ECOSYSTEM RESTORATION ON THE TRUCKEE RIVER, NEVADA: INTEGRATING ECOSYSTEM RESTORATION WITH FLOOD RISK MANAGEMENT IN A HIGH-DESERT LANDSCAPE

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US Army Corps of Engineers
Sacramento District

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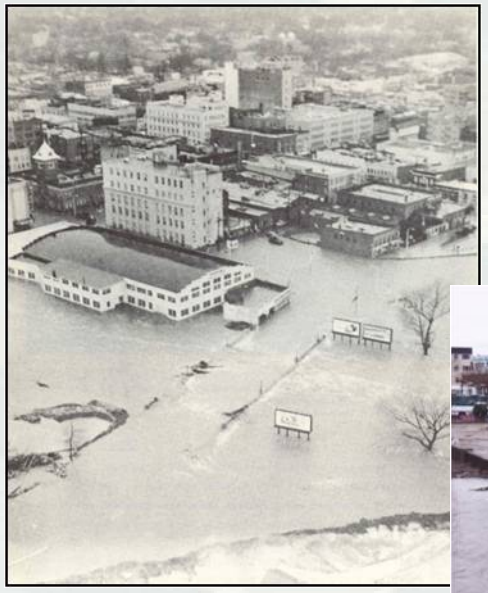
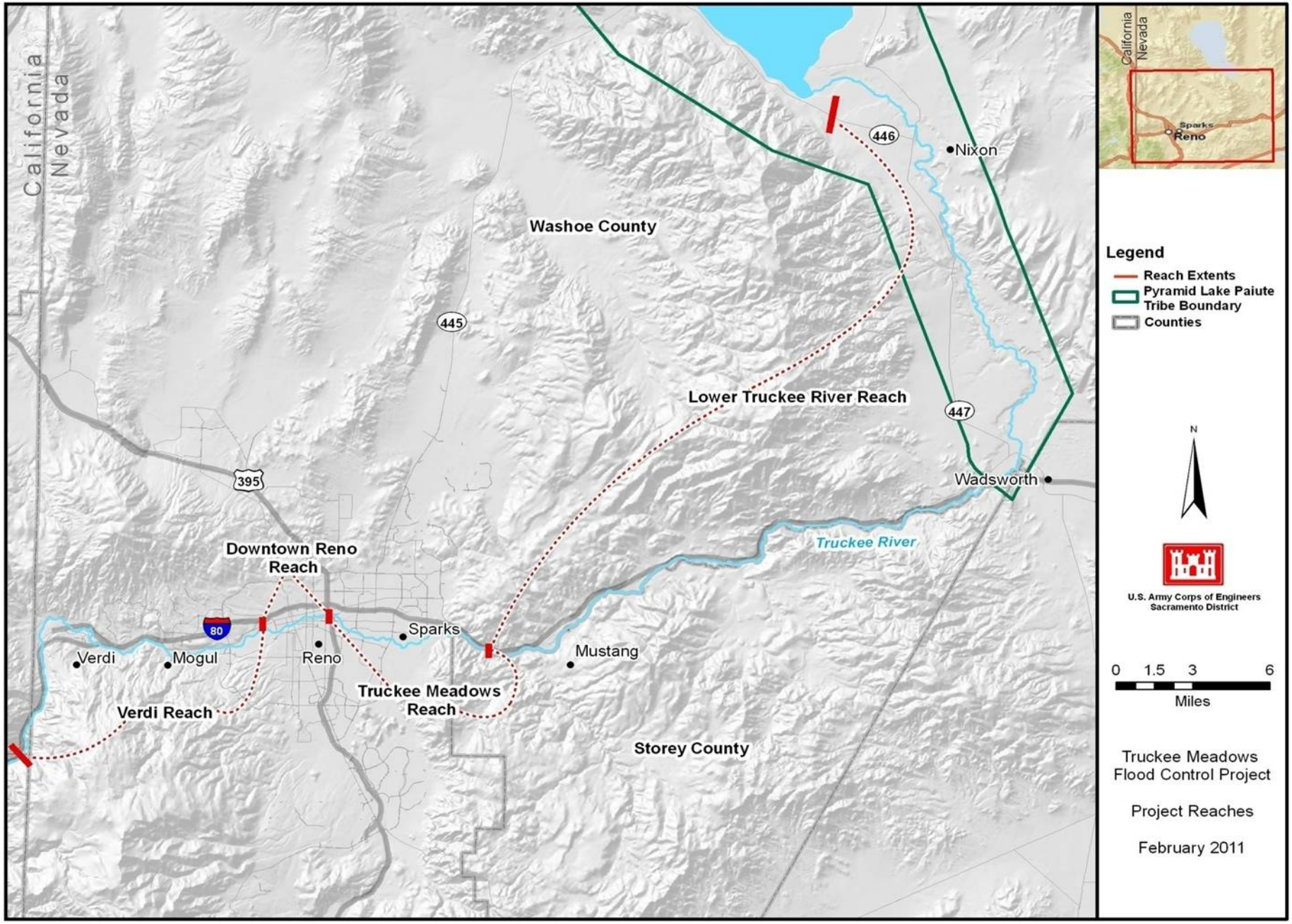
Pyramid Lake
Washoe County
Plumas County
Lemmon Valley-Golden Valley
Spanish Springs
Sun Valley
Sierra County
Reno
Sparks
Fernley
Storey County
Nevada County
Truckee
Toiyabe National Forest
Incline Village
Dayton
Lake Tahoe Nevada State Park
Lyon County
Placer County
Carson City County
Carson City
Lake Tahoe
Eldorado National Forest
El Dorado County
Douglas County
Yerington
South Lake Tahoe
NEVADA
CALIF

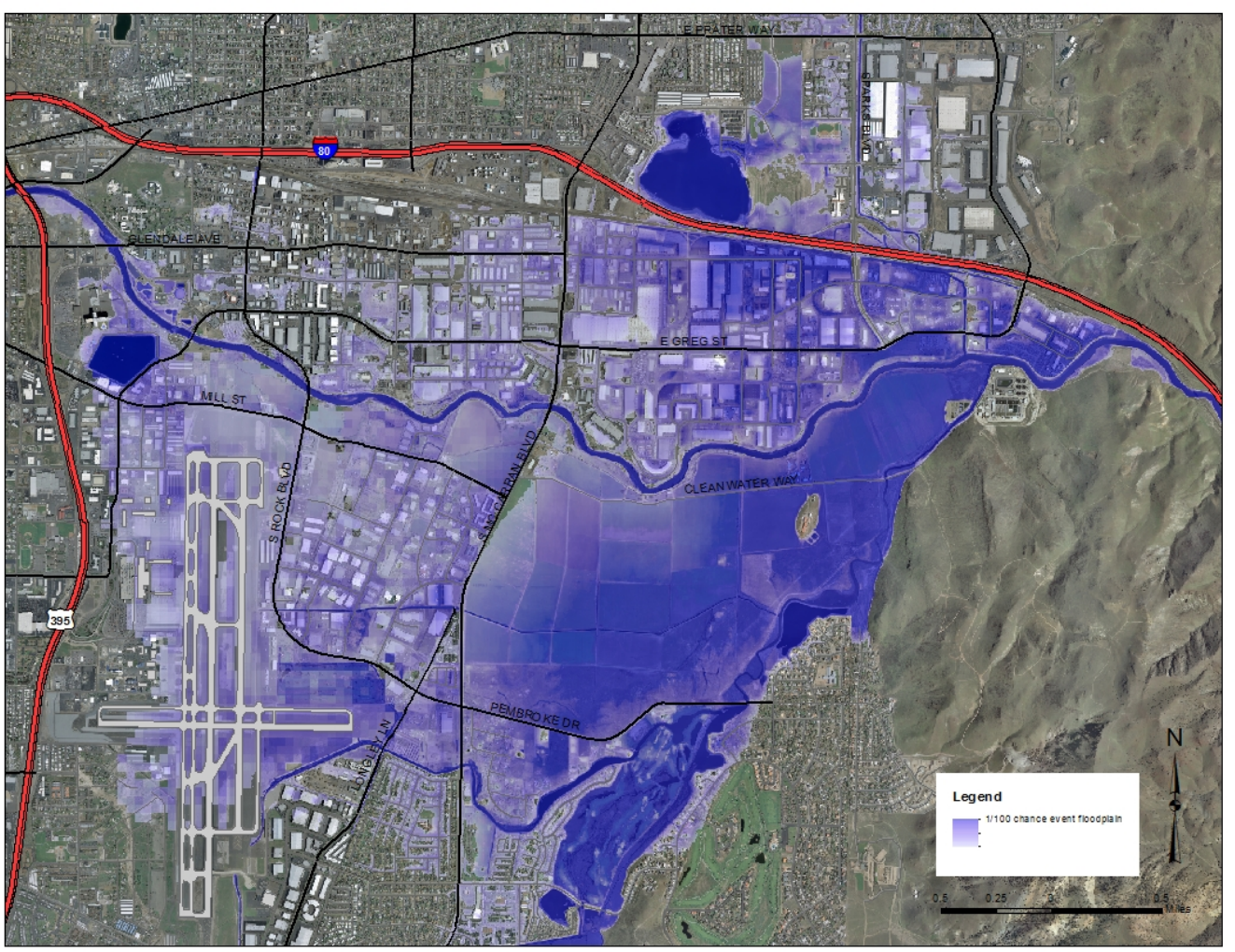
Truckee Meadows, NV

- Flooding problem in Reno/Sparks area
- Damaging floods in 1950, 1955, 1963, 1986, 1997, & 2005
- 1997 largest flood on Record
- Estimated $750 million in damages
- Great risk both in frequency and magnitude



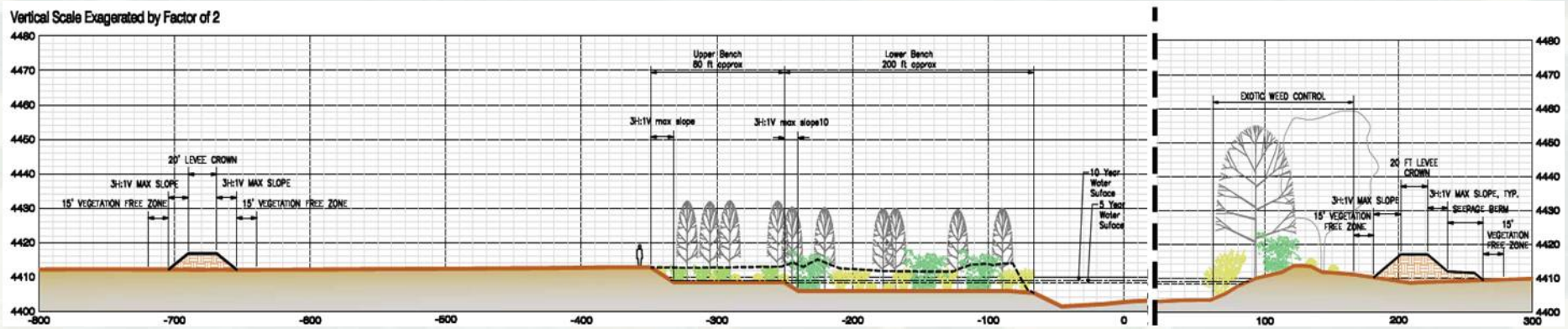

California
Nevada
446
Nixon
Washoe County
445
Lower Truckee River Reach
447
395
Wadsworth
Truckee River
Downtown Reno Reach
80
Sparks
Verdi
Mogul
Reno
Mustang
Truckee Meadows Reach
Verdi Reach
Storey County
California
Nevada
Sparks
Reno
Legend
Reach Extents
Pyramid Lake Paiute Tribe Boundary
Counties
N
U.S. Army Corps of Engineers
Sacramento District
0 1.5 3 6
Miles
Truckee Meadows Flood Control Project
Project Reaches
February 2011

Existing Floodplain – Truckee Meadows Reach



Restoration Integrated with Flood Risk Management (FRM)

- Setback levees and floodwalls.
- Floodplain terracing inside setbacks.
- Invasive plant removal and control.
- Riparian plantings on terraces.



FRM Effects on Lower Truckee River Flows

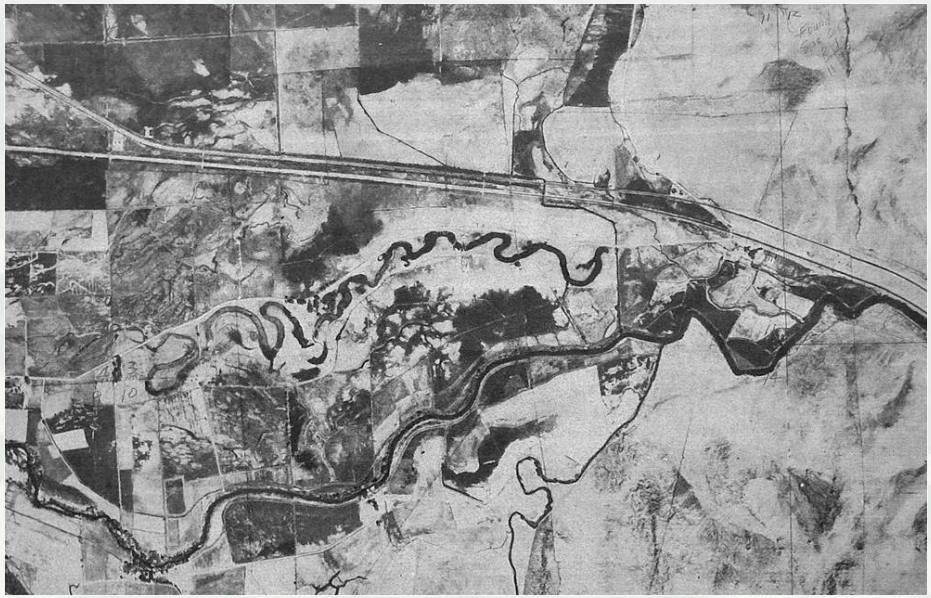
- Meadows FRM = ⇧ downstream flows.
- Ecosystem restoration attenuates flows?
- Hydraulic models indicated minimal attenuation of higher flows.
- However, substantial restoration benefits identified to support ER project purpose.

Degraded Ecosystem - Causes

- Reduced flows from diversions
- Upstream dams alter sediment transport
- Deforestation near river
- Channel incision
- Disconnected Floodplain
- Channel Straightening
- Reduced hydraulic complexity
- Widened Channel
- Increased water temperature

Degraded Ecosystem - Examples

Truckee Meadows - 1940



Truckee Meadows - 2006

Degraded Ecosystem - Examples

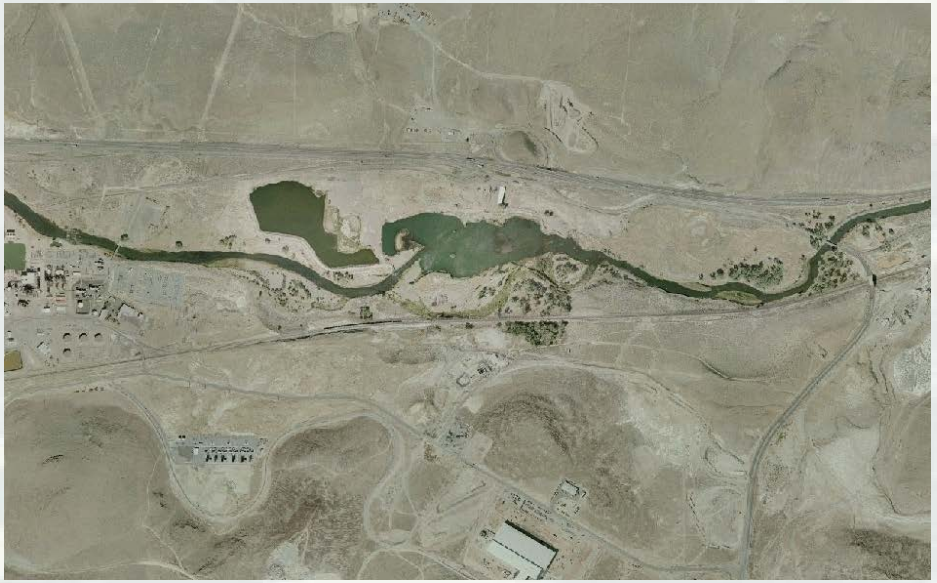
Channel Incision

Derby Dam

Degraded Ecosystem - Examples

Invasive Plants - whitetop

Channel Widening



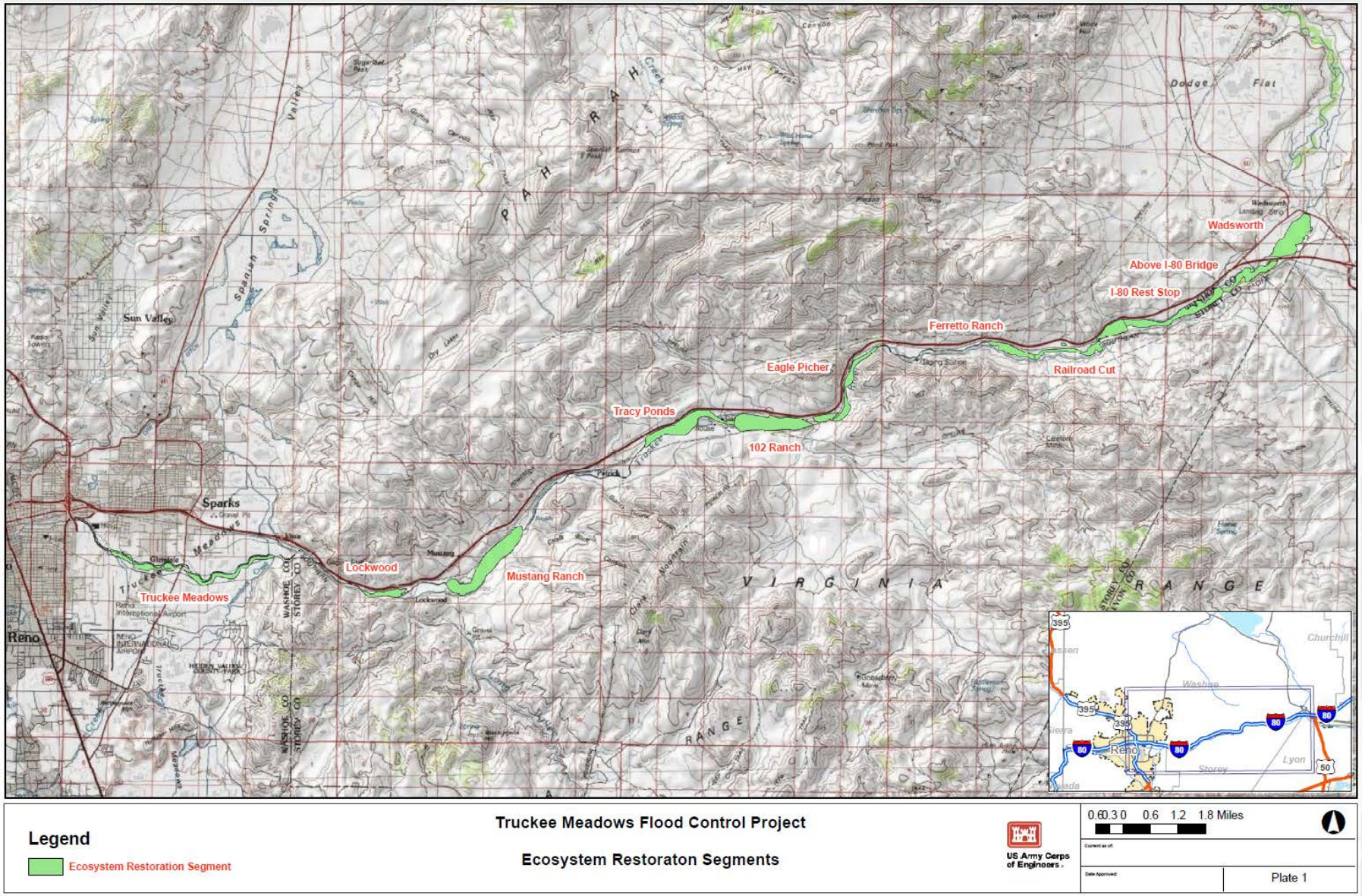
Ecosystem Restoration Objectives

- Increase riparian habitat.
- Restore hydrogeomorphic structure and functions.
- Increase wetland habitat.
- Reduce nonnative invasive plant species.
- Restore instream aquatic habitat.
- Improve upstream and downstream fish passage.

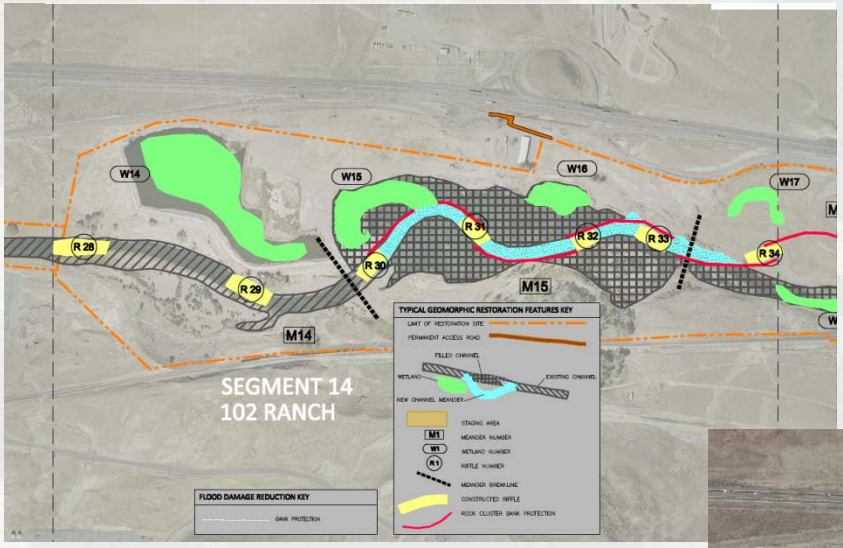
Ecosystem Restoration Measures

- Riparian Habitat Passive/Active Restoration.
- New Channel Meanders.
- New Channel Bed and Terraces/Benches.
- New Floodplain Ground Contours.
- Floodplain Wetland Habitat.
- Remove Invasive Plant Species.
- Restore River Riffle/Pool Complex.
- Fish passage features at dams.

12 Segments


Wadsworth
Above I-80 Bridge
I-80 Rest Stop
Ferretto Ranch
Railroad Cut
Eagle Picher
Tracy Ponds
102 Ranch
Mustang Ranch
Lockwood
Truckee Meadows
Sparks
Reno
Sun Valley
Dodge Flat
PAH RAH RANGE
VIRGINIA RANGE
Legend
Ecosystem Restoration Segment
Truckee Meadows Flood Control Project
Ecosystem Restoraton Segments
US Army Corps of Engineers
0 0.3 0.6 1.2 1.8 Miles
Plate 1

Ecosystem Restoration



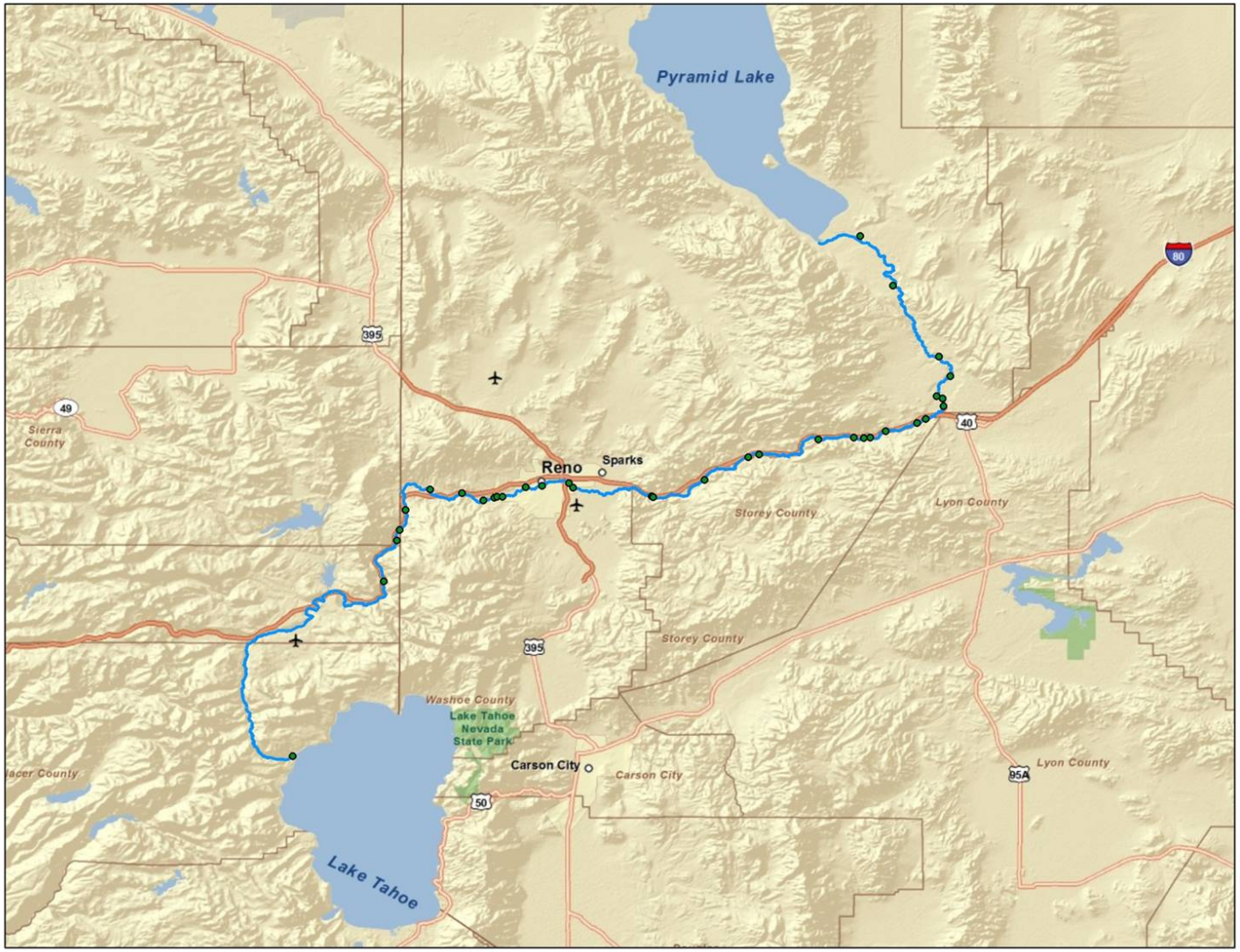
McCarran Ranch – Pilot Project

2006

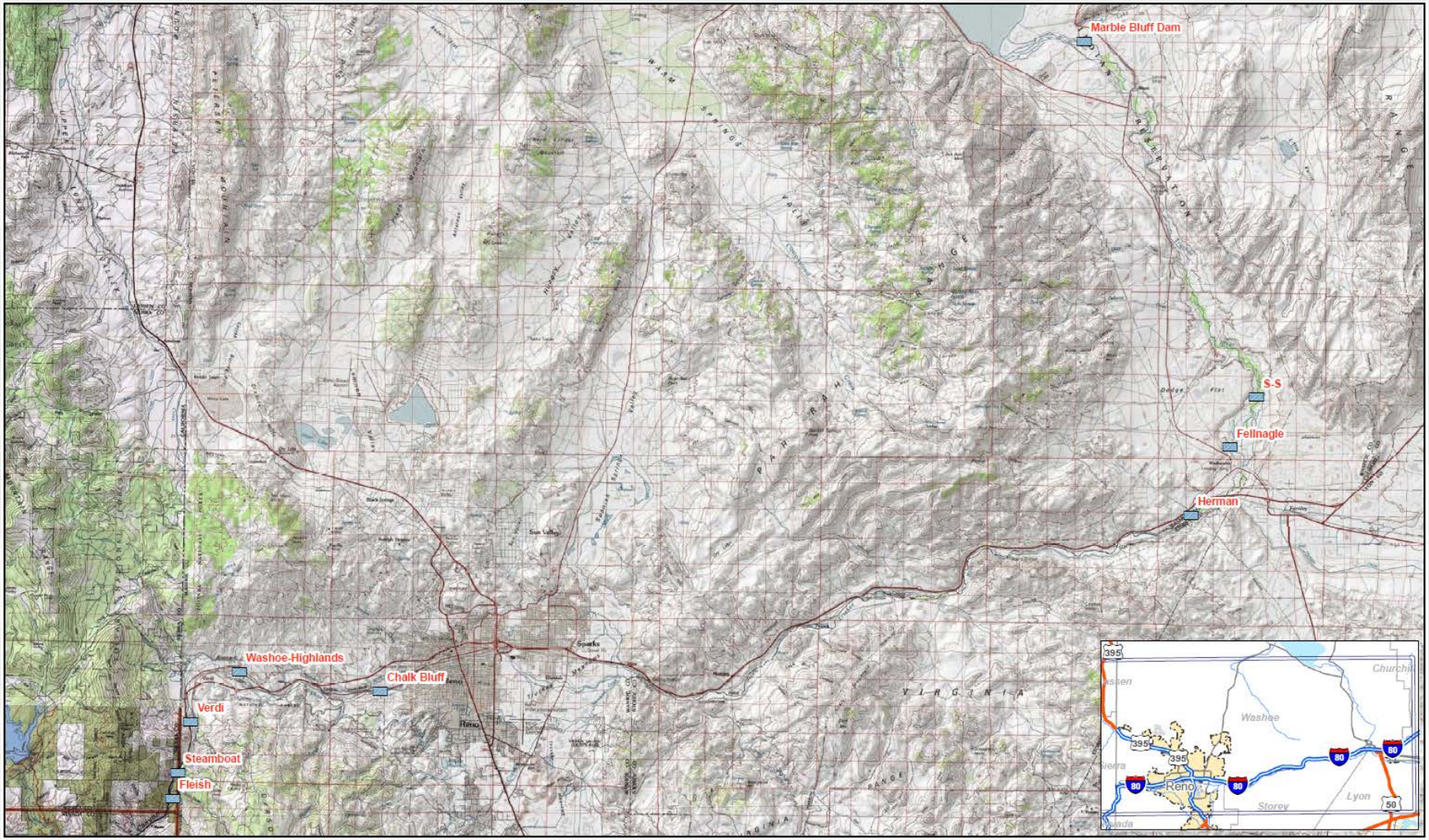
2010

Fish Passage

30+ Barriers to Migration



Nine Fish Barriers Selected



Legend

Fish Passage Barriers

Truckee Meadows Flood Control Project

Fish Passage Improvement Locations

US Army Corps of Engineers

10 5 0 1 2 3 4 5 Miles

Current as of:

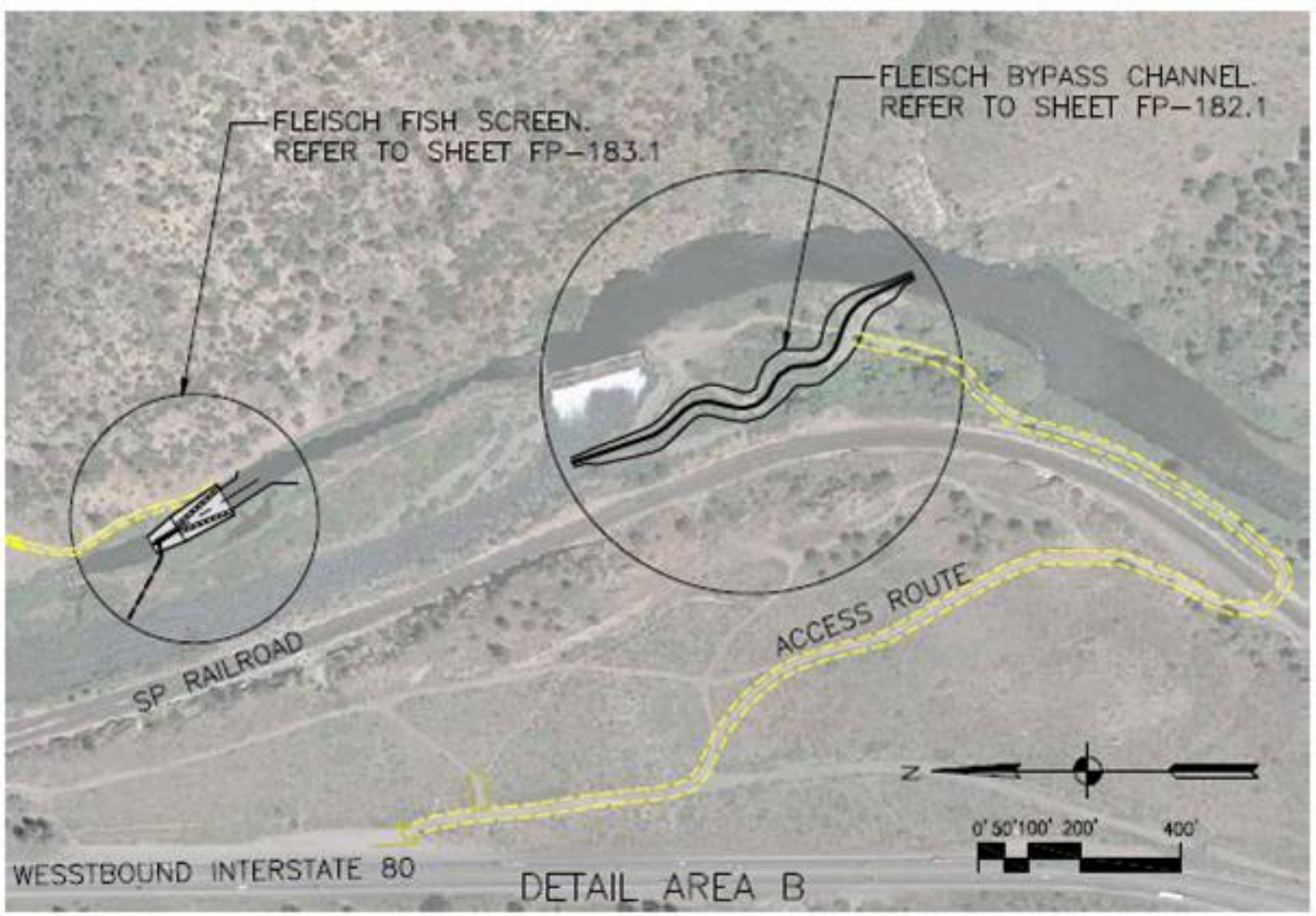
Date Approved:

Plate 2

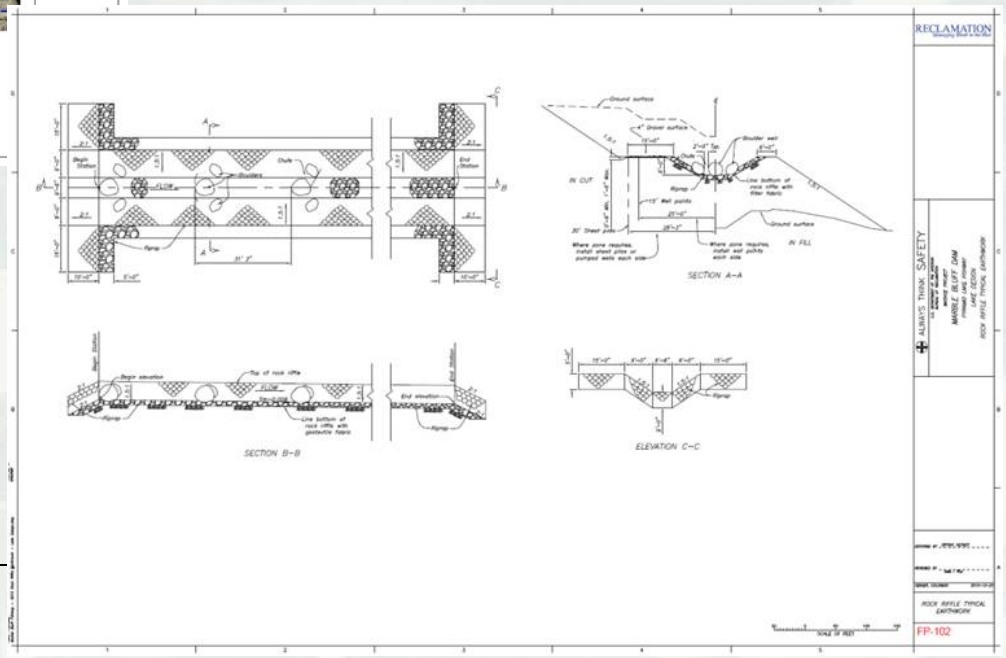
Passage Improvements Used

- Bypass channel
- Modification to Fish Ladder
- Replace Diversion with Pump
- Modify Existing Diversion Structure
- Install Fish Screens

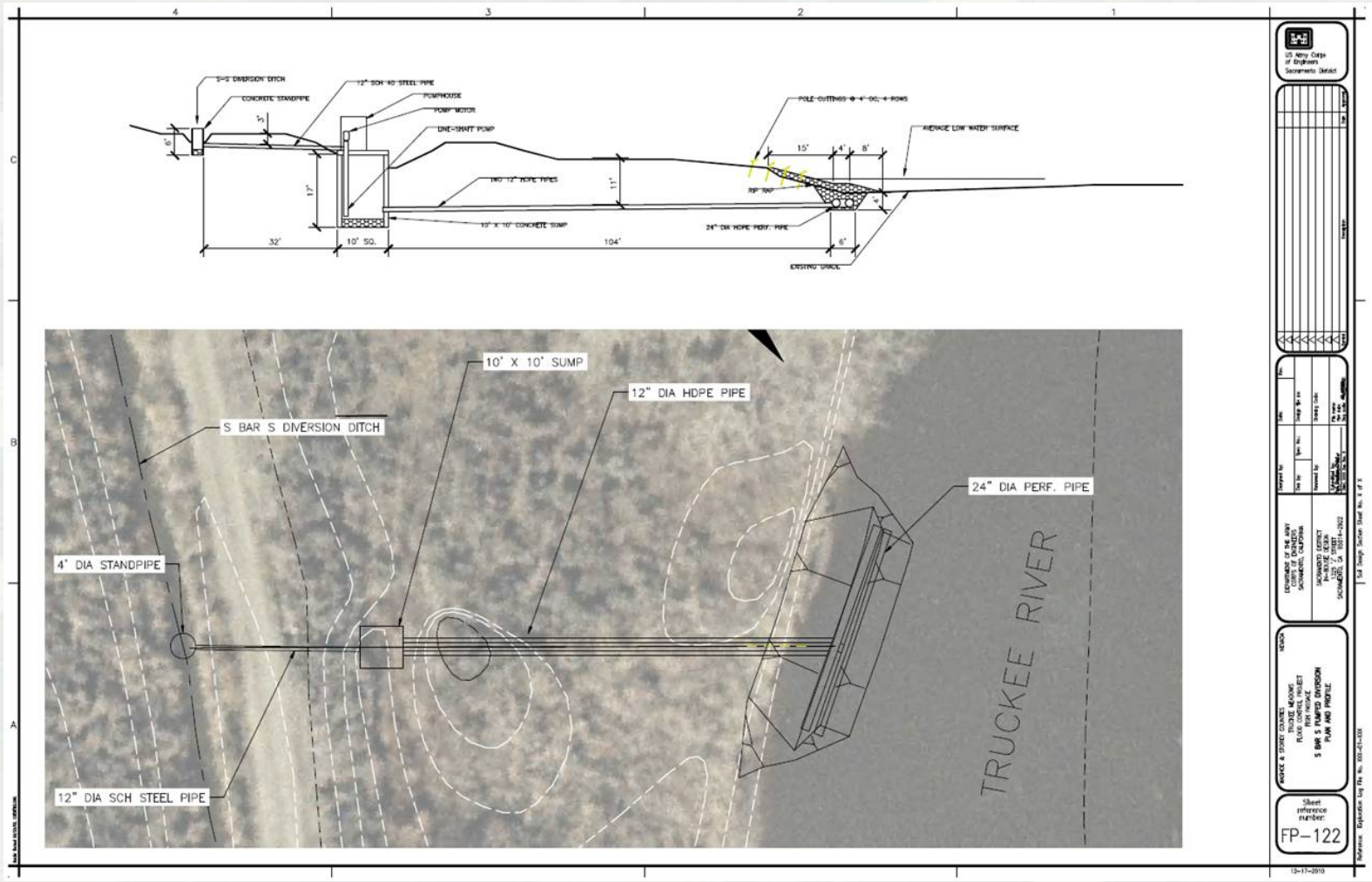
Bypass Channel and Fish Screen



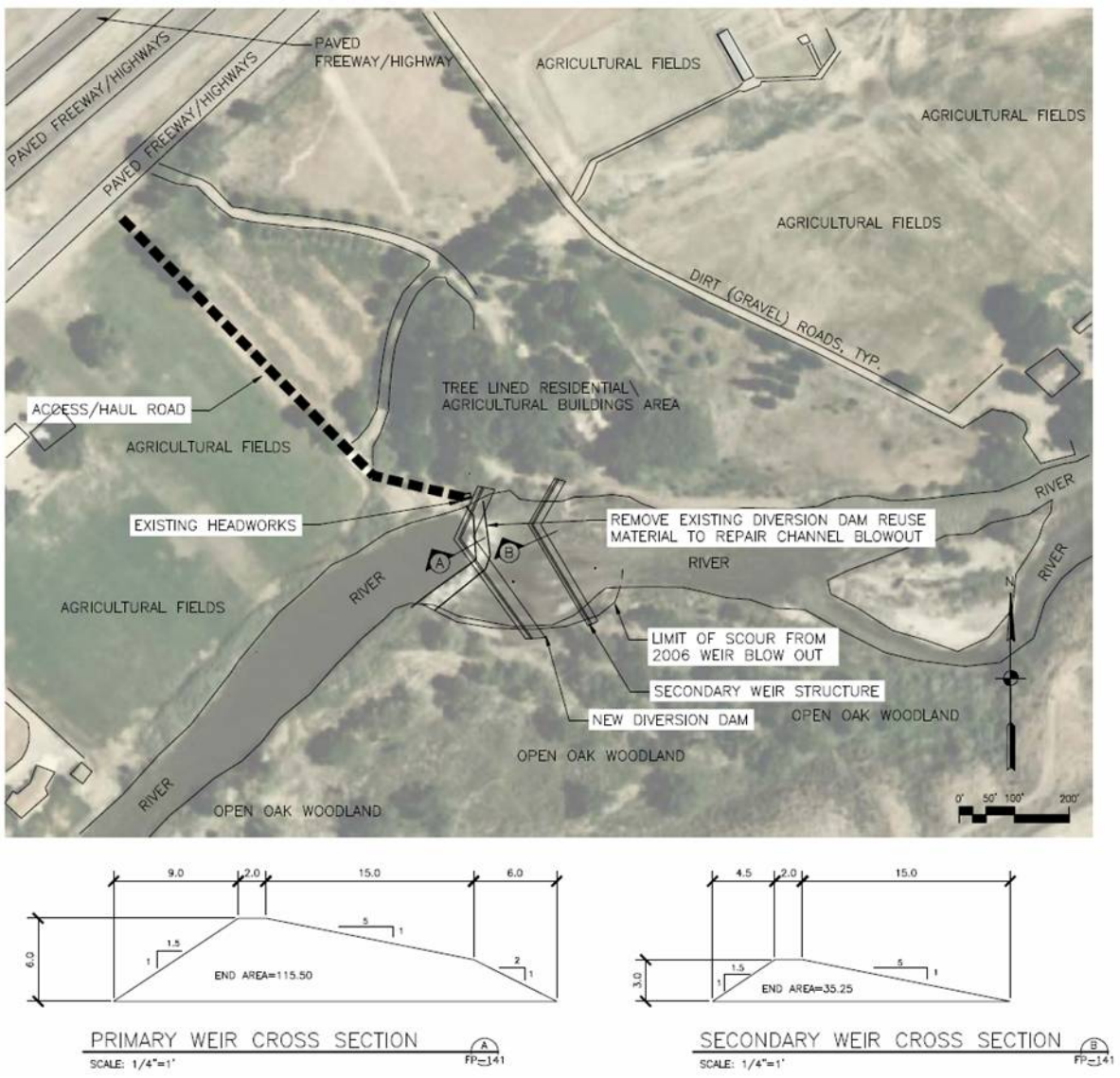
Modify Fish Ladder



Replace Diversion with Pump



Modify Existing Diversion



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Questions?