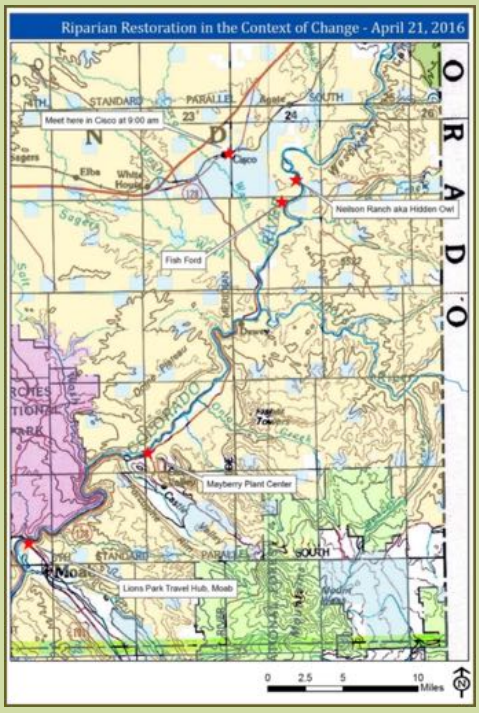
Cross-Visit to field sites along the Colorado River Corridor in Southeastern Utah

April 21, 2016

On April 21st, 37 attendees from the Southeast Utah Riparian Partnership (SURP) and the Desert Rivers Collaborative (DRC) came together to tour a wide range of field-sites along the Colorado River corridor in southeastern Utah. Participants delved into the nuances of riparian restoration at a variety of different scales and shared lessons-learned from their own experiences.



Acknowledgements:
Special thanks to The Nature Conservancy, Mayberry Native Plant Propagation Center, & the Tamarisk Coalition for organizing this cross-visit.

Purpose of cross-visit:

- Provide an opportunity for dialogue between practitioners and researchers.
- Increase understanding of ecosystem effects of invasive species and tamarisk beetle defoliation on future plant community composition.
- Share management approaches to direct desirable future ecosystem conditions.
- Provide input to researchers such that future research projects can be tailored towards informing management goals and objectives.

Major Take-Aways:

- Defoliation from tamarisk leaf-beetles is changing soil chemistry, with increased nitrogen inputs.
- Use of Russian knapweed biological control agents, especially where herbicide will not be applied, is an appropriate long-term strategy for suppressing knapweed infestations.
- Understanding the larger context (e.g. from altered flow regimes and projected climate scenarios) that s specific restoration site fits into is critical.
- DRC and SURP partners value continued cross-communications.

Field Presentations (see below for detailed notes)**:**

1) **Effects of Tamarisk Defoliation on Future Plant Communities**
2) **Use of Biocontrols in Riparian Restoration**
3) **UT and CO Noxious Weeds – Continued and emerging concerns**
4) **Plant Materials for Restoration Success**
5) **Understanding the Role of Geomorphology in Restoration**

The Cross-Watershed Network (XWN) structures venues that facilitate lesson-sharing between watershed practitioners. Find more ways to engage at crosswatershed.net/xwnprograms/

Notes from the field

1) 9:30-10:30AM: **Effects of Tamarisk Defoliation on Future Plant Communities** at Fish Ford
   Presenter: *Dr. Sasha Reed, US Geological Survey (USGS)*
   [See digital version of handout]

Sasha Reed works with USGS to research ecosystem changes initiated by tamarisk mortality and defoliation as well as management strategies to mitigate changes to soil chemistry. Pat Shafroth, also with the USGS, is using the same methodologies in an analogous study along the Virgin River.

Defoliation by tamarisk leaf beetle and tamarisk mortality impacts riparian soils by altering:

- Litter layer
  - With increased light, tamarisk duff breaks down faster
- Light availability
  - Linked to changes in soil temperature and moisture
  - Begin to see photosynthetic cryptobiotic soils with greater light availability
- Increased nutrient loading (nitrogen, phosphates, potassium)
  - Nitrogen, often times at an order of magnitude greater than normal, is released to the ground in the presence of tamarisk beetle – (beetle defoliation causes pre-senescence leaf drop which provides an increase of nitrogen in the system, appearing to give advantage to exotics, according to early research results)
  - 50% of nitrogen and phosphate are typically returned to the plant through a process called "resorption" in the fall– though it appears the beetle impacts lead to defoliation before resorption can occur.
- Salinity
  - Observed short term increases in soil salinity as a result of defoliation, however, the increase in salinity is minimal compared to increased nutrient loading
- Microbial communities

Management strategies to reduce heavy nitrogen levels in soil:

- Chipping – use woodchips to suck up nutrients on the floor
- Sugar – use sugar to increase microbial numbers to metabolize excess soil nutrients
- Native seed broadcast – to lessen the degree of advantage of exotics in primary successional stages

Research, next steps:

- Currently looking at light availability, connected to temperature and moisture
- Impacts of flood; e.g. Does inundation re-set soil conditions?
- Different soil types; e.g. How are impacts different in silty/clay soils vs. sandy soils?
- Seek to understand timescales and feedback loops that are at play, especially for nutrient loading
- Clay Kark and Kara Dohrenwend had sites in mind that may fit Sasha's research needs

Notes from the field

2) **Use of Biocontrols in Riparian Restoration** at Nielson Ranch
Presenters: *Tim Higgs, Grand County & Dr. Dan Bean, Palisade Insectary*
[see digital version of handout]

Russian Knapweed – allelophathy gives advantage over natives once established

- Neither available biocontrol attacks knapweed at the roots – meaning they do not kill the plant.
    - Currently researching root-feeder biocontrols
- Current biocontrols make knapweed a less successful invader by slowing its reproduction; gives native plants an opportunity to compete
- Biocontrol agents need a steady food supply. If you are planning on spraying your knapweed, it's best not to release any agents.
    - If you are low on funding and don't plan on spraying, biocontrol is a great option.

Russian Knapweed – Gall midge

- Available since 2009
    - Widely used in Colorado (40-60 releases elsewhere)
    - Spread over 20 miles in last 4 years
    - Mostly found close to rivers
- Initial results are showing good impacts made on knapweed
    - Best to release in spring
- How the gall midge works:
    - Lay eggs at the growing shoot tips of the weed causing the growing tips to cease elongating. The plant produces leaves which remain folded, forming layered galls at the growing tips; this in turn slows/stops flowering
    - Does not kill the plant – roots remain intact
- "Best bang for your buck"
    - Free because of the large numbers!
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Russian Knapweed – Gall wasps

- Obtained last year
    - Limited supply
- How gall wasps work:
    - Lay eggs in developing stems causing them to swell and in some cases become severely deformed.
    - Slows/stops flowering
- Best to release in spring

Biocontrol is a long-term tool that warrants long term monitoring to properly understand population dynamics (100-year scale)

Notes from the field

3) **UT and CO Noxious Weeds – Continued and emerging concerns** at Nielson Ranch
   Presenters: *Tim Higgs & Teresa Nees, Mesa County Noxious Weed & Pest*

Colorado efforts to help inform Utah management (opportunities for future collaboration)

- Colorado river weed-mapping efforts on the Colorado & Gunnison Rivers within Mesa County are underway; findings will be shared with SURP
- CO weed updates: Purple Loosestrife control efforts are looking good, dealing with yellow toadflax, leafy spurge, and a host of thistle spp.
- Utah and Colorado managers need to work together across the state boundary to decide what secondary species to treat, particularly after tamarisk/Russian olive removal

UT and CO need to collaborate on:

- Non-native Phragmites
- Variety of invasive thistles
- Ravenna grass (CO managers looking for best management practices, how to distinguish from pampas grass)

SE UT and W CO managers need to stay in touch, formally or informally to share lessons and resources. Contact teresa.nees@mesacounty.us

Notes from the field

4) **Plant Materials for Restoration Success** at Mayberry Native Plant Propagation Center

   Presenter: *Kara Dohrenwend, Rim to Rim Restoration*

   [see digital version of handout]

About the Mayberry Native Plant Propagation Center:

- 30 acres of orchard acquired by The Nature Conservancy to grow locally-sourced seeds and potted plants
- Partner in the Colorado Plateau Native Plant Program, part of a BLM national strategy

Research questions:

- Finding the missing link – what are the native annuals that could be used for restoration?
- How to use native seed for large-scale restoration?

Choosing the right plant for your site:

- CO River corridor in UT is unique, plants grown at other NRCS plant materials centers may not work in this climate
- Think ahead, consider climate projections (see Tom Whitham's common gardens work)
- New Mexico privet
  - Slow to establish /grow
  - Salt-inundation- & drought-tolerant!
  - Experimenting with strategies to start NM privet from seed
- Poverty weed
  - Might be a good rhizomatous species
  - Requires collecting permit
  - Are there negatives to using poverty weed in restoration?

Riparian restoration recommendations:

- Make clearings in tamarisk and, using carcasses as shade, plant salt grass in trenches
- Russian knapweed – use Roundup right after flower, Milestone in the fall, then repeat with Roundup again.

Resources:

- Utah Native Plant Society is a great resource
- Scott Nissen of CSU is a great resource
- Colorado Plateau Native Plant Program

Protecting natives (specifically sumac & privet) from deer and other grazers:

- Human hair
- Predators
- Predator pee from The Pee Mart: http://thepeemart.com ("America's number one discount urine store")
- Liquid Fence, old fermented eggs

Note: if you have suggestions for how the Mayberry Preserve ought to be managed, email Kara at kara@reveg.org

Notes from the field

5) **Understanding the Role of Geomorphology in Restoration** at Mayberry Plant Center

Presenter*: Dr. Jack Schmidt, Utah State University*

[see handout of PowerPoint presentation]

Channel and floodplain form:

- Factors: width, materials, depth, sinuosity, gradient, & bank height
- Determined by flow regime and sediment content
- Riparian vegetation holds the banks, causing floodplain constraints and controlling the meander (a problem when the regimes are altered!)

Upstream (rock, gravel beds) vs. downstream (fine grain beds) restoration differs:

- Boulder-cobble: sediment movement only at thresholds
- Gravel-sand: sediment movement will occur; how much is dependent on velocity.
    - Given altered flows, will all the sediment move through a given stretch?

Beware the paradigm of historical equilibrium! Understanding of the historical flood regimes is less relevant than considering new stream dynamics in the Colorado River Basin

- Snowmelt is now regulated; no longer controls flood regimes in CO Plateau
    - Manifest as political issues vs. hydrograph issues
    - Upstream controls lead to few/no overbank flood events
- Monsoon season controls flood regimes
- Bank-full does not happen on the Colorado Plateau
    - Steady-states are altered as channelization and sediment deposition increase

Take-aways:

- Riparian restoration needs to consider the new flood regime, don't expect over-bank flooding
- Always consider 3 factors: bed material, scale of river & geomorphic organizations in planning processes