PICTURE CANYON
Planning Riparian-Wetland Refugia in an Urban Setting

Rio De Flag

Graphic by David Mckee
Existing Conditions....

Ephemeral stream;
Limited riparian plants, habitats

...... & Opportunities

Water (effluent) available
Restore historic riparian habitats
Broad community support
Objectives

• Restore proper stream processes
• Restore channel meander and floodplain function
• Create additional wetland and backwater areas
• Control noxious weeds
• Restore native riparian vegetation and habitat
• Provide recreational, educational and aesthetic benefits
Reach 1 and Reach 2

**Project Area:** 60 acres  
**Length of Stream:** 1 mile  
**Acres of Riparian Habitat:** 15 acres
Problem

Channelized Rio de Flag and Meanders Abandoned

No access to floodplain

No spreading of flood flows

- Minimal riparian vegetation
- Lack of habitat complexity
- Noxious weeds dominate
Problem

Severe noxious weed invasion threatens the ecological integrity of the area
• Construct pond at upstream end of reach
• Create effluent stream channel and riparian wetland
• Plant native wetland and riparian plants
Solution

- Reconnect channel to its floodplain by:
  - Restoring the effective cross-section
  - Restoring the original meander alignment
- Fill dredged channel leaving downstream backwater areas
- Plant native wetland and riparian plants
Arizona State Land Department
Picture Canyon Partnership
Coconino County
Arizona Water Protection Fund
Natural Resource Conservation Service
Natural Channel Design
AZ Game and Fish
Coconino Natural Resource Conservation District
Museum of Northern Arizona
Coconino National Forest
City of Flagstaff
NAU Centennial Forest
Arizona State Land Department
Open Space Commission
NAU Ecological Restoration Institute
Museum of Northern Arizona
Coconino National Forest
Rupestrian CyberServices
Wildcat Hill Wastewater Facility (COF)
NAU
Northern Arizona Trail Runners Association
Private Landowners
Audubon Society
Friends of Flagstaff’s Future
US Fish and Wildlife Service
NAU
NAU Ecological Restoration Institute
Coconino National Forest
Natural Resource Conservation District
Flagstaff Biking Organization
Picture Canyon
Strategic Cooperative Planning

- Channel-Floodplain Features
- Noxious Weed Management Plan
- Re-vegetation Plan
- Fencing Plan
- Monitoring Plan
- Public Outreach Plan
Earthwork Activities

channel filling, bank sloping, meander restoration.

In addition: garbage removal/spoils, trail construction.
Structural Components

Structural components include:
bank protection (toe rock),
grade stabilization (rock weir),
water control structures (inlet boxes).
In addition:
Pedestrian bridge relocation
Riparian fencing,
additional toe protection (brush revetment, erosion logs), temporary irrigation system, off-channel watering).
Integrated Weed Management

Planning and implementation
Treatments
Revegetation
Ongoing management

....... to achieve desirable plant communities.
Mapping weed areas

- Yellow starthistle (*Centaurea solstitialis*)
- Bull thistle (*Cirsium vulgare*)
- Scotch thistle (*Onopordum acanthium*)
- Cheatgrass or Downy brome (*Bromus tectorum*)
- Dalmatian toadflax (*Linaria genistifolia ssp. dalmatica*)
- Diffuse knapweed (*Centauria diffusa*)
- other undesirable species.
Revegetation Plan

- Grass Plantings
- Wetland Plantings
- Shrub Plantings
- Tree Plantings
- Temporary Irrigation System

Future vegetation - willows, cottonwoods, native riparian & upland plants

- Reseed and mulch all disturbed and weed control areas!!
Benefits

Urban stream projects:
- Functioning riparian systems
- Increased habitat
- Increased recreational opportunities
- Increased educational opportunities
- Increased public awareness of riparian habitat importance
Refugia

With the threat of drought and increasing temperatures...

Urban projects augmented by effluent or other water sources...

Can provide valuable refugia for native riparian plant communities.
Planning & Coordination

- Projects require as much political as technical expertise.
- Can be slow and frustrating
- Are essential to success.
Technical consultants:
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