Tamarisk Invasion Reconsidered

Nearly 250 researchers at the 2005 Tamarisk Symposium in Grand Junction, Colorado, discussed issues related to tamarisk and riparian health in western North America last fall. The biennial meeting, sponsored by the Tamarisk Coalition and Colorado State University Cooperative Extension, covered research, control projects, restoration, mapping and funding, legislation and planning, economics, and biological control of tamarisks. Tamarisk, also called salt cedar, has the reputation of being an invasive species that crowds out native vegetation and consumes large amounts of water. Consequently, several state and federal programs have been enacted to eradicate it. However, some scientists view its invasion as a response to altered riparian conditions and say that simply removing the trees will not change the underlying problems.

Pat Shafroth, a plant ecologist at the U.S. Geological Survey presented two viewpoints of tamarisk invasion. Arguments for tamarisk as the cause of problems are that it replaces native vegetation and consumes greater amounts of water, provides poor wildlife habitat, increases soil salinity, promotes wildfires, clogs river channels, and if eradicated is naturally replaced by native vegetation. Alternatively, those who view tamarisk as an effect or response to river regulation argue that altered site conditions resulting from flow regulation give tamarisk a competitive advantage over native vegetation; tamarisk does provide good habitat for many kinds of wildlife and does not consume more water than native vegetation; restoring native vegetation following tamarisk control is costly and difficult; and increased soil salinity, greater occurrence of fires, and vegetation-clogged channels are the result of a lack of natural flood events, not tamarisk invasion.

Shafroth said that if tamarisks' relative contribution to the degradation effects observed in a riparian ecosystem are not accurately interpreted, unattainable expectations of the benefits of tamarisk control are a likely result. Successful and sustainable riparian restoration has been achieved when 1) the true causes of ecological degradation were identified, including changed conditions that have allowed tamarisk to thrive, and 2) likely changes that might allow species other than tamarisk to prosper were understood. Further, he said, complete eradication of tamarisk is unrealistic in most areas.

Joe Lewis, an economist with the U.S. Forest Service, noted that preliminary results from researchers at the University of California in Santa Cruz suggested no appreciable difference in the amount of evapotranspiration between tamarisk and native vegetation in lowland riparian areas, given similar conditions, but that tamarisk ET may exceed that of native vegetation by at least 30 percent in upland terrace areas.

PowerPoint presentations from the meeting are available at www.coopext.colostate.edu/TRA/Tamarisk2005Presentations.html.

Microbial Risks to Water Studied at UA "Water Village"

In October, the U.S. Department of Homeland Security and the U.S. Environmental Protection Agency announced the establishment of a jointly funded research center based at Michigan State University to study microbial risk assessment in support of homeland security objectives. A grant of $10 million for five years was awarded to establish the Center for Advancing Microbial Risk Assessment (CAMRA), which consists of a consortium of schools including the University of Arizona (UA). While the center will study microbial risk assessment through the environment in general, the UA contribution will focus specifically on risks to drinking water and water distribution systems.

To address the issue, UA researchers are creating a "Water Village," a four-house laboratory for testing technologies for monitoring the health, safety, and aesthetics of water supplies, reported *UANews.org*. The houses are being outfitted with plumbing, monitoring, and communication equipment. According to the report, the first house will be used for point-of-entry testing of water entering a building. The second house will be used to study how contaminants enter and travel through a water supply. The third will be used to test aesthetics—taste and odor—and the fourth will be used for public education.

Charles Gerba, professor of soil, water, and environmental science at the UA and one of three principal investigators on the grant, told *UANews.org* that the Water Village offers research options not possible in either a standard laboratory or an outside community. "The hardest question," he said, "is knowing where to look. The second question is, how do we clean it up? The third is, how clean is clean?" The new facility will enable the researchers to introduce contaminants into a water system and monitor their fate and transport, and how they respond to remediation.

Visit cals.arizona.edu, uanews.org, and es.epa.gov/ncer/rfa/2004/2004_microbial_risk.html.

District Receives Water Treatment Patent

The Contra Costa Water District (CCWD), located just south of the Sacramento-San Joaquin Delta in northern California, was awarded a patent last fall for a new approach to water treatment that uses chlorine dioxide in combination with ozone for disinfecting water. The new method significantly inhibits the formation of bromate, a regulated disinfection byproduct (DBP); it also reduces the total ozone dose needed for treatment, and slightly reduces the energy consumption of the treatment plant.

Bromate formation is a concern to water utilities that draw water from the delta, which contains naturally occurring bromide. When ozone, considered a very

effective disinfectant, is used to treat water, it oxidizes bromide to bromate. As 23 million Californians, including CCWD customers, receive drinking water from the delta, bromide management is of concern. Furthermore, control of DBPs in drinking water is becoming ever more critical: regulatory requirements demand higher levels of disinfection to control disease-causing microbes, but at the same time the rules mandate lower levels of DBPs.

CCWD, which currently uses ozone as a primary disinfectant to treat delta water at its Bollman Water Treatment Plant, led a cooperative research study with funding from the American Water Works Association Research Foundation (AwwaRF) and the California Energy Commission (CEC) to find new ways to disinfect drinking water while minimizing production of bromate.

CCWD cooperated in the patent effort with AwwaRF, CEC, and Black and Veatch to ensure that the potentially significant discovery would remain in the public domain and be available to all water utilities at no royalty costs.

Visit www.ccwater.com.

Sandia Opens Binational Sustainability Laboratory

from Sandia National Laboratories

In December, after four years of preparation, Sandia National Laboratories (SNL) opened the BiNational Sustainability Laboratory (BNSL) in Santa Teresa, New Mexico, near El Paso and the Mexican border. Financially supported by the United States, Mexico, and New Mexico, which collectively contributed $900,000 in initial funding, the general purpose of the lab is to establish a string of satellite research centers along the U.S.-Mexican border region from the Gulf Coast to the Pacific, helping to transform the region from a political trouble spot to a region of concentrated technology transfer sites benefiting both sides of the border. Success would be defined by the number of research ideas its personnel could transform into functioning, profit-making companies, while ideally creating better-paying jobs on both sides of the border. Besides a possible project dealing with border security issues, projects of current interest include environmental and water technologies, advanced materials for petroleum processing, and microelectromechanical systems. Ten states on both sides of the border have expressed interest in taking part in the project, as have U.S. and Mexican national laboratories, research universities and centers, and businesses.

The BNSL was envisioned initially as occupying a single building where Mexican and U.S. researchers would work on resolving problems that have potential for causing enmity between the countries. Solutions might include better border-crossing sensors and arrangements, more efficient use of water, and research into areas of joint interest such as crop development in arid regions. But the vision evolved into a main lab in Santa Teresa, with subsidiary research centers that the BNSL would help fund, according to SNL Vice President Gerry Yonas. The smaller centers would provide training and cross-border legal and patent expertise, as well as some laboratory space, and bring together researchers in government, academia, and private industry to create marketable goods that will bring to life and make more secure the somewhat desolate border region. BNSL expects to provide business planning, mentoring, incubation, marketing techniques, and aid in transforming ideas into products.

Yonas, who described himself as "a card-carrying physicist and dreamer," compared the BNSL's task to that of sherpas who repeatedly accompany tourist mountain climbers to the top of Mt. Everest without personal recognition. "The BNSL's activities will require steady, careful, sherpa mountain climbing," he said.

Visit www.sandia.gov.

Innovative Technologies Funded in New Mexico

Arsenic removal by capacitive deionization and a soil moisture-driven irrigation system are two of nine innovative water technology projects that recently received funding from New Mexico Gov. Bill Richardon's Water Innovation Fund II. The $3.2 million awarded in September will go toward supporting high-tech pilot projects that are expected to save New Mexico billions of gallons of water a year and serve communities statewide, according to a release from the governor's office, to help address the state's current and future water shortages.

This is the second round of funding by the program, with the $3.2 million augmenting $10 million awarded last year to 25 other water innovation projects now underway across the state. The new recipients include public, private, and tribal entities; they will be required to produce results in six to 18 months. The winning projects were judged to have concepts based on good science and economics, and to be ready for testing and deployment.

The nine new projects are in the general categories of water recycling, water production, water conservation, and communities in crisis. Three are for wastewater treatment, two address arsenic removal, two use remote sensing in agricultural applications, and two apply new technologies in irrigation.

The New Mexico Department of Finance Capital Outlay Unit oversees the Water Innovation Fund projects and draws technical expertise from the State Engineer's Office and the New Mexico Environment Department. A technical team from those agencies chose the latest projects based on their abilities to conserve or deliver useable water through innovative technologies that can eventually be applied statewide.

Visit www.governor.state.nm.us.