

Award Number:
NA16SEC0080003

Project Title:
Recharge the Rain: Community Resilience through STEM Education

Funded Institution:
Watershed Management Group

PI Name: Catlow Shipek
Evaluator: Allison L. Titcomb, Ph.D., ALTA Consulting, LLC
Date Prepared: 7 October 2021



COOPERATIVE EXTENSION
Arizona Project WET
Tucson Education



National Oceanic and Atmospheric Administration, Office of Education

Ref# NA16SEC0080003

Strengthening the Public's and/or K-12 Students' Environmental Literacy for Community Resilience
Recharge the Rain: Community Resilience through STEM Education

Executive Summary

In 2016, the National Oceanic and Atmospheric Administration Office of Education awarded four-year funding to the Watershed Management Group in partnership with Arizona Project WET (part of the University of Arizona Cooperative Extension) in Tucson, Arizona, to build environmental literacy among 4-12th grade teachers, students, and the public. The “Recharge the Rain” project centered on educator professional training and hands-on water harvesting skills to address extreme weather and climate threats Arizona residents face from extreme heat, drought, and flooding.

Participants moved through a continuum from awareness, to knowledge gain, to conceptual understanding, and ultimately to action. Utilizing data and experts from NOAA assets, we strengthened the capacity of residents to be resilient to our local climate threats. Recharge the Rain became a call for action and an inspiration for change and adaptation to extreme weather conditions in the urban environments of the Sonoran Desert putting Tucson at the core of understating climate, adaptation and community.

The approach of the external evaluation of Recharge the Rain stems from Developmental Evaluation principles (e.g., Patton, 2011) and a strategy framework that describes intended, deliberate, unrealized and emergent as components of an effort’s final realized strategies. (Patton, 2011, Mintzberg, 2008). The external evaluator served as consultant to the project staff for creation and adaptation of tools for collection of perspectives and learning throughout the project (2017-2021). These tools/methods included pre/post surveys for teacher workshops and classroom lessons, surveys of volunteer and public workshops, observations (e.g., of end-of-year and kick-off events, workshops, school site installations), facilitated discussions during workshops, document review (e.g., teacher posters showing changes at their schools and student learning), embedded assessments, interviews with teachers (e.g., final teacher interviews included in this report), and facilitated discussions of lessons learned. Results and summaries of these have been share in each annual report and showed increases in knowledge and comfort levels with engineering design and water harvesting as well as changes in the school sites as well as Watershed Management Group, Arizona Project Wet and other partner practices and programming.

Key Findings

The focus on growing relationships, connections, and networks resulted in the project meeting or exceeding most goals/objectives:

- 14,452 students reached with STEAM curriculum incorporating water harvesting that increased understanding of earth systems, engineering design, and weather
- 52 teachers and 191 community volunteers learned systems thinking, water harvesting practices and citizen-science data collection
- 8,289 Tucson community members learned water harvesting principles
- 21 teacher/student-led water harvesting projects completed at local schools

Key strengths of the Recharge the Rain project included the strong collaborative nature of the core project teams (Watershed Management Group and Arizona Project WET) augmented with

flexible, responsive, and innovative thinking, planning and implementation. This led to the ability to pivot and revise the approaches in response to unexpected outside pressures (e.g., teacher walkout in 2018, changes to Arizona Science Standards, and the COVID-19 restrictions) resulted in programming that ultimately will be even more sustainable than originally anticipated (e.g., Build Your Own Basin).

Key Recommendations

Based on the final teacher interviews, suggestions for ongoing work include:

- Expanding the reach as part of a green academy leadership team
- Maintaining and growing relationships with partner schools and others
- Continue to work on getting buy-in from all levels of school administration and personnel
- Coordinate training among city, county and schools' grounds crews about plantings and pruning practices
- Consider adding teacher pay as a strong incentive
- Connect the schools and business nearest the local river(s) to see in what ways they can learn about this work and be connected to help each other as well as the communities.