



Engaging Students in Environmental Stewardship: Minnesota's Changing Climate

ENRTF Final Report (2010-2013)



WILL STEGER
FOUNDATION



ENVIRONMENT
AND NATURAL RESOURCES
TRUST FUND



With major financial support (\$250,000 Legislative-Citizen Commission on Minnesota Resources appropriation) from the Minnesota Environment and Natural Resources Trust Fund (ENRTF), the Will Steger Foundation (WSF) was able to initiate a comprehensive climate change education program, focused on the impacts of climate change on Minnesota. The funding cycle concluded June 30, 2013, however the curriculum is still available and an August educator Institute featured the resources on the Mississippi River. For the purposes of this report the original project name, *Engaging Students in Environmental Stewardship through Adventure Learning* is referred as *Minnesota's Changing Climate* (MCC), the name given to the curriculum developed for the project.

Executive Summary

The Will Steger Foundation developed *Minnesota's Changing Climate* with the understanding that environmental stewardship begins with a local connection and sense of appreciation, or environmental sensitivity, towards the natural environment. In addition, effective teaching about climate change is best practiced in and about a students' local place. The project's primary audience, educators, have the unique and important opportunity to connect their students with their place, raising awareness about the changes happening in Minnesota and providing the skills to mitigate and adapt to climate change.

In order to make the issue relevant and connected to the lives of those reached through our project, we focused specifically on the impacts of climate change on Minnesota's biomes. Additionally, we wove in stories from Will Steger's life and examples of his own early observations of the natural world

and his curiosity of weather and climate. Finally, we utilized the expertise of many Minnesota scientists and educators in the development of our Grades 3-12 curriculum, online classroom, two public forums and three Summer Institutes for climate change education.

Over the three years of the project we:

- Increased the climate literacy of over 5,000 educators, members of the public and students via our Summer Institutes for Climate Change Education, year round workshops, conference presentations, school visits, field trips, public forums and our online classroom (willstegerfoundation.org).
- Developed a number of valuable, mutually beneficial, and long-term partnerships resulting in 20 student service projects and field trips for over 500 students to enhance their learning on Minnesota's changing climate.
- Were recognized in 2012 by Environmental Initiative in the area of environmental education for extraordinary environmental results by harnessing the power of partnership.
- Provided 600 formal and informal educators from all four biomes with a copy of the MCC curriculum.
- Shared MCC nationally and regionally via the Climate Literacy Network, the Great Lakes Education Collaborative, Green Teacher, Humphrey Institutes Innovations in Education Forum and the North American Association for Environmental Education as a model of place-based climate change education.
- Supported 1,000 students who submitted their observations of Minnesota's biomes during the school year to our online classroom, with at least 2,000 more viewing and/or commenting on their observations.



The Minnesota's *Changing Climate* curriculum framework was developed around five important ideas:

1. Connection to place is important in making issues and concepts relevant. The curriculum highlights Minnesota's four biomes and their unique biotic characteristics. Each lesson includes an opportunity for educators to take their students outside to explore their biome.
2. The curriculum's foundation is climate change science from peer reviewed journals, first person interviews with local scientists and state or federal resources.
3. Knowing that stories and local heroes can inspire hope and change, Will Steger's adventures and lifelong journals are included with each lesson.
4. Documentation is an important skill for students to develop and is useful in the case of climate change, for documenting plant and animal response to seasonal changes over time (phenology).
5. Climate change education needs to include opportunities for action and environmental stewardship. The final lesson of the curriculum gives students the opportunity to develop their own action projects related to climate change.

600 Grades 3-12 educators received a copy of and were trained in the *Minnesota's Changing Climate* curriculum. Workshops ranged from an hour introduction to the resource to 2-day intensive Institutes including activities from the curriculum and content specialists to provide in depth information about the concepts covered in the curriculum. Educators that received training were geographically from each biome in Minnesota and work in urban, suburban and rural settings; are formal and informal educators; represent a variety of disciplinary backgrounds; and work with students of all backgrounds. In addition to the curriculum itself, we were able to distribute 150 sets of curriculum kits that included the resources to successfully facilitate a number of the activities in the curriculum.



Educator Testimonials for Minnesota's *Changing Climate*

"This curriculum fills a niche that no other curriculum fills. It is relevant, brief and engaging because it addresses the world around us in Minnesota."

"The fact that this curriculum focused on Minnesota was perfect for my high school students who care more about things that seem pertinent to their lives."

"The tools and resources in the online classroom will be very engaging for my students. I'm very grateful for the resources that I've received to accompany the *Minnesota's Changing Climate* curriculum."



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Institutes

Three Will Steger Foundation Institutes for Climate Change Education, twenty workshops and three public forums were conducted during this project. This resulted in increased climate literacy and environmental stewardship of over 600 educators representing over 10,000 students statewide, as well as the increased awareness of over 400 members of the general public through public forums.

Public Forums were held between 2010-2012 in conjunction with each Summer Institute to provide an evening option for educators and to raise awareness about Minnesota's changing climate. The Humphrey Institute donated their space for the forums and they featured climate historian Dr. Naomi Oreskes; a sense of place panel with Kerri Miller, Don Shelby, Will Steger and J. Drake Hamilton; and climate anthropologist, Dr. Genie Scott. Approximately 250 members of the public and educators attended each forum.

Recaps of the Institutes can be found at:

<http://willstegerfoundation.org/summer-institute>.

Overviews of each of the forums can be found at:

- <http://www.willstegerfoundation.org/climate-news/item/1292>
- <http://willstegerfoundation.org/media-room/video-gallery/viewvideo/243/education/summer-institute-2012-genie-scott-ncse>.
- <http://vimeo.com/14809445>

Online Classroom

A *Minnesota's Changing Climate* online classroom (<http://classroom.willstegerfoundation.org/>) was developed by WSF in collaboration with Hamline University's Center for Global Environmental Education. The classroom features an entire learning module that is connected to each lesson in the curriculum. The learning module introduces all four biomes through videos of scientists and Will Steger, historical journal entries and case studies of climate change impacts.

The classroom also gave students from around the state the opportunity to share their observations and action projects. Over the two years this feature was available, over 1,000 students posted to the site (<http://classroom.willstegerfoundation.org/get-social/view-student-submissions/view-observations-by-others>). In addition, educators may download the *Minnesota's Changing Climate* curriculum and worksheets from the site.

Since the online classroom was launched in August of 2011 it has had over 9,000 unique visitors with over 16,000 visits.

*"The tools and resources in the online classroom will be very engaging for my students. I'm very grateful for the resources that I've received to accompany the *Minnesota's Changing Climate* curriculum."*

-Educator



School Visits

During the 2011-2012 school year, Will Steger and WSF education staff made visits to six schools located in each of the four biomes of Minnesota. Will did a presentation for the entire school and then visited the classroom of the teacher that had attended our Institute to see how they had been implementing the curriculum. 3,000 students throughout Minnesota were reached through these school visits.



Adaptation and Extensions

The *Minnesota's Changing Climate* curriculum has been used as a framework to develop curriculum specifically focused on the Mississippi River and climate change impacts on Wisconsin. Additionally the Minnesota Phenology Network (<http://phenology.cfans.umn.edu/>) and Minnesota Master Naturalists have used portions of it and endorse its effectiveness for communicating the connection between phenology and climate change. The curriculum was used as a template for a place-based teacher workshop for Wisconsin teachers in the LEAF program of UW Steven's Point.

The curriculum has been aligned with the St. Paul Public Schools "power standards" and Minneapolis Public Schools elementary STEM standards and used as an example of how to meet those standards. Finally, teachers from Minnesota American Indian reservations that are participating in The CYCLES (<http://nasagcce.wordpress.com/2013/02/14/2nd-follow-up-workshop-will-steger-curriculum/>) project, a project of the STEM Center at the University of Minnesota, received training and are using the curriculum in their schools because the place-based focus of the curriculum resonates culturally.

The online classroom, created in partnership with Hamline's Center for Global Environmental Education, has been used by educators around the state to learn more about Minnesota's unique biomes, their cultural history and climate change impacts. Finally, the Minnesota Phenology Network has utilized it to connect individuals with why phenology is important.

Educator Testimonials for the 2012 Summer Institute:

"All of the activities and speakers were valuable....This was one of the best professional development opportunities I have participated in."

"I can't thank you enough for putting on such a wonderful event. I learned so much from your excellent speakers, breakout sessions and trainings."

"This was a wonderful use of my time—I gained a great deal and I am excited to utilize what I have learned."



Project Evaluation

An outside evaluation team was able to provide and analyze evaluations from the Summer Institutes of 2011 and 2012, as well as follow up with teachers about their curriculum implementation. The feedback they provided proved invaluable in planning the 2012 Institute and in revision of the curriculum for a second edition.

Final evaluation of the Institutes showed overwhelming satisfaction with the experience and increased confidence and competence in teaching climate change. Reflecting back on the Summer Institute after implementing the curriculum, most teachers indicated that the Summer Institute had been helpful or very helpful. Approximately 1 in 5 teachers indicated that the Institute was very unhelpful; open-ended responses indicate that these teachers would have liked more hands-on activities and more guidance in adapting the curriculum to meet particular instructional demands, such as integrating it into their existing instruction and modifying it for select grade levels and student groups.

This feedback was taken into account when planning Institutes held the summer of 2013. Returning teachers indicated that the value of the Institute extended beyond the opportunities it provided for preparing to teach the MCC curriculum; it also was a place to share ideas and experiences and gain a sense of renewed purpose with like-minded educators.

The final curriculum evaluation showed that almost all felt that the curriculum was “helpful” or “very helpful” for teaching about climate change and environmental stewardship. Five strengths and two challenges were identified.

Strength	Challenge
The local focus on Minnesota and connections to students' experiences and the world	Greater differentiation of the curriculum
The active, hands-on, inquiry-based nature of the curriculum	Lack of time and other resources
The clarity of the lessons and teacher guide, including specific content and materials	
The ability to adapt the lessons to fit their students and curriculum	
There was a lot of support for implementing the curriculum	



Teachers were also asked to evaluate the online classroom. They shared that they had used the classroom to help prepare their lessons, and had showed or asked students to look at the videos and still images. We had not anticipated the classroom being used by adults as well as students and this insight will be useful in development of future programming.

The evaluation team concluded that overall,

the Will Steger Foundation is on the right track for meeting their project goals. The MCC curriculum is a much-needed and much-appreciated resource for teaching about climate change and promoting environmental stewardship. The annual Summer Institutes provide valuable professional development for teachers, effectively prepares them for implementing the MCC curriculum, and is a supportive community that inspires and refreshes its participants. In general, WSF should keep doing what it's been doing: refining the MCC Curriculum, maintaining its Online Classroom, holding Summer Institutes, and providing teachers with personalized support. The Foundation's close contact and good relationship with its teachers allow it to understand and improve teachers' and students' experience, deepen their understanding of climate change, and promote environmental stewardship. As grant funding draws to a close, WSF should look for ways to sustain close contact with teachers, expand its reach, and codify some of the lessons learned. For example, WSF could take common areas of support and create webinars and other more permanent scaffolds for teachers. Although these resources would not wholly replace personalized just-in-time supports, they could provide support for a larger number of teachers.



Additional Financial Support

Food and supply donations for our Summer Institutes included breakfast, lunch and snacks for 75 attendees in 2010, 100 attendees in 2011 and 100 attendees in 2012 for a value of \$18,000. Speakers and volunteers additionally provided their services in kind in 2010, 2011 and 2012.

A partnership with the Mississippi River Fund and the Mississippi National River and Recreation Area and \$20,000 in funding from the National Park Foundation made it possible to provide additional training, mini grants and field trips to a cohort of teachers attending the Institutes in 2011 and 2012. [A video that describes our collaboration with the National Park Foundation through the Parks Climate Challenge is available at: http://www.youtube.com/watch?v=_geolrl7Rhg.] This collaboration has continued and an Institute featuring the river and the curriculum was held in August 2013.

A \$25,000 grant from the Donald Weesner Family Foundation allowed us to distribute 100 biome kits to educators at our 2011 Institute. The kits contained field guides, cameras and other resources to explore outside. In addition to distribution of the kits, the Will Steger Foundation has 5 kits available for educators to borrow for three-week periods.

\$25,000 was donated from foundations to support the curriculum and \$39,000 of salary was donated through administrative and support of staff at the Will Steger Foundation.

"I really appreciated the opportunity to attend the Institute. I am very grateful that I was given this rich and important learning experience and I will definitely use what I have learned in my role as teacher, parent, grandparent, and citizen. Thank you so much for doing this work!"

-Educator

"We just finished the Minnesota's Changing Climate unit today and it was awesome! I teach in the inner city so I tend to have students that are a little lower level and they were engaged and really learned some great stuff. One great success was when we were doing visual drawings from lesson four with the fact cards, I had a student who needed help on representing the CO₂ levels over the years. I told her to do a graph. Not only did she do one, but she made a prediction about the future CO₂ levels! For my students to make a prediction and think outside the box was certainly a tearful moment for me!"

-MN Educator at MetroTech Career Academy

