

Republican River Russian Olive & Tamarisk Mapping & Inventory Summary

Inventory Background & Objectives – In 2006, the Tamarisk Coalition completed an inventory of Russian olive and tamarisk infestations on the Republican River watershed for the Colorado Water Conservation Board (CWCB). The purpose of this work was to economically provide a clear understanding of the extent of the Russian olive and tamarisk problems on the Republican River.

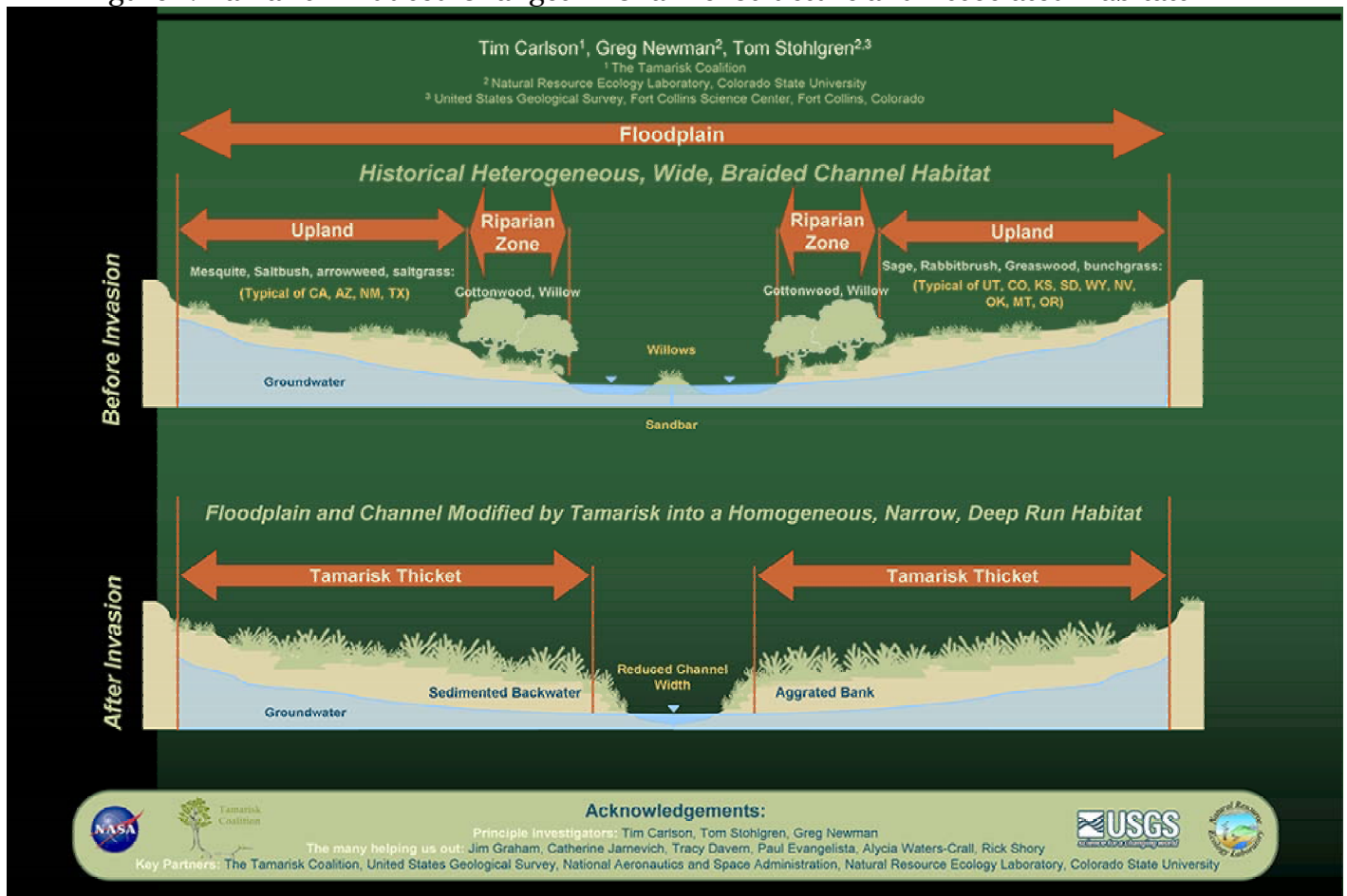
Inventory Approach – Inventory and mapping were coordinated with the U.S. Geological Survey's (USGS) efforts at establishing a national on-line database which would conform to the weed mapping standards developed by the North American Weed Management Association. The basic approach was to use existing aerial photography and satellite imagery and local knowledge available from counties, river districts, soil and water conservation districts, state agencies, Army Corps of Engineers, National Resources Conservation Service, USGS, CSU, and The Nature Conservancy. This information was then “ground-truthed” by a 2-man team to confirm infestation density, maturity, accessibility, presence of native species, and several other site characteristics. GPS data and digital photo records were taken and shape files were developed utilizing GIS capabilities at Mesa State College. Approximately 60 miles of Russian olive infestation on the North and South Forks of the Republican River and 2 plots of tamarisk on the South Fork were surveyed using this approach. This information, in the form of shape files and characteristics data, has been transformed into a digital GIS database which soon will be available on the USGS invasive species website, www.niiss.org.

Finding – The inventory for the Republican River is presented in Tables 1 through 4 (included in folder “Republican River Data Tables 1-4”). Table 1 presents the general mapping data; whereas, Tables 2 provides information on estimated current water and future water losses associated with the Russian olive and tamarisk infestations and the estimated costs for Russian olive and tamarisk control and revegetation. Tables 3 and 4 provide detailed information on each infested area and its unique attributes. These water losses and cost estimates are based on the most recent research and statistical analysis available through the USDA, NOAA, USGS, CSU, National Invasive Species Council, Tamarisk Coalition, and others. The following represents our findings:

1. The North and South Forks of the Republican River have approximately 3,300 total acres of Russian olive infestation at 19% average density. The South Fork of the Republican River has 350 acres of tamarisk infestation at a 30% density.
2. Current water losses are based on the amount of water Russian olive and tamarisk are currently using under observed densities minus the water that would be used by native plants. Figure 1 represents the differences in vegetative cover with and without Russian olive and tamarisk and illustrates how Russian olive and tamarisk will occupy an area much greater than the riparian zone which typically would support cottonwoods and willows, also phreatophytes. The significant water losses occur as Russian olive and tamarisk occupy upland areas within the floodplain that would normally have dryland xeric vegetation such as grasses, sage, rabbit brush, etc. Based on the percentage of upland Russian olive and tamarisk infestations along the Republican River, the estimates of current water losses above and beyond what native vegetation would use are approximately:
 - a. Russian olive on the North and South Forks of the Republican River = 1,600 acre-feet per year.

- b. Tamarisk on the South Fork of the Republican River = 350 acre-feet per year

Figure 1: Tamarisk Induced Changes in Channel Structure and Associated Habitats



- 3. Future water losses assume an infilling of the existing infestation areas that will likely occur over the next several decades based on similar conditions observed in other states (NM, UT, and NV). Future water losses from infilling only (no expansion from existing infested areas) are estimated to be:
 - a. Russian olive on the North and South Forks of the Republican River = 8,400 acre-feet per year.
 - b. Tamarisk on the South Fork of the Republican River = 1,200 acre-feet per year
- 4. Costs for Russian olive and tamarisk control and revegetation are based on current work being performed by the National Invasive Species Council on an economic model that incorporates *Integrated Pest Management* practices with planning, design, control, revegetation, monitoring, and maintenance activities. This information is contained in the folder titled “Options for Non-Native Phreatophyte Control” as a PDF file. Estimated costs for the Republican River within the study area are:

Economic summary

River	Total Costs*	Average Cost per Acre Treated*	Average Cost per Acre-foot of Water Preserved*	Average Cost per Mile*
Russian Olive	\$1,810,000	\$550	\$1,100	\$31,000
Tamarisk	\$290,000	\$840	\$850	N/A

* Rounded values from Tables 2 (included in folder “Republican River Data Tables 1-4)

5. If Russian olive and tamarisk control and revegetation occur on any of these river or tributary sections, the water lost to the atmosphere through evapotranspiration will be saved and will remain within the groundwater and/or surface water regimes.
6. The costs of water retained within the hydrologic system of approximately \$1,100 per acre-foot for the Russian olive infestation and \$850 for the tamarisk infestation should be compared to the value placed on the purchase of senior water rights because tamarisk is always using water even during a drought.
7. The method used to develop this inventory information is predicted to identify 85 to 90 percent of Russian olive and tamarisk within the Republican River watershed. The remaining percentage represents small pockets of infestations that are scattered throughout the region. Because these outlying infestations are not included in the cost development, approximately a 20% contingency should be added to these cost values to account for their identification and remediation.