

Annual Report of Accomplishments 2004

Institutions: The Ohio State University, Michigan State University, University of Minnesota, University of Wisconsin, Purdue University, Iowa Dept. of Natural Resources

Project Title: Building Capacity of *E. coli* Monitoring by Volunteer Networks: A Multi-State Effort

Program: National Integrated Water Quality Program, Extension Education Project, 110

This report captures the status of 2004 activities of the six states participating in the project. The following section taken from the grant proposal lists the project activities in sequence. Each activity is followed by an update of tasks completed during 2004.

Proposed Project Activities in Sequence

1. Formation of Project Team. The project team, comprised of Volunteer Monitoring coordinators from each participating state, and the National Facilitation Project on Volunteer Monitoring, will be responsible for overall project coordination and implementation of state activities. This Project Team was formed in August 2002 following the Great Lakes Regional Strategic Planning session.

During 2004 the team met via 10 monthly conference calls as well as two team meetings held in Madison WI on March 3-4 and Oct. 20-21.

2. Select Best E. Coli Test Kit method. During the first year of the project, Indiana and Iowa, the two state partners that have the most developed Volunteer Monitoring program, tested five methods. The 5 methods being evaluated are: Coliscan(r) Easy Gel (incubated) (IA & IN), Coliscan(r) Easy Gel (not incubated) (IA & IN), 3M(tm) Petrifilm(tm) (IA & IN), Coliscan(r) MF Method Kit (IN only), Colisure(r) Method with IDEXX Quanti-Tray/2000(tm) (IA only). Indiana and Iowa will also evaluate test kits based on volunteer preference using the survey instrument developed by University of Wisconsin Evaluation Unit. Results will be shared with remaining partner states and a recommendation will be made on a preferred test method based on usability, accuracy and preference of volunteers.

Indiana and Iowa volunteers completed sampling in late fall. Comparison of their data for accuracy with lab samples along with the survey developed by Univ. of Wisconsin lead the team to move forward with continued assessment of 3 test kits in years two and three. The kits chosen to continue future sampling are: (1) Easygel - Incubated 24hrs. (2) 3M Petrifilm- Incubated 24hrs. (3) Colisure – Incubated 24hrs. Purdue University's statistical analysis of the results greatly assisted with decision making throughout this process.

2. Preparation of Teaching and Evaluation Materials. Also during Year 1, Michigan will take the lead developing training curriculum and materials. Wisconsin will take the lead on developing evaluation strategy and survey instrument. The other partner states will participate in the development of these materials and compile further background information on criteria for assessing educational goals.

Wisconsin developed the survey instrument and evaluation strategy. This was used at the completion of the sampling season with volunteers from Indiana & Iowa to help the Team determine which test kits to proceed with in years two and three.

Michigan has developed a training manual that will be used in late spring 2005 training sessions for volunteers in all six states. The manual is currently in its final revision and will be available prior to the spring 2005 trainings.

3. Formation of state-level advisory teams. A state Advisory Team will provide agency input to the state activities and be a foundation for strengthening these relationships. Nearly all states have these at this time. Some are more formal than others. Several are geared toward overall volunteer monitoring programs and some are more specifically targeted toward this project.
4. Incorporate Test Kit Recommendations into State Monitoring Programs. In Year 2, test kit recommendations (from step 2) will be incorporated into each state's Volunteer Monitoring program for further evaluation. Each state will a) identify watersheds and volunteer groups to conduct the evaluation b) provide training to these volunteers, and c) evaluate usability and preferences of volunteers.
5. Modify and Continue Testing, Training and Evaluation. Training, testing and volunteer evaluations will be modified and improved based on the results of year 2. Year 3 will continue these activities, while expanding the monitoring protocol in two key ways: a) new groups will be rotated in to test the ease of transfer within the state, and b) the same groups will continue to monitor a second year in a row to track proficiency through time.
6. Develop Final Project Report and Materials. A final project report and evaluation will be developed at the end of the project, by December 2006. This will include summary of test kit evaluations, qualitative description of water quality results and comparison across states, and recommendations for enhancing volunteer monitoring programs to conduct E. coli monitoring.

Project Timetable

Year 1 (2003-2004)

Iowa and Indiana test the 5 methods: Coliscan(r) Easy Gel (incubated) (IA & IN), Coliscan(r) Easy Gel (not incubated) (IA & IN), 3M(tm) Petrifilm(tm) (IA & IN), Coliscan(r) MF Method Kit (IN only), Colisure(r) Method with IDEXX Quanti-Tray/2000(tm) (IA only). Staff will also compare the methods. Iowa will specifically analyze tests kits for replicability, precision, accuracy, and predictive powers.

This task has been completed.

1. Survey volunteers regarding their opinions on the various methods utilizing survey instrument developed by University of Wisconsin Evaluation Unit.

This task has been completed for year one and is ongoing.

2. Michigan will develop training materials and develop background information on sampling methods, and criteria for assessing the educational goals (better understanding of stream behavior with respect to bacteria).

Training materials are 75% completed. Training materials specific to the 3 identified test kits will now be incorporated into the spring 2005 training sessions & materials.

3. End of Year 1: Compare test methods for usability, accuracy/precision of methods, attitudes of volunteers. Make recommendation for the other states on which test kit should be used during Year 2 sampling.

This task has been completed.

Overview of Year 1 Accomplishments by Individual States

The following section contains brief individual reports from each state detailing major activities performed during 2004 (year 1) of the grant. During year one it should be noted that Iowa and Indiana were chosen as the lead states to test multiple home test kits therefore the majority of sampling activities center around these two states. Volunteers in the other four states Wisconsin, Ohio, Michigan and Minnesota will employ home test sampling coupled with lab samples in years two and three along with Iowa & Indiana.

Year 1 Project Overview – Iowa & Indiana

In 2004, trained volunteers from Iowa's IOWATER Program and Indiana's Hoosier Riverwatch collected grab samples in order to evaluate the accuracy, reliability, and usability of several commercially available E.coli test kits. Test kits chosen for this project included Coliscan® Easy Gel (incubated and not incubated), Coliscan® Membrane Filtration Method, 3M™ Petrifilm™, and IDEXX Colisure™. Each test kit has advantages and disadvantages for use by volunteers. One objective of this study was to evaluate each kit's performance based on numerous criteria including accuracy, ease of use, cost, and volunteer input. At the end of the study, researchers will determine the best test kit(s) to be used for volunteer E.coli monitoring programs.

For the first year of this study, standardized field and laboratory procedures for volunteers were created to ensure reliability of results. Samples analyzed by the volunteers were compared to split samples sent to a single laboratory certified in E.coli analysis. Split samples were taken from a larger composite bottle to ensure uniformly mixed samples. Throughout the first year, volunteers have been able to compare results observed by the lab to those determined from their test kits.

Following the sampling season, volunteers from Iowa and Indiana were surveyed to determine the usability of the various test kits. Based on survey results, along with comparisons between lab and volunteer data, the project team is working to identify and recommend the test kit method(s) that best combines accuracy, ease of use, and cost.

New volunteers from all states involved in the Midwest Bacteria Project will be trained in 2005 with consistent training methods. Questionnaires given at each training session will establish the basis of their knowledge of current water quality and bacterial contamination issues. Volunteer knowledge and proficiency in the use of the test kit will then be tracked over time. Based on these results, training curriculum will be assessed and revised as necessary to produce volunteers proficient in E.coli bacteria monitoring.

Through the use of standardized sampling and analysis procedures, as well as accepted reliable test kits, volunteer E.coli data can be useful and incorporated into statewide water quality data. Increased awareness and acceptance of this water quality data in various watershed programs, including watershed assessments and Total Maximum Daily Load development, will give volunteers an increased stake in their state's water quality.

Year 1 accomplishments – Iowa

- Determined methods to be used by single lab for method comparison.
- Designed field protocol for sample/field parameter collection.
- Standardized volunteer laboratory protocols between all volunteers.
- Managed contract for laboratory analysis of Iowa/Indiana water samples.
- Coordinated shipping of Indiana water samples/sampling equipment.

- Coordinated sample pickup/delivery for Iowa volunteers.
- Conducted training for 8 Iowa volunteers. (cont.)
- Managed volunteer data
- Managed and compiled laboratory data and volunteer data to keep volunteers informed of their readings in comparison to laboratory results.
- Monitored progress of each volunteer and kept in close contact to make sure no problems were occurring.
- Provided training/expertise to project researchers in other states involved to better understand each test used.
- Wrote standardized methods for website.

Year 1 accomplishments - Indiana

- Trained five volunteers to perform bacteria analysis using the Easygel (incubated), Easygel (non-incubated), Coliscan Membrane-Filtration (MF), and 3M Petrifilm methods.
- Shipped samples overnight to the Iowa State Hygienic Laboratory.
- Monitored five sites listed for TMDLs for Bacteria.
- Monitored bacteria from June through October.
- Hoosier Riverwatch staff supported the volunteer monitoring efforts by developing a DVD video on Easygel and Coliscan MF methods.
- Developed training materials for volunteers.
- Purchased supplies.
- Conducted a post-season meeting was held to discuss the results and learn from each others experience.
- Purdue University has added valuable statistical analysis of the volunteer sampling data from both Iowa and Indiana.

Year 1 accomplishments – Michigan

- Training manual development.
- Specific focus paid to *E. coli* in streams.
- Decisions made on training manual layout and format.
- Continuous updates have been made to training materials.
- Additional parameters, helpful in volunteer monitoring are discussed along with their importance.
- Compiled a list of resources for additional information, references, forms needed in the field, and local available resources within each state.
- Two full day training sessions on volunteering monitoring were held in Michigan and *E. coli* plate reading was incorporated as one of concurrent workshops, training a total of 32 participants.
- Participants attending the training were recently sent a letter requesting their participation in next year's *E. coli* monitoring study.

Year 1 accomplishments – Minnesota

- Coordinated monthly conference calls and two face-to-face team meetings in Madison, WI (3/2-3/04, 10/19-20/04).
- Managed overall budget and subcontracts with other states.
- Worked with graphic designer and facilitated our team's review and revisions of the drafts to arrive at our final project logo.
- Designed business cards for the project using the graphic and highlighting the web site.
- Gave presentation on the project and E. coli monitoring at Minnesota Lakes and Rivers Conference, Brainerd, MN (4/29-30/04). (see presentations section of report which follows)
- Communicated with Minnesota watershed groups who will be sampling in 2005.
- Reviewed and responded to training manual, surveys, web site request etc.

Year 1 accomplishments - Ohio

- Identified, trained and coordinated eight volunteers from 3 watersheds that collected over 50 samples which were processed by an EPA certified lab using the Modified M-Tech method employed by Iowa & Indiana.
- Purchased supplies for volunteers and addressed sampling problems / questions throughout the season.
- Created database of volunteer data for season one.
- Participated in monthly conference calls and two team meetings held in Madison WI on 3/2-3/04 & 10/ 19-21/04.
- Responded to requests for reviews for training manual, surveys etc.
- Presented “ Building Capacity of E. coli Monitoring by Volunteers” at the Citizen Environmental Monitoring Conference, Nov.4-6, Bristol Virginia. (see presentations section)

Year 1 accomplishments – Wisconsin

- Developed and updated project web site.
- Developed administered and evaluated survey instrument(s) that addressed volunteer attitudes and preferences concerning the home E.coli test kits and training sessions.
- Hosted and made lodging and food arrangements for team meetings in Madison on 3/2-3/04 & 10/19-21/04. Participated in 10 monthly conference calls.

Presentations

“Enhancing Citizen *E. coli* Monitoring in Streams in the Upper Midwest”,
National Volunteer Water Monitoring Conference, Chatanooga, TN. May 18, 2004.

“Building Capacity of *E. coli* Monitoring by Volunteer Networks: A Multi-State Effort”,
Citizen Environmental Monitoring in Appalachia Conference, Bristol, VI. November 4 –
6, 2004.

“Building the Capacity of Volunteer Monitoring for *E. coli* in the Upper Midwest”,
USDA – CSREES National Water Quality Conference, La Jolla, CA. February 6 – 10,
2005.

“Bacteria Monitoring in the Upper Midwest: Developing Consistent Training and
Monitoring Methods” USDA – CSREES National Water Quality Conference, La Jolla,
CA. February 6 – 10, 2005.