



Water Matters

News for the
Orange County
Water Community

JULY, 2017



Cadillac Desert: Reflections at a Milestone

After 30 Years, Its Compelling Vision has become Conventional Wisdom

By JAY LUND, Director, Center for Watershed Sciences, UC Davis

In 1987, when Mark Reisner published his book *Cadillac Desert*, I had just begun professing on water management. The book went “viral,” before the word viral had its present-day internet-intoxicated meaning. The book offered a compelling revisionist history and understanding of water development in the American West, based on economic self-interest, ideology, and Floyd Dominy’s personal drives. Since then, *Cadillac Desert* has been a “must read” book for Western water wonks.

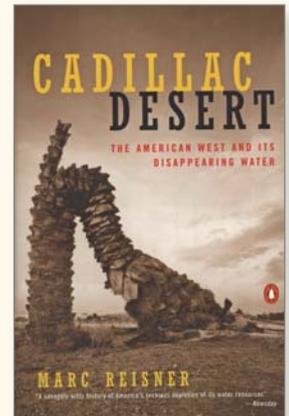
Cadillac Desert fell in the tradition of *Muddy Waters* (1951), *Dams and other Disasters* (1971), *Rivers of Empire* (1969), and *Water and Power* (1983), all written by giants in the field critical of Western water development, but was much better written and marketed (though less scholarly) and the time was ripe for publication of such a thoughtful, popular work. The era of large dam and water projects in the US had clearly ended, and needed a punctuation mark. Mark Reisner provided an exclamation mark.

Main Lessons at the Time

The main lessons from the book (for me) were:

- The 50-year era of building large regional and multi-state water projects was largely over (by 1987).
- Why do we expect anything as important as water to not be political? The individuals, sociology, economics, and politics behind the era of large water infrastructure construction were fascinating and important. In fact, they proved to be more important than traditional engineering (my field) in shaping water management. But contemporary and likely future politics and economics can no longer support continued traditional water project development.
- The public institutions responsible for the successes and failures of the big infrastructure era were incapable of adapting to new conditions. The large federal and state agencies have largely lacked political and financial support needed to develop new talented and ambitious people to effectively lead these institutions in better adapted directions.

- The West’s large water infrastructure systems have profoundly transformed and damaged the natural environment and pre-existing rural communities, particularly Native American communities.
- In many ways, the water infrastructure of the Western US was over-developed, or at least mal-developed for contemporary society’s water management objectives.



Becoming Conventional Wisdom

Marc Reisner’s themes are now conventional wisdom. Although these ideas were not new to well-read scholars, they were timely, well-written, and influential. Almost all books and scholarship following *Cadillac Desert* have adopted or been underlain by these themes (such as *The Great Thirst*, 1992, *The King of California*, 2005, and *Managing California’s Water*, 2011). But much has changed since *Cadillac Desert* was written (and revised in 1992).

Federal and State agencies no longer drive major water project construction. The additional water deliveries from new major dam or canal projects are typically small and expensive. The cheapest sites with the most capacity to deliver water already have water projects. Remaining potential reservoir sites are usually much less cost-effective.

The economic and political drivers of Western water also have changed in fundamental ways. The West is wealthier and much less agricultural. Agriculture’s diminishing role in the West’s economy (now less than 5% of GDP and employment) and the steady urban water conservation efforts have made regional economic prosperity much less dependent on cheap and abundant water supplies.

Environmental laws and regulations now greatly hinder the development of new projects, and impinge on the operation of existing projects. There is now great uncertainty and concern for the ability to preserve native aquatic species.

Continued on Page 2

Whither Western Water? Will Its Future be Bloom or Doom?

Continued from Page 1

Federal and state budgets no longer have substantial funds available for large water infrastructure projects anyway. There remains little political appetite to fund large federal and state water projects.

Federal and State water agencies have become financially and intellectually impoverished and, tragically, have substantially lost most of their sense of mission. Without a strong sense of mission, they often become mired in internal procedures and policies – and suffer greatly reduced effectiveness. A Floyd Dominy would be completely hamstrung in today's large agencies.



So where is Western Water going? And where should we as professionals and interests work to make it go? What should we teach students, the public, and policy-makers about Western water as it moves well beyond *Cadillac Desert*?

Emerging from the Desert

Cadillac Desert is now a bit dated in its lessons for the present and future water management and policy in the American West. What should we be preparing for?

Water in the West will continue to be important and controversial. But the structure of the West's economy will continue to make it less dependent on abundant water supplies. Modern urban economies need relatively little water to produce vast amounts of economic wealth. Per capita urban water use continues to fall substantially, and can probably continue to do so for several decades. Agricultural shifts to higher valued permanent crops, particularly vines and orchards, make farmers more interested in water reliability than total quantity.

Climate change will become more important, bringing more attention to variability and likely contraction of supplies and shifts in demands. It will be hard to know how to change major water infrastructure for a warmer, more variable, and perhaps drier climate. Larger reservoirs, while useful, might not be the most cost-effective solutions.

Local and regional water agencies have become increasingly important, and have been more successful at escaping the calcification of state and federal bureaucracies. Cost-effective contemporary water innovations are largely in water conservation, water markets, conjunctive use of ground and surface waters, wastewater reuse, and other actions which are more appropriately and effectively led and financed at local levels.

Most modern water systems are built around carefully crafted portfolios of water supply and demand management activities involving local, regional, and larger actions, users, and management agencies. State and federal agencies are most important in establishing legal and regulatory frameworks for local agencies and users to cooperate, as well as federal and state agencies continuing to run Dominy-era water supply projects.

Although individuals remain important, the success of adaptive water management portfolios over local, regional, statewide, and

inter-state scales relies increasingly on networks of people. It is hard and slow to organize a group of people distributed among many agencies and interests, but an effective convergence of ideas across such a network can be effective and powerful. Water management has always relied substantially on the development of informal networks of experts across agencies, interests, and academia to lead progress and support the development of effective legal and institutional frameworks.

Implications for California and the West

Water problems and solutions for the American West continue to change. The region is a dry place, with a highly variable (and probably increasingly variable) climate, that supports a growing population and economy.

Four more recent books give some options and optimism for improving water management in the West (*Comparing Futures for the Sacramento-San Joaquin Delta*, Lund et al. 2010; *Managing California's Water: From Conflict to Reconciliation*, Hanak et al. 2011; *Water is for Fighting Over: and Other Myths about Water in the West*, Fleck 2016; *The Water Problem – Climate Change and Water Policy in the United States*, Mulroy 2017). These all point to the importance of moving beyond the large projects of the Dominy era and the pessimism of *Cadillac Desert*. They all point out that despite the inevitability of water problems in the dry Western US, substantial prosperity and relative ecological success can occur with thoughtful and cooperative management. Excessive focus on conflict, and not the benefits of cooperation, is the surest recipe for failure.

For the full article, please visit www.californiawaterblog.com.

Registration Still Open:

2017 IWA Reuse Conference

Long Beach Convention Center • July 23 to 27

Register now for the 2017 International Water Association (IWA) Conference on Water Reclamation and Reuse, to be held on July 23-27, 2017, in Long Beach, California.

Jointly hosted by NWRI, Water Environment & Reuse Foundation (WE&RF), and WaterReuse California, the conference brings together water managers, industry leaders, and researchers to discuss four core topic areas: Water Reuse Management, Water Reuse Applications, Water Reuse Sustainability, and Innovations in Water Reuse Technologies.

Keynote speakers include: Takashi Asano, Ph.D., Professor Emeritus, University of California, Davis; Jörg E. Drewes, Dr.-Ing., Chair Professor of Urban Water Systems Engineering, Technical University of Munich (Germany); and Jeff Kightlinger, General Manager, Metropolitan Water District of Southern California.

The conference includes five pre-conference workshops, an exhibit hall, networking breaks, poster presentation, and a program with over 40 technical sessions.

For further information, to view the conference program, please visit <http://iwareuse2017.org/>.



Charles Haas to Receive 2017 NWRI Clarke Prize

Drexel U. Professor Developed Methods to Estimate Risk of Illness Caused by Pathogens in Drinking Water

The National Water Research Institute (NWRI) is pleased to announce that Charles N. Haas, Ph.D., will receive the NWRI Athalie Richardson Irvine Clarke Prize for pioneering and applying methods to assess and minimize health risks caused by exposure to disease-causing microorganisms (referred to as pathogens) in water and wastewater. Haas is the LD Betz Professor of Environmental Engineering and Head of the Department of Civil, Architectural, and Environmental Engineering at Drexel University in Philadelphia, Pennsylvania.

“I am humbled and honored to receive this award,” said Haas. “The Clarke Prize is great recognition for the line of research I have developed in microbial risk assessment. I am thankful for this high honor.”

Haas will receive the Clarke Prize on October 19, 2017, at the Twenty-Fourth Annual NWRI Clarke Prize Lecture and Award Ceremony in Irvine, California. NWRI presents the prize – which consists of a medallion and \$50,000 award – every year to recognize research accomplishments that solve real-world water problems and to highlight the importance and need to fund this type of research.

“Professor Haas’ accomplishments are exceptional and impact a broad number of scientific fields,” said NWRI Executive Director Kevin Hardy. “His research has led to a better understanding of what is safe when it comes to our water, how we address emerging pathogens, and how we control risks to human health, thereby upholding NWRI’s mission to ensure safe, reliable sources of water are available now and for future generations.”

Trained in both engineering and microbiology, Haas used his cross-disciplinary education to explore the disinfection and inactivation of pathogens in water. Haas explored this issue and published his first groundbreaking findings on estimating the risk of human exposure to low doses of microorganisms in the *American Journal of Epidemiology* in 1983. In this article, he concluded it was impossible to rule out that a single microorganism, when ingested, has the potential to cause infection or disease in humans. In other words, how do we know using a treatment process that removes 99.99 percent of all viruses is good enough? What exactly is “safe” when it comes to exposure to pathogens?

One of his first efforts to understand what constituted microbiologically “safe” water was through work with the U.S. Environmental Protection Agency (USEPA) to understand the minimum level of treatment needed to reduce outbreaks of the waterborne disease, *giardiasis*, of which at least 50 cases had been recorded since the late 1960s. Haas put his groundbreaking findings to practical application, developing a “dose response” function for the pathogen *Giardia*. Simply stated, a dose response indicates the number of disease-causing organisms (dose) needed to cause a negative reaction to human health (response). Using this function, the USEPA was able to estimate the level of protection needed to prevent *giardiasis*, which was then included in the newly developed Surface Water Treatment Rule (1989).

Ensuing research laid the groundwork for Haas’ most widely cited book, *Quantitative Microbial Risk Assessment* (1999), the first complete guide for measuring and evaluating the risks to humans posed by disease-causing organisms in food, water, air, and other environmental pathways. As used today, quantitative microbial risk assessment (QMRA) involves hazard identification, dose response, exposure assessment, and risk characterization. This valuable tool has influenced the development of public health guidance and policies by prominent organizations both nationally and internationally. The USEPA has cited Haas’ research in the Surface Water Treatment Rule and its iterations (including the Long Term 2 Enhanced Surface Water Treatment Rule) and Ground Water Rule (2006). Haas also used his expertise in QMRA to help the World Health Organization (WHO) develop both the Guidelines for Drinking Water and Guidelines for the Safe Use of Wastewater, Excreta, and Greywater. Today, Haas is known as the “Father of QMRA.”

Haas will present the 2017 Clarke Prize Lecture, tentatively titled *An Engineer to Microbiologists, and a Microbiologist to Engineers*, during the Award Ceremony on October 19. The Award Ceremony precedes the annual NWRI Clarke Prize Conference on Urban Water Sustainability, scheduled for October 20.

More information about the NWRI Clarke Prize Conference and Award Ceremony can be found at www.clarkeprize.com.



Save the Date:

24th Clarke Prize & Conference

Irvine Marriott Hotel • October 19-20

The 2017 Clarke Prize Award Ceremony and Conference will be held October 19-20 at the Irvine Marriott Hotel. The Clarke Prize recognizes an outstanding individual who has implemented exceptional water science research and/or policy development to solve real-world water challenges.

The conference will feature presentations from past Clarke Prize Laureates, representatives from water and wastewater utilities, and other well-known professionals in the water industry. In addition, the conference will showcase a mix of innovative academic research by leading experts complemented by practical case studies of problems facing industry practitioners. More information is available at www.clarkeprize.com.

Sponsorship opportunities are still available at three levels – Gold at \$5,000, Silver at \$2,500, or Bronze at \$1,000.

For more details about becoming a conference sponsor, please visit www.clarkeprize.com/sponsors.html or email Eileen Chao at echao@NWRI-USA.org.



Board of Directors

President

Neil Harper

(949) 373-8316

president@ocwater.org

Vice President

Roni Young

(949) 234-5410

vicepresident@ocwater.org

Secretary

Gregorio Estrada

(714) 730-2391

secretary@ocwater.org

Treasurer

John Robinson

(626) 375-9389

treasurer@ocwater.org

Directors

Michael Sinacori

(949) 644-3342

msinacori@newportbeachca.gov

Ryan Gallagher

(805) 298-3380

rgallagher@kehgroup.com

Bobby Young

(949) 837-7050

byoung@etwd.com

Ex-Officio

Jason Dadakis

(714) 378-3364

jdadakis@ocwd.com

Key Contacts

Membership

Ryan Gallagher

(805) 298-3380

membership@ocwater.org

Legal Counsel

Jeff A. Hoskinson

(949) 851-1300, x219

jhoskinson@bawg.com

Luncheon Info

Leticia Villarreal

(714) 378-3203

lvillarreal@ocwd.com

Programming

Ryan Gallagher

(805) 298-3380

rgallagher@kehgroup.com

Education & Competition

Neil Harper

(949) 373-8316

nharper@dudek.com

Golf Tournament

Michael Sinacori

(949) 644-3342

msinacori@newportbeachca.gov

Public Outreach

Roni Young

(949) 234-5410

ryoung@socwa.com

Newsletter & Webmaster

Tim Hogan

(714) 903-3991

timhogan@socal.rr.com

OCWA's Board of Directors meets on the third Wednesday of each month, unless notified otherwise. The next meeting is scheduled for:

**July 19, 2017
10:30 am to Noon**

Dave & Buster's Restaurant
Irvine Spectrum
Entertainment Center

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July Luncheon Topic

Pilot-Scale Evaluation of the Closed-Circuit Desalination Process for Minimizing RO Concentrate Disposal Volume

Presenter:

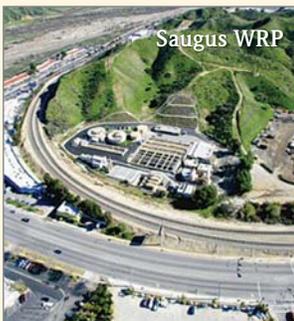
Bruce Mansell

Senior Engineer, Los Angeles County Sanitation District's
Wastewater Research Section



The Sanitation Districts of Los Angeles County operate the Valencia and Saugus WRPs, which are located in the Santa Clarita Valley approximately 30 miles north of downtown Los Angeles. These plants provide tertiary treatment and produce high quality effluent suitable for reuse. However, most of the effluent is

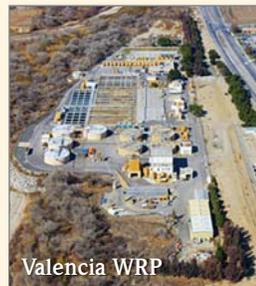
currently discharged to the Santa Clara River, which supports aquatic species and habitat and recharges the underlying groundwater basin that serves as a water supply. To protect salt sensitive strawberry and avocado crops grown within the watershed, the Los Angeles Regional Water Quality Control Board adopted a chloride TMDL, which imposes a discharge limit of 100 mg/L on the effluent from both WRPs.



Saugus WRP

To comply with the chloride TMDL, the Districts will construct an advanced water treatment facility at the Valencia WRP. The facility will treat a sidestream of tertiary effluent with RO membranes. Product water will be blended with the remaining tertiary effluent prior to river discharge to meet the chloride TMDL.

Due to the inland location of the Valencia WRP, disposal of RO concentrate represents a significant challenge to the



Valencia WRP

project. This presentation will discuss some of the research conducted by the Districts aimed at minimizing RO concentrate disposal volume. Specifically, results from pilot-scale testing of a new and innovative RO process (Closed-Circuit Desalination) will be discussed.

About Our Speaker

Bruce Mansell is a Senior Engineer with the Los Angeles County Sanitation Districts' Wastewater Research Section.

Bruce holds a B.S. in Civil Engineering from Cal Poly Pomona, a Ph.D. in Civil and Environmental Engineering from UC Davis, and is a California Licensed Civil Engineer.

Wednesday, July 19, 2017

Dave & Buster's Restaurant ◆ Irvine Spectrum Entertainment Center

11:30 am: Registration ◆ 12:00 – 1:30: Lunch & Presentation

OCWA Members with Reservations.....	\$30	Non-Members with Reservations	\$40
OCWA Members without Reservations...	\$40	Non-Members without Reservations.....	\$40

Reservations must be made by Noon, Tuesday, July 18, to qualify for the Reservation Rate. Cancellations received AFTER this date CANNOT be refunded.

To make reservations, please go to the OCWA website: www.ocwater.org

For more information, contact Leticia Villarreal at (714) 378-3203

Please identify yourself by name and membership number.

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