The Nature Conservancy

A Compendium of Financing Sources and Tools to Fund Freshwater Conservation

Prepared by:
The Nature Conservancy Colorado River Program
Nature.org

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The mission of The Nature Conservancy is to preserve plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.

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On the Cover: Carpenter Ranch, Yampa River, Colorado
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I. Introduction

This report is the first step in a comprehensive financial assessment of sustainable funding mechanisms to support freshwater conservation in the Colorado River Basin. It will inform and support the Sustainable Funding Strategy of The Nature Conservancy's (Conservancy) Colorado River Program. In cooperation with our conservation and government partners, the Colorado River Program is taking a holistic approach to conservation of the Colorado River Basin and its diverse ecosystems. These funding strategies will rely on a variety of both traditional and innovative sources, and endeavor to meet the financial needs of conservation priorities in the basin for the next five to ten years, and beyond. While this document was produced for the Conservancy's Colorado River Program, the information presented is intended to serve as a general reference applicable to a variety of freshwater conservation finance challenges.

Although historically applied mainly for land conservation, most traditional funding sources can be adapted and used to finance freshwater conservation as well. In many cases, land conservation activities that restore and protect ecosystems often generate improvements in water quality via erosion control or pollution prevention, and water quantity benefits through better regulation of both groundwater and surface water flows.

In order to develop financing mechanisms that contribute to sustainable funding strategies for freshwater conservation, it is important to understand the advantages and disadvantages associated with these traditional funding sources. Sections II and III of this report discuss the enabling conditions, potential pitfalls, and lessons-learned from traditional local, state, and federal government funding programs.

> *A financial assessment considers the project's scope, spatial scale, strategic activities and time frame, as well as total costs, current sources of revenue, and gaps. Thus, a sustainable financing strategy evaluates the total funding currently or potentially available from all sources – government budgets; funding from private donors, corporate or NGO partners; revenue generated by access and user fees, fines and other payment schemes. The assessment estimates the funding needed and determines the financing gap that must be filled to meet the program's conservation goals. A comprehensive financial assessment then evaluates the legal, social, political and environmental context to determine which finance mechanisms can most realistically close the financing gap.*
>
> ■ ***World Wildlife Fund (2009)***

This report also seeks to develop a better understanding of the key characteristics of promising and innovative market-based conservation finance tools that are either under development or being implemented in pilot programs. These include direct payments for ecosystem or watershed services, and ecosystem services markets that facilitate exchanges between buyers required to offset the impacts of economic activity and sellers who can affect the quantity and quality of watershed services through their land use

decisions. Section IV of this report provides an analysis of the benefits, enabling conditions and potential pitfalls associated with these innovative, market-based funding mechanisms.

A comprehensive freshwater conservation financing strategy faces numerous challenges. Existing or traditional sources of conservation funds generally have limited funds and there is often significant competition for available resources. Economic conditions and the current political climate have lead to a tightening of budgets and cuts to programs that traditionally provided funding in the past. Generating political will is critical for success, as is broad public support from diverse stakeholder groups.

In addition, although a number of innovative market-based approaches exist, these funding mechanisms are still in their relative infancy and have yet to be implemented on a basin-wide scale. While market-based financing mechanisms appear to have significant potential, it also remains to be seen whether these sources can generate funding to support conservation activities on a sustainable basis.

Once the many possible sources of conservation funding are better understood, analyses can be performed to determine future funding needs for conservation priorities based on political, social and economic viability. After the needs assessment is complete, our goal will be to identify a mix of traditional and innovative financing mechanisms that could be successfully implemented to sustainably meet the basin's freshwater conservation needs.

Cienega wetlands. Source: Colleen Marzec

Disclaimer

This report is not intended to provide an exhaustive assessment of all potential sources of funding that could be used to support freshwater conservation. The intent is to identify traditional and innovative funding sources that have been successfully applied in the past or show future promise. While intended to be general, the information presented in this report was chosen based on an initial assessment of potential applicability in the large river basins of the western United States.

II. State and Local Funding for Conservation

According to numerous published sources, the foundation of a sustainable conservation financing strategy relies at least in part on traditional funding sources. Although these sources and strategies are well established and have been historically applied mainly for land conservation, most can be adapted and used to finance freshwater conservation as well. Conservation programs that restore and protect forest, wetland and riparian ecosystems improve freshwater quality and result in improved regulation of quantity and flows. Concerns associated with these sources include: limited amounts of available funds, a highly competitive environment for what funds are available, significant and increasing budgetary pressures, and a challenging political climate. In addition, the magnitude of identified freshwater conservation, restoration and preservation needs will require looking beyond these traditional sources.

As one author observes, "Successful land conservation requires an array of funding sources and conservation tools, with top-down incentives and enabling legislation [combined] with bottom-up leveraging of conservation dollars."[1] This is a common theme in much of the recent literature discussing traditional and innovative approaches to conservation finance.

In addition, two important trends have been identified based on case study analyses specific to watershed restoration funding. The first is that most of the funding for watershed restoration historically comes from state and local sources. The second trend is that sustainable watershed restoration programs typically rely on a large number and variety of different financing sources.[2]

Economic Considerations

From an economic efficiency perspective it is important that freshwater conservation funding mechanisms be developed with the "benefits principle" in mind. The benefits principle requires those who benefit from the provision of a watershed-related good or service to pay in accordance with the benefits they receive. Similarly, those who cause unavoidable harm to ecosystems or related watershed services must pay in accordance with the damages they impose. Following the benefits principle not only contributes to economically efficient outcomes but also fairness in the sense that those who benefit from or harm important watershed resources pay accordingly.

[1] Matt Zeiper and the Trust for Public Land, *Online Conservation Finance Course* (TPL, 2005). Available online at: http://efc.muskie.usm.maine.edu/conservation_finance/HOME.htm.
[2] Zeiper and TPL, *Online Conservation Finance Course,* (2005).

Another important economic consideration relates to the sustainability of funding sources and ability of a particular source to generate stable and predictable revenue flows over time. Taxes and fees to fund freshwater conservation can be imposed in a number of different ways. Lump-sum or excise taxes are imposed in fixed dollar amounts on a per unit basis. A common example is excise taxes on gasoline and other fuels that are expressed as a fixed dollar amount per gallon purchased. Excise taxes generate predictable revenue streams but do not automatically increase over time to adjust for the effects of inflation without legislative action. Ad valorem taxes, on the other hand, are expressed as a percentage of the price of a particular good or service. The most common examples are retail sales taxes paid by consumers at the point of sale. The amount of revenue generated by an ad valorem tax will automatically increase with inflation without any action on the part of government. In this sense, funding mechanisms based on ad valorem taxes will generate more reliable revenue streams particularly in times of inflationary pressure.

Review of successful state land conservation programs finds they all possess three key elements:

- Local governments with the enabling authority to establish local conservation funding sources
- Financial incentives to encourage local governments to create their own funding sources
- Substantial, dedicated state and local funding sources.[3]

Local Enabling Authority

One of the most effective tools state governments have to encourage conservation is to provide local governments with enabling authority. Ideally, this comes via successful ballot measures allowing local government authority to establish dedicated conservation funding sources. A primary advantage of such enabling authority is that it encourages direct local involvement in protecting the environment. In addition, locally generated funding demonstrates a commitment to conservation, allows for greater local control over conservation activities, and provides a source of matching funds necessary to qualify for additional resources under various state and federal programs.[4]

[3] Josh Hurd, "Innovative Financial Mechanisms to Fund Watershed Restoration," in *The Political Economy of Watershed Restoration Services* (Missoula, Montana: Wildlands CPR, 2009). Available online at: http://www.wildlandscpr.org/files/Financial_Mechanisms_0.pdf.
[4] Zeiper and TPL, *Online Conservation Finance Course,* (2005).

Financial Incentives

Many states provide financial incentives for local conservation activities through matching grant and low-interest loan programs using funds derived from dedicated sources. These incentive programs provide financial resources that encourage local governments to partner with non-governmental organizations (NGOs) and other interested stakeholders to develop conservation programs, and to find creative ways to leverage state and federal funds.[5] States have a number of alternatives for securing funding for matching grant and low-interest loan programs that will be discussed in detail below.

Verde River Valley, Arizona. Source: Bob and Suzanne Clemenz

Dedicated State and Local Funding Sources

In terms of generating dedicated funds to finance freshwater conservation activities, state and local governments have a wide range of options available to them. However, the ability of local governments to make use of many, if not all, of these options is dependent on the state-level enabling conditions discussed above. Therefore, in the assessment phase, legal and political feasibility analyses must be performed to determine the options available in a particular location.

[5] The Trust for Public Land, *Local Greenprinting for Growth Workbook. Volume III: How to Secure Conservation Funds* (TPL, 2003). Available online at: http://www.tpl.org/content_documents/local_greenprinting_Vol_3.pdf.

Dedicated funding sources are most commonly established via passage of a ballot measure through referenda, or bills referred to the ballot by the legislature. According to the Ballot Initiative Strategy Center, 24 states currently allow ballot initiatives to appear directly before voters after the collection of a sufficient number of signatures.[6]

Through their LandVote database, the Trust for Public Land tracks the results of ballot initiatives to fund conservation at the national level. This database tracks conservation ballot measures by state, type of jurisdiction and finance mechanism employed, and can accommodate customized data queries. Analyses of data collected from 1988 through 2009 indicate that voters throughout the U.S. strongly support conservation finance ballot measures, even in challenging economic times. Since 1988, U.S. voters have approved more than 1,700 ballot measures generating more than $53 billion to support conservation.[7] Examples of freshwater conservation activities supported by voters and represented in this database include programs to protect watershed areas and water quality, and wetlands and critical riparian habitat.

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In general, voters are more likely to support spending for conservation if they understand how it will benefit them directly. In addition, voters have demonstrated a willingness to support new conservation spending to protect the sources of their drinking water. For example, in the 2010 midterm elections, voters in San Antonio, Texas approved two ballot initiatives to extend the local sales tax to protect the Edwards Aquifer and to develop parks along Salado and Leon creeks. Conservation activities that protect watersheds that provide clean drinking water also contribute to broader freshwater conservation goals.

Dedicated conservation funds may be generated using a variety of mechanisms, including state and local taxes, impact and user fees, lottery proceeds or debt financing. The following section provides an overview of some of the most common dedicated funding sources.

Taxes and Fees

Taxes and fees are an important source of conservation funds and an example of pay-as-you-go (or non-debt) financing. This means that the revenue streams generated are generally predictable, relatively stable, and can be dedicated or earmarked to fund particular activities. Taxes and fees to fund freshwater conservation may be established either through legislative action or voter approval through the ballot process. There are

[6] Ballot Initiative Strategy Center. Available online at: http://ballot.org.
[7] TPL LandVote® Database. Available online at: http://www.tpl.org/content_documents/landvote_2009.pdf.

many examples and a seemingly endless number of possible variations on the fundamental six themes discussed below.

1. Sales Taxes

Sales taxes represent one of the largest sources of revenue for both state and local governments. These taxes may be general and levied on a large number and variety of goods and services, or targeted at particular categories of spending. Targeted sales taxes may be levied on activities associated with use of particular natural amenities and related goods and services. Therefore they represent an effective mechanism for tapping into recreation and tourism related revenues and profits.[8] Examples include taxes on lodging and resort facilities, water-based recreational activities, related outdoor clothing and equipment purchases, and a variety of other activities. Targeted sales taxes provide a means of ensuring that users of natural environments help to pay for conservation that preserves their continued ability to benefit from these natural resources.

However, tax revenues fluctuate with changes in economic conditions and general sales taxes are often criticized for being regressive, meaning that the burden falls more heavily on low-income individuals and households. Some jurisdictions require that sales tax increases be imposed in relatively large increments, which may provide a disincentive to pursue this funding source, or make passage of new initiatives difficult in an anti-tax political climate.[9] Proposals for new sales taxes are likely to meet significant voter resistance unless tied to specific freshwater conservation goals with broad public appeal and support. Voters have demonstrated a willingness to support new or extended sales taxes to protect drinking water quality and to ensure the security of their drinking water supplies. Voters may also support additional spending to protect instream flows that benefit wildlife or enhance water-based recreational opportunities particularly if they realize direct benefits or if much of the burden is likely to fall on others (e.g., tourists).

There are many examples of communities creatively using sales tax revenues for purposes of watershed protection. In 2008, voters in Pitkin County, Colorado approved a sales tax initiative to fund water quality and quantity protection and improvement projects in the Roaring Fork watershed. Summit County, Colorado also has a program that allows a portion of sales tax revenue to be used for open space acquisition and water development projects that include an environmental component.

2. Resource Severance Taxes

Resource severance taxes are imposed on entities that profit from the extraction of oil, gas, coal, minerals and other non-renewable natural resources. Severance taxes are often justified because the direct burden falls on those who profit from the exploitation of natural resources, which often causes significant environmental damage in the process.

[8] TPL, *Local Greenprinting for Growth,* (2003).
[9] TPL, *Local Greenprinting for Growth,* (2003).

At the federal level, the US Department of the Interior's Minerals Management Service collects billions of dollars each year from extractive industries, yet only a relatively small fraction of that amount is devoted to funding environmental restoration. A successful campaign to redirect more of these funds to the federal or state agencies responsible for environmental restoration programs could generate significant additional funding for freshwater conservation. Redirection of these funds would be particularly appropriate given the responsibility of these agencies to remediate the adverse environmental impacts, often on riparian and other water-dependent ecosystems, of past non-renewable resource extraction. Another possibility would be to redirect some of these funds directly to the states to address specific freshwater conservation or watershed restoration priorities.

The Gila River in Gila Riparian Preserve, NM. Source: Harold E. Malde

At the state level, Colorado and Montana are leaders in using severance tax payments from natural resource extraction to fund activities that benefit natural environments. In Colorado, severance tax revenues are allocated to the Department of Natural Resources and then divided among the various state natural resource management agencies. For example, severance tax revenues are used to purchase water rights for instream flow protection through the Colorado Water Conservation Board, to purchase open space for watershed protection, and to fund other activities that protect wildlife and critical habitat. Montana uses severance tax revenues to support two trust fund programs, the Resource Indemnity Trust and the Coal Severance Tax Trust Fund. Proceeds generated by these programs are used to fund a wide variety of activities including efforts to reclaim lands damaged by non-renewable resource extraction, to protect and improve the Montana

environment, and to reclaim critical riparian habitat and spawning areas for cutthroat and bull trout.[10]

3. Trust Funds

Trust funds are a desirable mechanism for financing freshwater conservation as they are by definition sustainable when adequately capitalized and effectively managed. Funds from a variety of sources can provide capitalization funds to set up and maintain a trust, which earns interest income that can be used to finance various freshwater conservation activities. The trust fund model has been used to finance conservation in many different ways including water funds found primarily in Latin America. Water funds will be discussed in greater detail in section IV of this report.

The Wyoming Wildlife and Natural Resource Trust was established in 2005 to enhance and conserve wildlife habitat and other natural resources throughout the state. Projects that improve habitat or contribute to natural resource values are funded using interest earned on a permanent account created from a combination of donations and appropriated funds. The Wyoming Wildlife and Natural Resource Trust has funded over 160 projects located in all 23 counties throughout the state. The Trust has allocated more than $14 million thus far, and every dollar allocated from the Trust has been matched on average with an additional $6.50 obtained from other sources. Beneficiaries of the program have included agricultural operations, conservation related businesses, and other interests including the Wyoming tourism industry. The majority of allocated funding has gone to conservation districts sponsoring environmental projects that also generate economic benefits for local communities.[11]

With respect to freshwater conservation, the Wyoming Wildlife and Natural Resource Trust has been used to support the acquisition and protection of critical fish habitat. Trust fund proceeds have also been used to fund projects for wetland creation and enhancement, stream restoration, and improved water management. The trust fund approach could be applied in other major river basins for purposes of funding similar efforts to protect or enhance critical freshwater habitat for the benefit of threatened or endangered species.

4. Impact Fees

Another potential source of freshwater conservation funds is impact fees, generally used to finance infrastructure, parks and other necessary facilities associated with new development. One desirable characteristic of impact fees is that those responsible for the unavoidable impacts of development are forced to more fully compensate for the costs associated with their activities. In other words, impact fees help to ensure that developers pay the "true" economic and social costs of development projects. In addition, as

[10] Hurd, *Innovative Financial Mechanisms*, (2009).
[11] Wyoming Wildlife and Resource Trust. Available online at: http://wwnrt.state.wy.us/.

population pressures mount and increasingly sensitive areas are targeted for development, more and more states are adopting the necessary enabling legislation.

Unfortunately, most states limit the use of impact fee revenues to projects directly associated with new development, which can severely limit potential freshwater conservation uses. In addition, as a condition of allowing impact fees, entities may be required to create or have in place a comprehensive land use plan. Finally, opponents cite the additional costs imposed on developers and have suggested that a consequence of impact fees may be decreased availability of affordable housing, a potentially significant socioeconomic cost.[12]

CASE STUDY:
Coachella Valley Multiple Species Habitat Conservation Plan

In California, the Coachella Valley Multiple Species Habitat Conservation Plan relies on Local Development Mitigation Fees. In this program, all new development is subject to mitigation fees determined based on the total number of acres affected. New residential development is subject to an additional fee imposed on each new unit of housing constructed. Ultimately, the goal of this program is to permanently conserve 240,000 acres of natural desert ecosystem and to protect 27 sensitive plant and animal species including the desert pupfish.[13]

Where regulations require mitigation for unavoidable impacts of development on wetlands, streams or riparian ecosystems, impact fees can play an important role in funding freshwater conservation. Entities required to offset the unavoidable impacts of economic development on freshwater ecosystems can turn to mitigation banks to purchase credits that satisfy regulatory requirements. The impact fee revenues can be used to fund restoration and conservation activities elsewhere that offset the impacts associated with economic development.

For example, under the Clean Water Act, a developer who cannot avoid wetlands impacts is required to replace what is destroyed either nearby or elsewhere. Wetland mitigation banks provide a way for the developer to pay an impact fee that is used to create or preserve wetlands elsewhere and that offsets the damage associated with the development activities. In another example the U.S. Fish and Wildlife Service has developed conservation banking programs, primarily in California, that provide a means for developers to offset unavoidable impacts on endangered species habitat. The Oregon Department of Transportation is developing two similar banking programs to help conserve and protect habitat to benefit the endangered Oregon chub.[14]

[12] TPL, *Local Greenprinting for Growth*, (2003).
[13] WWF, *Guide to Conservation Finance,* (2009).
[14] Willamette Partnership. Available online at: http://willamettepartnership.org/.

According to one source, at least 29 state motor vehicle agencies in the U.S. now offer a special environmental license plate with the revenues generated directed to state wildlife agencies or conservation groups.[15]

Limits on the discharge of certain nutrients or thermal pollution into rivers and streams are also examples of regulations that can motivate the development of mitigation banks that harness the power of impact fees to generate sustainable funding to support freshwater conservation. In the presence of effective regulatory drivers, similar programs could be developed to help conserve and protect freshwater ecosystems and threatened and endangered species habitat in large river basins. Voluntary conservation on the part of environmentally responsible companies or concerned individuals can help to promote and sustain similar markets.

More generally, impact fees may be charged to access protected or environmentally sensitive areas, added to the cost of recreational hunting and fishing licenses, imposed on businesses providing outfitting or guide services for rafting, fishing, or back-country access, or variety of other water-based recreational services. In some cases, conservation funds have been generated through voluntary contributions paid by tourists and tourism interests, or collected at the point of sale by outdoor clothing and equipment suppliers.

Confluence of the Crow Wing and Mississippi rivers, Minnesota. Source: Garth Fuller.

[15] WWF, *Guide to Conservation Finance,* (2009).

5. User Fees

A variation on the impact fee concept is a user fee or conservation surcharge that could be added to utility and other bills associated with water use. If all who benefit from the consumptive use of water from a particular river system paid a small surcharge based on volume, then significant additional funding for freshwater conservation could be generated in a way that minimizes the financial burden on any single water user. Similarly, if user fees in the form of withdrawal or diversion charges were added to the costs faced by large water suppliers, still more resources could be generated to fund freshwater conservation. Basin-of-origin fees on transbasin water diversions are another possible variation on this general concept.

From an economics perspective, greater reliance on user fees would be a particularly efficient way to generate additional funds to support freshwater conservation. The user fee approach is in keeping with the benefits principle, which requires those who benefit from the provision of a good or service to pay in accordance with the benefits they receive. Similarly, those who cause unavoidable harm to ecosystems and watershed services must pay fees in accordance with the damages they impose. User fees may be more widely acceptable than new taxes because of the direct relationship between environmental impacts and uses of the funds generated. In addition, if collected directly from service providers, impact fees have an indirect impact on consumers.

An innovative voluntary program to generate funds to support freshwater conservation is based, in part, on the user fee concept. Conserve to Enhance is a program that allows residential water users to dedicate the monetary benefits of their water conservation efforts in a way that directly supports freshwater conservation activities. Under the Conserve to Enhance concept, residential water users who reduce their water consumption through conservation can opt to pay water bills based on their previous levels of consumption. Excess payments associated with the conserved water are then used to purchase water or water rights for environmental enhancement purposes. A key advantage of this approach is that it creates a direct connection between residential water conservation activities and environmental protection and improvement. The Conserve to Enhance concept was developed through a collaborative effort involving a wide variety of diverse stakeholder groups. Funds generated under Conserve to Enhance could be used to protect important riparian habitat or to purchase or lease water rights to support enhanced instream flows.[16]

[16] Andrew Schwarz and Sharon B. Megdal, "Conserve to Enhance – Voluntary Municipal Water Conservation to Support Environmental Restoration," *Journal of the American Water Works Association* 100:1 (January, 2008).

6. Conservation Tax Credits and Other Tax Incentives

State and local governments can use the tax code to create incentives for private landowners to donate land, and in some cases water rights, to support freshwater conservation goals. Carefully designed tax incentive programs can be used to supplement other funding sources or provide additional financial incentives that encourage voluntary conservation activities. Tax credits and incentives can also be designed to help achieve specific freshwater conservation priorities such as encouraging the donation of water rights for the purpose of enhancing instream flows.[17]

However, without careful design and monitoring, conservation tax credit and other incentive programs are susceptible to fraud and abuse. The Colorado Conservation Easement Tax Credit program, in place since 2000, provides state tax relief to private landowners who establish conservation easements on their property. Under the Colorado program, tax credits generated through the donation of conservation easements are transferrable, meaning that they can be sold to other parties seeking to reduce their state tax liability. Participants in the program can sell their credits generating nearly immediate income benefits, while also retaining ownership and the right to continued use of non-easement property. In a typical transfer or sale, owners receive slightly less than the full cash value of the tax credit, buyers pay somewhat less than this amount, and brokers who facilitate the transfers earn a modest commission.

The problems associated with the Colorado Tax Credit program were in part related to the transferable nature of the credits. The size of a particular tax credit is based on the difference between the value of the donated conservation easement, and what the value would be if developed instead. This provided an incentive for unscrupulous appraisers to overstate the development value in order to maximize the amount of the tax credit. The Colorado program as initially implemented also lacked transparency and adequate monitoring and enforcement provisions.[18] More specifically, appraisals were not subject to independent review and were treated, along with other relevant tax records, as confidential.[19] Subsequent legislation, passed in 2007 and 2008, placed new limitations on the program and provided for more adequate oversight of the appraisal process. Specific provisions that can help to reduce the potential for fraud and abuse under a transferable tax credit program include requirements for independent assessment of the conservation easement (to help ensure the generation of real environmental benefits), and adequate oversight and verification of the appraisal process.[20]

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[17] Zeiper and TPL, *Online Conservation Finance Course,* (2005).

[18] Jordan John Beezley, "Conservation Easement Tax Credit Abuse: Recommendations for Colorado Policy Makers" (Capstone Project for Masters of Applied Science, University of Denver University College, 2009). Available online at: http://ectd.du.edu/source/uploads/18313070.pdf.

[19] Jenny Lay, "Conservation Easement Conundrums," *High Country News*, March 21, 2008. Available online at: http://www.hcn.org/issues/367/17604.

[20] Cristin Linke Young, "Conservation Easement Tax Credits in Environmental Federalism," 117 *Yale Law Journal* Pocket Part 218, 2008. Available online at: http://www.yalelawjournal.org/the-yale-law-journal-pocket-part/legislation/conservation-easement-tax-credits-in-environmental-federalism/.

Yampa River wetland, Colorado. Source: Rob Buirgy

Advantages of the transferable tax credit mechanism are that it can provide a more immediate financial benefit to landowners who establish conservation easements or donate water rights and may thus accelerate the pace of freshwater conservation efforts. However, ongoing audits of transactions under the Colorado program have generated significant uncertainty and may have contributed to reluctance on the part of landowners to participate.

North Carolina, recognizing the importance of conservation to the state's economy, implemented one of the nation's first non-transferable conservation tax credit programs in 1983 to promote conservation of ecosystem functions, ecosystem services and related public benefits. The North Carolina tax credit is limited to 25 percent of the fair market value of the donation, and can be carried forward for up to five years for participants with limited annual state tax liability. The program is also subject to limits on the total value of credits that an individual or another entity can obtain for the donation of conservation easements. Inclusion of this or similar limitations can significantly reduce the potential for fraud and abuse under tax incentive programs. The North Carolina program not only provides financial incentives for voluntary conservation activities but also includes a public benefit component. In order to be eligible for the tax credit, donations must generate public benefits that include improved access to public beaches, waters or trails; conservation of fish and wildlife habitat; protection of forests, farmland and watersheds; and conservation of natural and scenic river areas, parkland, and historic landscapes.[21]

[21] North Carolina Department of Environment and Natural Resources. Available online at: http://www.onencnaturally.org/pages/ConservationTaxCredit.html.

In 2000, California implemented the Natural Heritage Preservation Tax Credit to fund open space acquisition and the protection of wildlife habitat. More specifically, the purpose of this program is to "protect wildlife habitat, parks and open space, archaeological resources, and agricultural land and water by providing state tax credits for donations of qualified land… and water rights." The tax credit program was suspended in 2002, but reinstated by the legislature in 2005 "in recognition of the effectiveness of the program as a tool to leverage limited fiscal resources and protect critical land and water resources." To date, the program has generated more than $48 million in tax credits, protected more than 8,000 acres and helped to protect riparian areas and enhance instream flows. [22]

In 2009, Colorado implemented a refundable income tax credit to provide financial incentives for farmers and ranchers to donate water rights to protect instream flows in rivers and streams across the state. Under this program, the Colorado Water Conservation Board is authorized to award tax credit certificates to land owners who donate water rights. Donations of water rights provide owners with an additional source of income while contributing to the health of Colorado's rivers and streams. Innovative tax policy approaches such as this can improve the health of watersheds throughout the state and reduce the potential for adverse socioeconomic impacts often associated with the permanent transfer of agricultural water rights to other uses.[23] Similar tax incentive approaches could be implemented elsewhere as part of a comprehensive strategy to generate sustainable funding to support freshwater conservation.

7. Lottery Proceeds

The North American Association of State and Provincial Lotteries reports that most states now have some form of lottery.[24] Many states specifically earmark at least a portion of lottery funds to support environmental protection and conservation activities. Arizona devotes lottery proceeds to the Clean Air Fund and Heritage Fund. In particular, the Arizona Game and Fish Department receives no money from the state's general fund and is completely dependent on lottery proceeds for their operating budget. Lottery proceeds have been used by the Arizona Game and Fish Department to support apache trout restoration efforts in the White Mountains.[25] Minnesota allocates lottery proceeds to the Environment and Natural Resources Trust Fund to protect, conserve, preserve and enhance the state's air, water, land, fish, wildlife and other natural resources. [26] In Oregon, lottery proceeds support the Oregon Watershed Enhancement Board, which

[22] California Wildlife Conservation Board. Available online at: http://www.wcb.ca.gov/Tax/.
[23] Environmental Defense Fund, "Groups Praise New Colorado Law to Protect Vulnerable Rivers, Streams." *EDF Press Release,* June 4, 2009. Available online at: http://www.edf.org/pressrelease.cfm?contentID=9908.
[24] North American Association of State and Provincial Lotteries. Available online at: www.naspl.org.
[25] Arizona Game and Fish Department. Available online at: http://www.azgfd.gov/w_c/heritage_program.shtml.
[26] Environment & Natural Resources Trust Fund. Available online at: http://www.legacy.leg.mn/funds/environment-natural-resources-trust-fund.

provides funding for a variety of watershed restoration activities including programs to restore critical salmon and steelhead habitat.[27]

CASE STUDY: The Colorado Lottery

The State of Colorado is a leader in using lottery proceeds to fund conservation activities to benefit the environment. Beneficiaries of the Colorado Lottery include the Conservation Trust Fund, Great Outdoors Colorado (GOCO), and the Colorado State Parks. Resources from the Conservation Trust Fund may be used to acquire, develop and maintain new land and water conservation sites, to conserve critical wildlife habitat, and to improve and expand river quality and access. GOCO funds large-scale open space projects and now specifically recognizes the direct connection between land conservation activities and water resources. In addition, beginning in 2011, GOCO funds are available for the Legacy Program to finance large-scale conservation projects that protect entire landscapes including river corridors. However, due to current economic conditions and budgetary challenges, the future of the Legacy program is uncertain. TNC supports allowing the use of GOCO funds to purchase water rights for instream flow protection although this has not yet occurred directly.

8. Special Assessment or Special Government Districts

Special assessment or special government districts function as separate governmental entities that manage specific resources (e.g., watersheds) within well-defined geographical areas. These districts can be established by state or local governments or by voters through the ballot process where state enabling conditions allow. These entities are authorized to raise operating funds from those who benefit directly generally through taxes, fees, charges, or by issuing new debt—from those who benefit directly from the fire, flood, water, sewer and other types of community services typically provided. Some states, such as California, have passed legislation authorizing the creation of park special assessment districts to fund land acquisition, capital improvements, and to help cover operating and maintenance costs. Specific examples of conservation activities funded through creation of special districts include land acquisition for parks and open space, protection of wildlife habitat, and establishment of migration corridors.[28]

A financing tool often associated with special districts is a benefit assessment. A benefit assessment is an annual levy on property that receives special benefit from the provision of a public good or service provided by the district. This funding tool is especially

[27] Hurd, "Innovative Financial Mechanisms," (2009).
[28] The Trust for Public Land, "Using Benefit Assessment Districts to Provide Local Funding for Parks and Open Space in California." Available online at: http://www.tpl.org/content_documents/confin_BenefitAssessment.pdf.

popular in California where courts have ruled that the funds generated under benefit assessments are not taxes and are not therefore subject to Proposition 13 limitations. The benefit assessment financing mechanism was first established under California law in 1911 and has been used since 1934 to specifically fund parks and conservation activities that benefit residents of local communities.[29]

The Colorado Forest Improvement District Act allows municipal governments to form special forest improvement districts to pay for projects that help to reduce the risk of potentially catastrophic wildfires. The forest improvement districts created under the act have the ability to raise funds, and work with both public and private landowners to implement forest improvement projects. [30] Prevention of catastrophic wildfires has important watershed benefits as well, and this concept could be adapted and applied more widely to watershed restoration and protection activities in large river basins.

Debt Financing

Debt financing is another source of conservation funds available at the state and local level, where enabling conditions are satisfied. While debt financing is especially useful in situations where large amounts of funds need to be generated quickly in order to protect land under immediate threat of development, the ability of a particular governmental entity to issue debt is subject to legally established, voter, or self-imposed limits. In addition, interest and associated finance charges add significantly to total project costs, nearly doubling the amount of the initial investment in some cases.[31] Finally, there is often significant competition among various public-spending programs for the limited amounts of additional funds that can be generated using debt mechanisms and, by definition, these sources of funding are not sustainable.

1. General Obligation Bonds

General obligation bonds are a common debt instrument and a popular conservation finance mechanism because they can be used to quickly finance the purchase of land under imminent threat of development. General obligation bonds allow for flexibility in financing conservation projects and allow repayment to be spread out over time.

However, while general obligation bonds may be used to quickly finance capital or land purchases, they do not generally provide funds to cover ongoing operating, maintenance, or monitoring and enforcement costs. In addition, issuance of new general obligation

[29] Laura Westrup, "Creating a New Benefit Assessment." (California State Parks, Planning Division, 2006). Available online at: http://www.parks.ca.gov/pages/795/files/benefit_assessment_article_final_oct_17.pdf.
[30] Josh Hurd, "Characteristics of Watershed Restoration Funding," in *The Political Economy of Watershed Restoration Services*. (Missoula, MT: Wildlands CPR, 2009). Available online at: http://www.wildlandscpr.org/political-economy-watershed-restoration-series.
[30] TPL, *Local Greenprinting for Growth*, (2003).

bonds requires voter and/or legislative approval, and there is often significant competition for additional funds among various public programs. Finance charges and interest add significantly to total costs, and there exist either legal or self-imposed limits on the total amount of funds governmental entities at all levels can generate through borrowing. Finally, voter resistance can pose a significant challenge to passage of a new bond measure for conservation proposes.[32]

Analysis of a California watershed restoration program database between 1980 and 2009 identified 2,027 projects and 79 different funding programs. General obligation bonds financed the majority of these watershed restoration activities, with more than $13 billion raised in this way to support water-related projects since 2000. Of this amount, nearly $3.3 billion went to specifically fund watershed restoration. The total repayment cost on the original $13 billion in bonds will eventually be nearly $24 billion. Because of its heavy reliance on general obligation bonds as a source of conservation funds, California has very high levels of debt and its credit rating has suffered.[33] Therefore, debt financing to support watershed restoration and other freshwater conservation activities must not be relied upon too heavily.

2. Revenue Bonds

Revenue bonds are issued when a project is expected to generate a dedicated and predictable stream of revenue, typically through tax receipts or user or access fees. Because repayment is to be made from a dedicated source of funds, revenue bonds do not typically require voter approval and are not constrained by legal or other limits on the ability of governmental entities to issue additional debt.[34]

Deer Creek (Escalante Valley), Utah.
Source: Nicole Gagstetter

[32] TPL, *Local Greenprinting for Growth*, (2003).
[33] Hurd, "Innovative Financial Mechanisms," (2009).
[34] TPL, *Local Greenprinting for Growth*, (2003).

III. Federal Sources of Funding for Conservation

There are a large number and variety of federal programs providing funds to finance freshwater conservation. The programs described below distribute funds to state and local governments, private entities and non-governmental organizations (NGOs), and can be used to finance a wide variety of conservation-related activities. Some programs, such as the state revolving funds, have significant financial resources and can provide long-term funding for freshwater conservation. Yet while the number of programs is large and the total amount of funds available in any given year is significant, these programs are subject to the legislative process and the ability of many of these programs to provide sustainable funding is limited due to the precarious nature of annual appropriations. In addition, there is often heavy competition for the limited funds available in a particular budget cycle. Under some programs, there are limits on the total amount of funds that can go to individual recipients or to fund particular types of conservation projects.

Federal dollars can be critical to financing larger conservation goals and can serve as components of a comprehensive, long-term funding strategy. Matching requirements associated with many of these sources provide incentives for conservation groups to seek dedicated state and local funding, to partner with NGOs and other interested stakeholders, and can be used to supplement other sources.

Although many of the federal funding sources discussed in this section have traditionally been used to fund land conservation, most can be used to finance freshwater conservation as well. Land conservation activities that restore and protect forest, wetland, and riparian ecosystems often generate improvements in both water quality and the regulation of both groundwater and surface water flows in freshwater environments.

Catalog of Federal Funding Sources for Watershed Protection

A particularly useful resource for those seeking information on potential sources of federal funding for conservation is the Catalog of Federal Funding Sources for Watershed Protection. This online data-base can be queried by type of funding (e.g., grants, loans, cost sharing), eligible organization types, and matching funds requirements. The database recognizes more than 30 different keyword search terms including fisheries, floodplain or riparian zone, invasive species, restoration, source water protection, and wetlands.

Available online at:
http://cfpub.epa.gov/fedfund/

State Directed Federal Grants

Through the funding programs described below, the federal government provides grants to state governments who have broad discretion over how those funds are allocated among competing priorities. The state directed federal grant programs best suited to fund freshwater conservation activities are authorized under the Clean Water Act (CWA) and are administered by the U.S. Environmental Protection Agency (EPA).

Clean Water Act Funding Programs

Under the Clean Water Act, the EPA makes grants to states, which then make loans to local governments, NGOs, and private citizens to fund a variety of water quality improvement programs. Although significant funding is made available under these programs each year, only a relatively small fraction has gone specifically to fund conservation activities. A major reason is that the historical focus of these programs has been to provide funding for the construction of drinking water and wastewater treatment facilities and other pollution control infrastructure. In recent years, EPA has encouraged broader use of the funding available under these programs, and more and more states have found innovative ways to use these resources to help pay for conservation activities related to source water protection.

State revolving fund programs under the CWA represent a potentially significant source of future funding for conservation, and can be seen to operate as environmental infrastructure banks.[35] There are two state revolving fund programs that are set up for different purposes but operate similarly. The Clean Water State Revolving Fund (CWSRF) is focused on wastewater treatment and water pollution. The Drinking Water State Revolving Fund (DWSRF) is focused on drinking water treatment and source water quality protection.

Federal dollars, largely from appropriations, along with matching contributions required of the states, are used to establish and maintain the funds. These programs then make zero or low interest loans to eligible projects and loan repayments are recycled back into the program creating sustainable sources of funding. In this way, the revolving fund programs are able to provide financing equal to many times the initial investment. For example, as of 2009, total federal outlays for the Clean Water State Revolving Fund amounted to nearly $26 billion, while total disbursements of funds amounted to approximately $65 billion.[36]

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[35] Josh Hurd, "Characteristics of Watershed Restoration Funding," in *The Political Economy of Watershed Restoration Services* (Missoula, MT: Wildlands CPR, 2009). Available online at: http://www.wildlandscpr.org/political-economy-watershed-restoration-series.

[36] U.S. EPA. "Clean Water State Revolving Fund: 2009 Annual Report." Available online at: http://water.epa.gov/grants_funding/cwsrf/upload/2009_CWSRF_AR.pdf.

Drinking Water State Revolving Fund

Administering Agency: U.S. Environmental Protection Agency
Office: Office of Groundwater and Drinking Water, Drinking Water Protection Division, Infrastructure Branch
On the Web: http://www.epa.gov/safewater/dwsrf/index.html

Purpose
The Drinking Water State Revolving Fund was originally established primarily to make funds available to water providers to finance drinking water infrastructure improvements. The program also dedicates a small portion of available funding to small and disadvantaged communities and to programs that encourage pollution prevention as a tool to ensure safe drinking water supplies.

A growing number of communities have used DWSRF grant funds to establish source water protection programs. Currently, states are allowed to reserve up to 15 percent of available funds to support source water protection activities that include conservation or land management practices. Source water refers to untreated water from streams, lakes, rivers or underground aquifers. Under this set aside provision, DWSRF funds may provide loans for acquiring land or conservation easements, and fund voluntary, incentive-based source water quality protection programs. Under the DWSRF program, there are opportunities for drinking water utilities to partner with NGOs and other interested stakeholders to implement a variety of conservation projects that benefit freshwater environments.

In the case of groundwater resources, DWSRF funds have been used acquire land to establish wellhead protection zones and aquifer protection areas. Other examples include restrictions on land use in recharge areas, capping of retired wells, limits on the location of and total area covered by impervious surfaces, and

programs to better monitor and improve aging septic systems. Many of these activities can be pursued in a way that contributes to broader freshwater conservation goals.

DWSRF funds have also been used to establish watershed protection districts to protect surface water sources. Examples include land use restrictions such as set back requirements or riparian buffers for erosion and flood control, or fencing cattle away from surface water sources and riparian areas to improve water quality and to protect riparian health. Interest in source water protection is driven by a growing realization that it is often more efficient and cost effective to protect drinking water sources from contamination, than it is to treat and remove contaminants after the fact. This awareness should be fostered and partnerships formed ensure that resources available under this program are used to maximum effect in protecting and restoring freshwater environments.

Creation of source water protection areas helps to ensure the provision of high quality drinking water supplies while also protecting the environment and critical wildlife habitat. Source water protection activities funded under the DWSRF program can include an education and outreach component that helps to connect people to their water sources and reinforces the importance of protecting these vital resources. [37]

Potential Freshwater Conservation Uses

- Acquisition of land or conservation easements to preserve open space and critical wildlife habitat.
- Wetlands restoration or protection in wellhead or source water protection areas.
- Voluntary, incentive-based water quality and riparian area protection programs.
- Installation of best management practices to establish and maintain riparian buffers such as fencing cattle away from surface water sources.

Strategies and Hints for Success

For success, projects should address a serious potential human health risk, help to achieve compliance with the Safe Drinking Water Act, or assist water supply systems in communities most in need of financial assistance. A clear connection between wetlands conservation and source water or groundwater protection is necessary in order to obtain funding for this purpose. Projects should demonstrate tangible water quality improvement benefits and cost effectiveness. Interested parties should contact and coordinate with their EPA regional point of contact and state DWSRF representative.

(Barnes and Antos, 2008)

[37] U.S. EPA. "Drinking Water State Revolving Fund." Available online at: http://www.epa.gov/safewater/dwsrf/index.html.
U.S. EPA, Office of Water. "Fact Sheet: Using DWSRF Set-Aside Funds for Source Water Protection." Available online at: http://www.epa.gov/safewater/dwsrf/pdfs/source.pdf.
U.S. EPA. Office of Water. "Using the Drinking Water State Revolving Fund for Source Water Protection Loans." Available online at: http://www.epa.gov/safewater/dwsrf/pdfs/landmanage.pdf.

Limitations

- DWSRF funds cannot be used for routine operating and maintenance costs. Monitoring, assessment or administration of a program is generally ineligible for funding.
- Funding for wetlands projects is limited to source water or wellhead protection areas.

Eligibility

- All 50 States, D.C., Tribes and Puerto Rico.

Matching Requirements

- Participation in the DWSRF program requires a state Intended Use Plan and a 20 percent cash match in order to qualify for federal capitalization grant funds.
- There is no matching requirement for individual projects funded through the DWSRF.

Examples

- States such as Maine, Maryland, Virginia, North Carolina and Pennsylvania have used DWSRF funds to successfully finance a variety of source water protection activities.
- In one of many similar examples, the Auburn Water Department in Maine used a $570,000 DWSRF loan to acquire a conservation easement on 434 acres of important watershed land in an effort to help maintain source water quality.

Clean Water State Revolving Fund

Administering Agency: U.S. Environmental Protection Agency
Office: Office of Wastewater Management, State Revolving Fund Branch
On the Web: http://www.epa.gov/owm/cwfinance/cwsrf/

Purpose

The Clean Water State Revolving Fund (CWSRF) was established to fund water quality improvement projects and has been traditionally used to fund the construction of publicly owned wastewater treatment facilities. However, potential uses of funds also include conservation and land management practices for water quality protection, and watershed and estuary management. Assistance is available to a variety of borrowers including municipalities, communities, farmers, homeowners, small businesses and NGOs. CWSRF funds can be used to provide loans for water quality improvement projects, non-point source water pollution control, watershed and wetlands protection, restoration or creation, and estuary management. [38]

[38] U.S. EPA. "Clean Water State Revolving Fund." Available online at: http://www.epa.gov/owm/cwfinance/cwsrf/.
U.S. EPA. "Clean Water State Revolving Fund: How the CWSRF Program Works." Available online at: http://www.epa.gov/owm/cwfinance/cwsrf/basics.htm.
U.S. EPA. "Protecting Drinking Water with the Clean Water State Revolving Fund." Available online at: http://www.epa.gov/owm/cwfinance/cwsrf/cwsrf8.pdf.
U.S. EPA. "Protecting Wetlands with the Clean Water State Revolving Fund." Available online at:

Potential Freshwater Conservation Uses

- Wetlands restoration, cleanup, enhancement or construction if projects remediate, mitigate or prevent pollution.
- Wetlands protection through land acquisition and conservation easements.
- CWSRF funds can also be used to support water quality trading programs that generate pollution abatement credits such as wetlands restoration.
- Costs for the initial development and delivery of education programs related to CWSRF funded projects are eligible as well.

Limitations

- Projects must be determined eligible under CWA Sections 212 (applies to publicly owned treatment works), 319 (applies to non-point source pollution control), or 320 (applies to estuary management).
- Eligible projects under CWA Section 212 include green infrastructure in the form of land conservation and the planting of trees and shrubs to create buffers for source water quality protection, and water conservation programs and water reuse projects.
- Eligible projects under CWA Section 319 include programs to control polluted runoff from agricultural operations and abandoned landfills, failing septic systems, and leaking underground storage tanks.
- Eligible projects under CWA Section 320 include the planting of trees and shrubs for buffers, environmental cleanup, and development and delivery of initial public education programs. An additional eligibility requirement under Section 320 is that projects must be part of a comprehensive conservation management plan.
- Only capital costs are eligible but these may include costs for planting vegetation and monitoring site conditions over an initial three-year project start up period.

Eligibility

- All 50 States and Puerto Rico.

Matching Requirements

- Eligibility for federal capitalization grants requires that states provide a 20 percent match.
- There is no matching requirement for individual projects funder under the CWSRF.

Strategies and Hints for Success

The likelihood of success increases where a project's environmental benefits can be clearly established and where projects directly manage stormwater, protect source water, or are located in wellhead protection or surface water drainage areas. Interested parties should contact and coordinate with their EPA regional point of contact and state CWSRF representative.

(Barnes and Antos, 2008)

http://www.epa.gov/owm/cwfinance/cwsrf/wetland.pdf.

Examples[39]

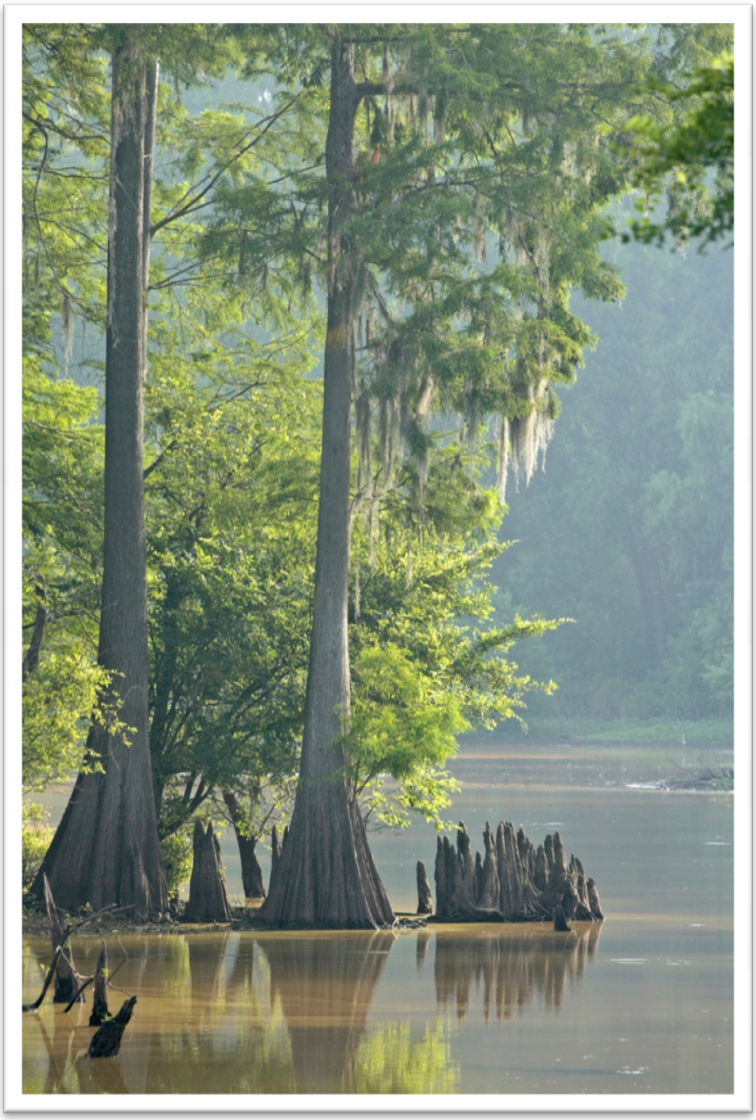
- States such as New York, Maryland, Ohio, California and Washington have used the CWSRF to fund a variety of source water protection activities.
- The City of New York used CWSRF loans to purchase important watershed lands to protect source water as part of their Watershed Protection Program. Suffolk County, New York used CWSRF loans to purchase land to protect groundwater underlying the Pine Barrens, an area that supplies drinking water for nearly three million people.
- Napa County, California used CWSRF loans to purchase hundreds of parcels of land along the Napa River in an effort to reestablish historical river-floodplain linkages and reduce the risk of future flooding.
- Ohio used the CWSRF to establish an innovative Water Resource Restoration Sponsor Program that encourages combining traditional approaches to wastewater treatment with conservation activities that restore watersheds. Under this program, an entity seeking a CWSRF infrastructure loan would also sponsor a watershed restoration project in partnership with an NGO or another organization. The CWSRF loan is used to fund both projects and is structured such that the total repayment amount is less than for the infrastructure project alone.

Cache River wetlands, Illinois. Source: Harold E. Malde

[39] Matt Zieper and Trust for Public Land, *Online Conservation Finance Course* (Trust for Public Land, 2005). Available online at: http://efc.muskie.usm.maine.edu/conservation_finance/HOME.htm.

Direct Federal Grants

Under these programs, the federal government makes grants to individuals, local governments, NGOs, and in some cases, partnerships. The purposes of these programs vary considerably as does the annual level of funding available under each program. Many of the programs most applicable to freshwater conservation were reauthorized or revised as a result of the 2008 Farm Bill and are discussed in a separate sub-section.



Cat Island National Wildlife Refuge, Louisiana.
Source: Byron Jorjorian

Wetlands Program Development Grants

Administering Agency: U.S. Environmental Protection Agency
Office: Office of Wetlands, Oceans and Watersheds, Wetlands Strategies and State Projects Branch
On the Web: http://www.epa.gov/wetlands/grantguidelines/

Purpose

This program provides grants to assist state, tribal, and local governments and NGOs to develop comprehensive programs to protect, manage and restore wetland and riparian resources. A major goal of the program is to advance the science and technical tools necessary to evaluate, protect and restore the health of wetland and riparian ecosystems. Program priorities include improving wetlands monitoring and assessment and creating incentives for voluntary wetlands restoration and protection activities. Grants are intended to encourage the development of comprehensive wetlands programs by promoting research, education and training, wetlands demonstration programs, and surveys and studies relating to the causes, effects, extent, prevention, reduction and elimination of water pollution. Another goal of the program is to facilitate development of watershed stakeholder partnerships and to improve public access to information regarding the importance of riparian and wetland ecosystems. [40]

Potential Freshwater Conservation Uses

- Development of comprehensive wetlands assessment, mapping, monitoring, restoration, enhancement and protection programs.
- Development of large-scale, comprehensive programs to protect wetlands and riparian ecosystems.
- Incentive programs that encourage voluntary wetlands restoration and protection.

Limitations

- Projects should be broad, benefitting two or more states or tribes, or be national in scope.
- Demonstration projects must use new or experimental technology or methods and the results of such efforts must be disseminated.
- Funds cannot be used for implementation of individual mitigation projects, mitigation banks or in-lieu-fee mitigation programs.

Eligibility

- State, Tribal and Local Governments and Universities that are agencies of state governments are eligible for EPA regional office grants.
- NGOs are eligible for grants from EPA headquarters.

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[40] U.S. EPA. "Wetlands Program Development Grants." Available online at: http://www.epa.gov/wetlands/grantguidelines/.
Federal Grants Wire. "Wetland Program Development Grants." Available online at: http://www.federalgrantswire.com/wetland-program-development-grants.html.

FY2010 Program Funding Levels

- Expected funding available under this program for FY2010 was $1 million to support individual grants of between $50,000 and $200,000.
- In FY2009, annual grants awarded averaged $253,500.

Matching Requirements

- 25 percent of total project costs in the form of cash or in-kind contributions.
- Other terms of a particular grant are determined at the time of award.

Examples

Program funds have been used for:

- Wetland and stream mitigation studies.
- Comprehensive wetland and watershed conservation plans.
- Wetland management training workshops.
- Wetlands monitoring and assessment programs and methods.
- Training in wetland science and monitoring techniques.
- Wetland mapping, inventory and classification projects.
- Wetlands database development.

Strategies and Hints for Success

This program is designed to encourage the development of comprehensive wetlands monitoring and assessment programs. Projects that improve the effectiveness of compensatory mitigation, refine or develop new processes for the protection of vulnerable wetland types or other aquatic resources, and enhance assessment and mapping efforts generally receive higher scores. In order to enhance the likelihood of success, projects should also rely on partnerships with a variety of stakeholder groups and leverage additional sources of funding.

(Barnes and Antos, 2008)

North American Wetlands Conservation Act, Standard and Small Grants Programs

Administering Agency: Department of the Interior
Office: U.S. Fish and Wildlife Service
On the Web: http://www.fws.gov/birdhabitat/Grants/NAWCA/index.shtm

Purpose
The North American Wetlands Conservation Act (NAWCA) program provides matching grants for the long-term protection, restoration, enhancement, and/or establishment of wetlands and associated uplands for the benefit of wetlands-associated migratory birds and wildlife.

The NAWCA includes two types of competitive grant programs: 1) the Standard Grants program ($75,000 - $1 million) which provides funds to support projects in the U.S., Canada and Mexico, and 2) the Small Grants program (less than $75,000) that operates only in the United States. NAWCA grant funds can be used for land acquisition, restoration or enhancement of wetlands and surrounding riparian buffers, and to establish new wetlands habitat. The NAWCA program encourages the formation of public-private partnerships among interested stakeholder groups that leverage funding from multiple sources.[41]

Potential Freshwater Conservation Uses
- Acquire, restore, create or enhance wetland ecosystems through the acquisition of land-title, conservation easements or long-term leases.
- Projects in Mexico that provide technical training, environmental education and outreach, or support organizational development and sustainable use studies are also eligible under the Standard Grants program.

Limitations
- Stewardship, monitoring, evaluation and project planning costs are not eligible for funding, although some of these costs can be counted as part of the required match.

Eligibility
- Large conservation organizations are the main recipients of NAWCA funds, often in partnership with state agencies, or state and tribal wetlands programs.

[41] U.S. Fish and Wildlife Service, Division of Bird Habitat Conservation. "North American Wetlands Conservation Act: Standard Grants." Available online at: http://www.fws.gov/birdhabitat/Grants/NAWCA/index.shtm.
U.S. Fish and Wildlife Service, Division of Bird Habitat Conservation. "North American Wetlands Conservation Act: Small Grants." Available online at: http://www.fws.gov/birdhabitat/Grants/NAWCA/Small/index.shtm.

FY2010 Program Funding Levels

- The FY2010 Congressional appropriation to fund this program was just over $47 million. Additional funding from other federal sources amounted to an additional $42 million.
- Between 1990 and 2010, NAWCA provided 4,440 partners in 2,038 individual projects with more than $1 billion in total grant funds.

Matching Requirements

- 1:1 match requirement in the form of cash or in-kind contributions.

Examples

- In Colorado's San Luis Valley, the intermountain west joint venture purchased a conservation easement to protect approximately six miles of river and 1,070 acres in the upper Rio Grande valley as part of the Silver Thread Scenic Byway.[42]
- A migratory bird joint venture is a collaborative, regional partnership of agencies, NGOs, corporations, tribes and individuals that conserve habitat for priority bird species within a specific geographic region. A joint venture increases the efficiency and effectiveness of habitat conservation by bringing together a diverse group of stakeholders to jointly develop and implement effective strategies. Currently, there are 18 regional joint ventures operating in the U.S. that have collectively invested over $4.5 billion to conserve 15.7 million acres of migratory bird habitat since 1986.[43]

Strategies and Hints for Success

Coordination with the regional joint venture project coordinator is essential to ensure project compliance with the ESA, NEPA, NHPA and other applicable environmental laws. Projects should contribute to the recovery of listed endangered species, species proposed for listing, or state listed species. Projects that impact large acreages and demonstrate cost effectiveness in the form of minimal compliance and monitoring costs are especially desirable. In addition, projects should generate tangible water quality improvement benefits, contribute to the restoration and protection of threatened wetland ecosystem types, or protect important migratory bird habitat.

(Barnes and Antos, 2008)

[42] U.S. Fish and Wildlife Service, "Joint Venture Fact Sheet."
[43] U.S. Fish and Wildlife Service, "Migratory Bird Joint Ventures: Joint Venture Fact Sheet." Available online at: http://www.fws.gov/birdhabitat/jointventures/files/JointVentureFactSheet.pdf.

Cooperative Endangered Species Conservation Fund or Endangered Species Act (ESA) Section 6 Program

Administering Agency: U.S. Department of the Interior
Office: U.S. Fish and Wildlife Service
On the Web: http://www.fws.gov/endangered/esa library/pdf/Sec6_Factsheet_2009.pdf

Purpose

The ESA Section 6 program provides grants to states and territories to assist in the development of programs for the conservation of endangered or threatened species. States then work with private landowners, conservation groups and other agencies to initiate planning and to acquire and protect critical habitat. Financial assistance under this program can be used to fund animal, plant and habitat surveys; habitat acquisition, protection, restoration and management; research, planning and monitoring; and public outreach and education programs. There are currently four grant programs operating under the Cooperative Endangered Species Conservation Fund:

- **Conservation Grants** provide assistance to states and territories for projects that will benefit listed and threatened species.
- **Habitat Conservation Planning Assistance Grants** provide funds to support development of Habitat Conservation Plans (HCP).
- **Habitat Conservation Plan Land Acquisition Grants** provide funds to states and counties for land acquisitions that complement approved HCPs. Funding under this program is only available for purchases that go above and beyond current responsibilities under the terms of an approved HCP. Projects must have non-federal partners willing to provide a 25 percent match and manage the protected habitat on an ongoing basis.
- **Recovery Land Acquisition Grants** provide funds to acquire habitat for endangered and threatened species subject to approved recovery plans. Funds from this program cannot be used for acquisition of lands associated with an approved HCP.[44]

Potential Freshwater Conservation Uses

- A range of activities related to protection and recovery of threatened and endangered species including animal, plant and habitat surveys; habitat acquisition, protection, restoration and management; research, planning, and monitoring; and public outreach and education programs.

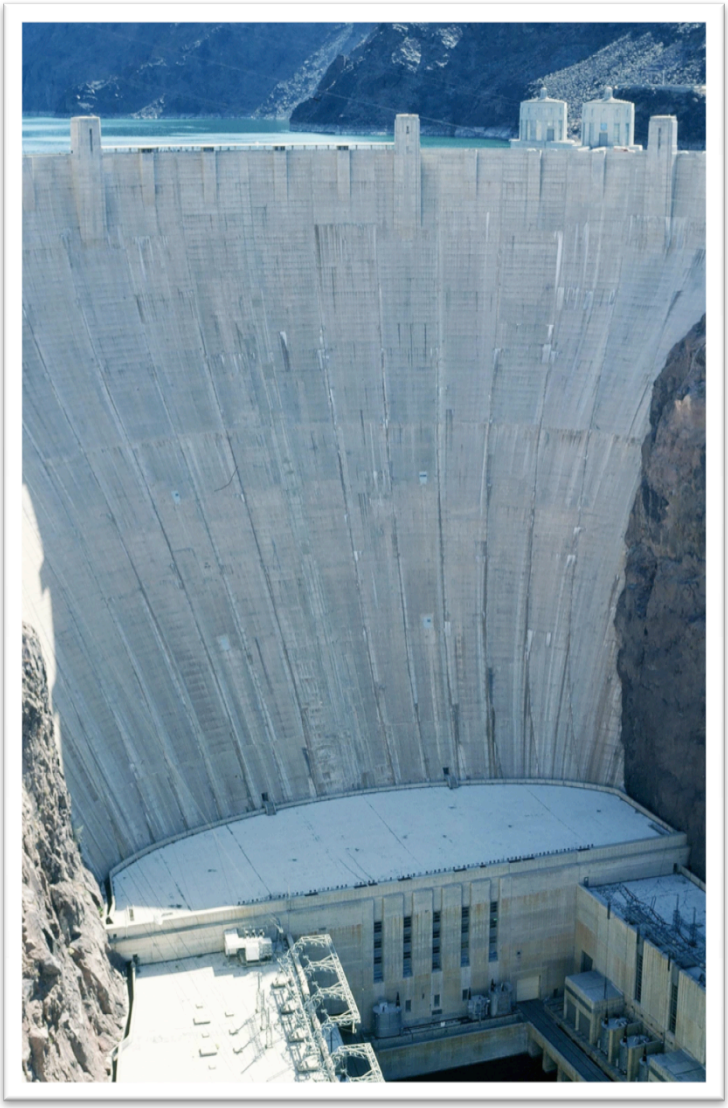
[44] Federal Grants Wire. "Cooperative Endangered Species Conservation Fund." Available online at: http://www.federalgrantswire.com/cooperative-endangered-species-conservation-fund.html.
The Trust for Public Land, "Cooperative Endangered Species Conservation Fund." Available online at: http://www.tpl.org/tier3_print.cfm?folder_id=191&content_item_id=10572&mod_type=1.

Limitations

- State conservation agencies must have entered into a cooperative agreement with the Secretary of the Interior. According to the U.S. Fish and Wildlife Service, most states and territories have already entered into such agreements for both plant and animal species.

Eligibility

- U.S. States and Territories.



Hoover Dam. Source: Tim Palmer

FY 2010 Program Funding Levels

- Conservation Grants, $11 million.
- Habitat Conservation Planning Assistance Grants, $10 million.
- Habitat Conservation Plan Land Acquisition Grants, $41 million.
- Recovery Land Acquisition Grants, $15 million.

Matching Requirements

- 25 percent for programs affecting individual states.
- 10 percent for programs where two or more states have entered into a joint agreement.

Strategies and Hints for Success

- Potential applicants should work through designated points of contact at the U.S. Fish and Wildlife Service regional office representing their state.

Farm Bill Programs

The grant programs under the Conservation Title of the Farm Bill are designed to encourage voluntary conservation of critical fish and wildlife habitat on private lands and also provide an important source of supplemental farm income. Private lands are of vital importance in the conservation of fish and wildlife habitat since they account for nearly 70 percent of land ownership in the lower 48 states.[45] Many Farm Bill conservation programs provide incentives for private landowners to partner with state and local governments or NGOs to leverage additional sources of funding. The direct federal grant programs discussed in this subsection have undergone or are undergoing revision as a result of the 2008 Farm Bill.

Pecatonica Watershed, Wisconsin. Source: Mark Godfrey

Strategies for Securing Funding from Farm Bill Conservation Programs

The Natural Resources Conservation Service (NRCS) directly administers most of the Farm Bill conservation programs and also provides technical assistance. Farm Bill conservation programs are subject to payment caps that limit the total amount of funds that a particular entity can obtain. Because of these payment caps and other limits on indirect cost recovery TNC centrally tracks participation in Farm Bill programs through the grants network. It is essential that individuals interested in pursuing conservation

[45] Randall Gray. "Field Guide to the 2008 Farm Bill for Fish and Wildlife Conservation." (U.S. NABCI and the Intermountain Joint Venture 2009).

funding through Farm Bill programs begin by coordinating with their local or regional Grant Specialist.

There are some fundamental strategies that can contribute to success in securing funding from Farm Bill programs to support freshwater conservation.

- Develop good working relationships with the State Conservationist and key Staff.
- Participate in your State Technical Committee to help determine enrollment and funding priorities.
- Develop good working relationships with regional conservation districts and local farmers and ranchers.
- Prepare and submit detailed and "ready to go" conservation project proposals to NRCS.

Conservation Reserve Enhancement Program

Administering Agency: U.S. Department of Agriculture
Office: Farm Service Agency
On the Web:
http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=cep

Purpose

The Conservation Reserve Enhancement Program (CREP) provides incentives, rental payments, cost share, and technical assistance to help establish long-term, resource conserving vegetative cover to reduce erosion and restore water quality, and to improve fish and wildlife habitat. This program is closely related to the Conservation Reserve Program, which is the country's largest voluntary environmental improvement incentive program. CREP contracts require a ten to fifteen year commitment from the landowner. For private landowners, this program provides both a means to address state environmental priorities and a source of supplemental farm income. [46]

Potential Freshwater Conservation Uses

- Protection and restoration of environmentally sensitive farm and ranch land, and critical fish and wildlife habitat for threatened and endangered species.
- Installation of filter strips and forested buffers to protect streams, lakes and rivers from sedimentation and agricultural runoff to protect groundwater and surface water quality.
- Restoration and development of wetlands through retirement of farmland and the planting of appropriate groundcover.

Limitations

- Land must meet cropping history, ownership or lease tenure and other eligibility requirements. The CREP program is also subject to total acreage limits.

[46] USDA, Farm Service Agency. "Conservation Reserve Enhancement Program." Available online at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=cep.

- Annual payments to farmers under the program are variable and depend on local land rental rates and the availability of other incentive payments for specific conservation practices.
- Enrollment is generally limited to specific geographic areas and practices that address identified conservation priorities within a particular state or geographic region.

Eligibility

- Eligibility is limited to privately owned farm and ranch land.
- Under CREP, private landowners are encouraged to form partnerships with state and local governments, tribes, and NGOs in order to maximize the beneficial use of funds available under the program.

Matching Requirements

- 50 percent of eligible costs to install the approved conservation practices.
- This can be provided by state or tribal governments or NGOs and can be in the form of technical support or in-kind services.

Example

- In Colorado, a Conservation Reserve Enhancement Program was established in 2006 to decrease irrigation water consumption and reduce runoff of agricultural chemicals and sediments into the Republican River and Ogallala Aquifer. The Republican River CREP is expected to generate water, energy and soil conservation benefits, as well as habitat improvements for declining fish species and other wildlife, in part, by re-establishing native grasses and riparian buffers.

Confluence of Middle and Coast Forks, Willamette River, Oregon.
Source: Rick McEwan

Environmental Quality Incentives Program

Administering Agency: U.S. Department of Agriculture
Office: Natural Resources Conservation Service
On the Web: http://www.nrcs.usda.gov/programs/eqip/

Purpose

The Environmental Quality Incentives Program (EQIP) is one of the largest private landowner conservation incentive programs and provides financial, educational and technical assistance to encourage conservation through adoption of best management practices (BMPs). Examples include management of manure and poultry litter, and reduced fertilizer and pesticide use. Goals of the program are to improve air and water quality, enhance critical fish and wildlife habitat, and improve soil health. Another goal of the EQIP program is to promote agricultural production and environmental quality as fully compatible goals.[47]

Potential Freshwater Conservation Uses

- Funding to develop conservation action plans and implement approved conservation practices on agricultural lands, forests or lands used to raise livestock.
- Encourage conservation through the adoption of BMPs for manure and poultry litter, and fertilizer and pesticide application.
- Improvement of air and water quality and enhancement of fish and wildlife habitat and soil health.
- The Colorado River Basin Salinity Control Project is listed as a National EQIP Initiative and Statute Supported Program.

Limitations

- Contracts run from a minimum of one year after the implementation of the last scheduled structural or management practices, to a maximum term of 10 years.
- Participation requires an approved EQIP plan of operations that includes specific conservation and environmental objectives.
- A landowner or other legal entity is limited to $300,000 in total EQIP funding for all contracts entered into during any six-year period. Projects with special environmental significance may apply to the NRCS Chief and request to have the limit raised to $450,000.
- Landowners must also meet adjusted gross income requirements.

[47] USDA, National Resource Conservation Service. "Environmental Quality Incentives Program." Available online at: http://www.nrcs.usda.gov/programs/eqip/.
Environmental Defense Fund Center for Conservation Incentives. "Montana Landowners use EQIP to Advance Conservation of Rare Wildlife." Available online at: http://www.edf.org/article.cfm?contentID=4523.

Eligibility

- Farmers, ranchers and forestland owners who are engaged in agricultural or livestock production on privately held land.

FY2010 Program Funding Levels

- Congressionally authorized funding for EQIP in FY2010 was $1.45 billion.

Matching Requirements

- 25 percent of incurred costs or income foregone as a result of implementing approved conservation practices.
- 10 percent for participants with limited resources.

Strategies and Hints for Success

- Information on how to apply for EQIP is available on a state-by-state basis. Interested parties should contact the NRCS through their local USDA Service Center. Each state's EQIP page contains information on priority natural resource and environmental concerns, application ranking criteria, and lists of eligible conservation practices.[48] For conservation or irrigation efficiency improvement projects seeking EQIP funding, the NRCS gives priority to producers who agree not to use any associated savings to bring new land under irrigated production.

Examples

- Montana landowners have used EQIP funds to advance the conservation of the pallid sturgeon and arctic grayling, and to improve critical trout habitat. In the case of the pallid sturgeon, EQIP funds were used to compensate downstream landowners for impacts associated with releases of large quantities of water from upstream reservoirs. These planned periodic water releases were designed to mimic natural seasonal flooding and encourage spawning.[49] EQIP funds were also used to pay farmers to shorten their irrigation season to increase flows in the Upper Big Hole River, the last native habitat for the arctic grayling in the continental U.S.[50] EQIP funds have also been used in Montana to improve critical trout habitat through stream bank vegetation restoration, and riparian area fencing.[51]

[48] Barnes and Antos, *Compendium of Federal Funding Sources,* (2008).
[49] EDF Center for Conservation Incentives. "Montana Landowners use EQIP."
[50] Gray, "Field Guide to the 2008 Farm Bill." (2009).
[51] Environmental Defense Fund, "Montana Landowners use EQIP."

Junction of the Mississippi and Wisconsin rivers. Source: Mark Godfrey

Healthy Forests Reserve Program

Administering Agency: U.S. Department of Agriculture
Office: Natural Resource Conservation Service
On the Web: http://www.nrcs.usda.gov/programs/hfrp/proginfo/index.html

Purpose

The purpose of the Healthy Forests Reserve Program (HFRP) is to help private landowners restore, enhance and protect forest ecosystems through easements, contracts and cost-share agreements. The goals of the program are to preserve forest ecosystems as habitat for the benefit of threatened and endangered species and to support biodiversity. In exchange for participation in HFRP, landowners can avoid certain regulatory restrictions under the Endangered Species Act on the use of their land.[52]

HFRP program funds can also be used for projects that restore and preserve forested wetlands. Restoration and preservation of forests and forested wetlands contributes to healthy watersheds and also provides watershed services improvement benefits. Where

[52] USDA, NRCS. "Healthy Forests Reserve Program: Introduction." Available online at: http://www.nrcs.usda.gov/programs/hfrp/proginfo/index.html.
USDA, NRCS. "Healthy Forests Reserve Program: Overview." Available online at: http://www.nrcs.usda.gov/programs/hfrp/proginfo/MoreInformation.html.
EDF Center for Conservation Incentives. "Healthy Forest Reserve Program." Available online at: http://www.edf.org/page.cfm?tagID=21.

identified priorities include significant areas of privately held forest land, HFRP can provide funding to support projects that contribute to broader freshwater conservation goals.

Potential Freshwater Conservation Uses

- Restoration and protection of private forestlands, including forested wetlands, for the benefit of threatened or endangered species through conservation easements and cost share agreements.

Limitations

- Eligible lands must be privately owned, non-industrial or tribal and owners must agree to implement a Forest Stewardship Plan.
- Projects must restore, enhance or measurably increase the likelihood of recovery of threatened or endangered species, must improve biological diversity or increase carbon sequestration.

Eligibility

- Privately owned forestlands or historical forestland converted to cropland.

FY2010 Program Funding Levels

- Congress has authorized $9.75 million per year in funding through FY2012.

Matching Requirements

- A 10-year cost share agreement requires 50 percent of the average cost of conservation activities.
- A 30-year easement requires 25 percent of the easement value and the average cost of conservation activities.
- A permanent or 99-year easement has no matching requirements.

Examples

- In 2007, Maine started a HFRP funded program to manage 180,000 acres of forested habitat along the St. John River to benefit two species of concern, the Canada lynx and the American pine marten. Improved forest management to benefit these two 'umbrella species' will also benefit approximately 85 percent of other forest vertebrate species. In 2010, Oregon established a program using HFRP funds to protect and improve habitat for the benefit of the northern spotted owl.

Wetlands Reserve Program

Administering Agency: U.S. Department of Agriculture
Office: Natural Resources Conservation Service
On the Web: http://www.nrcs.usda.gov/programs/wrp/

Purpose

The Wetlands Reserve Program (WRP) offers private landowners and tribes technical and financial support to protect, restore and enhance wetlands in exchange for retiring eligible land from agricultural production. Goals of the program are to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program.[53] More than two million acres are currently enrolled in the program and the WRP has been used successfully to restore more than 10,000 acres of wetlands.[54]

The WRP is closely associated with the Wetlands Reserve Enhancement Program (WREP) that now includes a "pilot program to purchase easements that reserve the grazing rights to the private land-owner…in exchange for reduced easement compensation."[55] This pilot program could be particularly valuable where a significant portion of lands targeted for conservation are privately owned and used primarily for grazing.

Potential Freshwater Conservation Uses

- Restoration, enhancement and long-term protection of wetlands habitat on private lands.

Limitations

- Land must be restorable as a functioning wetland and suitable for wildlife habitat.
- WRP acreage in a particular county cannot exceed 10 percent of total farmland.
- Landowners retain use rights to "hunting, fishing and quiet recreational use."[56]
- Payments are generally made on an annual basis for up to 30 years and vary with the estimated value of the easement.
- Total payments to a particular entity under a cost-share agreement are limited to $50,000 in any one year.

Eligibility

- Participation in the program is limited to private and tribal lands.
- Eligible lands must encompass a minimum of 20 contiguous acres.

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[53] USDA, NRCS. "Wetlands Reserve Program." Available online at: http://www.nrcs.usda.gov/Programs/wrp/.
USDA, NRCS. "Farm Bill 2008 at a Glance: Wetlands Reserve Program." Available online at: http://www.nrcs.usda.gov/Programs/farmbill/2008/pdfs/WRP_At_A_Glance_062608final.pdf.
[54] Gray, "Field Guide to the 2008 Farm Bill." (2009).
[55] Gray, "Field Guide to the 2008 Farm Bill." (2009).
[56] Gray, "Field Guide to the 2008 Farm Bill." (2009).

- The U.S. Fish and Wildlife Service and NRCS make the final eligibility determination.

Matching Requirements

- There is no matching requirement for a permanent easement.
- 25 percent of the easement value and restoration costs for a 30-year easement.
- 25 percent of the restoration costs under a restoration cost share agreement.

San Pedro River, Arizona. Source: Harold E. Malde

Wildlife Habitat Incentives Program

Administering Agency: U.S. Department of Agriculture
Office: Natural Resources Conservation Service
On the Web: http://www.nrcs.usda.gov/programs/whip/

Purpose
The Wildlife Habitat Incentives Program (WHIP) is a voluntary program that supports the development and improvement of critical habitat for fish and wildlife populations of national, state, local and tribal significance on agricultural and non-industrial private forest land. The WHIP provides technical assistance and up to 75 percent cost-share assistance to establish and improve upland, wetland, aquatic and other types of fish and wildlife habitat. Goals of the program are to protect, restore, develop or enhance native fish and wildlife habitat to benefit declining or at risk species, and to reduce the impacts of non-native or invasive species on important fish and wildlife habitat.[57]

Potential Freshwater Conservation Uses
- Protect, develop, restore or improve upland, wetland, aquatic and other wildlife habitat on private lands for the benefit of declining or at risk species.
- Programs that reduce the impacts of invasive species on fish and wildlife habitat.

Limitations
- A WHIP plan of operations is required.
- Participants are expected to maintain cost-shared conservation practices for the expected project lifespan.
- WHIP participation agreements are generally for a period of five to 10 years.
- Publicly owned lands are not eligible.
- Payments made to a person or legal entity shall not exceed $50,000 per year.

Eligibility
- Privately held agricultural, non-industrial forest, and Tribal lands determined by NRCS to be suitable for fish and wildlife habitat development.

Matching Requirements
- 25 percent of the costs to install conservation practices in permanent priority fish and wildlife habitat under agreements of up to 10 years.
- 10 percent of the costs to install conservation practices in long-term agreements, usually 15 years or longer.

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[57] USDA, NRCS. "Wildlife Habitat Incentive Program." Available online at: http://www.nrcs.usda.gov/programs/whip/.
USDA, NRCS. "Farm Bill 2008 Fact Sheet: Wildlife Habitat Incentive Program." Available online at: http://www.nrcs.usda.gov/programs/farmbill/2008/pdfs/whip_factsheet.pdf.
USDA, USFS. "Wildlife Habitat Incentive Program: Protecting and Enhancing Critical Wildlife Habitat." Available online at: http://www.fs.fed.us/spf/coop/programs/loa/whip.shtml.

The Green River at Brown's Park, Utah. Source: Tim Palmer

Direct Federal Acquisition

In some cases, the federal government directly acquires lands for conservation purposes in the form of national parks, national forests, or wildlife refuges. The most promising of these programs for purposes of watershed conservation is the Land and Water Conservation Fund (LWCF). The LWCF is actually set up as two programs, a state-level matching grant program (referred to as Stateside), and a federal-level land acquisition program.

Land and Water Conservation Fund

Administering Agency: U.S. Department of the Interior
Office: National Parks Service
On the Web: http://www.fs.fed.us/land/staff/LWCF/

Purpose
The LWCF was created by Congress in 1965 and is funded primarily through revenues derived from offshore oil and gas leases. Annual funding for the LWCF is authorized up to $900 million but the program has realized this level of funding only once. On July 30, 2010, the U.S. House of Representatives passed legislation calling for full funding of the

LWCF. Similar legislation in the U.S. Senate was not considered and the prospects for full funding of the LWCF in the current session of Congress are uncertain.

The LWCF Stateside program provides matching grants to state and local governments to fund the acquisition and development of outdoor recreation areas and related facilities. Between 1965 and 2005, this program awarded over 40,000 grants to state and local governments totaling nearly $3.7 billion. Funding for this portion of the LWCF program has declined significantly over time and the potential for future funding is uncertain.

The federal LWCF program provides funds for national park, forest and wildlife refuges, and BLM fee and easement land acquisitions. The LWCF program is intended to create and maintain a nationwide legacy of high quality recreation areas and facilities and to stimulate non-federal investments in the protection and maintenance of recreation and natural resources across the United States.[58]

Potential Conservation Uses

- Funds can be used for park development and the acquisition of land and easements for recreation, scenic landscapes, wildlife habitat, clean water, and quality of life benefits.
- Examples include wild and scenic rivers, wilderness areas, scenic areas, recreation areas, and scenic trails.

Seedskadee National Wildlife Refuge, Wyoming. Source: Edward Orth

[58] Margaret Wells, "Federal Funding for Conservation and Recreation: The Land and Water Conservation Fund," (Washington, DC: Resources for the Future, 2009).

Limitations

- Federal projects should generally be located within or adjacent to an established or proposed federal unit, e.g., a national park, refuge, forest, or federally managed area, and be considered a priority by the administering agency.
- Eligible projects are subject to a rigorous Appropriations Committee review process and the NPS has final approval.

Eligibility

- All 50 States, D.C. and U.S. Territories.

Matching Requirements

- 50 percent match to states for planning, developing, and acquiring land and water areas for natural resource protection and recreation enhancement.

Examples

- Examples of projects funded under the LWCF state matching grant program include the Allagash Wilderness Waterway in Maine, the Willamette River Greenway in Oregon, and the Platte River Park in Denver, Colorado.
- Federal LWCF project sites include Harper's Ferry National Historical Park, Greater Yellowstone Ecosystem, Maroon Bells-Snowmass Wilderness, Appalachian National Scenic Trail, Sawtooth National Recreation Area, Big Sur Ecosystem, Chattooga National Wild and Scenic River, and Columbia River Gorge National Scenic Area.

More Recent Federal Programs

SECURE Water Act: Authorization of Grants and Cooperative Agreements

Purpose

This program authorizes non-reimbursable grants to eligible applicants for (among other things) planning, designing, or constructing any improvement to: 1) conserve water, 2) increase water use efficiency, 3) facilitate water markets, 4) enhance water management, 5) prevent the decline of species proposed or being considered for listing, or 6) accelerate the recovery of species and designated critical habitats adversely affected by federal reclamation projects or subject to a recovery/conservation plan under the Endangered Species Act. Activities that address climate-related impacts, ecological resiliency, or the potential for water-related crises or conflicts in watersheds with a nexus to a federal reclamation project or service area may also be eligible for funding.

Potential Freshwater Conservation Uses

- Funding for projects that facilitate the creation of water markets, or contribute to conservation, greater water use efficiency, or enhance water management.
- Projects that accelerate the recovery of threatened species and designated critical habitats, or prevent the decline of endangered species are also eligible for funding.
- Projects that address potential climate-related impacts and ecological resiliency.

Limitations

- Water savings realized through the adoption of conservation measures may not be used to increase irrigated acreage or consumptive use.
- Project operations and maintenance costs are not eligible.

Eligibility

- Eligible applicants must be located in the U.S. and submit an application and proposal to the Secretary of the Interior.

Matching Requirements

- Federal share of costs is limited to 50 percent of infrastructure costs.

Current Status

- This program is currently on hold pending Congressional action on FY2011 appropriations bills. The prospects for funding of this program are uncertain.

Omnibus Public Lands Act of 2009: Cooperative Watershed Management Program

Purpose

This program authorizes grants to form or enlarge a watershed group, and to conduct one or more projects in accordance with the established goals of a watershed group. Funding can be applied to watershed management projects that: 1) enhance water conservation, 2) improve water quality, 3) improve the ecological resiliency of a river or stream system, 4) reduce the potential for water conflicts, or 5) advance other water quality or quantity goals the Secretary of the Interior determines appropriate. The program is designed with three phases.

- Phase 1 - $100,000 per year maximum for not more than three years to: 1) establish or enlarge a watershed group, 2) develop a mission statement and goals, 3) develop project concepts, and 4) to develop a watershed restoration plan.
- Phase 2 - $1,000,000 per year maximum for not more than four years to plan and carry out approved watershed management projects.
- Phase 3 - $5,000,000 maximum for not more than five years to carry out at least one watershed management project.

Potential Freshwater Conservation Uses

- Projects to enhance water conservation and improve water quality.
- Projects to improve the ecological resiliency of river or stream systems.
- Projects that reduce the potential for water conflicts.

Moose in Rocky Mountain National Park, Colorado. Source: Taylor Hawes

Limitations

- Funding is subject to an annual determination of eligibility based on satisfaction of established performance and advancement conditions.
- Grant money may be spent on a variety of related costs subject to limitations. Refer to Section 6002(c)(3) Authorizing Use of Funds for Administrative and Other Costs.

Eligibility

- Priority may be given to watershed groups that represent a diversity of interests or that serve sub-basin-sized watersheds with an eight-digit USGS hydrologic unit code.
- Matching Requirements
- Phase 1 has no matching requirement.
- Under phases two and three the federal participation or cost share is limited to 50 percent.

Current Status

- This program is currently on hold pending Congressional action on FY2011 appropriations bills. The prospects for funding of this program are uncertain.

IV. Innovative Market-Based Approaches to Freshwater Conservation: Payments for Watershed Services and Ecosystem Services Markets

Market-based approaches to fund freshwater conservation, whether in the form of direct payments for ecosystem services or voluntary exchanges between willing buyers and sellers, are being implemented all over the world on a larger scale than ever before. These approaches are not new, economists and others have been discussing the relative merits of market-style funding mechanisms for many years. Notably, they leverage a significant and growing willingness to pay for watershed services such as drinking water protection or pollution prevention. Market-based funding mechanisms can be a key component of a diversified portfolio of funding sources and have great potential as a sustainable source of financing for freshwater conservation.

However, market-based approaches are not a financing panacea. Estimates of the amount of funds currently generated under these types of programs to fund freshwater conservation fall far short of anticipated needs. In addition, due to the unique nature of conservation challenges in any particular watershed, a comprehensive and sustainable financing model must be developed from the ground up and designed to address local concerns. Issues to consider in the design of market-based programs include not only local conservation priorities, but cultural, socioeconomic and political realities as well. Thus each market-based program will necessarily be unique due to watershed characteristics, conservation goals, and the preferences of the local population.

Motivating Factors for Market-Based Approaches

- Healthy, functioning watersheds and the many services they provide are valuable assets that once damaged are difficult and costly, if not impossible, to replace.
- There is significant and growing demand for natural environments and the many valuable benefits they provide.
- Market-based approaches are inclusive and engage diverse groups of stakeholders in environmental protection and conservation.

Perhaps the most significant factor motivating the development and implementation of market-based approaches to freshwater conservation finance is a growing realization that the services provided by watersheds, such as natural water filtration, regulation of climate and ground and surface water flows, or aesthetic and recreational benefits, are highly valuable and once lost or damaged are costly and

difficult to replicate or replace. There is also significant and increasing demand for the cultural and environmental benefits provided by ecosystems in their unspoiled natural state, and growing appreciation of the value healthy watersheds provide. As one report states, "The laws of supply and demand are now taking effect because cumulative impacts on natural systems have reached the point where such systems are increasingly scarce, and therefore increasingly valuable."[59]

Market-Based Mechanisms to Fund Watershed Restoration and Freshwater Conservation

Payments for Watershed or Ecosystem Services programs enable individuals or groups to receive direct payments or other forms of compensation from those who value or benefit from those services. For example, under the Water Fund model, downstream beneficiaries of watershed services make payments to upstream interests to implement conservation and land management practices that ensure the continued availability and quality of these services.

Ecosystem Services Markets facilitate voluntary exchanges between buyers required to offset the impacts of economic activity and sellers who can affect the quantity and quality of watershed services through their land use decisions. For example, developers face a regulatory requirement to mitigate the degradation or removal of wetland areas. Wetland mitigation banks serve as a source of credits developers can buy to offset the unavoidable environmental impacts of their activities. Wetland mitigation banks also provide financial incentives in the form of supplemental income to landowners who conserve, develop or restore wetlands on their property above and beyond regulatory requirements.

Adapted from Cassin and Davis, 2008.

[59] Jan Cassin and Adam Davis, "New Innovative Funding Sources." (Puget Sound Partnership, 2008). Available online at: http://www.psp.wa.gov/downloads/AAAPX/funding.pdf.

Payments for Watershed or Ecosystem Services

Payments for Ecosystem Services (PES), refers to direct or indirect payments that are made in exchange for measurable units of environmental services or performance.[60] In a freshwater conservation scenario, upstream landowners may receive assistance in the form of cash payments, cost-sharing or technical assistance, in exchange for implementing land use practices that ensure the continued delivery of watershed services (such as high quality water, reliable water flows, or flood and erosion control) to downstream users. In the case of ecosystem services specific to watersheds, the terms Payment for Watershed Services (PWS) or simply Watershed Payments are sometimes applied.[61]

Participation in these programs is typically voluntary and most of the examples currently in place were set up and are operated by governments or the public sector. In the U.S. and other developed countries, funding for such programs is typically generated from general revenues or through the appropriations process. However, corporations and other sources of private funds, foundations, NGOs, and international aid organizations often play a significant role in funding similar programs, particularly in developing countries. Drinking water utilities, hydroelectric generators, breweries, and bottled water and other beverage companies have all willingly contributed to ecosystem payment programs of various types to ensure the continued delivery of high quality watershed services.

Yampa and Green River Confluence.
Source: Taylor Hawes

[60] Cassin and Davis. "New Innovative Funding Sources." (2008).
[61] Tracey Stanton et al., *State of Watershed Payments: An Emerging Marketplace* (Ecosystem Marketplace: Forest Trends and the Katoomba Group, 2010). Available online at: http://147.202.71.177/~foresttr/documents/files/doc_2438.pdf.

Potential Challenges

A few potential challenges associated with payment for services approaches are important to consider in the design phase of any new program. First, participation on the part of sellers may be limited or inadequate if the payments offered for implementation of conservation practices are not large enough.[62] Second, participation by buyers may be insufficient without effective regulatory drivers, particularly in under-developed countries lacking a well-established regulatory framework. Preliminary analyses must examine both the financial needs of potential sellers of environmental services and the potential efficacy of current or anticipated regulatory requirements.

Given the inherent diversity of freshwater ecosystems and land use patterns, it is certain that the costs to implement particular conservation practices will not be the same for all landowners. This further complicates the process for establishing payment amounts that will encourage sufficient participation on the part of sellers. In other words, the payment scheme must be developed taking into account site specific circumstances and conditions. In addition, in the absence of adequate performance measures, monitoring and enforcement, there may be little control over either the actual levels of environmental protection or watershed improvement.[63] It is important to develop effective ecosystem services measures and to establish a baseline condition from which improvements in ecosystem function and watershed services provision can be assessed.

Public or Government-Funded Programs

The largest category of PES/PWS programs, which are generally found in developed countries with a well established regulatory infrastructure, are public and funded mainly using government revenues. These programs typically provide direct payments to

[62] Cassin and Davis. "New Innovative Funding Sources." (2008).
[63] Cassin and Davis. "New Innovative Funding Sources." (2008).

Reverse Auctions

In a reverse auction, multiple sellers compete to provide a good or service to a single buyer. The presence of multiple sellers has the effect of bidding prices down, which allows the buyer to obtain the most desirable units of a good or service at the lowest possible price.

To create a reverse auction scenario in an environmental markets context, administrators establish minimum project design criteria or performance standards, forcing potential sellers to compete with one another to provide the greatest environmental benefit at the lowest cost on a per unit basis. For example, in a wetlands mitigation program, administrators could use a reverse auction to identify projects that generate the greatest ecosystem benefits in terms of wetlands location and function. Potential sellers compete to see whose location or type of conservation practice provides the greatest wetland benefits per dollar of expenditure.

Use of a reverse auction mechanism can help to alleviate or minimize the challenges associated with pricing and participation noted in the text. Generally speaking, the reverse auction mechanism can be used to more efficiently allocate a limited conservation budget, thereby realizing the greatest environmental benefit for a given level of expenditure.

(Adapted from: Cassin and Davis, 2008; Greenhalgh et al., 2007)

landowners in exchange for implementation of various types of conservation and land management practices, often with the goal of protecting water quality or better regulating surface and groundwater flows.

In the U.S., a variety of voluntary, government-funded programs provide direct payments to private landowners to implement Best Management Practices (BMPs) and other conservation activities for control of agricultural runoff, wetlands restoration, as well as habitat enhancement and protection for the benefit of threatened and endangered species. Many of these programs are authorized under the Farm Bill and provide direct payments, cost sharing or technical assistance. These programs are designed to address a variety of environmental concerns including the impacts of agriculture on freshwater ecosystems in the form of soil erosion and nutrient loading, and the loss of wetlands and other critical riparian habitat types. Farm Bill programs provide funds and other forms of assistance to private land owners that encourage voluntary conservation and land management activities and help to sustain the economic viability of local agricultural communities by providing a source of supplemental farm income.[64] The Farm Bill programs best suited to provide resources to fund freshwater conservation are discussed in greater detail in Section III of this report.

At the state level, New York City's Watershed Protection Program funds the direct purchase of land and conservation easements, riparian and wetland ecosystem restoration, and other projects to support natural drinking water filtration, pollution prevention and other watershed services. This program has allowed New York to avoid additional costs for new water treatment facilities by investing in the watershed rather than new infrastructure. The program has spent more than $1.5 billion on watershed protection and restoration activities since its inception and has allowed New York City to avoid construction costs of $6 to $8 billion for new drinking water treatment facilities. Annual operating and maintenance costs for these new facilities were estimated to be between $250,000 and $500,000 per year. In addition to the avoided costs for new water treatment infrastructure, the program has generated significant economic benefits for upstate New York communities and significantly improved the environmental health of its watershed areas.

International Examples

In China, the Sloping Lands Forest Conservation Program is one of the world's largest and most ambitious ecosystem services payment programs. It is designed, among other goals, to reduce desertification and aid in afforestation. Afforestation, as opposed to reforestation, refers to the establishment of a forest or stand of trees on land that was not previously covered by forest. Government payments and subsidies encourage farmers to convert marginal cropland on slopes exceeding 25 percent to forest or grassland.[65]

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[64] Stanton et al., *State of Watershed Payments.* (2010).
[65] Whitney Johnson, Jessica Kane and Sonya Suter, "China's Conservation of Forestry: Current Actions." (University of Michigan, 2010). Available online at: http://sitemaker.umich.edu/section07group4/current_actions.

In the Murray-Darling River Basin in Australia, a payment for services approach is being used to restore natural vegetation to control dryland salinization. In this case, clearing of natural vegetation for cropland resulted in rising groundwater levels and contamination of soils and surface water through the deposition of mineral salts. Salts negatively affected agricultural productivity, environmental health and the overall health of the watershed. In 1999, a multi-stakeholder agreement was reached to invest in planting native trees as a cost-effective strategy for lowering the water table and reducing salinity contamination.[66]

Upper Yangtze River, China. Source: Roger Geatz.

Water Funds

Water Funds are another category of PES/PWS programs and are becoming increasingly common in the developing world, especially in Latin America. Water funds are typically capitalized using funds from a variety of public or private sources and then set up as trusts. Government funds may come through general revenues or the appropriations process. Private buyers in water funds typically include drinking water providers, hydropower generators, breweries, and bottled water and other beverage companies.

[66] Mark Smith et al., *Pay–Establishing Payments for Watershed Services* (Gland Switzerland: IUCN, 2006. Reprint, Gland, Switzerland: IUCN, 2008). Available online at: http://data.iucn.org/dbtw-wpd/edocs/2006-054.pdf.

Interest income from these funds is used to fund watershed restoration and protection. Water funds provide financing for riparian land management and conservation activities that protect the environment and ensure the continued delivery of high-quality watershed services to downstream beneficiaries. To date, water funds have served millions of people, protected millions of hectares of watershed, engaged new stakeholders in conservation, provided environmental education opportunities, helped to conserve biodiversity, and created a new and sustainable source of funds to support freshwater conservation. Recent reports from The Nature Conservancy[67] and the World Wildlife Fund[68] provide many examples of water funds and similar funding mechanisms currently operating around the world.

Factors motivating buyer participation in water funds typically include a desire to avoid costs associated with new or replacement water supplies and higher treatment costs associated with degraded source water quality. The Nature Conservancy and other conservation groups are interested in water funds because they provide a source of financing to support freshwater conservation on a long-term, sustainable basis.[69]

Some water funds have been successfully used to leverage additional sources of funding to support conservation. For example, the Fondo para la Proteccion del Agua (FONAG) fund in Quito, Ecuador has leveraged more than $7.1 million in additional matching donations from a number of sources including the U.S. Agency for International Development and the Inter American Development Bank.[70]

Guandu watershed in the state of Rio de Janeiro, Brazil. Source: Andriano Gambarini

[67] Rebecca Goldman et al., "Water Funds: Protecting Water for Nature and People." (Arlington, Virginia: The Nature Conservancy, 2010). Available online at: http://www.equatorinitiative.org/images/stories/ep2010/Prize_Ceremony/FlashDrive/tnc-%20water%20funds%20report.pdf.
[68] World Wildlife Fund, "Guide to Conservation Finance." (2009).
[69] Goldman et al., "Water Funds." (2010).
[70] Goldman et al., "Water Funds." (2010).

In terms of enabling conditions, successful implementation of a water fund requires an identifiable group of downstream beneficiaries who value, rely on and can afford to pay for upstream conservation and land management practices that ensure the continued delivery of high-quality and predictable surface water flows. A perception that water quality or the reliability of flows are threatened also helps to create incentives to pay for watershed conservation.

The Upper Colorado River Basin Salinity Control Program, while not specifically a water fund, shares some key characteristics. Under the Salinity Control Program, downstream interests in the Lower Basin states allow payments to upstream landowners and other parties to implement conservation and land management practices that reduce salinity loading into the Colorado River, thus generating water quality improvements. The Salinity Control Program is funded using revenues derived from the generation of hydropower at the large dams located in the Lower Basin.

The City of Santa Fe, New Mexico has established an innovative payment for ecosystem services program to help protect its watershed from wildfire and to ensure the continued delivery of high quality drinking water. The value of the ecosystem services provided in this case was estimated based on the actual costs of maintaining a healthy forested watershed. Research indicates that it is far less costly to reduce forest wildfire risk, than it is to dredge reservoirs of sediment and repair damage to water filtration systems after the fact. Costs to remediate water supply systems after a catastrophic wildfire have ranged from $10 million (Los Alamos, New Mexico in 2000) to $31 million (Denver, Colorado in 2002). Estimates of the cost to reduce the risk of catastrophic wildfire in the Santa Fe watershed are approximately $200,000 per year, whereas estimates of the cost associated with a catastrophic wildfire are nearly $22 million. The cost of the Santa Fe ecosystem services payment program for an average household is estimated to be $6.50 per year.[71]

Ecosystem Services Markets

Ecosystems services markets bring together willing buyers and sellers and facilitate the voluntary exchange of measurable units of environmental protection, quality or improvement. In an ecosystem services market, land developers, resource extraction companies, and other entities required to offset the environmental impacts of economic activity look to markets to purchase credits that represent units of environmental protection, enhancement or ecosystem services. Current examples include wetlands mitigation, conservation and biodiversity banking, water rights trading, markets for carbon emissions, and water quality programs including salinity and nutrient trading.[72]

[71] City of Santa Fe, Water Division, "Payment for Ecosystem Services in the Santa Fe Municipal Watershed, Draft" (City of Santa Fe, 2009).
[72] Cassin and Davis, "New Innovative Funding Sources." (2008).

Markets for ecosystem services can target strategic locations and specific conservation goals through the setting of environmental quality standards. For instance, where water quality problems are associated with particular contaminants, discharge limits from identifiable point sources can form the basis for a market-driven solution.

Under a cap and trade approach, a regulatory agency determines the maximum allowable discharge of the targeted contaminants and allocates discharge permits to identified point sources. These sources then have a choice, reduce discharges consistent with their permit allocation, seek out additional permits, or buy pollution reduction credits. Additional permits are generated by point sources that reduce pollutant discharges below their current permit allocation. Pollution reduction credits are often generated by unregulated (usually non-point) sources who implement practices that measurably reduce discharges of the targeted contaminants. The potential to generate valuable pollution reduction credits provides unregulated sources with a powerful financial incentive to pursue voluntary activities that reduce pollution and benefit the environment. Ultimately, this market-based approach contributes to water quality improvement goals in an efficient and flexible way.

Development of measures for credits that reflect the quantity and quality of watershed improvements associated with conservation practices is particularly important. For example, credits can be based on Best Management Practices that result in reduced nutrient loading per acre of land. Other measures that can form the basis for credits include miles of shoreline, linear feet of stream, acres of wetland restoration or impervious surface reduction, or volume of storm water runoff reduction.[73]

Market Participants

Market demand for ecosystem services is typically generated by entities required to offset the environmental impacts of land development, resource extraction, or other types of economic activity. In many examples, particularly in developed countries with established regulatory infrastructure, demand is effectively driven by regulations that require mitigation to offset the adverse impacts of economic activity. In some cases, demand is generated by individuals and other entities that wish to voluntarily invest in environmental protection or improvement.

A number of drivers can stimulate demand in an environmental markets context: [74]

- Regulatory demand is the most common and is driven by requirements for compliance with federal, state, and local laws and environmental regulations. Examples include Total Maximum Daily Loads to protect water quality, and requirements under the Clean Water Act regarding no net loss of wetland area and function.
- Quasi-regulatory demand is driven by regulations that require an assessment of environmental impacts and consideration of alternatives that minimize impacts

[73] Cassin and Davis, "New Innovative Funding Sources." (2008).
[74] Cassin and Davis, "New Innovative Funding Sources." (2008).

and balance costs and benefits. National Environmental Policy Act requirements for an Environmental Impact Statement, for example, create demand by generating incentives to minimize the impact of economic activity and to avoid protracted legal battles.

- Pre-regulatory demand is based on the potential benefits of avoiding future regulations, such as proactive conservation to avoid endangered species conflicts, violation of established water quality standards, or other regulatory issues.
- Voluntary demand drivers refer to incentives for voluntary conservation activities, often undertaken as a public service. This is sometimes motivated by a sense of corporate responsibility or recognition of the value and importance of environmental stewardship. Another factor is the growing willingness of consumers to pay higher prices for goods and services produced using environmentally friendly or sustainable methods. Check-box programs that allow consumers to voluntarily round up their utility bills to support conservation are another example.

The supply of credits in markets for ecosystem services is usually generated by landowners or organizations that voluntarily restore, conserve, or manage land for ecological benefits beyond what is required by regulations. This generally includes farmers, non-commercial foresters, land trusts, NGOs, watershed councils, and in some cases, environmentally conscious for profit companies.[75]

Three Gorges Dam, China. Source: Brian Richter

[75] Stanton et al., *State of Watershed Payments.* (2010).

Potential Challenges

A few potential challenges associated with markets for ecosystem services are important to consider in the design phase of a new program. First, buyer participation may be inadequate in the absence of effective regulatory or other demand drivers. Second, participation on the part of sellers may be inadequate if the price of credits, generated through voluntary implementation of various conservation and land management practices, is inadequate. Early-stage analyses that carefully examine the current or anticipated regulatory regime, as well as the likely financial needs of potential suppliers, are important.

Where voluntary activities generate more than one type of environmental benefit, some have suggested the use of multiple crediting to create additional incentives for conservation. For example, a restoration project primarily focused on water quality may also produce wetland or other habitat-related benefits. The landowner would like to generate credits for these additional benefits that would also help to reduce his risks. At the time a landowner must make a decision to participate in an ecosystem services market, it may not be clear what types of credits will be most in demand or of highest value when the conservation project is finished. Multiple crediting provides some insurance for the landowner that he or she will be able to recoup the costs of their conservation activities by selling the credits with greatest value in the marketplace. Allowing multiple credit types may also attract greater numbers of potential buyers and generate better outcomes for the environment.

Unfortunately, this seemingly simple concept is not without potential pitfalls. Credit stacking is a concern when a single conservation project produces multiple types of environmental benefits. If entities are allowed to purchase multiple types of credits generated by the same conservation project, inadequate oversight and restrictions on credit sales may make it possible for entities to double-dip, or effectively double-count the net environmental benefit associated with the project.

A pilot program currently under way in Oregon (see Willamette Partnership below) recognizes the potential benefits of multiple crediting and allows landowners to generate up to four different ecosystem service credit types. However, as soon as one type of credit is sold in the marketplace, the project generating those credits is not allowed to sell other types and collect additional revenues.[76]

Perhaps the most significant concern is that setting up a market for ecosystem services is a tremendously complex, resource intensive and difficult task. Some of the enabling conditions and other complexities associated with setting up an ecosystem services market are discussed in greater detail below. Given the many enabling conditions and significant investment of time and other resources required, an ecosystem services markets-based approach will generally only be a viable option in a large geographic area, with multiple ecosystem types and facing a multitude of population-growth related environmental challenges.

[76] Stanton et al., *State of Watershed Payments.* (2010).

Willamette Partnership: A Pilot Ecosystem Services Market

The Willamette Partnership in Oregon is currently mid-way through a two-year pilot program to demonstrate the potential of a broad-based market for ecosystem services as a source of funding to support conservation. The Willamette Partnership consists of a diverse group of 25 public, private and NGO stakeholders who have been working together since 2004 to identify solutions for environmental challenges facing the Willamette Valley in Washington State. Ultimately, the partnership hopes to demonstrate that market-based approaches to conservation finance can generate cost effective ecological benefits with less conflict than traditional regulatory approaches. The goals of the partnership include:

- Reducing stream temperatures and supporting salmon recovery.
- Achieving a multi-stakeholder agreement to use a shared accounting system for quantifying impacts and benefits to ecosystem services.
- Leading pilot projects to demonstrate the feasibility and benefits of ecosystem services market-based approaches.
- Developing the tools farmers, foresters, and other land managers need to participate in ecosystem services markets, prioritize restoration activities, and access payments for performing restoration activities in high value areas.

A key component of the Willamette Partnership's efforts is the development of quantitative measures of the environmental improvements resulting from conservation and improved land management activities. As the Partnership notes, there is a need for "standards, methods and tools to ensure [ecosystem services] markets achieve their environmental goals in a way that is credible and transparent."

The Willamette Partnership developed two measures to quantify the ecosystem benefits associated with riparian habitat improvement. One measure, called temperature crediting, estimates water temperature reductions that result from restoring trees and other streamside vegetation. Estimated reductions in water temperature form the basis for credits that can be purchased by entities required to mitigate their use of cooling water or discharge of thermal pollution. A second measure, nutrient and sediment crediting, is applied to improvements in irrigation practices, crop cover, fertilizer use, tillage, and installation of filter strips. Entities required to mitigate nutrient or sediment loading impacts can purchase credits generated by landowners implementing approved conservation practices.

A measure quantifying acres of functional wetland habitat was developed for projects that create, enhance or restore wetland ecosystems. Entities engaging in activities that benefit wetlands generate credits that are purchased by developers and other entities required to mitigate wetland removal or degradation.

Lastly, the Willamette Partnership pilot includes a measure of ecosystem services based on linear feet of functional salmon habitat. Credits are generated through conservation projects such as stream bank re-vegetation, placement of large trees in streams, and riparian area fencing. Implementation of approved conservation practices generates credits that are purchased by entities required to mitigate adverse impacts on riparian vegetation, hydrology, water quality, or critical wildlife habitat.

The Willamette Partnership program is notable for developing a set of functional ecosystem services measures that are scientifically sound and have buy-in from a large and diverse group of interested stakeholders. The process used and measures developed for this program can provide a model for development of similar measures for application in other freshwater conservation contexts.

Available online at: http://willamettepartnership.org/

Water Quality Trading: Cap and Trade and Tradable Permits

Water quality trading programs are examples of markets for ecosystem services found only in developed countries and are known more broadly as cap and trade or tradable permit programs. Under a typical cap and trade program, a limit (or cap) on the total volume of emissions of a particular pollutant is established. Permits allowing only this cap amount are then distributed to regulated point sources required to participate. Under some cap and trade programs, pollution reduction credits can be generated by unregulated sources that voluntarily reduce emissions of the targeted pollutants. Exchanges of permits and credits between regulated and unregulated sources are then allowed and a market is thus created. Although not a source of funding for freshwater conservation, water quality and other trading programs are examples of market-based mechanisms that have been successfully employed to address environmental improvement and protection issues. As discussed below in a groundwater management context, this concept could be adapted and applied more widely to freshwater conservation challenges.

Buyers of permits and credits in water quality trading programs are usually regulated point sources of a pollutant subject to the cap, typically large municipal or industrial sources. Sellers in water quality markets are typically unregulated, non-point sources or regulated point sources with excess permits. Excess permits are generated by regulated sources that reduce emissions to a level below that allowed under their current permit allocation. Pollution reduction credits are usually generated by entities that voluntarily implement clean technologies or best management practices. Examples of agricultural BMPs that generate credits and also benefit the environment include planting trees and other appropriate vegetation, installation of buffer strips, reductions in fertilizer and pesticide use, and improved animal waste management including fencing animals out of streams and other sensitive riparian areas.

Examples of successful water quality trading programs are found only in developed countries with well-established regulatory infrastructures and effective monitoring and enforcement mechanisms. According to a recent report, four countries account for nearly all of the water quality trading programs currently in existence: Australia, Canada, New Zealand, and the U.S. In some cases, water quality trading programs have failed to generate the expected levels of participation due to inadequate regulatory demand drivers. For example, several programs in the U.S. are currently on hold awaiting adoption and implementation of EPA Total Maximum Daily Load requirements.[77]

A primary advantage of water quality trading programs and similar market-based approaches is that they are flexible and can help to achieve water quality and other environmental goals at lower cost than traditional approaches to environmental regulation. In effect, cap and trade programs create a valuable commodity in the form of

[77] Mindy Selman et al., "Water Quality Trading Programs: An International Overview" (World Resources Institute, Issue Brief, WRI. 2009).

permits and credits that provide powerful incentives for entities to make efficient choices and look for ways to maximize that value.

The cap and trade approach could be adapted and applied to integrated surface and groundwater management. In alluvial river basins, where a direct connection exists between surface and groundwater sources and where groundwater pumping is having an adverse impact on instream flows, a cap and trade program could be employed to more efficiently manage water resources. One way to do this would be to impose a cap on groundwater withdrawals at a level modeled to produce consistent minimum instream flows. It would be important to explicitly consider current users in setting the cap as well, for purposes of stakeholder buy-in or political viability. Entities that currently benefit from groundwater use would be able to continue to do so but would face a choice. They could continue to use groundwater that they now own, or sell their now valuable rights (or permits) to another user.

Trout. Source: John Woodling

In this context, a cap and trade program essentially creates something of value from something that once was free. By creating a valuable right to pumped groundwater, a cap and trade program would generate incentives for more efficient water use. Greater efficiency would leave entities with excess water (or credits) that could be sold in the market thereby generating additional income. Some groundwater users might determine that the best course of action is to sell some or all of their rights to another entity seeking water for a higher valued economic use. Thus, a cap and trade approach is also flexible, allowing water to shift between uses in response to changes in relative economic value. Finally, a cap and trade program can provide a means of protecting instream flows and better balancing human and environmental water needs.

A program currently operating in the Deschutes River Basin in Oregon illustrates many of the concepts discussed above. Surface water in the Deschutes River Basin has long been fully appropriated for agricultural and other uses, and groundwater is increasingly relied upon to provide water supplies to support economic growth. A study by the U.S. Geological Survey and Oregon Water Resources Department indicated that the ground and surface water resources of the Deschutes Basin were strongly hydrologically

connected. In response to these realities, the state of Oregon established the Deschutes Groundwater Mitigation Program in 2002. As a result, most new proposed groundwater uses require a permit and the purchase of mitigation credits to offset the anticipated impact of the additional pumping on stream flows in the Deschutes River.[78]

Under the current program the Deschutes River Conservancy operates a Groundwater Mitigation Bank. Through the bank, entities required to mitigate the impact of new groundwater use can buy temporary credits created through a separate instream flow leasing program. The leasing program allows landowners who do not wish to use their water rights the option to temporarily leave their water in the river for the purpose of enhancing instream flows.[79] A key enabling factor that allows this program to work is that Oregon specifically recognizes instream flows as a beneficial water use. The leasing program allows surface water users to maintain the validity of their water rights, generates instream flow and other environmental benefits, and provides a source of groundwater mitigation credits. Groundwater users can also purchase permanent mitigation credits from private interests or water brokers, or through the Deschutes Water Alliance Water Bank.[80] These programs represent a successful model could be adapted and applied in other alluvial basins where surface water is fully appropriated and groundwater withdrawals are having an adverse impact on instream flows and the health of freshwater ecosystems.

Water Restoration Certificates – Bonneville Environmental Foundation[81]

The Bonneville Environmental Foundation (BEF) has created an innovative market-based mechanism for restoring flows in critically dewatered sections of rivers and streams. The BEF Water Restoration Certificate (WRC) program can be seen to operate as an environmental market for restoring instream flows. This program provides water rights holders (sellers) with economic incentives in the form of direct payments, to leave some of their water in a critically dewatered river or stream. The certificates or credits are then sold to businesses, individuals or other groups (buyers) who wish to offset their water footprint in a way that generates high-value instream flow benefits. Each WRC represents 1,000 gallons of water restored to a critically dewatered section of a river or stream and costs the buyer $1.

In order to ensure the generation of instream flow benefits all WRC projects are reviewed and certified by the National Fish and Wildlife Fund. In addition, each WRC is tracked through a central registry and, once sold, retired so as to prevent the possibility of resale

[78] Deschutes River Conservancy. "Groundwater Mitigation Program." Available online at: http://www.deschutesriver.org/CEDocuments/Downloads_GetFile.aspx?id=175181&fd=0.
[79] Deschutes River Conservancy. "Water Leasing." Available online at: http://www.deschutesriver.org/What_We_Do/Streamflow_Restoration/Water_Leasing/default.aspx.
[80] Deschutes River Conservancy. "Groundwater Mitigation Bank." Available online at: http://www.deschutesriver.org/What_We_Do/Water_Banking/Mitigation_Bank/default.aspx.
[81] Bonneville Environmental Foundation. "Water Restoration Certificates." Available online at: http://www.b-e-f.org/water.

or credit trading. Such activities could lead to the double counting of credits and reduce the potential instream flow and other environmental benefits of the program. Currently active WRC programs are located in the Middle Deschutes River and Evans Creek in Oregon, and Prickly Pear Creek in Montana. Participants include several breweries, a natural foods company, a tea company, the Natural Resources Defense Council, and a computer equipment manufacturer. This program was launched in 2009 and, so far, the number of buyers participating in the WRC program has been limited. Data are not readily available regarding the total number of participants, the number of transactions, or the volume of water flows restored to rivers and streams.

Upper Colorado River, Colorado. Source: Mark Godfrey

This model could be adapted and applied more widely to help increase flows in other critically dewatered river and stream systems. In establishing similar market-based approaches for instream flow protection it will be important to identify appropriate economic incentives that will induce adequate participation on the part of potential sellers. Without adequate financial and other incentives, it is unlikely that sellers will make enough water available to generate ecologically meaningful increases in flows on a consistent basis.

Analyses must also be performed in order to better understand factors that will motivate water users to participate in such a scheme. Regulations that require an entity to offset their water footprint to some degree are one potential demand driver. However, such regulations do not currently exist, would be unpopular with water users, and the prospects

for future regulation appear remote. Another possibility would be to explore ways to create incentives that motivate greater voluntary participation on the part of businesses, individuals, households or other groups. Public outreach and education programs that make people more aware of their water footprint or the water footprint of businesses that produce various types of common goods and services could help generate demand for credits. Establishing connections between the activities of large water users and critically water short sections of rivers or streams could also help to generate demand for the goods and services produced by environmentally responsible companies that participate in this or similar programs. Current participants in the WRC program appear to be motivated by a desire to produce water neutral goods and services that appeal to the growing number of green minded and environmentally conscious consumers.

Advantages and Benefits

There are many advantages associated with market-based approaches to funding freshwater conservation. A fundamental economic advantage is that they effectively put a price on functioning freshwater ecosystems and the valuable environmental and social benefits they provide. Placing a dollar value on environmental resources incentivizes their protection, enhancement and restoration. Market-based approaches encourage voluntary conservation activities by providing supplemental income to landowners that creates incentives to avoid environmental damage and to preserve or improve the quality of natural resources.[82]

In the presence of effective regulatory drivers, such as water quality standards, market-based funding mechanisms provide opportunities for public or commercial entities to efficiently mitigate impacts to the environment. Often cited examples are wetland mitigation banks that provide a way for developers to offset unavoidable adverse impacts to wetland ecosystems. Rather than require the restoration of multiple small and isolated parcels, wetland mitigation banking allows developers to offset impacts in a coordinated way through pooled investments in larger and more ecologically important areas. In the end, mitigation banking allows developers to efficiently compensate for the unavoidable impacts of their activities, in a way that generates greater environmental benefit for a given level of expenditure.[83]

Market-based approaches are more flexible and less intrusive than traditional command and control approaches to environmental regulation, and thus generate greater environmental benefits at lower cost. Under a market-based funding mechanism, economic growth contributes directly to conservation, thereby achieving a balance between economic development and environmental protection.[84] In addition, implementation of market-based programs generates economic activity and creates new jobs. The personnel and services needed to support market-based programs are significant and involve businesses that conduct environmental assessments, perform

[82] Cassin and Davis, "New Innovative Funding Sources." (2008).
[83] Willamette Partnership. Available online at: http://willamettepartnership.org/.
[84] Cassin and Davis, "New Innovative Funding Sources." (2008).

conservation and environmental restoration work, and firms that provide consulting and other market support services.[85] Finally, market-based approaches are generally self-policing to a significant degree. That is, market participants have a vested interest in ensuring the participation of all identifiable sources of damage, thereby ensuring consistent participation, monitoring and enforcement.[86]

Another important benefit of market-based approaches to conservation finance is that they are highly flexible and can be designed to coordinate environmental protection efforts across political boundaries or multiple jurisdictions. This is particularly important since natural ecosystems rarely conform to man-made boundaries.[87] In addition, payments that encourage and support conservation under market-based mechanisms help to maintain the economic viability of local agricultural economies while generating environmental benefits. This can be especially important in rural agricultural areas with limited economic opportunities.

Advantages and Benefits of Market-Based Approaches

- Generate market-driven estimates of the costs of environmental harm or degradation, as well as the financial benefits of conservation, restoration or preservation.
- Provide powerful financial incentives for landowners to engage in voluntary conservation activities.
- More flexible and less intrusive than traditional regulatory approaches and generate greater environmental benefits at lower cost.
- More efficiently balance economic growth and environmental needs, by forcing those who damage the environment to pay for conservation.
- Attract investment, generate economic activity and create new jobs.

[85] Willamette Partnership. Available online at: http://willamettepartnership.org/.
[86] Cassin and Davis, "New Innovative Funding Sources." (2008).
[87] Smith et al., *Establishing Payments for Watershed Services*. (2008).

Enabling Conditions

Successful implementation of market-based funding programs requires that a number of enabling conditions be satisfied. The conditions discussed here apply to some extent to all of the market-based approaches presented in this paper. Additional enabling conditions specific to particular categories of programs are discussed in the relevant sections.

First, it must be established that land use and management practices can directly affect the quantity and quality of watershed services that benefit water users. Data quantifying the cost effectiveness of conservation and environmental protection, as well as the economic and social benefits of healthy ecosystems, is sorely lacking. A number of studies have identified this lack of quantitative data as a significant shortcoming associated with the current state of market-based approaches and an important area for future research. Specifically, the Environmental Protection Agency's Healthy Watersheds Initiative has identified the development and dissemination of information regarding the cost effectiveness of conservation and environmental protection relative to engineered or technological solutions as a program priority.

Baca Ranch, Colorado.
Source: J.D. Marston

For market-based approaches to be a viable alternative there must also be recognition that the benefits associated with watershed services are valuable assets. In the absence of recognition of this value, there exists little incentive for those who benefit to pay for the ecosystem services nature has typically provided at no cost. There must also be a sense of urgency among those who benefit that the watershed services they rely on are in decline or imminent danger.[88]

Next, measurable and scientifically verifiable units of environmental improvement or protection must be developed. These units serve as the product or commodity that is to be exchanged in the market and can also be used to establish baseline environmental conditions and measure progress toward meeting conservation goals. When possible, it is desirable to have both qualitative and quantitative measures characterizing the watershed services, in order to ensure that transactions generate both the expected level of environmental benefit, as well as a net improvement in overall ecosystem function.[89]

However, it is not of vital importance to have estimates of the absolute monetary value of these units of environmental improvement or protection. The buyer's willingness to pay, as well as the seller's willingness to provide or generate such units, will be revealed as part of the market assessment and development process. It is important to note that the cost to improve and the value of resulting watershed improvements will be location specific and differ depending on environmental conditions, economic opportunities, availability of alternatives and local politics.[90]

Once watershed services and linkages to upstream activities have been identified and measures developed, an assessment of potential buyers and sellers in the market must be made. Willing buyers and sellers must exist in sufficient numbers to sustain a market. In addition, buyers and particularly sellers should be located where their activities will have significant and measurable impacts on overall ecosystem health and the levels of watershed services provided. It is also important that property, access and use rights be clearly established.

For potential buyers, the key economic variable is willingness to pay. It will be in the buyer's best interest to participate if the cost of losing or replacing watershed services is greater than the cost of participating in a market-based program. Potential sellers must compare their economic returns before and after implementation of the necessary conservation practices. If the payment is at least as great as the foregone net profits from the next best use of their land, sellers will voluntarily participate in a market-based program. The buyer's willingness to pay and seller's willingness to implement conservation practices will necessarily vary depending on local environmental conditions, economic opportunities, and other factors. [91]

[88] Goldman, et al., "Water Funds." (2010).
[89] Cassin and Davis, "New Innovative Funding Sources." (2008).
[90] Smith et al., *Establishing Payments for Watershed Services*. (2008).
[91] Smith et al., *Establishing Payments for Watershed Services*. (2008).

At a minimum, the development process should be inclusive and directly involve all interested stakeholder groups in a meaningful way from the outset. This is important in order to generate support and achieve buy-in from all affected parties.[92] At this stage it is also important to assess and better understand the interests and capacities of the various stakeholder groups and relevant institutions to build a case for improved watershed management. Scoping, scenario analysis, and feasibility studies engage stakeholders in the process early on, facilitate social learning, and help to achieve buy-in for pursuing a market-based approach.[93]

In practice, the most successful market-based programs are flexible and thus better able to adapt to unforeseen developments. Experience has shown that it is important to have administrative and governance structures that are transparent and that include and encourage the direct participation of all interested stakeholder groups.[94]

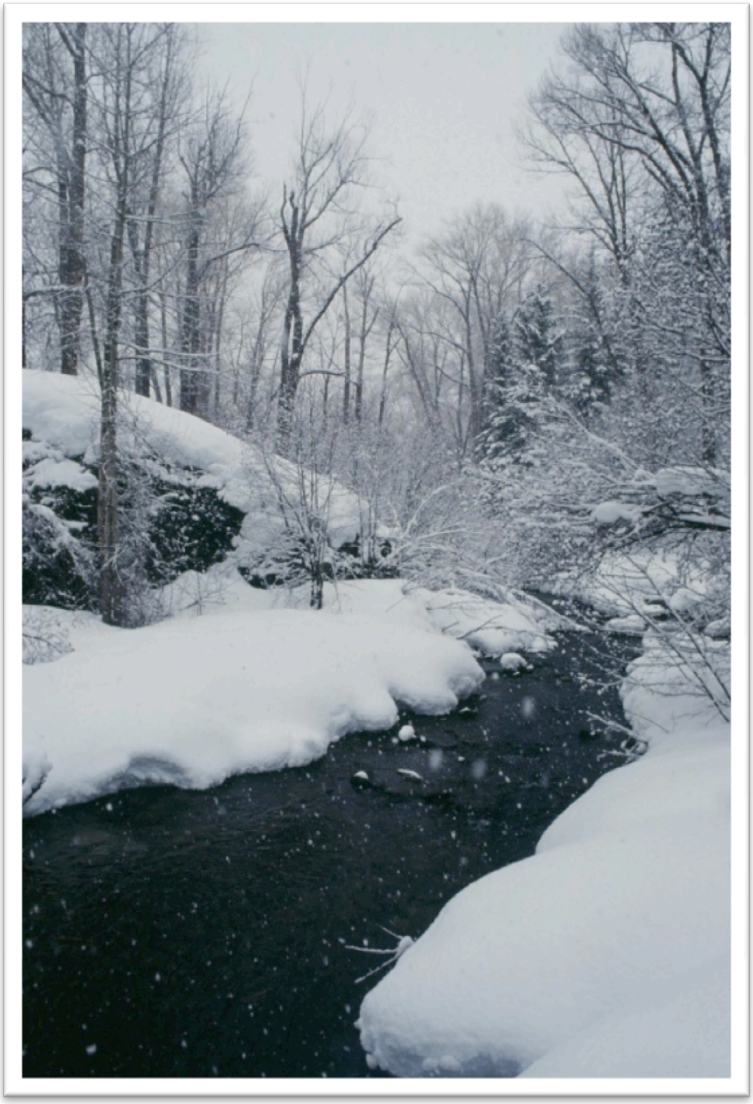
Enabling Conditions that Contribute to Successful Implementation of Market-Based Approaches

- Upstream land use and management decisions directly affect the quality and quantity of watershed services that benefit downstream water users.
- Watershed services are recognized as valuable assets and there exists a sense of urgency driven by realization that the continued availability of services may be threatened.
- Benefits can be measured in verifiable units, and are directly associated with specific changes in land use and management practices.
- Adequate numbers of willing buyers and sellers exist who find it in their best economic interest to participate, and property rights are clearly established and enforceable.
- Implementation of an inclusive, cooperative approach that includes representation from all interested stakeholder groups from an early stage.
- Flexible and transparent governance and administrative structures that include representation from all affected stakeholder groups.

[92] Stanton et al., *State of Watershed Payments.* (2010).
[93] Smith et al., *Establishing Payments for Watershed Services.* (2008).
[94] Stanton et al., *State of Watershed Payments.* (2010).

An Important Consideration: Additionality

An important consideration in the design of a market-based conservation finance mechanism is "additionality." Additionality can be defined in this context as environmental improvements that would not have occurred in the absence of a market-based approach.[95] In other words, these are environmental benefits above and beyond what is required under current regulations or would result from business as usual. Additionality ensures that environmental protection credits are awarded only to those activities that generate lasting net improvements in ecosystem function and enhanced provision of watershed services.[96]



South Fork of the Gunnison River, Colorado. Source: Tim Palmer

In order for additionality to be realized, it is important that market-based programs establish clear performance metrics and engage participants, particularly suppliers, through long-term enforceable contracts. Careful integration of the additionality concept can also help to prevent leakage or the transfer of program-related benefits and costs from one place to another resulting in no overall net gain in ecosystem function. An example of leakage would be where a program that makes payments to preserve forests in one area inadvertently causes forest clearing activities to increase somewhere else.[97]

[95] Smith et al., *Establishing Payments for Watershed Services*. (2008).
[96] Willamette Partnership. Available online at: http://willamettepartnership.org/.
[97] Smith et al., *Establishing Payments for Watershed Services*. (2008).

V. Conclusion

The magnitude of freshwater conservation challenges is great and the resources available to address those challenges are limited, particularly for sustained and long-term conservation efforts. Development of a strategy to sustainably finance freshwater conservation activities over the next ten years and beyond will require making use of all potential sources of funds to some extent. Although this report was produced for the Conservancy's Colorado River Program, the information is intended to be generally applicable to a variety of freshwater conservation finance challenges.

Many published reports discussing conservation finance mechanisms suggest that the foundation of a successful strategy is based on dedicated and locally generated funding sources. Dedicated sources of funding allow greater local control over projects and demonstrate a commitment to conservation. In addition, locally generated funds are often necessary to meet the matching requirements associated with funding available from state and federal government programs. Section II of this report discusses traditional sources of funds available at the state and local levels and provides examples that could be adapted and applied to current and future freshwater conservation challenges.

Despite challenging political, budgetary and economic conditions, significant financial resources to support conservation remain available through a variety of federal government programs. The Clean Water Act State Revolving Fund programs have been identified as promising sources of funding to support future freshwater conservation efforts. Where identified priorities include significant privately held lands, financial resources that encourage voluntary conservation activities are available through a number of federal Farm Bill programs. Section III of this report identifies these and a number of other federal programs that provide financial resources that can support freshwater conservation activities.

There also exist a number of promising and innovative market-based mechanisms that could be used to generate funding to support freshwater conservation. Several promising opportunities that harness the power of markets to generate funds to support conservation were discussed in Section IV of this report. Although these innovative approaches have significant potential, many are still in their relative infancy and have yet to demonstrate the ability to generate funds to support freshwater conservation on a long-term, sustainable basis.

In developing strategies to sustainably fund freshwater conservation, the challenges are as great as the environmental needs. Sustainable funding strategies will require consideration of all potential sources of funds. Multiple and diverse funding sources are inherently less risky than a strategy that relies on a few, potentially unstable sources. In addition, the magnitude of freshwater conservation challenges will require that many sources of funds are integrated into a diverse and sustainable overall strategy.

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