

## NERRS Science Collaborative Progress Report

**Reporting Period:** March 1, 2012 – August 31, 2012

**Project Title:** Implementing Credits and Incentives for Innovative Stormwater Management

**Principal Investigator(s):** Amy H. Brennan

**Project start date:** November 15, 2011

**Report compiled by:** Amy H. Brennan

### **Contributing team members and their role in the project:**

- *Project Coordination and Fiscal Agent:* Amy H. Brennan; Chagrin River Watershed Partners, Inc.
- *Collaboration Lead:* Heather Elmer; Old Woman Creek National Estuarine Research Reserve with Ona Ferguson; Consensus Building Institute providing Collaboration Technical Assistance
- *Applied Science Investigator:* Jay D. Dorsey; ODNR, Division of Soil and Water Conservation
- *Additional project team members:*
  - Breann M. Hohman and Crystal Dymond; Erie Soil and Water Conservation District
  - Frank Lopez and Cheryl Wolfe-Cragin; Old Woman Creek National Estuarine Research Reserve

### **A. Progress overview:**

The goal of this project is to promote the implementation of Low Impact Development (LID) and other innovative stormwater systems in the Ohio Lake Erie Basin by addressing barriers to implementation, gathering data on local best management practices (BMPs), building capacity of local stormwater professionals, and developing tools to effectively guide communities and consultants toward more sustainable stormwater management. This project will also highlight the role of LID in adapting to changes in rainfall volumes and intensities due to climate change. The project team includes the Chagrin River Watershed Partners (CRWP), Old Woman Creek National Estuarine Research Reserve (OWC NERR), Ohio Department of Natural Resources Division of Soil and Water Resources (ODNR-DSWR), Erie Soil and Water Conservation District (Erie SWCD), and the Consensus Building Institute (CBI).

Planned activities during this reporting period include: meetings and coordination with the project team and collaborative learning group (CLG), assist with design of BMPs, characterize site soils at BMP locations, begin monitoring, develop, calibrate, and validate models, provide training through CLG, and provide technical assistance on adoption and implementation of local codes. CRWP entered into contracts with Avetin Engineering to complete modeling work and ODNR-DSWR to complete monitoring and modeling components and to provide technical assistance and guidance throughout the project. In addition, CRWP is negotiating a contract with North Carolina State University (NCSU) and Biohabitats to complete the monitoring components of this project. CRWP and Erie SWCD have been working with communities to develop potential projects that may be designed or monitored through this project. The project team selected five (5) sites to assist with the design and possible monitoring of BMPs, 2 of which are still pending funding for construction. ODNR-DSWR completed infiltration tests at 2 of these sites and the design for the Perkins Township Administration Building stormwater BMPs have been reviewed and modified to meet the objectives of this project.

CRWP and Erie SWCD have been working with communities to adopt and implement model zoning codes to promote good land use decisions and promote LID, including a workshop with Erie County communities to discuss model code language and adoption. CRWP is also revising our model regulations for stormwater management and off street parking and provided adoption and implementation assistance to numerous CRWP Member communities.

### **B. Working with Intended Users:**

During this six month period the project team has continued regular conference calls and in person meetings and has held two CLG meetings and site visits with intended users. The two CLG meetings held during this reporting period (April 4 and July 18, 2012) went very well. They are summarized briefly here, but for more detail, please see the complete meeting summaries posted on basecamp. Likewise on basecamp are two Project Updates that were sent to the CLG between CLG meetings to keep them abreast of project activities. Attendance at the CLG meetings was strong though a few members have not been able to participate since the first meeting. We have checked in with the absent members and they have

indicated that they could not attend due to scheduling conflicts, expressed their continued interest in the project and said they would like to remain part of the group. One group member expressed concern that currently all candidate sites are public projects, noting that he would like to see a commercial project included. The project team is exploring opportunities to include a commercial project among the sites.

*The April 4 meeting* included a site visit to a project under consideration for monitoring and discussion with the project engineers and the project's Applied Science Lead regarding monitorability of BMPs. There was a presentation about another potential monitoring site, which was ultimately re-designed with technical assistance from the project team to ensure BMPs were capable of being monitored. CLG members talked extensively about what makes something monitorable and methods for reconciling monitoring needs with site constraints. Based on the group's questions, the project team is developing a fact sheet entitled "Making Stormwater BMPs Monitoring Capable". A draft version of this fact sheet was presented at the July CLG meeting for feedback from CLG members.

At that meeting, we also began to institute the idea of some interactive exercise or component designed to help the CLG learn new skills or work better together. In this case, Ona Ferguson presented some key negotiation concepts (interests and positions) and shared reflections on the strengths and weaknesses of various modes of communication (online, phone, in person) for different types of interactions among group members.

CLG members were given the opportunity to provide input on an RFP through which the project team awarded funds to assist with the design of priority BMPs that they had selected. The RFP was finalized and released before the April meeting and CLG members were asked to help circulate the RFP. A draft RFQ for a monitoring contractor was shared with the CLG immediately following this meeting for comment.

*At the July 18 meeting*, the CLG visited a construction redevelopment site for the Perkins Township administration building. We built on lessons learned from our first site visit and brought microphones so people could hear the discussion clearly and participate, we began the session with an indoor introduction to the site and construction process, and more carefully structured the various segments of the site visit to ensure participants could all hear and discuss the project at hand. Pervious concrete and a swale planned for the site were re-designed to be monitorable by a CLG member, with technical assistance from the project's applied science lead. The group observed a demonstration of the soil infiltration test being completed at potential project sites, walked the site, reviewed the BMP designs, asked questions, and made suggestions. During the site visit, Project Team members and CLG member discussion surfaced several constraints and challenges associated with design and monitoring.

After the site visit, participants had a more formal sit down CLG meeting. Participants gave feedback on the site visit and said they really appreciate the opportunity to see a site during construction, to see an infiltration test and to understand the details about one of the demonstration and monitoring sites. Some liked seeing site constraints like elevation first hand, while others liked hearing about challenges encountered and solutions developed during site design. CLG members indicated interest in seeing each project at various stages of development to fully understand each site. At this meeting, the activity designed to help the group work better together was a 20 minute segment in which CLG members talked one-on-one with someone they don't know well about their experience with trying to do creative stormwater projects. Key outcomes from this meeting included updating the CLG on modeling progress and on the sites selected for design assistance support and a discussion of the barriers to effective stormwater codes (to be taken up in more detail in maybe 6 months or more).

Following the July meeting, CLG members were sent an online survey to gather their feedback regarding their participation in the project overall during this first six months. 14 of 17 CLG members completed the survey. 77% of respondents agreed or strongly agreed that participating in this project was a good use of their time, and the same number indicated that they have learned something new that they will apply in their work or future decisions. 67% have shared information from collaborative learning sessions with others and 75% indicated that they are using information from the project in their current work or decision-making. 67% indicated that they have experienced obstacles to applying the outcomes of the project, some specifically cited cost, a compliance rather than outcomes focus of stormwater designs, skepticism regarding BMP

performance, lack of education, and lack of political and public acceptance as barriers. Complete results can be found at: [http://www.surveymonkey.com/sr.aspx?sm=ghSIW\\_2b16yyS69VM08BSIbWawQfKuilye5K5KA2swUbk\\_3d](http://www.surveymonkey.com/sr.aspx?sm=ghSIW_2b16yyS69VM08BSIbWawQfKuilye5K5KA2swUbk_3d)

CRWP, Erie SWCD and Cleveland State University completed a workshop on August 1, 2012 for Erie County communities interested in updating or adopting local codes to more effectively manage stormwater and maintain compliance with state and federal regulatory programs.

### **C. Progress on project objectives for this reporting period:**

*Objective 1: Engage stormwater professionals in a collaborative process to identify and remove regulatory and technical barriers to implementation of LID in Ohio.*

1. Completed activities and products:
  - a. Held two collaborative learning group (CLG) meetings
  - b. Produced two project updates for CLG members and others interested in the project
  - c. Drafted "How to Make BMPs Monitorable" fact sheet
  - d. Provided training on soil infiltration testing
  - e. Documented lessons learned, conflict, and ideas from CLG meetings in summaries.
  - f. Developed a process flow that will guide involvement of the project team and CLG in design, construction, and monitoring of stormwater BMPs.
  - g. Established a contact list for intended users and others interested in receiving project updates.

*Objective 2: Quantify BMP specific and site level hydrology for local soil and climate characteristics.*

1. Assist with design, construction oversight, and monitoring of LID BMPs
  - a. Selected 4 possible sites for design assistance.
  - b. Selected 6 possible sites for monitoring.
  - c. Assisted Perkins Township with design of stormwater BMPs at the new administration building site.
2. Characterized soil infiltration at Perkins Township and Old Woman Creek NERR

*Objective 3: Simultaneously model treatment of water quality and quantity volumes to meet local and state requirements.*

Modeling contractor, Avetin Engineering, developed historic continuous and design event data sets in electronic format (one each) for Chagrin River Watershed and Erie County including full period of record, typical year, wet year, and dry year sets necessary to run models. In addition, Avetin provided a literature summary outlining state of the science on: 1) quantification of evapotranspiration (ET) in urban environment; 2) quantification of ET for stormwater BMPs; 3) ET accounting methodologies. Finally, Avetine compared 3 commonly used rainfall frequency data sets (NOAA Atlas 14, Bulletin 71, and TP40). This analysis showed that NOAA Atlas 14 is based on the most updated data and generally estimated rainfall depths for various durations and frequencies are in good agreements.

*Objective 4: Adapt models to include rainfall runoff scenarios anticipated as a result of climate change and characterize climate change adaptation functions of LID BMPs.*

No work was proposed for this objective in this reporting period, however the project team is reaching out to several researchers that may be developing climate change predicted rainfall patterns.

*Objective 5: Develop and provide training and technical assistance materials to build capacity of stormwater professionals and communities to implement LID approaches.*

1. Informal training with CLG.
  - a. CLG meetings on April 4 and July 18, 2012 provided training on soil infiltration and discussions on designing BMPs to allow monitorability and to address barriers to effectively developing stormwater management codes.
2. Provide formal training and technical assistance.
  - a. CRWP, Erie SWCD, Ohio EPA, and Cleveland State University provided training to Erie County communities on codes to more effectively manage stormwater and maintain regulatory compliance.

3. Model regulations that remove regulatory barriers to LID
  - a. CRWP is revising our regulations for stormwater management and off street parking.
4. Technical assistance on the adoption and implementation of local codes and project recommendations.
  - a. CRWP and Erie SWCD provided technical assistance on possible stormwater retrofits, codes for downspout disconnection, riparian setbacks, erosion and sediment control, stormwater management, conservation development, and off street parking.
5. Ohio specific guidance on design, construction, cost, operation and maintenance of BMP's
  - a. CRWP is working with Cuyahoga County Board of Health, Cuyahoga SWCD, Ohio EPA and ODNR-DSWR to develop guidance for the operation and maintenance of stormwater BMPs for Ohio.

**What data did you collect?**

- Projected continuous and design event data sets in electronic format for Chagrin River and Erie County/Old Woman Creek including typical year, wet year, and dry year sets necessary to run models.
- CLG input on barriers and gaps in stormwater codes, permits, and guidance, and how to improve consistency.

**Has your progress in this period brought about any changes to your methods, the integration of intended users, the intended users involved or the project objectives?**

The project team realized that with each stormwater project for which we provide design assistance, we need to be sure we are (a) documenting the experience so we can share lessons with other members of the Project Team and with the CLG, and (b) staying coordinated so the Project Team members working on a given site stay closely coordinated with the rest of the Project Team as they are making decisions. We have developed a new protocol for working with each site, laying out the process of engagement among the Project Team members, CLG members, site owners, engineers, contractors and Ohio EPA for designing BMPs for each site. This will be used in contracts with the sites we provide design dollars to so that they understand what is expected of them in terms of opening their process to the CLG and others to learn and benefit from.

**Have there been any unanticipated challenges, opportunities, or lessons learned?**

- The July CLG meeting brought up communication challenges regarding project team and end user engagement in site design. A process flow has been developed to address this challenge and a project team point person has been designated for each project receiving funding for stormwater design or to be monitored through this project (available on basecamp). The point person will be involved in every stage of project development and will be responsible for tracking and communicating lessons learned to the rest of the team and CLG.
- The July CLG meeting also exposed points of conflict between agency regulators and technical assistance providers participating in the project with regard to design standards and classification of BMPs. The collaborative leads will facilitate separate discussions with the goal of achieving consensus and consistent interpretation which would be beneficial and reduce barriers for this and other stormwater projects.
- To date we have found that CLG members who come from a range of backgrounds are working very well together and able to think through challenging topics jointly. There have been some insightful discussions helping to shape the projects undertaken. Likewise, a few key challenges have begun to emerge. There are times when the group seems to trust the Project Team and not need to be too involved, for example in providing guidance on the modeling work. We continue to update them on that work and seek a small handful of people to ground truth our approach on that activity.

**What are your plans for meeting project objectives for the next six months?**

In the coming 6 months, we anticipate holding two more quarterly CLG meetings (one to be held on October 18). We plan to shift to holding longer CLG meetings three times a year starting in 2013, as it is difficult to have a robust site visit (which requires an hour or more) and then have enough time to really dig in to discussions on other project activities at our sit down meeting (which may really require more than 2.5 hours). We will continue to send out one CLG Update, a one to two page synthesis of key activities, at the mid-point between meetings. We will also provide additional opportunities for CLG members to be engage in the design of projects funded through this project. Members will be invited to participate in design review meetings and site visits with site owners, design engineers, the project team, and the project's monitoring contractor, and will have the opportunity to comment on draft plans posted on the project's ftp site. The project team is also exploring

development of webinar capacity and the possibility of developing video and other multi-media tools based on the design and monitoring process to provide additional engagement opportunities and capture the process for use in future tools and training.

Objective 1:

1. Host and co-facilitate collaboration training for project team members and stakeholders.
2. Two quarterly CLG stakeholder meetings.

Objective 2:

1. Finalize contract with NCSU to complete the monitoring on the project.
2. Finalize contracts for design assistance at BMP monitoring sites
3. Site characterization at each monitoring site:
  - a. Characterize site soils, including soil and subgrade infiltration on sites where BMP monitoring is proposed
  - b. Design each BMP so discharge over the entire range of rainfall events can be measured
  - c. Characterize BMP drainage area and site watershed
  - d. Work with monitoring contractor, USGS and project team to fully instrument BMPs to track hydrologic performance
  - e. Calibrate weirs to develop a stage-discharge relationship
4. Begin data collection from monitoring of BMPs at Perkins Township Administration Building.

Objective 3:

1. Begin development, calibration, and validation of models that quantify infiltration capacity and hydrologic performance of LID BMPs.

Objective 5:

1. Provide informal training through CLG meetings.
2. Provide a formal training with CRWP staff, OWC NERR, Cleveland State University, and Erie SWCD to review CRWP model codes, adoption steps, and implementation tips and concerns. This "train the trainer" will increase the capacity of these organizations to work with their respective communities on model code adoption and implementation.
3. Provide technical assistance on the adoption and implementation of local codes and project recommendations.
4. Solicit CLG input on approach for training and tool development through this project.
5. Begin development of training materials on BMP life cycle.

**D. Benefit to NERRS and NOAA: List any project-related products, accomplishments, or discoveries that may be of interest to scientists or managers working on similar issues, your peers in the NERRS, or to NOAA. These may include, but are not limited to, workshops, trainings, or webinars; expert speakers; new publications; and new partnerships or key findings related to collaboration or applied science.**

Preliminary discussions regarding how this project can develop long term monitoring capacity while possibly laying the groundwork for a stormwater research center in Ohio may be applicable to other projects and regions.

**E. Describe any activities, products, accomplishments, or obstacles not addressed in other sections of this report that you feel are important for the Science Collaborative to know.**

- CRWP advertised a RFQ for a monitoring contractor and had seven responses, most of which had a private consulting firm completing the local contractor component. This further highlighted that there is not a local expertise in stormwater monitoring and this project presents an opportunity to expand this expertise. The project team will continue to work with our selected contractor to train local university and stormwater utility personnel to build the local capacity for stormwater monitoring in our area.
- The project team discussed the possibility of encouraging Ohio EPA to recommend or require that projects being awarded grant funding under Ohio EPA's Section 319 and Surface Water Improvement Fund (SWIF) programs be designed to facilitate monitoring for selected BMPs and is developing a fact sheet that will highlight what might be incorporated into a design to facilitate monitoring.