



Applying knowledge to improve water quality

# Southwest States & Pacific Islands Regional Water Program

A Partnership of USDA CSREES  
& Land Grant Colleges and Universities

Fall 2006  
RWQ004

## Reclaiming Wastewater for Beneficial Uses

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Wastewater reclamation and reuse have become essential components of water resource management plans throughout the world. As urban populations continue to grow and demands on water resources increase, new sources of water remain scarce. For many urban areas, wastewater has been identified as a readily available source that may be brought online with reasonable costs for treatment and structural improvements.

### Federal and State Regulations and Guidelines

Regulations governing the use of reclaimed water are necessary to guard against potential negative impacts on public health if the use is not properly planned and implemented. Common regulatory requirements involve performance standards of the reuse system through definition of treatment levels and/or establishment of numerical standards for the finished water. Some level of monitoring for water quality parameters of biochemical oxygen demand (BOD), turbidity, and total (or fecal) coliform counts is generally required.

At the federal level, the Clean Water Act encourages water reuse as a means of reducing pollutant discharge needs. While there is no federal code specifically addressing water reuse, regulatory requirements are folded into case- and site-specific discharge permits issued to wastewater dischargers through the National Pollutant Discharge Elimination System (NPDES) permit program. Many states, including Arizona, California, and Nevada, have established water conservation programs in which water reuse is an important component. In these states, regulations and guidelines, including minimum treatment requirements, have been established to aid in the planning and development of water reuse projects.

### Potential Concerns

While wastewater reuse for crop and landscape irrigation has many benefits, careful management is required to maximize productivity and minimize negative environmental impacts such as salt buildup, nitrate leaching, and crop uptake or transport to groundwater of potentially toxic substances. Large-scale wastewater reuse has been practiced for many decades under various approaches with no documented public health problems. However, the fate and transport of pathogens, toxic chemicals, endocrine disruptors, and pharmaceutically-active compounds are being closely watched for long-term safe use of reclaimed wastewater.



Reclaimed wastewater is being used at this site in Palmdale, CA. In 2003, agricultural irrigation accounted for approximately 46% of all water reuse in California.

Public opinion surveys show that, while the public is generally receptive to water reuse, preferences would steer reuse efforts toward indirect and non-potable uses such as irrigation, groundwater recharge, and environmental enhancement rather than direct reuse for potable water.

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<http://ag.arizona.edu/region9wq/>

*This material is based upon work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under Agreement No. 2004-51130-02258*

## Common Applications of Reclaimed Wastewater

- ◆ **Unrestricted urban reuse** – irrigation of areas in which public access is not restricted, such as parks, playgrounds, school yards, and residences; toilet flushing, air conditioning, fire protection, construction, ornamental fountains, and other aesthetic purposes.
- ◆ **Restricted urban reuse** – irrigation of areas in which public access can be controlled, such as golf courses, cemeteries, and highway medians.
- ◆ **Agricultural reuse on food crops** – irrigation of food crops which are intended for direct human consumption, often further classified as to whether the food crop is to be processed or consumed raw.
- ◆ **Agricultural reuse on non-food crops** – irrigation of fodder, fiber, and seed crops, pasture land, commercial nurseries, and sod farms.
- ◆ **Unrestricted recreational reuse** – a confined body of water in which no limitations are imposed on body contact water recreation activities.
- ◆ **Restricted recreational reuse** – a confined body of reclaimed water in which recreation is limited to fishing, boating, and other non-contact recreational activities.
- ◆ **Environmental reuse** – reclaimed water used to maintain constructed wetlands, enhance natural wetlands, and sustain or augment stream flows.
- ◆ **Industrial reuse** – reclaimed water used in industrial facilities primarily for cooling system water, boiler-feed water, process water, and general washdown.
- ◆ **Groundwater recharge** – using infiltration basins, percolation ponds, or injection wells to recharge aquifers.
- ◆ **Indirect potable reuse** – the intentional discharge of highly treated reclaimed water into surface waters or groundwater that are or will be used as a source of potable water.

### Opportunities and Challenges in Agricultural Water Reuse

Specialty Conference



October 29 – 31, 2006

Hyatt Vineyard Creek  
Santa Rosa, California



Sponsored by  
the WateReuse Association,  
U.S. Department of Agriculture's  
Cooperative State Research,  
Education, and Extension Service  
(CSREES),  
Agricultural Research Service  
(ARS),  
and Washington State University

### Regional Efforts on Reuse

The Southwest States and Pacific Islands Regional Water Program is currently supporting a project, led by Dr. Laosheng Wu, to develop a technical bulletin for the safe use of reclaimed wastewater in agriculture and landscapes, and a user-friendly computer model to assist users in the management of salinity and nitrogen in lands irrigated with reclaimed wastewater. The technical bulletin will be available in late 2006 and the computer model will be available in 2007.