from:

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5541&org=NSF

➤ **Sustainability of semi-Arid Hydrology and Riparian Areas STC– SAHRA**

University of Arizona (lead institution)

The Center focuses on water management issues in the greater southwestern U.S., a region experiencing rates of development exceeding those

of other regions. The area is highly sensitive to long-term climate change. Social and economic research activities focus upon the implications of demographic and economic shifts, changing legal structures and economic markets for water, and changing public attitudes toward sustainable water management. Educational activities bring water resource issues to the forefront of science education at all levels. Such activities include K-12 teacher education programs involving field study experiences, the development of new curricular materials and special outreach to Native American schools.

The vision of SAHRA is to develop an integrated, multidisciplinary understanding of the hydrology of semi-arid regions, and to build partnerships with a broad spectrum of stakeholders (both public agencies and private organizations) so that this understanding is effectively applied to the management of water resources and to the rational implementation of public policy. In practice, the power to improve sustainability of water resources properly rests with elected officials, professional water managers, and legal experts at local, state, and national levels.

SAHRA has identified three stakeholder-relevant integrating questions on which to focus its scientific research, all of which are or will soon become critical for the wise management of water resources in semi-arid regions and which can only be addressed by researchers operating in center mode through the consistent deployment of integrated, multidisciplinary science. These three questions, which are broad-based and capable of engendering and crosscutting many related topics of inquiry, touch on scenarios that are of prime interest in this region: land use changes, population growth, and climate variability:

RIPARIAN QUESTION: What are the costs and benefits of riparian restoration and preservation?

WATER MARKETS QUESTION: Under what conditions are water markets and water banking feasible?

VEGETATION QUESTION: What are the impacts of vegetation change on the basin-scale water balance?

Description of Program from:

<http://www.nsf.gov/cgi-bin/goodbye?http://www.sahra.arizona.edu/>,
<http://www.nsf.gov/od/lpa/news/press/99/pr9945.htm>

(e) Engineering Design – Division of Design and Manufacturing Innovation

The goals of the Engineering Design program are: (a) To enhance a heightened awareness of engineering design as an important element of engineering education and practice. (b) To support fundamental research on new technologies for engineering design and to foster the development of a "science" of engineering design. (c) To promote improved application of sound principles of engineering design, particularly through the support of research that leads to the development of software to support their application. (d) To encourage curriculum development to encompass modern concepts of engineering design principles and to promote design education across the engineering curriculum.

The Engineering Design program embraces a holistic view of design that encompasses the full range of design activities, and that recognizes the notion that design choices are decisions best made in a total system, life-cycle context. An important aspect of the program is the rigorous application of fundamental theories taken from disparate disciplines, such as mathematics, economics and operations research, to the engineering design process.

In the context of the Engineering Design program, engineering design is defined broadly to include all activities related to the acts of conception and description of engineered products, systems, processes and services, including comparative analysis of alternatives and selection of a preferred alternative. It reaches into other areas, such as manufacture, use and disposal, to the extent necessary to ensure good design decision making. A key element of the program lies in the recognition of uncertainty and risk in the design decision making process and their accommodation through research on appropriate design theories and methodologies.

Description of Program from:

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13340&org=NSF&more=Y

(f) Environmental Research and Education (ERE)

In August 1998, the National Science Board established the Task Force on the Environment within its Committee on Programs and Plans. The Task Force was created to provide guidance to the National Science Foundation (NSF) in defining the scope of its role with respect to environmental research, education, and scientific assessment and

in determining the best means of implementing related activities related.

The report, *Environmental Science and Engineering for the 21st Century: The Role of the National Science Foundation* was issued in February 2000. It presents the findings and recommendations developed by the Task Force on the Environment and approved unanimously by the National Science Board.

One result of this report was the establishment of the NSF Working Group on Biocomplexity in the Environment, later renamed the Working Group on Environmental Research and Education. This group serves both as an internal advisory group and an investment design team whose primary responsibilities are to provide communication support for the broad ERE Portfolio and to identify areas of opportunity for future investment (e.g., the Biocomplexity in the Environment Initiative). Members are drawn from each NSF directorate as well as from the budget office, the international programs office, and the NSB Task Force on the Environment.

In addition to the working group, NSF established a standing Advisory Committee on Environmental Research and Education.

NSF has supported activities associated with environmental research and education for decades, primarily through disciplinary programs. In recent years, program officers have recognized that many exciting research opportunities in this area cut across extant disciplines and have formed interdisciplinary and interorganizational programs in response.

In supporting activities at the interdisciplinary frontiers, NSF has sought to integrate holistic multidisciplinary investments with disciplinary-intensive opportunities. Because of the tremendous opportunity for advances in environmental science and engineering revealed by this integrative approach, NSF considers environmental research and education a strategic priority for the Foundation.

In FY 2001, funding in ERE areas totaled approximately \$825 million, roughly one-fifth of NSF's research budget.

Description of Program from:

<http://www.nsf.gov/geo/ere/ereweb/about.cfm>

- **Advisory Committee Report:**
**"Complex Environmental Systems:
Pathways to the Future."**

The report suggests several new 'pathways' for environmental research and education (ERE) opportunities at the National Science Foundation. In particular, it identifies water and complex environmental systems research as a priority. It had this to say about the necessity for enhanced water research:

The AC-ERE recommends that NSF focus on water as a unifying theme for CES research. Organizing around a pervasive environmental component may provide a model for future research campaigns. Because it is a critical resource whose availability strongly impacts human health and economic development, answering questions in this domain will advance scientific understanding while addressing urgent societal issues. Water-related research requires enhanced understanding of processes at environmental interfaces, approaches for integrating across scales, including social scientists in the development of truly integrative research questions, and improved coupling of biological and physical processes. Collectively, this research will advance the ability to forecast and plan for changes in water systems. Resulting methods can then be applied to other potential foci for CES research, such as land use, energy, and climate. (Page 7)

"*Pathways to the Future*" also suggests expanding the grants programs so that smaller awards can be available to new investigators. It also proposes a "GLUE" program (Grants to Leverage Understanding of the Environment), which would connect various projects across NSF to facilitate multi-disciplinary and coordinated research. The final conclusion of the report is that NSF must continue to promote and improve the opportunities for interdisciplinary research across the ERE.

The full report can be found at:
http://www.nsf.gov/geo/ere/ereweb/ac-ere/acere_pathways.pdf

(g) Biocomplexity in the Environment

NSF divides the focus of its funding programs into priority areas. One of these areas is Biocomplexity in the Environment (BE). The BE Competition is one of the centerpieces of the ERE Program. Initiated in fiscal year (FY) 1999, this special competition promotes comprehensive, integrated investigations of environmental systems using advanced scientific and engineering methods.

Biocomplexity refers to the dynamic web of interrelationships that arise when living things at

all levels--from molecular structures to genes to organisms to ecosystems--interact with their environment. Investigations of biocomplexity in the environment are intended to provide a more complete and synthetic understanding of natural processes, human behaviors and decisions in the natural world; and ways to use new technology effectively to observe the environment and sustain the diversity of life on Earth. By placing biocomplexity studies in an environmental context, the Biocomplexity in the Environment competition emphasizes research with the following characteristics: highly interdisciplinary; explicit consideration of nonhuman biota and humans; and focus on challenging systems with high potential for exhibiting nonlinear or highly coupled behavior.

BE includes activities designed to foster research and education on the complex interdependencies among the elements of specific environmental systems and interactions of different types of systems. All kinds of organisms--from microbes to humans--fall within the BE framework, as do environments that range from frozen polar regions and volcanic vents to temperate forests and agricultural lands as well as the neighborhoods and industries of urban centers. The key connector of BE activities is complexity--the idea that research on the individual components of environmental systems provides only limited information about the behavior of the systems themselves.

The Biocomplexity in the Environment program is no longer being run as one competition but as a number of separate competitions run by different organizations within NSF. This year, three competitions have been announced: Carbon and Water in the Earth System (Deadline Date: March 15, 2006) Materials Use: Science, Engineering, and Society (Deadline Date: March 13, 2006) and Cyberinfrastructure for Environmental Observatories: Prototype Systems to Address Cross-Cutting Needs (Deadline Date: January 25, 2006).

2006 Budget: \$83 million. FY 2007: \$58 million.

Description of Program from:

<http://www.nsf.gov/od/lpa/news/publicat/nsf04009/cross/priority.htm>,
<http://www.nsf.gov/geo/ere/ereweb/fund-biocomplex.cfm>

NSF-Sponsored Conference - Cities of the Future: "Creating Blue Water in Green Cities" -- a Wingspread Conference, Racine, WI, July 12-14, 2006

In conjunction with Northeastern University's Center for Urban Environmental Studies, the Johnson Foundation, CDM, and the International Water Association, the National Science Foundation is helping to put on **Blue Water in Green Cities**. The conference will be an interdisciplinary workshop of worldwide experts convened to develop visionary concepts related to this issue of ecological sustainability. With urban waters as a focal point, this workshop will explore links between urban water quality and hydrology, landscape, the concepts of green cities and smart growth, legal and social barriers and the issue of sustainability during extreme hydrological events.

The main areas of focus and suggested topics to be addressed include: Legal and Socio-Economic Issues; Environmental/ Ecological Impacts, Sustainability and Recovery Goals for Urban Waters and Landscape; and Technology, Planning, and Optimization of Urban Water Resources, including the sub-categories: Soft and Hard Engineering; Optimization and Multi-Use Management; and Planning and Future Development.

The workshop will forge interdisciplinary interactions among the participants and creation of research teams that will work on realization of the workshop goals. Each invited speaker will prepare a chapter on an assigned and agreed on interdisciplinary discussion topic, summarizing the state of the art and developing a vision of research and actions that would lead to sustainable urban landscape and receiving waters. The panel discussions will then deliberate on the topic and develop recommendations. The edited proceedings will be then published as a book by IWA Publishing.

A proposal will be made to the workshop participants to continue, enlarge and formalize the group into an alliance/consortium of researchers, consultants, city officials, NGOs, and other stakeholders that would continue working towards the goals of clean (blue) water in new and retrofitted historical "green" ecologically balanced and sustainable cities and expand these efforts, with international partners, to encompass "megacities" of the Third World. Subsequent to the workshop, the alliance will, in a coordinated effort, seek funding and look for research ideas and develop a research agenda.

Description of Conference:

<http://www.bluewatergreencities.net/default.html>

(g) Long Term Ecological Research (LTER) - Division of Environmental Biology

(See also the Baltimore Ecosystem Study, a LTER project, listed under the Northeastern Research Station, section 3(b) under the Department of Agriculture.)

Long-Term Ecological Research (LTER) supports fundamental ecological research that requires long time periods and large spatial scales. This program supports a coordinated network of more than two dozen field sites [<http://www.lternet.edu/sites/>]. The general mission of LTER is to understand ecological phenomena that occur over long temporal and broad spatial scales; to create a legacy of well-designed and documented ecological experiments; to conduct major syntheses and theoretical efforts; and to provide information necessary for the identification and solution of environmental problems. The LTER network of sites conducts integrated research in five core areas: pattern and control of primary production; spatial and temporal distribution of populations selected to represent trophic structure; pattern and control of organic matter accumulation in surface soils and sediments; patterns of inorganic inputs and movements of nutrients through soils and waters; and patterns, frequency, and effects of disturbance.

LTER also supports a Network Office [<http://lternet.edu/sites/net/>], whose mission is to coordinate and facilitate information technology development and implementation across the network, to facilitate management of the network, to aid efforts in research synthesis, and to conduct public outreach. LTER field sites represent a diversity of habitats in continental North America, the Caribbean, Pacific Ocean, and the Antarctic, including coral reefs, deserts, estuaries, lakes, prairies, various forests, alpine and Arctic tundra, urban areas and production agriculture. This breadth is possible through coordinated funding from Biological Sciences, Geosciences, Polar Programs, and Social, Behavioral and Economic Sciences. Supplemental funding supports the LTER Schoolyard educational program, international collaborative research, and related activities at LTER sites.

Funding: In 2005, the LTER program at NSF supported 15 continuing awards and nine renewal projects as a result of a panel held in April 2004 (seven in the Directorate of Biological Sciences (BIO), two in the Directorate of Social and Behavioral Sciences). Total NSF core funding for the LTER program in FY05 was \$22.2 million, with \$17.2 million (78 percent) coming from BIO.

Additional, important support for a range of peripheral and/or new activities at LTER sites is made possible through a very active and dynamic

supplement program. Funding from DEB for this program has been level over the past several years at \$1.96 million, including the (REU), Schoolyard LTER, and other discretionary components. Historically, a number of other programs in NSF also provide supplement funds (e.g., amounting to more than 60 percent in FY05), so that DEB support is highly leveraged. Supplement funding in 2005 was limited to educational supplements, but at an increased total of \$660,000 from BIO (an 83 percent increase). In 2005, however, only Schoolyard (K–12) activities were supported.

Description of Program from:

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13449, <http://www.lternet.edu/news/Article66.html>

Contact: Henry L. Gholz (hgholz@nsf.gov)

(h) National Ecological Observatory Network (NEON)

The **National Ecological Observatory Network (NEON)** will be the first national ecological measurement and observation system designed both to answer regional- to continental-scale scientific questions and to have the interdisciplinary participation necessary to achieve credible ecological forecasting and prediction. As such, NEON will transform the way we conduct science by enabling the integration of research and education from natural to human systems, and from genomes to the biosphere. Social scientists and educators will join ecologists and physical scientists in NEON planning and design and participate as observatory users, recognizing that we live on landscapes that are, to varying degrees, human-dominated ecosystems.

In response to grand challenges in ecology and the environmental sciences, the National Science Foundation (NSF) has proposed that Major Research Equipment and Facilities Construction (NSF-MREFC) funds be used to implement a new and unprecedented research and education platform—NEON, the National Ecological Observatory Network. NEON is envisioned as

"a continental scale research instrument consisting of geographically distributed infrastructure, networked via state-of-the-art communications. Cutting-edge lab and field instrumentation, site-based experimental infrastructure, natural history archive facilities and/or computational, analytical and modeling capabilities, linked via a computational network will comprise NEON. NEON will transform ecological research by enabling studies on major environmental challenges at regional to continental scales. Scientists and engineers will use NEON to

conduct real-time ecological studies spanning all levels of biological organization and temporal and geographical scales. NSF disciplinary and multi-disciplinary programs will support NEON research projects and educational activities. Data from standard measurements made using NEON will be publicly available." (NSF 04549, 2004)

With coordination by the American Institute of Biological Sciences (AIBS), a 2-year planning effort led by the NEON Design Consortium (described below) will begin in September 2004 to produce the following key documents that will govern the design, construction, and functionality of NEON:

The Integrated Science and Education Plan—the plan that identifies the scientific and educational agenda, and technical requirements for NEON.

Networking and Informatics Baseline Design—the plan that specifies the cyberinfrastructure that supports data management, communication, analysis and visualization, and translation of data into information and knowledge for the community of stakeholders.

Reference Design—the comprehensive document that specifies and prioritizes the science for which NEON is required, identifies the technologies that will enable NEON to accomplish its scientific mission, and specifies the unique educational opportunities that can be offered by NEON and the enabling educational infrastructure.

Project Execution Plan—the final blueprint for the building NEON, including the Work Breakdown Structure, budget, and the Project Management Control System.

The real work of the NEON Design Consortium will be done by the scientists, educators, engineers and technologists that will serve on committees and the broad community of stakeholders that will review the design. The NDC process consists of identifying and prioritizing the science drivers for NEON, and determining the cost of the infrastructure required for the specified science and education plans; this will be accomplished during three large meetings to be held in January, March and June of 2005. Reports from these meetings will support the creation of the Reference Design by the National Network Design Committee with input and guidance from the broad community

Description of Program from:
<http://www.neoninc.org/>
<http://www.neoninc.org/about/index.html>

(i) Partnerships for International Research and Education (PIRE) – R&D

Partnerships for International Research and Education (PIRE) seeks to catalyze a cultural change in U.S. institutions by establishing innovative models for international collaborative research and education. The program will enable U.S. institutions to establish collaborative relationships with international groups or institutions in order to engender new knowledge and discoveries at the frontier and to promote the development of a globally-engaged, U.S. scientific and engineering workforce. International partnerships are, and will be, increasingly indispensable in addressing many critical science and engineering problems. As science and engineering discoveries result more and more from international collaboration, U.S. researchers and educators must be able to operate effectively in teams comprised of partners from different nations and cultural backgrounds. The program supports forward-looking research whose successful outcome results from all partners – U.S. and foreign – providing unique contributions to the research endeavor. It is also intended to facilitate greater student preparation for and participation in international research collaboration, and to contribute to the development of a diverse, globally-engaged, U.S. science and engineering workforce.

Award: \$7,000,000 per year for five years, pending availability of funds.

Number of Awards: 14 to 17

Eligible Applicants: Ph.D.-Granting Academic Institutions.

Description of Program from:
<http://www.nsf.gov/pubs/2006/nsf06589/nsf06589.pdf>

VIII) U.S.Intergovernmental(1) Chesapeake Bay Program

The Chesapeake Bay Program is a unique regional partnership that has led and directed the restoration of the Chesapeake Bay since 1983. The Chesapeake Bay Program partners include the states of Maryland, Pennsylvania and Virginia; the District of Columbia; the Chesapeake Bay Commission, a tri-state legislative body; the Environmental Protection Agency, representing the federal government; and participating citizen advisory groups.

Description of Program from:

<http://www.epa.gov/region3/chesapeake/index.htm>

The goals of the Program as stated in the Chesapeake 2000 Agreement:

Restore, enhance and protect the fish, shellfish and other living resources, their habitats and ecological relationships to sustain all fisheries and provide for a balanced ecosystem.

Preserve, protect and restore those habitats and natural areas that are vital to the survival and diversity of the living resources of the Bay and its rivers.

Achieve and maintain the water quality necessary to support the aquatic living resources of the Bay and its tributaries and to protect human health.

Develop, promote and achieve sound land use practices which protect and restore watershed resources and water quality, maintain reduced pollutant loadings for the Bay and its tributaries, and restore and preserve aquatic living resources.

Promote individual stewardship and assist individuals, community-based organizations, businesses, local governments and schools to undertake initiatives to achieve the goals and commitments of this agreement.

Source/Reference: "Chesapeake 2000: A Watershed Partnership." *The Chesapeake Bay Program*. Website: www.chesapeakebay.net/agreement.htm

(2) Columbia River Gorge Commission

The Columbia River Gorge Commission was authorized by the 1986 Columbia River Gorge National Scenic Area Act, and created through a bi-state compact between Oregon and Washington in 1987. The Commission was established to develop and enforce policies and programs that protect and enhance the scenic, natural, cultural and recreational resources of the Gorge, while encouraging compatible growth within existing urban areas of the Gorge and allowing economic development outside urban areas consistent with resource protection.

The Commission works in partnership with a number of entities to implement a regional Management Plan. Partners include Oregon and Washington; the USDA Forest Service; four treaty Indian Tribes: the Nez Perce, Umatilla, Warm Springs, and Yakama Indian Nations; Clark, Klickitat and Skamania counties in Washington; and Hood River, Multnomah, and Wasco counties in Oregon.

Economic Development Grants and Loans Program. The Columbia River Gorge National Scenic Area Act created a fund to provide grants and loans for economic development in the Gorge. Eventually, this fund will amount to \$10 million split equally between the states of Oregon and Washington. Each state administers its portion of the fund and determines what projects are eligible for grants and loans. The Columbia River Gorge Commission is given one responsibility in the grant and loan program: to certify that all activities undertaken with a grant or loan are consistent with the purposes of the Act, the Gorge Management Plan, and county Scenic Area land use ordinances. The Oregon Investment Board (OIB) and Washington Investment Board (WIB) will assist you in getting through this certification process.

Sources, etc.: Columbia River Gorge Commission, #1 Town & Country Square, P.O. Box 730, White Salmon, Washington 98672. Phone: 509-493-3323; fax: 509-493-2229; e-mail: info@gorgecommission.org; <http://www.gorgecommission.org>

***(3) Cooperative Conservation
Initiative and Executive Order 13352***

R&D, E&O

In August 2004, President Bush signed Executive Order 13352 to facilitate cooperative conservation in the United States. Cooperative Conservation describes the efforts of landowners, communities, conservation groups, industry, and governmental agencies who join together to conserve our environment. Through cooperative conservation, citizens from every walk of life enhance, restore, and protect lands, waters, air, and wildlife resources on public and private lands. Through cooperative conservation, citizens play a central and substantive role in the stewardship and governance of the environments in which they live, work, and play.

The Order directs federal agencies that oversee environmental and natural resource policies and programs to promote cooperative conservation in full partnership with states, local governments, tribes, and individuals. These agencies are the Departments of Agriculture, Commerce, Defense, and Interior, and the Environmental Protection Agency.

The Order directed the Chairman of the White House Council on Environmental Quality (CEQ) to convene a conference on cooperative conservation. The Departments of Agriculture, Commerce, Defense, Interior, and the Environmental Protection Agency co-hosted the White House Conference on Cooperative Conservation (the Conference) in St. Louis, Missouri, on August 29-31, 2005. The Conference included over 1,200 invited participants drawn from diverse sectors involved in cooperative conservation.

Topics discussed at the Conference were: changing organizational culture, maintaining effective communication, building trusting relationships, increasing collaborative leadership capacity, planning for action, bringing science and information to problem solving, designing and managing meaningful participation, creating incentives, and measuring progress.

Concerning the discussion of bringing science and information to problem solving, there was widespread recognition of the importance of integrating accurate scientific and technical information and community-based and traditional knowledge into cooperative conservation efforts. Cooperative conservation can provide innovative ways of bringing information and knowledge to bear on decision making. This is accomplished through transparent discussion of the key

questions and assumptions addressed through joint fact-finding processes. The participants encouraged the federal government to improve its capacity to systematically collect and analyze data, and provide information that participants could use in cooperative conservation activities. Participants also stressed the need for resources to collect baseline data, conduct monitoring, and evaluate projects.

Text and Report of Conference from:
<http://www.doi.gov/initiatives/DaytwoAnalysis12-28-05.pdf>,
<http://cooperativeconservation.gov/about/index.html>

Website for Cooperative Conservation:
www.cooperativeconservation.gov and for Cooperative Conservation America (a database of CCI case studies):
www.cooperativeconservationamerica.org

**(a) Cooperative Conservation at the
Natural Resources Conservation Service
(USDA)**

(Administered by the Natural Resources Conservation Service NRCS at USDA.)

The Natural Resources Conservation Service (NRCS) announces the availability of up to \$4 million through the Cooperative Conservation Partnership Initiative (CCPI), under authorities provided by the Soil Conservation and Domestic Allotment Act of 1935. The CCPI offers two components in fiscal year 2006: the Conservation Priorities component and the Rapid Watershed Assessment component.

The Conservation Priorities component offers a mechanism to foster partnerships that focus technical and financial resources on conservation priorities in watersheds (8-digit HUC or smaller) or airsheds of special significance. The Rapid Watershed Assessment component provides funding for locally-led resource assessment and planning on an 8-digit HUC watershed basis. The CCPI is administered in two phases. First, applicants apply through NRCS State Conservationists for planning funds. For each component, State Conservationists may forward up to two proposals to NRCS National Headquarters for evaluation and award consideration. Following successful completion of the planning phase, implementation may begin using funding secured or provided by partners. CCPI projects are expected to secure implementation funds from a wide range of potential partners from local, State, and Federal governmental agencies and non-governmental organizations that have a history of

working with agricultural producers. Potential implementation funding sources must be identified in the final plan.

Description of Program from:

http://www.nrcs.usda.gov/programs/ccpi/pdf_files/CCPI06WebFinal.pdf

➤ **Grass Roots Source Water Protection Program**

The Grass Roots Source Water Protection Program is a relatively new partnership between the Farm Service Agency (FSA) and the nonprofit National Rural Water Association (NRWA). It is designed to help keep surface and groundwater water pollution from affecting drinking water, relying primarily on education and outreach to encourage farmers, ranchers, and producers to take voluntary action to prevent drinking water pollution.

FSA has provided almost \$4 million and NRWA has hired a full-time Rural Source Water technician for each of the 33 participating states. Technicians work with FSA directors and state conservation specialists to identify priority areas for local pollution prevention. Working with State Rural Water Associations, technicians also help organize local citizen teams from diverse federal, state, local, and private interests. Teams develop Rural Source Water Protection plans outlining voluntary measures that farmers, ranchers, and other producers can install to prevent source water pollution. Measures could include more secure storage of herbicides, pesticides, and other chemicals to relocating waste lagoons. Plans establish steering committees to evaluate voluntary practices implemented by local producers. FSA will monitor the overall performance of the program. By working at the grassroots level, local team members inform and educate producers about source water protection measures that benefit their neighbors and communities.

Description of Program from:

<http://www.cooperativeconservationamerica.org/viewproject.asp?pid=262>

(b) Cooperative Conservation at the National Oceanic and Atmospheric Administration (Commerce)

NOAA has a long history of cooperative conservation. From improving habitat and rebuilding fishery stocks to helping mitigate the effects of drought and reduce the damage from natural disasters, NOAA has always relied on partnerships to help achieve its mission. By drawing on outside expertise and experience,

NOAA is able to multiply the benefit of its programs.

Many of the programs which NOAA considers as cooperative conservation, are listed in the chapter on NOAA in this catalogue. These programs include: the Sea Grant Program, National Education for Municipal Initiatives (NEMO), the Community-Based Restoration Program, and the National Estuarine Research Reserve (see *Department of Commerce* Chapter for program descriptions).

Website:

<http://conservationconference.noaa.gov/welcome.html>

(c) Cooperative Conservation at DOD

The Department of Defense supports efforts that promote “cooperative conservation” through the proper inclusion of local participation in Federal decision-making. Cooperative conservation activities are those that promote the protection, use, enhancement or enjoyment of natural resources on military lands by collaborative action among Federal, State, Tribal and local governments, other nongovernmental entities, and private institutions.

➤ **Gulf Coastal Plain Ecosystem Partnership**

Florida’s Western Panhandle is one of the most rapidly growing areas in the Nation; its pristine coastal region is under intense development pressure. Rapid growth and the loss of green space are creating serious encroachment issues for Eglin Air Force Base (AFB), Pensacola Naval Air Station (NAS), and NAS Whiting Field. The most serious issues include concerns about low level flights and weapons testing in the face of encroaching development.

The Gulf Coastal Plain Ecosystem Partnership (GCPEP), formed in 1996 via a Memorandum of Understanding, launched a joint planning process to identify conservation goals and actions, and to provide buffers for military lands. Non-government partners have contributed funds and office space, and have provided volunteers, public outreach, and other services.

Description of Program from:

<http://cooperativeconservationamerica.org/viewproject.asp?pid=544>

(d) Cooperative Conservation at DOI

The Department of the Interior Administers a number of grants programs under the Cooperative Conservation Initiative, including the Coastal Program and the BLM Cost Share Grants.

➤ **Coastal Program – Fish and Wildlife Service**

The Coastal Program identifies important coastal resource problems and solutions, seeks partnerships to carry out on-the-ground conservation projects, and encourages public action in 16 of the nation's highest priority coastal areas. The Coastal Program provides incentives for voluntary protection of threatened, endangered and other species on private and public lands alike.

Eligible Applicants: The program works with a variety of partners, including other Federal and State agencies, local and tribal governments, businesses, conservation organizations and private landowners.

Funding: FY 2002 - 11,299; FY 2003 - 11,021; FY 2004 - 10,186; FY 2005 - 13,060

➤ **Cost Share Program – Bureau of Land Management**

To leverage federal dollars with private and state funding for conservation efforts, benefiting resources on BLM administered public lands. The program solicits partnerships and partnership funding through a variety of resource management programs, including fisheries, wildlife, Threatened and Endangered species, cultural resources and recreation. Funding for the CCI program was initially provided in FY 2003 in pre-existing bureau challenge cost share programs. In FY 2003, this included \$5.0 million in each bureau challenge cost share program; to be targeted specifically at resource restoration and habitat enhancement. In FY 2004; the entire challenge cost share program request is characterized as part of the CCI.

Eligible Applicants: Private and public organizations, tribal interests and individuals.

Funding: FY 2002 - \$9,150; FY 2003 - \$13,882; FY 2004 - \$16,177; FY 2005 - \$21,000

Description of Program from:
<http://www.nbc.gov/cci/matrix.cfm>

(e) Cooperative Conservation at EPA

In keeping with the spirit of the executive order, EPA has collaborated with federal, state and local governments on a variety of projects across the country.

Many of the programs which EPA considers as cooperative conservation, are listed in the chapter on EPA in this catalogue. These programs include: the Targeted Watershed Program, the National Estuary Program, and the 319 Nonpoint Source Pollution Program (see *Environmental Protection Agency* Chapter for program descriptions).

➤ **The Great Lakes: Metro Detroit Conservation Partnerships**

The Detroit River Watershed, traditionally know for automobile manufacturing, steel making and heavy industry, offers world-class water, wildlife, heritage and recreational opportunities. It is no secret that Southeast Michigan has suffered from pollution and other negative impacts of global industrialization. However, there's a change happening, due to innovative partnerships, the region is becoming a model for preserving and enhancing quality of life by protecting regional resources. This session highlights how unique cross-border partnerships established North America's only international wildlife refuge. This project is a prime example of locally led partnerships within the broader context of the Great Lakes Regional Collaboration effort.

Description of Program from:
<http://www.epa.gov/whccc/>

(4) Great Lakes Commission

The Great Lakes Commission is a bi-national public agency dedicated to the use, management and protection of the water, land and other natural resources of the Great Lakes-St. Lawrence system. In partnership with the eight Great Lakes states member states: (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Wisconsin), and the two Canadian provinces of Ontario and Québec, the Commission applies sustainable development principles in addressing issues of resource management, environmental protection, transportation and development.

The Commission was established by joint legislative action of the Great Lakes states in 1955 (the Great Lakes Basin Compact) and granted congressional consent in 1968. A Declaration of Partnership (PDF) established associate membership for the two Canadian provinces in 1999. The Commission is ideally suited to promote a consistent and coordinated interagency and integrated approach to issues associated with the largest system of freshwater on the planet.

And, as well, it provides accurate and objective information on public policy issues; an effective forum for developing and coordinating public policy; and a unified, system-wide voice to advocate member interests.

The Resource Management Program is concerned with the sustainable use and conservation of the region's natural resources through multiple projects and regional services. Working with scores of project partners throughout the public and private sectors, program efforts are directed at identifying regional priorities, developing policy, conducting and coordinating research, and sharing information on a broad range of resource management and protection initiatives.

The Environmental Quality Program supports efforts to restore beneficial uses in Great Lakes Areas of Concern (AOCs) and other degraded areas; strengthen environmental monitoring programs; improve management of coastal wetlands; and protect high-quality areas. Program staff employ cutting-edge information technologies to advance project goals, and leverage and coordinate the resources and expertise of public agencies and other stakeholders to achieve a healthy and sustainable Great Lakes ecosystem.

Sources/Address: <http://www.glc.org>. Phone: 734-971-9135; Fax: 734-971-9150. Great Lakes Commission, Eisenhower Corporate Park, 2805 S. Industrial Hwy, Suite 100, Ann Arbor, MI 48104-6791

(5) Small Business Innovation Research (SBIR)

The SBIR (Small Business Innovation Research) and STTR (Small Business Technology Transfer) programs, two competitively awarded, three-phase Federal Government programs, are designed to stimulate technological innovation and provide opportunities for small business. These dynamic teamings of the private and public sectors include joint venture opportunities for small businesses and the nation's premier nonprofit research institutions.

The SBIR program solicitations are issued by eleven Federal agencies, including the Department of Agriculture, the Department of Commerce, the Department of Defense, the Department of Education, the Department of Energy, the Department of Health and Human Services, the Department of Homeland Security, the Department of Transportation, the Environmental Protection Agency, the National Aeronautics and

Space Administration, and the National Science Foundation.

SBIR targets the entrepreneurial sector because that is where most innovation and innovators thrive. However, the risk and expense of conducting serious R&D efforts are often beyond the means of many small businesses. By reserving a specific percentage of federal R&D funds for small business, SBIR protects the small business and enables it to compete on the same level as larger businesses. SBIR funds the critical startup and development stages and it encourages the commercialization of the technology, product, or service, which, in turn, stimulates the U.S. economy.

Since its enactment in 1982, as part of the Small Business Innovation Development Act, SBIR has helped thousands of small businesses to compete for federal research and development awards. Their contributions have enhanced the nation's defense, protected our environment, advanced health care, and improved our ability to manage information and manipulate data.

Three-Phase Program:

Following submission of proposals, agencies make SBIR awards based on small business qualification, degree of innovation, technical merit, and future market potential. Small businesses that receive awards then begin a three-phase program.

1. Phase I is the startup phase. Awards of up to \$100,000 for approximately 6 months support exploration of the technical merit or feasibility of an idea or technology.

2. Phase II awards of up to \$750,000, for as many as 2 years, expand Phase I results. During this time, the R&D work is performed and the developer evaluates commercialization potential. Only Phase I award winners are considered for Phase II.

3. Phase III is the period during which Phase II innovation moves from the laboratory into the marketplace. No SBIR funds support this phase. The small business must find funding in the private sector or other non-SBIR federal agency funding.

Description of Program from:

<http://www.sbirworld.com/aboutSBIRProg.asp?mnuProg=1>, <http://www.sba.gov/sbir/indexsbir-sttr.html#sbir>

(a) SBIR at CSREES (USDA)

The Small Business Innovation Research (SBIR) program at the U.S. Department of Agriculture (USDA) makes competitively awarded

grants that are to qualified small businesses to support high quality, advanced concepts research related to important scientific problems and opportunities in agriculture that could lead to significant public benefit if successful.

The objectives of the SBIR Program are to:

- stimulate technological innovations in the private sector;
- strengthen the role of small businesses in meeting Federal research and development needs;
- increase private sector commercialization of innovations derived from USDA-supported research and development efforts; and
- foster and encourage participation by women-owned and socially and economically disadvantaged small business firms in technological innovations.

The USDA SBIR program office directs all activities required under the SBIR law and executes the policy established by the Small Business Administration. The SBIR program at USDA is administered exclusively by the Cooperative State Research, Education, and Extension Service (CSREES). SBIR program awards are based on the scientific and technical merit of investigator initiated ideas. The SBIR Program does not make loans and does not award grants for the purpose of helping a business get established.

(i) Soil and Water Resources

This is one of 12 topic areas in the USDA SBIR program. Soil and Water Resources projects develop technologies to reduce soil erosion caused by wind or surface runoff, increase wind utilization for agricultural purposes, improve the physical and chemical properties of soil and minimize the loss of soil nutrients, optimize water conservation, develop improved methods for monitoring water quality, and improve the efficiency of irrigation systems. The table below includes information for the entire SBIR program; click the link for more detailed SBIR information.

(A) Scope of Research

The objective of this research area is to develop technologies for conserving and protecting soil and water resources while sustaining optimal farm and forest productivity and the manufacture of resulting agricultural commodities (proposals related to air pollution caused by animal wastes should be submitted to the Animal Manure Management topic area (8.11)). Proposals need to

address some aspect of agriculture or make clear how the proposed project would impact agriculture.

(B) Suggested Subtopics. Examples of appropriate subtopics for research proposals from small businesses include, but are not limited to the following:

(1) Water Quality and Conservation - Develop new and improved technologies to optimize water conservation, monitor the quality of surface water and groundwater resources for biotic and abiotic pollutants, develop improved methods for the reuse of waste water, and remediate and restore water resources that impact agriculture and forestry operations.

(2) Irrigation - Develop improved irrigation technologies that will provide more efficient and cost-effective delivery of water and chemicals, and develop new irrigation methods that allow for more efficient use of water and more accurate delivery of water to where it is needed.

(3) Soil Erosion - Develop better methods for preventing soil erosion by wind and surface water runoff, and for monitoring wind erosion and sediment transport.

(4) Soil Quality - Develop new technologies for measuring soil properties, soil nutrient content and the physical and chemical nature of soil, and research new technologies that enhance soil properties while restricting adverse environmental impact and develop improved methods to remediate degraded soils.

Eligible Applicants: Small Businesses.

2006 Budget: 19.2 million.

Description of Program:

http://www.csrees.usda.gov/funding/sbir/sbir_synopsis.html

(b) SBIR at the Environmental Protection Agency (EPA)

EPA issues annual solicitations for Phase I and Phase II research proposals from science and technology-based firms for the SBIR. Under Phase I, the scientific merit and technical feasibility of the proposed concept is investigated. EPA awards firm-fixed-price Phase I contracts of up to \$70,000 and the period of performance is typically 6 months. Through this phased approach to SBIR funding, EPA can determine whether the research idea, often on high-risk advanced concepts, is technically feasible, whether the firm can do high-quality

research, and whether sufficient progress has been made to justify a larger Phase II effort.

Phase II contracts are limited to small businesses that have successfully completed their Phase I contracts. The objective of Phase II is to commercialize the Phase I technology. Competitive awards are based on the results of Phase I and the commercialization potential of the Phase II technology. In Phase II, EPA awards contracts of up to \$225,000 and the period of performance is typically 24 months.

EPA also offers up to \$120,000 and 1 additional year as Phase II Options for firms with third party financing for accelerating commercialization or for technologies accepted into an EPA technology verification testing program.

Phase I Topics:

Great Lakes Environmental Problems (EPA Region 5):

Improving the Great Lakes
Control of Air Pollution
Monitoring and Remote Sensing
Green Buildings

Environmental Problems in America's Heartland (EPA Region 7):

Mining and Mine Waste Management
Lead Paint Detection and Removal
Agriculture and Rural Community
Improvement
Management of Animal Feeding Operations

Drinking Water and Wastewater Management for EPA Office of Water:

Drinking Water Treatment and Monitoring
Pollution Indicators for Beaches and
Recreational Waters
Water and Wastewater Management

Critical EPA Research Topics:

Innovation in Manufacturing for
Environmental Protection
Nanotechnology
Engine and Vehicle Emissions Reduction
Solid and Hazardous Waste
Homeland Security

Description of Program from:

www.epa.gov/ncer/sbir

(c) SBIR at the National Institute of Standards and Technology (NIST) (Commerce)

The Department of Commerce (DOC) National Institute of Standards and Technology (NIST) invites small businesses to submit research proposals under this solicitation. Firms with strong research capabilities in any of the areas listed in Section 9 of this solicitation are encouraged to participate.

The objectives of this program include stimulating technological innovation in the private sector and strengthening the role of small business in meeting Federal research and development (R&D) needs. This program also seeks to increase the commercial application of innovations derived from Federal research and improve the return on investment from federally funded research for the economic benefit of the Nation.

RESEARCH TOPIC AREAS:

- Advanced Biological and Chemical Sensing Technologies
- Analytical Methods
- Homeland Security
- Information Technology
- Intelligent Control
- Manufacturing System Integration
- Microelectronics Manufacturing
- Microwave Technology
- Nanofabrication
- Optics and Optical Technology
- X-ray System Technologies

Description of Program from: "FY 2006 Small Business Innovation Research. Program Solicitation." U.S. Department of Commerce, National Institute for Standards and Technology. NIST-06-SBIR

(d) SBIR at the National Science Foundation (NSF)

The National Science Foundation (NSF), an independent agency of the Federal Government, invites (by solicitation) eligible small business concerns to participate in the Small Business Innovation Research (SBIR) and Small Business

Technology Transfer (STTR) Programs. NSF will support high quality projects on important scientific, engineering, or science/engineering education problems and opportunities that could lead to significant commercial and public benefit if the research is successful.

The primary objective of the NSF SBIR/STTR Program is to increase the incentive and opportunity for small firms to undertake cutting-edge, high risk, high quality scientific, engineering, or science/engineering education research that would have a high potential economic payoff if the research is successful. The STTR program further expands the public/private partnership to include joint venture opportunities for small businesses and non-profit research institutions. NSF expects synergism in the proposed research. A team approach is required in which at least one research investigator is employed by the small business concern as the Principal Investigator and at least one investigator is employed by the research institution as the Research Institution Investigator. The proposed research for both SBIR and STTR must be responsive to the NSF program interests.

The NSF SBIR/STTR Program solicits proposals in the following areas:

- Advanced Materials
- Biotechnology
- Chemical-Base Technologies
- Electronics
- Information Technology
- Emerging Opportunity
- Manufacturing Innovation
- Security Technologies

Within that framework, the following critical technology areas of national importance are emphasized:

- Applied Molecular Biology
 - Distributed Computing and Telecommunication
 - Integrated, Flexible Manufacturing
 - Materials Synthesis and Processing
 - Microelectronics and Optoelectronics
 - Pollution Minimization and Remediation
 - Software
-

- Transportation

Description of the Program from:
<http://www.nsf.gov/eng/sbir/program.jsp#ProgGoals>

IX) Associations, Non Governmental Organizations

(1) American Rivers

American Rivers is a national non-profit conservation organization dedicated to protecting and restoring healthy natural rivers and the variety of life they sustain for people, fish, and wildlife.

It explores and provides innovative solutions to improve river health; raise awareness among decision-makers and the public; serves and mobilizes the river conservation movement; and collaborates with partners in developing and revising the *Citizens' Agenda for Rivers*, which provides a unified vision for improving river health across the country.

It takes a pragmatic, science-based approach to solving problems facing rivers meant to assure credibility and professional quality in its mission. And, it works closely with grassroots river and watershed groups across the country, and collaborates with other conservation groups, sporting and recreation groups, local citizens and businesses, and various federal, state, and tribal agencies to build strong coalitions.

At the website, there are numerous additional resources which expand further on these issues, some of them excerpted here.

➤ **“Catching the Rain: A Great Lakes Resource Guide for Natural Storm Water Management.”**

“Catching the Rain”, written by Gary Belan and Betsy Otto of American Rivers, is a guidebook which describes different “soft path”/low impact/green infrastructure approaches to stormwater management.

Find the full text of the report at:
<http://www.americanrivers.org/site/DocServer/CatchingTheRain.pdf?docID=163>

Sources/References: <http://www.american-rivers.org/site/PageServer?amrivers@americanrivers.org>. American Rivers, 1101 14th Street NW, Suite 1400, Washington, DC 20005. Phone: 202-347-7550; Fax: 202-347-9240.

(2) American Society of Civil Engineers

Founded in 1852, the American Society of Civil Engineers (ASCE) represents more than 133,000 members of the civil engineering profession worldwide, and is America's oldest national engineering society. ASCE's vision is to position engineers as global leaders building a better quality of life.

(a) Committee on Sustainability

One of the main goals of the Committee on Sustainability is to help promote the principles and practice of sustainability by distributing information on developments and issues that relate to sustainable engineering education and practice. In pursuit of this goal, ASCE co-sponsors the Engineers Forum on Sustainability with the American Society for Engineering Education (ASEE) and the American Institute of Chemical Engineers (AIChE). The Forum meets three times a year at the National Academy of Engineering, and publishes a Newsletter highlighting the issues, developments and activities discussed at each Forum meeting.

Practice, Education and Research for Sustainable Infrastructure (PERSI)

On February 24, 2005, ASCE convened all of its institutes; several of its divisions, councils, and committees; and the Civil Engineering Research Foundation in the Forum on Technical Opportunities for Sustainable Infrastructure. The Forum (Wright, 2005) concluded that engineers – and other decision makers such as planners, architects, contractors, owners, and operators of infrastructure – need sound practices to guide their decisions for functional, safe, economical, esthetic, and sustainable infrastructure. The Forum recommended that ASCE, in partnership with other professional and trade organizations and federal, state, and local governmental agencies, create a partnership for Practice, Research and Education for Sustainable Infrastructure (PERSI).

The mission of PERSI is to advance and incorporate concepts and knowledge of sustainability into the standards and practices used throughout the life cycle of infrastructure systems. Many professional organizations and agencies have been advancing practices for sustainable infrastructure related to their areas of expertise and responsibility. Through PERSI, partnering organizations will collaborate in identifying and addressing needs for practice, education and research for sustainable infrastructure.

The ultimate objectives for PERSI are to:

1. Provide the practices needed for sustainable renewal of America's infrastructure to respond to marketplace values and meet society's needs.
2. Embed sustainability provisions in the practices regularly used for planning, design, construction, commissioning, operation, maintenance, renovation and removal of infrastructure.
3. Assist all educational programs in architectural, civil and construction engineering, and related technology, in incorporating principles for sustainable infrastructure in their curricula.
4. Establish an enduring program of research to provide critically needed knowledge for improvement of practices for sustainable infrastructure.
5. Engage the U.S. infrastructure community in international efforts for sustainability.

Description of Programs from:

<http://www.asce.org/files/pdf/instfound/june05report.pdf>, <http://www.asce.org/inside/>, Wright, Richard. "Practice, Education and Research for Sustainable Infrastructure (PERSI)." Means, Methods and Trends. Resources for the A/E/C Community. www.mmtmagazine.org/fall_2005_wright2.html

(3) American Water Resources Association (AWRA)

Mission: To advance multidisciplinary water resources education, management and research.

Founded in 1964, the American Water Resources Association is a non-profit professional association dedicated to the advancement of men and women in water resources management, research, and education. AWRA's membership is multidisciplinary; its diversity is its hallmark. It is the professional home of a wide variety of water resources experts including engineers, educators, foresters, biologists, ecologists, geographers, managers, regulators, hydrologists and attorneys.

Objectives:

- The advancement of water resources research, planning, development, management and education.
- The establishment of a common meeting ground for physical, biological, and social scientists, engineers, and other persons concerned with water resources.

- The collection, organization, and dissemination of ideas and information in the field of water resources science and technology.

Project: Third National Water Resources Policy Dialogue. January 22-23, 2007

The First and Second National Water Resources Policy Dialogues brought together water resources experts from around the Nation to focus on the policy needs of the Nation. The Third Dialogue will build on the results of these Dialogues with the aim of providing decision makers with guidance in the formulation and development of water resources policies attuned to societal needs and preferences.

At the conclusion of the Third Dialogue, an after-action report will be prepared that will be distributed widely within the Administration, the Congress, the Nation's Governors and the attendees of the Dialogue.

The focus of the Third Dialogue will be sessions on the following themes developed from the earlier Dialogues:

1. **Setting a Direction** - reconciling the current ad hoc "National" water policy
2. **Working Together Holistically** - integrative, multidisciplinary approaches to water resources issues using collaboration
3. **Building on Science** - the need for good science to support sound policy decisions

Description of Program from:

<http://www.awra.org/about/>, and <http://www.awra.org/meetings/DC2007/index.html>

(4) Awwa Research Foundation

Mission: "Advancing the science of water to improve the quality of life."

The Awwa Research Foundation works to achieve the mission in three ways:

By sponsoring research. AwwaRF sponsors an anticipatory and scientifically credible research program that is responsive to the needs of the water supply community.

By developing knowledge. AwwaRF identifies the practical benefits of research findings and

delivers this knowledge to stakeholders throughout the water supply community.

By promoting collaboration. AwwaRF cultivates partnerships with organizations around the world to leverage funding and share expertise.

The Awwa Research Foundation (AwwaRF) is a member-supported, international, nonprofit organization that sponsors research to enable water utilities, public health agencies, and other professionals to provide safe and affordable drinking water to consumers.

The Foundation was established in 1966 to provide a centralized, practical research program for the drinking water community. Its research program, which is highly respected as being one of the most scientifically credible and best-coordinated in the world, focuses on four main goal areas:

- High-quality water
- Efficient and customer-responsive organization
- Infrastructure reliability
- Environmental leadership

Specific research projects focus on the following:

- Treatment
- Distribution
- Resources
- Monitoring & Analysis
- Management
- Health Effects

Description of Program from:

<http://www.awwarf.org/thefoundation/ourPrograms/strategicResearchPlan.aspx>

(5) Casey Trees Endowment Fund

The Casey Trees Endowment Fund was established in 2001 in response to studies documenting a dramatic loss of tree canopy in Washington, DC over a 25-year period. A generous gift from the Eugene B. Casey Foundation was used to create an endowment that provides the continuing funds to support the core programs and initiatives of Casey Trees to reverse the tree-loss trend. The Casey Trees Endowment Fund (Casey Trees) works to restore, enhance, and protect the tree canopy of the Nation's Capital. It does this by working collaboratively with residents, community groups, the Mayor's office, District and federal agencies, and the private sector.

Casey Trees is now working with the National Park Service and others to survey city trees to determine their value for combating air pollution. It is also working with the city's public school system and American Forests to establish GreenTech -- a new education program to promote greener schoolyards while teaching GIS mapping and analysis. And, recently they partnered with DC Greenworks and Blake Real Estate, Inc. to install the first greenroof on a commercial building in downtown DC.

Casey Trees – Limno-Tech Report: “RE-GREENING WASHINGTON, DC: A Green Roof Vision Based on Quantifying Storm Water and Air Quality Benefits.”

This research determines and assesses the water and air quality benefits at different green roof coverage scenarios for existing buildings and proposed development throughout the District. The storm water benefits were estimated using a model created by LimnoTech, Inc, which developed the modeling for the DC Water and Sewer Authority's (WASA) Long Term Control Plan for combined sewer overflows. The air quality benefits were estimated using the Urban Forest Effects model (UFORE), developed by the United States Department of Agriculture (USDA) Forest Service. A green roof coverage objective was proposed based on the estimated water and air benefits, the mix of existing and proposed development, and projected and actual green roof coverage in other cities.

The report finds that green roofs drastically reduce the amount of stormwater runoff: by as much as 85% for an “intensive” green roof.

The report can be found at:

<http://www.caseytrees.org/pdfs/Green%20Roof%20Vision%20for%20DC%20-%20Full%20Report%20082405.pdf?id=48903>

Casey Trees, along with our partner Limno-Tech, Inc., was awarded a grant from the Environmental Protection Agency in 2005 to develop a “Green Build-out Model” for the District of Columbia. The model will quantify the cumulative storm water benefits of trees and green roofs. The findings will demonstrate the value of including green infrastructure in the city's long term water management plans.

Description of report and fund from:

<http://www.caseytrees.org/pdfs/Green%20Roof%20Vision%20for%20DC%20-%20Full%20Report%20082405.pdf?id=48903>,
<http://www.caseytrees.org/pdfs/2006%20Winter.pdf>,
<http://www.caseytrees.org/about/index.html>

(6) Center for Watershed Protection

Founded in 1992, the **Center for Watershed Protection** is a non-profit 501(c)3 corporation that provides local governments, activists, and watershed organizations around the country with the technical tools for protecting some of the nation's most precious natural resources: our streams, lakes and rivers. The Center has developed and disseminated a multi-disciplinary strategy to watershed protection that encompasses watershed planning, watershed restoration, stormwater management, watershed research, better site design, education and outreach, and watershed training.

Technical Assistance. The Center provides services to local governments, watershed groups, and others looking for hands-on technical assistance. The most active technical assistance programs provided by the Center are described below, and represent a mix of grants and contracts with the federal government, local government, private foundations, and local watershed groups.

Watershed Workshops: The Center is dedicated to training watershed managers around the country to protect, manage and restore our streams, lakes and rivers. Our single and multi-day workshops provide communities with specific guidance on the types and combinations of watershed protection and restoration tools to apply, leading to more effective local watershed protection and restoration efforts.

Direct Assistance to Watersheds: The Center is dedicated to providing communities with guidance on what type of watershed protection and restoration tools to apply and in what combination. We usually contract with local government, private foundations, and/or local watershed groups. Assistance is provided in 4 categories: Watershed Planning, Watershed Restoration, Watershed Protection, and Watershed Consultation.

Stormwater Management: The Center staff is composed of a professional civil engineering team that provides technical assistance on a variety of stormwater topics, including creating manuals, providing design assistance, retrofitting, and conducting workshops. Some of the projects undertaken under the stormwater management program include an Urban Forestry Manual and a stormwater program assessment for the Charles River in Massachusetts.

Technical Skills Assistance: The Center works on the following 4 training skills areas: subwatershed delineation/estimating impervious

cover, stream assessment field training, stormwater retrofitting, and stream restoration.

Website: <http://www.cwp.org/index.html>

Description of Program from:
<http://www.cwp.org/research.htm>

(7) Clean Water Action

Clean Water Action was founded in 1972. It is a 700,000 member, national organization of diverse people and groups, joined together to protect our environment, health, economic well-being, and community quality of life.

The goals of CWA include: clean, safe and affordable water; prevention of health-threatening pollution; creation of environmentally-safe jobs and businesses; and empowerment of people to make democracy work.

CWA organizes strong grassroots groups and coalitions, and campaigns to elect environmental candidates and solve environmental and community problems.

Clean Water Action's national programs focus on the following areas:

- a) Defending water protections
- b) Energy/air
- c) Drinking water
- d) Toxics policy

Description of Program from:
<http://cleanwateraction.org/about.html>

(8) Coalition for Alternative Wastewater Treatment (CAWT)

CAWT was initially organized as a local citizen action group, formed in response to EPA orders to sewerize sections of Gloucester, Massachusetts, which, because of shallow bedrock ledges, were not suitable for sewerizing by conventional means. (CAWT's founder, Valerie Nelson, was on the Gloucester City Council at the time, and especially interested in fisheries, coastal, and wastewater issues.)

CAWT has since gone national, initially promoting and investigating the promise of

'alternative and innovative' wastewater treatment, but presently involved more generally in holistic watershed management based on 'soft' or low impact development.

CAWT's focus is not so much on technology, but on policy, planning, governance, economics and outreach.

The organization has produced numerous publications (cf), and conducted many workshops, nationwide.

Source/reference: Valerie I. Nelson, PhD, Founder and CEO. Email: Valerie508 @AOL.com; tel: 978-283-7568; mail: CAWT, P.O. Box 7041, Gloucester, MA 01930.

(9) Electric Power Research Institute (EPRI)

The Electric Power Research Institute (EPRI), with major locations in Palo Alto, California, and Charlotte, North Carolina, was established in 1973 as an independent, nonprofit center for public interest energy and environmental research, albeit, obviously, on behalf of the electric power industry and its concerns. Its budget is approximately \$300 million per year, and its membership accounts for over 90% of the electricity generated in the United States.

The institute brings together members, participants, the organization's own scientists and engineers, and other experts to work collaboratively on solutions to the challenges of electric power. These solutions span nearly every area of electricity generation, delivery, and use, and importantly include health, safety, and environmental issues.

Its researchers are independent scientists and engineers with total freedom to assure that unbiased, credible science is brought to bear on challenging and often controversial issues. Research is regularly submitted to outside scientific committees and to peer-reviewed journals.

The Institute recognizes that technical challenges will increasingly engage a wide range of scientific and technical disciplines, or require basic research to help resolve practical issues. In such cases, and in those where breakthroughs and novel approaches show special promise, EPRI's Technology Innovation program contributes cross-cutting expertise to its core R&D efforts. Examples of some of its programs follow.

Land and Groundwater. Meeting the twin goals of protecting the environment and returning contaminated sites to productive use relies in part on the ability to characterize and manage emissions and byproducts from power plants and other facilities. EPRI's land and groundwater R&D programs support this quest. Through its R&D programs, EPRI provides scientific information about the prevention, assessment, and remediation of land and groundwater contamination. This work informs regulatory decisions as well as novel approaches for managing combustion byproducts and remediating contaminated sites.

Water and Ecosystems. Integrated management of water resources, energy facilities, and natural ecosystems is supported by EPRI's programs, which are yielding new knowledge, analytical tools, methodologies, and field-proven technologies in this area. Leveraged by leading research institutions, policy analysis organizations, and key regulatory agencies, EPRI's R&D activities help fill critical knowledge gaps and serve as a catalyst for investigation of emerging issues. These efforts help to improve water quality and to preserve traditional land uses without constraining the cost-competitiveness of power industries.

Sources/References: Electric Power Research Institute, www.epri.com, 3412 Hillview Avenue, PO Box 10412, Palo Alto, CA 94304, Phone: 650-855-2000, E-mail: askepri@epri.com.

(10) International Water Association (IWA)

The IWA is a professional membership association dedicated to the improvement of water management worldwide in an environmentally sustainable way. Its reputation is based on its international coverage with membership embracing more than 130 countries. IWA promotes best practice and exchange of the latest skills, techniques and knowledge of all aspects of water management. It aims to disseminate this worldwide by all possible means including meetings, publications, expert networks and electronic media.

The main focus of the International Water Association is water quality. Not only are the causes of water quality deterioration of primary concern to the Association but also the means by which these may be prevented or alleviated, through control of pollution at source, improvements to existing treatment processes and development of new ones. Through its activities in conferences, publications and specialist groups,

IWA is deeply involved with the many aspects of water quality in the water cycle.

On the collection and treatment side there is a large body of knowledge about treatment processes of all kinds, advanced and low technology, for both domestic and industrial wastewaters, including residuals management and disposal and wastewater reuse.

Management considerations are covered in activities such as river basin management; instrumentation, control and automation; and management and institutional affairs.

Specialist Groups. Specialist groups represent the core vehicle for issue-based interaction on scientific, technical and management topics. The specialist groups facilitate collaboration and product generation, including conferences and publications. These groups are an exceptionally effective means of international networking, sharing information and skills and making good professional and business contacts.

An IWA member can join an unlimited number of specialist groups and each group has its own program of conferences and other meetings and a regular newsletter or web-based discussion forum. The following are among the specialist groups listed at the time of writing:

- Diffuse Pollution,
- Drinking Water,
- Ecological Sanitation,
- Efficient Operation and Management of Urban Water Systems,
- Environmental Restoration,
- Groundwater Remediation,
- Membrane Technology,
- Operation and Costs of Large Wastewater Treatment Plants,
- Small Water and Wastewater Systems,
- Source Management,
- Strategies for Developing Countries,
- Urban Drainage
- Wastewater and Solid Waste Treatment Processes Design,
- Water and Waste Technology and Management,

- Water Quality Management,
- Water Reuse,
- Watershed and River Basin Management.

Contact: IWA, Alliance House, 12 Caxton Street, London, SW1H 0QS, UK. Tel: +44 (0) 207 654 5500 ; Fax: +44 (0) 207 654 5555; Email: water@IWAhq.org.uk.

(11) Joyce Foundation

The Joyce Foundation supports efforts to protect the natural environment of the Great Lakes, and to assure the well-being of residents in the region. It is especially interested in improving public policies because of their influence in all sectors of the economy. To ensure that public policies truly reflect public rather than private interests, the foundation also supports efforts to reform election financing.

Protecting the natural environment of the Great Lakes region has been a long-time commitment. The Foundation supports the development, testing, and implementation of policy-based, prevention-oriented, scientifically sound solutions to environmental challenges facing the region. Program priorities involve the health of the Great Lakes and the tributaries that feed them, as well as Great Lakes restoration efforts. In addition, it supports initiatives in obtaining energy from 'clean coal.' Assets of the foundation are around \$850 million. In 2005 it made about 20 environmental program grants ranging from some \$100 to \$800 thousand.

Source/reference: www.joycefdn.org. The Joyce Foundation, 70 West Madison Street, Suite 2750, Chicago, Illinois 60602. Phone: (312) 782-2464; Fax: (312) 782-4160. Email: General Information: info@joycefdn.org. Stephen Brick (Environmental Program Manager), Margaret H. O'Dell (Senior Environmental Program Officer).

(12) Low Impact Development Center

The Low Impact Development Center was established to develop and provide information to individuals and organizations dedicated to protecting the environment and our water resources through proper site design techniques that replicate pre-existing hydrologic site conditions.

Balancing growth and environmental integrity, The Low Impact Development Center (LID), Inc. is a non-profit 501 (c)(3) organization dedicated to

research, development, and training for water resource and natural resource protection issues. The Center focuses on furthering the advancement of Low Impact Development technology. Low Impact Development is a new comprehensive land planning and engineering design approach with a goal of maintaining and enhancing the pre-development hydrologic regime of urban and developing watersheds. This design approach incorporates strategic planning with micro-management techniques to achieve superior environmental protection, while allowing for development or infrastructure rehabilitation to occur. This innovative approach can be used to help meet a wide range of Wet Weather Flow (WWF) control and community development goals.

Description of Program and Website from:
<http://www.lowimpactdevelopment.org>

(13) National Association of Home Builders (NAHB)

Founded in 1942, NAHB is a federation of more than 800 state and local associations. About one-third of NAHB's 225,000 members are home builders and/or remodelers. Based in Washington, D.C., the trade association's mission is to enhance the climate for housing and the building industry. Chief among NAHB's goals is providing and expanding opportunities for all citizens to have safe, decent and affordable housing. It has a professional staff of more than 300 in Washington alone.

NAHB's various groups analyze policy issues, take the industry's story to the public through the media and other outlets; monitor and work toward improving the housing finance system; analyze and forecast economic and consumer trends; and educate, train and disseminate information to members. NAHB works with federal agencies on regulations affecting the housing industry in areas such as mortgage finance, codes, energy, and the environment.

Environment. Development and growth, by their very nature, have an impact on the environment. In many cases, that impact can be positive, as proactive planning works to preserve open spaces and protects environmentally sensitive areas. Resources provided by NAHB provide information on a variety of environmental issues, from clean air and wetlands to Smart Growth and endangered species.

The NAHB Research Center is a wholly-owned subsidiary of NAHB. Founded in 1964, the

Center provides independent third-party evaluation and testing of products and materials to keep builders on the leading edge of technology. At the same time, the Research Center works to enhance the quality and affordability of housing materials.

In addition to researching the design and construction of homes and testing new products, the Center also studies important social and policy issues such as land use, the environment, affordable and sustainable housing, and special needs housing. Located in a modern research facility in Upper Marlboro, MD, one of the Research Center's interests is in Green building research, which provides the building industry with recommendations for environmentally sensitive building and land development.

Sources/References: National Association of Home Builders, 1201 15th Street NW, Washington, DC 20005. Telephone 202-266-8200 or 800-368-5242; Fax: 202-266-8400. <http://www.nahb.org>

(14) National Association of Homebuilders (NAHB) Research Center

The NAHB Research Center is a wholly-owned subsidiary of NAHB. Founded in 1964, the Research Center provides independent third-party evaluation and testing of products and materials to keep builders on the leading edge of technology. At the same time, the Research Center enhances the quality and affordability of housing materials.

In addition to researching the design and construction of homes and testing new products, the Research Center also studies important social and policy issues such as land use, the environment, affordable and sustainable housing, and special needs housing.

The Research Center provides, among other things, the following resources:

ToolBase services, the housing industry's resource for technical information on building products, materials, new technologies, business management, and housing systems.

Specialized material and structural systems testing, both in the lab and in the field, to **ensure safety and high standards** of quality in building materials.

Codes conformity assessment services to ensure that construction products meet the intent

of their codes and that the products being installed have the same attributes as the product that was tested.

Customized **market research** to help develop new products and markets and refine existing products and their production.

Certification programs that enable builders, remodelers, and consumers to choose products and contractors with confidence.

Green building research that provides the building industry with recommendations for environmentally sensitive building and land development.

Path Program Projects: Under the auspices of the PATH program, the Research Center maintains and regularly updates a collection of outstanding housing projects throughout the U.S. where innovative technologies are being used. The inventory provides case history information on a range of projects, from individual homes to entire subdivisions, that are pushing the state-of-the-art in design and construction innovation. Information is presented from the viewpoint of builders and remodelers who can use these examples as models for projects of their own.

➤ **Technologies in Practice** is a collection of outstanding housing projects throughout the U.S. where innovative technologies are being installed and used. The inventory provides case history information on a range of projects that are pushing the state-of-the-art in design and construction innovation. Information is presented from the viewpoint of builders and remodelers who can use these examples as models for projects of their own.

➤ **Field Evaluations** are the first step in the introduction of PATH affiliated technologies into the home building industry. Although many of the technologies are not new, the information available to the industry on them is either vague or nonexistent. Information gathered by the NAHB Research Center in Field Evaluations fills in the voids in the existing information on the technologies undergoing evaluation. This comprehensive information on technologies is necessary to determine their potential for advancing the goals of the PATH program.

➤ **Demonstrations** comprise subdivisions with 25 or more homes. These projects illustrate and evaluate how PATH technologies perform on a community-wide or production scale. Demonstrations primarily focus on technologies whose cost and performance are well documented. However, demonstration sites may also include

field evaluations of new and emerging technologies. These field evaluations at a demonstration site allow prompt feedback to the building industry.

Contact: Alex Duran, 400 Prince George's Boulevard Upper Marlboro, Maryland 20774
Phone: 301-249-4000 Website: www.nahbrc.org

Description of Program from:

<http://www.nahb.org/page.aspx/generic/sectionID=96>
<http://www.nahbrc.org/about2.asp?TrackID=&CategoryID=1737>

(15) National Center for Small Communities

The mission of the National Center for Small Communities is to provide the elected leaders of America's small communities with tools to govern effectively. The Center envisions a future where elected leaders of small communities have the skills and resources to: draw upon strengths and talents of the diverse members of their communities to solve local problems; expand local economies while preserving community character; protect local natural resources for future generations; and protect the health and welfare of their citizens.

(a) Small Town Wellhead and Source Water Protection Initiative

Since 1994, the National Center for Small Communities (NCSC) has worked with the Environmental Protection Agency's Office of Ground Water and Drinking Water to promote source water protection among America's small towns and rural communities. These efforts accelerated with the passage of the **1996 Amendments to the Safe Drinking Water Act (SDWA)** that provide an unprecedented opportunity to focus human and capital resources on protecting irreplaceable water supplies.

The NCSC/EPA Small Town Wellhead and Source Water Protection Initiative promotes three major objectives:

- to summarize local source water protection responsibilities and strategies;
- to explain the opportunities for local governments available through the SDWA and other federal programs; and
- to identify key points at which local, timely input can help determine State-based source

water priorities and set-aside funding levels to benefit local and county governments.

The source water protection measures in the SDWA are helping to fund a comprehensive State-wide approach that builds on the framework already established in the existing State wellhead protection programs (now approved or underway in 43 States and two U.S. territories) and in many watershed areas where contaminant assessments are completed.

Description of Program from:

<http://www.natat.org/ncsc/>

**(16) National Community
Decentralized Wastewater
Demonstration Project**

In 1999, the U.S. Congress began funding a National Community Decentralized Wastewater Demonstration Project, with twenty-one sites designated at funding levels ranging from \$700,000 to \$5.5 million. These demonstration projects are intended to “jump start” technology transfer of improved methods and approaches, and have been selected to provide a diversity of climate, soils, and ecosystems, as well as a focus of each one on a different challenge or aspect of innovative technology and management. To be eligible, each project has also been required to involve appropriate state and county regulatory agencies and to assure the participation of training centers, universities, or other experts.

Since initiation of the National Community Decentralized Wastewater Demonstration Project in 1999, the focus has broadened beyond decentralized wastewater systems to include stormwater technologies and other land development techniques as well.

Examples of Demonstration Projects:

➤ **Block Island/Green Hill Pond, Rhode Island -- \$3 million**

This project will demonstrate a watershed-based approach to managing on-site wastewater systems using alternative technologies. Products will include watershed-based treatment standards for on-site systems, public education materials, administrative procedures for local system inspection and maintenance, and monitoring and evaluation following the installation of alternative technologies in “hot spots”. On Block Island, with about 800 year-round residents, outdated septic systems are threatening the sole source aquifer and

shellfishing habitat. On Green Hill Pond, 2,200 unsewered homes densely clustered near the shoreline are responsible for shellfish closures and contamination of shallow private wells.

➤ **La Pine, Deschutes County, Oregon -- \$5.5 million.**

The Deschutes County Dept. of Environmental Health, in partnership with the Oregon Dept. of Environmental Quality will implement new and innovative nitrate-reducing methods of handling on-site wastewater and will develop an on-site system management program. Most drinking water comes from a single source, unconfined shallow aquifer, which is highly vulnerable to pollution because of its high permeability and depth to the water table (0 to 2 feet at certain times of the year). La Pine has been severely affected by cutbacks in timber harvesting and 49.7% of the population is below the low-to-moderate income level. \$500,000 has already gone into planning studies and community input, and additional matching funds will be sought. A substantial groundwater/contaminant modeling research program, in conjunction with USGS, will be included in this project. The Oregon DEQ views this project as a major demonstration for small communities throughout the state.

➤ **Chittenden County, Vermont
Integrated Water Resource Project -- \$3.05 million**

Chittenden County will demonstrate how integrated water resource protection and remediation strategies can reduce non-point pollution, protect source water, and reduce the need for expensive centralized infrastructure on a regional (inter-municipal) and local basis. The project also relates decentralized wastewater management, distributed stormwater treatment, and source protection to key land use issues, such as retro-fitting existing suburban developments for stormwater treatment, and supporting new growth centers with on-site wastewater systems instead of expensive centralized treatment systems. Colchester is taking an integrated approach to a set of traditionally discrete water quality issues in the Town's Strategic Water Quality Plan, including septic system management, drinking water protection, stormwater treatment, and “smart growth” land use. The project will locate all non-point sources of pollution and link these to watersheds, surface waters, and NRCS soils mapping. A mini-grant program will be established for both distributed stormwater systems and practices, and decentralized wastewater systems, and existing distributed stormwater infrastructure will be repaired. A

monitoring program will measure the effectiveness of these infrastructure programs.

Chittenden County will also design, install, and monitor the effectiveness of four suburban watershed retrofits in a typical cold-climate suburban landscape of commercial strips, regional shopping malls, and post-war and more recent residential subdivisions. Untreated runoff from impervious surfaces is implicated as the source of nearly 40% of the phosphorous loading in Lake Champlain. Municipalities and landowners are now being charged with retooling an existing built environment into a more "water smart" land use system, but they lack the toolbox needed. Monitoring of systems will demonstrate their effectiveness in cold climates, and the project will also focus on needed regulatory flexibility and the development of appropriate utilities for management of distributed stormwater infrastructure.

Source and text from: Nelson, Valerie. "Preliminary Lessons from the National Community Decentralized Wastewater Demonstration Project."

(17) National Decentralized Water Resources Capacity Development Project (NDWRCDP)

The NDWRCDP is a cooperative effort funded by the U.S. Environmental Protection Agency (USEPA) which supports research and development to improve understanding and strengthen the foundations of training and practice in the field of onsite/decentralized wastewater treatment.

Organizations collaborating in this effort include the Coalition for Alternative Wastewater Treatment (CAWWT), the Consortium of Institutes for Decentralized Wastewater Treatment (CIDWT), the Electric Power Research Institute (EPRI), the National Onsite Wastewater Recycling Association (NOWRA), the National Rural Electric Cooperative Association (NRECA), and the Water Environment Research Foundation (WERF).

The goal of the NDWRCDP is to break down the barriers to, and address, critical information gaps, in order to develop the capacity of community leaders, regulators, service providers, and others to respond to the increasing complexities of and expanding need for onsite and/or decentralized wastewater treatment. The NDWRCDP achieves this by identifying research and development opportunities in the onsite/decentralized wastewater field and then

providing funding to support universities, non-profit organizations, and other qualified public and private agencies and institutions to carry out these projects.

Capacity development is achieved primarily through support of research and development projects that address issues affecting more widespread consideration and effective application of decentralized wastewater treatment approaches. Federally appropriated funds are provided through a Cooperative Agreement with the US Environmental Protection Agency - Office of Research and Development ([USEPA-ORD](#)).

Sources: <http://www.ndwrmdp.org/research.cfm>. To download and review a Status Report on NDWRCDP activities and funding: [NDWRCDP Status Report on Cooperative Agreement No. CR827881-01](#).

(18) National Environmental Services Center

The National Environmental Services Center (NESC), is comprised of four national programs that help small and rural communities answer drinking water, wastewater, solid waste, and environmental training questions. NESC is a program within The National Research Center for Coal and Energy, located at one of our nation's leading, land-grant institutions of higher education – West Virginia University.

Description of Program from: <http://www.nesc.wvu.edu/>

(a) National Small Flows Clearinghouse E&O

(NSFC)--wastewater

Since 1979, the National Small Flows Clearinghouse (NSFC) has provided information to "small flows" communities-those that treat fewer than one million gallons of wastewater per day. Funded by the U.S. Environmental Protection Agency under an amendment to the 1977 Clean Water Act, the NSFC is a respected national source of information about small flows technologies, including onsite and decentralized wastewater treatment systems.

Website: http://www.nesc.wvu.edu/nsfc/nsfc_index.htm

(b) National Drinking Water Clearinghouse E&O

(NDWC)--drinking water

The National Drinking Water Clearinghouse (NDWC), funded by the U.S. Department of Agriculture Rural Utilities Service since 1991, helps small and rural communities improve their drinking water by offering easy-to-read technical, regulatory, financial, operation and maintenance, and management information.

Website:

http://www.nesc.wvu.edu/ndwc/ndwc_index.htm

(c) National Environmental Training Center for Small Communities

(NETCSC)--training

The National Environmental Training Center for Small Communities (NETCSC), funded by the U.S. Environmental Protection Agency since 1991, helps small communities improve their public health and environmental conditions by providing training, information, and referral services in the areas of wastewater, drinking water, and solid waste.

Website:

http://www.nesc.wvu.edu/netcsc/netcsc_index.htm

(d) National Onsite Demonstration

Program **R&D**

(NODP)--wastewater projects

The National Onsite Demonstration Program (NODP), established in 1993, was developed to encourage the use of alternative, onsite and wastewater treatment technologies to protect public health, ensure water quality, and sustain the environment in small and rural communities.

Funded by EPA and administered through the National Small Flows Clearinghouse (www.nsfrc.wvu.edu), this multi-phased project demonstrates the effectiveness of alternative on-site water technologies (treatment of wastewater on the property where it originates, or by means of cluster systems serving several homes). The program calls for construction of on-site systems at various locations in more than 10 states. It also includes monitoring of systems performance, documentation of costs, active public education programs, and development of management approaches to assure proper operation and maintenance. The program aims to develop model programs for managing and maintaining on-site systems and for training local officials, installers, and engineers. Congressional add-on funding has provided \$6 million for the program through FY 1999.

Note: Federal funding for this program was cut in 2005.

Description of Program from:

<http://www.epa.gov/owm/mab/smcomm/104g/ar99int.htm>, http://www.nsfrc.wvu.edu/nodp/nodp_index.htm

➤ **Program Example: "NATIONAL ONSITE DEMONSTRATION PROJECT - PHASE II"** Green Hill Pond Watershed Towns of South Kingstown and Charlestown, Rhode Island. **R&D**

In conjunction with the communities of South Kingstown and Charlestown, the Rhode Island Independent Contractors and Associates, and the Rhode Island Department of Environmental Management, the University of Rhode Island Cooperative Extension On-site Wastewater Training Center will construct several innovative septic systems for remedial use in the Green Hill Pond Watershed. Green Hill Pond is experiencing water quality problems due to inputs of nitrogen, and shellfish closures due to high coliform levels. The selected septic systems, installed as replacements for failed systems, will be specifically designed to remove nitrogen and pathogenic organisms from wastewater.

This project would utilize the actual installations as training sessions for participating members of the Contractors Association. Post-construction community-based workshops will be conducted for homeowners, municipal officials and board members, real estate agents, designers, installers, inspection and maintenance personnel, and regulatory agencies. All these workshops will be geared towards transferring information about conventional and alternative and innovative septic systems to the various user groups to raise their understanding and knowledge base. Information from these demonstration systems will also be integrated into all workshops delivered at the Training Center on the URI Kingston campus. These workshops serve a broad-base of clientele from the southern New England region.

The Cooperative Extension Water Quality Program will work with the two towns to develop their wastewater management programs to address the use of these innovative and existing conventional systems. Municipal activities will be coordinated through the Cooperative Extension Municipal Training Program. Homeowner outreach activities will be conducted through the University of Rhode Island Cooperative Extension Home*A*Syst Program and the Cooperative Extension Education Center. On-site Wastewater Training Center personnel will work jointly with these two sister programs to deliver septic system

oriented workshops and activities within the watershed to the target audiences.

The On-site Wastewater Training Center will be responsible for instrumenting, sampling, monitoring, and evaluating the performance of the systems installed. This information will be shared with national audiences through articles in Small Flows published by the National Small Flows Clearinghouse at West Virginia University. Other forums will include articles in local newspapers and national newsletters, and fact sheets which will be made available to City zoning and planning departments/boards, wastewater commissions, building officials, and state regulatory programs to distribute. Locally, Training Center personnel will work with municipal and state regulatory decision makers to use the results of this project to effect regulatory policy changes.

Description of Program from:

http://www.uri.edu/ce/wq/owtc/html/owtc_nodpsum.html

Website:

http://www.nesc.wvu.edu/nodp/nodp_index.htm

(19) National Fish and Wildlife Foundation

The National Fish and Wildlife Foundation was established by Congress in 1984 and dedicated to the conservation of fish, wildlife, and plants, and the habitat on which they depend. The Foundation creates partnerships between the public and private sectors and strategically invests in conservation and sustainable use of natural resources.

Matching Grants: The Foundation identifies conservation needs, reviews proposed projects, fosters cooperative partnerships, and commits a combination of federal and non-federal funds to on-the-ground conservation projects. The Foundation commits funds in the form of matching grants, ensuring that the Foundation's funds are leveraged. Matching grants are partially supported by Congressionally appropriated dollars that must be matched by a ratio of one to one. However, the Foundation strives to maximize dollars invested in conservation and currently average more than a 2:1 return on funds entrusted to the Foundation. For every dollar that Congress provides to the Foundation, nearly \$3 in on-the-ground conservation takes place. Since our founding in 1984, the Foundation has awarded over 7,000 grants to more than 2,600 organizations in the United States and abroad and has leveraged - with

its partners - more than \$300 million in federal funds since its establishment, for a total of more than \$1 billion in funding for conservation.

Delivering Revenue: The Congressionally appropriated funds entrusted to the Foundation are multiplied and delivered to conservation projects; none are used for operating expenses. The Foundation therefore depends upon private contributions for its operating funds. The Foundation is recognized by Charity Navigator with a 3-star rating for efficiency and effectiveness. Ninety-two cents of every dollar contributed to the Foundation is directed to on-the-ground efforts, with 5 cents supporting management and administration of the Foundation's multi-million dollar grants program and 3 cents funding partnership development and fundraising.

The Foundation administers two grant programs: the General Matching Grants Program and the Special Grants Program.

(a) General Matching Grant Program

The National Fish and Wildlife Foundation funds projects to conserve and restore fish, wildlife, and native plants through matching grant programs. The Foundation awards matching grants to projects that address priority actions promoting fish and wildlife conservation and the habitats on which they depend, work proactively to involve other conservation and community interests, leverage Foundation-provided funding, and evaluate project outcomes. Federal, state, and local governments, educational institutions, and nonprofit organizations are welcomed to apply for a general matching grant throughout the year, using the General Matching Grant Guidelines.

(b) Special Grant Programs

In addition to the general matching grant, the Foundation administers a number of special grant programs with specific guidelines and time-lines. If the project is not funded under the general matching grant program for which it was submitted, Foundation staff may move the project to the general matching grant program or a different special grant program if it has the potential of being funded under it.

Special Grants Programs Website:

http://www.nfwf.org/grant_apply.cfm

Special Grant Programs of Interest:

- **The 2006 Chesapeake Bay Small Watershed Grants Program**

The Chesapeake Bay Small Watershed Grants Program provides grants to organizations working on a local level to protect and improve watersheds in the Chesapeake Bay basin, while building citizen-based resource stewardship. The purpose of the grants program is to address the water quality and living resource needs of the Chesapeake Bay ecosystem. The Small Watershed Grants Program has been designed to encourage the development and sharing of innovative ideas among the many organizations wishing to be involved in watershed protection activities.

Under last year's program, 88 projects from across the Bay watershed (out of approximately 120 applications) received grants. Grants ranged in size from \$5,000 to \$50,000, and also included five Community Legacy Grants of up to \$100,000. The average grant award is between \$25,000 and \$35,000. Under the *2006 Chesapeake Bay Small Watershed Grants Program*, grants of up to \$50,000 will again be awarded on a competitive basis to support projects which meet the following guidelines.

The Small Watershed Grants Program is administered by the National Fish and Wildlife Foundation (Foundation), in cooperation with the U.S. Environmental Protection Agency, Chesapeake Bay Program. Additional funding for the program is provided by NOAA Fisheries, USDA Forest Service, USDA Natural Resources Conservation Service, and other sponsors. Authorization for the program comes from the Chesapeake Bay Restoration Act of 2000 which authorizes the Chesapeake Bay Program to "offer technical assistance and assistance grants ... to local governments and nonprofit organizations and individuals in the Chesapeake Bay region to implement i) cooperative tributary basin strategies that address the water quality and living resource needs in the Chesapeake Bay ecosystem; and ii) locally based protection and restoration programs or projects within a watershed that complement the tributary basin strategies, including the creation, restoration, protection, or enhancement of habitat associated with the Chesapeake Bay ecosystem."

➤ **Chesapeake Bay Targeted Watersheds Grant Program**

A 2004 report issued by the Chesapeake Bay Program's Scientific and Technical Advisory Committee indicates that "there is a need to better quantify the effectiveness of new, more aggressive nutrient reduction goals." Moreover, the jurisdictions within the Chesapeake Bay watershed have agreed to meet aggressive nutrient reduction targets by 2010 through the development and

implementation of Tributary Strategies in accordance with the *Chesapeake 2000 Agreement*. The Administration and Congress have responded to this increased focus on the need to reduce nutrient loads to the Chesapeake Bay by appropriating nearly \$8 million dollars in fiscal year 2005 through EPA's National Targeted Watersheds Grant Program. This funding is intended to support innovative projects designed to foster nutrient reduction in Chesapeake Bay watershed.

The overall goal for the Chesapeake Bay Targeted Watersheds Grant Program is ***to expand the collective knowledge on the most innovative, sustainable and cost-effective strategies - including market-based approaches - for reducing excess nutrient loads within specific tributaries to the Chesapeake Bay***. To achieve this goal, the National Fish and Wildlife Foundation will award 8-12 grants of up to \$1 million on a competitive basis to selected projects that target and reflect the diverse conditions (e.g., urban, rural, suburban) and sources of nutrients (e.g., agricultural, stormwater, other non-point sources) that exist throughout the Chesapeake watershed.

The Chesapeake Bay Targeted Watersheds Grant Program is administered by the National Fish and Wildlife Foundation, in cooperation with the Chesapeake Bay Program and, funding partner, the Chesapeake Bay Trust. Authorization for the program comes from the Consolidated Appropriations Act of 2005 (P.L. 108-447) which directs the Chesapeake Bay Program to establish "a regional pilot program for the Chesapeake Bay that shall demonstrate effective non-point source nutrient reduction approaches that target small watersheds and accelerate nutrient reduction in innovative, sustainable, and cost-effective ways."

➤ *Coastal Counties Restoration Initiative*

The National Association of Counties and the National Fish and Wildlife Foundation, in cooperation with the Community-Based Restoration Program within NOAA Fisheries, announce a new program targeting marine habitat restoration in coastal counties. The *Coastal Counties Restoration Initiative* provides financial assistance on a competitive basis to innovative, high quality county-led or supported initiatives that foster community-based wetland, riparian, and coastal habitat restoration projects through project planning and hands-on conservation. These projects will improve habitat for NOAA trust resources, including marine, estuarine, and anadromous fish habitat.

Grants will be awarded through a competitive process to eligible grant recipients. Grants that are community-based in nature and willing to work in partnership with NOAA will be given special consideration, as NOAA's Community-based Restoration Program is providing major financial support for this partnership. Grants will range from \$25,000-\$100,000, based upon need.

The *Coastal Counties Restoration Initiative* seeks to:

- Encourage innovative, county programs or projects that restore important marine and coastal habitats and living resources;
- Develop the capacity of local county governments, citizens groups and other organizations to promote community based stewardship and enhance local watershed-based resource management;
- Strengthen the relationship between coastal counties and the NOAA Community-Based Restoration Program.

Eligible Applicants: NACo member counties (visit www.naco.org to determine membership), or public or nonprofit private agencies, institutions, and organizations, educational institutions, and any form of local government (i.e., departments, townships, cities, villages, boroughs, conservation districts, planning districts, utility districts, or other units of local government) working in partnership with a NACo member county are eligible for funding. All applicants must include a letter of support from their chief elected county official. Non-county applicants should ensure that the letter demonstrates a substantial county partnership in the project.

(c) Five-Star Restoration Matching Grants Program

The National Association of Counties, the National Fish and Wildlife Foundation, the Wildlife Habitat Council, in cooperation with the U.S. Environmental Protection Agency (EPA), and our newest partner, Southern Company, are pleased to solicit applications for the Five-Star Restoration Matching Grants Program. The Five-Star Restoration Program provides modest financial assistance on a competitive basis to support community-based wetland, riparian, and coastal habitat restoration projects that build diverse partnerships and foster local natural resource stewardship through education, outreach and training activities. In 2005, 53 projects out of 220 applications received grants of an average \$10,000.

The President's Wetlands Initiative calls for collaborative approaches by federal, state, tribal, and local governments, the private sector, and the public to restore, improve, and protect 3 million acres of wetlands by 2009. Wetlands help our communities protect themselves against devastating floods, improve local water quality and provide critical wildlife habitat.

The stars in "Five-Star" are the partners, funders, and/or participants necessary to complete the project including: Schools or youth organizations (e.g., state or local youth conservation corps, county job training programs); Local or tribal governments (e.g., boards of county commissioners, departments of planning, environment or parks and recreation); Universities and local cooperative extension districts; Local businesses or corporations; Conservation organizations or local citizens groups; State and federal resource management agencies; and Foundations or other funders. Projects must therefore involve diverse partnerships of ideally five organizations that contribute funding, land, technical assistance, workforce support, and/or other in-kind services.

Awards are between \$5,000 and \$20,000; the average grant is \$10,000.

Projects must include a strong on-the-ground wetland, riparian, or coastal habitat restoration component and should also include training, education, outreach, monitoring, and community stewardship components. Projects involving only research, monitoring, or planning are not eligible for funding.

Applicants must demonstrate that measurable ecological, educational, social, and/or economic benefits are expected to result from the completion of the project.

Projects may be a discrete part of a larger restoration effort but must be ready to complete within a one-year time-frame upon receipt of funding.

(d) Great Lakes Watershed Restoration Program

Eligible Projects: To be eligible for consideration, a project must 1) be located within the Great Lakes watershed or 2) support the development or implementation of local watershed management plans that address the water quality and living resource needs in the Great Lakes. In addition, projects must also directly address at

least one of the priority areas identified by the Great Lakes Regional Collaboration's Habitat/Species Strategy Team:

- Restore, enhance, and protect near shore and off shore native fish communities and other living resources, their habitats, and ecological relationships to sustain all fisheries and provide for a balanced ecosystem.
- Preserve, protect, and restore the wetlands that are vital to the survival and diversity of the living resources of the Great Lakes.
- Preserve, protect, and restore the tributaries and their watersheds that support the living resources of the Great Lakes ecosystem.
- Restore, enhance, and protect the Great Lakes shoreline and upland habitats.
- Promote individual stewardship and assist individuals, community-based organizations, businesses, local governments, and schools to undertake initiatives to achieve the above goals.

For the purposes of this program, the Great Lakes watershed will be defined by the Great Lakes Water Quality Agreement: Article 1. (h) "Great Lakes System" means all of the streams, rivers, lakes and other bodies of water that are within the drainage basin on the St. Lawrence River at or upstream from the point at which this river becomes the international boundary between Canada and the United States.

Eligible Applicants: Eligible applicants are either non-profit 501 (c) organizations, tribes, or state and local governments (i.e., counties, townships, cities, boroughs, conservation districts, planning districts, utility districts, school districts or other units of local government) from the Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, or Wisconsin portions of the Great Lakes watershed. Individuals, federal government agencies, and private for-profit firms are not eligible for grants under this program.

Grant Awards: Grants range between \$35,000 and \$100,000.

Description of Program from:
<http://www.nfwf.org/about.cfm>

(20) National Ground Water Association (NGWA)

The National Ground Water Association (NGWA) was founded in 1948 and now has a membership base of over 14,000 organizations, contractors, scientists, engineers, manufacturers, and suppliers. Its mission is "dedicated to advancing the expertise of all ground water professionals and to furthering ground water awareness and protection through education and outreach."

NGWA is the industry leader in continuing professional education, offering short courses and workshops throughout the world. It also offers a catalog of books and other educational materials; conducts annual trade shows; and provides discounts on various products and services important to the membership, including commercial property and casualty insurance, contractors' pollution liability insurance, and environmental errors and omissions insurance. (<http://www.ngwa.org/about/about.cfm>)

With its \$6.4 million budget, the Association gives scholarships and fellowships, operates foundations, holds conferences, and releases numerous publications. Of particular interest to this report is the Foundation for Affordable Drinking Water and the National Ground Water Research and Educational Foundation.

(a) National Ground Water Research and Educational Foundation

Established in 1994, the National Ground Water Research and Educational Foundation (NGWREF) is operated by the National Ground Water Association as a 501(c)(3) public foundation and is focused on conducting educational, research, and other charitable activities related to a broader public understanding of ground water. NGWREF's mission is clear: Conduct educational, research, and other charitable activities related to ground water. The Foundation is an arm of NGWA that is focused on activities related to a broader understanding of ground water. When appropriate, NGWREF's findings will be made public via publications, education experiences at major meetings, public information forums, and by way of National Ground Water Information documents.

Funding Priorities: The Foundation is currently funding research that looks at the following areas: Sustainability of ground water resources; Ground water rights; Drinking water infrastructure alternatives; Water testing

technology applicable at individual household levels; Relationships between ground water industry-related regulations and public benefits.

Eligible Applicants: NGWREF encourages the submission of research proposals from all qualified entities, including international organizations and disadvantaged business enterprises. NGWREF particularly encourages and values those proposals that bridge the gap between research and practical applications of the research findings. Each proposal is expected to contain statements on the critical ground water research to be addressed, the relationship of the research to NGWREF's current priorities, the research approach employed, anticipated outcome of the study, and benefits and/or information expected from the project.

Budget: \$20,000

Description of Program from:
<http://www.ngwa.org/ngwef/ngwef.cfm#proposals>

(b) Foundation for Affordable Drinking Water

“The mission of the Foundation for Affordable Drinking Water is to provide low interest loans to low- and moderate-income rural homeowners for the construction, refurbishing, and servicing of household water well systems in order to assure cost-effective access to a safe and affordable drinking water supply to a heretofore underserved constituency. These one percent loans are available up to a maximum of \$8,000 for a 20-year maximum loan term.”

Eligible Applicants: Homeowners. Additionally, applicants must own the home and use it as the principal residence; the homeowners must live in a rural area, defined as a city, town or unincorporated area with a population of less than 50,000 in one of the participating states (see next section); they must have a total household income (inclusive of all income received by all occupants of the home—salary, wages, child support payments, commissions, bonuses, interest and dividends, business net income, retirement income, social security, public assistance money, insurance disability payments, and all other payments received by any member of the household) that does not exceed the median nonmetropolitan household income limits for their state; they must have as their primary drinking water source an individual household water well system located on the property of the home; they must obtain from a licensed contractor (or multiple contractors) a description of the work needed, why it is necessary,

alternative solutions and costs, and an estimate of the cost of the proposed solution; they must wait until the loan has been approved to begin any well construction project.

Further, the program is only available for homeowners in the following states: Alabama, Colorado, Idaho, Indiana, Iowa, Kansas, Maine, Massachusetts, Minnesota, Missouri, Nebraska, New York, North Carolina, Ohio, Tennessee, Texas, Utah, Vermont, Washington, West Virginia, and Wisconsin.

Application Process: Homeowners file application forms and submit them along with a written proposal from a local water well contractor to the foundation. The foundation will make a decision on the project and pending approval, the contractor will complete the project. Upon completion of the project, the loan will then be allocated to the homeowner and the contractor will be paid by the foundation. (Details of the application process, plus forms and contractor databases, can be found at:
<http://www.ngwa.org/affordablewater/main.cfm#works>)

Description of Program from:
<http://www.ngwa.org/affordablewater/main.cfm#works>

(21) National Onsite Wastewater Recycling Association (NOWRA)

The National Onsite Wastewater Recycling Association (NOWRA) is the largest organization within the U.S. dedicated solely to the onsite and decentralized industry. Its purpose is to “to provide leadership and promote the onsite wastewater treatment and recycling industry through education, training, communication and quality tools...”

It is a 501(C)6, not-for-profit organization, supported by a membership of over 3500 individuals within the onsite industry that includes service providers, installers, equipment manufacturers, suppliers and distributors; system designers, planners and engineers; regulators and public officials. In addition, membership includes organized state groups, and businesses.

Its programs are primarily funded through membership dues, industry contributions, education and training courses, and, finally, grants, such as one through the National Decentralized Water Resources Capacity

Development Project (NDWRCDP), an effort subvned by EPA.

Onsite systems provide more than 40% of the wastewater treatment services to residential areas, communities, shopping centers and commercial businesses throughout the U.S. Onsite systems also support the larger municipal wastewater treatment infrastructure by providing services in outlying areas with low population densities and/or difficult or remote topography.

Moreover, onsite systems are an effective solution to protecting water quality. They are a valuable component of integrated watershed management plans, and in implementing sustainable development concepts. The local recycling aspect of these systems supports the water resources management goals in many arid areas of the country.

NOWRA's most important initiative at this time is the development of a model performance code for use by state and local regulators. A white paper authored by the leadership of the Model Performance Code Committee of the National Onsite Wastewater Recycling Association (NOWRA), presenting the concept of a national Model Performance Code was approved by the NOWRA Board, June 12, 2004 and formally adopted September 28, 2004.

The paper presents the advantages of using performance over prescription codes in making decisions on the use and location of onsite or cluster wastewater treatment systems.

Sources, etc.: <http://www.nowra.org>; Email: webmaster@nowra.org. Phone: 410.798.1697; Toll Free: 800.966.2942; Fax: 410.798.5741. National Onsite Wastewater Recycling Association Inc., P.O. Box 1270, Edgewater, MD 21037.

(22) Natural Resources Defense Council (NRDC)

The NRDC is a not-for-profit, tax-exempt membership organization incorporated under the laws of the State of New York in 1970. It uses law and science, as well as the support of its 1.2 million members and online activists, to protect the planet's wildlife and wild places and to ensure a safe and healthy environment for the entire biosphere. It works to:

- restore the integrity of the elements that sustain life (air, land and water),
- defend endangered natural places,

- establish sustainability and good stewardship of the Earth as central ethical imperatives of human society.

NRDC affirms the integral place of human beings in the environment, and strives to protect nature in ways that advance the long-term welfare of present and future generations.

Finally, it works to foster the fundamental right of all people to have a voice in decisions that affect their environment, and ultimately strives to aid in creating a new way of life for humankind, one that can be sustained indefinitely without fouling or depleting the resources that support all life on Earth. Some of its programs:

The Land Program is set up to protect the biological, ecological and natural values of U.S. national forests, parks and other public lands, to promote improved management of private forest lands, and to reduce U.S. consumption of products made from wood.

The Water and Oceans Program is set up to protect and restore the nation's water quality, fish populations, wetlands and oceans, and undertakes key regional initiatives in pursuit of these goals.

Building Green: From Principle to Practice. Designed to offer building professionals, and others, guidance in planning a green building project, from inception and design through marketing.

(a) Green Communities – a partnership between Enterprise and NRDC

Green Communities is the first national green building program focused entirely on affordable housing. It incorporates many innovations from the "mainstream" green building movement, including the use of environmentally sustainable materials, reduction of environmental impact, and increased energy efficiency. Green Communities takes the idea of green several steps further, emphasizing design and materials that safeguard the health of residents, and siting that provides close, easy access to public transportation, schools, and services.

Green Communities is designed to help developers, investors, and builders make the transition to a greener future for affordable housing. Created in consultation with some of the nation's leading green building experts, Green Communities sets forth an achievable vision of green affordable housing. A comprehensive offering of Green Grants, loans, tax-credit equity,

training, and technical assistance gives developers and builders the resources to bring green projects to life.

The Program offers the following resources to developers, builders, community associations and others:

Green Grants

To assist in planning, designing and building green communities

Low-Interest Loans

For predevelopment, site acquisition, and construction

LIHTC Equity Investments

To fund rehabilitation and construction

Educational Conferences

A wide range of cross-cutting program conferences related to sustainable communities, multifamily housing economic development and smart-growth tactics and techniques for building green communities

Description of Program from:

<http://greencommunitiesonline.org/about.asp>

<http://greencommunitiesonline.org/about-essentials.asp>

Sources/References: <http://www.nrdc.org>.

Natural Resources Defense Council, 40 West 20th Street, New York, NY 10011. Telephone: (212) 727-2700; Fax: (212) 727-1773. Inquiries about NRDC's programs and campaigns should be directed to the NYC headquarters. Or, for general questions about NRDC or the environmental issues it works on, email: nrdcinfo@nrdc.org.

(b) Rooftops to Rivers

– Green Strategies for Controlling Stormwater and Sewer Overflows

The urban landscape of roadways, sidewalks and buildings has changed the way water moves through our environment. Rain and snow that falls on paved surfaces becomes stormwater runoff that picks up dirt and pollutants as it follows gravity downhill into storm drains and ultimately into our streams, rivers and lakes; polluted runoff can threaten public health and degrade wildlife habitat. Some cities are using green techniques -- including rooftop gardens on city buildings, more absorbent concrete, and street planters that intercept rainwater before it hits the ground -- to protect their water. This May 2006 report is a policy guide for decision makers looking to implement green strategies in their own area, including nine case studies of cities that have successfully used green techniques to create a healthier urban environment.

To access the report, visit:

<http://www.nrdc.org/water/pollution/rooftops/contents.asp>

Description of Program from:

<http://www.nrdc.org/water/pollution/rooftops/contents.asp>

(23) National Rural Water Association

Mission: "to provide our state associations with support services to meet the needs of their membership."

The National Rural Water Association is a non-profit federation of State Rural Water Associations. Member state associations are supported by their water and wastewater utility membership and offer a variety of state specific programs, services, and member benefits. Additionally, each state association provides training programs and on-site assistance in areas of operation, maintenance, finance, and governance.

➤ **Wastewater Training & Technical Assistance Program**

Designed to assist systems, this program focuses on combining formal classroom sessions with on-site follow-up in Clean Water Act compliance issues and health protection related to wastewater management and operational issues.

Description of Program and Program

Website: <http://www.nrwa.org/au.htm>

(24) Progressive Policy Institute (PPI)

The Progressive Policy Institute is the think tank of the Democratic Leadership Council. In spite of partisan leanings, it describes itself as interested in political analysis and policy innovations [that transcend] "the worn-out dogmas of traditional liberalism and conservatism." Its core principles and ideas emerge from the "Third Way" movement, and are set forth in The New Progressive Declaration: A Political Philosophy for the Information Age.

PPI's mission is to define and promote a new progressive politics for America in the 21st century. Through its research, policies, and commentary, the Institute hopes to fashion a new governing

philosophy and agenda for public innovation geared to the Information Age.

The Third Way. The industrial order of the 20th century is rapidly yielding to the networked "New Economy" of the 21st century. American political and governing systems, however, have lagged behind the rest of society in adapting to these shifts. They remain stuck in the left-right debates and the top-down bureaucracies of the industrial past.

The Third Way philosophy seeks to adapt enduring progressive values to the new challenges of the information age. It rests on three cornerstones: the idea that government should promote equal opportunity for all while granting special privilege for none; an ethic of mutual responsibility that equally rejects the politics of entitlement and the politics of social abandonment; and, a new approach to governing that empowers citizens to act for themselves.

PPI's Energy & Environment Project.

This endeavor is dedicated to the idea that abundant and affordable energy, economic prosperity, and across-the-board improvements in environmental quality are compatible goals. Achieving those goals does not require the public to choose between markets and government, or between more or less regulation. Instead, they both must be accommodated.

At the website, there are numerous additional resources which expand further on these issues, some of them excerpted in this document.

- **"Charting a 'Soft Path' to Cleaner Water.**
- **"A Blueprint for Greener Buildings."**

Model Initiatives, PPI, May 14, 2004.

Sources/References: Progressive Policy Institute, 600 Pennsylvania Ave. SE, Suite 400, Washington, DC 20003. DLC Phone: (202) 546-0007; PPI Phone: (202) 547-0001. DLC Fax: (202) 544-5002; PPI Fax: (202) 544-5014. <http://www.ppionline.org>

(25) River Network

River Network's Mission is to help people understand, protect and restore rivers and their watersheds.

We envision a nation whose rivers are cared for by those who use them and live in their watershed. Our constituency is comprised of grassroots river and watershed conservation

organizations, public agencies, tribal governments and coalitions, and others working to save freshwater ecosystems.

Among national environmental organizations, River Network has assumed primary responsibility for building and supporting the river and watershed movement. And the movement is growing—from just a few hundred groups a decade ago to over 4000 organizations today. We work closely with local watershed protection groups, state river conservation organizations, Native American tribes, schools, organizations and agencies. We provide our conservation Partners with information, training, consultation, grants, referrals to other service organizations and networking opportunities, including our annual National River Rally.

In September 1998, the Environmental Protection Agency's Office of Wetlands, Oceans, & Watersheds selected River Network to coordinate and administer the Watershed Assistance Grants Program (WAG). The WAG program will make grants to local watershed partnerships to support their organizational development and long-term effectiveness.

Grants will be distributed to a pool of applicants, which are diverse in terms of geography, watershed issues, the type of partnership, and approaches.

For more information on WAG grants, see Watershed Assistance Grants under the Office of Wetlands, Oceans, and Watersheds, within the Office of Water at EPA.

Description of Program from:

http://www.rivernetwork.org/aboutrn/index.cfm?doc_id=65

(26) Rural Policy Research Institute (RUPRI)

Mission: The Rural Policy Research Institute provides objective analysis and facilitates public dialogue concerning the impacts of public policy on rural people and places.

The Rural Policy Research Institute (RUPRI) conducts policy-relevant research and facilitates public dialogue to assist policymakers in understanding the rural impacts of public policies and programs. Many policies which are not explicitly "rural policies" nevertheless have substantial implications for rural areas, and RUPRI

is dedicated to understanding and articulating these implications.

RUPRI utilizes an inter-disciplinary approach to facilitate understanding of the rural impacts of public policies and to provide decision support to rural residents. RUPRI has established a unique international model for bringing objective external analysis to public policy decision making. This is achieved through: (1) topical research, policy impact modeling; and (2) through nationally recognized Expert Panels, Working Groups, and Task Forces.

This comprehensive approach to rural policy analysis involves scientists from founding member institutions at Iowa State University, the University of Missouri, and the University of Nebraska; and those from affiliate member institutions. In addition, RUPRI involves researchers, practitioners and analysts from numerous other universities, research institutes, governmental units, and other organizations.

To date, RUPRI projects have involved over 176 scientists representing 16 different disciplines at 67 universities. This international collaboration includes community, regional, national, and international policy research and decision support programs.

Description of Program from:

<http://www.rupri.org/purpose/>

(27) Smart Growth Program: Knight Program in Community Building

(National Charrette Institute Certification, University of Miami in Coral Gables, FL). Text that follows is directly from the program's literature and website.

The Knight Program in Community Building is a forum for examining the state-of-the-art in community building.

The program's mission is to advance the knowledge and practice of effective community building through an innovative series of interdisciplinary initiatives including fellowships, scholarships, conferences, charrettes, and publications.

Today's communities face a host of urgent problems ranging from growth issues to quality-of-life concerns. The Knight Program fosters an interdisciplinary approach to these complex problems in the belief that the cooperation of

diverse professions is essential for creating and maintaining livable communities. The fellowship, which is the heart of the Knight Program, each year brings together twelve distinguished mid-career professionals from a multitude of fields.

The Knight Program is based at the University of Miami School of Architecture and is funded by the John S. and James L. Knight Foundation, which promotes excellence in journalism worldwide and invests in the vitality of twenty-six U.S. communities.

How can the public process be organized to create win-win outcomes for communities and developers? What role can charrettes (public design workshops) play in community planning...?

This intensive, two-part certification addresses these questions and more, exploring the nexus between public participation and the design of livable communities. The course offers a complete overview of the NCI Dynamic Planning process, which provides holistic solutions to design and public involvement obstacles encountered in most conventional planning processes...

Participants can include anyone who wants to learn about this...collaborative planning process, including elected officials, planning staff, developers, and concerned citizens...

The course is offered by the Knight Program in Community Building in conjunction with the National Charrette Institute (NCI). It is organized as two modules: an introductory half-day course with open enrollment (\$150), followed by an intensive two-day course (\$750) limited to 35 participants.

Bill Lennertz, lead course instructor, is executive director of the National Charrette Institute. He draws upon his experience with over 150 charrettes to teach participants in planning techniques, including team coordination, the design process, stakeholder engagement, and NCI charrette logistics.

Information is posted on the Knight Program website (www.arc.miami.edu/knight).

Comment by an enrollee from USEPA, Office of Policy, Economics and Innovation: "For those who are interested, this is a great training. I took it last year and it was probably the best 2.5 days I've spent in a long time. I highly recommend it to anyone who is working with communities on growth and development issues. The tools, techniques, strategies, etc are really valuable for

those working directly with communities trying to implement smart growth approaches.”

(28) Taxpayers for Common Sense (TCS)

Taxpayers for Common Sense is a non-partisan, independent advocate for American taxpayers, founded in 1995. The TCS mission statement asserts that the organization is committed to cutting wasteful government spending and/or subsidies, in order to achieve a responsible and efficient government that lives within its means. The vision is for a federal government that costs less, lives within its means, is easier on the environment, and transcends ideological and partisan differences in favor of reinvesting in common sense. It has assets of about \$1 million.

Included at its website is a list of papers and policy positions, some of which have been excerpted in this document.

➤ **“Banking on the Future: Investing in Smart Water Strategies for Pennsylvania and the Nation.”**

Written by Autumn Hanna.

From the Executive Summary: “Banking on the Future” focuses on the coming funding gap crisis for water infrastructure and suggests how to make smarter water infrastructure investments that have more “bang for the buck.” Though the report focuses on southeastern Pennsylvania, it explores an issue that communities are facing all across the nation: how to manage the fiscal crunch when the bill comes for essential water infrastructure improvements.

Drawing from four case studies of southeastern Pennsylvania’s watershed-based organizations, “Banking on the Future” provides several key recommendations to help states and the federal government make better water infrastructure investments. These include better integration of water infrastructure regulations and financial incentives, greater reliance on watershed groups, and stronger emphasis on long-term water planning that keeps future operating and maintenance costs in mind. None of these reforms can happen, however, unless we hold our legislators and water planners more accountable for the health of our watersheds, the quality of our water services, and the proper expenditure of our hard-earned tax dollars.

To read the full report, visit Tax Payers for Common Sense at:
<http://www.taxpayer.net/waterinfrastructure/banking.pdf>

Sources/References:
<http://www.taxpayer.net/about/>

(29) TreePeople

TreePeople's mission is to inspire the people of Los Angeles to take personal responsibility for the urban forest - educating, training and supporting them as they plant and care for trees and improve the neighborhoods in which they live, learn, work and play.

Its forestry programs restore watersheds and fragile habitats. This work also brings neighbors together, revitalizes inner-city communities, cools and greens campuses, and address serious urban issues including water and energy conservation, flood prevention and stormwater pollution.

T.R.E.E.S.

T.R.E.E.S. stands for Transagency Resources for Environmental and Economic Sustainability. The project employs technologies that mimic the “sponge and filter” function of trees. It also demonstrates the technical and economic feasibility (and desirability) of retrofitting a city to function as an urban forest watershed.

The T.R.E.E.S. Project was created by an unprecedented coalition of government agencies and environmentalists, and it offers the first truly integrated approach to resolving all of these issues. In 1997, T.R.E.E.S. held a **design charrette** that brought together dozens of city planners, landscape architects, engineers, urban foresters and public agency staff members to design the retrofit of Los Angeles as a living watershed. Together they developed a series of best management practices (BMPs) for industrial sites, commercial buildings, schools, apartments and single-family homes. The resulting **planbook** is a blueprint for an ecologically, socially, and economically sustainable Los Angeles, and an **implementation plan** proposes public policy and financial strategies that can facilitate the widespread use of the BMPs.

The T.R.E.E.S. Project also promotes sustainable watershed management practices for residential and commercial properties. These practices can conserve water, reduce pollution, create open space and recreational opportunities

and provide jobs for youth in their own communities.

The T.R.E.E.S Project was sponsored by the following agencies: USDA Forest Service/National Urban and Community Forestry Advisory Council; The City of Los Angeles; The City of Santa Monica; The United States Environmental Protection Agency (the EPA's participation was managed by its Clean Water Division); The Los Angeles County Department of Public Works; The Metropolitan Water District of Southern California; The Los Angeles Urban Resources Partnership; (A multi-agency partnership including the Natural Resources Conservation Service, US EPA, and the US Forest Service); The Southern California Association of Governments; Environment Now; ARCO Foundation; Angelica Foundation; Global Environmental Project Institute; California Bay-Delta Authority (CALFED); and the Los Angeles Unified School District (LAUSD).

Find the Planbook at:
<http://www.treepeople.org/trees/PBpreface.htm>

Description of Program from:
<http://www.treepeople.org/vfp.dll?OakTree~getPage~&PNPK=2> <http://www.treepeople.org/trees/default.htm>,
<http://www.treepeople.org/vfp.dll?OakTree~getPage~&PNPK=32>

(30) Water Environment Research Foundation (WERF)

WERF is a not-for-profit 501(c)(3) organization that funds and manages water quality research through a diverse public-private partnership among municipal utilities, corporations, academia, industry, and the federal government. It seeks to promote the development and application of sound science to water quality issues.

Local municipal wastewater and stormwater agencies in 40 states representing some 70 percent of the sewered U.S. population and several agencies in other countries support WERF through annual subscription fees. These subscribers include municipal and regional water and wastewater utilities, industrial corporations, environmental engineering firms, and others that share a commitment to cost-effective water quality solutions that protect the environment and improve the quality of life for all.

Its research portfolio is valued at nearly \$60 million with more than 200 completed and ongoing research projects. It typically funds nearly

\$7 million in new projects each year. The foundation maintains an unbiased and competitive contractor selection process, stringent quality control measures, and a stringent technical peer review process. As a result, its research is a trusted resource that is used widely for water quality, science policy, and management decisions.

WERF is currently funding research in decentralized stormwater technologies and benefits, and is the current administrative agent for the National Decentralized Water Resources Capacity Development Project (see no. 12 listing above).

Sources/Contacts: www.werf.org; Email: werf@werf.org. WERF, 635 Slaters Lane, Suite 300, Alexandria VA 22314. Telephone: (703) 684-2470; Fax: (703) 299-0742.

(i) International Stormwater Best Management Practices (BMP) Database R&D, E&O

The Database, which is now run by the Water Environment Research Foundation (WERF) and began in 1996 under a cooperative agreement between the American Society of Civil Engineers (ASCE) and the U.S. Environmental Protection Agency (USEPA), has support and funding from a broad coalition of partners including, ASCE Environmental and Water Resources Institute (EWRI), USEPA, Federal Highway Administration (FHWA) and the American Public Works Association (APWA). **Wright Water Engineers, Inc.** and **GeoSyntec Consultants** are the entities maintaining and operating the database clearinghouse and web page, answering questions, conducting analyses of newly submitted BMP data, conducting updated performance evaluations of the overall data set, disseminating project findings, and expanding the database to include other approaches such as Low Impact Development techniques. The database itself is downloadable to any individual or organization that would like to conduct its own assessments.

The overall purpose of the project is to provide scientifically sound information to improve the design, selection and performance of BMPs. To accomplish this goal, the Project Team has developed tools to promote scientifically-based collection and management of the data needed to evaluate the effectiveness of stormwater runoff BMPs. These tools include standardized BMP monitoring and reporting protocols, a stormwater BMP database, BMP performance evaluation protocols, and BMP monitoring guidance. Continued population of the database and assessment of its data will ultimately lead to a better understanding of factors influencing BMP

performance and help to promote improvements in BMP design, selection and implementation.

On the website, you can obtain: the minimum protocols for submitting BMP monitoring studies for inclusion into the database; guidance for monitoring stormwater BMPs to meet these protocols; data entry software to store and report BMP monitoring study data; performance summaries for individual BMPs through the on-line searchable database containing roughly 200 BMPs; statistical summaries of the overall BMP database; statistical summaries of performance by BMP types (e.g., wet ponds); technical reports describing the statistical techniques recommended for analyzing BMP performance and the results of performance evaluations; published papers from conference proceedings and journals on the BMP database; and other useful information.

Website and Text from:

<http://www.bmpdatabase.org/index.htm>

(31) WateReuse Foundation

The WateReuse Foundation is an educational, nonprofit public benefit corporation that serves as a centralized organization for the water and wastewater community to advance the science of water reuse, recycling, reclamation, and desalination. The Foundation's research covers a broad spectrum of issues, including chemical contaminants, microbiological agents, treatment technologies, salinity management, public perception, economics, and marketing.

The mission of the Foundation is to conduct and promote applied research on the reclamation, recycling, reuse, and desalination of water. The Foundation's research advances the science of water reuse and supports communities across the United States and abroad in their efforts to create new sources of high quality water through the reclamation, reuse, and desalination while protecting public health and the environment. The Foundation's research provides information on the safety and quality of reclaimed and recycled water, and provides water professionals with the tools and knowledge to meet their commitment of increasing the reliability and quality of the nation's water supplies. The Foundation meets these goals by building on: Scientific integrity; Collaborative partnerships to address critical needs; Leverage of research dollars; Member involvement; and Demonstrated benefits.

The Foundation's primary sources of funding are its Subscribers and its funding partners, which

include the U.S. Bureau of Reclamation, the California State Water Resources Control Board, and the Southwest Florida Water Management District. The Foundation's Subscribers include water and wastewater agencies, and other interested organizations. The Foundation also conducts research in cooperation with two water research coalitions, the Global Water Research Coalition and the Joint Water Reuse and Desalination Task Force, and other water research organizations in the United States and abroad. The Foundation is committed to pursuing new partners to collaborate on research and leverage resources.

2006 Budget: The WateReuse Foundation is financially supported as part of funding for the Bureau of Reclamation's Title XVI Program. For 2006, the U.S. Congress approved \$2.5 million to support the research of the WateReuse Foundation when the conference committee for Energy & Water Development Appropriations met on November 7 to decide funding levels for the U.S. Army Corps of Engineers, the Bureau of Reclamation, and the Department of Energy. The Title XVI program focuses on water reclamation and reuse.

Example of Funded Projects:

➤ **“Use of Recycled Water for Community Gardens.” WRF-04-005**

The project includes the development of a demonstration site where recycled water is used to irrigate crops in a community garden setting. The project involves a number of innovative activities including: the development of “hands on” education and training, including lectures, training sessions, and workshops; a survey of public attitudes before and after implementing the project; and soil and plant tests. The project will serve as a technology transfer of a novel water reuse application for other communities interested in similar applications.

➤ **“Extend the Integrated Resources Planning (IRP) Process to Include Water Reuse and Other Non-Traditional Water Sources.” WRF-04-10**

Description of Program from:

http://www.watereuse.org/pdf/wrf_resupdate0804.pdf

(a) Unsolicited Research Program

The mission of the Foundation's Unsolicited Research Program is to promote applied research through projects proposed by researchers. Unsolicited research projects typically address

emerging issues and involve original concepts, novel techniques, and other scientific research needs. Consistent with the Foundation's other research programs, the Unsolicited Research Program is designed to meet the future needs of the water reuse and desalination communities by encouraging innovative and creative research solutions to priority issues.

Projects proposed under the Foundation's Unsolicited Research Program should address topics related to water reuse or desalination that may not be addressed by other Foundation research programs. These projects are intended to have long-term benefits to the water reuse and desalination communities.

Description of Program from:

<http://www.watereuse.org/Foundation/aboutus.htm>,
http://www.watereuse.org/pdf/wrf_projectssummary.pdf

X) Web Portals

Catalog of Federal Domestic Assistance (CFDA) The online CFDA provides access to a database of all federal assistance programs (not just financial aid) available to state and local governments (including the District of Columbia); federally-recognized Indian tribal governments; territories (and possessions) of the United States; domestic public, quasi-public, and private profit and nonprofit organizations and institutions; specialized groups; and individuals.

Catalog of Federal Funding for Watershed Protection is a searchable database of federal financial assistance sources (grants, loans, cost-sharing) available to fund a variety of watershed protection projects.

Chronicle of Philanthropy Guide to Grants is an electronic database of all foundation and corporate grants listed in The Chronicle since 1995. To search this database, users must purchase a subscription; subscriptions are available for terms ranging from one week to one year and start at \$29.

Community of Science (COS) The COS Funding Opportunities Web site allows users to search more than 23,000 records, representing over 400,000 funding opportunities, worth over \$33 billion. Individuals involved in scientific or scholarly research are invited to join COS' network of more than 480,000 research professionals worldwide at no cost. Corporations and Universities/Research Institutions are required to purchase a membership.

Directory of Watershed Resources A searchable directory of federal, state, local, and private watershed funding sources available for development and implementation of watershed projects. It includes information on nationwide funding opportunities, as well as state and local information for Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, Vermont, Alaska, Idaho, Oregon, and Washington.

Environmental Grantmaking Foundations Directory This directory provides information on more than 900 foundations that fund environmental projects. The directory costs \$115 for the print version, \$125 for the CD-ROM, or \$190 for both (including shipping).

The Foundation Center's (FC) Foundation Finder allows users to search for basic information (contact information, Web site address, and IRS 990 form) on 70,000 private and community foundations in the United States (free

service). They also offer two subscription-based online searchable databases, the **Foundation Directory** and **Foundation Grants to Individuals**, (subscriptions start at \$19.95 per month)

Foundations Providing Grants for Environmental Purposes The National Council for Science and the Environment provides this online directory with links to foundations that provide grants for environmental purposes.

Grants.gov This Web site provides organizations with the ability to search for competitive grants from all grant-making Federal agencies, register to receive grant notices via e-mail, and download grant applications.

Notices of Funding Availability (NOFA) The NOFA Web site allows users to generate a customized listing of federal grant program announcements from the Federal Register.

River Network's Directory of Funding Sources for Grassroots River and Watershed Conservation Groups This Directory (available to River Network members as part of the \$60 annual membership fee) provides profiles of more than 300 private, corporate, and federal funding sources for river and watershed groups.

Additional Resources:

Environmental Finance Center (EFC) Network is a university-based program that provides financial outreach services to regulated communities. The Network consists of ten EFCs that provide advisory services; education, publications, and training; technical assistance; and analyses on financing alternatives. The EFC Network currently includes: **University of Southern Maine**, **Syracuse University**, **University of Maryland**, **University of North Carolina at Chapel Hill**, **University of Louisville**, **Great Lakes EFC at Cleveland State University**, **New Mexico Institute of Mining and Technology**, **California State University at Hayward**, and **Boise State University**.

Environmental Financing Information Network (EFIN) is an outreach service offering electronic access to many types of environmental financing information for state and local environmental programs and projects. EFIN maintains a Web site of environmental financial tools, including links to *A Guidebook of Financial Tools*.

Environmental Support Center (ESC) aims to improve the quality of the natural environment, human health, and community sustainability by increasing the organizational

effectiveness of local, state, and regional organizations working on environmental issues and for environmental justice. ESC offers a variety of training opportunities, loans, and grants to help these organizations become better managed, funded and equipped.

Institute for Conservation Leadership (ICL) empowers leaders with training and build volunteer institutions that protect and conserve the environment. ICL does this by helping leaders lead better, building connections between groups with similar goals, and supporting groups' progress with fundraising, board development, and other activities. Its Complete Fundraiser Program is a 12-month program which provides fundraising skills, training, and consulting support to participants and their organizations as they implement new fundraising efforts and transition to more systematic and sustainable fundraising.

River Network works to protect and restore America's rivers by building the capacity of grassroots organizations and acquiring threatened riverlands. River Network offers publications, fundraising tips, technical assistance and resources, and opportunities to network with other groups across the country. River Network's Resource Library provides tools on how to raise more money, build stronger organizations, and protect rivers and their watersheds. The River Advocates Fundraising Guide contains information, case studies, and lists of resource on a wide range of fundraising topics.

Watershed Information Network A roadmap to information services for protecting and restoring water resources, including resources on financial, technical, and hands-on assistance to support watershed efforts.

Resources for Nonprofit Organizations

Chronicle of Philanthropy The Chronicle's Web site provides links to information on fundraising, volunteerism, technology, academic centers on philanthropy, and publications for nonprofit professionals.

EPA's Grants Desk Top Resource is an online training seminar to help nonprofit recipients understand the assistance agreement regulations, how to manage assistance agreements and how to close out assistance agreements. It also includes a section with tips on writing a grant proposal.

The Foundation Center (FC) strengthens the nonprofit sector by advancing knowledge about U.S. philanthropy. They achieve this is by providing education and training on the

grantseeking process. For example, their Learning Lab provides information on training opportunities, access to virtual classrooms and libraries, and other resources and Literature of the Nonprofit Sector provides access to their collection of literature on philanthropy.

Grassroots Fundraising Journal This web site offers articles with practical, how-to instruction on fundraising strategies such as direct mail, special events, major gift campaigns, and online fundraising. It also offers tools to help you build a board of directors that is willing to raise money, choose a database to track donors, manage your time effectively, and ultimately develop a successful fundraising program.

Groundspring.org is a nonprofit organization that offers software tools and services, online and classroom training, and consulting to help to other nonprofit organizations. It provides assistance with online fund raising and communication and technology to more effectively manage operations.

Internet Prospector is an online, monthly newsletter for nonprofit fundraisers. It provides information on fundraising and links to various types and sources of funding.

Npower Npower's mission is to help nonprofits use technology to better serve their communities. Their Web site's Resources page includes links to articles and resources on databases, fundraising tools, financial management tools, and other tech-related topics.

Source/Reference:

<http://www.epa.gov/owow/funding.html>
