

Gunnison River Tamarisk Mapping & Inventory Summary

Inventory Background & Objectives – In 2006, the Tamarisk Coalition completed an inventory of tamarisk infestations on the Gunnison River watershed and its main tributaries for the Colorado Water Conservation Board (CWCB). The purpose of this work was to economically provide a clear understanding of the extent of the tamarisk problem on the Gunnison River. The Gunnison River through the Black Canyon and the Gunnison National Park area was not surveyed because the Bureau of Land Management and the National Park Service are actively controlling tamarisk in those areas.

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 100 miles on the Gunnison River from Grand Junction to the upper extent of the infestation on the North Fork of the Gunnison 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.

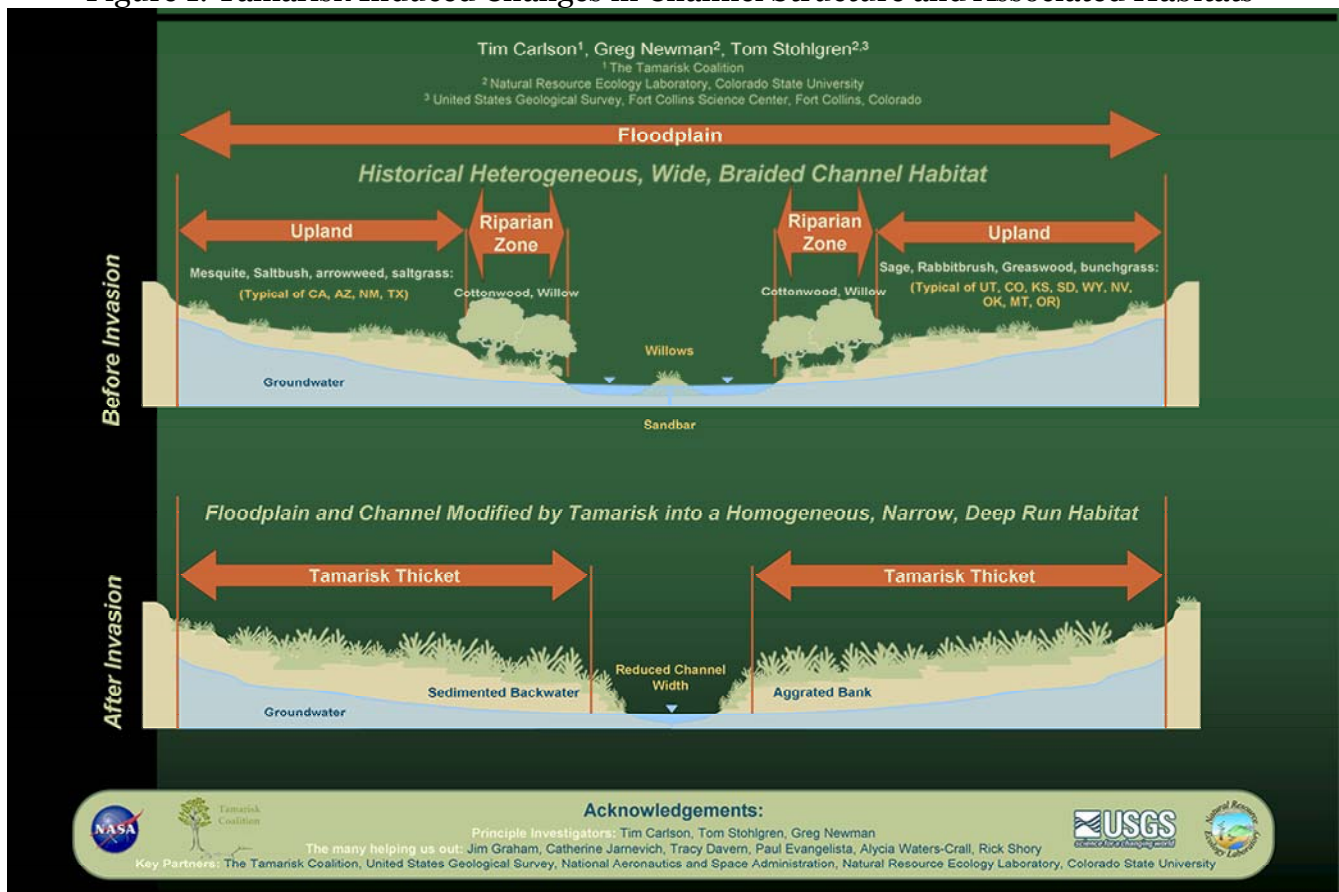
Finding – The inventory for the Gunnison River and its major tributaries is presented in Tables 1 through 4 (included in folder "Gunnison River and Tributary Data Tables 1-4" as an Excel file). Table 1 presents the general mapping data; whereas, Tables 2 provides information on estimated current water and future water losses associated with the tamarisk infestations and the estimated costs for 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 Gunnison River from Grand Junction to its confluence with the North Fork of the Gunnison has 2,600 total acres of tamarisk infestation at approximately 27% average density. The broadest section of the infestation stretches from the Mesa/Delta County Line to Delta City, averaging over 400 feet in width with a 28% density, and the narrowest from Grand Junction to the Mesa/Delta County Line averaging only 191 feet at 28% density.
2. The major tributaries of the Gunnison River have an additional 710 acres of infestation with an average density of approximately 22%.
3. Current water losses are based on the amount of water tamarisk is 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 tamarisk and illustrates how 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 tamarisk occupies 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 tamarisk infestations along the Gunnison River and its major tributaries, the estimates of current water losses above and beyond what native vegetation would use are approximately:

- a. Gunnison River from Grand Junction to its confluence with the North Fork Gunnison = 1,900 acre-feet per year.
- b. Tributaries = 440 acre-feet per year.

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



4. 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. Gunnison River from Grand Junction to its confluence with the North Fork Gunnison = 7,000 acre-feet per year.
 - b. Tributaries = 2,000 acre-feet per year.
5. Costs for 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. Estimated costs for the Gunnison River and its tributaries 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*
Gunnison River	\$2,090,000	\$800	\$1,100	\$27,000
Tributaries	\$480,000	\$650	\$1,100	\$25,000

* Rounded values from Tables 2 (included in folder “Gunnison River and Tributary Data Tables 1-4” as an Excel file)

6. If tamarisk control and revegetation occurs 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.
7. The costs of water retained within the hydrologic system of approximately \$1,100 per acre-foot should be compared to the value placed on the purchase of senior water rights because tamarisk is always using water even during a drought.
8. The method used to develop this inventory information is predicted to identify 85 to 90 percent of tamarisk within the Gunnison 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.