



# Creative Partnerships in Volunteer Water Quality Monitoring: A What Works Snapshot

A River Network Report, by Merritt Frey





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### **What Works series**

This is the first in an occasional series of “What Works” snapshots from River Network’s Rivers and Habitat Program. The series is built around case studies from the great work watershed organizations and others are doing on critical river habitat issues. The series doesn’t attempt an academic level of research and analysis, but rather attempts to use real world stories to illustrate ideas other organizations may want to import to their own watershed, to share peer-to-peer lessons (good and not-so-good) learned, and to document replicable practices.

### **Acknowledgements**

Our sincere thanks go to those who took part in the volunteer monitoring partnership survey. We especially thank those groups featured in our case studies: Waccamaw Riverkeeper, Coastal Carolina University’s Waccamaw Watershed Academy, Horry County, Agriculture’s Clean Water Alliance, Iowa Soybean Association, Johnson Creek Watershed Council, Xerces Society, and the Kiap-TU-Wish Chapter of Trout Unlimited. Thanks also to Mary Frey, our volunteer editor.

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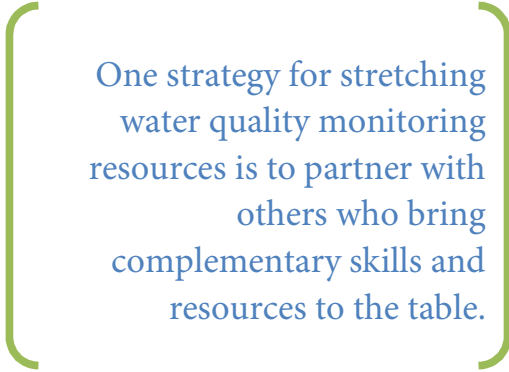
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## Introduction

River and watershed groups often struggle to secure the financial and technical capacity to conduct good, long-term monitoring that effectively documents success (or failure) in protecting or improving water quality or habitat. As budgets have shrunk over the last several years, these challenges have only loomed larger. One strategy for stretching water quality monitoring resources is to partner with others who bring complementary skills and resources to the table.

In this short report, we present an overview of the extent to which volunteer monitoring efforts are incorporating partnering into their strategies, and how those partnerships work. We present two types of information here: 1.) results of a short, national survey of monitoring project leaders and 2.) a selection of case studies demonstrating different types of volunteer monitoring partnerships.

The goal of this report is to provide creative ideas for river and watershed groups that are considering either creating a new volunteer monitoring effort or adding a partnership component to their existing efforts.



One strategy for stretching water quality monitoring resources is to partner with others who bring complementary skills and resources to the table.

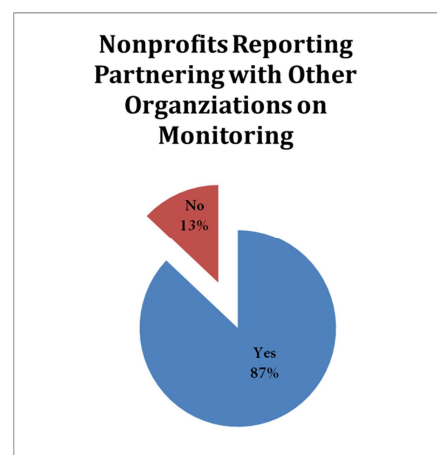
## Overview: Surveying Creative Volunteer Monitoring Partnerships

In the spring of 2012, River Network conducted a national survey about the use of partnerships in volunteer monitoring efforts. The survey used an online platform, and a request to participate was circulated to the River Network Partner listserv and to the U.S. EPA’s volunteer monitoring listserv. The survey presented 10 simple questions. We had 82 respondents.

We present the results here in two groups based on the type of respondent: nonprofits and governments. Those answering “other” for type of group are not included in this summary.

### Nonprofit responses

Partnering is widespread in the nonprofit volunteer monitoring world. Eighty-seven percent of the responding nonprofits said they currently partner with other entities to implement their monitoring programs. Nonprofit groups are most likely to partner with a university or college (62.5% or 25 of those responding). State governments were a close second as the most common partners (60% or 24 respondents) and local governments came in third (57.5% or 23 respondents). Half of the respondents reported partnering with another nonprofit, with 37.5% (15) reporting partnering with K-12 schools. Federal agencies came in last, with 22.5% or 9 respondents reporting a partnership with a federal agency.



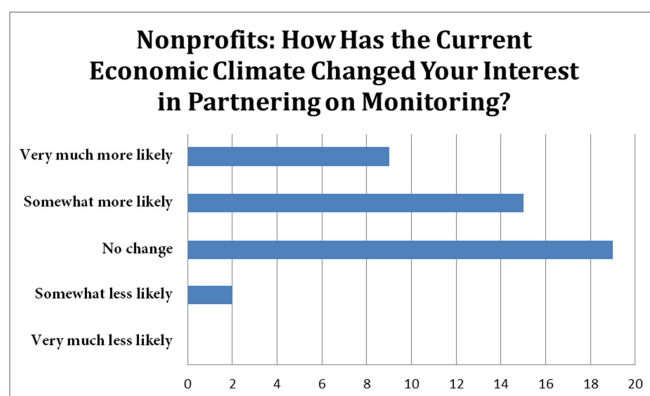
It is not surprising that nonprofits ranked their own partnership contributions in the areas of volunteer management and public outreach high, with volunteer training and maintenance coming in first (92.5% or 37 groups noted they bring this skill to a partnership) and volunteer recruitment and public education and outreach tying for second (90% or 36 respondents). There was a relatively large drop in responses to the other contribution categories, but it is notable that the third-place contribution area was technical expertise (77.5%), which is an area in which some may assume nonprofits are weak. The lowest-ranking contribution area was funding (60%).

When asked what nonprofits’ current partners bring to their partnership, two factors were tied for first place: technical expertise and equipment (both reported by 59.5% (25)

groups). Applying the data and providing funding were a close second and third respectively (52.4% and 50%). Other factors came in below 50%, with public outreach and education coming in last at 33.3%.

When asked what they look for in a prospective partner (i.e. a “dream” partner contribution), there was no huge surprise in terms of what nonprofits were looking for: funding. At 90% or 43 of 48 responses, funding was far and away the leader in desirable contribution areas. (Thirty ranked funding as their first choice for “dream” contributions from a partner, with another 11 ranking it second or third.) The next tiers of desirable contributions from partners are equally unsurprising: technical expertise (56% or 27 responses) and applying the data (50% or 24 responses). Equipment also ranked relatively high at 40% or 19 responses and database support/data storage was next with 29% or 14 responses. The remaining contribution categories all ranked significantly lower (with volunteer training and maintenance ranked lowest with the 83% of responses in the #3 category).

The recent economic downturn has made volunteer monitoring nonprofits somewhat more interested in partnering, although not overwhelmingly so. Just over half of the nonprofit respondents (53% or 24) reported that the economic and funding climate has made them somewhat or very much more likely to partner with others to achieve their volunteer monitoring goals. Forty-two percent (19) reported that the situation has not changed their inclination to partner with other groups. Four percent (2) reported they were somewhat less likely to partner and zero nonprofits reported being very much less likely to partner.

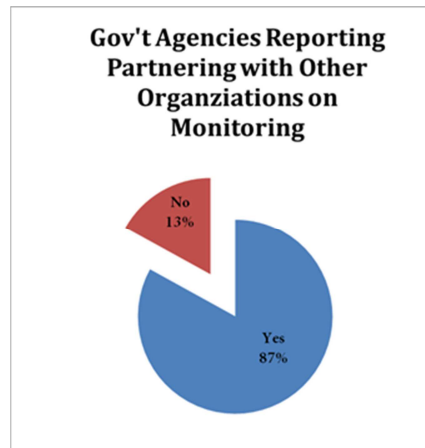


### Government responses<sup>1</sup>

Partnering is nearly as widespread in the government world of volunteer monitoring programs as it is in the nonprofit world, with 83% of the responding government groups saying they currently partner with other entities to implement their monitoring programs.

<sup>1</sup> This category included respondents from federal, state and local governments. Due to the small sample size (20), we did not separate the different types of governments for individual analysis. It would be interesting to do a larger survey to investigate any differences among these groups.

Far and away the top partner for government agencies was nonprofits (84.2% or 16 respondents). Local governments came in second (57.9% or 11). The remaining categories all came in under 50%: K-12 schools (47.4% or 9); universities or colleges (42.1% or 8); state governments (36.8% or 7); and federal agencies (21.1% or 4).



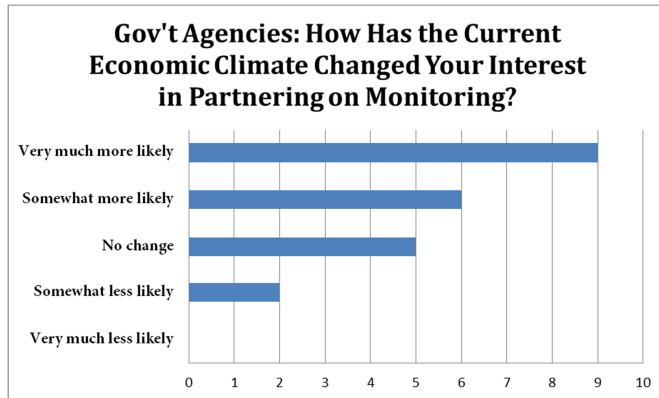
Unanimously, government agencies see themselves as bringing technical skills to the table.

Government agencies ranked technical expertise (100% or 19 responses) highest in terms of skills brought to partnerships. The next group of responses were all closely ranked, with equipment second (84% or 16), volunteer training/maintenance third (78.9% or 15), and applying the data fourth (73.7% or 14). The next group of categories tied for fifth: funding, database support/data storage and public outreach/education (68.4% or 13). Volunteer recruitment ranked lowest at 57.9% (or 11).

When asked what their current partners bring to their partnership, government agencies overwhelmingly find people skills through their partnerships, although the benefits are not limited to that. Government agencies rely most heavily on partners to bring public outreach and education skills to their partnership (95% or 19). Volunteer recruitment is a strong second at 80% (or 16). The next tier of responses is moderately surprising, with applying the data coming in at 65% (13) and the categories of equipment and technical expertise at 60% (12). The remaining categories come in at 50% or lower: volunteer training and maintenance (50%); funding (45%); and database support/data storage (40%).

When asked what they look for in a prospective partner (i.e. a “dream” partner contribution), government agencies were most likely to answer – you guessed it – funding. Like nonprofits, the top contribution government agencies look for in a partner is funding, with 58% of respondents (14) ranking this in their top three desirable partner resources (11 of those respondents ranked it as the first choice resource). Applying the data came in second overall with 54% (13) ranking it in their top three choices, but only four of those ranked it as the first choice. Volunteer recruitment was third at 50% (12) with 83% of those ranking it as first or second choice. Technical expertise was fourth at 46% (or 11), but again only four of those ranked it as the first choice and six ranked it third choice. Volunteer training and maintenance was fifth at 42% (or 2) but 80% of those respondents ranked it as the first or second choice.

The recent economic climate has made governments more likely to seek volunteer monitoring partnerships. The shift in their interest has been notably stronger than the shift in nonprofit interest. Sixty-eight (15) percent of government agencies reported that the economic and funding climate has made them somewhat or very much more likely to partner with others to achieve their volunteer monitoring goals. Twenty-three percent (5) reported that the situation has not changed their inclination to partner with other groups. Nine percent (2) reported they were somewhat less likely to partner.





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## Case Study 1: Waccamaw River, North Carolina & South Carolina

**T**he Waccamaw River Volunteer Water Quality Monitoring Program (the Program) is a strong example of a partnership between a nonprofit, a university and local governments, with funding largely driven by stormwater permit requirements.

### The setting

The Waccamaw River is an outstanding illustration of a southern blackwater stream. Starting in North Carolina, the river flows southeast into South Carolina and ultimately into the Atlantic Ocean. The Waccamaw's watershed is still largely forest or forested wetlands, but roughly 6-7 percent of the watershed is in agricultural use, with a similar amount developed for urban uses.

Still largely healthy, the watershed is home to rare, threatened and endangered species of plants and diverse wildlife species, including the American Black Bear and several endemic plants and animals. The river also supports diverse recreational uses, provides drinking water for local communities and is a major economic driver for the region. Yet problems include recreational impairments caused by bacterial contamination, fish consumption advisories for mercury, wetland losses, and issues related to increased development.

### The monitoring program basics

The Program stemmed from the Coastal Waccamaw Stormwater Education Consortium, which started in 2004. In the Consortium, local governments in the Grand Strand region banded together with local education providers (NGOs, state agencies, universities) to conduct stormwater outreach and education. Coastal Carolina University (CCU) and the Waccamaw Riverkeeper are both founding and continuing members of the Consortium. The Riverkeeper was interested in creating a volunteer monitoring program, and the local governments were interested in meeting Clean Water Act stormwater permit requirements for public involvement. These mutual needs launched the Waccamaw River Volunteer Water Quality Monitoring Program, with CCU providing the technical support.

Established in 2006, the Program monitors 12 sites in South Carolina, and recently added six sites in North Carolina. Approximately 50 volunteers work in teams of three to five. Each team samples one, two or three sites twice a month year-around, monitoring for a wide variety of parameters. These include measuring dissolved oxygen, pH, conductivity and temperature with handheld meters in the field; using colorimetric strips to check

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ammonia, nitrate and nitrite, also in the field; and taking water samples home for measurement of turbidity using a portable meter and for determination of bacteria counts, specifically for E. coli and total coliform by plating, incubating and counting bacterial colonies. Volunteers enter their data into an online database. These data undergo a quality assurance, quality control check by the volunteer monitoring coordinator and other administrative staff before they are approved for submission to a publicly accessible online database.

### **The partnership and roles**

This partnership brings together a nonprofit watershed group, a university, several local governments, and others. The watershed group – Waccamaw Riverkeeper – recruits, trains and manages the volunteer monitors and hosts an annual public meeting where the volunteer monitoring data is shared and discussed with stakeholders, including the public, and an annual volunteer meeting at which issues may be discussed and additional training is provided. As part of the Quality Assurance Quality Control (QAQC) procedure, Waccamaw Riverkeeper also reviews incoming data and notifies appropriate agencies if the monitoring results show potential problems, including illicit discharges and other water quality problems. Waccamaw Riverkeeper and its volunteers will then assist the regulatory agencies in illicit discharge investigation and follow-up to their resolution.

The university – Coastal Carolina University’s (CCU) Waccamaw Watershed Academy – manages the financial side of the project, houses the Volunteer Monitoring Coordinator, maintains the online database for volunteer data, purchases and maintains equipment, and coordinates requirements such as QAQC project plans, etc. Both project administrators – CCU’s Waccamaw Watershed Academy and Waccamaw Riverkeeper – regularly interact with the local municipalities to ensure that project needs are met. Specifically, twice yearly meetings with the regulating municipalities are held as part of the Coastal Waccamaw Stormwater Education Consortium, where programmatic updates are provided and discussions may ensue.

Three local governments – the City of Conway, Horry County and Georgetown County – are key partners in the effort. Funding is provided from stormwater utility fees from the three local governments. These entities are covered under a stormwater permit (a Municipal Separate Stormwater Sewer System or MS4 permit), which motivates them to participate in the volunteer monitoring program. Why? Funding the program contributes to compliance of the local governments’ stormwater permit requirements for public education and outreach, public involvement and participation, and illicit discharge detection.

Funding is provided from stormwater utility fees from three local governments.

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The investment by local governments is significant. Horry County alone spends approximately \$67,000 per year on 10 volunteer monitoring sites – eight on the Waccamaw River and two in Murrells Inlet. This covers costs for materials, equipment, and lab oversight and quality control at CCU’s Waccamaw Watershed Academy. In addition, the County cost-shares with the U.S. Geological Survey for continuous monitoring gages on the river, monitoring at an ocean fishing pier, and bacterial source tracking in specific areas. The County also provides funds for the Coastal Waccamaw Stormwater Education Consortium.

Horry County staff list other benefits as well, including: detection of illicit discharges; long-term trend analysis and understanding the river system more thoroughly; spawning additional monitoring programs based on the success of the Waccamaw River program; and developing a core group of educated citizens who serve as advocates for the river.

“The volunteers do not necessarily come to the program with a thorough scientific or policy background, but their participation educates them about the river system and impacts from our land-based activities,” says Dave Fuss of Horry County. He adds, “Trend analysis and reporting from CCU has helped the stormwater programs to gain a better understanding of our unique river system and its baseline conditions, so that we can better understand its response to climate variability such as drought and other phenomena.”

And the benefits go beyond the direct impacts of monitoring efforts. “The county has developed strong relationships with CCU and the Riverkeeper program, which has resulted in better communication and support for a variety of initiatives related to water quality and sustainable land use,” says Fuss.

### **Use of data**

Volunteer data are used in several ways. Most directly, the local governments use the data as part of their stormwater management program. After each sampling event, Coastal Carolina University’s Waccamaw Watershed Academy creates a provisional report of results, which summarizes findings and trends. The information is used in the illicit discharge detection effort, as well as in adjusting ongoing management efforts. In addition to identifying exceedances of water quality standards, the University has established a method for identifying “somewhat unusual” or “highly unusual” results for each sampling site using percentile thresholds computed from nearly seven years of water quality data. This methodology enables the stakeholders to identify conditions that require immediate attention, as highly unusual conditions are indicative of an ongoing illicit discharge.

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The Program also hosts an annual public meeting where the data and their significance is discussed with a diverse audience, including volunteers, the media, local governments that fund the effort, other agencies, other interested parties and the public at large.

The Program is working on revisions to its Quality Assurance Project Plan (QAPP) with a plan to seek approval by the SC Department of Environmental Control. Because the Program's QAPP is not approved by the state, project data cannot be officially used in the state's impaired waters listing program or for other regulatory purposes. However, the data are shared with the state to help prioritize where official state monitoring may be needed to follow up on volunteer-identified problem areas. Because the volunteers are monitoring more locations on the Waccamaw more regularly than the state program can manage, the volunteer data help direct the state's resources more efficiently by targeting state monitoring.

### Lessons to share

- *Tying volunteer monitoring efforts to an existing need – such as fulfilling a regulatory requirement for a community – can provide steady investment.* Long-term funding and stability are a challenge for many volunteer monitoring programs. The Program got around this problem by connecting their efforts with the stormwater permit program requirements – making sure the Program served an important and ongoing regulatory need for the communities involved. Meeting this need has resulted in a steady investment of dollars and institutional commitment. “Where regulations are helping to drive the partnership, funding opportunities are a little easier to identify. Where regulations are not driving the partnership, funding can prove to be more elusive,” says Christine Ellis, of Waccamaw Riverkeeper. “However, in those cases the credibility and visibility of the nonprofit organization is improved; hopefully with the end result that the partnership project and the results it achieves are better supported administratively and financially over the long-term.”
- *A partnership approach to volunteer water quality monitoring can enhance the credibility of your data, and of the individual partners.* In a well-designed partnership, the data that results is all the more defensible because it is supported by diverse partners. “The credibility of the data is stronger when a nonprofit, academic institution and a regulatory agency are all involved; each serving an important role in ensuring quality data that are being used to drive water quality improvements,” says Ellis. More specifically in this example, Riverkeeper found they gained credibility by working with an academic institution, which increased the scientific aspect of the nonprofit's work. In addition, Riverkeeper found increased credibility in working with the regulators to provide for the cost-effective use of volunteers in the delivery of important data upon which to make regulatory decisions.

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- *Working in partnership with others on volunteer water quality monitoring efforts may help strengthen your relationship with partners in other ways.* For example, through this partnership, Riverkeeper and Horry County developed a stronger relationship that has made discussions about more controversial issues easier. “One of the advantages of the partnership is that we have defused the adversarial relationship that sometimes exists between government and nonprofit environmental advocacy groups,” says Dave Fuss of Horry County. “We already have open communication lines, and the elected and appointed officials are more familiar with Riverkeeper, so that comments about proposed development projects are taken more seriously and not readily dismissed.”
  - *As in any kind of volunteer monitoring effort, helping volunteers see the results of their work over the short- and the long-haul is critical, and a partnership can help you do just that.* “The power of volunteer monitoring or any monitoring is in the long-term trends that are statistically sound, which can sometimes test the patience of volunteers. Now that the river program has nearly seven years of data, we are getting to a point where the data is pretty powerful, but it still takes time to make policy and code changes that are based on the data, because we have to be confident that the data supports those changes,” says Dave Fuss of Horry County. “This is probably the most difficult part for the monitoring coordinators – keeping the momentum going with the volunteers.” Building in feedback loops like the annual monitoring conference allows volunteers to see that their data is being compiled and used by the various partners, even if they don’t see immediate policy changes.
  - *Smart partnerships establish structures to keep all partners actively engaged.* Engagement is critical to the success of any partnership. All partners need to be invested at some level in designing the program, decisions impacting it, and its ultimate goal of improving water quality. In this example, the Program has built in regular meetings, data review systems and more to make sure all partners are engaged in gathering and using the data. Design these types of connections and engagement opportunities into your partnership to keep everyone engaged and connected to the program’s results.
  - *It may seem obvious, but remember that partnerships allow access to a range of resources that may not be available otherwise.* In this example, the University has many resources that a nonprofit and even a municipality may not have access to. These include assets such as equipment, faculty/staff and students, and potential funding sources that are available to academic institutions. In addition, grant sources have been pursued by the University on behalf of the municipality and to the benefit of the Riverkeeper program. It is little wonder that the survey of partnerships outlined in the introduction to this report listed universities as key partners for nonprofits working on volunteer water quality monitoring!

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## Case Study 2: Des Moines & Raccoon River, Iowa

The Agriculture’s Clean Water Alliance’s volunteer monitoring project is an example of how partnerships can create a reliable funding solution to support an intensive, technically rigorous monitoring effort focused on a specific issue of joint concern.

### The setting

The Des Moines River begins in southwestern Minnesota and flows generally southeast. It is joined by the Raccoon River just south of downtown Des Moines and flows on to the Mississippi. The Raccoon and Des Moines rivers drain millions of acres of farmland in central Iowa. The rivers also provide drinking water to approximately 500,000 Iowans. In the 1990s, increasing nitrate concentrations in the rivers resulted in a large investment – approximately \$4 million – in nitrate treatment at the Des Moines Water Works (DMWW) in order to comply with U.S. EPA’s 10 mg/L nitrate Maximum Contaminant Level (MCL) for drinking water.

The Raccoon and Des Moines rivers provide drinking water to approximately 500,000 Iowans.

### The monitoring program basics

The program started in 1999 with a synoptic study (basically, a study collecting data from a large area at the same time) in the Raccoon watershed funded by U.S. EPA and led by the DMWW. Among other things, this study demonstrated that good, solid data could be collected by trained volunteers. At the same time, DMWW was reaching out to fertilizer retailers in the watershed with the goal of engaging the retailers in a discussion of the role of fertilizer management on water quality in the Raccoon and Des Moines rivers.

As a result of all the attention on fertilizers and water quality, local fertilizer retailers came together in 2000 to form Agriculture’s Clean Water Alliance (ACWA). The mission of the ACWA is: “To reduce the nutrient loss – specifically nitrates from farm fields – and keep the nutrients from entering the Des Moines and Raccoon Rivers and their tributaries.” As part of that mission, ACWA took up the volunteer monitoring idea from the earlier synoptic study and ran with it.

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The project volunteers monitor for a variety of parameters, including nitrate, phosphorus, bacteria, dissolved oxygen, temperature and turbidity.<sup>2</sup> Twenty-nine certified volunteers covered 107 sites in 2011, collecting a total of 1,148 samples.<sup>3</sup> Volunteers monitor each site once every two weeks from April through July. The project draws its volunteers from Soil and Water Conservation Districts, County Conservation Boards, and Future Farmers of America, as well as from local watershed groups.

Laboratory work and analysis was originally done by staff at the DMWW, but today that work is conducted by staff at the Iowa Soybean Association.

### The partnership and roles

The volunteer monitoring project relies on a diverse mix of partners to succeed. The heart of the ACWA is made up of 13 agricultural retailers. These retailers play several roles in reducing nitrate pollution in the watershed, but in terms of the monitoring program it is their financial support that is most critical. The retailers pay annual member

The retailers pay annual member dues taken from a percentage of annual nitrogen fertilizer sales, and this supports the monitoring program costs.

dues taken from a percentage of annual nitrogen fertilizer sales, and this supports the monitoring program costs. According to an ACWA report: “Since 1999, ACWA members have invested more than \$1 million in water quality monitoring in the Raccoon and the Des Moines Rivers and their largest tributaries. Well over 10,000 samples have been collected by more than 100 certified samplers.”<sup>4</sup>

The Iowa Soybean Association (ISA) describes themselves as a group of producers who came together to develop “... policies and programs that help farmers expand profit opportunities while promoting environmentally sensitive production using the soybean check-off and other resources.” As part of this vision, the ISA provides technical and administrative support to the ACWA’s volunteer monitoring project. This includes providing volunteer training, hosting the lab, managing all the logistics for the monitoring days and managing the board of ACWA.

Other partners include local watershed groups, the U.S. Geological Service, the National Laboratory for Agriculture and the Environment, and the Des Moines Water Works. Several corporate entities – Dow Agriscience and Mosaic – are represented through

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<sup>2</sup> <http://www.acwa-rrws.org/monitoring.html#>

<sup>3</sup> Agriculture’s Clean Water Alliance, *Celebrating Progress: 2011 ACWA Progress Report*. Available online at: <http://www.acwa-rrws.org/newsroom.html>.

<sup>4</sup> Agriculture’s Clean Water Alliance, *Celebrating Progress: 2011 ACWA Progress Report*. Available online at: <http://www.acwa-rrws.org/newsroom.html>. (page 3)

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Associate Membership. Associate membership allows interests from outside the watershed to contribute financially to the project.

For the most part, the partnerships involved in the project have been informal. Over time, roles have evolved as needed, and the Iowa Soybean Association has grown to take over some roles originally played by other partners.

### Use of data

One of the most exciting aspects of this story is the extent to which the project's data has been used in meaningful ways. For example, the data were used by the Iowa Department of Natural Resources to develop Total Maximum Daily Loads (TMDLs) for the Raccoon and Des Moines rivers. The Iowa Soybean Association used the data to identify 25 target sub-watersheds for restoration through the USDA Mississippi River Initiative. The data have also been used to support successful grant applications for planning and implementation of restoration efforts throughout the watersheds.<sup>5</sup>

Volunteer data were used to develop Total Maximum Daily Loads. The Iowa Soybean Association used the volunteer data to identify 25 target sub-watersheds for restoration through the USDA Mississippi River Initiative.

“The DNR has accepted the data as credible and included it in some TMDL reports,” says Tony Seeman of the Iowa Soybean Association. “But the intent of the data is really for watershed characterization and targeting and not regulatory purposes, so it hasn't been used in a regulatory manner. I will say that when we do see a fish kill or other strange results, we do let the DNR know so they can investigate and collect their own samples for enforcement actions.”

### Lessons to share

- *Establish a long-term funding stream with investment from those who stand to benefit from resolving a specific water quality question.* Monitoring needs are ongoing and education about why monitoring should be continued is just as never-ending. Although this reality will always be a challenge, this project's structured funding mechanism provides ongoing funding from an interest group focused on understanding and using the data.
- *Keep partners engaged by keeping the work relevant and new.* This is always true, but even more so when you're holding partners together on a project. Make sure

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<sup>5</sup> Agriculture's Clean Water Alliance, *Celebrating Progress: 2011 ACWA Progress Report*. Available online at: <http://www.acwa-rrws.org/newsroom.html>.



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to identify a new goal for your work if you achieve your original goal(s). “We are now challenged by the fact that the monitoring started out as a characterization of the watershed, so now we are thinking about transitioning to different monitoring such as edge of field and practice performance monitoring,” says Seeman. “We also are considering sampling with an eye on submitting peer reviewed publications. It is becoming increasingly hard to justify the monitoring for the sake of monitoring, so that we aren't just collecting samples but not getting any new information.”

- *Identify common concerns of prospective partners right up front.* For example, concerns about the cost of nitrate treatment cut across different interests – from the DMWW to county conservation boards.
- *Public/private partnerships work well when neither entity can succeed on its own.* In this case, the business partners can bring funding to the table, while the nonprofit and volunteers can bring bodies and skills.
- *A regulatory driver helps focus efforts.* The nitrate MCL for drinking water safety really focused the issue and the players on a concrete problem with real-world implications – for the agricultural communities, for the water supplier, and for drinking water consumers.
- *Tout unexpected benefits and make sure all your partners see those benefits.* “This monitoring has been used to target and get several restoration and runoff control projects going. I don't think we initially realized how many doors this data would open,” says Seeman. “The data has been used to bring in lots of project dollars to different areas that generally go to the retailers’ customers [farmers]. It is important to keep telling the Board, as they don't see this day to day like the staff does.”
- *Go figure – money helps.* Interestingly, the project pays trained volunteers \$10 per sample, allowing dedicated volunteers to cover costs and perhaps come away with a small profit. Seeman says that as a result, “... we have about a 99 percent follow-through rate on scheduled sampling.” The funding mechanism of the partnership in this project allowed this modest payment.

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## Case Study 3: Johnson Creek, Oregon

**T**he Johnson Creek mussel monitoring project is a fascinating example of how a partnership between two nonprofits can play to the strengths of both organizations and create a truly different kind of volunteer experience. The project also illustrates the fact that nonprofits can bring serious scientific skills to the table.

### The setting

Johnson Creek flows 26 miles from its headwaters near the Sandy River to its confluence with the Willamette River, passing through four cities – including urban Portland, Oregon – on its journey. The Creek drains into the Willamette River, which then flows into the Columbia River.

### The monitoring program basics

The Johnson Creek Watershed Council runs several monitoring projects; this case study focuses on their mussel monitoring project, conducted in partnership with the Xerces Society for Invertebrate Conservation. The mussel project was piloted in 2008, and has since monitored four new sites each year, using 20-40 volunteers. (Additional sites are monitored by staff from the two organizations.)

The project strives to document freshwater mussel populations in Johnson Creek using presence/absence surveys. The surveys have documented two native taxa – the western pearlshell and floaters – and one invasive species – the Asian clam. The goals of the project include generating simple, cost-effective baseline data on mussel species and distribution in the waters, increasing resident and stakeholder awareness of mussels in the watershed and providing data to help inform stream management decisions.<sup>6</sup>

The goals of the project include generating baseline data, increasing resident and stakeholder awareness of mussels in the watershed and providing data to help inform stream management decisions.

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<sup>6</sup> Mazzacano, Celeste. The Xerces Society for Invertebrate Conservation. “Community-based Freshwater Mussel Surveys, EMSWCD Partners in Conservation Grant #209-7000, Final Project Report from the Xerces Society.” Undated.

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Why mussels? According to the Xerces Society, freshwater mussels are the most at-risk group of animals and plants in the United States.<sup>7</sup> Mussels are also extremely understudied, according to the Society. Yet mussels are very important to the health of our streams, and can serve as excellent biological indicators because they are sensitive to water quality changes, long-lived, and fairly stationary.<sup>8</sup>

Mussels also provide a particularly physical and graspable volunteer monitoring experience. “Monitoring for mussels has connected our volunteers with the watershed in a very physical way ... in a way that chemical monitoring just can’t do. The mussels are visible and touchable,” says Lodholz. “We’ve found mussel beds in places we never expected, and found beds that were more than 80 years old. This excites us and our volunteers.”

### **The partnership and roles**

The Xerces Society was the initial force behind the mussel monitoring project. The Xerces Society received a grant to launch a pilot monitoring project and reached out to the Council to help with implementation. The Society saw value in the Council’s detailed knowledge of the watershed and in their skills in volunteer recruitment and management.

For their part, the Society provided a PhD expert to design a mussel study and establish credible methodologies to train volunteers. The Society also provided the initial funding for the pilot and has managed the later grants.

“This partnership frees up the Xerces Society’s technical staff to do what they do best – science – while allowing us do what we do best – making sure we have good trained volunteers come out for a great event,” says Amy Lodholz, Volunteer and Outreach Coordinator for the Council.

From the Society’s viewpoint, working with volunteers to collect the data provided benefits beyond the data itself. “The outreach component has been phenomenal, because the majority of people who participated had virtually no knowledge about native mussels or knew that mussels lived in Johnson Creek – even people who grew up playing in and around the stream,” says Celeste Mazzacano, Staff Scientist and Aquatic Program

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<sup>7</sup> Citations for this include: Stein, B.A., L.S. Kutner, and J.S. Adams. 2000. *Precious Heritage: The Status of Biodiversity in the United States*. Oxford University Press, 416 pages and Lydeard, C., R. H. Cowie, A. E. Bogan, P. Bouchet, K. S. Cummings, T. J. Frest, D. G. Hebert, R. Hershler, O. Gargominy, K. Perez, W. F. Ponder, B. Roth, M. Seddon, E. E. Strong & F. G. Thompson, 2004. The global decline of nonmarine mollusks. *Bioscience* 54: 321–330.

<sup>8</sup> Mazzacano, Celeste. The Xerces Society for Invertebrate Conservation. “Community-based Freshwater Mussel Surveys, EMSWCD Partners in Conservation Grant #209-7000, Final Project Report from the Xerces Society.” Undated.

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Director at the Xerces Society. “The volunteer-based surveys empower the community to take ownership of, and responsibility for, natural resources – a lot of times people have the sense that “nature” is something that you have to get in your car and drive to see, and it can be a very eye-opening experience to show people that wild nature is right there in their own city at their very feet, if they know how to look for it. With the education they received and the opportunity to interact directly with these neat little animals, they are now better able to be advocates for stream protection and conservation of stream biota.”

“Monitoring for mussels has connected our volunteers with the watershed in a very physical way ... in a way that chemical monitoring just can't do. The mussels are visible and touchable.”

While those initial roles did prove valuable, both the Council and the Society found additional benefits in the partnership as the project matured. For example, the Society found that access to the creek for monitoring was made much easier as a result of the Council's existing relationships with riparian landowners. And the Council saw that their volunteers found the science angle – learning from a PhD! – really compelling, bringing out new volunteers and old volunteers who might

have lost interest in other projects like stream cleanups.

“Having access to a PhD level scientist who can actually communicate with volunteers about the science of the project and can develop the protocols has been a huge benefit,” says Lodholz. “It was attractive to a different group of volunteers than some of our other projects.”

In just one example of the logistical benefits of working together, Mazzacano says: “All volunteers worked under my permit from the state endangered species program.” (Mussels aren't federally protected but are recognized as sensitive at the state level, and a permit is required for handling them.) This is the type of permitting challenge that might otherwise discourage watershed groups from tackling this kind of unique monitoring project. Here it was solved relatively easily through the partnership approach.

### Use of data

The data generated by the mussel project has been used in a wide variety of ways, with implications ranging from the academic to on-the-ground. On the academic front, the Xerces Society has shared their findings with an interagency working group focused on status and trends of the Pacific Northwest's native mussels. The Society also hopes to publish their findings in the future, making a contribution to the understanding of these understudied creatures.

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The on-the-ground uses of the data are even more compelling. Because the Xerces Society maintains a database, they can and do respond to inquiries from local governments and others about the locations of mussel beds. This has allowed entities that are working in a stream (say, installing a bridge or capping contaminated sediments) to salvage mussels before the project is underway and relocate the animals, which would otherwise be killed. In an additional instance of organizational cooperation, the agencies that need to do mussel salvage usually don't know anything at all about mussels, so Xerces Society staff provides translocation guidelines and technical and direct assistance. The Council also plans to use the data to assist in prioritization of restoration projects and to identify sites where restoration efforts might need to consider impacts to mussel beds.

In the end, the project benefits are fundamentally about what the volunteers find through their work. "As far as the benefits Xerces has seen, this project increased our understanding of the location, numbers and age structure of existing mussel populations, which it turned out far exceeded my expectations of what we would find in what is really a pretty impacted urban stream," says Mazzacano. "It also highlights the importance of urban and urbanized habitats as important refuges for threatened organisms, which can be vital for maintaining connectivity between populations."

## Lessons to share

- *Don't assume you know what different organizations might contribute in a partnership.* In this nonprofit-to-nonprofit partnership, one participant brought extensive scientific expertise to the table. Don't pigeonhole nonprofits as "good with volunteers" or state agencies as "strong on technical skills." Really explore the potential universe of partners to see what pieces could come together for your project.
- *Reach beyond "sister" organizations to "cousins."* In this example, you have two groups focused on different things – one on a watershed, one on invertebrates. The habitat of the river brought them together. Think broadly about who might be interested in the quality of the water and habitat in your watershed.
- *Let a potential partnership expand your horizons. Think about monitoring in its broadest sense as documenting the watershed.* For example, think about the benefits of mussel monitoring in this project: it is a new idea for volunteers to get excited about; volunteers can actually see the mussels (as opposed to trying to see pollution in a chemical sample); mussels document a different and in some ways broader record of the health of the watershed; etc., etc. Shake yourself up and consider what else you could monitor with the right partner: Land use? Recreational visits? Particular habitats? Fish health? Eroding banks? Beaver populations?

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- *Know your own strengths well; respect your partner's strengths.* In this example, the staffs from the different organizations know what they are good at and clearly admire what the other organization delivers. Roles were clearly delineated in grant proposals, and implementation efforts respected those roles. One reason this project worked so well may have been the familiarity of the players. The Society's Mazzacano was already a volunteer with the Council (and had worked extensively with several other watershed councils) and so was well-versed in how the Council worked. This allowed her to design her part of the project based on a strong understanding of the Council's goals and projects, and how the volunteer program worked.
  - *Incorporate adaptive management into your plans. Especially when you're partnering on a project, it can be hard to adjust, but don't lock yourself in!* While the grant agreements established clear roles, the overall project was fluid and flexible. For example, after the first year of the mussel project the Society conducted a survey, asking volunteers to rank their feelings on issues ranging from their own knowledge to learning, engagement, comfort with the training provided, comfort with the physical expectations and more. The volunteer methodology was then adjusted to reflect that feedback.

In another example, Mazzacano explains: "I also realized that in places where the stream contained small native pea clams, volunteers were occasionally confusing the pea clams with young Asian clams. I added more training on distinguishing between the two during the morning training phase of each survey day, and during subsequent mussel surveys I found that volunteers were now able to tell the difference between them." Although this additional training wasn't spelled out in the partnership agreement, the project benefited from the Society's willingness to adjust plans.

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## Case Study 4: Pine Creek, Wisconsin

**T**he Pine Creek monitoring effort is an example of two types of partnership: 1) external: cooperative efforts between a nonprofit and a state agency that utilizes their different skill sets in a clearly defined way, and 2) internal: collaborations within volunteer-based organizations made up of people with a variety of skills.

### The setting

The Pine Creek watershed is located in the Driftless Area of southwestern Wisconsin. The Driftless Area is famous for its cold water streams and great trout fishing, and Pine Creek is a prime example. However, the creek has suffered from poor agricultural practices – including overgrazing – which have caused sediment runoff, severe stream bank erosion, and in-stream habitat degradation.

In 2002 and 2003, the West Wisconsin Land Trust (WWLT) purchased two properties (220 acres) that encompass much of the permanently flowing portion of Pine Creek, thus conserving these areas forever. In 2006, interest in restoring Pine Creek resulted in a unique mix of players coming together for the creek. The West Wisconsin Land Trust, several local chapters of Trout Unlimited (led by the Kiap-TU-Wish Chapter), Trout Unlimited’s state council and national organization, the Wisconsin Department of Natural Resources (WI DNR), the U.S. Fish and Wildlife Service, a local corporate partner (Fairmount Minerals), and others tackled a bold restoration effort with an aim to restore and conserve the native brook trout population. Restoration objectives included increasing brook trout numbers by 40-50 percent, increasing numbers of brook trout 10 inches and larger by 50-100 percent, reducing stream bank erosion to 10 percent of natural conditions, increasing coarse bottom substrate by 50 percent, and increasing aquatic macrophyte growth by 25 percent. The project supporters also expected to see improvements in stream temperature and the macroinvertebrate community.<sup>9</sup>

“Pine Creek was a habitat-deprived stream,” says Kent Johnson, the volunteer leader on the project from the Kiap-TU-Wish Chapter of Trout Unlimited. “The creek had cold water, good water quality, and was home to a fair number of native brook trout, but the habitat was really a limiting factor for fish community health.”

The restoration effort began in 2007 and, after a year off in 2010, wrapped up in 2011. Over the course of those five years, two miles of stream were restored. The project has been very successful – for example, Pine Creek was named by the National Fish Habitat

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<sup>9</sup> Pine Creek Restoration Project: 2007-2011. On file with author.

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Action Plan as one of 10 “Waters to Watch” in 2009. (For more on the restoration effort, please see: <http://www.kiaptuwish.org/pine-creek-project>.)

### **The monitoring program basics**

The monitoring portion of the larger restoration effort involved both the WI DNR and volunteers from the Kiap-TU-Wish Chapter of Trout Unlimited. The program established pre- and post-restoration monitoring plans, and focused on 1) Eastern Brook Trout densities and size distribution, and 2) temperature and habitat conditions and macrophyte and macroinvertebrate community health. The partnership largely divided up the work, with the WI DNR staff focusing on collecting fish data, and volunteers collecting the temperature, habitat and biotic community data.

Pre-restoration fish data were collected at two Pine Creek stations during the summers of 2005 and 2006. To compare to pre-restoration conditions, post-restoration fish data were collected during the summers of 2007-2011. WI DNR staff conducted the fish surveys, obtaining information on trout densities and size distribution.

Meanwhile, during the spring and early summer of 2007, volunteers used a methodology created by the Kiap-TU-Wish Chapter of Trout Unlimited to collect pre-restoration data on stream temperature, habitat, and biotic condition. Habitat assessment included an evaluation of stream bank erosion, stream channel morphometry, and stream bed substrate. Biotic assessment included estimates of macrophyte presence and collection of macroinvertebrate samples. Temperature monitoring has been ongoing at six sites since 2007, and will continue, perhaps at a reduced number of sites, for the foreseeable future. Short-term monitoring will determine whether the restoration work improved the Pine Creek temperature regime, and long-term monitoring will determine how well the restored creek has been “armored” for the impacts of climate change. Post-restoration monitoring of habitat transects and the macrophyte and macroinvertebrate communities is slated to begin in 2013, and project leaders hope to continue the practice at regular intervals. Regular monitoring of habitat conditions and the biotic community will evaluate the long-term success of the restoration project, and will also help inform any project maintenance needs.

The partnership largely divided up the work, with the WI DNR staff focusing on collecting fish data, and volunteers collecting the temperature, habitat and biotic community data.



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## The partnership and roles

The division of roles between the state agency (WI DNR) and Kiap-TU-Wish was straightforward. In terms of the hands-on fish monitoring, the WI DNR used their existing expertise and skills. Meanwhile, Kiap-TU-Wish volunteers tackled all the details involved in setting up volunteer monitoring of temperature, habitat, macrophytes, and macroinvertebrates. Kiap-TU-Wish recruited and trained the volunteers and Kent Johnson, a Kiap-TU-Wish volunteer, purchased the necessary monitoring equipment, developed and wrote the monitoring protocols, and prepared the monitoring datasheets. Kent also oversees data collection and analysis, and ensures that monitoring data are shared with funders, WI DNR, volunteers, and others.

WI DNR is also playing an important role in the long-term maintenance of the restoration project, and hence any use of the monitoring data for future maintenance and restoration. Although the West Wisconsin Land Trust originally purchased the majority of land in the Pine Creek riparian corridor, WWLT donated this land to the WI DNR in 2011, which makes the agency the long-term shepherd of the project and restoration data.

Interestingly, this case study also illustrates the importance of “internal partnerships.” By this we mean the diverse strengths and skills that can be found within a group of volunteers such as the Kiap-TU-Wish Chapter of Trout Unlimited. As Kent Johnson points out, “We needed a variety of talents within the chapter to make this project succeed. I tended to focus on the technical and scientific side of the project, but we needed outgoing personalities and multiple skills to create partnerships, prepare budgets, write grants, raise money, track costs, and mobilize partners to help with the restoration work. An assessment of volunteer strengths and skills and clarification of roles is a valuable exercise before taking on a project of this magnitude.”

## Use of data

The monitoring plan for the Pine Creek project was established with two primary goals in mind: 1) to create meaningful baseline and post-project data sets to measure achievement of project goals and inform future projects and 2) to document the concrete benefits of the project for funders, partners, and the public.

As mentioned, the restoration project established measurable goals before work began. These goals addressed issues ranging from increased brook trout numbers and size to decreased stream bank erosion and improved temperature regime, habitat, and biotic health. The monitoring plan was designed to directly measure these and other parameters pre- and post-project. Setting up this structure allowed project leaders to examine Pine Creek project success, but also informed a larger effort in the Driftless Area. Using data generated by a broad-based monitoring network, this larger effort could create

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a targeting and prioritization system to identify the best stream candidates for restoration and protection projects in the region.

The Pine Creek monitoring project has been used as a model for other stream restoration projects being conducted as a part of the Trout Unlimited Driftless Area Restoration Effort.

The Pine Creek monitoring project has been used as a model for other stream restoration projects being conducted as a part of the Trout Unlimited Driftless Area Restoration Effort (TUDARE). During 2010 and 2011, Trout Unlimited volunteers from the Kiap-TU-Wish, Clear Waters, and Oak Brook chapters used the model to start restoration monitoring work on three additional streams in the area. The Pine Creek project also resulted in standardized stream monitoring protocols for determining if

restoration projects in the region are successful at improving stream temperature and habitat conditions.

The restoration monitoring data are also invaluable for informing funders and partners who invested in the restoration effort about the results of their investment. Foundations, government funders and others are increasingly focused on specific, measurable, on-the-ground returns on restoration projects. The design of the Pine Creek monitoring plan allowed project leaders to clearly demonstrate improved stream conditions as a result of their restoration work, as shown in the figures below.

### Lessons to share

- *Although the pieces need to fit together, don't be afraid to divide and conquer in your partnership.* The Pine Creek monitoring partnership allowed the state agency to tackle the piece of the project they did best – fisheries surveys – while allowing Kiap-TU-Wish volunteers to play to their strengths in temperature, habitat, and macroinvertebrate monitoring. However, coordination between the two efforts was critical, and was built upon the clear and well-thought-through goals for the overall restoration project.
- *Remember that volunteer groups may bring a vast array of skills to the table.* In this case, Kiap-TU-Wish was clearly the leader on designing and implementing the scientific pieces of the volunteer monitoring, and several members were involved in this effort. However, a more diverse array of chapter volunteers with multiple skills was needed to reach out to prospective partners, write grants and solicit funding, track project costs, and recruit volunteer assistance with the stream restoration work.

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- *Do your homework ahead of time.* This lesson is not specific to monitoring partnerships, but rather is true for all monitoring efforts – make sure you’ve thought through how your data will be used and design your monitoring approach accordingly. The Pine Creek project leaders set clear, measurable goals for their restoration effort and designed the monitoring plan to demonstrate the degree to which the project goals were met. One partnership-specific reason to do this? Having clarity among the partners about what you need from your data will keep everyone on the same track and may help you divide up work without heading off on different tracks.
  - *Volunteer monitoring is a small monetary investment with a large return and all the project partners benefit.* Since Pine Creek monitoring began in 2007, Kiap-TU-Wish has invested about \$3,500 in monitoring equipment and \$2,500 for analysis of macroinvertebrate samples, for a total monitoring project cost of \$6,000. Compared to the total cost of the stream restoration work during the 2007-2011 period (\$270,000), the monitoring cost is a very small investment (2 percent). However, the monitoring data and information allow Kiap-TU-Wish to convey a very clear and quantifiable message of success to project partners, funders, and the public. This investment in monitoring helps the project partners see the value of the larger restoration partnership, and may translate into additional partnership activities.

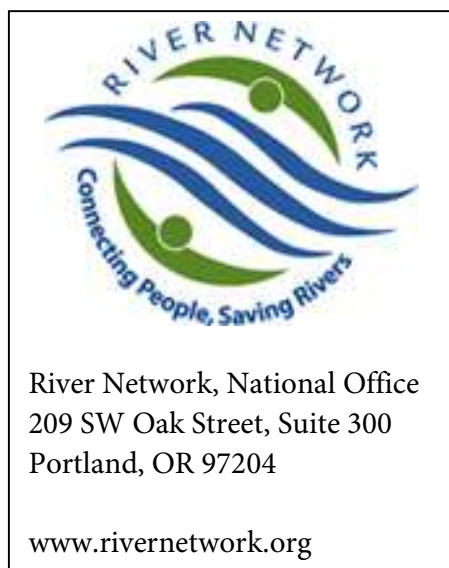
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## Wrap up: Concepts to Consider in Your Own Projects

**T**his short report features just a few of the many creative partnerships delivering quality volunteer water quality monitoring underway around the country. Although the needs, the players and the end use of monitoring information will vary in every situation, the findings of our survey and the lessons from these case studies illustrate a few ideas watershed groups should keep in mind when designing or updating a volunteer monitoring partnership. More specific food-for-thought can be found in the “lessons to share” section of each of the four case studies.

- ***Consider early on just how explicit and detailed your partnership set-up needs to be.*** Our case studies illustrated a range of approaches – from informal personal understandings to roles defined through grant agreements, to official written agreements. Each of these approaches can work, but has some rules of thumb: use the simplest approach that can still deliver clarity for everyone involved; write down and clarify anything that might generate confusion; agree on roles early, respect them throughout the process, and be sure new players are briefed on those roles. And don’t avoid the sticky issues ... for example, do you need to talk about how to take credit for the work with funders? Who is in charge of direct communication with the public? What happens if a partner needs to bow out?
- ***Look for levers that will bring those not traditionally involved in monitoring to the table.*** For example, stormwater permit requirements were the key to bringing local governments into the mix in the Waccamaw case study, while in Iowa expensive drinking water treatment requirements got the agricultural communities’ attention. These types of issues may turn groups/people who aren’t thought of as water geeks into the fold, and they may bring some specialized skills and resources to the partnership.
- ***Pitch what you bring to a potential partnership based on the needs you see.*** You may pride yourself on your organization’s wonderful technical skills or enthusiastic group of volunteers. That’s great, but if a potential partner feels like they are really looking for funding, you may have to translate your assets into addressing that need. In this case, volunteer time might be pitched as cost-savings over staff time or technical skills may be framed as cutting consultant costs or equipment budgets. This theme can be seen in each of the case studies in this short report.

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- ***Don't pigeonhole what potential partners can bring to the table.*** We saw in both the survey and the case studies that partnership roles can break down the stereotypes we often hear about roles. For example, we often think that nonprofits don't have the funding and/or technical capacity of other prospective partners, but Xerces Society is a nonprofit with huge technical capacity and the ability to bring along funding resources. Rather than approaching a potential partner with one role in mind for them, start any discussion about possible partnerships by trying to really draw out information about a potential partner's skills, interests, and background.
  - ***Remember that even duplication of skills/capacities already present within your own organization can be beneficial.*** It might be tempting to think you don't need a particular partner because you have similar skills. However, combining efforts may allow a volunteer monitoring project to expand its scope or free-up resources for one or both groups to focus on other needs and skills. For example, in the Pine Creek case study the state agency clearly had the ability to conduct the water quality monitoring but by partnering with the volunteer groups they were able to both focus on their more specialized skills (i.e., fish surveys, etc.) and use their other water quality monitoring resources elsewhere.



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