STATE OF
The University of Arizona
Water and Environmental Technology (WET) Center

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SPRING MEETING
February 20, 2025
WEST Center
The University of Arizona, Tucson, AZ

WATER AND ENVIRONMENTAL TECHNOLOGY CENTER

STATE OF THE COUNTRY?

– Divided

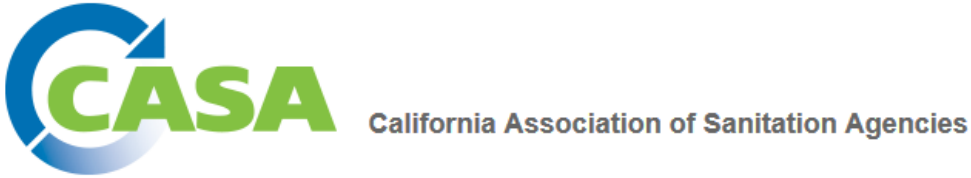
STATE OF THE UNIVERSITY OF ARIZONA?

– Financially in Trouble

STATE OF THE WET CENTER

– Good Shape

UA WET CENTER MEMBERS



UA WET CENTER RESEARCH FOCAL AREAS

- Biosolids/Land Application
- Water Reuse
- Wastewater-based Epidemiology (WBE)
- Detection of Viruses in Water
- Water Distribution Systems
- Magnetic Treatment of Water
- Emerging Contaminants (PFAS)

UA WET CENTER CURRENT PROJECTS

- PHASE 1. National Collaborative PFAS Project: Incidence and Mobility of PFAS in Land Application Plots Across the U.S.
- PHASE 2. National Collaborative PFAS Project: Crop Uptake of PFAS from Land Application Plots across the U.S.
- PROPOSED: Is Side stream Treatment Effective for Reducing PFAS Discharges?
- Smartphone and Paper based Microfluidic Devices for Detection of PFAS
- Biochar feedstock and Temperature Affect Sorption of PFAS from Contaminated Groundwater
- Impacts of Magnetic Water Treatment on Biofilm Formation

WET CENTER NATIONAL COLLABORATIVE PFAS PROJECT

- Evaluating concern about PFAS analytes in biosolids post land application – can it cause groundwater contamination? (Phase 1 and 2)
- Project evaluates incidence and mobility of PFAS in soil following land application (Phase 1)
- Crop uptake from land application sites
- Project gained national interest
  - 30 entities provided donations for the research
  - $450K raised for research (Phase 1)
  - Phase 2 fund raising underway

INTERESTED PARTIES

1. **Utilities:** major wastewater treatment plant that recycles its biosolids via land application
2. **Non-Profit Associations:** Groups such as CASA, NACWA, NEBRA, MABA, NW Biosolids, Arizona Business Council are all on board. These groups in turn are well connected with utilities.
3. **Private Sector:** Companies that manage biosolids for public agencies will be contacted. These include companies like Synagro, Denali Water.

EPA REPORT ON LAND APPLICATION AND PFAS

- Biased
- Multiple mistakes
- Risks over estimated

BUT:

causing issues nationally

ISSUES WITH THE EPA REPORT

- Studies used for risk assessment cherry picked

Included in report

- Blaine *et al*., 2013
  - ❖ greenhouse pot study for crop uptake study
  - ❖ Biosolids contaminated industrially
  - ❖ Loading rate at 1X agronomic rate to simulate 10 years at 1X rate

Excluded in report

- Pepper *et al*., 2025
- Pepper *et al*., 2021

UA WET CENTER FUNDING 2022-2024

- WET Center Membership Funds = $121K
- National Collaborative PFAS Project = $450K

TOTAL ≃ $571K

- Big emphasis on PFAS and land application

UA WET CENTER RECENT PUBLICATIONS

2024 Brosky, H., Prasek, S., Innes, G., Pepper, I.L. *et al.* A framework for integrating wastewater-based epidemiology and public health. *Front. Public Health* 12:1418681.

2024 Foster, A.R., Haas, C.N., Gerba, C.P., and Pepper, I.L. Effectiveness of monochloramine for inactivation of coronavirus in reclaimed water. *Sci. Tot. Environ*. 906, 167634.

2024 Foster, A.R.,, Stark, E.R., Ikner, L.A., Pepper, I.L. Effects of magnetically treated water on the survival of bacteria in biofilms. *Sci. Tot. Environ.* Submitted. *Biofouling* 41:79-91.

2023 Prasek, S.M., Pepper, I.L., Innes, G.K., Slinski, S., Betancourt, W.Q., Foster, A.R., Yaglom, H.D., Porter, W.T., Engelthaler, D.M., and Schmitz, B.W. Variant-specific SARS- CoV-2 shedding rates in wastewater. *Sci. Tot. Environ.* 857:159165.

UA WET CENTER RECENT PUBLICATIONS

2022 Prasek, S.M., Pepper I.L., Innes, G.K., Slinski, S., Ruedas, M., Sanchez, A., Brierley, P., Betancourt, W.Q., Stark, E.R., Foster, A.R., Betts-Childress, N.D., Schmitz, B.W. Population level SARS-CoV-2 fecal shedding rates determined via wastewater-based epidemiology. *Sci. Tot. Environ.* 838:156535.

2022 Pepper, I.L., Kelley, C. and Brusseau, M. Is PFAS from Land Applied Municipal Biosolids a Significant Source of Human Exposure? *Sci. Tot. Environ.* Dec 23;864:161154. doi: 10.1016/j.scitotenv.2022.161154.

2022 Foster, A.R., Stark, E.R., Ikner, L.A., and Pepper, I.L. Bench scale investigation of the effects of a magnetic water treatment device in pool systems on chlorine demand. *J. Wat. Process Eng.* 50:103198, ISSN 2214-7144.

UA WET CENTER RECENT PUBLICATIONS

2021 Pepper, I.L., Brusseau, M.L., Prevatt, F.J., Escobar. Incidence of PFAS in soil following long-term application of Class B biosolids. *Sci. Tot. Environ.* 793:148449.

2021 Betancourt, W.Q., Schmitz, B.W., Innes, G.K., Prasek, S.M., Pogreba Brown, K.M., Stark, E.R., Foster, A.R., Sprissler, R.S., Harris, D.T., Sherchan, S.P., Gerba, C.P., Pepper, I.L. COVID-19 containment on a college campus via wastewater-based epidemiology, targeted clinical testing and an intervention. *Sci. Tot. Environ.* 779:146408.

2021 Schmitz, B.W., Innes, G.K., Prasek, S.M., Betancourt, W.Q., Stark, E.R., Foster, A.R., Abraham, A.G., Gerba, C.P. and Pepper, I.L. Enumerating asymptomatic COVID-19 cases and estimating SARS-CoV-2 fecal shedding rates via wastewater-based epidemiology. 801:149794.