Truckee River Watershed Council

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

Photo by Mathew Grimm, used by permission of Environmental Defense Fund.

Martis Watershed Assessment

January 24, 2012

With input from:

Valley and Mountain Consulting

Dr. Susan Lindstrom

Digital Mapping Solutions

Truckee River Watershed Council

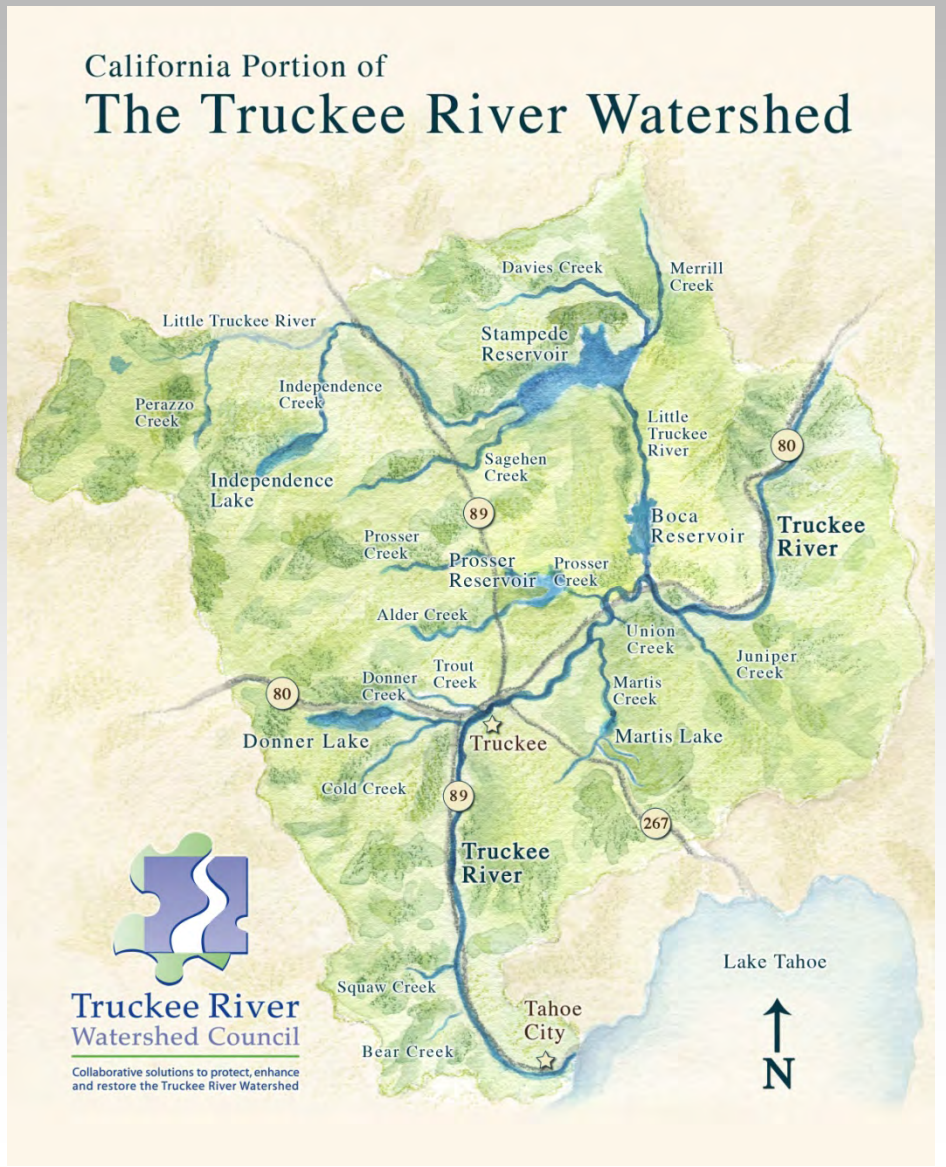
Collaborative solutions to protect, enhance and restore the Truckee River Watershed

Our Values

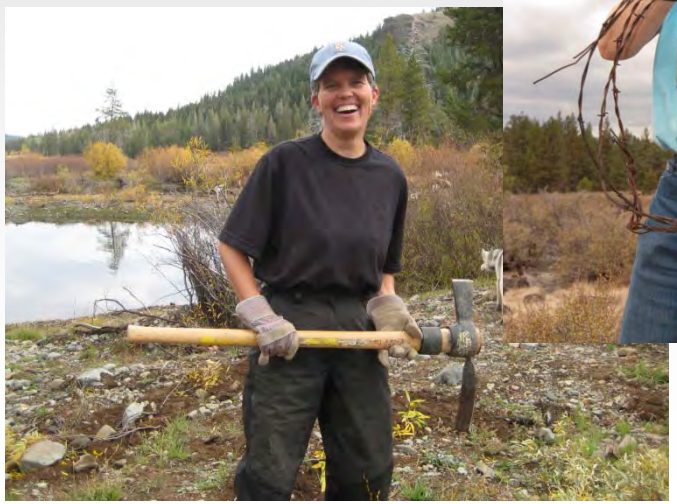
- Partnerships
- Ecologically Sound
- Economics

Pristine? No…

- 7 dams
- 6 listed waters
- 1 railroad
- 1 Interstate
- Logging
- Gravel mining
- Grazing



Truckee River Day – 16 years!



RIVER-FRIENDLY LANDSCAPING

CALL US TODAY FOR A FREE SITE EVALUATION

530-550-8760 ext. 3

Soil loss from your property is a form of pollution. The River-Friendly Landscaping program wants to help you implement pollution controls at your Truckee or Placer County property.

Receive up to $1,000 rebate if you implement by July 1, 2012

For more information visit truckeeriverwc.org or email aotto@truckeeriverwc.org.

Sierra Nevada Alliance

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

California Water Boards

The River-Friendly Landscaping program is a joint project by the Truckee River Watershed Council and Sierra Nevada Alliance. Funding for this project has been provided in full or in part through an agreement with the State Water Resources Control Board and the U.S. Environmental Protection Agency under the Federal Nonpoint Source Pollution Control Program (Clean Water Act Section 319). The contents of this document do not necessarily reflect the views and policies of the State Water Resources Control Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use. (Gov. Code, 7750, 40 C.F.R. 31.20)

www.truckeeriverwc.org

Thank You Funders!

- Bella Vista Foundation
- The Martis Fund
- Donors of the Truckee River Watershed Council

Thank you Stakeholders

- California Department of Transportation
- DMB Highlands
- Lahontan HOA and Golf Club
- Northstar Community Services District
- Placer County Stormwater
- Sierra Pacific Industries
- Tahoe Truckee Sanitation Agency
- Teichert Aggregates
- The Martis Fund
- Timilick
- Town of Truckee
- Truckee Donner Land Trust
- Truckee Donner PUD
- Truckee Donner Recreation and Parks District
- Truckee River Watershed Council
- Truckee Tahoe Airport District
- U.S. Army Corps of Engineers
- U.S. Forest Service – Tahoe National Forest
- Vail Resorts/Northstar-at-Tahoe
- Washoe Tribe

Martis Watershed Assessment

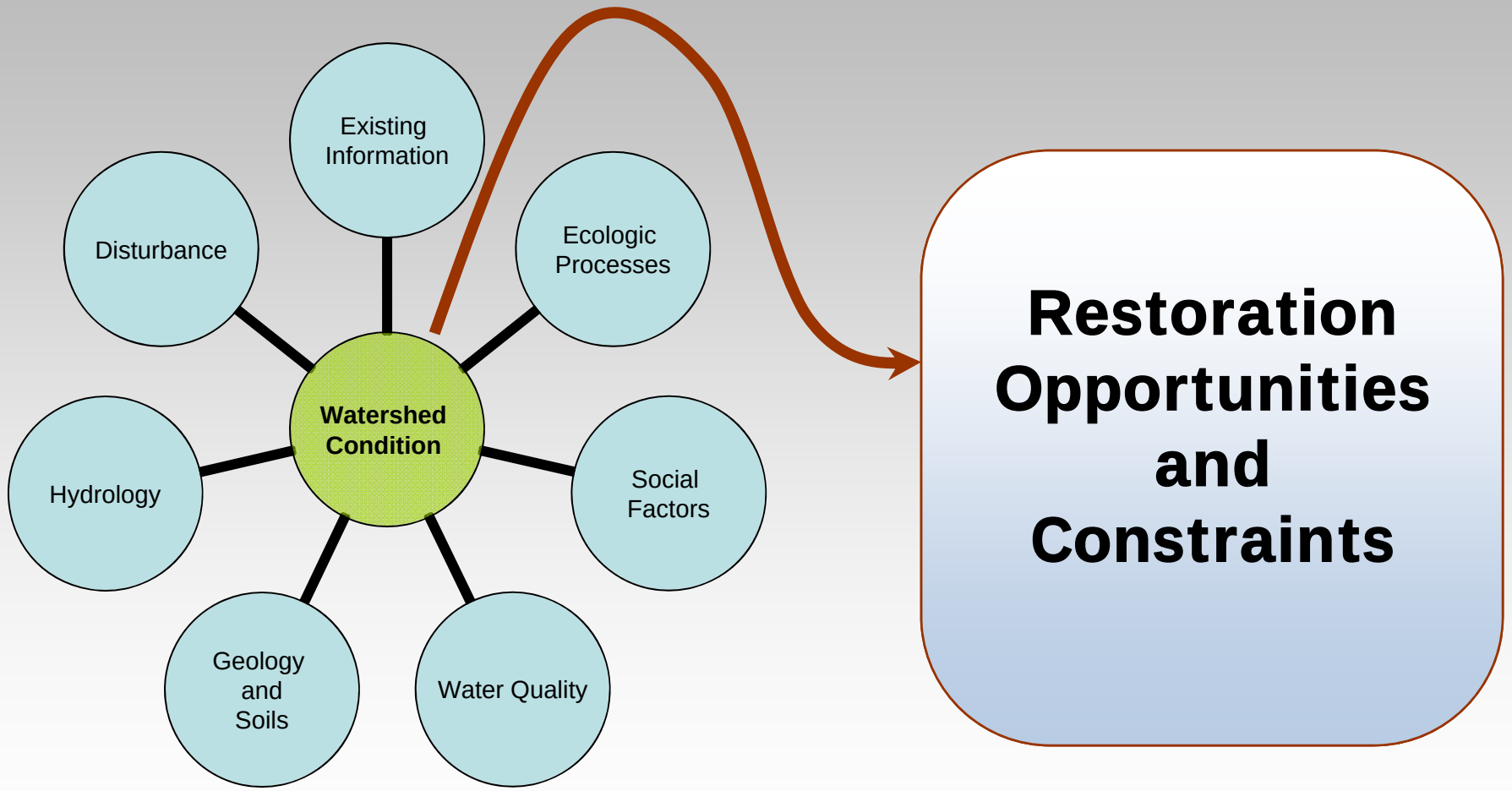
Key Basis:

Channel types and supported habitat vary according to slope, soils, hydrology, and land management practices, which depend on underlying geology and climate.

Habitat and water quality in one location may be affected by management actions and disturbance in another part of the watershed. This necessitates an ***integrated watershed approach*** to restoration planning.

Approach

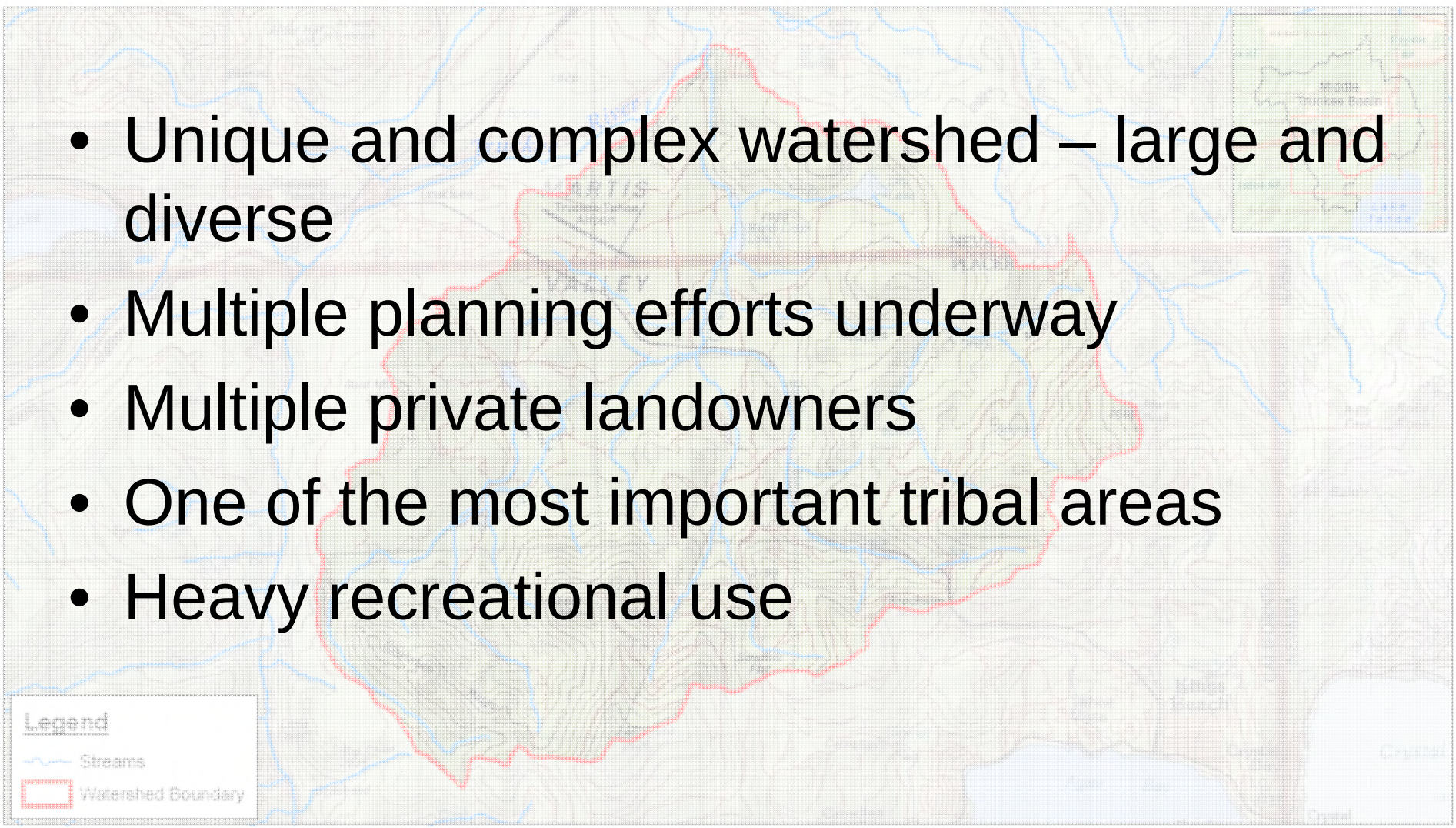
Based on EPA and California Assessment Framework, but customized….



Watershed Attributes ⇨ Watershed Condition ⇨Restoration Opportunities

Considerations and Challenges

- Unique and complex watershed – large and diverse
- Multiple planning efforts underway
- Multiple private landowners
- One of the most important tribal areas
- Heavy recreational use



Past and current efforts

- Martis Valley Aquifer Studies (TDPUD, NCSD, PCWA)
- Martis Dam Geophysical Evaluations (USACE)
- Martis Dam Hydrology Evaluations (USACE)
- Truckee River Water Quality Assessment (Town of Truckee and Placer County)
- Streamflow and Water Quality Data (USGS, DRI, TRWC, T-TSA)
- Martis Watershed Phosphorous Study (T-TSA)
- Waddle Ranch Assessment (IERS, Lahontan)
- Northstar Habitat Management Plan (Northstar-at-Tahoe)

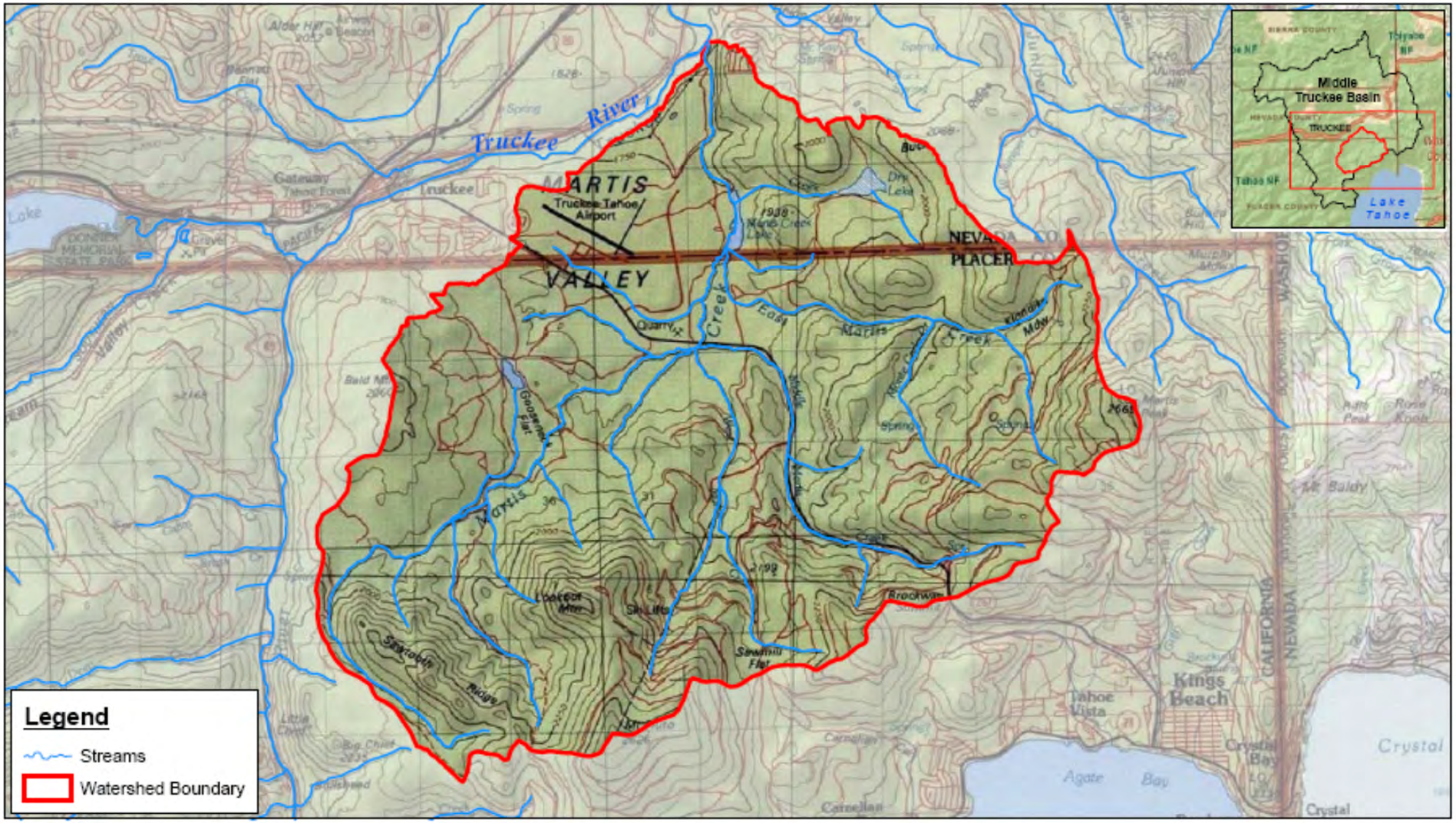
Part 1: Watershed Attributes

Watershed Setting

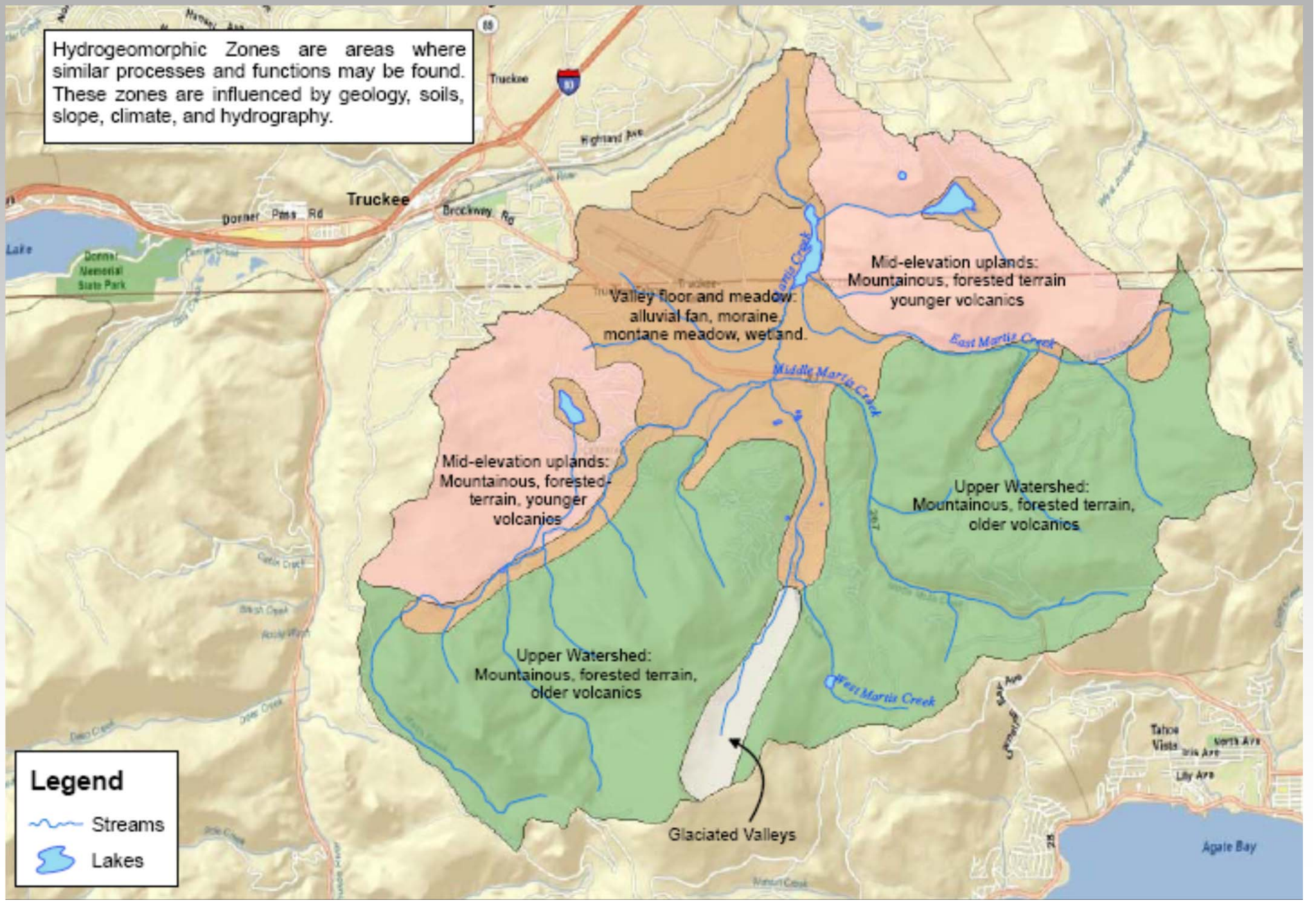
Hydrology and Hydrogeology

Historical and Recent Land Use

Historical Trends


Truckee River
MARTIS
VALLEY
Truckee Tahoe Airport
NEVADA
PLACER
Martis Creek
Martis Creek East
Middle Truckee Basin
TRUCKEE
Lake Tahoe
Legend
Streams
Watershed Boundary
Kings Beach
Tahoe Vista
Crystal Bay
Agate Bay
Crystal
Mt Baldy
CALIFORNIA
NEVADA

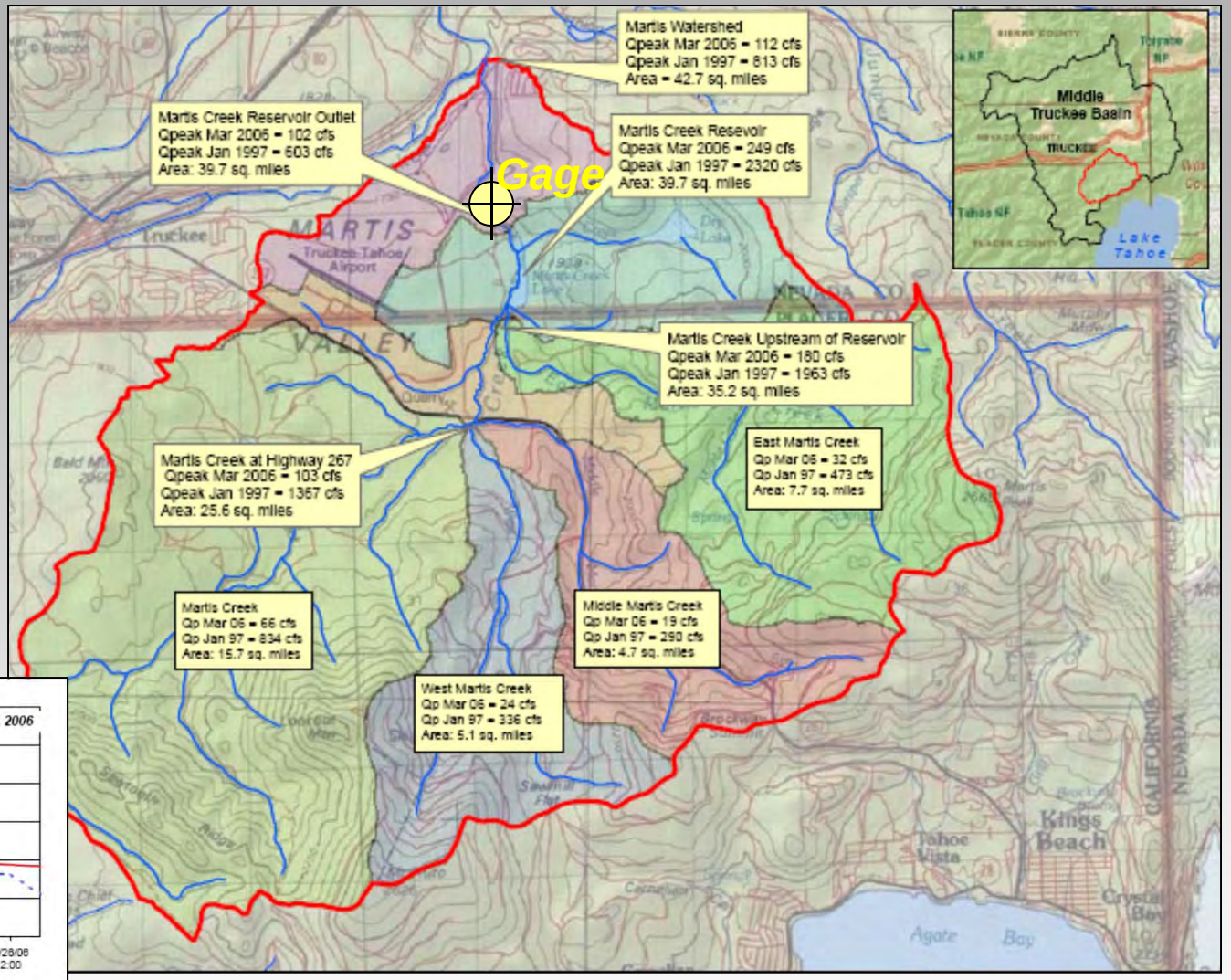
Hydrogeomorphic Zones and Processes



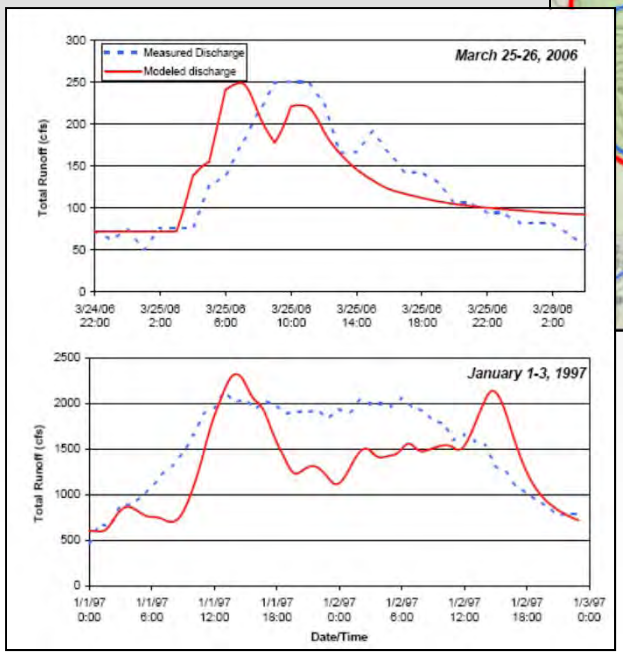
Streamflow

- Adapted USACE model to estimate peak and channel altering flows on a subwatershed basis
- Evaluated potential groundwater recharge benefits of stormwater infiltration and wetland restoration

Calibrated peak flows by subwatershed



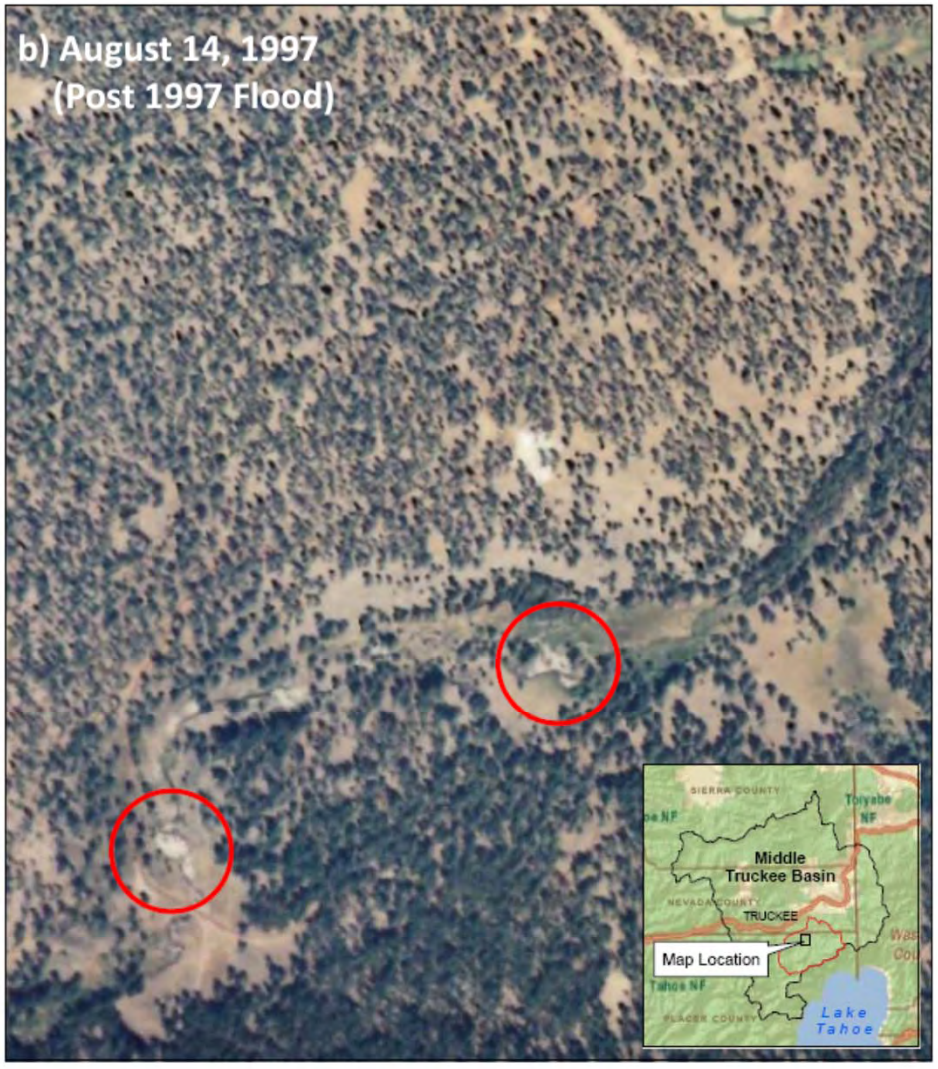
Calibration data



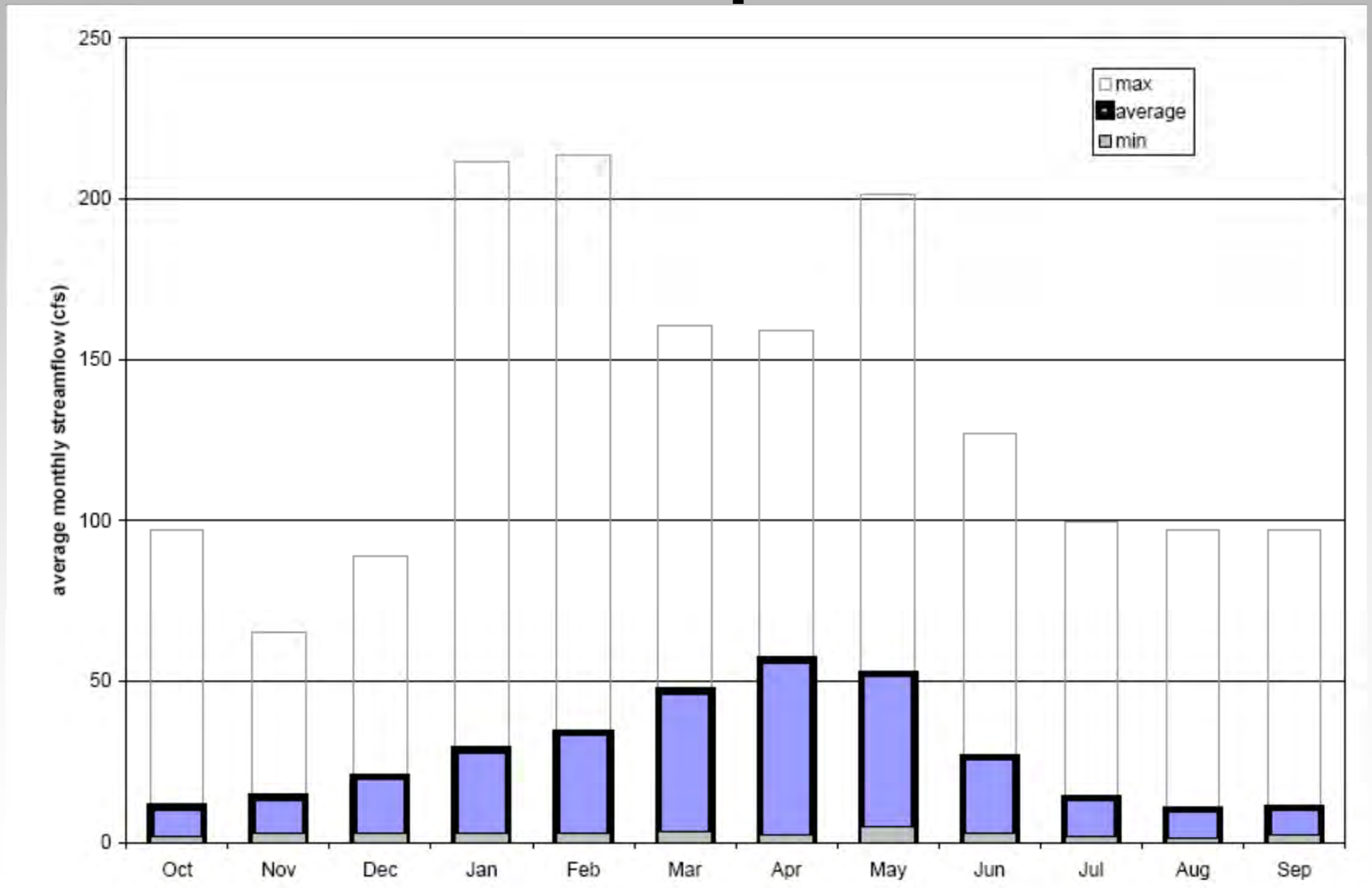
Martis Creek	***unregulated***
Qpeak March 2006	***249 cfs***
Qpeak January 1997	***2,320 cfs***
Q100 (per ACOE)	***5,000 cfs***

Effects of Rain on Snow:

Martis Creek



What is the range of low flows that can be expected?



What is the range of low flows that can be expected?

In Summer 2002:

Martis Creek	30%
West Martis	6%
Middle Martis	3%
East Martis	18%
Valley Floor springs	41%

RECHARGE IS KEY!

(Source: Interflow Hydrology, 2003)

Streamflow Summary

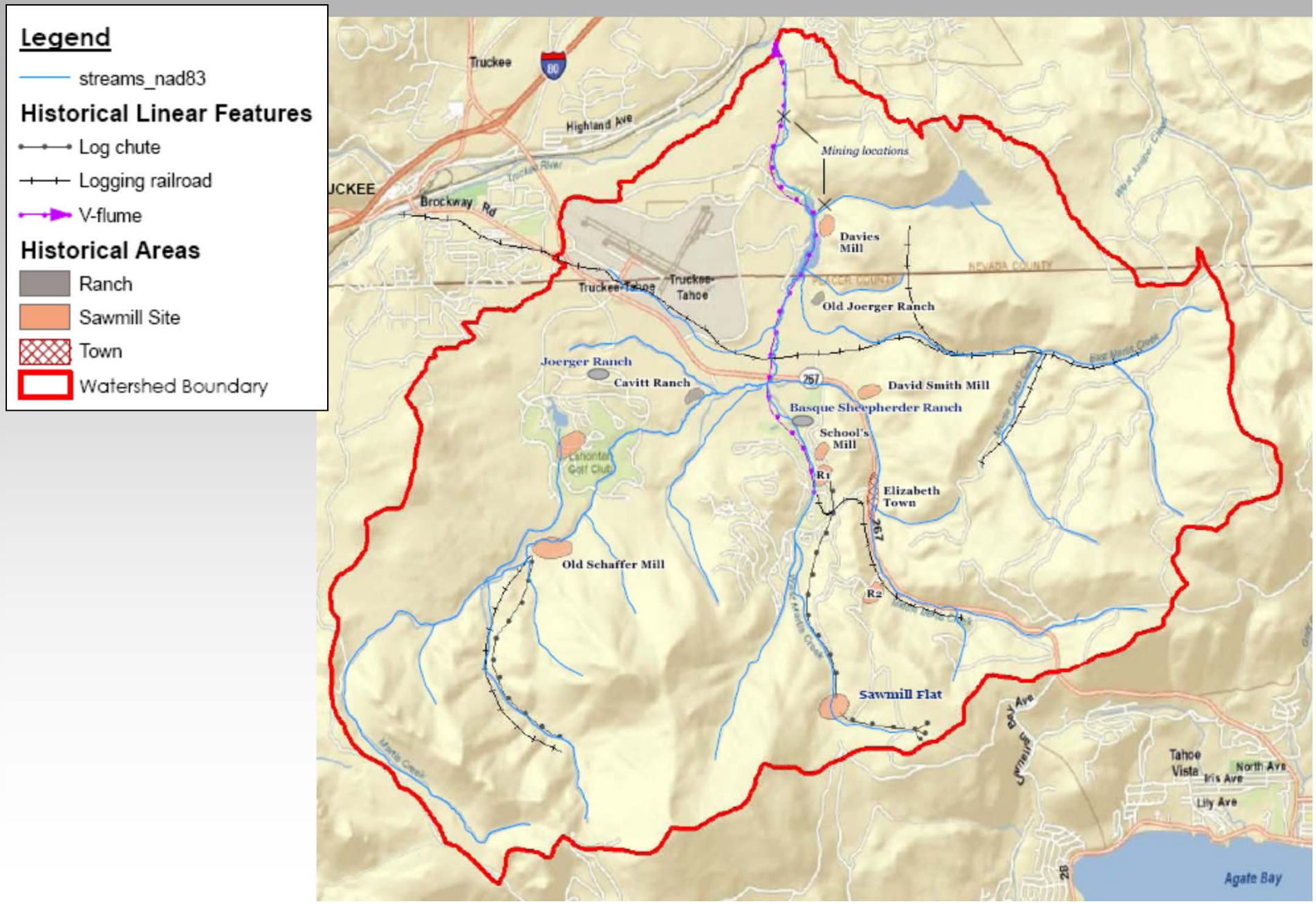
- Significant channel changes occur during rain on snow events
- These channel-altering events are much more common than the ‘100-year flood’
- Channel changes associated with less-frequent, but longer-duration (2- to 5-year) peak flows are not detectable through aerial photography and will be evaluated in the field.
- Infiltration and groundwater recharge in the upper watershed is key to maintaining baseflow in the lower watershed.

Land Use History

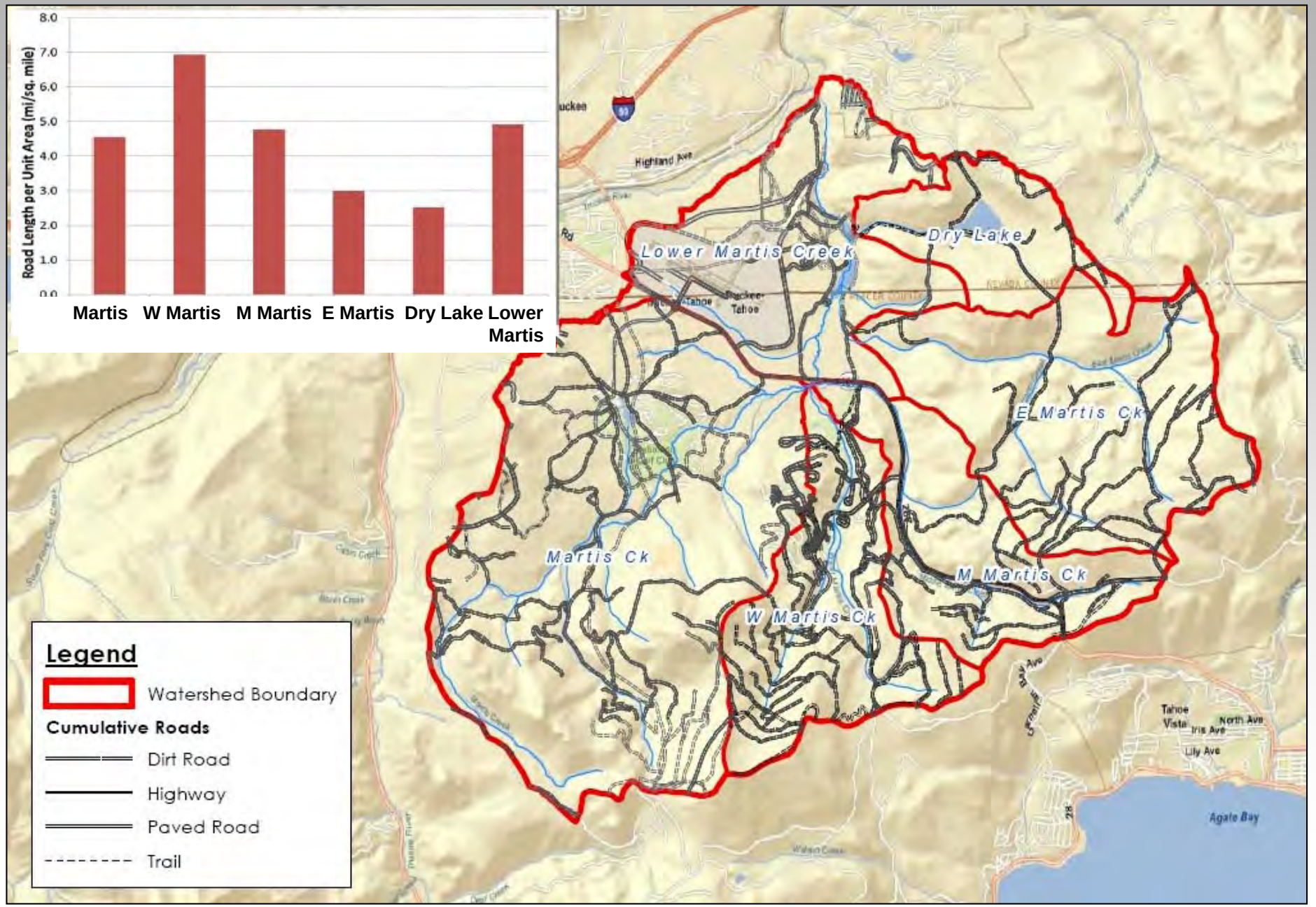
1860 to 1930s

- **Deforestation (early 1900s)**
- **Grazing (1930-1970)**
- **Logging roads and skid trails**
- **Channel re-alignment**
- **Railroads**
- **Flumes and chutes**
- **Mills**
- **Mining**

1860s to 1930s



Roads: 1940 to 2005



Washoe

PREHISTORIC → RECENT and PRESENT → FUTURE

- **9,000-year history of human habitation to draw from.**
- **Native American use of watershed resources may provide a model for sustainable use and engagement with the resource today.**
- **Cultural resources have legal protections and need to be considered for protection as part of any planning process, including habitat restoration activities.**

Cultural Resource Opportunities

Scientific Name	Common Name	Washoe Name	Seasonal consumption or medicine	Collected, processed, and stored for food	Used for construction
Achillea millefolium	yarrow	*Wémši*	X		
Allium companulatum	dusky onion	*Bošdi*	X		
A. validum	swamp onion	*Búye* or *Puyeli*		X	
Amelanchier ainifloia var. *pumlia*	western service berry	*Śu-wet-k*	X		X
Arctostaphylos patula	greenleaf manzanita	*eyéye-e*	X		
Balsamorhiza sagittata	arrow-leaf balsam root	*Śú'gilá-ci'*	X		
Camassia quamash	small camas	*Sésmi*		X	
Fragaria virginiana	mountain strawberry	*Ma alanji*	X		
Heracleum lanatum	cow parsnip	*K'ómho*	X		
Lilium parvum	Sierra tiger lily	*Silá'twhu*	X		
Lupinus polyphyllus	bigleaf lupine	*Wadasa or Wa*		X	
Mentzelia dispersa	bushy blazing star	*Dáhal*		X	
Peonia brownii	mountain peony	*Tuyá'g-mhu*	X		
Perideridia spp.	Yampah	*Déguš*		X	
Pteridim aquilinum var. *pubescens*	bracken fern	*Megé-eš*			X
Ribes rozelii	Sierra gooseberry	*Séw-t yá'g-l*	X		
Rorippa nasturtium-aquaticum	water cress	*Ulipántza*	X		
Rosa woodsii var. *ultramontane*	interior rose	*Pećumeli*	X		X
Triteleia hyacinthine	white brodiaea	*Ma-hal*	X		
Typha latifolia	broadleaf cattail	*Mahatálal*	X		X
Verattrum californicum var. *californicum*	California corn lily	*Badópo*	X		
Wyethia mollis	mules ear	*Śú'gil*		X	

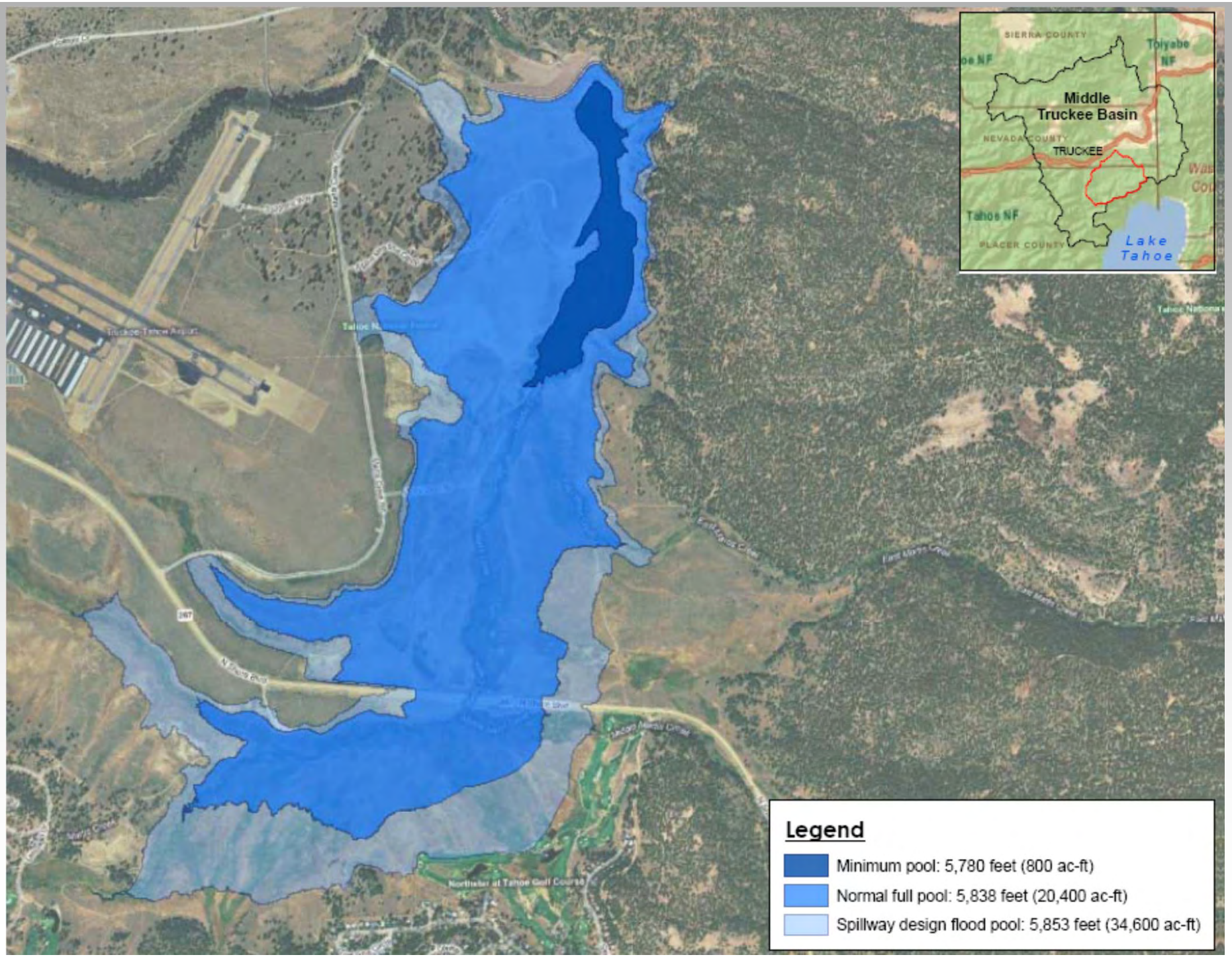
Disturbance

Lower Martis Creek

Altered drainage

Channel entrenchment and floodplain conversion

Martis Dam construction


SIERRA COUNTY
Toiyabe NF
Middle Truckee Basin
NEVADA COUNTY
TRUCKEE
Tahoe NF
PLACER COUNTY
Lake Tahoe
Truckee-Tahoe Airport
Legend
Minimum pool: 5,780 feet (800 ac-ft)
Normal full pool: 5,838 feet (20,400 ac-ft)
Spillway design flood pool: 5,853 feet (34,600 ac-ft)

Martis Creek at Martis Valley

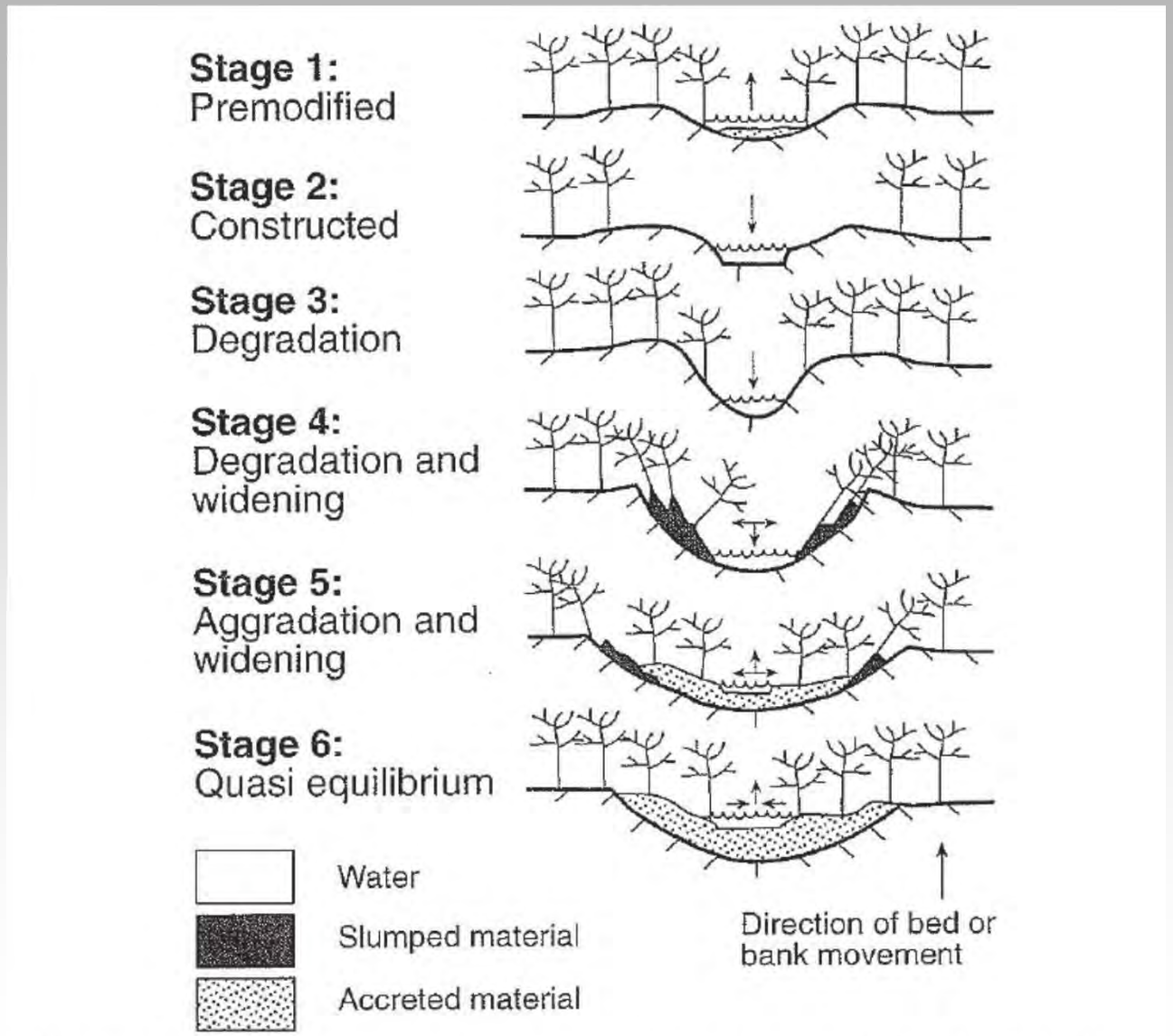
Hwy 267 modified and raised

Continued and near-complete conversion to single thread channel

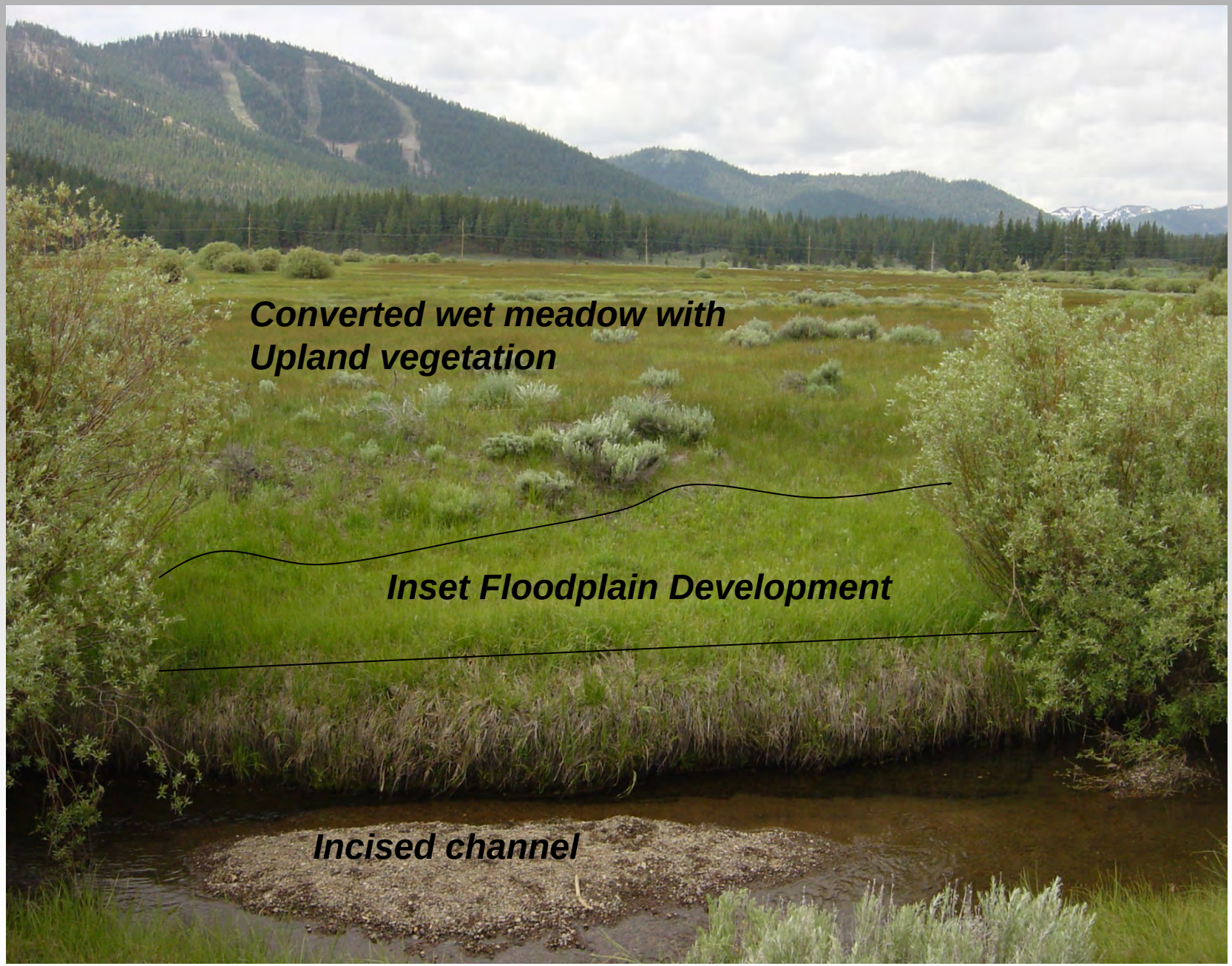
Floodplain areas converted to drier conditions

Meadow is no longer irrigated

Martis Creek at Martis Valley

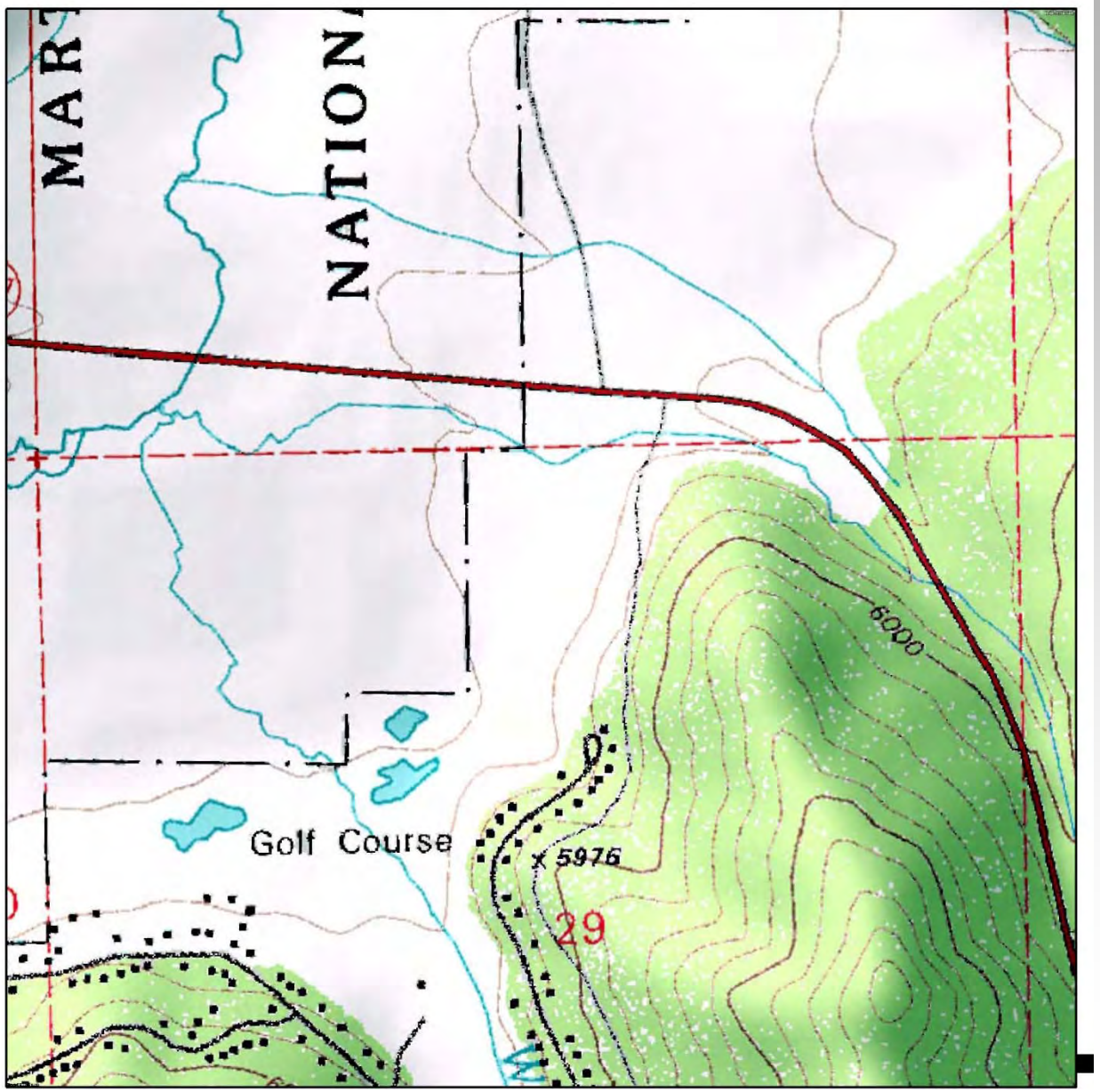


a) Six-stage model of channel evolution following channelization (Hupp, 1999)

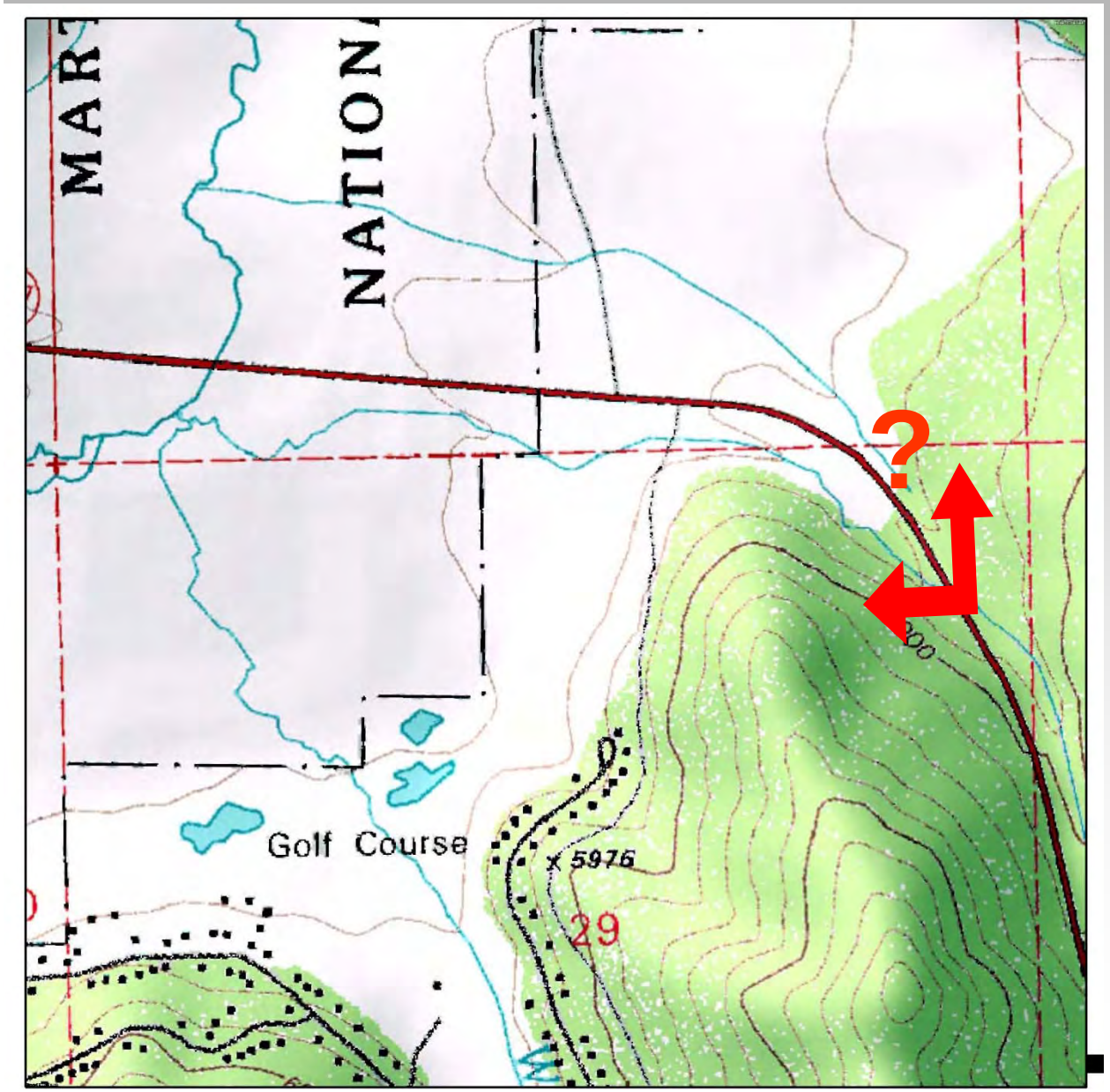

Converted wet meadow with
Upland vegetation
Inset Floodplain Development
Incised channel

Middle Martis Creek Disturbance

Middle Martis Creek



Middle Martis Creek



Middle Martis Creek

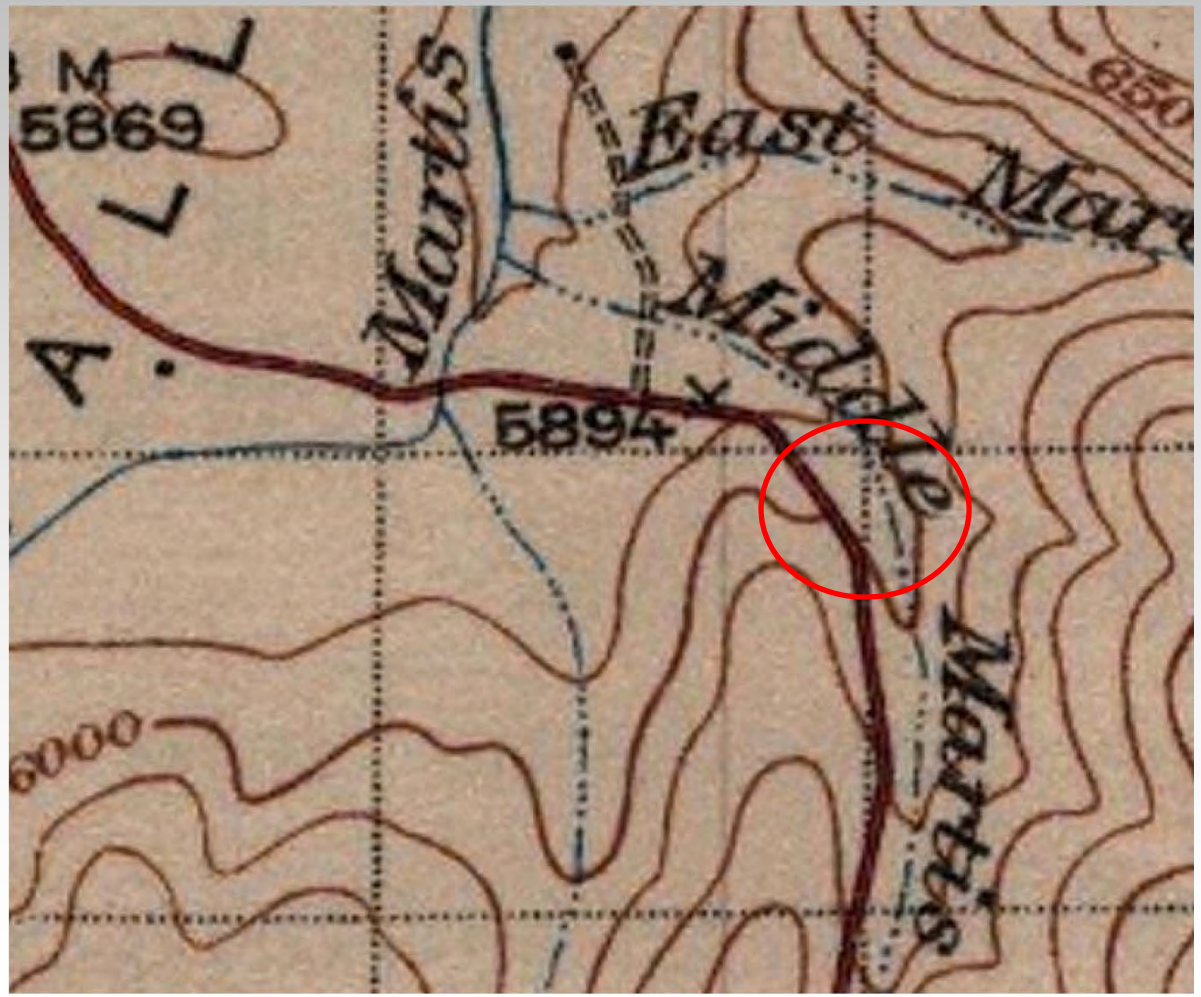
1895

Historical diversion?

????

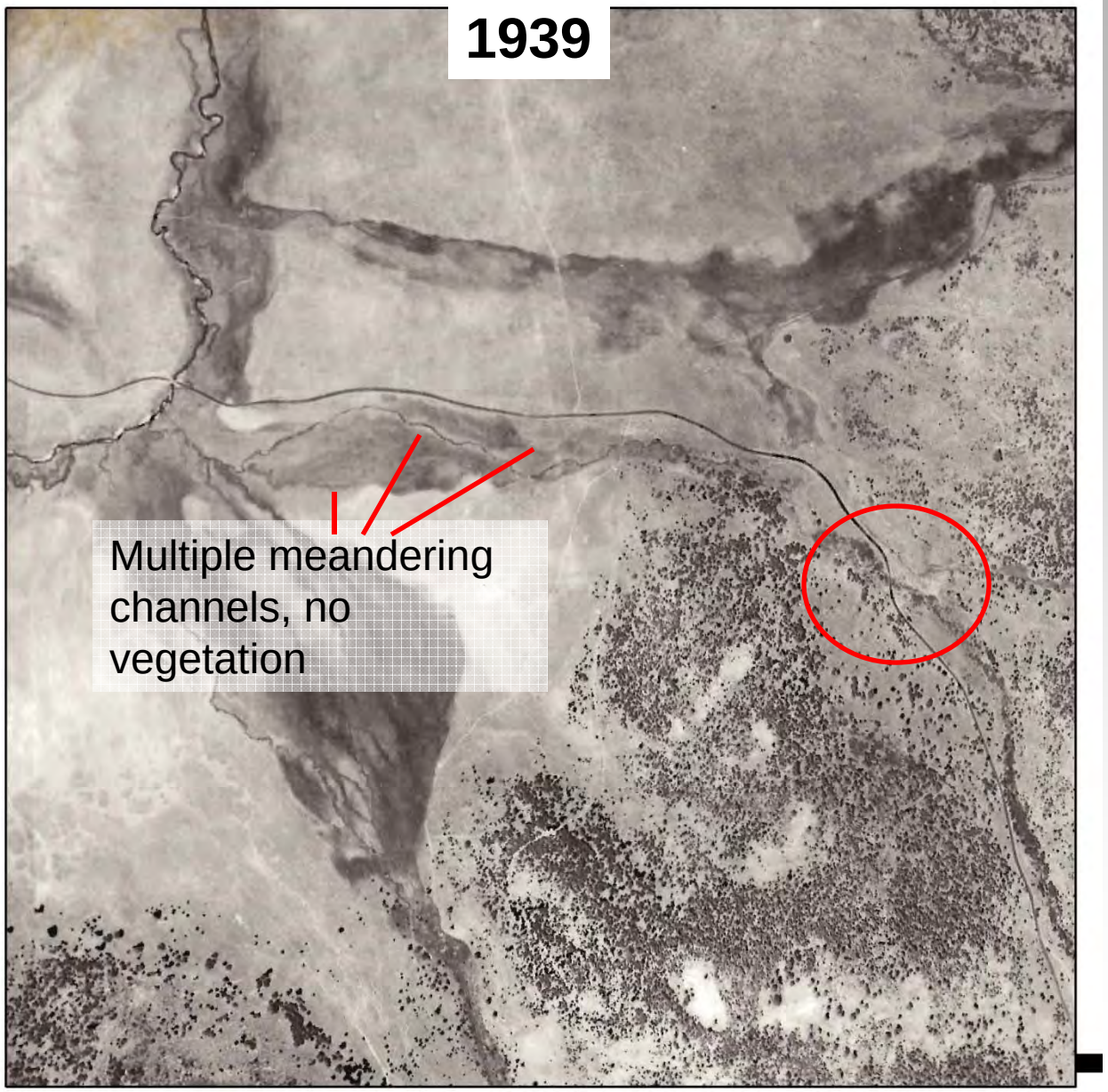
Middle Martis Creek

1940



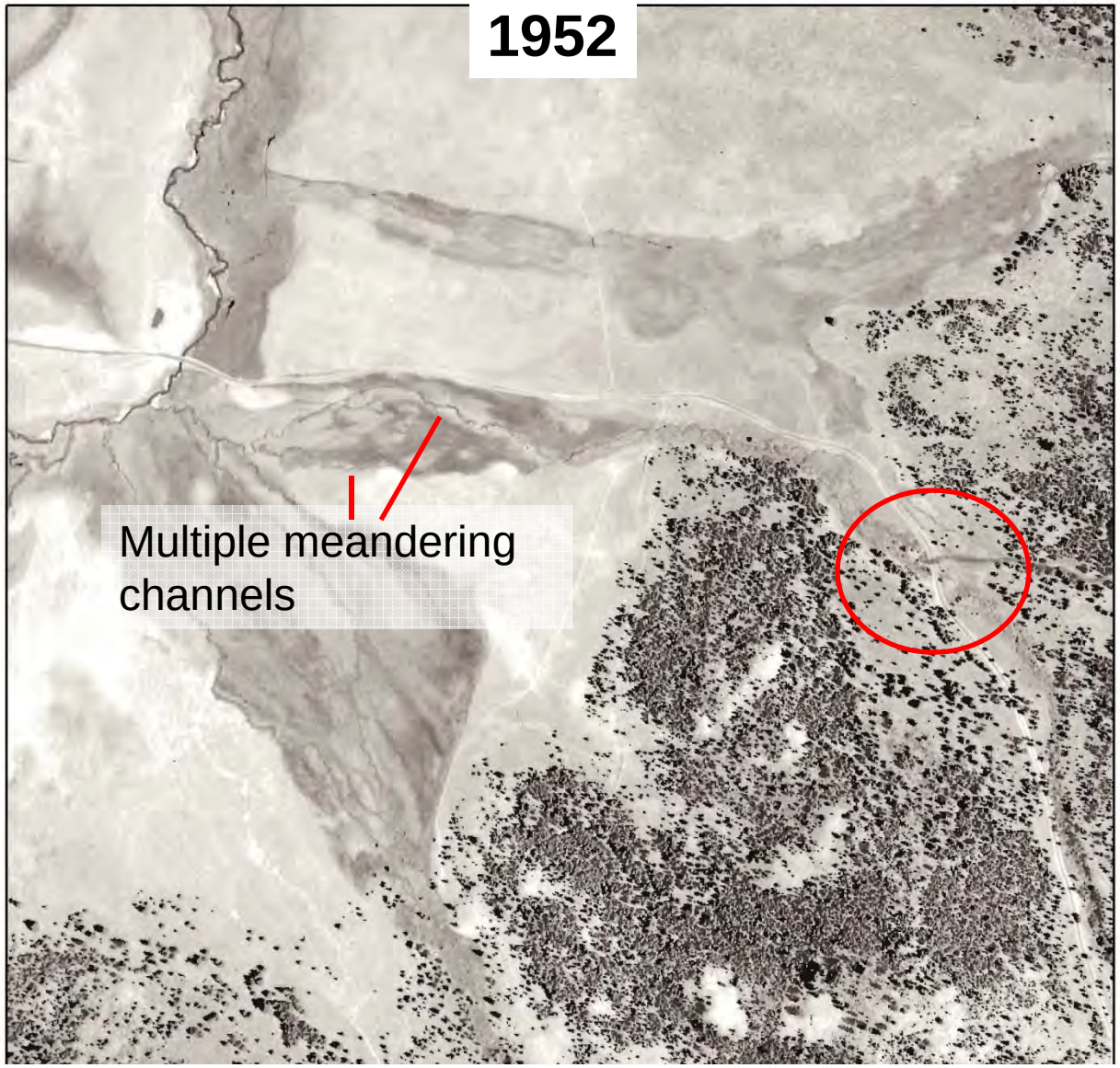
Channel "blue-line" shown on northeast side of Brockway Road

Middle Martis Creek



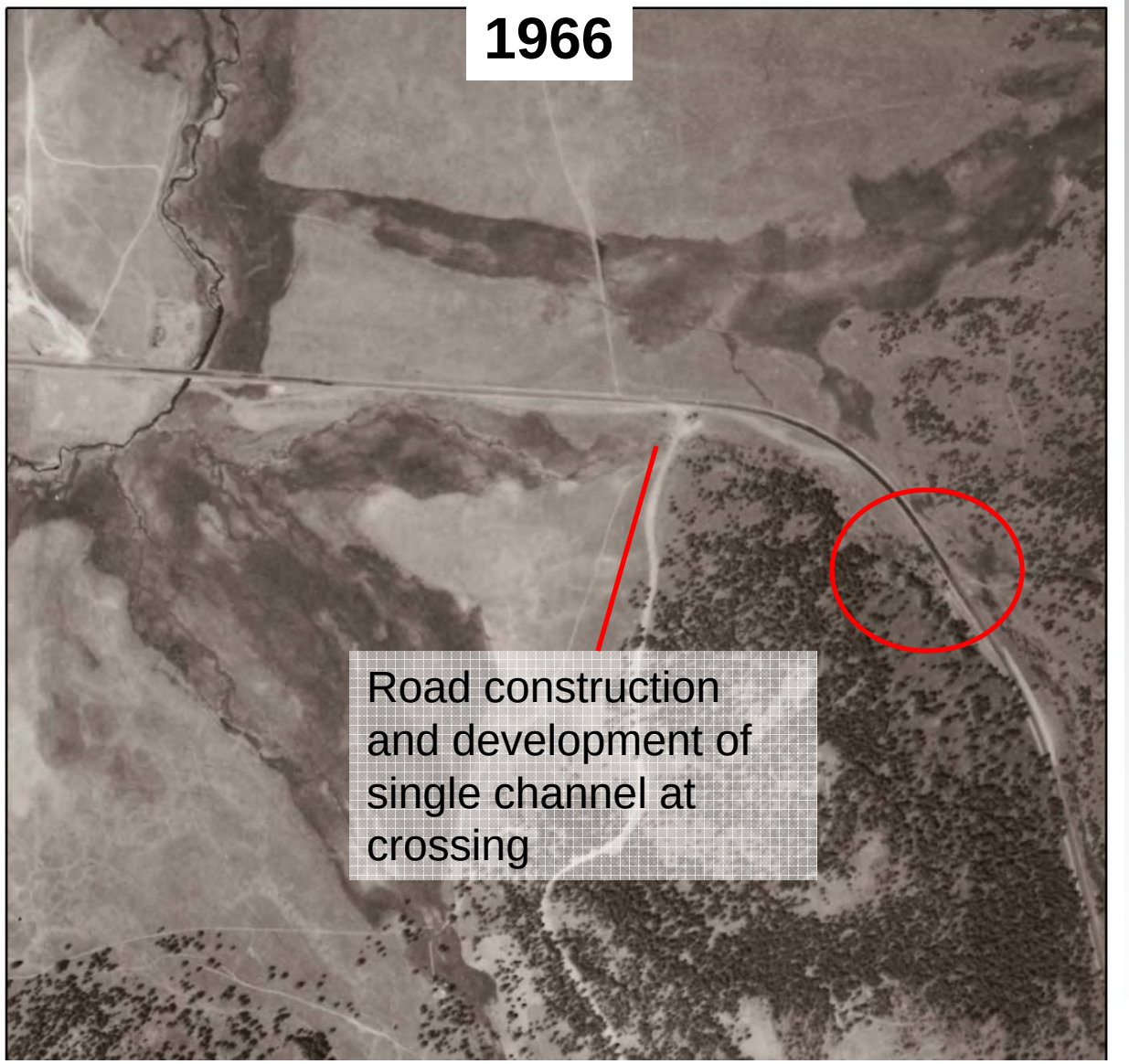
Historical diversion?

Middle Martis Creek

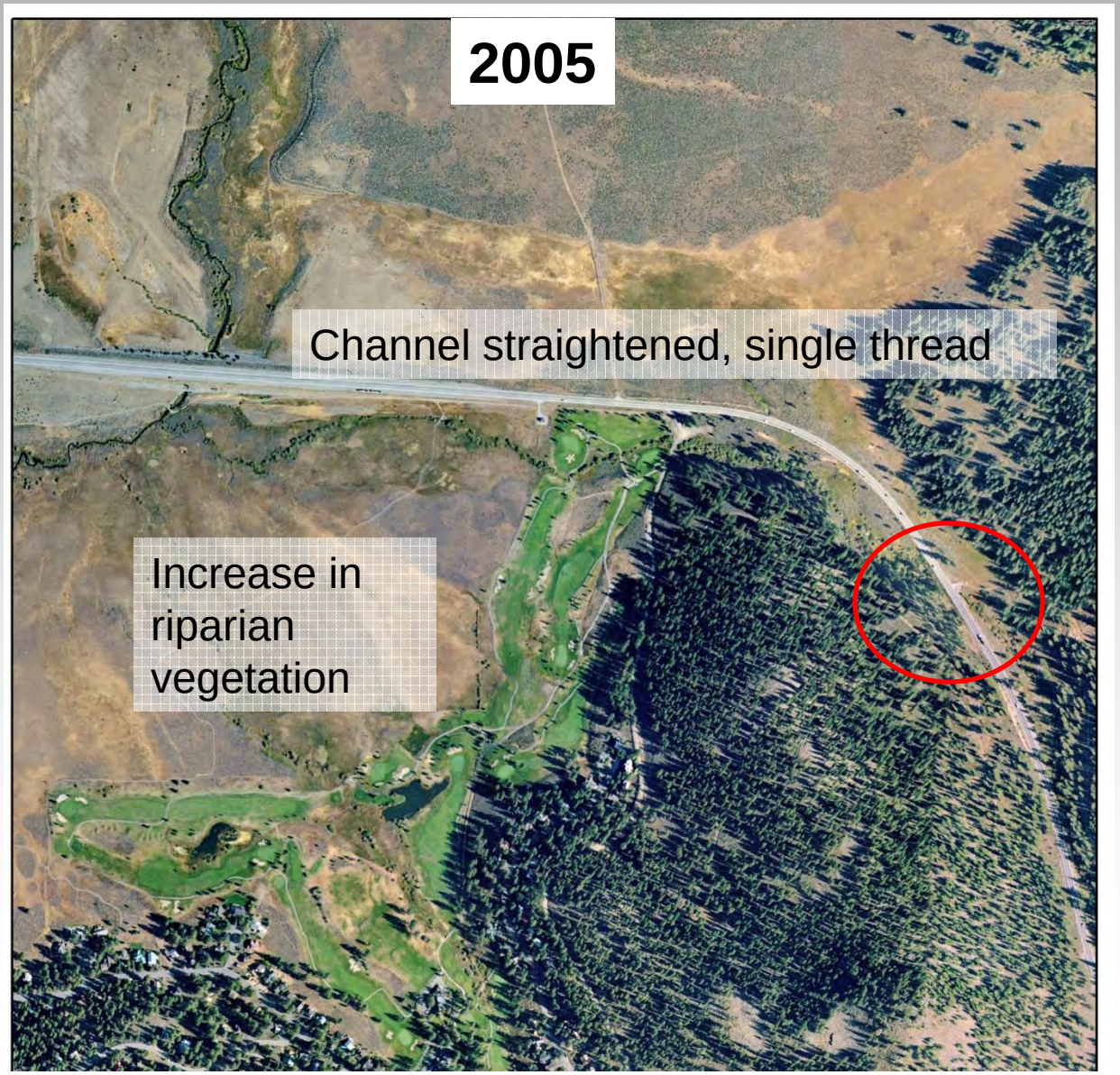


Historical diversion?

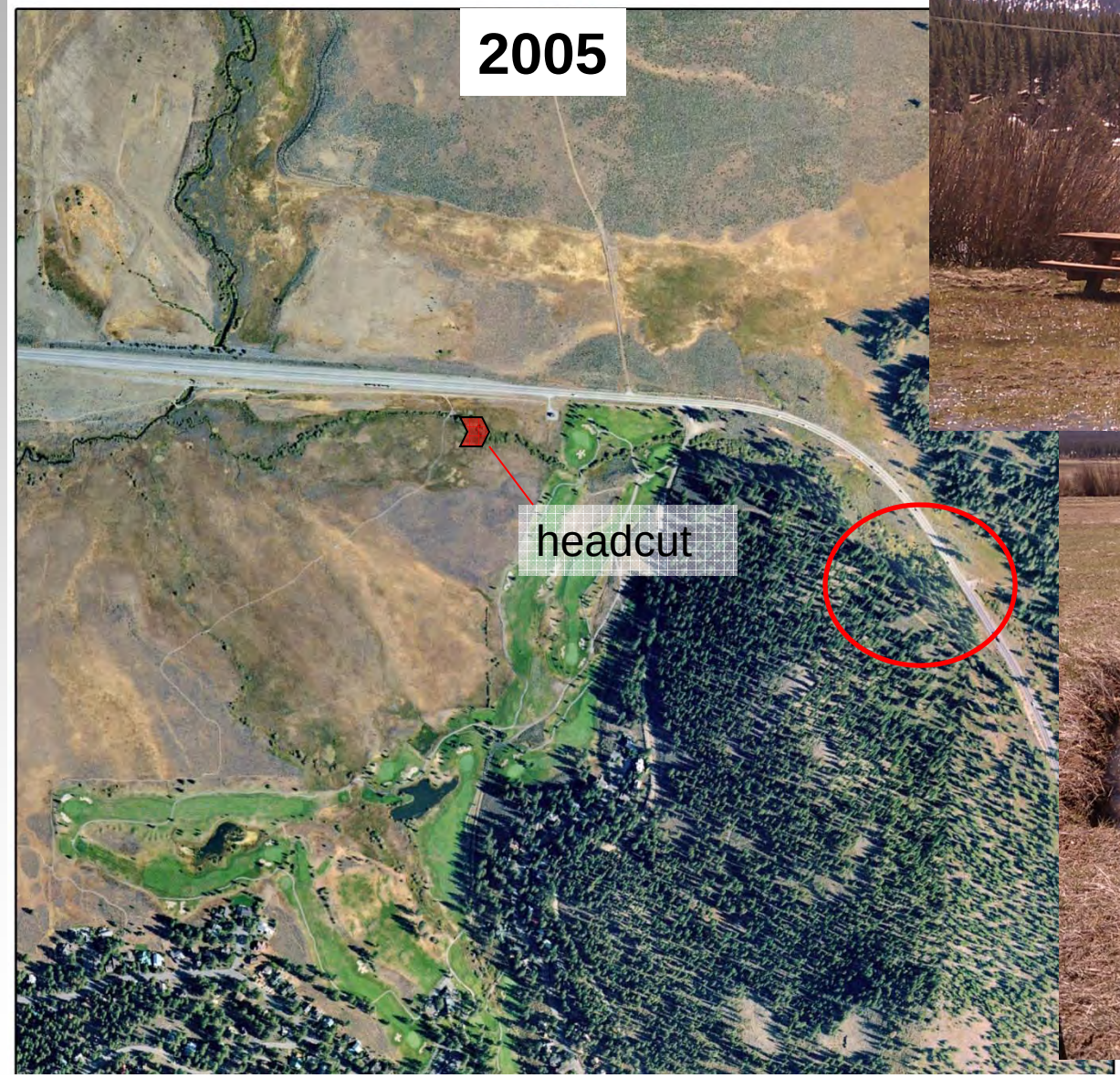
Middle Martis Creek



Middle Martis Creek



Middle Martis Creek



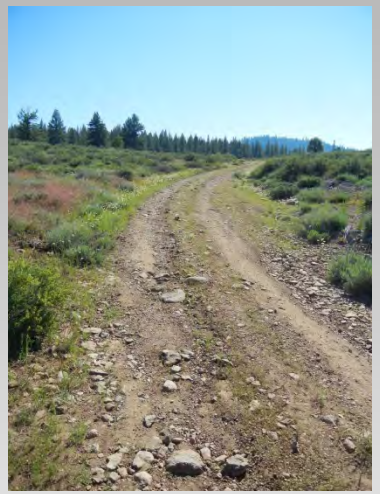
Disturbance Inventory: Landings and Skid Trails





Disturbance Inventory - Roads

Before road grading

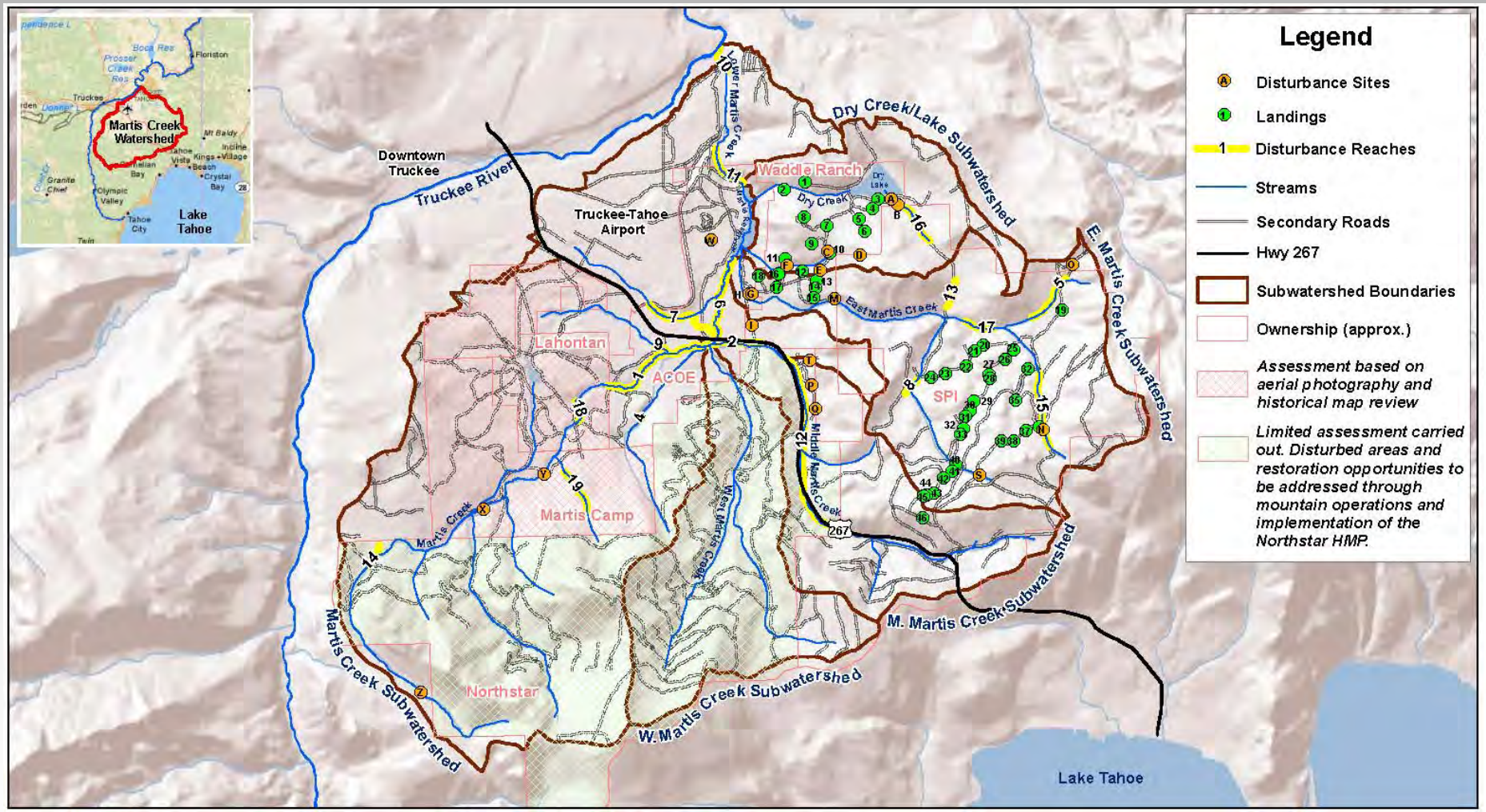


After road grading

Disturbance Inventory: Road/Stream Interaction

Disturbance Inventory: Road/Stream Connectivity

Watershed Disturbance Map



Restoration Opportunities

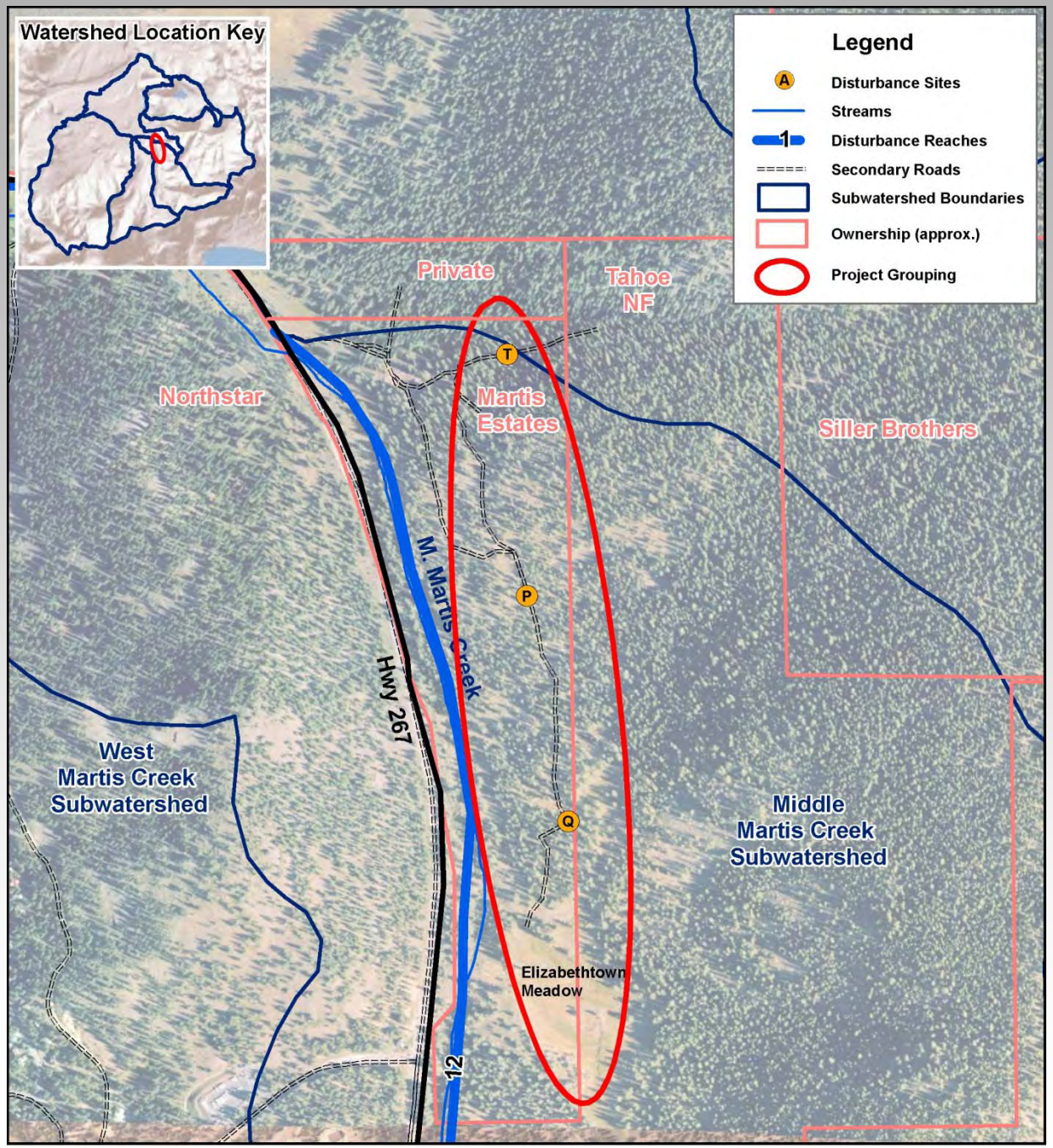
Targeted road recontouring/decommissioning

Spoils piles – use for road restoration

Landings as reservoirs

Project Identification

- Projects identified to address disturbance
  - Hydrologic connectivity
  - Proximity
  - Similarity
  - Same catchment
  - Ownership



Martis Estates Project 7

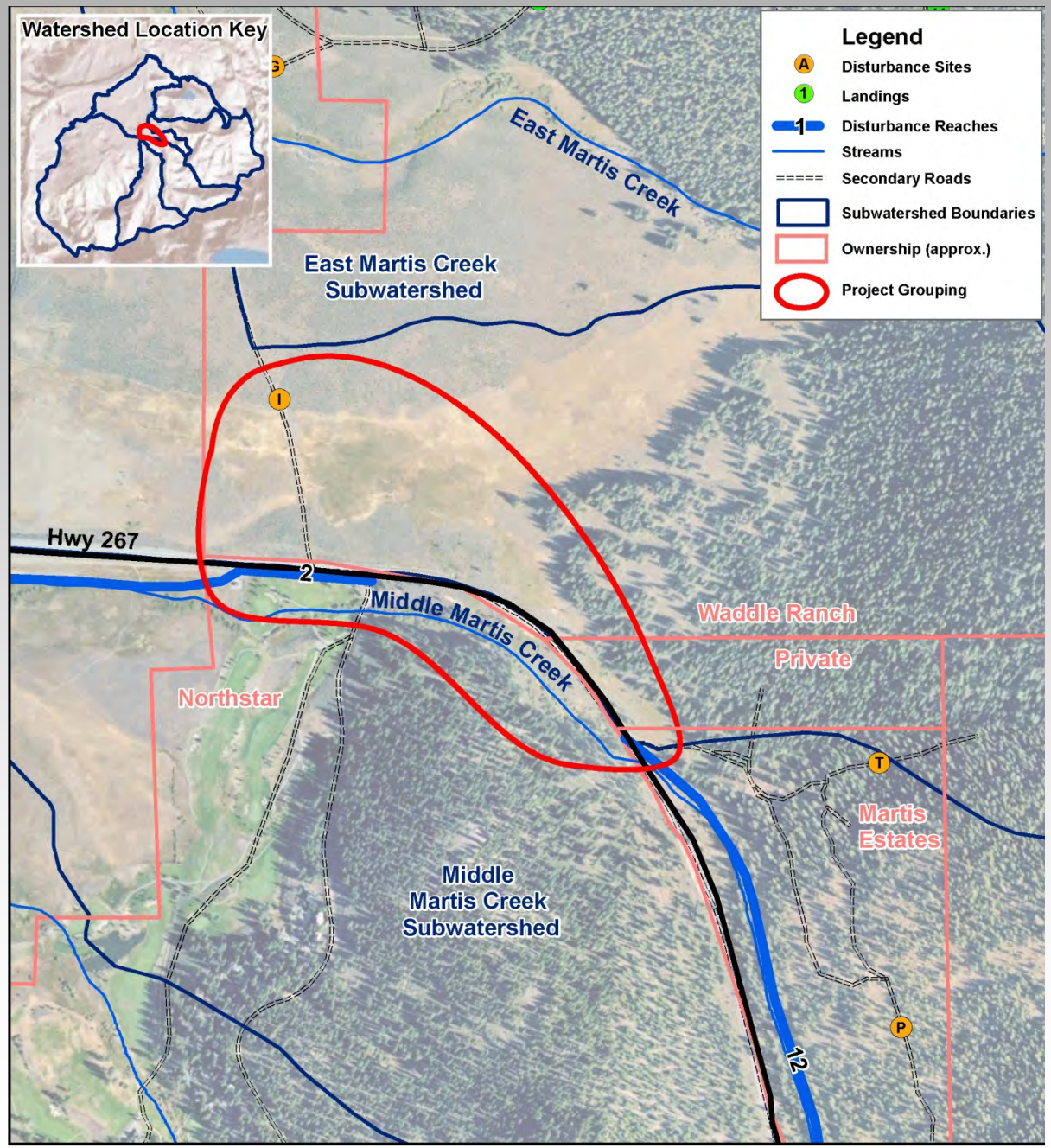
- Road water capture
- Sediment deposition
- Channel incision
- Vehicle access

Restoration Opportunities

Targeted road recontouring/decommissioning

Spoils piles – use for road restoration

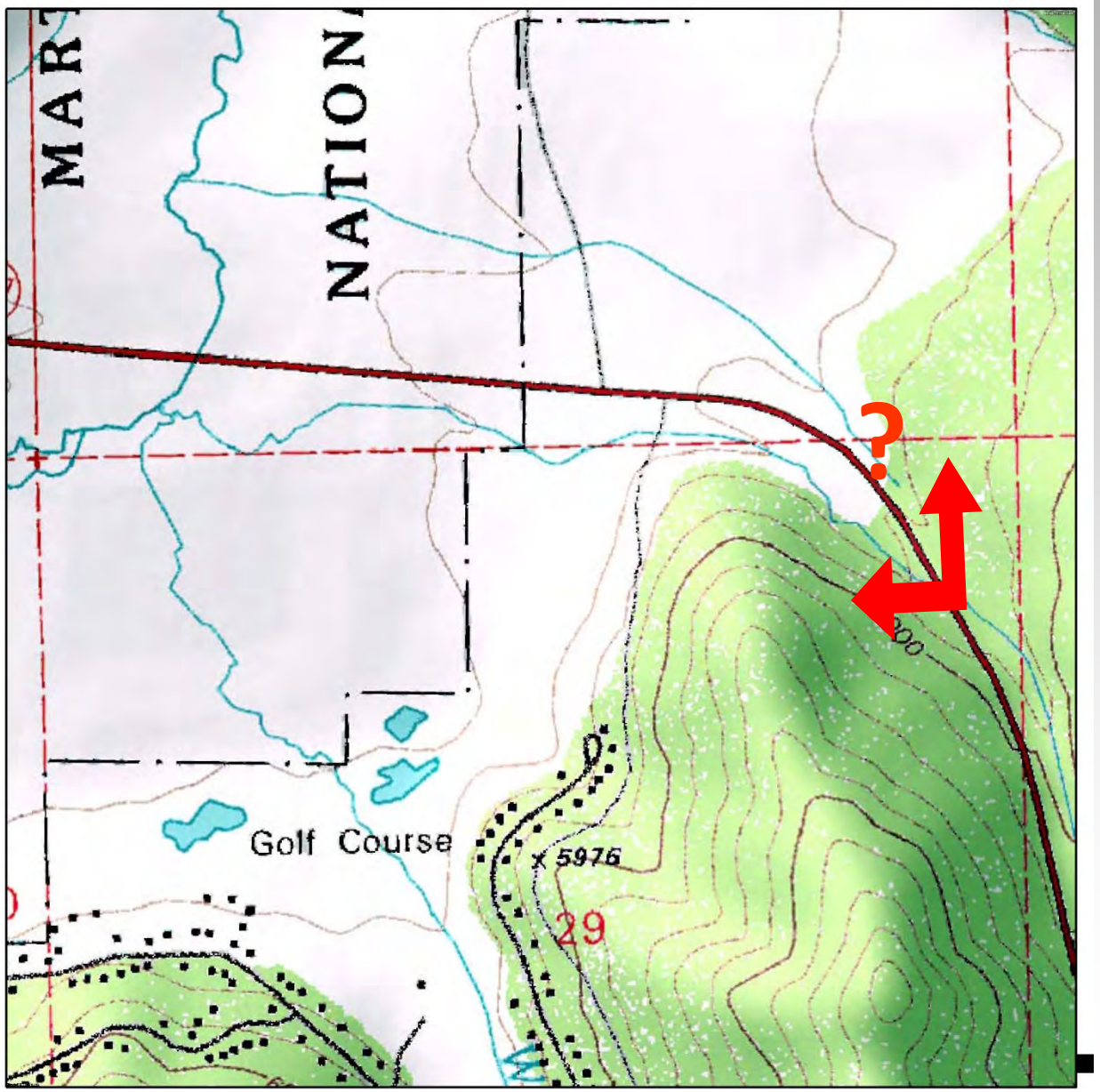
Landings as reservoirs



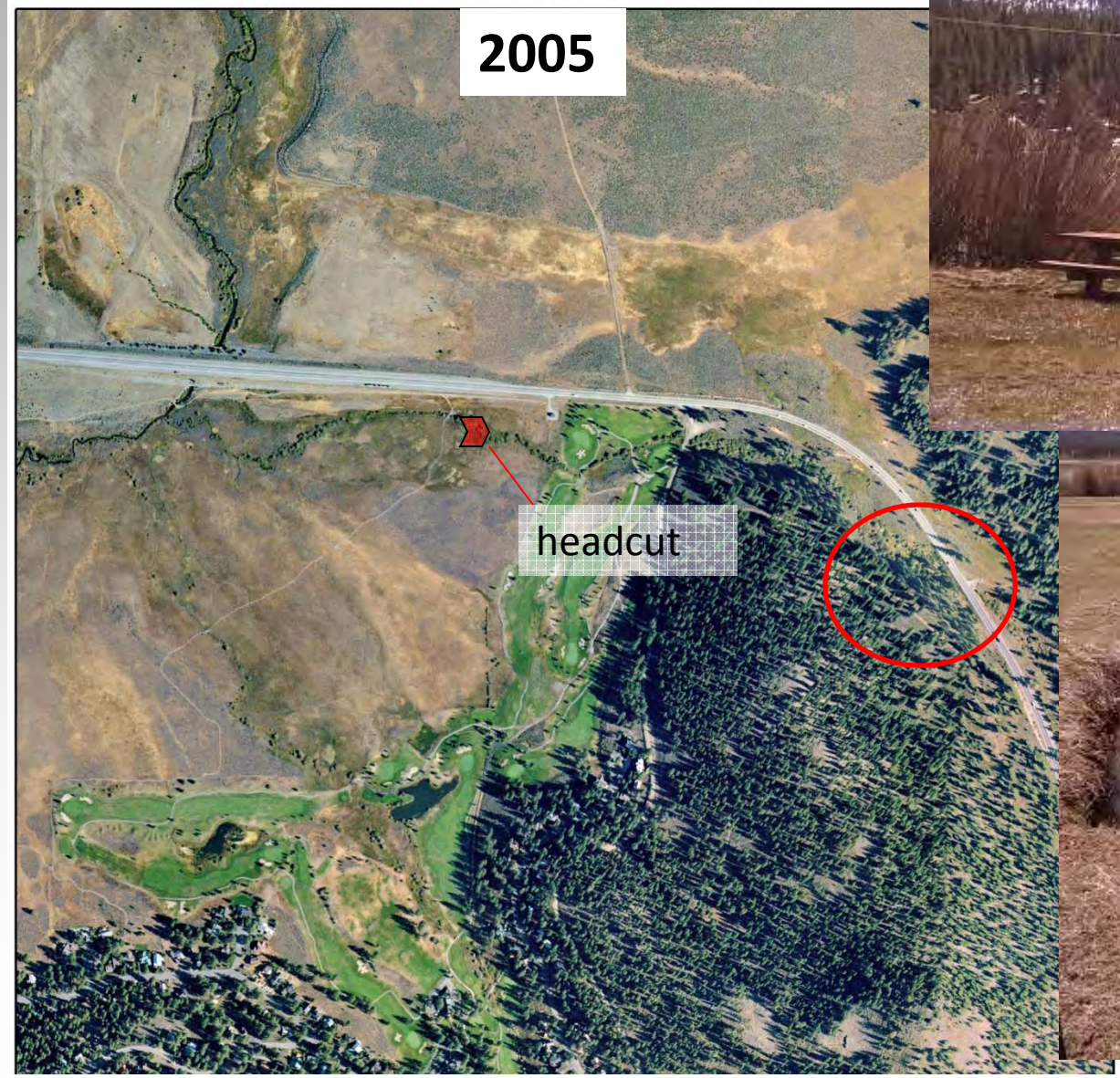
Project 11

- Complex project
- Interaction of Middle Martis Cr. and 267
- Incised stream channel
- Erosion and headcutting
- Altered stream alignment

Middle Martis Creek



Middle Martis Creek



Conclusions

- Complex watershed
- Rich land use history – past and present
- Assessment a “living document”
- Partnerships are key

Questions