

Regional Geographic Initiatives

Enhancing Environmental
Stewardship for Future Generations

2007



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Foreword

I AM PLEASED TO PRESENT *Enhancing Environmental Stewardship for Future Generations*, a report that showcases projects funded by the U.S. Environmental Protection Agency's (EPA's) Regional Geographic Initiatives (RGI). These projects demonstrate the enormous potential for community, state, and federal partners to work together toward our common goals of clean air, pure water, and protected land.

EPA and its partners recognize that achieving a cleaner, healthier environment requires us to look at environmental problems in an integrated way. Not only must we address threats to air, water, and the land holistically, but we must also work with citizens and organizations at a local level to help them protect the environment in which they live, work, and play. RGI is one way that EPA is fostering this integrated approach.

Each year, RGI funds a myriad of environmental and public health projects that support new collaborations and leverage local resources to achieve environmental results. The projects captured in this publication are representative snapshots of what RGI is all about. I invite you to explore these projects to see how RGI is helping people all across America work together to improve their environment.

Christopher P. Bliley, Associate Administrator
Office of Congressional and Intergovernmental Operations

Overview

E*NHANCING ENVIRONMENTAL STEWARDSHIP FOR FUTURE GENERATIONS* highlights the different types of projects that are funded throughout the country using Regional Geographic Initiative (RGI) funds.

Funding

RGI is a funding source that supports Presidential, Administrator, and Regional priorities. RGI projects must meet national criteria. These projects can:

- Address places, sectors, or innovative projects.
- Be based on a regional, state, tribal, or other strategic plan.
- Address problems that are multi-media in nature.
- Fill a critical gap in the protection of human health and the environment.
- Demonstrate state, local, and/or other stakeholder participation.
- Identify opportunities for leveraging other sources of funding.

Each Region administers RGI funds and has the discretion to set Regional-specific criteria (in addition to the national criteria), which relates to Regional, state, and/or local priorities or initiatives.

Target Audience

This publication intends to inform the general public, government agencies, nonprofit organizations, institutions, and other interested parties about funded RGI projects and the accomplishments achieved through using innovative or multimedia approaches to solving local/regional environmental issues.

Availability of Funds

Each Region determines annually the way they will administer RGI resources based on Regional priorities and needs. Eligibility, types of projects, and availability of funds vary from year to year and from Region to Region. In general, RGI projects support investigations, experiments, training, outreach, education, demonstrations, surveys, studies, and special purpose assistance that address one or more environmental media (air, water, waste, pollution prevention, compliance). To get a better sense of the type of projects that can be funded with RGI funds, contact the appropriate Regional Office (see listing at the back of this document) to find out what opportunities exist.

The following list provides a general description of the types of entities that can and have received RGI funding:

- States, territories, Indian tribes, and possessions of the United States, including the District of Columbia.
- Interstate, intrastate, and local government agencies, districts, and councils.
- K-12 schools and districts.
- Public and private universities and colleges.
- Hospitals.
- Laboratories.
- Research facilities.
- Public or private nongovernmental, nonprofit institutions.
- Individuals.

To be considered, an entity needs to submit an application proposing a project with significant technical merit and relevance to EPA's mission.



Introduction

REGIONAL GEOGRAPHIC INITIATIVES (RGI) is a funding source designed to address complex environmental challenges through integrated, multi-media approaches. EPA uses RGI to support innovative, place-based projects that reduce risks to human health and ecosystems. RGI projects involve a wide range of stakeholders and leverage resources from federal, state, and private sectors to find cost-effective solutions to communities' environmental problems.

This introduction provides background information about RGI funding and addresses Agency and Regional goals. The remainder of this document highlights RGI projects that have been carried out across the country. The projects are organized around three RGI themes: fostering sustainable communities and empowered citizens, encouraging innovation and sound science, and reducing risks. Contacts are provided for each RGI project.

Background

In 1991, EPA Regional offices completed comparative risk assessments of environmental problems to estimate relative risks posed to human health and ecosystems. These assessments identified several place-based problems with characteristics unique to the states in their Regions. Regional offices then developed strategies to identify environmental risks that were not being addressed, wholly or in part, by existing national environmental programs.

The Regions proposed addressing these complex and cross-jurisdictional problems by using geographic-based approaches. RGI funding was established in 1994 to support these efforts and help EPA Regional offices develop strategic approaches to local environmental risks while achieving national goals. The RGI funding offers the Regions flexibility to support projects that are bounded by the region or place in which the problem exists, rather than projects that address a pollutant or sector. In general, funding allows each Region to support eight to 10 projects annually.

Innovation and Partnership

RGI is one of EPA's premiere innovation resources, supporting local projects that have gone on to become national models. Examples of such projects include school bus diesel retrofits and agricultural pollution prevention performance standards for pest management. The RGI approach has been very successful in using new and creative approaches to resolve complex environmental and health problems across programmatic areas.

RGI funds also encourage the creation of partnerships to develop and carry out projects that address local environmental and health concerns. With RGI, EPA Regions are able to fund environmental stewardship initiatives proposed by communities and nongovernmental organi-

zations. RGI funds support collaboration with communities and other partners to address local environmental issues through a grassroots approach, which fosters stakeholder involvement and participation in project development and implementation.

Leveraging

Regions use RGI to leverage other federal, public, and private resources to achieve the Agency's performance priorities. In addition, the results from RGI projects can inform Regional priorities. Regions use RGI to further Presidential, Administrator, and Agency initiatives such as children's health, green buildings, clean energy, agriculture, and environmental stewardship. RGI projects span the traditional environmental areas of air, water, and land, and provide Regions with flexibility to focus funding on projects that meet the greatest local environmental needs.

Agency Goals

RGI funds support Goal 4, Healthy Communities and Ecosystems, of EPA's Strategic Plan. This goal seeks to "Protect, sustain, or restore the health of people, communities, and ecosystems using integrated and comprehensive approaches and partnerships." In addition, Objective 4.2 of the Goal is to "Sustain, clean up, and restore communities and the ecological systems that support them." Goal 4 and its strategic objectives describe a collaborative approach to addressing a wide range of environmental issues relating to human and/or ecosystem health. RGI-funded projects address many of the multi-media targets in this goal, including urban, rural, industrial, agricultural, mountain, and coastal environments. RGI funds serve as a flexible vehicle for Regions to respond to strategic regional, state, and local priorities.



Fostering Sustainable Communities and Empowered Citizens

RGI FUNDS SUPPORT PROGRAMS THAT empower citizens to identify environmental problems in their communities and develop sustainable solutions. RGI helps citizens make connections between their neighborhoods, supporting ecosystems, and surrounding communities. Residents work together to educate themselves about how to make their communities more livable, healthy, and beautiful.

Each local community has different concerns—from promoting energy efficiency, to keeping the air clean, to creating open space. RGI funds typically foster collaborations that bring together people from many walks of life to address each local community's concerns. RGI funding has been particularly helpful in supporting sensitive populations, such as low-income and minority communities that face multiple environmental threats. Examples of RGI-funded projects that foster sustainable communities and empower citizens are identified below, and described in further detail in this chapter.

- In Massachusetts, the Chelsea Green Space & Recreation Committee received RGI funding to create a community visioning process for the neighborhood's last remaining salt marsh. Using RGI funds, residents learned the importance of an estuary, became informed about the permitting process for redevelopment, and developed a sense of ownership for the estuary. Residents worked with other stakeholders to create a community-based master plan, generated dialogue with local industry, and identified opportunities to create community access to Chelsea Creek.
- In Oregon, the Lane County Board of Commissioners in the Willamette area, along with the councils of many of the surrounding cities, worked to develop plans to manage their communities' growth in a sustainable manner. They used RGI funding to measure and monitor the impacts of three alternative growth scenarios on air and water quality and rare habitat types. The study used Geographic Information System models and baseline data to identify ways to direct growth into areas that would have the least impact on air and water quality and important habitat areas.
- In Minneapolis, RGI funding supported a city project to increase solar power as a way to diversify the city's energy supply, reduce dependence on imported fuels, improve air quality, offset greenhouse gas emissions, and stimulate the economy. The city of Minneapolis is examining several tools for encouraging solar power investment in new private developments. To demonstrate the effectiveness of solar power, the city installed photovoltaic solar panels on three highly visible city facilities.
- In Philadelphia, the Livable Neighborhood Program used RGI funding to empower citizens to address environmental concerns on their blocks. Neighbors formed teams, chose topics of concern, and worked together to address those concerns using the Livable Neighborhood Program workbook. Focus areas included health and safety, beautification and greening, energy efficiency, resource sharing, and neighborhood building. Training and certification were also offered for neighborhood block leaders to develop skills in leadership, empowerment coaching, group facilitation, project management, and community organizing.

Building Healthy Urban Communities in Boston

Area Description

Chelsea and East Boston are surrounded by Mill Creek and Chelsea Creek, Mystic River, Island End River, and Boston Harbor. However, there is almost no public access to these waterfronts, and a number of businesses still use the Chelsea Creek area as an illegal dumping ground. Chelsea Creek is a working river, navigated by large ships, and is a designated port within Boston Harbor. This designation does not generally allow for public access or recreational use of the waterfront, which limits redevelopment opportunities.

Chelsea's population is close to 37,000. Its racial/ethnic composition is 50 percent Latino, 40 percent White, and 10 percent Asian, African-American, or other. Median household income is \$25,000, and 24 percent of Chelsea residents live below the poverty level. East Boston is separated from Chelsea by Chelsea Creek and has a population of over 38,000. Its racial/ethnic composition is 50 percent White, 39 percent Latino, 4 percent Asian, 3 percent African-American, and 3 percent mixed-race. Median household income is \$31,300, and 20 percent of East Boston residents live below the poverty level. The percentage of people living below poverty level in both areas is two to three times the statewide average.

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Environmental Challenges

In urban areas throughout New England, residents are exposed to significant environmental and public health hazards every day, including lead poisoning, rat-infested vacant lots, contaminated rivers, asthma exacerbated by poor indoor and ambient air quality, and a lack of safe, useable open and green space.

These poor environmental conditions create cumulative, disproportionate, and inequitable health risks to urban residents, especially high-risk and sensitive populations such as children and the elderly.

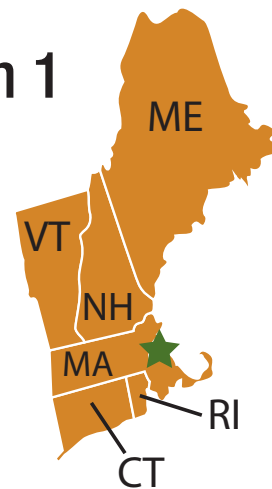
The urban communities of Chelsea and East Boston, Massachusetts, experience environmental injustice as typified by the cumulative environmental and public health problems described above. The two communities are geographically located in close proximity

to large highways (e.g., the Tobin Bridge and Route 1A) that are a significant source of vehicle emissions. They are also host to Boston's Logan Airport and associated industries that generate a high volume of truck traffic and resulting diesel emissions. Chelsea and East Boston contain 398 state

designated hazardous waste sites; five major oil storage facilities; the largest rock salt pile in the Northeast; a working tannery; and more than 90 freight forwarding companies. Together, these sources result in significant levels of air, water, land, and noise pollution.

A June 2000 report titled *Unequal Exposure to Ecological Hazards: A Preliminary Report on Environmental Injustices in the Commonwealth of Massachusetts* by Daniel R. Faber and Eric J. Krieg identifies Chelsea and East Boston as the third and fifth "most environmentally overburdened cities/towns in Massachusetts." To address these concerns, EPA New England has made Chelsea and East Boston a focus for community-based environmental improvement.

Region 1



Partners

In addition to the efforts made by Neighborhood for Affordable Housing and Chelsea Green Space & Recreation Committee, numerous other stakeholders were part of the efforts, including EPA's Urban Environmental Program; Chelsea Creek Action Group; Greater Boston Urban Resources

Partnership; Massachusetts Environmental Trust; Watershed Institute; Massachusetts Executive Office of Environmental Affairs; Massachusetts Institute of Technology (MIT); Tufts University; Conservation Law Foundation; Massachusetts Riverways Program; Campaign for the Water's Edge; City of Chelsea Planning and Development Department; Chelsea Summer Environmental Youth Crew; Department of Housing and Urban Development; and the Boys & Girls Club.

Major Milestones/Accomplishments

In 2000, the Chelsea Green Space & Recreation Committee received RGI funding to support its Mill Creek Restoration Project. The project worked to revitalize Chelsea's last remaining salt marsh through a community visioning process. Through the project, residents became involved in the planning and visioning phase for renovations to the waterfront land and made a presentation to the city's Planning and Development Department. Residents also learned the importance of an estuary, became informed about the permitting process for redevelopment, and developed a sense of ownership for the estuary. The project created a model waterfront development to demonstrate the link between natural resources and sustainable economic development.

In 2001, the Neighborhood of Affordable Housing received RGI funding to support its Chelsea Creek Master Planning/Visioning Project. This project brought residents together with other stakeholders to create a community-based master plan to help improve dialogue with industry about improvements needed for Chelsea Creek. The project leveraged resources from polluting businesses and other entities to develop safe public access and open spaces. The project also prepared residents to participate in the municipal harbor planning process and impact zoning decisions.

Generally speaking, dedicated programmatic funding sources are not available to support this type of community planning and capacity-building effort. In this case, RGI funding enabled the community to create a clear plan and cost estimate for the best use of the area. Fortunately, an opportunity to put this plan into action arose when EPA New England was negotiating a supplemental environmental project in the area. The Urban Environmental Program worked with community partners to define a \$900,000 project to remediate and construct the Condor Street Urban Wild, a 4.5-acre site of urban vacant land. The goal of the project was to transform this site from a degraded, contaminated former industrial area into a safe, attractive, accessible natural area. As a result of the project, East Boston and Chelsea residents now have access to open/green space and recreational and environmental educational opportunities in line with community priorities and their master vision for the Chelsea Creek.

Because of the strong partnership, planning efforts, and community infrastructure created and sustained through RGI-funded projects, the public was able to participate in the planning and design process for the site and the Chelsea Creek as a whole. The final design reflects public priorities and interests for the urban wild. Additional trees and plants were

targeted to provide air quality benefits, wildlife habitat restoration, and water quality enhancement. A path and boardwalk system was created for safe public access to the Chelsea Creek, which represents the first such access of its kind to the Creek. The restored property now poses no environmental or public health risk from contamination and provides much needed green and open space.



The site was officially opened to the public on Saturday, October 4, 2003, with a ceremony attended by EPA Acting Administrator Marianne Lamont Horinko, EPA New England Regional Administrator Robert W. Varney, Boston Mayor Thomas M. Menino, and local artist B. Amore. Even the rain could not keep more than 100 people from touring the site and participating in the ceremony. Since the opening ceremony, the partners have created local programming to continue to encourage safe public use of the site, and community residents have reported an increase in wildlife in the area.

Planning for Rapid Growth in Oregon

Area Description

Lane County is located in the Southern Willamette Valley of the Willamette Basin. The valley is a narrow, fertile trough between the coast and Cascade mountain ranges in central-western Oregon. The region is centered around Eugene/Springfield, the second largest metropolitan area in Oregon, which is surrounded by eight smaller incorporated cities and 15 rural unincorporated communities. Several rivers and streams drain from both ranges into the Willamette River, which divides the valley. The Willamette flows north from the Eugene/Springfield area and empties into the Columbia River near Portland.

Those who work and live in the basin depend on the Willamette River and its tributaries for drinking water and water to supply industry and agriculture. The river and its tributaries are also the corridors for several species of salmon and steelhead trout, and home to a variety of resident trout populations. The rich and fertile lands within the Southern Willamette Valley support agriculture and industrial forestry. The valley lands include valuable remnant habitats of wet prairies; bottomland gallery forests of cottonwood, ash, and alder; and oak-savannas in the surrounding foothills.

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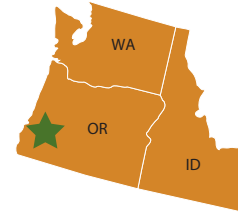
Environmental Challenges

Oregon's Southern Willamette Valley region is growing rapidly, and with this growth have come development pressure, unplanned development, and consequent impairment of the region's water resources. By 2050, the region's population is projected to be 463,500 (a 55 percent increase), supported by 215,000 jobs (85,000 more than today). Residential development is booming in the small cities, while job opportunities remain concentrated around Eugene/Springfield.

This projected growth cannot be accommodated within the existing urban growth boundaries (UGBs). Unplanned development threatens surface water, ground water, and air quality in the region. Localized high nitrate levels in ground water are expected to become more widespread as higher density development continues to rely on septic systems. The Oregon Department of Environmental Quality (DEQ) has identified many of the waters within the region, including the Willamette River, as impaired for temperature, mercury, and bacteria. DEQ recently adopted the Willamette Total Maximum Daily Loads (TMDLs) for these waters. The Regional Growth Management Strategy 2050 is intended to help guide growth management in the region, specifically in Lane County, Oregon.

Major Milestones/Accomplishments

The Lane County Board of Commissioners and the councils of many of the surrounding cities passed formal resolutions endorsing the concept of a Regional Growth Management Strategy. The Lane Council of Governments (LCOG) was directed to seek funding and develop the strategy. LCOG brought key technical experts and community decision-makers together to identify key issues and agree on a vision and actions to address growth issues such as housing, jobs, schools, transportation, water, and other public facilities, while protecting natural resources and the environment. From this effort, three alternative growth scenarios and seven land use maps were produced using historic and scientific data. The maps showed footprints of the 100-year floodplain, wetlands, riparian areas, and other habitats. They also depicted ecosystem services provided by these areas. Areas with native vegetation were identified as "possible native habitats" to help identify habitats available for selective species. The maps showed some of the threats posed by



Region 10



development and potential mitigating approaches. The maps also identified priority areas in which conservation and restoration would be desirable in order to provide permanent protection for Oregon's unique plant and wildlife species.

LCOG used the three alternative growth scenarios to facilitate a community involvement process to discuss growth in each community and the region: 1) the Compact Urban Growth Scenario, which depicted growth in the Eugene/Springfield Metropolitan area; 2) the Satellite Communities Scenario, which targeted growth in the surrounding small cities; and 3) the Rural Growth Scenario, which showed growth in rural residential lands in rural communities.

Citizens, planners, and elected officials discussed and evaluated the relative merits of the three growth scenarios using seven quality of life categories: land use, housing, economy, natural resources, community facilities and services, transportation, and education. Of these, land use and development, transportation, and environment have the most profound effect on the region's open spaces and natural resources. Several key environmental concerns emerged, including:

- Nitrates, bacteria, and elevated temperatures in surface and ground water threaten the quality of drinking water.
- Pollution threatens livelihoods of fishermen and others dependent on clean water.
- Water pollution increases costs for all users.
- Conserving and restoring certain critical habitats can aid in improving water quality.
- Urbanization and development almost inevitably lead to fragmentation and degradation of habitat with resulting loss of biodiversity.
- As the population of the area

increases and density within cities increases, recreational areas will become over-populated and over-used. With increasing travel costs, recreational opportunities should be close to cities and accessible by a variety of travel modes.

In July 2003, LCOG received RGI funding to measure and monitor impacts of the three alternative growth scenarios on air and water quality and rare habitat types. The study used Geographic Information System (GIS) models and baseline data to compile information on air and water quality and rare habitats; improve the likelihood that growth would be directed into areas least impacting air and water quality and rare habitats; transfer the lessons learned into the broader land use and planning process; and promote similar planning activities by sharing methods and results with outside organizations and regional agencies.

Several key milestones were achieved: developing the three alternative growth scenario maps; securing needed additional baseline data; establishing a greater understanding of the scenarios and the impacts to the environmental resources; adjusting scenario maps to meet land use needs; and completing a quantitative and a qualitative evaluation of the alternatives using GIS models. LCOG also scored each alternative growth scenario relative to key criteria using baseline data and community input.

The results of this study helped guide the development of a final preferred growth scenario, which encompassed elements of all three scenarios. The scenario became part of the Regional Growth Management Strategy 2050. In September 2005, EPA awarded LCOG additional RGI funding to contribute to the ongoing development of the strategy. More than \$200,000 of

Partners

The following stakeholder groups contributed to the success of this effort:

- LCDG
- The 10 planning commissions and elected bodies from Lane County and the 10 cities in the region: Coburg, Cottage Grove, Creswell, Eugene, Junction City, Lowell, Oakridge, Springfield, Veneta, and Westfir
- Regional Technical Advisory Committee
- Regional Policy Advisory Board
- Lane County Homebuilders Association
- Lane Economic Committee
- Lane Transit District Board
- Emerald People's Utility District Board
- Eugene Water and Electric Board
- Eugene Chamber of Commerce
- McKenzie Watershed Council
- Middle-fork Willamette Watershed Council
- 1,000 Friends of Oregon
- League of Women Voters of Lane County
- Oregon Planning Institute
- University of Oregon
- Oregon Department of Land Conservation and Development
- Oregon Department of Environmental Quality
- Oregon Water Resources Department
- Office of the Governor of Oregon
- U.S. EPA
- U.S. Bureau of Land Management
- More than 1,000 dedicated citizens from the Southern Willamette Valley

in-kind staff and local support, and over \$500,000 in direct revenues, have also been committed to the effort from six cities, several utilities, and other stakeholders.

Capturing Solar Energy in Minneapolis

Area Description

The project is located in the city of Minneapolis, Minnesota. The state has more annual solar energy potential than Houston, Texas, and nearly as much as Miami, Florida. The city itself is a progressive, environmentally friendly urban center. However, the city would like to make even greater progress on formidable environmental issues related to air quality, water quality, and renewable energy use in the urban core and the surrounding neighborhoods.

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Environmental Challenge

The city of Minneapolis has set a goal to improve air quality by reducing emissions of criteria pollutants, air toxics, and carbon dioxide and other greenhouse gases. Solar power is an important tool to meet this goal. Solar energy can diversify the energy supply, reduce dependence on imported fuels, improve air quality, offset greenhouse gas emissions, and stimulate the economy by creating jobs in the manufacturing and installation of solar energy systems.

Region 5



The city of Minneapolis believes that private investment in solar power is accelerating in Minnesota, and the city is examining several tools for encouraging solar power investment in new private developments. Before asking for investments from the private sector, however, the city decided to demonstrate that solar power is feasible in Minneapolis and lead by example by installing solar



Partners

The Minnesota solar project is part of Region 5's Great Cities Program, created in 2003 to serve as a vehicle to build partnerships with the six oldest, largest cities in the Region (<http://www.epa.gov/Region5/greatcities/>). The program focuses on the city's environmental and public health priorities, as defined by each city's mayor. Great Cities is designed to shift resources to opportunities that exist for accelerating environmental progress and filling regulatory gaps through innovative ideas and collaborative partnerships.

With the assistance of RGI funds, the city of Minneapolis partnered with the state to leverage existing rebate and tax programs to encourage solar power. The Minnesota Energy Office within the Department of Commerce offers partnership contributions in the form of rebates of \$2,000 to \$8,000, depending on the size

of the power systems. For this demonstration project, because of its comprehensive nature, the city was able to obtain the maximum rebate of \$23,000, which exceeded all original projections. This rebate funding was used to increase the capacity of the photovoltaic power system installed and to purchase software for a real-time data system for the solar installation. In addition to the rebate program, the project took advantage of the state sales tax exemption (5 percent) on solar panels and electric systems.

The city is also partnering with the U.S. Department of Energy (DOE) to assess barriers, incentives, education, and outreach regarding the feasibility and benefits of solar energy. Through its "Million Solar Roofs" partnership program, DOE will work with the city to explore regulatory barriers and market incentives to promote solar energy and energy efficiency applications in buildings.

Major Milestones/Accomplishments

panels on city facilities.

The city installed photovoltaic solar panels on three highly visible city facilities to demonstrate the feasibility and benefits of solar energy in Minneapolis. Specific installations included:

- 5.0 kilowatt (KW) solar panels on the roof of Fire Station #6.
- 2.6 KW solar panels in the yard of the Royalston Maintenance Facility.
- 4.0 KW solar panels on the roof of the Currie Equipment Maintenance Facility.

This project will displace the use of power generated through the burning of fossil fuels and is expected to offset:

- 9,600 pounds of nitrogen oxides per year.
- 17,400 pounds of sulfur dioxide per year.
- 2,500,000 pounds of carbon dioxide per year.

The city has also installed a real-time interactive data system on the city's Web site to showcase power savings and potential cost savings to highlight the difference between using solar

power and fossil fuels.

This demonstration project served to educate the public about renewable energy and jumpstart the city's partnership with the Minnesota Department of Commerce to encourage private interests to install similar equipment. The city will also encourage other building owners to consider using solar energy by involving them in partnerships and through education and outreach.



Great Cities Project Goals

- 1) Achieve tangible environmental results for all projects in a timely manner, preferably within one to two years.
- 2) Build collaborative partnerships and relationships among cities, states, and public and private sectors to address public health and environmental issues.
- 3) Leverage resources that allow projects to be sustainable beyond the range of Agency funding.
- 4) Develop transferable work products, best practices, and lessons learned to promote innovative actions in other areas.
- 5) Focus on each city's environmental and public health priorities to fill critical gaps in EPA's ability to protect human health and the environment at the local level.

Empowering Neighborhood Action in Philadelphia

Area Description

The Livable Neighborhood Program operates within low-income, “row home” neighborhoods in Philadelphia, Pennsylvania. Philadelphia is a city of neighborhoods, and this program reaches the south, southwest, west and north sections of the city. These are neighborhoods most in need of addressing environmental issues on their blocks.

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Environmental Challenge

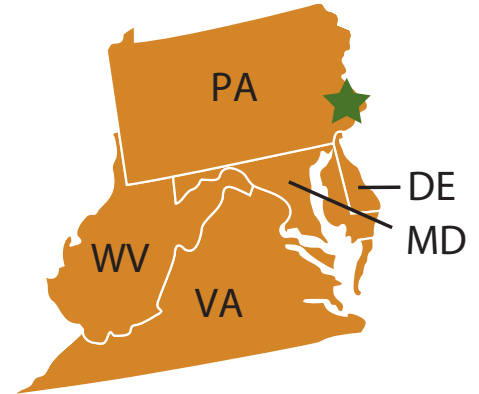
Too often, neighborhoods wait for the appropriate government agency to show up and fix their problems. Yet, government at every level is stressed to meet the public’s demands. The Livable Neighborhood Program offers an alternative—a detailed menu of actions that citizens can take to address environmental problems on their own, while interacting with local government as efficiently as possible.

The Livable Neighborhood Program is designed so that any level of activity will produce benefits, and these successes can increase over time. It can be used in any neighborhood setting—urban, suburban, or rural. The ideal situation combines energetic grassroots initiative with strong partnerships with government, community service organizations, and businesses.

The city of Philadelphia faces many environmental and health challenges due to poor air quality (both outdoor and indoor), polluted stormwater runoff, hazardous waste and Brownfields sites, and solid waste issues. These issues result in critical human health concerns for some middle- and low-income residents, including lead poisoning in children, radon exposure, and increased asthma cases due to toxics found in the home and garden. The time had come for some kind of neighborhood program to provide residents with practical tools and easy-to-learn skills for making their communities healthier places to live. The Livable Neighborhood Program was born.

The birth of this program gave EPA Region 3 the opportunity to provide RGI funding for the Livable Neighborhood Program and meet RGI goals, such as identifying multi-media problems in the protection of human health and the environment, partnering with various stakeholders, addressing a specific geographic area, and providing “start-up” funding to complement other EPA national programs.

Region 3



Major Milestones/Accomplishments

Participation in the Livable Neighborhood Program began with neighbors knocking on doors and inviting other neighbors to a block meeting. At the first meeting, participants assessed their most critical needs, selected actions to pursue, divided up responsibilities, and created a plan. The teams met seven times over four months to carry out their plans. The actions each team chose to pursue came from the Philadelphia Livable Neighborhood Program workbook, which covers five topics: health and safety, beautification and greening, energy efficiency, resource sharing, and neighborhood building. Also included in the workbook are step-by-step instructions for establishing a meeting format and an easy-to-use planning guide for taking actions.

The Livable Neighborhood Program is designed to help people take personal responsibility for the communities in which they live. Neighbors, working together, keep their environment clean and safe. The hope is that this behavior change will become habitual within individual families and communities, fostering a new way of living and being in a community. The Livable Neighborhood Program is based on a state-of-the-art understanding of how to change individual and group behavior. The secret is clear incentives and immediate rewards. Using the program's proven methods, neighbors work together to make their blocks safer, cleaner, healthier, more beautiful, friendlier, and a better place to raise their children.

An outgrowth of the Livable Neighborhood Program is the development of the Block Leadership Academy, which offers training and certification for neighborhood block leaders to develop skills in leadership, empowerment

coaching, group facilitation, project management, and community organizing. RGI funding contributed to tuition costs that supported more than 100 residents' training in the Block Leadership Academy.

The Livable Neighborhood Program boasts very impressive recruitment statistics: 87 percent of all households invited to participate in the program indicate an interest in attending a meeting. Of those interested households, 74 percent commit to attending a meeting, and 88 percent of those who commit to attending actually do so. In all, 60 percent of all households originally invited to attend a meeting and join a team actually do so and actively participate in the program. The program's original goal of creating 60 teams was far exceeded by the actual creation of over 90 teams. This translates into hundreds of individual actions getting completed within Philadelphia neighborhoods.



Many environmental issues are being addressed through the program, including poor indoor and outdoor air quality, polluted stormwater runoff, hazardous waste and Brownfields sites, solid waste, radon, lead poisoning in children, and asthma. The environmental actions being taken to address these issues include calming traffic, curbing dogs, conserving water and energy, cleaning storm drains, planting neighborhood gardens,

Partners

The following stakeholder groups are contributing to the success of this effort:

- City of Philadelphia
 - Mayor's Office
 - Managing Director's Office
 - Health Department
 - Streets Department
 - Municipal Energy Office
 - Transportation Office
- Commonwealth of Pennsylvania
- University of Pennsylvania
- Pennsylvania Department of Environmental Protection
- U.S. EPA
- Hundreds of Philadelphia residents who attend neighborhood training sessions, recruit fellow neighbors, serve as block leaders, and conduct Livable Neighborhood Program activities to improve the health and safety of family, friends and neighbors.

and conducting lead and radon safety workshops. The program also has improved the quality of life for residents in many ways. Blocks have been turned into safe, supervised play areas during the summer months; abandoned houses have been sealed; and street signs, lighting, and potholes have been fixed or improved. The city has also conducted fire and safety inspections, and residents participate in Town Watch programs.

RGI funds contributed to the success of the Livable Neighborhoods Program. This success is due to the commitment of truly dedicated neighbors who are empowered to take action, assume responsibility for the environmental challenges in their neighborhood, and gain the knowledge necessary to eventually create the kind of neighborhood that is safe, clean, and a joy in which to live.

Innovation and Sound Science



RGI PROJECTS BRING COMMUNITY MEMBERS into the scientific process, both by giving them the scientific tools to participate with researchers and by helping them inform researchers about their environmental concerns. RGI also fosters sound science by promoting collaborations across the scientific community. Finally, RGI fosters innovation by funding emerging tools to help solve environmental problems. For example, industrial ecology is a systems-based approach that analyzes the interrelationships between the economy and the environment, focusing on the impact of human activity on the environment. This approach can be effective in generating pollution prevention strategies and reducing the use of raw materials. Examples of RGI-funded projects that promote innovation and sound science are identified below and described in more detail in this chapter.

- In a project focusing on the New York/New Jersey Harbor, RGI funds have supported a multi-year project designed to identify pollution prevention strategies for five contaminants of concern entering the harbor: mercury (and methylmercury), cadmium, polychlorinated biphenyls (PCBs), dioxins, and polyaromatic hydrocarbons (PAHs). RGI funds enabled community members to participate in the research process by helping scientists identify areas to sample and potential exposure routes.
- At the University of Southern Mississippi, state and local agencies are identifying which animals contribute to bacteria-containing fecal material that is impairing Gulf of Mexico waters. RGI funding enabled the university to convene a group of scientists who work in the bacterial source tracing field in the coastal waters of the southern United States to discuss, develop, and test the most appropriate, effective methods for identifying bacterial sources in the Gulf of Mexico.
- In Kansas City, a regional By-Product Synergy project has brought 12 companies together to match unwanted by-products as resources for new products and by-products. Individual companies have been transformed into a cross-industry team focused on turning every gram of material running through their plants into usable products.

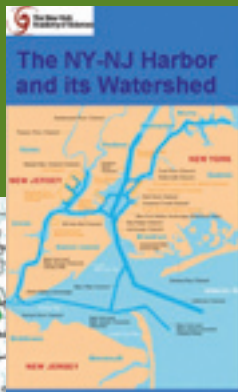
Preventing Pollution in the New York/New Jersey Harbor

Area Description

The New York/New Jersey Harbor's airshed and watershed are vast, covering about 95,000 and 13,400 square miles, respectively. Overall, the environment of the Harbor is affected by a geographic area extending from at least North Carolina in the South to Indiana in the Midwest. Most of the work for this project was focused on the watershed, which includes the states of New York and New Jersey.

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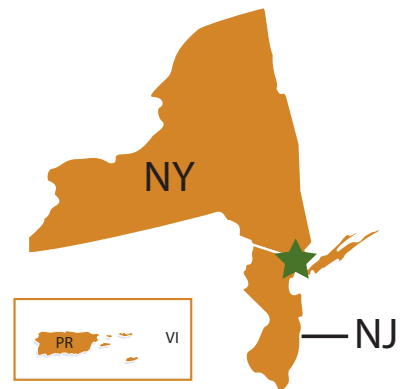
Environmental Challenges

This is a dynamic time for the entire Hudson Valley watershed, and the New York/New Jersey Harbor in particular. Currently, planners, regulators, and lawmakers are shaping the environmental future of the harbor through their decisions on issues such as land-use practices, dredging to increase capacity of port facilities, and cleanups of Superfund sites. These decisions will profoundly affect pollution levels in the harbor—with far-reaching consequences for the economic future of the region.

The harbor has been a key manufacturing and shipping center since the early 19th century, and the harbor's industrial pollution is one of the region's most pressing environmental problems. Despite the great strides that have been made in reducing pollution in the harbor, continued high levels of polychlorinated biphenyls (PCBs), dioxin, mercury, and other toxicants in fish, such as striped bass and bluefish, have resulted in numerous fish consumption advisories. Consuming contaminated fish can result in adverse health effects, including increased incidence of cancer as well as endocrine, immune, and nervous systems impairments. Children and developing fetuses are at the highest risk.

In addition to human health threats, the harbor ecosystem's health and productivity are threatened by toxicants, pathogens, and nutrient and organic enrichment, as well as by habitat loss and degradation. This environmental damage has led to declines in fish and shellfish populations and a reduction in diversity of the watershed's wildlife, including birds.

Region 2



Partners

The New York Academy of Sciences (NYAS) is an independent, nonprofit, membership-based organization created to advance the understanding of science, technology, and medicine. To address the problem of contaminant pollution in the New York/New Jersey Harbor, NYAS has been convening a consortium of regional and national stakeholders, including local, community, and environmental conservation groups;

industry and small business associations; local, state and federal government (including the Port Authority of New York/New Jersey and EPA); academia; and labor from the entire harbor watershed.

Each of the partners provided technical expertise and, when feasible, financial support. EPA Region 2 awarded NYAS several years of RGI funding totaling over \$200,000 for the harbor project. This funding helped to leverage more than \$1.5 million from other partners and sources, including the Port Authority of New York/ New Jersey and the Harbor Estuary Program.

Major Milestones/Accomplishments

Utilizing an industrial ecology approach, this multi-year project aims to identify pollution prevention (P2) strategies for five contaminants of concern entering the harbor: mercury (and methylmercury), cadmium, PCBs, dioxins, and polyaromatic hydrocarbons (PAHs). The project uses materials flow analysis coupled with mass balance and economic analyses to identify economically feasible P2 strategies with the greatest environmental impact. The three-pronged approach includes: 1) thorough review of available scientific research, 2) outreach to and communication with key stakeholders to facilitate public participation in developing and implementing P2 measures, and 3) promotion of the stakeholders' recommended strategies to achieve implementation.

The project's specific outputs include:

- 1) Four contaminant reports have been published on mercury, cadmium, PCBs, and dioxins. (See www.nyas.org for full reports.)
- 2) The project has identified leverage points for intervention, control technologies, and P2 alternatives to reduce contaminant inputs to the harbor. The project has also developed cost estimates for these alternatives and technologies.
- 3) Harbor-specific P2 recommendations have been developed for

mercury, cadmium, PCBs, and dioxins. Research findings on sources of mercury in the region were unexpected, as national trends indicate that large quantity generators are the primary contributors of mercury to the environment. However, the substance flow assessment used in this project showed that the cumulative contributions from small generators in the New York/New Jersey region are the most significant contributors of mercury to the harbor. To reduce mercury contributions to the harbor, the project developed P2 plans targeting these small quantity generators, including 8,500 dentists using or removing mercury amalgams; more than 143 regional hospitals; and 270 laboratories.

Through sound science and collaborative decision-making, the project has generated viable harbor-specific P2 recommendations that will help promote a cleaner harbor and watershed environment, reduce the exposure route and accumulations of various contaminants in the harbor, and improve recreational fishing. The project has also shared the recommendations with local stakeholders who could implement and/or benefit from them. For example, a workshop was held for New York City area dentists to educate them about the proper handling of



mercury-containing dental amalgams. Outreach efforts to communities have helped raise public awareness about watersheds, aquatic systems, and water quality issues. Other efforts have included conducting public meetings and workshops, developing a project-specific Web site, and publishing toxicant reports and scientific background materials.

Representatives of the New York Academy of Sciences (NYAS), which led the harbor project, have been asked to speak about its successes both nationally and internationally. The National Pollution Prevention Roundtable awarded the NYAS and the Harbor Consortium the Most Valuable Pollution Prevention Writing Award in 2004 for the *Pollution Prevention and Management Strategies for Mercury in the New York/New Jersey Harbor*. NYAS was also honored by "Trees for the Future," which planted a grove of 100 trees as a living tribute to the harbor project.

Saving “America’s Sea” Through Bacteria Tracking

Area Description

The Gulf of Mexico is sometimes called “America’s Sea” because it is the source of many of the United States’ renewable and nonrenewable resources. Covering 3,400 miles of shoreline, the 600,000-square-mile Gulf is bordered by five states (Florida, Alabama, Mississippi, Louisiana, and Texas) and hundreds of communities. The Gulf’s bottom topography includes broad continental shelves, submarine canyons, abyssal plains, and ancient reefs. The Gulf is of tremendous economic, ecological, and social value to the Southeast and the nation. The specific project area included three coastal Mississippi counties: Hancock, Harrison, and Jackson, and the metropolitan areas of Bay St. Louis, Waveland, Biloxi, Gulfport, Ocean Springs, and Pascagoula. All of these communities were severely impacted by Hurricane Katrina in 2005 and are experiencing increased industrial development and population growth.

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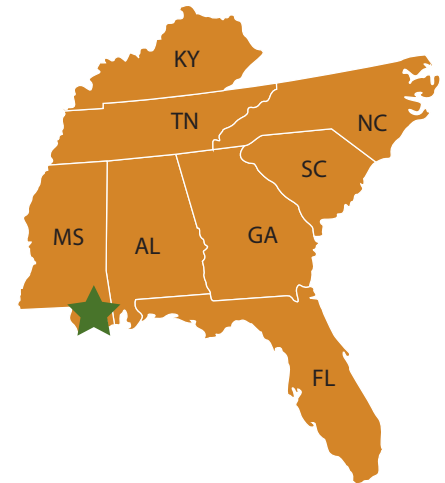
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Environmental Challenge

In 2004, 85 percent of the nearly 20,000 beach closures in the United States were due to high bacterial levels. Over the past 25 years, pollution source studies have revealed that in spite of the enormous improvements in physical wastewater treatment facilities, the rapid growth of residential, commercial, and industrial developments still overwhelm the treatment systems. Scientists assess microbiological impairment of water by monitoring concentrations of fecal-indicator bacteria, such as fecal coliforms and enterococci. These microorganisms are associated with fecal material from humans and other warm-blooded animals, and their presence in water is used to indicate potential presence of enteric pathogens that could cause illness in exposed persons. Reliable and accurate tools to identify the sources of the bacteria are imperative for developing best management practices to control fecal contamination, protect recreational water users from waterborne pathogens, and preserve the integrity of drinking source water supplies.

The University of Southern Mississippi (USM) Microbial Source Tracking Initiative assists state and local agencies in identifying which animals contribute to fecal material containing *E. coli* and enterococci bacteria. The initiative builds infrastructure, develops and validates methods, builds networks, and educates the public. RGI funding enabled USM researchers to convene a group of scientists who work in the bacterial source tracing (BST) field in the coastal waters of the southern United States to discuss, develop, and test the most appropriate and effective methods. This gathering provided a better understanding of the geographical range of the bacterial sources in the Gulf of Mexico.

Region 4



Partners

The Gulf of Mexico Program's mission is "to facilitate collaborative actions to protect, maintain, and restore the health and productivity of the Gulf of Mexico in ways consistent with the economic well-being of the region." The partnership includes representation from state and local governments; the citizenry in each of the five Gulf states; business and industry; federal agencies responsible for research, monitoring, environmental protection, and natural resource management; and the academic community.

The Microbial Source Tracking Initiative is a collaborative initiative supported by the partners in the Gulf of Mexico Program. This and other projects are used to achieve the goals of engaging many people across the Gulf region and coordinating projects that move the Region in an environmentally and economically sound direction.



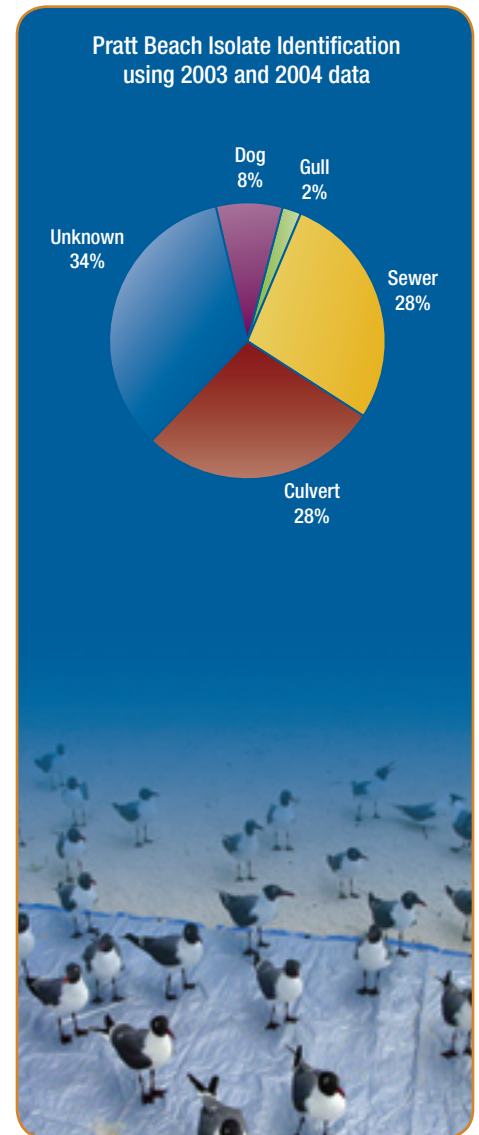
Major Milestones/Accomplishments

Although BST has become a research focus for many investigators throughout the country, there have been few initiatives with a regional focus, and no previous efforts specifically considered the problems encountered in the southeastern United States. BST has the potential to focus federal, state, and local funding and conservation efforts where they will be the most effective—on the actual sources of contamination. To increase public awareness of the fecal pollution problem and provide technical knowledge to researchers, USM has created a Web site, available at www.usm.edu/bst.

- Developed the capability to reliably capture, document, and analyze bacterial DNA fingerprints.
- Created a reference library of over 9,000 bacterial DNA fingerprint profiles for determining the source of bacteria found in the environment around the Gulf of Mexico.
- Identified sewage and storm drains as important sources of bacteria for the coastal area.
- USM received additional \$600,000 to continue this important effort—a 10-fold leveraging of funds.

Specific accomplishments resulting from this project include the following:

- Improved the knowledge-base for developing and implementing Total Maximum Daily Loads (TMDLs) for waters impaired by fecal pollution.



Reusing Materials Through By-Product Synergy

Area Description

The Kansas City metropolitan area includes locations in both Missouri and Kansas, covering an area of 7,976 square miles. Anchored by Kansas City, Missouri, this metropolitan area is the 27th largest in the United States and contains 15 counties. In 2005, this area had a population of 1,947,694 residents. Major private employers in the area include Hallmark Cards, Harley-Davidson Motor Company, Honeywell Federal Manufacturing & Technologies, Ford Motor Company, General Motors, and Sprint/Nextel. Companies with headquarters in the area include Embark Corporation, Hallmark Cards, and the Kansas City Power & Light Company.

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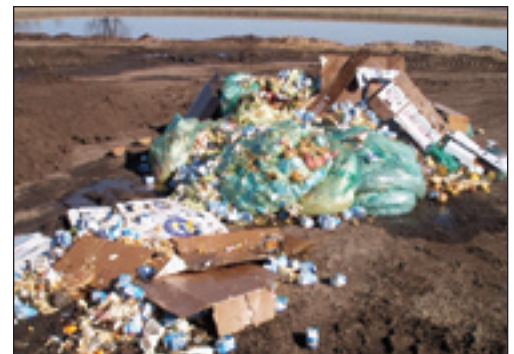
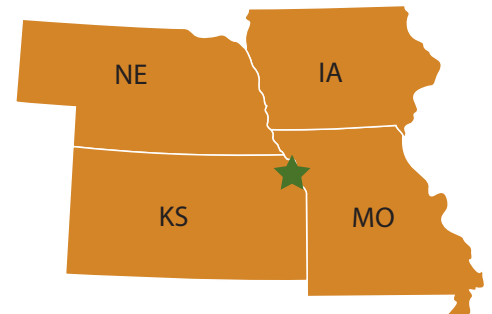
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Environmental Challenge

As in other metropolitan areas in the nation, companies in the Kansas City metropolitan area accumulate waste. However, in the Kansas City area, Bridging the Gap (BTG), a nonprofit organization, is helping reduce waste through the Kansas City Regional By-Product Synergy (BPS) Initiative. BPS applies the principles of industrial ecology in which companies work together to match unwanted by-products and underutilized raw materials as resources for new products and processes. Each project involves recruiting between 10 and 20 diverse companies as fee-paying participants and engaging local, state, and federal government agencies as supporters. Through the BPS process, individual companies are transformed into a cross-industry team focused on turning every gram of material running through their plants into product. This collaborative, business-driven approach also enlists industry in addressing waste and pollution issues. EPA and state regulators are working with the participants to ensure that reuse options requiring environmental permits result in higher environmental protection.

The Kansas City Regional BPS Initiative is a direct result of an event sponsored by the Environmental Excellence Business Network, a BTG program that encourages environmental awareness through community education and action. The project's goal is to bring neighboring industrial facilities and organizations together to discover innovative ways to integrate their operations, cut pollution, reduce material costs, and improve internal processes.

Region 7



Major Milestones/Accomplishments

BTG used RGI funds to recruit 12 local companies to participate in creating a BPS network. BTG and the BPS team developed three different working groups in which companies could participate: products/processes, innovation, and sustainable infrastructure. Reflecting participants' desire to go beyond by-product synergies and expand the initiative to search sustainability, the project team and working groups are evaluating the 50 potential synergies identified during the data collection and analysis process, as well as other sustainable practices within participating organizations. BTG was also able to use the RGI funds to leverage other local funds and in-kind contributions to sustain and expand the project.

BTG and the BPS team developed a process to measure where companies were in the synergy process and to measure their progress. A simplified explanation of the process comprises five stages in developing BPS:

1. **Synergy idea:** The parties involved identify the potential for BPS.
2. **Discussion:** The parties discuss the BPS opportunity in more detail (e.g., costs and quantities of materials to be exchanged), including sustainability metrics evaluation.
3. **Negotiation:** The parties work towards a formal BPS agreement and develop a business plan that includes a sustainability performance matrix.
4. **Implementation:** Once a formal agreement is reached, the parties are ready to implement the BPS business plan.
5. **Completion:** The synergy is complete, and the feedstock needs of one partner are matched to unwanted by-products of another partner.

Currently BTG and the BPS team are actively pursuing 29 synergies. All 29 synergies have passed through the idea and discussion stages, while five are in the negotiation stage, and one has been implemented and completed.

A sustainability metric was also developed to assist the project team and participants in narrowing down the synergies' possibilities and ranking them. It evaluates three main aspects:

- Economic
- Social/community
- Environmental impacts



Participants prepared individual sustainability metrics for each of the identified synergies. The project team then compiled the data into a sustainability performance matrix for 29 synergies.

The first implemented synergy project is a partnership between Hallmark Cards, a greeting card manufacturer, and Missouri Organic Recycling, a food waste composter. The Hallmark Cards cafeteria serves approximately 3,000 meals a day, and Missouri Organic Recycling collects the food waste. Missouri Organic Recycling is also composting food waste from the Jackson County, Missouri, Department of Corrections and from Whole Foods supermarkets. In 2006, Missouri Organic Recycling collected and composted 346 tons of food waste from these sources: 46 tons from Hallmark Cards, 220 tons from Whole Foods,

Partners

The BPS Initiative received approximately \$90,000 in RGI funding from EPA Region 7. Leveraged resources include \$100,000 in additional funds from the Missouri Environmental Improvement and Energy Resources Authority (EIERA), and \$65,000 from the Mid-America Regional Council (MARC) Solid Waste District. The private sector has contributed equivalent funding for each phase of the initiative.

Public Partners

- EPA Region 7
- Missouri EIERA Market Development Program
- MARC Solid Waste Management District

Business Charter Members

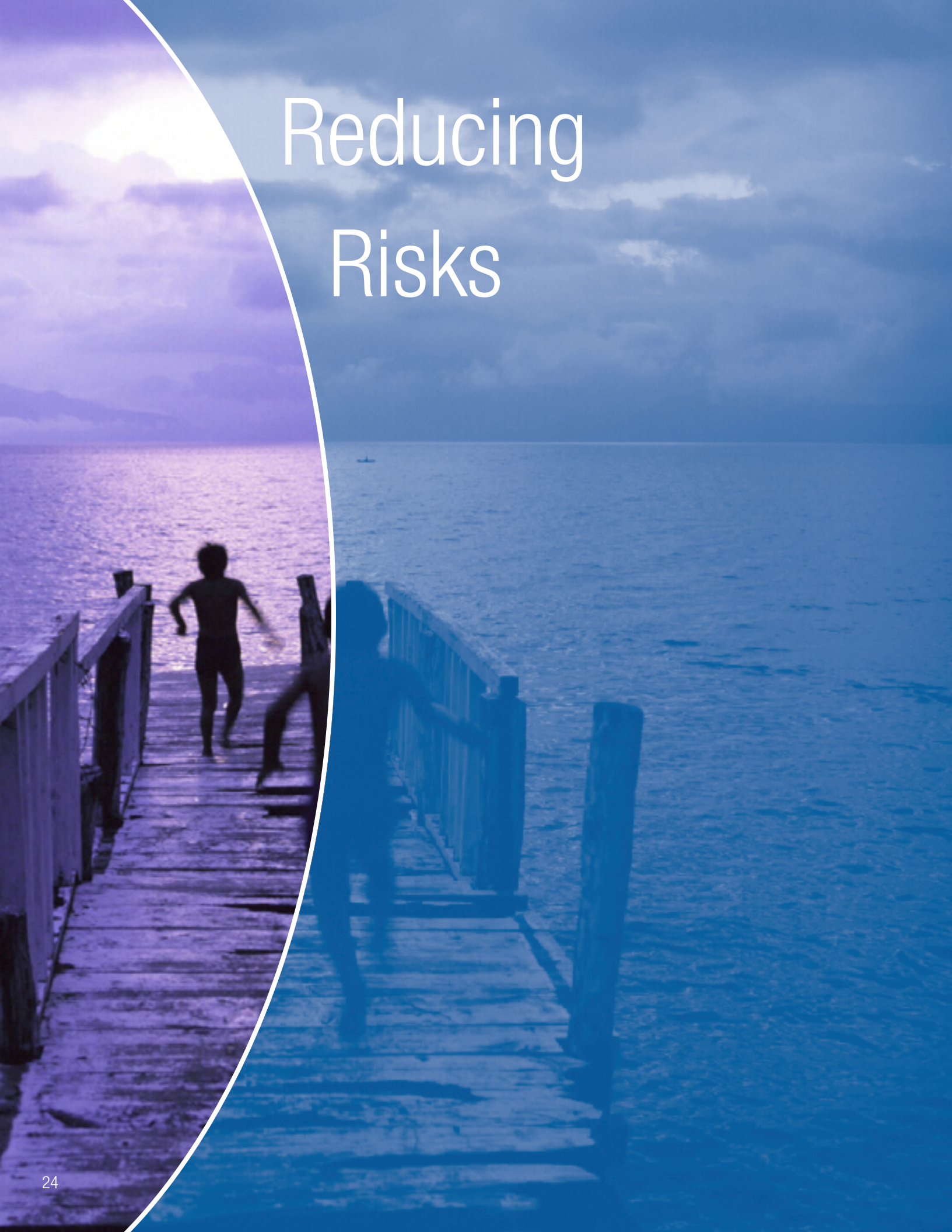
- City of Kansas City, Missouri
- Cook Composites and Polymers (CCP)
- Gerdau Ameristeel
- Hallmark Cards, Inc.
- Harley-Davidson Motor Company
- Jackson County, Missouri
- Johnson County, Kansas
- Kansas City Power & Light Company
- Lafarge Corporation Cement Group
- Little Blue Valley Sewage District
- Missouri Organic Recycling
- Systech Corporation

BPS Project Team

- Bridging The Gap
- Franklin Associates – a division of Eastern Research Group

and 80 tons from the Department of Corrections' jail. The BPS project team is negotiating with other potential participants to expand the food waste composting synergy.

Reducing Risks



RGI WORKS TO REDUCE RISKS to human health and the environment by funding projects that identify and address pollution sources. Some RGI projects focus on reducing risks by promoting good stewardship practices that protect natural resources and keep them from becoming polluted. Other RGI projects use scientific methods to identify and assess a diverse range of risks to local communities, including point and nonpoint sources of air, water, and land pollution. Finally, some RGI projects focus on revitalizing lands that have been polluted in the past. Examples of RGI-funded projects that reduce risks to human health and the environment are identified below and described in more detail in this chapter.

- In California, RGI funding has supported a number of sustainable agriculture projects involving local farmers and citizens as well as state and local government officials. RGI projects have included demonstrating biologically integrated agriculture methods that reduce pesticide use, providing public access to information on pesticide use and toxicity, and promoting environmental performance certification programs that offer market-based incentives for pollution prevention. A focus has been on preventing air and water pollution through improved management and treatment of dairy manure.
- In the Baton Rouge, Louisiana, area, RGI funds are supporting a project to survey ambient air quality. The survey used EPA's Trace Atmospheric Gas Analyzer mobile laboratory unit to determine the concentration, distribution, and sources of hazardous air pollutants. This survey supported the efforts of EPA and the Louisiana Department of Environmental Quality to reduce air pollution and protect local populations that live in this heavily industrialized corridor.
- In Colorado, RGI funds helped the residents of the city of Creede and the surrounding portion of Mineral County develop a community-based effort to identify and address pollution from historic silver mines in the Willow Creek watershed. The Willow Creek Reclamation Committee is directing a stakeholder effort designed to improve surface and ground water quality, restore physical habitat in the Willow Creek watershed, revitalize mine-scarred lands, and protect the Rio Grande from future fish kills.

Developing Dairy Manure Technology for the San Joaquin Valley

Area Description

The Pacific Southwest supports the most productive agricultural economy in the United States. California alone is home to a \$30 billion agricultural industry employing 27 percent of the nation's farm workers and producing 64 percent of the nation's vegetables and melons. California's San Joaquin Valley, with its Mediterranean climate and many rivers born in the surrounding mountains, is the single richest agricultural region in the world. Its alluvial soil produces nearly 300 crops worth \$20 billion per year. Despite its productivity, the San Joaquin Valley has high poverty rates and its geography also contributes to some of the worst air quality conditions in the country.

California is also the nation's leading dairy state, and dairy products are California's most valuable agricultural product, worth nearly \$5 billion per year. Over the last 30 years, the number of milk cows in California has more than doubled (to over 1.7 million) while the number of dairies has dropped by half (to approximately 2,000). This concentration of the dairy industry has caused a dramatic increase in the average number of animals at new dairies, and a corresponding increase in the amount and concentration of animal waste. Three-quarters of the state's dairy cows are in the San Joaquin Valley.

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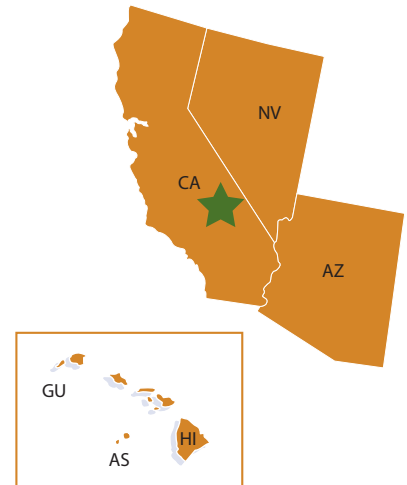
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Environmental Challenge

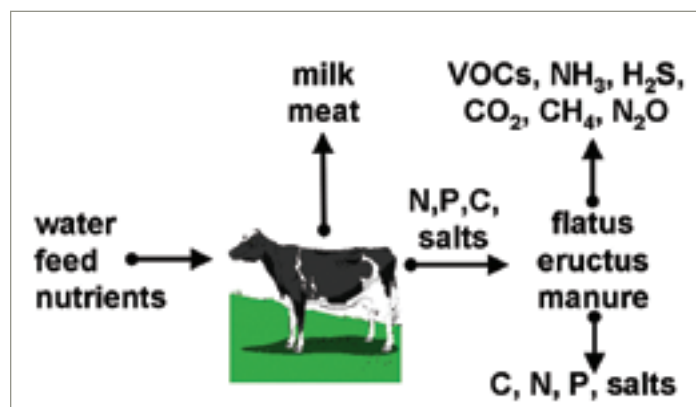
The geographic and economic characteristics of the San Joaquin Valley combine to create serious environmental problems. The Valley exhibits some of the nation's worst air quality, with high levels of ozone and particulate matter that contribute to high rates of respiratory illness. In many areas, ground water and surface water are contaminated with pesticides, fertilizers, animal manure, and salts, threatening drinking water sources.

Dairies contribute to the San Joaquin Valley's environmental problems. The 1.3 million dairy cows in the San Joaquin Valley produce an average of 120 pounds of manure per cow per day, a total of 60 billion pounds per year. Air emissions from feed, cows, and decomposing manure include volatile organic compounds (VOCs), precursors to the formation of both fine particulate pollution and ozone; ammonia, a precursor to formation of fine particulates; methane and nitrous oxide, which are global warming gases; and odors. Nutrients, salts, bacteria, and organic matter in manure can pollute surface water and ground water. The nutrient and carbon content of dairy manure, however, make it a useful feedstock for the production of agricultural inputs and energy. More efficient management and treatment of dairy manure could improve the quality of soil, air, and water; create jobs and stabilize rural economies; provide a source of renewable energy; and reduce regulatory pressures on dairies.

Region 9



Cows Make More Than Meat and Milk



Major Milestones/Accomplishments

To address the environmental effects of dairies in the San Joaquin Valley, the Region 9 Agriculture Program and the California Air Resources Board formed the Dairy Manure Collaborative in 2004. Participants include more than 200 representatives of federal, state, and local government agencies; academia; the dairy industry; environmental and community groups; utilities; and technology vendors. The collaborative's approach is nonregulatory and practical. Its activities, described below, support the goal of demonstrating and implementing technologies for managing manure as a resource, improving soil quality, supplying nutrients, and generating renewable energy while reducing emissions of pollutants to air and water.

EPA Region 9's Agriculture Program serves as an information clearinghouse for the collaborative, providing frequent e-mail updates on available funding for dairy manure management projects and other topics. An early collaborative product, updated, expanded, and reissued in 2007, was a set of Geographic Information System (GIS) maps showing the locations and herd sizes of San Joaquin Valley dairies. These widely requested maps indicate areas with the greatest potential for environmental problems as well as for economies of scale in manure treatment. Building on the dairy GIS project, the collaborative sponsored a 2006 forum, supported by a \$10,000 RGI grant to the Local Government Commission, on "Developing Projects and Partners to Comprehensively Treat Dairy Manure in the San Joaquin Valley," at which participants identified technologies, locations, funding, and infrastructure needed for manure treatment pilot projects. A major funding source introduced to the California dairy industry at this con-

ference has since provided a \$496,000 grant for a dairy manure gasification pilot project in the state.

Dairies are a source of the VOCs that are precursors to formation of ozone, but the precise source of VOCs in dairy operations has been unclear. To address this data gap, RGI funding supported a study to quantify VOC emissions from cows. Results, released in 2005, showed that cows emit only one-eighth as much VOCs as originally estimated and that fresh feed contributes more VOCs than manure lagoons. This information was an important factor in the San Joaquin Valley Air Pollution Control District's determination of Best Available Control Technologies for dairies. In addition to EPA's \$75,000 in RGI funding, the Milk Advisory Board contributed \$65,000 and Merced County provided \$600,000.

The Dairy Manure Collaborative formed the Dairy Manure Technology Feasibility Assessment Panel, co-chaired by Region 9 and the California Air Resources Board, to assess the environmental and economic performance of the many technologies proposed to treat dairy manure. RGI funds supported data collection and preparation of the panel's report, *An Assessment of Technologies for Management and Treatment of Dairy Manure in California's San Joaquin Valley* (www.arb.ca.gov/ag/caf/dairypnl/dairypanel.htm). The 2005 report provides a useful survey of currently available technologies, and concludes that much information on off-the-shelf products is still needed.

Dairy Manure Collaborative participants have established a number of pilot projects to test a variety of treatment technologies. Many of these projects address the generation of re-

Partners

State and federal agencies, the University of California and other state universities, environmental and community groups, dairy industry organizations, utilities, and elected officials from the San Joaquin Valley have met to plan projects that improve manure treatment. The California dairy industry and regulatory agencies (California Air Resources Board, San Joaquin Valley Air Pollution Control District, EPA Region 9) keenly follow research conducted by the University of California Cooperative Extension. The technology assessment panel included representatives from federal and state agencies, the University of California, community and environmental organizations, and the California dairy industry.

newable energy from dairy manure. At least 18 anaerobic digesters are now in operation at dairies, and the captured bio-gas reduces greenhouse gas emissions and fuels electricity generators and alternative-fuel vehicles. Another project involves gasification of manure to produce marketable energy. Other projects address nutrient management, another primary concern of the collaborative. Two of these projects are testing denitrification technologies using reciprocating ponds and algae tanks, while others are demonstrating tools to measure nitrogen content of lagoon water and to meter its application to fields to match crop needs. Ten dairies are participating in a demonstration of lagoon mixing and purple-sulfur bacteria to reduce VOCs and odors. The knowledge gained from these projects in the next few years will move the collaborative toward its goal of demonstrating comprehensive systems for managing all manure constituents to control environmental contamination while maintaining economic feasibility in the California dairy industry.

Real-Time Investigation of Air Toxics in the Gulf Coast Region

Area Description

Ambient air monitoring was conducted at various locations near Baton Rouge, Louisiana. Southern Louisiana is a heavily industrialized corridor with known ambient air quality problems. The region also has many neighborhoods that are adjacent to huge petrochemical complexes, and are therefore cause for environmental justice concerns. Although Louisiana is in attainment for all federal National Ambient Air Quality Standard (NAAQS) pollutants, with the exception of ozone in the city of Baton Rouge, air sampling in several areas has shown significantly elevated levels of hazardous air pollutants (HAPs), including benzene, toluene, ethylene dichloride, 1,3-butadiene, styrene, methyl-tert-butyl ether, and total levels of volatile organic chemicals. In October 2004, the Louisiana Department of Environmental Quality (LDEQ) released a statement that the Baton Rouge area exceeded the annual standard for 1,3-butadiene.

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Environmental Challenge

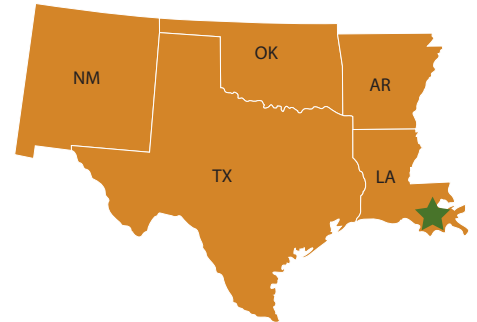
For more than 10 years, the Louisiana Department of Environmental Quality (LDEQ) has focused significant regulatory efforts on reducing public exposure to various toxic and carcinogenic air contaminants in the Louisiana Gulf Coast region.

While existing air quality samples showed elevated levels of air

toxics, more information was needed to identify disproportionately impacted urban areas and to quantify risks based on cumulative concentrations of air toxics. Identifying sources of contamination that contribute to cumulative air pollution would also support efforts for more effective and targeted enforcement activities. There was also a need to establish baseline air contaminant concentrations to support the work of the Department of Homeland Security.

Beginning in 2004, LDEQ developed a strategy to supplement its ambient monitoring network with additional highly reactive volatile organic compound (HRVOC) monitors in the Baton Rouge area. The goal of this monitoring is to achieve real-time data availability, similar to that achieved with EPA's Trace Atmospheric Gas Analyzer (TAGA). TAGA is a specialized air monitoring vehicle used primarily for real-time detection of pollutants, identification of pollution sources, and when necessary, assistance with emergency response activities, such as responding to chemical spills and fires. Region 6 supported LDEQ's efforts by allocating RGI funds to make EPA's TAGA equipment available for use in southern Louisiana.

Region 6



Major Milestones/Accomplishments

In January 2005, EPA Region 6 partnered with LDEQ, through the use of RGI resources, to conduct a survey of ambient air quality in the Baton Rouge area. The purpose of the survey was to augment the ever-growing number of stationary ambient air monitors in the area, determine other potential sources of air pollution, and help focus future actions to reduce these pollutants.

The survey used EPA's TAGA mobile laboratory unit to determine the concentration and distribution of the air pollutants and identify potential sources. Specifically, the survey focused on eight hazardous air pollutants (HAPs): benzene; toluene; vinyl chloride; xylenes; 1,2-dichloroethane; trichloroethane; tetrachloroethane (PCE); and 1,3-butadiene. The survey also measured airborne concentrations of hydrogen sulfide, sulfur dioxide, and mercury.

During the project, three air pollutants, 1,3-butadiene, vinyl chloride, and mercury, were found to be present at concentrations that warranted further investigation. The presence of 1,3-butadiene and vinyl chloride were

detected at concentrations ranging from detectable levels up to approximately 30 parts per billion by volume (ppbv). Mercury was detected at concentrations up to approximately 4,000 nanograms per cubic meter (ng/m³), and benzene was briefly detected in several survey runs.

EPA Region 6 and LDEQ have distributed the survey report and its findings to local leaders and community groups. The survey data also have proven useful in enforcement cases being handled by both agencies, which are considering many compliance assistance and enforcement tools to address concerns that remain after the completion of the project. A complete summary of the survey report and its results can be accessed at the EPA Region 6 enforcement Web page at: www.epa.gov/earth1r6/6en/a/taga-unit-results.htm.

EPA Region 6 and LDEQ also are closely coordinating with the companies emitting these pollutants to identify next steps to address elevated levels of pollution. For example, Pioneer Companies, Inc. accounted for an estimated 18 percent of mercury

Partners

The following stakeholder groups contributed to the success of this effort:

- Louisiana Department of Environmental Quality
- Louisiana Environmental Action Network

Various members of the petrochemical industry participated through administrative order agreements with LDEQ.

air emissions reported in the state of Louisiana in 2005. In 2007, the company announced that it was eliminating the use of mercury at its St. Gabriel chlorine plant by the end of 2008. By converting from mercury cell technology to a new membrane cell technology, mercury emissions are expected to be significantly reduced.

The southern Louisiana TAGA project could not have taken place without the funding provided by RGI. With the RGI funding, EPA Region 6 was able to respond to the requests of the state and community groups like the Louisiana Environmental Action Network to bring the TAGA and its innovative technology to the region.



Restoring a Watershed in a Colorado Mining District

Area Description

Willow Creek, formed by the confluence of East and West Willow Creeks, is a tributary of the Rio Grande River near its headwaters in the San Juan Mountains in Mineral County, Colorado. The Creede mining district, one of the largest silver mining districts in Colorado, occurs within the Willow Creek watershed and includes numerous underground mines. A key mining facility within the Creede mining district is the Nelson Tunnel, which was constructed to dewater the underground mines along the Amethyst vein and to provide a haulage route for ore.

Historically, the Creede mining district included underground silver, gold, and base metal mines that significantly impaired water quality in the 35-square-mile Willow Creek watershed. Concentrations of zinc, cadmium, and lead exceed the water quality standards put in place by the state of Colorado. The state of Colorado, which has placed the segment of the Rio Grande River below the confluence with Willow Creek on the Clean Water Act (CWA) 303(d). This is a formal designation of impairment and requires the state to take concrete actions to restore the water quality to meet applicable standards. The Willow Creek watershed is also within the EPA Region 8 San Juan Mountains focus area. Watersheds within this area receive focused attention from EPA Region 8 programs.

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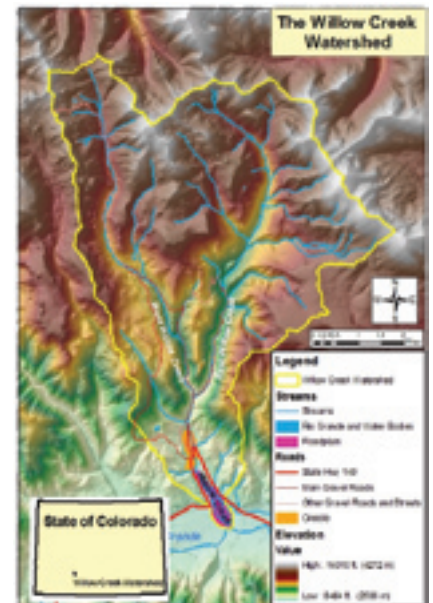
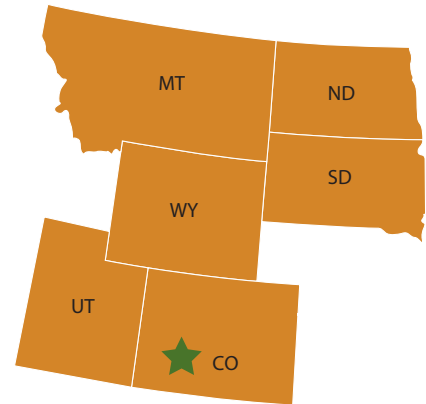
Environmental Challenge

Metals mining and processing has been a major influence on the economic and cultural development of the western United States, especially in many of the major mountain ranges in Colorado, California, Montana, Nevada, New Mexico and Arizona. Extensive mining began in the 1880s and 1890s and continued, mostly uninterrupted, until World War II.

In some areas, primarily Nevada and Arizona, precious metal mining continues to be a major part of the state's economy.

Historically, when mines were no longer profitable, individual mines and whole mining districts were abandoned, with little thought about future environmental impacts. More than 100,000 known abandoned mine sites currently exist in the country. Many of these abandoned mines are significant sources of heavy metals and acidity to nearby streams, associated riparian/aquatic communities, and ground water. Since mining has such a large waste to product ratio, and historically very large volumes of waste rock and tailings were disposed of without adequate environmental controls, abandoned mines are very hard to clean up. Moreover, characterizing and remediating contaminated drainage from underground mines is difficult and expensive.

Region 8



Major Milestones/Accomplishments

From 1999 through 2003, the Willow Creek Reclamation Committee (WCRC) completed a rigorous environmental characterization of heavy metals contamination within the watershed. This characterization identified discharge from the Nelson Tunnel as the largest source of metal loading into Willow Creek. Approximately 70 to 80 percent of the zinc load delivered to the Rio Grande via Willow Creek comes from the Nelson Tunnel discharge (200 to 275 gallons per minute). Based on this analysis, the project identified remediation of contaminated discharge from the Nelson Tunnel as one of two key elements necessary to successfully restore Willow Creek's aquatic and riparian habitat. The other key element is restoring the flood plain riparian zone on lower Willow Creek.

At many precious metal and heavy metal mines, underground source control techniques can be effectively applied as an element of a mine closure plan or a remedial action where acid mine drainage is an environmental concern. Source control techniques include the use of plugging and/or backfilling tunnels and shafts, grouting ground water inflow zones to tunnels and shafts, and segregating "clean" inflows from "contaminated" inflows. These techniques can be used to isolate contaminated mine pools, divert clean inflows around mine workings, reduce or control the volume of discharge from tunnel portals, and reduce the risk of tunnel blowout. The WCRC is evaluating the use of source control techniques for remediating the Nelson Tunnel.

Utilizing RGI grant funds, the WCRC investigated sources and pathways of ground water entering the mine workings associated with the Nelson Tunnel

and mine waters discharging from the Nelson Tunnel portal. The findings from this characterization will be used to evaluate potential remedies to control the Nelson Tunnel discharge. A portion of the RGI funds has also been used to conduct a remedial feasibility study to assess the treatment requirements for the water that flows into the Nelson tunnel. A pilot treatment test was designed and implemented, utilizing a blocked off portion of a mine drift to temporarily store mine water for treatment. The pilot was successfully completed, and data are currently being evaluated and analyzed.

Sampling was conducted for chemical analysis and to obtain water level elevation and flow rate data at a number of locations within the Nelson Tunnel. These data helped to improve the conceptual understanding of the hydrology of the Nelson Tunnel enough to allow for some limited feasibility studies related to in-situ treatment of mine waters prior to discharge from the Nelson Tunnel portal.

The work funded by the RGI grant has been instrumental in developing a sound conceptual understanding of the hydrologic conditions that control inflow to and outflow from the underground mine workings associated



Partners

The residents of the city of Creede and the surrounding portion of Mineral County have developed a community-based effort to identify and address the most pressing environmental concerns in the Willow Creek watershed. The WCRC, convened in 1999, is directing a stakeholder effort designed to improve surface and ground water quality, restore physical habitat in the Willow Creek watershed, revitalize mine-scarred lands, and protect the Rio Grande from future fish kills. The WCRC has partnered with numerous state and federal agencies, including EPA, the U.S. Forest Service, the Colorado Division of Minerals and Geology, the Colorado Department of Public Health and Environment, and the Natural Resources Conservation Service.

with the Nelson Tunnel. The Colorado Division of Minerals and Geology produced interim and final reports summarizing the work completed and the data collected and interpreted for 2003 and 2004.



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