

concerns about reusing water too quickly. The greatest challenge, however, is to bring these technologies to the public in a timely manner. The goal of our research is to provide cost-effective and efficient water treatment technology to rural communities in need of alternate water sources.

Science and Technology

Reclamation maintains an active research program to develop innovative ways to manage our water delivery program and address increased water demands in the West. Invasive species are a major challenge to our ability to continue to provide efficient water delivery because they clog rivers and canals, damage facilities, and consume large quantities of water. We are currently focusing a large portion of our research efforts on controlling invasive species.

FY 2004 Highlights Thousands of miles of Reclamation canals and water systems are at considerable risk of damage from invasive aquatic and riparian weeds. These non-native plants can be found throughout the West as a result of accidental transplanting or escaping from domestic landscaping sites. They have now multiplied and are causing many problems: obstructing waterflow, consuming excessive water, crowding out native species, preventing access for maintenance and recreation, damaging structures, and seriously threatening water delivery.

Major invasive plants that universally jeopardize Reclamation facilities include saltcedar (tamarisk), hydrilla, water hyacinth, and giant salvinia. These plants annually consume millions of acre-feet of water, cause millions of dollars in damage, and result in millions of dollars of lost revenue.

Reclamation contributed approximately \$3.7 million over the last 28 years to an effort that reduced acres of hydrilla in California from 10,000 acres to less than 900. An infestation of hydrilla and water hyacinth now threatens the flow of the Rio Grande for more than 500 miles. During FY 2004, Reclamation participated in partnerships with Federal, State, and local agencies, and water users, and provided funding to help control this invasive species. The effect of hydrilla spreading to other Western water systems would be devastating. The plant has the potential to seriously disrupt water systems on a regional scale.

Reclamation is contributing to invasive species control in several States: Texas, Wyoming, and North and South Dakota. Activities include photo-interpretation of more than 90,000 acres of land at Lake Meredith National Recreation Area, Texas; experimental caged release of saltcedar leaf beetles at Mullinaw Creek in June; and

Species	Area of Infestation	Estimated Damage
Saltcedar	Colorado River	2.5 million acre-feet of water consumed annually \$288 million in lost irrigation annually \$43.5 million in lost hydroelectric power generation annually
Brazilian elodea	Central Valley Project	Emerging Problem — Without daily removal of plant debris, the Tracy Fish Facility risks shutdown and \$1 million/day income loss
Water hyacinth	Lower Rio Grande	150 miles of river infested
Hydrilla		30 to 100 percent more water required to push deliveries through the clogged river

release of a companion study jointly funded by Reclamation and a Canadian partner. Biannual insect and vegetation monitoring at a caged insect release site is ongoing and continuing through 2005.

Invasive species are not confined to plants. Zebra mussel is another invasive species that Reclamation is actively monitoring. Zebra mussels, an introduced species, are extremely invasive, attaching themselves to structures (such as water intake structures) and adversely impacting waterflow. Through recent survey work, the presence of Zebra mussels at Cheney Reservoir in Kansas was confirmed.

Future Challenges and Goals Reclamation’s Science and Technology program is studying innovative ways to battle invasive species. These methods include various herbicides and biological control using natural predators such as insects and fish. The program seeks sustained, area-wide management of these plants.

Reclamation has an active saltcedar biological control insect (tamarisk leaf beetle) research program in association with the interagency Saltcedar Biological Control Consortium. Biocontrol employs natural enemies of saltcedar from its native range in Asia and offers a promising alternative to using herbicides in environmentally sensitive areas. We are in our third year of field release, and the introduction of these insects is beginning to show good results—several thousand acres have been defoliated at eight cooperative field study sites.

Drought

FY 2004 Highlights Reclamation projects are designed to capture and store water in reservoirs during wet periods so it can be with-

drawn when needed during dry periods. Much of the West is currently in its fifth consecutive year of a drought that has had major impacts. However, Reclamation's reservoirs have allowed us to efficiently manage and deliver water even though water levels at some of our reservoirs are lower than average.

For example, all of our water delivery contracts in the Colorado River Basin were met this year because our storage reservoirs did what they were designed to do.

Reclamation contributes funds to a variety of projects at State and local levels to mitigate the impacts of drought. In FY 2004, we contributed almost \$3 million in emergency drought relief to several entities. For example, Reclamation provided funding to the State of Nebraska

for real-time stream gauging to assist in managing and stretching their available water supply; to the city and county of Santa Fe, New Mexico, for completing

Reservoirs like Lake Powell are critical in supplying water to the West. Although the water levels in some reservoirs are low, the reservoirs are performing as they were designed to do.



domestic wells; and to the Navajo Nation for drilling a well to serve a fish hatchery. These funds helped minimize losses and damages resulting from the current drought.

Drought conditions reduce the amount of water available for hydroelectric power generation. Under the current drought situation, Reclamation procured temporary water supplies, augmenting existing supplies, to help meet our water and power delivery contracts while remaining in compliance with various environmental requirements. We also used alternate pumping schedules to reduce conflicts during peak water use periods, but this puts an extra burden on the equipment, increases wear on the components, and adds to maintenance costs.

Future Challenges and Goals Ensuring adequate water supplies are available in the future to maintain and optimize water delivery and hydroelectric power production presents a serious challenge for Reclamation and the West. When adequate supplies are not available to generate hydroelectric power, electrical power must be found elsewhere, usually at a much higher cost.

Delivering Power

FY 2004 Highlights Reclamation's hydroelectric power facilities include some of the most important electrical resources in the Western United States. We are the Nation's second largest hydroelectric power producer with 58 hydroelectric powerplants having an installed capacity of over 14 million kilowatts. Reclamation's hydroelectric powerplants annually generate about 42 million kilowatthours of hydroelectric energy, enough to meet the annual needs of 9 million people or the energy equivalent of over 80 million barrels of crude oil. Over the last 10 years, annual power sales revenue has averaged just under \$700 million.

Reclamation has authority to use a portion of power revenues to fund construction, operation, and maintenance costs at our hydroelectric power-related facilities. Power revenues are also used to provide a portion of our annual funding for irrigation, salinity control, and other authorized project uses.

Reclamation leads the hydropower industry for low costs and high reliability. By efficiently using financial resources and maintaining reliable facilities, we are keeping costs in check. In fact, Reclamation's facilities produced power at a cost estimated to be within the lowest quartile of all hydropower producers. We also have an outstanding record for reliable power delivery with an estimated