EFAB Sustainable Watershed Finance Report

Executive Summary

The goal of clean water for every use, human and environmental, is a firm and long-standing national priority. Substantial progress has been made through implementing the Clean Water Act and other authorities, but much remains to be done. Over 40% of assessed waters do not meet water quality standards. The causes include failing or inadequate wastewater and septic systems, runoff from streets, parking lots, factories, lawns, farms, forests and emissions from power plants and vehicles. Among the obstacles to clean water is the enormous cost of cleaning up existing discharges, restoring damaged ecosystems and preventing current and future pollution from reaching the nation's waters.

Federal and State grant and loan programs, especially the Clean Water and Safe Drinking Water Revolving Funds and the various programs under the Farm Bill, coupled with state, local, and private funding, have gone a long way toward achieving the goal and will play a considerable part in making future progress. But there is a significant gap between the capacity of those programs and the needs identified for both wastewater facilities construction and improvement and actions needed to eliminate or prevent nonpoint sources (NPS) of pollution. It is unlikely that federal or state funding will fill this gap in an acceptable timeframe, so it will be incumbent on the residents, governments and businesses in each basin and watershed to finance a significant portion of the costs of necessary actions, as they have to a considerable extent in the past.

The United States Environmental Protection Agency's (EPA) policies for sustainable infrastructure finance include full cost pricing and a watershed approach. Many of the challenges to meet water quality goals, including Total Maximum Daily Load (TMDL) requirements, are best approached from a watershed perspective, so the analysis of finance needs should incorporate that perspective.

To illuminate the challenging financing issues watershed managers and groups face in closing the watershed finance gap, a roundtable on Sustainable Watershed Finance was co-hosted by the Environmental Financial Advisory Board (EFAB) and the Office of Wetlands, Oceans, and Watersheds (OWOW) in Washington, D.C. on March 9, 2006. The purpose of the roundtable was to explore some of the key questions that will affect the success of innovative methods for financing watershed protection and restoration.

Speakers and participants shared perspectives on a variety of issues related to increasing local capacity to finance needed improvements.

1. Uses of State Revolving Funds and other Federal Programs

The presentations by EPA officials made several points clear:

- Many Federal funding programs support watershed protection;
- The Clean Water State Revolving Fund (SRF) Program and other Federal programs are

already financing a wide variety of NPS solutions;

- There is enormous flexibility in both Clean and Drinking Water SRF's to finance almost any needed improvements, both point and non-point; but,

- There is little likelihood that the SRF's will be capitalized at a high enough level for them to finance more than the highest priority waste treatment and some non-point infrastructure; and,

- TMDL allocations under the Clean Water Act will be a strong driver for watersheds to meet water quality requirements, making financing an increasingly critical need in the coming years.

2. Principles for allocating the costs of watershed improvements among users and beneficiaries

If there is interest at the local level in raising revenue to finance the costs of watershed improvements, there are many complex challenges in fairly and equitably allocating these costs among the various users and beneficiaries and across jurisdictions, but there are also some sound principles under which watersheds could raise money through taxes, fees, or other charges in ways that would be politically acceptable.

Among the principle sources of potential revenue, user fees are generally preferred, because they are perceived as avoidable, fair, equitable, and efficient. User fees enjoy these advantages, however, only where there are cost-effective means for excluding non-payers from using the service. Tax options, including sales, income and ad valorem taxes, benefit assessments and entrance fees all present their own difficulties.

Sustainable financing of watershed improvements should strive to be fair and equitable, produce adequate funds, be politically acceptable, provide incentives for efficient fund use and for efficient use of environmental services and avoid free riders.

Another challenge is finding fairness in determining who should pay, the beneficiaries of better water quality, those whose activities cause degradation, those who can afford pay, or the general public.

The provision of ecosystem services by watersheds, including clean and sufficient water, waste absorption capacity, flood control and habitat for native plants and animals can be a basis for determining the allocation of costs and burdens. Some are more fairly protected by broad based government programs, while others can be the subject of market or other payments.

Future generations have an intense interest in how we manage watershed resources and ways should be explored to create a forward market for intergenerational services that would have the lowest life cycle costs. As a first step, a number of entities are exploring emerging markets for ecosystem services to serve multiple, environmental, habitat and resource conservation needs. It

is likely that interest in markets and other ways of paying for ecosystem services will increase significantly in the next few years.

3. Collaborative Governance

The best chance of enacting new or increased charges, taxes or fees is where there is agreement among the various groups of payers across multiple jurisdictions, sectors and interests. All to be charged must be represented so they have a chance to negotiate the burdens that will fall on their constituency. There are examples of collaborative governance approaches that show promise for how agreements might be reached and implemented. The lessons learned can readily be incorporated into collaborative approaches needed for sustainable watershed finance. Important components of a collaborative governance approach are (1) a respected convener to bring people together, (2) a neutral forum, such as a university center to provide expert assistance to te convener and members of the collaborative team and (3) a sponsor, such as a governor, agency, or alliance of organizations to call for and support the process.

Some of the practical political considerations that need to be addressed for any successful process are:

- Keep it simple and transparent;
- Connect the actions needed and their costs to the beneficiaries and those responsible;
- Share the financing costs among the broadest possible group of payers;
- Incorporate clear lines of accountability;
- Seek sources of revenue that are the most sustainable; and
- Make sure any new financing mechanism is embraced by key advocacy groups.

4. Innovative Finance and Market Methods

There is a broad and growing variety of innovative finance or market tools that a collaborative local team may choose among. They include:

- Leveraging the funds available through innovative use of SRF's;
- Special purpose financing like Maryland's Bay Restoration Fund;
- Special district financing, such as septic tank management partnerships and ecosystem service districts;
- Water or wastewater rate increases, like New York City's financing for improving in its reservoirs' watersheds, and the local utility financing of streamside planting to reduce temperatures in the Tualatin river in Oregon.
- Watershed assessments, allocated on the basis of relative benefits and contributions;
- Tax base sharing;
- Transfer of development rights, as in the Cuyahoga and Deschutes watersheds;
- Tax increment financing, to help pay for land protection programs that benefit watershed health and increase property values on properties within the watershed;
- Integrated services financing, through long term bonds issued by a watershed based utility to finance infrastructure and other services via the integrated design of a full range

of environmental and other services needed by both present and future generations;

- Market based programs, to put together consumers of agricultural and forest products or ecosystem and restoration services with producers of those products and services; and
- Supplemental environmental projects, where in lieu of fine or penalty for an environmental violation a source could pay into a revolving fund or other mechanism.

See the list of Innovative Finance and Market Methods in Section 5 of the Discussion of Issues for fuller descriptions of these tools.

5. Potential Implementing Entities

Once there is agreement on who will pay and what type of traditional or innovative finance mechanism will be used, an entity to issue bonds, collect and distribute revenues, leverage other sources of funds and accounting to all stakeholders must be designated or established. Potential entities include water, wastewater or other public utilities, public authorities, redevelopment districts, special service districts and multi-jurisdictional entities created by intergovernmental agreements. Selection of the appropriate entity will depend on the functions that are to be assigned to it. Some of these may be the responsibility of a decision-making, multi-jurisdictional governance entity and others of an implementing entity.

Recommendations

- Expand Knowledge and Foster Use of Collaborative Governance Approaches. EPA should foster use of collaborative governance approaches for achieving sustainable finance in all watersheds, using the many forums that EPA hosts or participates in. EPA should disseminate success stories that demonstrate the use of collaborative governance principles and techniques in achieving successful financing outcomes.

- Disseminate innovative finance tools. EPA should designate an environmental finance center to maintain a directory of innovative finance and market techniques. EPA and the environmental finance centers should disseminate information about these successes and model techniques.

- Encourage ecosystem services markets. EPA should partner with university research centers and others to determine whether and to what extent ecosystem service values can be used to make local taxing, fee or other revenue raising systems more equitable, fair and acceptable to payers. EPA should work with the Department of agriculture and other organizations which are exploring how to pay for and make markets in ecosystem services to determine how loans and grants from both agencies can be used to leverage payments for markets in these services.

- Leverage existing finance tools. EPA should continue to review its existing superb financing tools under the Clean and Safe Drinking Water Acts to determine how they might be leveraged with local efforts to obtain additional funds and markets to help close the funding gap.

- Track sustainable finance implementing entities. EPA should, with the assistance of the EFCs and EFAB, develop a compendium of the potential entities that would be appropriate to implement whole watershed finance strategies agreed upon.

- Initiate demonstration projects. EPA should fund or otherwise assist several watershed scale demonstration projects that incorporate sustainable finance techniques, and that use collaborative governance approaches.

Background

Implementation of the Clean Water Act (CWA) has made tremendous progress since 1972 in removing billions of tons of pollution, but the nation has a long way to go to meet the CWA's goals. Forty percent of assessed rivers and streams, 45 percent of assessed lakes and 51% of assessed estuary square miles do not meet basic water quality standards.

The U.S. Environmental Protection Agency (EPA) and other Federal agencies provide substantial funding and financing. Safe Drinking Water Act (SDWA) and CWA capital grants for state revolving loan programs (SRFs) are important sources for local drinking and wastewater infrastructure. Other programs include the Farm Bill, Section 319 grants for nonpoint source (NPS) pollution and smaller programs, such as targeted watershed grants. Despite this commitment of Federal dollars and matching or complementary state contributions, the gap between what funding is available and the overall need is huge and the cost of addressing polluted runoff and achieving ecological watershed goals is daunting.

According to EPA, NPS pollution remains the nation's largest source of water quality problems and the main reason that so many of our surveyed rivers, lakes, and estuaries are not clean enough to meet basic uses such as fishing or swimming. Nevertheless, most of the funding for water quality improvement has gone to address point sources, given the large capital expenditures needed for treating sewage and industrial wastes. Since adoption of the Clean Water Act, Congress has appropriated about $70 billion for investment in clean water infrastructure. State and local governments has invested many billions of dollars more. Still, it is estimated that, over the next two decades, the United States needs to spend hundreds of billions of dollars to replace or improve existing wastewater infrastructure systems. While there is no agreed estimate on the cost of addressing nonpoint sources, it is certain that many additional billions will also be needed, and, in many watersheds, addressing NPS will be the major cost of restoring water quality.

Total Maximum Daily Load (TMDL) allocations required for all water bodies not meeting water

quality standards, will be an increasing driver for reducing pollution from both point and nonpoint sources. Implementation plans devised to meet these allocations will highlight the work remaining to be done to achieve the nation's water quality goals. These plans have led and will lead to increasing public expectations that pollution sources be abated and that funding or financing be provided where past actions, on-going prevention, redesign of systems causing pollution and other avoidance and restoration activities fall short. It should be noted that there are funding and financing issues related to the collection and analysis of data for the completion of TMDL allocations. To the extent data is unavailable, it becomes harder to identify the precise problem that needs financing to solve. Paying for data is traditionally the role of government, permittees, responsible parties, universities and volunteers. A robust watershed financing approach will need to include payments for collecting and analyzing data.

At the same time, available funding through EPA for both point and nonpoint sources is in decline. While the Farm Bill is likely to continue to pay for beneficial improvements to address agricultural nonpoint sources, Federal and state programs for other nonpoint sources are unlikely to make up the shortfalls. While a variety of measures have been successful in improving water quality, the financing gap is a significant barrier to the continued work necessary to maintain and improve our waterways.

These conclusions are reflected at a regional scale. In the draft report entitled *A Strategy to Restore and Protect the Great Lakes*, the President's Great Lakes Regional Collaboration (GLRC) identified over $20 billion in investments necessary to begin work on high priority restoration opportunities in the next five years, with 85% of the funds dedicated to capital costs. Green infrastructure capital costs, to address non-point sources and ecosystem restoration, were identified at $1.75 billion and traditional infrastructure capital costs were identified at $18.25 billion. The Great Lakes Protection Fund has found that innovative financing methods will be required to enable these investments to be made, even assuming that the Federal Government will contribute as much as $11 billion of the total. The potential needs at the state and local level total some $9 billion dollars.

Most efforts of watershed managers and groups have been expended on seeking outside grants, loans and other forms of public and private assistance to pay for the substantial cots of projects needed to achieve watershed health. These efforts are worthwhile and need to be pursued to the fullest extent, in order to reduce the burden on local residents.

But even with every state, federal and private funding option employed, it is clear that those responsible for meeting watershed health goals will need to finance a significant portion of the cost of needed improvements on their own. With the general public largely resistant to increased taxation, there is a need to develop innovative market and financing mechanisms that will generate the funds to finance the actions necessary to improve water quality while maintaining the necessary political support for this effort.

EPA has adopted as one of the four pillars of sustainable water quality infrastructure the idea of full cost pricing, meaning that local resources will ultimately have to be depended upon to finance needed water quality improvements, principally through fees and charges. While EPA's

policy does not apply to nonpoint sources, the same logic would dictate that local resources need to be mobilized to pay for or make the improvements required to meet TMDL's and other watershed health goals.

EFAB Roundtable

To illuminate the challenging financing issues watershed managers and groups face, a roundtable was co-hosted by the Environmental Financial Advisory Board (EFAB) and the Office of Wetlands, Oceans, and Watersheds in Washington, D.C. on March 9, 2006. The purpose of the roundtable was to explore some of the key questions that will affect the success of innovative methods for financing watershed protection and restoration.

Among the questions posed to the participants of the Roundtable were:

- What types of new fees and charges or new markets for avoiding polluting activities are acceptable to the public?
- How far can charges like water and sewer fees be raised to pay for more than traditional/infrastructure investments?
- Can charges or markets be effectively and fairly linked to sources and benefits?

Summary of Roundtable

Charge

Diane Regas, Director of EPA's Office of Wetlands, Oceans, and Watersheds (OWOW), charged the participants to think about how to move forward on implementing watershed plans and commitments to achieve Clean Water Act and community water quality goals. Financial mechanisms should be realistic and based on collaboration among stakeholders. What are models of governance that maximize leveraging at the watershed level? What market-oriented solutions lead to sustainable approaches? What goods and services can be built into markets to achieve sustainable financing of watershed goals? How can one build capacity and sustainability into watershed efforts? She urged participants to maintain the dialogue among all stakeholders; everyone has an interest in doing this well.

OWOW considers three components essential to sustainable watershed funding: (a) hydrological focus, (b) collaboration, and (c) a strategic or scientific approach using a geographic framework for rational plans and mechanisms to assess progress and adjust actions.

Ms. Regas and James Hanlon, Director of the Office of Wastewater Management, pointed out that the watershed approach is one of the four pillars of sustainable water infrastructure. Being based on cooperation among all stakeholders, it allows efficiency and effectiveness not otherwise available and affords opportunities to both provide critical water services and protect watersheds.

Discussion of Issues

1. Uses of State Revolving Funds and other Federal Programs

The presentations by EPA officials made several points clear:

- Many Federal funding programs support watershed protection;
- The Clean Water SRF Program and other Federal programs are already financing NPS efforts to a significant extent;
- There is enormous flexibility in both Clean and Drinking Water Revolving Funds to finance almost any needed improvements, both point and nonpoint; but,
- There is little likelihood that the SRFs will be capitalized at a level for them to finance more than the highest priority waste treatment and some nonpoint infrastructure.

Georg Ames emphasized that a "community quilt" approach to watershed finance, patching together a variety of national, state, local and private sources, is likely to be the most successful way to make progress. This approach allows for the most efficiency in finance as well. Fore example, where an SRF makes a loan to a municipality that has done a thorough analysis of sources of pollution, it may be far cheaper to achieve needed load reductions by negotiating with land owners to use best management practices upstream. The municipality could off-lend to those owners, which will be more cost-effective than upgrading the facility. This kind of thing is possible through the SRF, but has rarely been done to date.

The SRFs can be used to make investments that leverage additional financing from local sources. For example, the Safe Drinking Water SRF is capable of providing start up funds for some innovative watershed market and financing programs in watersheds, through the Source Water Protection Program. Peter Shanaghan, Director, Office of Groundwater and Drinking Water, pointed out that these can be applied to a variety of activities, including (a) loans to water systems for land/conservation easements to protect drinking water sources, (b) implementing voluntary, incentive-based source water protection measures, (c) development of own-source water protection programs to build capacity to implement and oversee these programs.

He gave examples in Des Moines, Iowa, where a company that runs a drinking water utility collaborates with agricultural users upstream on controls to lower levels of nitrates in water bodies, and in Illinois, where a drinking water investor-owned utility had a project with the State to trade upstream sediment control to allow discharge of solids downstream that reduces twice as much discharges of solids.

Mr. Ames and Stephanie vonFeck of the Office of Wastewater Management stressed TMDL allocations under the Clean Water Act will be a strong driver for watersheds to meet water quality requirements, making financing an increasingly critical need in the coming years. TMDLs are accompanied by implementation plans, which, while not technically required to be implemented, provide a pathway toward meeting water quality standards and the other goals of the Act. There is a compelling role for the use of financial or market incentives that produce innovative, cost effective approaches to achieving these goals.

2. Principles for allocating the costs of watershed improvements

The presentations of John Boland, Johns Hopkins University; and Josh Farley, Gund Institute for Ecological Economics, are summarized extensively below both because they point out many of the complex challenges in fairly and equitably allocating the costs of watershed improvements among the various users and beneficiaries and across jurisdictions, but also because they suggest some sound principles under which watersheds could raise money through taxes, fees or other means that would be politically acceptable.

Mr. Boland pointed out that watershed-level programs are some of the most straightforward, effective, and efficient means of accomplish ecosystem protection. But they present the most complex and challenging means of raising funds needed for ecosystems protection. What is good about watershed programs also makes them challenging to finance. Watersheds only rarely match political boundaries; most regulatory and financial institutional arrangements are at the wrong scale or in the wrong place. Watershed pollution sources are diffuse; responsibility for them cannot easily be established. Free riders-nonpayers-cannot be excluded from the benefits. Effective ecosystem protection measures may also conflict with private property rights.

Mr. Boland stated that the objectives of a financing strategy include (s) sufficient resources to carry out the program, (b) sustainability (current financing strategy should not jeopardize ability to raise enough funds in the future), (c) efficiency (the financing strategy should promote economic efficiency, (d) equity (equals are treated equally), (e) fairness (financing method should be regarded as fair by most affected persons), (f) political acceptability (sufficient political support at all levels to assure implementation), and (g) lack of perverse incentives (should not encourage free riding and counterproductive action, inefficient uses of resources, etc.).

Mr. Boland then reviewed several sources: taxes, user fees, and voluntary contributions of money, property, and services. In general, people like user fees, which are perceived as avoidable; fair, because they are tied to services rendered; equitable, because they fall only on service receivers; and efficient, because properly configured they can provide an appropriate incentive for use of the service.

User fees enjoy these advantages, however, only where the associated service is excludable, that is, there are cost-effective means for excluding nonpayers from using the service. In the absence of excludability, the user fee becomes a voluntary payment, inviting free riders and eliminating many advantages (efficiency, equity, and fairness) of this funding source. This is a challenging problem.

Another issue is distinguishing between sources and instruments. “Financing instrument” refers to the means used to connect monetary sources (the ultimate payers) to sinks (project costs). Financing instruments can reallocate costs and associated risks over space and time; for example, borrowing reallocates costs over time, and broadly based taxes reallocate costs over space. “Financing source” refers to the identity of the ultimate payers of the cost. Identification of

financing source and the choice of a financing instrument are related decisions, but not identical.

Some tax and fee options:

- ***Broadly based taxes*** (e.g., sales and income taxes) are inequitable for watershed problems, because the financing source is different from the beneficiaries, raising resistance and diminishing incentives for efficient use of funds.

- ***Ad valorem taxes*** (e.g., special watershed taxing district) require benefit measures for equity and fairness, but not all benefits accrue to locals, raising resistance and moderately reducing incentives for efficient use of funds.
- ***Benefit assessments*** require benefit measures and may correlate well with local benefits, but not all benefits accrue to locals. The process of setting such an assessment is often transparent and improves the incentive for efficiency.

- ***Entrance fees/license fees for recreational services*** correlate well with benefits, provided they are limited to recreational services. Funding of other benefits is inequitable and may be seen as unfair and create pressure to skew improvements to recreation services.

Voluntary options include:

- Cash contributions and property contributions are usually not sufficient or sustainable as a funding source and may be targeted, restricting the scope of improvements.
- In-kind contributions are not sufficient as a funding source, but may build community support helping sustainability; however, they have limited applicability.

In summary, sustainable financing of watershed improvements must:

- Be fair and equitable (e.g., user fees and voluntary contributions)
- Produce adequate funds (e.g., taxes)
- Be politically acceptable (e.g. user fees and voluntary contributions)
- Provide incentives for efficient funds use (sometimes user fees and voluntary contributions)
- Provide incentives for efficient use of environmental services (sometimes user fees)
- Avoid free riders (taxes and sometimes user fees)

Josh Farley presented further insights on equitable financing of watershed projects. Approaches include beneficiary pays, polluter pays, those who can afford pay, and government pays for public goods, but fairness in these approaches is difficult to determine.

Environmental services often have a wide geographic distribution from local to global. Determining who benefits according to receipts is very complicated. One example of beneficiaries paying is the nine million paying customers of the New York City water utility,

who are paying for watershed protection measures by upstream farmers and others. Another is payments by the Costa Rican government of $70 a year per hectare to certain farmers to protect upstream forests or to allow forests to regroup. In Colombia, the Colombia-Cauca irrigation cooperative pays upstream landowners to preserve the watershed.

How much should beneficiaries pay? On the supply side, they should pay as much as they need to continue supply of those services or the lower limit of upstream landowners' opportunity costs. On the demand side, the most that beneficiaries are willing to pay is the upper limit of what the benefits are worth to them. Nature provides services regardless of income; yet, economists try to decide the value of ecosystem services only in terms of income. One could base it on a democratic principle of one person, one vote, but most economists use a plutocratic approach of one dollar, one vote.

The spatial distribution of impacts on watersheds is also broad: impacts may come from afar (e.g., mercury and acid rain emissions) or locally or regionally (e.g., phosphorous and nitrogen emissions or deforestation). Direct damage may be caused by such activities as channelization of water bodies or direct point source emissions. It is difficult, therefore, to implement the "polluter pays" solution. A first step might be to get rid of perverse subsidies-such as massive subsidies for agricultural production and logging in national forests and on royalties on fossil fuel extraction-but that is not going to happen very soon.

One example of the polluter pays model is "cap and trade": giving polluters permits to pollute, which they can trade. On the supply side, price is determined by supply and, therefore, by democratic processes. The equitability of "cap and trade" raises issues of the equity of revoking property rights and/or privileges. It is easier to regulate waste absorption capacity, but it is also harder to monitor.

Markets require excludability, and prices require feedback loops. Most ecosystem services, however, are inherently non-excludable, making direct markets impossible, and have no feedback loops, making pricing difficult.

Some ecosystems services (e.g., recreation; waste absorption, for which there are an abundance of cap and trade emission schemes; and structural elements of ecosystems, such as water use rights and tradable development permits) can be made excludable. It is easier to make unowned waste absorption capacity excludable than to revoke/change existing property rights.

The less excludable a resource, the more transaction costs and free riding occur. The more transaction costs, the greater is the efficiency of government intervention. Examples in which natural resources have been made excludable are all cap and trade schemes (e.g., carbon dioxide markets in Europe) and charging for use of a resource (e.g., flood control; clean water for non-consumptive uses; recreation, although congestion can occur; and waste absorption capacity).

Mr. Farley summarized his points on excludability of resources as follows:

- Excludable rival resources (rival resources are exhausted by use) include market goods

(e.g., irrigation and drinking water, waste absorption capacity of forests and lands) and constitute a natural area for non-governmental financing.

- Non-excludable rival resources include open access regimes (tragedy of the commons), such as waste absorption capacity (requires governmental regulations to create markets by making the resource excludable).

- Excludable non-rival resources include recreation and patented information, for example, on pollution control technology (requires government financing).

- Non-excludable non-rival resources include pure public goods, such as information, most ecosystem services (flood control, clean water for non-consumptive uses) and require government financing.

Mr. Boland and Mr. Farley also talked about delivering resource to future generations. The challenge in business is to create a "forward market" for intergenerational services. In addition, there are designs with zero cost, for example, facing a school to the south to capture solar heat.

Mr. Farley noted that intergenerational financing is difficult. How much will future generations pay for long-term debts incurred today? In addition, all we know about what future generations will want is what *we* want now. All we can do is rule out the worst and look at the best possibilities. The only way future generations will pay is through debt financing, which is perfectly reasonable, when benefits occur over multiple generations.

Hank Patton of World Steward responded that a powerful way to bring science to answer the question of what future generations will want is to use life cycle assessment to assist in determining the full costs of the things we want today and give bond trustees the ability to determine that future generations would want those investments that have the lowest life cycle costs.

1. Ecosystem Services Valuation

It was an assumption made in planning the workshop that ecosystem services valuation might play a significant part in sustainable watershed finance, by helping to adjust fees, charges or taxes to take account of the differing contributions to problems or benefits received by different stakeholders in the watershed, especially landowners. While it appears that making these adjustments is theoretically possible and perhaps could contribute to making needed increases in revenues more palatable to stakeholders, the complexities and uncertainties involved at this stage of development of the science make it challenging. Further research is needed.

Mr. Farley said that, if something is non-excludable like ecosystem services, it might be possible to put a vlaue on those benefits and create some kind of mechanism to pay for them that is fair and equitable. The elements of ecosystem structure that create those services are rival and excludable, which allows the possibility for creating those mechanisms. Many of the benefits are

easy to measure. For example, if one deforests a watershed, new infrastructure costs (e.g., storm water management) will be phenomenal. It is easy to estimate a huge tax to create that storm water control. Ecosystems tend to provide many services cost-effectively, there is no constant flow of new money going in.

A number of entities are exploring emerging markets for ecosystem services to serve multiple environmental, habitat and resource conservation needs. These include universities, private businesses, nonprofit organizations, and governmental agencies, here and abroad, including the U.S. Department of Agriculture. The U.S. Forest Service, within that Department, has been especially active in looking for opportunities for private forest landowners to be paid for conservation activities that benefit watersheds while providing income in addition to sustainable tree harvesting. Forest Trends, a non-profit organization, publishes extensively on the issues and opportunities for markets in ecosystem services. Projects in Colombia, Costa Rica and elsewhere have brought together municipal water suppliers, businesses that rely on clean water and forest landowners, who receive payments to protect their forests rather than exploiting them in ways that damage water quality or availability. In New York, farmers, forest landowners and municipalities in the upstate watersheds of the City of New York's reservoirs are receiving payments, investments, and assurances, mostly paid for by the users of the City's water supply system, in order to protect the water quality of the streams flowing into the reservoirs.

It seems likely that interest in markets and other ways of paying for ecosystem services will increase significantly in the next few years. EPA, with its long experience in encouraging trading for water quality improvements and in measuring water quality values through its monitoring and TMDL programs, is well positioned to participate in both the development and implementation of these markets. The flexibility afforded by the SRFs and the farm programs provides an enormous opportunity for the Federal government to leverage markets in ecosystem services, providing avenues for more efficient and effective means of producing water quality (with significant air quality, habitat and soils benefits), at a great savings to taxpayers and rate payers, compared to the costs of providing these services through engineered solutions.

2. Collaborative Governance

One of the hardest aspects about local financing is the difficulty of reaching agreement among the various groups of payers. Transparency and accountability are very important. There needs to be a sense that the money to be raised is needed and will be efficiently used to address the highest priorities. Adding to the challenge is the need to achieve agreement across multiple jurisdictions, sectors, and interests.

The best chance of enacting new or increased charges, taxes or fees is where democracy works best, that is: all to be charged are represented, have a chance to negotiate the burdens that will fall on their constituency, have a say in how, when and where any new charges will be implemented, and will not be surprised by any changes after they have agreed.

Achieving agreement on these issues is hard to do in our fractionated world, but there are some examples of collaborative governance approaches that show promise for how agreements might

be reached and implemented to assess new or increased charges to pay the financing costs of watershed an related community improvements.

Greg Wolf, National Policy Consensus Center, talked about how collaborative governance attempts to solve problems at regional and community levels, such as a watershed, by multiple governmental bodies (Federal, state, county, city, district, etc.) And non-governmental entities and citizens. A collaborative governance network consists of a sponsor (leader, agency, community group, business, etc.); a convener (e.g., governor, legislator, mayor, civic leader, etc.); and a neutral forum (e.g. university, civic organization, etc.). Through collaborative governance, *sponsors* identify and raise an issue or opportunity and assess which sectors should participate. *Leaders* convene all stakeholders, who adopt the collaborative governance system as a working framework for action. *Conveners and participants* frame or reframe the issue for further deliberation. The *neutral forum* designs and conducts a quality process for participants to negotiate their interests and integrate resources. A written agreement among all parties establishes accountability and spells out individual and collective actions.

This process is based on transparency and accountability, equity and inclusiveness, effectiveness and efficiency, responsiveness, forum neutrality, and consensus processes. Not following these principles could derail the process later. At the regional level, this system creates and determines the objectives, policies, and kinds of investments needed to solve the problem across jurisdictional and other lines. At the community level, public, private, nonprofit, and citizen groups leverage resources and implement the agreed actions as community-based projects.

Mr. Wolf described the example of the Lower Columbia Solutions Group, which was sponsored by the governors of Oregon and Washington and the Director of the Council on Environmental Quality for collaborative decision making on sustainable dredge material disposal in the lower Columbia River area, a source of contention between environmental and industry groups in the two states. A collaborative team was organized using a respected state legislator as the convener. The effort led to high-level regional agreements that produced a charter and collaborative governance system to address the issue. Individual teams reached agreements on specific alternative disposal solutions.

Jeff Edelstein, a Maine facilitator, described the Casco Bay/Sayco Bay Interlocal Stormwater Working Group, listing the factors for success of the group, including taking a problem based approach, using a respected convener, providing neutral facilitation, process management, research and technical expertise, involving all appropriate parties, avoiding excess formality and obtaining adequate seed funding for the process.

Panelist and participants emphasized that collaborative approaches must be used to solve the conundrum of having to raise local revenues for needed and often well accepted projects and actions, through means, like taxes, fees and assessments that are generally politically unpopular. Successful adoption and implementation of new financing measures are more likely with consensus-based agreements that are worked out by all affected interests and jurisdictions and implemented fairly and equitably.

Charles Evans, Special Assistant to the Secretary in the Maryland Department of Natural Resources provided a useful list of some of the practical political considerations that must be satisfied for adoption of innovative financing at the state level and will have resonance at the local level as well:

- Keep it simple;
- Connect the actions needed and their costs to the beneficiaries and those responsible;
- Share the financing costs among the broadest possible group of payers;
- Seek sources of revenue that are the most sustainable; and,
- Make sure the new financing mechanism is embraced by the environmental and other key advocacy groups that have the ability to defeat proposed financing measures.

5. Innovative Finance and Market Methods

A collaborative governance team or other entity or group that can make politically achievable recommendations for raising money to finance watershed improvements or for making markets in watershed services, has a broad variety of innovative finance or market tools to choose among. And the listing is growing longer. Following are brief descriptions of some of the more interesting ones that were discussed at the Roundtable or uncovered by subsequent research.

Leveraging the funds available through innovative use of SRFs

Stephanie vonFeck listed some innovative financing ideas, including:

- A Watershed Revolving Fund (EFABs proposal for an Environmental Revolving Fund could find application in the watershed context);
- Conduit lending (municipal borrowers from SRF lend to individuals or nonprofits to undertake projects);
- Sponsorship (user fees for NPS);
- Matching SRF loans with other Federal programs (e.g., Clean Water Act 319 nonpoint source funding and various Farm bill programs);
- State financial management (e.g., very creative arbitrage rebate rules in New York); many other innovations are "bubbling up" from the states, particularly in Ohio;
- Portfolio financing (funding in stages, phases, and segments); and
- Septic tank management partnerships

Special purpose financing: **Maryland's Bay Restoration Fund**

Dan Nees, Maryland Environmental Finance Center; Bob Summers, Director for Water Management Administration in the Maryland DNR, and Charlie Evans described development of Maryland's "flush fee" as an innovative approach to funding the State's Chesapeake Bay Restoration Fund. A 2000 agreement among the states of Pennsylvania, Maryland, Virginia and the District of Columbia and later included New York, Delaware, and West Virginia was the original impetus; each state had agreed to cap load allocations for nitrogen and phosphorus at certain levels. In Maryland, however, it had not been possible to get a line item in the State's

budget for wastewater treatment plants, so an alternate source of funding was needed.

Funding had to come directly and indirectly from those who contributed to the problem and those who loved and benefitted from the Bay. An innovative and complicated "flush fee" system was developed in which Maryland households are charged $2.50/month on sewer bills and each commercial and industrial user pays an equivalent dwelling unit charge based on wastewater flow. Users of septic systems, holding tanks, or other on-site sewage disposal systems pay $30/year, of which part covered planting of cover crops and upgrades to failing septic systems, providing direct benefits to rural areas. Funded in this way, the Bay Restoration Fund will allow Maryland to achieve more than one-third of the necessary additional nutrient reductions by upgrading wastewater treatment plans with enhanced nutrient removal and on-site sewage disposal systems within 1,000 feet of tidal areas and planting cover crops on agricultural land.

A key element in eventual acceptance of the flush fee was the large percentage of citizens willing to pay for perceived services and benefits. Political acceptability was also gained because the tax was simple, connected directly to benefits, involved a broad base for collection, and was embraced by the environmental community, which communicated the viability of the program to the public.

The Maryland flush fee is unique because it was based on a cooperative, multi-state scientific evaluation of the water quality benefit and nutrient reduction requirements for the Bay. The enabling legislation received broad, bi-partisan support; all nutrient-rich wastewater generators are paying the fee, including homeowners; and it included for the first time a fee paid by owners of on-site sewage disposal systems. A key byproduct of the process was collaborated created among all State agencies to get the Governor's approval.

The other states who signed the 2000 agreement are not setting up similar fees, because it appeared politically impossible. These state view Maryland's "flush fee" as a tax they are reluctant to impose and are focusing on existing programs to reach their agreed goals.

Special district financing. On a watershed level, septic tank management partnerships can be created to establish a special district that takes over maintenance of decentralized on-site systems so they fail at a lower rate. James White, Executive Director, Cuyahoga River Remedial Action Plan, proposed that the Great Lakes and other nationally supported watershed strategies call for mandatory or highly incentivized, sequential formation of watershed-based stewardship organizations (e.g., watershed conservancy districts) with authority and capabilities to raise funds. This mechanism would provide equitable regional benefits on a watershed basis and a non-regulatory structure. There would be an incentive-based sliding scale for Federal/local matching ratios to increase the motivation to create a local conservancy district. Fund-raising authority would be based on a standard drainage unit for single-family households and multiples thereof. He termed it the "pizza equivalency", that is, households would pay the equivalent of a pizza for the family every quarter. This could raise as much as $20 billion in 20 years.

Similarly, Geoffrey Heal of Columbia University and others have proposed to create ecosystem service districts to improve the efficient provision of watershed services necessary for human

welfare, financed by government programs or local taxes.

A more complex, but perhaps more equitable means of raising money for watershed financing might be a watershed assessment on all beneficiaries and pollution sources, allocated on the basis of relative benefits and contributions. The assessment might be increased if there were clear evidence of runoff or excess volume of water use attributable to the property or increases in property value from benefits of upstream improvements. It might be decreased by the value of allocable ecosystem services or by improvements made from restoration projects and best management practices. The assessment could be allocated via the property tax or a universal water fee.

Water fees for watershed protection. Several speakers indicated that water fees were among the most logical sources of new financing for watershed improvements. New York City's landmark agreement to preserve the ability of the watersheds of its Catskill mountain reservoirs in order to protect their water quality and avoid multibillion dollar filtration costs was financed by a rate increase on the nine million users of the City's water system. The increased revenue paid for improvements in public infrastructure, acquisition of land from willing sellers, and implementing best practices by farmers and working forest landowners.

Mr. Shanaghan pointed out that if watersheds include drinking water utilities, the utilities will become strong advocates for watershed protection. Karl Morgenstern described how the Eugene Water and Electric Board (EWEB) increased water rates to leverage partner contributions and grant funding for specific projects to address the contributions of agricultural and forest activities, especially pesticides, and septic systems to water quality degradation in the watershed.

In the Tualatin River watershed in the Willamette Basin, the Oregon Department of Environmental Quality made water quality trading a part of the local water quality agency, Clean Water Services'watershed-based NPDES permit to meet temperature standards through paying upstream owners for stream bank vegetation restoration and other measures that will reduce river temperatures. The fees for sewage treatment were used for watershed improvements that were more cost effective than other treatment options.

Tax base sharing. Some form of tax base sharing among neighboring municipalities responsible for improving water quality of shared watersheds may encourage collaborative planning and coordinated action. Tax base sharing has the potential to reduce the fiscal burden that each municipality must pay for water quality protection, while creating a regional funding stream that may be more effective in addressing watershed issues. Noted examples of tax base sharing include the Twin Cities region in Minnesota and Hackensack Meadows District in New Jersey.

Transfer of Development Rights (TDR). A method of exchange between landowners in designated areas for development rights and development restrictions, TDR programs create a market for environmental protection by restricting development in "receiving areas" and requiring that development rights be purchased from "sending areas". Used often to guide growth away from sensitive environmental or aesthetic resources, TDRs are in wide use

throughout the United States. Adaptability to the local context is one of the greatest strengths of a TDR program. In Deschutes County, Oregon, a Transfer of Development Credits program was established with the goal of reducing the number of septic systems in the sending area and transferring potential development to a Neighborhood Planning Area. After generating enough credits, a planned subdivision has been constructed. The program is noted as a success for preventing groundwater pollution, and consequent pollution of the Deschutes River. Other ecosystem benefits include protection of wildlife habitat, lower threat of wildfire and air quality improvements.

Tax Increment Financing (TIF). Often used in Urban Renewal Areas, TIF funds are captured from increasing property tax values in a specific area and often used to finance public investment. TIF funds have been used for brownfield remediation projects, sometimes with significant water quality benefits. TIF has also been used to capture the value created on nearby properties by the public acquisition of open space for water protection and other ecological purposes. TIF might be used to help pay for land protection programs that benefit watershed health and increase property values on properties within the watershed.

Integrated services financing. Hank Patton described a new concept for regional or watershed based financing that would rely on issuing long term bonds through a watershed based utility to finance infrastructure and other services via the integrated design of a full range of environmental and other services needed by both present and future generations. Investments contracted for by the utility using the bond proceeds would be measured by life cycle assessment based standards adopted by the state to assure that the services are fully sustainable over the long term. Teams of bidders would compete to come up with an integrated set of services that best fit the standards and the particular needs of the watershed or region. Debt service and profit for the winning team would come from fees paid by the recipients of the services provided. Experts and government officials in several states are actively looking at the concept.

Market based programs. Mr. Morgenstern described EWEBs market-based approach on regional agricultural buyers and processors, where demand exceeds supply. It has established a system that provides growers easy access to regional markets (increasing efficiency) and support to transition to meet demands. It seeks to change behaviors through markets to reduce chemical use and protect drinking water. He said they were developing four marketplaces: food, water, restoration or ecological, and temperature (driven by TMDLs). For restoration, priority areas are identified in the watershed and restoration early fully funded for growers in that area. For water and temperature marketplaces, a grower who puts in a more efficient irrigation system can reap benefits by trading their water right to someone else or by leasing it or, if they need more water, by trading or paying for someone else or by leasing it or, if they need more water, by trading or paying for someone else's water right. EWEB is looking at trading credits with farmers to develop riparian habitat and lower temperature in exchange for their discharge.

In the longer term, transactions in these marketplaces could generate small fees that could help pay for the financing of other watershed improvements.

Supplemental environmental projects. Federal, state and local governments have access to

miscellaneous funds, which in some circumstances can be bleneded with other funds to help finance or write down the cost of projects. An example is the supplemental environmental project (SEP), a project or payment for an environmental improvement, in partial reduction of a fine or penalty for an environmental violation. Instead of going into the Federal, state or municipal treasury, the funds are kept in the community where the violation occurred. There is an increasing interest in using SEPs to help solve a variety of problems, ranging from environmental justice to renewable energy. While these are occasional sources, there are many that relate to water quality and could become part of the community quilt of financing that watersheds need to sew. At present, only between 6% and 15% of environmental violations lead to SEPs.

6. Potential Implementing Entities

While the structure and powers of watershed implementing entities is crucial to the success of watershed finance, there was not time for much discussion at the Roundtable. Potential entities include public authorities, public utility or redevelopment districts, special service districts, intergovernmental agreements, etc. There will be one or more mechanisms that can be adapted to do the functions that might be agreed upon by the watershed jurisdictions and interests. Among the functions any entity might have are the following:

- Adopting and updating the watershed plan so that it meets Federal and state requirements;
- Prioritizing the projects, activities and other steps in the plan;
- Identifying and obtaining all available Federal, state and private grants, loans and other resources to meet the plan's objectives;
- Leveraging or integrating government resources with other investments in the watershed, for example transportation, housing, economic development, and other infrastructure investments, and business, volunteer and government activities that affect or can improve the watershed;
- Identifying the gaps in resources available;
- Agreeing on additional sources of revenues;
- Collecting revenues, issuing financial obligations such as bonds, disbursing or lending bond receipts, paying bond obligations, etc; and,
- Accounting for and reporting to revenue payers, community at large, and investors.

Some of these may be the responsibility of a decision making, cross jurisdictional governance entity; others are more appropriate for an implementing entity and some, like integration of investments, are responsibilities of both. The governance group could become the board of the implementing entity or could stay separate. Watershed managers and groups attempting to create a sustainable finance system would benefit from a detailed analysis of the pros and cons of the different entities with respect to each of these functions.

Recommendations

1. Expand Knowledge and Foster Use of Collaborative Governance Methods

While recognizing that partnerships must be formed at the watershed level, EPA should foster use of collaborative governance approaches for achieving sustainable finance in all watershed in the many forums that EPA hosts or participates in, such as the Watershed Academy, the Environmental Finance Centers, and other outreach and training programs hosted by others. These tested approaches are suitable for all financing needs in the watershed, including both wastewater treatment, stormwater and other nonpoint sources. Knowledge sharing should build on existing collaborative approaches being used successfully in many watersheds to build agreements on problems, plans, priorities and projects, adding those elements crucial for success in using local resources to finance projects or use markets to eliminate problems or substitute good practices. Existing watershed groups should be encouraged to add parties and use robust governance approaches to identify to create the financing and marketing techniques appropriate to filling the funding gap. EPA should collect and disseminate success stories that demonstrate the use of collaborative governance principles and techniques in achieving successful financing outcomes. EPA and the Environmental Finance Centers should use outreach and training programs to bring together parties with normally opposing viewpoints, such as watershed groups and utilities and encourage them to work together on sustainable finance methods. EPA and its sister Federal agencies should identify and support neutral forums at universities and elsewhere that will design and conduct a quality collaborative governance processes for watersheds wishing to use a collaborative governance approach.

2. Disseminate Innovative Finance Tools

EPA should designate an environmental finance center to maintain a directory of innovative finance and market techniques that have been successfully employed in watersheds and other contexts or which have been developed but not actually implemented because of local or other factors. It should at a minimum include the list of tools from section 5 above. EPA and the environmental finance centers should disseminate information about these successes and model techniques through the Academy, a sustainable watershed finance summit, workshops, EFAB Guidbook and tool box, websites, state-EPA agreements, publications and presentations.

3. Encourage Ecosystem Services Markets

EPA and other Federal agencies should partner with university research centers and NGOs working on valuing and making markets in ecosystem services to determine whether and to what extent ecosystem service values can be used to assist in sustainable watershed financing, for example, by making local revenue raising systems more equitable, fair and acceptable to payers. EPA should work with the Department of Agriculture and other organizations which are

exploring how to pay for and make markets in ecosystem services to determine how loans and grants from both agencies can be used to create payments for and markets in these services. EPA should disseminate successful examples and promising approaches as suggested in Recommendation 2.

4. Leverage Existing Finance Tools

EPA should continue to review its existing superb financing tools under the Clean and Safe Drinking Water Acts to determine how they might be leverage with local efforts to obtain additional funds and markets to help close the funding gap. Further, it should explore how funding available through programs such as the Source Water Protection program and the National Estuary Program can be used to assist the local collaborative efforts needed to develop financing and marketing strategies. Agreements with other agencies, especially the Department of Agriculture, should be expanded toward the same end.

5. Identify Sustainable Finance Implementing Entities

EPA should, with the assistance of the EFCs and EFAB, develop a compendium of the potential entities that would be appropriate to implement the finance strategies agreed upon by the watershed collaborative governance teams, including factors to evaluate in choosing one or the other. Utilities that encompass one or more watersheds should be encouraged to develop capacity to finance local projects to supplement loans and grants available from other sources.

6. Initiate Demonstration Projects

EPA should fund or otherwise assist several watershed scale demonstration projects that incorporate sustainable finance techniques, such as those described in Innovative Finance and Market Methods above, and that use collaborative methods such as those described in Collaborative Governance, above. Some existing innovative grant programs, such as Section 319, Brownfields and Targeted Watershed Grants might be drawn on for this purpose.

While no single model will fit all situations, one or more of the projects might employ the following model:

- The grantee would use a collaborative governance approach (see Recommendation #2) to work with existing watershed and other groups and with regional and basin-wide interests to identify appropriate sponsors, conveners and participants for a team approach to address the financing and implementation of priority projects in the watershed. The team would include representatives from existing watershed groups, utilities the finance sector, business, municipal governments, nonprofit organizations (e.g., habitat restoration groups, land trusts), state and federal agencies, and organizations from outside the watershed, as appropriate.

- The grantee would work with political leadership at the State, Federal and local

levels to sponsor the process and appoint a local convener.

- The grantee would assist the convener to appoint members of the team and to hold meetings to reach agreement on the priority projects to be financed, the innovative finance tools to be used, the precise geographic areas to be covered and the methods and implementing entities, public and private to be employed.

- The team would also develop agreements on how to leverage their own and outside resources to create maximum benefit.

- The project would employ financing information tools like *Plan2Fund™* and the *Directory of Watershed Resources*, developed by the EFC at Boise State and modified for the particular geographic areas as part of the grant.

- With those tools and others, the grantee would identify all the possible sources of existing funding and financing to accomplish projects identified in watershed plans and the gap needing to be filled by innovative, watershed based financing strategies.

- The grantee and the collaborative team would attempt to reach agreement on the most appropriate innovative finance tools to be employed to close the gap (see the partial list in issue #5, above).

- The team would stay in place for as long as needed to assist in implementation of the agreement, make mid-course corrections, solve implementation problems and oversee the evaluation of the project.

- Reports at each stage and progress conferences with all the grantees and others pursuing similar strategies would foster learning and develop best practices.