



C. Copplin 2008

∞ Upper Muddy River is an area of high biodiversity

- 4 rare and endemic fish species
- 76 breeding bird species

∞ One of The Nature Conservancy's Priority Landscapes

- 8 species found nowhere else in the world



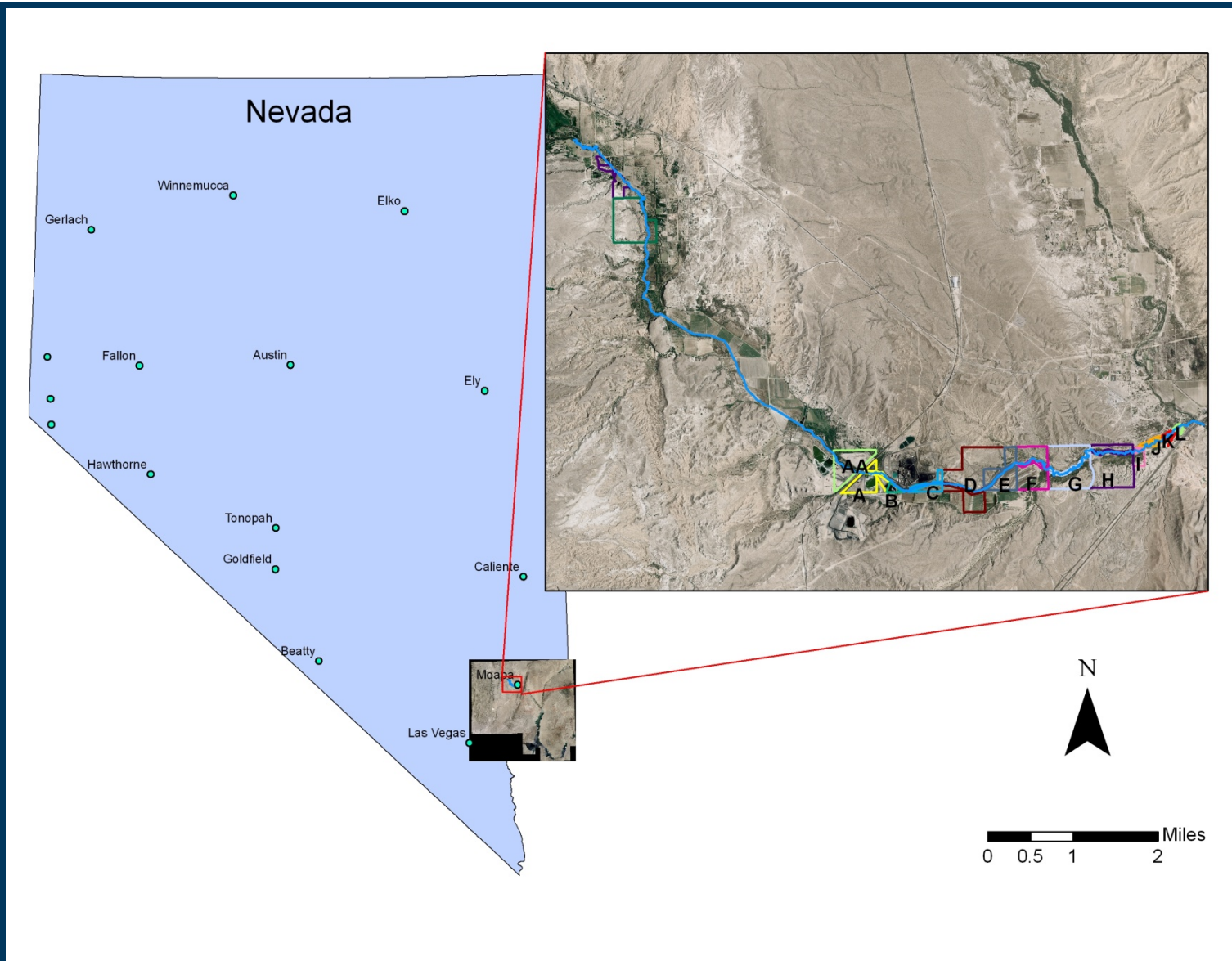
- ❧ The United States suffers from \$1.1-120 billion per year in economic losses due to exotic, invasive species
- ❧ Approximately 42% of Threatened or Endangered species are at risk due to non-native, invasive species
- ❧ Successful invasive species:
  - ❧ Germinate or leaf out earlier
  - ❧ Are highly prolific
  - ❧ Decrease the suitability of habitats



- ↪ MSHCP identified exotic and invasive species as major threats to desert riparian systems
- ↪ Salt cedar was initially introduced in early 1800s as a nursery plant and later used to stabilize banks
- ↪ Salt cedar represents 80% of the vegetation in the Las Vegas Wash
- ↪ Russian knapweed and Tall Whitetop were accidentally introduced as contaminants in the early 1900s
- ↪ Tall Whitetop was identified in the Las Vegas Wash in the



# Study Area

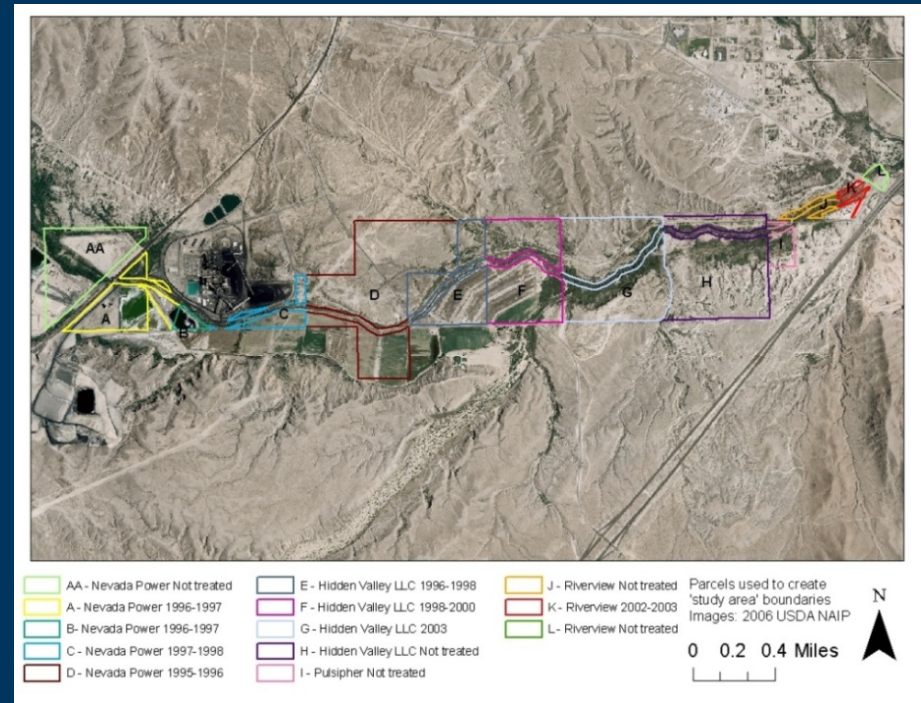


## Objectives

- ↻ Conduct retrospective effectiveness monitoring for past weed control and restoration efforts
- ↻ Conduct experimental effectiveness monitoring for weed and restoration efforts
- ↻ Map the distribution of salt cedar, Russian knapweed, and tall whitetop using remote sensing on the Muddy River

## Retrospective Study

- ↪ MRREIAC has been treating salt cedar along the Muddy River from NV Energy downstream to I-15 since 1995
- ↪ MRREIAC subcontracts NDF to remove the salt cedar and to spray for Russian knapweed
- ↪ We sampled 7 previously treated properties and two untreated properties as controls



➤ To evaluate the effectiveness we are conducting:

- Fish surveys
- Breeding bird surveys
- Sampling randomly selected 10 m plots
  - Soil salinity
  - Vegetation composition
  - Canopy cover



- ∞ Properties included were distributed along the Muddy River
- ∞ Treatments were applied in a randomized block design

- Control
- Salt Cedar Removal
- Salt Cedar Removal + Seeding
- Salt Cedar Removal + Salt Cedar Chips



- Pre Treatment and Post Treatment Sampling
- Each treatment was 10 m wide
- Attributes measured within treatment plot:
  - Vegetation cover
  - Soil salinity
  - Canopy cover



Riverview Block 4 Before Treatment



Riverview Block 4 After Treatment

- ❧ Spatial Solutions, our subcontractor, will extract tall whitetop, salt cedar, and Russian knapweed based on spectral characteristics from 2006 Quickbird imagery
- ❧ The Quickbird imagery attributes:
  - 5 bands of information
  - ~2.5 m spatial resolution



- ∞ All retrospective plots were sampled
  - Total of 9 properties
  - 5 -10m plots per property
- ∞ 2008 breeding bird surveys were conducted by volunteers
- ∞ 2008 fish surveys were conducted by NDOW
- ∞ 2009 breeding bird surveys have been completed
- ∞ 2009 fish surveys have not been completed yet

- ↻ All included properties have been sampled pre treatment
  - Five properties for a total of 15 blocks
  - Four 10-m treatments plots per block
- ↻ All properties with the exception of BLM Perkins have been treated by MRREIAC
  - NEPA permitting prohibited work from March 31<sup>st</sup> to August 31<sup>st</sup>
- ↻ Three properties, for a total of 10 blocks, have been sampled post treatment
  - NV Energy and BLM Perkins are awaiting post treatment sampling



- Due to timing of imagery capture and changes in property management imagery is no longer relevant
- Alternative imagery and techniques are being explored

## Conclusion

- ∞ Data are being compiled
- ∞ Statistical processing will begin after completion of post treatment sampling
- ∞ We hope to locate additional funding to continue assessing effectiveness of our experimental treatments
- ∞ Thank you to Clark County for providing the funding for this project and to MRREIAC for doing the really hard work of the project

## Muddy River

