Roundtable on the Crown of the Continent
Adaptive Management in the Crown of the Continent
November 2015

1. **Project:** Engaging Communities in Ecosystem Monitoring and Promoting Regional Discussions on Climate Change Impacts

2. **PIs:** Elaine Caton (Project Coordinator, Clearwater Resource Council and Blackfoot Challenge; Cory Davis (SWCC Monitoring Coordinator, University of Montana); Bruce Rieman (Clearwater Resource Council); EC prepared the report: P.O. Box 92, Ovando, MT 59854, (406) 793-5038, woodpecker@blackfoot.net

3. **Overview of Project:** Project coordinators worked with teachers, students, and community volunteers from five schools in four communities in the Southwestern Crown of the Continent to monitor stream flow, temperature, and turbidity, as well as forest conditions that will respond to climate change. We helped those teams of citizen scientists establish permanent stream and forest monitoring sites and collect data throughout the year. We created protocols for sampling, recording, and analyzing data, and developed curricula with related materials for teachers to use in classrooms, allowing teachers to use student data collection to teach about local aquatic and forest systems and their responses to climate change. Community organizations are using data collected by these citizen scientists to guide local management of streams and forests. Kresge AMI funding not only provided support for establishing sites and coordinating 2 years of monitoring, but also helped institute a monitoring prototype that will be maintained, refined, and potentially expanded throughout the Crown in the future.

The data generated in the project provide concrete examples of the changes occurring in our environment. 2015 was a very different in weather, and hydrologic conditions influencing local streams (see figures 6 and 9, attachment A). The differences are most apparent in Morrell Creek, where we have the longest time series of information, showing very early and much reduced spring and summer flows and much warmer temperatures than any preceding year. These differences cannot be attributed directly to climate change but they are characteristic of changes predicted in climate and hydrologic models for our region. Information like this provides the foundation to directly engage students and citizens in a discussion about the challenges we may face in the future. Data summaries from the other 3 streams will be available on the SWCC website [www.swcrown.org](http://www.swcrown.org).

Using outreach funding carried over from 2015 and additional dedicated funding from the AMI, we hired student interns from the community to produce a 15-minute
video on this and other efforts of local students and volunteers related to climate change in the Southwestern Crown (Students in Action with Climate Change). The film and work with the students was part of an outreach effort with the broader community. The film can be viewed at http://www.swcrown.org/?p=1923. The film was “premiered” in Seeley Lake as part of a celebration of the work in the schools and the community and broader attempt to engage the community in discussions about natural resource issues and climate change (see Attachment B).

Seeley Lake Elementary students wrote reports on the Rapid Forest Assessment data they collected in fuel treatment and control sites on the Lolo National Forest near their community, and some of those reports have been published in the “Junior Journal” section of the local newspaper the Seeley Swan Pathfinder. See Attachment C for an example of one of these student essays.

4. Shared learning: We shared our approaches and methods with COC partners and others through: an AMI webinar (2014); posters at the Crown Roundtable annual meetings (2014 and 2015); a talk and posters at a Citizen Science conference hosted by the Mistakis Institute, a COC partner (2014); the Southwestern Crown Collaborative Adaptive Management Workshop (2015) a COC citizen science workshop (2015); and the distribution and a public premiere (see Attachment A) of the Students in Action video (2015). Information about and materials from our project are available at www.swcrown.org/monitoring/citizen-science-and-education/. Additionally, the stream monitoring site locations are available on an interactive online map of stream temperature monitoring sites maintained by the USDA Forest Service’s Boise Aquatic Sciences Lab at http://www.fs.fed.us/rm/boise/AWAE/projects/stream_temp/maps.html.

5. Value of AMI network: The AMI network was helpful in providing opportunities for conversations and exchange of information with others in the Crown with similar interests, experiences, and concerns. We discussed methods and protocols used in our project directly with a few COC partners who were interested in potentially using them, and although we don’t know of any Crown partners who have adapted our model for their area yet, we believe that the exchange of ideas among partners is vital to improving programs that share goals of community engagement in conservation.

6. Note any significant changes to your original proposal. Our original proposal included work with citizens to “adopt” streams outside of the network of intensive monitoring at the schools, but was dropped as part of this project. The citizens based monitoring is moving forward with other funding. The work described here provides the foundation and calibration point for the broader monitoring so this project has leveraged a real benefit in broader landscape monitoring and understanding.
Our original proposal also included discussions about climate adaptation through community meetings; we replaced this form of outreach with a student-produced video on local climate efforts which has been shown and distributed through several venues. And finally, our original proposal included funding for a student conference among the participating schools. Due primarily to teacher turnover at two of our four sites, we were unable to achieve this project goal.

7. **Share lessons learned under each category of (1) “what’s working well?” and (2) “what could be improved or what were your challenges?”**

(1) **Working well:** Participants have been particularly enthused to engage in real world science and help collect valuable data about their surroundings. Development of detailed instructions for methods and protocols, and the creation and adaptation of classroom lessons for middle and high school students have been keys to successful implementation. These tools allow citizen scientists to feel more comfortable with unfamiliar processes, and give classroom teachers the tools they need to fit the project into their curriculum. Condensed and simplified methods and tools for data collection, such as those used in RFA, have also been a key.

Frequent visits by coordinators to monitoring sites and schools to teach and review methods and regular communication have been important, helping volunteers feel comfortable with what are initially viewed as complex procedures. Teachers have very much appreciated the opportunity to have their students analyze and graph real data collected by the students themselves. In fact, participating teachers have shared our project and methods with other teachers in the region and attracted interest from additional schools in joining the network.

(2) **Challenges:** Starting a stream project with schools in the spring can be difficult, as teachers and students have many prior commitments at that time and weather and high flows limit opportunities for installing equipment and collecting data. Finding local support for data collection and maintenance of site equipment, especially during busy times at school and in summer, has been challenging. It is critical to have a “champion” for each site to ensure that critical data are collected and quality control maintained at the appropriate times regardless of whether the schools can participate or not. More time was initially needed to coordinate activities, methods, and communication among schools and volunteers than was expected. New costs for transporting students to some monitoring sites arose, straining resources. There is a need for alternative methods to measure flows during unsafe conditions. There is need for careful selection of sites that remain accessible to supporting volunteers on a regular basis. A permanent data management protocol and a structure to network and share information among
schools and sites are ongoing challenges. Turnover in teachers has necessitated “starting over” with some schools. Bringing schools and/or teachers together to share experiences and information has been difficult because of competing demands.

8. Describe how your project links to or supports (or has the potential to link to or support) efforts in other parts of the Crown of the Continent:
A larger network of sites throughout the Crown could provide real information on climate related variation and changes in streams and forests, and create richer and more diverse experiences and interactions for students and volunteers. Such a network would allow participants to see broader patterns of change and share ideas about challenges and solutions in adaptation of local communities to climate change. Our project has developed the protocols and detailed instructions for implementation, along with an extensive curriculum to help students collect, analyze, and understand local data in the context of climate change in the Crown.

We have shared our project design and methods with COC partners through posters and presentations at conferences in 2014 and 2015. Some partners have expressed interest in pursuing similar monitoring in their areas. Teachers and partners around the geographical “edges” of our project area (Helena, Bigfork) have been discussing incorporating our methods and expanding the existing network to those areas.

9. Describe additional funds that supported your project and specify how (who and how much?)
Kresge funds leveraged additional funds to reach project goals.
2014 leveraged funds:
• Swan Ecosystem Center contributed $1,100 for the local (Condon/Swan Valley) project coordinator.
• Swan Ecosystem Center contributed $1,000 for community climate education.
• Clearwater Resource Council contributed $9,800 for coordination of the aquatic monitoring and education program.
• Clearwater Resource Council contributed $4,000 in administrative costs, and provided additional coordination and outreach for community discussions.
• University of Montana contributed $4,400 for forest monitoring and education staff.
• University of Montana contributed $4,000 for forest monitoring supplies.
• Blackfoot Challenge contributed $4,000 for community meeting coordination (carried over to 2015) to support production of the student video.
• Blackfoot Challenge contributed $700 for travel to community meetings (carried over to 2015).
• Blackfoot Challenge contributed $1000 for administrative costs (carried over to 2015).

2015 leveraged funds:
• $10,000 was received from the U.S. Forest Service to continue student or citizen based stream monitoring in the Clearwater Watershed in 2016.
• Missoula County and the Seeley Lake Sewer Board contributed $2,000 for continued work by the Seeley Lake schools.
• Blackfoot Challenge contributed $1,000 to support a fifth school and community members to monitor a new site near Ovando.
• Montana Fish, Wildlife, and Parks provided equipment and technical support for fish monitoring in Morrell Creek directly tied to the Seeley stream site.
• Seeley Lake Community Foundation contributed $2,500 for “aquatic messaging” and creation of a video on water related issues in Clearwater Watershed that will feature work at the schools.

10. Describe briefly longer-term project goals and plans you have for future collaboration.
We plan to maintain our network of monitoring sites and continue to coordinate our citizen science program with participating schools and local communities. We are pursuing funding for this continuation of the project. Additionally, we have plans to expand the network of participating schools to two more communities in the Blackfoot watershed (Helmville and Potomac), where teachers have requested to join the project. In Helmville the stream monitoring will dovetail with a planned restoration project. One of our partners (Swan Ecosystem Center) is interested in expanding the program to additional schools in the Swan Valley, and we will support their efforts as well.

We will continue to assist expansion of the network into additional schools and communities as interest develops. With consistent participation by teachers in at least a few schools we hope to connect students from various schools in a more cohesive way through physical or online conferences.

11. Please elaborate on anything else you think the Roundtable should be aware of in trying to apply science, communication and climate adaptation to issues in the Crown surrounding community, culture and conservation.
Community engagement is essential to effective climate adaptation, and our experiences have taught us that involving schools in that participation can be key. Schools provide an existing structure for the basic work, a receptive audience in parents and other members of the community, and a strong link to agencies, potential partners, funders and others that value the connections with schools and students who will guide our future.

Many teachers are enthusiastic about such projects but in reality have little time to plan and implement projects without substantial help. Providing ways to directly link project science to classroom curriculum is crucial, as is funding for student transportation if travel is needed.
12. **Accounting**: provide a budget of how your AMI funds were spent.

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<th>2015 Kresge COC AMI</th>
<th>Budget Item</th>
<th>Details</th>
<th>Partner</th>
<th>$ Award</th>
<th>Expenses</th>
<th>AMI New</th>
<th>YTD</th>
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1: Allocated funds; final 10% allotment will be distributed to partners when funds are received.
2: Includes match
3: Unspent and unallocated funds remaining

**Attachments:**

A. All year summary of Information for Morrell Creek at the Seeley Swan High School monitoring site
B. Announcement of the “Premiere” for “Students in Action with Climate Change” produced through the AMI project
C. Junior High student essay on Rapid Forest Assessment in Seeley Lake area
D. Description of project and link to curriculum package and protocols