Management Actions and Restoration Opportunities, Pole Creek Watershed, Placer County, California, 2024

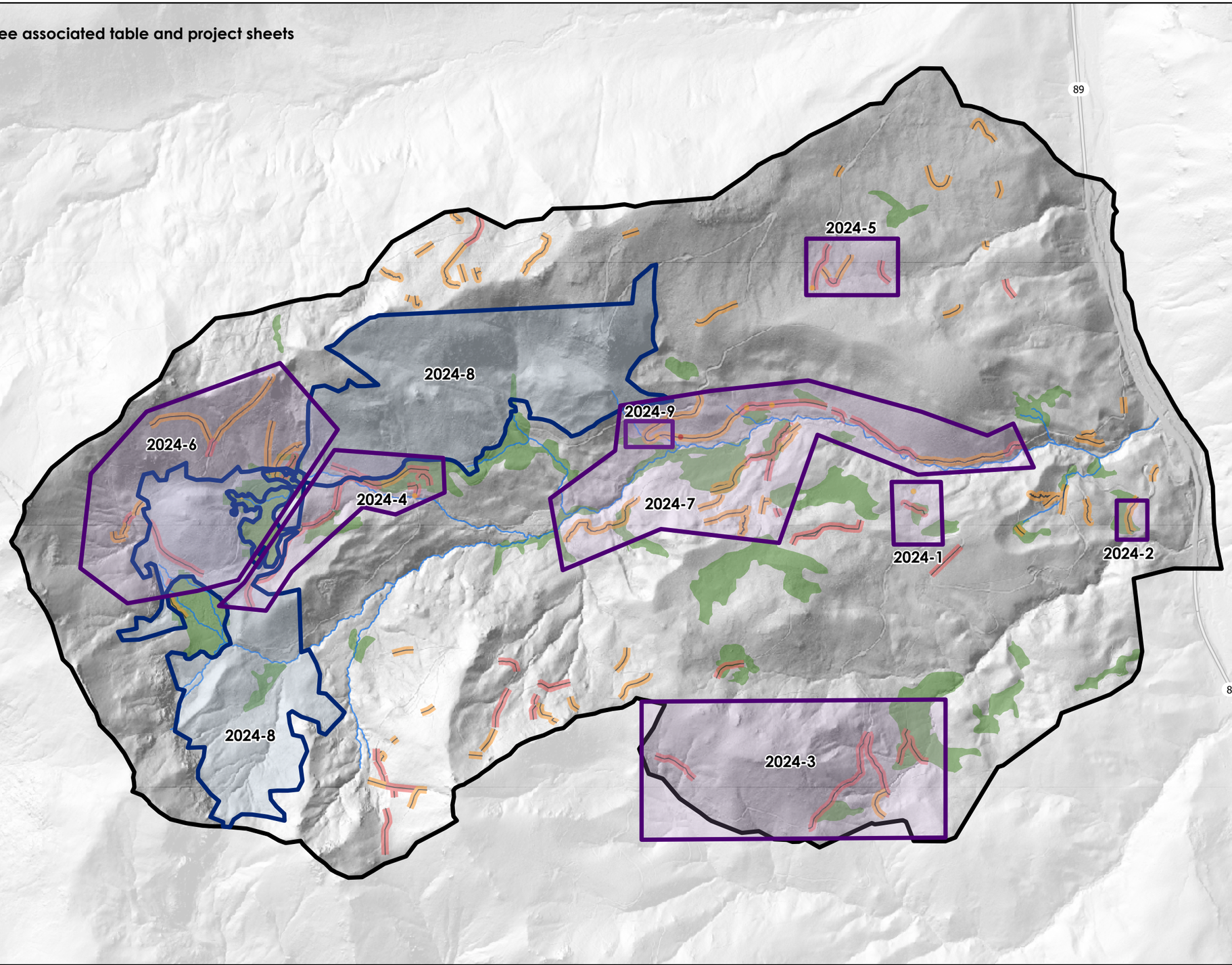
Project Map ID	Project	Location	Stakeholders/Landowners	Problem or Source of Degradation	Goal(s)	Recommended Actions	Implementation Constraints	Target Conditions	Performance Monitoring Recommendations	Estimated Costs	Priority
					Relatively Straight-forward Projects						
2024-1	Meadow restoration protection	Meadow ID: M-13, M-15, T16N, R16E, Section 17	USFS	Vehicular access; road capture	Restore meadow condition	(1) Block vehicle access to meadows; (2) remove ruts and restore natural flow paths	None	No visual ruts or evidence of vehicle access	visual, photographic	$	LOW
2024-2	Meadow restoration protection	Meadow ID: M-16, T16N, R16E, Section 16	USFS	Vehicular access; rutting, road capture generating gullying	Restore meadow condition	(1) Remove road and restore natural flow pathways; (2) block vehicle access to meadow	None	No visual gully or rilling erosion	Native vegetation regrowth	$	LOW
					Moderately Complex Projects						
2024-3	**FS Road 5708-002 Sediment Reduction (See Project Sheet)**	Unnamed Southern Drainage; T16N, R16E, Section 20 (also identified as Critical Site #1, TruckeeTrib2, USDA, 2016)	USFS	Road drainage; gully development; meadow dewatering	Reduce excessive runoff and sediment to Truckee River; improve meadow habitat	(1) Increase number of rolling dips on actively managed roads; (2) maintain existing rolling dips; (3) remove road rilling; (4) improve culverts; (5) remove fill from meadows; (6) construct check dams in gully to aggrade gully and minimize meadow draining; (7) obliterate road thru meadow to restore natural meadow drainage; (8) obliterate roads not within USFS road inventory	Work will require disturbance to portions of existing meadow/wetland	Absence of road capture and rilling on roads; improved dispersed flow across meadow	Surveys of gullys; meadow vegetation cover and diversity; photographic	$$	HIGH
2024-4	**Pole Creek Road FS-5208 Sediment Reduction (see Project Sheet)**	T16N, R16E, Section 18 Pole Creek Road (below Benson Hut) T16N, R15E, Section 13 Spur road (currently abandoned)	USFS/TDLT	Legacy logging impacts, OHV use, absence of road maintenance	Reduce excessive runoff and sediment to Pole Creek; Restore natural flow pathways; Protect cold, clean perennial source waters to downstream LCT habitat	(1) Maintain existing rolling dips; (2) add additional rolling dips; (3) obliterate abandoned roads; (4) restore natural flow pathways to minimize road capture; and (5) obliterate abandoned roads that are 'at-risk' or 'impaired';	None	No rilling of roads or additional gully formation	Visual inspection; photographic	$$	HIGH
2024-5	Road drainage improvements	Unnamed Northern Drainage; T16N, R16E, Section 8 (also referred to as TruckeeTrib1, USDA, 2016)	USFS	Road drainage	Reduce excessive runoff and sediment to Truckee River	(1) Obliterate road(s) associated with gullying; (2) repair/recontour gullies	None	No concentration of flow to existing gully	Visual, photogaphic	$$	MOD
2024-6	Road drainage improvements	Pole Creek Road and spur roads; T16N, R15E, Section 13; roads above 7,600 feet elevation	USFS/TDLT	Poor road drainage; stream capture; steep roads subject to extreme weather; sedimentation of meadow	Reduce excessive runoff and sediment to headwaters of Pole Creek and meadow	(1) Maintain existing rolling dips; (2) add additional rolling dips; (3) restore natural flow pathways to minimize road capture; (4) obliterate abandoned roads that are 'at-risk' or 'impaired'; and (5) construct features to aggrade incised channels	Steep roads, rocky; high elevation (short implementation period)	Absence of road rilling and downslope erosion; reduced sedimentation in head of meadow	Visual inspection; photographic	$$	MOD
					Highly Complex Projects						
2024-7	**Pole Creek LCT Habitat Enhancement (see Project Sheet)**	(T16N, R16E, Sections 16, 17, 18) D-2: Old Pole Creek Road (closed) D-3: Road proposed for improvements D-4: Pole Creek Road west of bridge) (also identified as Critical Site #2, USDA, 2016)	USFS	Watershed-wide historical land-uses, legacy impacts, cumulative effects	Reduce excessive runoff and sediment to Pole Creek; Protect existing LCT habitat	(1) Obliterate and re-contour Old Pole Creek Road; (2) Improve road drainage on roads proposed for improvement for Five Creeks Project; (3) improve road drainage along Pole Creek Road including outsloping; (4) remove in-board ditch; (5) additional rolling dips; and (6) fell trees downslope of road where instabilities are present to encourage hillslope storage	Equipment operation on steep slopes and adjacent to channel; unstable ground	No rilling/gullying; no rilling of cutslope or fill slope; improved pool habitat	Pool sediment assessment; photographic; bed condition monitoring	$$$$	HIGH
2024-8	**Forest Health Improvements (see Project Sheet)**	Upper elevation zones outside the Five Creeks Forest Health Project	USFS/TDLT	Century of fire suppression; tree mortality--accumulation of fuels	Reduce wildfire hazard; protect sensitive meadow habitat from post-fire impacts; improve forest health and habitat	(1) Thinning, piling, and burning	Limited accessand timing due to elevation and snow; steep terrain	Reduction in understory; reduction in surface fuels	Inspection plots	$$$	HIGH
2024-9	Cottonwood Grove Restoration	Pole Creek Road sharp right bend-uphill; T16N, R16E, Section 17	USFS	Road construction and maintenance	Restore natural drainage and cottonwood forest	(1) Consider alternative road alignment; (2) obliterate road segment through cottonwood forest; (3) restore cottonwood forest and natural hillslope drainage associated with meadow/wetlands	Currently an active road for recreation and resource management; re-route may require short-term impacts	Natural flow pathways; regeneration and expansion of cottonwood/riparian communities	Vegetation surveys	$$$$	LOW

References:

USDA, 2016, Middle Truckee River Tributaries Sediment Source Assessment: Prescription Plan, Tahoe National Forest, Truckee Ranger District; prepared for the Truckee River Watershed Council, 177 p.

Cost Key: **$ = <100K**
$$ = $100K - $500K
$$$ = $500K-$2M
$$$$ = $2M+

See associated table and project sheets



Approximate Project Area

Approximate Project Area (Forestry)

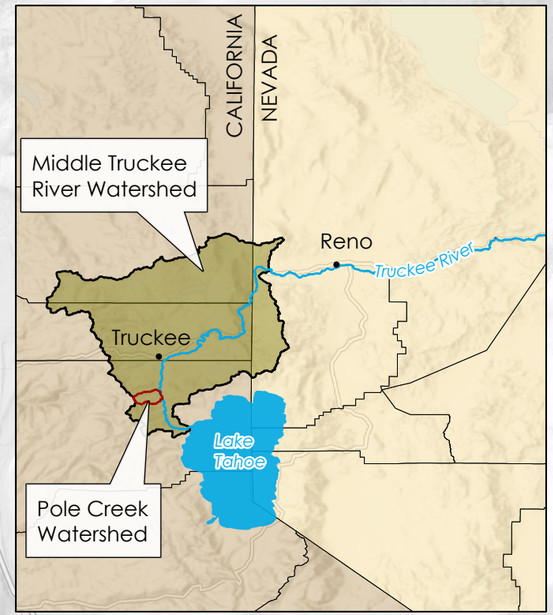
Perennial Stream

Meadows (Source: TNF, 2023)

Road/Trail Condition
- At Risk
- Impaired

Culvert Condition
- At Risk
- Impaired

Road Condition	Total Length (mi)
Functional	26
At Risk	6.2
Impaired	5.3
Not Evaluated	4.25



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California State Parks, Esri, TomTom, Garmin, FAO, NOAA, USGS, Bureau of Land Management, EPA, NPS, USFWS, Esri, CGIAR, USGS

Balance Hydrologics

H. T. HARVEY & ASSOCIATES
Ecological Consultants
50 years of field notes, exploration, and excellence

MASON BRUCE & GIRARD
Natural Resource Consultants

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Feet

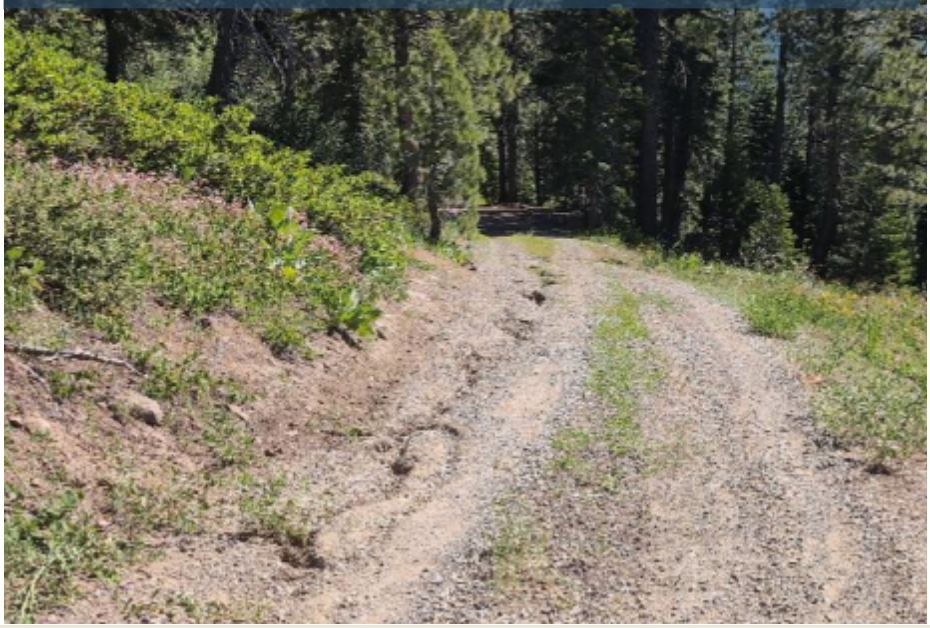
Management Actions and Restoration Opportunities
Pole Creek Study Area, Placer County, California

FS Road 5708-02 Sediment Reduction

Pole Creek Watershed, Placer County, California

Project Map ID: 2024-3

Balance Hydrologics



Description of Problem

Existing and abandoned roads/trails are concentrated in an unnamed tributary to the Truckee River within the Pole Creek Project Area. Construction of these roads has concentrated runoff and sediment delivery and degraded existing meadow; excess sediment may also discharge to the Truckee River. Some roads and trails are abandoned and not used for resource management, while others are key access routes for recreation and resource protection. This area was also identified as "Critical Site #1" in the Sediment Source Assessment (USDA, 2016).

Cost Estimate

<$10K - $100K | **$100K— $500K** | $500K—$2M | $2M+

Goals

- Restore montane meadow conditions
- Reduce fine sediment to Truckee River

Sources of Degradation

- Legacy logging impacts, lack of road maintenance

Objectives to Achieve Goal

- Maintain existing functional road drainage features;
- Add additional road drainage features;
- Replace culverts to match channel slope;
- Obliterate and re-contour abandoned roads
- Armor low flow crossings
- Remove road fill from meadow; restore vegetation

Client

Truckee River Watershed Council

Tahoe National Forest

Landowners

Tahoe National Forest

Project

MAP ID: 2024-3; Priority = HIGH
Approx. 1.0 mile of road drainage improvements, Road obliteration and re-contouring, Restoration of meadow impacts

Locations

T16N, R16E, Section 20

- Access: Pole Creek East Road (Spur)
- FS 5708-02-02-01 and FS 5708-02-02
- Unnamed southern drainage

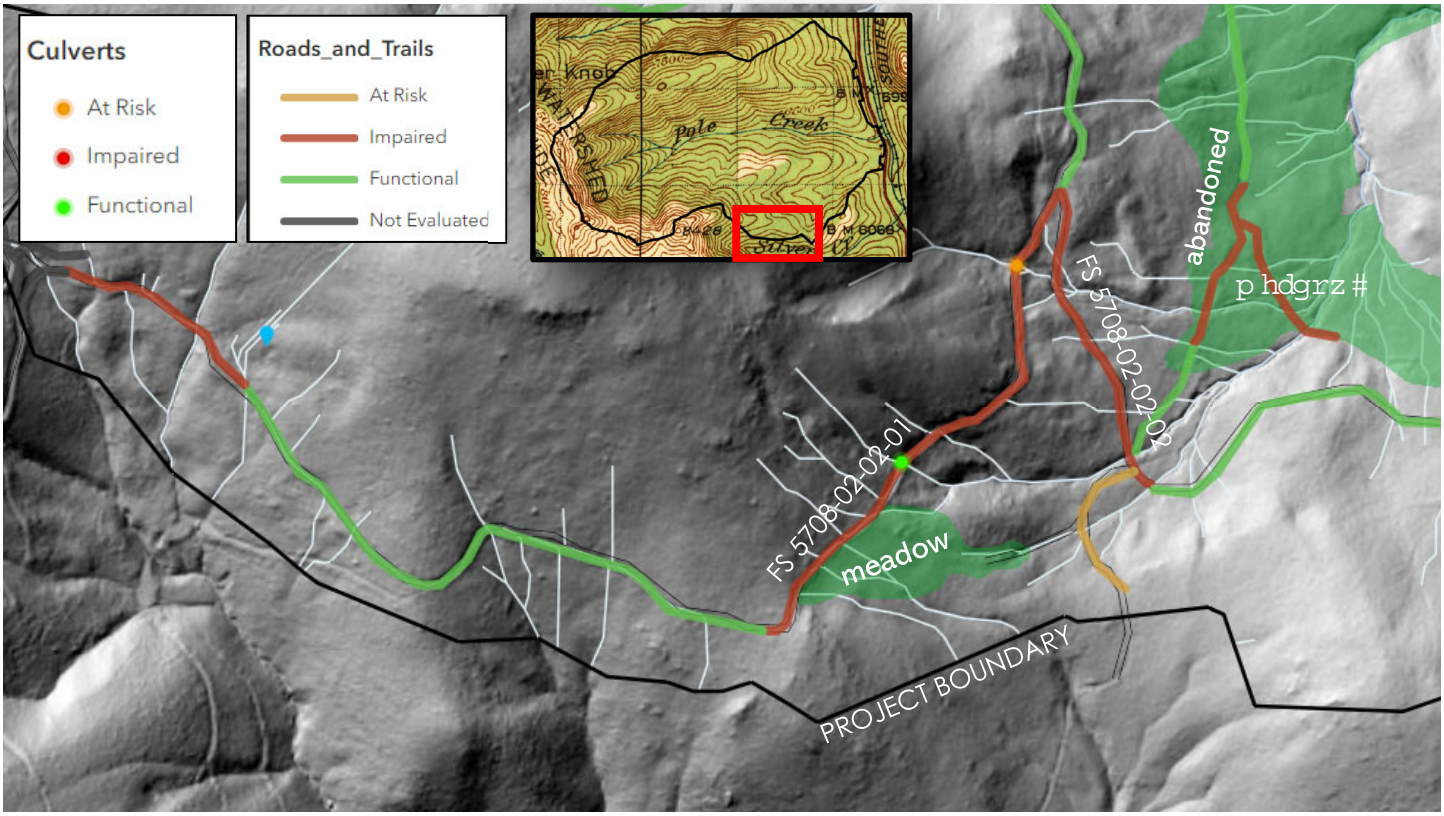
Resources

USDA, 2012, National Best Management Practices for water quality management on National Forest System Lands, Vol. 1, national Core BMP Technical Guide

PWA, 2014, Handbook for Forest, Ranch, and Rural Roads: A guide for planning, designing, constructing, reconstruction, upgrading, maintaining, and closing wildland roads

USDA, 2001, Forest Roads: A synthesis of scientific information, Pacific Northwest Research Station, General Tech Report PNW-GTR-509

Road graded through meadow



Target Conditions/Success Criteria

No rilling or gullying

No concentration of road runoff

Natural flow pathways in meadow

Implementation Timeline

Design (1 month)
Permitting (6 months)
Construction (2-3 weeks)

Project Monitoring Recommendations

Visual evaluation, photo points

References:

USDA, 2016, Middle Truckee River Tributaries Sediment Source Assessment: Prescription Plan, Tahoe National Forest, Truckee Ranger District; prepared for the Truckee River Watershed Council, 177 p.

USDA, 2021, Five Creeks: Purpose and need and proposed action, Tahoe National Forest, Truckee Ranger District, 31 p.

Management Approach

The approach is similar to the Middle Truckee River Tributaries Sediment Source Assessment (USDA, 2016) with the focus of improving drainage on Pole FS 5708-02-02-01 and FS 5708-02-02, and restoring natural flow lines where legacy logging impacts occur. This assessment augments improvements to include obliteration of abandoned roads that impact a meadow and restoration of meadow conditions.

Improvement to drainage on Pole Creek East Road includes maintenance of existing rolling dips, construction of additional rolling dips on steeper road segments, and replacement of an 'at-risk' culvert to match the channel slope. Existing stream-crossing may require armoring to support a stable crossing and minimize scour and erosion of the road surface.

Meadow enhancements may include re-contouring of meadow surfaces, and filling of gulleys or use of plugs to disperse flows onto the meadow surface.

All roads mapped as 'impaired' will be addressed (~1.0 miles)

Constraints

- Sensitive meadow habitat

Opportunities

- Access is via existing roads and trails
- Road improvements include roads used for Five Creeks Project (USDA, 2021)

Pole Creek Road-FS Road 5708 Sediment Reduction

Pole Creek Watershed, Placer County, California

Project Map ID: 2024-4

Balance Hydrologics

Description of Problem

A perennial tributary provides cold, clean waters to Pole Creek and downstream LCT habitat. Multiple roads, logging trails, and landings have altered natural flow pathways, concentrated runoff and increased sediment to this tributary. Some roads and trails are abandoned and do not appear to be used for resource management, while others are key access routes for recreation and resource protection. This area was also identified as “Critical Site #3” in the Sediment Source Assessment (USDA, 2016).

Cost Estimate

<$10K - $100K | **$100K— $500K** | $500K—$2M | $2M+

Goals

- Reduce excessive sediment to Pole Creek
- Restore natural flow pathways
- Protect cold, clean perennial source waters to downstream LCT habitat

Sources of Degradation

- Legacy logging impacts, OHV use, lack of road maintenance and drainage featur

Objectives to Achieve Goal

- Maintain or improve road drainage features; outslope, obliterate or armor road in areas where drainage to creek is unavoidable

Client

Truckee River Watershed Council

Tahoe National Forest

Landowners

Tahoe National Forest

Project

MAP ID: 2024-4; Priority = HIGH
1.1 miles of road drainage improvements,
Road obliteration and re-contouring,
Restoration of natural flow pathways.

Locations

T16N, R16E, Section 18

- Pole Creek Road (near Benson Hut)

T16N, R15E, Section 13

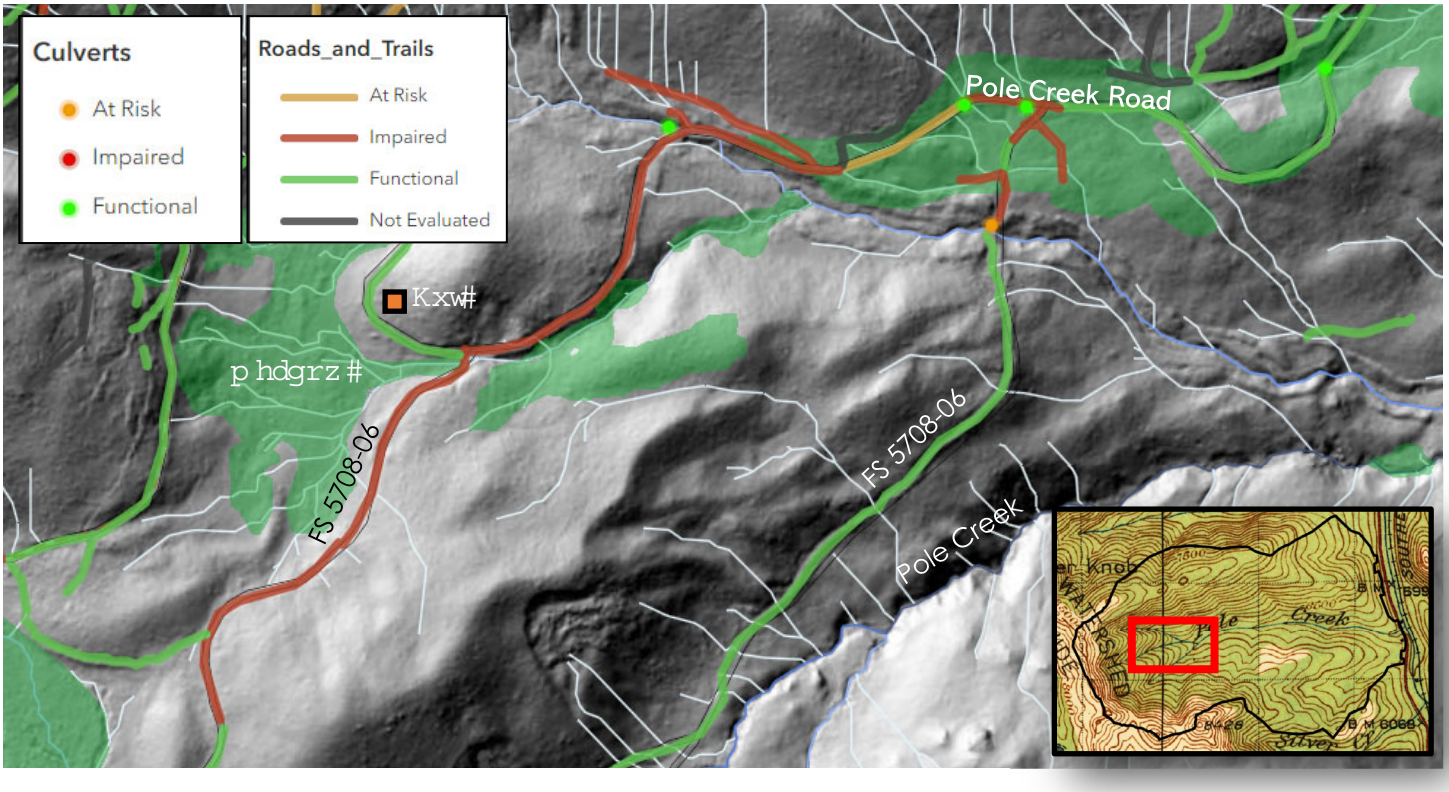
- FS Road 5708-06

Resources

USDA, 2012, National Best Management Practices for water quality management on National Forest System Lands, Vol. 1, national Core BMP Technical Guide

PWA, 2014, Handbook for Forest, Ranch, and Rural Roads: A guide for planning, designing, constructing, reconstruction, upgrading, maintaining, and closing wildland roads

USDA, 2001, Forest Roads: A synthesis of scientific information, Pacific Northwest Research Station, General Tech Report PNW-GTR-509



Target Conditions/Success Criteria

No rilling or gullying

No concentration of road runoff

Implementation Timeline

Design (1 months)
Permitting (6 months)
Construction (2-3 weeks)

Project Monitoring Recommendations

Visual evaluation, photographic

References:

USDA, 2016, Middle Truckee River Tributaries Sediment Source Assessment: Prescription Plan, Tahoe National Forest, Truckee Ranger District; prepared for the Truckee River Watershed Council, 177 p.

USDA, 2021, Five Creeks: Purpose and need and proposed action, Tahoe National Forest, Truckee Ranger District, 31 p.

Management Approach

The approach seeks to improve drainage on Pole Creek Road and impaired segments of FS Road 5708-06 and restore natural flow lines where legacy logging impacts occur. This approach modifies and augments road treatment elements identified in Critical Site #3 (USDA, 2016) to reflect current conditions and include some adjacent drainage issues associated with abandoned skid trails and roads that, if addressed, will minimize the amount of runoff capture and erosion on Pole Creek Road and sediment to Pole Creek. Abandoned roads and trails should be obliterated and re-contoured where feasible; abandoned roads/trails that are well vegetated, show no degradation, and appear to be functional, and can remain undisturbed.

Improvement to drainage on Pole Creek Road would include maintenance of existing rolling dips and construction of additional rolling dips on steeper road segments. Other segments of the road that are immediately adjacent to Pole Creek may require additional armoring to minimize erosion and delivery of fine sediment to the creek.

Legacy logging areas, including landings, should be re-contoured to disconnect runoff concentration in existing ditches and gullies. Unnatural gulleys can be filled and re-planted. In total, approximately 1.1 miles of roads can be addressed.

Constraints

- Sensitive meadow habitat
- Emergency access needed

Opportunities

- Access is via existing roads and trails
- Includes areas proposed for forest health improvements (USDA, 2021)

Pole Creek Lahontan Cutthroat Trout Habitat Management

Pole Creek Watershed, Placer County, California
Project Map ID: 2024-7

Balance Hydrologics

Old Pole Creek Road and related landslide above Pole Creek

Client

Truckee River Watershed Council

Tahoe National Forest

Landowners

Tahoe National Forest

Project

MAP ID: 2024-7; Priority = HIGH
2.5+ miles of road drainage improvements, Road obliteration and re-contouring, Restoration of natural hillslope flow path-ways, Road-fill and cut-slope stabilization and revegetation

Locations

(T16N, R16E, Sections 16, 17, 18)

D-2: Old Pole Creek Road (closed)

D-3: Road proposed for improvements

D-4: Pole Creek Road west of bridge)

(see Pole Creek Disturbance Inventory)

Description of Problem

A small population of Lahontan Cutthroat Trout (LCT) exists in Pole Creek. Stream-resident LCT generally prefer rocky areas, riffles, deep pools, and habitats near over-hanging logs, shrubs, or undercut banks. Pole Creek dissects unstable and poorly sorted glacial drift that provides a source of coarse sediment, but limits the opportunity for undercut and/or stable banks. Instream wood and overhanging vegetation exists but are intermittent along the channel. Legacy impacts from logging, road building, and grazing, altered the hillslope processes in the watershed. These impacts continue today and contribute excessive sediment deposition to Pole Creek, filling pools with fine sediment. Management of near-channel sediment sources can reduce sediment to the channel and LCT habitat. This project will benefit from completion of other sedi-ment-source reduction projects in the watershed. This area was also identified as "Critical Site #2" in the USDA (2016) Sediment Source Assessment.

Cost Estimate

<$10K - $100K | $100K— $500K | $500K—$2M | **$2M+**

Goals

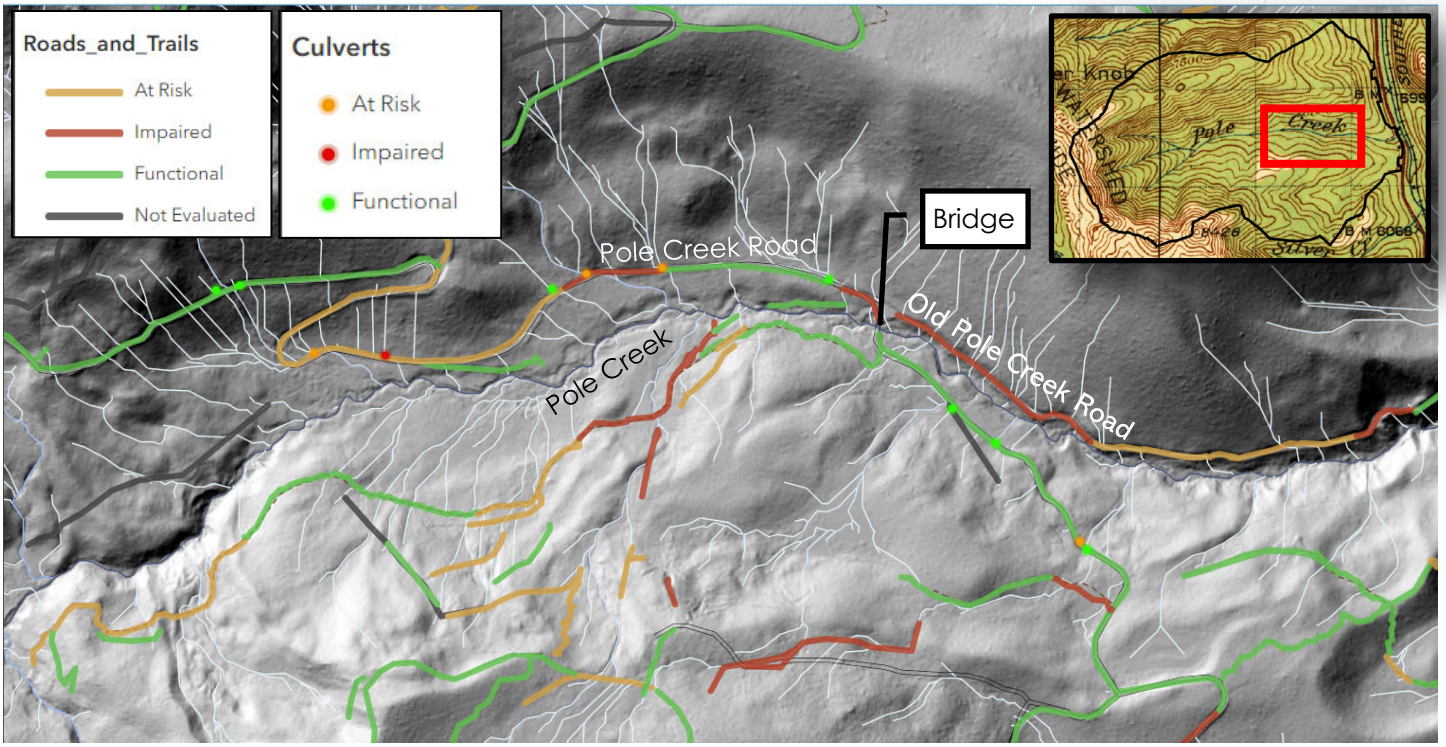
- Reduce excessive runoff and sediment delivery to Pole Creek
- Protect existing LCT habitat

Sources of Degradation

- Watershed-wide land uses, legacy impacts, cumulative effects
- Sediment delivery from roads and associated slope instabilities

Objectives to Achieve Goal

- Road obliteration, re-contouring, drainage improvements, road surface armoring.



Target Conditions/Success Criteria

No rilling or gullying

No roadfill or minimum cutslope rilling/ gullying

Improved pool habitat (depth, texture)

Implementation Timeline

Design (3-6 months)
Permitting (6 months)
Construction (4-6 weeks)

Site D-3 requires coordination with Five Creeks Project (USDA, 2021)

Project Monitoring Recommendations

Visual evaluation, photographic
Pool depth measurements
Pool sediment texture
Fish abundance

Management Approach

Obliterate and re-contour Old Pole Creek Road where feasible. Areas that are well vegetated and show no degradation should remain undisturbed. Re-contoured slopes should include felling and placement of logs on contour or downslope from road to dissipate slope runoff, stabilize steep slopes, and provide sediment storage.

Roads in the southern area of the map (see above) are proposed for improvement under the Five Creeks Project (USDA, 2021). Currently, roads contribute to concentrated flow and erosion that discharge directly to Pole Creek. Improvements should include addressing road drainage issues and restore legacy historical impacts; including areas upstream and downstream of roads

Pole Creek Road, upstream of Pole Creek Bridge will require removal of an in-board ditch and culvert, road outsloping, and additional rolling dips to improve drainage and reduce concentration of runoff and sediment to the creek.

All roads/culverts mapped as 'impaired' and 'at-risk' will be addressed

Constraints

- Equipment operation on steep slopes, potentially unstable ground

Opportunities

- Access is via existing roads and trails
- Work compliments Five Creeks Project

References

USDA, 2016, Middle Truckee River Tributaries Sediment Source Assessment: Prescription Plan, Tahoe National Forest, Truckee Ranger District; prepared for the Truckee River Watershed Council, 177 p.

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