Adaptive Management Strategies For Controlling Exotic Plant Species

July 2013

Chad McKenna, Ondrea Hummel, and Todd Caplan

GSA GeoSystems Analysis, Inc.
Innovations in Hydrology

Why is exotic species management in MRG a good model for adaptive management?

- Little historical management experience in MRG ecosystem
- Used experiences gained from previous projects to guide design of future projects
- Not exercise in blind trial and error – used best available information
- Implementation of pilot studies between projects
- Sound science
- Continuous process of planning, acting, monitoring, evaluating, adapting
- "Learning by doing"
- Faced and addressed challenges relevant to other regions

GSA GeoSystems Analysis, Inc.
Innovations in Hydrology

Bosque Wildfire Project (2003-2006)

In response to several major wildfires in Albuquerque bosque

Primary goals:

- Reduce threat of catastrophic wildfire
- Control exotic phreatophytes
- Revegetation of select sites with native tree and shrub species

Other notes:

- One of the first large-scale thinning projects on Rio Grande in a mixed native/exotic plant community
- Primary targets were Russian olive (*Elaeagnus angustifolia*) and Saltcedar (*Tamarix* spp.)
- Exotic species control not combined with other physical site manipulations

GSA GeoSystems Analysis, Inc.
Innovations in Hydrology

General Response to Initial Treatment

- Successful reduction in Saltcedar and Russian olive
- Re-colonization and spread of other exotic phreatophytes -Tree of heaven (*Ailanthus altissma*), Siberian elm (*Ulmus pumila*), and Mulberry (*Morus* spp.)
- Annual weed invasion
- Increased spread of herbaceous noxious weeds

GSA GeoSystems Analysis, Inc.
Innovations in Hydrology

Route 66 Habitat Revitalization Project (2008-2010)

- Portions of project area with heavy Tree of Heaven, Mulberry, and Siberian elm
- Treatments effective on Mulberry
- Variably effective on Siberian elm
- Ineffective on Tree of Heaven
- Physical site manipulations implemented
- Heavier revegetation

GSA GeoSystems Analysis, Inc.
Innovations in Hydrology

Herbicide Pilot Studies

- Perennial pepperweed (*Lepidium latifolium*), Tree of Heaven, Siberian elm

- Implemented to inform MRG treatment specifications

GeoSystems Analysis, Inc.
Innovations in Hydrology

Study Goals

- Determine effective control technique for each species
- Cost/benefit analysis
- Quantify previous observations
- Validate research from other regions

Sampling Transect
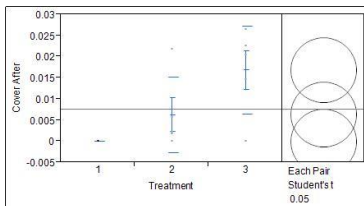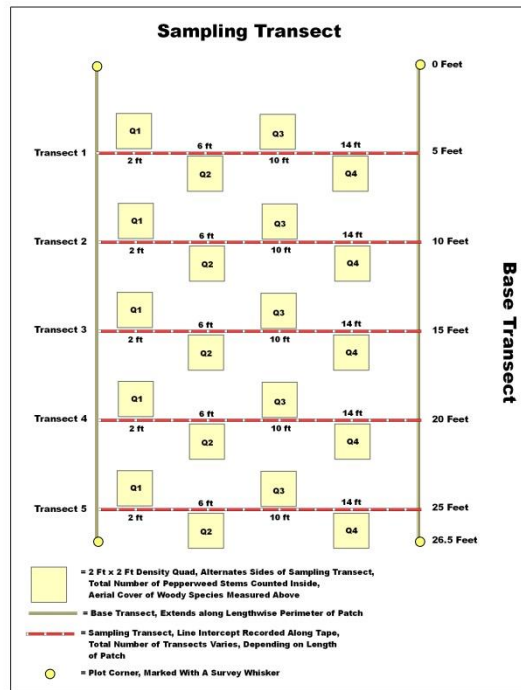
Other Studies

- Mulch depth study
- Annual weed control techniques

GSA GeoSystems Analysis, Inc.
Innovations in Hydrology

New Species Introduction

- Ravenna grass (*Saccharum ravennae*)

- Introduced to NM in 1980's

- First documented along the Rio Grande in 1990

- Aggressively spreading into willow wetland habitats in Rio Grande, including constructed willow swales

- Very little information on successful control techniques

- Not listed as "noxious"

GSA GeoSystems Analysis, Inc.
Innovations in Hydrology

Ravenna grass (*Saccharum ravennae*)

- The base of coyote willows is a preferred germination safe site
- Converts structure in coyote willow communities

GeoSystems
Analysis, Inc.
Innovations in Hydrology

GSA

What to Do?

GSA GeoSystems Analysis, Inc.
Innovations in Hydrology

Actions implemented

- Successfully petitioned to add Ravenna grass to NM noxious weed list
- Began mapping infestations through city bosque

GeoSystems Analysis, Inc.
Innovations in Hydrology
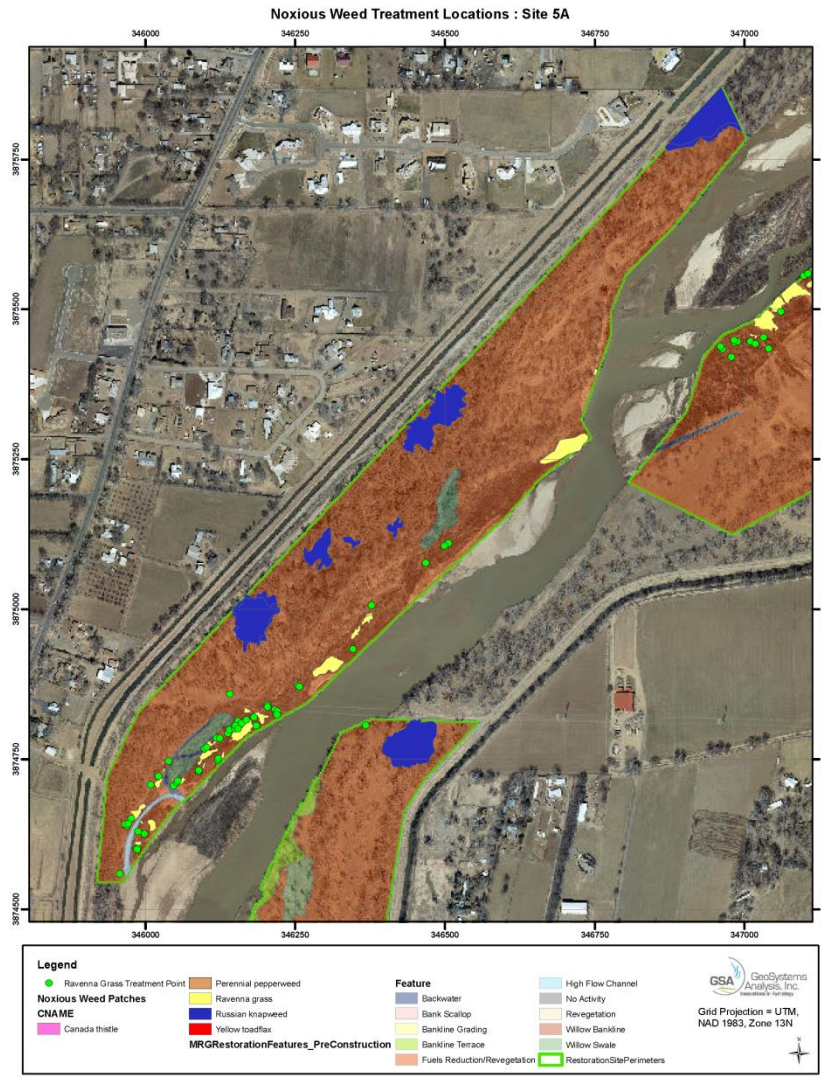
Middle Rio Grande (MRG) Restoration Project

- Treatment specs based on results of pilot (and other) studies
- Thorough inventory in MRG sites
- Tried two experimental treatments on Ravenna grass
- In process of documenting treatment effectiveness
- More thorough documentation

GSA GeoSystems Analysis, Inc.
Innovations in Hydrology

Why Adaptive Management?

- Do not count on achieving similar treatment results between different climates and ecosystems

- Objective, scientifically based effectiveness information difficult to find

- Impossible or difficult to predict variables (fire, rainfall, peak discharge, timing) that influence site succession

- Seed bank

- Perception of ecological value of certain exotic species changes over time

GSA GeoSystems Analysis, Inc.
Innovations in Hydrology

Adaptive Management Lessons

Noxious Weed Treatment Locations : Site 5A

- Document pre-treatment distribution and abundance

- Document what you did and where

- Validate that treatments are implemented as designed

- Monitor treatment effectiveness: learn from each project

- Monitor site performance

- Time monitoring so lessons learned can be used to guide treatment specs for future projects

- Budget for additional treatment

GeoSystems
Analysis, Inc.
Innovations in Hydrology

15

Questions?

GeoSystems
Analysis, Inc.
Innovations in Hydrology

GSA