# RITA-15-8805 Final Report


Grantee Name: Clearwater Resource Council

EIN: 20-0526054, DUNS# 962091927

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Funding:

| | |
|---|---|
| Total Project Cost | $16,364.00 |
| Grant Award | $ 4,775.00 |
| Grant | RITA-15-8805 |


Copies of this report may be obtained from the Project Administrator named above or by email request to info@crcmt.org. The report is also available online at crcmt.org.

## 2. Introduction

### A. A brief history of the problem

Aquatic invasive plants like Eurasian watermilfoil (EWM) and curly-leaf pondweed (CLP) lead to a degradation of water quality through increased nutrient loading, depletion of dissolved oxygen and increases in the amount of decaying organic matter. They also lead to severely reduced species diversity by outcompeting desirable native plants and by decreasing the amount of desirable habitat or food for aquatic invertebrates, amphibians, fish and birds. Researchers have found that fragments of invasive plants as small as an inch can colonize new areas.

Zebra and quagga mussels are introduced invasive species that rapidly colonize new water bodies, creating large monocultures and drastically changing the aquatic systems they invade. They are filter feeders and can remove substantial amounts of phytoplankton, which increases water clarity and light penetration, resulting in flushes of aquatic vegetation. Mussel production can also result in massive amounts of organic material that consumes oxygen as it decomposes. Zebra and quagga mussels may rapidly colonize hard surfaces such as pipes, screens and pump parts and other structures, causing major economic damage by clogging facilities such as water treatment facilities, dams, water intake systems and irrigation systems.

Options available for management of AIS after they have fully established in a water body are severely limited and expensive. Prevention and early detection are the most effective actions we can take to preserve and protect our healthy aquatic systems.

The Clearwater Watershed has no known infestations of these AIS, yet high levels of transient human use, proximity to existing invasive plant infestations in surrounding watersheds, and a large project area make the threat of invasion very real.

We recruited local volunteers from homeowners, fishermen, boaters and the businesses that rely on and value healthy aquatic systems to monitor our lakes. By developing, training and supporting a committed group of volunteer watershed stewards, we encouraged local citizens to take ownership of their natural resources and broadened our environmentally engaged community.

In 2011, the Clearwater Resource Council (CRC) developed protocols to sample lakes by means of plankton net tows and to properly prepare and preserve the samples for microscopic analysis. Our protocols are an expansion of those provided by MTFWP. The protocols were reviewed by Eileen Ryce, director of the AIS program for MTFWP. In 2013, the protocols were augmented to include sample preparation for eDNA, in consultation with Dr. Gordon Luikart of the Flathead Lake Biological Station and the University of Montana Genetics Lab. The protocols were field tested by two teams of volunteers.

## B. Project Location

Our project area lies in the headwaters of the Columbia River Basin, in the Clearwater River watershed of West-Central Montana. The watershed includes five major (> 250 acre) lakes, several between 50 and 250 acres, and numerous smaller lakes, ponds and wetlands (Figure 1). The lakes are important natural resources for the local community, the region, and the State of Montana. Fisheries, wildlife, recreation and aesthetic values are central to tourism, local lifestyles, and the local and regional economy. The lakes support populations of migratory bull trout (an Endangered Species Act *threatened species*), westslope cutthroat trout, non-native kokanee salmon and brown trout in addition to several non-native warm and cool water species such as largemouth bass and northern pike. Loons and other wildlife such as grizzly bear and bald eagles are also associated with the lakes and connecting riparian and wetlands areas. Seeley Lake serves as the primary water source for the community of Seeley Lake.

Our project was implemented on the six (6) largest and most heavily used lakes, which face the greatest threat of invasion by AIS. These are Lake Alva, Lake Inez, Seeley Lake, Placid Lake, Salmon Lake and Big Sky Lake. Another 11 less threatened lakes in the watershed have been identified by the United States Forest Service, Seeley Lake Ranger District, for monitoring as well.

## C. Purpose

The objective of our project was to monitor the six largest and most heavily used lakes in the Clearwater Watershed for zebra (Dreissena polymorpha) and quagga (D. rostiformis) mussels and Eurasian watermilfoil (Myriophyllum spicatum). The CRC's AIS Prevention Coordinator recruited, trained and supported volunteers for each lake. Volunteers collected monthly plankton net tow samples throughout the 2015 season. The samples were tested by environmental DNA (eDNA) techniques for zebra and quagga mussels and EWM. Simultaneous samples for microscopic detection of Dreissenid veligers were also collected, preserved, and tested.

In 2015, the project was expanded to include 11 additional lakes. These lakes are scheduled to be monitored once every three years. The CRC will monitor Summit, Rainy, Clearwater, Marshall, Spook, Hidden, Tuppers, and Elsina. The Missoula County Weed District will monitor Harpers, Elbow, and Blanchard. The CRC developed a synoptic protocol to not only collect plankton net tow samples for analysis, but to also navigate the entire shoreline, examining and mapping aquatic flora, and measuring Secchi depths in the deepest areas of the lakes.

## 3. Results and Discussion
## A. Project Goals and Objectives

In the 2015 field season, our goal was to monitor each of the six major lakes four (4) times throughout the season between June and October, and to monitor four of the lesser threatened (minor) lakes once.

CRC's AIS Prevention Coordinator finalized the protocols, assembled one kit for each lake, plus a "roving" kit for the minor lakes and worked with homeowners' associations and public media to recruit volunteers. During the initial round of sampling the Coordinator accompanied each volunteer to provide hands-on training in the volunteers' boats on their lakes.

The Coordinator picked up, logged and transported samples to the lab and recorded subsequent results. Any positive results would have been reported immediately to MTFWP.

Following the final round of samples, the Coordinator collected the kits and prepared field blanks on each net assembly, to evaluate the thoroughness of net cleaning to prevent or reduce cross-contamination between sampling events.

i. Completed Tasks
- Finalized the protocol
- Purchased materials (nets and rope assemblies, bottles, preservative)
- Assembled 7 kits (6 major lakes, plus 1 minor lake kit)
- Recruited volunteer teams for Placid, Big Sky, Salmon, Inez, Alva
- Provided hands on training for each volunteer team
- Collected 2-3 samples on each of the six target lakes
- Simultaneously examined collection sites for presence of EWM (negative)
- Mapped aquatic vegetation in the littoral zone, measured Secchi depth and collected plankton net tow samples on four of the minor lakes.
- 22 samples were sent to MTFWP microscopy lab to test for presence/absence of Dreissenid veligers
- All tests results were negative for invasive species
- Completed visual examination of the complete shorelines of Seeley Lake and Salmon Lake for the presence of EWM and curly-leaf pondweed (negative)

ii. Project Goals versus Actual Results

The primary discrepancy between the goals and actual results was the failure to collect four rounds of samples on each of the target lakes. Three samples were collected from Lake Inez, Placid Lake, Salmon Lake and Big Sky Lake, and two from Seeley Lake and Lake Alva. A third visit was made to Seeley Lake, but boat engine failure resulted in no sample collection. The goal of monitoring four of the minor lakes was realized,

although local wildland fires and low lake levels required a change in which lakes were monitored this year.

## B. Planning Process

The planning process for this project actually began several years ago when CRC began collecting plankton net tow samples for the detection of Dreissenid veligers by microscopic examination. CRC was working with a few select volunteers to define and refine the process with an eye to developing a process that could be reliably performed by citizen volunteers. Expanding the process to collect and prepare samples for eDNA required stricter adherence to techniques to minimize contamination, and a higher level of sophistication in the entire process. Last year's project sought workable solutions that provided the quality control required for reliable results. While this year's project for this grant did not include eDNA analysis, volunteers simultaneously collected eDNA samples when collecting microscopy samples. To increase the likelihood of detection, the protocol was revised this year to include vertical tow samples in the deepest holes of each lake. After the lakes stratify, the Dreissenid veligers tend to stay below the thermocline.

CRC worked with the Missoula County Weed District to avoid duplication of effort in the mapping of aquatic vegetation on the target lakes.

Volunteers will be debriefed prior to planning the next season to revise protocols as needed.

## C. Problems and Solutions

CRC has had good success in the past recruiting and retaining dependable volunteers. One reason for that is a system that sets up the volunteers to succeed. Volunteers are rewarded for their efforts by knowing that they are making a valuable and usable contribution to the community. They continue to return season after season.

Additional recruitment of new volunteers is a different picture. Of the several thousand people who live and recreate in this area, only a few dozen volunteer in the variety of citizen science projects the CRC administers. Seeley Lake itself has been the most difficult lake to recruit volunteers for project assistance. We have no idea why, and therefore no solution – except to keep trying. We recruited just one new volunteer this year who worked directly with the Project Coordinator.

Heavy smoke in the valley from wildland fires resulting in poor air quality prevented sample collection by canoe for several weeks during the season.

## 4. Natural Resources and Public Benefits

The six target lakes within our project area were monitored repeatedly throughout the 2015 season for Dreissenid mussels and Eurasian watermilfoil. A routine for broad-

scale, systematic monitoring by volunteers was developed that will continue beyond the funding period. This project increased community awareness and participation in our efforts to protect our lakes and streams from the threat of aquatic invasive species. The continued absence of AIS is important to the economic vitality of the community and the range of natural resource values associated with our lakes and streams.

## 5. Grant Administration & Project Costs

### A. Work Schedule

1. The sample collection and sample preservation protocol was completed by the target date of April 1 but was modified throughout the project.
2. Acquired materials and assembled a kit for each lake, 7 kits total by May 15.
3. Recruited volunteers for four of the lakes, with one new volunteer sharing Lake Alva with CRC staff, by June 1.
4. Rounds 1 – 4 Sampling and Testing (monthly beginning in June) Only Lake Alva, of the 6 major lakes, was actually sampled in late June, with initial samples ranging from July 2 to July 20 on the other lakes. Final samples were collected on all lakes in September.
5. Monitored and sampled four minor lakes (Spook, Hidden, Elsina, Tuppers) between late August and late September.
6. Final report to be shared with all collaborators and cooperators and the public. Final microscopy sample results were received in early December. The final report will be shared by the end of 2015.

### B. Budget

The attached Budget v. Actual table presents the full set of values. Deviations from budget are:

**Equipment/Supplies**: Budgeted $1475 to purchase plankton tow nets, allowing the CRC to return loaner nets to FWP; and to purchase additional supplies. Actual costs were $1049.46.

**Time/Salary:** Budgeted $2800 for Project Coordinator salary. Actual salary expenses were $3888.50.

**Travel**: Budgeted $500 for Project Coordinator travel to support the volunteers and deliver samples to FWP Region 2 office in Missoula. Actual costs were $419.75.

C. **Matching Funds**

Montana Fish, Wildlife and Parks provided the Scientific Collectors Permit at no charge, sample transportation from Missoula to Helena, and cross-polar microscopic testing.

United States Forest Service provided grant funds that purchased additional materials and paid some staff salary.

Clearwater Resource Council provided additional supplies and literature in the kits, and grant fiscal administration.

Volunteers provided time and boats. The largest discrepancy between budget and actual for In-Kind matching is the boat rental. The teams samples fewer times than scheduled and also appear to be working more efficiently, requiring less time to complete the sample collection and preservation.

## 6. Project Completion and Certification

Project Sponsor's Certificate of Compliance is attached.