Special Focus Session

Session: # 051409

Ecology, Monitoring, and Management of Tamarisk: Overview of Tamarisk Problems and Management

Chair: Deborah Finch

Rationale for Special Focus Session: Tamarisk invasion has had serious effects on the structure and stability of native plant and animal communities. New methods for monitoring and managing Tamarisk have been developed over the past decade, but many considerations influence how, when, and where to monitor and control Tamarisk. The decline of riparian stands of cottonwood (Populus fremontii) along the Rio Grande in New Mexico is partially attributable to the invasion of tamarisk which has limited the number of germination sites suitable to cottonwood. Water uptake by salt cedar is higher than most native plants owing to its high leaf, stem, and shrub densities, contributing to drying of rivers. Efforts to salvage water by removing Tamarisk have led to mixed results that need to be understood by managers. Current drought conditions aggravate salt cedar spread, contributing to increased fuel loads. Salt cedar ignites easily and quickly burns out of control, damaging river habitats and posing hazards to homes and structures. Salt cedar thickets form barriers that are often impenetrable to animals and humans. Wildlife habitat invaded by salt cedar is structurally and floristically less diverse posing negative consequences for native species.

The suitability of tamarisk as wildlife habitat has been a subject of considerable debate. However, from a structural standpoint it does provide cover for some species, particularly birds. It is important to note that all published studies of the value of tamarisk as wildlife habitat have focused on birds during the breeding season. Purported benefits to selected birds do not necessarily extend to other animals. Additional research is needed on the relationship between tamarisk and other groups of species including invertebrates as compared to native vegetation types. These two sessions will review the needs and methods for controlling Tamarisk, review water salvage and wildlife responses to managing Tamarisk, and discuss some of the controversies associated with Tamarisk control.

Keywords: tamarisk, monitoring, management, Rio Grande, populus fremontii, salt cedar, fuel loads, wildlife habitat, native vegetation

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The Politics and Science of Tamarisk

Author: Phil Westra

Tamarisk is a woody invasive weed of riparian areas which has galvanized an amazing array of scientists, politicians, ranchers, farmers, tribal people, and many other interested parties because of its devastating impacts on natural ecosystems and valuable water ways in the west. Rarely has a single plant become such a catalyst for so many people to use as a "poster child" for a variety of interesting issues. Among these issues are water resource issues, soil quality, land use issues, wildlife habitats, access to federal funds to support local community initiatives, and support for research on a plant with an amazing ability to invade and alter natural habitats. This collective effort to understand and manage a major water robbing plant in riparian ecosystems is due to the efforts of many people, many organizations, and to the vision provided by a group such as the tamarisk coalition. The science of tamarisk is currently focused primarily on genetic diversity, biological, chemical, and mechanical control, mapping of tamarisk infestations, flooding impacts on tamarisk dynamics, wildlife impacts, and ecosystem restoration. Because tamarisk is spreading at such a large scale, significant resources will be required to halt the negative impacts causes where it invades. Political action by congress and many agencies suggest that the necessary resources to support tamarisk science, education, and management may help in the battle to control this invasive weed. Tamarisk is providing a novel and revealing project around which both rural and urban citizens can rally for economic, environmental, and recreational benefits.

Keywords: political action, water resource issues, catalyst, tamarisk, riparian, invasive weed

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Tamarix Control in the West: Overview of Central Issues and Monitoring Needs

Authors: Vanessa Beauchamp[1] and Patrick B. Shafroth[2*]

State and federal funding to control *Tamarix* spp. in the western U.S. has burgeoned over the past decade due to concern by land and water managers that *Tamarix* invasions decrease streamflow, provide poor wildlife habitat, and displace native plant communities. However, evidence from the scientific literature is often equivocal regarding these reported impacts, and clear predictions of the outcomes of *Tamarix* control programs are elusive. Given uncertain predictions, monitoring the results of *Tamarix* control programs is essential. Ideally, rigorous before-after-control-impact studies will be designed and implemented, with measurements of various hydrologic, botanical, and zoological responses occurring over at least several years. Whenever possible, similar monitoring protocols should be implemented for *Tamarix* control projects at different locations, to allow for clear comparisons and more robust and general conclusions. Finally, monitoring should be focused to address particular hypotheses regarding the effects of *Tamarix* control.

Keywords: Tamarix control, monitoring, western United States

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Monitoring Riparian Restoration: A Management Perspective

Authors: Yasmeen Najmi and Sterling Grogan

As the largest landholder of cottonwood-dominated riparian forest or "bosque" in the Middle Rio Grande from the Cochiti Dam to the Bosque del Apache National Wildlife Refuge, the Middle Rio Grande Conservancy District, along with several cooperators, is implementing "fuels reduction" projects throughout the bosque. Fuels reduction is defined as the removal of exotic phreatophytes such as Tamarisk (*Tamarisk ramosissima*) and Russian olive (*Elaeagnus angustifolia*), treatment of the exotic stumps or stems with herbicide, and treating dead and down wood to reduce fire hazard. Primary objectives for fuels reduction projects include fire management; biodiversity; water salvage and recreation access. While projects were initially small scale, increased funding availability and the use of mechanical equipment such as mulcher-grinders and tree extractors has enabled managers to implement projects more rapidly and on a larger scale. Concern for effects of fuels reduction activities on wildlife, particularly the Southwestern willow flycatcher (a Federally endangered species), and the growing influence of fire as the primary disturbance force in the bosque, led to the establishment of two studies with the USDA Forest Service Rocky Mountain Research Station. These studies are examining the effects of different fuels reduction treatments and wildfire on vegetation, water resources, wildlife and fuel loads in the Middle Rio Grande bosque. The University of New Mexico's Bosque Ecosystem Monitoring Program (BEMP) utilizes elementary and secondary students from San Juan Pueblo south to Socorro, New Mexico to conduct ecological monitoring and, through methods such as measuring volume of leaf fall, have detected a trend of declining productivity among valley cottonwoods. There is also support for BEMP to monitor large-scale restoration work in the Albuquerque reach. Universities and government agencies are monitoring evapotranspiration from bosque vegetation as well as groundwater levels and movement to learn how restoration activities affect water supply. The numerous monitoring and research efforts occurring in the Middle Rio Grande have led to an attempt to focus on ecosystem-level processes in the bosque. Scientifically-sound monitoring and research programs have the potential to strongly influence how we look at the bosque and approach restoration, now and in the future. The question for bosque managers like the Conservancy District is how monitoring fits into a management scheme - that is whether, when and how information from different monitoring programs can be integrated efficiently into restoration plans and implementation strategies, including best management practices.

Keywords*:* restoration, tamarisk, monitoring, riparian, management, fire, endangered species, bosque, Rio Grande

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Planning for Large Scale Habitat Restoration In the Socorro Valley, New Mexico

Authors: Regina E. Dello Russo and Yasmeen Najmi

One initiative for large scale bosque restoration on the Rio Grande in central New Mexico is being led by a nonprofit organization, the Save Our Bosque Task Force. The Task Force has just completed a conceptual restoration plan using historic and current information on the vegetative, geomorphologic and hydrologic conditions of this 72 kilometer reach of river. Flood modeling was used to predict inundation and the potential for reestablishing and maintaining riparian habitats through improved river management. The specific river issues addressed in the plan include endangered species habitat improvement, fire management, and overall improved biodiversity through exotic species control and native plant establishment. Important water issues addressed by this plan include existing and potential use by the mosaic of habitats along the river and potential savings through improved management and delivery. Restoration of river processes coupled with exotic species control, bank destabilization, wetland enhancement, sand bar maintenance, grassland reestablishment, and other techniques will improve the diversity of native riparian plants on approximately 8,500 hectares of active floodplain under the jurisdiction of federal, state, local government agencies and private landowners. Areas where flooding occurs less frequently are designated as suitable for reestablishment of grasslands and more open forest/savannas. These areas are predicted to provide the greatest water savings. Restoration in areas where flooding occurs more frequently would focus on reestablishment and maintenance of cottonwood/willow forests of different age classes, wet meadows, and permanent wetlands. In this way, the restoration of the diverse mosaic of habitat that occurred on the Rio Grande could be returned to the degree possible while addressing important socioeconomic issues such as water use and fire. This plan is presently being used by water and land managers, private landowners, and other local interests to guide implementation of large scale resource management efforts.

Keywords: Ecosystem function, large scale planning: first step to large scale implementation, monitoring, tamarisk removal, restoration, water use, endangered species, management perspectives, Southwestern U.S.

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Control of Tamarisk Infested Water Courses within Threatened and Endangered Species Habitat

Authors: Nyleen H. Troxel Stowe

The Lower Rio Grande Salt Cedar Control Project treated 7,648 acres of monotypic Salt cedar in riparian areas along the Rio Grande in Socorro, Sierra, and Dona Ana Counties in New Mexico. We contracted North Star Helicopters, Inc. to do aerial treatment of these Salt cedar stands. The biggest issue in doing this treatment was the presence of the Southwestern Willow Flycatcher, an endangered bird species that is now nesting in Salt cedar.

For this project to be undertaken, we had to ensure the USFWS that no treatment would occur within a ¼-mile buffer radius of the Southwestern Willow Flycatcher's nesting sites. We had ESRI (Environmental Systems Research Institute, Inc.) shape files of the nesting sites with the ¼-mile buffer. These files were uploaded into the on-board Trimble GPS units on the helicopters and marked as exclusion zones. The spray pump could not be activated when the helicopter was within this zone. The on-board GPS units also had real-time differential correction. ESRI shape files of the areas to be treated were loaded into the GPS units. When the helicopter was within the boundaries of these files, the spray pump could be activated. When outside of these boundaries, the spray pump could not be activated.

This project was very successful. It was done with several constraints such as the exclusion zones, and the time period allotted for treatment. Current technology allows us to do very accurate and safe treatment.

Keywords: monotypic salt cedar control, riparian, Rio Grande, southwestern willow flycatcher, endangered species,

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Overview of Saltcedar Biological Control

Authors: C. Jack DeLoach, Raymond I. Carruthers, Allen E. Knutson, Debra Eberts, David C. Thompson, David J. Kazmer, Tom L. Dudley, Dan W. Bean, Jeff B. Knight, and Lindsey R. Milbrath

Biological control has successfully controlled 10 exotic, invasive weeds of rangelands and natural ecosystems in the United States since 1945, and control of others is in progress. We initiated biological control of saltcedar (*Tamarix* spp.) in 1987, using host-specific insect herbivores that regulate their populations in the Old World. We did an extensive risk analysis, including the possible effects of biological control on the southwestern willow flycatcher, which had begun nesting extensively in saltcedar in Arizona. Our cooperators in France, Israel, Kazakhstan, China and Turkmenistan tested 15 insect species; after quarantine testing, we released the first of these, the leaf beetle *Diorhabda elongata* from Fukang, China and Chilik, Kazakhstan, into field cages at 10 approved sites in 6 states in 1999 and into the open environment in May 2001. These beetles overwinterd and increased rapidly in the field at 5 sites in Nevada, Utah, Colorado and Wyoming and by September 2003 had defoliated from 15 to 500 acres at those sites. The area defoliated increased greatly during 2004. However, these beetles failed to establish in Texas and California because the short summer daylength stimulated premature diapause and failure to overwinter. Our overseas cooperators sent four different collections of *Diorhabda* beetles in 2002 and after quarantine testing, we released the Crete beetles into field cages then into the open environment at 7 sites in Texas, 3 in New Mexico, and 1 in California during late 2003 and 2004. They overwintered well and are increasing in populations but have encountered heavy predation in some areas; intensive monitoring is underway. Biological control can provide self-sustaining, permanent, safe, and low cost control of saltcedars. This will allow recovery of native riparian plant communities, improved wildlife and fish habitat, reduced wildfires, and increased availability of water and recreational usage of parks and natural areas.

Keywords: saltcedar, *Tamarix*, biological control, riparian ecosystems, invasive plants

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Analyzing the Economics of Tamarisk in the Pecos, Rio Grande, and Colorado River Ecosystems

Authors: Joseph W. Lewis

Synopsis: The potential economic effects of tamarisk (saltcedar), and the costs and benefits associated with controlling tamarisk infestations will be evaluated in two case studies – one on the Pecos/Rio Grande River ecosystem, and one on the Colorado River ecosystem. Resources analyzed will include water, wildlife habitat, and fire risk. The extent of existing infestation will be quantified and projected over the next 30 years under the following 4 scenarios:

1. No action (status quo)
2. Containment
3. Maximum control in 20 years
4. Maximum control in 30 years

The economic costs and benefits associated with each alternative scenario will be estimated, and a sensitivity analysis will be conducted to determine which variables have the most impact on the results of the economic analysis.

Keywords: tamarisk infestations, saltcedar, economic costs and benefits, sensitivity analysis, economic analysis

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