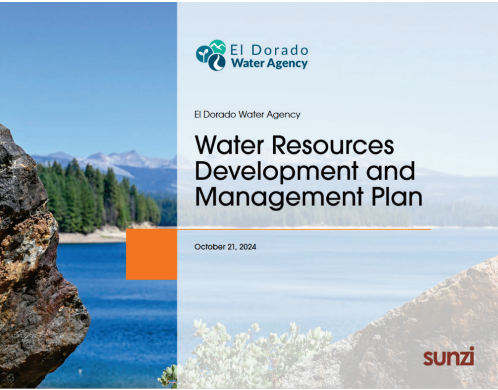


REGIONAL VULNERABILITIES AND THEIR PATHWAYS IN THE EL DORADO TAHOE BASIN

The detailed review of regional vulnerabilities and their pathways is to establish the foundation for regional planning under the Blueprint Tahoe to achieve water security. The outcome will improve the characterization of El Dorado Water Agency’s 2024 [Water Resources Development and Management Plan](#) (WRDMP).

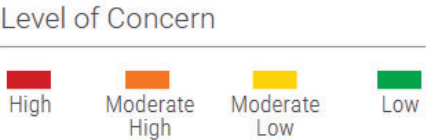


The WRDMP includes a summary of water resource related challenges in the West Slope and the Tahoe Basin with consistent categories and assigns the level of concern rating (high, moderate high, moderate low, and low) on a categorical level. Blueprint Tahoe will have more refined considerations and corresponding assessments for each level of concern, building on the WRDMP summary for the Tahoe Basin. For reference, the summary is shown on the right.

Definitions

- Stressor:** External events, changes, or conditions influencing Tahoe Basin’s water security that are beyond our control.
- Generally, the stressors are population growth, climate change (natural hazards and more), ecosystem degradation, regulatory intervention (for environmental protection and human health and safety), and changes in social values and preferences.
- Vulnerability:** The regional susceptibility or predisposition of communities, infrastructure, resources, and management to damage, failure, contamination, and disruption when facing the stressors.
- Level of Concern:** A combined consideration regarding probability of occurrence and subsequent consequences.

Water-Resource Related Challenges in the Tahoe Basin						
Water Supply			Water Quality			Public Safety
Long-Term Water Supply-Demand Imbalance	Vulnerability During Droughts	Loss of Water Supply Due to Other Resource Management Practices	Long-Term Water Quality Impacts Due to Wildfires	Water Quality Impacts Due to Stormwater Runoff	Concerns Over Groundwater Contamination	Vulnerability to Flooding
• The planned economic growth areas are covered by the existing service areas of major water purveyors, although many small water systems exist. • The growth restrictions and land use in the Tahoe Regional Plan significantly reduce the risk of water supply-demand imbalance • Emerging needs of using surface water due to groundwater contamination threat • Uncertain outcomes of ongoing water right proceeding for the California's share of Truckee River	• The Tahoe Basin is less susceptible to extended droughts, relying on both surface water and groundwater. • Existing drought ordinances do not provide coverage to the entire Tahoe Basin, although most areas have human consumption. • Small water systems and domestic wells are susceptible to water shortage due to drought or other contributing factors including power shutoff during extreme weather conditions.	• Dense forests prevent snow from reaching the ground, resulting in reduced water supply available to the Tahoe Basin as groundwater via recharge. • Stormwater is presently being managed as a hazard and for water quality compliance purposes but not as a potential resource for broader benefits. • Water quality impacts from historical and emerging contamination in groundwater basin restricts existing water supply.	• Increasing frequency and intensity of wildfires result in both temporary and long-term water quality degradation.	• Stormwater runoff may impact water quality in Lake Tahoe, groundwater resource, and water bodies along highway corridors.	• Septic tanks are not prevalent in the Tahoe Basin, but leakage could affect groundwater quality. • Long-term groundwater availability is less of a concern because runoff and snowmelt, even under climate change, are adequate for recharge. • Historical contamination of Perchloroethylene, Methyl tert-butyl ether, uranium, and natural occurring arsenic, and emerging contamination of per-and polyfluoroalkyl substances.	• Riverine flooding is not a substantial threat in the Tahoe Basin; however, rain on snow often causes extensive street flooding in certain areas. • Inflow and infiltration during flooding may overload the sewer system and prevent access sewer lines running through low-lying meadows.



Water Supply

Long-term Water Supply-Demand Imbalance

Vulnerability	Applicable Condition	Pathway(s)	Level of Concern	Notes and Supporting Briefs
Regional water supply-demand imbalance	Regionwide	Insufficient water supply for planned development	Low	Brief: 20260413 Blueprint Tahoe Water Supply-Demand Imbalance
High ratio of transient population to resident population	Regionwide	Significant fluctuation of seasonal populations for recreation and jobs Existing elevated regulatory requirements for water conservation and reporting	High	Brief: 20260413 Blueprint Tahoe Water Supply-Demand Imbalance
Insufficient financial and technical capacity for standard operations and maintenance	Small water systems and domestic wells	Small rate base and historical private systems relying on volunteers and nonprofessional support Recent elevated regulations (e.g., SB 552, human rights to water), including mandatory metering, water loss monitoring, and annual reporting	Moderate High	Brief: 20260414 Blueprint Tahoe Small Water Systems 20260622 Blueprint Tahoe DACs and Vulnerable Populations 20260622 Blueprint Tahoe Drinking Water System Consolidation
Lack of alternative sources of water for reliability	Regionwide	High cost of developing major surface water facilities if the reliability of groundwater supply is impacted by water quality concerns or regulatory change under the condition that water reuse is not permitted in Lake Tahoe region	Moderate High	See related entries in Water Quality Briefs: 20260414 Blueprint Tahoe Small Water Systems 20260622 Blueprint Tahoe Sustainable Groundwater Management 20260622 Blueprint Tahoe Regional Comm and Advocacy

Vulnerability during Droughts and Water Shortage Conditions (including Public Safety Power Shutoff events)

Vulnerability	Applicable Condition	Pathway(s)	Level of Concern	Notes and Supporting Briefs
Lack of alternative sources of water for emergency	Small water systems (SWS) and domestic wells (DW) Urban Water Suppliers (UWS; TCPUD, STPUD)	Lack of interties and mutual aid agreements with adjacent larger water systems Lack of access to adjacent water systems due to isolation and/or terrains Lack of sufficient onsite storage and/or backup power for health and safety water supply during emergencies Water right curtailments under emergency regulations	Moderate High (SWS and DW) Low (UWS)	Briefs: 20260414 Blueprint Tahoe Small Water Systems 20260622 Blueprint Tahoe DACs and Vulnerable Populations 20260622 Blueprint Tahoe Drinking Water System Consolidation 20260622 Blueprint Tahoe SB 552 Imp Streamlining 20260622 Blueprint Tahoe Sustainable Groundwater Management

Vulnerability	Applicable Condition	Pathway(s)	Level of Concern	Notes and Supporting Briefs
		Shutdown of intakes on Lake Tahoe for an extended period due to disabling water quality issues Groundwater basin overdraft or prevailing disabling water quality issues		

Loss of Water Supply Due to Other Resource Management Practices

Vulnerability	Applicable Condition	Pathway(s)	Level of Concern	Notes and Supporting Briefs
PCE contamination due to primarily past dry cleaning operations	Tahoe Key, Lukins Brothers, and a small portion of STPUD service areas)	Slow migrating plume affecting water quality requiring well head treatment and/or alternative facilities Uncertain schedule and outcome for Lahontan Regional Water Quality Control Board’s regulatory and enforcement process and mitigation outcome	High (for impacted systems) Low (regionwide)	On state level, in the Sustainable Groundwater Management Act implementation context, there is a misperception of its level of impact on the sustainability of the underlying groundwater basin and regional water supply. Also see related vulnerabilities in Water Quality section. Briefs: • 20260410 Blueprint Tahoe South Y Area PCE Contamination • 20260622 Blueprint Tahoe Sustainable Groundwater Management
Water reuse not permitted	Regionwide	Existing regulations prohibiting water reuse in the region	N/A	Treated wastewater is used in other counties
Stormwater treated as hazard	Regionwide	Lack of integrated use opportunity as a water supply	Low	No water supply-demand imbalance or groundwater overdraft Briefs: • 20260413 Blueprint Tahoe Water Supply-Demand Imbalance • 20260622 Blueprint Tahoe Sustainable Groundwater Management
Overgrown forests	Headwaters	Reduced ground accumulation of snow due to overgrown canopy Reduced runoff due to evapotranspiration from overgrown forests	Moderate High	Related to watershed-scale forest management and associated wildfire mitigation strategy (out of scope) Brief: • 20260622 Blueprint Tahoe Wildfire Impact on Water Quality • 20260622 Blueprint Tahoe Water 4 Fire Supression Rural Areas

Water Quality

Long-term Water Quality Impacts Due to Wildfire

Vulnerability	Applicable Condition	Pathway(s)	Level of Concern	Notes and Supporting Briefs
Burned scar from wildfire in watershed	Dring water systems with surface water as the primary source	Erosion and debris from burned scars and reduced watershed regulating and retention capacity	Moderate High (systems on surface water but not from Lake Tahoe) Moderate Low (other systems)	No substantial impacts from past fire events; potential impacts are best prevented by supporting and advancing watershed-scale forest management and associated wildfire mitigation strategy (out of scope) Brief: 20260622 Blueprint Tahoe Wildfire Impact on Water Quality

Water Quality Impacts Due to Stormwater Runoff and Failure of Sewer Infrastructure

Vulnerability	Applicable Condition	Pathway(s)	Level of Concern	Notes and Supporting Briefs
Personal vehicle uses for transportation	Major transportation corridors	Increase in visitation and seasonal duration for recreation interests in the Tahoe Basin	Moderate High	Existing management structure and plan providing baseline protection (e.g., TRPA Regional Transportation Plan)
Front country and backcountry recreation	Recreation sites and watershed	Increase in visitation and seasons	Low	Existing management structure and plan providing strict baseline protection
Urbanization and intensification	Developed areas	Increases in pollutants and impermeable surfaces	Moderate Low	Existing management structure and plan providing baseline protection (e.g., TRPA Regional Plan and County Area Plan)
Sewer infrastructure in environmentally sensitive areas	Infrastructure footprints and adjacent areas	Infrastructure failure or malfunction Substantial sewer infiltration and inflow due to change in precipitation and hydrologic patterns	Moderate High	Briefs: 20260413 Blueprint Tahoe Sewer Line Sensitivity 20260412 Blueprint Tahoe Flood Risks 20260622 Blueprint Tahoe Sewer Line in Environmentally Sensitive Areas
Aging private sewer laterals in environmentally sensitive areas	Infrastructure footprints and adjacent areas	Private lateral leakage and failure	Moderate Low	Briefs: 20260622 Blueprint Tahoe Private Sewer Laterals

Concerns Over Groundwater Contamination

Vulnerability	Applicable Condition	Pathway(s)	Level of Concern	Notes and Supporting Briefs
PCE contamination due to past dry-cleaning operations	South “Y” Area	Slow migrating plume affecting water quality requiring well head treatment and/or alternative facilities Uncertain schedule and outcome for regulatory process and mitigation	High	Briefs: • 20260410 Blueprint Tahoe South Y Area PCE Contamination • 20260622 Blueprint Tahoe Sustainable Groundwater Management • 20260622 Blueprint Tahoe Regional Comm and Advocacy •
Natural occurrence of contamination in groundwater	General regionwide	Elevated regulatory requirements, when approved	Current: Moderate High Long-term: High	Arsenic, radioactive elements, and other contaminants in volcanic formation Briefs: • 20260622 Blueprint Tahoe Public Outreach and Education • 20260622 Blueprint Tahoe Regional Comm and Advocacy
Emerging contamination in groundwater and surface water	General regionwide	Elevated regulatory requirements, when approved	Current: Low Long-term: High	PFAS, etc., including release from material use in outdoor recreation attires and equipment, and other applications Briefs: • 20260622 Blueprint Tahoe Public Outreach and Education • 20260622 Blueprint Tahoe Regional Comm and Advocacy
Stormwater runoff contamination	Vicinity of stormwater infiltration basins	Stormwater infiltration basins introduce stormwater contaminants in a concentrated manner to groundwater aquifers	Moderate Low	

Public Safety

Vulnerability to Flooding

Vulnerability	Applicable Condition	Pathway(s)	Level of Concern	Notes and Supporting Briefs
Community located downstream of dams	Areas downstream of DSOD jurisdictional dams	Dam failure with DSOD regulations and approved operations and maintenance practices	Low	Brief: • 20260413 Blueprint Tahoe Dam Breach Inundation
Community located in the riverine floodplain	Areas with FEMA 0.1 and 0.05 annual chance of flood hazard	Located in natural and modified floodplains, including areas under backwater effects from Lake Tahoe and choke points created by bridges and other flow restricting built infrastructures. Changes in hydrologic patterns due to climate change or projects in floodplain or inappropriately mitigated project impacts (e.g., transportation, floodplain restoration)	Moderate High	Existing land use policies and regulatory settings limiting development in FEMA 0.1 annual chance of flood hazard floodplain. Briefs: • 20260412 Blueprint Tahoe Flood Risks • 20260622 Blueprint Tahoe Unintended Consequences Beaver Dams and Meadow Restorations
Inadequate stormwater system and facility capacity	General drainage areas	Changes in precipitation and/or snowmelt patterns	Moderate High	Brief: • 20260412 Blueprint Tahoe Flood Risks

Fire Suppression for Structure Protection

Vulnerability	Applicable Condition	Pathway	Level of Concern	Notes and Supporting Briefs
Inadequate water supply for fire suppression to protect structures during urban fire or wildfire events	Regionwide	Insufficient distribution system capacity for adequate fire flow and/or insufficient density of hydrants in areas with a municipal-like water system Insufficient ready sources (e.g., tanks, storage), supporting infrastructure (e.g., dry hydrants) and operations (e.g., tender shuttle) consistent with the approach of National Fire Protection Association 1142 for rural areas without a municipal-like water system	Moderate-High	Briefs: • 20260414 Blueprint Tahoe Fire Protection 4 Structures • 20260622 Blueprint Tahoe Water 4 Fire Supression Rural Areas • 20260622 Blueprint Tahoe Public Outreach and Education • 20260622 Blueprint Tahoe Regional Comm and Advocacy

Extended Emergency Conditions

Vulnerability	Applicable Condition	Pathway	Level of Concern	Notes and Supporting Briefs
Constrained capacity for sustaining health and safety water delivery in extended emergency conditions	Regionwide	Insufficient fuels for backup power generating equipment to sustain extended emergency conditions due to relatively restricted access routes from outside of Laket Tahoe region	Moderate Low	This condition may amplify drought and water shortage vulnerability. There are no similar historical incidents; the possibility of this condition is not assessed. Related to regional fuel product supply and vulnerability (out of scope).

Cross Cutting

Communication, Engagement, and Education

Vulnerability	Applicable Condition	Pathway	Level of Concern	Notes and Supporting Briefs
Insufficient and uneven public awareness and understanding about water and wastewater management challenges and issues	Regionwide	Lack of a cohesive communication channel with coordinated messages on water issues or a regular venue to engage all water systems and interested parties, particularly in the following areas: - Water conservation regulatory changes - Increased drought and water shortage resilience requirements and enforcement actions for all water systems - Assistance needed for alleviating potential regulatory burdens and augmenting capacity for implementation	Moderate High	Brief: 20260622 Blueprint Tahoe Public Outreach and Education 20260622 Blueprint Tahoe Regional Comm and Advocacy
Limited workforce and difficulty retaining operators	Regionwide	High cost of living Limited career opportunities for water operators and practitioners Loss of institutional knowledge with aging workforce	Moderate High	Brief: 20260622 Blueprint Tahoe Workforce and Loss of Inst Knowledge

Document Notes:

- Previous version(s):
 - [20260413 Blueprint Tahoe Regional Vulnerabilities.pdf](#) was used in Workshop 1.
- Vulnerabilities and Pathways can have a multiple-to-multiple relationship; same will be for short-term response and long-term mitigation actions.
- Use of briefs in Blueprint Tahoe:
 - The briefs are interim documents to support the blueprint development. They are developed as needed. The date (in yyyyymmdd format) in the first part of filename denotes the version.
 - The primary utility of these briefs is to document the findings of team's research and derivation, laying the foundation for blueprint roadmap development. The team shares the briefs periodically to support workshop discussion. Research and considerations related to one vulnerability may be in multiple briefs; similarly, a brief may cover multiple related vulnerabilities.
 - Once shared, these interim documents will not be further maintained.
 - Hyperlinks to these briefs in the [Blueprint Public Folder](#) will remain valid through 2028. Permanent workshop records are on the Water Agency's website, [Regional Water Blueprint Initiative](#).

PRIVATE SEWER LATERALS IN THE EL DORADO TAHOE BASIN

During Workshop 1, it was clarified that the vulnerability associated with septic tanks should be revised to be about private sewer laterals. The [Porter-Cologne Water Quality Control Act](#) of 1969 (California Water Code Sections 13950-13951), as Amended, effectively made the use and permitting of any septic tank impossible.

Other brief(s) incorporated by reference:

- [20260413 Blueprint Tahoe Sewer Line Sensitivity](#)
- 20260622 Blueprint Tahoe_Sewer Lines in Environmentally Sensitive Areas

Outstanding National Resource Water

Outstanding National Resource Waters (ONRW) is a term referencing the description in the federal Clean Water Act ([40 CFR 131.12\(a\)\(3\)](#)) of the highest tier of anti-degradation protection.¹

"Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected."

State Water Resources Control Board (SWB) [Resolution No. 68-16](#) provides a description of the State's implementation of water quality control policies consistent with the anti-degradation protection described in the Clean Water Act.

Water Quality Control Plan for the Lahontan Region (Basin Plan)

Based on the Porter-Cologne Water Quality Control Act and Resolution No. 68-16, the Lahontan Regional Water Quality Control Board (LRWQCB) imposes strict anti-degradation requirements in its [Basin Plan](#), including its TMDL standards. The Basin Plan states that the only California waters designated as ONRWs are Lake Tahoe and Mono Lake. Thus, the highest tier of anti-degradation protection is applied to Lake Tahoe and its tributaries.

The resulting regulatory framework imposes a near-zero input of nitrogen, phosphorus, and fine sediment, which effectively deems it impossible to permit treatment processes of septic tanks, cesspools, and similar. LRWQCB may consider exemptions in a case-by-case condition; rare exemptions have been provided, particularly after the 1982 SWB's [Water Quality Order 82-1](#).

The LRWQCB granted an exemption to the sewer-export mandate for a small number of remote cabins where installing sewer lines would cause more environmental harm. In these cases, toilet waste must go into sealed holding tanks (pumped out of the Basin) and only graywater is leached on-site under strict conditions (no kitchen or laundry discharges) ([Chapter 5 Water Quality Standards and Control Measures for the Lake Tahoe Basin](#), page 63 of 104).

¹ Where the federal anti-degradation policy applies, it does not absolutely prohibit any changes in water quality but requires that any reductions in water quality be consistent with the three-part test described in 40 CFR 131.12(a).

Regional Sewer Services

South Tahoe Public Utility District (STPUD) and Tahoe City Public Utility District (TCPUD) have provided regional sewer services on the South Shore and West Shore, respectively, since 1950, and under mandated export requirements beginning in the late 1960s.

STPUD exports its treated wastewater over Luther Pass to the Diamond Valley Ranch in Markleeville, Alpine County, California for irrigation purposes. TCPUD exports wastewater to the Regional Water Reclamation Plant of the Tahoe-Truckee Sanitation Agency, a regional wastewater agency for North and West Shores of Lake Tahoe and communities along the Truckee River corridor.

Related to water supply reliability, the strict anti-degradation requirements also limit water reuse in the Tahoe Basin. Truckee Regional Planning Agency (TRPA) [Code of Ordinances](#) (Section 60.1.3.C.4) allows use only for fire protection during emergency catastrophic wildfire conditions with authorization by the fire incident commander and with a report to TRPA Emergency Response Coordinator.

Areas without Regional Services

There are exceptions for the mandatory regional sewer collection and export. These areas were permitted to use septic vaults with pump out services.

- State Parks: Septic vault use with pump out services
 - D.L. Bliss State Park
 - Emerald Bay State Park (Eagle Point Campground has a collection system and raw sewage is pumped and sent to STPUD wastewater treatment plant and is thus included in STPUD service area.)
 - Washoe Meadow State Park
- Cabins and lodges under U.S. Forest Service's recreation resident special use permit (e.g., Echo Lake area)
- Sites that are remote and used for camps and other transient purposes (e.g., Angora Lake Resorts)

Private Sewer Laterals

Private sewer laterals connect plumbing on the property to the public sewer main. Unlike public sewer mains, private laterals often escape regular inspection and can degrade over time. Old or damaged private laterals can leak sewage, which poses risks to groundwater and Lake Tahoe's nearshore environment. Undetected leaks can discharge raw sewage into soil and shallow groundwater and eventually into streams or the lake, carrying harmful bacteria and nutrients.

Requirements for Connection

There are established requirements for existing sewer laterals of new and/or remodeled buildings, or new constructions to be permitted for connecting to the regional sewer system. ([STPUD Administrative Code](#), Section 4.3.9 and 4.3.10; [TCPUD Sewer Ordinance](#), Section 3.03.2).

Ownership for Maintenance

Property owners are responsible for keeping the entire lateral in good working order, including preventing and fixing clogs or leaks on their property ([TCPUD Sewer Ordinance](#), Section 3.03.5; [STPUD Administrative Code](#), Section 4.7.2).

Costs for replacing private laterals in El Dorado Tahoe Basin can vary from \$5,000 to \$15,000² depending on the lengths of laterals, replacement methodology, permit and inspection requirements, and restoration needs.

Recent Incidents of Private Sewer Lateral Leak

In late July 2025, routine weekly water-quality monitoring at Camp Richardson Beach detected unusually high E. coli levels in the lake water. This finding immediately prompted follow-up sampling and coordination among the monitoring team and local regulators. Lahontan Water Board staff and University of Nevada scientists conducted extra tests to confirm the contamination, while STPUD and Camp Richardson’s maintenance staff inspected nearby sewer lines. On August 1, 2025, the resort’s team discovered a leaking private sewer lateral, pinpointing it as the source of the E. coli pollution ([Carlson & Chandra, 2025](#)). This leak prompted temporary beach closures and an inter-agency response to protect public health ([USFS LTBMU, 2025](#)).

In October 2018, STPUD also received a call about a blockage in a private lateral in the Kokanee neighborhood ([Tahoe Daily Tribune](#)).

Back in 2005, a broken sewer lateral allowed an estimated 1,000 to 3,000 gallons of sewage to flow into the Angora Creek ([Tahoe Daily Tribune](#)).

Examples of Private Lateral Management

Lateral Testing or Certification Programs

Entity (with link)	Certificate Issuing Party	Trigger Events	Exemptions
East Bay (EBMUD Region)	Licensed plumbing contractor	Close Escrow Permit sign-off for major remodeling (>\$100k) Changing water meter size	Lateral recently replaced or newly contrasted. Pressurized laterals. Some Title Transfer are exempt. See Guidelines for Exemptions for details.

² [Online vendor free estimate tool](#) based on national average.

City of Santa Cruz	Licensed plumbing contractor	Transfer of Title	Lateral less than 20 years old or inspected within last 20 years.
Santa Cruz County (unincorporated)	Licensed plumbing contractor	Close of Escrow	Lateral less than 20 years old or inspected within last 20 years and no known problems
City of Morgan Hill	Qualified contractor ¹	Start of new water service	Lateral less than 15 years old
City of South San Francisco	Licensed plumbing contractor	Close of Escrow	Lateral less than 25 years old or lateral was inspected within the last 10 years.

¹Licensed plumbing contractor with a City of Morgan Hill business license and an active pipeline or lateral assessment certification from the National Association of Sewer Service Companies.

Funding Assistance Programs

- West County Wastewater (serving areas near Richmond, CA): [Public Incentive Program for Efficiency of Sewers](#) to provide rebates to residential and commercial property owners who repair or replace damaged sewer laterals.
- City of Morgan Hill: [Private Sewer Lateral Grant](#).

Educational Materials

- [Redwood City](#)
- [City of Santa Bernardino Water Department](#)

Conceptual Vulnerability Assessment Tool

Purpose

This conceptual tool is to provide a framework to delineate the geographic area for the above-mentioned inspection certificate requirement.

The resulting classification may be considered in future ordinances or codes to:

- Specify required corrective actions.
- Incentivize repairs of aging laterals.
- Provide a progressive enforcement strategy for broad support.

The results of this risk assessment can improve public awareness and understanding.

The previously mentioned areas without regional sewer systems are excluded from the analysis because of their use of septic vaults with permits.

Concept

- Potential areas of impact: Lake Tahoe and Stream Environment Zones (SEZs), which is defined as “generally an area that owes its biological and physical characteristics to the presence of surface or ground water” in TRPA Code of Ordinances.³
- Potential factors contributing to likelihood of lateral failure:
 - Age of development (particularly, prior to 1970)
 - Soil movement/slope
 - Freeze-thaw exposure (depth of laterals)
 - Known infiltration and inflow problem
- Potential factors contributing to consequences of lateral failure:
 - Distance to Lake Tahoe (e.g. nearshore having the highest consequences)
 - Proximity to streams or SEZs
 - Groundwater depth (e.g. shallow having the highest consequences)
 - Hydraulic connectivity to Lake Tahoe

Scoring System

The scoring model for illustrative purposes is shown below. The total maximum score is 25.

Factor	Score =	1	2	3	4	5
Distance to Lake Tahoe ¹ (feet)		>3,000	≤3,000	≤2,000	≤1,000	≤500
Near SEZ ¹ (feet)		>20	≤20	≤10	≤3	0
Building age ² (per parcel data)		-	-	≤2000	≤1990	≤1970
Average Slope ³ (%)		≥5	≥15	≥30	≥50	≥75
Groundwater Depth ^{4,5} (feet from the surface)		-	-	>20	≤20	≤10

¹ Measured from the center of the parcel.

² Based on County parcel data.

³ Based on the USGS map in parcel.

⁴ Based on DWR groundwater records (Tahoe Valley-Tahoe West and Tahoe South subbasins), and available modeling data (Tahoe Valley-Tahoe South Subbasin only).

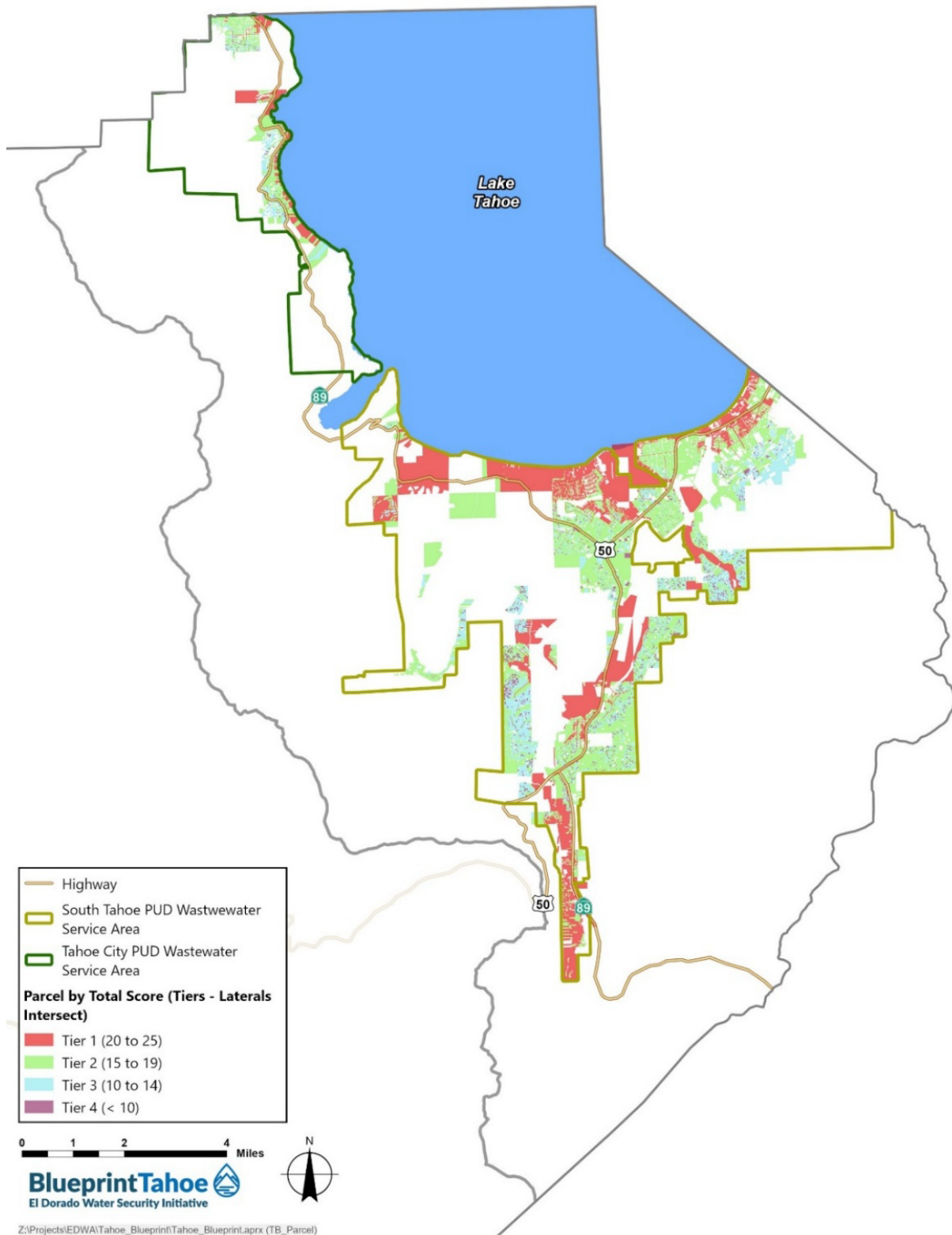
⁵ The highest score is used for any larger parcel satisfying multiple thresholds. There is no groundwater elevation for the Tahoe Valley-Tahoe West groundwater basin; a uniformed score of 4 was assigned.

³ [California Tahoe Conservancy](#) provides a more understandable summary: The Tahoe Regional Planning Agency developed the concept of a Stream Environment Zone (SEZ) to suit unique resources at Lake Tahoe. SEZs include perennial, intermittent, and ephemeral streams and drainages. They also include marshes and meadows. They generally have the following characteristics:

- streambank (riparian) or wet site (hydric) vegetation;
- alluvial, hydric soils; and
- the presence of surface water or near-surface groundwater at least part of the year.

Tier	Total Score	Statistics (No. of Parcels)	Est. Total Cost* (in M)
Tier 1	20-25	3,327	17 - 50
Tier 2	15-19	13,117	66 - 197
Tier 3	10-14	7,837	39 - 118
Tier 4	Less than 10	390	2 - 6

* Based on the assumed range of 5K to 15K per parcel and the total number of parcels without individual verification of lateral conditions.



Potential Measures/Partial Solutions

The following measures/partial solutions are for discussion.

1. **(A: Entity)** institutes the requirement of a lateral compliance certificate issued by **(B: Certification Party)** for residential and commercial properties within **(C: geographic areas)** when **(D: Trigger events)** with **(E: Exemptions)** to meet the standards of corresponding sewer utility for connection.

The Certificate should state one of the following:

- Private lateral passed inspection,
- Repairs are completed, or
- Conditional compliance (with escrow funds secured) [*flexibility may be necessary to accommodate the local conditions including winter conditions, contractor availability and other constraints*]

The ordinance or code for instituting the requirement needs to be clear on all conditions as well as consequences (e.g., fines, liens).

The options for various placeholders in the above measure description are provided below. In some cases, multiple options may be preferable.

A. Entity:

- a. County of El Dorado, City of South Lake Tahoe
- b. TRPA (for Lake Tahoe Region)
- c. El Dorado Water Agency
- d. STPUD, TCPUD
- e. TVS GSA
- f. Other

B. Certificate issuing party:

- a. Corresponding regional sewer utility (i.e., STPUD or TCPUD)
- b. Third-party with minimum qualifications
- c. Other

C. Geographic areas:

- a. All parcels in the El Dorado Tahoe Basin (or the Tahoe Basin as a whole)
- b. Risk-based determination (Tiers 1 and 2) according to the risk assessment (see later discussion)

- c. Risk-based determination (Tiers 1, 2, and 3) according to the risk assessment (see later discussion)

D. Trigger events:

- a. Substantial improvement as defined by [California Building Code](#):

Any repair, reconstruction, rehabilitation, alteration, addition or other improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the improvement or repair is started. If the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of the actual repair work performed. The term does not, however, include either:

- 1. Any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the building official and that are minimum necessary to assure safe living conditions.*
- 2. Any alteration of a historic structure provided that the alteration will not preclude the structure's continued designation as a historic structure.*

Enforcement agencies: County of El Dorado, City of South Lake Tahoe

- b. Property transfer
 - The ordinance at utility or local government level will ensure the enforcement of escrow companies.
 - Escrow companies will explicitly reference the ordinance/code and requirements.
 - Title companies will require proof of compliance prior to recording.
- c. Other

E. Exemptions:

- a. No exemptions
- b. Within certain (2, 5, 10, 15, or more) years of previously satisfied inspection with certification

2. **(A: Entity)** maintains a parcel-level database for **(B: Geographic Region)** with integration with county assessor parcel data, utility records, and building code permit systems, containing inspection status, age/material of lateral, repair history, and enforcement records.

The geographic area will match the entity's authority unless explicitly delegated with consent. Certain entities may provide administrative records as part of the workflow (e.g., if STPUD provides the certificate, it will have a record for such an action even though it is not responsible for the complete workflow).

A. Entity and B. Geographic Region:

- a. TRPA; Lake Tahoe Region
- b. EDWA; El Dorado Tahoe Basin
- c. County of El Dorado and City of South Lake Tahoe; El Dorado Tahoe Basin unincorporated and incorporated areas, respectively.
- d. Other

3. **(A: Entity)** develops educational information for responsibility and care of private laterals and distributes the materials through **(B: Channels)**.

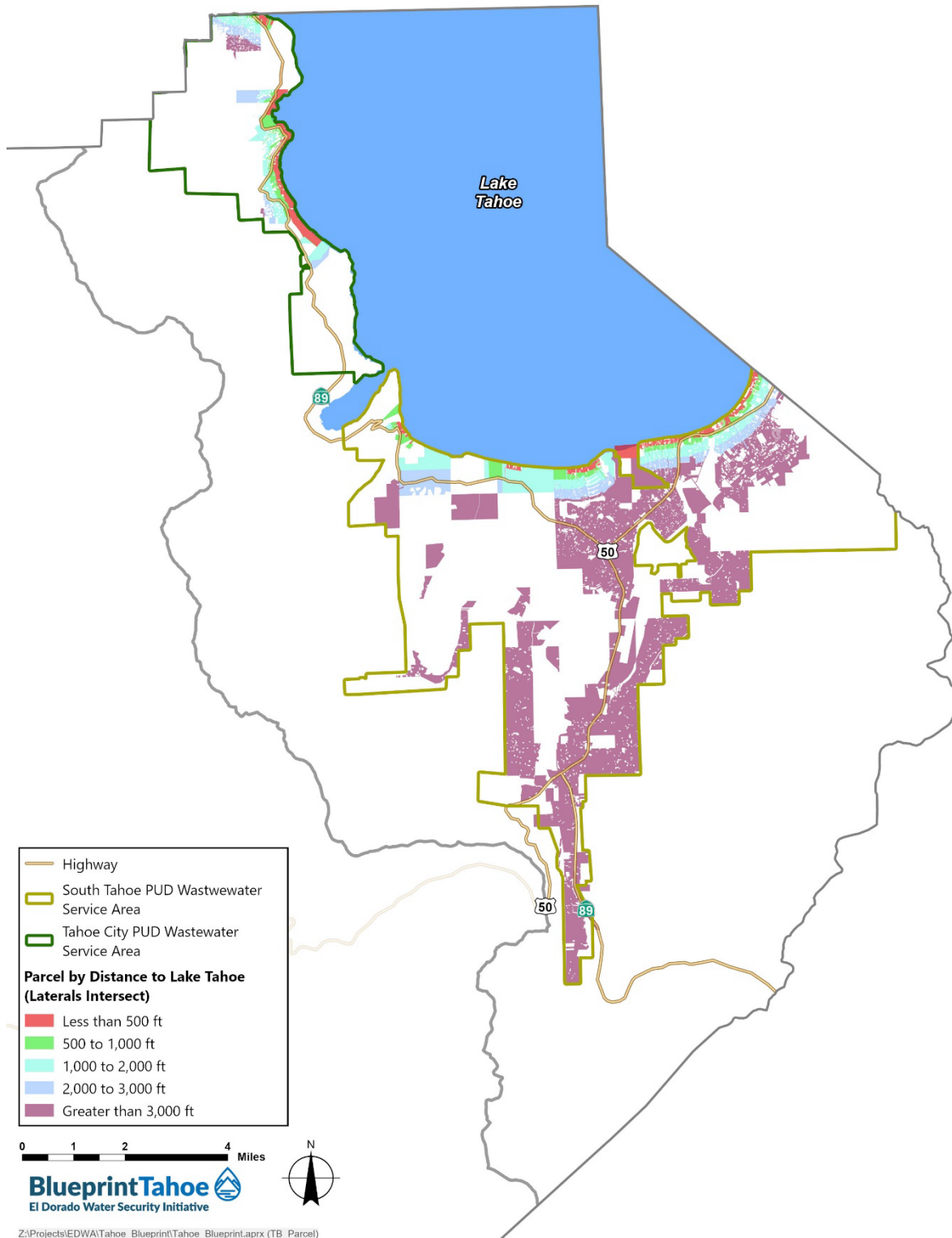
A. Entity:

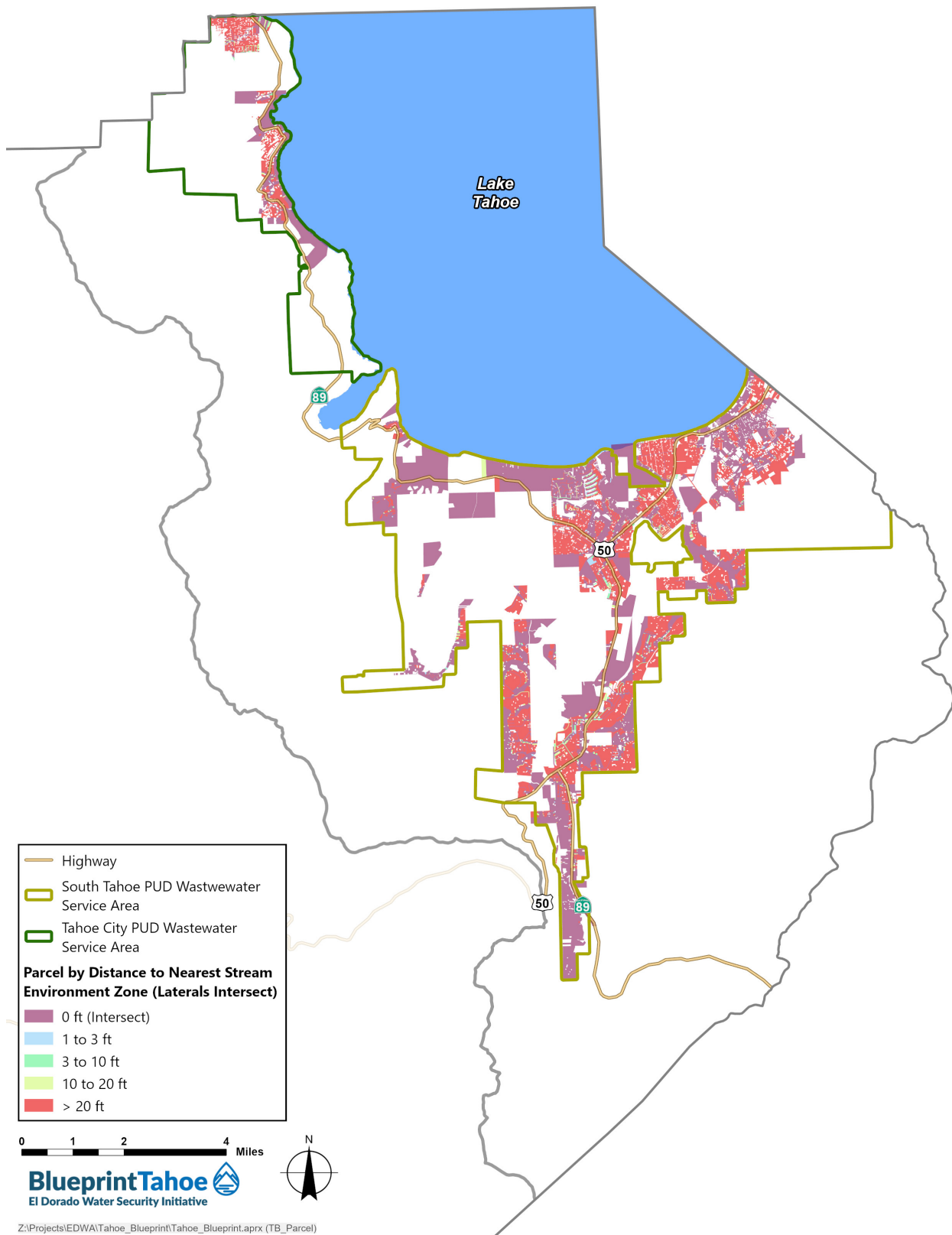
- a. TRPA (for the Lake Tahoe Region)
- b. County of El Dorado, City of South Lake Tahoe
- c. El Dorado Water Agency
- d. STPUD, TCPUD
- e. TVS GSA
- f. Other

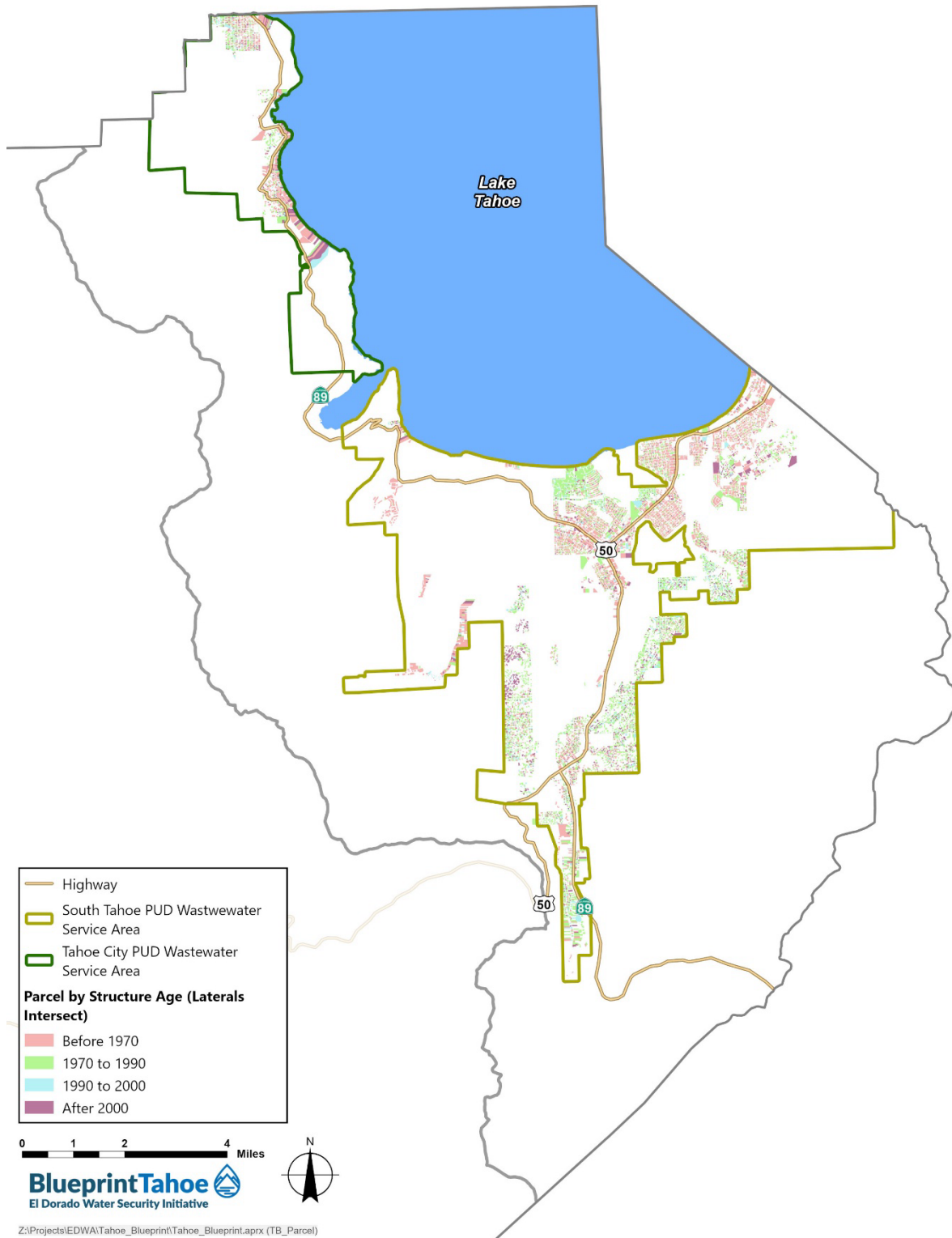
B. Channel:

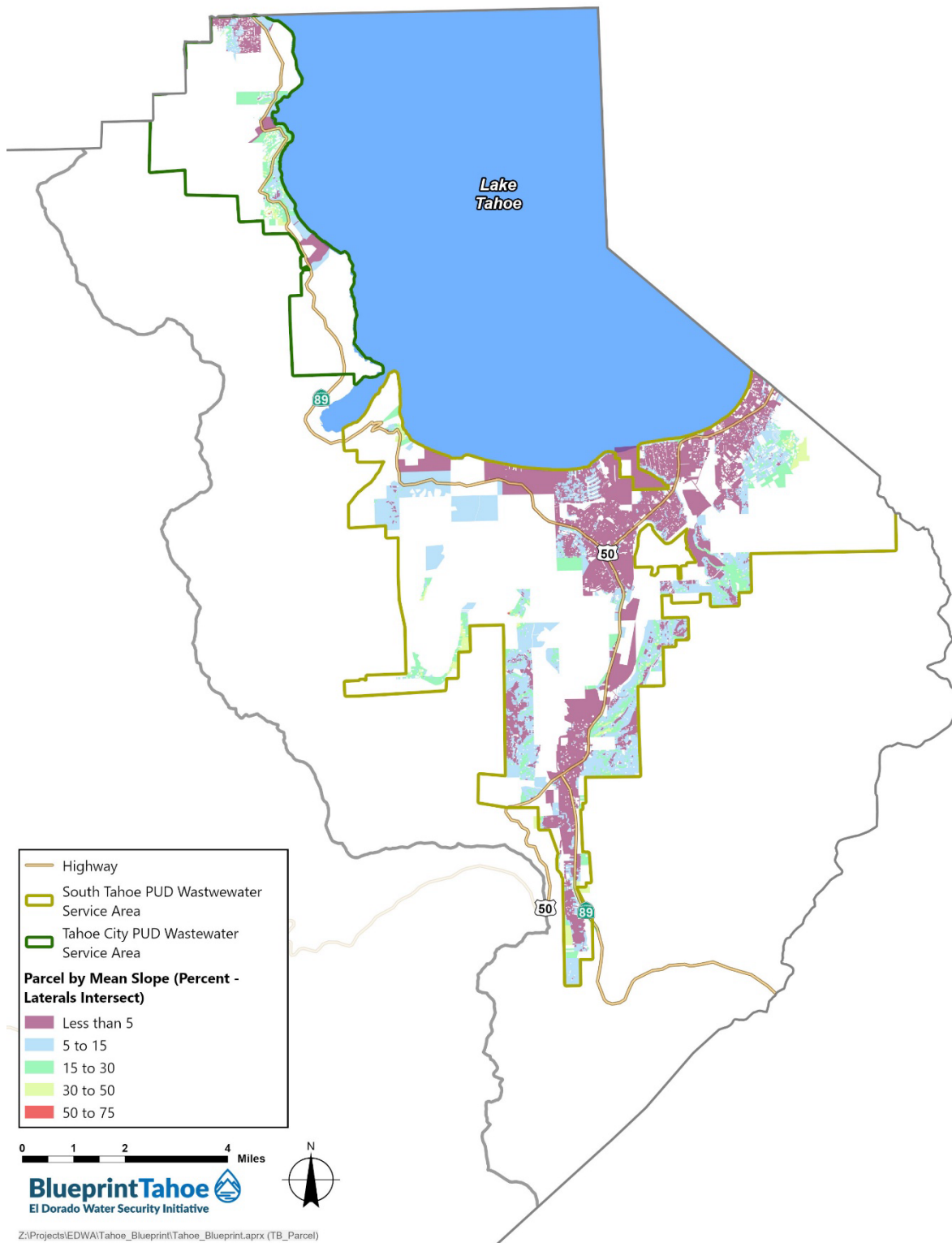
- A. Sewer Service Provider's monthly bills and communication
- B. TRPA communication (e.g., [Tahoe In Depth](#))
- C. New communication channel for El Dorado Tahoe Basin (as part of Blueprint implementation)
- D. Other(s)

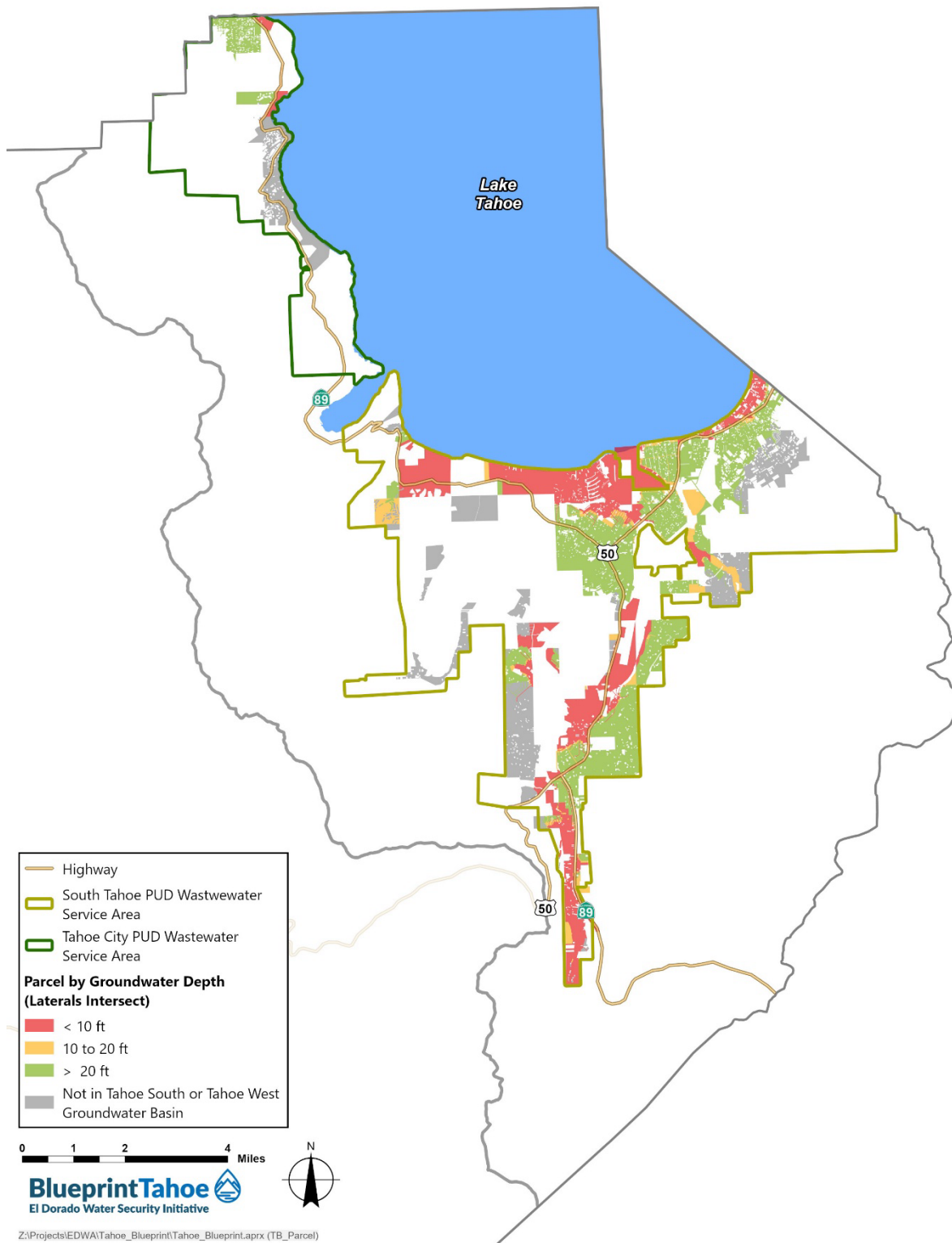
Supplemental Information: Individual Factor of the Conceptual Prioritization Tool











SEWER LINES IN ENVIRONMENTALLY SENSITIVE AREAS

Wastewater treatment and disposal have been major areas of concern for water quality in the Lake Tahoe Basin and have been the focus of major policy shifts in the past. In 1966, a significant control action took place to protect the pristine quality of Lake Tahoe when Nevada and California prohibited the discharge of treated wastewater (effluent) into the Lake. Treatment plants were retrofitted with export pipelines and pump stations to transport the effluent out of the basin.

During the scoping discussion and Workshop 1, concerns were raised regarding sewer lines in environmentally sensitive areas, posing potential water quality risks and environmental degradation. However, it was also recognized that total avoidance is not possible, and that relocation of these facilities is potentially costly.

This current brief is expanded from the draft for Workshop 1 with assessments and potential measures or partial solutions for discussion purposes.

Briefs incorporated by reference:

- 20260413 Blueprint Tahoe_Sewer Line Sensitivity (Workshop 1)
- 20260622 Blueprint Tahoe_Private Sewer Laterals, which includes a brief history of regional collecting and exporting sewage in the Lake Tahoe region.
- 20260622 Blueprint Tahoe_Beaver Dams and Meadow Restorations

Tahoe Basin-wide Wastewater Management Approach

United States Army Corps of Engineers (USACE) is [one of the leading federal ecosystem restoration agencies](#) in the Lake Tahoe Basin and has worked with local, state and other federal partners since 1997 to preserve the lake's prized clarity by restoring natural inflows and controlling invasive species. Corps involvement in the Lake Tahoe Basin is shaped by two programs: the Tahoe Partnership and the Tahoe Section 108 programs.

- The Tahoe Partnership program provides watershed planning and restoration as part of a multi-agency environmental improvement program to improve the implementation of global climate change adaptation policies and to improve storm water models and tools.
- The 2005 Consolidated Appropriations Act created the Tahoe Section 108 program, which provides assistance to non-federal interests in the Lake Tahoe Basin for environmental infrastructure projects. Assistance under this program may be in the form of planning, design, and construction assistance.

Lake Tahoe Wastewater Infrastructure Partnership

Eight sewer districts¹ operating in the Tahoe basin, together with the USACE, formed the Lake Tahoe Wastewater Infrastructure Partnership in 2007 to develop and implement tools and processes designed to support a programmatic approach to wastewater rehabilitation in the Tahoe Basin ([TRPA Regional Plan Update Draft Environmental Impact Statement](#), 2012). Through the partnership, these districts coordinated in their capital improvement projects with USACE's technical assistance.²

The partnership was a result of [2005 Kings Beach spills](#) caused by damage to the NTPUD's sewer main due to pier construction activities.

District-specific Risk-Based Sewer System Management Plans

Though each has its own distinct service area within the Basin, these districts recognize that 1) individual actions by each district affect the Basin as a whole, and 2) there are benefits of collaboration among the districts to maintain the environmental quality of the entire Lake Tahoe Basin. As such, many of the Partnership districts are working collaboratively to prepare a common framework for agency-specific Risk-Based SSMPs.

South Tahoe Public Utility District (STPUD) and Tahoe City Public Utility District (TCPUD) provide regional sewer services in the El Dorado Tahoe Basin. TCPUD exports untreated wastewater to the Town of Truckee, California, for treatment and disposal by the Truckee Tahoe Sanitation Agency (TTSA), which also provides services to other Lake Tahoe communities. STPUD services the South Shore communities and exports treated wastewater to Alpine County for irrigation purposes.

STPUD's 2020 [Sewer System Management Plan](#), and TCPUD's 2026 [Risk-Based Sewer System Management Plan](#) are current district-specific management plans.

Wastewater Facilities in Environmentally Sensitive Area

The sensitive areas in the Tahoe Basin include Lake Tahoe, the tributaries, and Stream Environment Zone (SEZ).

Complexity of Managing Wastewater Systems in the Tahoe Basin

Several characteristics of managing the sewer systems in the Tahoe Basin result in a complex matter.

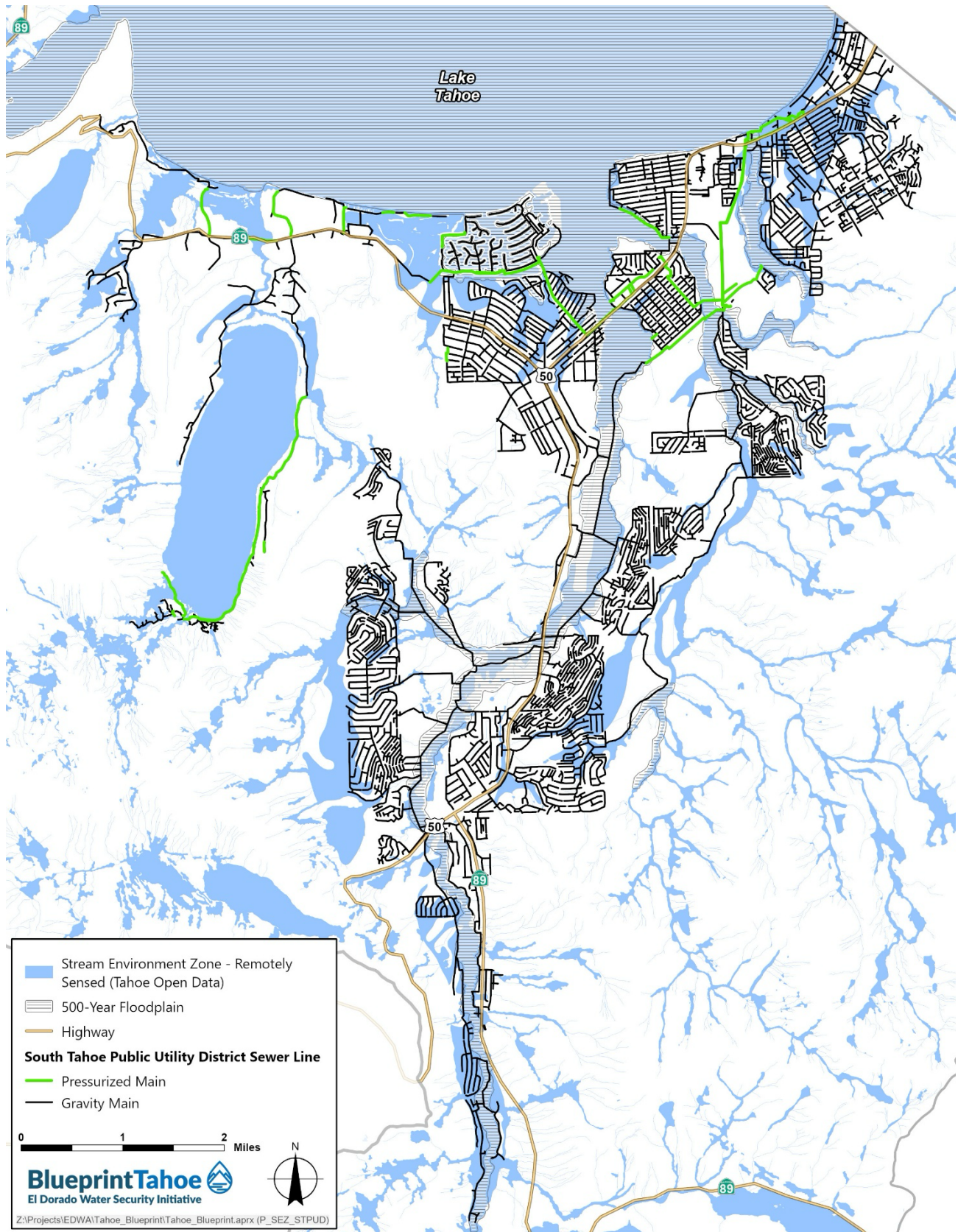
¹ STPUD, TCPUD, North Tahoe Public Utility District (NTPUD), Incline Village General Improvement District (IVGID), Douglas County Sewer Improvement District No.1 (DCSID), Kingsbury General Improvement District (KGID), Tahoe-Douglas District (TDD), and Round Hill General Improvement District (RHGID).

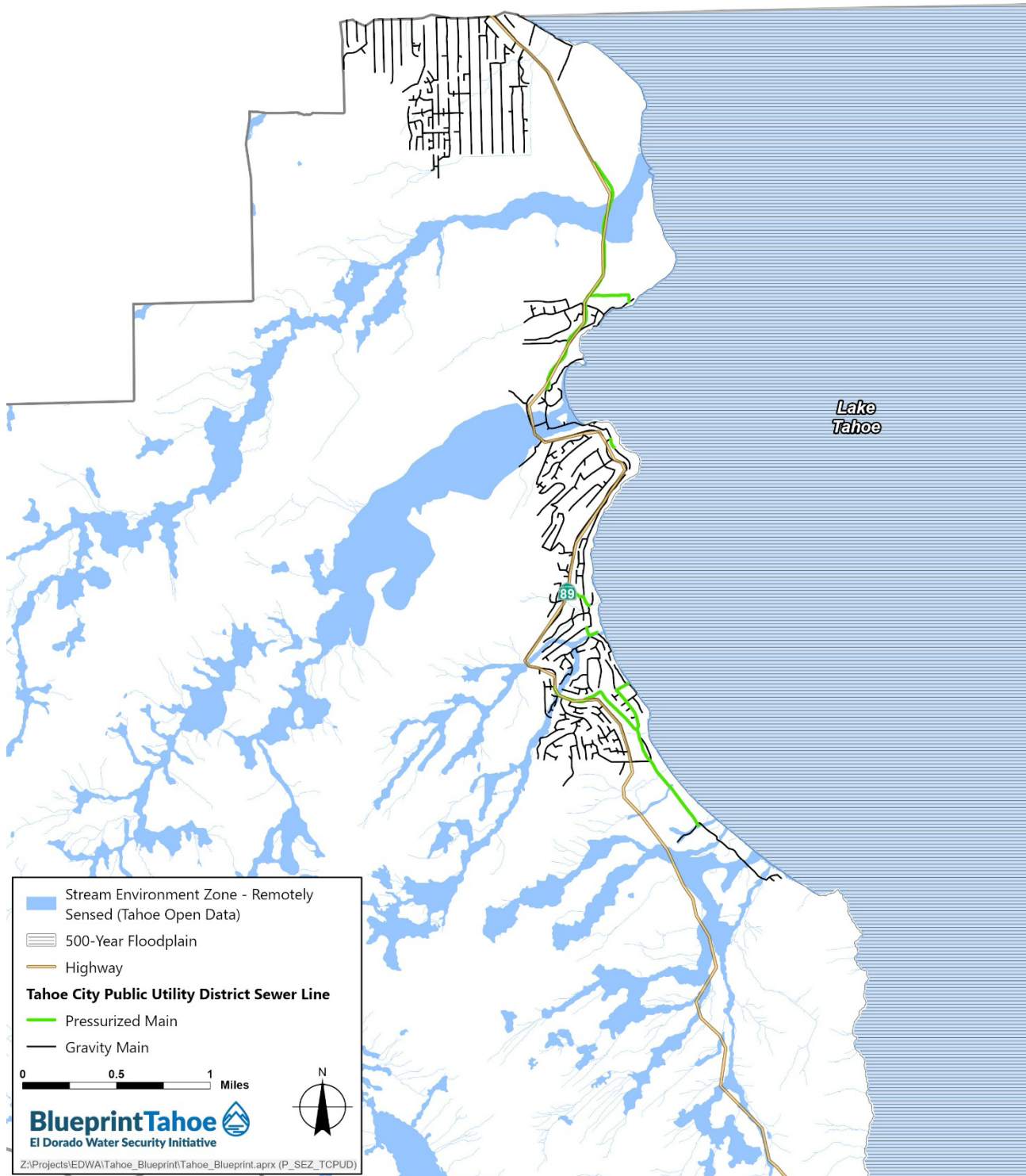
² The US Army Corps of Engineers (USACE) has executed a Project Management Plan for Technical Assistance - Lake Tahoe Watershed Restoration with LTWIP, which includes technical assistance related to the identification of sewer system defects, project identification, project prioritization, and application of consistent engineering standards for the execution of a wastewater capital replacement program within the Lake Tahoe Basin.

- Many regional wastewater pipelines and facilities are over 50 to 60 years old. The regional wastewater utilities face costly updates or replacements of these aging facilities.
- The integrity of the buried sewer pipeline systems can be inspected only through video inspection, which can be conducted for only a fraction of the systems on an annual basis.
- The placement of many sewer mains in early regionalization of wastewater systems may not be ideal for current social preferences because of concerns over water quality and health impacts when failing, regardless of the reason (e.g., aging facilities, human error). However, complete avoidance of environmentally sensitive areas is not possible given the lake and SEZ settings. The terrain also limits pipeline alignments for gravity flow to avoid additional pump stations and energy costs.
- Human errors during construction activities are often the cause of failure, despite the law being clear that the permittee(s) for construction activities is/are responsible for locating the pipeline and infrastructure and implementing measures to prevent damage to these facilities.
- High-flow events can place stress on sewer infrastructure and increase the potential for overflows. There are increasing concerns over facilities within the floodplain because precipitation intensity has increased with climate change.
- Private laterals, especially the aging ones, pose a risk of great uncertainty as they are not within the regional wastewater utility's jurisdiction.³

The following two maps show the STPUD's and TCPUD's wastewater systems in relationship with (a) 500-year floodplain, and (b) SEZ. Lake Tahoe and major tributaries are also shown.

³ Management of private laterals is discussed in a separate brief to outline potential measures considered for Blueprint Tahoe.





Examples of Recent Events in the Tahoe Basin

Some examples of recent events demonstrate the above-described risks and associated causes.

- [July 2024](#) - A private contractor working for Caltrans on Highway 28 near Gar Woods struck a North Tahoe Public Utility District's main sewer export pipeline on July 18. This sent an estimated 85,000 gallons of raw sewage into Carnelian Bay. The spill closed beaches and a myriad of health advisories were issued with warnings of elevated water bacteria counts. All advisories were finally lifted on July 31.
- [July 2024](#) - On July 28, the corroded valve broke and gave way to 5-10 gallons of sewage spilling into Tahoe's neighbor, Fallen Leaf Lake. This much smaller Tahoe counterpart lies immediately south of Tahoe and across Highway 89 but connects to Lake Tahoe by Taylor Creek. While bacterial levels in Fallen Leaf Lake never reached levels requiring beach closures, warning signs remained posted until bacterial counts dropped to baseline levels 36 hours later.
- [August 2025](#) - On August 1, USFS issued a warning for elevated Escherichia coli, commonly known as E. coli, in water quality samples collected on the South Shore of Lake Tahoe near Camp Richardson Resort. The resort immediately initiated a sewer line inspection, located the leak, and has initiated repair. No illnesses have been reported.

Past Sewer Pipeline Construction and Relocation Projects in Environmentally Sensitive Areas

The following projects provide examples for illustrative purposes.

- [Angora Creek Restoration Project - Sewer Line Capture](#) - Following construction of a new sewer main, Angora Creek migrated to a straight alignment directly over the sewer corridor for approximately 2,000 feet. This resulted in elevated inflow and infiltration (I&I) and increased water quality risk to the creek and adjacent meadow. In 2002, California State Parks restored the creek to a more natural meandering alignment, relocating flow away from the sewer infrastructure.

This project preceded the Angora Creek Stream and Floodplain Restoration project (2014-2015).

- [STPUD Upper Truckee Marsh Sewer Facilities Protection Project](#) - In 2014, STPUD moved the Trout Creek away from existing sewer mains and a pump station adjacent to the Upper Truckee Marsh and Trout Creek. The project also constructed graded earthen berms and native plantings to prevent Trout Creek from re-routing or flooding these facilities. Monitoring through 2020 confirmed that the installed features effectively altered flow patterns as intended, thereby reducing erosion and spill risk in this wetland environment. The total project cost is estimated to have been about \$735,000 ([EIP Project Tracker](#)).

This project preceded the Upper Truckee Marsh Restoration project (2020-2022).

- [Taylor Tallac Restoration Project](#) (or Baldwin Beach Gravity Rehab/Replacement Project) – In 2023 STPUD, in partnership with the U.S. Forest Service (USFS), launched this project to relocate approximately 2,200 linear feet of gravity sewer mains from its prior shoreline alignment near Baldwin Beach to a more stable corridor along an existing roadway. STPUD estimates that this project will cost approximately \$1.6 million ([STPUD's 2024 CIP](#)).

This project is closely coordinated with the USFS Taylor-Tallac Restoration, a 74-acre wetlands restoration.

- [Meeks Creek Bridge Sewer Relocation](#) - TCPUD, in coordination with Caltrans and USFS, is relocating and upgrading the Meeks Creek sewer crossing as part of the Meeks Bay Restoration. By 2027, approximately 340 feet of new sewer mains will be installed on a safer alignment, new manholes added, and about 480 feet of inactive main rehabilitated to tie into the reroute. TCPUD has budgeted about \$700,000 for this project ([TCPUD Approval for Engineering Design](#)).

The relocated line will be integrated with the new fish-friendly bridge to keep it out of the creek and protected from scouring and flood debris. This project is closely coordinated with the [Caltrans and USFS's Meeks Creek Bridge Replacement Project](#).

Conceptual Vulnerability Assessment

For Blueprint Tahoe planning purposes, the concerns over wastewater facilities (pressurized and gravity mains) were classified based on a conceptual scoring model below with Lake Tahoe being the greatest concern. The total score ranges from 0 to 10.

Factor	Score ¹ =	0	1	2	3	4
Distance to Lake Tahoe (ft)		>5,280	≤5,280	≤1,000	≤500	≤100
Distance to Major Tributaries (ft)		>500	≤100	≤50	0	-
Distance to Stream Environment Zone ² (ft)		>5	≤5	-	-	-
Within Floodplain (Return Period in Years)		>500	500	100	-	-

¹ Scoring is for planning purposes.

² Major tributaries and floodplains are part of the Stream Environmental Zone (SEZ); therefore, the scores for SEZ are set with a reduced emphasis. The presence of SEZ in the El Dorado Tahoe Basin is significant; that contributes to the short distance references in the scoring system.

STPUD and TCPUD provided the GIS data on their corresponding sewer mains for analysis shown below.

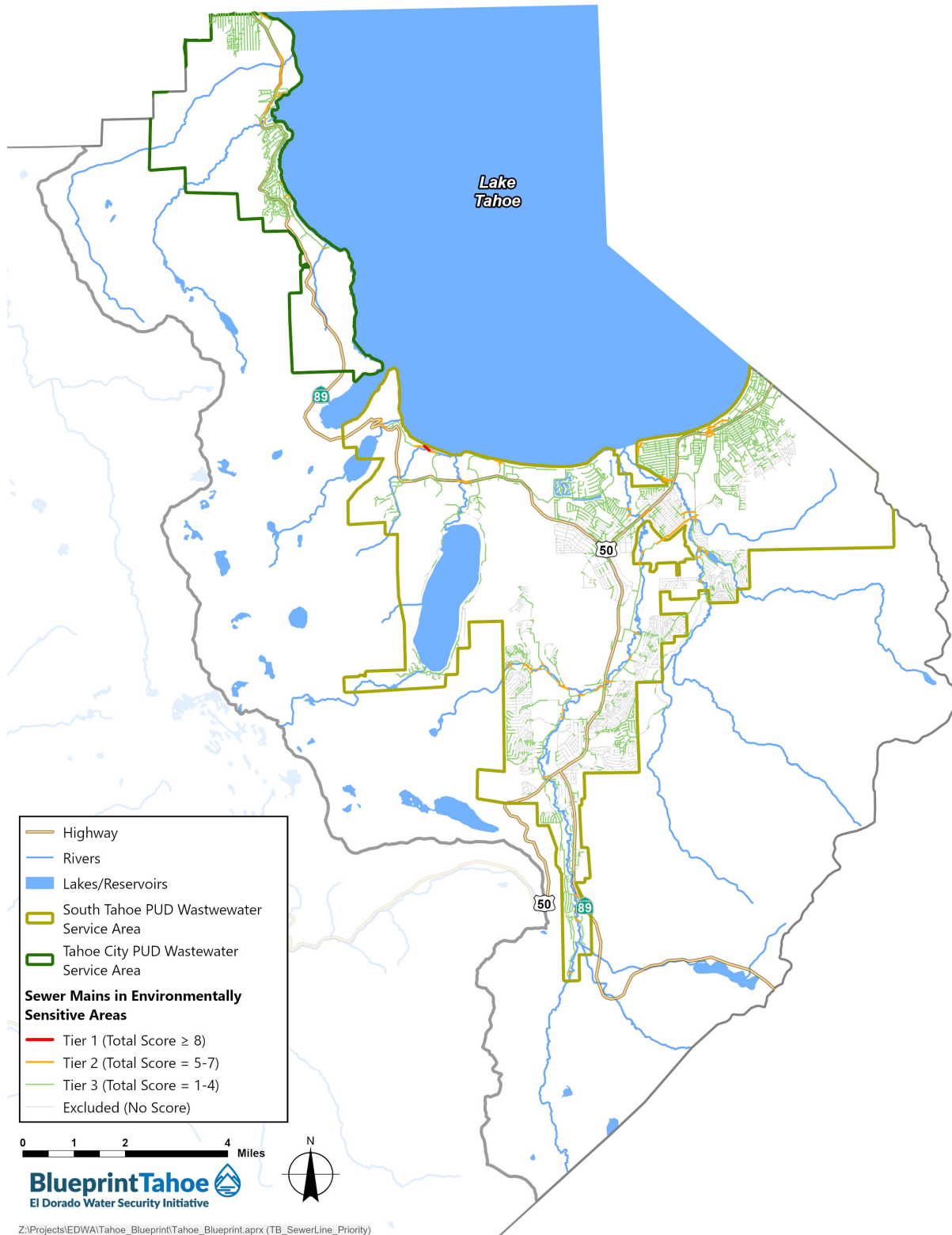
Classification ¹	Score	Approximate Total Length ² (ft)	Order-of-Magnitude Cost Estimate (in M) ³
Tier 1	≥ 8	600	0.5
Tier 2	5 to 7	55,100	45
Tier 3	1 to 4	1,112,200	920
Excluded	0	814,800	-

¹ Classification is for illustrative purposes only.

² Based on GIS line segment properties.

³ \$830/feet, based Taylor Tallac and Meeks Creek Bridge projects (inflation adjusted).

The following figure shows the prioritized sewer mains. The supplemental information in the end includes maps by factor.



Potential Measures/Partial Solutions

Concerns over sewer lines in environmentally sensitive areas are valid. STPUD and TCPUD have their own standards of operations for operations and emergency responses. The associated costs of relocating sewer lines can be significant. Existing regulatory requirements are sufficient to cover the construction activities near sewer mains although they cannot completely account for human error. Therefore, the measure development focuses on improved coordination on planned activities.

It does not matter if the project's genesis is to respond to a failing facility or improve ecosystem capacity or functions. Close coordination among all interested parties can improve project outcome, facilitate co-beneficial innovation on both the environmental or wastewater management sides, and minimize unintentional consequences or redirected impacts.

The following potential measures (or partial solutions) are for discussion.

1. **For EIP, TRPA adds the guidance or requirement for project proponents to provide explicit evidence of coordination with the regional wastewater utilities, and, if warranted, assess potential impacts on the integrity and existing operations of affected wastewater facilities and associated mitigation.**

The Lake Tahoe Environmental Improvement Program (EIP) is an excellent partnership of over 80 public and private organizations including federal, state, and local agencies, the Washoe Tribe, and the private sector.

2. **(A: Entity) develops educational materials for the purpose of coordinating with regional wastewater utilities when pursuing environmental restoration projects in areas with sewer mains to minimize, if not to avoid, potential unintended consequences or redirected impacts.**

A. Entity:

- a. STPUD, TCPUD
- b. TRPA (for Lake Tahoe Region)
- c. El Dorado Water Agency
- d. Other

3. **For potential improvement of facilities with (A: Priority) concerns, STPUD and TCPUD provide opportunities for early coordination with TRPA and environmental restoration interests to facilitate co-beneficial creation and/or complementary project schedule alignment, with (B: Exceptions).**

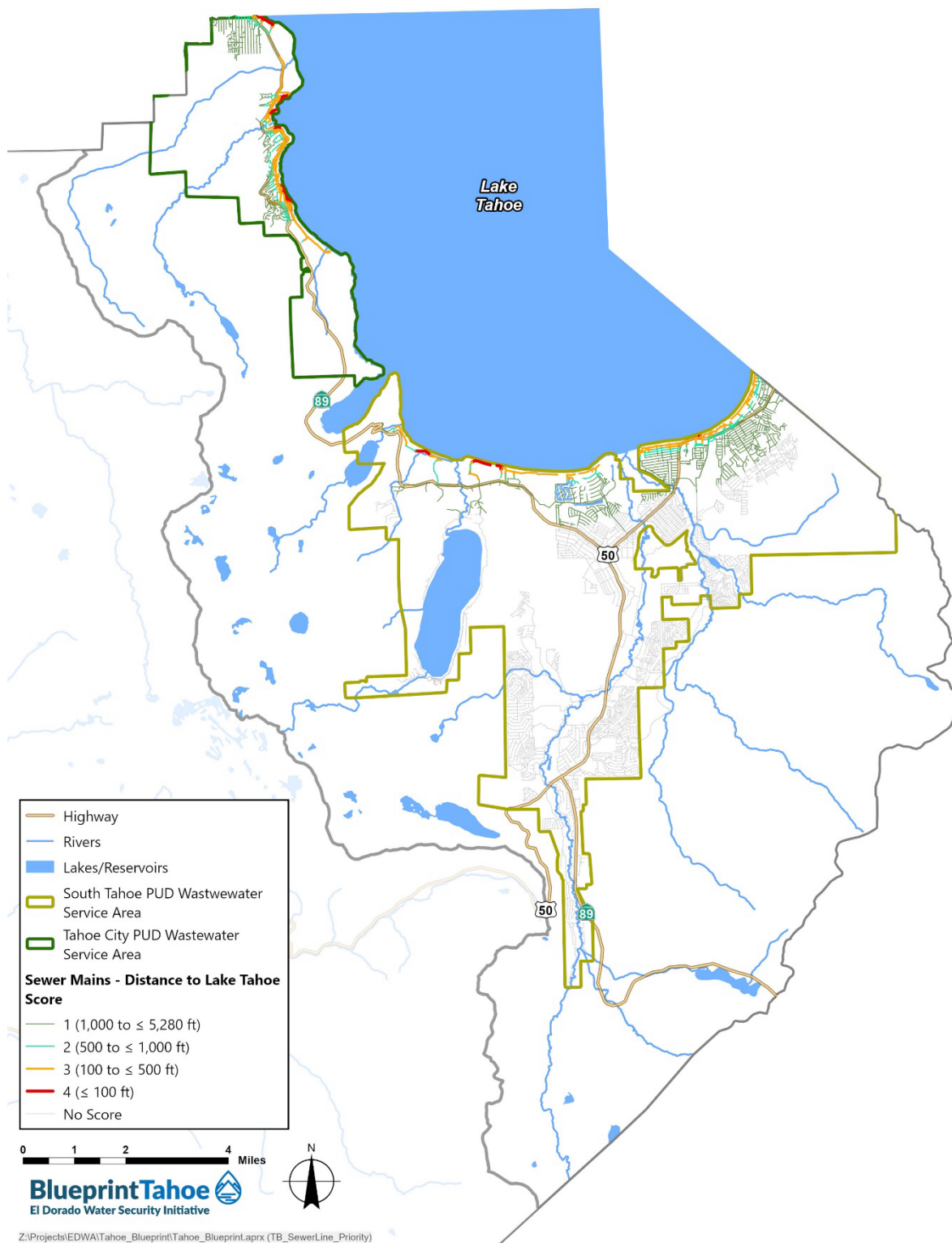
A. Priority:

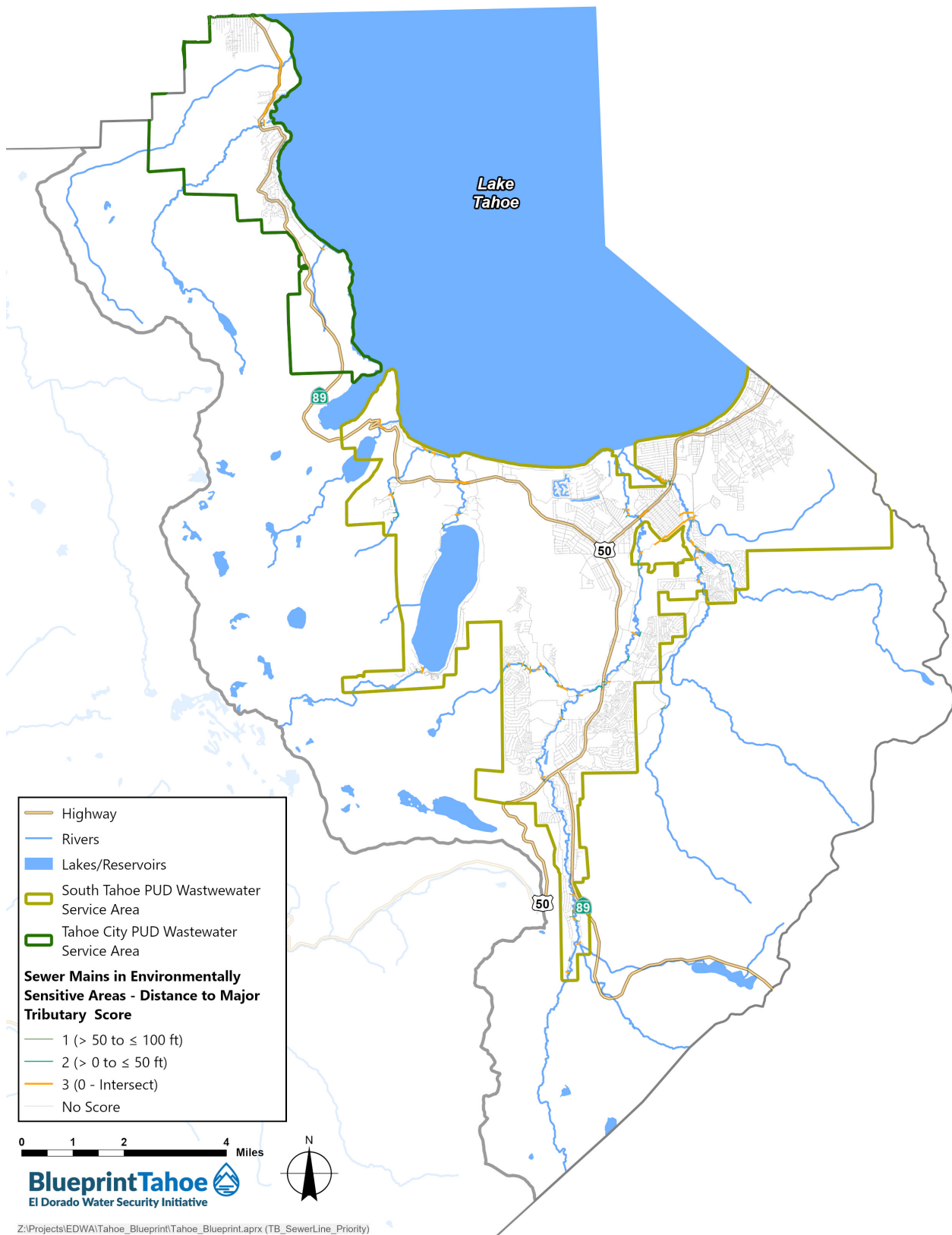
- a. Tier 1
- b. Tiers 1 and 2
- c. Other

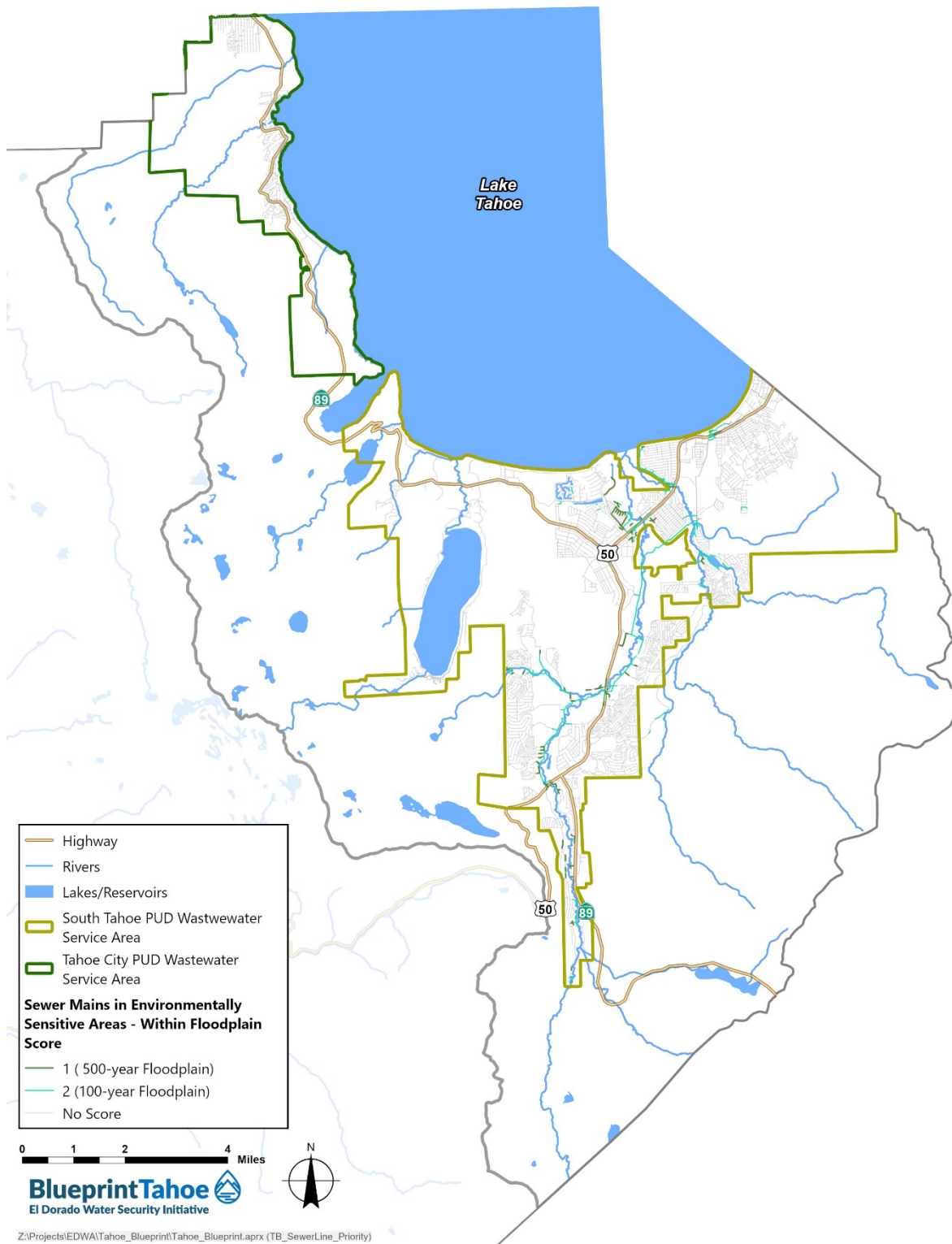
B. Exceptions:

- a. No exceptions
- b. Exception of pressure mains (facilities unlikely affected by increased infiltration and inflow)
- c. Other

Supplemental information on Risk Assessment based on Facility Locations









POTENTIAL UNINTENDED CONSEQUENCES OF BEAVER MANAGEMENT AND MEADOW RESTORATION IN FLOODING AND WASTEWATER FACILITIES IN OR NEAR FLOODPLAINS

During Workshop 1, stakeholders identified concerns about localized flooding associated with naturally forming dams (e.g., ice and beaver dams) and meadow restoration projects. Reported impacts include inundation of nearby structures and infrastructure, particularly sewer facilities located in or near floodplains.

This brief evaluates the historical and potential unintended consequences of beaver dams and/or meadow restoration efforts, and other potential contributing factors. The analysis focuses on hydrologic mechanisms and effects of previously implemented projects within the El Dorado Tahoe Basin.

Other brief(s) incorporated by reference:

- [20260413 Blueprint Tahoe Sewer Line Sensitivity](#) (Workshop 1)
- 20260622 Blueprint Tahoe_Sewer Line Sensitivity

Hydrologic and Hydraulic Effects

Beaver Dams

Beavers have reestablished in Tahoe Basin watersheds over recent decades, drawing public attention in early 2010 due to localized flooding concerns and local beaver management policies.¹

From hydrologic and hydraulic perspectives, studies indicate that beaver dams can influence flooding by:

- Increasing local storage and promoting overbank flow²

¹ Beaver management actions in the Tahoe Basin in the early 2010s generated public awareness and controversy. In 2010, [beavers were removed](#) due to flooding concerns, prompting public response and the formation of advocacy groups. In 2012, the Nevada Department of Wildlife [issued a depredation permit](#) near Incline Village to address risks to a sewer pipeline. In response, the Lahontan Regional Water Quality Control Board convened a [forum in 2013 to evaluate beaver management approaches](#).

² [USGS modeling in the Tualatin River Basin](#) shows beaver dams increase stormwater storage but do not consistently reduce peak flows, with effects varying by site and diminishing at higher flows.

- Attenuating peak flows in small to moderate events, causing localized backwatering and lateral flow expansion³
- Increasing downstream flood magnitudes during dam failures, though resulting increases are generally minor during moderate to large storms.⁴

Available studies indicate that these effects are most pronounced during smaller events and diminish as storm magnitude increases. For larger storm events (greater than approximately a 2-year return interval), the influence of beaver dams on peak flows becomes limited.

Meadow Restoration Projects

Meadow restoration projects in the Tahoe Basin aim to restore natural hydrologic function by reconnecting incised streams to their floodplains and raising meadow water tables. These actions increase ecosystem resilience to drought, attenuate downstream peak flows through distributed storage, and improve water quality, particularly in tributaries to Lake Tahoe.⁵

Key examples of completed meadow restoration projects in the El Dorado Tahoe Basin include:

- [Angora Creek Stream and Floodplain Restoration](#) (2014–2015) - Led by the U.S. Forest Service, this project addressed channel incision associated with past fire and development impacts.
- [Upper Truckee Marsh Restoration](#) (2020–2022) - Led by the California Tahoe Conservancy, this project restored more than 250 acres of marsh and meadow by dispersing flows across the floodplain.

Additional meadow restoration projects are in progress; an interactive map is available through the [Tahoe Central Sierra Initiative's project tracker](#) (filter: "Water Security and Riparian Health").

Observed Effects

The following examples are provided for illustrative purposes. All restoration projects have gone through environmental review and other supporting processes. The discussion below does not imply any negligence or failure in compliance with law and regulations.

³ A [Bavaria study](#) found beaver dam cascades can expand inundation and reduce peak flows with delayed timing, but effects become negligible for larger flood events.

⁴ [Modeling of extreme storms in Quebec](#) indicates beaver dam failures contribute only minor increases in downstream flooding, with flood magnitude primarily driven by precipitation and channel conditions.

⁵ Beaver dams can contribute to these hydrologic functions by promoting overbank flow, increasing floodplain storage, and raising local water tables. Since the mid-2010s, management approaches in the Tahoe Basin have shifted toward beaver-compatible strategies and nonlethal mitigation, with projects such as the [Trout and Saxon Creeks Restoration Project](#) (El Dorado County, 2022–2025) illustrating the integration of beaver activity into meadow restoration design and performance.

Angora Creek Stream and Floodplain Restoration

During this 2016 winter storm, post-project monitoring documented meadow inundation and temporary flooding along Lake Tahoe Boulevard. USFS assessments indicated that beaver dams upstream of the restored reach contributed to lateral spreading of flows during these events. Following this storm, USFS worked with El Dorado County to determine if modifications to the installed wood structures could reduce the risk of future roadway flooding.⁶

Figure 1 shows the incised Angora Creek pre-restoration as well as the associated meadow flooding during a moderate winter storm in February 2016.



Incised Angora Creek channel above Lake Tahoe Boulevard, prior to restoration, 2013



Flooding of meadow adjacent to Angora Creek February, 2016

Figure 1. Before and After photos from the Angora Creek Stream and Floodplain Restoration Project

Upper Truckee Marsh Restoration

Observed outcomes from the Upper Truckee Marsh restoration show that high runoff was accommodated through widespread floodplain inundation and distributed storage, with most floodwater remaining within the meadow. However, STPUD sewer facilities located along the edge of the meadow experienced some adverse impacts.

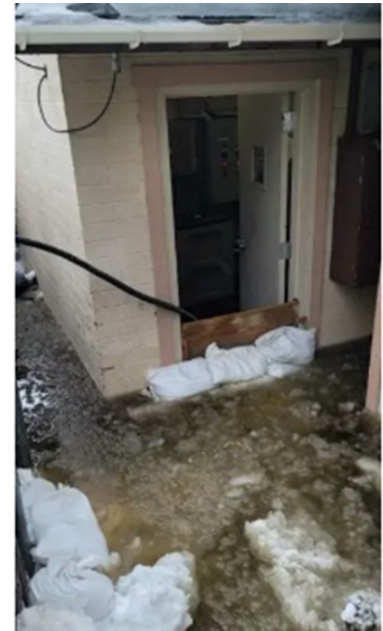
During the exceptional spring 2023 snowmelt, the newly restored Upper Truckee Marsh experienced widespread inundation, with high runoff spreading across its expanded floodplain. This resulted in minor, localized flooding along the meadow's eastern edge. Inflow and infiltration (I&I) from saturated soils in the area also surged, pushing a neighboring STPUD sewer pump station near its capacity limit. Most of the floodwater remained confined to the marsh and meadow, demonstrating the restored floodplain's function of storing and attenuating peak flows.

⁶ Reported in the [Angora Creek Stream and Floodplain Restoration fact sheet](#) published by USFS - Lake Tahoe Basin Management Unit.

Figure 2 shows the flooding of STPUD's pump station adjacent to the Upper Truckee Marsh during the March 2023 snowmelt.⁷



Upper Truckee Meadow floodwaters flowing toward STPUD's pump station during large March 2023 rain-on-snow event.



Temporary flood protection measures implemented to protect the pump station.

Figure 2. Observed flooding at STPUD sewer pump station

Generally, the meadow restoration project has moved the stream to flow closer to STPUD's pump station. Figure 3 shows conditions near the STPUD sewer pump station before, during, and after restoration. In 2014, STPUD relocated Trout Creek away from sewer infrastructure. In 2017 channels appear dry. Restoration occurred from 2020–2022. By 2021, surface water returned to former channels, and by 2025, channels appear well-defined and consistently saturated.

Note that the changes are relatively small; however, unintentional consequences can occur at facilities located based on previously known flooding conditions, which were derived from then-available hydrologic and hydraulic information.

⁷ Photographs are from SouthTahoeNOW.com's article titled [Storm impacts to South Tahoe Public Utility District](#), published March 15, 2023.

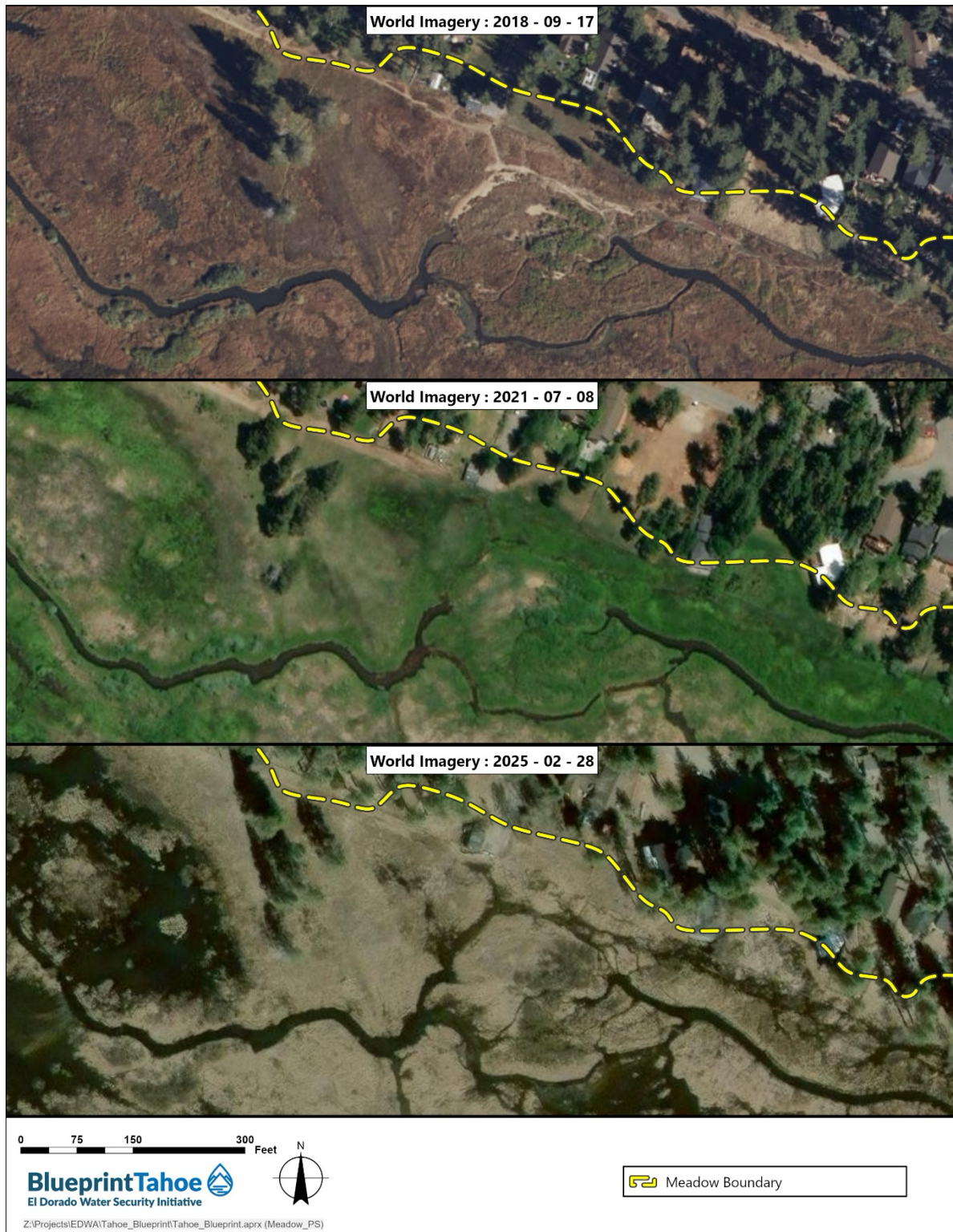


Figure 3. Changes in meadow extent near the pump station from pre-restoration through post-restoration conditions. Aerial imagery from 2017 (pre-restoration), 2021 (active restoration), and 2025 (post-restoration) illustrates spatial changes in meadow area adjacent to STPUD's sewer pump station.

Potential Measures/Partial Solutions

Proper coordination and consultation during project development phase is the most effective in avoiding potential unintended consequences. Continued coordination in post-project monitoring and management is also beneficial to addressing emerging problems early.

For Blueprint Tahoe, the potential measures/partial solutions are consistent with **recommendations 1 and 2 for Sewer Line in Environmental Sensitive Area** and thus, the discussion is redirected to avoid duplication.

SUSTAINABLE GROUNDWATER MANAGEMENT IN EL DORADO TAHOE BASIN

Groundwater serves as the primary source of potable water across the Lake Tahoe region, supplying both large municipal utilities and dozens of small, localized systems. Snowmelt filters through decomposed granite and underground gravel vaults, creating natural underground reservoirs that yield pure, high-quality drinking water. Therefore, managing groundwater for sustainable use is an important topic for Blueprint Tahoe.

In the Blueprint Tahoe scoping meeting on 10/23/2025 and Workshop 1, the regional contamination near the South Y area was heavily discussed. The working group, including Lahontan Regional Water Quality Control Board (LRWQCB), recognized that the contamination has resulted in additional costs of operation and facility relocation; however, long-term regional water security is not impacted. This brief explores broader considerations for **environmentally and financially sustainable groundwater management** in El Dorado Tahoe Basin.

Briefs incorporated by reference:

- [20260410 Blueprint Tahoe South Y Area PCE Contamination](#)
- [20260413 Blueprint Tahoe Water Supply-Demand Imbalance](#)
- 20260622 Blueprint Tahoe_DACs and Vulnerable Populations
- 20260622 Blueprint Tahoe_Regional Comm and Advocacy

Groundwater Basins in El Dorado Tahoe Basin

In El Dorado Tahoe Basin, groundwater is primarily extracted from either the Tahoe Valley-Tahoe South (TVS) or Tahoe Valley-Tahoe West (TVW) Subbasins (shown on **Figure 1**) in and near the service areas of South Tahoe Public Utility District (STPUD) and Tahoe City Public Utility District (TCPUD), respectively. TVW extends further into Placer County.

Per the regulatory requirements of the 2014 Sustainable Groundwater Management Act (SGMA), STPUD and the El Dorado Water Agency (Water Agency) assumed the roles of Groundwater Sustainability Agencies (GSA) for the TVS Subbasin in areas within and outside of the STPUD service area, respectively. The California Department of Water Resources (DWR) determined that the TVS Subbasin is a medium priority basin. The TVW Subbasin is of very low priority, and per the SGMA, requires neither a GSA nor a Groundwater Sustainability Plan (GSP). These are the only two recognized groundwater basins in El Dorado County.

The main difference between medium and very low priority basins in California is how heavily they are regulated under SGMA. Medium-priority basins are under strict state requirements to actively manage and sustain their groundwater, while Very Low-priority basins are not. TVS is thus the main subject of groundwater management.

Groundwater production and surface water diversions in El Dorado Tahoe Basin count against the California allotment of 23,000 acre-feet per year in the Truckee River Operating Agreement.

Figure 1 Sustainable Groundwater Management Act Subbasins in the Tahoe Basin within El Dorado County



TVS Subbasin

The TVS Subbasin is a 23-square-mile, high-elevation groundwater basin in El Dorado County, California, shown on **Figure 1** (as 6-005.01 Tahoe Valley – Tahoe South). Underlying the City of South Lake Tahoe, it is the largest and most productive subbasin in the greater Tahoe Valley Groundwater Basin. The subbasin serves as the primary source of drinking water for the South Shore communities.

Highlights of SGMA Requirements for a Medium Priority Basin

The TVS Subbasin has been sustainably managed before and after the SGMA. As a medium-priority basin, TVS is subject to strict, legally mandated regulations under SGMA.

In response to SGMA requirements, STPUD in 2015 and the Water Agency in 2017 formed GSAs for the areas within and outside of STPUD’s service area, respectively. These two agencies jointly manage the groundwater basin with STPUD as the lead GSA. There is very limited, if any, groundwater use in TVS Subbasin outside of the STPUD service area. STPUD and the Water Agency adopted an Alternative GSP, which has been formally approved by DWR as meeting SGMA requirements. As a Medium Priority Basin, an Annual Report is required as well as a 5-Year Periodic Evaluation.

SGMA also requires **annual public meetings** on groundwater management and related issues. Past presentation topics in these annual meetings include well permitting changes and water quality updates, as well as indirect groundwater subject matters. These indirect subject matters include water conservation, invasive species, stormwater programs, and restoration programs presented by STPUD, TCPUD, Tahoe Resource Conservation District, Lahontan Water Quality Control Board, and Tahoe Regional Planning Agency.

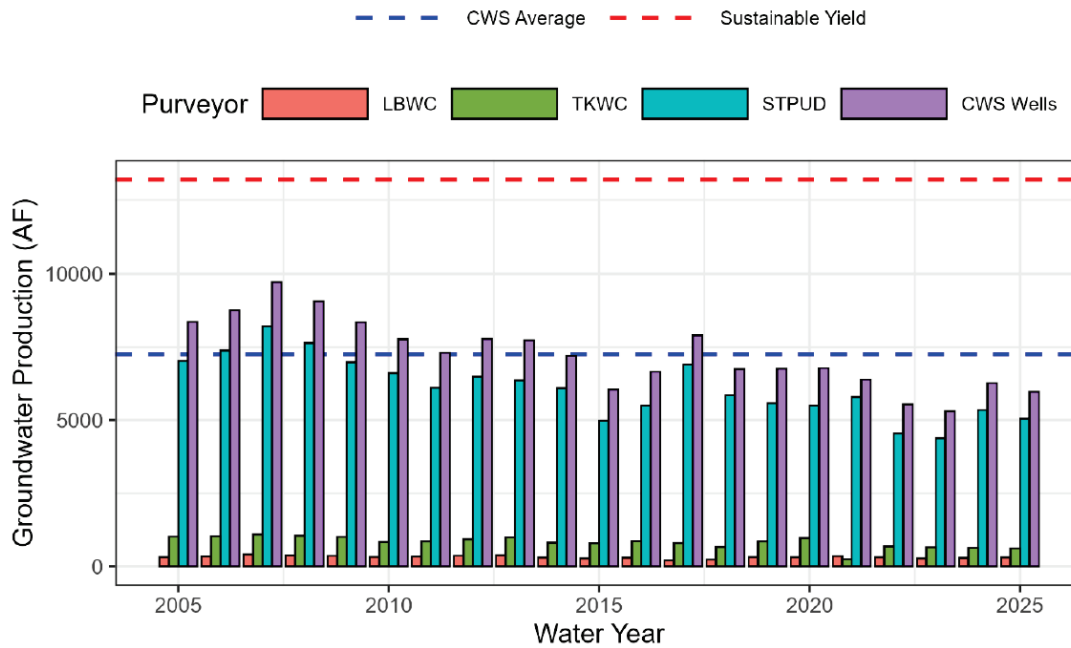
Prioritization Inconsistent with Groundwater Basin Conditions

The primary purpose of SGMA is to halt the unsustainable use of groundwater and bring aquifers into balanced levels of pumping and recharge. Passed by the California legislature in 2014, the law requires local agencies to sustainably manage their groundwater supplies in the long term without causing negative environmental or economic impacts.

Locally, groundwater production has decreased since 2005. Groundwater production is limited under SGMA, including the identified sustainable yield of 13,600 acre-feet per year. Community Water Supply¹ (CWS) pumping in the TVS has decreased to less than half of the sustainable yield, or approximately 6,500 acre-feet per year (see **Figure 2**). Estimated future water demands are projected to total slightly more than half the total annual allocation for the Lake Tahoe Basin.

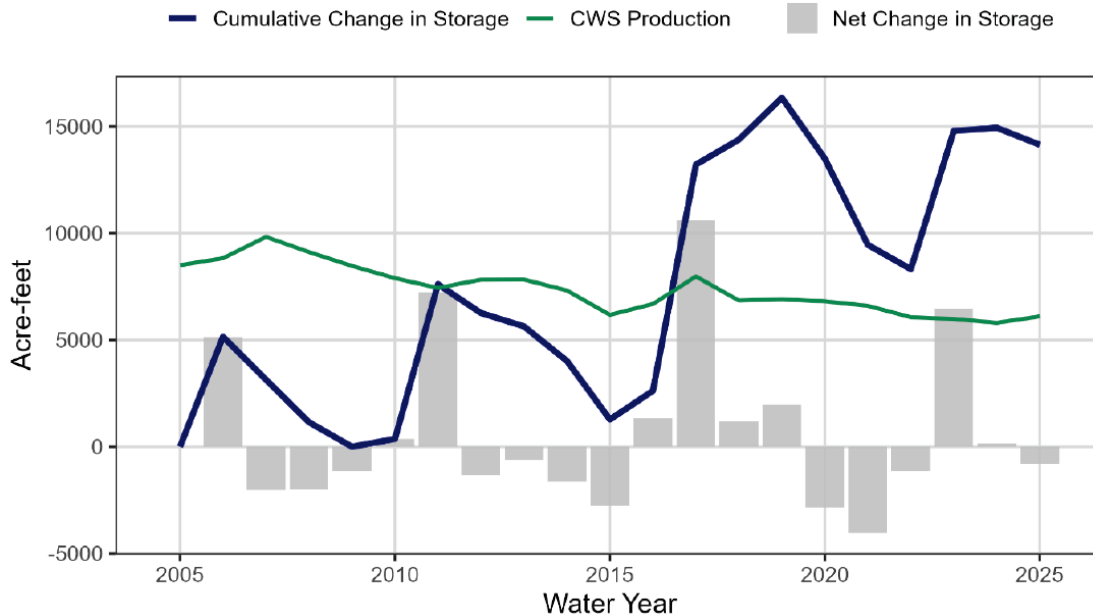
¹ In the previous annual reports, Community Water Supply is defined as wells actively used for drinking water supply or emergency standby for drinking water supply. The abbreviation, CWS, is used herein for consistency. However, it is noted that it is not defined the same as in other briefs, where CWS stands for Community Water Systems.

Figure 2 TVS Subbasin Annual Groundwater Production (STPUD, 2026)



A change in groundwater storage is an indicator of sustainable groundwater management. While year-to-year storage levels fluctuate depending on snowmelt, long-term trends have shown a gradual increase in storage over the last two decades; more water is being recharged than pumped. **Figure 3** shows cumulative storage increasing over time since 2005, while CWS well pumping has decreased from approximately 10,000 acre-feet per year to approximately 6,500 acre-feet per year.

Figure 3 TVS Subbasin Cumulative Change in Storage (STPUD, 2026)



The TVS Subbasin also faces well-documented contamination issues, primarily from man-made industrial and fuel chemicals, such as PCE (Tetrachloroethylene), a toxic chemical once widely

used in dry cleaning and metal degreasing. The LRWQCB is overseeing cleanup efforts and enforcement orders on responsible parties to remove and contain the chemicals. STPUD has shown over the last 20 years that **the contamination does not fundamentally impact regional water security** (as discussed in Workshop 1).

Currently, SGMA does not constrain groundwater management or operations within the TVS Subbasin. The subbasin has been managed sustainably for more than 20 years, but STPUD and the Water Agency must continue reporting in accordance with its SGMA basin priority. This comes at the cost of financial and workforce resources. They are considering submitting evidence to support a petition for change in basin priority.

TVW Subbasin

The TVW Subbasin is a 9-square-mile (6,000-acre) groundwater basin located on the California side of the Lake Tahoe Basin, on the western edge of Lake Tahoe. Shown on **Figure 1** (as 6-005.02 Tahoe Valley - Tahoe West). It spans portions of El Dorado and Placer counties and is bound by Lake Tahoe to the east and the Sierra Nevada mountain peaks to the west. Underlying Tahoe City, it is the primary water source ([TCPUD UWMP, 2026](#)) for the area. The subbasin serves as the region's primary source of drinking water.

The TVW Subbasin is ranked as a very low-priority basin by DWR. This means that the Subbasin has shown no signs of chronic groundwater depletion, subsidence, water quality degradation impacting supply, or adverse impacts on local stream flows and ecosystems. Although sustainable, the subbasin's supply cannot meet the overlying demand during all conditions.

TCPUD maintains legal water rights to divert over 1,000 AF, or approximately 326 million Gallons (MG), of surface water from Lake Tahoe and surrounding areas annually (Settlement Act and the Truckee River Operating Agreement). TCPUD successfully completed and opened the new West Lake Tahoe Regional Water Treatment Plant in Tahoma, California, in the fall of 2025. The TCPUD constructed the \$30 million facility, replacing a temporary, seasonal plant (built in 2003), to ensure a permanent, drought-resistant, and high-quality year-round water supply ([TCPUD, 2026](#)). The West Lake Tahoe Regional Water Treatment Plant currently serves the McKinney/Quail system, but can serve the Tahoe Cedars, Madden Creek, and Tahoe Swiss Village water systems via interconnections.

Concerns over the McKinney Quail water system's reliability and water quality led to TCPUD's transition from groundwater to surface water use. The primary well for the system went dry in some years and at times had high corrosivity. TCPUD attempted to add two additional wells, but both had naturally high corrosivity and required treatment, limiting their use for drinking water. These challenges prompted TCPUD to construct a temporary treatment plant in 2003 that could supplement the well. Subsequently, TCPUD opted to exercise their surface water rights and construct a permanent treatment facility ([TCPUD, 2015](#)). The plant was built with extra capacity to provide water supply to multiple aging, fragmented water systems in the West Shore region under one secure, modern network ([TCPUD, 2025](#)).

Recent Changes in the TVS Subbasin Management

After several months of discussion, the Water Agency and STPUD have agreed to make changes in the TVS Subbasin Management Structure in May 2026. While both agencies maintain their corresponding GSA roles, the Water Agency is now the lead GSA for the TVS Subbasin management for SGMA compliance purposes.

The change in management structure was made with support from both Boards to leverage the Water Agency's planning expertise and experience in engagement with state agencies, especially DWR, working toward the potential downgrading of TVS Subbasin's priority under SGMA. Currently, there is no established process for reevaluation of groundwater basin prioritization.

With or without SGMA requirements, **EDWA and STPUD commit to the sustainable management of the TVS Subbasin.** If the SGMA requirements for the TVS Subbasin because of its medium-priority status are removed per the pending petition, the TVS Subbasin management would still need to satisfy other law and regulatory requirements but to a much lesser degree – similar to the conditions for this subbasin prior to the SGMA, which is what the Alternative Plan was originally developed for. In summary, this change intends to seek relief from regulatory requirements that are misaligned with the local conditions or SGMA-specific regulatory objectives.

Intent to Downgrade the Subbasin Priority under SGMA

EDWA and STPUD agreed that the TVS Subbasin should be downgraded to Low Priority due to its proven sustainable management and because there was no evidence suggesting the subbasin may experience any of the six undesirable outcomes:

- Chronic lowering of groundwater levels, indicating a significant and unreasonable depletion of supply.
- Significant and unreasonable reduction of groundwater storage.
- Significant and unreasonable seawater intrusion.
- Significant and unreasonable degradation of water quality.
- Significant and unreasonable land subsidence.
- Groundwater-related surface water depletions that have significant and unreasonable adverse impacts on beneficial uses of surface water.

Supporting Evidence for Subbasin Priority Downgrade

Subject to further refinement and information development, the following evidence forms the basis of the priority downgrade petition.

- Current groundwater demand has decreased:
 - Groundwater storage has been increasing.
 - Groundwater pumping has been decreasing.
- Future groundwater demand is expected to decrease:

- STPUD has a pending petition for surface water rights to increase resilience and reliability of its water supply portfolio.
- STPUD continues to progress in water conservation per the Making Water Conservation a California Way of Life regulation.
- The Subbasin has been sustainably managed for over 20 years.
- The groundwater contamination in the South Y area did not create long-term impacts on regional water security although it did incur costs for facility upgrade and relocation. The contamination is actively managed by LRWQCB.

Strategy Development

The Water Agency and STPUD will engage in strategy development to create a pathway for priority change because there is no existing process or precedent following the 2018 basin prioritization. The strategy will include information development, as well as communication and advocacy for broad support by the public, stakeholders, elected officials, and other partners. A purposeful communication plan with DWR is also necessary.

Other Groundwater Resource Management Considerations

The following highlights some groundwater resource management considerations that are generally applicable countywide and thus, applicable in El Dorado Tahoe Basin in its own context.

Coordination with EMD's Well Permit Program

Environmental Management Department (EMD) of the County of El Dorado administers well permits in El Dorado County. Permits are required for the construction, destruction, deepening, and repair of a water well. EMD's Water Well Program protects the health, safety, and general welfare of the people of the County of El Dorado by ensuring that the groundwater will not be impacted. Key ordinance requirements can be found under [Chapter 8.39](#) (El Dorado County, 2026) of the County Ordinance Code; primary responsibilities of EMD include:

- Determining the eligibility for new well construction.
- Reviewing and approving/denying well permit applications based on El Dorado County's ordinance.
- Conducting site inspections.
- Ensuring that well production and completion reports are submitted.

Currently, El Dorado County does not have an ordinance requiring EMD to consult with a GSA for well permitting purposes. However, EMD routinely consulted with STPUD for well permit applications in the TVS Subbasin. With the change in management structure, **the Water Agency will become the primary agency for consultation.** This practice is consistent with the practice enforced during the 2019-2022 drought.

Executive Orders N-7-22 and Executive Order N-3-23 enacted during the 2019-2022 drought required well permitting agencies to consult with the local GSA and receive written verification

from the GSA that the proposed well location is consistent with the applicable GSP and will not decrease the likelihood of achieving the sustainability goals developed by the GSAs under SGMA. These EOs were rescinded in 2024 after the drought emergency was lifted.

EMD and the Water Agency had discussions regarding the formalization of this consultation practice during the drought period (when the above mentioned EOs were effective) and during the update process for 2024 *Water Resources Development and Management Plan* (WRDMP). Potentially, the resulting El Dorado County ordinance may also formalize the consultation with the Agricultural Commissioner for agricultural well permit applications to address the trend of “fake ag well” applications in the West Slope.

County Well Database Update and Reconciliation of State’s Records

Incomplete well data is one of the challenges in CDRP development. Well construction vendors are required to file a well completion report to the State after drilling a new well. However, the State is not notified if the well is no longer used, sealed, or abandoned. As a result, there is a significant gap between the perceived number of wells in El Dorado County and the number of wells in EMD’s records. Voluntary reporting under the State Water Resources Control Board’s Groundwater Ambient Monitoring and Assessment program is also incomplete. Certain well information is reported through DWR’s CASGEM system. State agencies developed tools and information based on what they can have, including DWR’s [Water Shortage Vulnerability Explorer](#) tool for SB 552 implementation.

As discussed in 20260622 *Blueprint Tahoe_DACs and Vulnerable Populations*, the inference from these tools and data analysis has its ways of flowing into State’s allocation of resources and funding distribution. Improving the quality and consistency of well data and groundwater use information would be helpful to better position El Dorado County and associated water management partners. However, all recognize the difficulty and associated resource needs in cleaning up these datasets.

EMD is in the process of upgrading its well permitting data system. The Water Agency has made suggestions regarding EMD’s well permit application form to improve consistency and efficiency, including:

- Acknowledgement of required GSA consultation and approval
- State well number for cross reference
- Other pertinent information² to support CDRP implementation.

See **Supplemental Information 3** for general well data that could be helpful for groundwater resource management and drought and water shortage resilience improvement.

Dry Well Reporting and Associated Implications

Dry well conditions are not as concerning in the El Dorado Tahoe Basin as they are in the West Slope area. State encourages dry well reporting to inform adequate water shortage resilience

² It was detailed in EDWA’s October 24, 2024, memo to EMD for assistance request, but omitted here for brevity.

planning and emergency response, as well as future budgetary planning and resource allocation. Although there are casual personal accounts and anecdotal information, there has been no established practice or culture in El Dorado County for reporting dry well conditions to County Health Officer, EMD, or other government agencies.

There are potential barriers related to the perception that such a dry well report may deem the property uninhabitable or affect property value. This is an issue identified in the CDRP and past discussions of WRDMP updates.

Long-term Operating Funding Considerations

SGMA has been an unfunded mandate by the State to protect groundwater supplies as a drinking water resource. To date, operating costs for managing the TVS Subbasin are equally shared by the Water Agency and STPUD as stipulated in the memorandum of understanding (MOU) between these two agencies.

The TVS Subbasin has been managed sustainably for more than 20 years, but STPUD and the Water Agency must continue reporting in accordance with the TVS Subbasin's SGMA basin priority at the cost of financial and workforce resources. Before the priority status of the TVS Subbasin changes, continued compliance with SGMA is important to avoid complications associated with being out of compliance due to procedural issues.

The Water Agency is also reviewing options of long-term funding sources for TVS Subbasin's management. SGMA allows GSA to offset operational costs by assessing fees and other charges. Currently, the funding is provided by STPUD's rate charge and EDWA's allotment of ad valorem tax from the County.

There is a need for more generalized well-related management practices and the support necessary for CDRP implementation in addition to that previously mentioned. The Water Agency may explore other more sustainable and equitable alternative sources of funding in conjunction with resource management needs.

Potential Measures/Partial Solutions

The following measures/partial solutions are developed for discussion purposes.

1. **Blueprint Tahoe parties will support sustainable groundwater resource management in El Dorado Tahoe Basin consistent with applicable law and regulations and Lake Tahoe Region-specific management objectives related to groundwater resource protection and use.**
2. **The Water Agency (lead) and STPUD will continue to co-manage the TVS Subbasin for SGMA compliance and pursue TVS Subbasin priority downgrade to seek relief from unnecessary regulatory compliance costs and resource needs.**
 - a. **The Water Agency will engage Blueprint Tahoe parties in the TVS Subbasin annual public meeting and information dissemination.**

The annual meeting may be a stand-alone event, or part of the agenda should there be a regular gathering of Blueprint Tahoe parties for continued

collaboration and progress tracking included in recommendations. See 20260615 *Blueprint Tahoe_Regional Comm and Advocacy*.

- b. **Blueprint Tahoe parties** will consider supporting the initiative provided that prudent information and supporting evidence are developed and shared adequately.
- 3. **The Water Agency** and **EMD** will collaborate on the following:
 - a. Ordinance development to formalize the requirements for GSA consultation, where applicable, in well permitting process.
 - b. Management and acquisition of well data to support broad groundwater management objectives.
- 4. **The Water Agency** will coordinate with **County of El Dorado** and **STPUD** to assess long-term financial sustainability for TVS management.
- 5. **The Water Agency** will monitor LRWQCB's process for South Y Area contamination in coordination with **EMD**, **STPUD**, **Lukins Brothers**, and **Tahoe Key Water Company**, and provide support in hearings and other related activities where appropriate in collaboration with LRWQCB.

Supplemental Information 1: GSA's Authority for Operating Cost Recovery

SGMA provides broad authority for GSAs, including recruiting operating costs by levying regulatory and pumping fees on groundwater users, assessing property-based charges, collecting contributions from member agencies, and securing state or federal grants. These funding mechanisms allow agencies to cover administrative duties, plan development, and mitigation projects (DWR,2024).

Common strategies GSAs use to fund their operations include:

- **Extraction Fees:** Charges based on the actual amount of groundwater pumped, often measured in dollars per acre-foot.
 - This option is not viable in the Tahoe Basin as pumpers are all public agencies providing supply to municipal and industrial customers.
- **Regulatory Fees:** Flat fees imposed on well owners or permitted activities to fund ongoing program administration and monitoring.
 - This option is used by Salinas Valley Basin in a hybrid approach. Charges are applied by acre-feet for ag pumpers and flat fee per municipal connection (Salinas Valley Basin, 2026).
- **Benefit Assessment:** As defined by Prop 218, an assessment is any fee property by an agency conferring a special benefit upon the property.
- **Property or Parcel Assessments:** Property-based charges collected directly through county tax rolls, which are typically tied to land acreage or historical water use.
 - Used by Sonoma Valley GSA (Sonoma Valley GSA, 2022) and Napa County (Napa County, 2026).
- **Member Agency Contributions:** Direct financial support provided by the local cities, counties, or water districts that formed the GSA - the current approach where STPUD and the Water Agency are funding.

Table. Comparison of SGMA Implementation Funding Options (DWR, 2024)

Funding Mechanism	Regulatory Mechanism	Public Vote Required	Approval Process	Method of Collection	Outreach Requirements
Regulatory Fee	Proposition 26	No	Board Approval	Direct or County Tax Roll	Public Meeting Notice
Property Fee	Proposition 218	No	No Majority Protest and Board Approval	Direct or County Tax Roll	Mailed Notice to impacted customers, Public Hearing
Benefit Assessment	Proposition 218	Yes	No Majority Protest and Board Approval	County Tax Roll	Mailed Notice to impacted customers, Public Hearing
Special Tax	California Government Code	Yes	Two-thirds approval from electorate	County Tax Roll	Mailed Notice to impacted customers, Public Hearing

Funding strategies for groundwater management have been developed for agencies across California. DWR has outlined steps to be taken for funding strategies specific to GSP implementation (DWR, 2024). The approach is similar to that of a rate or fee study. The process provides guidance and is not a specific course of action that must be followed to achieve successful funding, and includes the following steps:

1. Analyze Funding Needs
2. Identify Customers or Beneficiaries
3. Develop Cost of Service
4. Determine Average Unit Cost by Customer or Beneficiaries.
5. Develop Rates for Target Revenue
6. Reevaluate and Update

Examples of work conducted are available to understand what is required and a level of effort. These include:

- Sonoma Valley Groundwater Sustainability Agency Rate and Fee Study, (Sonoma Valley GSA 2022)
- Napa County Groundwater Sustainability Agency Rate and Fee Study (Napa County Basin GSA, 2025)

Supplemental Information 2: Experience with Adopting an Ordinance for Well Permit Application Consultation with GSA

In March of 2024, the Sustainable Groundwater Management Office at the Department of Water Resources released a report ([DWR, 2024](#)) summarizing the various approaches local agencies took to comply with the Executive Orders. It contained observations of groundwater conditions that occurred while these actions were taken and policy recommendations that could be used to develop future solutions to align land use planning and well permitting with groundwater management and use.

The report concluded that the Executive Orders caused changes in well permitting by increasing coordination among local agencies responsible for differing aspects of protecting groundwater for all users. They accomplished a shift in the well permitting process from the primary concern of protecting groundwater quality to a broader concern that includes SGMA regulations and the goal of sustainable groundwater management. Managing groundwater sustainability in a basin requires the need to fully consider the effects of new or modified well construction processes. The primary conclusion of the report was “Statutory provisions should be enacted that provides public disclosure of well permit applications and collaboration between Local enforcement Agencies and GSAs.” The report also noted that standards of applicability/exemption should be established for basins with low- and very low-priority designations (those with optional GSAs and GSPs) or in non-alluvial areas. Currently, permits are informally vetted through STPUD for consistency with the GSA within the TVS Subbasin. A County ordinance would add greater alignment with well development, land use, and SGMA.

Several California counties enacted local ordinances that require GSA review for well permit applications similar to the requirements of the former Executive Orders. Counties that have enacted ordinances or developed strict procedures for GSA review include (Kronick, 2024):

- Yolo County: Passed Urgency Ordinance No. 1569 (and subsequently UO No. 1576), which mandates a two-step permitting process and coordinated GSA review for new or modified agricultural wells in designated "Focus Areas".
- Stanislaus County: Adopted a local well ordinance requiring applicants to prove that new wells will not detrimentally impact groundwater resources before receiving a construction permit.
- Sonoma County: Amended its well ordinance to create a regulatory process that evaluates potential adverse impacts on public trust resources and requires water use reporting.
- Napa and Sonoma Counties: Shifted to formal well permitting procedures that are closely coordinated with the sustainability requirements of SGMA.

These ordinances address the missing consistency between county well permitting and SGMA. Each of these ordinances addressed specific areas of need to their county. Making a change to the well permitting allocation can assist in solving this issue. Adding a statement to inform the permittee that their well may be within a groundwater basin managed under SGMA.

For illustrative purposes, the [2023 EO languages](#) could be used for an ordinance for the TVS.

The Sustainable Groundwater Management Act (SGMA) requires local agencies to form groundwater sustainability agencies (GSAs) for high and medium priority basins. GSAs develop and implement groundwater sustainability plans (GSPs) to avoid undesirable results and mitigate overdraft within 20 years. Any proposed well located in the Tahoe Valley South Subbasin is subject to approval by the GSA unless it meets any of the following conditions:

- *The proposed well will provide less than two acre-feet per year of groundwater for individual domestic users,*
- *The proposed well will exclusively provide groundwater to public water supply systems as defined in section 116275 of the Health and Safety Code,*
- *The proposed well will replace existing, currently permitted well(s) with new well(s) that will produce an equivalent quantity of water as the well being replaced when the existing well is being replaced because it has been acquired by eminent domain or acquired while under threat of condemnation.*

Supplemental Information 3: Beneficial Information Gathering for General Well Permitting and Domestic and Agricultural Wells

Ag wells and domestic wells have different construction standards, permit rules, drinking water testing requirements, and designated uses. Both well types are processed through the El Dorado County Water Well Program. Methods to combat this are enforcing strict zoning limits, requiring very specific well completion reports, and verifying the intended land/well use. Limiting zoning may be difficult given agriculture and housing can often occur on the same parcel in El Dorado County. Field visits to verify use type may not be feasible in such a large county with limited staff. Increasing the specificity of the well completion report is a low-cost option that may deter permitting domestic wells as ag wells and reduce health risks.

Additional detailed information on well permits information requested below is useful, but because it is typically the well driller completing and submitting the county well permit form. This specificity may receive resistance from drillers and developers.

Domestic/Private well:

- Dwelling unit type served (single family, multifamily)
- Number of dwelling units served.
- Location of water use (indoor or outdoor [non-agricultural irrigation such a watering the lawn), or both])
- Acreage of outdoor (irrigated) area
- Well treatment (if applicable)

Public/Commercial well:

- Number and type of units (public/commercial establishment(s) served (i.e., restaurant, gas station, school, etc.)
- Land use and acreage (by land use type) served.
- Location of water use (indoor or outdoor [non-agricultural irrigation such as watering the lawn), both])
- California Department of Water Resources (DWR) well permit number/water system number (if applicable)
- Well treatment (if applicable)

Agricultural/Irrigation well:

- Applied area (acreage), orchard vs row crop, crop type, irrigation method
- Proposed operational periods and estimated water usage.
- Well treatment (if applicable)

All Wells:

- Latitude and Longitude of well location
- Elevation of wellhead
- Indicate if new well construction is a replacement well.
- If replacement well, provide distance from the existing well. And provide groundwater elevation and permit number of existing well(s) (if available).
- Indicate if replaced well has been destroyed.
- Is adequate separation provided as per El Dorado County Code Sec. 8.39.090. – Setbacks

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REGIONAL COMMUNICATION AND ADVOCACY

Issue Clarification

During Workshop 1, the discussion suggested that some vulnerabilities (e.g., natural occurrence of contamination and emerging contaminants in groundwater) will be exacerbated when regulatory changes occur. There are also established requirements for small water systems but at this point, they are subject to funding availability (e.g., metering and other requirements under Senate Bill (SB) 552. See 20260622 Blueprint Tahoe_Drinking Water System Consolidation.

Other regulatory requirements, not directly related to water security or water management in general (e.g., electrical vehicle use), are also in place or under development that could add additional burdens to water system operations and costs.

Due to the complexity of these laws and regulations with their intentional and unintentional consequences, in many cases, resources and subject matter expertise become constraining factors for many water managing agencies and groups to monitor and manage the development effectively. The potential compounded and aggregated effects of different laws and regulations on utility operations could also result in direct impacts on affordability and other societal benefit considerations.

Briefs incorporated by reference:

- 20260413 Blueprint Tahoe_Water Supply-Demand Imbalance
- 20260622 Blueprint Tahoe_Sewer Line in Environmentally Sensitive Areas
- 20260622 Blueprint Tahoe_Drinking Water System Consolidation
- 20260622 Blueprint Tahoe_Private Sewer Laterals
- 20260622 Blueprint Tahoe_Drinking Water System Consolidation
- 20260622 Blueprint Tahoe_Sustainable Groundwater Management
- 20260622 Blueprint Tahoe_Water 4 Fire Suppression_Rural Areas
- 20260622 Blueprint Tahoe_Workforce and Loss of Inst Knowledge
- 20260622 Blueprint Tahoe_Public Outreach and Education
- 20260622 Blueprint Tahoe_SB 552 Imp Streamlining

Considerations

The concerns over increasing regulatory requirements and other legislative actions on state and federal sides are not new; the intensity, complexity, level of requirements, and potential interconnection (or worse, interference) can be overwhelming.

The implementation of these laws and regulations requires proper public dissemination and education for support and lasting effects, particularly regarding how various forces may collectively affect cost of service, required individual actions, and other aspects of our daily lives.

Supplemental Information 1 provides a snapshot of some thought processes that may help in preparing for regulatory changes.

Existing Implementation

This collective approach is a known and implemented strategy in El Dorado Tahoe Basin for different circles and issues. The intent is to change our tactics from reactive to proactive to ensure the resulting laws and regulations create value for water systems and utilities, as well as communities around us, for water resilience or other management objectives.

This strategy has been implemented on a sector level, interest level, and other attributes to facilitate collaboration. The focus ranges from proactive legislative and regulatory approaches to advocacy for policy and implementation needs.

Examples of existing implementation include:

- The Water Agency engages with STPUD and TCPUD regularly regarding legislative and regulatory updates and potential joint positions and actions, mostly for water supply (including water use efficiency), water resilience, and water rights topics.
- The Tahoe Water for Fire Suppression
- Active involvement with the Mountain Counties Water Resources Association¹ (e.g., the Water Agency)
- Active involvement with the Association of California Water Agencies,² including regional and committee leadership and participation in subject specific working groups (e.g., water conservation)

The above examples are not even close to covering efforts through various associations and affiliations on organizational and individual levels or the efforts based on specific interests or professions.

To help the discussion and awareness, a particular section of the 1959 El Dorado County Water Agency Act is included in **Supplemental Information 2** to highlight the purpose of the Water Agency.

Interim Findings of Blueprint Tahoe

The input from the October 23, 2025 Blueprint Tahoe scoping session also suggests the need for a similar approach to promote innovations or adaptive measures requiring urgent attention for climate adaptation, with support for consistent outreach and messaging across different levels of government and managing agencies. The scoping comments also suggested that there

¹ Members are mostly entities in the Sacramento-San Joaquin Delta watersheds.

² ACWA is a statewide organization for public water agencies, excluding private water companies governed by California Public Utilities Commission.

is no existing regional forum on water that allows collaboration across the water systems, managing agencies, and interested parties.

In addition, consistent and complementary public communication and education, as well as advocacy on the regional level, are suggested in multiple briefs developed for issue clarification and measures/partial solutions for identified vulnerabilities.

Potential Measures/Partial Solutions

The following measures/partial solutions are developed for discussion purposes.

1. **The Water Agency** will organize annual public meetings/partner workshops for Blueprint implementation, serving as the regional forum for water and cover one or more of the following functions for efficiency and effectiveness:
 - a. Public education and awareness of changes and pending changes of vulnerabilities, response actions, and mitigation actions
 - b. Blueprint implementation progress tracking and reporting
 - c. El Dorado County Drought and Water Shortage Task Force, Tahoe Basin Subcommittee Meeting (see 20260622 Blueprint Tahoe_SB 552 Imp Streamlining)
 - d. Annual public meeting for the Tahoe Valley - Tahoe South Subbasin to meet SGMA requirements (see 20260622 Blueprint Tahoe_Sustainable Groundwater Management)
 - e. Other purpose(s)

Note that the draft findings in other briefs are incorporated herein under a regional approach.

2. Subject to the concurrence of existing partnerships, coalitions, or collaborative groups, expand active participation for efficiency and coverage.
 - a. The Water Agency/STPUD/TCPUD group for (Entity/Entities)
 - b. Tahoe Water for Fire Suppression for EDWA to represent small water systems (see 20260622 Blueprint Tahoe_Water 4 Fire Supression_Rural Areas)
 - c. Lake Tahoe Wastewater Infrastructure Partnership for expanding its advocacy capacity beyond current project coordination and technical assistance, if appropriate (see 20260622 Blueprint Tahoe_Sewer Line in Environmentally Sensitive Areas)
 - d. Other
3. To fill a gap, (Entity/Entities) will organize a new partnership, coalition, or collaborative group for (Purpose)

Supplemental Information 1: Snapshot of thought process that may help in preparing for regulatory changes

Without being specific or customized for individual issues, the following could be helpful in formulating a tactical plan.

- Proactive Planning and Assessment - Completing water system-appropriate asset management plans with updated system mapping, asset inventories, and infrastructure inspection plans, including funding strategies for known required upgrades.
- Establish Working Groups - Establishing local working groups that pool resources to enable smaller agencies to understand what is coming and how to best plan for change.
- Engagement - Actively tracking EPA and state regulatory changes (e.g., wastewater and drinking water quality standards) to anticipate new requirements. Actively track legislative activities for subject areas that may impact operations.
- Embrace Technology and Partnerships: Implementing decentralized, modular treatment systems to manage costs. Partnering with nearby systems can provide better services and share compliance costs.

Smaller water and wastewater utilities can prepare for changing regulations by tracking potential regulatory changes, conducting early treatment system assessments, leveraging existing training and technical assistance grants, and adopting modular, decentralized technologies.

- **United States Environmental Protection Agency (USEPA)**: USEPA has launched the Real Water Technical Assistance ([RealWaterTA](#)) initiative. This program provides rural, small, and tribal water utilities with [technical assistance](#) to maintain Safe Drinking Water Act compliance, manage infrastructure upgrades, and train operators. This program is not proactive to plan for regulatory changes, but reactive to handle them once the changes have occurred. Assistance is available in the form of grants and technical assistance technical assistance to maintain regulatory compliance, identify infrastructure solutions, and build utility technical, managerial, and financial capabilities.
- **State Water Resources Control Board (SWB)**: The SWB is concerned about the effects of climate change on public water systems and may impose future regulations. The State Board has adopted a resolution requiring a proactive approach to climate change in all State Board actions, including drinking water regulation, water quality protection, and financial assistance. Proactively participating in this discussion of effects of climate change on public water systems and the resilience and adaptation measures being planned and implemented can assist in preparation.
- **American Water Works Association (AWWA), California-Nevada Section**: AWWA helps utility professionals track and adapt to changing regulations through targeted toolkits, advocacy updates, and actionable guidance. The local California-Nevada Section provides several opportunities to combine resources to track and respond to new regulatory requirements with those in the region that may be impacted similarly.

Committees: The California-Nevada Section has an extensive [list of active committees](#) that are relevant to tracking and responding to changing regulations. Each committee has an extensive list of active committee members available as a resource, as well as the products of the committees; examples include:

- [Asset Management Committee](#)
 - [Distribution System Water Quality Committee](#)
 - [Legislative Committee](#)
 - [New Technology Committee](#)
 - [Regulatory Committee](#)
 - [Smaller Utilities Committee](#)
 - **Mountain Counties Water Resources Association (MCWRA):** The MCWRA was initiated in response to a changing legislative and regulatory landscape and represents more than 50 water agencies, counties, and local governments across the Sierra Nevada watershed. The MCWRA is focused on providing “a higher level of education to policymakers and advocacy for our members to help protect the water resources in the Sierra Nevada watershed with strong emphasis on outreach, education and legislative influence.” Currently, the MCWRA has two committees: Legislative and Governmental Affairs and Governance Committees. The Legislative and Governmental Affairs Committee’s goal is to monitor and represent the interests of its membership relative to the State Legislature, U.S. Congress, and State and federal regulatory agencies. The Governance Committee is internally focused.
- The MCWRA annually develops policy principles and platforms and regularly participates in the California legislative process. An example includes efforts to provide feedback on behalf of their members on subjects related to Advanced Clean Fleets regulations to the California Legislature and the chair and members of the California Air Resources Board.
- **California Rural Water Association (CRWA):** California Rural Water Association (CRWA) is an association dedicated to providing on-site technical assistance and specialized training for rural water and wastewater systems. CRWA also provides technical assistance, resources and information to assist water and wastewater utilities under several United State Department of Agriculture (USDA) and US EPA programs. CRWA does advocate at the state and federal levels but operates more in assisting small utilities in response to changes in regulations.

There are more organizations and coalitions that may be of interest but are not enumerated herein.

Supplemental Information 2: 1959 El Dorado County Water Agency Act, Section 95-103

Section 96-103 of the 1959 [El Dorado County Water Agency Act](#) provides the reason and expectation for the Legislature to authorize the establishment of the Water Agency.

“The Legislature hereby finds that water problems in the county require county-wide water conservation, flood control and development of water resources; that these problems are not general or state-wide; that the county for many years has had made investigations and engineering surveys of the county’s water resources by private, public and United States engineers; that county water districts, municipalities, and water conservation districts now exist within portions of the county, have acquired property and works, developed a limited water supply, and have incurred indebtedness, but have been and are unable alone to economically develop an adequate water supply and control the floods of said county and for such reason it is necessary to have a political entity coextensive with the geographical limits of the entire county; that the county cannot be supplied with water from a common source or by a common system of works; that investigation having shown conditions in said county to be peculiar to it. It is, therefore, hereby declared that a general law cannot be made applicable to said county and that the enactment of this special law is necessary for the conservation, development, control and use of said water for the public good and for the protection of life and property therein.”

References:

1. The EPA guidance for small water systems - https://www.epa.gov/sites/production/files/2020-05/documents/guidance_for_small_community_water_systems_on_risk_and_resilience_assessments_under_awia_final.pdf.
2. The EPA Real Water Technical Assistance (RealWaterTA) Program - [Real Water Technical Assistance \(RealWaterTA\) | US EPA](#)
3. State Water Resources Control Board - [RESOLUTION NO. 2017-0012 - Comprehensive Response To Climate Change](#)
4. State Water Resources Control Board Water Resiliency Tools for Preparation - https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/water_resiliency/prepare.html
5. AWWA Committee list - https://www.ca-nv-awwa.org/CNS/AboutTheSection/Org_Chart_with_Committee_List.aspx?WebsiteKey=4a2b83c9-e0a8-4aae-bfa8-b0dab3956c54&hkey=66b76d41-4d9e-4804-ab8e-5fd74a74bd13&0e91c0ee25e5=2#0e91c0ee25e5

OUTREACH AND PUBLIC EDUCATION

BACKGROUND ON ISSUE CLARIFICATION

Vulnerability description: Insufficient and uneven public awareness and understanding about water management challenges and issues

At the first workshop, participants validated the importance of addressing insufficient and uneven public awareness and understanding of water system challenges, which limits community buy-in that is needed to support rate discussions for infrastructure improvements and upgrades, particularly given that much of the system is out of sight.

Topics for public education may include:

- Infrastructure considerations
 - Costs of infrastructure improvements
 - Understanding current infrastructure limitations on connecting fire hydrants and adding backflow prevention
 - Opportunities to showcase infrastructure improvements (e.g. new treatment plant)
- Water supply and demand
 - Water conservation
- Regulatory compliance
 - Water quality related regulatory changes and their impacts on water supply
 - Increased drought and water shortage resilience requirements and enforcement actions for all water systems
- Workforce development
 - Career opportunities in the water supply field

Level of Concern: Moderately High, regionwide

Current Related Efforts

UC Davis Tahoe Environmental Research Center (TERC) [UC Davis Tahoe Environmental Research Center](#)

TERC is the anchor institution for water science communication in the basin. TERC connects the public with science and promotes informed stewardship through the Tahoe Science Center and outreach programs, with over 60 years of continuous scientific monitoring of Lake Tahoe. TERC currently interacts with more than 11,000 people annually, including providing over 4,000 local students with the opportunity to learn about the unique and fragile ecosystem of Lake Tahoe.

Its public-facing programs include:

- The Tahoe Science Center in Incline Village and the Eriksson Education Center in Tahoe City, offering year-round exhibits, interactive hands-on activities, school field trips, and a monthly lecture series where community members hear from scientific experts. [Tahoe Environmental Research Center](#)
- A Citizen Science program anyone can participate in using the free Citizen Science Tahoe app, monitoring water quality, algae growth, and litter at beaches around the lake. [Tahoe Environmental Research Center](#)
- K-12 programs covering Water on Earth, Ecology, Tahoe Food Web, Landforms, and Lakes of the World, aligned with state science curriculum, plus an annual Science Expo for third through fifth graders. [Tahoe Environmental Research Center](#)

Tahoe Water Suppliers Association (TWSA) – "Drink Tahoe Tap" [Your Tahoe Place](#)

The TWSA is a Lake Tahoe-based partnership of California and Nevada municipal water agencies dedicated to providing clean and safe drinking water, with a mission to develop and maintain an effective watershed control program and advocate for the protection of Lake Tahoe as a viable source of drinking water.

The TWSA public education work centers on the [Drink Tahoe Tap](#) campaign. "Drink Tahoe Tap" is the regional outreach message of the TWSA, whose members are the major public water suppliers in the Lake Tahoe Basin whose source of drinking water is Lake Tahoe. This includes a network of public water refill stations mapped across the basin, reducing single-use plastic bottle consumption while educating people about the quality of Tahoe's tap water.

Sierra Watershed Education Partnerships (SWEP) [Give Back Tahoe](#)

SWEP has provided hands-on experiential learning to over 4,000 TK-12 students in the North Tahoe-Truckee region annually for 30 years, with programming focused on climate action, sustainability, conservation, forest health, climate science, watershed health and restoration, environmental career pathways, and zero waste.

SWEP's Winter Discovery Program teaches students about snowpack and the connection between mountain snow and water supply, making it explicit to young people that "mountain snow is our source of water in California" and that less snow means less available water.

[Winterwildlands](#)

Keep Tahoe Blue (League to Save Lake Tahoe) [Keep Tahoe Blue](#)

Keep Tahoe Blue is one of the most recognized environmental organizations in the region, operating since 1957. Their water education work is multifaceted. Snapshot Day, now in its 26th year, invites volunteers of all ages and skill levels to sample water quality at sites across the Tahoe-Truckee watershed on a single day – testing for dissolved oxygen, pH, nutrients, and more – generating 25 years of comparative data while directly connecting people with the watershed as citizen scientists. [Keep Tahoe Blue](#)

The Citizen Science Tahoe app, developed by TERC and joined by Keep Tahoe Blue, the Desert Research Institute, TWSA, and Take Care Tahoe, allows visitors and locals to report observations of aquatic invasive species, litter, water quality, algae, and water refill station locations, with one partner noting that "millions of people depend on Tahoe for their water supply."

Tahoe Regional Planning Agency (TRPA) [Tahoe Fund](#)

TRPA conducts public outreach and education to encourage Basin residents and visitors to implement best management practices for water quality and to prevent the introduction and proliferation of invasive species. As the bi-state regulatory authority, TRPA's outreach is oriented toward compliance and long-term behavior change, particularly regarding stormwater runoff, erosion control, and shore zone protection.

Tahoe Conservancy

The [Tahoe Conservancy](#) works with regional partners on watershed restoration and public education related to drought resilience, stream restoration, wetlands, and climate adaptation. Their outreach emphasizes how healthy forests and wetlands protect water quality and sustain regional water supplies.

The Tahoe Resource Conservation District

The Tahoe Resource Conservation District leads the Tahoe Network of Fire Adapted Communities program, which engages thousands of residents through wildfire preparedness and watershed education efforts across the basin. The regional Community Wildfire Protection Program also highlights the need to upgrade water infrastructure used for wildfire response and educate residents about defensible space and fuels reduction.

The Drought Response Outreach Program for Schools (DROPS)

DROPS in the Tahoe Truckee Unified School District teaches students about stormwater management, water conservation, watershed protection, green infrastructure, and water quality monitoring through hands-on activities and sustainability clubs.

Outreach Summary

Programs and tools for outreach:

- Public webinars, workshops, and informational materials
- Children and youth-focused outreach including school programming, educational events and activity books
- Hands-on engagement including watershed restoration tours and videos and community workdays
- Website and social media campaigns
- Neighborhood leader resource libraries
- Multilingual outreach efforts

Takeaways from current outreach efforts: Most outreach efforts in the Tahoe region are focused on environmental stewardship as it relates to water resources. Common themes include water conservation and drought preparedness, watershed protection, forest health and wildfire resilience, defensible space and home hardening, stormwater and runoff reduction, climate adaptation, community-based stewardship, and emergency preparedness and evacuation awareness. While these efforts help build public understanding of the connection between environmental conditions and water resources, water supply systems and infrastructure issues are generally not a primary focus of outreach and education activities.

Potential Measures/Partial Solutions

Given the many existing outreach programs, ongoing efforts, and strong public engagement in the Tahoe region, **water agencies and small water systems** may find it more efficient and effective to coordinate with existing outreach initiatives rather than develop entirely new programs to build public awareness around water infrastructure needs, regulatory requirements, and water supply resilience. Below are suggested outreach focus areas and potential regional organizations and agencies that could be leveraged to advance key messaging and build public awareness.

1. **WATER SUPPLY INFRASTRUCTURE:** Build on and integrate existing outreach related to environmental stewardship and wildfire preparedness to promote public understanding of water supply infrastructure and system resilience. Highlight ongoing infrastructure investments to increase awareness of the operational, regulatory, and financial challenges associated with maintaining Tahoe's water systems. Key themes may include:
 - a. Explaining how power outages, wildfire damage, or drought conditions affect water delivery systems, fire flows, and emergency water access.
 - b. Expanding existing watershed and forest health to illustrate the connection between source water protection, infrastructure reliability, and long-term water supply sustainability.

Proposed Action: Coordinate with Tahoe Water Suppliers Association (TWSA), Sierra Watershed Education Partnerships, Keep Tahoe Blue, Tahoe Regional Planning Agency, and Tahoe Conservancy.

2. **WATER SUPPLY VULNERABILITY:** Develop public-facing maps and visual materials that show where Tahoe's water comes from, how it is treated and delivered, and the vulnerabilities associated with aging infrastructure, extreme weather, and wildfire risk.

Proposed Action: Coordinate with TERC - Tahoe Science Center in Incline Village and the Eriksson Education Center in Tahoe City.

3. **SHOWCASING INFRASTRUCTURE:** Partner with schools, visitor centers, and community organizations to provide educational tours of water treatment facilities, pump stations, and watershed restoration projects to help residents better understand the complexity of maintaining reliable water service in rural settings.

Proposed Action: Coordinate with TERC and the Drought Response Outreach Program for Schools.

4. PREPAREDNESS: Leverage community events and emergency preparedness campaigns to incorporate practical information on household water resilience (e.g., conservation, the role of backup power systems during outages).

Proposed Action: Coordinate with the Tahoe Resource Conservation District.

5. WORKFORCE: Public communication efforts could inform community members about workforce and career opportunities to support the local water industry.

Proposed Action: Coordinate with Truckee Meadows Community College, Lake Tahoe Community College, and California Rural Water Association

Public Engagement Topic	Content for Sharing	Organizations to Coordinate/Collaborate With
The intersection of environmental stewardship and the water supply system	The impacts of power outages, wildfire damage, or drought conditions on water delivery systems. Explain the connection between source water protection, infrastructure reliability, and long-term water supply sustainability.	• Tahoe Water Suppliers Association (TWSA) • Sierra Watershed Education Partnerships • Keep Tahoe Blue • Tahoe Regional Planning Agency • Tahoe Conservancy
Water supply vulnerability	Develop public-facing maps and visual materials that show where Tahoe's water comes from, how it is treated and delivered, and the vulnerabilities associated with aging infrastructure, extreme weather, and wildfire risk.	• TERC - Tahoe Science Center in Incline Village • Eriksson Education Center in Tahoe City
Showcase infrastructure	Provide educational tours of water treatment facilities, pump stations, and watershed restoration projects to help residents better understand the complexity of maintaining reliable water service in rural settings.	• TERC and the Drought Response Outreach Program for Schools
Preparedness	Leverage community events and emergency preparedness campaigns to incorporate practical information on household water resilience (e.g., conservation, the role of backup power systems during outages).	• Tahoe Resource Conservation District
Workforce development	Inform community members about workforce and career opportunities to support the local water industry.	• Truckee Meadows Community College • Lake Tahoe Community College • California Rural Water Association

WORKFORCE SHORTAGE AND LOSS OF INSTITUTIONAL KNOWLEDGE

Background on Issue Clarification

Vulnerability description: Workforce shortages and the loss of institutional knowledge are caused by recruitment and retention challenges, as well as the retirement of an aging workforce. Together, these factors are creating staffing gaps and eroding critical expertise.

Level of Concern: Moderate High, regionwide

Pathways that are exacerbating this vulnerability:

- Small systems require staff to be highly versatile, covering multiple responsibilities (e.g., underground work, sampling, treatment, and cross-connection control), unlike larger systems with specialized roles.
- Work conditions are physically demanding, often involving extreme weather (e.g., freezing temperatures, frozen ground) and on-call emergency response.
- An aging workforce brings valuable institutional knowledge but may have reduced physical capacity to meet field and emergency demands.
- High turnover is common, as employees often leave after gaining certifications (e.g., D2, T2) and experience, pursuing higher pay and better benefits elsewhere.
- The local job market competes with seasonal resort and landscaping work, which may be more attractive to potential hires.
- High costs of living and economic pressure discourage new hires from relocating and contribute to employee attrition, especially after experiencing harsh winter conditions.

Current Related Efforts

STPUD/TCPUD and other Small Water Systems

Each agency recruits and trains independently, benefits packages are used as the primary retention tool, Operator in Training positions are occasionally posted as entry points, and housing is an acknowledged but largely unaddressed barrier.

Tahoe Prosperity Center

The Tahoe Prosperity Center's work is focused on broader community and economic development. It works regionally with local businesses, jurisdictions, nonprofits, and community members to advance data-driven initiatives that better the environment, community, and

economy for everyone living and working in Tahoe, including attainable workforce housing, job and training opportunities, reliable internet, and fire safety infrastructure.

Through its Envision Tahoe initiative, [Tahoe Prosperity Center](#) focuses on diversifying the regional economy away from over-reliance on tourism, noting that challenges like drought and workforce crises have placed urgency on making the Basin economy stronger and more resilient.

Lake Tahoe Community College

[ADVANCE](#), at Lake Tahoe Community College, is a collaborative network of education and government agencies, local organizations, and employers serving the Lake Tahoe Basin and Alpine County. Their mission is to support and empower adults seeking to enhance their career, educational, and civic opportunities. They also offer training programs, including apprenticeships, to help meet the workforce needs of our industry partners.

[The Tahoe Basin Public Safety Training Complex](#) is a new initiative at the College to build the region's first in-basin training facility for emergency responders in fire, forestry, emergency medical services, Search and Rescue Training, and Wilderness Medicine. The facility is scheduled to open in 2027.

Currently, there is no specific program that addresses water operators.

Sierra College, Tahoe-Truckee Campus

The [Tahoe-Truckee campus](#) offers career and technical education programs, workforce development, and noncredit career education programs in trades and technological fields and connects students to the broader Sierra College district with over 120 degrees and certificates. The campus's current CTE focus is on areas like EMT, Mechatronics, and business.

Currently, water/wastewater operator training is not among its listed programs.

Golden Sierra Job Training Agency (GSJTA)

GSJTA is a job training agency that connects job seekers and employers, offering employment services and resources to individuals and businesses in Placer, El Dorado, and Alpine counties. It is a Joint Powers Authority (JPA) organized between those three counties, with its primary annual funding allocated through Title I of the Workforce Innovation and Opportunity Act (WIOA).

Currently, there is no documented specific program for water operator workforce development in their current offerings. However, because they can fund vocational training and certifications through WIOA, they could theoretically support individuals pursuing water/wastewater operator certifications in their service area. See goldensierra.com for more details.

Potential Measures/Partial Solutions

While currently there is no dedicated, coordinated water operator workforce development initiative specific to the Tahoe region, there are relevant examples that may be considered or modeled after:

- **BAYWORK Regional Collaborative Internship Program:** A network of water and wastewater agencies in the San Francisco Bay Area focused on workforce reliability through regional collaboration. It was established in 2009, and its internship program is BAYWORK's primary pipeline tool for bringing new people into the water/wastewater sector. See baywork.org for more information.
- **IEWorks:** Built on the BAYWORK model, West Valley Water District (WVWD) leadership formed in 2021 and united a group of Inland Empire water and wastewater utility agencies, local colleges, and community stakeholders to launch IEWorks with three core goals: (1) build a regional training workforce consortium, (2) deliver high-quality training leading to in-demand jobs in maintenance and operations using apprenticeship, internship, and career awareness models, and (3) address economic equity by prioritizing workers in communities with a disproportionate burden of income and environmental inequality. See [The future of water/wastewater in the Inland Empire - IEWorks](#) for more information.

A potential measure is to establish a workforce development coalition as described below.

1. **(A: Convener) to coordinate a Workforce Development Coalition of (B: Educational institutions), (C: Water purveyors), (D: other regional interests) to support a water operators workforce development that focuses on (E: activities).**

For effective workforce development, it will be important to consider the operators' career pathways and address: (1) outreach and education about career opportunities, (2) employment opportunities in the region through internships and apprenticeships, and (3) retention of new workforce.

The options for various placeholders in the above measure description are provided below.

A. Convener

- a. The Tahoe Prosperity Center
- b. El Dorado Water Agency
- c. Other entity

B. Educational institutions

- a. Sierra College - Truckee campus
- b. the ADVANCE initiative at Lake Tahoe Community College
- c. Local schools

C. Water purveyors

- a. STPUD, TCPUD
- b. Small Water Systems

D. Other regional interests

- a. City of South Lake Tahoe
- b. Golden Sierra Job Training Agency (GSJTA)
- c. Tahoe Water Suppliers Association

E. activities

- a. Regional Outreach: Raising awareness of careers in the water sector is essential to building a sustainable pipeline of qualified workers. Existing outreach materials can be adapted for the Tahoe region, and partnerships with community colleges, training organizations, and neighboring utilities can help create practical pathways into the field, including internships. Outreach efforts should ideally focus on high school students but can also target individuals seeking career change. Field trips and visits to water system infrastructure, such as treatment facilities, are effective ways to generate interest.
- b. Regional internships and apprenticeship program: Develop internship and apprenticeship programs that include a rotational component, allowing participants to gain experience with different types of systems across the region as well as exposure to varying organizational structures.
- c. Regional reciprocity agreements: For small systems where consolidation is not feasible, consider opportunities for sharing operators among multiple public water systems. Regional operator agreements can spread the costs of the operator's salary across multiple enterprise funds and may result in better retention, as the systems could collectively offer a more competitive salary.
 - Description of regional operator sharing agreements opportunities - Environmental Finance Center Network - Operating at a Deficit: Solutions to a Water and Wastewater Operator Shortage - Environmental Finance Center Network
 - Potential barriers to operator sharing agreements:
 - Structural mismatch: Small systems require generalists who can manage a wide range of tasks, while larger utilities often rely on specialized roles. For example, South Tahoe Public Utility District operates with specialized crews (e.g., underground, sampling), whereas Lukins Brothers Water Company follows a more generalist model.

- Liability and insurance: Sharing operators across systems may raise liability and insurance concerns. While this can be manageable during emergencies, sharing routine operations may be more challenging.

DRINKING WATER SYSTEM CONSOLIDATION (OR SOMETHING LIKE IT) IN EL DORADO TAHOE BASIN

The Division of Drinking Water of the State Water Resources Control Board (SWB) encouraged voluntary consolidations of public water systems with an emphasis on small, disadvantaged communities. This is one area of SWB's focus under its [SAFER program](#), established around the implementation of [Assembly Bill \(AB\) 685 of 2012](#), which establishes the state policy known as the Human Right to Water (HR2W). Two major pillars of HR2W are accessibility and affordability. System consolidation is one possible means to address the fundamental health and safety needs and overall water resilience.

Briefs incorporated by reference:

- 20260414 Blueprint Tahoe_Small Water Systems
- 20260622 Blueprint Tahoe_Workforce and Loss of Inst Knowledge
- 20260622 Blueprint Tahoe_DACs and Vulnerable Populations
- 20260622 Blueprint Tahoe_SB 552 Imp Streamlining

Regulatory Framework

This section provides a brief overview of the relevant regulatory framework to support subsequent discussions. It is not a comprehensive review.

Mandatory Consolidations

When a public water system fails, SWB has the authority to mandate certain water systems to consolidate with, or receive an extension of service from, another public water system as provided by [Senate Bill \(SB\) 88 of 2015](#) and [SB 403 of 2021](#), which amended Sections 116680-116686 of the California Health and Safety Code. The candidate water systems shall meet the following criteria:

- The system is classified as a Public Water System or State Small Water System; and
- the system serves a disadvantaged community; and
- the system consistently fails to provide an adequate supply of safe drinking water.

A mandatory consolidation can be physical (including regionalization) or managerial. Mandatory extension of service to domestic wells is authorized only when a disadvantaged community is substantially reliant on domestic wells that consistently fail to provide an adequate supply of safe drinking water, and when agreed to by the well owner. So far, [none of the water systems in El Dorado County](#) are subject to this enforcement action.

SAFER Dashboard for Failing and At-Risk Drinking Water Systems in the El Dorado Tahoe Basin

Five systems in the El Dorado Tahoe Basin are included in SWB's [2025 Need Assessment](#) focusing on community water systems and K-12 non-transient, non-community schools in DAC/SDAC.

Water System No.	System Name	2025 Risk Assessment Results	Current Status	Final SAFER Status
CA0910002	SOUTH TAHOE PUD - MAIN	Not At-Risk	Not Failing	Not At-Risk
CA0910007	LUKINS BROTHERS WATER COMPANY	Not At-Risk	Not Failing	Not At-Risk
CA0910012	TAHOE CITY PUD - RUBICON	Not At-Risk	Not Failing	Not At-Risk
CA0910015	TAHOE KEYS WATER COMPANY	Potentially At-Risk ¹	Not Failing	Potentially At-Risk ¹
CA0910019	LAKESIDE PARK ASSOCIATION	Not At-Risk	Not Failing	Not At-Risk

¹ Mostly due to the increase in MCL water quality concerns.

SWB provides information for consolidation including [Consolidation Approach - Step by Step](#), which includes pertinent information for consolidation and implementation including tools for outreach and funding.

System Consolidation Options

For voluntary system consolidation, there are several potential levels of system consolidation.

- **Physical consolidation:** The permanent physical interconnection of water systems where one system is absorbed by another, typically resulting in the dissolution of the smaller system. This includes annexation and extension of service.
- **Regionalization/Partnership:** Multiple systems join to form a new entity or share resources, often involving regional infrastructure projects that benefit a broader area. A variation is to form an umbrella organization to manage regional aspects of water delivery while local systems maintain their own autonomy over some or all services.
- **Managerial consolidation:** Systems keep their own infrastructure but combine operations, management, or administrative staff to improve efficiency and reduce costs.

Past System Consolidation in the El Dorado Tahoe Basin

There have been many system consolidations in the El Dorado Tahoe Basin; however, many small water systems and domestic wells exist. See the brief, 20260414 Blueprint Tahoe_Small Water Systems.

Currently, there is **no** drinking water system subject to mandatory consolidations in El Dorado Tahoe Basin.

Roles in System Consolidation

As described in the [El Dorado County Drought and Water Shortage Resilience Plan](#) (CDRP), **consolidation is between two willing systems and the County's or Water Agency's role is to facilitate when possible.**

Findings of Little Interest in Physical Consolidation but...

In the CDRP development process, the Water Agency has not identified much interest in physical consolidation in El Dorado Tahoe Basin, citing the cost barrier and preference of status quo and independence. However, it is recognized that there are increasing concerns over the overall sustainability of smaller water systems with limited financial, managerial, and technical capacities, especially under the pressure of increasing regulatory requirements including both performance and reporting requirements.

For example, per SB 552 (CWC Section 10609.62),

Small water suppliers and nontransient noncommunity water systems that are schools shall implement, subject to funding availability, all of the following drought resiliency measures:

(a) No later than January 1, 2023, implement monitoring systems sufficient to detect production well groundwater levels.

(b) Beginning no later than January 1, 2023, maintain membership in the California Water/Wastewater Agency Response Network (CalWARN) or similar mutual aid organization.

(c) No later than January 1, 2024, to ensure continuous operations during power failures, provide adequate backup electrical supply.

(d) No later than January 1, 2027, have at least one backup source of water supply, or a water system intertie, that meets current water quality requirements and is sufficient to meet average daily demand.

(e) No later than January 1, 2032, meter each service connection and monitor for water loss due to leakages.

(f) No later than January 1, 2032, have source system capacity, treatment system capacity if necessary, and distribution system capacity to meet fire flow requirements.

SB 552 clarifies that these requirements are subject to funding availability; however, in cross consideration with HR2W policy, these also provide a roadmap for future regulations as we have seen with large water systems.

Workshop 1 discussion and individual follow-ups suggest managerial consolidation has potential but also challenges in workforce management.

The team also learned that certain voluntary system connections for backup supply exist. For example, Station House Inn, which is a groundwater system with transient and non-transient¹ occupancies, has established a connection and backup supply with Lakeside Park Association, which is a surface water system with a service area covering Station House Inn's completely. This is a step forward.

Opportunity Assessment for System Consolidation

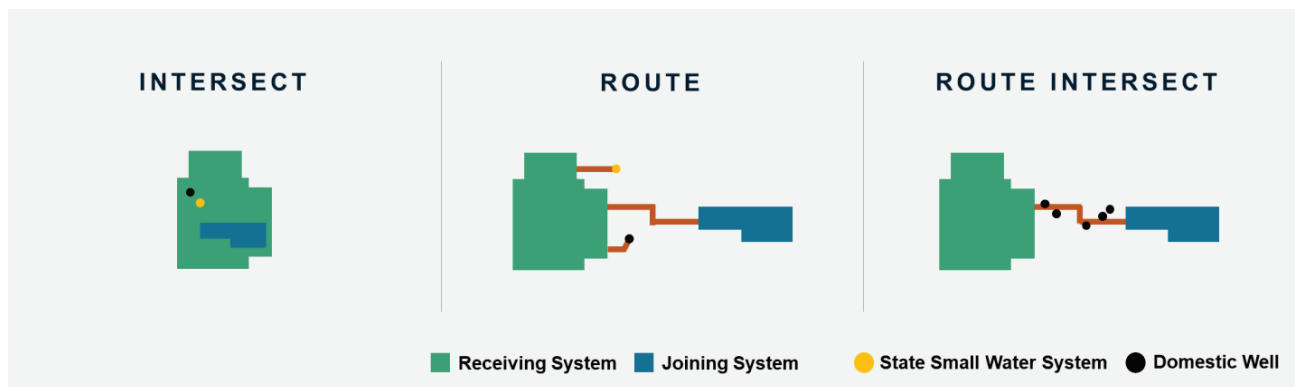
An opportunity assessment may be helpful to facilitate water system operators' considerations for varying levels of system consolidation (not just physical consolidation). Recognizing the significance of cost barriers (both capital costs and long-term service costs), and improving understanding of the true costs, may be helpful for advocacy and long-term management purposes.

State Water Resources Control Board's Assessment

For similar reasons but with a narrower focus, State Water Resources Control Board (SWB) implemented a [methodology](#) to assess the opportunities and associated costs for physical consolidation.

The opportunity for physical consolidation is mostly based on the distance between the service areas of two systems. The following shows the terminologies used by SWB to describe the relative physical locations of two candidate systems for consolidation, including a domestic well.

- For public water systems, the distance is measured from the boundary of the joining system to the center of the receiving system.
- For state small water systems and domestic wells, the distance can be either measured to the boundary of the receiving system or to the modeled consolidation route. In general, the receiving water system is the largest water system nearby, with a similar or higher number of connections than the joining system.



¹ Non-transient occupancy may be work-related and thus, could be a potential priority for SB 552 implementation. See 20260613 Blueprint Tahoe_SB 552 Imp Streamlining.

For cost estimates, SWB's approach includes the following:

- Usage of generalized unit cost assumptions for pipelines, service lines, connection fees, administrative costs, permitting costs, system rehabilitation costs for water quality issues, other costs, as well as costs for contingency, inflation, planning and construction, engineering services and generic regional multipliers.
- Inclusion of prioritized systems that meet system pairing criteria and distance criteria.

Criteria			
Joining Systems:			
Failing Public Water Systems	≤ 1,000 service connections.		
At-Risk Public Water Systems	≤ 500 service connections.		
Potentially At-Risk, Not At-Risk, & Not Assessed Public Water Systems	Excluded		
State Small Water Systems & Domestic Wells	High-Risk in the <i>Water Quality</i> and/or <i>Water Shortage</i> categories in the Risk Assessment.		
Receiving Systems for Joining Public Water Systems:			
Failing Public Water Systems	Largest System > 1,000 service connections.	Public Water Systems	• Intersect • Route: Maximum route distance = 3 miles
At-Risk Public Water Systems	Largest System > 500 service connections.	State Small Water Systems	• Intersect • Route: Maximum route distance = 0.38 miles • Route Intersect: Systems that intersect a viable public water system's modeled physical consolidation route.
Potentially At-Risk, Not At-Risk, Not Assessed Public Water Systems	Largest System > 500 service connections.		
State Small Water Systems & Domestic Wells	Excluded	Domestic Wells	• Intersect • Route: Maximum distance = 0.38 miles • Route Intersect: Domestic wells located within a 1-mile section that intersects a viable public water system's modeled physical consolidation route.

Cost estimates focus on the capital cost of physical consolidation without considering long-term service costs. This is appropriate for the state's role for assistance, including formulating budget requests with focus on critical needs under the SAFER program.

Generalized Application of SWB Methodology in DWR's Direct Technical Assistance Program

To support counties in CDRP development, DWR established a [County Drought Resilience Planning Assistance Program](#) with options of financial assistance and direct technical assistance (DTA). Through the County of El Dorado, the Water Agency received financial assistance for completing the 2025 CDRP.

Under the DTA, certain counties (e.g., San Luis Obispo²) requested assistance for a preliminary countywide consolidation assessment based on SWB methodology with minor refinements to include all public water systems, state small water systems, and domestic wells regardless of their SAFER status. This is referred to as DWR/SWB methodology in the remaining brief.

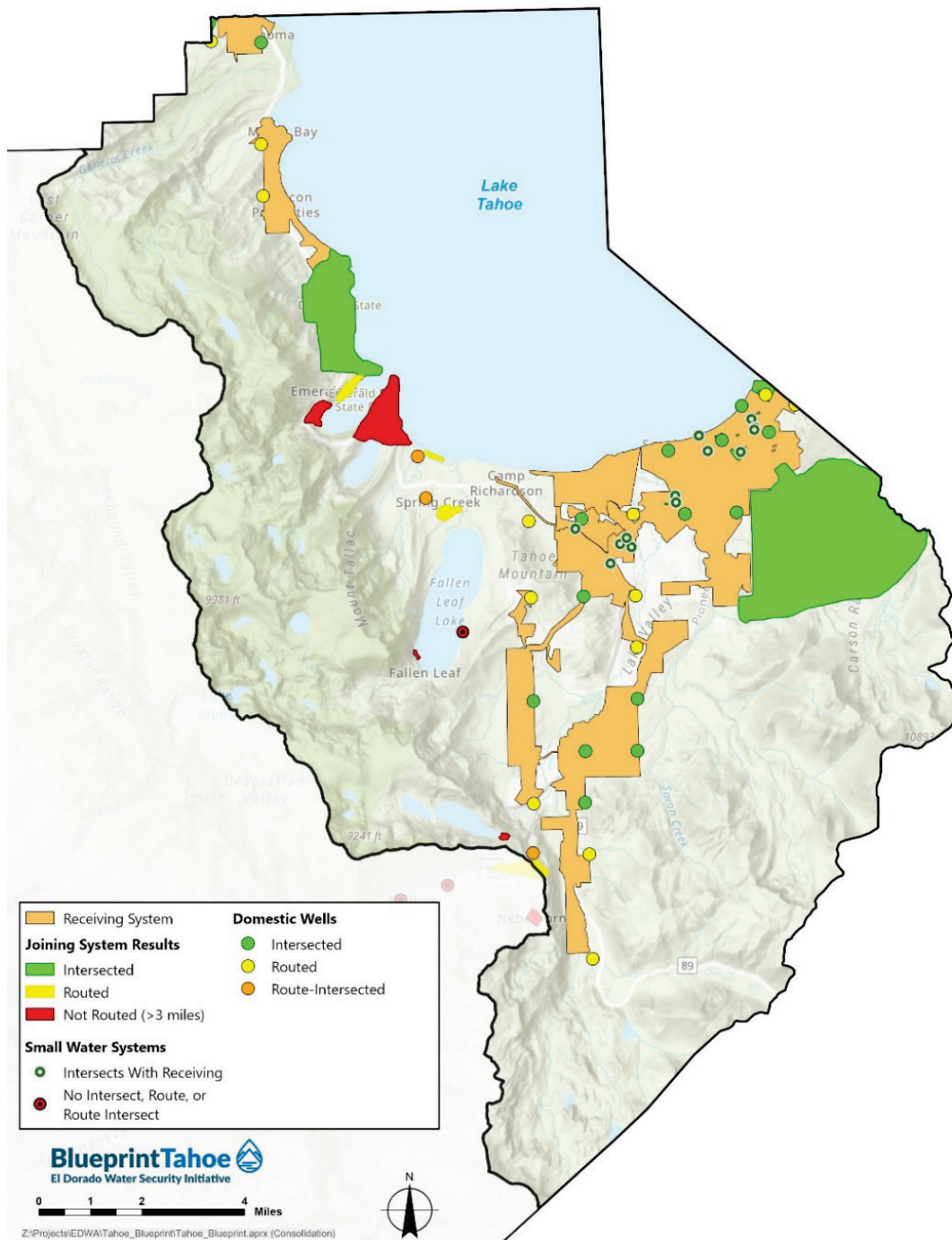
As-is Application in El Dorado Tahoe Basin

In conjunction with considerations for streamlining SB 552 implementation (see 20260622 *Blueprint Tahoe_SB 552 Imp Streamlining*), a system consolidation assessment with further customized rules and cost estimate assumptions may help inform additional policy choices for SB 552 implementation.

² San Luis Obispo County has many failing or at-risk water systems and regional groundwater and water quality concerns affecting the continued operations of domestic wells.

The following map shows the preliminary results when applying DWR/SWB methodology in the El Dorado Tahoe Basin based on currently available information from SWB and County EMD. STPUD and TCPUD are considered receiving systems.

Based on the distance criteria, there are isolated systems near Fallen Leaf Lake and Emerald Bay that are excluded from physical consolidation considerations.



The resulting cost estimates based on the cost scheme developed by SWB.

Joining System Numb	Joining System	Number of Connections	Consolidation Type	Receiving System	Distance (Miles) (GIS Analysis)	Estimated Project Cost	DAC	SDAC	VC per LCI VCP (drought) [PENDING]
CA0900595	Lower Emerald Bay Tract SWS		9 Routed	Tahoe City PUD - Rubico	2.57	\$ 302,000			
CA0900699	2218 Lake Tahoe Blvd LLC	Not Available	Intersected	South Tahoe PUD - Main	-	Unknown	YES		
CA0900551	Alder Inn		3 Intersected	South Tahoe PUD - Main	-	\$ 92,000	YES		
CA0900576	Alpine Inn & Spa		4 Routed	South Tahoe PUD - Main	0.05	\$ 189,000		YES	
CA0900629	American Legion Tract Resort Assoc		34 Intersected	South Tahoe PUD - Main	-	\$ 782,000			
CA0900654	Baldwin Beach		16 Routed	South Tahoe PUD - Main	1.75	\$ 457,000			
CA0900553	Beverly Lodge		2 Intersected	South Tahoe PUD - Main	-	\$ 70,000	YES		
CA0900631	Camp Concord		10 Routed	South Tahoe PUD - Main	1.88	\$ 324,000			
CA0900505	Camp Shelly		15 Routed	South Tahoe PUD - Main	1.88	\$ 435,000			
CA0900523	Cascade Mutual Water Company		33 Routed	South Tahoe PUD - Main	2.81	\$ 836,000			
CA0900578	Coyote Den		1 Intersected	South Tahoe PUD - Main	-	\$ 47,000		YES	
CA0900592	Deerfield Lodge At Heavenly		2 Intersected	South Tahoe PUD - Main	-	\$ 70,000			
CA0900559	Della Cella		6 Intersected	South Tahoe PUD - Main	-	\$ 159,000		YES	
CA0900536	Econo Lodge Inn And Suites		7 Routed	South Tahoe PUD - Main	-	\$ 256,000		YES	
CA0900641	Fallen Leaf Mutual Water Company		103 Routed	South Tahoe PUD - Main	2.02	\$ 2,394,000			
CA0900585	Ginger Mountain Lodge		2 Intersected	South Tahoe PUD - Main	-	\$ 70,000	YES		
CA0900562	Heather Lake Road Tract		13 Intersected	South Tahoe PUD - Main	-	\$ 315,000			
CA0900588	Heavenly Valley Trailer Park		13 Intersected	South Tahoe PUD - Main	-	\$ 315,000			
CA0900566	Hunter Water Supply System	Not Available	Intersected	South Tahoe PUD - Main	-	Unknown	YES		
CA0900564	King's IV Condominiums		4 Intersected	South Tahoe PUD - Main	-	\$ 114,000			
CA0910019	Lakeside Park Association		139 Intersected	South Tahoe PUD - Main	-	\$ 3,120,000		YES	
CA0910007	Lukins Brothers Water Company		982 Intersected	South Tahoe PUD - Main	-	\$ 21,889,000	YES		
CA0900672	Meadow Park Village		11 Intersected	South Tahoe PUD - Main	-	\$ 270,000	YES		
CA0900667	Pine Cone Trailer Park SWS		9 Intersected	South Tahoe PUD - Main	-	\$ 225,000		YES	
CA0900535	Pinewood Inn		1 Intersected	South Tahoe PUD - Main	-	\$ 47,000		YES	
CA0900656	Rainbow Tract Water Association		23 Intersected	South Tahoe PUD - Main	-	\$ 537,000			
CA0900663	South Echo Summit Tract Civic		13 Routed	South Tahoe PUD - Main	2.79	\$ 391,000			
CA0900649	South Shore Recreation Area		200 Intersected	South Tahoe PUD - Main	-	\$ 4,478,000			
CA0900506	Spring Creek Tract Association		137 Routed	South Tahoe PUD - Main	2.50	\$ 3,152,000			
CA0900529	Station House Inn		4 Intersected	South Tahoe PUD - Main	-	\$ 114,000		YES	
CA0900621	Summit Pines Apartments		1 Intersected	South Tahoe PUD - Main	-	\$ 47,000		YES	
CA0910015	Tahoe Keys Water Company		1566 Intersected	South Tahoe PUD - Main	-	\$ 34,892,000			
CA0900623	Tahoe Travel Inn		6 Intersected	South Tahoe PUD - Main	-	\$ 159,000	YES		
CA0900565	Tahoe Valley Lodge		3 Intersected	South Tahoe PUD - Main	-	\$ 92,000		YES	
CA0900582	The Jeffrey Hotel		2 Routed	South Tahoe PUD - Main	0.07	\$ 145,000		YES	
CA0900554	The Trailhead		1 Intersected	South Tahoe PUD - Main	-	\$ 47,000		YES	
CA0900624	Villa Tahoe Condominiums		4 Intersected	South Tahoe PUD - Main	-	\$ 114,000			
CA0900557	Watermarc		8 Routed	South Tahoe PUD - Main	0.13	\$ 278,000			
CA0900515	Angora Lakes Resort		14 Does not meet distance viabili		>3 miles				
CA0900511	Cathedral Water Association		26 Does not meet distance viabili		>3 miles				
CA0900652	Echo Chalet Inc		6 Does not meet distance viabili		>3 miles				
CA0900650	Echo Lake Camp		11 Does not meet distance viabili		>3 miles				
CA0900603	Echo Peak Water Association		26 Does not meet distance viabili		>3 miles				
CA0900525	Echo Road Group Water Association		19 Does not meet distance viabili		>3 miles				
CA0900615	Fallen Leaf Camp Assoc	Not Available	Does not meet distance viabili		>3 miles				
CA0900560	FLL Mutual		41 Does not meet distance viabili		>3 miles				
CA0900591	North Echo Summit Water Association		15 Does not meet distance viabili		>3 miles				
CA0900507	Stanford Sierra Camp		32 Does not meet distance viabili		>3 miles				
Physical Consolidation Capital Cost Estimate Assumptions									
	Line Item	Cost	Units	Assumptions					
	Regionally Adjusted Pipeline Cost	\$286.00	\$/LF	Includes material and installation					
	Regionally Adjusted Service Line Cost	\$8,060.00	\$/connection	Based on joining systems connection					
	Connection Fees	\$5,437.00	\$/connection	Fee for connecting to Receiving System. Based on Joining System connections.					
	Inflation	3.10%	Total Cost						
	Administrative Cost	15%	Total Construction Cost						
	CEQA	\$100,000.00	\$/Project	For "Route" consolidation					
		\$25,000.00	\$/Project	For "Intersect" consolidation					
	Contingency	20%	Total Construction Cost						
	Planning + Construction	10%	Total Construction Cost						
	Engineering	15%	Total Construction Cost						

The above suggests potential areas of refinement once the methodology is applied beyond SWB's original scope, including the assumptions of distance measurement and unit costs, to better represent county-specific conditions. In El Dorado County, regional-specific conditions may be more important due to the significant dissimilarity between the West Slope and Tahoe Basin.

Potential Options of Refinement

As previously mentioned, the consolidation study using DWR/SWB methodology may further inform policy development and SB 552 implementation while advancing drought mitigation actions identified by the El Dorado County Drought and Water Shortage Task Force during development of the CDRP.

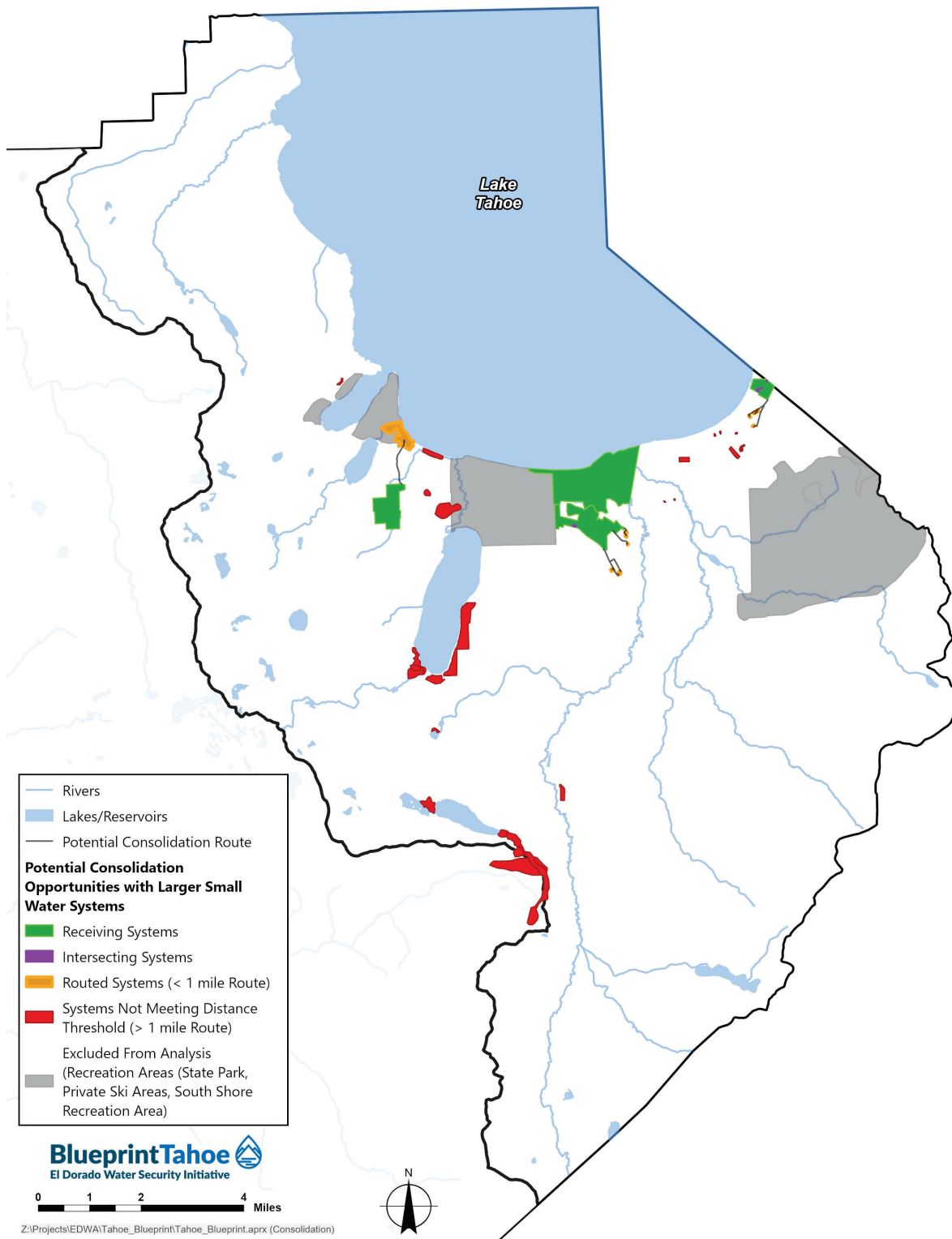
There are several refinement options for consideration to further enhance the value of this study:

- a. Refine the cost assumptions based on local data and experience with assistance and information sharing of experienced Blueprint partners.
- b. Refine the basis for distance measurement to be based on receiving system configurations instead of the generic assumption using the center of the receiving system service area.
- c. Expand the candidate receiving systems to include larger small water systems as a surrogate in order to suggest opportunities of less intensive consolidation.
- d. Review distance criteria for local suitability, and when a larger small water system is considered as a receiving system, reduce the distance threshold.
- e. Incorporate the prioritization of water systems in SB 552 implementation to favor residents and nontransient populations and year-long services, or otherwise amended, as described in *20260622 Blueprint Tahoe_SB 552 Imp Streamlining*.

For illustrative purposes only, the following map shows consolidation opportunities under the following conditions:

- Defer having STPUD and TCPUD as the receiving systems.
- Consider Tahoe Key Water Company, Lukins Brothers Water Company, Lakeside Park Association, and Spring Creek Tract Association as the potential receiving systems.
- Reduce the distance threshold between the joining and receiving water systems from 3 miles to 1 mile (measured from the existing road system configuration). The distance criteria for state small water systems and domestic wells remain the same.
- Remove recreation areas from consolidation considerations; this includes Heavenly systems (Gondola, Ski Sky Deck, Ski Creek Station), State Park systems (D.L. Bliss, Emerald Bay Boat Campground, Emerald Bay Eagle Point Campground), and South Shore Recreation Area.

The following map shows the results for illustrative additional layers of opportunities. The estimated cost is not provided herein to avoid misleading information because the necessary review and collaboration with partners to refine cost estimate methodology have not been performed.



If valued, a refined study could be considered in the continued SB 552 implementation with the following principles:

- The assessment and subsequent policy development, if warranted, will be led by the Water Agency (planning agency) in close collaboration with EMD (managing agencies).
- The Blueprint Tahoe partners will assist in methodology refinement including sharing information of past successful and unsuccessful consolidation attempts and pertinent cost information.
- The opportunity identification is to promote potential interest in some levels of consolidation (not just physical consolidation). As previously mentioned, this is between two water systems. The roles of the County of El Dorado and the Water Agency in this mitigation action are to facilitate and assist where appropriate, subject to resource availability.
- By incorporating certain criteria for inclusion and prioritization, the Water Agency could potentially leverage the high-level cost estimate to advocate for state and federal assistance for water resilience in collaboration with Blueprint partners and beyond.
- The refined study may be conducted in coordination with DWR and, where necessary, the SWB, to help clarify the applicability response and mitigation actions in the El Dorado Tahoe Basin and specific needs of assistance.

Potential Measures/Partial Solutions

The following measures/partial solutions are for discussion purposes.

1. **(A: Entity) will conduct research and outreach to complete the basic information of water systems and domestic wells in the El Dorado Tahoe Basin.**

The basic information will, at a minimum, include all attributes in the SWB drinking water system information, the status of various requirements in CWC Section 10609.62 on small water systems, and pertinent information on domestic wells.

A. Entity:

- a. EMD [management agency for most systems, but not all]
 - b. The El Dorado Water Agency [county water resource planning agency]
 - c. Other
2. In collaboration with **Blueprint Tahoe partners, the Water Agency** (lead) and **EMD** will conduct a system consolidation opportunity assessment with a refined approach for local suitability to inform policy development in SB 552 implementation and related advocacy.

The assessment will conform with the draft principles as stated earlier.

- a. If implemented, **the Water Agency** (lead) and **EMD** will share the findings and public education materials through venue(s) and channel(s) for Blueprint Tahoe implementation.

STREAMLINING SB 552 IMPLEMENTATION IN EL DORADO TAHOE BASIN

El Dorado Water Agency, at the request of County of El Dorado, led the compliance with [Senate Bill 552 \(SB 552\)](#) of 2021, establishing the standing [El Dorado County Drought and Water Shortage Task Force](#) in 2022 and completing the [County Drought and Water Shortage Resilience Plan](#) (CDRP) in 2025. Per the direction of El Dorado Water Agency's Board, **the CDRP was developed to cover ALL small water systems and rural communities**, not only the minimum requirements under SB 552 focusing on state small water systems and domestic wells.

It is important to stress that **SB 552 concerns water shortage preparedness, not only drought preparedness**. Water shortage can be caused by natural conditions (i.e., droughts) or other incidents (e.g., Public Safety Power Shutoff events). SB 552 is the last piece required by the 2018 legislations on water conservation and drought planning (SB 606 and Assembly Bill 1668) to address the varying and unique vulnerabilities of small water systems and rural communities. The intent to cover drought and water shortage preparedness is consistent across all water systems.

Other brief(s) incorporated by reference:

- [20260413 Blueprint Tahoe Water Supply-Demand Imbalance](#) includes discussions on no long-term water supply-demand imbalance, Making Conservation a California Way of Life regulation, and El Dorado Water Agency's representation of the Other County Area (OCA) outside of service areas of five urban water suppliers.
- [20260414 Blueprint Tahoe Small Water Systems](#) includes a summary of small water systems in El Dorado Tahoe Basin, SB 552 and its requirements, and El Dorado Water Agency's County Drought Resilience Plan (CDRP) in meeting SB 552 requirements to improve drought preparedness of small water systems and rural communities.
- 20260622 Blueprint Tahoe_System Consolidation includes an assessment of opportunities for varying degrees of consolidation in El Dorado Tahoe Basin.
- 20260622 Blueprint Tahoe_Regional Comm and Advocacy.

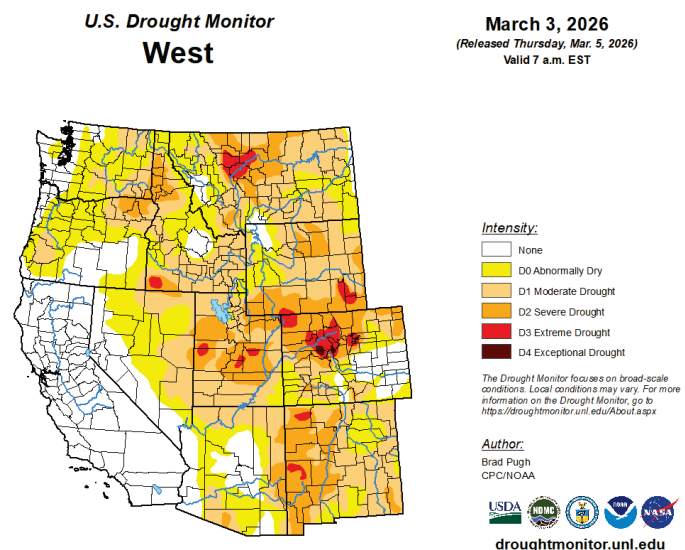
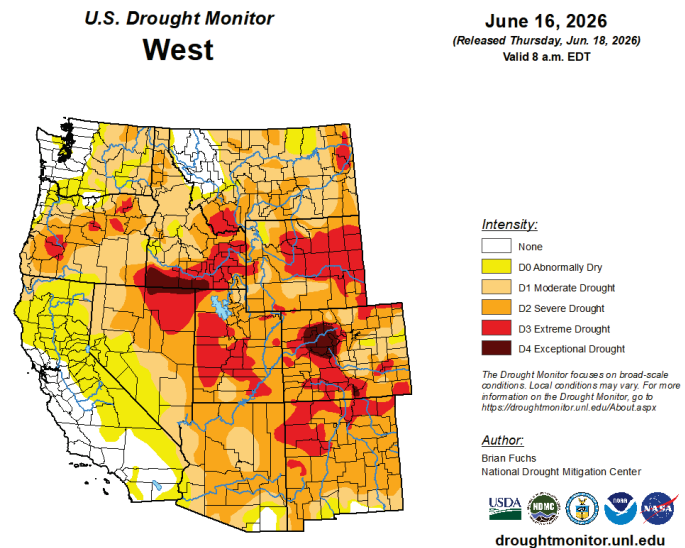
Droughts

Droughts have their way of creeping into our life quietly without clear cues, unlike severe storms or other extreme weather; however, its impact is significant. After our experience in past decades, most are familiar with the U.S. Drought Monitor and its information.

Definitions

While all droughts fundamentally stem from a lack of water, scientists and organizations often [define droughts](#) by how the shortage manifests and where the impact is realized.

- **Meteorological Drought** is determined by a lack of precipitation and how conditions like temperature and winds affect moisture levels. It is region-specific and expressed in relation to a region's average historical conditions.
- **Agricultural Drought** focuses on precipitation shortages, soil moisture deficits, and evaporative demand, and its severity depends heavily on soil properties, plant types and stages of plant growth.
- **Hydrological Drought** refers to the effects of rain and snow shortfalls on streamflow, groundwater, and reservoir or lake levels. Because it takes longer for precipitation deficiencies to show up in larger hydrological systems, this type of drought often "lags" behind other types of drought.
- **Ecological Drought** occurs when prolonged or widespread shortages in naturally available water supplies create multiple cascading stresses across ecosystems (i.e., ponds drying up and impacting cattle).
- **Socio-economic Drought** describes the impact of drought on the broader economy related to supply and demand. While it includes agricultural products, it also affects hydroelectric energy generation, tourism, public health and infrastructure.
- **Snow Drought** is a period of abnormally low seasonal snowpack due to lack of precipitation or unusually warm temperatures, which causes precipitation to fall as rain rather than snow or causes the accumulated snowpack to melt unusually early. In many mountainous regions, especially the western U.S., snowpack acts as a vital "natural reservoir". It stores water during the winter and slowly releases it as snowmelt during the



drier spring and summer months, affecting both human and natural systems. **This term is now commonly associated with 2026 conditions.**

There are other terms focusing more on duration:

- **Flash drought:** A subset of agricultural drought characterized by extremely rapid development and intensification over a short period (weeks rather than months). It is usually driven by a combination of low precipitation, extreme heat, strong winds, and high solar radiation that rapidly bakes moisture out of the soil.
- **Megadrought:** A prolonged, structural drought that is multi-decadal in scale. A megadrought lasts for 20 years or more, severely reshaping regional climates and water access over vast geographic areas. This term is often associated with the condition in the Colorado River system.

U.S. Drought Monitor uses a five-level system in classifying the severity of drought: D0 – Abnormally Dry, D1 – Moderate Drought, D2 – Severe Drought, D3 – Extreme Drought, and D4 – Exceptional Drought. The information used in characterizing conditions for these classifications is complex. No two states experience droughts the same way. Therefore, U.S. Drought Monitor also provides some reference for what these classifications may mean for the nation and for individual state. (See **Supplemental Information 1** of this brief for more information.)

US. Drought Monitor and its maps may be the most well-known products provided by [National Integrated Drought Information System](#) (NIDIS). NIDIS made leaping progress in enriching the integrated information and assessments by sector and by location (on the county level) in recent years. It is excellent for awareness of trends and regional conditions; however, it is likely crude for local conditions. [California Water Watch](#) is the State’s information system, customized for statewide and local water conditions.

Droughts in Lake Tahoe Region

Droughts occur in Lake Tahoe region; however, its implications on water security, the focus of Blueprint Tahoe, are limited or indirect (e.g., through vulnerability of wildfires).

No Long-term Water Supply-Demand Imbalance

As discussed previously in [20260413 Blueprint Tahoe Water Supply-Demand Imbalance](#), there is no anticipated long-term water supply-demand imbalance even in climate change conditions. This is a combined effect of limited water demands and abundant water availability in the region, as well as strict land use control by TRPA and counties.

Operational Level Drought Management

Drought is a complex phenomenon that is difficult to accurately describe because its definition is both spatially variant and context dependent. A uniform method for defining and monitoring drought conditions and quantifying the severity of drought does not exist.

At an operational level, drought management means translating big-picture hydrometeorological data (e.g., NIDIS data) into actionable, day-to-day decisions. Rather than

just waiting for rain, organizations and municipalities use objective, location-specific data to trigger preset restrictions, manage reservoir water storage, ration irrigation, and initiate disaster relief. However, the operational triggers may vary from organization to organization, sector to sector, and system to system, and response actions often correspond to their level of preparedness or requirements per emergency declarations.

For drought planning purposes, objective metrics or regulatory mandated metrics are also common references. Even with these, further customization is required. The general lack of water scarcity concern in Lake Tahoe region renders very different approaches taken by water managers. Triggers used in the Urban Water Management Plans (UWMPs) by STPUD and TCPUD can provide additional illustrative examples.

Per SB 606 of 2018, Urban Water Suppliers¹ will submit their UWMP, including Water Shortage Contingency Plan (WSCP), every 5 years. The next deadline is July 1, 2026. The Water Shortage Contingency Plan (WSCP) is an action plan for addressing water shortage conditions including drought. The WSCP describes water demand reduction and supplies augmentation actions to be taken in the event of a water shortage pertaining to six standard levels of water shortage: 0 to 10%, 10-20%, 20-30%, 30-40%, 40-50%, and greater than 50%.

The WSCP framework of action allows for customization to fit local conditions. It is worth noting that the framework is defined by water shortage, not by category of drought or other hydrometeorological conditions, to account for efforts in facility improvement (e.g., storage), diversified portfolio of water supply, and institutional or market arrangements. However, it is noted that in the past 2020-2022 drought, through Governor's Executive Orders and emergency regulations, a statewide mandate of water conservation (i.e., demand reduction), along with many other measures, was imposed regardless of local conditions, superseding the locally defined framework.

Consistent with its previous UWMP, TCPUD's [Draft 2025 UWMP](#) recognizes triggering mechanisms for water shortage including:

- TCPUD or state declaration due to drought,
- Federal, state, or local disaster declaration that may impact water supplies,
- TCPUD determination,
- Unplanned TCPUD water system maintenance, and
- Other unanticipated circumstances.

Similarly, consistent with its previous UWMP, STPUD maps the triggering conditions to corresponding water shortage in its [Draft 2025 UWMP](#).

- A water shortage in a neighboring water system(s) could result in an emergency condition requiring STPUD to provide emergency water through intertie(s) under a mutual aid agreement. In below normal water years or dry water years, an unexpected

¹ Urban water supplier defined in California Water Code (CWC) is generally a retail or wholesale water supplier with more than 3,000 connections, or a delivery more than 3,000 acre-feet of water annually.

delivery of emergency water could possibly trigger a 10%-20% water shortage in the STPUD's system.

- An extended regional power outage (RPO) during peak demand conditions in summertime could result in a 40%-50% water shortage.
- A wildfire event with extended RPO during peak demand conditions in summertime could result in a >50% water shortage.

For small water systems in El Dorado Tahoe Basin, the triggering conditions are expected to align with those identified by STPUD and TCPUD; however, their ability to tolerate these disturbances could be lower, making them potentially more vulnerable. As discussed later in this brief, a significant proportion of small water systems in El Dorado Tahoe Basin are primarily for recreation purposes with seasonal operations, indicating much lower health and safety risks associated with residents. These conditions suggest potential adjustments to SB 552 implementation for the El Dorado Tahoe Basin.

SB 552 Implementation

SB 552 implementation includes county drought and water shortage task force and CDRP implementation. SB 552 focuses on counties to improve drought planning and preparedness of State Small Water Systems (5 to 15 connections) and domestic wells (no more than four connections), consistent with California's Standardized Emergency Management System, which places counties as the operational areas.

As discussed previously in [20260414 Blueprint Tahoe Small Water Systems](#), per request by the County of El Dorado and guidance of its Board, the El Dorado Water Agency (Water Agency) developed the CDRP to cover all small water systems and domestic wells. In El Dorado Tahoe Basin, STPUD and TCPUD are the only two water systems excluded from the scope of CDRP.

The Water Agency's current CDRP is a single document for the county that also addresses relationships to other countywide planning efforts including land use and emergency response. However, SB 552 allows flexibility in plan packaging per each individual county's preference, as long as the requirements are met.

The Water Agency started the planning process before SB 552 was enacted and participated in DWR's County Drought Advisory Group, formulating recommendations to the Legislature, resulting in SB 552. Since SB 552's enactment, the Water Agency has actively coordinated with DWR in developing the CDRP, leveraged available assistance for plan development and implementation, and interacted with DWR and the Drought Resilience Interagency & Partners Collaborative (DRIP Collaborative).² The Water Agency has been invited to be a speaker in DWR's California County Café³ and DRIP Collaborative to share experiences and advocate for the interests of rural and foothill communities.

² DRIP Collaborative, convened by DWR, was established per another section of SB 552 to serve as a public forum with state and non-state agency members to advance our drought strategies and continue building resilience to the increasingly arid conditions California face.

³ Informal gathering DWR established to support counties in CDRP development and SB 552 implementation.

El Dorado County Drought and Water Shortage Task Force

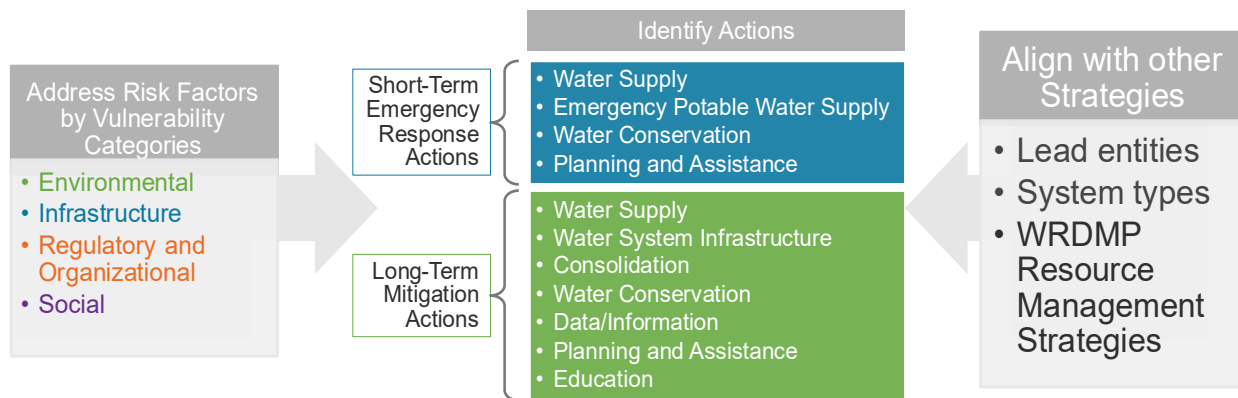
SB 552 requires counties to establish a standing county drought and water shortage task force to facilitate drought and water shortage preparedness for state smalls and domestic wells within the county's jurisdiction (California Water Code §10609.70 subd. (a)).

The Water Agency is the convener of the El Dorado County Drought and Water Shortage Task Force (Task Force). Task Force members include representatives from the Water Agency, County Chief Administrative Office, County Environmental Management Department (EMD), County Office of Emergency Services (OES), and the County Public Health Officer. Advisory members from the El Dorado Tahoe Basin entities include STPUD, TCPUD, Lukins Brothers Water Company, Tahoe Key Water Company, City of South Lake Tahoe. See [El Dorado Water Agency's website](#) for the complete list of advisory members. The next Task Force meeting is scheduled on June 26, 2026.

During drought or other water shortage events, the Task Force will meet more frequently to discuss emergency response actions to support county water users in having a reliable water supply.

CDRP Response and Mitigation Actions

The 2025 CDRP outlined short-term response actions and long-term mitigation actions to address identified water shortage vulnerability for small water systems and domestic wells following the process below. See **Supplemental Information 2** of this brief for the implementation plan.



Blueprint Tahoe provides an opportunity to review these actions considering the above discussion and the varying types of water systems in the El Dorado Tahoe Basin to create a streamlined framework that improves the efficiency of CDRP implementation to meet the intentions of SB 552, associated requirements, and the guidance from the EDWA Board.

Water System in El Dorado Tahoe Basin

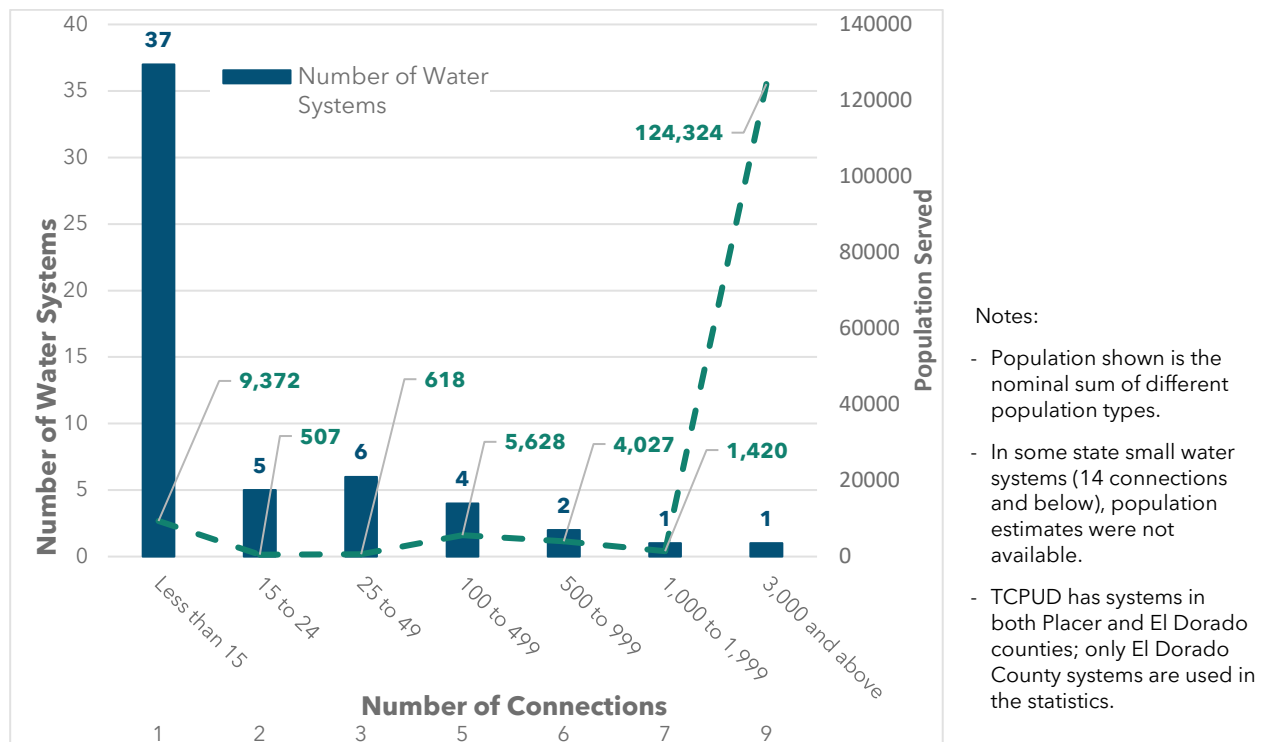
In the El Dorado Tahoe Basin, there are two large urban water suppliers (STPUD and TCPUD) and 55 small water systems. The analysis and content of RDCP were completed before the most

recent system consolidation between TCPUD and Glenridge Water Company, which was [approved by California Public Utilities Commission](#) in January 2025.

Law and regulations associated with drinking water systems, including the 2018 legislation for water conservation and drought planning (i.e., SB 606 and AB 1668) and SB 552 of 2021, reference the water system classification outlined by California Health and Safety Code, defining community water systems, nontransient noncommunity water systems, transient water systems, state small water systems, and domestic wells based on number of connections, annual service duration (yearlong or seasonal), and population types (resident, nontransient,⁴ and transient). (See **Supplemental Information 3** of this brief for more information.)

Another intercepting term, public water system, refers to a system that provides water for human consumption with 1 to 15 or more connections or that regularly serves 25 or more people daily for at least 60 days out of the year. A public water system is not necessarily a public entity, and most public water systems are privately owned. It could be a community, nontransient noncommunity, or transient system. Operation of a public water system requires a domestic water supply permit from SWB. SWB's [fact sheet on public water systems](#) suggests that public water systems are typically run more efficiently when costs can be spread out over a large group of people to obtain good economies of scale. Small public water systems without a very high level of managerial, technical and financial capacity tend to be unsustainable.

The following figure provides an overview of these water systems with number of connections and reported population served, showing significant numbers of "micro" water systems. The data was obtained from the State Water Resources Control Board (SWB; circa 2022).



⁴ Nontransient population includes regular individuals present at a location (such as schools and job locations).

Prioritization Provided by SB 552

SB 552 requires certain small water suppliers to have a WSCP, which is an abridged version of the urban water management plans mandated for completion by urban water suppliers. The applicable water systems are required to submit their plan by July 1, 2023, and every 5 years afterward. Applicable water systems are those serving 1,000 to 2,999 service connections and nontransient noncommunity (NTNC) schools. SWB provides [templates](#) for these systems, which outline the same 6 levels of water shortage for planning purposes like those for urban water suppliers.

The selective implementation required by SB 552 suggests that Legislature recognizes not all water systems are the same and favors residents and nontransient populations with yearlong services. Water users of other systems have more options during water shortage emergencies, including leaving the premises as it is not their primary resident or workplace.

In addition, small water system's implementation of certain requirements of SB 552 is subject to funding availability as explicitly stated. Particularly, the requirements under CWC Section 10609.62:

Small water suppliers and nontransient noncommunity water systems that are schools shall implement, subject to funding availability, all of the following drought resiliency measures:

(a) No later than January 1, 2023, implement monitoring systems sufficient to detect production well groundwater levels.

(b) Beginning no later than January 1, 2023, maintain membership in the California Water/Wastewater Agency Response Network (CalWARN) or similar mutual aid organization.

(c) No later than January 1, 2024, to ensure continuous operations during power failures, provide adequate backup electrical supply.

(d) No later than January 1, 2027, have at least one backup source of water supply, or a water system intertie, that meets current water quality requirements and is sufficient to meet average daily demand.

(e) No later than January 1, 2032, meter each service connection and monitor for water loss due to leakages.

(f) No later than January 1, 2032, have source system capacity, treatment system capacity if necessary, and distribution system capacity to meet fire flow requirements.

As previously mentioned, the Water Agency's CDRP is intended to cover drought and water shortage preparedness for all small water systems and rural communities, leaving no residents behind. Therefore, implementation of this part of SB 552 is also included. This is a major difference from the CDRPs of many other counties that cover only state small water systems and domestic wells as explicitly required by law.

Conceptual Prioritization of SB 552 Implementation in El Dorado Tahoe Basin

For illustrative purposes, water systems in the El Dorado Tahoe Basin have been categorized into the following categories, based on SWB's drinking water system data, considering their service area, duration of service, and population type.

- There are only two large urban water suppliers (TCPUD and STPUD) in El Dorado Tahoe Basin; therefore, they are also shown in the categorization for completeness.
- Based on SWB data (circa 2022), there are only 2 systems in El Dorado Tahoe Basin that have more than 1,000 connections: STPUD and Tahoe Key Water Company. Lukins Brother Water Company is close with 982 connections. Note that most of TCPUD's service area is in Placer County; the subsystems in El Dorado County are relatively small. Therefore, the population does not influence categorization.
- There are no school water systems in El Dorado Tahoe Basin.
- There are 9 state small water systems that are not categorized due to insufficient information. SWB data does not have complete information on state small water systems. However, based on anecdotal information available on the internet, characteristics of these systems can be generally assessed. These systems may be further categorized after consulting with EMD.

The subsequent figure shows the water systems by priority.

Low Priority Systems

- Service area = T (Recreation Area, Summer Camp)
 - Seasonal operation
 - Population type = T
 - CA0900505 CAMP SHELLY
 - CA0900631 CAMP CONCORD
 - CA0900650 ECHO LAKE CAMP
 - CA0900654 BALDWIN BEACH
 - Population type = T and NT
 - CA0900587 HEAVENLY SKI SKY DECK
 - CA0900665 HEAVENLY GONDOLA
 - Year-round operation
 - Population type = T
 - CA0910303 CA STATE PARKS - EMERALD BAY, EAGLE POINT
 - Population type = T and R
 - CA0900507 STANFORD SIERRA CAMP
 - CA0910301 CA STATE PARKS - D.L. BLISS
 - CA0910302 CA STATE PARKS - EMERALD BAY, VIKINGSHOL
 - CA0910305 CA STATE PARKS - EMERALD BAY, BOAT CAMPG
 - Population type = NT
 - CA0900660 HEAVENLY SKI CREEK STATION
 - CA0900649 SOUTH SHORE RECREATION AREA

- Service area = T (Other Transient Area)
 - Seasonal operation; Population Type = T
 - CA0900515 ANGORA LAKES RESORT
 - CA0900652 ECHO CHALET INC

Medium Priority Systems

- Service area = T (Hotel/Motel); year-round operation
 - Population Type = T
 - CA0900535 PINWOOD INN
 - CA0900536 ECONO LODGE INN & SUITES
 - CA0900551 ALDER INN
 - CA0900553 BEVERLY LODGE
 - CA0900554 THE TRAILHEAD
 - CA0900565 TAHOE VALLEY LODGE
 - CA0900576 ALPINE INN & SPA
 - CA0900582 THE JEFFREY HOTEL
 - CA0900585 GINGER MOUNTAIN LODGE
 - Population Type = T and R
 - CA0900578 COYOTE DEN
 - CA0900585 GINGER MOUNTAIN LODGE
 - Population Type = T and NT
 - CA0900529 STATION HOUSE INN
 - CA0900623 TAHOE TRAVEL INN
- Service area = R
 - Seasonal operation
 - Population Type = T
 - CA0900523 CASCADE MUTUAL WATER COMPANY
 - CA0900525 ECHO ROAD GROUP WATER ASSOC
 - CA0900560 FLL MUTUAL
 - CA0900591 NORTH ECHO SUMMIT WATER ASSOCIATION
 - CA0900603 ECHO PEAK WATER ASSOCIATION
 - Population Type = R
 - CA0900641 FALLEN LEAF MUTUAL WATER CO (also in year-round operation w population type = T)
 - Year-round operation; Population Type = T
 - CA0900511 CATHEDRAL WATER ASSOCIATION
 - CA0900564 KING'S IV CONDOMINIUMS
 - CA0900621 SUMMIT PINES APARTMENTS
 - CA0900624 VILLA TAHOE CONDOMINIUMS
 - CA0900641 FALLEN LEAF MUTUAL WATER CO (also in seasonal operation w population type = R)
 - CA0900656 RAINBOW TRACT WATER ASSOC

High Priority Systems

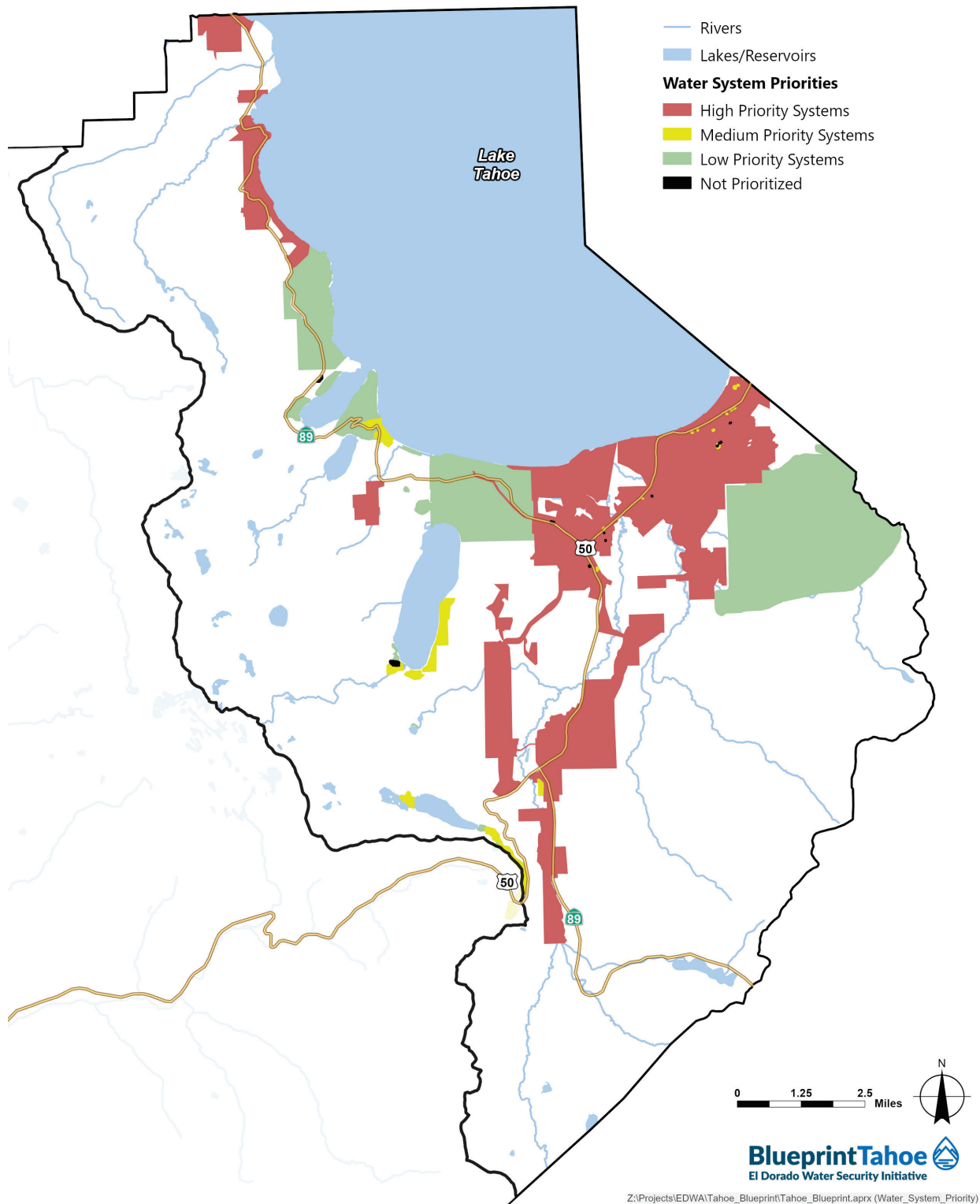
- Service area = R; Year-round operation
 - Population Type = R and T
 - CA0900506 SPRING CREEK TRACT ASSOCIATION (R)
 - CA0900562 HEATHER LAKE ROAD TRACT (R)
 - CA0900629 AMERICAN LEGION TRACT RESORT ASSOC
 - CA0910012 TAHOE CITY PUD - RUBICON (R) & CA0910024 GLENRIDGE WATER COMPANY (T)
 - Population Type = R, T and NT
 - CA0910019 LAKESIDE PARK ASSOCIATION
 - Population Type = R
 - CA0910007 LUKINS BROTHERS WATER COMPANY
 - CA0910015 TAHOE KEYS WATER COMPANY
- Service area = R and O (Other [wholesale]); Population Type = R and W (wholesale); year-round operation
 - CA0910002 SOUTH TAHOE PUD - MAIN

Not Prioritized Systems

There is no sufficient information for the following state small water systems for prioritization purposes.

- CA0900557 WATERMARC
- CA0900559 DELLA CELLA COTTAGES
- CA0900566 HUNTER WATER SUPPLY SYSTEM
- CA0900588 HEAVENLY VALLEY TRAILER PARK
- CA0900595 LOWER EMERALD BAY TRACT SSWS
- CA0900615 FALLEN LEAF CAMP ASSOC
- CA0900667 PINE CONE TRAILER PARK SSWS
- CA0900669 2218 LAKE TAHOE BLVD LLC
- CA0900672 MEADOW PARK VILLAGE

The following figure illustrates the above prioritization.



Potential Measures/Partial Solutions

Based on the above assessment, the following measures/partial solutions are for discussion purposes.

1. **Blueprint Tahoe Parties will support the Water Agency to recognize the great regional difference between the Tahoe Basin and West Slope in their drought and water shortage risks and separate these two regions for continued SB 552 implementation to improve effectiveness.⁵**
2. **Blueprint Tahoe Parties will support the Water Agency to merge the Blueprint Tahoe initiative and SB 552 implementation in the El Dorado Tahoe Basin for efficiency and an aligned regional approach for all water systems.**
3. **Blueprint Tahoe Parties will support the Water Agency to prioritize water systems with year-round services for residents and nontransient populations with (A: Exception) for planning and assistance in SB 552 implementation.**

A. Exception:

- i. No exception
 - ii. Exceptions when opportunities arise with funding, assistance, or other factors favoring the other systems
 - iii. Exceptions when extraordinary circumstance warrants a special case-by-case consideration
 - iv. Exceptions for public water systems, which require SWB permits to operate
 - v. Other
4. **Blueprint Tahoe Parties will support the Water Agency to establish Tahoe Basin Subcommittee under El Dorado County Drought and Water Shortage Task Force and schedule meetings as needed or as part of the Blueprint Tahoe implementation meeting for progress tracking and continued collaboration (see 20260622 Blueprint Tahoe_Regional Comm and Advocacy).**

⁵ It is anticipated that similar measures/partial solutions will be discussed during the planning process for Blueprint West Slope, which is scheduled to start in fall 2026, with region-specific customized principles.

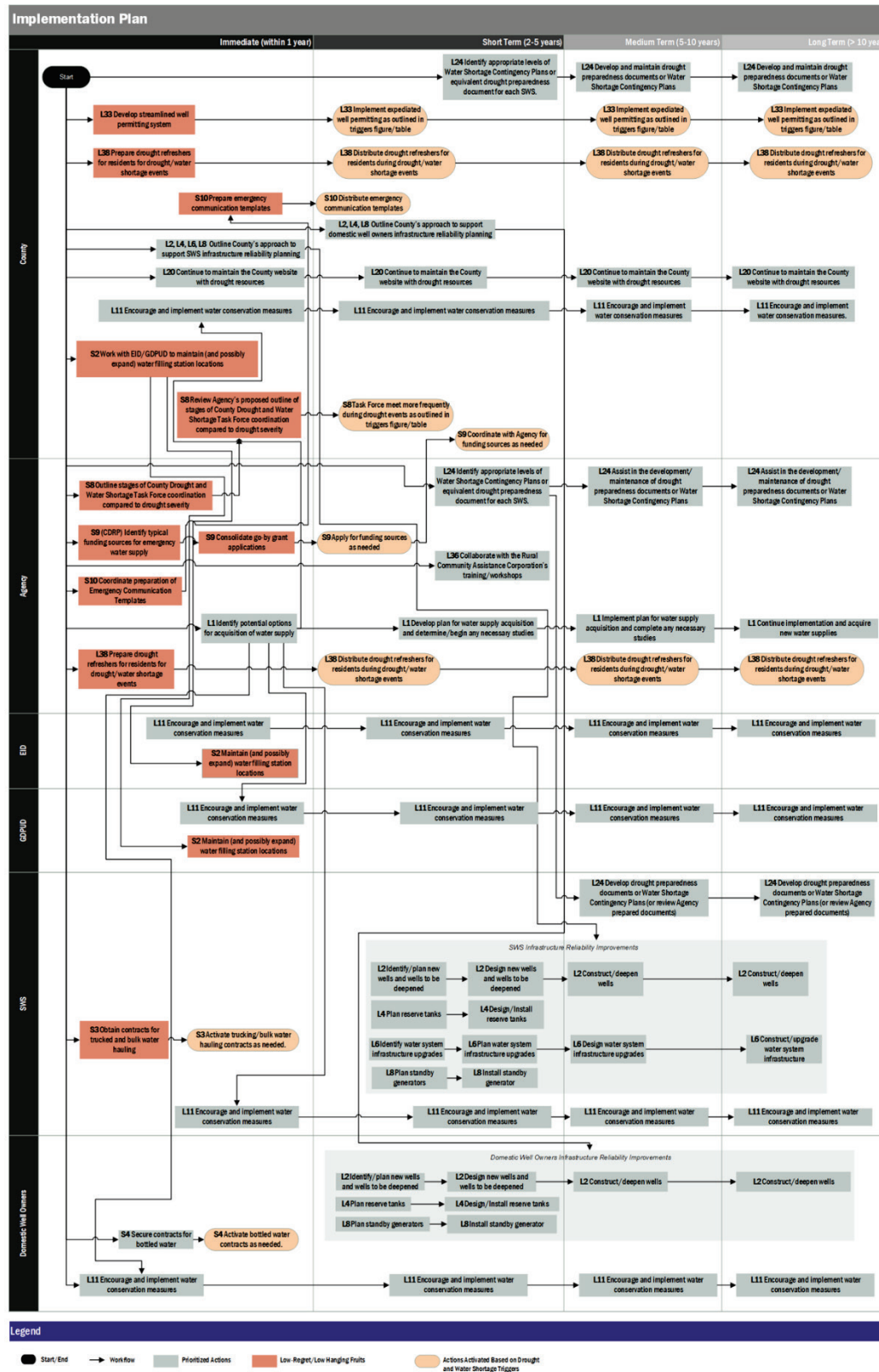
Supplemental Information 1: Potential Drought Impacts per U.S. Drought Monitor Category (Not Exhaustive Lists)

Category	Percentile of Historical Record Ranking	Impacts (Nation)	Impacts (California)
D0 - Abnormal Dry 	21st to 30th percentile	Short-term dryness slowing planting, growth of crops or pastures. Some lingering water deficits Pastures or crops not fully recovered	Soil is dry; irrigation delivery begins early Dryland crop germination is stunted Active fire season begins Winter resort visitation is low; snowpack is minimal
D1 - Moderate Drought 	11th to 20th percentile	Some damage to crops, pastures Streams, reservoirs, or wells low, some water shortages developing or imminent Voluntary water-use restrictions requested	Dryland pasture growth is stunted; producers give supplemental feed to cattle Landscaping and gardens need irrigation earlier; wildlife patterns begin to change Stock ponds and creeks are lower than usual
D2 - Severe Drought 	6th to 10th percentile	Crop or pasture loss likely Water shortages common Water restrictions imposed	Grazing land is inadequate Producers increase water efficiency methods and drought-resistant crops Fire season is longer, with high burn intensity, dry fuels, and large fire spatial extent; more fire crews are on staff Wine country tourism increases; lake- and river-based tourism declines; boat ramps close Trees are stressed; plants increase reproductive mechanisms; wildlife diseases increase Water temperature increases; programs to divert water to protect fish begin River flows decrease; reservoir levels are low, and banks are exposed
D3 - Extreme Drought 	3rd to 5th percentile	Major crop/pasture losses Widespread water shortages or restrictions	Livestock need expensive supplemental feed; cattle and horses are sold; little pasture remains; producers find it difficult to maintain organic meat requirements Fruit trees bud early; producers begin irrigating in the winter Federal water is not adequate to meet irrigation contracts; extracting supplemental groundwater is expensive Dairy operations close Fire season lasts year-round; fires occur in typically wet parts of state; burn bans are implemented

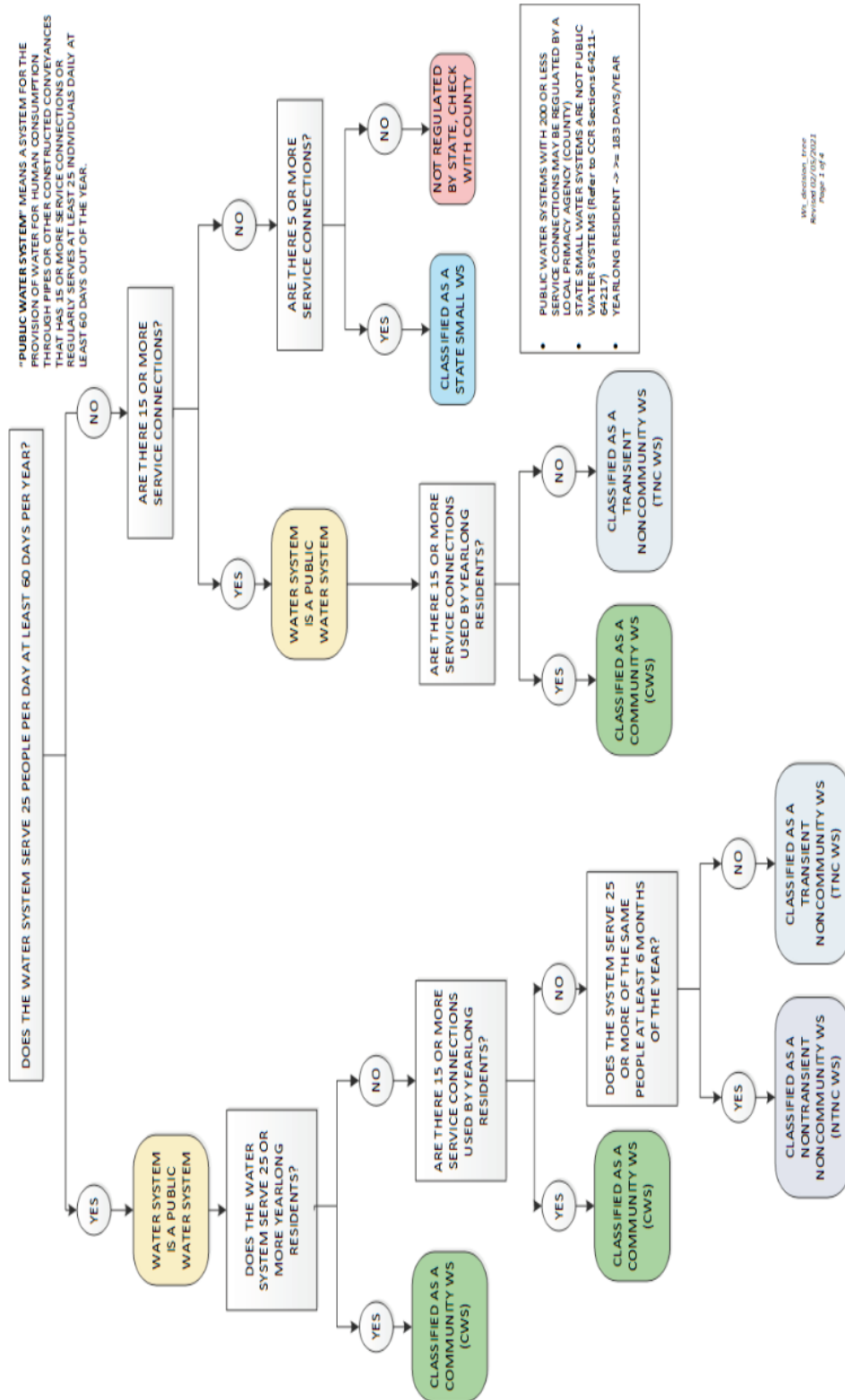
Category	Percentile of Historical Record Ranking	Impacts (Nation)	Impacts (California)
			Ski and rafting businesses are low, mountain communities suffer Orchard removal and well drilling company business increase Panning for gold increases Low river levels impede fish migration and cause lower survival rates Wildlife encroach on developed areas; little native food and water is available for bears, which hibernate less Water sanitation is a concern; surface water is nearly dry; flows are very low; water theft occurs Wells and aquifer levels decrease; homeowners drill new wells Water conservation rebate programs increase; water use restrictions are implemented; water transfers increase Water is inadequate for agriculture, wildlife, and urban needs; reservoirs are extremely low; hydropower is restricted
D4 - Exceptional Drought 	0 to 2nd percentile	Exceptional and widespread crop/pasture losses Shortages of water in reservoirs, streams, and wells creating water emergencies	Fields are left fallow; orchards are removed; vegetable yields are low; honey harvest is small Fire season is very costly; number of fires and area burned are extensive Many recreational activities are affected Fish rescue and relocation begin; pine beetle infestation occurs; forest mortality is high; wetlands dry up; survival of native plants and animals is low; fewer wildflowers bloom; wildlife death is widespread; algae blooms appear Agriculture unemployment is high; food aid is needed Poor air quality affects health; greenhouse gas emissions increase as hydropower production decreases; West Nile Virus outbreaks rise Water shortages are widespread; surface water is depleted; federal irrigation water deliveries are extremely low; junior water rights are curtailed; water prices are extremely high; wells are dry, and more and deeper wells are drilled; water quality is poor

See [NIDIS website](#) for more information. Drought category logos were of NIDIS design.

Supplemental Information 2: CDRP Implementation Plan



Supplemental Information 3: Decision Tree for Classification of Water System



DISADVANTAGED COMMUNITIES AND VULNERABLE POPULATIONS IN THE EL DORADO TAHOE BASIN

The Lake Tahoe region is not often associated with disadvantaged communities (DACs) or vulnerable populations, but they do exist. Affordability and related workforce concerns were raised in Workshop 1 by working group members.

This brief provides information on the converging platforms and indices on state and federal programs after several years of overwhelming efforts in various hydrometeorological, physical and social index development by multiple sectors of governments, universities and research institutions, and non-government organizations. These platforms facilitate the awareness of the relative severities of community vulnerabilities, promoting a more equitable outcome of water management policy and implementation. DAC and vulnerable populations are of great interest because they are often tied to eligibility or preference for assistance.

Briefs incorporated by reference:

- 20260414 Blueprint Tahoe_Small Water Systems
- 20260622 Blueprint Tahoe_Drinking Water System Consolidation
- 20260622 Blueprint Tahoe_SB 552 Imp Streamlining

SB 552 and Human Right to Water Nexus

Considerations for DACs in water management planning efforts have been implemented over the last two decades. Social vulnerability is a relatively new factor and is particularly emphasized in certain programs including Senate Bill (SB) 552 implementation.

- DWR developed its social vulnerability index (SVI) as part of its [Water Shortage Vulnerability Explorer](#) tool, which provides counties and other interested parties with baseline information for drought and water shortage resilience planning. El Dorado Water Agency (EDWA) developed its County Drought and Water Shortage Resilience Plan (CDRP) using the data to augment existing county-specific information.
- SWB explicitly connected [Human Rights to Water](#)¹ (HR2W; AB 685 of 2012) implementation in its [Safe and Affordable Funding for Equity and Resilience](#) (SAFER) program to support SB 552 implementation. Note that HR2W has two key components: accessibility and affordability.

Awareness and understanding of this information and its applications could help navigate the complex administration of state and federal agencies, and relative competitiveness of El Dorado

¹ HR2W policy means “every human being has the right to clean, affordable, and accessible water for human consumption, cooking, and sanitary purposes, that is adequate for the health and well-being of the individual and family.”

Tahoe Basin's projects in regards to various grant opportunities. For illustrative purposes, all maps in this brief are shown at the statewide level, not limited to the geographic area of El Dorado Tahoe Basin.

Prop 4 Climate Bond Requirements

The voter-approved Prop 4 Climate Bond requires that *"at least 40 percent of the total funding made available pursuant to this division shall be invested in programs or projects that provide direct and meaningful benefits to disadvantaged communities, severely disadvantaged communities, and vulnerable populations."*

The following definitions come directly from the bond (PRC Section 90100) and will be used across 2024 Climate Bond programs:

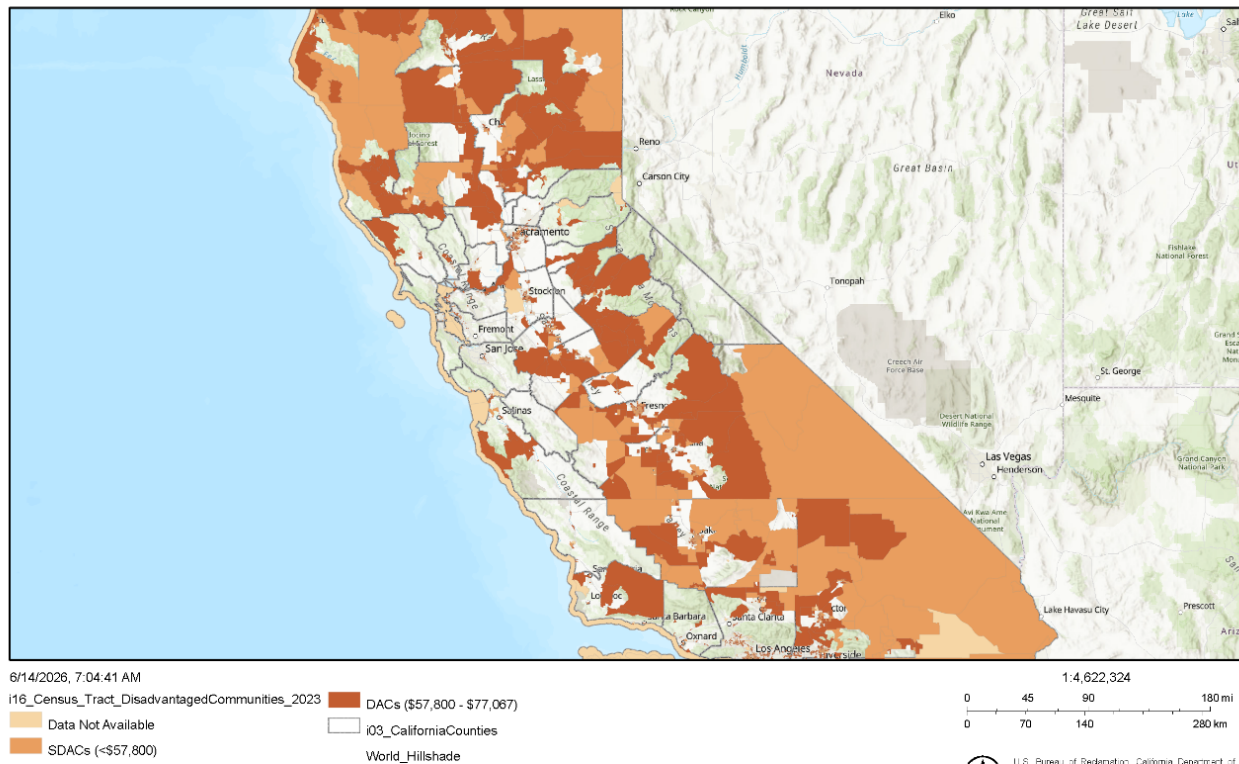
- **Disadvantaged community (DAC):** A community with a median household income of less than 80 percent of the area average or less than 80 percent of statewide median household income.
- **Severely disadvantaged community (SDAC):** A community with a median household income of less than 60 percent of the area average or less than 60 percent of statewide median household income.
- **Vulnerable population:** A subgroup population within a region or community that faces a disproportionately heightened risk or increased sensitivity to impacts of climate change and that lacks adequate resources to cope with, adapt to, or recover from such impacts. (Note: tribes are considered vulnerable populations)
- **Tribe:** A federally recognized Native American tribe or a non-federally recognized Native American tribe listed on the California Tribal Consultation List maintained by the Native American Heritage Commission.

There are other programs, tools, and studies with varying definitions of these terms; particularly, vulnerable populations can vary by hazard type (e.g., extreme heat, flood, drought, and wildfire).

Disadvantaged Communities

DWR's [DAC mapping tool](#) has been available for years. The figure below shows the distribution of DAC and SDAC.

ArcGIS Web Map



Federal Emergency Management Agency's National Risk Index

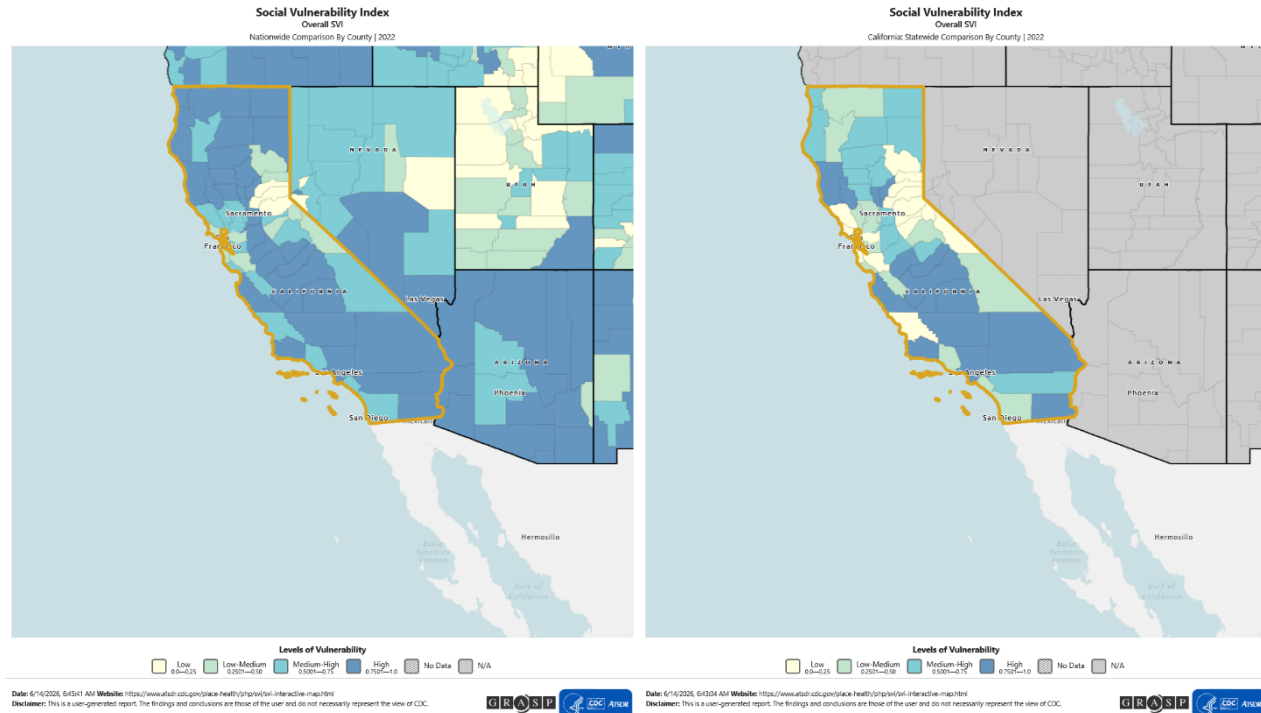
Federal Emergency Management Agency (FEMA) created the [National Risk Index](#) (NRI) dataset to provide information on communities most at risk to 18 different natural hazards.² NRI is part of FEMA's Resilience Analysis and Planning Tool (RAPT) and offers a baseline risk measurement for expected annual loss, social vulnerability and community resilience at the Census tract or county level. The information could become relevant for the development of local hazard mitigation plans (LHMP), particularly if they are used as a vehicle to meet SB 552 CDRP requirements. FEMA developed the platform and RAPT in general to empower communities for resilience planning. More importantly, FEMA and other federal agencies also rely on the platform's information to develop programs and assistance.

FEMA's NRI uses the SVI developed by Centers for Disease Control and Prevention (CDC). [CDC's SVI](#) uses

Overall Vulnerability	Socioeconomic Status	Below 150% Poverty Unemployed Housing Cost Burden No High School Diploma No Health Insurance
	Household Characteristics	Aged 65 & Older Aged 17 & Younger Civilian with a Disability Single-Parent Households English Language Proficiency
	Racial & Ethnic Minority Status	Hispanic or Latino (of any race) Black or African American, Not Hispanic or Latino Asian, Not Hispanic or Latino American Indian or Alaska Native, Not Hispanic or Latino Native Hawaiian or Pacific Islander, Not Hispanic or Latino Two or More Races, Not Hispanic or Latino Other Races, Not Hispanic or Latino
	Housing Type & Transportation	Multi-Unit Structures Mobile Homes Crowding No Vehicle Group Quarters

² The 18 natural disasters are avalanche, coastal flooding, cold wave, drought, earthquake, hail, heat wave, hurricane, ice storm, landslide, lightning, riverine flooding, strong wind, tornado, tsunami, volcanic activity, wildfire, and winter weather.

16 U.S. Census variables from the 5-year American Community Survey (ACS) to identify communities that may need support before, during, or after disasters (see right figure). CDC also provides an [interactive map](#) tool to help the exploration and data viewing. The following figures show SVI by county in a national comparison (left) and statewide comparison (right).



Governor's Office of Land Use and Climate Innovation's Vulnerable Communities Platform

In 2018, the [Integrated Climate Adaptation and Resiliency Program](#) (ICARP)'s Technical Advisory Council defined the term "vulnerable communities" to clarify the many factors that affect communities' climate adaptation and resilience and to help inform State climate adaptation efforts.

Climate vulnerability describes the degree to which natural, built, and human systems are at risk of exposure to climate change impacts. Vulnerable communities experience heightened risk and increased sensitivity to climate change and have less capacity and fewer resources to cope with, adapt to, or recover from climate impacts. These disproportionate effects are caused by physical (built and environmental), social, political, and/or economic factor(s), which are exacerbated by climate impacts. These factors include, but are not limited to, race, ethnicity, class, gender, sexual orientation, national origin, income inequality, and disability. People facing multiple forms of marginalization and inequality will confront more intense climate change impacts and barriers to recovery.

The [Vulnerable Communities Platform](#) (VCP) is a new website and mapping tool created by the Governor's Office of Land Use and Climate Innovation (LCI; formerly Governor's Office of Planning and Research) to help identify Californian communities most vulnerable to the impacts

of climate change. The platform serves to help us understand where different climate hazards will be most severe, which communities are most vulnerable, and what makes them vulnerable. LCI also developed [Storymap: Using the VCP for the 2024 Climate Bond](#) to assist communities in their planning for bond funding acquisition.

The VCP's primary purpose is to encourage adaptive planning for climate change. It focuses on five core climate hazards: extreme heat, flooding, sea level rise, wildfire, and drought. An interesting feature of VCP is that it has an underlying 90-meter-by-90-meter data set representing the populated areas.³

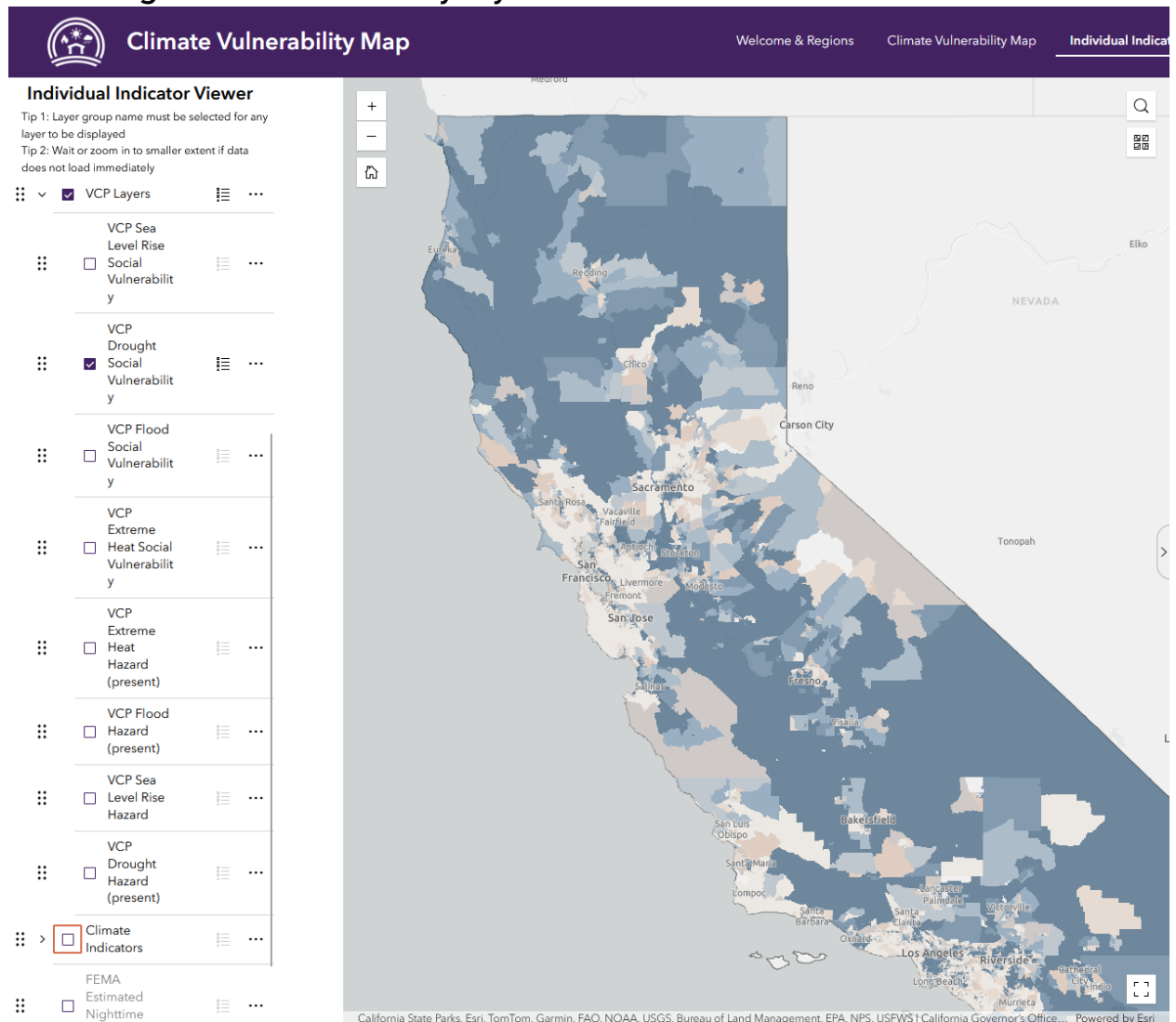
A high VCP score DOES NOT indicate that the State (rather, LCI) believes life or property is at risk in the community receiving that score. A high score merely indicates that the community in question would benefit from adaptation planning.

Many indicators are available to explore and use with a well-designed dashboard. It provides information at different scales and the ability to explore individual indicators, as well as a compare tool showing current and 2050 other conditions concurrently with synchronized displays.

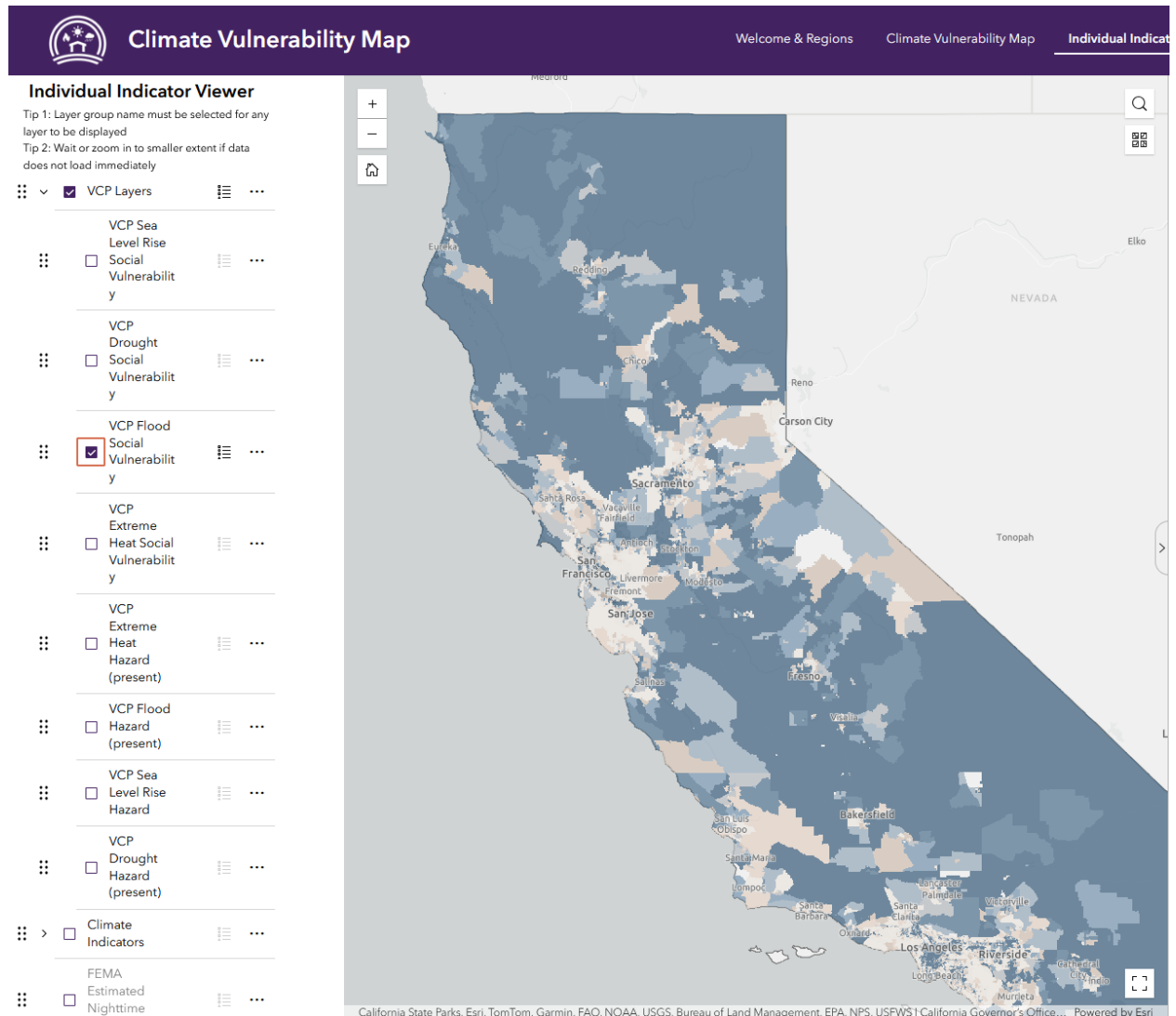
California Natural Resource Agency (CNRA) has officially adopted the platform and information for all programs under the CNRA, including DWR's. All programs are adjusting accordingly if they have not already, especially those tied to Prop 4 funding. DWR's SVI was incorporated into the VCP with minor modifications (listed as VCP Drought Social Vulnerability); for consistency, DWR plans to update its Water Shortage Vulnerability Explorer tool to incorporate LCI information in 2026.

³ This is a whole different topic by itself; some pending data (nighttime populations) are very relevant to flood emergency response particularly.

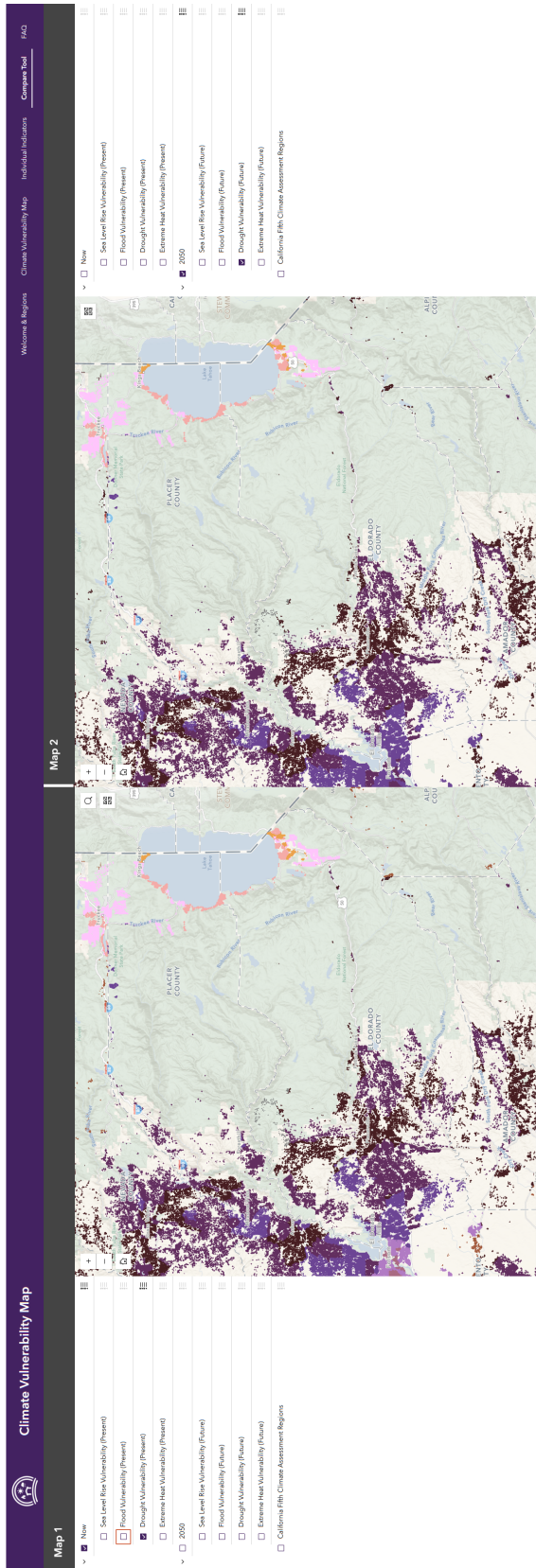
VCP Drought Social Vulnerability Layer



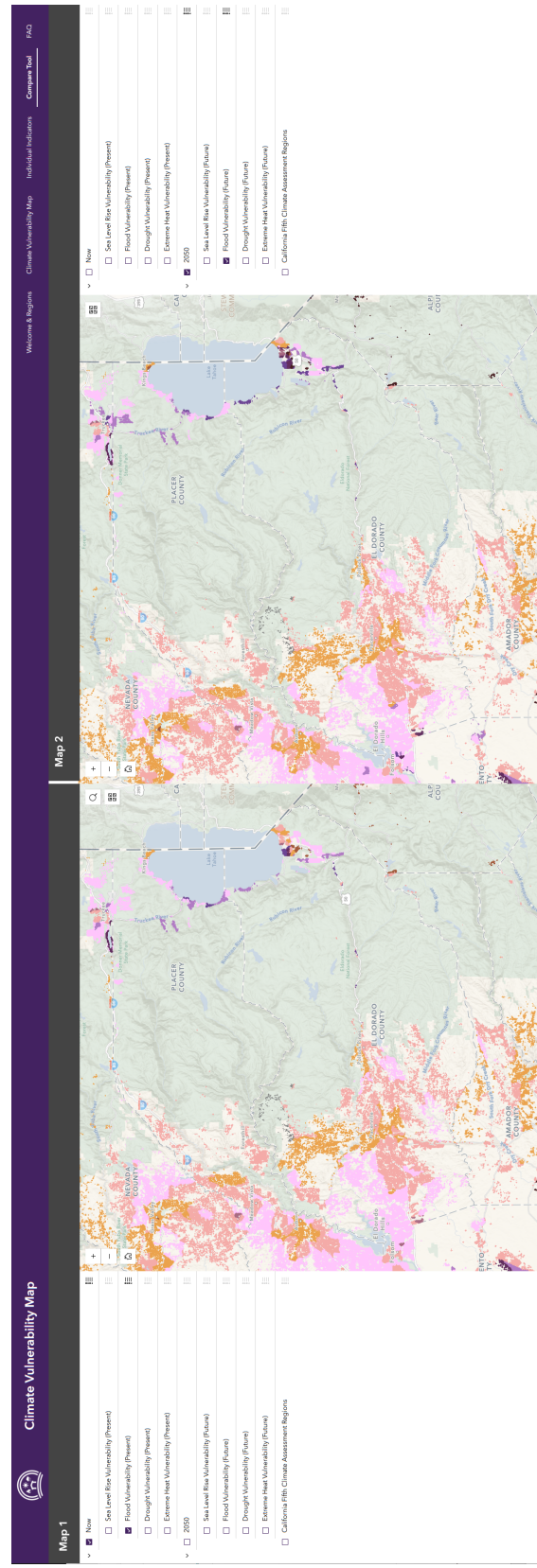
VCP Flood Vulnerability Layer



VCP Drought Hazard Comparison (now and 2050)



VCP Flood Hazard Comparison (now and 2050)



TAHOE WATER FOR FIRE SUPPRESSION - RURAL AREAS WITHOUT A MUNICIPAL-LIKE WATER SYSTEM

Background

For Blueprint Tahoe, the water for fire discussion is limited to fire protection for structures, not for wildfire suppression. With this understanding, the participants engage in discussions with wildfire resilience in mind.

The discussion also suggests that many systems, especially larger ones, are making improvements systematically and collaboratively. However, many smaller water systems fall behind due to their unique set of challenges.

Related brief incorporated by reference:

- [20260414 Blueprint Tahoe_Fire Protection 4 Structures](#)

Clarification on Focus

When water for fire protection is considered, it is beneficial to differentiate between two different intents:

- Structural fire protection / fire-flow engineering, and
- Wildfire resilience / catastrophic incident survivability.

For Blueprint Tahoe, it is a necessary distinction due to differences in scale, role and responsibilities, as well as effective measures; however, it is also recognized that for communities under constant threats of wildfire and increasing challenges in securing adequate insurance, the distinction may be blurry. As discussed later, the distinction may be even blurrier for small water systems and the rural communities they serve.

The January 2025 Los Angeles Fires brought the above distinction to the front and center. The fire-flow requirements for municipal water systems were not designed to mitigate catastrophic wildfire events. [UCLA Luskin Center for Innovation \(2025\)](#) provides succinct questions and answers on this important understanding. Wildfire mitigation requires a set of solutions that are multi-jurisdictional and more community-based, including water system improvement. See later discussion in this brief for more information.

Fire Protection Requirements through Building Code Enforcement

The [California Fire Code](#) (CFC), Part 6 of the California Building Standards Code (Cal. Code Regs., Title 24), is a set of regulations addressing fire safety and fire prevention in buildings and structures throughout the state. The current California Fire Code 2025 is based on the International Fire Code 2024. Accordingly, local jurisdictions adopt the CFC provisions with necessary amendments to set minimum standards for fire protection. The El Dorado County Fire

Chiefs Association also established a set of [regional fire protection standards](#), which were adopted by many fire protection agencies in El Dorado County for consistency.

The following does not provide a comprehensive review of applicable building code provisions for firefighting, but rather a general understanding of the setting.

It is also important to recognize that building code requirements are applicable to new constructions or major improvements. For a built-out area, the opportunity for enforcement may be limited.

Fire Protection with a Municipal-Like Water System

The CFC Section 507.1 requires an approved water supply capable of providing the required fire flow for fire protection to premises upon which facilities, buildings, or portions of buildings that are hereinafter constructed or moved into or within a land use jurisdiction. The CFC Section 507.2 further explains that the water supply shall consist of reservoirs, pressure tanks, elevated tanks, water mains, or other fixed systems capable of providing the required fire flow. The CFC, as amended locally, requires the minimum fire flow for residential one- and two-family dwellings to be 1,000 gallons per minute for a 1-hour duration for dwellings of 3,600 square feet or smaller. For dwellings 3,601 square feet or greater, the minimum fire flow is 1,000 gallons per minute for a 2-hour duration.

These requirements provide a fire protection strategy for buildings and structures with a pressurized, high volume water supply. The supporting water system(s) and associated purveyor(s) play a major role in this strategy. However, it is also important to recognize that the intended fire protection for structures can contribute to community wildfire resilience and emergency preparedness but is not intended to be a complete wildfire mitigation strategy.

These utilities are engaging in major infrastructure improvement in the next five years to improve community resilience and emergency preparedness. This includes the installation of new fire hydrants, upsized waterlines, new water storage tanks, emergency generators, and critical interties between the public and private water companies. These upgrades are necessary because most of the water systems were built decades ago to support summer vacation use. The utilities leverage the rates, state and federal assistance, and low-interest loans for needed upgrades.

South Tahoe Public Utility District (STPUD), Tahoe City Public Utility District (TCPUD), and North Tahoe Public Utility District collaborated with other utilities¹ in the Tahoe Basin, under the [Tahoe Water for Fire Suppression Partnership](#), to advocate for state and federal assistance to maintain and upgrade the region's aging water infrastructure to provide critical water to defend our communities against catastrophic wildfires. The bi-state partnership was established after the 2007 Angora Fire.

¹ Tahoe Park Water Company/Talmont Resort, Tahoe Swiss Village, Lakeside Park Mutual Water Company, Lukins Brothers Water Company, Tahoe Keys Water Company, Spring Creek Tract Association, and Nevada parties including Incline Village General Improvement District, Round Hill General Improvement District, Douglas County Community Development, Kingsbury General Improvement District,

The advocacy effort recently resulted in a major success. H.R. 6938, [the Commerce, Justice, Science; Energy and Water Development; and Interior & Environment Appropriations Act, 2026](#) provides more than \$20 million in federal funding for long-standing Lake Tahoe Restoration Act priorities, including watershed protection, forest health, aquatic invasive species mitigation, water infrastructure improvements, and climate resilience projects that reduce wildfire risk and protect water quality. For the first time, it includes a line item of [\\$2.125 million](#) for critical water infrastructure projects. This is a significant recognition for the role of water systems and their performance in the context of Lake Tahoe protection and restoration.

Rural Area Alternative

CFC also recognizes that rural areas may not be served by a municipal-like water system that can provide the required minimum fire-flow capacity and associated functions. The CFC Section B103.3 (Area without Water Supply Systems) provides an alternative.

For information regarding water supplies for firefighting purposes in rural and suburban areas in which adequate and reliable water supply systems do not exist, the fire code official is authorized to utilize NFPA 1142 or the California Wildland-Urban Interface Code.

This provision allows the authority having jurisdiction (AHJ) to use National Fire Protection Association (NFPA) 1142: [Standard on Water Supplies for Suburban and Rural Firefighting](#) to identify a method of determining the minimum requirements for alternative water supplies for structural firefighting purposes in areas where the AHJ determines that adequate and reliable water supply systems for firefighting purposes do not otherwise exist.

Based on the authorization and NFPA 1142, [El Dorado County Regional Fire Protection Standard D-003](#) sets the minimum water supply requirements for applications to one- and two-family dwellings in rural areas of El Dorado County with local amendments.

Standard D-003 considers water systems and their purveyors in a more generalized manner without a detailed differentiation among classifications of drinking water systems. It contains a definition for water purveyor: a public utility, mutual water company, government agency or special district, or other entity owning and operating a water system and holding a valid permit from the California State Department of Public Health to purvey water.

The approved water supplies include:

- Purveyor supplied hydrant system,
- Tanks (above ground or underground), and/or
- NFPA 1142 Annex B Optional methods approved by the AHJ, which may include a pool, reservoir, or pond that may be used as a replacement for a tank system when in compliance with NFPA 1142, Section IX.J – Draft Hydrants & Fire Valves as described in NFPA 1142 and approved by the AHJ.

Standard D-003 provides the methodology for calculating the minimum water supply for firefighting, excluding fire sprinklers if applicable. Consistent with NFPA 1142, Standard D-003

also includes design standards and requirements if the storage is also used for domestic water supply without affecting firefighting purposes.

Other Related Requirements

There are other law and regulatory changes that resulted from recent catastrophic wildfire events.

California Wildland Urban Interface Code

A major change in the 2025 CFC is the relocation of the provisions contained in Chapter 49 (Requirements for Wildland Urban Interface Fire Areas). These requirements were removed from the CFC and incorporated into the newly established California Wildland-Urban Interface Code (CWUIC) as [Part 7 of Title 24](#).

For all parcels in all Fire Hazard Severity Zones in State Responsibility Areas (SRA) and Local Responsibility Areas (LRA) designated as a Very High Fire Hazard Severity Zone, the CWUIC requirements for defensible space and structure hardening against ignition are applicable to all new structures, additions, and exterior alterations of existing structures regardless of use, size, separation distances, or occupancy type (including garages, workshops, greenhouses, etc.).

The 2025 CWUIC incorporates other provisions related to materials and construction methods for exterior wildfire exposure in California Building Code Chapter 7A, and California Residential Code Chapter 3, Section 33. The primary purpose of the CWUIC is to protect lives and property by reducing wildfire risks, as well as to establish minimum construction and development standards for properties in high-risk fire areas. In terms of water supply for firefighting, the CWUIC refers to CFC.

Other Fire Protection Requirements

There are some other regulatory requirements that do not depend on permitting actions but establish a performance-based standard that could be leveraged for a community-based approach.

Emergency Water Supply for Fire Protection

CCR, Title 14, Section 1275.02 provides the minimum standards for emergency water supply for all structures in SRA.

(a) When a water supply for structure defense is required to be installed, such protection shall be installed and made serviceable prior to and during the time of construction except when alternative methods of protection are provided and approved by the Local Jurisdiction.

(b) Water systems equaling or exceeding the California Fire Code, California Code of Regulations title 24, part 9, or, where a municipal-type water supply is unavailable, National Fire Protection Association (NFPA) 1142, "Standard on Water Supplies for Suburban and Rural Fire Fighting," 2017 Edition, hereby incorporated by reference, shall be accepted as meeting the requirements of this article.

(c) Such emergency water may be provided in a fire agency mobile water tender, or naturally occurring or man made containment structure, as long as the specified quantity is immediately available.

(d) Nothing in this article prohibits the combined storage of emergency Wildfire and structural firefighting water supplies unless so prohibited by local ordinance or specified by the local fire agency.

(e) Where freeze or crash protection is required by Local Jurisdictions, such protection measures shall be provided.

The requirements are consistent with CFC provisions; however, they are more specifically open to measures including tender operations and community water storage.

Fire Water Security for Communities without a Municipal-like Water Supply System

As previously discussed, water security for fire has very different prospects in rural communities that are at or near built-out conditions and served by a small water system with little or no opportunity to connect to a large water system with adequate fire flow and a hydrant system. Among other things, homeowners may voluntarily install a tank or other devices on their corresponding properties to improve their overall fire resilience. However, in this case, upgrading the water system completely to meet fire flow and hydrant system requirements is typically not cost effective.

Effected El Dorado Tahoe Basin Communities

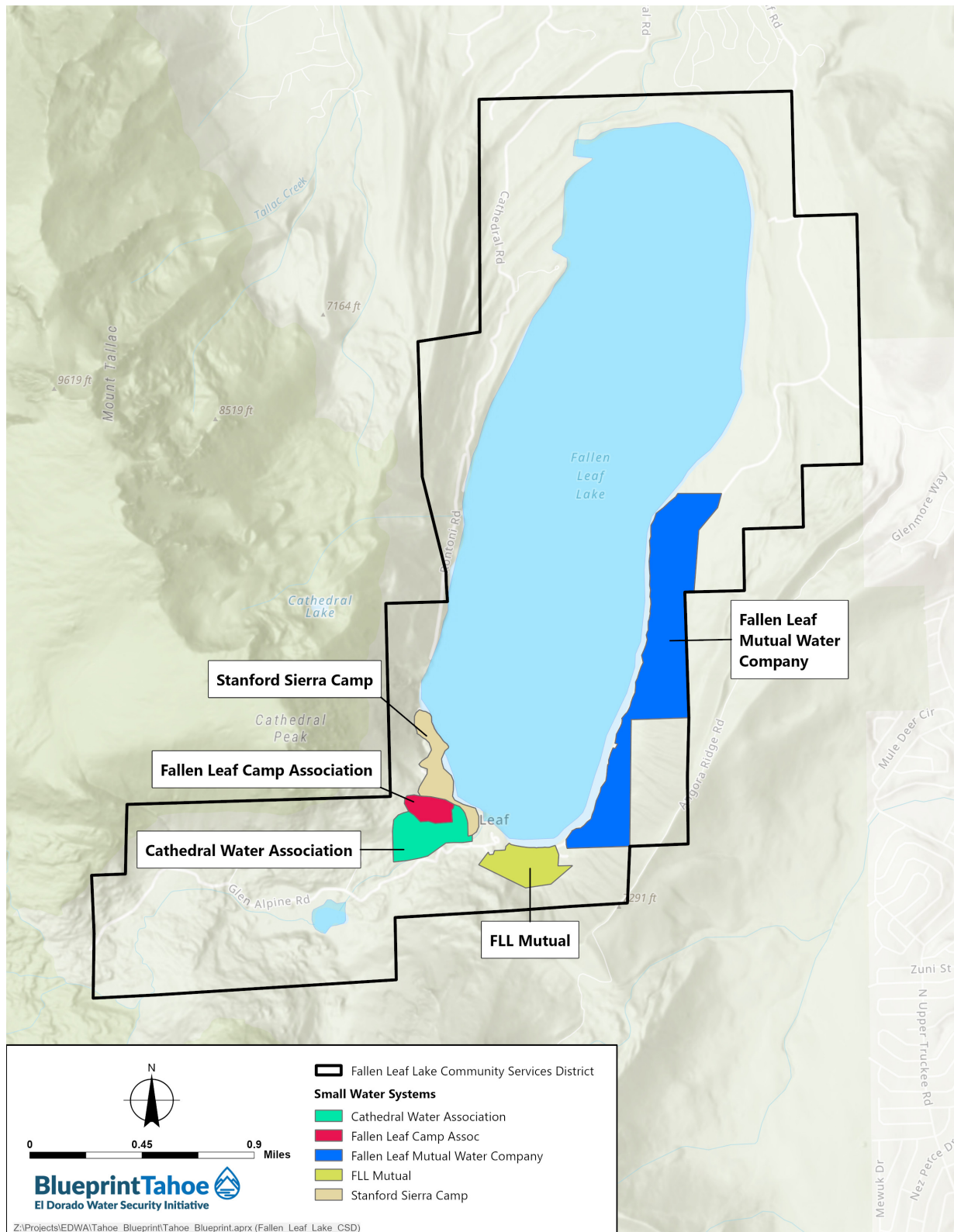
In El Dorado Tahoe Basin, the communities without a municipal-like water system include the communities around Fallen Leaf Lake and those near Echo Lake.

- The Fallen Leaf Lake Community Services District (FLLCSD) provides fire protection service for communities around Fallen Leaf Lake. This creates a unique condition discussed later.
- The communities near Echo Lake are served by Lake Valley Fire Protection District (LVFPD); however, state and federal agencies are the primary responsible parties for fire protection. Therefore, they can be excluded from further consideration.
- Communities served by small water systems and domestic wells in and near the service areas of STPUD and TCPUD are considered to be covered for fire protection purposes after the planned upgrades in the next five years. The corresponding fire protection agencies are LVFPD and City of South Lake Tahoe.

Case Study for Fallen Leaf Lake Communities

A 2023 study for Fallen Leaf Lake communities conducted by El Dorado Water Agency (Water Agency) in collaboration with FLLCSD and communities demonstrated the issue of affordability to invest in water system infrastructure to boost their firefighting capacity. The water systems considered in this study include the Fallen Leaf Mutual Water Company (FLMWC), Fallen Leaf

Lake Mutual Water Company (FLLMWC), Stanford Sierra Camp (SSC), Cathedral Water Association, and Fallen Leaf Camp Association. FLLCSD provides fire protection services along with other services such as parks and recreation.



The Fallen Leaf Lake area is a long-established, built-out community. Generally, the updated building code requirements have limited effects on improving fire protection for structures. However, the overall wildfire risk and the threat of losing fire insurance provide motivation for considering water system improvements and other firefighting measures.

Community-Based, Firefighting Only Upgrade

The study recognizes that upgrading the water system to meet fire flow requirements is not practical. Instead of considering parcel-by-parcel protection, the study investigated a community-based approach with upgrade options focusing on:

- Leveraging the lake as the alternative source of water and storage,
- Building intakes and pumps, as well as pipes for fire protection only, and
- Supporting fire tender operations including fire boat operations.

The estimated cost for this community-based approach is over 6.5 million.²

Affordability Barriers

The Fallen Leaf Lake communities did not move forward with the recommendations citing cost issues. Note that the small water systems in the Fallen Leaf Lake area were established for drinking water supply purposes, not for firefighting. Adequate fire protection is an issue of building code enforcement (i.e., a land use issue). This is an important clarification for potential liability considerations.

EDWA's study provides a snapshot of affordability barriers faced by mature communities in considering water system upgrades to improve fire resilience and emergency preparedness. Under this condition, other measures including vegetation management, defensible space, structural hardening, tender operations, and drafting locations and access may be more cost-effective on a community level of implementation.

El Dorado Local Agency Formation Commission's Findings

El Dorado Local Agency Formation Commission (El Dorado LAFCO) completed a [Fire Protection Districts Targeted Municipal Services Review](#) in January 2026. The review covers FLLCSD and three other smaller service providers.

El Dorado LAFCO found that FLLCSD provides limited water services that support its fire protection capabilities. FLLCSD maintains and operates a non-potable water supply system primarily intended for fire suppression purposes. This includes stamp pipes (standpipes) positioned throughout the FLLCSD that can deliver water to elevated or remote areas. FLLCSD has upgraded pumps to increase water pressure, and residents have added more portable gas-powered pumps following recent fire events such as the Caldor Fire. However, the water system

² Domenichelli and Associates, 2023. *Technical Memorandum: Fallen Leaf Fire Protection Water Systems Evaluation*. March.

is not a full-scale municipal water utility, and the communities are served by several small water systems, private wells or water tanks for domestic use.

The district's service area does not anticipate growth or population increase. The population served in the district varies by season. In the winter, approximately 20-50 residents occupy their homes. During June, July and August the population on any given Saturday afternoon can exceed 1,500. There are no disadvantaged communities within the district's service area.

Ongoing improvements to the fire water system, like the addition of new pumps and pressure-enhancement equipment, are part of FLLCSD's efforts to improve fire readiness and response time, particularly on the west side of the lake where access is more difficult and the need for distributed infrastructure is greater.

The review suggests that FLLCSD is adequate for providing continuous services but financially constrained. El Dorado LAFCO provides the following comments:

- FLLCSD operates as a seasonal fire department, creating unique challenges in service continuity.
- Discussions had taken place about consolidating services with Lake Valley Fire Protection District (Lake Valley FPD), but operational and cost differences hindered progress at the time.
- FLLCSD's service areas are entirely within state and federal responsibility areas, raising questions about whether CAL FIRE or the U.S. Forest Service (USFS) should take over the responsibility.

Community Fire Resilience

The above Fallen Leaf Lake Case Study suggests that in rural areas where there is no municipal-like water system, the distinction between structure fire protection and a community-based approach for wildfire mitigation may become intertwined and inseparable.

Community fire resilience can have many components, including

- A. Defensible space
- B. Building hardening
- C. Firefighting water supply, such as:
 - Fire flow and hydrant systems provided by municipal water systems
 - Alternative water supply in rural and suburban areas where a municipal water system is not available, including
 - Fire-only or combined community or distributed storage (e.g., cisterns, tanks)
 - Dry hydrants,
 - Drafting points,

- Emergency interties, and
- Tanker shuttle operations.

These strategies may be applied as appropriate in addition to the firefighting capacity provided by the serving small water system. In these cases, small water systems provide a supplemental water supply to fire suppression instead of meeting the NFIA standard.

The Water Agency is currently working with various fire protection agencies, including the Lake Valley Fire Protection Agency (LVFPA) to identify water drawing sites to support alternative water supply and tender shuttle operations for fire protection.

D. Certifications

This strategy serves to further move away from a structure-by-structure water-centric fire protection approach to a community-based condition.

○ Public Protection Classification

The [Public Protection Classification](#) (PPC) of the Insurer Services Office (ISO) has been a long-time reference for insurers to establish appropriate fire insurance premiums for residential and commercial properties. The PPC is based on the [Fire Suppression Rating Schedule](#) (FSRS) measures the major elements of a community's fire protection system.

- Emergency communication (10 points)
- Fire department (50 points)
- Water supply (40 points; including municipal water supply and alternative water supply)
- Community risk reduction (5.5 points; covering code adoption, education, etc.)
- Diversion adjustments if relative scores for fire department and water supply do not align.

PPC classification includes 10 levels; Class 1 generally represents superior property fire protection, and Class 10 indicates that the area's fire-suppression program does not meet ISO minimum criteria.

○ Firewise USA® Communities and Other Certificates

Many new certification programs emerged recently with the recognition of the scale and impacts of wildfire that are beyond traditional urban fire considerations. This includes [Firewise USA Program](#).

- Fire Adapt Community Framework

US Forest Service (USFS) promotes the [fire adapt community](#) program, encouraging the development and implementation of a Community Wildfire Mitigation Plan. However, USFS emphasizes that fire adaptation is not a recognition program and it is not a checklist. A community cannot achieve “fire adapted community” status or certification because the work to reduce wildfire risk never ends.

Potential Measures for Blueprint Tahoe

The following potential measures are developed for discussion.

1. **All Blueprint partners** will support communication and advocacy to implement the 2025 [Lake Tahoe Basin Community Wildfire Protection Plan](#) and 2025 renewed [Lake Tahoe Basin Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy](#) for wildfire mitigation and community fire resilience improvement led by the County of El Dorado, fire protection agencies, Fire Safe Councils, USFS, and Cal FIRE.
2. In coordination with the County of El Dorado, **El Dorado Water Agency** will participate in a Disaster Response Team (with a Presidential declaration) or coordinate post-fire response team (without a Presidential declaration) for water-related subject matter expertise and potential small water system assistance.
3. **El Dorado Water Agency** will assist local fire protection agencies in exploring water-related options for firefighting capacity improvement for communities not served by a municipal like water system consistent with NFPA 1142.

This could include the existing efforts in water draw location investigation, or the as-needed technical support like the Fallen Leaf Lake study discussed earlier.

4. **El Dorado Water Agency** will represent small water systems and domestic wells in the Tahoe Water for Fire Suppression Partnership for joint advocacy and potential assistance.

The current participating agencies include California parties (North Tahoe Public Utility District, **South Tahoe Public Utility District**, **Tahoe City Public Utility District**, Incline Village General Improvement District, **Lakeside Mutual Water Company**, **Lukins Brothers Water Company**, Tahoe Park Water Company/Talmont Resort, Tahoe Swiss Village, **Tahoe Key Water Company**, and **Spring Creek**) and Nevada parties (Round Hill General Improvement District, Douglas County Community Development, and Kingsburg General Improvement District).

5. **All water systems** will notify their customers regarding their firefighting capacity and limitations for transparency and liability protection, with education materials developed by (A: Entity).

For example, this notification is to establish the foundational understanding with customers on the following:

- The intentions of building codes for fire flow and use of hydrants in a municipal-like water system for urban fires and NFPA 1142 applicability in rural communities not served by a municipal-like water system. NFPA 1142 does not rely on local water systems for required water supply for firefighting.
- The water system's role and responsibility for the above, and additional effort in supporting community fire resilience, if applicable.

A. Entity:

- Individual water system owner
- El Dorado Water Agency, supplemented with system-specific information by owner.
- TRPA, supplemented with system-specific information by owner.
- Other

6. (A: Entity) will develop public education information on potential water supply and water quality impacts of wildfire to support communication and advocacy for forest health and fire resilience for (B: Circulation).

A. Entity

- STPUD & TCPUD
- EDWA
- Water associations or groups in Tahoe Basin
- TRPA
- Other

B. Circulation

- Water service customers
- El Dorado Tahoe Basin-wide communications
- Tahoe Regional Planning Agency basin-wide channel(s)
- Others

WATER QUALITY IMPACTS OF WILDFIRES IN THE EL DORADO TAHOE BASIN

Background on Issue Clarification

Wildfires can cause immediate and subsequent water quality impacts from precipitation events, such as debris and pollutants in runoff and/or sediment loads from slope erosion. The resulting impacts are mostly on surface water bodies, resulting in concerns over the overall water quality of Lake Tahoe and other environmentally sensitive areas, and temporary or long-term water supply impacts.

Groundwater is the primary source of supply in the Tahoe Basin; however, several systems rely partially or entirely on surface water. These include Lakeside Water District, several noncommunity water systems that serve recreational areas around Lake Tahoe, and the summer-only communities around Fallen Leaf Lake and Echo Lake. TCPUD also uses surface water from Lake Tahoe as a part of its supply portfolio.

This vulnerability pathway was discussed in Workshop 1; however, the working group acknowledged that wildfire mitigation is a broader issue of community, land use, and forest management and thus, is not within the scope of Blueprint Tahoe. This brief examines historical observations of water quality impacts from wildfires.

Briefs incorporated by reference:

- 20260414 Blueprint Tahoe_Fire Protection 4 Structures
- 20260622 Blueprint Tahoe_Water 4 Fire Suppression_Rural Areas

Historical Wildfire Events and Water Quality Impacts

The two most impactful wildfires affecting the Tahoe Basin in recent decades were the Angora Fire (2007) and the Caldor Fire (2021). These events provide evidence of how wildfires can alter basin hydrology and lake conditions.

Angora Fire

The Angora Fire ignited on June 24, 2007, in the forest above Fallen Leaf Lake. The blaze was fully contained in early July after burning roughly 3,100 acres of forest within the Lake Tahoe Basin's southwestern corner (Angora Ridge area) and destroying 254 structures.

After the [Angora Fire](#), the Angora Creek was monitored for 2 years to assess potential downstream impacts. The study found an increase in various nutrients, including total nitrogen, nitrates, and turbidity, in Angora Creek compared to streams outside of the burn area,

especially during the wetter second year.¹ However, this impact was limited to Angora Creek and did not impact potable water supply in the Tahoe Basin.

Angora Fire did not receive a presidential level disaster declaration and thus was not eligible for FEMA assistance.

Caldor Fire

The Caldor Fire began near Grizzly Flats community in the El Dorado West Slope, outside the Tahoe Basin on August 14, 2021. It grew into a 67-day megafire that ultimately burned 221,835 acres across three counties. In late August, driven by high winds, the fire crossed the Sierra Crest at Echo Summit and entered the Tahoe Basin, burning roughly 35,000 acres in the basin's south and southwestern sectors around Meyers and Christmas Valley and impacting both the Trout Creek and Upper Truckee River watersheds.²

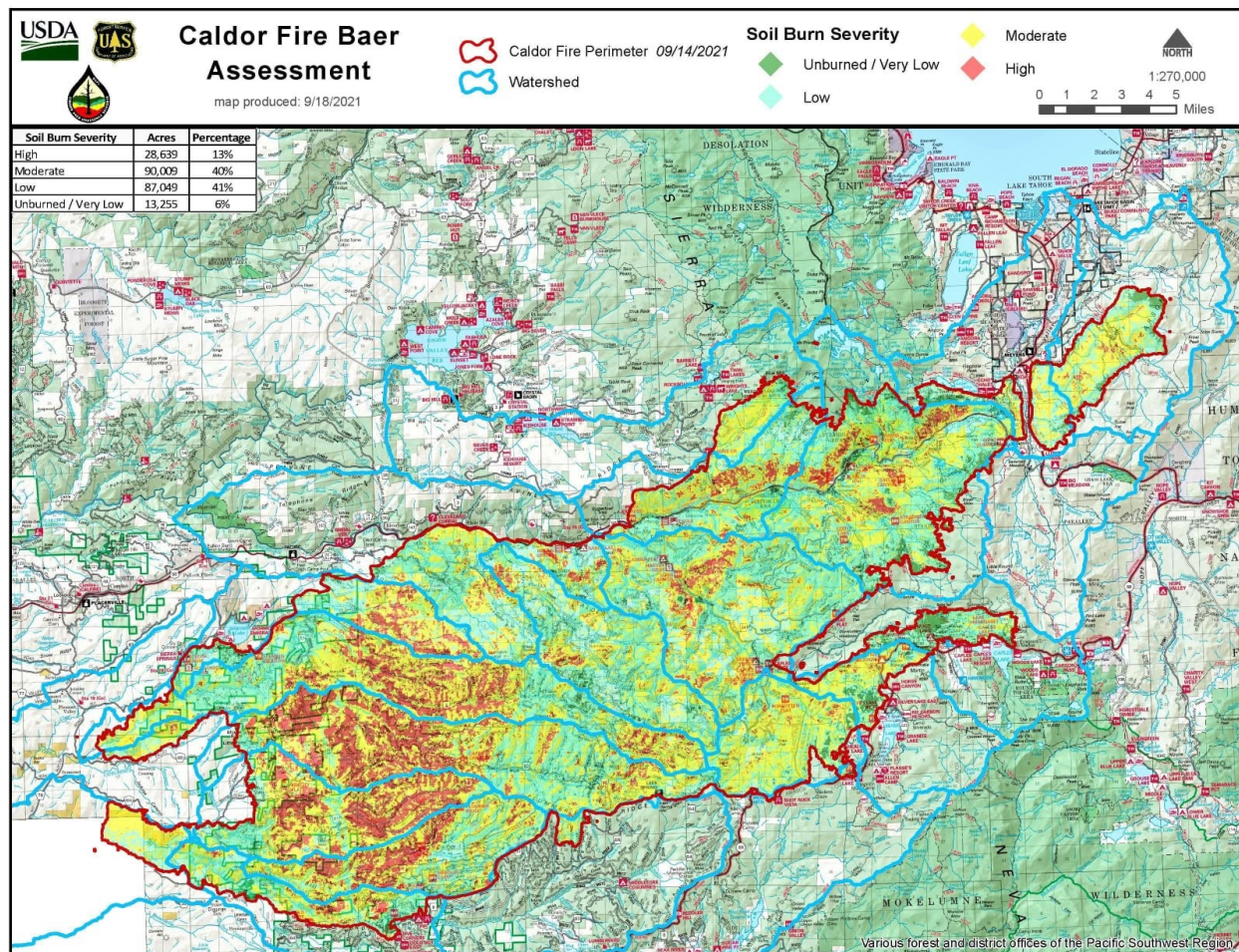
During the fire and over the subsequent two water years, water quality was monitored at ten stations across the basin for total suspended solids, turbidity, nitrate plus nitrite, and other contaminants. Analysis showed that surface waters exhibited elevated turbidity during the height of the fire, but turbidity levels dropped rapidly after the blaze was contained, indicating that the water quality impacts in the region were short-lived and had negligible impacts on potable water supply.²

Caldor Fire received a presidential declaration of major disasters and thus, FEMA provided assistance for immediate response as well as individual and public assistance programs. Counties are the operational-level units under California's [Standardized Emergency Management System](#) (SEMS). Per the County of El Dorado's request, El Dorado Water Agency was officially part of the Response and Recovery Team in coordination with the County of El Dorado to provide communication and as-needed assistance to water systems (primarily small water systems; major water systems have the capacity to coordinate with the Response and Recovery Team directly).

Over erosion and water quality concerns, El Dorado Water Agency coordinated with the Burned Area Emergency Response (BAER) program, led by the U.S. Forest Service as an emergency response program to investigate burn severity and associated erosion, landslides, and other risks. For the Caldor Fire, the BAER team covered both the USFS Lake Tahoe Basin Management Unit and the Eldorado National Forest with scientists and specialists including hydrologists, geologists, soil scientists, engineers, botanists, biologists, archeologists, and geographic information specialists. The resulting [assessment report](#) provides a summary of burn severity, which plays a key role in risks of increase in runoff, sediments and ash, debris flows, and landslides. The BAER team also recommended emergency stabilization treatments. The elevated runoff risks were identified in the Cosumnes and South Fork American River basins.

¹ [Water quality response to the Angora Fire, Lake Tahoe, California](#)

² [Caldor Fire Stormwater Impact Report](#) by Tahoe Resource Conservation District, dated December 31, 2022



The Water Agency also coordinated with the American River Conservancy, which has water quality monitoring stations in Cosumnes River basin, for potential enhanced monitoring needs including locations and frequency and their ongoing watershed water quality modeling effort.

In the post fire recovery phase, the Water Agency provided significant assistance to Grizzly Flats community and Grizzly Flats Community Service District, a small water system, with FEMA assistance program support.

For education and advocacy purposes, the Water Agency also developed a study to examine the true cost of wildfire³ (the West Slope only) based on its earlier valuation of ecosystem goods and services.⁴ Note that the ecosystem good and service values were also directly used in the

³ Soares, J.; Batker, D.; Sun, Y.-H.; Batker-Pritzker, A.; Guo, R. Incorporating Natural Capital Damage from Major Wildfire Events in Headwaters Management and Resource Allocation. Water 2025, 17, 2368. <https://doi.org/10.3390/w17162368>.

⁴ Batker, D.; Soares, J.; Sun, Y.-H.; Batker-Pritzker, A.; Guo, R. Headwater Valuation as a Tool for Economic Development, Healthy Forest Management, and Water Resilience. Water 2024, 16, 2121. <https://doi.org/10.3390/w16152121>.

Grizzly Flats CSD's assistance application to streamline the process, per FEMA-approved protocols.

Vulnerability Assessment

Historical Events

Lessons from the Angora and Caldor fires indicate that groundwater, the basin's primary water source, is relatively resilient to wildfire impacts and did not experience effects from past wildfire events. Surface waters can be affected, but observed impacts have been moderate and short-lived, without long-term loss or restrictions of water supply.

Climate Change and Future Wildfires Potential

Warming temperatures are extending the wildfire season in the Sierra Nevadas. By the end of the century, snow-season lengths are expected to be between one to three months shorter.⁵ Fewer freezing nights and earlier spring thaws mean the traditional mid-summer fire season now starts earlier and ends later in the year.

Climate change is also linked to more frequent and intense droughts, like the 2012-2016 event that killed millions of trees in the Sierra Nevada. Drought-stressed, dying trees add to fuel loads, and outbreaks of pests (e.g. bark beetles) further increase dead, flammable vegetation.⁶ The El Dorado County portion of Tahoe, which experienced severe fire conditions during the 2021 Caldor Fire, exemplifies how prolonged hot-dry periods can set the stage for large fires. Projections indicate that these wildfire trends will continue as the region keeps warming up.⁷

Improving Fire Resilience

The best defense for Tahoe's water is to prevent large, severe wildfires and manage inevitable ones. There are many related efforts by USFS, CAL Fire, and communities to improve forest management and community fire resilience. For example, a robust network of multi-agency wildfire resilience programs has been established in the Tahoe Basin. Key initiatives include:

- The [Tahoe Fire and Fuels Team \(TFET\)](#) is a multiagency partnership (formed after the 2007 Angora Fire) coordinating basin wide fuel reduction. Over 70,000 acres are treated through thinning and prescribed fire, reducing fire intensity, erosion risk, and downstream water quality impacts.
- The [Tahoe Network of Fire Adapted Communities](#) is led by Tahoe Resource Conservation District (RCD) in collaboration with local fire districts and University of

⁵ Dettinger, M. & Rajagopal, S. (2023). [Simulated Hydrologic Responses to Climate-Change Projections for the Lake Tahoe Basin](#).

⁶ USDA Forest Service Region 5 Ecology Program. (2022). [Tahoe National Forest Climate Change Trend Summary](#).

⁷ Westerling, A.L. (2018). [Wildfire simulations for California's Fourth Climate Change Assessment - Sierra Nevada region](#).

Nevada Reno's fire extension program. It supports homeowners in creating defensible space around homes and adopting Fire Adapted Community strategies. These measures were credited with helping save neighborhoods during the Caldor Fire.

- The [2025 Tahoe Basin Community Wildfire Protection Plan \(CWPP\) update](#) is a basin-wide, multi-agency framework emphasizing cross-boundary fuels work, evacuation planning, and firefighting water infrastructure, aligning wildfire resilience with water system preparedness.

These efforts are primarily focused on forest and community protection, which are key for preventing water quality impacts from wildfire – **addressing the source of problems, not the symptoms.**

USFS Post-fire Restoration

USFS recently [released the final Environmental Assessment](#) in March 2026 for restoration of the roughly 11,700 acres of national forest lands in and around the Caldor Fire area. Proposed restoration activities include:

- Thinning surviving tree stands and nearby unburned trees
- Removing diseased, insect-infested, fire-killed, or damaged trees
- Preparing areas to plant native seedlings
- Using approved herbicides to support reforestation
- Implementing prescribed fire
- Restoring stream channels, meadows, and aquatic and aspen tree habitats
- Improving wildlife habitat, including Protected Activity Centers

Due to the time-sensitive nature of the proposed action and the continued deterioration of forest stands in the Caldor Fire burn area, the Lake Tahoe Basin Management Unit received an Emergency Action Determination for this project. This action waives the pre-decisional objection process and uses other emergency authorities to expedite project implementation. Preliminary survey and site preparation actions are planned to start in spring 2026.⁸ The amount of time to get to this decision is worth noting, stressing the importance of preventive actions.

Potential Measures or Partial Solutions

Potential measures or partial solutions developed for this topic are conceptually and practically consistent with some of the recommendations (items 1, 2, and 6) in the brief, ***Water for Fire Suppression_Rural Area***.

⁸ The detail of the Environmental Assessment is available [here](#).