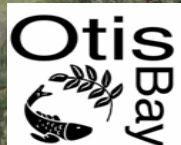


Acknowledgements



**Moapa Band
of Paiutes**

MRREIAC





Study Purpose

Assess present condition of river in terms of process and function

Provide recommendations for riparian ecosystem restoration

Propose a vision for the future of the Muddy River and local community



Presentation Outline

Examples of restoration projects throughout the West

Historic and current conditions of the upper Muddy River

Restoration actions

Benefits

Functional Riparian Ecosystems

What is necessary?



Legal Protection

Water Quality/Quantity

Space

“Natural” Hydrology

Continuity

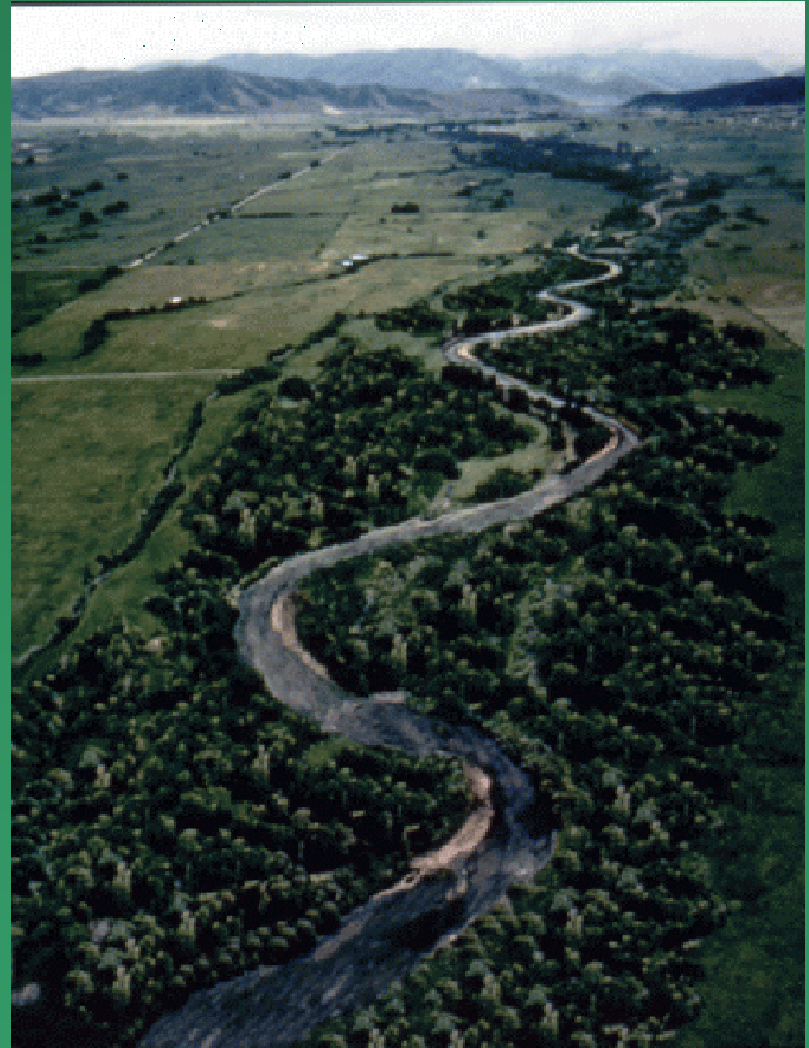
Connectivity

Complexity

Dynamics

Restoration examples

Provo River, Utah



Provo River, Utah

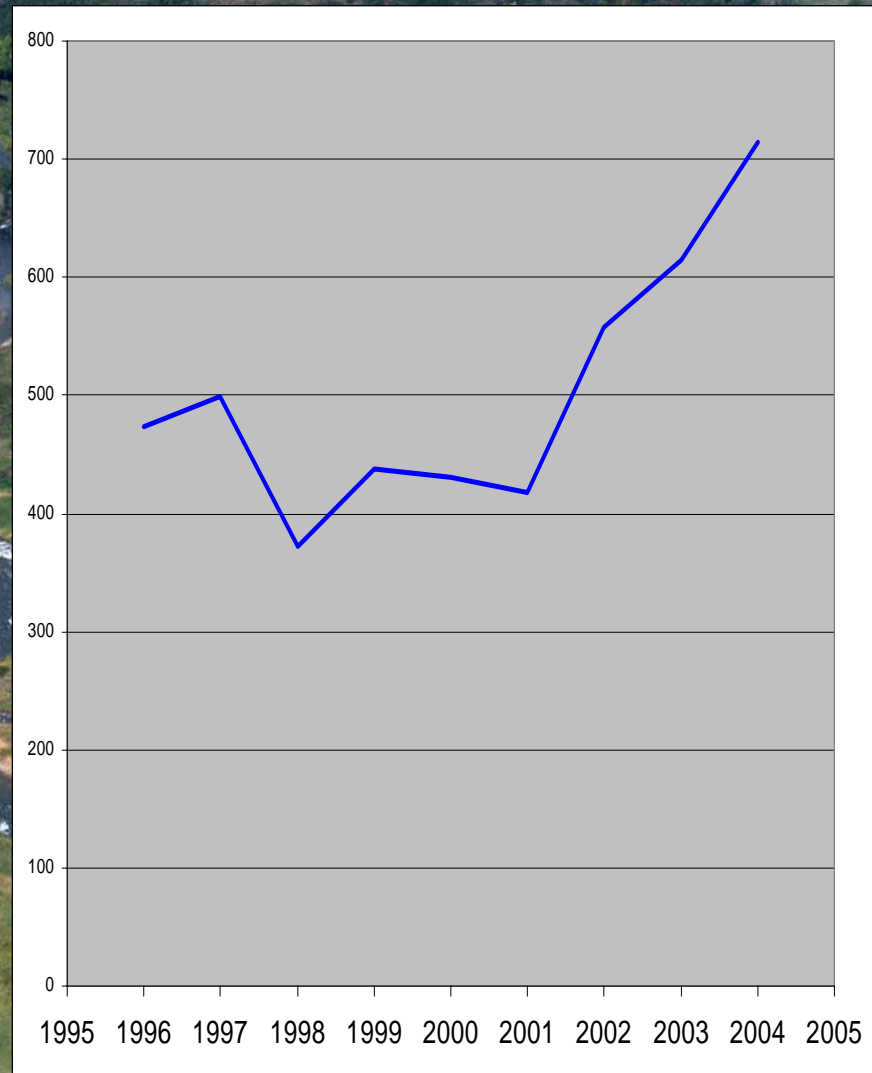


Objective: to create a more naturally functioning and complex river

Provo River, Utah

Columbia Spotted Frog Egg Mass Counts

Year	Egg Masses
1996	473
1997	499
1998	372
1999	438
2000	431
2001	418
2002	557
2003	615
2004	715



Parker Ranch, Beatty, Nevada



Objective: to create habitat for the Amargosa toad and Oasis Valley speckled dace

Parker Ranch, Beatty, Nevada



TNC



© David D Oakey



Shawn Goodchild

Ash Meadows National Wildlife Refuge



Objective: to restore spring and spring channel habitat for Ash Meadows pupfish and other native aquatic species

Ash Meadows National Wildlife Refuge



Objective: to restore spring and spring channel habitat for Ash Meadows pupfish and other native aquatic species

Ash Meadows National Wildlife Refuge



Ash Meadows National Wildlife Refuge

1997

2002



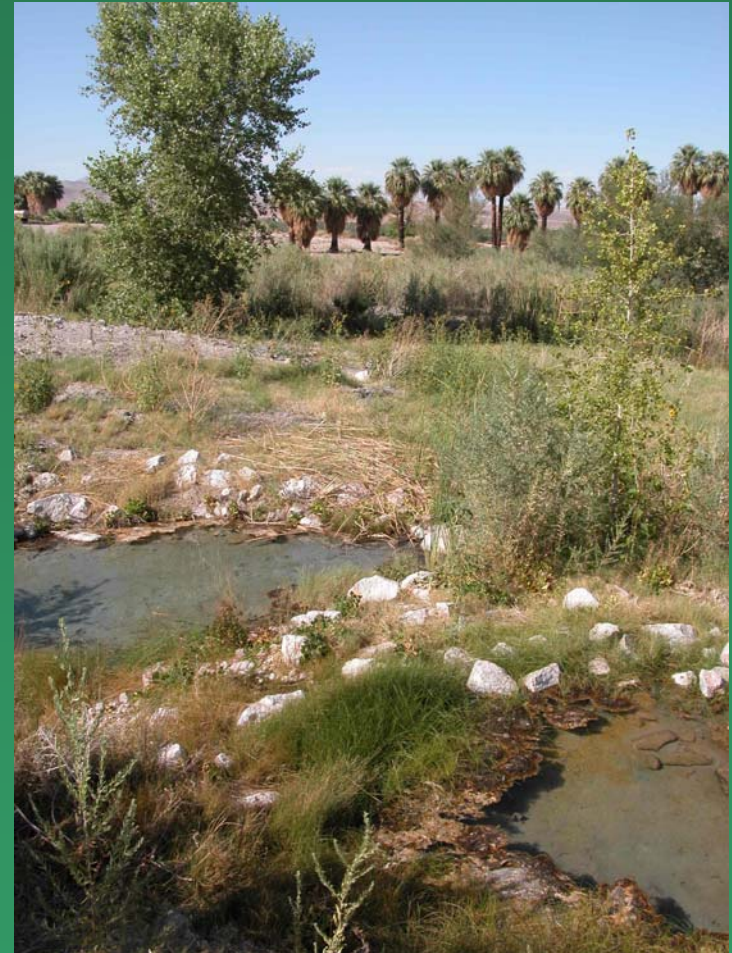
Ash Meadows Pupfish



Gary Monroe NNPS

Peter Rissler

Moapa Valley National Wildlife Refuge



Objective: to restore spring and spring channel habitat for Moapa dace and other native aquatic species

Moapa Valley National Wildlife Refuge



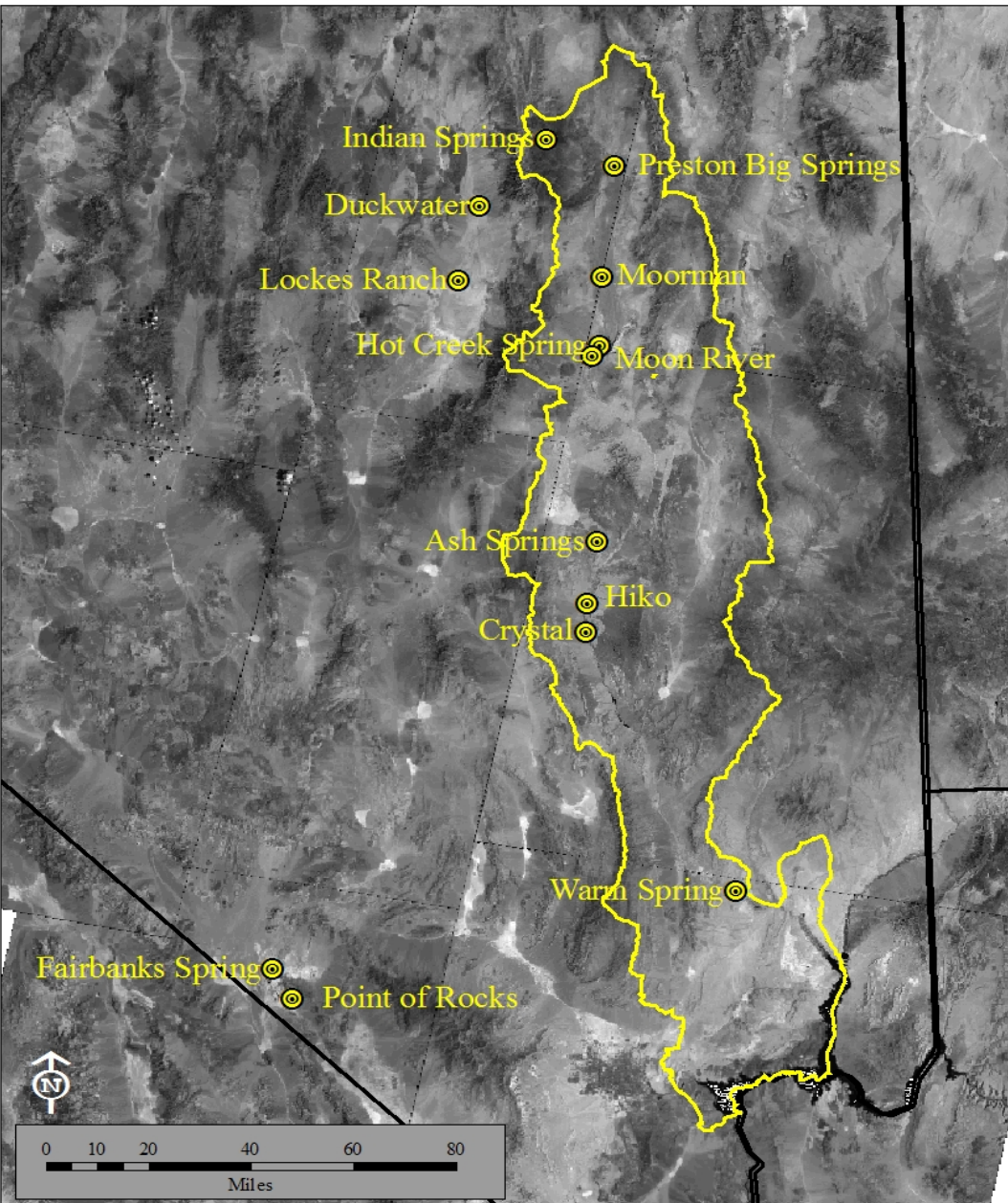
Bridget Nielsen

Moapa Valley National Wildlife Refuge



Objective: to restore spring and spring channel habitat for Moapa dace and other native aquatic species

White River Drainage



What's so special about the Muddy River?



Common Chuckwalla



Glenn Clemmer, NNHP

Southeast Nevada springsnail



Jan Nachlinger, TNC

Speckled dace



Glenn Clemmer, NNHP

© John Rinne



Moapa dace

Merlin Tuttle

Big free-tailed bat



California leaf-nosed bat

Merlin Tuttle



Townsend's big-eared bat



Merlin Tuttle

Bordered Patch



Steve West

Melissa Blue



Paul Opler

Palmer's Metalmark



Paul Opler

Fatal Metalmark



Paul Opler

Bordered Patch



Steve West

Purple Hairstreak



Paul Opler

Blue Grosbeak



Willow Flycatcher



Brian Small



Yellow-billed Cuckoo

Photo by J. A. Spendelow

Vermillion Flycatcher



Crissal Thrasher



Mike Danzenbaker

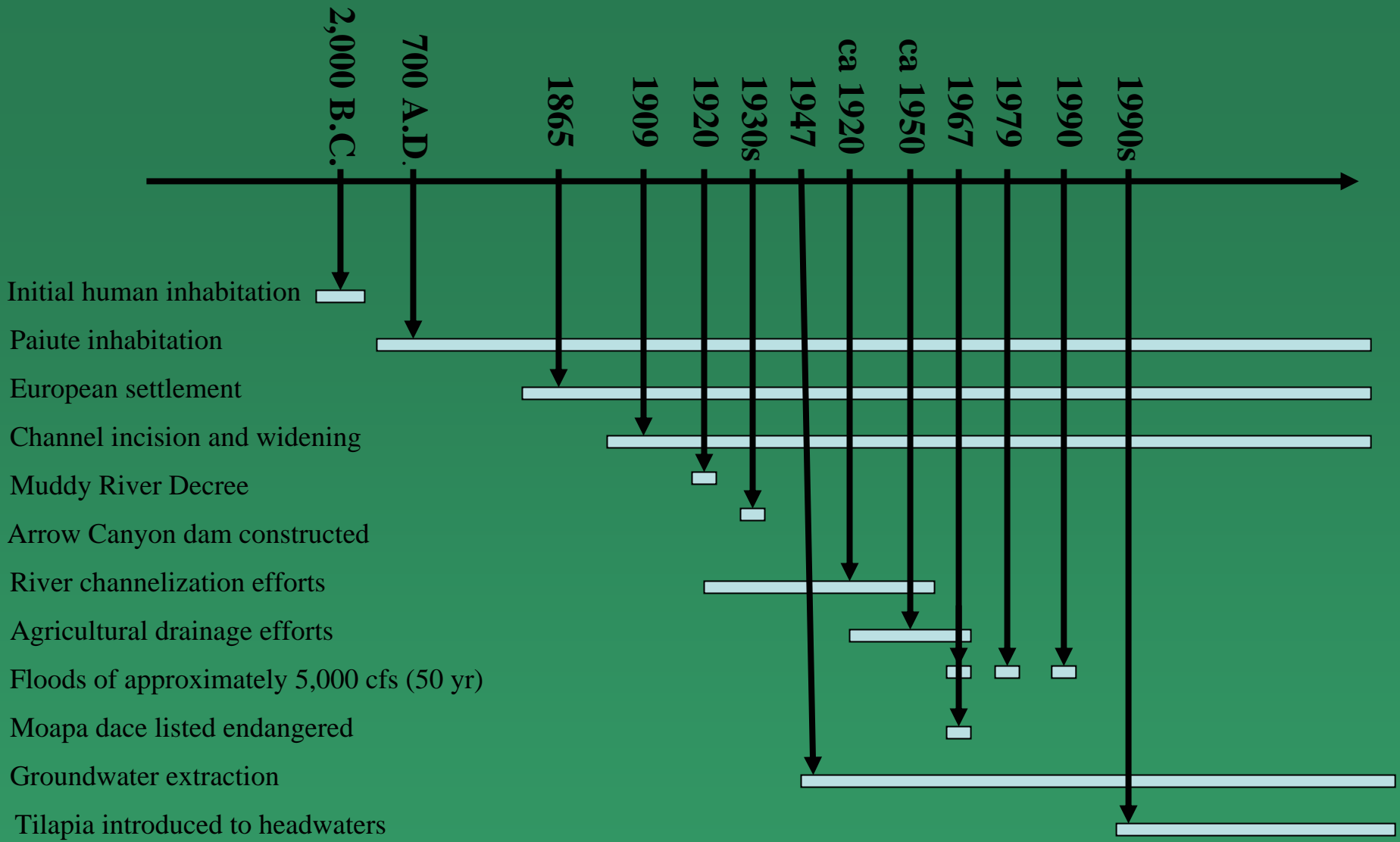
Yellow Warbler

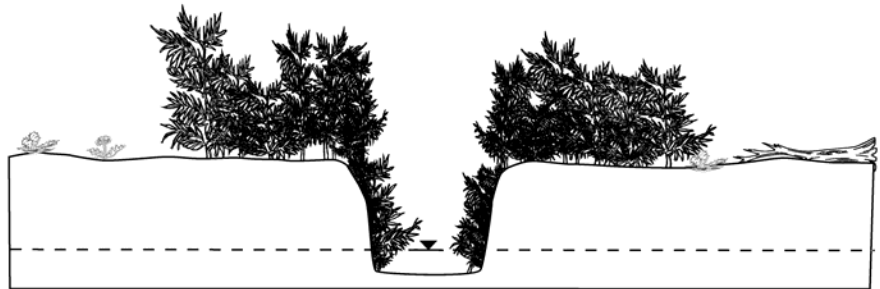
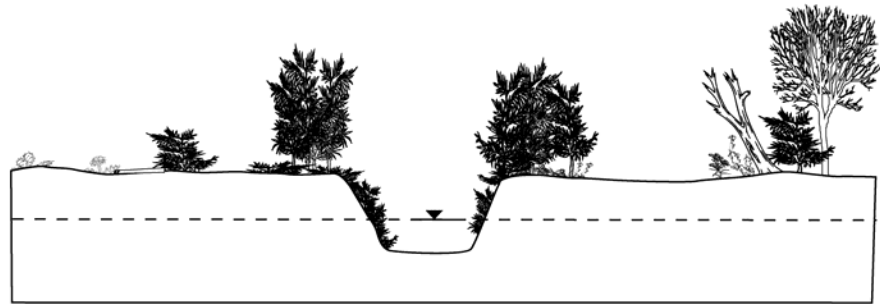
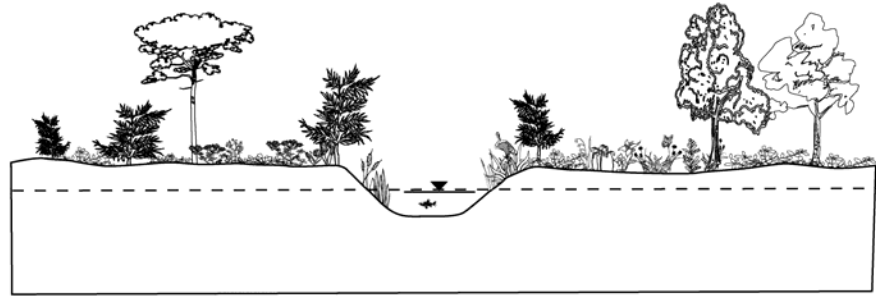
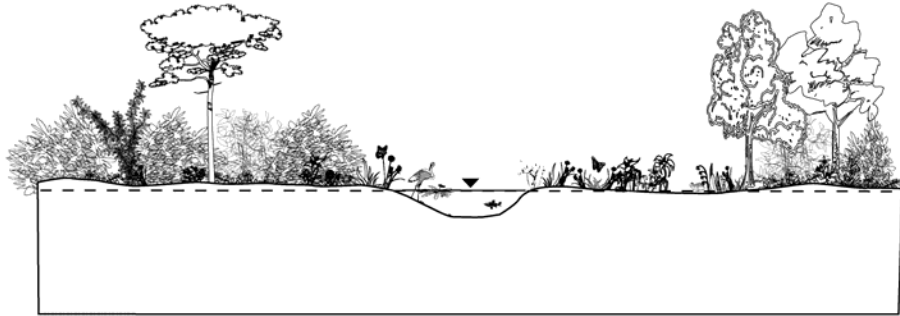


Brian Small

Historic and Current Conditions







The Muddy River continues to change



A five feet deep headcut along the North Fork

The Muddy River continues to change



Toppled tamarisk and vertical shoots

The Muddy River continues to change



Channel widening in action: upper North Fork

The connection between the channel and floodplain



Recurrence Interval
(years)

Discharge
(cfs)

100

8,690

50

5,496

25

3,359

10

1,622

5

851

2

273

1988





1988

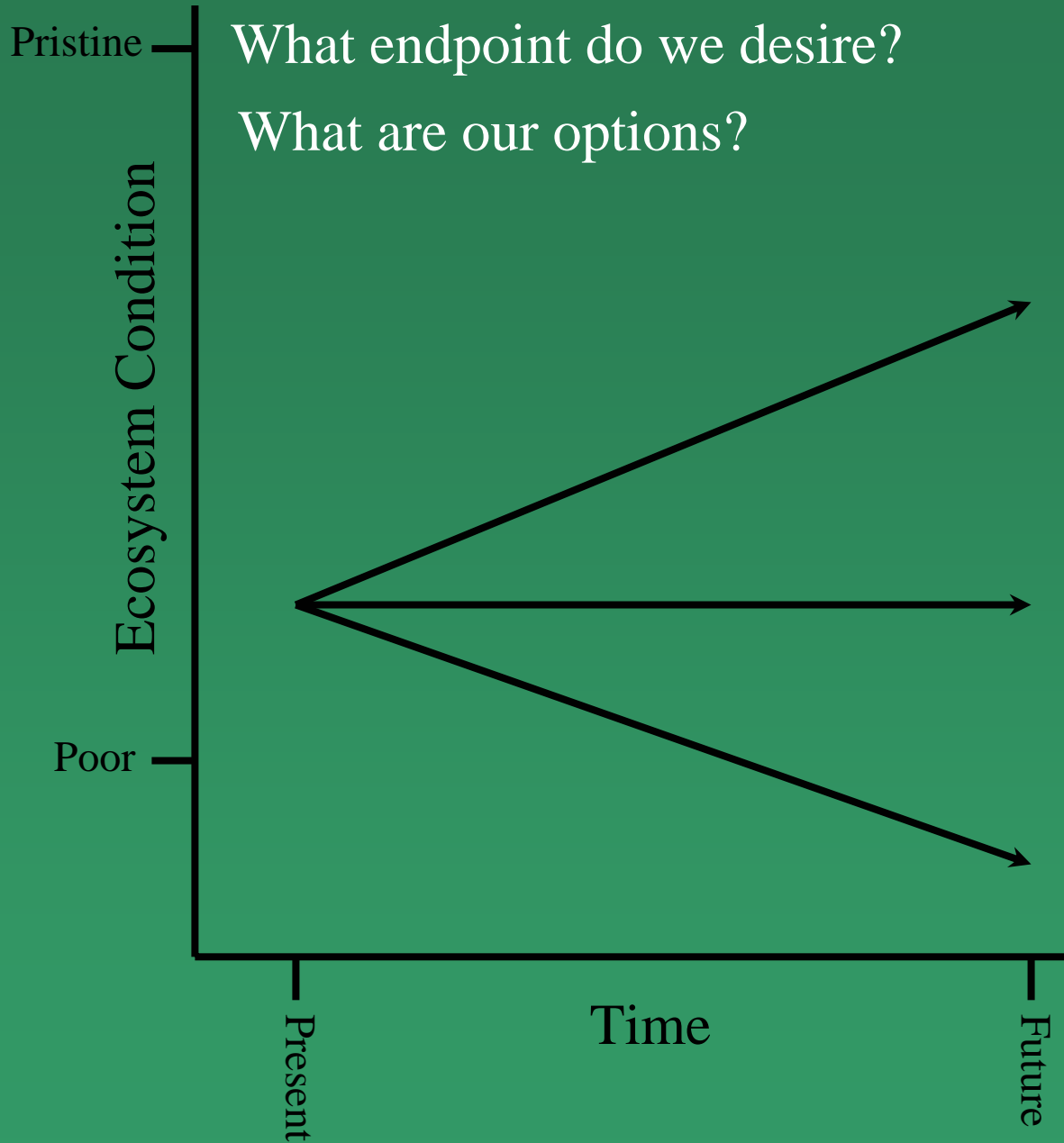




1988







What endpoint do we desire?
What are our options?

General Restoration Actions

Construct a new channel and/or floodplain

Construct instream structures

Change sediment delivery from watershed

Change thermal regime in headwaters

Change riparian vegetation

Change conditions for native fish and other aquatic species

Alter land use in the riparian corridor and watershed

Define flows necessary for preservation of native species and the riparian ecosystem

General Restoration Objectives

Improve riparian habitat

Increase riparian corridor width where possible

Restore and improve hydraulic habitat for native aquatic species

Restore riparian, transitional, and wetland aquatic habitat types

Restore hydraulic connection between the river and floodplain

Provide public access to the river and other natural features

Mainstem Restoration Actions

Legal protection of land through conservation easements or acquisition

Channel reconstruction

Legal protection of water within river

Wetland construction

Invasive fish species removal

Emplacement of fish barriers

Invasive vegetation removal

Revegetation with native plants



Headwaters Restoration Actions

Legal protection of land through conservation easements or acquisition

Legal protection of water within tributaries and river

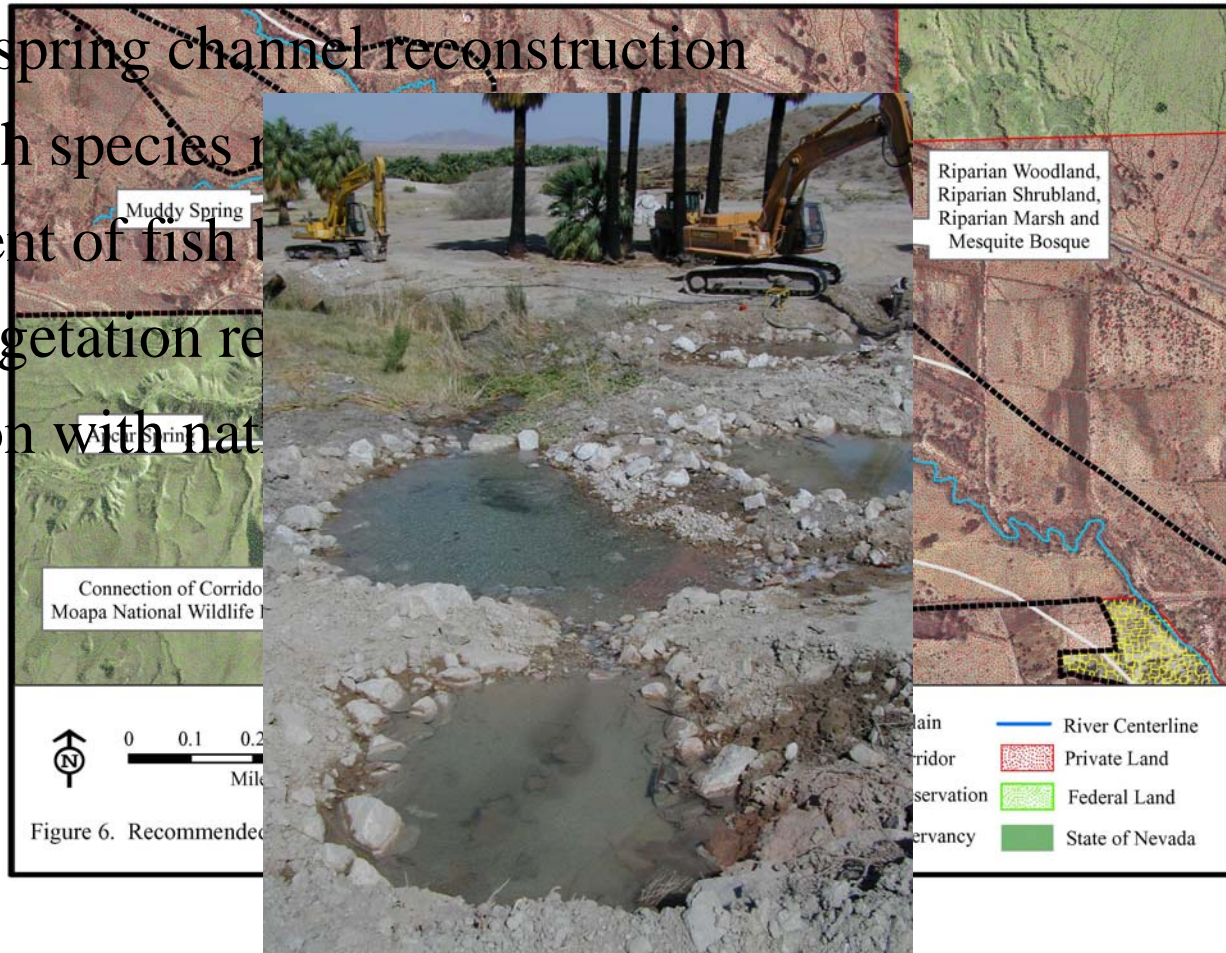
Spring and spring channel reconstruction

Invasive fish species removal

Emplacement of fish ladders

Invasive vegetation removal

Revegetation with native species



Public Benefits from Riparian Ecosystem Preservation and Restoration

Preservation of rural lifestyle

Flood protection

Preservation of regional and biological heritage

Avoidance of endangered species listings

Open space for the community

Recreation corridor

Enhanced quality of life

Tourism and business revenue

Increased property values

