



Truckee River Watershed Council

Collaborative solutions to protect, enhance and restore the Truckee River Watershed

Donner Basin Assessment

Community Presentation
April 25, 2016

Donner Basin Assessment

- I. Goals of the Assessment
- II. Assessment Findings
 - I. Natural Attributes
 - II. Disturbances
 - III. Conditions Today
 - IV. Project Opportunities
- III. Next Steps

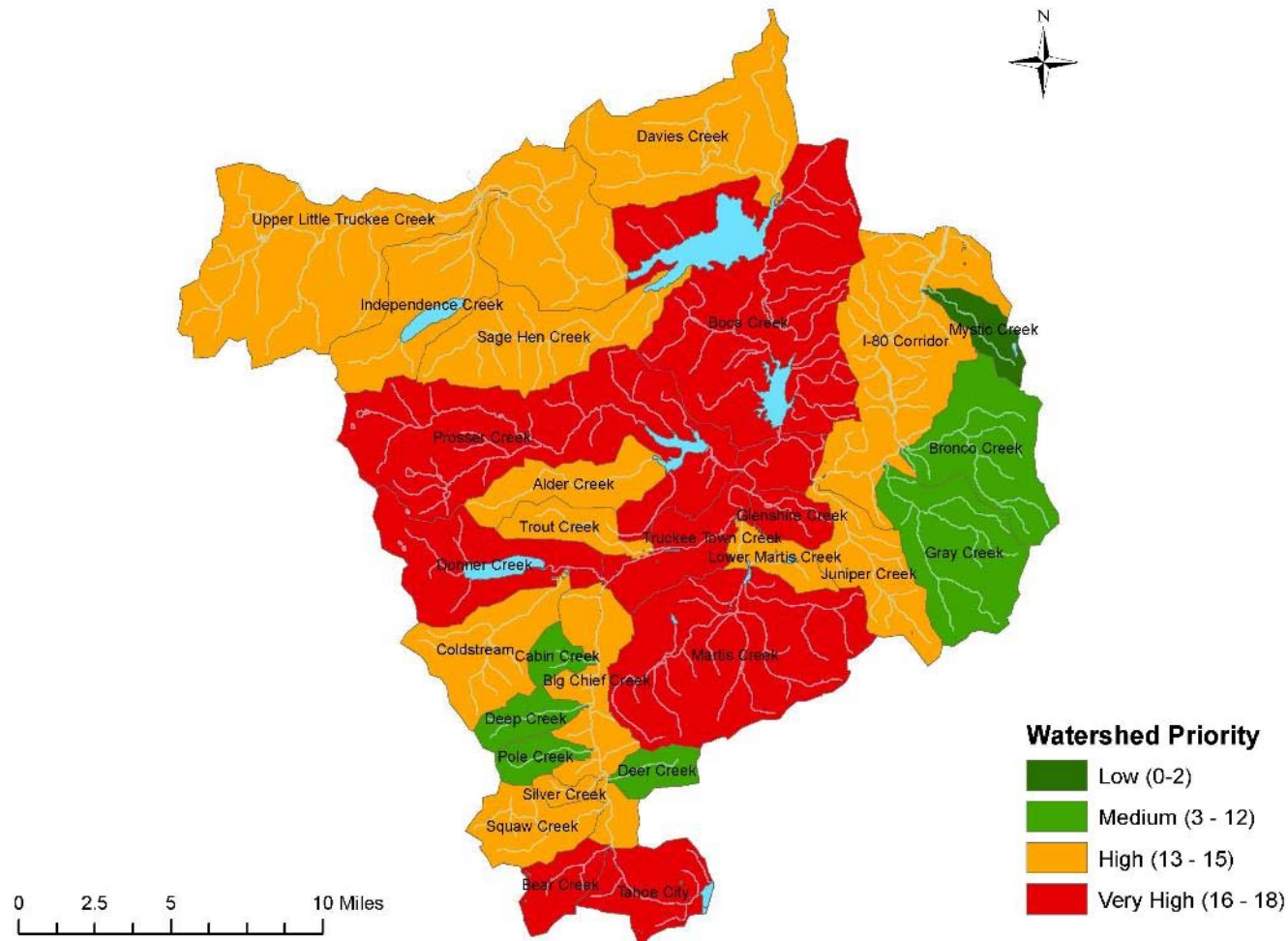


Photo: Sam Okamoto



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Priorities in the Truckee River Watershed



Donner Basin Assessment

- Ability to implement successful restoration
- Allows for greater efficiency
- Wide range of needs in this basin
- Building on success of past assessments
- Appealing to funders



Photo: cbec



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Goal of the Donner Basin Assessment

- To provide the SCIENCE needed to direct RESTORATION AND PROTECTION PROJECTS within the Donner Basin watershed.



Photo: cbec



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Thank You to our Funders

- Donors to the Truckee River Watershed Council
- The Laird Norton Family Foundation
- Community Foundation of Western Nevada, Truckee River Fund



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Ordained by resolution of the Board of Directors of the Truckee River Watershed Council



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Donner Basin Watershed Assessment



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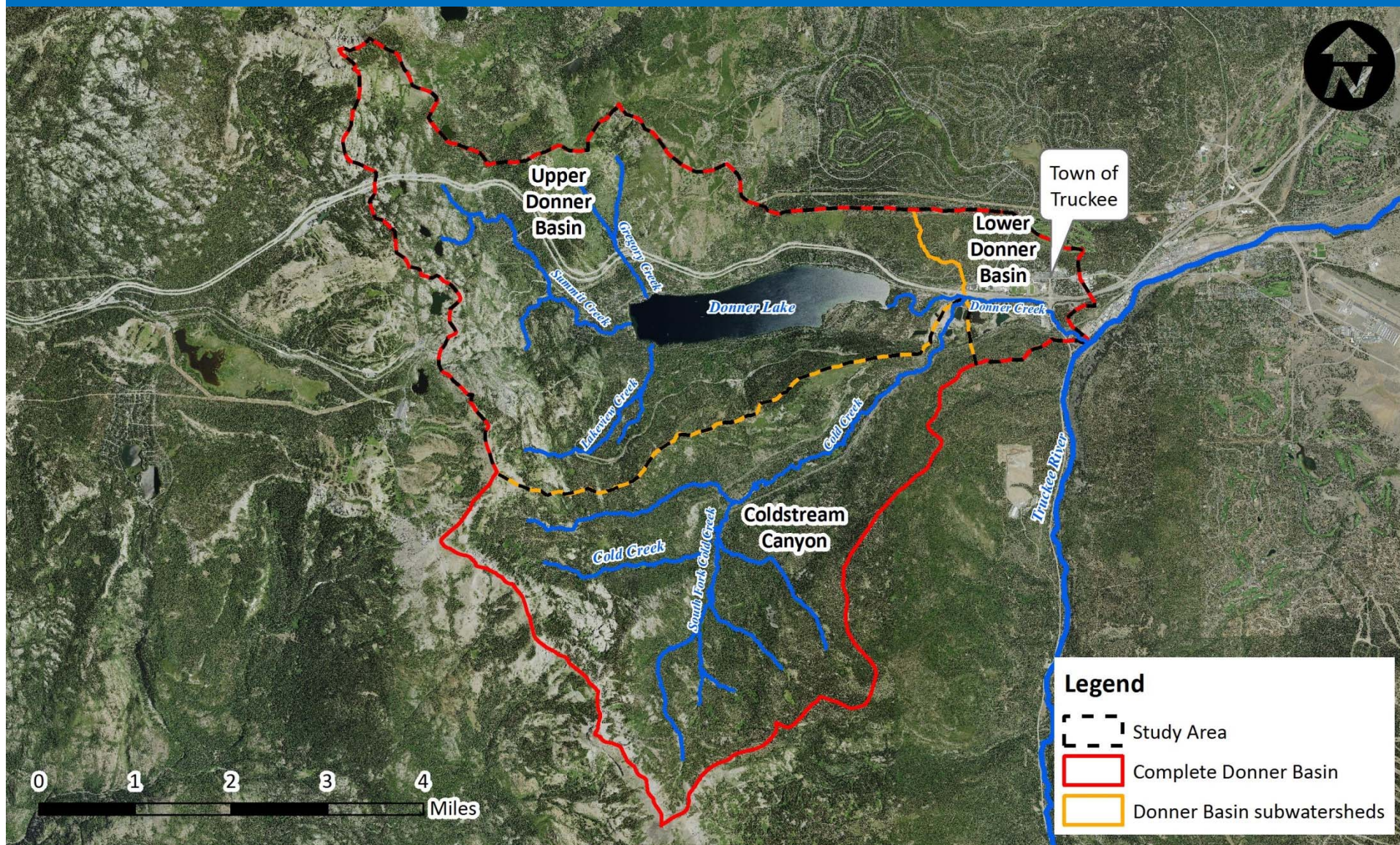
April 25, 2016



Study Area

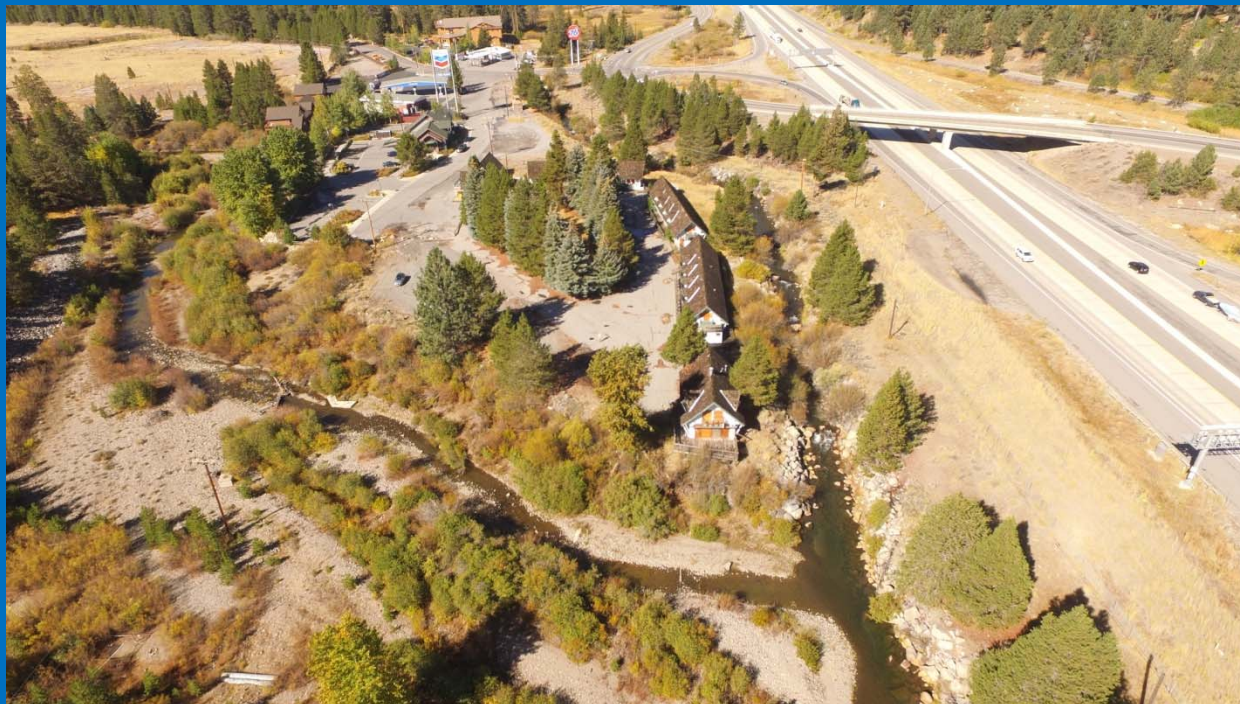


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Assessment Objectives

1. Characterize natural watershed attributes
2. Identify disturbances
3. Characterize existing conditions
4. Identify and prioritize restoration opportunities

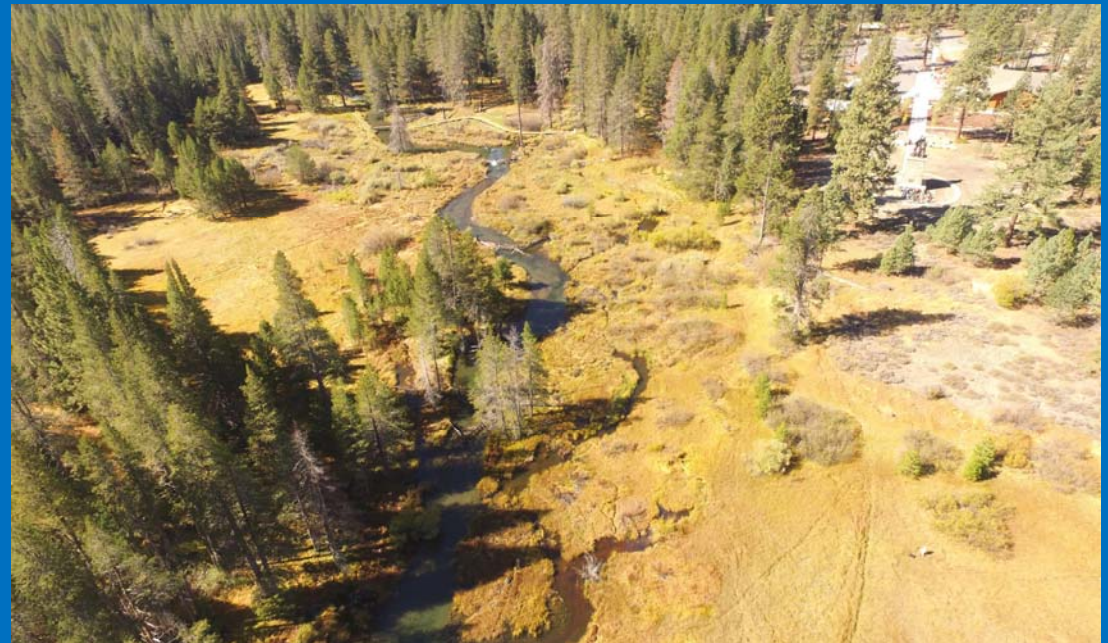


Natural Watershed Attributes



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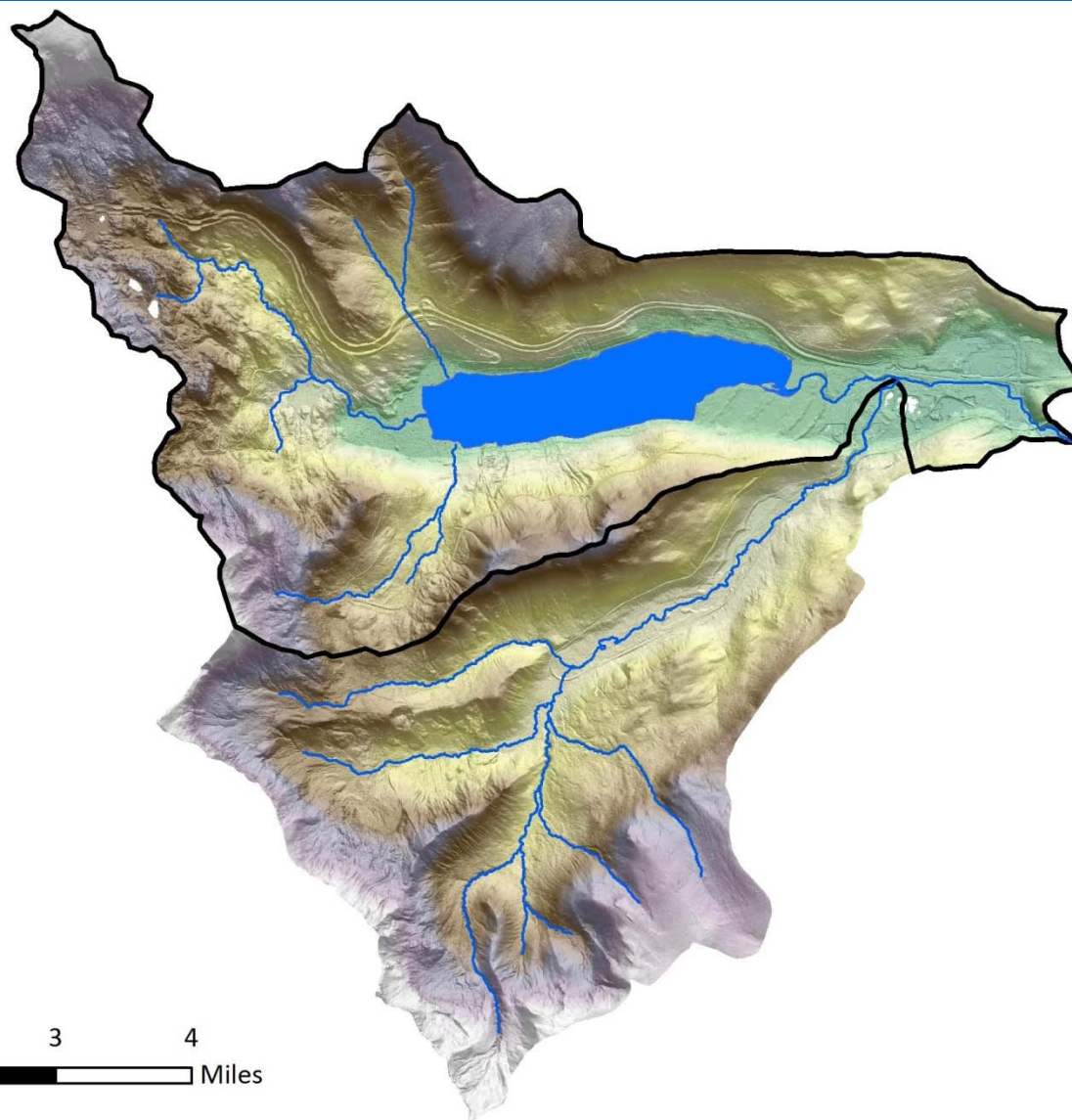
- Hydrology characterized by rain-on-snow events, spring snowmelt, and dry summers and falls
- Watershed naturally prone to high sediment yields due to glacial history and easily erodible soils
- Donner Lake a natural water body with a productive fishery
- Donner Creek mostly a meandering, wet-meadow floodplain system
- Lower Summit Creek a distributary floodplain system



Glacially Influenced Topography



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0 1 2 3 4
Miles

Legend

 Study Area

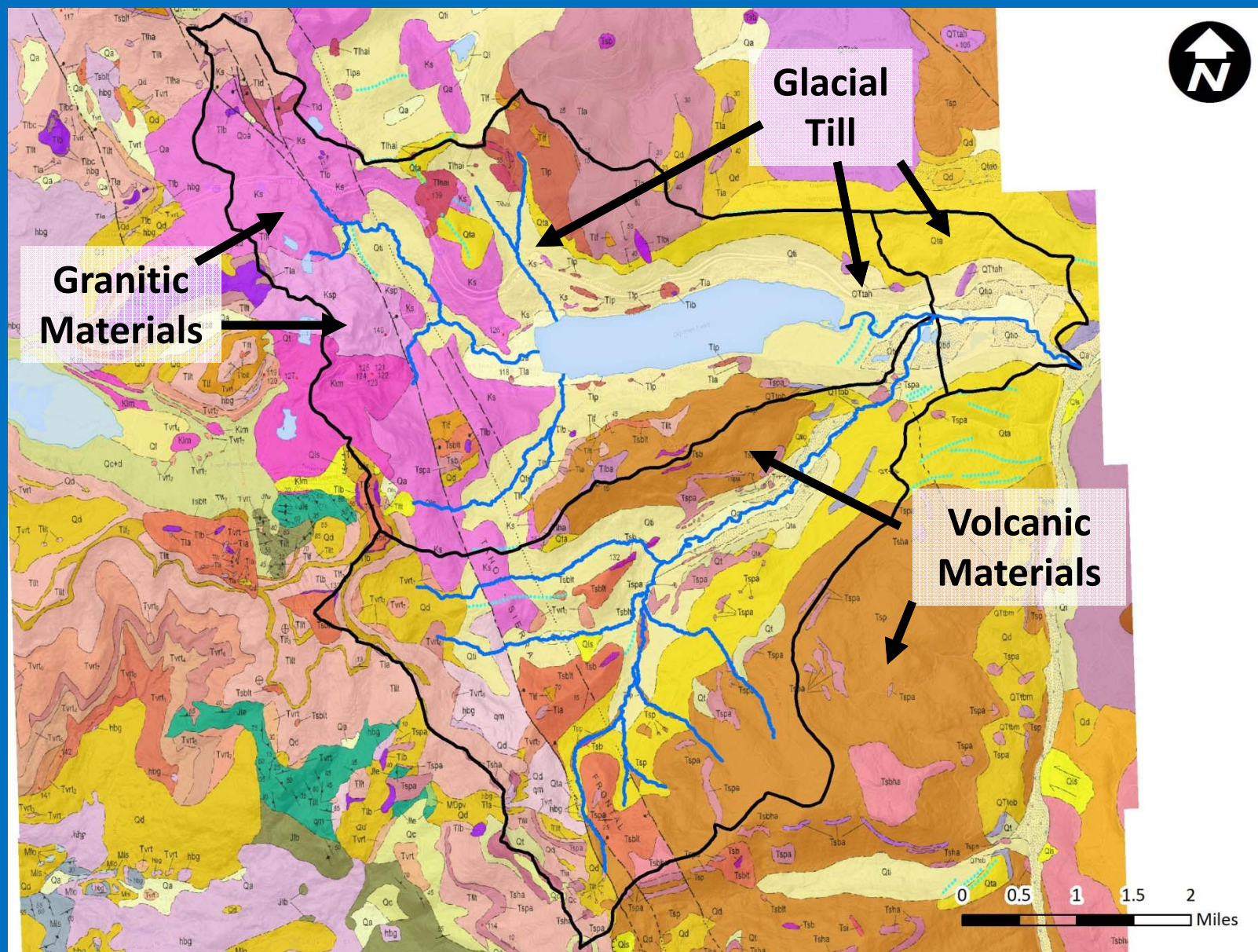
Elevation (ft)

 High : 8946
Low : 5832

Geology Reflects Glacial History

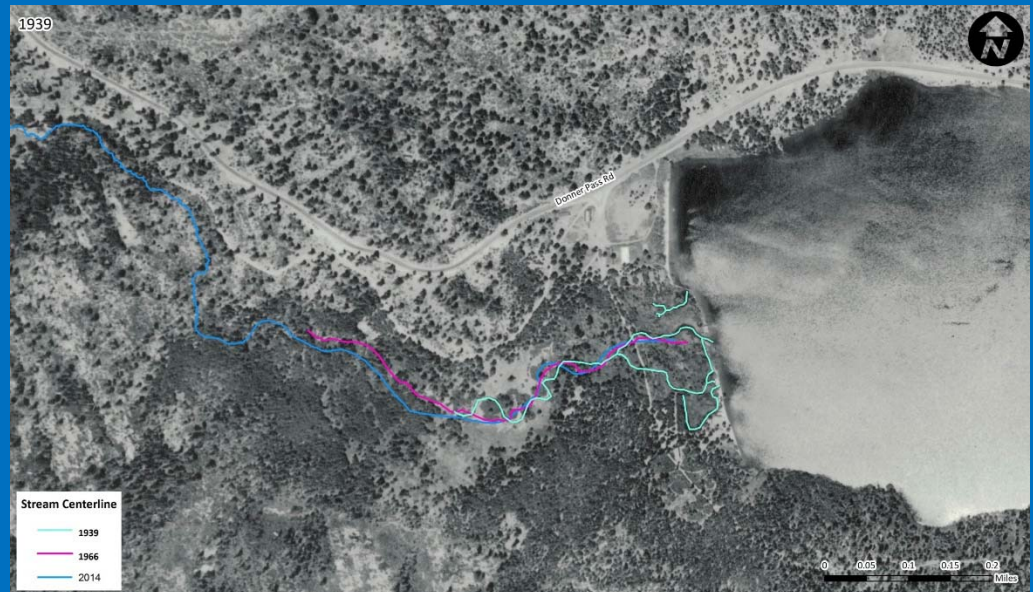


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Disturbances

- Logging, transportation, and land development impacted basin hydrology, sediment yields and water quality
- Donner Lake converted into a water supply reservoir, impacting habitat, shoreline and downstream flow regime
- Donner Creek and near-lake reaches of western tributaries realigned, channelized and disconnected from floodplains
- Significant habitat loss in residential and urban areas
- Aquatic invasive species



Overview of Historic Basin Impacts



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9000 years ago to 1840s

- Prehistory/Washoe peoples history

1840s – 1880s

- Initial emigrant travel
- Timber around lake harvested
- Railroad constructed over Donner Pass
- Initial dam construction
- Fisheries impacted



1913 - 1928

- Highway construction
- Modern dam completed
- Dredging below lake outlet

1940 – 1971

- Timber stand re-entry and modern logging
- I-80 completed

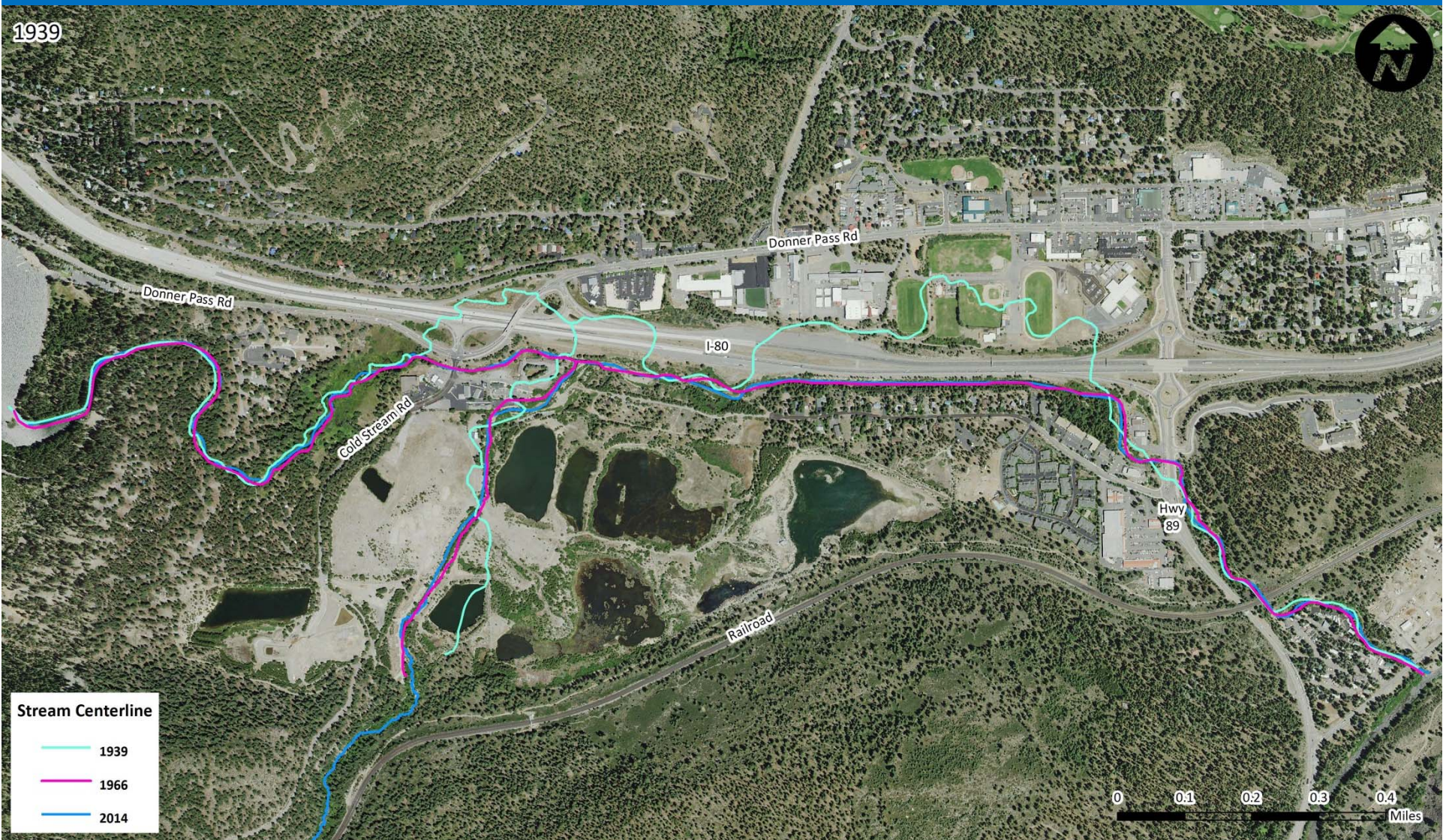


Sierra College

Loss of Historic Meandering Channel Pattern



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Conditions Today

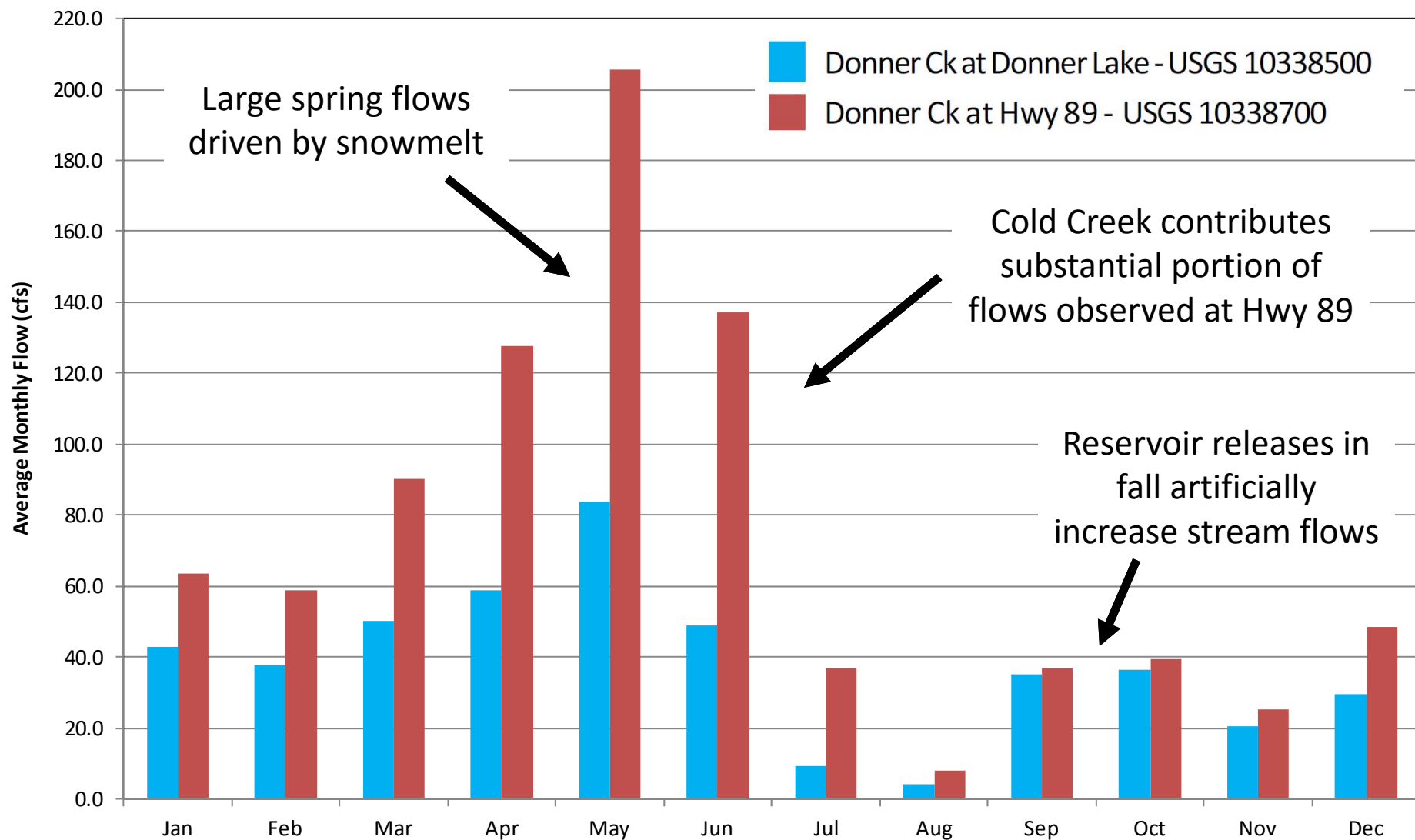
- Uplands exhibit altered runoff patterns and increased fine sediment loading
- Donner Lake reservoir management affects shorelines and alters Donner Creek flow regime
- Physical processes and riparian habitat along Donner Creek and near-lake reaches of western tributaries mostly limited to narrow, urbanized stream corridors
- Water quality impaired by arsenic, chlordane, PCBs, mercury and fine sediment



Stream Flows Reflect Snowmelt and Management



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Data presented is common period of record (WY 1994 to 2014)

Cold Creek Turbidity After Thunderstorm



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Donner
Creek

Cold
Creek

Backcountry Roads – A Fine Sediment Source



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I-80 Stormwater and Erosion Concerns



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Issue: I-80 artificially concentrates stormwater and causes downhill gullyng, erosion and fine sediment loading



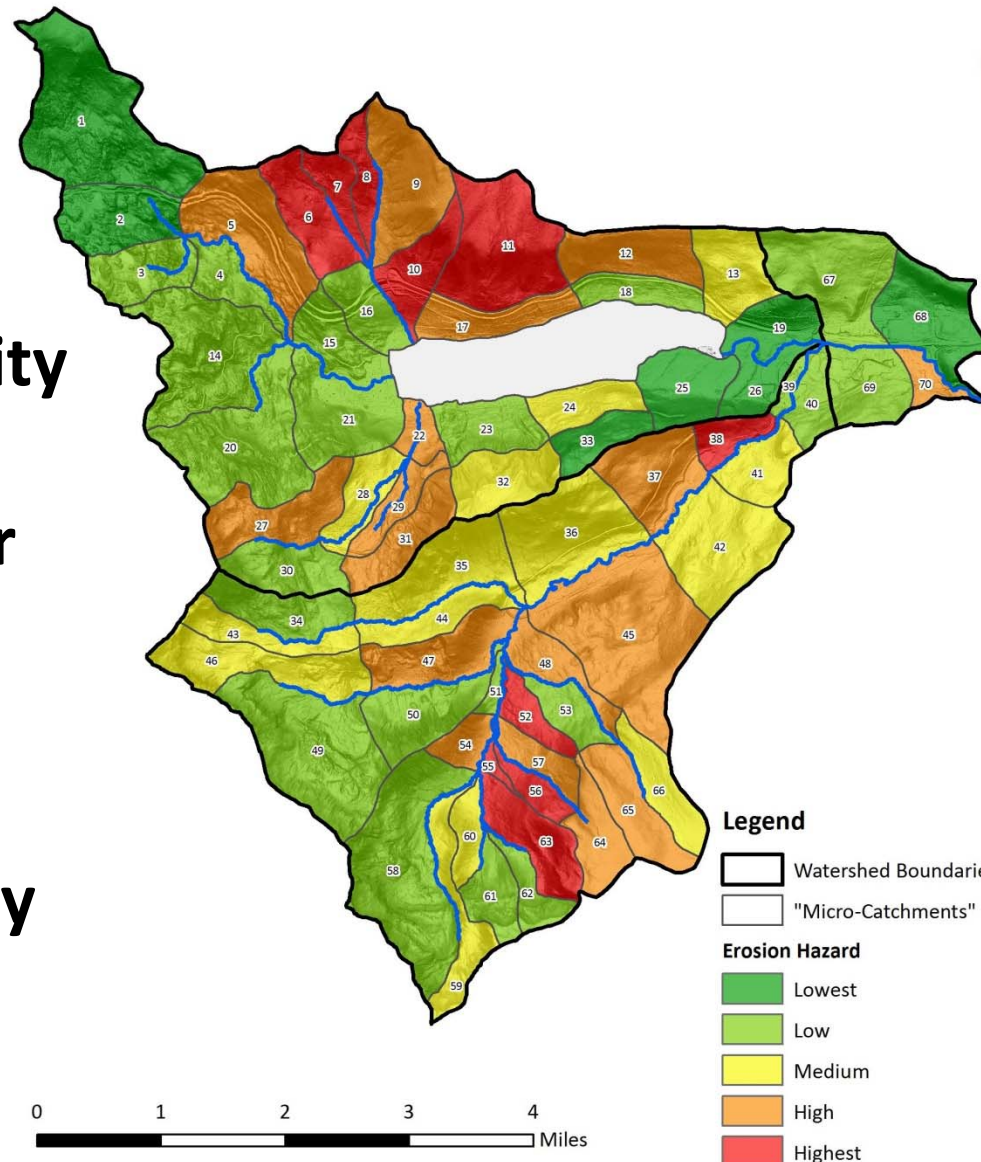
Elevation dataset from 2014 USFS LiDAR

Erosion Hazard Greatest in Johnson and Coldstream Canyons



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**Erosion
Hazard
=
Soil Erodibility
+
Land Cover
+
Slope
+
Backcountry
Road
Density**



Engineering and Land Use Pressure



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Bank Armoring



Weir



Culvert

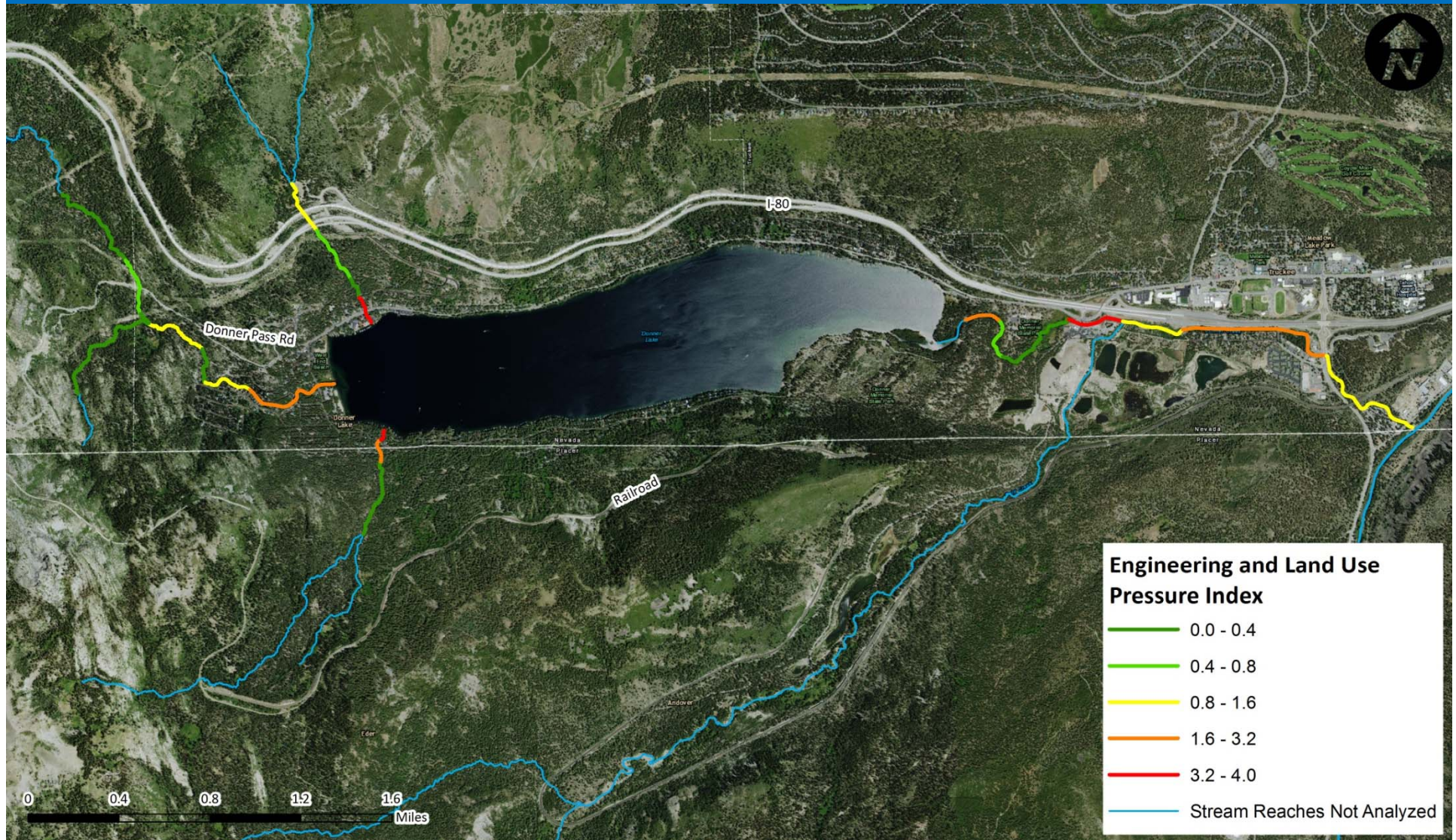


Dam

Engineering and Land Use Pressure



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Fine Sediment Sources to Lower Donner Creek



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Bank Erosion Along Hwy 89

Fine Sediment Sources to Lower Donner Creek



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Bank Erosion Downstream of RR Culvert

Water Quality Findings



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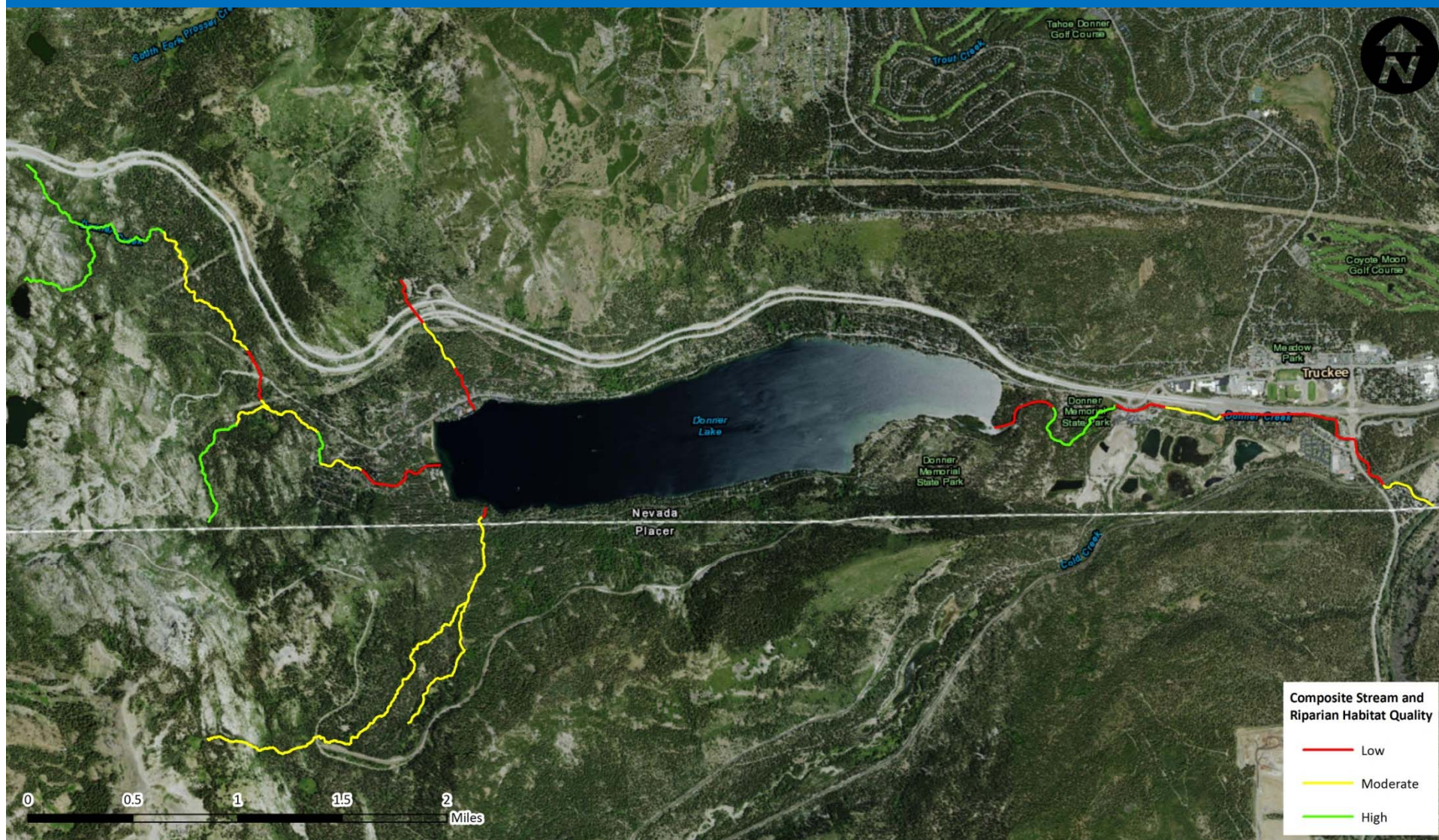
1. Excess sediment not the only pollutant: other concerns include arsenic, chlordane, mercury and PCBs
2. Sediment particles can transport other contaminants
3. Large range of sources which include legacy contamination and atmospheric transport
4. Chemical properties influence pollutant transport, persistence and fate
5. PCBs, arsenic, chlordane and mercury can pose human health risk via consumption of Donner Lake fish



Stream and Riparian Habitat Quality Mapping



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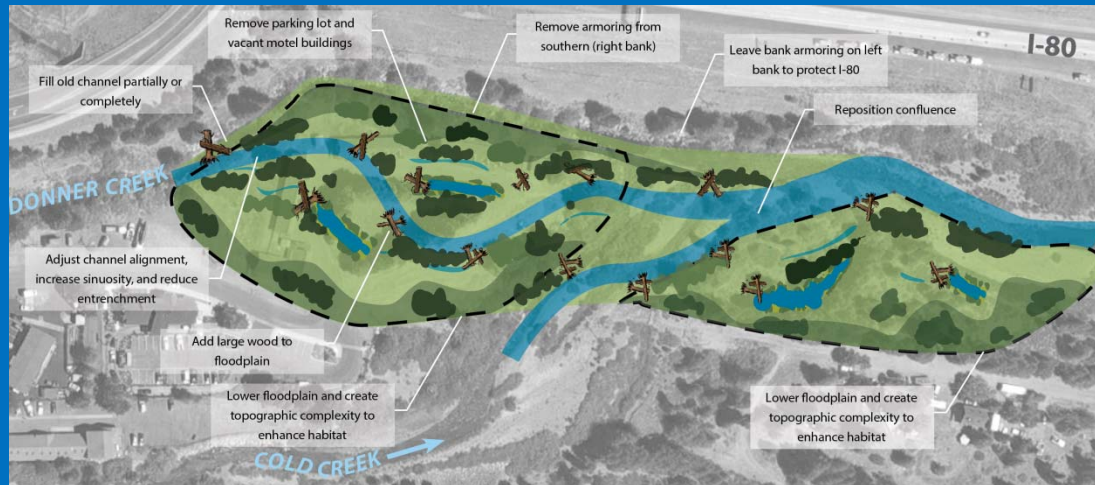


Opportunities Assessment



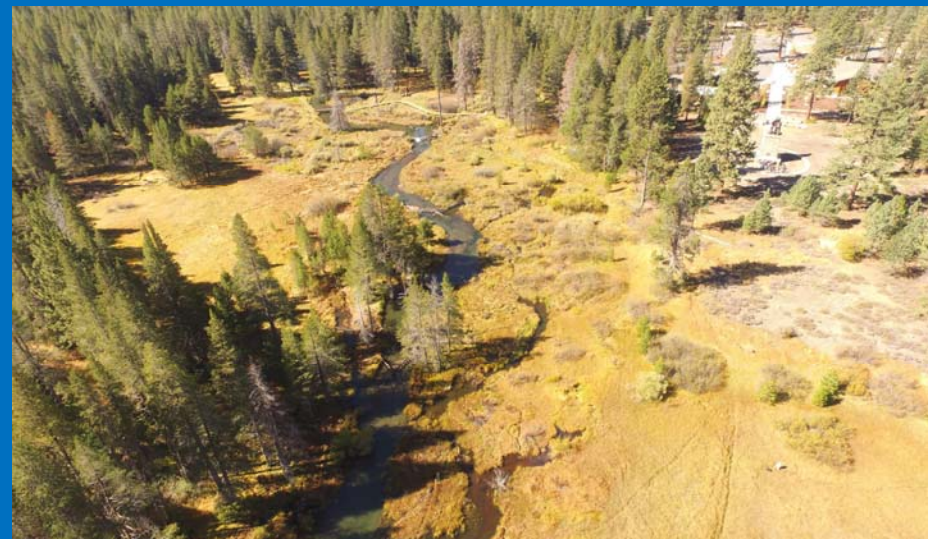
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Restoration Projects



Management Actions

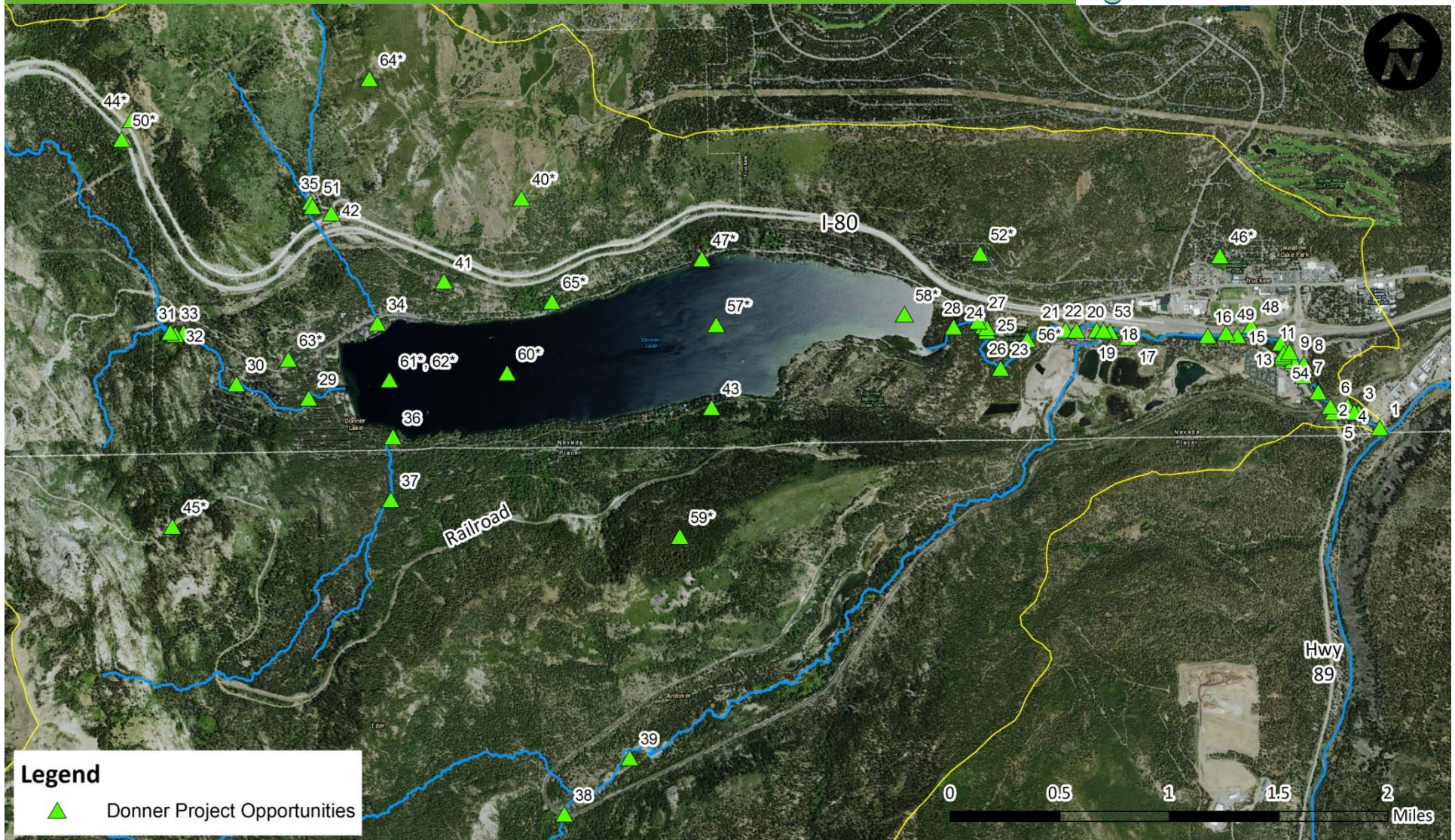
Protection Sites



Opportunity Locations



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Legend

▲ Donner Project Opportunities

An asterisk after the site number (e.g., 52*) indicates projects involving multiple or basin-wide locations

Opportunity Categories



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- In-Channel and Stream Corridor Projects (39)
- Upland Erosion Treatment Projects (8)*
- Stormwater Treatment Projects (5)*
- Trash Clean Up (3)
- Management Actions (11)
- Future Studies (5)



* In some cases, a grouping of projects (e.g., unpaved road erosion treatment and stabilization) is listed as one project.

Opportunities Criteria



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- Potential projects prioritized by anticipated benefits to watershed health:
 - Geomorphic / Physical Processes
 - Hydrology
 - Water Quality
 - Fine Sediment
 - Habitat

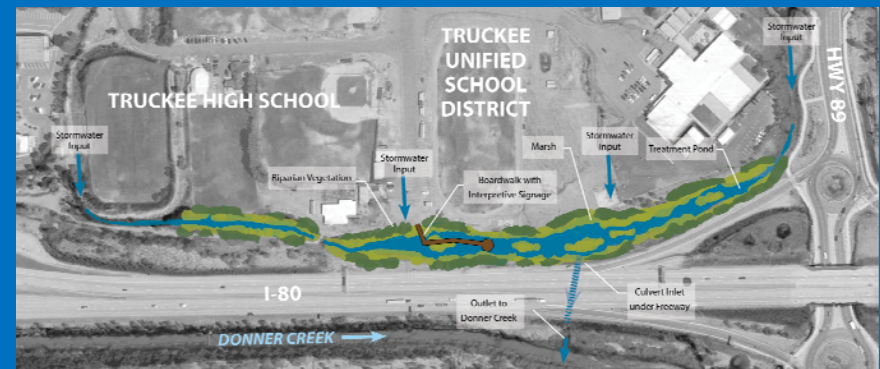
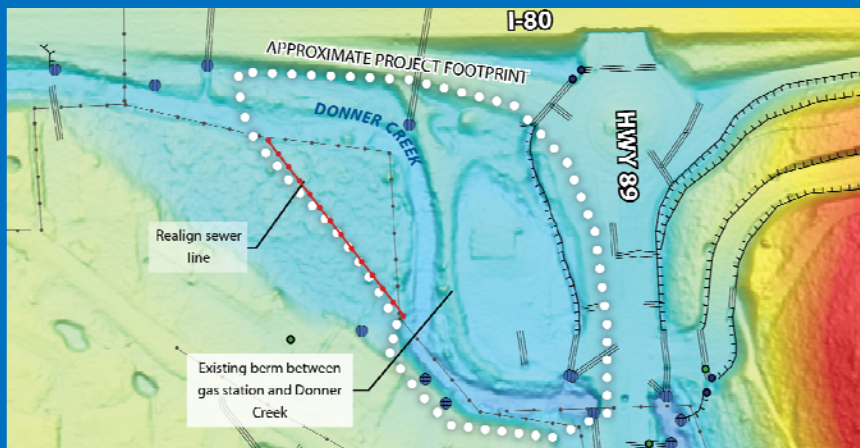
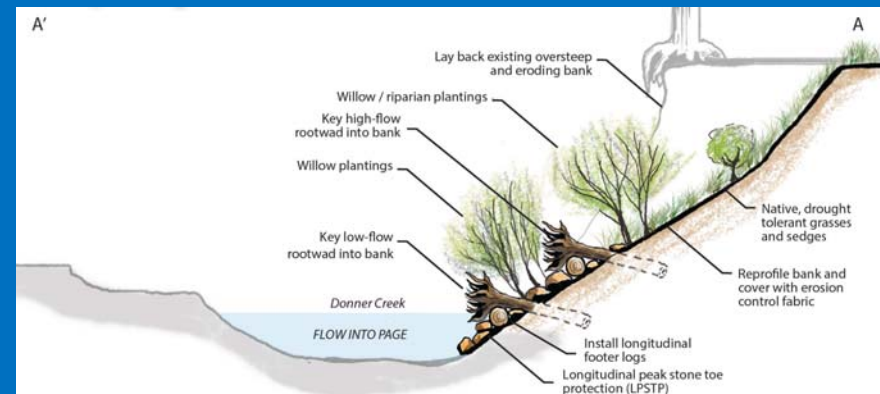


What to Expect Moving Forward



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- Projects presented here are CONCEPTUAL only
- Additional analysis and coordination with stakeholders required to assess project feasibility and further develop designs



Donner Lake Challenges



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- Water quality degradation
- Aquatic invasive species (AIS)
- Introduced species
- Shoreline erosion
- Reservoir management impacts
- Heavy recreation use



Donner Lake Opportunities



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- Create a comprehensive multi-agency recreation management plan
- Stabilize eroding footpaths between road and public docks
- Aquatic Invasive Species
 - Continue watercraft inspections for AIS at boat launches
 - Implement community education programs for water quality and AIS
 - Synthesize existing AIS and water quality data from UNR
- Monitor sediment loading from western tributaries
- Conduct additional water quality monitoring
- Adjust reservoir operations for physical and ecological benefits
- Phase out 2-stroke engines



Bank Stabilization Downstream of RR Culvert



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Issue: severe bank erosion due to culvert directing high velocity flows at right bank, resulting in significant fine sediment loading

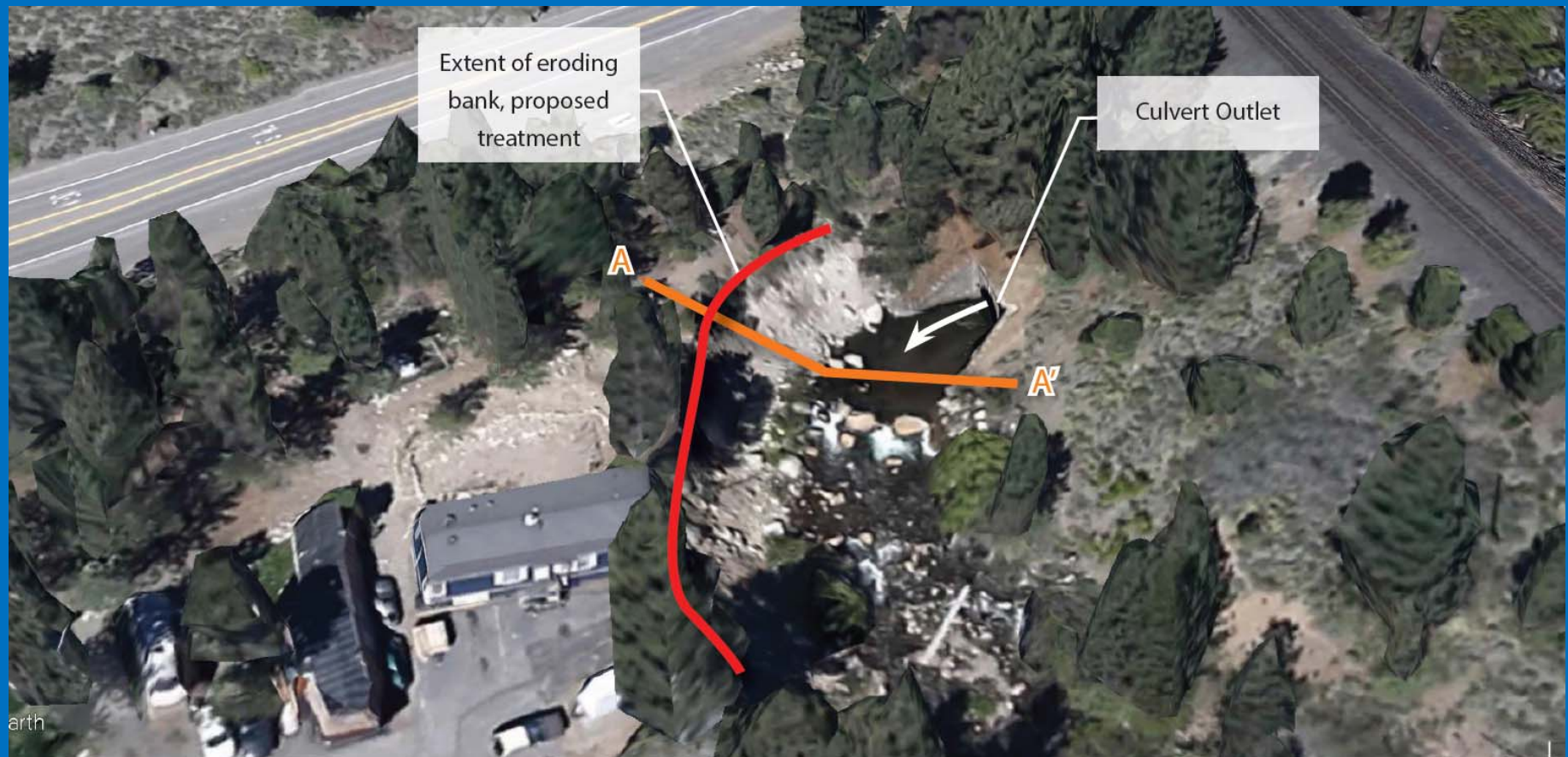


Bank Stabilization Downstream of RR Culvert



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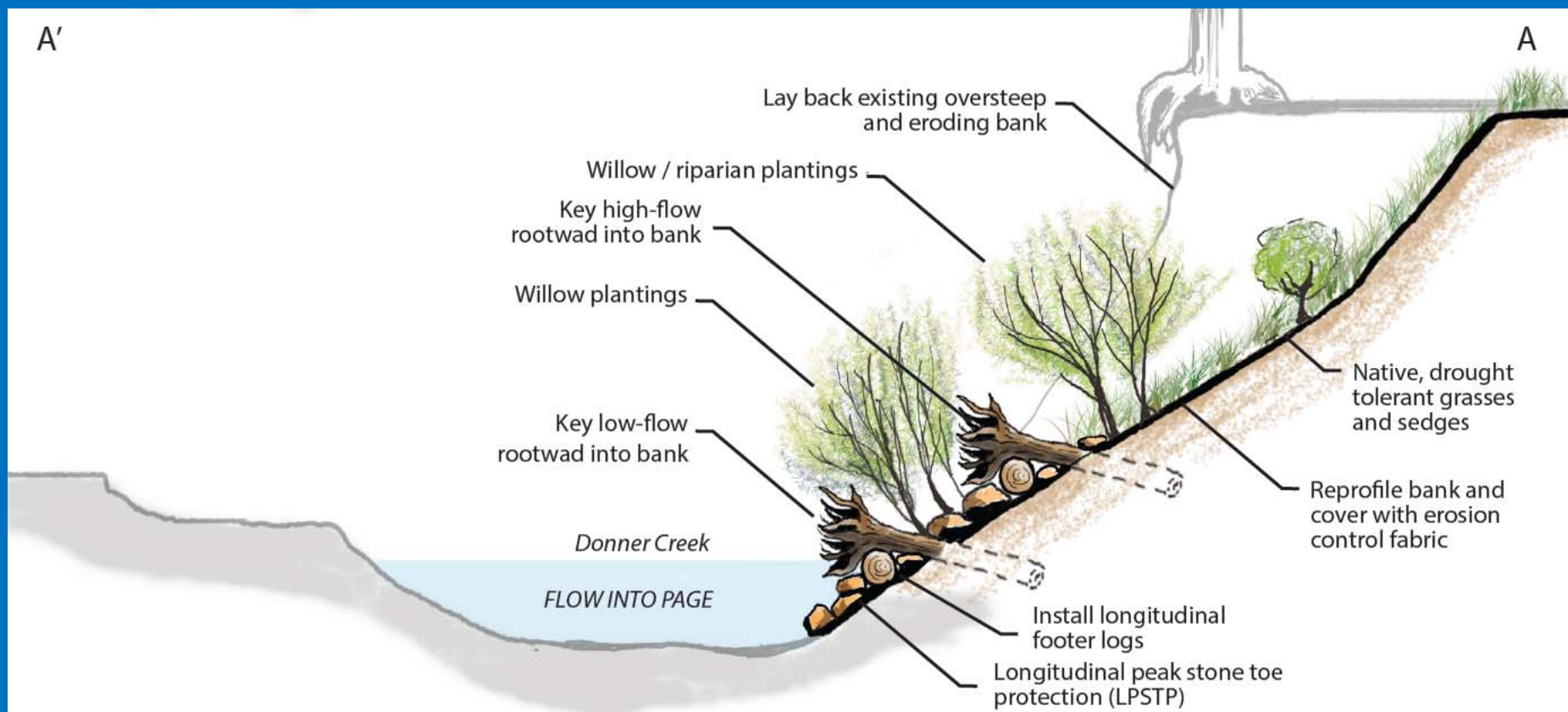
Bank Stabilization Downstream of RR Culvert



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Opportunity: stabilize site by re-profiling bank, installing eco-friendly bank protection, and planting native vegetation

Benefits: reduced fine sediment loading, improved riparian habitat



Bank Stabilization and Channel Enhancement Along Hwy 89



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Issue: severe bank erosion, fine sediment loading; poor habitat quality



Bank Stabilization and Channel Enhancement Along Hwy 89



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Issue: severe bank erosion, fine sediment loading; poor habitat quality

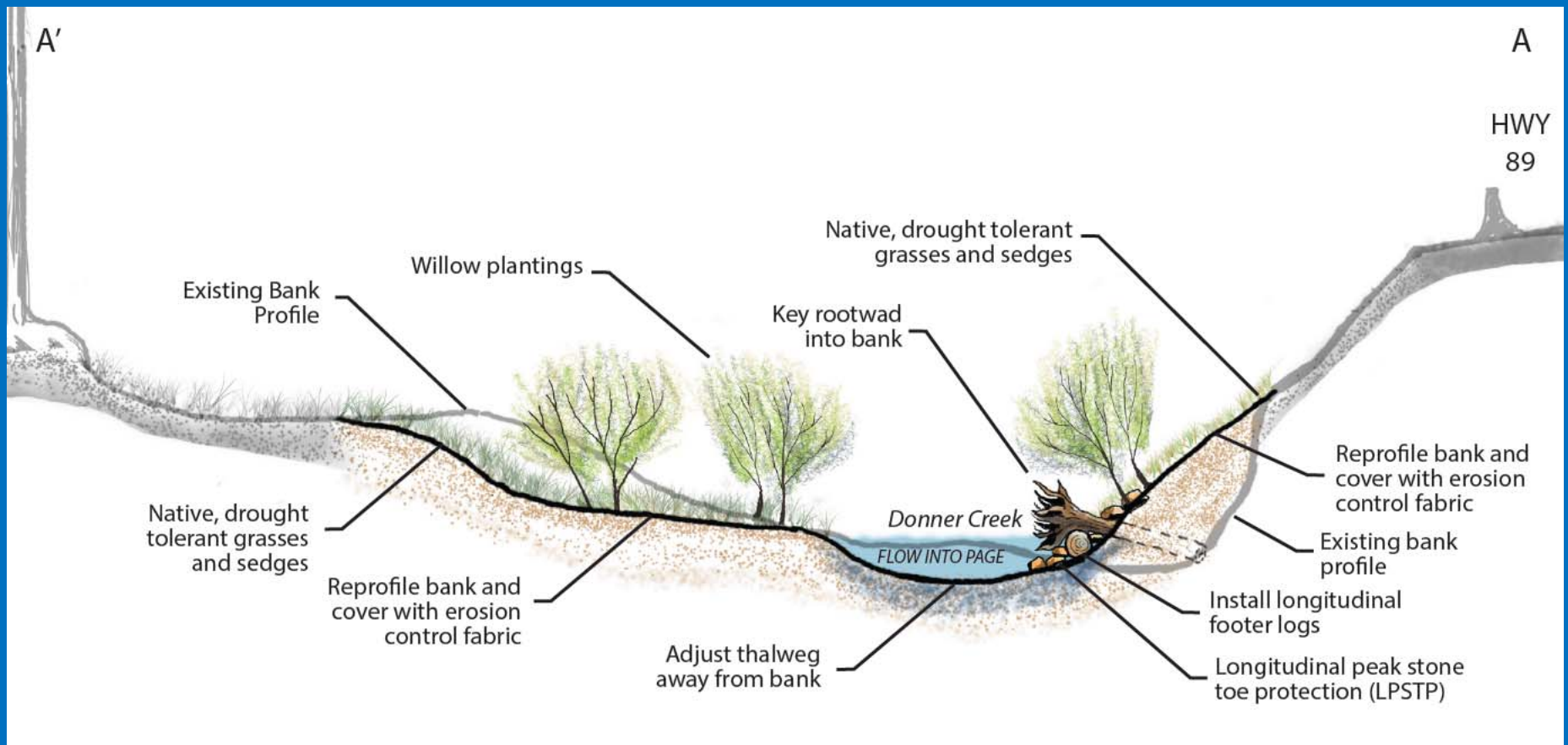


Bank Stabilization and Channel Enhancement Along Hwy 89



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Opportunity: re-profile and re-vegetate right bank, set back left bank
Benefits: reduced fine sediment loading, improved riparian habitat



Stormwater Treatment Wetland Complex and Educational Site



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Issue: stormwater runoff from west-bound I-80 and commercial development discharge untreated to Donner Creek



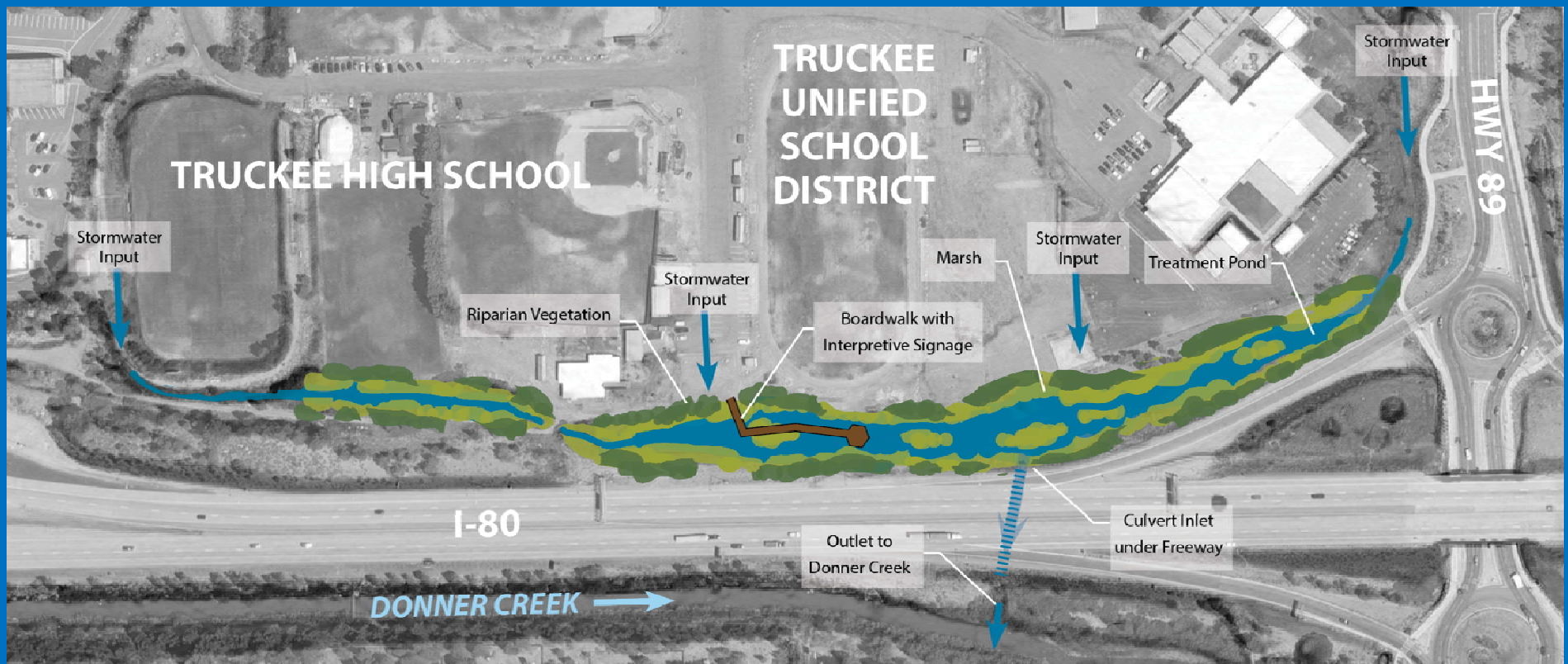
Stormwater Treatment Wetland Complex and Educational Site



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Opportunity: create stormwater treatment wetland complex and educational site between high school and I-80

Benefits: reduced pollutant loading from urban runoff



Artificial Weir Removal on Summit Creek

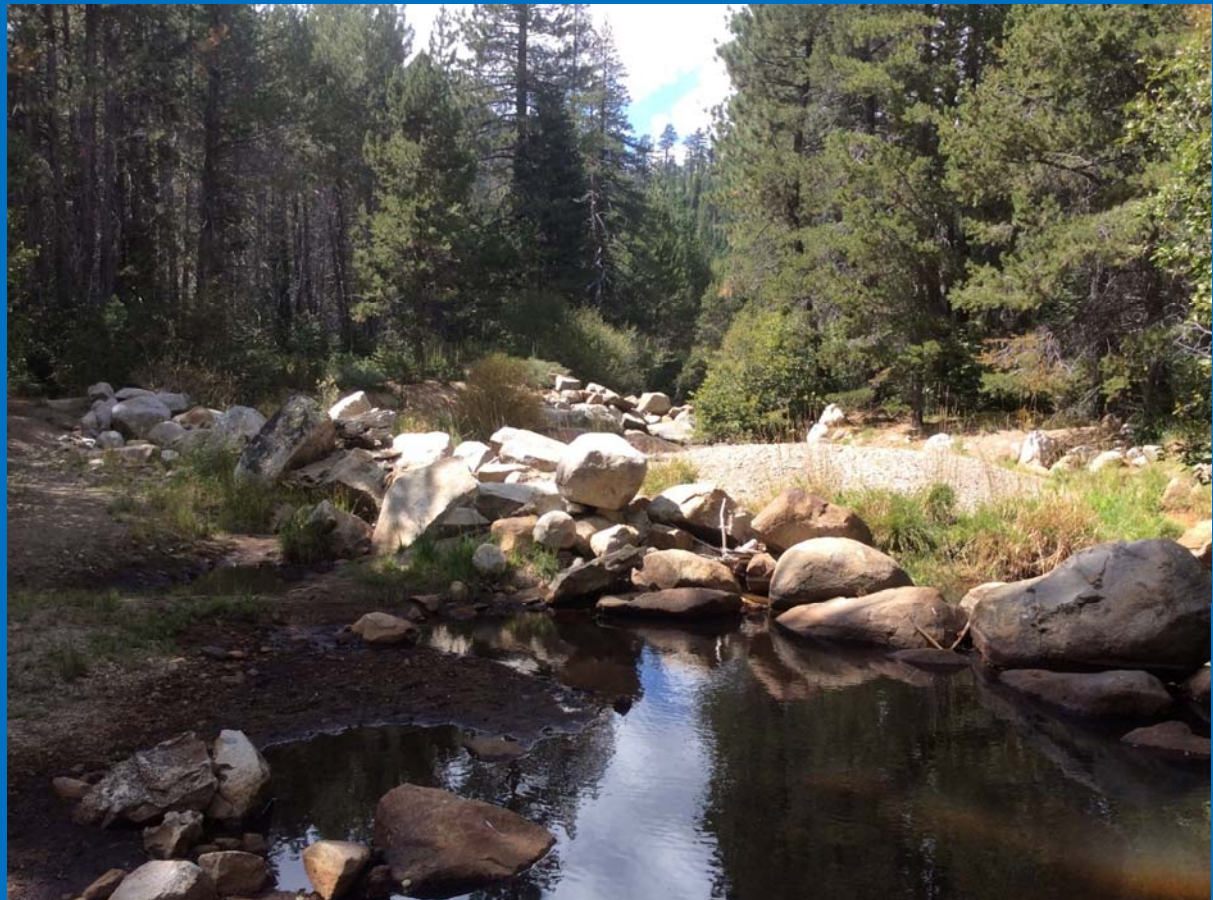


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Issue: three artificial weirs of boulder and concrete degrade channel

Opportunity: remove weirs and redistribute boulders

Benefits: improved longitudinal connectivity of physical processes and aquatic habitat



Next Steps

- Assessment report available on TRWC website
- Continue to work with stakeholders
- Look for funding



Photo: Sam Okamoto



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Acknowledgements

- Funding
 - Donors to the Truckee River Watershed Council
 - The Laird Norton Family Foundation
 - Community Foundation of Western Nevada, Truckee River Fund
- Data and assistance
 - US Forest Service - Tahoe National Forest
 - Truckee Donner Public Utility District
 - California Department of Parks and Recreation
 - Town of Truckee
 - Tahoe Donner Association
 - Truckee Donner Land Trust
 - CDM Smith
 - CALTRANS
 - Truckee Meadows Water Authority
 - Truckee Sanitary District
 - Tahoe Institute for Natural Science
 - University of Nevada, Reno



Thank you to our stakeholders

- California Department of Parks and Recreation
- California Department of Transportation
- Donner Creek Mobile Home Park
- Donner Gate Chevron
- Donner Lake Marina and Watersports
- Donner Lake Property Owner's Association
- Donner Lake Woods Homeowner's Association
- Donner Lake Village Resort
- Donner Park 76
- Nevada County Planning Department
- Nevada County Supervisor
- Savemart
- Sierra College
- Tahoe Donner Association
- Teichert/Stonebridge Properties
- Town of Truckee
- Truckee Donner Land Trust
- Truckee Donner Lodge
- Truckee Donner Public Utility District
- Truckee Donner Recreation and Parks District
- Truckee Meadows Water Authority
- Truckee Shell
- Truckee Tahoe Unified School District
- Truckee Sanitary District
- Union Pacific Railroad
- US Forest Service
- Washoe Tribe



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Questions?

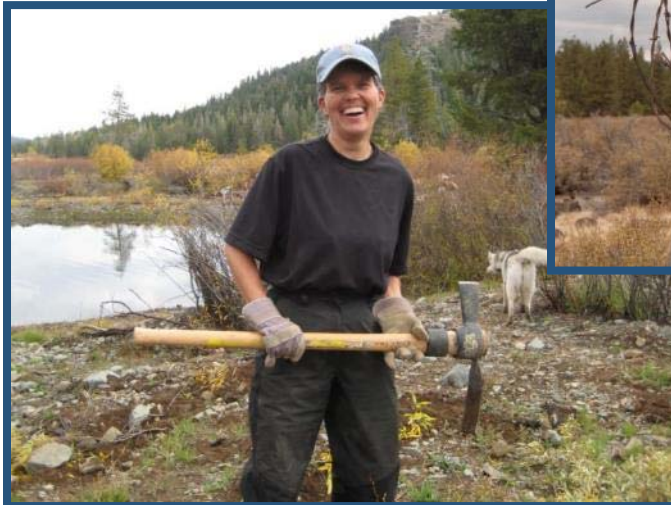


For more information contact Michele Prestowitz
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THANK

YOU!!



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Creating a better future for the Truckee River watershed