Sackett Brook Education Program - Extension
Final Report September 2015

Overview

The overall goal of the Sackett Brook Education Project, funded by the Massachusetts SubCouncil of the Housatonic River Natural Resource Trustees as part of the settlement with General Electric, was to increase the public's knowledge of the Housatonic watershed, the impact of human actions on that watershed, and the positive actions that can be undertaken to improve the environmental condition of the watershed. Mass Audubon educators developed and presented educational programs on "Watersheds, Dams, and Dam Removal" and related topics to more than 1,200 school students, teachers, and the public between 2012 and 2015.

During the "extension year" of the project, from September 2014 to September 2015, Mass Audubon educators built on the success of the previous two years of the program and, responding to the needs and interests of teachers and community members, focused on direct service to and contact with schools and students. This report focuses on work completed during this extension year.

School Programs

Elementary school

During the 2014-2015 academic year, Mass Audubon educators presented Sackett Brook programming at five Pittsfield elementary schools: Crosby, Egremont, Allendale, Williams, and Stearns. Students from four of the five schools participated in field trips to Mass Audubon's Canoe Meadows Wildlife Sanctuary in Pittsfield during the 2014-2015 academic year to visit the Sackett Brook restoration site, learn more about the dam removal project, and better understand the positive effects that removing the dam had on the river and surrounding habitat. The field trip for the students at Egremont Elementary School needed to rescheduled due to spring testing schedules at the school, and then rescheduled again for September 2015 due to a fire at Canoe Meadows.

Overall, we presented four Sackett Brook lessons to 388 students as part of our elementary school programs. In-school programs varied according to teachers' selections, and included topics such as: Dams and Dam Removal, Watersheds and Pollutants, Owl Pellets, Vernal Pools, and Fish and Warming Waters.

During their field trip to Canoe Meadows Wildlife Sanctuary, students participated in hands-on activities, including checking under coverboards for invertebrates, examining vernal pools, fishing for small fish using minnow traps, and exploring the edges of Sackett Brook for macroinvertebrates and aquatic salamanders.

Middle school

Middle school students continued to film seasonally, learn about vernal pools, and check water quality. They tracked wildlife, built bird houses, and learned about edible plants and the differences between native and invasive plants and animals. Using a twice a week, afterschool format, Mass Audubon educators typically taught one class indoors at the school and then brought students outside to Canoe Meadows for a second class. Outside, they used the GoPro camera to record their tracking and snowshoeing activities, and spent time learning about the native wildlife of Sackett Brook and Canoe Meadows. Using water quality indicators such as pH,

dissolved oxygen, and temperature, students determined that Sackett Brook was a clean, highly oxygenated, slightly alkaline, cold water stream that could support a wide variety of organisms.

High school
Mass Audubon educators worked with high school students from several public and private schools to carry out community service and citizen science projects at Canoe Meadows Wildlife Sanctuary. A class of sixteen students from Miss Hall's School worked to restore habitat by removing invasive plants at Canoe Meadows. A youth group of fourteen students from Knesset Israel Hebrew School cut back invasive plants and cleared a sanctuary boardwalk for visitors to use. Also during 2014-2015, two high school students from Miss Hall's School completed projects that included wildlife camera monitoring and comparing wildlife observations before and after the dam removal and restoration project. These two students also assisted with elementary school programs throughout the year.

One interesting observation is that student reports from three years ago, before the dam removal, showed far fewer large mammals than in this past year's observations. Both pre- and post-dam removal observations reported birds such as Great Blue heron and smaller birds; however, the camera sightings from 2015 showed many deer, raccoons, and even an owl. The camera also caught many people at the brook and, unfortunately, many domestic dogs. Reviewing these findings with the students was interesting as they had many ideas as to why the dam removal would result in gentle slopes and the brook becoming more accessible to large animals (and people!). One student, a senior, presented her findings at the end of the year poster presentation for other high school seniors.

In addition to engaging high school classes, Mass Audubon scheduled a series of public community service programs for high school students during Earth Week in April 2015. The purpose of these programs was to involve young adults who may not have been involved in our project through their schools. These programs are described in more detail in the *Public Programs* section.

Materials
During the extension year, Mass Audubon purchased two interactive watershed models to be used as part of in-school and public programs: The Watershed and Groundwater model illustrates how water moves across the watershed, and a Toxic Waste model shows how toxic substances can migrate and contaminate large areas of land and water. These models were engaging for students of all ages and abilities, and provided a clear visual to illustrate sometimes difficult environmental concepts such as developing a resilient ecosystem that can withstand and ameliorate high water (flash flood) events [the sand tables], or the difficulty of decontamination once toxins spread. The models were used in school programming, educator trainings, and public programming.

We also purchased equipment for in-class activities and citizen science projects, including minnow traps, hand lenses, field guides, collecting nets, and bathyscopes. High school students also used the wildlife and GoPro cameras which were purchased prior to the extension year. For one of the classroom lessons, students participated in owl pellet dissections to learn the steps of field work and analysis.

Public Programs
As a highly trafficked urban wildlife sanctuary with a large local constituency, Canoe Meadows Wildlife Sanctuary and the Sackett Brook dam removal case study provided a terrific opportunity for public engagement.

During March 2015, we delivered a family program on "Wildlife, Pollutants, and Watersheds," held at Pleasant Valley Wildlife Sanctuary. Two high school students from Miss Hall's School assisted with the delivery of the program. Participants used sand tables and watershed models to understand how pollution migrates through surface water and groundwater. Although it was a cold, snowy night, we still had eleven people turn out for the program (see photo attachment).

Mass Audubon also tried a new outreach venue, the "Third Thursday" event held in Downtown Pittsfield. The theme for the event was "Healthy Pittsfield," and our focus was on a healthy watershed. This is a widely attended community event that attracts hundreds of Pittsfield residents to downtown for food, music, activities, and public information. Mass Audubon educators set up a booth near several other environmental organizations (Berkshire Environmental Action Team [BEAT] and Housatonic Valley Association [HVA]). A looping PowerPoint presentation illustrated the dam removal process and restoration, and participants interacted with the hands-on watershed models. Approximately 110 people stopped by the table and engaged with the educators. Although many said they lived nearby, most had never visited Canoe Meadows Wildlife Sanctuary. We hope that the interactions through this event will lead to more Pittsfield residents visiting and appreciating their local wildlife sanctuary, and perhaps visiting the restoration site at Sackett Brook.

During Earth Week in April 2015, Mass Audubon scheduled a series of community service programs for high school students. We had hoped to engage young adults in citizen science and community service projects at Canoe Meadows. However, because in-school scheduling proved to be difficult to arrange at the high school level in early spring, we offered the program during the April vacation week and in May. Topics for these programs were: "Birding for Citizen Science," "Vernal Pool Monitoring and Coverboards," and "Wood Turtles and Woody Invasives." To attract students, we submitted press releases, advertised in the Berkshire Eagle and on social media, and reached out to high school teachers and guidance counselors (see attachment). Despite these efforts, these programs were not well attended. We feel this was due in part to poor weather, and it also highlights the ongoing challenge of engaging high school students who have busy school and extracurricular schedules.

Mass Audubon's hosting of the 24-hour Berkshire BioBlitz this year, on June 18-19, 2015, offered another opportunity to share information about the Sackett Brook restoration with scientists and the public. Mass Audubon educators led a fish survey workshop for six participants at the restoration site (see photo attachment).

Educator Trainings and Collaborations
In addition to delivering school and public programs, Mass Audubon educators presented workshops at the Berkshire Environmental Educators Network Educators' Conference during November 2014, and at the Youth Environmental Summit (YES) during May 2015. This is the third year that Mass Audubon has used Sackett Brook content and collaborated with BEEN at both the Educators' workshop and YES. This year during the Educator Conference, Mass Audubon presented two programs to fourteen teachers. During YES in May 2015, Mass Audubon presented two programs to 58 middle and high school students and their teachers.

In addition to sharing our lessons and program content at events, we have adapted our lesson plans for the web so they are easily accessible to the public. Information about the project can be found here: http://www.massaudubon.org/get-outdoors/wildlife-sanctuaries/canoe-meadows/about/sackett-brook-restoration-project/educational-outreach (alternatively, tinyurl.com/nle5226).

Mass Audubon's participation in the Museum Institute for Teaching Science, July 10, 2015, shared our work and resources with an additional 25 interested scientists and educators. The session took place at Canoe Meadows, and the content was on Dam Removal and Stream Restoration. Teachers had a morning session with an instructor from the American Rivers Institute, and then came out to the Sackett Brook site for a discussion on stream restoration, plus a search for vertebrate (fish and salamander) and invertebrate life in the stream, all led by a Mass Audubon educator. Mass Audubon will be participating in a callback session in late October 2015 as a follow up to this session.

Challenges

While we have been pleased with the overall success of the Sackett Brook Education Program, several challenges outside of our control have necessitated adapting our original timeline and methods. For instance, increased standardized testing in schools during the spring of 2015 made program and field trip scheduling difficult. In some cases, classes were not able to schedule as many classroom programs as they originally planned. We also experienced an unforeseen incident at Canoe Meadows Wildlife Sanctuary when our wildlife observation building burned down during June 2015. This required the rescheduling of our Egremont Elementary field trips to September 2015.

Another challenge has been the recruitment and engagement of high school participants. Our efforts to recruit additional high school students through public programming indicate that working with specific teachers and classes may be more effective than attracting students to programs through public advertisements and social media.

Impacts, Outcomes, and Evaluation

The Sackett Brook Education Program used a logic model to identify and evaluate short, medium, and long term outcomes and impacts. This logic model was reworked twice to reflect changes in the program; the Logic Model v3 was used to evaluate the extension year of the project (see attachment). At the close of the extension year of the project, all short and medium term outcomes have been completed, and long range outcomes, as reported by educators, students, participants and Mass Audubon staff, are progressing successfully.

To evaluate the effectiveness of the Sackett Brook Education Program, including the long term outcomes and impact, Mass Audubon educators used qualitative and quantitative survey measures. During the extension year, teachers and program participants were surveyed at the midpoint and conclusion of the program. We initially contacted 22 teachers and administrators who had participated in the program, and received written responses from four people. We also received additional qualitative feedback from many of the teachers and participants, who were contacted by email as well as interviewed by phone and in person to report on the effectiveness of the programs. Most often teachers responded with anecdotal and narrative insight into their experience with the programs presented. Overwhelmingly, they were pleased with the classroom lessons and related field trips, and grateful for the opportunity that this grant provided.

Many participating teachers reported observing a heightened awareness and interest in wildlife and nature in their students. Jeanne Nailos, a fifth grade teacher, stated, “This ties in with the science standards we teach them, and hands on learning helps them remember.”

Eric Lamoureaux, the School Community Coordinator from Crosby Elementary School, remarked, “In classrooms today there is a major focus on ELA [English Language Arts] and Math. Although staff try to teach Science and S.S. [Social Studies], it doesn't always get the focus it should. The Mass Audubon program gives students the opportunity to look into aspects of science and nature in educational ways that are fun and engaging. Mass Audubon gives many students an opportunity to get outside and look more closely into nature in ways they wouldn't otherwise be able to.” His students commented, “I love looking for animal tracks in the snow the most,” (fourth grade student) and, “We do really cool things with Hannah and she's so nice!” (fifth grade student).

The most indicative factor of the success of the education programs is continued student involvement and engagement in 2014-2015. Students that participated in elementary school have continued to select the Sackett Brook programs as an elective for their middle school afterschool programs. We have also seen middle school students who have participated in the afterschool programs sign up for other community service programs at Canoe Meadows. This past summer, middle school students helped clear an old gravel bed of weeds, invasive plants, and shrubby growth to help encourage nesting turtles. Their enthusiasm for this project was infectious! Repeated contact with these middle schoolers allowed for deeper connections, increasing the impact of our program.

High school students have inquired about developments at Sackett Brook after “their” projects were completed. We strongly believe that this shows an affinity for this wildlife area in their community, and that these students are building a sense of ownership. The opportunity for high school students to use current technology tools (wildlife cameras, GoPro units) was a major interest area for them.

Looking forward

Mass Audubon continues to deliver educational programs that were developed during the Sackett Brook Education Program. We are partnering with the Pittsfield Public Schools in several capacities and, in particular, we are using the middle school afterschool program model during the 2015-2016 academic year.

Of course, all the programming offered over the past three years depended upon the successful dam removal and restoration at Sackett Brook. Today, Sackett Brook is a clear, cold water stream that is populated by dusky salamanders and caddisflies. Wood turtles are documented as using the habitat. Wildlife cameras have captured deer, Great Blue herons, raccoons and Great Horned Owls feeding along the edges of Sackett Brook. Pittsfield students have had opportunities to observe and document restoration in action, and teachers have appreciated the ability to apply scientific content to their lessons. The public has a better idea of the special nature of Sackett Brook and Canoe Meadows Wildlife Sanctuary. We thank the Massachusetts SubCouncil of the Housatonic River Natural Resource Trustees for their ongoing support and encouragement of high quality, place-based environmental learning delivered through Mass Audubon’s Sackett Brook Education Project.