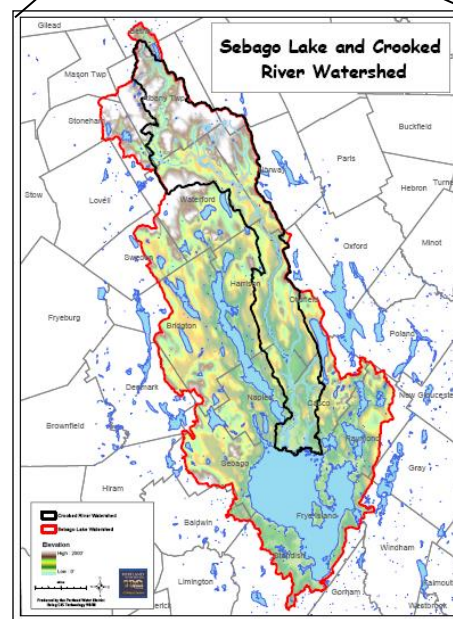
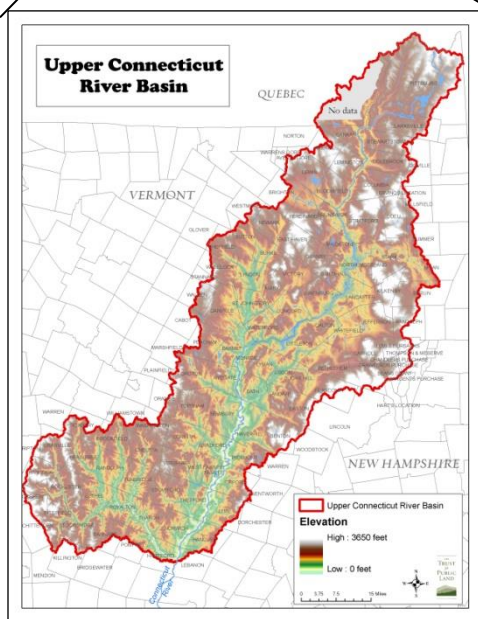
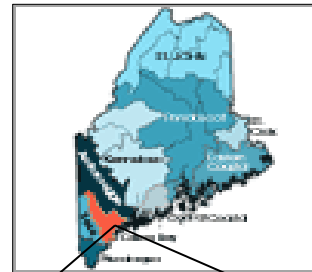
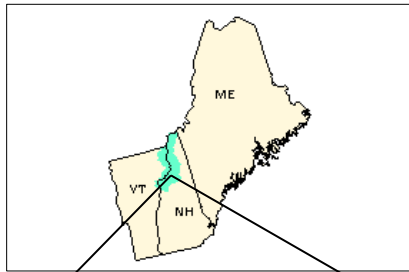


Northern Forest Watershed Services: Parallel Pilot Initiatives Providing Incentives for Forest Management and Conservation on Private Lands

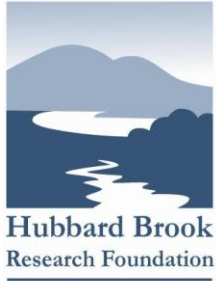
Final Report for Conservation Innovation Grant NRCS-69-3A75-9-149
December 2012



Tree planting along the White River, VT, May 2012. Photo: Laury Saligman

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Project Overview:

Approximately 53% of the water supply in the lower 48 states originates on forests (Brown et al 2005) – and that water is widely recognized as clean compared with waterflow coming from other sources. Watersheds with more forest cover have been shown to have higher groundwater recharge, lower stormwater runoff, and lower levels of nutrients and sediment in streams than do areas dominated by urban and agricultural uses (Brett et al. 2005, Crosbie and Chow-Fraser 1999, Matteo et al. 2006). With more than half of our nation’s forests in private ownership, the contribution of private forests to the supply of high-quality water in the lower 48 states is exceptional: more than one quarter of our fresh water flows from and is filtered by private forest lands (Stein et al. 2009). Nowhere in America than New England are people more dependent on the good forest stewardship of their neighbors, as more than 80% of the region’s forests are privately owned (New England/New York Forestry Initiative, NRCS 2011)

Clean, reliable water is becoming increasingly scarce in many parts of the country as climate change and development pressures affect water quantity, quality, timing and distribution (USDA Forest Service 2008) – and the forests of northern New England are not exempt from these pressures. Market-based approaches are proven to provide effective incentives for sustainable forest management and have emerged as alternative financing mechanisms to ensure water quality and the protection of other important watershed services (Echevarria and Lochman 1999). The American Forest Foundation was awarded a \$500,000 Conservation Innovation Grant in 2009 to work with partners to develop and implement pilot initiatives that provide incentives for forest management and conservation on private lands in the larger rural and exurban Upper Connecticut River watershed in Vermont and New Hampshire, and the smaller Crooked River watershed in Maine which serves an urban population. Both areas provide vital watershed services that face an array of threats including development pressures leading to fragmentation of landscapes, pollution from aging municipal water treatment plants or overflow during storm events; sedimentation in tributaries; non-point source water pollution from land management activities; proposed dam construction; noxious species; loss of biodiversity; and additional adverse impacts related to climate change. To develop ways to address these challenges, federal and non federal matching funds were used to:

- compile and synthesize existing information on watershed services;
- conduct education and outreach activities to landowners, policymakers and the public;
- develop a market-based framework for watershed services;
- create resource guides and other publications;
- implement best management practices on private forest lands; and
- demonstrate payment for ecosystem services transactions.

Working in these two parallel watersheds provided the opportunity to compare and contrast the impact of their biological and social characteristics on the strategies developed by project partners to have a positive impact on forest stewardship within these watersheds, and to test innovative ways to recruit new funding for investments in land conservation and forest stewardship.

This comparative analysis provides information on relevant characteristics of each watershed, followed by descriptions of each approach developed to support forest stewardship in these watersheds. Lessons learned through developing and applying each method are provided, followed by overall project conclusions.

Project Objectives:

We set out to accomplish three primary objectives:

- Develop an innovative, self-sustaining, and replicable, market-based model that facilitates transactions between ecosystem service buyers and sellers to protect and enhance watershed services.
- Create a partnership including landowners, foresters, conservation groups, policy makers, and other members of the public focused on the conservation and management of private forests and the links among sustainable forest management, clean water, and the provision of other critical ecosystem services.
- Make tangible contributions toward the conservation of private forests by increasing the use of best management practices and the number of forested acres protected and/or managed for watershed and other ecosystem services.

This report describes how we met each of these objectives in each watershed.

Project Areas:

The Crooked River watershed serves an urban population while the much larger Upper Connecticut River watershed serves a largely rural and exurban audience, with many small towns.

The *Crooked River watershed* in southwestern Maine supplies over 40% of the surface inflow to Sebago Lake which is the reservoir for the Portland Water District, a utility that supplies drinking water to 200,000 customers in 11 Maine communities. Part of the Presumpscot River Basin, the Crooked River's drainage basin covers approximately 275 square miles in Oxford and Cumberland counties, and is predominantly forested (Portland Water District 2009). The river is currently Rated AA (highest water quality and free flowing) excepting two segments which are classified A, and has been rated an "Outstanding River" by The Landmark Maine Rivers Act (Natural Resources Council of Maine 2009). Based on the threats to the drinking water supply, experts determined the Presumpscot watershed to be the top priority watershed for forest conversion. The watershed contains the cleanest water of all watersheds in the Northeast, but is at highest risk due to development pressure facing privately owned forestland (Gregory and Barten 2008). Additionally, Sebago Lake, including its largest tributary the Crooked River, supports one of only four known indigenous populations of landlocked Atlantic salmon (*Salmo salar Sebago*) in Maine. The watershed also provides habitat to five rare or endangered species and has high concentrations of potential habitat for 13 bird species of statewide importance (ME DIFW 2009).

The *Upper Connecticut River watershed* in Vermont and New Hampshire comprises 16 major tributaries, 12 of which drain 100 square miles or greater. The Upper Connecticut River watershed target area is upstream of the confluence of the White River and Connecticut River at White River Junction, VT, and West Lebanon, NH. The area covers approximately 3 million acres, encompassing all or part of 95 towns. Total population of the six counties that contain land in the watershed is 237,000. Although the main stem supplies no municipal drinking water, numerous tributary dams create reservoirs, and groundwater provides drinking water to multiple municipal water suppliers (Clay *et al.* 2006). Only 32% of the Connecticut River watershed's known water-supply areas are protected, and protecting the remaining lands is a regional priority (Clay *et al.*, 2006). The Connecticut River, an American Heritage River and National Scenic Byway, is the focus of a multi-state and federal initiative—the Connecticut River Basin Atlantic Salmon Compact—to restore Atlantic salmon to the river. The salmon restoration effort involves major investment in research, hatcheries, fish passage at hydroelectric dams. Additionally, the watershed provides habitat to ten known federally listed species (Silvio O. Conte NFWR 2009).

Watershed Characteristics

Organization	White River Partnership	Hubbard Brook Research Foundation: Clean Water Future CleanWaterFuture.org	Manomet Center for Conservation Science: Clear Water Carbon Fund ClearWaterCarbonFund.org
Watershed	White River Watershed, VT	Upper Connecticut River Watershed, VT and NH	Crooked River Watershed, ME
Contact	Mary Russ	Wayne Barstad	Ethel Wilkerson
Group	White River Partnership	Hubbard Brook Research Foundation	Manomet Center for Conservation Science
Phone	802-763-7733	603-643-3160 (home)	207-721-9040
Email	mary@whiteriverpartnership.org	wayne.barstad@dartmouth.edu	ewilkerson@manomet.org
USGS Hydrologic Unit Code (HUC)	01080105	010801	subset of 01060001
Size	703 sq mi (USGS); 710 sq mi (VT ANR)	4060 sq mi	275 sq mi
Population	??	173,000	??
% developed	5%	3%	4.6%
% agricultural	7%	6%	4.7%
% forest cover	84%	80%	88.7% (additional 1.8% scrub)
% urban vs. rural/exurban	Mostly rural	Mostly rural	Mostly rural
% privately-owned vs. publicly-owned	Mostly private	Mostly private	Mostly private
Used as drinking water supply?	Yes. Farnsworth Brook & Lake John are surface water supplies; presumably numerous wells	Yes. Some surface water reservoir supplies; numerous private wells	Yes. supplies 40% of surface flow to Sebago Lake, which is the drinking water supply for 200,000 people in 11 communities
% protected	32%	??	??
Water treatment plant capacity	N/A	N/A	Hoping to avoid need for water filtration infrastructure
Pollution sources	runoff from developed land, agriculture, human waste, sewage, animal waste (non-point source)	runoff from developed land (highways, streets), agriculture, human waste, sewage, animal waste (non-point source)	threat of new development; existing non-point sources

Program Characteristics

Watershed	White River Watershed, VT	Upper Connecticut River Watershed, VT and NH (upstream of White River confluence)	Crooked River Watershed, ME
PES Purpose	Water quality, public river access, habitat, native species protection	Clean water, healthy forests, erosion control, flood management, fish and wildlife habitat, access to recreation, and scenic views	Water quality, habitat (shading for streams, forest buffer cover),
PES Financial Mechanism	Landscape Auction	Clean Water Future (threshold pledge system, crowd sourcing)	Clear Water Carbon Fund (Tree plantings as carbon off-sets)
Legal framework - federal/state/local laws	No binding legal requirements; all voluntary/soft guidelines (Forestry Accepted Management Practices (AMPs), Agriculture BMPs, Clean	No binding legal requirements; all voluntary/soft guidelines (individual forest management plans for Current Use, Forestry Accepted	No binding legal requirements; Safe Drinking Water Act (filtration avoidance) – remote

	Water Act anti-degradation standards and Long Island Sound TMDL (indirectly)	Management Practices (AMPs), Agriculture BMPs)	requirement; Maine Natural Resource Protection Act
Prioritization of what strategy to use, and where to apply it	Opportunistic and experimental mechanism selection; sought out willing land owners (low hanging fruit)	Opportunistic and experimental mechanism selection; projects suggested by non-profit partners. Partners were provided with conservation atlases highlighting areas of concern identified by a variety of agencies and NGOs	Partner relationships with landowners; cross-referenced with Conservation Priority Index (matrix to prioritize land parcels for conservation work)
Buyer	Individuals, groups, community bid (several individuals joining together to buy bigger item), businesses (primarily New England, but some out of state)	Mostly individuals, mostly local. Some matching gifts were provided by public and private organizations	Primarily individuals; some businesses; looking to expand business participation
Seller (person who will make behavior change)	Private landowners; Green Mountain National Forest (sold experience, i.e. Monitor fish w/ us)	Private landowners and non-profit organizations (many are on public lands, or not specific to a piece of land (bridge project), less focus on farmers or owners of small woodlots than initially expected)	Landowners
Beneficiaries	Community, river (watershed), landowners (sellers), river users	Environmental non-profits; public and private water suppliers; commercial water users; municipalities (particularly w/ flooding concerns); recreational outfitters; foresters; individuals	Community, river (watershed), landowners, businesses dependent on clean water
Valuation tools	Actual cost (estimate)	Actual cost (estimate)	Actual cost of seedlings, labor, maintenance, monitoring, administrative, overhead (estimate)
Legal Framework/Enforcement/Enforcer	Contracts held and enforced by WRP	Non-profit partners monitor, enforce, and verify project completion	Contracts for landowners; American Carbon Registry; local partner monitoring
Length/Self Sustaining	One-off auction, developed over 7 months (but could be self-sustaining in theory)	Will continue, contingent on funding and identifying non-profit administrator	Intend to continue, dependent on funding; build cost of administering project into price
Monitoring and Verification	White River Partnership monitors and verifies	Partner project sponsors (non-profits)	Manomet and other local non-profits/American Carbon Registry
Price	items ranged in price from \$25 - \$19,800; \$7,500 most expensive bid	Current projects range from \$2000-\$11,000; potential for more expensive projects; bids from \$5 up	\$6/tree (cost expected to rise following feedback on actual cost from early plantings)
Metrics	Number of access points conserved, acres of habitat restored or riparian buffer restored (not specific units); on the ground outcomes	Number of projects funded and implemented	Number of trees planted (pounds of carbon offset)
Service Providing Unit (what is bought and sold)	Project implementation	Project implementation	Trees
Infrastructure to facilitate payments	Bid was tax free donation to WRP, a non-profit	Ability to accept credit card payments over the internet; tax free donation to HBRF	Ability to purchase trees online

Program Descriptions:

White River Landscape Auction

The White River flows for 56 miles through central Vermont – one of the last free flowing rivers in the state. As the longest un-dammed tributary to the Connecticut River, the White River is very important to the Connecticut River Atlantic Salmon Restoration Program. The White River Partnership was formed in 1996 to help maintain and restore water quality in this critical river. Although there are water quality issues stemming from non-point sources like agriculture and land development, there are no large communities, point sources of pollution to the river or any looming regulatory compliance threats. This made it a challenge to identify and develop a method to incentivize forest stewardship to maintain and restore the existing water quality and attract new sources of funding for these projects, since many people in the region are already active in the Partnership.

The White River Partnership and partners decided to hold a landscape auction in the White River watershed. The Landscape Auction was a one-off auction where landowners put items up for bid, and individuals and groups purchased the items. The items involved actions taken by the landowner on the land to improve the White River in some way (e.g., improve water quality, create wildlife habitat, increase public river access, and protect native species). The decision to hold a landscape auction was more opportunistic and experimental than strategic—a supervisor from the Green Mountain National Forest learned about landscape auctions at a conference and suggested that it might work well for the White River. In a situation without fixed regulatory drivers around which to design a creative market-based mechanism to meet those standards, the Landscape Auction appeared to be a creative new way to involve local residents in protecting and restoring their own watershed.

When attempting to find landowners to participate in the landscape auction, the WRP approached landowners, with whom they had a good relationship, asking them if they had a project in mind that would be suitable for the auction format. Many of these landowners were already good land stewards, and the auction provided an opportunity to reward and bring attention to their past efforts as well as encourage their continued stewardship. Again, without regulations or laws to require certain land management behaviors, the landscape auction had to rely on landowners who would voluntarily change their behavior or continue to go above and beyond land management requirements. Importantly, even though the landowners who participated in the auction were generally good land stewards, they still had to perceive that their participation would be beneficial to them. The benefit for these landowners was the ability to bring attention to their businesses and good land practices at the auction, and to help fund stewardship activities on their land.

Items for the auction were valued at the estimate of the actual cost of implementing the project. A project involved two contracts: one with the landowner detailing what actions they had agreed to perform and what monitoring activities to take place; the other with the purchaser, binding them to the amount of their bid and what they would get in return. The contracts were drafted by a Vermont licensed attorney. It was critical for several reasons to have the White River Partnership, a non-profit organization, facilitate payments. They directly received the money from bidders, which meant it was a tax-free donation. The WRP also made payments directly to landowners, meaning landowners and bidders did not interact directly. The WRP is also responsible for monitoring and verification. The administrative costs to pay for these activities were built in to the cost of auction items. Since this was the first time a landscape auction had been tried in the US, The Dutch organization that pioneered this concept was hired to provide some technical assistance. Grant funds were used to cover the cost of this contract and for some initial program development and start up costs.

Key Conclusions:

- The existing landscape auction model involved a large non-profit partner, the Dutch firm Triple E, with substantial capacity to develop, market, and host the auction. The White River Partnership, with only 2 full time staff, did not have sufficient capacity to scale the landscape auction up to the desired level or to market the

auction sufficiently. This suggests that this approach might work better in a larger, more highly populated watershed, and with a larger host organization.

- Items were more likely to sell if they 1) were less expensive and 2) had a compelling story and clear connection to the watershed. The auction generated \$20,000 for 30 funded projects.
- Landscape auctions depend on high buyer interest and participation; sufficient population, finances, and marketing abilities are necessary to ensure auction items are purchased.
- Timing of the auction is critical—summer events could interfere with busy travel schedules, suggesting that fall or spring might be better; providing a comfortable environment (inside) with food and drink could also help to encourage buyers.
- Allowing items to be auctioned online would allow people to bid on items even if they could not attend the live auction event.
- Consider adding the opportunity to “pre-sell” items to corporations or individuals. That approach may be part of the marketing activities better handled by a larger organization.

Upper Connecticut Threshold Pledge System

The portion of the Upper Connecticut River watershed in the project area covers an area of 4060 square miles with a small dispersed population. Many of these residents use groundwater from drilled wells while others use surface water from ponds and reservoirs as their water source. The communities along this portion of the river are currently facing dispersed threats to their water quantity and quality from land development, agriculture and other non-point sources. This part of the Connecticut River watershed is approximately 125 miles from Springfield, MA - the closest large community with a population of 153,200 residents. Work in this watershed was intended to identify a technique to protect multiple water-oriented services in addition to water quality such as recreation, habitat and flood regulation. It was a challenge to identify and develop a method to incentivize forest stewardship to maintain the existing high water quality and resulting ecosystem services and attract new sources of funding for these projects with no significant point source threat to water quality or quantity, nor any existing or imminent requirements for regulatory compliance.

The Upper Connecticut threshold pledge system uses crowd sourcing or social marketing to bring many people together to achieve large outcomes. Essentially, forest restoration, streamside buffers or other projects beneficial to the Upper Connecticut watershed are posted on a website, along with a cost for implementation of that project. At that point, any individual or business or group can ‘invest’ in the project at any amount. If enough people invest enough money to reach the project’s listed cost, then the project is funded. If not enough money is raised within a time limit (usually 3-4 months), then the project is not funded, and no one who invested in that project is actually charged since the project did not meet its funding goal. The idea for this threshold pledge system came from a story about a Boston-area fisherman who suddenly needed to buy a refrigerated truck to bring his fish from the boat to the various restaurants and markets he served in order to comply with new regulations. He decided to go to each of his customers and ask them to invest a small amount in the cost of a new truck, which he was then able to purchase. This fund raising method, known as crowd-sourcing, has been successful in bringing together small donations to fund larger projects via websites like Kickstarter and IOBY. However, it had never been tried for the types of projects envisioned in the Upper Connecticut River watershed. Like the White River Partnership’s landscape auction, in lieu of any regulations requiring specific behaviors, the Upper Connecticut River watershed project developers were looking for an innovative way to fund and support ecosystem restoration and decided to test applying this crowd-sourcing method to conservation and restoration projects.

As a first step, project leaders decided to identify several on-the-ground nonprofit partners to help select and verify conservation projects for the website... A key reason for working with nonprofit partners involved the lack of regulations requiring landowners to take specific conservation actions – without regulatory drivers, individuals would be unlikely to self-select and offer projects for the site. Thus the project was heavily reliant on local partners to find, partially fund,

implement, and monitor the projects. However, for those local partners who were willing to make the effort, the threshold pledge website provided them with a new mechanism for generating much-needed funding support. However, for those local partners who did not put in the work to generate excitement about their projects, these projects were unlikely to be funded and implemented. Furthermore, although most donors to date are local, the social media aspect of this project provides the possibility of attracting donors/investors from more distant geographic regions, particularly people who may have a connection to the watershed (through recreational pursuits, for example) but do not live nearby.

Project developers have successfully transitioned the website to the Connecticut River Watershed Council (CRWC). The Council, which covers the entire watershed, sees the website as an important tool in raising awareness of the need for watershed protection and stewardship activities throughout the region, potentially addressing some of the issues of name recognition and being able to reach out to people across a large enough area, for both projects and donors, that the project developers faced. As a tool to carry out their mission, CWRC is committed to supporting staffing and administration of the website. Project sponsors estimate that it will require one full time staff person to reach out to nonprofits, and to market and operate the website.

Key Conclusions

- The threshold pledge system has the potential to generate significant funding for local nonprofits working to implement restoration and other conservation projects, provided local partners are willing to put in the time to generate excitement around their projects.
- In the absence of strong regulatory drivers, this technique can provide an exciting and new fundraising mechanism for local groups, with the potential for attracting non-local donors.
- The website also can educate the public about the meaning and importance of ecosystem services.
- A website with the ability to accept credit card payments is a critical piece of making this type of pledge system successful.
- Donors must be informed on a regular basis about the status of the project in which they have invested.
- The name of the project is important – the broader public may not understand words like ‘watershed’; so simple, well understood terms are helpful (“Clean Water Future”). This also carries over to marketing efforts, which must be able to clearly explain these types of projects.
- Additional funding may be needed to “prime the pump” for individual projects; these funds should be an integral part of marketing efforts.
- Project development and overall operating costs of the website should be built into the cost of the individual projects.
- A number of traditional and social marketing techniques were tested to raise interest and drive people to the Clean Water Future website to make contributions for projects. In the first 6 months of operations, the CWF website raised \$38,000 to fund 9 projects with a 2.5% donation rate, which is higher than industry averages. In addition to radio interviews and print articles, cross posting of projects on websites where people likely to be interested in specific projects might go was an effective tool to raise CWF website traffic. In addition, we learned that reaching out to people through facebook and encouraging people to share project information was more effective than sending emails directly to targeted people.

Crooked River Watershed Clear Water Carbon Fund

The Clear Water Carbon Fund (CWCF) was created by the Manomet Center for Conservation Sciences to allow individuals and businesses to offset their carbon footprint through tree-planting. Planting trees near rivers has the dual benefit of storing carbon and improving river health by increasing water quality and improving wildlife habitat. The

CWCF relies on local partners to help them identify land parcels and landowners willing to plant trees on their land. Thus, landowner participation is heavily dependent on existing relationships with local nonprofits. Ideally, the financial incentive received from agreeing to plant trees is helping landowners who want to be good land stewards to get over the financial hurdle which may be keeping them from restoring buffer zones and planting trees on their property. Manomet also prioritizes land parcels with their Conservation Priority Index by cross checking the land parcels recommended by their local partners to ensure that they are priority areas for restoration. Tree plantings have been most successful when local partners are already doing restoration work (as opposed to a land trust, for instance, which is primarily concerned with conserving land and not restoring it per se). For local partners already doing restoration work, the CWCF will provide a new revenue source for work already occurring. However, in order for this to happen, it is likely that the price of each tree will have to go up to reflect the true costs of getting the trees into the ground and ensuring that they stay there for the required time. There will be contracts with landowners to verify tree plantings, as well as monitoring from local nonprofit partners and independent verification from the American Carbon Registry. Monitoring and administrative costs are paid for by contributions to the program and are embedded into the cost of a “tree” in the online marketplace.

The Western Foothills Land Trust, a key partner in landowner outreach and engagement in forest management for water quality protection in the Crooked River watershed, complemented the PES – approach of the CWCF by negotiating conservation easements and fee purchases on several key tracts totaling 880 acres in the watershed. These tracts were among those identified as priority areas by the Conservation Priority Index, although negotiations on some started before the CIG period began.

Key Conclusions

- Regulatory drivers and watershed threats must be immediate and urgent in order for them to provide the motivation and incentive for behavior change; Portland is not in danger of losing its filtration avoidance waiver, and therefore this does not provide a motivation for change.
- Relationships with landowners are critical as it is otherwise difficult to engage landowners; therefore local nonprofit partners who have built trust with landowners and are already doing similar restoration work are critical to the success of this project, at least initially; hopefully successful projects can be used as examples to engage other landowners.
- It is important for local partners to be doing restoration or similar work already; if tree planting does not really fit within their mission, it is unlikely to be a good fit for them to be a partner on this project.
- CWCF is working to engage businesses that benefit from clean water. Investments in green infrastructure to protect water quality and quantity can be a compelling way to ensure their supply of a vital resource and build community support.
- Marketing to attract people to the Clean Water Future Fund website relied less on social media and more on campaigns to raise awareness and interest among people who had ties to the Portland, ME area. For example, campaigns were developed and publicized through earned media around gifting holidays such as Christmas, Mother’s day, Earth day, Father’s day, and birthdays. CWCF also effectively engaged institutional investors, such as Idexx, Nike and Central Maine Power in campaigns that enabled the businesses and their employees to offset their carbon emissions through matching gift programs and direct contributions.
- The voluntary carbon marketplace provides a new revenue source to address the need for restoration of forests within riparian areas to improve or maintain water quality. Planting of trees in riparian areas without forest cover provides a long-term carbon sequestration benefit as well as the co-benefit of water quality protection. Tree planting is an expensive activity relative to other carbon offset types, therefore the co-benefits of water quality protection and local investment of conservation dollars needs to be emphasized.

- From CWCF website launch in fall 2011 through mid-September 2012, 945 trees that will remove 268 tons of CO2 were planted to create 3 new miles of riparian buffer in the Crooked River and White river watersheds.

Lessons Learned:

Looking at all three projects, there are some common themes and lessons throughout. Though there are clearly some differences between the projects, there are important similarities in the characteristics of the watershed and legal framework. The watersheds are primarily rural, not highly populated, and there are no regulatory drivers requiring landowners to perform specific behaviors that would benefit rivers and water quality. In each project, the group leading the project had to think of a creative market-based mechanism, independent of any regulatory requirements, and dependent on voluntary donations and landowner actions. Thus, this analysis will likely be most helpful for other similar watersheds, where there are no urgent regulatory requirements driving behavior change.

Several key lessons emerge from these three projects. They are:

- Clear demand of adequate size and duration is essential
- Project success can depend on existing relationships with landowners, at least in the initial demonstration phase of the project
- Local nonprofit partners who are already doing similar work and already have relationships with landowners are critical to project development, funding, implementation and ultimate success in maintaining and restoring ecosystem services.
- Marketing is a key aspect, particularly in rural areas; considerable capacity and effort is required to get the message out about these new programs
- Online aspect of programs is likely to allow for participation of donors from a broader geographic region – and may take more time to build the relationship.
- It is important to understand whether these strategies are raising new money or redirecting existing funds among the sponsoring organizations from the same donors.

General conclusions

Market-based approaches can provide effective incentives for landowners to plan and implement sustainable forest management strategies that help maintain the full range of ecosystem services that spring from healthy well-managed forests, including water quality and quantity, habitat, and recreational opportunities. We have learned through this project that they are more likely to be effective when specific characteristics are found in the watershed.

- Need a threat: It is challenging to establish payments for watershed services when threats are diffuse and there are no imminent regulatory pressures. People are more likely to respond to a crisis, such as Hurricane Irene, especially if they are not directly dependent on the threatened resource.
- Need demand: Significant, sustained and specific demand for water from the watershed is required as an anchor for the work. The water quality and quantity needs of these users can provide the basic outlines for what the payment for watershed services system delivers and how it is structured. Together, water use by residents within these watersheds is significant. But none of them individually can be as aware of changes to water quality and quantity as a large user, such as a water utility, brewery, or manufacturer, is likely to be.
- Need clear science: The link between the forest management practices being used and water quality improvements, or carbon sequestered – whatever is being paid for through the payment for services strategy - needs to be clear and credible to buyers and sellers.

- Make investments in the right places: The locations where appropriate practices are installed should be developed through a ranking system, like the Conservation Priority Index developed as part of this project, to help insure that investments are made in the right places.
- Connect people with your work in ways they care about: In trying to engage the general public in funding water quality protection activities on the ground, it is important to draw a strong connection between the place where the water quality practice will be put in place with the improvement that will result and why this matters to the people being asked to fund it. Drawing this connection is particularly important when the downstream water users are physically separated from the upstream suppliers of that water.
- Marketing to buyers: Talk with potential buyers (utilities, businesses and residents) early on to understand their perception and knowledge of their water sources, what threats or risks they see, and what they plan to do about them. Ask about their willingness to pay and what they expect to see in return – reports, opportunities for field tours, etc.
- Marketing to sellers: Talk with buyers and sellers to learn what they think about their role in maintaining water quality in their watershed. Ask forestland owners about payment for watershed services program and practice ideas that vary in length of commitment, amount of payment, the forest management practice to be installed, and other variables before launching a fully formed program.
- Look for existing payment infrastructure: Is there a system already in place that could be the platform for establishing payments from people who want to keep clean water to those who are working on the ground to do so?

Northern Forest Watershed Incentives Program Products 2009-2012
(a number of products are shared between the two watersheds)

General

1. Final report
2. Deliverables report
3. PES project development framework description and diagram

Crooked River Watershed Project

1. Vermont Law School Land Use Institute New England Regulatory Drivers Report
2. Vermont Law School Land Use Institute Case Study Analysis
3. Conservation Priority Index (CPI) Methods Report and CPI Maps (Van Doren)
 - a. Gravel Atlas
 - b. Afforestation Potential
4. Improved Forest Management Practices for Water Quality - Costs and Benefits Study Report (Wilkerson & Gunn)
5. Sebago Lake Beneficiaries Assessment (primarily commercial users of water) Report (Sage Advisors)
6. Clear Water Carbon Fund (website, brochures, FAQ, press)
7. WRI Report to Manomet on Sebago Lake “Green vs. Gray Infrastructure” (see also links below)
 - a. <http://www.wri.org/stories/2011/01/using-economic-incentives-connect-us-forests-water-and-communities>
 - b. <http://insights.wri.org/news/2012/06/green-vs-gray-infrastructure-when-nature-better-concrete>
 - c. <http://www.wri.org/publication/insights-from-the-field-forests-for-water>
8. University of Michigan Graduate Student Project Report (engaging landowners)
9. Austin Troy Ecosystem Valuation Study (full report and summary)

Upper Connecticut River Watershed Project

1. Conservation Atlas outlining priority areas for watershed conservation in the Upper Connecticut River watershed
2. Clean Water Future website: summary of development and lessons learned
3. Landscape auction: summary of development and lessons learned; press
4. Clean Water Future Marketing Team Report: Lessons Learned and Recommendations

Literature sources:

Barten, P., and C.E. Ernst. 2004. Land Conservation and Watershed Management for Source Protection. *Journal of American Water Works Association* 96(4):121-135.

Butler, B. 2008. *Family Forest Owners of the United States, 2006*. Gen. Tech. Rep. NRS-27. Newtown Square, PA: U.S.D.A, Forest Service, Northern Research Station. 72 p.

Clay, C., Deininger, M., and J. Hafner. 2006. "The Connecticut River Watershed: Conserving the Heart of New England." Trust for Public Land.

de la C retaz, A.L. and P. Barten., 2007. *Land Use Effects on Streamflow and Water Quality in the Northeastern United States*. CRC Press–Taylor & Francis Group, Boca Raton, Florida and London, 319 pp.

Echevarria, M., and L. Lochman. 1999. "Policy mechanisms for watershed conservation: Case studies." *Nature Conservancy*.

Gregory, P., and P. Barten. 2008. "Public and Private Forests, Drinking Water Supplies, and Population Growth in the Eastern United States, Northeastern Region (20-state) Overview". University of Massachusetts Amherst – USDA Forest Service, Forest-to-Faucet Partnership.

Johnson, N., White, A. and D. Perrot-Ma tre. 2002. "Developing Markets for Water Services: Issues and Lessons for Innovators." *Forest Trends*.

ME DIFW: Maine Department of Inland Fisheries and Wildlife. 2009 <www.maine.gov/ifw>. Natural Resources Council of Maine. 2009, February 24. <http://www.nrcm.org/awards.asp>>.

Northern Forest Center. 2009, February 24. <<http://www.northernforest.org/>>.

Portland Water District. 2009, February 24. "Environment and Health: Sebago Lake". <<http://www.pwd.org/environment/sebago/sebago.php>>.

Silvio O. Conte National Fish & Wildlife Refuge. 2009, February 24. "Watershed Species". <http://www.fws.gov/r5soc/natural_resources/watershed_species.html>.

Stein, S.; McRoberts, R.; Mahal, L.; Carr, M.; Alig, R.; Comas, S., Theobald, D.; Cundiff, A. 2009. [Private forests, public benefits: increased housing density and other pressures on private forest contributions](#). Gen. Tech. Rep. PNW-GTR-795. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 74 p.

Stein, S., McRoberts, R., Alig, R., Nelson, M., Theobald, D., Eley, M., Dechter, M., and Mary Carr. 2005. *Forests on the edge: Housing development on America's private forests*. USDA Forest Service PNW Research Station.

USDA Forest Service. 2008. *In Brief: Climate Change and Water; Perspectives from the Forest Service*, USDA.