

Site-built Composting Toilet Pilot Report

STUDY PERIOD: May 30th, 2012 – May 30th, 2014

FUNDED BY: EPA Environmental Education Grant

PROJECT TITLE: Closing the Nutrient Loop – A Community Desert Soils education and Action Program

Project Overview - *Composting Toilet Research Action Pilot.*

Watershed Management Group (WMG) led the 2-year Composting Toilet Research Action Project as part of an EPA Environmental Education Grant focused on developing desert soil stewardship. The goal of the Desert Soil Stewardship program was to teach urban gardeners and neighborhood activists critical thinking and stewardship practices regarding soil management to address the environmental issues of loss of soil nutrients, food security, waste reduction, and water conservation.

An advisory stakeholder committee was formed to guide WMG's Composting Toilet Research Action Pilot (CT Pilot). The advisory committee included:

- Dr. Diane Austin, Director, Bureau of Applied Research in Anthropology, University of Arizona
- Dr. Charles Graf, Senior Hydrologist, Arizona Department of Environmental Quality
- Dr. Charles Gerba, Professor, Department of Soil, Water, and Environmental Science, University of Arizona
- David Omick, Sustainable systems expert, omick.net
- Brad Lancaster, Author and WMG Sr. Watershed Specialist
- Leona Davis, Community Food Bank of Southern Arizona

WMG applied for and received a temporary Aquifer Protection Permit from the Arizona Department of Environmental Quality (ADEQ). This permit allowed for up to 24 site-built composting toilet systems to be installed, used, and monitored for a 1-year period. WMG applied for and was awarded a renewal for the 2nd year of the pilot.

To attract participants WMG hosted two educational workshops to inform attendees about the CT Pilot and the benefits of composting toilets. Over 75 individuals attended the two informational sessions. With the help David Omick and Dr. Diane Austin, two composting toilet systems were proposed to be piloted (please see separate document for composting toilet designs).

A total of 22 sites were selected and approved to participate in the CT Pilot. The sites consisted of 8 composting toilet advocate (expert users and advocates of composting toilets) sites, 2 institutional (WMG and Community Food Bank's Las Milpitas Farm) sites, and 12 residential (participants in our soil steward program) sites.

The barrel kit-based systems were assembled through participatory educational workshops by the users and taken home to be installed on their own. The two sites which implemented a masonry double-chamber system installed the complete system on their own.

All sites had pre-inspection and post-installation site visits made by a WMG project staff and a UA Bureau of Applied Research in Anthropology (BARA) researcher. The CT Pilot sites were required to participate in the monitoring process. Self-monitoring was conducted at each and every site. The self-monitoring forms were collected quarterly by (BARA) researchers and WMG staff.

Prior to the end of the 2nd year, 18 samples of composted humanure were tested by UA's microbiology lab. The test assessed the presence of e-coli and fecal coliforms in all the samples. A total of 16 samples passed EPA's threshold for Class A Classification of biosolids for safe use in the garden. Two systems did not pass the Class A threshold, however, in both cases the sample was taken prior to fully composting the humanure the recommended 4 month minimum.

At the end of the 2nd year WMG submitted a report and a summary of lab results of participating systems to ADEQ. Based on the success of the systems meeting Class A bio-solids ADEQ provided the pilot participants in coordination with local county departments with an individual 1.08 General Permit at no additional cost. The General Permit is essentially for a "containerized privy" and allows the owners to continue to legally use their composting toilets.

Public awareness and acceptance of composting toilets as a safe and viable alternative grew tremendously through this campaign. Weekly email and phone inquiries to WMG's office also grew along with our published videos and materials on the topic becoming some of our most popular multimedia materials. The multimedia items produced during the 2-year CT Pilot included:

- Instructional videos on site-built composting toilets:
 - a. "How to Build a Site Built Composting Toilet Barrel System" (http://youtu.be/xOOUxa4_K1g) posted Aug 13, 2012
 - b. "How to Use and Maintain a Composting Toilet Barrel System" (<http://youtu.be/GSVsGhkf4c4>) posted Aug 13, 2012
 - c. "Waste Not! Transform your waste into soil, water, and energy" (released shortly after the pilot period)(<http://youtu.be/7LONm4XeoAk>) , posted June 2, 2014
- 10 educational workshops held on the topic of composting toilets attracted a range of urban to rural users all with an interest in water conservation and/or soil health development
- Two webinars on the topic of ecosanitation:
 - a. Why Pee on That Lemon Tree? How to Use Urine in Your Landscape—with Carol Steinfeld and David Del Porto (<http://youtu.be/4SVlvjV2V8>), presented Thursday, February 7, 2013. 48 Attendees. 4956 Views on YouTube
 - b. Extreme Composting: Using Human Waste to Enhance Soil in Case Studies from Around the World—with Dr. Diane Austin and Sowmya Somnath (<http://youtu.be/6900zoid55s>), presented Thursday, February 21, 2013. 50 Attendees. 681 Views on YouTube.
- 5 informational presentations specific to composting toilets were given to:
 - a. Arizona Sanitarian's Annual Conference, ~40 attendees
 - b. Arizona County Directors of Environmental and Health Services Association's (ACDEHSA) Onsite Technical Advisory Committee (OTAG), ~10 members
 - c. Maricopa County training for environmental and public health representatives, ~100 attendees
 - d. Pima County's Wastewater Community Advisory Committee, ~25 attendees
- Additional outreach opportunities were used to promote WMG's CT Pilot and the benefits of using a composting toilet. Other venues included tabling events, general presentations, and more.

WMG is currently working with ADEQ to submit the two site-built composting toilet systems as reference designs. The approval of these reference kit-based systems by ADEQ would allow all Arizona residents to apply for and permit a site-built composting toilet that followed these designs. Currently only approved commercially available systems may be permitted in the state of Arizona.

Lessons Learned for the Composting Toilet Research Action Pilot

- A longer lead time and greater assistance to participating sites (e.g. guidance and financial subsidy) is needed for siting and building the double chamber composting toilet system.
- Participants desired more informal opportunities to share/ask/exchange with other participants through the process.
- Natural curiosity to composting toilets draws an interested audience. Fears and squeamishness are often easily overcome through showing actual systems and careful explanation of use.
- An advisory committee consisting of select individuals with interest and influence in the projects impact is critical to the long-term success of the project. It was important that we engaged these individuals especially early in the project phasing and fairly frequently to work through issues.