3, Opportunities and Constraints Analysis

Opportunities and constraints were identified for meeting the goals and objectives of the *Truckee River Corridor Access Plan*. Specifically, opportunities were identified for

- improving fish and wildlife habitat,
- water quality,
- recreational access to and along the river, and
- environmental education.

Constraints to potential improvements were also identified including

- protection of private property along the river,
- protection of the SR 89 right-of-way,
- steep slopes,
- protection of existing high-quality habitat, and
- restricted easements or rights-of-way.

Issues, opportunities, and constraints, and potential approaches to resolving them are summarized in Table 3-1 and represented graphically in Exhibits 3-1 through 3-5. The table and exhibits are intended to document a step in the planning process and complement each other; however, neither are intended to provide an exhaustive list.

TABLE 3-1 Summary Opportunities and Constraints Analysis

REACH 1 — PLACER COUNTY LINE TO SQUAW VALLEY (SEE EXHIBITS 3-1, 3-2 AND 3-3)

ISSUES	OPPORTUNITIES	CONSTRAINTS	POTENTIAL APPROACHES / LOCATIONS
Water Quality • Erosion and sedimentation • Heavy sediment accumulation along highway from winter road sanding • Collapsed or damaged drain outlets from highway to river • Many culverts drain directly into river **Wildlife and Aquatic Habitat** • LCT recovery coordination with resource agencies (i.e., USFWS and DFG) • Existing high quality meadow habitat (Goose Meadow and Silver Meadow) **Recreation and Public Access** • Unofficial camping areas and river access areas (including boating access) • Numerous over-wide shoulders and road pullouts	**Water Quality** • Current Caltrans plan to improve roadside runoff, improve existing culverts, and install sediment basins along SR 89 • Opportunities to work with Caltrans to improve some pull-outs as official access points and eliminate others **Wildlife and Aquatic Habitat** • Relatively high ecological values • Potential LCT recovery/reintroduction sites at tributary confluences (Squaw, Pole, etc.) **Recreation and Public Access** • Easy access with high recreational values (i.e., boating, swimming, angling, camping, winter access across highway) • Recreation related industries and economic benefits • High aesthetic values from highway and existing public-access sites • Potential to improve summer access to river and winter access to backcountry areas west of highway • Town of Truckee Legacy Trail proposals along river corridor in Truckee • Potential to improve existing USFS campgrounds (well-used on key weekends during peak summer months) to provide greater day-use opportunities and clearer ingress-egress to highway • Scenic area and easy construction base for potential multiuse trail along existing sewer line alignment on public lands if Tahoe-Truckee Sanitation Agency is amenable to easement agreement	**Water Quality** • Frequent correspondence of locations with poor drain outlets from highway with steep riverbanks and limited floodplain • Section 303(d) listing and TMDL development of tributary streams, including Squaw Creek **Wildlife and Aquatic Habitat** • Potential for presence of nonnative salmonids to impede LCT recovery efforts **Recreation and Public Access** • Steep river banks correspond with constricted SR 89 right-of-way and may impeed potential for multi-use trail • Patchy public/private land ownership - Opportunity for multiuse contiguous trail restricted - Silver Creek area significantly restricted • Restricted potential for use of existing sewer line easement for public access, as it crosses river and many private parcels	• Identify public parking and access areas (angling, picnicking, river access) with signage and trails • Coordinate with Caltrans to improve or remove pull-outs along highway through revegetation (for eliminating pull-outs) or by developing trailheads with formalized access to bike trail and river • Develop educational signage outlining angling regulations and LCT recovery efforts • Coordinate efforts to expand public access with water quality and riverbank improvements - Water quality swales and wetland catch basins along highway - Riparian planting combined with boulder placement for bank protection • Prioritize key destinations and linkages for trail and access connections - Develop flexible trail system that could provide continuous access for (at minimum) pedestrians/hikers • Coordinate with USFWS and DFG in LCT recovery efforts - Habitat restoration and enhancement - Installation of artificial barrier to migration (i.e., isolate tributary streams to aid in recovery efforts)

NOTES:

Caltrans	California Department of Transportation
CWA	Clean Water Act
DFG	California Department of Fish and Game
LCT	Lahontan cutthroat trout
SR	State Route
TMDL	Total Maximum Daily Load
TROA	Truckee River Operating Agreement
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

REACH 2 — SQUAW VALLEY TO RIVER RANCH (SEE EXHIBIT 3-4)			
ISSUES	OPPORTUNITIES	CONSTRAINTS	POTENTIAL APPROACHES / LOCATIONS
Water Quality • Erosion and sedimentation • Some collapsed or damaged drain outlets from highway to river • Many culverts drain directly into river **Wildlife and Aquatic Habitat** • Bare banks or riprap with limited riparian vegetation in some areas • General separation of river from trail by steep riprapped embankments **Recreation and Public Access** • Angling access more limited • Numerous over-wide shoulders and road pullouts • Intersection at Squaw Valley does not clearly delineate Class I trail access, signaling, and pedestrian/bicycle crossings could be improved	**Water Quality** • Current Caltrans plan to improve roadside runoff, improve existing culverts, and install sediment basins along SR 89 • Opportunities to work with Caltrans to improve some pull-outs as official access points and eliminate others **Wildlife and Aquatic Habitat** • Steep river gradient, narrow channel, and significant riffle-pool morphology, which provide good quality fish habitat • Relatively high ecological values because river is generally separated from bike trail with steep banks and boating use is greatly reduced **Recreation and Public Access** • Existing connections to official Western States Trail • Existing developed trailhead at Squaw Valley Road • Limited adjacent land uses—some private property • High aesthetic values	**Water Quality** • Section 303(d) listing and TMDL development of tributary streams, including Bear Creek • Frequent correspondence of locations with poor drain outlets from highway with steep riverbanks and limited floodplain **Wildlife and Aquatic Habitat** • Confined floodplain • Altered water releases • Potential restriction of floodwater conveyance • Potential for presence of nonnative salmonids to impede LCT recovery efforts **Recreation and Public Access** • Steep river banks correspond with constricted SR 89 right-of-way and may impeed potential for multi-use trail • Patchy public/private land ownership – Opportunity for multiuse contiguous trail restricted – Squaw Creek area significantly restricted • Restricted potential for use of existing sewer line easement for public access, as it crosses river and many private parcels	• Plant willow cuttings along riverbank in areas where riparian cover is limited or nonexistent, consistent with channel flood capacity • Improve signage for river access along highway, including parking, fishing, rafting, etc. • Coordinate with Caltrans to improve or remove pull-outs along highway through revegetation (for eliminating pull-outs) or by developing trailheads with formalized access to bike trail and river • Identify public parking and access areas (angling, picnicking, river access) with signage and trails • Develop educational signage outlining angling regulations and LCT recovery efforts

REACH 3 — RIVER RANCH TO TAHOE CITY (SEE EXHIBITS 3-4 AND 3-5)

ISSUES

Water Quality

- Erosion and sedimentation
- Warm summer water temperature
- Channel-widening and water temperature issues near Caltrans maintenance yard and Tahoe City Lumber
- Heavy sediment accumulation along highway from winter road sanding
- Collapsed or damaged drain outlets from highway to river
- Drainage of many outlets directly into river
- Erosion on embankment between highway and bike trail

Wildlife and Aquatic Habitat

- Homogenous aquatic and riparian habitat in most upstream portion of reach
- Little to no riparian buffer between channel and bike trail
- Lahontan cutthroat trout (LCT) recovery efforts
- Non Native Vegetation

Recreation and Public Access

- Heavy recreation use and related disturbances throughout reach
  - Numerous highway pullouts and user-defined access trails from highway to bike trail
  - Encroachment on bike trail from channel widening in lower portion of reach
  - Heavy rafting and trail use
  - Multiple user-defined access trails from highway and bike trail to river
  - Bank erosion and vegetation damage from raft rest stops, swimming, and wading
- Heavy and conflicting recreational uses at River Ranch between trail users, boaters, and business patrons
- Connecting to existing Class I bike trail

OPPORTUNITIES

Water Quality

- Current Caltrans plan to improve roadside runoff, improve existing culverts, and install sediment basins along SR 89
- Opportunties to work with Caltrans to improve some pull-outs as official access points and eliminate others

Wildlife and Aquatic Habitat

- Relatively high ecological values in some areas where river bends away from SR 89, creating a wider floodplain terrace
- Restoration and enhancement potential in areas with sparse instream habitat and riparian vegetation along heavily affected upstream portion of reach

Recreation and Public Access

- Good access with high recreational values
  - Boating
  - Biking
  - Swimming
  - Angling
- Support of multiple beneficial uses through appropriate management and development of access features that also protect the riverine environment
- High aesthetic values because river is visible from highway and bike trail

CONSTRAINTS

General

- Multiple and often conflicting uses
  - Transportation corridor
  - Heavy recreational uses
  - Ecologically sensitive area
- Multiple jurisdictions and public/private land ownership
- Adjacent developed land uses
  - Tahoe City
  - Caltrans
  - Lumber yard
  - Private residences
  - Parking lots

Water Quality

- Truckee River CWA Section 303(d) listed as impaired for sediment
- SR 89 proximity reduces floodplain
  - Continual inputs of road sand
  - Shoulder and road fill erosion
  - Poor culvert conditions with limited area for natural treatment of runoff

Wildlife and Aquatic Habitat

- Floodwater conveyance requirements may restrict restoration activities
- Altered water releases and geomorphology
  - Water rights
  - TROA

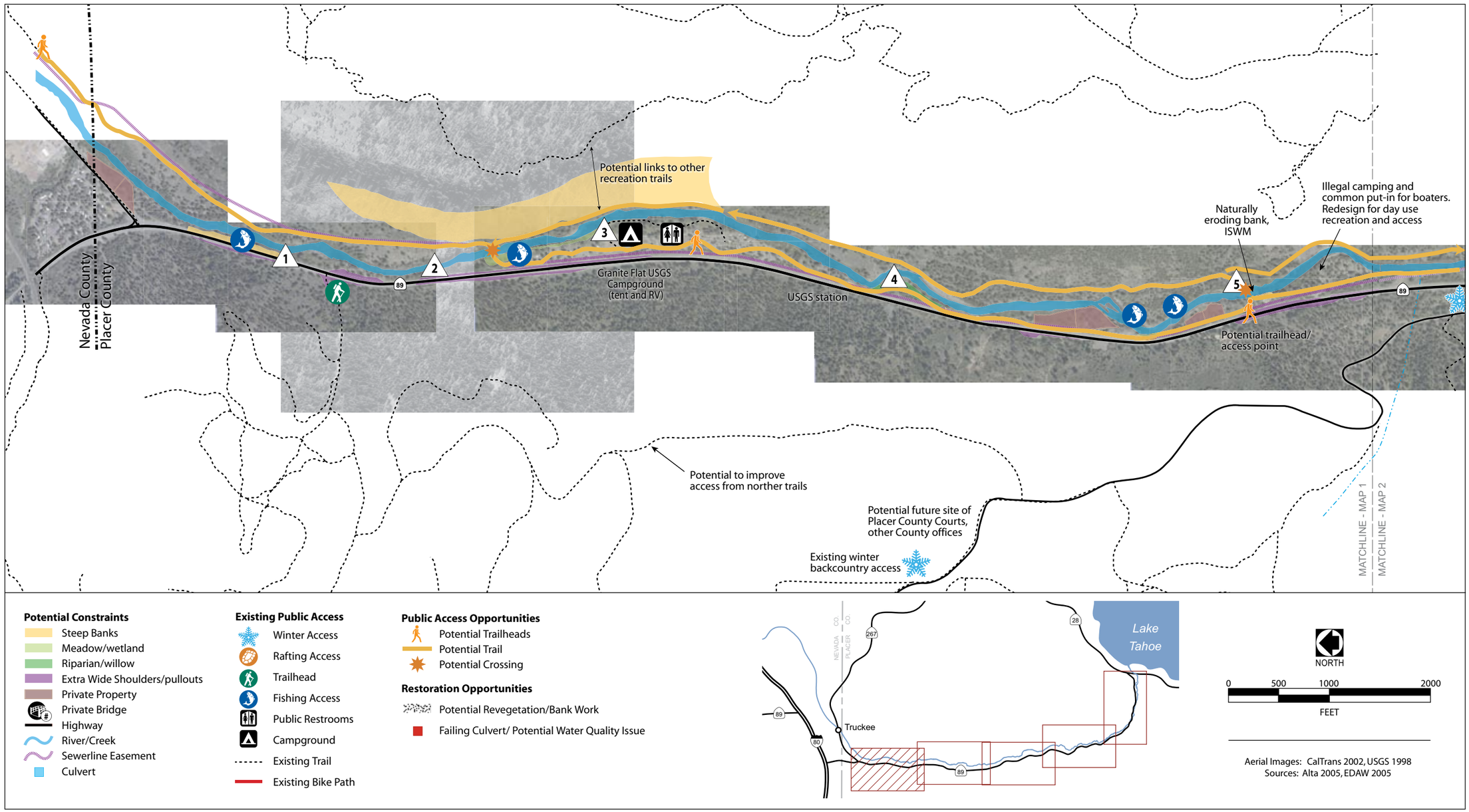
Recreation and Public Access

- Conflicting pedestrian, bicycle, boating, and automobile circulation at River Ranch

POTENTIAL APPROACHES / LOCATIONS

- Identify multipurpose enhancement projects
  - Recreation, water quality, and aquatic habitat benefits
- Identify and repair failing culverts to reduce erosion potential and improve hydrologic connectivity to riparian areas
  - Related water quality and riparian benefits
  - Coordinate with Caltrans and Lahontan RQWCB
- Use appropriate materials to improve instream habitat without conflicting with rafting or generating flood-related hazards
  - Use appropriately anchored rootwads in banks, away from higher velocity areas
  - Place large river rock boulders within channel without interrupting navigation (raft passage)
- Locate restoration efforts in a fashion to direct recreational use areas
- Improve/formalize access from SR 89
  - Improve/formalize appropriate areas (e.g., public safety, shoulder parking space, signage, erosion control)
  - Decommission access that crosses sensitive areas (e.g., boulder placement, no parking signage, vegetation barriers)
- Revegetate and amend soils in potential riparian floodplain areas
- Improve instream habitat via installation of large boulder clusters in areas that allow clear raft navigation
- Work with Caltrans and local businesses to improve riparian areas by restoring low floodplain terrace into channel. Use boulders, bio-logs, and rootwads (configured as stream barbs and deflectors) at water interface to create stable bank and plant fill area with native riparian/wetland species.
- Repair culverts and direct drainage into restored areas to restore hydrologic connectivity and for water quality treatment/improvement
- Work with River Ranch, Caltrans, businesses, and other key landowners to redesign circulation of bicycle trail, boating access, and parking
- Improve signage for river access along highway, including parking, fishing, rafting, etc.
- Coordinate with Caltrans to improve or remove pull-outs along highway through revegetation (for eliminating pull-outs) or developing trailheads with formalized access to bike trail and river
- Develop improved environmental outreach (river etiquette) for boaters
- Enforce existing rules and regulations for boaters
- Develop environmental education program or interpretive water trail for rafters to increase stewardship and self-enforcement of rules

EXHIBIT 3-1 Opportunities and Constraints Map 1, Reach 1



1. Steep bank along SR 89

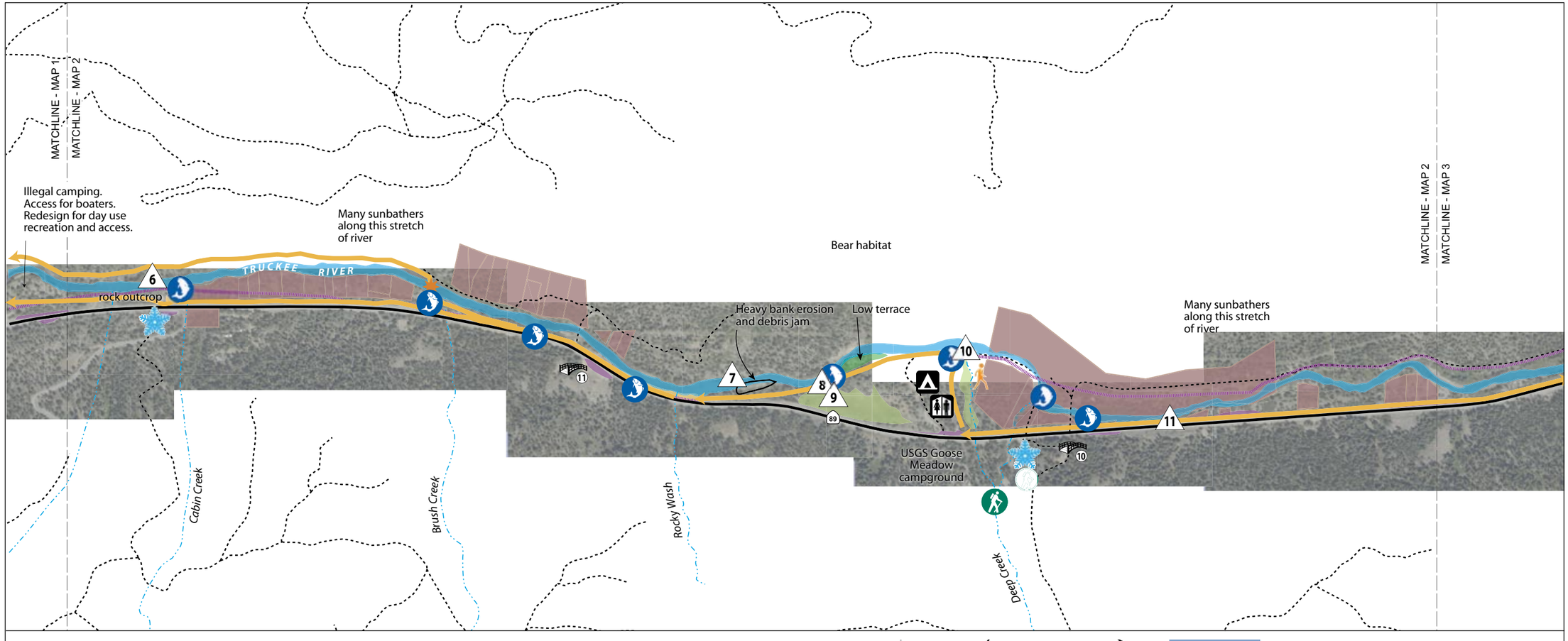
2. Typical river channel with limited riparian

3. Existing user-defined trail along sewerline

4. Potential trail alignment along sewer easement or on railroad grade

5. Eroding bank with downed trees and in-stream woody material

EXHIBIT 3-2 Opportunities and Constraints Map 2, Reach 1



6. Naturally occurring woody debris along river

7. Heavy bank erosion and woody debris

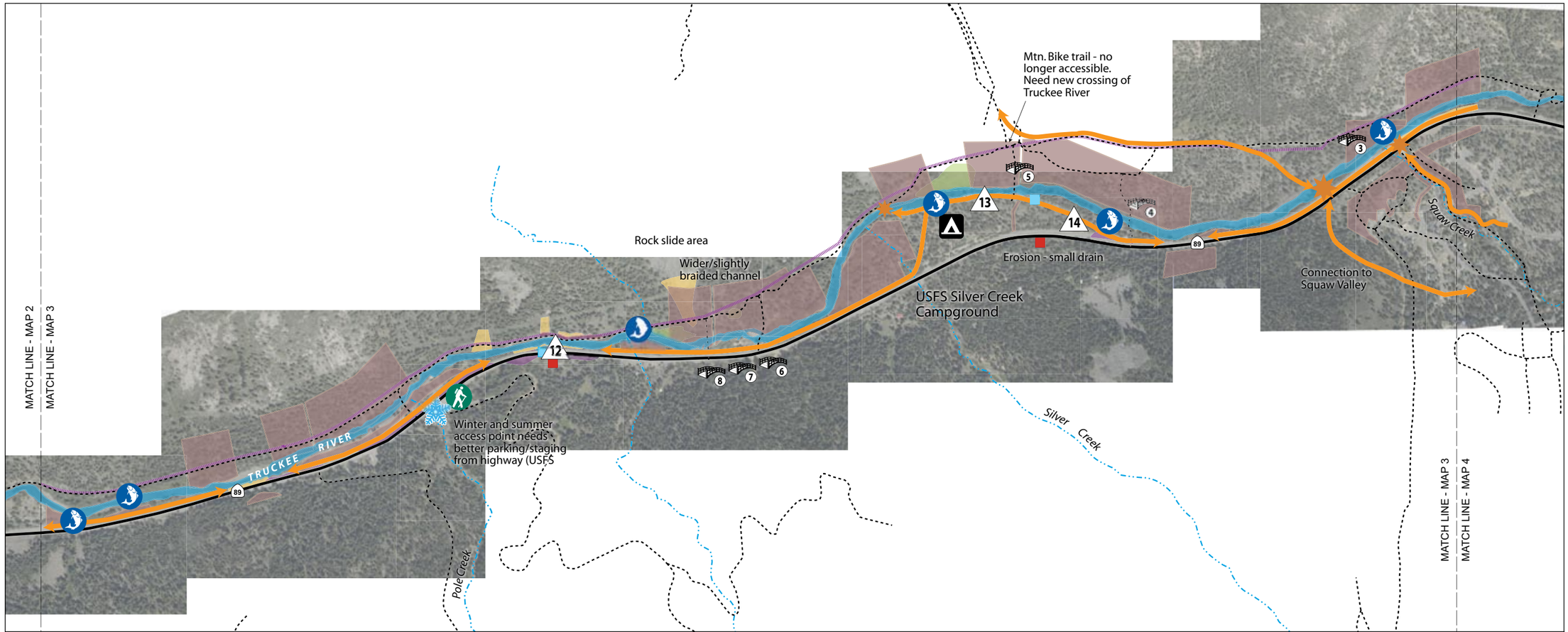
8. Seasonal wetland plants and a stream outflow from Goose Meadow to Truckee River

9. Goose Meadow is a significant natural resource along the Truckee River

10. User-defined trail along existing sewerline easement could be converted to a Class I trail

11. Wide unvegetated shoulders could accommodate a Class I trail or should be revegetated to reduce sediment into Truckee River

EXHIBIT 3-3 Opportunities and Constraints Map 3, Reach 1

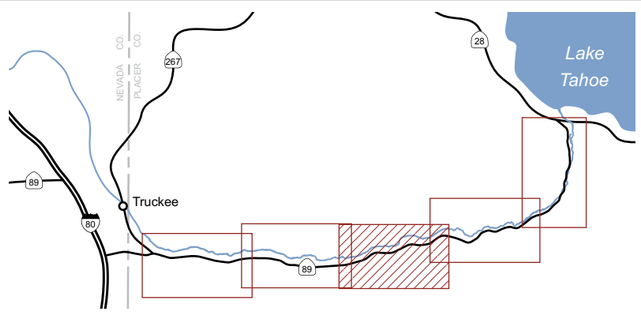


Potential Constraints
- Steep Banks
- Meadow/wetland
- Riparian/willow
- Extra Wide Shoulders/pullouts
- Private Property
- Private Bridge
- Highway
- River/Creek
- Sewerline Easement
- Culvert

Existing Public Access
- Winter Access
- Rafting Access
- Trailhead
- Fishing Access
- Public Restrooms
- Campground
- Existing Trail
- Existing Bike Path

Public Access Opportunities
- Potential Trailheads
- Potential Trail
- Potential Crossing

Restoration Opportunities
- Potential Revegetation/Bank Work
- Failing Culvert/ Potential Water Quality Issue



NORTH

0 500 1000 2000

FEET

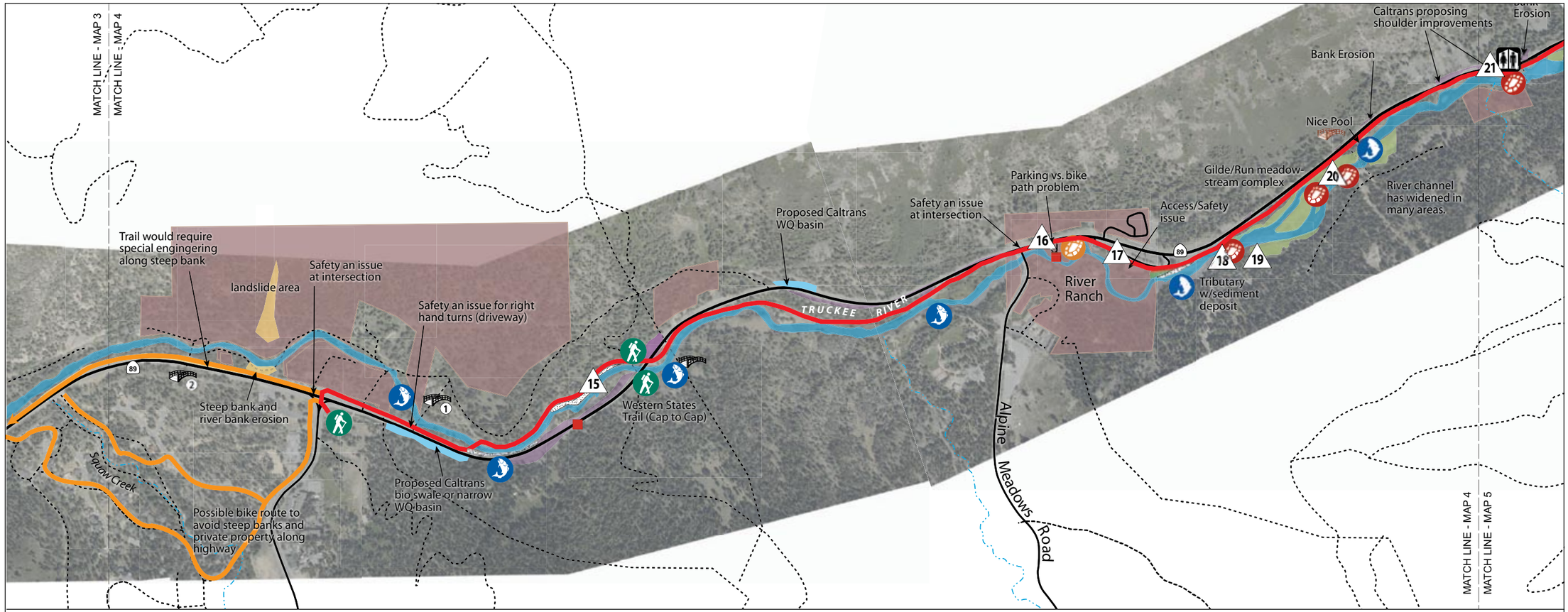
Aerial Images: CalTrans 2002
Sources: Alta 2005, EDAW 2005

12. Poorly designed culvert draining highway is eroading bank into Truckee River

13. Existing sewerline easement could be converted to Class I trail

14. Existing sewerline or old railroad alignment could be converted to Class I Trail

EXHIBIT 3-4 Opportunities and Constraints Map 4, Reaches 2 & 3

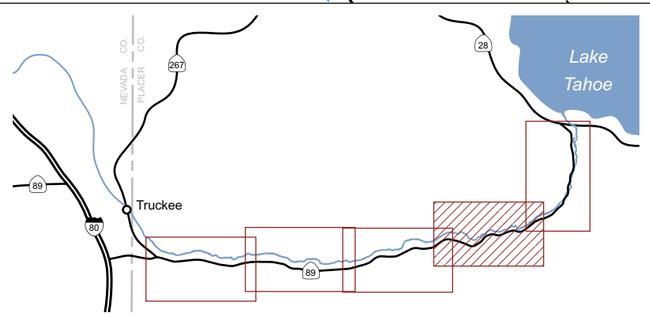


Potential Constraints
- Steep Banks
- Meadow/wetland
- Riparian/willow
- Extra Wide Shoulders/pullouts
- Private Property
- Private Bridge
- Highway
- River/Creek
- Sewerline Easement
- Culvert

Existing Public Access
- Winter Access
- Rafting Access
- Trailhead
- Fishing Access
- Public Restrooms
- Campground
- Existing Trail
- Existing Bike Path

Public Access Opportunities
- Potential Trailheads
- Potential Trail
- Potential Crossing

Restoration Opportunities
- Revegetation/Bank Work
- Failing Culvert/Potential Water Quality Issue
- Heavily Used Raft Pull-out



NORTH

0 500 1000 2000

FEET

Aerial Images: CalTrans 200?
Sources: Alta 2005, EDAW 2005

15. Existing Class I trail

16. Recreation and traffic conflicts at River Ranch

17. Class I trail and private raft parking at River Ranch

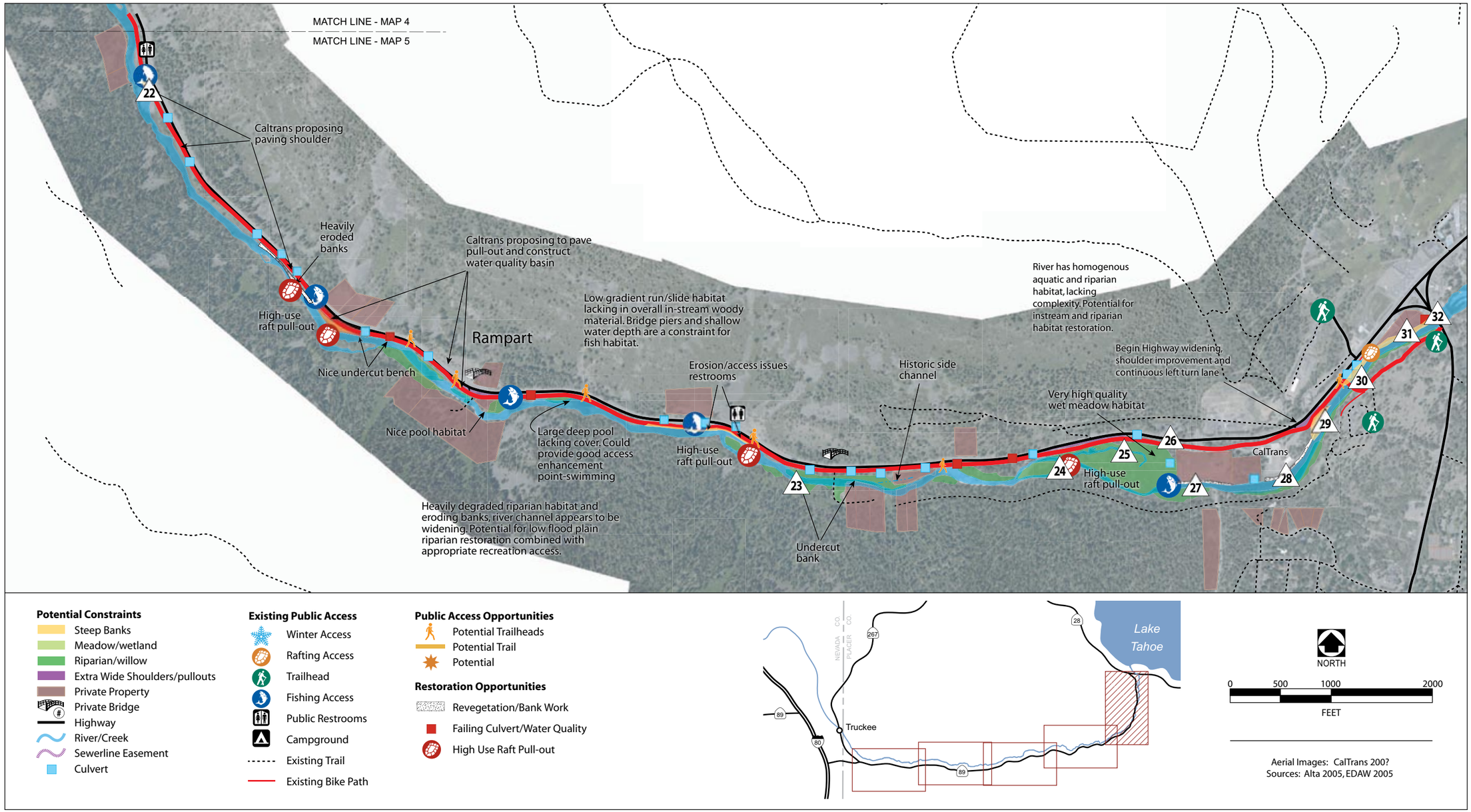
18. Heavy use denudes vegetation

19. High quality meadow habitat along river

20. Rafters frequently pull-out on private property and heavy use denudes river bank of vegetation

21. Restroom available along river

EXHIBIT 3-5 Opportunities and Constraints Map 5, Reach 3



22. Heavy recreation access has limited riparian plant growth in some locations

23. Minor bank erosion along river channel

24. High use raft pull-outs can degrade wetland and riparian habitat

25. High quality riparian/wet meadow habitat

26. Very large shoulder along SR 89 could be converted to more formal recreation access trailhead

27. Bare steep river banks could be restored to provide habitat, water quality and aesthetic enhancements

28. Bare steep river banks could be restored to provide habitat, water quality and aesthetic enhancements

29. The Truckee River is wide, slow, and shallow in Reach 3

30. Formalized river access in Tahoe City

31. River banks along commercial area in Tahoe City could be enhanced with riparian plantings

32. Existing culvert at Fanny Bridge could be improved with best management practices