

# Water Quality Center (WQC)

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## Land Application of Bio-Solids



There has been considerable national debate over the safety of land application of bio-solids. Such applications have been under a moratorium in many areas of the country as a result of public concern about potential adverse health effects from pathogens in the bio-solids becoming airborne contaminants. Research at the Water Quality Center showed that the risk of such airborne contamination is low. The center's research was instrumental in reversing or preventing moratoriums on land applications of bio-solids in Solana County, Calif., and Loudoun County, VA. For more information, contact Dr. Ian Pepper, Director, 520-626-3328; e-mail: [ipepper@ag.arizona.edu](mailto:ipepper@ag.arizona.edu).

*Above:* The Water Quality Center eval-

uates water quality issues related to land application of liquid biosolids.

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*Left: Avra Valley. A Water Quality Center-supported graduate student samples a biosolid solar drying bed for *Salmonella*.*

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## Effects of Water Recharge Treatment in Tucson

In response to dwindling ground water supplies, the Central Arizona Project was undertaken to bring water by canal from the Colorado River to Tucson, Ariz. When this 20-year, \$3-billion effort was completed, the water quality was determined to be inadequate and therefore the water unusable. The remedy was to "recharge" the water--sending it from the canal into filtration basins in the ground prior to use. Researchers at the Water Quality Center played a role in this solution by evaluating the effects of recharge treatment on removal of natural organic matter and the subsequent potential for formation of disinfectant by-products, which are undesirable for human health. Center research demonstrated that the quality of the recharge water in these respects was adequate for consumption. For more information, contact Dr. Ian Pepper, Director, 520-626-3328; e-mail: [ipepper@ag.arizona.edu](mailto:ipepper@ag.arizona.edu).

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## HPC Bacteria in Water

Heterotrophic plate count (HPC) bacteria are a certain class of organisms that in the past have been considered undesirable in the water supply. It was thought that point-of-use filtration devices such as filters on faucets--many of which are used in third world countries to purify water--provide a breeding ground for such bacteria. Research at the Water Quality Center showed that regardless of the source of water, and of the type and extent of water treatment, HPC bacteria proliferate as biofilms. Furthermore, center research showed that these bacteria are not harmful and can even inactivate pathogens--they may actually provide a beneficial effect. As a result of this research, the World Health Organization redefined limits for HPC bacteria. This development has a broad impact since it not only enhances public acceptance of point-of-use treatments, but also, for companies who sell these devices, enhances the marketability of point-of-use technologies. For more information, contact Dr. Ian Pepper, Director, 520-626-3328; e-mail: [ipepper@ag.arizona.edu](mailto:ipepper@ag.arizona.edu).

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## Endocrine Disruption Activity In Waters and Wastewaters

Endocrine disruptors or hormonally active agents can result in declining human sperm counts, malformed genitalia, aberrant mating behavior and other behaviors anomalies. Pharmaceutically active agents are known to be present in waters particularly wastewaters. This project evaluated the fate and transport of endocrines following dispersion of treated effluent in dry river bottoms. The project showed that soil aquifer treatment reduced estrogenic activity by up to 90%. These data have been of enormous value to the Arizona Department of Environmental Quality, to wastewater treatment facilities, and to the community at large.

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## Occurrence and Control of Emerging Waterborne Pathogens

Molecular method development for emerging pathogens including protozoan parasites (*Naegleria fowleri* and *Microsporidia*) and Norwalk virus was the focus of this research. The project has had state and national implications. At the state level, two young boys swimming in a surface recreational lake close to Phoenix, Arizona were later found to be infected with *Naegleria fowleri*. This parasite enters through the nose, swims to the brain and causes death. Both boys died, causing a local panic in Maricopa County. The project was in immediate and direct response to the Arizona Department of Environmental Quality plea for help. Norwalk virus gained recent national notoriety as the causative agent of gastroenteritis on cruise ships.

