

Saltcedar removal, water salvage, and wildlife habitat restoration along rivers in the southwestern U.S.: state of the science and future research directions

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In the arid and semi-arid western United States, efforts to increase the scarce supply of water are common. In most cases, though, water and the legal rights to it are already fully allocated, leaving few alternatives to augment the supply. One approach that has received periodic attention in the past, and that is currently being implemented and/or considered for broader application, is to clear floodplain vegetation along western rivers to “salvage” the water that leaves the system via evapotranspiration. Of particular interest has been clearing the non-native shrub, saltcedar (*Tamarix* spp.). Often, a case for restoration of native vegetation is mentioned as a simultaneous benefit to clearing the alien saltcedar for water salvage. Because native riparian forests in arid and semi-arid parts of western North America are critical to the support of a variety of organisms (e.g., birds, small mammals, reptiles, amphibians, and fish), riparian restoration has been the focus of many efforts along southwestern rivers in the past few decades, and these efforts commonly involve saltcedar removal.

Complex interactions exist between saltcedar removal, water budgets, post-removal vegetation dynamics, vegetation management/restoration, and wildlife use. For example, water use of many desirable native species (i.e., restoration targets) may offset water savings associated with saltcedar removal. To make sound decisions surrounding efforts to remove saltcedar for the primary purpose of water salvage and secondary purpose of environmental restoration, policy makers, scientists, and natural resource managers should consider the available scientific information from several relevant disciplines/sub-disciplines of ecology and hydrology. There is a strong need to synthesize the state of the science, connections/interactions, and knowledge gaps associated with the following topics: 1) riparian vegetation evapotranspiration (ET) rates, and quantification of expected water salvage following saltcedar clearing; 2) estimation of natural vegetation dynamics following clearing, and associated ET rates; 3) approaches and costs of vegetation management/restoration following clearing and associated ET rates; 4) expected wildlife use of a range of habitats, pre- and post-clearing, pre- and post- restoration; 5) other potential effects of control efforts (e.g., herbicide use along river corridors). Timely communication of such a synthesis would be useful to a range of entities that are or likely will be involved in the development, implementation, and evaluation of saltcedar removal programs, including the principal Department of Interior land and water management agencies (BLM, BOR, NPS, FWS, and BIA), as well as numerous state and non-governmental organizations. Finally, there is a need to coordinate and plan future research activities of USGS scientists to effectively address the unresolved scientific problems surrounding the issue of saltcedar removal in the western US.

I propose three tasks to address the needs described above:

I. Publish synthesis article

Develop and co-author with ca. 6 subject experts a synthesis of the state of the science connections/interactions, and knowledge gaps associated with the following topics: 1) riparian vegetation evapotranspiration (ET) rates, and quantification of expected water salvage following saltcedar clearing; 2) estimation of natural vegetation dynamics following clearing, and associated ET rates; 3) approaches and costs of vegetation management/restoration following clearing and associated ET rates; 4) expected wildlife use of a range of habitats, pre- and post-clearing, pre- and post-restoration; 5) other potential effects of control efforts (e.g., herbicide use along river corridors).

The proposed outlet for this synthesis is "*Frontiers in Ecology and the Environment*," a new publication of the Ecological Society of America that is, "...international in scope and interdisciplinary in approach..."; "...focuses on," current ecological issues and environmental challenges." ; and is "aimed at professional ecologists and scientists working in related disciplines. With content that is timely, highly relevant, and understandable, even to those reading outside their area of expertise, it will have a broad, interdisciplinary appeal to all users of ecological science, including resource managers, educators, and policy makers."

I have spoken with and sent a prospectus to the editor-in-chief of *Frontiers* who has indicated that the journal would welcome an article covering the topics described above. The journal is designed for rapid publication of topics of current interest.

Timeline for task I

- > Convene co-authors on a three-day retreat to prepare draft manuscript. (early June 2003)
- > Revise manuscript, get outside pre-review and submit to *Frontiers* (June/July 2003)
- > Peer-review and publication process (August-Nov. 2003; should be published by Nov., according to the editor-in-chief of *Frontiers*)

II. Coordinate and plan future USGS saltcedar research activities

Convene a meeting of USGS scientists from Biological Resources, Water Resources, and National Mapping Disciplines to identify research needs and capabilities; to plan and coordinate future saltcedar research activities; and to develop funding strategies.

Timeline for task II

- > Shortly following submission of manuscript in Task I (Aug.-Sept. 2003)

III. Convey findings at a special session of a saltcedar group (e.g., Saltcedar Consortium; Tamarisk Coalition) and, perhaps, at a national scientific meeting (e.g., Ecological Society of America)

I will convene the subject experts who collaborated on the manuscript and participated in coordination activities (Tasks I and II), plus other relevant scientists at one or more of the meetings indicated above.

Timeline for task III
> Spring/Summer 2004

Budget (should fully fund Task I and partially fund either task II or III):

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| travel, honoraria (for non-fed experts): | \$2.5K/person x 3 persons = | 7.5k |
| travel (federal experts): | \$1.5K/person x 3 persons = | 4.5k |
| publication/dissemination costs | \$2.0K | = 2.0k |
| FORT Science Support (15%) | \$2.1K | = 2.1k |
| TOTAL | | 16.1k |