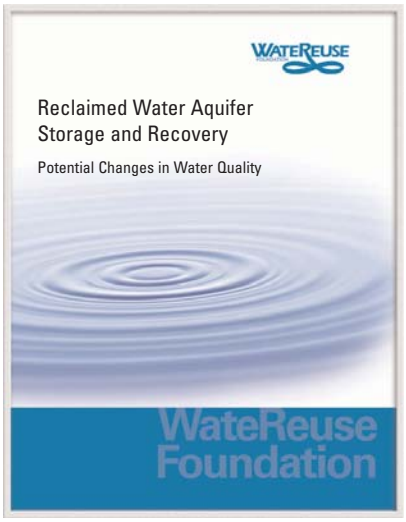
Reclaimed Water Aquifer Storage and Recovery: Potential Changes in Water Quality

WATEREUSE FOUNDATION

www.WateReuse.org/Foundation

Advancing the Science of Water Reuse and Desalination through Research



Product Number: 03-009-01
WRF Subscribers: $15
WRA Members: $25
Others: $45

Project Number
WRF-03-009

Principal Investigators
Carollo Engineers, ASR Systems, Inc., CSIRO

Aquifer storage and recovery (ASR) is defined as the storage of water in a suitable aquifer through a well during times when water is available and recovery of the water from the same well during times when it is needed. The water sources used for ASR include potable water, reclaimed water, and stormwater.

Storage of reclaimed water through ASR represents a powerful tool for effectively using a valuable water resource. A significant problem challenging more widespread application of reclaimed water ASR is the uncertainty regarding the impact of recharged water on native groundwater resources. This concern, and the concern for the quality of the reclaimed water after it is stored, drive the need for an understanding of the fate of contaminants present in the recharge water.

To date, significant experience has been gained in the practice of reclaimed water ASR through several testing programs and operational facilities. Collectively, the data from these programs can be used to help identify water quality issues associated with reclaimed water ASR and to better understand fate and transport properties of residual contaminants in reclaimed water

Objectives

The objectives of this project were to:

- Describe the state of the practice of reclaimed water ASR;
- Identify wastewater constituents and water quality parameters of significance for designing, monitoring, and evaluating reclaimed water ASR;
- Measure concentrations of contaminants at various stages of recharge, storage, and recovery of reclaimed water; and
- Analyze observed data with respect to attenuation mechanisms and rates to characterize water quality changes through ASR.

Benefits

This study investigated the variables of aquifer characteristics, storage time, travel distance, recharge water quality, and operational history. The data support many aquifer process assumptions, such as enhanced activity near the well.

Highlights

- Four reclaimed water ASR sites were selected for participation in the water quality monitoring study—two in Florida, one in Arizona, and one in South Australia.
- Total organic carbon, pH, and nutrient reductions observed in this study generally supported the theory that notable microbial and chemical activities occur in the zone closest to the wellhead, where the influx of dissolved oxygen enhances many processes.
- Pathogens and indicator organisms were rarely detected in monitor programs at ASR sites.
- Concentrations of regulated disinfection byproducts, including total trihalomethanes and haloacetic acids, decreased between recharge and recovery at three of four sites.
- The most notable microcontaminant trend was with atrazine, which decreased at the three sites where it was detected.

PROJECT PROFILE

Order Form

Yes! Send me _____ cop(ies) of the WateReuse Foundation research report entitled
Reclaimed Water Aquifer Storage and Recovery: Potential Changes in Water Quality
(Product No. 03-009-01, WRF Subscribers: $15, WRA Members: $25, Others: $45)

Price _____

❒ I would also like to order the following other WateReuse Foundation research products:

Qty	Title	Product Number	
____	_____	_____	_____
____	_____	_____	_____

Shipping and Handling

Standard Delivery	Delivery Time	Rate
Domestic	4-8 business days	$5.00 for the first book $3.50 for each additional book
International	8-12 business days	$15.00 for the first book $10.00 for each additional book

Delivery times are estimates and only apply to items in stock. Business days are Monday through Friday, excluding holidays observed by the Post Office and UPS.

Subtotal: _____

Shipping and Handling: _____

Total Enclosed: _____

Name _____ **Organization** _____

Street Address (No P.O. Boxes) _____

City _____ **State** _____ **Zip Code** _____ **Country** _____

Phone _____ **Fax** _____ **E-mail** _____

Payment Method:

❒ Check Enclosed

❒ Credit Card

❒ MasterCard ❒ Visa ❒ American Express

Account No. _____ Exp. Date _____

Signature: _____

Date: _____

THREE EASY WAYS TO ORDER

(1) FAX form to 703-548-5085

(2) www.WateReuse.org/Foundation

(3) Mail form to:

WateReuse Foundation
1199 North Fairfax Street, Suite 410
Alexandria, VA 22314
Phone: (703) 548-0880
Fax: (703) 548-5085
www.WateReuse.org/Foundation

Other Research Products

An Economic Framework for Evaluating the Benefits and Costs of Water Reuse (Product No. 03-006-02)

Irrigation of Parks, Playgrounds, and Schoolyards with Reclaimed Water: Extent and Safety (Product No. 04-006-01)

About the Foundation

The mission of the WateReuse Foundation is to conduct and promote applied research on the reclamation, recycling, reuse, and desalination of water.