



THE REPORT ON CONSERVATION INNOVATION

Fall 2004: *In this Issue...*

Letter from the Editors: The Viral Spread of Innovation

Good ideas in the public sector can effectively be spread, as Malcolm Gladwell has pointed out, like viruses. Our opportunity is to spread great, emerging innovation in the fields of conservation and the environment. **Page 2.**



Face to Face with Gowher Rizvi of the Ash Institute for Democratic Governance and Innovation

This Fall, the *Report on Conservation Innovation* had the opportunity to talk with Gowher Rizvi, Director of the Ash Institute for Democratic Governance and Innovation. In this post, he oversees the Innovations in American Government Award Program at Harvard's Kennedy School of Government. In this interview he talks about his perspective on, and vision for conservation innovation. **Page 4.**



Using Nature's Plumbing to Restore Aquatic Ecosystems

Seattle Public Utilities is revolutionizing how Seattle, Washington manages its stormwater. Denise Andrews and her team of engineers, architects, safety and political officials are implementing low-impact development stormwater management systems in urban neighborhoods and gaining recognition around the world. Learn more about this recent winner of an Innovations in American Government Award. **Page 8.**



How to Apply for an Innovations in American Government Award

Do you, or does your agency, have an innovation that you think may be deserving of an Innovations in American Government Award? Here we explain the details of the application process. **Page 14.**



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Letter from the Editors: The Viral Spread of Innovation

Malcolm Gladwell's *The Tipping Point: How Little Things Can Make a Big Difference* is a recent classic on the topic of social change. Gladwell explains, in the introduction, that his book "is the biography of an idea, and the idea is very simple. It is that the best way to understand the emergence of fashion trends, the ebb and flow of crime waves, or for that matter, the transformation of unknown books into bestsellers, or the rise of teenage smoking, or the phenomena of word of mouth, or any number of the other mysterious changes that mark everyday life is to think of them as epidemics. Ideas and products and messages and behaviors spread just like viruses do."^{*}

To spread, a good idea has to be understood and transmitted to others by "a handful of exceptional people"—people like you, the readers of this edition of the *Report on Conservation Innovation*. And people like the scores—and then hundreds—of city officials and stormwater engineers who read about and visited the City of Seattle's suite of Natural Drainage System (NDS) projects that have recently appeared in neighborhoods in the hills above Puget Sound. The telephone chatter, and now the press reports, on the NDS projects are impressive. Planners from as nearby as Bellingham, Washington to as far away as New Zealand have toured Seattle's demonstration NDS sites to understand how they enhance neighborhood quality-of-life, water quality and local salmon habitat by capturing rainwater and directing it to naturally recharge local aquifers, rather than sending it down impervious street surfaces to scour out local streambeds. Word is spreading quickly that NDS and similar low-impact design strategies for stormwater management are ideas whose time has come.

The focus of this edition of the *Report on Conservation Innovation* is a research and awards program that is specifically designed to help a small number of outstanding initiatives in the public interest (such as Seattle's NDS program) to spread throughout the United States and the world. The Innovations in American Government Award Program, administered by the Kennedy School's Ash Institute for Democratic Governance and Innovation, grants on an annual basis \$100,000 to each of five outstanding public innovations that merit widespread attention and replication.

The award winning innovations, selected by a panel of distinguished judges, span the range of public programs, from day care to disaster relief. What is likely to be of concern to this publication's readers, of course, is the attention that the Innovations Award Program has drawn to initiatives relevant to conservation and the environment. Accordingly, we have prepared for you several articles of interest.

First is an interview with Gowher Rizvi, Director of the Ash Institute for Democratic Governance and Innovation. Rizvi, a native of India with a Doctorate from Oxford, brings a remarkable international perspective to his work. He is particularly enthusiastic about the present-day prospects for conservation and environmental innovations in the public interest.

Next is an in-depth profile of Seattle's Natural Drainage Systems program, a 2004 Innovations in American Government Award winner. Note that the NDS story has a protagonist—an individual who, despite her personal modesty, has been relentless about getting the word out about the remarkable effort she helped to launch several years ago. Her name is Denise Andrews. Andrews would be recognized by the readers of *The Tipping Point* as an exceptional practitioner of the art of salesmanship. She infects others with her understanding of how the reasonably complex Natural Drainage System works and can

^{*} Malcolm Gladwell, *The Tipping Point: How Little Things Can Make a Big Difference*, Boston: Little, Brown and Company, 2000, page 7.

operate even more effectively on a broader scale. And she helps us to see the potential for the NDS program, and other “low-impact development” initiatives, to become essential elements in the recovery of water quality and aquatic wildlife habitats throughout the entire Puget Sound, one of America’s crown jewel natural resources.

Finally, we offer information on how an outstanding innovation that you may be familiar with can become a candidate for an Innovations in American Government Award. Each year the Innovations Program talks to professional organizations and knowledgeable individuals throughout the nation in search of remarkable programs. The broad search usually pays off handsomely. Great new ideas quite regularly come in from every corner of the nation. So, if you are involved in, or are aware of a program that may merit national recognition and broad replication, please encourage that program’s manager to read through this issue of the *Report on Conservation Innovation*, and to contact us or the Innovations Award Program itself (www.innovationsaward.harvard.edu), for more further information on how to jump into the applicant pool.

What might be the impact of such an innovation, trumpeted by the Innovations Program or some other channel of communication? Empirically, there is no certain way to predict such outcomes. Still, experimentation in the fields of conservation and environmental protection—particularly at local, state and regional levels in the United States, from Seattle to South Florida—is robust and breaking new ground every day. From such experiments may well emerge the ideas that help us save salmon populations across the continent, or find an array of effective ways to address global climate change. With this in mind, we urgently and enthusiastically welcome your very best ideas and innovations on conservation and the environment. Please let us hear from you.

Best regards,

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Face to Face with Gowher Rizvi of the Innovations in American Government Program

In November 2004, Jim Levitt and Lydia Bergen of the Program on Conservation Innovation at Harvard Forest visited with Gowher Rizvi, Director of the Ash Institute for Democratic Governance and Innovation at Harvard University's Kennedy School of Government. We had an opportunity to talk at some length about the Ash Institute's Innovations in American Governance Award Program and its relationship with the fields of environmental protection and landscape conservation.



Gowher Rizvi, Director of the Ash Institute for Democratic Governance

Gowher is a welcoming man with a bright smile. His crimson-colored office at the Kennedy School is decorated with beautiful artwork from around the world, including his native India. We learned of Gowher's work for social justice and human rights as both a foundation officer and university-based educator, and of his conviction that environmental conservation initiatives are key to successful global development efforts in the twenty-first century.

Before joining the institute, Gowher directed the Ford Foundation's office in India, where he advanced the foundation's programs fostering peace and social justice, community development, and education. Prior to joining the Ford Foundation, he was at Oxford University where he taught, authored several books, and founded and edited *Contemporary South Asia*, a policy studies journal. Gowher Rizvi is a Rhodes Scholar from India and he received his Doctorate of Philosophy from Oxford's Trinity College.

REPORT ON CONSERVATION INNOVATION (RCI): Please tell our readers, a group that is quite interested in environmental conservation, what you would want them to know about you, personally, and the Innovations Program.

RIZVI: I was born in a developing country and the bulk of my professional and research work is drawn from that experience. When I joined the Ash Institute one of my main objectives was to make the institute truly global—to make the institute a global resource for scholars and practitioners trying to improve the quality of life for the world's citizens. There is much to learn from American experience, as indeed there is much to be gained from learning from our partner institutions outside the U.S. But for that learning to be productive and creative, the flow of knowledge has to be genuinely two-way. And in the world of environment and conservation we have much to learn from developing societies. This is especially true because in developing countries, the scale of environmental damage is staggering and the resources to deal with these problems are quite limited. And yet, through imagination and creative problem solving, many of these societies have done admirable work to address environmental degradation. For example, in India I have witnessed a remarkable event—a river that was dry for more than 30 years has been recharged and is now flowing again. At the Ash Institute we hope to bring creative and innovative solutions together so that innovators can learn from each other.

RCI: What is the Roy and Lila Ash Institute for Democratic Governance and Innovation, and its Innovations in American Government Award Program, and why are the Ash Institute and the Innovations Award Program significant to the American people?

RIZVI: In 1985 the Ford Foundation, in collaboration with the Kennedy School of Government at Harvard University, launched the Innovations in American Government Award Program. Every year the program recognizes innovative programs at all levels of government—federal, state, local, tribal and territorial—and across all policy levels. From civic engagement to juvenile justice, recycling to adult education, parks to the management of debt, public health to e-governance, the Innovations in American Government Award Program identifies and promotes excellence and creativity in the public sector. Since its inception the program has recognized more than 300 initiatives and awarded more than \$18 million in grants.

In 2001, the Ford Foundation established an endowment at the Kennedy School to continue the program in perpetuity, and to support a global network among those committed to advancing government innovation worldwide. In 2003 Roy and Lila Ash provided a generous additional gift allowing the Kennedy School to establish the Ash Institute for Democratic Governance and Innovation. Through the Ash gift, the Institute was able to expand its mission to focus on the nature of democracy itself—its societal value, historic lessons, its continual evolution, opportunities, vulnerabilities and challenges for the future of democracy both in the United States and throughout the world.

RCI: How is the Innovations in American Government Program linked to sister programs around the world in such places as Brazil, South Africa and the Philippines?

RIZVI: Following the pioneering work of the Innovations in American Government Program, the Ford Foundation sponsored the creation of government innovation awards programs in Brazil, Chile, China, Mexico, the Philippines, Peru, South Africa, the East African region, and the Native American tribes in the United States. While each of these initiatives is adapting the innovations approach to local concerns and priorities, we all share a strong allegiance to the core idea that government can be improved through the identification and dissemination of examples of effective solutions to public-sector problems.

The Ash Institute collaborates closely on a number of research, training, and dissemination projects with its partners through a formal structure known as the "Innovations Liaison Group." This group is currently convened by Peter Spink, (Spink@fgvsp.br) director of Programa Gestão Pública e Cidadania (Public Management and Citizenship Program), the Brazilian innovations program located at the Getulio Vargas Foundation in São Paulo.

RCI: How does innovation in conservation and the environment relate, as you see it, to the grand challenges facing the American people, and people around the world, in the twenty-first century?

RIZVI: If one were to say that environmental degradation and pollution is the single biggest problem confronting humanity both in the developed and developing world, I believe it would not be an exaggeration. This will certainly be the biggest challenge facing us in the 21st century. Environmental degradation not only threatens the very survival of our planet. It also is inextricably tied to a great many social inequities and injustices around the globe. It is the poor citizens of this planet who suffer most from air and water pollution; it is their livelihood that is most affected by the destruction of forests; and it is

they who are least capable of taking advantage of green technology which could improve their quality of life.

The challenges are also enormous for Americans. Our current consumption patterns are taking a severe toll on nature; and as other countries develop and acquire higher incomes and standards of living, they too will want to copy the American pattern of consumption. It is frightening to imagine what will happen to the planet when the rest of the world also possesses as many cars, refrigerators, and all other such gadgets, or consume as much electricity and water or food calories as the Americans do today. Our planet will be hard pressed to meet the needs of 6 billion people living a lifestyle like the Americans or the Europeans. Environmental conservationists will not only have to think about new technologies to slow down the environmental ravages but will also have to initiate more urgent discussions about consumption patterns and sustainable development. We have a responsibility to future generations and we must learn to behave as custodians and trustees for generations yet to be born.

RCI: To date, what are some of the outstanding conservation and environmental programs that have been recognized and advanced by the Innovations in American Government Program?

RIZVI: Since 1986, the Innovations Program has bestowed 17 awards on government programs that are working to improve environmental quality. The winners range from a wetland-based wastewater treatment plant in Arcata, CA (1987 winner), to an environmental cleanup initiative in Wichita, KS (1992 winner), to a land recycling program in Pennsylvania (1997 winner). Each one of these programs has shown outstanding success in meeting the criteria set forth by the Innovations review committee: novelty, transferability, effectiveness, and significance.



View overlooking Arcata, CA wetland-based wastewater treatment facility

(Note: See Box 1 below for more details about these three programs)

RCI: As you look ahead, what are some of the opportunities you see for research, education and award efforts in the field of conservation and the environment for the Innovations in American Government Program itself and for the Ash Institute generally?

RIZVI: At the Ash Institute our concern for conservation and environment will continue to inform our work. We would like to see a dedicated award (along with our existing Innovations in American Government Award) for environmental conservation; we should like to see the Ash Institute play a more active role in promoting a robust exchange of ideas and solutions between conservationists from the developed and developing world; and most importantly, we would like to be engaged in cutting-edge research to enhance our understanding of the issues.

Box 1: Exemplary Environmentally Oriented Innovations Award Winners

Wetland Restoration and Effluent Control

City engineers in Arcata, California turned their wastewater disposal problems into a natural resource by harnessing the biodegrading powers of wetlands to treat their effluent. The approach has been effectively cleaning Arcata's wastewater for close to 20 years now, benefiting the city's bay and attracting wildlife. As part of the program, the city's Department of Public Works created the 170-acre Arcata Marsh and Wildlife Sanctuary, a refuge for bird watching, walking, picnicking, boating, fishing, and other recreational activities. In addition, the program supports research on water quality, aquaculture, wetland management, and other topics. To top it all off, the innovative program has cut capital costs to the city by at least \$5 million, and cut on-going sewage treatment costs by one-third. (See: www.ashinstitute.harvard.edu/Ash/wetlands.htm.)

Expediting Groundwater Cleanup

Wichita, Kansas avoided being saddled with costly Federal Superfund regulations by assuming responsibility for cleaning up its groundwater aquifer that supplied water to its residents. Rather than allow the area to be designated as a Superfund cleanup site, city officials created a settlement agreement with the state to lead a cleanup initiative. In this capacity, the city identified contributing polluters and got them to pool their resources to cleanup the area. The city also leveraged innovative financing techniques including risk-free loans from seven local banks and a new method of tax-increment financing. In just over a year, clean up of the aquifer began; in contrast, according to the Office of Technology, the Federal Superfund program typically studies a problem for seven years before initiating cleanup. (See: www.ashinstitute.harvard.edu/Ash/envirocleanup.htm.)

Encouraging Redevelopment

The Commonwealth of Pennsylvania initiated a program of land recycling that is speeding up the process of redeveloping abandoned contaminated industrial sites, also known as "brownfields." The program is the result of a package of laws passed by the legislature in 1995 that make redeveloping brownfields not only feasible, but in many cases attractive. By establishing clear standards and guidelines for redevelopment and releasing owners and developers from liability, the motivation to redevelop these contaminated sites is growing rapidly. In the 16 years before the program, only 10 brownfield sites were cleaned up statewide. In the two years following its creation, 103 sites were cleaned. (See: www.ashinstitute.harvard.edu/Ash/landrecycle.htm.)

Natural Drainage Systems

See this issue of the Report on Conservation Innovation for a profile of a 2004 award-winning program that uses novel natural drainage systems to markedly improve the management of stormwater to benefit neighborhood quality-of-life, hydrological conditions, and biodiversity habitat in the City of Seattle, Washington.



Natural Drainage System award presentation. Left to Right: Nancy Ahern (Seattle Public Utilities), Gowher Rizvi (Ash Institute), Patricia McGinnis (Council for Excellence in Governance), Stephen Goldsmith (Ash Institute), and Denise Andrews (Seattle Public Utilities).

Using Nature's Plumbing to Restore Aquatic Ecosystems: The City of Seattle's Natural Drainage System

By James N. Levitt and Lydia K. Bergen

Salmon, steelhead trout and their cousins that make the epic journey from freshwater streams to the ocean and back again, are charismatic symbols of America's Pacific Northwest. These fish, known by the scientific community as anadromous species, are iconic reminders of the region's spectacular natural abundance. For example, the State of Washington has adopted the steelhead as its official fish. King County, home to the City of Seattle, actively encourages local families to take an "awe inspiring" trip to a nearby streamside or hatchery, telling potential visitors "the return of the salmon to the streams of their birth is a natural wonder..."¹

Salmon and other natural aquatic communities in and around Seattle's Puget Sound are, however, in trouble. After years of public debate, several species of Pacific salmon now appear on the federal threatened and endangered species lists. In part in response to the listing, urban, suburban and rural communities in the Puget Sound watershed have engaged in various efforts aimed at bringing back healthy salmon populations, including stream and estuary restoration projects and community education programs. Surface restoration and community education programs alone, unfortunately, do not go far enough. If you really want to address the fundamental issues you have to go, quite literally, below the surface.

In contrast to salmon and the streams in which they live, the region's stormwater management systems are decidedly uncharismatic. Historically, local voters generally have not given much thought to stormwater management, unless they or their neighbors have flooded basements after a heavy rainfall.

Despite the prosaic nature of stormwater drainage systems, Denise Andrews, an employee of Seattle Public Utilities, did recognize an opportunity to innovate at the intersection of stormwater management and salmon habitat restoration. Andrews, with more than a decade of experience in the construction industry, and a degree in communications from the University of Washington, was able to mold what the stormwater technical experts know about geology and hydrology into a package that meets a variety of interests—that of citizens, regulators and politicians.

When the city announced in 1998 that it would fund a series of small, innovative projects as a way to celebrate the coming Millennium, Andrews and other stormwater planners with the Seattle Public Utilities (SPU), proposed a scheme for installing natural drainage systems in northwest Seattle neighborhoods that had inadequate stormwater management systems. Such natural drainage systems utilize soil and plants—nature's drainpipes—to substantially decrease surface runoff from impervious surfaces such as city streets, thereby encouraging the absorption of rainwater into the natural subsurface hydrologic systems, changing stream flow conditions and reducing pollutant loads in aquatic ecosystems. In effect,



Figure 1. NDS Team (left to right): Miranda Maupin, Jim Johnson, Denise Andrews, Darla Inglis. Tracy Tackett not shown.

Andrews and her colleagues (see Figure 1) had envisioned a way to integrate an existing gray infrastructure with a novel “green infrastructure” in a major metropolitan area. The city approved an initial planning grant, thus launching the effort, now known as the SPU Natural Drainage Systems (NDS) program.

With a team of civil engineers, landscape architects, fire and police department representatives, Seattle Public Utilities managers and local elected officials, Andrews set out to demonstrate that “low-impact development” (LID) strategies for stormwater management could be both technically effective in improving aquatic ecosystem health, and economically efficient at getting the job done. By 2004, the team has succeeded well beyond their expectations, developing five natural drainage projects, including the recently completed Broadview Green Grid, a project covering 15 city blocks in northwest Seattle’s Piper’s Creek watershed.²

For their efforts, the NDS team has received wide recognition. Visitors from as far away as New Zealand have come to inspect and consider replication of the novel and measurably effective stormwater system design. The team has also successfully engaged in a rigorous competitive process to win one of five 2004 Innovations in American Government Awards presented by the Ash Institute for Democratic Governance and Innovation at Harvard University’s Kennedy School of Government. In winning an Innovations Award, the NDS program demonstrated that it had done an outstanding job in meeting each of four principal criteria of the awards program. The NDS program is positively characterized by:

- **Novelty:** the degree to which the program demonstrates a leap of creativity
- **Significance:** the degree to which it successfully addresses an important problem of public concern
- **Effectiveness:** the degree to which it has achieved tangible results, and
- **Transferability:** the degree to which it, or aspects of it, shows promise of inspiring successful replication by other government entities.

Along with the Innovations in American Government Award comes a grant of \$100,000 intended to help the NDS program tell its story and see its success reproduced in other places and circumstances. In support of the effort to broadly transfer the lessons learned, a concise explanation of the NDS program’s notable accomplishment follows below.

The Stormwater Management Challenge

Stormwater management is a challenge to existing and emerging urban, suburban and rural settlements across the United States and around the world. In conventional stormwater systems engineered in the twentieth century, a network of impervious troughs, tanks and pipes fit together to literally drain an area, much like the plumbing in a house. Such conventional stormwater systems send irregular, high velocity flows of storm runoff into natural bodies of water, including streams, ponds, lakes and bays. Such flows result in unnatural erosion and the subsequent deposition of sediment. These factors alone can seriously disrupt habitat for aquatic species. In addition, in conventional systems the runoff from storms washes pollutants such as pesticides, motor oil, and bacteria from animal waste off of streets and impervious surfaces into the pipe-and-tank system. By sending such contaminants “down the drain,” and then swiftly into local streams, lakes and estuaries, traditional stormwater management systems can further harm local freshwater and marine ecosystems.

A More Efficient, Effective Alternative

The natural drainage systems approach to these problems is simple in concept: restore and utilize the environment to do the work it was intended it to do. Generally, the NDS approach does so by: increasing, along the edges of city streets, the amount of soil and plants in an interlinked network of “vegetated swales and cascades” (see Figures 2 and 3); reducing the area of impervious surfaces on the street itself by adopting new, multi-functional street designs (see Figure 4); and using these landscape features to allow stormwater to be absorbed into the ground, rather than sending polluted water, at unnaturally high velocities, to rush into local streams, lakes, and bays.



Figure 2. An attractively planted swale at Broadview Green Grid, Seattle, Washington.

essential element of stream restoration.⁴ That is, without the installation of distributed stormwater systems it is doubtful that the urban creeks in Seattle could ever support a sustainable, healthy population of salmon.

The city of Seattle is finding that in addition to providing significant environmental protection, the implementation of natural drainage systems is more cost effective to implement than traditional systems. The reduction of runoff at its source has reduced the need to build and maintain costly infrastructure such as pipes and holding tanks. It also mitigates the pollution of local waterways thus lowering costs to the city in the long run. In addition, the tools of natural drainage systems, plants and trees, maintain themselves and increase their benefit with time as they grow bigger and provide more surface area to slow runoff. SPU estimates that natural drainage systems cost 25 percent less than traditional roadside development. This cost reduction does not factor in environmental services such as increased carbon sequestration through the planting of trees, cleaner waterways, and replenished groundwater—when these benefits are considered, the actual benefit to society is likely much greater.

Initial tests of the pilot projects to date have been so successful that SPU has made a commitment to utilize NDS as its primary stormwater management approach in all areas that drain directly to creeks. Based on early results, the city is recognizing three types of benefits are most notable: environmental benefits, cost effectiveness, and public appeal.

Studies of SPU’s pilot projects reveal that they are extremely successful at capturing water flow and reintroducing it to the natural groundwater system. Empirical tests of the initial “Street Edge Alternative” project, led by Richard Horner at the University of Washington,³ suggest that runoff was reduced by 98 percent over the two-block wide monitored area over the first two years. Associated transmission of pollutants was likely similarly reduced. Monitoring to assess the reduction of contaminants is on-going. Testing of the pilot “cascade” project shows that stormwater flow velocities were reduced by approximately 20 percent. These environmental benefits are significant to improving urban stream quality and reducing the amount of pollution entering Puget Sound. While this work in itself does not generate pristine salmon habitat, experts, such as Dr. Derek Booth, a professor at the University of Washington, suggest that addressing hydrologic conditions is an

Public support for natural drainage systems has been very enthusiastic. Neighborhood residents and community activists alike are supportive of the concept and the implementation. SPU has been working diligently to involve residents in all stages of planning and implementation. The residents are supportive of the programs because they are planting trees and public gardens along the streets, making their neighborhood more livable and aesthetically appealing. Redesign of old streets has added sidewalks to areas where there were none. The curvilinear streets are slowing the speed of traffic, in effect creating a pedestrian friendly environment. Many residents attribute a recent rise in property values to the installation of NDS systems along their streets; additional market data will need to be collected to prove this. Finally, many residents are proud to be associated with the NDS initiative because of the environmental benefits it is beginning to yield.

Together these benefits go beyond the initial SPU aim of improving salmon habitat; the project appears to be improving the entire ecosystem, using government funds efficiently, and enhancing the quality of life of Seattle residents. This culmination of improvements has increased the visibility of the NDS program, and drawn to SPU's door municipal officials and stormwater engineers from far and near seeking more information.

Building on Earlier Initiatives

Utilizing the idea that biological systems can effectively retain rainwater and provide environmental and economic benefits is not new in the United States. Part of the rationale for creating the Adirondack Preserve in New York State and National Forests across the country was that these public forests would absorb rain where it fell and replenish groundwater supplies that feed major navigable rivers. Heightened awareness of the pollution-related damages caused by stormwater runoff in the mid-1980s inspired creative initiatives to mitigate such impacts. Prince George's County, Maryland in metropolitan Washington, D.C. actively sought new methods to reduce runoff into its local estuary, Chesapeake Bay, and implemented a variety of LID designs for stormwater control. Such LID designs included bio-swales and rain gardens. In 1998, the U.S. Environmental Protection Agency awarded Prince George's County a first place national award for the Outstanding Municipal Stormwater Program, setting it as an example for the rest of the country.

Denise Andrews and her colleagues picked up on the LID ideas then gaining currency to propose a novel approach to retrofitting city streets in northwest Seattle. Previously LID had only been applied to small areas, such as parking lots or individual buildings, or in new suburban developments. Seattle was the first major city in America to apply these techniques to existing city streets and neighborhoods.

The number of jurisdictions interested in learning more about NDS indicates the success of the Seattle program. Since its implementation SPU has given over 50 tours to representatives from local communities, across the United States, and around the world. Almost any local government challenged to



Figure 3. A cascade in full flood at Broadview Green Grid, Seattle, Washington.

comply with EPA stormwater management regulations could benefit from learning more about the NDS program in Seattle. The lessons are applicable both for jurisdictions that are redeveloping traditionally built infrastructure and for those permitting new subdivisions and developments.

Things to Look Out For

As SPU has moved forward in developing its initiative they have come up against challenges. Initial obstacles to implementing the low-impact development approaches came from within the city government. City traffic engineers were at first opposed to the redesigned street plans that reduced the total paved surface area. According to SPU the redesigned streets are gradually gaining favor with this group of individuals. Emergency response professionals were also concerned that narrower streets might impair the delivery of public safety services. Once the pilot project was completed, the alternative street designs gradually gained acceptance among public safety officials, as they found that their ambulances and fire trucks could navigate the curvilinear street without exceptional difficulty.



Figure 4. An aerial view of “Street Alternative Edge” design showing narrow, curvilinear streets with sidewalks and street-edge gardens.

With continued development of SEA and cascade projects some risks remain. From an engineering perspective there are two main concerns. One is that if the infiltration of a redesigned soil bed or vegetated swale does not work properly the result could be standing water in the neighborhoods. Recognizing that standing water provides a breeding ground for mosquitoes and other insects, the swales have been designed to drain completely within three to five days; mosquitoes require six days of standing water to breed. Another potential engineering problem is the risk that repeated infiltration might cause slope instability. To reduce this risk the city is remaining cautious in implementing the LID techniques in steep, densely populated areas and adhering to strict engineering standards.

In an effort to encourage citizen involvement and reduce costs, SPU has enlisted homeowners to contribute to the maintenance of their street-side gardens. Initial response to this request by residents has been quite positive. However, if the gardens are not maintained there will be an increased cost to the government to manage these areas.

Inspiring Innovation

In applying for an Innovations in American Government Award, the City of Seattle demonstrated that its effort met each of the four key criteria considered by site visitors and competition judges. The program is *novel* in that it is the first application of low-impact development design strategies in a dense urban environment. NDS is *significant* in that it offers a distinctive and practical method for addressing what has been a nearly intractable problem—the pollution of and hydrological disruption of natural aquatic systems cause by largely unmanaged stormwater flows. Early tests indicate that it is both technically and cost *effective*. In addition, the methods used in NDS are clearly *transferable* to other jurisdictions around the country and around the world.

A fifth criteria—the *ability to endure* as an innovation—is also relevant to any review of conservation and environmental innovations.⁵ That is, if a conservation innovation is to have a significant on the ground affect over time, it must demonstrate, or shown strong promise of demonstrating, a lasting influence over the course of decades, or even several human generations. The first pilot project for Seattle’s NDS

program is only four years old, so it is difficult to judge definitively whether the project will have an enduring affect. Initial indications, however, are that low-impact development has the potential to have a highly significant and lasting influence on how stormwater flows are managed in both the developed and the developing world.

Seattle's Deputy Mayor, Tim Ceis, and SPU Director, Chuck Clarke, explain that the NDS program is likely to have a long life for several reasons. First, all reports to date indicate that it achieves its stated objectives in a cost-effective manner.⁶ Second, as it is currently structured, the revenues that support the program come from SPU stormwater fees, which by law the City of Seattle cannot use for any purpose other than stormwater-related efforts. Third, the program enjoys widespread support not only from elected officials and experienced city managers, but also from local political advocates. In short, the program's future appears bright and stable, notwithstanding the stress that nearly all locally-funded programs experience in early 21st century America.

With this significant political and financial support behind them, Denise Andrews and her team are actively expanding the NDS program. Having successfully completed the 32-acre Broadview Green Grid in September 2004, they are planning another 15-block SEA, called the Pinehurst Green Grid, to be installed in Seattle's Thornton Creek watershed. In the most ambitious initiative to date, SPU is working with the Seattle Housing Authority to apply NDS methods to a 34-block high-density housing redevelopment called High Point. The redevelopment project will cover 129 acres and encompass 10 percent of the Longfellow Creek watershed. High Point is challenging SPU to achieve significant stormwater absorption while maintaining traditionally designed curbs, gutters and sidewalks.⁷ Once completed, High Point should provide a significant test case for the use of LID methods in a high-density urban area. As SPU continues to evolve its NDS program, widely distributed groups of stormwater management officials, as well as citizens striving to improve local water quality conditions, are likely to notice.

ENDNOTES:

¹ See the "Fall for Salmon Guide" on the King County website (<http://dnr.metrokc.gov/wlr/PI/Fall4Salmon/>), as of September 2004.

² Seattle Public Utilities Press Release, "Natural Drainage Systems Receive \$100,000 Award: Harvard Recognizes Innovative City Program," July 28, 2004. City of Seattle: Seattle, WA. See: http://www.ci.seattle.wa.us/util/About_SPU/News/News_Releases/COS_003041.asp.

³ Horner, Richard R., Heungkook Lim, and Stephen J. Burges. "Hydrologic Monitoring of the Seattle Ultra-Urban Stormwater Management Projects." Water Resources Series: Technical Report No. 170, Department of Civil and Environmental Engineering, University of Washington, Seattle, Washington, November 2002.

⁴ Field interview of Dr. Derek Booth by James N. Levitt, February 12, 2004, Seattle, Washington.

⁵ Levitt, James N. "Conservation Innovation in America: Past, Present, and Future." Report on Conservation Innovation, Harvard Forest, Petersham, Massachusetts, Fall 2003.

⁶ Field interview of Tim Ceis and Chuck Clark by James N. Levitt, February 12, 2004, Seattle, Washington.

⁷ See "High Point Project" on the Seattle Public Utilities website: (http://www.ci.seattle.wa.us/util/About_SPU/Drainage_&_Sewer_System/Natural_Drainage_Systems/High_Point_Project/index.asp), as of September 2004.

How to Apply for an Innovations in American Government Award

The Ash Institute for Democratic Governance and Innovation at Harvard's Kennedy School of Government each year presents five winners with an Innovations in American Government Award. The annual winners are outstanding programmatic initiatives in the public sector that are characterized by novelty, significance, measurable effectiveness, and transferability. Each winning initiative receives a grant of \$100,000 to be used to advance the use of the innovation around the nation.

The process for selecting annual winners begins each year in mid-September and goes through five rounds of consideration by judges, with the winners announced in the summer of the following year. The following article was prepared to inform potential American Government Award candidate programs about the application, eligibility, and the selection process.

Eligibility

The Ash Institute accepts applications from all levels of government and across all policy areas. Federal, state, city, town, country, tribal, and territorial governments are all encouraged to apply. Originally the award was limited to all government entities other than federal; however, in 1995 the program expanded to include federal innovations. As noted on the Innovations Award web page (see www.innovationsaward.harvard.edu), the program has accepted applications from a breadth of policy areas, from "training employees to juvenile justice, recycling to adult education, parks to the management of debt, public health to e-governance." The program is limited to domestic programs. Internationally focused agencies may apply as long as their innovation serves to meet the needs of domestic affairs.

Program applicants must meet the following four guidelines to be eligible:

- Programs must be administered under the authority of one or more governmental entities;
- Program must have been implemented 12 months prior to the date of submission (e.g., for a 2006 award, the program must have been launched prior to September 15, 2004.)
- Programs must be currently in operation;
- Applications must be submitted by the governmental entity responsible for the innovation; nonprofit, private sector, and union initiatives are eligible only with significant governmental involvement and oversight.



The cover image from a recent Innovations in American Government Awards brochure.

Awards cycle

Evaluators go through five rounds of consideration to select winners for the Innovations in American Government Award. First, a pre-application is due prior to September 15 on a given year for consideration for the following year's awards. The pre-application is straightforward, providing the Innovations Program with basic information about the organization (name, contact, type of organization) and the innovation up for consideration. This short application requires three brief essays (totaling less than 1000 words) describing the innovation and why it is deserving of an award.

Expert practitioners and scholars review all of the initial applications and evaluate them for merit. Reviewers advance the eligible applicants to the second phase of the process and ask them to submit a second, longer application. The detailed application requires a series of detailed essays totaling about 8000 words. Evaluators consider these applications and select 50 programs in the winter following the initial application deadline. The Ash Institute provides significant press coverage to all 50 semi-finalists.

Over the winter months reviewers deliberate on the applications from the 50 top programs and select 15 programs for further consideration. In the fourth round of evaluation each of the 15 selected programs receive a site visit by an expert evaluator. Upon completion of the site visits the Ash Institute announces the 15 programs as finalists for the award and each program receives additional press coverage. The fifth and final round of competition involves presentations by the 15 finalists to a panel of experts in late spring. The judges select five winners from the pool of 15 finalists. The Ash Institute and the Council for Excellence in Government announce the award winners in July of each year in conjunction with the national Excellence in Government conference (www.excelgov.org).

Selection Criteria

As listed on the Innovations website (www.ashinstitute.harvard.edu/Ash/awardcriteria.htm), the following criteria are considered at each round in the competition:

1. **Novelty:** the degree to which the program demonstrates a leap in creativity
 - a. Does the program represent a fundamental change in the governance, management, direction, or policy approach of a particular jurisdiction?
 - b. Does the program represent a significant improvement in the process by which a service is delivered?
 - c. Does the program introduce a substantially new technology or service concept?
2. **Effectiveness:** the degree to which the program has achieved tangible results
 - a. Does the program respond to the needs of a well-defined group of clients?
 - b. Does the program demonstrate its effectiveness in meeting its stated goals and objectives quantitatively and qualitatively?
 - c. Does the program produce unanticipated benefits for its clients?
 - d. Does the program present evidence of already completed, independent evaluation?
3. **Significance:** the degree to which the program successfully addresses an important problem of public concern
 - a. To what degree does the program address a problem of national import and scope?
 - b. To what degree does the program make substantial progress in diminishing the problem within its jurisdiction?
 - c. To what degree does the program change the organizational culture or the traditional approach to management or problem solving?

4. **Transferability:** the degree to which the program, or aspects of it, shows promise of inspiring successful replication by other governmental entities
 - a. To what extent can this program be replicated in other jurisdictions?
 - b. To what extent can this program serve as a model that other jurisdictions will seek to replicate?
 - c. To what extent are program components, concepts, principles, or insights transferable to other disciplines or policy areas?

Selection Committee

Practitioners and scholars who are experts in evaluating innovations in general, and in specific areas, evaluate candidates for the award. A national selection committee convenes each year to select the winners from among the 15 finalists. The current make-up of the national committee is available at: www.ashinstitute.harvard.edu/Ash/awardcommittee.htm.

When to apply

The Innovations Program accepts applications for the Innovations Award year round. The application window for the 2005 award is now closed but the Ash Institute is accepting applications for the 2006 award. A reference application and the online application are available at: www.innovationsaward.harvard.edu.

Duly Noted: News and Upcoming Releases from the PCI

- **FRONTIERS OF CONSERVATION FINANCE.** Following up on a highly successful 2004 Lincoln Institute Conservation Leadership Dialogue, work continues in the field of conservation finance. Island Press has recently signed on to publish a volume on the topic to be edited by Jim Levitt tentatively titled, *From Walden to Wall Street*. Watch for it in fall 2005.
- **WELCOME TO LYDIA BERGEN:** This fall we welcome Lydia Bergen as the 2004-2005 program associate at the Program for Conservation Innovation. Lydia is a 2001 graduate of Harvard's Kennedy School of Government with several years of work experience as the Policy and Outreach Coordinator for the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) in Santa Cruz, CA. Lydia's responsibilities include editing, research, writing and conference management. Her crisp, clean writing is a pleasure to read. Welcome, Lydia.