

PICTURE CANYON

Planning Riparian-Wetland Refugia in an Urban Setting



Rio De Flag



Existing Conditions....


Ephemeral stream;
Limited riparian plants, habitats



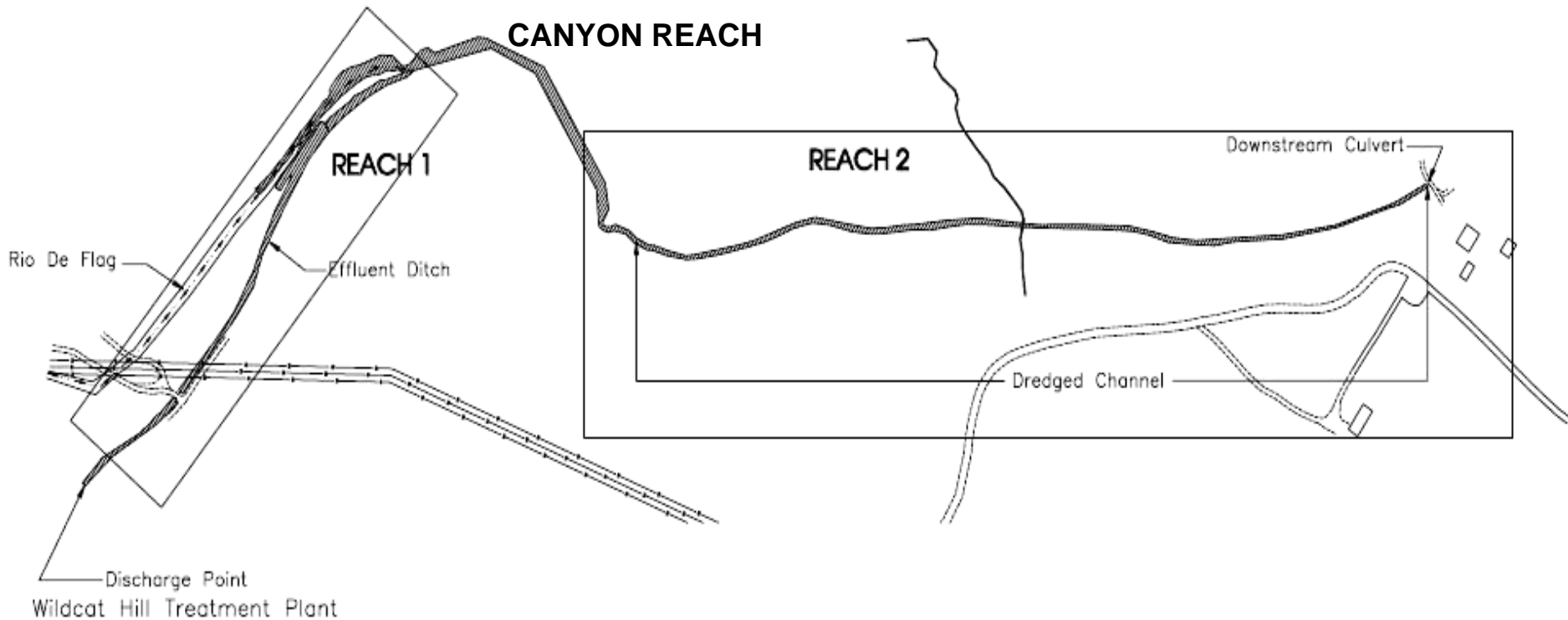
..... & Opportunities

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

Objectives

- 
- A black dog with a red collar is walking through tall, green and yellow grasses next to a stream. The grasses are dense and reach up to the dog's back. The stream is visible in the foreground, and the background shows a line of trees.
- **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

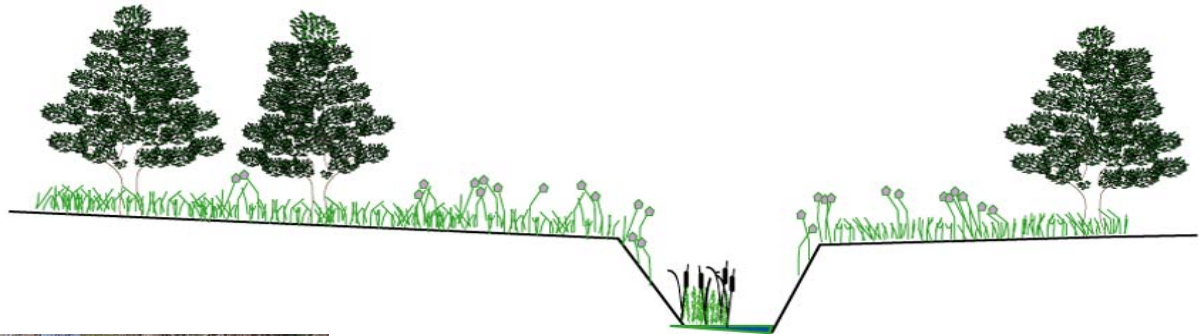
Acres of Riparian Habitat: 15 acres

Channelized Rio de Flag and Meanders Abandoned

Problem

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**

REACH 1

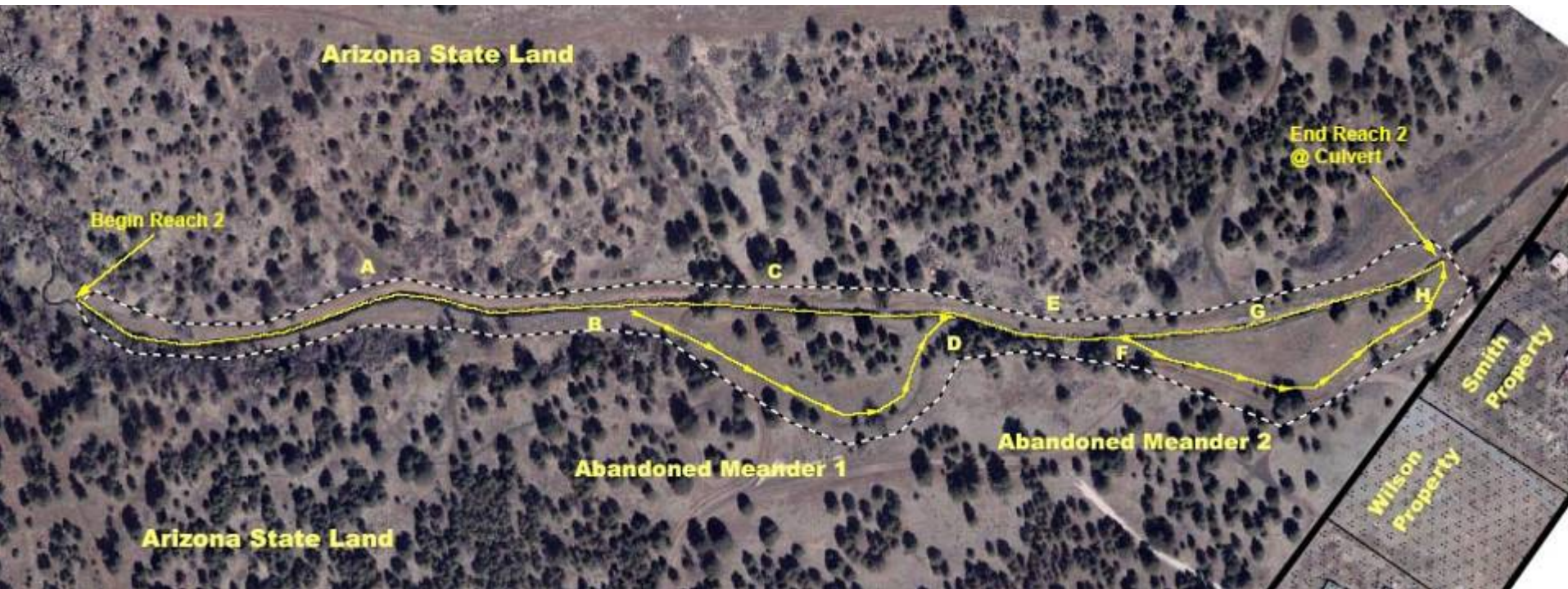
Solution



- Construct pond at upstream end of reach
- Create effluent stream channel and riparian wetland
- Plant native wetland and riparian plants

REACH 2

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

Coconino County

Arizona Water
Protection Fund

Natural
Resource
Conservation
Service

Natural Channel Design

AZ Game and Fish

NAU
Centennial
Forest

Arizona State Land
Department

NAU Ecological
Restoration Institute

City of Flagstaff

Museum of
Northern Arizona

Open Space Commission

Coconino
National
Forest

Picture Canyon Partnership

NAU

US Fish and
Wildlife
Service

Rupestrian CyberServices

Private
Landowners

Audubon Society

Wildcat Hill Wastewater
Facility (COF)

Friends of
Flagstaff's
Future

Coconino
Natural
Resource
Conservation
District

Northern Arizona Trail
Runners Association

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.



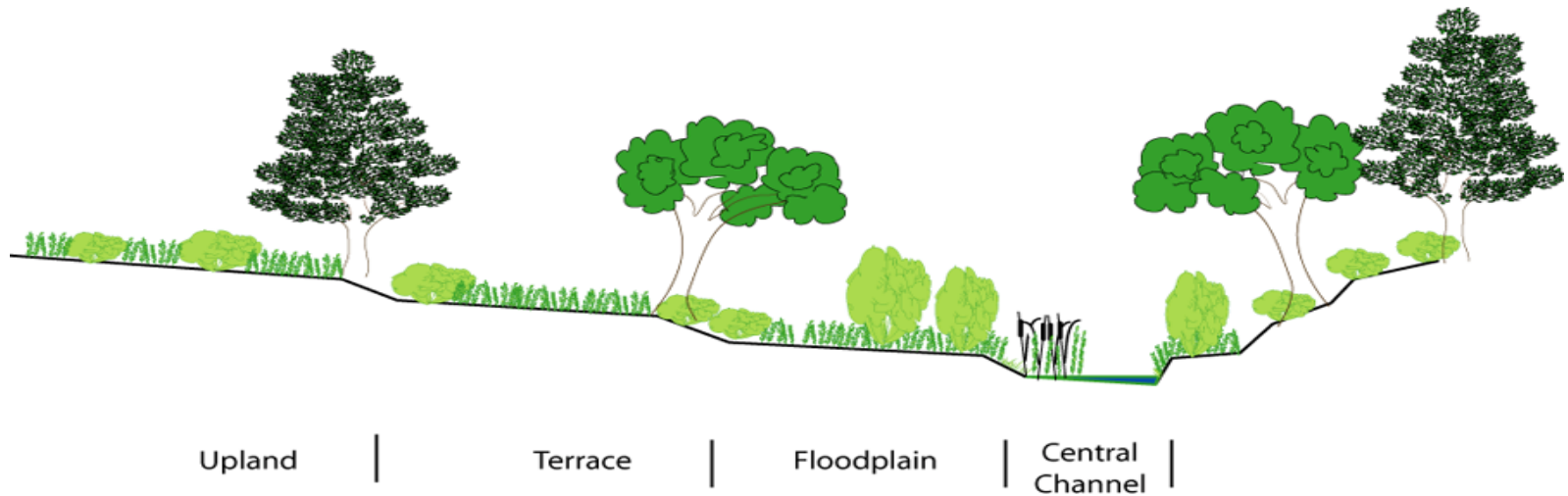
Mapping weed areas



- 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 (*Centaurea diffusa*)
- other undesirable species.

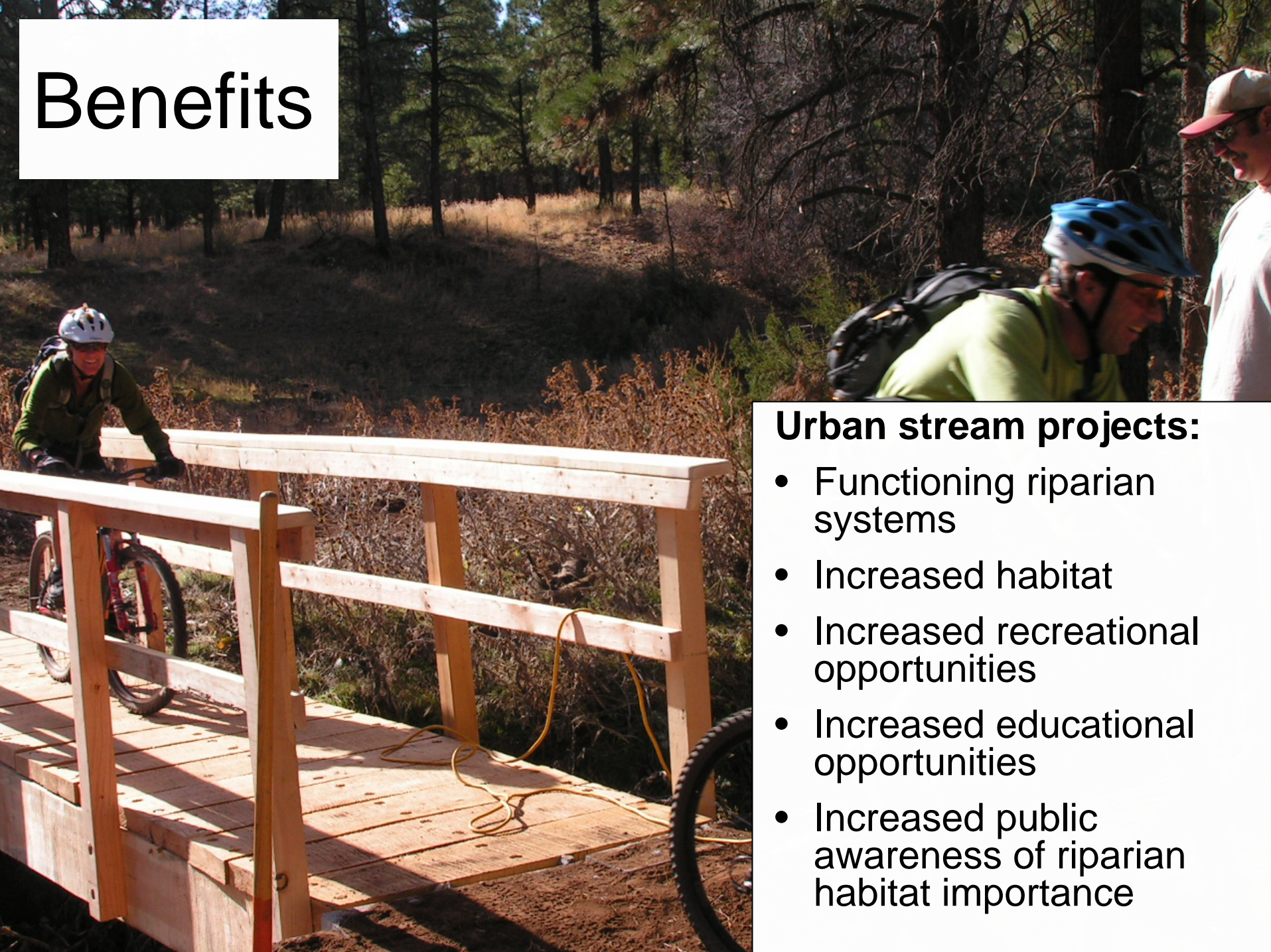
Revegetation Plan

- Grass Plantings
- Wetland Plantings
- Shrub Plantings
- Tree Plantings
- Temporary Irrigation System
- **Reseed and mulch all disturbed and weed control areas!!**



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

Benefits



Urban stream projects:

- Functioning riparian systems
- Increased habitat
- Increased recreational opportunities
- Increased educational opportunities
- Increased public awareness of riparian habitat importance



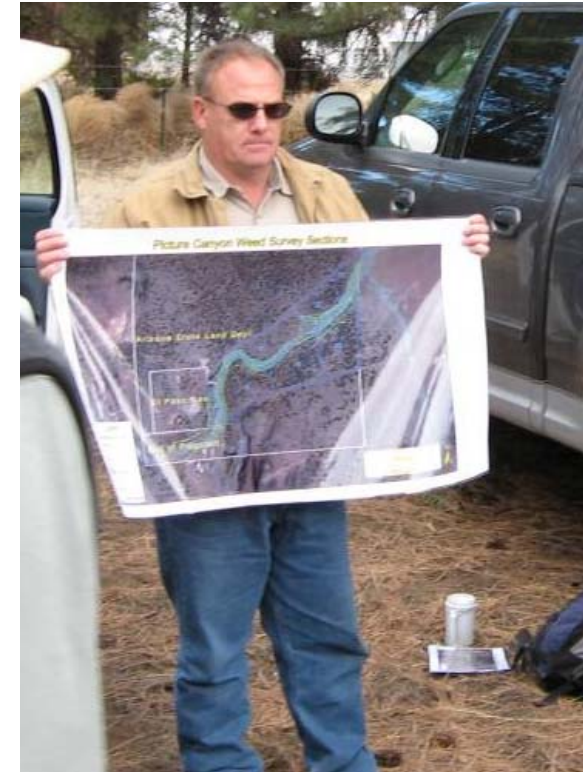
Refugia

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.





City of Flagstaff

Arizona State
Land
Department

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Flagstaff, AZ

