

SITE CONDITIONS IN THE LONG TERM:

Collaborating to Evaluate Vegetation Changes, Beetle Activity and Current Conditions in South Eastern Utah



COLLABORATORS in the SE Utah Riparian Partnership

Bureau of Land Management (Moab Field Office primarily), National Park Service Forestry Fire and State Lands(Sovereign and Wildland Urban Interface), Utah Department of Wildlife Resources
 Grand County Weed Department, Moab City, Town of Castle Valley
 Utah Conservation Corps, Plateau Restoration Inc, Rim to Rim Restoration, The Grand Canyon Trust, The Nature Conservancy (Moab Office), and private individuals.

Specific Contributors to these monitoring efforts

Kara Dohrenwend, Rim to Rim Restoration
 Gabe Bissonette, Bureau of Land Management, Moab Field Office
 Tim Higgs, Tim Graham and Wright Robinson, Grand County Weeds

WHY MONITOR

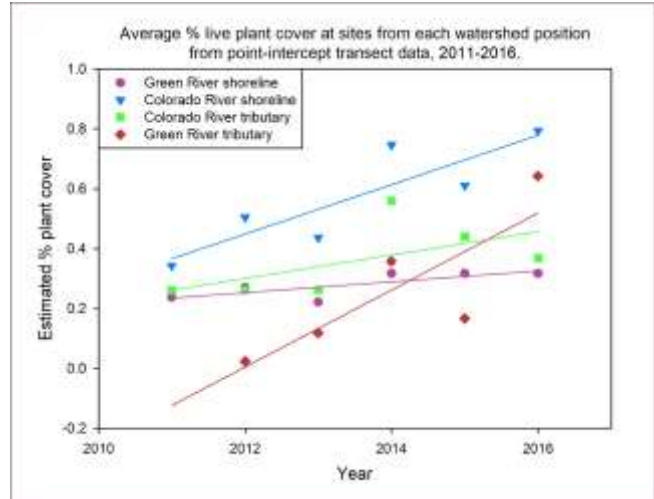
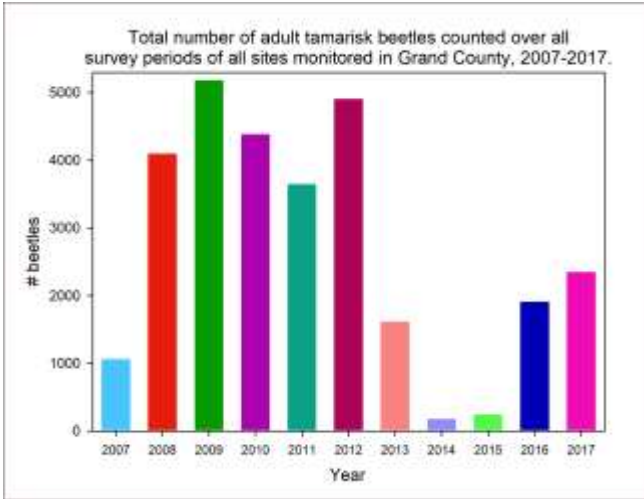
In 2004, the Grand County Weed Department released tamarisk leaf beetles (*Diorhabda carinulata*) on private and state land in SE Utah. By 2007 tamarisk in the Grand County portion of the Colorado River corridor

defoliated at least once during the growing season, raising concerns about fire risk in high use recreation areas. This concern, coupled with unknowns about long term beetle effects on tamarisk led to a rapid increase in tamarisk removal efforts along the Colorado River Corridor on both public and private land. In response to beetle impacts, as well as organizational efforts by the Tamarisk Coalition in SE Utah, the SE Utah Tamarisk Partnership began meeting in 2006. Initially 26 organizations, this group drafted a plan addressing impacts in riparian areas along the Colorado River and its tributaries from the Colorado state line to the confluence with the San Juan River. This group continues to meet, now called the SE Utah Riparian Partnership (the Partnership), to share lessons learned through hands on work and monitoring, and to work to coordinate projects.

When the leaf beetles were released the Grand County Weed Department, with input from the Grand County Weed Board, initiated tamarisk leaf beetle monitoring efforts to track beetle establishment. Systematic monitoring started in 2007 when it became obvious beetles were well established. In 2011, as tamarisk began to show evidence of significant decline, the County began monitoring tree mortality as well as other plant recruitment under defoliated tamarisk trees.

In 2007 Rim to Rim Restoration initiated vegetation response monitoring efforts to gather information at treatment locations along the mainstem Colorado, as well as up highly used tributaries including Mill Creek and Kane Creek. This monitoring program sought to better understand the response of vegetation to manipulation and to augment shorter term BLM project monitoring by establishing long term transects at various private and public project sites.

Over 10 years later both monitoring efforts, while somewhat modified from initial efforts, continue to collect data about beetle activity, tamarisk tree mortality, vegetation response to beetle activity in unmodified areas and in areas of vegetation manipulations. Monitoring efforts are hard to fund, leaving little capacity for sharing



VEGETATION RESPONSE TO REMOVAL OF TAMARISK AND OTHER LARGE WOODY EXOTIC TREES

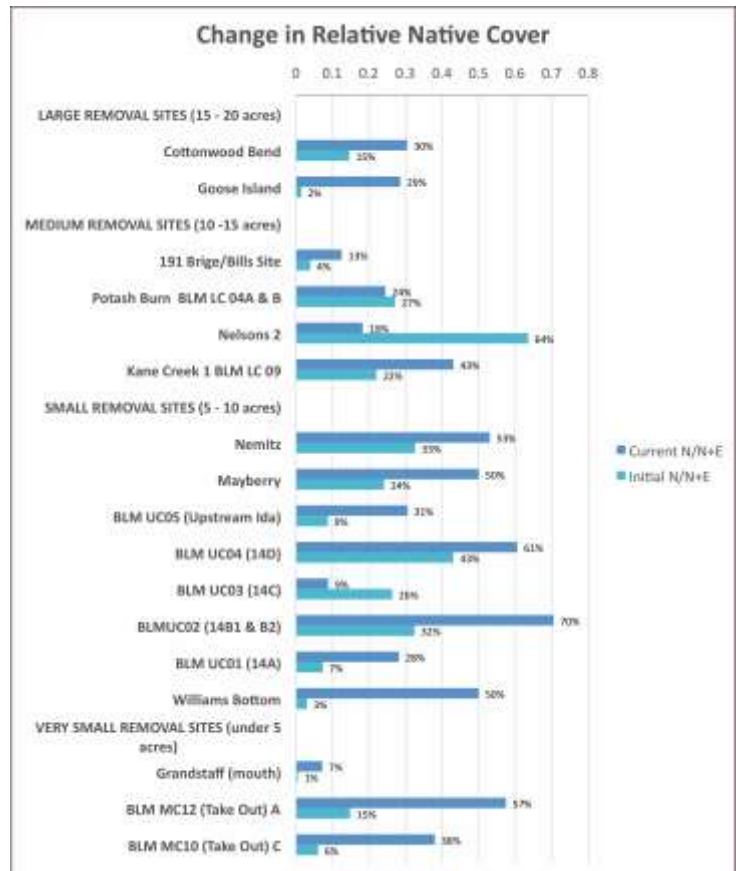
According to BLM reports, a significant amount of tamarisk removal work occurred throughout the Colorado River area between 2004 and 2010: 342 acres along the River and minor tributaries were thinned, piled and burned; 7 acres were broadcast burned as a test; 197 acres were bull hogged; 354 acres were treated with herbicide; and 216 acres were seeded and 128 planted with trees (mostly at campgrounds) with a total foot print of over 546 acres of public land treated in a 6 year period. Private land owners, and work by The Nature Conservancy and Utah Department of Wildlife Resources jointly managed Matheson Wetlands, treated at least another 100 acres during that time.



Varied site conditions, a myriad of initial treatments and follow up methods (or lack of follow up), as well as the rapid spread of the tamarisk leaf beetle from its initial local releases in 2004 suggested to Rim to Rim that long term quantitative monitoring of the vegetation response to tamarisk removal could provide useful insight in terms of the plant response to tamarisk removal. The monitoring protocol was modeled after several methods we found used by others performing short term monitoring (usually only one to three years) in the Colorado River Basin, most notably was the work by Michele DePrenger- Levin in conjunction with Dr. Anna Sher from the Denver Botanic Gardens.

Monitoring locations were selected from over 50 removal sites on Bureau of Land Management land and over 10 private sites along the Colorado River within 50 miles of Moab. Factors influencing these sites were listed, with an emphasis on identifying unchangeable site conditions as well as factors influenced by project design. These factors fall into three categories: environmental conditions and events, site conditions and land management actions.

Initial removal methods noted include broadcast burning (accidental or intentional), large scale mastication of biomass with herbicide follow up, cut stump/spray treatments, chipping of brush piles from cut stump treatments (with a chipper or with a masticating machine), or burning cut stump treatments. At each monitoring site the environmental and site conditions have been cataloged and documented to provide context for the land management actions. This includes mostly the land uses (past and present), the overall size of the site compared to the size of the removal area, the vegetation around the site, flooding extents and other site description. Additionally, in 2011, soils samples were collected and analyzed for all monitoring sites.



A report with summary data and other detailed observations for each site, as well as tables and graphs summarizing the sites in relation to each other is in process. One of the more surprising observations in recent years is the not insignificant increase in relative native cover at locations along the River (see table below). Earlier observations suggested a tendency towards lower relative native cover over time, especially at some sites significantly infested with knapweed or kochia. Currently, many sites exhibit higher relative native plant cover with some sites reflecting significantly lower exotic plant cover, even in some locations with established knapweed or high densities of kochia in 2012 (Graph 5). Drought conditions over the past few years may be inhibiting exotic species growth, at least temporarily.

Relative native plant cover compared to total native cover and total exotic cover at the first data collection

compared to the latest data collection.

Somewhat surprisingly, 10 years after project work many sites show a relative native cover increase even at locations that appeared to be dominated by exotic species in 2011 and 2012. At times it is a reflection of a reduction in exotic cover only, but other times it is a reflection of an increase in native cover. The aerial image shows sites with a relative native cover increase in green, a decrease in red, and a mixed vegetation response in orange.

	last year of data			first year of data			Change over time		
	Current N/N+E	Current total N	Current total E	Initial N/N+E	Initial total N	Initial total E	change rel cover	change native	change exotic
LARGE REMOVAL SITES (15 - 20 acres)									
Cottonwood Bend (pvt)	30%	34%	87%	15%	18%	116%	16%	16%	-29%
Goose Island (BLM)	29%	29%	73%	2%	4%	258%	27%	25%	-185%
MEDIUM REMOVAL SITES (10 - 15 acres)									
191 Brige/Bills Site (FFSL)	13%	8%	77%	4%	26%	137%	9%	-18%	-60%
Potash Burn BLM LC 04A & B	24%	44%	155%	27%	14%	64%	-3%	31%	90%
Nelsons 2	18%	28%	126%	64%	28%	16%	-45%	0%	110%
Kane Creek 1 BLM LC 09	43%	71%	94%	22%	39%	136%	21%	33%	-42%
SMALL REMOVAL SITES (5 - 10 acres)									
Nemitz	53%	50%	49%	33%	39%	80%	20%	11%	-31%
Mayberry	50%	47%	49%	24%	12%	33%	26%	34%	16%
BLM UC05 (Upstream Ida)	31%	42%	88%	9%	12%	150%	22%	31%	-52%
BLM UC04 (14D)	61%	70%	46%	43%	49%	64%	17%	22%	-19%
BLM UC03 (14C)	9%	17%	179%	26%	29%	81%	-18%	-11%	99%
BLMUC02 (14B1 & B2)	70%	144%	64%	32%	42%	87%	38%	103%	-23%
BLM UC01 (14A)	28%	41%	105%	7%	13%	158%	21%	29%	-54%
Williams Bottom	50%	79%	79%	3%	207%	7%	47%	-127%	73%
VERY SMALL REMOVAL SITES (under 5 acres)									
Grandstaff (mouth)	7%	6%	94%	1%	0%	100%	7%	6%	-6%
BLM MC12 (Take Out) A	57%	93%	69%	15%	18%	105%	43%	74%	-36%
BLM MC10 (Take Out) C	38%	44%	71%	6%	8%	123%	32%	36%	-52%
Beckstrand	12%	8%	58%	33%	33%	29%	-22%	-26%	29%
Nelsons 1	89%	132%	17%	91%	99%	37%	-2%	33%	-20%
JayCee Park BLM LC 05	18%	78%	17%	7%	116%	8%	11%	-40%	8%

FUTURE COORDINATION & COOPERATION: MAINTAINING MEMORY

The SE Utah Riparian Partnership has realized its institutional memory regarding projects and work outcomes is in jeopardy. An effort partially funded through Restore our Rivers funding to facilitate reporting monitoring locations as well as some of the observations from the past 10 years is beginning. For the moment many long term members of the Partnership are still active, but as people approach retirement and as personnel shift in some agencies, gaps in knowledge have appeared. To facilitate better long term information transfer the Partnership is developing a geodatabase to ensure current and future land managers and private land owners have information as it continues to be collected. This can also link to past and future monitoring information.

To this end the Partnership is inventorying all past work in the area focused on tamarisk and Russian olive removal to link it to beetle and vegetation monitoring efforts. In 2018 all project sites along the Colorado River and side canyons from the Colorado State Line to the Canyonlands National Park Boundary will be re-assessed to create a new baseline of information. The reassessments will include repeat photography, a record of initial removal work and follow up activities at each site, and a simple vegetation survey at all sites to record changes over time. Partnership members, through support from the Restore our Rivers funding from the Tamarisk Coalition as well as from other sources, are working to compile monitoring records and observations into shareable documents to help land managers in our areas and other nearby locations better understand the dynamics of the leaf beetle, and the efficacy of various vegetation manipulations and follow up treatments. Funding for these efforts does not yet meet all anticipated costs, making completion of this important task uncertain.

SOURCES

Continued Tamarisk Beetle Distribution Monitoring at the Landscape Level, UPCD Watershed Restoration Initiative proposal Dec 2008, Rev 3/3/2009 by Tim Higgs, Grand County Utah and Kara Dohrenwend, Rim to Rim Restoration

Report on 2016 results for plant recruitment under defoliated tamarisk study, Tim Graham, for the Tamarisk Coalition, 2017.

Tamarisk Leaf Beetle Monitoring Program of the Grand County Weed Department, handout for SE Utah Riparian Partnership November 2017 meeting, Tim Graham and Tim Higgs

VEGETATION RESPONSE TO LARGE WOODY INVASIVE BIOMASS REMOVAL NEAR MOAB, UTAH2013 Report with preliminary data summary FOR State of Utah, Department of Natural Resources Division of Forestry Fire and State Lands Redesign Grant "Tamarisk Eradication and Native Tree Restoration along the Colorado River. Prepared by Kara Dohrenwend, Rim to Rim Restoration, Moab Utah, June 30, 2013

Tamarisk Monitoring Report, US DOI BLM Moab Field Office, Gabriel Bissonette, October 2010. Also included are BLM Canyon Country Fire Zone Riparian Reports and tables of total treated areas 2004 – 2010.