

Monitoring of vegetation, soil, and water use associated with biological control of Tamarix along the Colorado, Dolores, and Virgin Rivers

USGS Biology Science Centers: SBSC, FORT, WERC

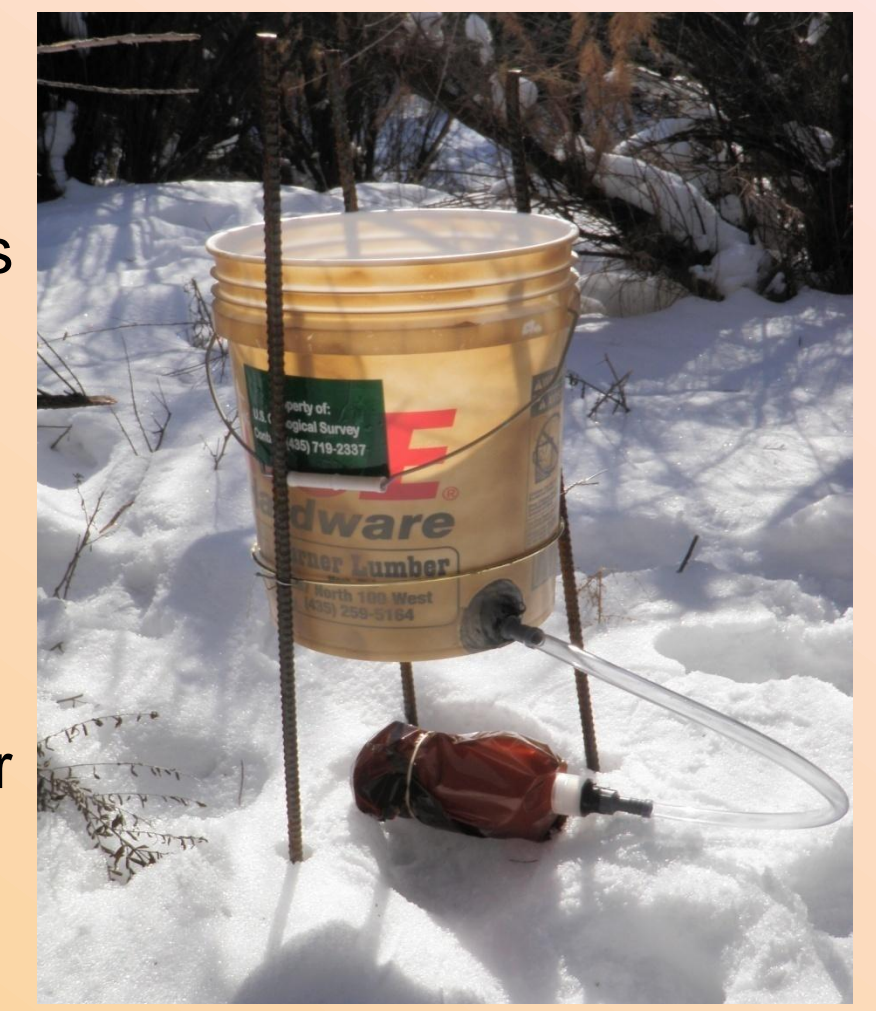
H. J. Smith¹, E. M. Ogata¹, S.C. Reed¹, J. Belnap¹,
P. L. Nagler², C. van Riper III³, S. Ostoja⁴, P. Shafroth⁵

¹USGS, Canyonlands Field Station, 2290 SW Resource Blvd, Moab UT 84532; ²USGS, Sonoran Desert Research Station, 1110 E. South Campus Drive, Tucson, AZ 85721; ³USGS, Sonoran Desert Research Station, 125 Biological Sciences East, University of Arizona, Tucson, AZ 85721-125; ⁴USGS, Western Ecological Research Center, 5083 Foresta Road El Portal, CA 95318-0700; ⁵USGS, Fort Collins Science Center, 2150 Centre Ave, Bldg C, Fort Collins, CO 80526



Diorhabda elongata

Nitrogen
Phosphorus
Salt
Carbon
↓
Deposited Litter



Litter Traps



Cisco Upstream Site

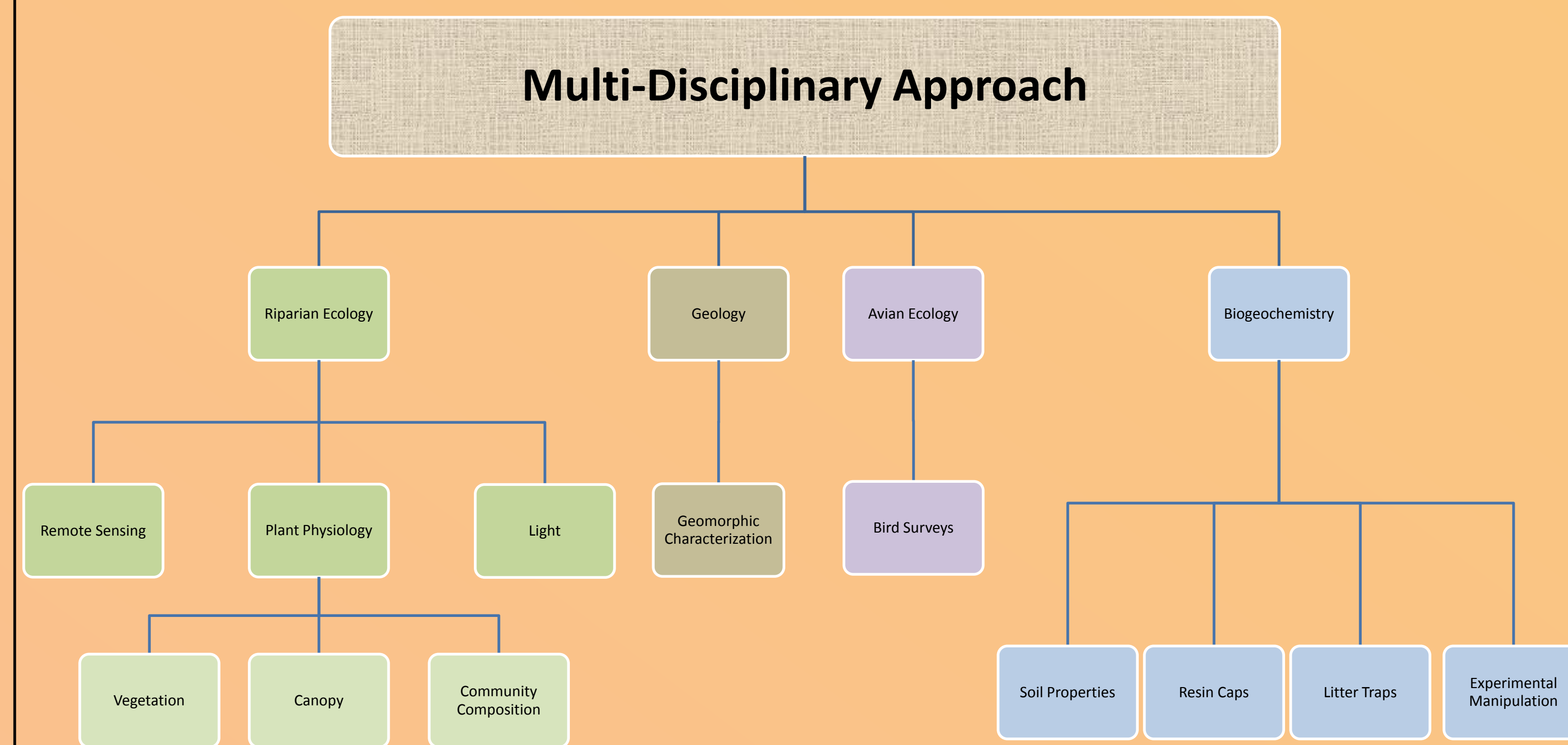


Cisco Downstream Site



Potash Road

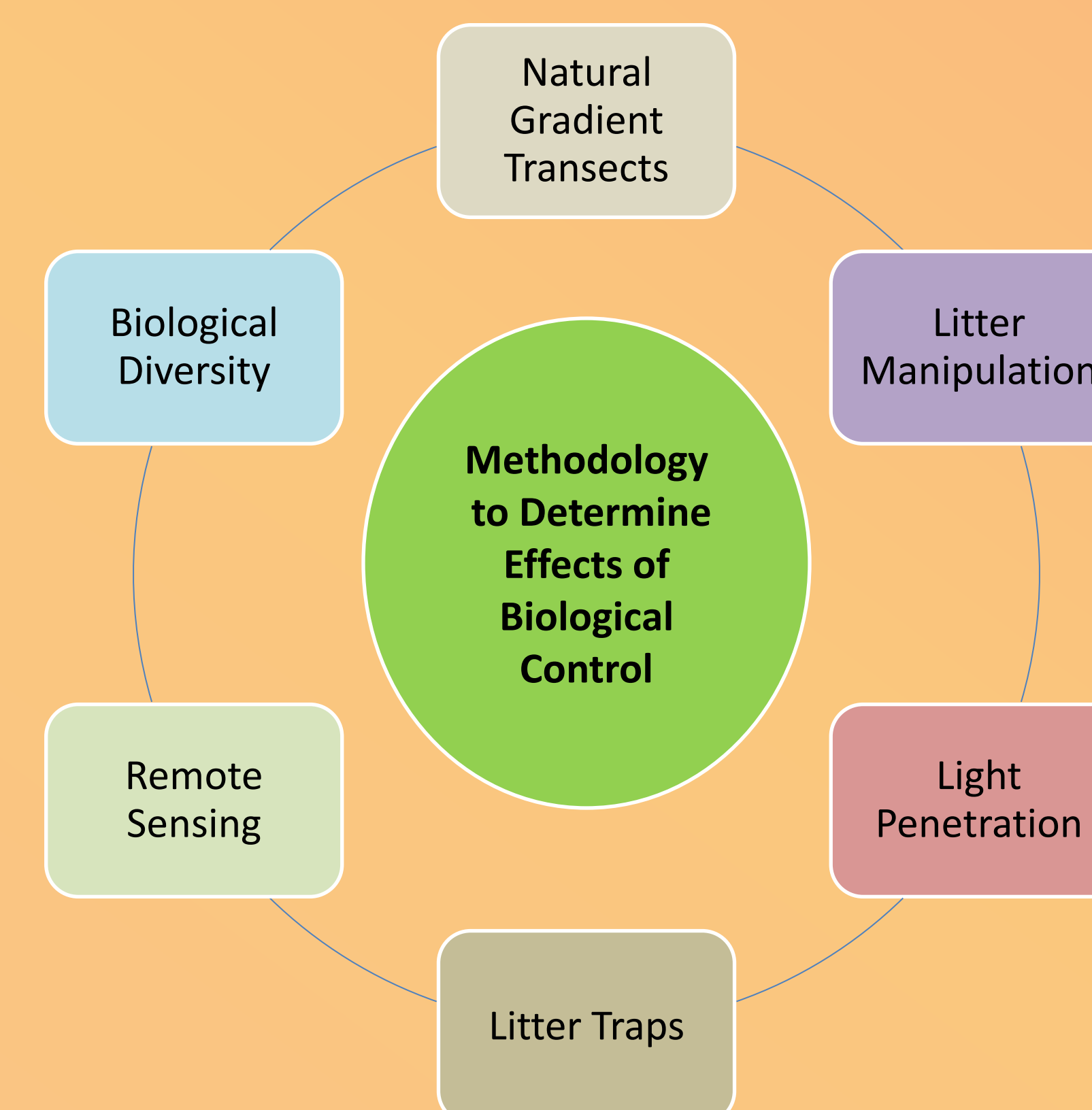
Introduction: Biological controls are a major ecological and land management focus, and the recent release of the Tamarisk beetle has caused notable Tamarisk defoliation along many western rivers. Our research team is beginning an integrated set of studies to enhance understanding of how this defoliation will affect riparian plant communities, soils, water use, and animal populations along river systems in the western U.S. Our overarching goal is to provide information regarding the consequences of and mechanisms behind riparian change resulting from defoliation, in particular, considerations of riparian exotic invasion after Tamarisk decline.



Methods: We are using a variety of methods to investigate the ecosystem ecology of Tamarisk defoliation. For example, in 2010 sixty transects were set up along the Colorado River split between the upper Cisco and lower Potash regions.

We performed:

- ❖ Vegetative cover by species at 1m intervals, including canopy cover with densitometers
- ❖ Litter classification and depth at 1m intervals
- ❖ Soil collection for chemical analysis



Future Directions: Using our established transects, we will continue to monitor how tamarisk defoliation affects invasive plant establishment along natural gradients of litter deposition, light, soil salinity and nutrients. To establish the role of light infiltration, litter depth and chemistry in invasive plant establishment of riparian areas, we will use experimental plots. Litter will be collected from different settings, its chemistry determined, and then it will be added in different quantities to soils seeded with invasives.

Influence of Tamarisk Litter on Exotic Plant Invasion



Study growth of *Centaurea repens* and *Bromus tectorum* in varying amounts of Tamarisk litter



Acknowledgements:

Sincere thanks to Alexa Killion, Danace Arthur, Mara MacKinnon, Michael Cleaver, Paul Maier, Steven Anderson for all their support during the project design, setup, and data collection.

This work is funded by the USGS Invasive Species Program.

Contact Emails:



Hilda Smith hsmith@usgs.gov

Elizabeth Ogata eogata@usgs.gov

Sasha Reed screed@usgs.gov

Jayne Belnap jbelnap@usgs.gov

Pamela Nagler pnagler@usgs.gov

Charles Van Riper III charles_van_riper@usgs.gov

Steven Ostoja sostoja@usgs.gov

Patrick Shafroth shafrothp@usgs.gov