Final Report

Project Name: Water quality and macroinvertebrate diversity in streams entering and leaving Michigan lakes.

Organization: Michigan Lake and Stream Associations (MLSA)

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Project Duration: March 2007 to July 2009

Grant Request: $11,502 **Local Match:** $8754 **Project Total:** $20256

Project Goals and Objectives

The MLSA stream monitoring program was initiated to monitor the water quality of streams entering and leaving association lakes. Water quality of inlet and outlet streams is important to lake associations because lake health depends on the quality and quantity of water entering the lake and downstream health depends on the quality and quantity of water exiting the lake. All data collected by volunteers will become part of a state-wide data base managed by the MLSA and The Michigan Clean Water Corps (MiCorps).

The primary goal of the proposed program is to protect and improve the water quality of streams in the State of Michigan. Specific objectives include 1) quantifying ecosystem health of primary inlet and outlet streams by collecting baseline data on macroinvertebrate communities and water quality, 2) examining the effects of inlet streams on lake ecosystems by estimating the volume of nutrients and sediment deposited by the inlet stream, 3) examining the effects of lake ecosystems on outlet streams by comparing macroinvertebrate communities near the lake outlet (100 m) and far downstream of the lake (1000 m), 4) identifying specific water quality problems in inlet and outlet streams, and 5) educating citizens about stream health.

Task 1: Develop and implement Quality Assurance Project Plan
(Project Manager, Scientific Consultant 3%)

Sub-task 1: Develop and submit Quality Assurance Project Plan within 60 days of grant award.

Sub-task 2: Implement QAPP throughout the duration of project.

Task 2: Attend 8-hour training session provided by MiCorps (Project Manager 1%)

Task 3: Solicit volunteers and acquire stream access permission (MLSA staff 3%)

Sub-task 1: Recruit volunteers via lake association newsletters, local media, and mailings.
Sub-task 2: Develop database of volunteer contact information.
Sub-task 3: Contact riparian owners for stream access permission.

Task 4: Purchase equipment and supplies for stream monitoring activities (MLSA staff 1%)

Task 5: Coordinate and conduct stream monitoring training sessions (Project Manager 27%)

Sub-task 1: Determine location and times for training sessions; mail information to volunteers.
Sub-task 2: Conduct indoor training sessions to provide overview of project, program goals, field data collection methods, and importance of quality data.
Sub-task 3: Conduct outdoor training sessions with field collection methods and stream habitat analysis.

Task 6: Coordinate volunteer stream monitoring (Project Manager, Science Consultant 16%)

Sub-task 1: Determine sample site locations and sampling dates.
Sub-task 2: Assign volunteer groups to sites and provide equipment and data sheets.
Sub-task 3: Oversee monitoring activities via site visits and phone communication.
Sub-task 4: Schedule joint sampling evaluation event with MiCorps staff.

Task 7: Coordinate and implement macroinvertebrate enumeration (Project Manager, Science Consultant 14%)

Sub-task 1: Determine time and location for macroinvertebrate training sessions; mail to volunteers.
Sub-task 2: Arrange for macroinvertebrate identification expert to attend training session.
Sub-task 3: Conduct training session and ensure quality control.
Sub-task 4: Store macroinvertebrate specimens in 70% ethanol in air-tight containers.

Task 8: Database development, data entry, and data analysis (Project Manager, Science Consultant 14%)

Sub-task 1: Develop database for all macroinvertebrate, stream habitat and water quality data.
Sub-task 2: Enter all volunteer monitoring data into appropriate part of database.
Sub-task 3: Calculate diversity indices, flow rates, sediment and nutrient loads, and other required analyses.
Sub-task 4: Submit data to MiCorps Data Exchange Network semi-annually.

Task 9: Report writing and web-site development (MLSA staff 11%)

Sub-task 1: Develop and submit quarterly status and financial reports following MiCorps guidelines.
Sub-task 2: Develop and maintain web-site with stream monitoring data.
Sub-task 3: Develop and submit final report following MiCorps guidelines.

Task 10: Submission of release of claims statement (MLSA staff 1%)

Task 11: Project evaluation (MLSA staff 9%)

Project Successes and Challenges:

Successes

- Data collected during this project was distributed in several ways. The project manager developed and maintained an Excel database with volunteer information and all water quality data collected during the 2-year project. All water quality data was uploaded onto the MiCorps web site. Summary reports were written and sent to participating lake associations.
- Successful publicity for stream monitoring project was accomplished through publication in the *Riparian* magazine and presentations at annual MLSA conferences.
- The public was involved in educational outreach activities including "bug" identification sessions at CMU and an a presentation on stream monitoring techniques at the annual MLSA conference in 2008.
- Students from Newago schools helped monitor streams entering and leaving Hess Lake and helped identify invertebrates collected during the monitoring event.
- MLSA submitted quarterly status reports and a final report.

Challenges

- Difficult to organize and schedule 4 separate sampling events across a wide geographic area. A concentrated effort on one watershed would be easier to manage.
- Volunteers were inconsistent in their motivation and availability. A larger volunteer base would be desirable.
- Publicity for stream monitoring project could be improved by informing local newspapers about this project and advertizing stream monitoring events in the MLSA newsletter.
- MSLA has not yet developed pre-training and post-training surveys to evaluate the effectiveness of the training sessions and needs and/or recommendations of the volunteers. These surveys will be developed in upcoming years.
- MLSA did not print a training booklet for volunteers in this project.
- MSLA has not yet created a website for this project.

Project Partners:

1. Central Michigan University:
    - Provided laboratory space and microscopes for macroinvertebrate identification sessions.
    - Use of minivans to transport equipment and personnel to monitoring events.
    - Space to store equipment and samples.
2. Coldwater Lake Association
    - Helped recruit volunteers for stream monitoring.

- Helped arrange access to monitoring sites.

3. Hess Lake Association
   - Helped recruit volunteers for stream monitoring.
   - Helped arrange access to monitoring sites.
4. Lake Isabella Property Owners Association
   - Helped recruit volunteers for stream monitoring.
   - Provided an indoor meeting location for all sampling events.
   - Helped arrange access to monitoring sites.
5. Muskellunge Lake Association
   - Helped recruit volunteers for stream monitoring.
   - Helped arrange access to monitoring sites.

Products Completed:

1. Project Manager hired to train and educate Stream Leaders and other volunteers.
2. Four training sessions conducted at the start of the project (fall 2007).
3. Equipment purchased using MLSA funding. Equipment includes D-frame nets, enamel pans, sample jars, ethanol, forceps, hand lenses, and eye droppers.
4. Nine trained Stream Leaders.

Ross McNeel	Nancy Ramsey	Hugh Rohrer
Larry Hiither	Larry Lovell	Ron Huyck
Joe Hammerle	Carlos Trevino	Lou Ecker

5. Habitat assessment for 16 stream locations.
6. Macroinvertebrate assessment for 16 stream sites during 2 spring and 2 fall sampling events.
7. Water quality measurements (temperature, oxygen, pH, conductivity, total phosphorus, suspended sediment) for 16 stream sites during 2 spring and 2 fall sampling events.
8. Database with volunteer information, macroinvertebrate data, habitat data, and water quality data.
9. All data listed on MiCorps web site.
10. Four newsletters (one for each lake association; see attached files) summarizing data collected during 2 spring and 2 fall sampling events.
11. Article about stream monitoring project in *Riparian* magazine (see attached file).
12. Presentations at Michigan Lake and Stream Associations annual meeting in 2007 and 2008.

Sustainability

After this pilot project is completed, MLSA will continue to coordinate monitoring efforts at the sites monitored using MiCorps funding. MLSA intends to continue the stream monitoring program as long as the program is effective and helpful for protecting and improving water quality. In the future, MLSA will seek additional funds to expand the volunteer stream monitoring program to include additional streams in the upper and lower peninsulas and additional water quality parameters.