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River Voices

The Zen of Monitoring & Oreo Cookies

Monitoring for Protection & Restoration

By Barb Horn, Colorado Parks and Wildlife, **wildlife.state.co.us**

To "monitor" is to observe, track and gather data about someone or something. In the context of watershed protection and restoration efforts, we typically establish a reference point to describe the expected condition, health or status of a specific waterbody. We may ask the question: "what is the existing health of our watershed?" Or, perhaps we wonder if a stressor (e.g., gravel-mining, CAFOs, new development, etc.) is creating adverse conditions. In either case, we often employ monitoring as a strategy to provide our answer. If the information that is translated from our data indicates that the reference condition is met, we can direct our resources towards protecting the water body; to ensuring the condition does not deteriorate. If the expected condition is not met, we can direct our resources towards restoration projects.

The act of monitoring should generate data that, if turned into information, can provide the connection between expectation, current condition and subsequent action. This is true whether applied to the implementation of the Clean Water Act, or to wondering if the fish you stocked in your farm pond will survive. (See Figure 1 below.)

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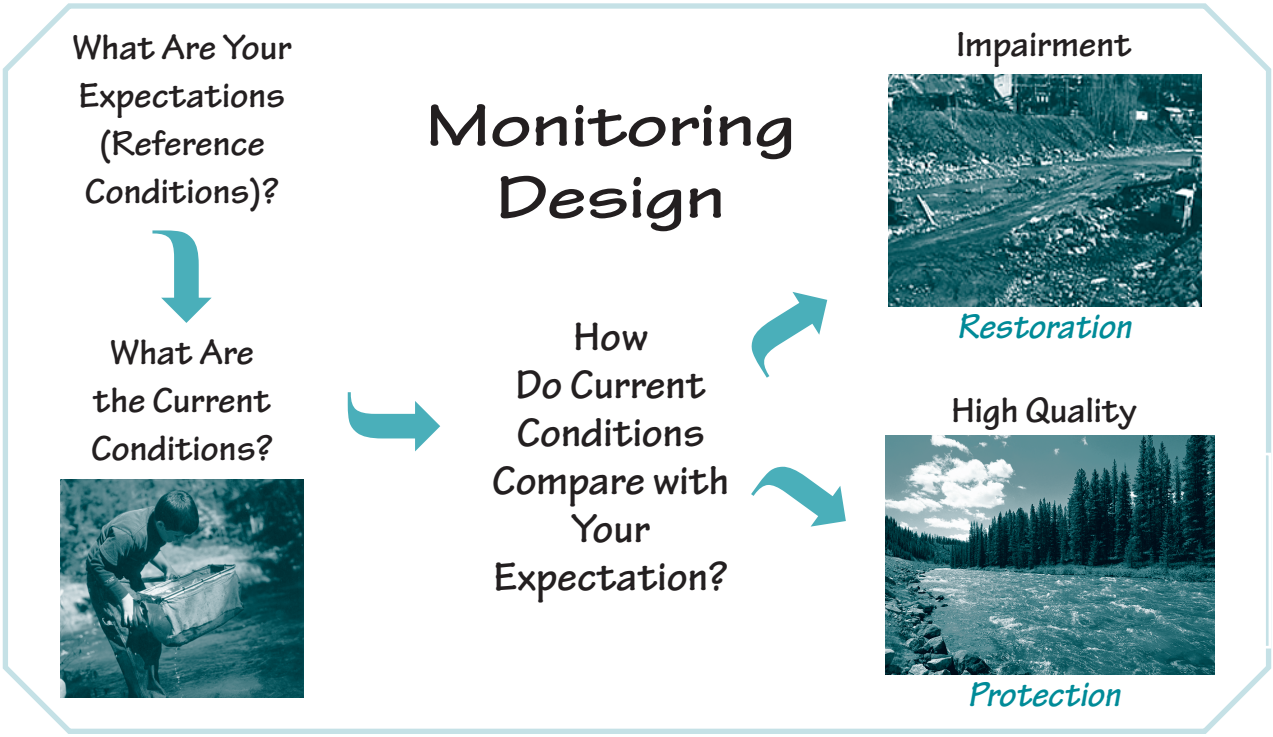
Figure 1. Typical Assessment



River Network

Connecting People, Saving Rivers

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River Network is a national, nonprofit organization. Our mission is to empower and unite people and communities to protect and restore rivers and other waters that sustain the health of our country.

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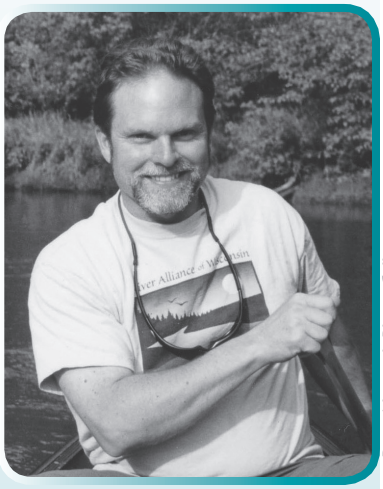

River Network Photo Collection

Dear Friends,

Data. Even the word sounds boring. But data is so vital to knowing the health of our rivers and watersheds and what we need to do to protect and/or restore them for the future. It is a simple equation—you can't know where you are going if you don't know where you are. Meaningful water quality data is how you build the road map for your watershed. Unfortunately, in this era of exceedingly tight government budgets, especially at the state and local level, funding for gathering data is often one of the first things cut. Thankfully, we have a growing army of volunteer citizen monitors out there who just need a little more direction and some tools to help fill the gap.

This year, River Network is teaming with the National Water Monitoring Conference folks to work on how best to fill that gap. First, we worked together to schedule their conference and our River Rally back to back in Portland in early May. We scheduled a Bridge Day in between the two events to focus on key questions like how to use data to achieve restoration and protection results, how to best share data among entities, how to communicate the results of that data effectively, and as always, how to make sure that the data collected meets important quality assurance thresholds.

We hope that the articles in this edition of *River Voices* will help you in your water monitoring work. Together, we can help to build that road to a healthier future for our rivers and watersheds.

Yours in river conservation,

Todd Ambs, President
River Network

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Monitoring Objectives & Data Collection

Are your monitoring efforts making a difference? How do you know? Effective monitoring programs:

- manage and transform collected data into information, so decision makers can take action;
- deliver and communicate the information to community and decision makers; and
- evaluate actions or decisions made against the generated monitoring data.

Such monitoring programs are successful because they understand that monitoring is only one activity among many that comprise an information system. Many programs succumb to focusing only on monitoring outputs, such as number of miles monitored, and lose the connection to the real endpoint: protection and restoration of our waterbodies. Monitoring for the sake of data production merely produces data; it is the information system that results in desired actions or outcomes.

Picture an Oreo cookie. Now envision monitoring as the stuffing; a key ingredient, but presented without the structure of the two cookies, not much beyond a pile of white fluff. Data collection is not the beginning nor the end of the process, but the "stuff" that holds everything together.

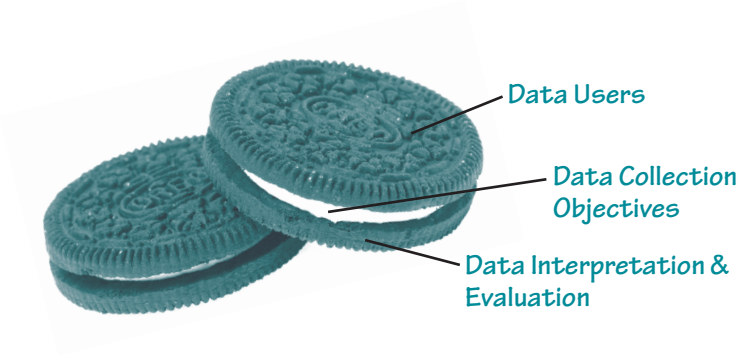
Unfortunately, most monitoring programs start with the Oreo cookie stuffing—or worse—don't ever consider the chocolate cookies; in doing so, they lose the effectiveness and the ability to leverage resources such as time and funding. Our desire to monitor is motivated by our expectations about the observed condition; we suspect a threat and we act. The questions we ask become our monitoring objectives—the questions we hope to answer by generating data.

- What was the source of that fish kill?
- Why has the algae increased?
- Is the dissolved oxygen too low for fish?
- Are there toxins in this water?
- Is that operation hurting our water?
- Will that effort improve water quality?

Monitoring objectives are a necessary and important component of any monitoring program; they are the secret ingredient of Oreo's stuffing, but are not the cookie in its entirety.

Our goal is to meet our expected watershed health, and to have our monitoring lead to effective protection or restoration. We want an information-rich and data-rich system. We want to build an information system, which includes the act of monitoring as one piece among many. Given the state of our waterways, combined with dwindling available resources, we need to know that every monitoring program is producing measurable results in the most effective and efficient manner. We need to generate data that can be used more than once. We need the whole Oreo cookie.

What, then, are the chocolate cookies? A successful monitoring program will surround the monitoring objectives and data collection with



1. data users and their needs, and
2. data interpretation, communication and evaluation.

The Power of the People

In the end, someone (e.g., a person, program, unit, regulation, etc.) will take the collected data and turn it into information to guide a decision or action. This is the data user. What information needs do they have to make this decision or take that action? Are they the same as yours? Often their needs are more involved than the question asked in a monitoring objective. How good does the data need to be for them to make the decision you want (data quality control/quality assurance)? By when

Table 1. Determining Assessment Types: Unique Combinations of Data Use/Purpose & Data User(s)

Data Use / Purpose(s)*		Data User (s) * I Education/ Community Inquiry	II Community or Agency Advocacy/ Planning	III Regulatory/Legal
A. Condition and Trend Investigation		**Assessment A-I** General background information	**Assessment A-II** Watershed Management Planning; 305(b) report	N/A
B. Impact Investigation	Non Point Source	**Assessment B-I** Educate community or students about pollution impacts	**Assessment B-II** Identify impacts for remediation	**Assessment B-III** CWA Violations
	Point Source	**Assessment B-IV** Educate community or students about pollution impacts	**Assessment B-V** Identify impacts for remediation	**Assessment B-VI** CWA Violations
C. Effectiveness Investigation		**Assessment C-I** Educate students about effectiveness of BMPs, restoration projects	**Assessment C-II** Evaluation of effectiveness of BMPs, restoration projects	
D. Use Support Investigation		**Assessment D-I** Community or student education about use impacts	**Assessment D-II** Watershed Management Planning; 303(d) report	**Assessment D-III** CWA violations

*It takes people to educate, advocate, plan and/or regulate; these people are the 'data users.' To this end, they use the data for the purpose of identifying trends, impacts and effectiveness.

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do they need the information? In what format should the data be presented (e.g., raw data, summarized data with averages, conclusions and recommendations, etc.)? (See Table 1.) How will you get the data or information to them? How will you know if and when they made a decision or took action?

The people element, the information needs of identified and targeted decision makers, should drive what, where, when and how you actually monitor (e.g., your methods and data quality). When we know what "information" is necessary to make the appropriate decisions or take the best action, we can make sure it is reflected in the collected data. This is an essential piece to any information system, regardless if the monitoring has occurred for 30 years, if your monitoring program is in the planning stage; if your role is only to collect the data that will allow someone else to generate information and take action; or if you are using others' data to evaluate for other uses.

A simple and systematic way to identify information needs of targeted decision makers is to (See Figure 2.):

1. identify all data uses;
2. identify all desired data users;
3. list all unique combination of data use/users;
4. document and summarize what you have discovered.

Data Interpretation & Evaluation

Very few of us can honestly complete the following statement: "My monitoring question will be answered when…" In part, this is because we always have more questions than answers. But, to evaluate and document your progress, you should provide an answer based on what you do

Figure 2. Information the Decision Maker Needs

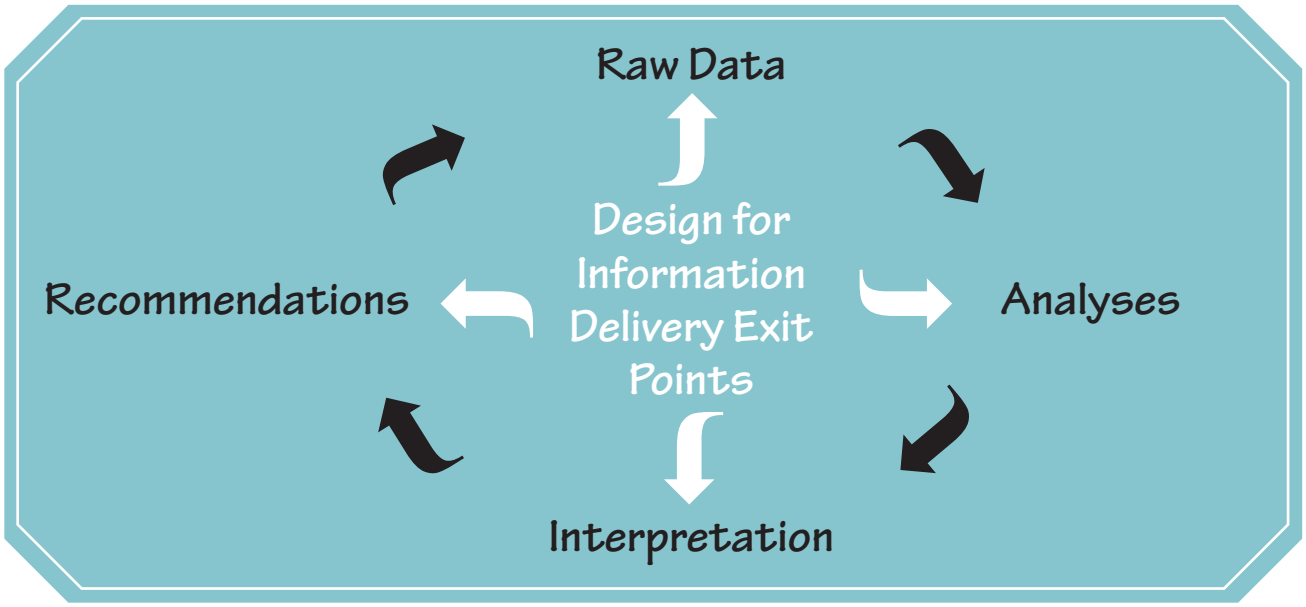
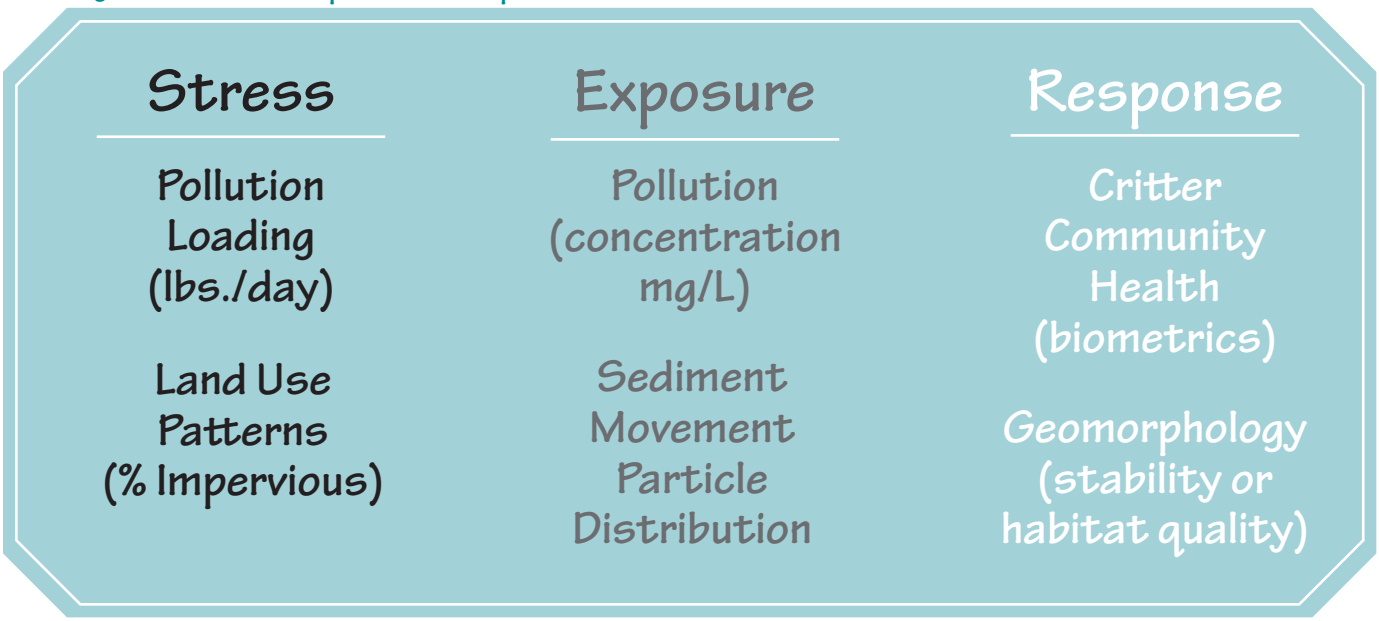


Figure 3. Stress, Exposure & Response Indicators



know. This will force you to define ambiguous terminology such as "health," "condition," "restoration" and other common terms that largely are undefined, and thus, immeasurable. Providing answers allows us to expand and integrate stressors, exposure and response indicators to tell a complete story (See Figure 3.), which will assist us in focusing our precious—and limited—resources.

The act of generating data simply for the sake of generating data never produces information, action, decisions, measurable results or a defined end. When you go to that doctor for a physical, the doctor may take your temperature, your blood pressure and check your reflexes. She has generated many pieces of data. It is the doctor that assesses the data, turns each piece into information, and then makes decisions or recommendations upon which you (in theory) act. The measurable result is the improved (or not) condition of your health (and she may recommend you cut down on Oreo cookie consumption). The monitoring of your health is means to your actual physical health.

If we identify targeted decision makers, decisions and actions and associated information needs; if we have a plan to take what we generate for a specific use and user; if we turn data into information; if we deliver or communicate our results—then, and only then, do we have something to evaluate. If a decision or action is taken, how will we evaluate if our monitoring objective is met? How and when will we communicate what we learned and adapt our monitoring program accordingly? Without a plan to answer monitoring objectives, meet information needs, and evaluate what did happen, we have nothing to measure but monitoring outputs. In essence, this involves defining our outcomes before we start the monitoring. What difference do we want our planning, targeting, monitoring, information, decisions and actions to make? Too many monitoring programs are disconnected from

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outcomes—which is more and more necessary to secure funding and maintain successful monitoring efforts.

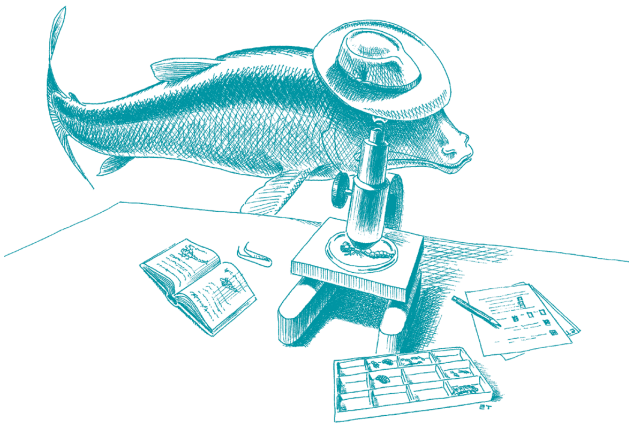
An information system measures decisions made, actions taken, information produced and outcome achieved. It is the result of exhausting the 'so what?' question. If you answer monitoring question X, so what? Then next question, so what? If decision X or action Y is taken, so what? This helps us get to outcomes that are connected to actual decision makers, decisions, action and monitoring. While some funders are motivated by outputs (e.g., what you do when, where and how)—and these are important to track—what most funders want to know is: did we make a difference for our river, for our community, for our children? This is the outcome, result or "so what" question we are charged with asking all the time, until it is exhausted based on what you know at the time. Thus, the other side of our Oreo cookie becomes our plans; our ability to generate, communicate and evaluate the data we collect in the context of our identified needs and desired outcomes.

An information system measures decisions made, actions taken, information produced and outcomes achieved.

The reality is that these chocolate cookies do take time to make. But, there is ample evidence illustrating that it is time well spent, and that resources are wasted when this is not done adequately. Once a cookie is perfected, it is valuable to write-down the recipe. Documentation becomes the monitoring plan that you evaluate progress against. A documented monitoring plan tells others what you are doing and also what you are not doing, providing credibility, consistency, accountability, efficiency and a way to leave your legacy for others.

Not all cookies match up to Oreos and similarly, not all data generated from monitoring programs are equal. When we take the time to create and implement information systems, we create a valuable product that makes a measurable difference; we create a package of Oreo cookies. And this is the Zen of monitoring and Oreo cookies.

If you would like to learn more about successful monitoring programs and how to evaluate your programs's effectiveness, contact Barb Horn at **barb.horn@state.co.us**.



The Key to River Wholeness

Biological Knowledge & Understanding

By Susan P. Davies
Maine Department of Environmental Protection (retired)

With ancient elegance, a column of mayflies was silhouetted against the evening sky, gracefully rising and falling in mating flight. The biomonitoring crew paused in tired, quiet appreciation for this broad, forested riverbank, the beauty of the prehistoric ritual of the mayflies' dance, and this deeply satisfying work. The crew was finishing up a long day of SCUBA diving to retrieve samples of invertebrates from the bottom of the Penobscot River, Maine. The adult mayflies circling overhead signified to them a beautiful and rewarding affirmation that the once-degraded river was coming back to life. Biological assessment of the aquatic life of rivers and streams builds knowledge and understanding. As with human interaction, knowledge and understanding of the natural world makes relationship possible. Once in appreciative relationship—to a person, another creature, an idea—reservoirs of caring, accountability and interest are inevitably tapped. Biological assessment, at its heart, is an expression of a human desire to understand, and to deepen relationship with the object of our interest. Those drawn to advance the work of biological assessment have one way or another, found themselves in relationship to the aquatic creatures with which we share the world. For some, this relationship might be triggered by growing awareness of the astonishing intricacies of morphological design and life history that are exhibited by aquatic species, which typically go unnoticed. For others, a feeling of relationship and accountability emerges spontaneously, out of simple gratitude and wonder at the beauty and wholeness of natural ecosystems, and the life they support.

Monitoring the make-up (the 'who and how many') of aquatic assemblages yields fabulous riches of information to deepen understanding of the overall condition of an ecosystem. Lists of species (or genera, or even families) and their abundances in relation to each other, unveil a "pattern of elements so unified as a whole that its properties cannot be derived from a summation of its parts (Webster's definition of the German word "gestalt")." This phrase neatly summarizes the vital contribution that an understanding of biological condition offers, to complement and ground-truth physical and chemical water quality assessments, such as levels of dissolved oxygen, bacteria or nutrient concentrations. Technically proficient assessment of aquatic assemblages like fish, macroinvertebrates and periphyton provides a rigorous and systematic means to organize and extract meaning from enormous ecological complexity (Yoder, C. 2011 *River Voices* V21N1, Yoder & Barbour 2009). Of what value are reassurances of passable physical and chemical results, if we do not know the end result for vulnerable aquatic organisms?

Figure 1.
Mayfly adult (Ephemeroptera) and Mayfly nymph

Mayfly adult © dave-pemcoastphotos.com, Flicker Creative Commons

Mayfly adult © Dave Huth, Flicker Creative Commons

Appreciation for the myriad forms of aquatic life may blossom into intense curiosity and fascination that can hook a person for a lifetime. The 1983 biomonitoring crew on the Penobscot River was documenting a dramatic rebound in invertebrate life of the river, due

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to implementation of provisions in the U.S. Clean Water Act (CWA) requiring better treatment of wastewater discharges. The monitoring site had, twelve years earlier in 1971, been blanketed with oxygen-depleting wastes and industrial solids that had all but eliminated clean water insects, including mayflies. Mayflies require clean water. While adult mayflies usually live less than one day, the immature aquatic nymph can live for as long as two years. With the river-bottom their home for most of their lifespan, aquatic nymphs must extract oxygen from water with delicate, leaf-like gills. Sharp-edged mandibles of grazing mayflies scrape nourishment from biofilms and periphyton on silt-free rocks of clear, sunlit river bottoms. As this crew observed, given half a chance life finds a way to express itself anew.

Long-term efforts to restore water quality in the Penobscot River are paying off in 2012, in a massive restoration project: The Penobscot River Restoration Trust **www.penobscotriver.org**. This collaborative effort has brought together the Penobscot Indian Nation, non-governmental environmental advocates, state and federal scientists and the hydropower industry to restore eleven species of sea-run fish. Core aspects of the restoration vision include the strategic removal of two large dams and implementation of ecologically beneficial changes in operations of the remaining dams. But imagine for a moment the economic and ecological savings that would have been realized if we had understood the basic survival needs of those eleven migrating species before the Penobscot River hydro-electric dams were constructed! Capital costs of dam construction, both in the past and now, would be substantially less. The proposed dam re-configurations will deliver the same amount of energy, but the devastating impacts to migratory fish would have been dramatically reduced.

Biological Integrity

The most visionary framers of the Clean Water Act insisted, against energetic opposition, that the 'Declaration of Goals and Policy' in the Act must include the 'biological integrity objective', along with the less controversial objectives for the restoration and maintenance of chemical and physical integrity of waterbodies (Davis 1994, in Davis and Simon; Adler in *River Voices* V21N1 R.). Use of the term "integrity" itself was visionary. Integrity for this usage is defined as "the quality or state of being complete or unimpaired; wholeness; soundness." The biological integrity objective, in effect, codifies our will and intent as a Nation to value, protect and restore the 'integrity' of the living components of aquatic systems, not just physical and chemical properties. Have we convincingly exercised that will and intent? How effective are current state and national efforts to grow the knowledge and understanding that are required to sustain the life in our waters?

Biological assessment and biocriteria (that is, numeric thresholds, stated in law, that precisely define goals for the condition of aquatic life), play a dominant role in those state and tribal monitoring programs that most successfully protect high existing biological condition, and that most effectively restore aquatic life in degraded locations. Biological monitoring now serves as the overarching water management paradigm for such states as Maine, Ohio and Vermont, due to their rigorous commitment

to creative innovation and technical excellence (U.S. Environmental Protection Agency 2011-Bioassessment Primer). These states have joined scientific excellence and intelligent public policy by passing state water quality standards and biocriteria that contain technically explicit, progressive goals to safe-guard aquatic life, and to drive impaired biological assemblages to their best possible condition.

The motivation to redeem river and stream life from the damaging effects of habitat destruction comes through increasing knowledge and understanding of these complex systems. It is just such awareness and curiosity that Dan Mosley sought to awaken as he stood with the several tribes of the Pomo People on the banks of their ancestral home, the Upper Russian River in northern California.

> *"We are a People connected to the life that is all around us. When I teach tribal environmental workers about biological assessment, I remind them it is part of our indigenous cultural identity to know that everything that is alive—it all speaks to us."*

As he was expressing this understanding to tribal monitoring staff on the Russian River, he reminded them, "See, you are a fishery-based people. This is your River," and with that he dipped in a sampling net and pulled out a Steelhead trout fry. His pupils were instantly transformed—suddenly they were in attentive and interdependent relationship with the native life that has shared their River for thousands of years.

Dan Mosley himself is deeply rooted in relationship to the life of his home lands. Dan is the monitoring 'circuit rider' for the U.S. Environmental Protection Agency Region 9, charged with offering technical support for the 160 tribes in Arizona, California and his home state of Nevada. He is from the Pyramid Lake Paiute Tribe (PLPT) where his people were known as the Koo-ee-yoo-ee because their lives were supported and nourished by the Cui-ui fish, and the Lahontan cutthroat trout (LCT). Cui-ui is an endemic species, now critically endangered: in the entire world they are to be found only in Pyramid Lake (Figure 2). Pyramid Lake itself is one of only six terminal freshwater lakes in the world, having no outlet. It is fed by the Truckee River, the receiving water for domestic and industrial wastewater from the cities of Reno and Sparks, Nevada. Over the past 12 years, skilled biological observations by the PLPT Biological Monitoring Program have highlighted the critical role of Truckee River water quality and flow volume to the survival of the Cui-ui and LCT. To spawn successfully, both species require adequate flows and good water quality in the Truckee River. Biological monitoring under the leadership of the Pyramid Lake Paiute Tribe has helped

Photograph courtesy of www.freeinfosociety.com/media

Figure 2.
Pyramid Lake, Pyramid Lake Paiute Tribe Reservation, Nevada.

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Figure 3. The Biological Condition Gradient: Standardized Biological Response to Increasing Levels of Stress

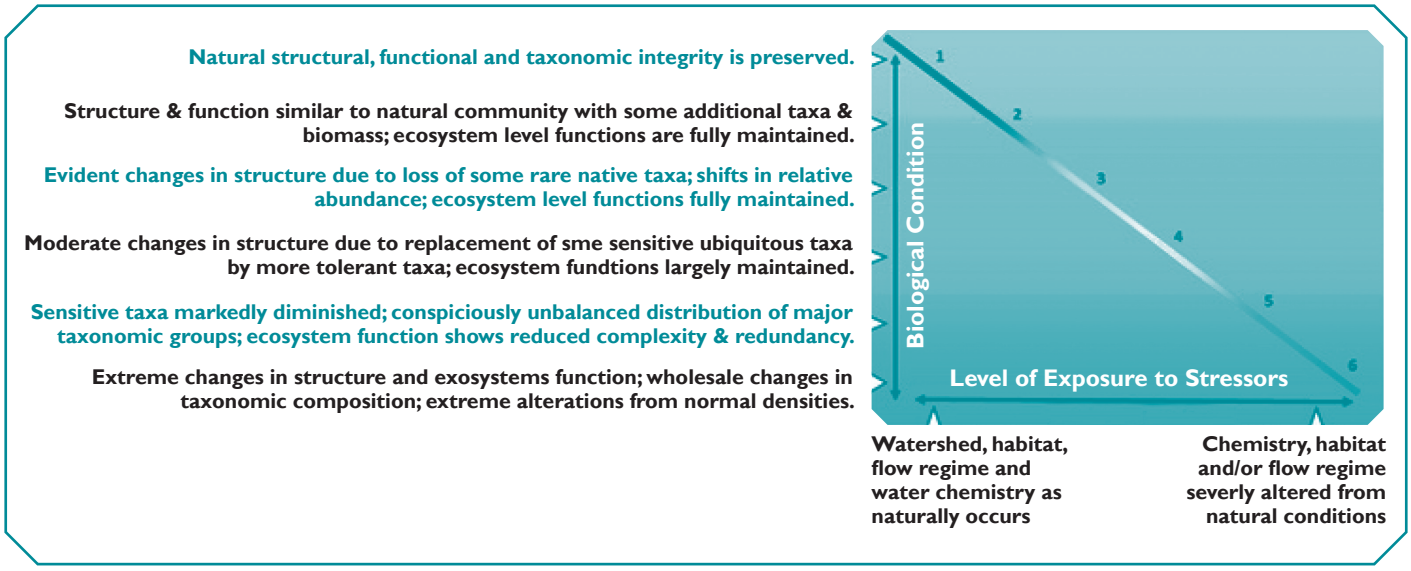

Figure 3. *The Biological Condition Gradient, a descriptive model for interpreting changes in ecological condition in response to human disturbance (Davies, S.P. and S.K. Jackson 2006; graphic courtesy of USEPA National Biocriteria Program)*

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focused crucial attention on these issues, such that the future of these irreplaceable species is now more hopeful.

Biological assessment needs strong advocates. Biological knowledge and understanding requires long-term investment to observe and document complex ecological responses in specific locales. Overwhelmed by burdens of conventional "end-of-pipe" water quality management, some state and tribal monitoring programs have little incentive or capacity left to implement technically sound biological programs. River advocates can play a crucial role by pressing for substantive progress in the quest to understand the biological implications of societal choices. And biological knowledge and understanding are critical, if efforts to preserve and restore vulnerable aquatic assemblages are to succeed.

The Biological Condition Gradient

Fortunately, for individuals who lack advanced degrees in ecology, the Biological Condition Gradient (BCG) can help to make sense of the enormous scientific complexity (Davies and Jackson 2006; Figure 3). Changes in structure and function occur in aquatic assemblages as they are subjected to increasing levels of human disturbance. The BCG provides an ecologically detailed description of commonly observed stages of decline across six steps or tiers. Tier 1 describes biological characteristics and attributes of naturally derived aquatic assemblages, and Tier 6 describes the same for severely stressed, impaired assemblages. The BCG captures the empirical observations and measurements of countless bioassessment practitioners and research scientists. The model distills this information into an easily understood and readily communicated progression of

declining biological condition in response to human disturbance. One does not have to fully understand all that the BCG describes about stress-induced changes in ecological attributes across the six declining Tiers. In its simplest form the BCG provides a readily accessible, six-part yardstick to facilitate conversations about environmental values. It animates the complexities of "data" by creating a bridge between scientific results and their meaning. It helps the uninitiated to interpret the implications of complex ecological data in relation to their own environmental values. To enter the conversation, it is enough to simply know in what BCG Tier a river reach falls, and then to consider that condition in relation to ones hoped-for condition for the river.

In summary, well-designed biological assessment organizes and assembles scientific evidence about ecosystem condition, and the BCG then empowers everyone to participate in conversations about what it means, what is of value, and what needs to be done. Clearly, bioassessment is an indispensable tool if we hope to arrive at the fullness of 'integrity' for our waters envisioned by the Clean Water Act. Beyond that, increased biological knowledge and understanding may hold a promise of restoring our right relationship to what Henry David Thoreau calls "…the indescribable innocence and beneficence of Nature."

Acknowledgements:

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Volunteer Monitoring Data

Data to Action Southern Style

By Bill Deutsch
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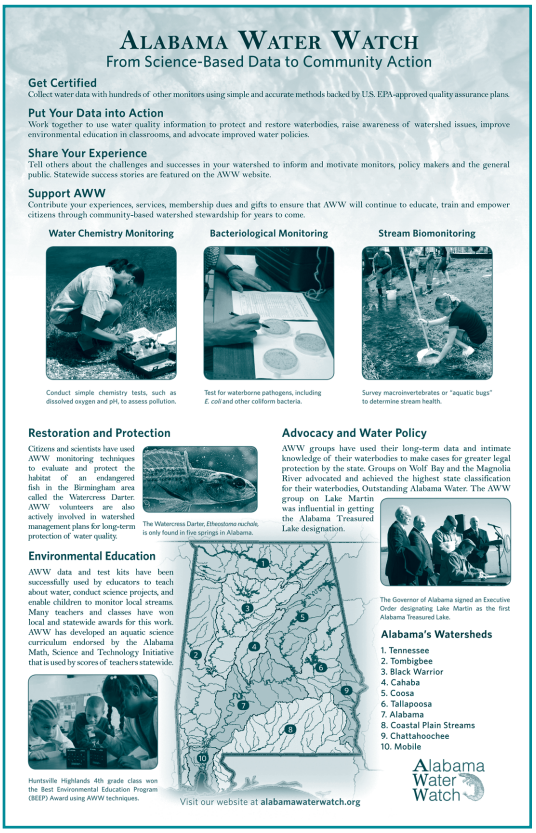
Following the surge in volunteer water testing groups in the early-mid 1990s, many program coordinators began getting together at conferences and other venues to compare war stories and share lessons learned. A clear and often-repeated message that came from those gatherings was, "The fastest way to kill a volunteer monitoring program is to do nothing with the data!"

We knew it then, and we know it now, but it's much easier to say than do. We still face significant hurdles in meaningful use of data collected by volunteers. These include the skeptics who say volunteer data are unreliable, the bureaucrats who say that even good volunteer data cannot be used for regulation, and the exhausted who abandon quality assurance plans and hope that volunteering monitoring will be a rewarding end in itself.



The Alabama Water Watch (AWW) program is by no means immune to these challenges, in fact, we face them almost daily. Nevertheless, we have managed to see several significant and encouraging success stories that came from volunteer monitors and their data.

AWW began in 1992, when the Federal Clean Water Act, Section 319 grant money for startup volunteer monitoring programs was "flowing like milk and honey" from Washington, D.C. through the States. The Alabama Department of Environmental Management was one of the recipients of these funds, through the EPA Region 4 office. They approached Auburn University (AU) to design and coordinate the program, and a couple of us in the AU Fisheries Department jumped at the opportunity.

At about the same time, a new Green Index came out of North Carolina that ranked all 50 states according to their environmental quality and policies. Alabama was dead last on the list. It seemed like an impossible dream that Alabamians would freely give their time to learn how to monitor water, and then systematically test specific sites over the long term, but it didn't take long to see eyebrows raised at what was happening. After attending countless group meetings and conducting scores of certification workshops in the first two years of the program, the response was gratifying and contagious. There were 20 active water monitoring groups after the first year, 50 by year three, and 80 by year 10. Now that AWW is soon to celebrate its

20th anniversary, we look back on cumulative monitoring of 70,000 data records from 2,200 sites on 800 waterbodies.

All monitoring through the AWW program followed EPA-approved Quality Assurance (QA) Plans that were developed in the mid-late 1990s and occasionally revised and reapproved. Though challenging to implement in a way that balances scientific rigor and acceptability by volunteers, the QA Plans have standardized methods statewide and convinced many that the information is valuable.

Use of the data started in earnest after volunteers got excited by seeing simple graphs of a year or two of their monitoring results. They had been "pure scientists" in their faithful collection of data, with little to no preconceived ideas about what the numbers should be (or even what they really meant!). They just followed the monitoring directions, kept their test kits in good working order, and mailed (or later, submitted online) in their data sheets. Initially, a lot of trust by the monitors was involved. They were willing to keep monitoring with the expectation that this new "science thang" was going to pay off in terms of making their stream or lake better.

Seeing patterns in the data added a new level of understanding, and spawned lots of ideas for putting it into action. Seasonal curves of dissolved oxygen (DO) concentrations overlaid with water temperature revealed a textbook-classic inverse relationship between the two variables, but also showed long-term conditions and trends. Did the DO levels meet standards for the Fish and Wildlife Use Classification? Did the waterbody ever become supersaturated (hinting at excess nutrient levels)? Did water temperature trends show evidence of healthy riparian zones (shaded and cool) or periodic shots of hot runoff from impermeable surfaces like asphalt parking lots, metal roofs or concrete sidewalks? One of our workshop mantras was, "Is my waterbody getting better or worse…and why?" This is an easy-to-remember, but profound question that many monitors were ready to tackle…with their credible data.

Many AWW groups participate in periodic Bacterial Blitzes to assess pathogens on a watershed scale.

Novice monitors gained an ever-increasing understanding of what the data meant by viewing the graphs and tables on the online AWW database. The graphs could be custom-made to represent any time period, and options such as trend lines and comparisons with other sites in the watershed helped people learn at their own pace. All this was fortified by frequent data interpretation sessions that AWW conducted for specific groups and waterbodies. The impact of "community-based, science-based data" was emerging, and responses became more apparent and strategic. After about 15 years of learning from data-to-action efforts in Alabama, and in several countries where the AWW approach was applied through the Global Water Watch program, a "Practical Model of Global Watershed Stewardship" was developed.

The model outlines the process where motivated citizen groups find appropriate technologies to gather credible data. Water data is translated to information that is relevant to stakeholders and

cont. on page 16

Middle school students work with AWW staff to do stream bank restoration in Opelika, Alabama.

cont. from page 15

gets internalized to become local knowledge. From there, three basic strategies are used to take action.

1 Environmental Education

In the AWW context, environmental education is the use of citizen data and activities to raise community awareness and appreciation of water resources. Many schools have integrated AWW monitoring within classroom exercises or extracurricular activities, and teachers make up about 15% of all AWW group leaders. The AWW program developed a curriculum for grades 4-12 called, *Exploring Alabama's Living Streams*, which got endorsed by the Alabama Math, Science and Technology Initiative (AMSTI) of the State Department of Education. Scores of teachers have attended training workshops on how to apply this in the classroom, and hundreds of students have benefited. Use of the curriculum became a great way to link AWW monitoring groups with classrooms. Instead of teachers relying on time-strapped AWW program staff to respond to requests for classroom visits and demonstrations, the "local experts" go to the schools and share their monitoring experiences and related activities with children from their community.

2 Protection & Restoration

Many AWW groups now have 10 or more years of data from several sites in their watersheds… an invaluable source of information that often exceeds that of the state regulatory agency or other sources. The goal is to "protect the good, and restore the bad" using monitoring data as a guide to pinpoint sources of problems and document positive remediation. One approach that is gaining popularity among groups is the Bacterial Blitz. This is a time when several certified monitors decide to sample many

Distribution and concentrations of E. coli that are found in a Bacterial Blitz are explained to the public by placing the cultured plates on watershed maps.

sites on the same day, and use the Coliscan Easygel methods of collecting E. coli bacteria, to get a watershed-scale snapshot of pathogen concentrations. On virtually every blitz, a surprise "hot spot" is found, and many have been fixed with collective efforts of volunteers, land owners and municipalities.

3 Advocacy for Improved Water Policy

Having intimate knowledge of a particular watershed's condition by long-term monitoring lends itself to a unique and powerful way to advocate for positive change. Sometimes it seems that policy-makers resist being "confused by the facts," and good scientific information is sometimes not enough to change the status quo. When local, vocal, voting citizens approach their politicians with water data they've collected and can defend, they often get things done. Patience is a virtue in many of these cases. To apply an old analogy to advocating better policy: it's usually more productive to boil the frog slowly than to suddenly turn up the heat and watch him jump out of the pot! Many policy successes of AWW monitors have taken 5-10 years to come to fruition. A notable, recent example was the designation of Lake Martin as the first Treasured Alabama Lake, largely because of the long-term data record and persistence of the Lake Watch of Lake Martin group since the early 1990s.

As AWW moves into an uncertain future, with the recent elimination of a core funding grant because of federal and state budget cuts, we are confident that citizen monitors have been inspired by their abilities to produce positive change. With a growing nonprofit AWW Association, about 20 volunteer trainers statewide, and an online database for storage and retrieval of water data in customized ways, AWW has become more "bullet proof" from the whims of government funding. A recent year of mentoring the AWW Association by River Network as part of a group capacity-building project has made the organization stronger and more focused. Now, several success stories in data-to-action will hopefully pave the way for the next 20 years.

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Riley designates Lake Martin 'treasured'

Brent Maze / *The Record*

Honorary member: Lake Watch of Lake Martin president Dick Bronson presents Gov. Bob Riley with a T-shirt from Lake Watch.

BRENT MAZE
Record Web Editor

Many area residents have believed Lake Martin was a treasure for years.

Now, state officials are finally recognizing that fact.

Gov. Bob Riley signed an executive order creating the designation "Treasured Alabama Lake," which will be awarded by the Alabama Department of Environmental Management to lakes that meet special quality standards for cleanliness and nutrient enrichment.

Lake Martin will likely be the first in line to receive the title once proper rules have been created by ADEM following guidelines set up by the U.S. Environmental Protection Agency.

Dick Bronson, president of Lake Watch of Lake Martin, said they have been working on trying to protect Lake Martin for more than a decade. He said it will raise the bar on water quality requirements for the lake and its tributaries upstream, but it could also affect the water war with Georgia.

"If you have a higher water quality standard for a lake downstream, you've got to have some

See Riley, *Page 10*

Newspaper headline of Lake Martin's designation as a Treasured Alabama Lake.

Effective Communication of Data

By Travis Pritchard
and
Jamie Ortiz
San Diego
Coastkeeper
sdcoastkeeper.org

To reach beyond technical audiences, water quality monitoring programs need a communication strategy to ensure they deliver data in a format that allows a diverse set of audiences to understand it.

Sewage-contaminated water

If you only speak English, and someone tries to talk to you in German, do you understand him? No, you can't understand one another because you don't speak the same language. This exact rule applies to communicating water quality data to various stakeholders—each of which has its own language.

Water quality monitoring programs invest huge amounts of time and resources into their data collection. Programs that don't integrate effective communication of information stop short of bridging their data into a vital component that allows multiple stakeholders to understand the health of our aquatic resources.

Most water quality data portals are either so technical that they speak only to water quality experts or so simplified that they only speak to the general public. A solid communications strategy will take into account a specific water quality issue or data set and define messaging and channels to share that information with the target audiences, regardless of their knowledge base. This article will highlight an example of a successful communications strategy employed by San Diego Coastkeeper that showcases the multifaceted nature of a water quality data communications strategy.

The Problem

On September 8, 2011 a massive region-wide power outage plunged all of San Diego County into darkness. Everything without backup generators shut down: people got stuck in elevators, traffic ground to a halt, and two sewage pump stations without backup generators failed and released millions of gallons of sewage into local streams. Wastewater officials assumed the natural flow would quickly flush the contaminated water to the ocean, but San Diego Coastkeeper's water quality volunteers discovered where the sewage had settled downstream from originating spill.

Coastkeeper volunteers reported classic signs of sewage-contaminated water--the creek smelled strongly of sewage, the water turned deep black in color, and dead fish washed up onto the banks.

Our test results showed almost no dissolved oxygen and extremely high levels nutrients and fecal bacteria. The sewage-contaminated water had not flushed out to the ocean, but instead backed up in a creek upstream of a fragile coastal lagoon. We had identified the problem that now needed fixing.

Data Communication

After the discovery, San Diego Coastkeeper sprang into action. The entire organization, not just the water quality experts got together to generate a plan of action. The different roles represented included:

- Coastkeeper's water quality director, who pulled together historical data and continued monitoring the effects of the contamination.
- The communications director, who worked directly with the water quality director to determine what needed to be said to whom and how.
- The policy director, who set up meetings with elected officials and legislative committees.
- The development director, who updated current and potential funders for Coastkeeper's water quality and volunteer teams.

The team held regular meetings to ensure all parties had current information and shared similar messaging.

Communicating Data to Officials & Other Experts

Water quality experts represent that easiest and most common audience to which we disseminate water quality data. These users can interpret raw data themselves and draw their own conclusions of the data. Data portals that share raw numbers or graphs of concentrations speak only to these technical audiences that fluently speak the water quality language. The vast majority of water quality data portals on the internet cater to these users. Examples include the USGS data portal (**http://waterdata.usgs.gov/nwis/sw**), California's Surface Water Ambient Monitoring Program (**www.waterboards.ca.gov/water_issues/programs/swamp/**), and most other monitoring programs.

Databases containing data to be queried have the advantage of being cheap and easy to put together and they allow knowledgeable users the ability to find exactly the information they seek. When San Diego City wastewater officials needed to get a handle on background conditions to gauge the effectiveness of their cleanup, Coastkeeper sent ambient water quality data in a table of raw data. This raw data perfectly communicated the data to these officials, who work with similar data on a regular basis.

However, this method of communication only works for this audience and had to be adapted to effectively communicate the damage done by the sewage spill to individuals without a water quality background.

Communicating Data to the General Public & Media

When communicating water quality data to the general public and media, our teams translate raw data into something the public can understand. We then identify different channels of communication to deliver that information to our various stakeholders. Tables of data and

cont. on page 20

cont. from page 19

graphs of concentrations do not speak to the general public—in fact, it scares most people away. Joking aside, most of public does not have the tools or the time to interpret water quality data. Given an online database, most users will not know where to start looking for relevant information, let alone have the ability to put it into meaningful context. These users need the data explained to them in a way that the can relate to. Coastkeeper generally does this by answering a few simple questions:

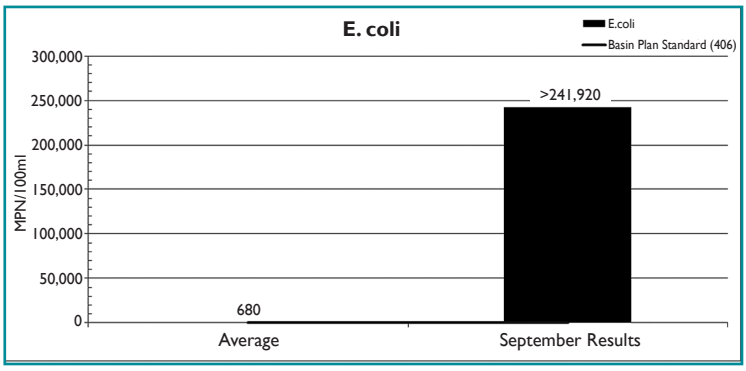
- What is the problem?
- How does this affect them?
- What are we doing to fix it?

Since raw data has less meaning for the general public, Coastkeeper turns the information into a set of basic statements that summarized the impact of the sewage spill on our water quality and employed visually storytelling to connect with the audience at an emotional level. We utilized our blog to share personal perspectives from our water quality director and our volunteers, who first discovered the sewage spill in the lagoon. Here we posted photos of dead fish floating in murky water, which conveyed much more information to this audience than fecal bacteria counts would have. We also included graphs, but rather than display data directly, we used them to illustrate the contrast between sewage contaminated water and normal conditions. This ability to connect the data to the effects (the photos) and illustrating the difference between polluted and normal (the before and after graphs) moved the public to take action, not reports of specific concentrations.

Visual storytelling

At the same time that our team posted blogs, we sent out press releases to all media in San Diego County that included a mix of technical data with links to our blog posts for the "behind the scenes" appeal. We continued to employ high-level language about water quality data, complemented with enough specific data to appease the more technical writers on our media list. We carefully crafted the headlines, introductory paragraphs and quotes to appeal to mass audiences, as those pieces are most likely replicated in follow up stories, and therefore needed to appeal to a wide variety of audiences. We worked with our water quality director to prep him for media interviews that would include questions that run the gamut of general questions like, "How bad is it?" to informed questions like, "What are the long term affects?"

We also took care to send email blasts to our supporters. Given that Coastkeeper's email subscribers include mothers of children who



attended a beach cleanup to staff at local water quality agencies, we ensured that each recipient could easily access the information they needed. In general, we keep the overarching language simple because audiences of all levels can understand titles such as "Massive sewage spill pollutes coastal waters." And then we include highlight boxes with varying levels of access to information—"click here to see raw data" or "click here to see photos of the fish kill." After reviewing our email analytics, it appears that all access points received heavy amounts of click thrus.

On a personal level, our development director called or sent one-off emails to communicate similar messaging to our donors. These personal interactions focused much more on giving thanks and noting areas for continued support during the highly reactive, resource intensive time period that we committed to tracking and calling for action from decision makers.

Communicating Data to Elected Officials

For Coastkeeper, simply sharing our water quality data that documented the sewage spill would not be enough unless we saw permanent action taken to prevent similar incidents from occurring in the future. Disseminating water quality data to elected officials—the ones empowered to make change—required an entire new set of messaging and delivery.

One mistake we see often with water quality programs is sending technical data to public representatives and their staff. While they often have to learn complicated industries in order to lead their districts, it doesn't mean they have full backgrounds in the subject matter or sufficient understanding to make informed decisions. Our staff boiled down the impacts of the sewage spill into easily digestible sound bytes that would resonate with an elected official—most centered on the size of the spill, the impact to health of their constituents and the devastating economic impact to the region. For a region whose number one business is tourism, a sewage spill that closes several popular beaches for an extended period of time can have major economic impacts.

We presented our findings locally to San Diego City Council with a presentation from our water quality program director and our policy director, who collectively presented the data positioned to show the harmful impacts to our region. We also share the information with our state officials, resulting in a full legislative investigation into the power outage, and another opportunity for us to share our findings with our elected officials.

Success

Within 24 hours of the discovery of the backed up sewage, city crews were out pumping the polluted creek for treatment. Two weeks and fourteen million gallons of pumping later, the creek had returned to its normal condition. Recently, wastewater officials have proposed a $12 million plan to install generators at all pump stations that currently lack one. These positive actions are the result of discovering and communication a problem.

Lessons

When communicating water quality data, one needs to be aware of the audience—both in the best messaging for each segment and the proper channels to deliver it.

River Medicine for Johnson Creek

Developing a Long-Term Monitoring Plan

By Robin Jenkinson
Johnson Creek
Watershed Council
www.jcwc.org

Imagine rivulets as capillaries, tributaries as veins, and the creek itself as a heart—pumping rainwater lifeblood from the hills to the sea to the rhythm of the earth's orbit. After a century of impacts, Johnson Creek was sick and had undergone multiple cardiac arrests. Its prognosis was poor.

Ideally, ecological restoration heals the landscape. Twenty years ago, the many entities that manage parts of the Johnson Creek Watershed made a collaborative commitment to a healthier future for Johnson Creek, along with frequent check-ups to ensure that our dosage of restorative treatments was working.

Plantings in 2003 have grown so much that you can't see the building anymore. Already in 2012, Johnson Creek partners have planted over 40,000 native trees and shrubs.

Before

After

Photos courtesy of Johnson Creek Watershed Council

Meet the Patient

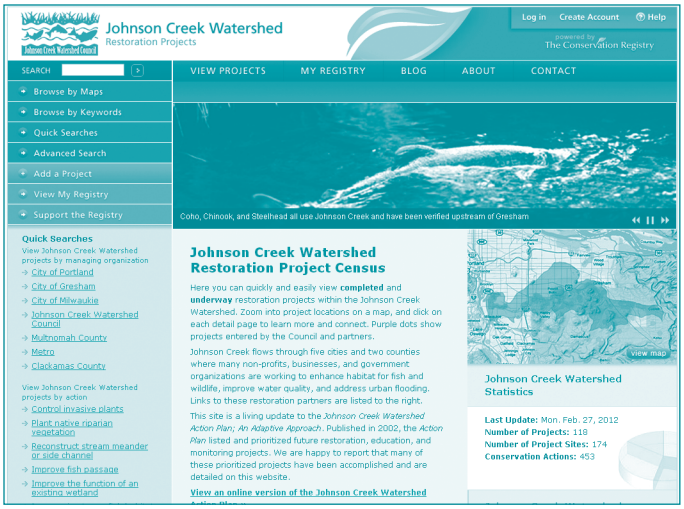
The only free-flowing salmon stream in Portland, Oregon, 26-mile-long Johnson Creek flows into the Willamette River, which flows into the Columbia River, and to the sea. Its 52-square-mile watershed is home to ESA-listed threatened runs of coho, Chinook and steelhead, along with over 180,000 people.

Starting in the mid-1800s, it was logged and farmed, dammed, polluted, railroaded, covered in concrete and channelized. Today, the creek doesn't meet Oregon state water quality standards for temperature, toxics or bacteria (E. coli). And for many, "Johnson Creek" is synonymous with "flooding." Channelization and development in the floodplains have pitted neighborhoods against Johnson Creek's natural hydrology, its heartbeat.

Johnson Creek is a rural and urban stream with a host of physical and biological challenges. Yet, the size of the watershed is a good scale for understanding these issues well enough to make a difference and hopefully to detect improvement over time.

The Medical Team

In 1991, a team of fluvial physicians (a.k.a. local technical experts) gathered to take the creek's pulse and check its vitals. Long-term monitoring and recovery of a watershed, which is managed by five cities, two counties, a Metro regional government, and multiple state and federal agencies, requires intense, basin-wide coordination.



After publishing the Johnson Creek Resources Management Plan in 1995, technical staff from each of the counties and cities formalized the Johnson Creek Interjurisdictional Committee (IJC). Colleagues from the Watershed Council, the U.S. Geological Survey, the Oregon Departments of Environmental Quality and Agriculture, and the Soil & Water Conservation Districts joined in. The group has met monthly ever since.

Today, the Johnson Creek IJC is a forum for joint cooperation on watershed issues of a technical nature. We work as a collaborative group, bridging urban and rural issues and finding common areas for study and implementation, while addressing multiple regulatory drivers (e.g., TMDL, NPDES, ESA).

Prescription for Health

The first step was to visualize what level of health would be possible. A creek colonoscopy - habitat monitoring and assessment—found a decided lack of large woody debris in Johnson Creek, along with silt-embedded gravels, both of which indicate poor trout and salmon habitat. An Ecosystem Diagnostic and Treatment (EDT) model was applied to habitat measurements in areas where salmon and trout had been found. The EDT model estimated potential trout and salmon production for specific stream reaches based on their present degraded state and then compared it to fish production if restored.

By combining EDT model results and a detailed health history (a.k.a. Watershed Assessment) and running a battery of tests, the Johnson Creek Watershed Action Plan was finalized in 2002 (available online at **www.jcwc.org**). It prioritized interventions and set target values for fifteen indicators of watershed health. Indicators included summer baseflow, flood flashiness, toxics such as residual DDT, bacteria levels, temperature, aquatic habitat features, floodplain connectivity, indices of biotic integrity, and acreage targets for natural area conservation. Appointments to detect changes in these parameters were scheduled for the next ten years.

To protect the best, voter-approved bond measures funded permanent conservation of over 400 acres of natural areas. A rails-to-trails bicycle path (the Springwater Corridor Trail) follows the

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creek for much of its length, connecting natural areas. Each year, hundreds of dedicated people volunteer with the hope of restoring a cooler, clearer, swimmable creek and ribbon of green—to serve both as a wildlife migration corridor and as an aesthetic respite for people in the city.


Johnson Creek:
The State of the Watershed
Spring 2008

Stream Habitat
Do fish have places to live?

Fish and Wildlife
What lives in the watershed?

Stream Flow
How much water is in the stream?

While much progress has been made, it feels like we're just getting started. We remain open to administering innovative new cures as we learn new things about Johnson Creek each year.

Monitoring Recovery

Management of Johnson Creek is moving from a place where we didn't have full knowledge of the creek, but had to create a plan for action. Now, we're fleshing out our understanding at a watershed scale to get a sense of the whole. We are moving from treating isolated symptoms to improving the holistic health of the watershed. The Johnson Creek IJC is integral to this process.

Each jurisdiction or entity monitors many different parameters at different spacial scales across the watershed. In addition, regulatory drivers (e.g., NPDES Permits) require regular reporting on water quality. In several cases, the IJC members have combined and analyzed this data at a watershed scale to provide a broader perspective. To facilitate data sharing, we created a free Google Site that everyone can access and edit where we share datasets, maps and reports.

Here are some of our collaborative achievements:

1. For the past three years, our August IJC meeting has been in the field sampling benthic macroinvertebrates at 20 random sites throughout the watershed. Multiple partner institutions pay for analysis to the species level. Results are identifying diverse islands of biotic health in tributary headwaters, helping focus management on expanding habitat and improving water quality in these areas.
2. The IJC collaboratively plans summertime temperature data logger placements, with the Watershed Council filling measurement gaps. Each winter, we lump all of our data for analysis. Together, we've identified a number of cool tributaries and spring-cooled areas that have become targets for conservation and enhancement.
3. In 2008, we published a *State of the Watershed Report* that communicated monitoring results and the health status of Johnson Creek in a four-page, glossy brochure that was aimed towards the curious, but non-technical layperson. The next iteration will be published in May, 2012.
4. In 2011, watershed-wide fish distribution studies were completed by surveying headwater reaches that had never been surveyed before. Now, we've documented


© Wild Fish Conservancy

Recent fish surveys have documented threatened coho salmon much higher in the watershed than previously believed.

threatened coho salmon higher up in Johnson Creek than recently thought possible—which will drastically change the way the creek is managed.

5. Since 1999, the jurisdictions cooperatively fund three USGS streamflow and temperature gages based on what percentage of the watershed each given jurisdiction occupies. In years when one city cannot pay their share, other jurisdictions pitch in to maintain the gages. This hydrologic data is used to model and engineer channel reconfiguration and floodplain reconnection projects, as well as to better understand flood recurrence intervals and flashiness in Johnson Creek.
6. Descriptions and maps of over 150 restoration projects by multiple partners throughout the watershed were compiled and are available via an online database called the Conservation Registry. We are constantly updating and enriching these case studies. Johnson Creek's portal can be found at **jcwc.conservationregistry.org**.

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A protected reach through a Natural Area in Johnson Creek

Healing Takes Time

After twenty years of existence—about 240 monthly meetings, the IJC is committed to the long-term. Our group thrives on an atmosphere of fun, open communication and acceptance of the inner-nerd. At each monthly IJC meeting, committee members (and invited guests) present new research or updates on the status of existing monitoring and restoration projects. Often, the group is used as a sounding board; it's a safe and open space to brainstorm and discuss project concepts with respectful and informed colleagues. Longevity of the committee has built upon itself, and common interests and goals keep us talking and working together.

Adaptive, science-based watershed restoration is like maintaining a healthy lifestyle. It takes a constant effort and one's work is never done. Over the next few years, we'll conduct a 10-year evaluation of progress since the 2002 Action Plan. Through this process, we will try to determine why we have or haven't met targets for indicators of watershed health, and we will revisit our restorative prescription.

We feel the watershed is on the path to recovery. In the midst of a developing landscape, Johnson Creek is pulsing with life.

Bright Idea!

To keep things lively, Johnson Creek IJC committee members host a "Good Water for Clean Beer" social every so often in recognition of the fact that the Northwest remains a great place for quality microbrews because we all do our part to keep water clean.

Sharing Data

Nonprofits & Agencies Working Together

By Danielle Donkersloot
New Jersey DEP
www.state.nj.us/dep
and
Alyse Greenberg
Stony Brook-Millstone
Watershed Association
www.thewatershed.org

Did you know approximately 20% of our nations waterways are assessed for water quality impairments? As state and nonprofit budgets shrink and the complexity of water protection and restoration efforts increases, the need for collaborating with partners becomes more apparent. State agency monitoring programs are typically designed to assess and report on the health of a watershed and volunteer monitoring programs tend to be more involved in protecting and improving their watershed. While it's true that the goals of each entity may be different, there is usually some common ground between the two and sharing data may help both sides meet their individual goals.

State agencies can, and often do, use volunteer data if the data comes from a trusted source. Agencies have used volunteer-collected monitoring data to assist in:

- tracking sources of point and nonpoint source pollution;
- developing watershed or source-water protection plans;
- monitoring the effectiveness of Best Management Practices;
- identifying impaired waters; or
- evaluating compliance with total maximum daily load allocations.

Quality Assurance

The first step in data sharing is to determine what type of data you have, what type of data you need and the quality of the data. The standardized format of communicating the quality of data is called a Quality Assurance Project Plan. Did your

eyes glaze over when you read the words "quality assurance project plan"? Although it might not be the most stimulating subject, quality assurance project planning (QAPP) is an essential step in documenting the type of data you have.

When developing quality assurance project plan you should start by answering these three basic questions:

1. Why do you want to monitor?
2. How do you want the data to be used?
3. And by whom do you want the data to be used by?

One way to begin working with your state agency is to engage them in the QAPP process when starting your monitoring program. If you have a program already up and running, ask them to review and comment on your existing QAPP. Find the right person at the agency to discuss your monitoring program with and meet with them or better yet, take them out in the field. Ask them if they would sign your QAPP as a data user, or quality assurance advisor. Involving them in the process allows them to take some ownership of the data when the time comes to use it.

If your state agency is not receptive to the idea, try connecting with someone at your US EPA Regional office. EPA has been encouraging the use of volunteer collected data since the late 1980s. Often, your EPA regional office is responsible for reviewing and approving the state's water quality assessment reports. They may be interested in helping with the QAPP process and may be able to review and approve your QAPP instead of the state.

An example of a partnership in New Jersey that may be transferable to other regions is between the Stony Brook-Millstone Watershed Association's (a nonprofit organization) program, the Watershed Institute, and the NJ Department of Environment Protection's program, The Watershed Watch Network (WWN). The Watershed Institute provides support to New Jersey's watershed groups through training, information sharing and an annual grant program. Since 2007, the WWN has been providing $27,000 a year to the grant program to support growing volunteer monitoring programs and help sustain existing programs.

The Watershed Watch Network serves as a resource for the NJ volunteer monitoring community and provides guidance to monitoring projects that come through the grant program. Partnering with the Watershed Institute has proven to be the most effective way for the Department to assist local monitoring efforts while increasing the amount of data available for assessment purposes. Since grantees are required to develop or update their QAPPs and submit their data to the NJDEP, this partnership has led to an increase in the use of volunteer collected data at the state level. Here are some examples of projects that have provided the state with high quality data while also helping to restore and protect the local rivers.

Musconetcong Watershed Association: Dam Removal Monitoring

The Musconetcong Watershed Association is a leader in dam removal efforts in New Jersey. In 2009, they identified a need to establish pre and post dam removal monitoring protocols, in order to assess how dam removals were impacting water quality. Funding was provided for Musconetcong Watershed Association to research existing dam removal monitoring efforts, develop a dam removal monitoring program, train monitoring volunteers, and conduct pre and post removal monitoring for dams in the watershed. The work done under this project as served as an example for future dam removals done by other groups throughout New Jersey. The project has an agency approved QAPP and the data was reviewed during the 2010 assessment cycle at the agency.

Pequannock River Coalition: Monitoring for Invasives

The Pequannock River Coalition has conducted streambank restoration projects for many years. In 2009, they decided to enhance their restoration work by addressing invasive plants. Funding was provided to Pequannock River Coalition to test different methods of Japanese knotweed removal at Appelt Park in Riverdale, New Jersey. In order to measure the success of their knotweed removal efforts, the NJDEP recommended documenting their efforts through a quality assurance monitoring plan. The goal was to assess and document the extent of knotweed pre-removal and re-surveying the area for two years post-removal to determine effectiveness of the removal strategies. The monitoring plan was reviewed and approved by the New Jersey Department of Environmental Protection, and has served as an example for other groups starting out with invasive removal efforts.

15 Years of Monitoring the Waters of Kentucky

Reclaim the River

By Hank Graddy
Kentucky Watershed Watch
www.state.ky.us/nrepc/water/wwhomepg.htm

Kentucky has over 90,000 river and stream miles that need more protection and restoration. Our many miles of rivers and streams are also the home to unique and vital fresh water aquatic ecosystems. Three of our major river basins, and numerous additional smaller watersheds appear on the Nature Conservancy's hot spot list of watersheds vital to the protection of fresh water aquatic biodiversity. Yet, when the Kentucky Division of Water prepares the Report to Congress on Kentucky Water Quality, as required by Clean Water Act section 305(b), it has data on only about 15% of those stream miles. Water quality for the great majority of Kentucky streams is still unknown.

The Watershed Watch in Kentucky began collecting water quality data in Kentucky in 1997, wearing tee-shirts that declared our ambitious purpose to Reclaim the River. Fifteen years later, we are still wearing that call to action. We consider that statement to be both a claim of ownership as well as a declaration of our willingness to accept the responsibility that comes with ownership. To be clear, we are not here to Occupy the River; we are the owners of the waters of Commonwealth of Kentucky, and we are monitoring and advocating for water quality protection and improvement by right, not by permission.

More detail about our local basins can be found at their separate websites, such as:

The Kentucky River Watershed Watch, at:
www.uky.edu/OtherOrgs/KRWW

The Salt River Watershed Watch, at:
http://srww.org

The Licking River Watershed Watch, at:
www.lrww.org

In 2000, Watershed Watch in Kentucky program adopted the following mission statement:

> *A statewide citizens monitoring effort to improve and protect water quality by raising community awareness, and supporting implementation of the goals of the Clean Water Act and other water quality initiatives.*

We have been able to build the program to become a statewide citizen run, volunteer based, quality assured, source of current synoptic water quality data, adding about 20,000 new measures of water quality data each year.

The Kentucky Division of Water currently stores the data from our eight local watershed basins at **http://water.ky.gov/wsw/Pages/default.aspx**

TURNING OUR WATER QUALITY DATA INTO ACTION

We have several different ways to turn our synoptic water quality data into action, including

1) Focus Studies;

2) Grant applications;

3) Pollution Detection and Prevention, and

4) Supporting Governmental Action.

Focused Studies

In early 2011, the Four Rivers Watershed Watch completed collection of samples for the Red Duck Creek focus study. Four Rivers Watershed Watch partnered with Murray State University and the City of Mayfield to conduct a focus study along Red Duck Creek, trying to ascertain the potential sources of high bacteria levels observed in this stream for years. Samples collected during this study included E. coli, chloride, nitrate and total phosphorus samples. Bacterial source tracking was also performed by Western Kentucky University WATERS Laboratory in Bowling Green, Kentucky. This investigation is ongoing.

Grant Applications

In 2010, assisted by an EarthForce grant in the amount of $10,000 the Salt River Watershed Watch (SRWW) worked with the Jefferson County Public School District to promote water quality awareness among local high schools and middle schools. SRWW volunteers work with teachers to assist them in taking students out to streams for investigations, surveying their school campuses for stormwater runoff issues, and providing in-class assistance as needed.

Pollution Detection & Prevention

The Kentucky River Watershed Watch supports turning data into action, using "CAPs"—citizen action plans. One of our most successful groups is the Friends of Wolf Run (FOWR). FOWR has documented a number of episodes where their monitoring activities have been reported to governmental entities, sometimes resulting in effective responses to prevent further water pollution. These include:

Hank Graddy at the river.

1. Leaking Sanitary Sewers:
   Discharge of Pathogens Into Waterway
   Commercial Service Line Connection
   November 2005

   FOWR documented high E. Coli values at sampling station in Fall of 2005. Results were provided to the Lexington Division of Sanitary Sewers in November. LFUCG Sanitary Sewers, who dispatched a survey crew to look for potential sources of contamination and provided technical assistance to FOWR using a dye-tracing project designed to check for leaks in sewer trunk lines. (No leaks were found) Lexington Sanitary Sewers crews continued to check the area with smoke testing equipment and found a leak in a commercial building's service line connection. LFUCG Sanitary Sewers repaired the leak.

2. Stormwater Runoff:
   Oil, Grease and Total Suspended Solids
   Chevron USA Lexington Terminal
   June 2005

   Neighbors contacted Friends of Wolf Run about petroleum smell and rainbow slicks

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in a runoff ravine entering Preston's Spring Branch. FOWR Pollutant Source Tracking Volunteers traced the channel to the back of the Chevron Bulk Station.Kentucky Division of Water cited the bulk station for KPDES Permit limit for Total Suspended Solids in June of 2005. FOWR Continues to monitor the runoff for oil and grease.

Supporting Governmental Action

Recently, the Kentucky Division of Water (DOW) gave public notice for a Total Maximum Daily Load (TMDL) for pathogens in Elkhorn Creek, a tributary of the Kentucky River, and a watershed that includes portions of Lexington. In making the case that the Elkhorn Creek was required to have a TMDL for pathogens, the DOW included 13 years of data gathered by the Kentucky River Watershed Watch.

HOW TO RECRUIT VOLUNTEERS

The quick answer: Ask! We started with several resources and we used them as effectively as possible.

1. Start with Who You Know

Prior to our initiative, Ken Cooke (currently retired from the Kentucky Division of Water and a leader in the Friends of Wolf Run) had been employed by the DOW to teach water quality monitoring as a public education program, called the "Kentucky Water Watch" program. This state-run, state-funded program was primarily aimed at teaching water chemistry to high school students and to concerned citizens, but no attempt was made to actually use the water testing results. However, this experience had created a list of citizens across Kentucky who had been issued field chemistry water monitoring kits [in most cases, Hoch kits for dissolved oxygen, pH and temperature].

In 2004, the Division of Water adopted a policy to allow the use of citizen water quality data for all purposes provided the data was gathered with proper quality assurance:

http://water.ky.gov/ww/pages/default.aspx

Go to the 3rd paragraph and click on "Learn more."

2. Promote Your Program

We used our existing access to the print and television media to "get the word out." In 1997, we called upon a friendly reporter with the local newspaper who wrote an article titled, Volunteers Needed to Monitor Kentucky River. We held our breath to see if anybody would show up. Thirty strangers showed up at the Monterey Baptist Church and became our first samplers. Growth and recruitment since 1997 has been primarily by word of mouth, and by our ability to obtain earned media coverage. The local Lexington newspaper has continued to print our opinions (e.g., op-eds), which promote water quality by encouraging volunteerism.

3. Acquire Funding

Recently, we have encountered funding constraints that have caused us to have to cut back our sampling programs in our local basins.

However, we hope that will change this year. In January, the Watershed Watch in Kentucky program was awarded a CWA 319 grant from EPA to significantly improve our water monitoring capabilities. The grant is for $264,174, with matching funds of $176,116 required from WWKY. This new award is for enhanced training —not for laboratory expenses—but it clearly allows us to resume recruiting new volunteers into the WWKY program.

HOW TO TRAIN

We involved our volunteer science advisors. Again, we benefited from some resources available when we started, and from a strong commitment to listen to the scientists who were willing to help us.

1. Experience Begets Experience

Ken Cooke's experience with the Kentucky Water Watch program gave us several resources when we began. The Water Watch program had helped him connect to the water scientists at our universities and colleges and in high schools across Kentucky. Ken's experience also gave us a starting place for training materials and equipment.

2. Start Small

After several early consultations with volunteer scientists, we agreed upon an initial training program and sampling program. Being overly ambitious, at first we trained our volunteers to sample water quality using all four sampling methods: 1) field chemistry, 2) grab samples to be tested at a certified lab, 3) habitat assessment using US EPA forms, and 4) macro-invertebrate collection, using a variation of the Izaac Walton League methodology dip net and pan and key. We began the training in the classroom and went to a stream to give every volunteer "in stream" training. At each training event, we helped each volunteer find a sampling site, and we recorded that site on the sampler's certificate, along with the equipment we were checking out to the sampler. At the end of each training event, our trained volunteers got their tee-shirt with Reclaim the River across the front. This made for a long day of training.

3. Reuse & Replicate

As we grew from the Kentucky River into each of the other seven local basins, we used the same training materials and, in general, the same sampling program. In general, each basin would take a grab sample for certain herbicides and pesticides in May, a grab sample for pathogens in July and August, and a "low flow" sampling for nutrients and metals in September.

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4. Coordinate

As we grew the program, we set up areas coordinators and "runners" who would collect samples and chain of custody forms to help get our samples to the labs on time—especially with our fecal coliform or E. coli samples in July, our re-sampling for pathogens at our worst sites in late summer, and an expensive sampling for multiple metals and nutrients during what was expected to be the "low flow" portion of the year, in early September.

5. Adapt as Needed

After several years of experience, we modified the training program to offer a Phase I and Phase II training opportunity. In Phase I we would train to use the Field Chemistry equipment (some basins have added conductivity meters to the equipment we issue) and grab samples, including the opportunity to do "focus sampling"—multiple samples taken pursuant to an approved Standard Operating Plan (SOP) and an approved Quality Assurance Protection Plan (QAPP). In Phase II, we would train to do habitat assessments and macro-invertebrate collection.

The practical effect of this division of the training is that our volunteers have dramatically reduced their habitat assessments and macro-invertebrate collection. The weakening of this aspect of our sampling program, when the DOW appears to place increased reliance on biological integrity as the preferred measure of water quality, was one of the major factors that resulted in the above referenced CWA 319 grant to the WWKY.

6. Keep Them Current

This Spring, as part of the CWA 319 award, we are "re-training" all of our trainers to equip them to teach the new habitat and macro-invertebrate training "modules."

In spring 2012, we will conduct our 16th year of training concerned citizens across Kentucky to go to their spring, creek stream and, in some cases, their river to act as the owners of that waterbody should act—to take a scientifically defendable water sample, and to cause the results of that sample to be entered on our WWKY data base—where the public and resource protection agencies are able to access that data and decide what action that data compels.

HOW TO RETAIN VOLUNTEERS

Our volunteers must believe that their data matters, and they must enjoy their work. This is probably the most difficult issue facing all volunteer organizations. Based upon our 15 years of recruiting and training, and then trying to retain volunteer water samplers, we offer the following observations.

1. Make Data Matter

Our program was built upon the implicit—and occasionally explicit—"promise" to our volunteers that we would help make sure their data would matter, that it would be used in some way to accomplish improved water quality.

One way we tried to make the data matter was to encourage our volunteers to take their data into their own hands and prepare Citizen Action Plans (CAPs). This has had limited success, but with several very exciting and positive examples, such as the Friends of Wolf Rune. Another approach relies upon the local basin leadership to use data to comment on NPDES discharge permits, CWA 305(b) listing actions and TMDL development, as well as other forms of advocacy, such as opposing zone changes that would adversely impact already impaired waters.

2. Engage Volunteers as Ambassadors

Many of our volunteers are teachers at the high school of college levels, and these volunteers are usually very comfortable presenting their data to students, neighbors and local officials.

3. Make It Fun

Volunteers must want to be volunteers, which mean they must enjoy getting into the stream and getting wet. Those of us trying to run an organization built upon volunteers must not forget this essential piece.

There is increasing concern that the kind of volunteerism that helped us build the Watershed Watch in Kentucky program is waning and that future volunteers will not commit to one organization for more than one event, much less keep sampling for 15 more years. Stay tuned.

The Best Moments

I have had the opportunity to spend most of my adult life as an advocate for the environment —especially the water quality aspect of environmental protection. I have performed that work as a professional—as an attorney representing citizens and environmental organizations; as a national policy advocate—as former chair of the Sierra Club national Clean Water/Stop CAFOs campaign; as a regional policy advocate—I am currently co-chair of the Sierra Club Mississippi River Issue Team; as a state and local policy advocate, and as the advocate for Glenns Creek, which flows from the City of Versailles, past the wastewater treatment plant, and past the Woodford Reserve Distillery (maker of Woodford Reserve Bourbon Whiskey), and past the Millville Community Club, where kids of all ages play in the creek, before it empties into the Kentucky River.

When I am asked to think about my best moments as an environmental advocate, my answers are easy. My best moments are sitting on a rock in Glenn's Creek, holding my pH meter up to the sunlight at 7:30 am in mid-July, for the past 14 years, making a permanent contribution to the data within the scientific and regulatory community about the condition of my creek, and making another permanent contribution to my faith that my life has some purpose.

THANK YOU!

Watershed Watch in Kentucky would like to acknowledge the Virginia Environmental Endowment for its ongoing financial support of our work.

Industrial Stormwater:

Monitoring for a Solution to a Persistent Problem

By Mark Riskedahl
Northwest Environmental Defense Center
www.nedc.org

The Northwest Environmental Defense Center (NEDC) is a small nonprofit organization based at Lewis and Clark Law School in Portland, Oregon. NEDC and its members love clean water. It turns out, they're not alone. In poll after poll, Americans list clean water as their top environmental priority. That finding was confirmed in a poll conducted recently by Oregon Public Broadcasting. The firm that conducted the poll stated that residents of the Pacific Northwest "mentioned water quality more than anything else, and when we gave them a list to choose from, they still rated water quality as their top concern."

The poll also found that the greatest category of concern for residents across the region is "Discharge From Industrial and Commercial Sites." NEDC shares that concern, and has devoted time and energy in recent years to tackling the problem of industrial stormwater pollution. The group has created an aggressive industrial stormwater monitoring and enforcement initiative, and has spent many hours out in canoes and kayaks during rain events taking pictures, video and water quality samples.

They have also spent a lot of time working to insure that Oregon's industrial stormwater permit terms are as protective as possible.

In 2007, the Pacific Environmental Advocacy Center at Lewis and Clark Law School represented NEDC and its partner Columbia Riverkeeper in a challenge to the terms of Oregon's previous industrial stormwater permits. To its credit, the Oregon Department of Environmental Quality (DEQ) recognized the numerous legal inadequacies with its old permits, and committed to a rigorous review and comprehensive revision of those permits.

The agency embarked on a time-consuming, but ultimately very thorough effort to assess nearly every aspect of industrial stormwater pollution. In 2009, it convened a work group that met on 16 separate occasions. NEDC's Executive Director, Mark Riskedahl, attended these meetings, and also had numerous additional meetings and calls with agency staff as they worked towards finalizing the terms of the new permits.

Late last year, Oregon DEQ issued the revised permits. These permits are considered by many to be the most protective in the nation; they require substantially increased efforts and attention by industrial polluters to the water quality problems they cause.

Though a confluence of many factors led to more protective permit conditions, the stormwater monitoring that NEDC did leading up to its lawsuit against the agency played a key role in the creation of one of the newest permit requirements: increased monitoring for toxic heavy metals. NEDC targeted several high-profile industrial sites, ranging from shipyards to scrapyards, located the outfalls discharging polluted stormwater from the sites, and collected samples during rain events. Through this effort, the group demonstrated that the sites frequently discharged a wide range of heavy metals, not

Collecting water samples in Portland's Comumbia Slough Watershed.

Under the new Oregon stormwater permit terms, industrial facilities are now also required to monitor for cadmium, nickel and chromium. Additionally, auto salvage yards must monitor for mercury; and scrap metal facilities must monitor for mercury and PCBs.

just the three metals for which the prior permit required monitoring: copper, lead and zinc.

With the lab results from their water quality monitoring in hand, they were then able to compel the agency to perform a scientific literature review to assess whether studies and data collection efforts by federal and other state agencies supported our field findings. As it turned out, their concerns were warranted.

EPA, for example, found in research it conducted to support its industrial multi-sector general permit that:

- arsenic and chromium appeared in industrial stormwater more than 50% of the time,
- nickel and cadmium appeared more than 40% of the time,
- cyanide appeared more than 20% of the time, and
- antimony, beryllium, and selenium appeared more than 10% of the time.

Of course, more protective permits are only valuable if compliance with their terms is adequately enforced. In an era of diminishing state agency resources, independent citizen enforcement plays an increasingly critical role in water quality protection. Now that the group has secured stronger, more protective permits in Oregon, they intend to turn their energy towards enforcement work.

The results of Clean Water Enforcement work can be dramatic. "One of our greatest rewards is getting back out on the water to sample stormwater discharge from a facility that has been the target of one of our enforcement efforts, and finding that pollution levels have been substantially reduced," said Mark Riskedahl, NEDC's Executive Director. "It remains our strong belief that industrial stormwater pollution reduction work provides one of the best remaining opportunities available as the Nation works towards meeting the Clean Water Act's goal of fishable and swimmable waters for everyone."

Construction Stormwater:

Why Your Eyes & Voices Are Needed More than Ever!

By Mike Mullen
Choctawhatchee Riverkeeper
sites.google.com/site/chocrivkeeper

I have been inspecting and reporting permit violations at construction sites for over ten years now. When I first reported a noncompliant construction site it was because there were three such sites within a quarter-mile of my home and numerous noncompliant sites at the University where I worked. At the time I was not yet a Waterkeeper and was not even aware that the Waterkeeper Alliance existed. I was doing education and outreach work under contract to the Alabama Department of Environmental Management (ADEM). When I first started filing complaints it was common for ADEM to issue repeated warning letters and repeated notices of violation before progressing to a penalty order if they ever got that far. Orders to cease activity were not even used, and I remember an exchange with an enforcement person who said that he had no authority to use cease orders and would not use them if he could.

Enforcement in Alabama has improved somewhat over the years, but enforcement seems to have peaked sometime in late 2009 or early 2010. Things improved to the point that ADEM was no longer issuing multiple warning letters or multiple notices of violation on the same site, and they were using cease orders very effectively. It also appeared ADEM was progressing toward issuance of penalties a little faster. One might ask: Why did things change at ADEM? Why does it appear that ADEM is regressing at this time? What might be done to get trends going the right way again?

In my opinion, it was not the complaints filed by Choctawhatchee Riverkeeper, Hurricane Creekkeeper and others that resulted in improvements in enforcement at ADEM. Patrolling and filing complaints are important, but are only one of the actions that are needed. Both myself and Hurricane Creekkeeper, John Wathen, applied pressure by sending frequent followup emails and phone calls to ADEM enforcement folks and the special assistant to the Director, asking when enforcement was going to occur. Over time, letters complaining about the lack of enforcement to EPA Region 4 and to the editors of newspapers became frequent. A majority of the letters to the editor were published. Presentations were made to the Alabama Environmental Management Commission (AEMC - charged with oversight of ADEM) with the same complaints.

The first real change that occurred was that pressure from EPA Region 4 caused ADEM to cease issuing multiple warning letters and multiple notices of violation. The pressure on ADEM created by the published letters ultimately forced ADEM's assistant to the Director to admit that its construction stormwater program was out of control. Around this time, ADEM began to use cease orders on some sites in my river basin with reasonably good success. Because of these positive enforcement trends and the large decrease in construction activity, efforts to create public exposure of ADEM's failure to enforce decreased.

Across the nation, many states and local jurisdictions have historically been rather soft on enforcement of construction stormwater permits. With the economic downturn and the huge drop

Runoff from a project in Alabama that initially employed inadequate BMPs—straw—when a high quality erosion blanket was needed.

in construction activity, regulators have been even more reluctant to enforce construction stormwater permits. However, this situation will not last forever and, as construction increases, agencies will find themselves more short-handed than ever before due to state and local budget cuts. The eyes of river advocates, your eyes, will be needed more than ever to report construction permit violations. Your voices will be vital to assure that laws are being enforced and that violators are convinced that erosion and sediment control are an essential part of the construction job.

There are a number of ways and different levels of involvement for river advocates who want to become involved in seeing that construction stormwater is controlled. At the most fundamental level, that simply involves determining who your local or state contacts are for reporting stormwater violations and submitting your complaints. In some places, there are numbers established by your local stormwater program or your state to receive complaints. Alabama has an internet-based complaint system that soon will have the capability for uploading digital images. If you know the contractor, you may want to communicate that there appears to be a problem and that you would like to see the situation corrected so you do not have to file a complaint. Some contractors will want to learn more about how to do more detailed inspections and file more detailed reports complete with digital photographs. If you have a Waterkeeper Alliance member in your river basin you might encourage them to join the Waterkeeper Alliance member organizations involved with the Muddy Water Watch program; visit **www.muddywaterwatch.org**.

You will probably develop your own process for looking at construction sites as I have. When I look at a site for the first time, I initially look to see if there is or has been recent offsite transport of pollutants. If there is runoff during or shortly after a significant rain event, look for highly turbid water leaving the site. If you have a way to measure turbidity, collect a sample at the discharge point and take a picture (if at all possible, collect samples upstream and downstream of outfalls discharging from the site). If your camera does video, get a short video clip in addition to your photos and use the audio to describe where you are and what you see. If it has stopped raining, and there is no active runoff, look to see if there is fresh sediment (the color of the material on-site) deposited offsite. If so, take pictures and get a short video clip. Whether there is offsite pollutant transport or not, document

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Employment of acceptable BMPs: Diversion of offsite water.

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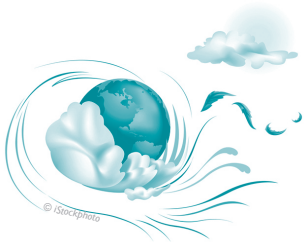
the status of the erosion and sediment control measures onsite. If it is a new construction site, I check first to see if sediment detention ponds have been installed before there is large-scale land disturbance. I then check to see if offsite water is diverted away from the site or if not whether it is put into stabilized conveyances. Finally, I check for erosion control and sediment control BMPs.

Erosion control is ground cover and temporary or permanent seeding—mulch, compost, hydromulching, erosion control blankets or sod. In many jurisdictions ground cover in the form of temporary vegetation is required on the 14th day that there is not active construction on a site or any substantial part of a site. Keep a log of your inspections and note on complaints if there has been bare ground for 14 days or longer.

Sediment control BMPs are devices like silt fence and inlet protection devices that filter out the sediment or that allow it to pond long enough for larger particles to settle. I check to see that these measures are properly located and maintained. These are all things that volunteers with a modicum of training can do. Muddy Water Watch provides this training! As a Certified Professional of Erosion and Sedimentation Control (CPESC), I am able to go beyond this and point out problems with the choice of BMPs utilized—such as use of straw bales as if they were treatment devices.

In any case, just get out there and report pollution from construction sites. Be careful and be safe to avoid dangerous situations. Know your local laws on trespassing and avoid creating legal issues for yourself or for your organization.

Once you have collected images and have reported probable permit violations, finish the job! Work with others to assure that your efforts or the efforts of your group go from data to action. Don't hesitate to use the media to complain if your agencies are not enforcing construction stormwater permits.



Resources & References

There are numerous online resources available for both new and experienced water quality programs; below is a sampling.

RESOURCES & GUIDES

The **Alliance for Aquatic Resource Monitoring** (ALLARM) is an environmental organization based out of Dickinson College that empowers local communities with scientific tools to assess, protect and restore waterways. Since 1986, ALLARM has provided technical assistance to volunteer stream monitors in the state of Pennsylvania.

www.dickinson.edu/about/sustainability/allarm

Community-Based Water Monitoring: A Practical Model for Global Watershed Stewardship, edited by William Deutsch, Sergio Ruiz-Cordova and Bryan Duncan, describes the formation, approaches and accomplishments of a variety of citizen groups that have monitored water quality and quantity since the early 1990s. This book is primarily for the practitioner. It is written for water monitors, group leaders, policy makers, educators and members of the scientific community who interact with multiple stakeholders for holistic watershed stewardship. Contact Alabama Water Watch for ordering information:

info@alabamawaterwatch.org

The **National Water Resource Project** (NWRP) has created a comprehensive support system for Extension volunteer water quality monitoring and citizen science efforts across the country. The goal is to expand and strengthen the capacity of the existing Extension Volunteer Monitoring Network and to support development of new programs. The site has numerous free, downloadable .pdfs, including 'Getting Started,' 'Building Credibility,' 'Monitoring Program manuals' and much more.

www.usawaterquality.org/volunteer

Additional resources can also be found here:

www.usawaterquality.org/volunteer/links.html

The **National Water Quality Monitoring Council** was created in 1997 as a vehicle for bringing together diverse expertise needed to develop collaborative, comparable and cost-effective approaches for monitoring and assessing our Nation's water quality. The Council provides a national forum for coordination of comparable and scientifically defensible methods and strategies to improve water quality monitoring, assessment and reporting, and promotes partnerships to foster collaboration, advance the science and improve management within all elements of the water quality monitoring community.

http://acwi.gov/monitoring/vm/resources.html

U.S. EPA's Volunteer Monitoring site encourages all citizens to learn about their water resources and supports volunteer monitoring because of its many benefits. The site contains fact sheets, links to directories and newsletters and lists of helpful resources, including manuals and upcoming conferences.

http://water.epa.gov/type/rsl/monitoring/index.cfm

The Volunteer Monitor newsletter facilitates the exchange of ideas, monitoring methods and practical advice among volunteer environmental monitoring groups across the nation. It is available both electronically and hard-copy.

http://water.epa.gov/type/rsl/monitoring/info.cfm

LISTSERVS

U.S. EPA Volunteer Monitoring LISTSERV is an electronic community network where you can ask questions, solicit input and provide information on any volunteer monitoring program or administrative topic. To subscribe to the LISTSERV, send a blank email message to:

volmonitor-subscribe@lists.epa.gov

The **National Water Resource Project**. The Univeristy of Wisconsin's-Extension has created a LISTSERV to exchange information with water quality and monitoring program coordinators. To join this email list service, use the form at

https://lists.uwex.edu/mailman/listinfo/csreesvolmon

They also have an extensive archive of select interactions to help ensure that the knowledge shared through them can reach as wide an audience as possible.

River Network
Connecting People, Saving Rivers
520 SW 6th Avenue, Suite 1130
Portland, OR 97204-1511

River Network Partnership

A Co-op of River & Watershed Organizations

www.rivernetwork.org/programs/partnership-program

Partnership Benefits

Promote Yourself
- Advertise Jobs & Events
- Promote Blogs & e-Newsletters
- Sell Products through Our Marketplace

Find Funding
- Grant Opportunity Alerts
- *Grassroots Fundraising Journal*
- NOZA Database of Charitable Funding

Save Money on Goods & Services
- CC Payroll
- Global Water Monitoring Equipment
- Insurance
- Online Mapping
- Orion Magazine
- ProMotive.com
- Watergrass Database Design
- Wish Lists

Learn More & Gather Info
- Toll-free Partner Hotline
- *eStream*
- One-on-One Assistance
- Publications
- Resource Library
- River Rally Conference

Build Community
- Quarterly Webinars
- Listserv
- River Network Partner Logo
- Share Success Stories

Partnership Benefit Highlight

Alliant

As the country's premier provider of insurance to 501(c)3 organizations, Alliant offers the Conserve-A-Nation® program to River Network Partners nationwide. Conserve-A-Nation® is designed to anticipate and fulfill the unique insurance needs of environmental protection & advocacy groups, including:

- Watershed Councils
- Waterkeepers
- Land Trusts
- Nature Education Centers
- Botanical Gardens

Areas of Expertise Include:
- Canoe & Kayak Activities
- Fundraising Events
- Watershed Clean-Ups
- River Festivals
- Volunteer Coverage
- Nature Education Programs