



U.S. Army Corps of Engineers
BUILDING STRONG.

Water Efficient Installation Initiatives in the Army

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Background

- ERDC-CERL – One of the U.S. Army Corps of Engineers (USACE) Research and Development Laboratories
- Focus on research and development and technical support to the military and military installations throughout the country and the world along with assistance to other agencies, organizations, and nations.
- This poster's focus is to highlight a few of the many water efficiency initiatives to support military installations
- One way to assist installations is guidance documents called Public Works Technical Bulletins
- Sponsored by USACE HQ
- Variety of subjects
- Available through the Whole Building Design Guide
- Accessible at: http://www.wbdg.org/ccb/browse_cat.php?o=31&c=215

Introducing Four PWTBs

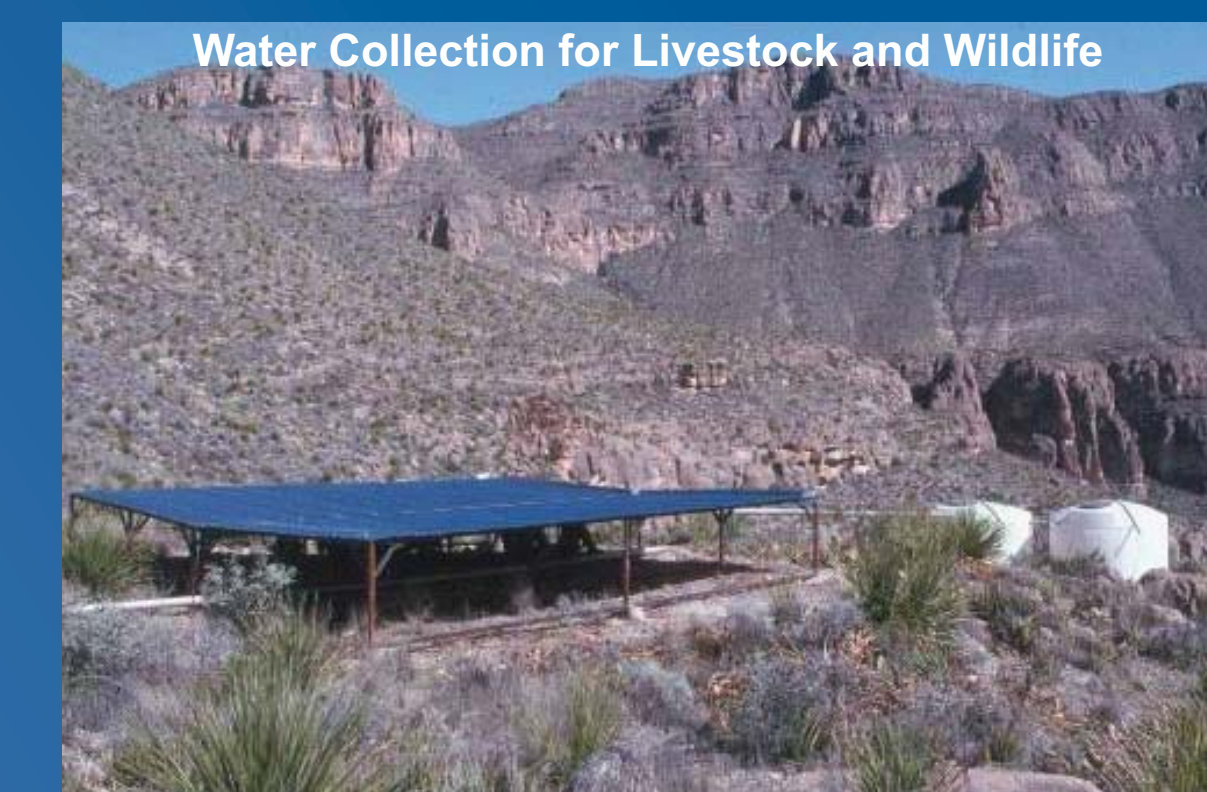
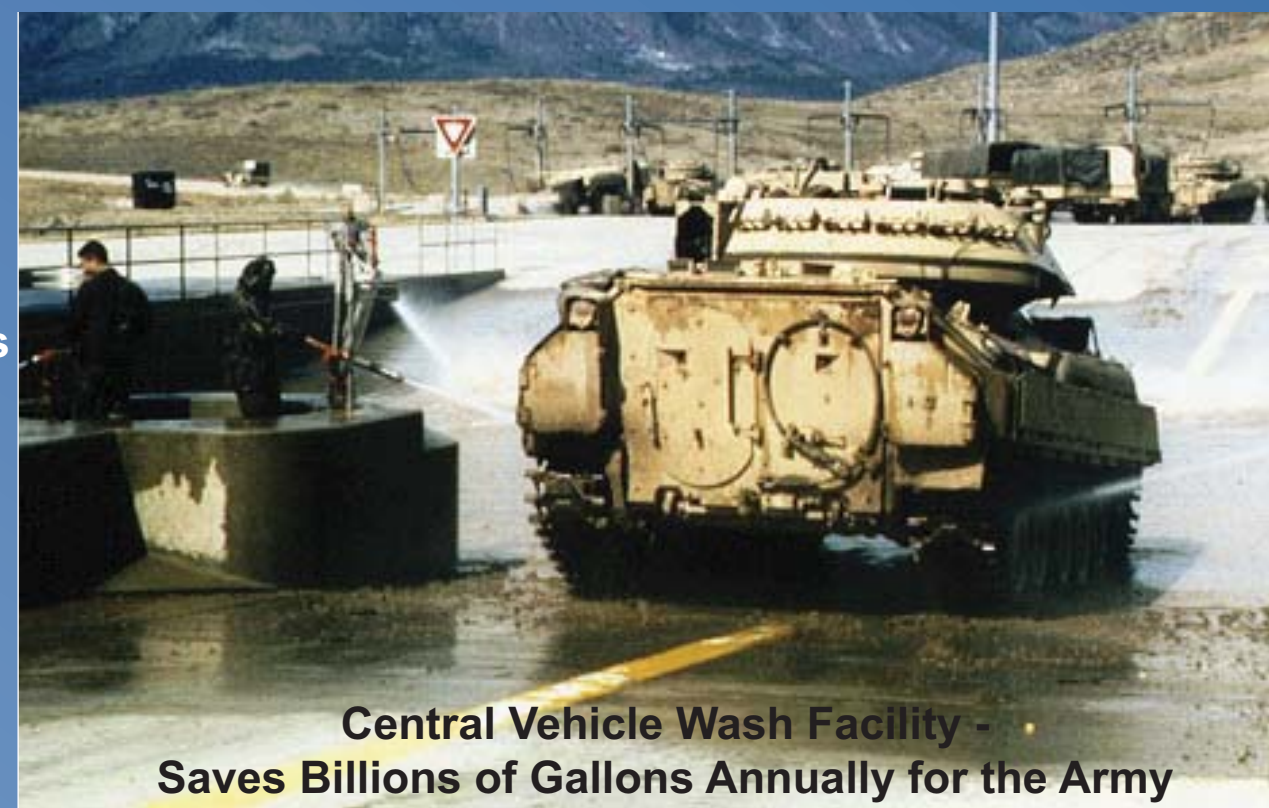
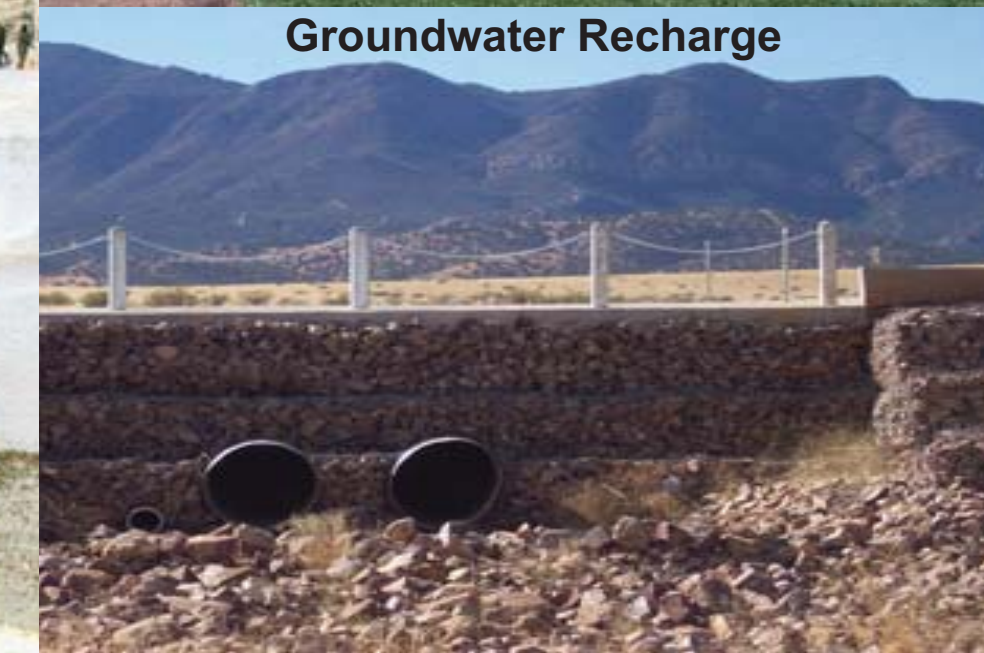
- Water Efficient Installations
- Implementing a Water Conservation Plan
- Rainwater Harvesting for Army Installations
- Graywater Application for Army Installations

Army Installations

- Cantonments are like small cities, up to 50,000 population
- Directorate of Public Works – responsible for all real estate, easier to implement changes
- Have all the amenities – schools, housing (barracks and family), hospitals, restaurants, commissaries, service stations, heating plants, hotels, industry
- Large amounts of green space – parade grounds, athletic fields, parks, cemeteries
- Self-contained, but dependent on surrounding region for support
- Usually senior water rights, but follow a good neighbor policy and take stewardship of natural resources seriously



Types of Water Reuse		
Category	Typical Application	
Irrigation	Parks	Parade grounds
	School yards	Athletic fields
	Highway medians	Building landscapes
	Golf courses	Crops and vegetables gardens
	Cemeteries	
Industrial recycling and reuse	Cooling water	
	Boiler feed	
	Process water	
	Construction	
Groundwater recharge	Groundwater recharge	
	Saltwater intrusion control	
	Subsidence control	
Recreational/environmental uses	Lakes and ponds	
	Marsh enhancement	
	Streamflow augmentation	
	Fisheries	
Nonpotable urban uses	Fire protection	
	Air conditioning	
	Toilet flushing	
	Water features	



Climate Change and Future Water Supply are Major Concerns



PWTB Contents - Water Efficient Installations

- Overview
- Importance of water efficiency, water conservation
- Motivation – why do it?
- Expands previous CERL Technical Reports and FEMP (Federal Energy Management Program) BMP (Best Management Practices) information – presents a wide range of state-of-the art information and options
- Installation examples/experience
- Other
- How to perform a water audit
- Implementation of water loss program
- Water/energy interaction
- ESPC (Energy Service Provider Companies) issues and concerns
- Resources

BMP Examples

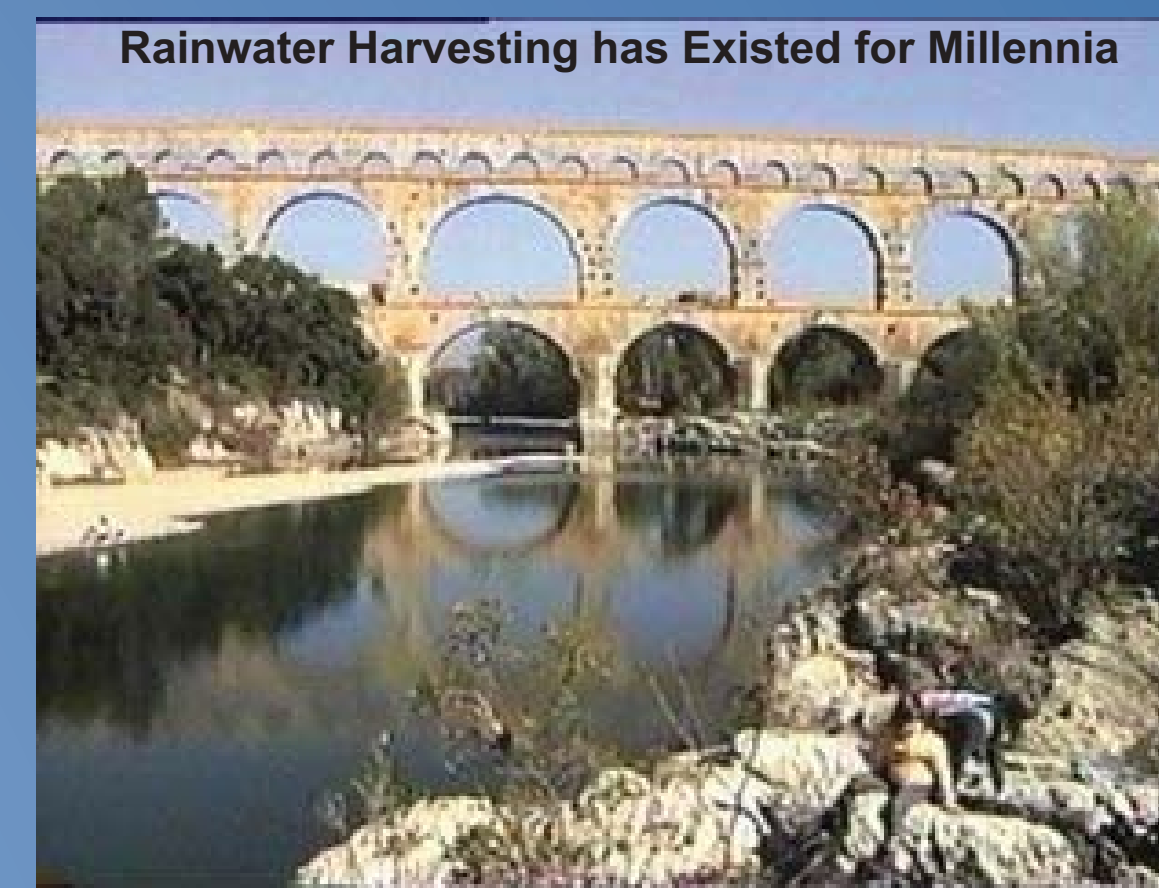


PWTB - Implementing a Water Conservation Program on Army Installations

- Paired with Water Efficient Installations PWTB
- Will enable installations to determine potential for water conservation at their facilities as part of a sustainable water program
- How-to guide
- Lessons learned/ shared installation experience combined with applicable examples from public sector.

PWTB Contents - Rainwater Harvesting

- History of Rainwater Harvesting
- Overview
- Drivers, Opportunities and Regulations
- Developing a Rainwater Harvesting System
- Types of Systems
- Operation and Maintenance
- Potential Military Installation Applications
- Lessons Learned
- Summary



Rainwater Harvesting

- Ideal for large barracks, industrial or commercial/institutional buildings
- Also applicable to expansive parking lots
- Water stored in tanks or ponds – reducing runoff
- Stored water can be used indoors – filtered and treated – fixture flushing, laundry, cooling tower, boiler makeup
- Outdoors – irrigation, water features
- Result – reduces overall demand for municipal water

Development of an Active Rainwater Harvesting System

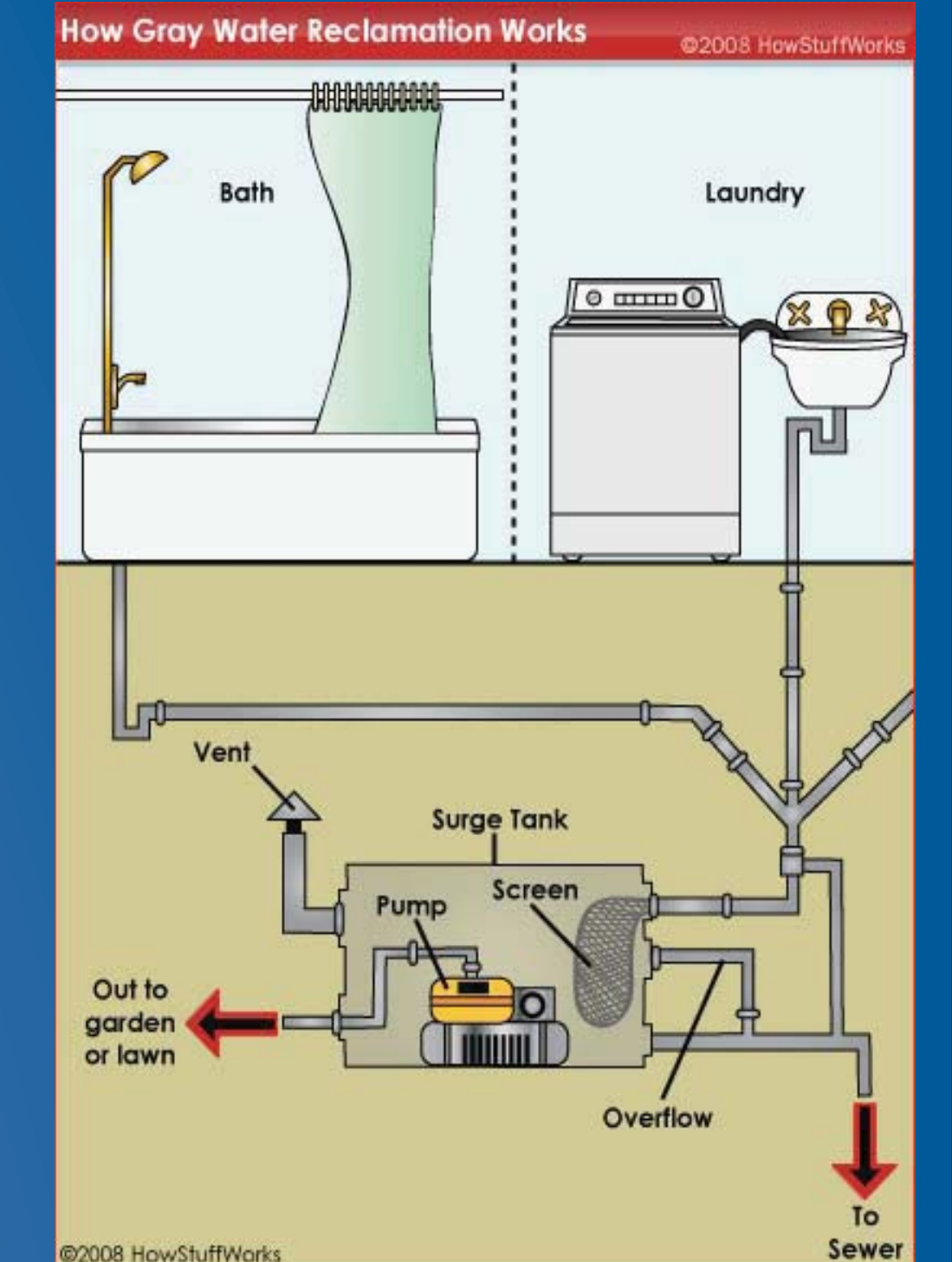
- Questions to Be Answered
- Retrofit to an existing building or a new integral system?
 - System size - L,M,S?
 - How complex – “Active” or “Passive”?
 - Permissible costs?
 - System requirements - Intensity of use, level of commitment, water security?
 - Intended use of the system? Irrigation, potable, other?
 - What water quality is required?

PWTB Contents - Graywater Applications for Army Installations

- Definitions
- Regulatory Review
- Overview of Graywater
- Types of Systems
- Potential Military Installation Applications
- Summary

Using Graywater

- Advantages
 - Saves Water
 - Less Discharge
 - Less Energy and Chemical Use
 - Recovery of Nutrients
 - Reduction of Hydraulic Load to Existing Systems
- Disadvantages
 - More Costly
 - May Decrease Flow to Sewage Plant
 - Potential for Spreading Disease Through Human Contact if not Properly Handled or Treated
 - Damage to Soil Long-term?
 - Potential Odors in Surge or Storage Tanks



Summary

- Water is an essential resource vital to maintain quality of life and support the military mission
- Military demands only one of many sectors needing water
- Numerous drivers promote water efficiency
- Current practices and supplies are insufficient for the future
- Must use less or find new sources or supplies
- Match water quality with needs
- New/emerging technologies should be demonstrated/adopted
- Variety of options exist for water efficiency

This poster's focus has been to introduce and to highlight a few of ERDC-CERL's many water efficiency related initiatives supporting military installations. ERDC-CERL conducts research and development and provides technical support to the U.S. military throughout the world. In addition, ERDC and USACE provide a wide variety of support to other agencies, organizations, and nations.