

# Douglas County Floods of 2023, Lessons Learned & Stormwater Master Planning

**ROAD  
CLOSED**



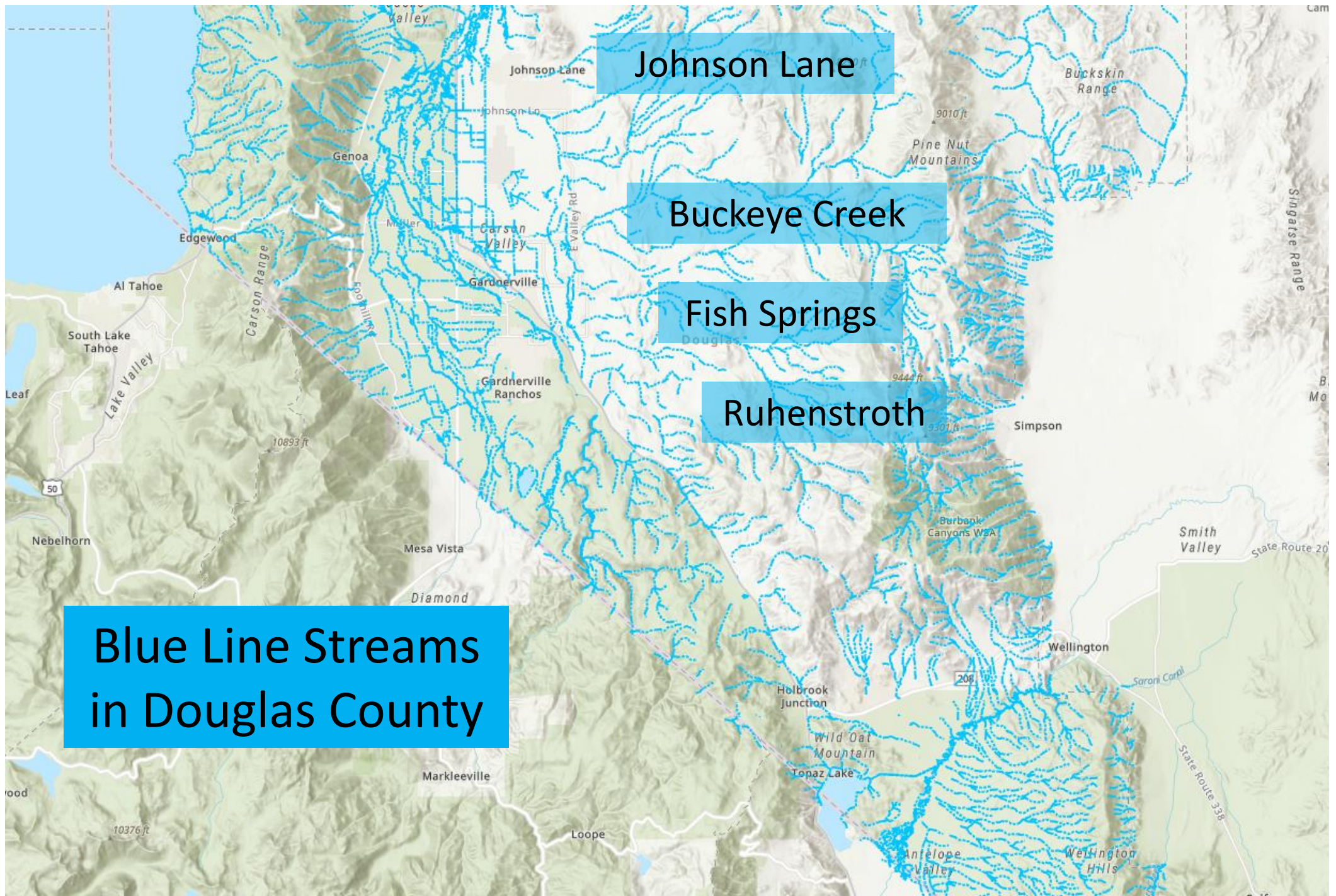
# Blue Line Streams in Douglas County

Johnson Lane

Buckeye Creek

Fish Springs

Ruhenstroth





Ruhenstroth Community



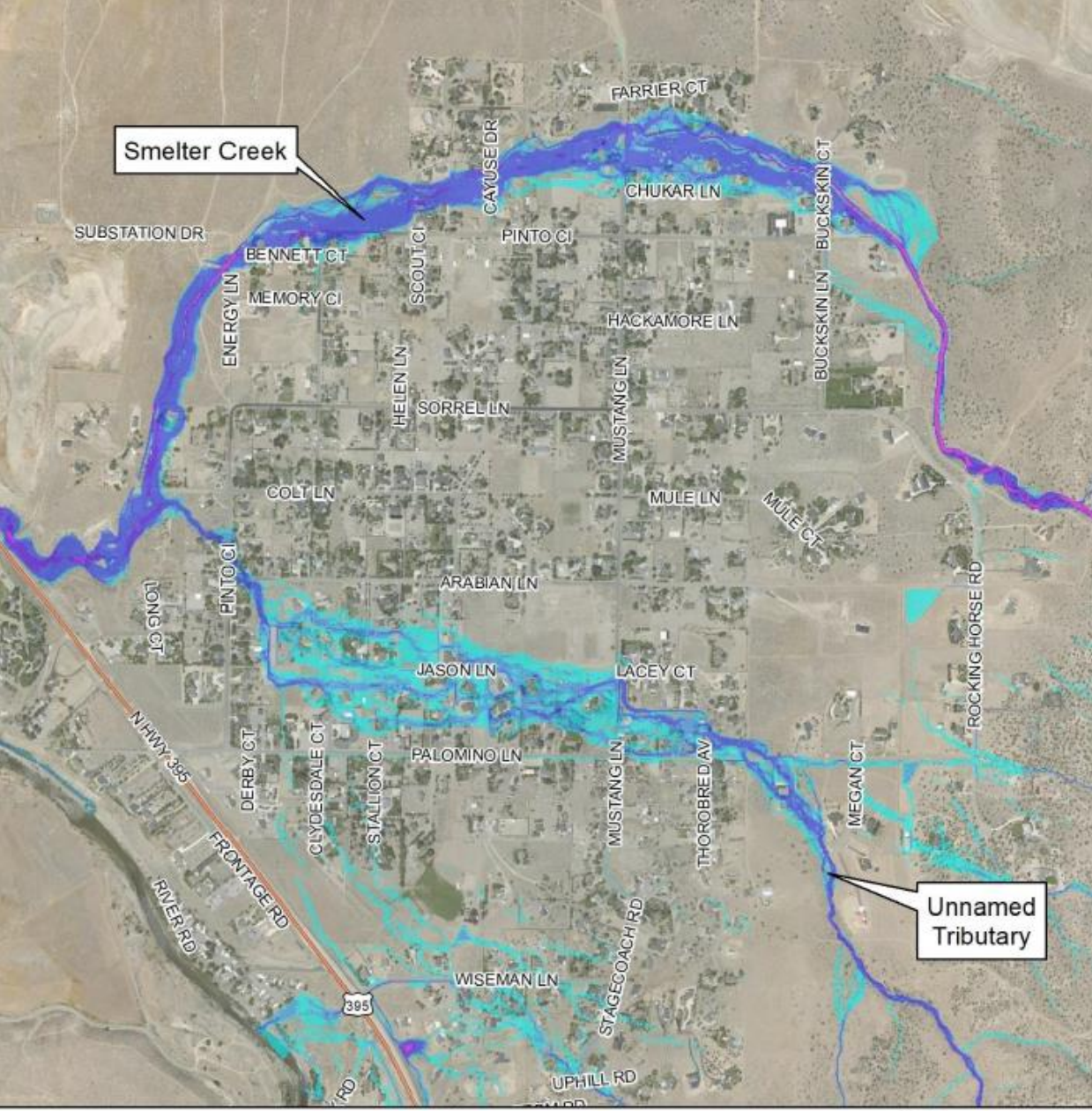
Smelter Creek and  
Unnamed Tributary



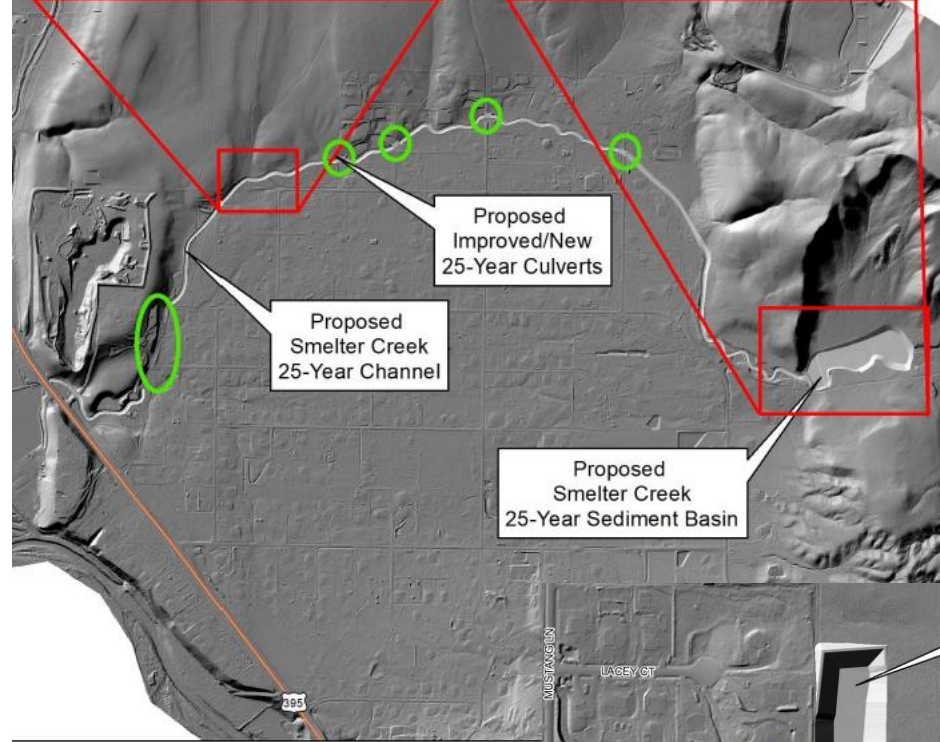
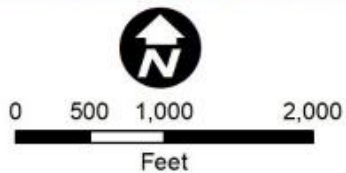
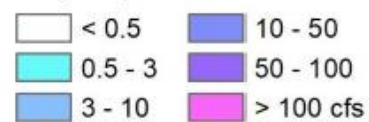


Smelter Creek



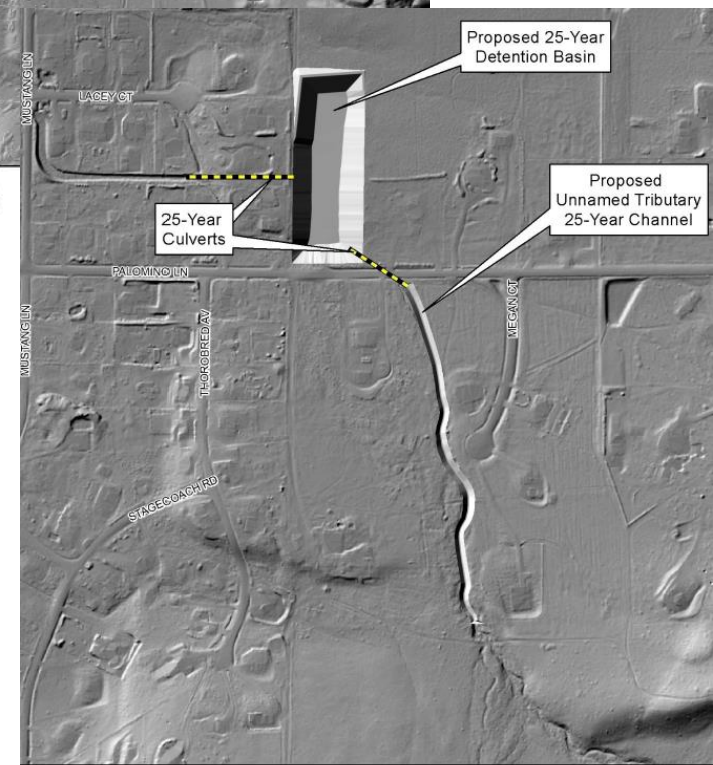


**25-year, 24-hour Maximum Discharge (cfs)**

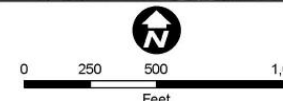


**Smelter Creek Mitigation Alternatives**

Proposed New 25-year Culverts



**Unnamed Tributary Mitigation Alternative 2**



# Pinenut Creek in Fish Springs



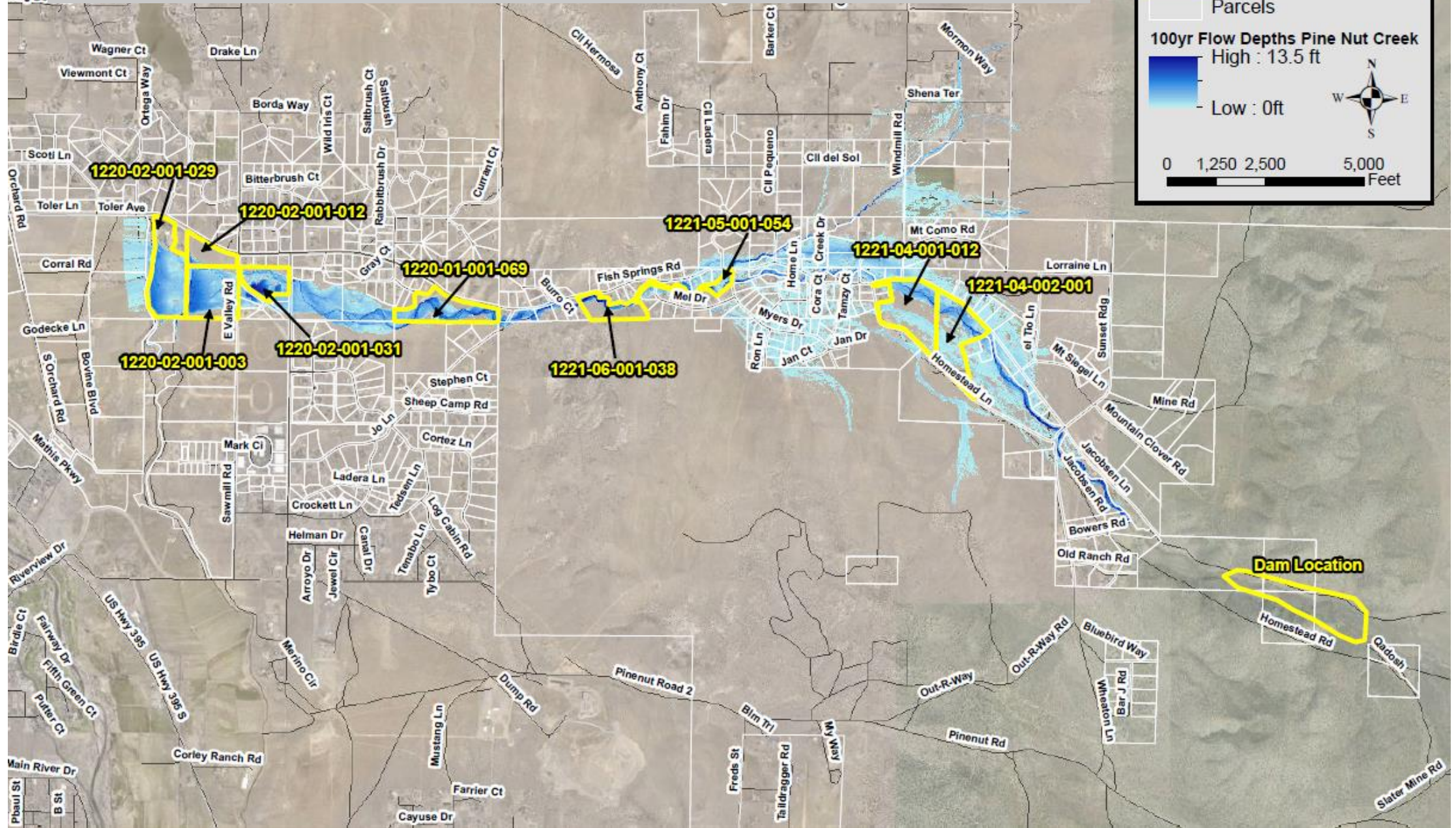
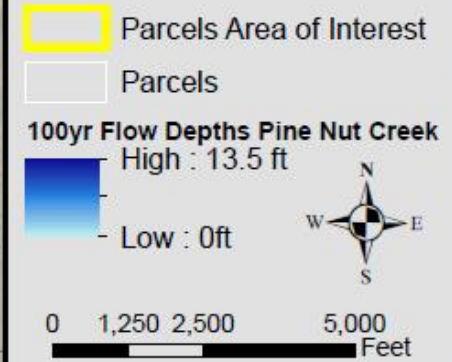






# Pinenut Creek Upstream Storage Feasibility Study

## Legend



Buckeye Creek break out over Buckeye Road





Existing Culvert in Road - approx capacity is similar to Orbit crossing

Location of new Channel (~25 ft wide x ~12ft deep)

gravel pit flooded

Buckeye Wash Bank Breach

Approx 600 feet of shoulder damaged

Virginia Ditch banks eroding

Bently Parkway North

Buckeye Rd

Vector Dr

Orbit Wy

Orchard Rd

Bently Parkway South

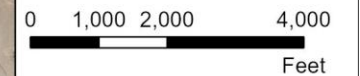
ter Py

Mid Va

Buckeye Creek  
Flood Mitigation  
Assessment

**Proposed Mitigation  
Facilities**

**Proposed  
Mitigation  
Facilities  
Location**

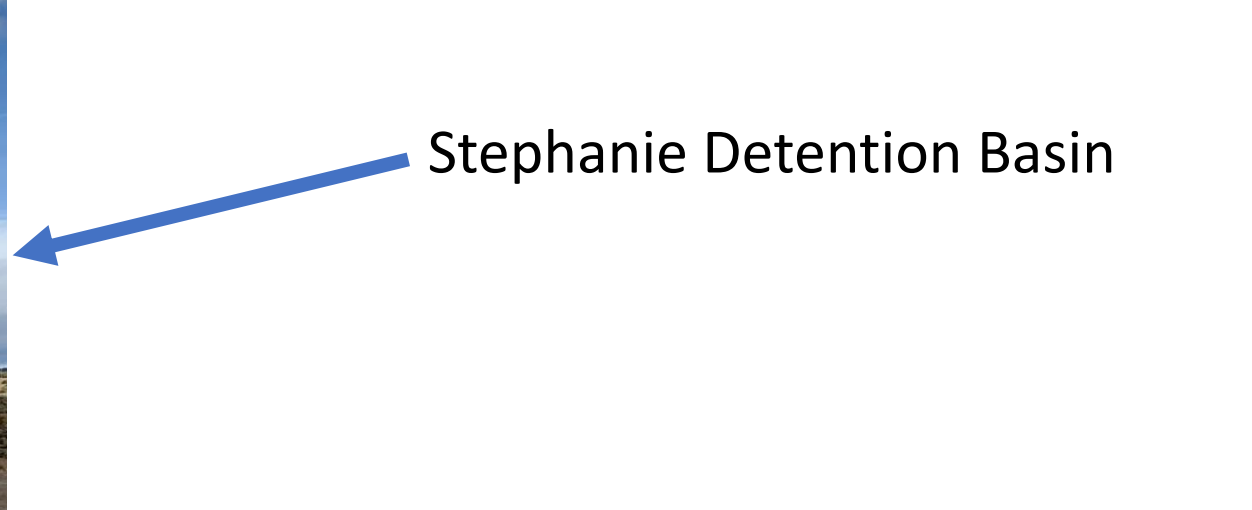


# Johnson Lane Wash

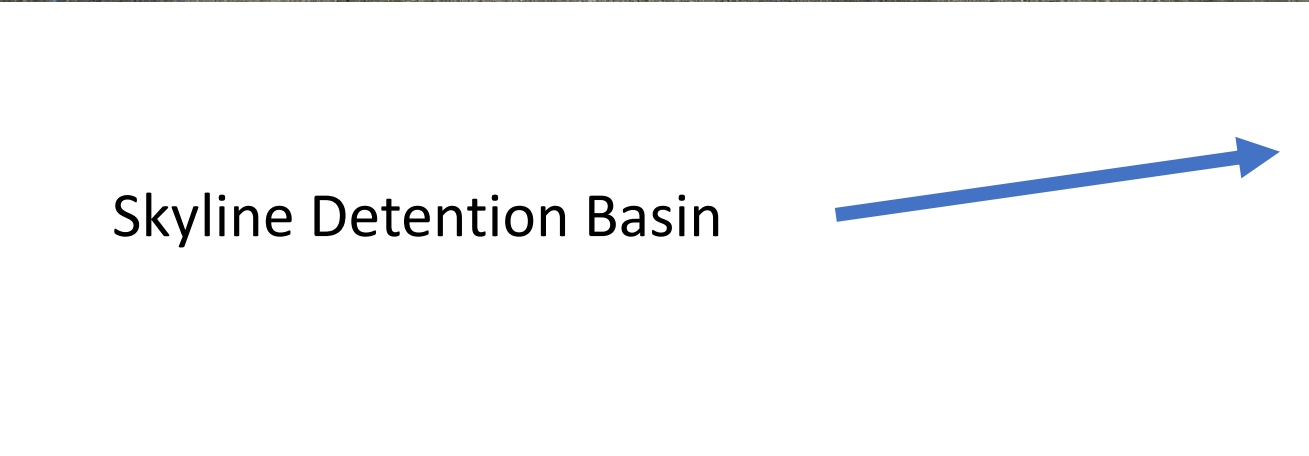


Johnson Lane downstream of Stephanie,  
Romero, Skyline and Chowbuck  
Detention Basins project





Stephanie Detention Basin



Skyline Detention Basin



Irrigation Ditches overflowing from  
diversions in Carson River



## Levee Erosion East Fork Carson River



Downstream of levee is a  
golf course and residential  
neighborhood.



# After all of that...

Board of County Commissioners funded a Stormwater Master Plan to be a proactive approach to manage and control stormwater in the County.









## Douglas County Stormwater Master Plan and Capital Improvement Projects List

- Covers entire County
- Goal is reducing risk of damage and improving water quality
- Organize existing drainage reports
- Provide list of priority projects
- Identify additional areas to study
- Discussion on funding possibilities for identified projects



# Douglas County Stormwater Master Plan

## Watershed Study Areas for Strategic Plan

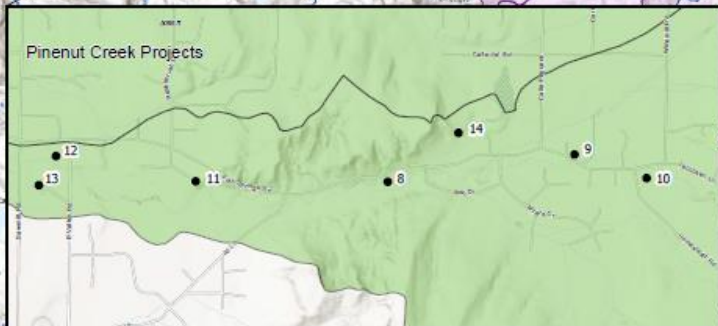
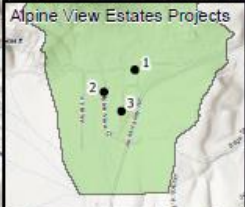
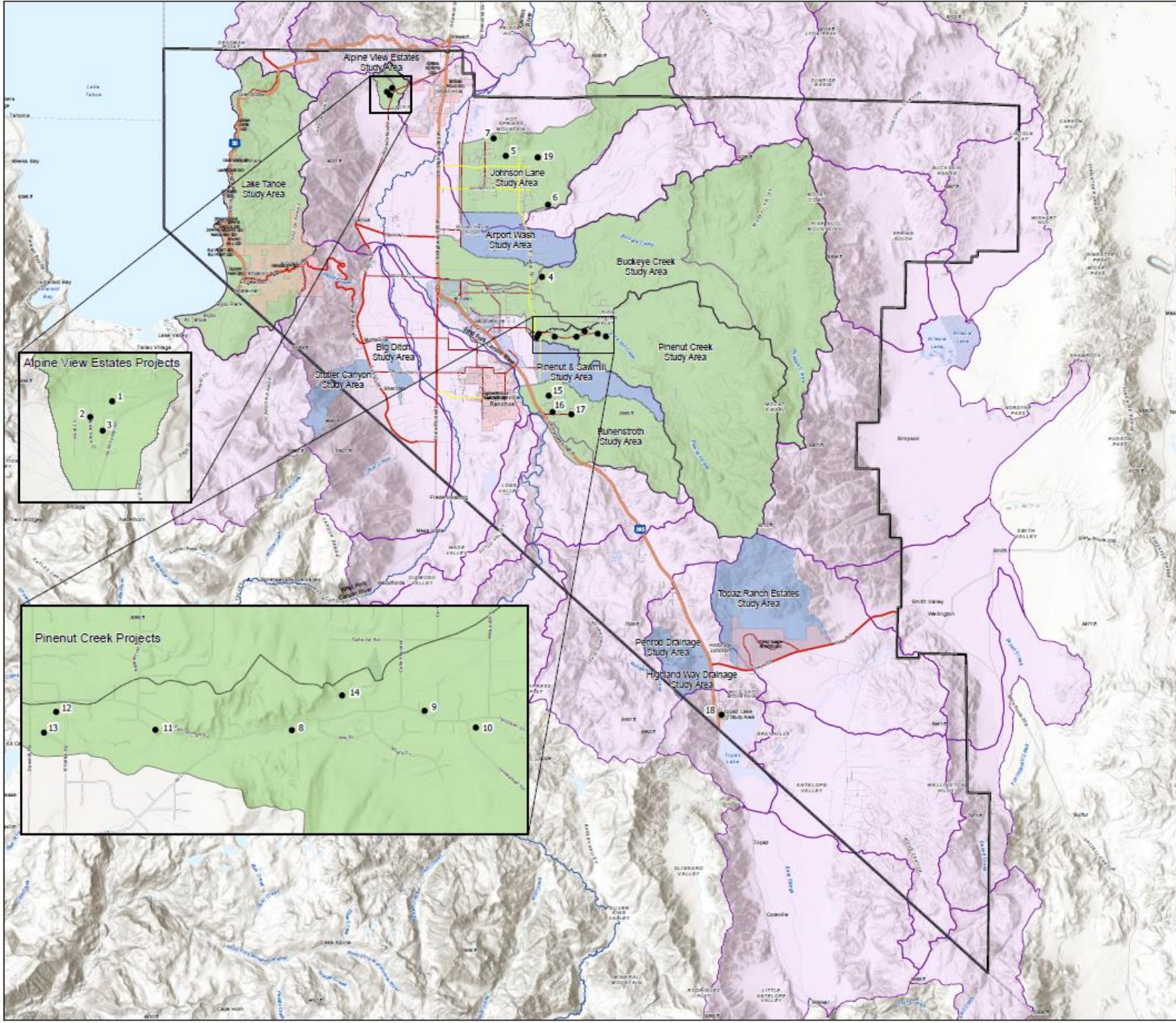
-  Douglas County Boundary
-  USGS Watershed Boundaries
-  Major Rivers
-  General Improvement Districts
-  Towns
-  Studied Watersheds
-  Future Study Watersheds
-  Other Watersheds



Studied Watersheds	Implementing CIPs
Alpine View Estates	✓
Buckeye Creek	
Johnson Lane	✓
Pinenut Creek	
Ruhenstroth	
Topaz Lake	✓
Lake Tahoe	
Future Study Watersheds	Funded
Airport Wash	
Pinenut Road and Sawmill Road Washes	
Topaz Ranch Estates	
Penrod Drainage	
Highland Way Drainage	
Stutler Canyon	
Big Ditch	



Need more information or want to share? Contact Courtney Walker, Stormwater Program Manager at [CWalker@douglasnv.us](mailto:CWalker@douglasnv.us)



**Table 11 – Prioritized list of capital improvement projects**

Rank	Table Heading
1	101 - Rain/Flow gauges
2	7002 - Waterloo Lane Box Culvert at Cottonwood Slough
3	4001 - Fish Springs - Mel/Myers Basins
4	4006 - Fish Springs - Redhawk Basin
5	3004 - Johnson Lane - Pine Nut North (25 yr) (Completed)
6	6001 - Topaz Lake
7	2002 - Buckeye Road 36" pipe/Box culvert (Upper Alleman)
8	5001 - Smelter Creek - Phase 1 Sediment Basin upstream
9	3001 - Johnson Lane - Hot Springs Buckbrush (100 yr)
10	4002 - Fish Springs - Pine Nut Creek Dam
11	5003 - Smelter Creek - Unnamed Tributary, Alternative 1 (25-yr Storm Drain)
12	4003 - Fish Springs -Bently Basins
13	5004 - Smelter Creek - Unnamed Tributary, Alternative 2 (25-yr Basin)
14	5002 - Smelter Creek - Phases 1-8 (25-yr)
15	7001 - East Valley Dip Section (Pine Nut Road)
16	2003 - Crossing at Buckeye Road and Martin Slough
17	4004 - Fish Springs - Janelle Basin
18	3006 - Johnson Lane Wash Dam
19	4005 - Fish Springs -Denmar Basin
20	3005 - Pamela Place
21	3002 - Johnson Lane - Pine Nut South (25 yr).
22	2004 - Buckeye Detention Basin DCSID Site
23	4007 - Fish Springs - Syphus Basin East (upstream) of Alleman Canal
24	2001 - Buckeye Creek Grandview Detention Basin
25	3003 - Johnson Lane - Unnamed Wash A (25 yr)
26	1001 - Alpine View Estates - Bavarian Drive and Zurich Court
27	1003 - Alpine View Estates - Cul-de-sac on Bernese Court
28	1002 - Alpine View Estates - between Bavarian Drive and Jacks Valley Road

**Table 12 – List of prioritized projects by area**

Area	Project Alternative
<b>Tier 1</b>	
Johnson Lane	3004 - Johnson Lane - Pine Nut North (25 yr) (Completed)
Ruhenstroth	5001 - Smelter Creek - Phase 1 Sediment Basin upstream
Buckeye Creek	2002 - Buckeye Road 36" pipe/Box culvert (Upper Alleman)
Fish Spring	4001 - Fish Springs - Mel/Myers Basins
County	101 - Rain/Flow gauges
<b>Tier 2</b>	
Johnson Lane	3001 - Johnson Lane - Hot Springs Buckbrush (100 yr)
Ruhenstroth	5003 - Smelter Creek - Unnamed Tributary, Alternative 1 (25-yr Storm Drain)
Buckeye Creek	7001 - East valley Dip Section (Pine Nut Road)
Fish Spring	4006 - Fish Springs - Redhawk Basin
County	7002 - Waterloo Lane Box Culvert at Cottonwood Slough
<b>Tier 3</b>	
Johnson Lane	3005 - Pamela Place
Ruhenstroth	5004 - Smelter Creek - Unnamed Tributary, Alternative 2 (25-yr Basin)
Buckeye Creek	2003 - Buckeye at Martin
Fish Spring	4002 - Fish Springs - Pine Nut Creek Dam
County	6001 - Topaz Lake
<b>Tier 4</b>	
Johnson Lane	3002 - Johnson Lane - Pine Nut South (25 yr).
Ruhenstroth	5002 - Smelter Creek - Phases 1-8 (25-yr)
Buckeye Creek	2001 - Buckeye Creek
Fish Spring	4003 - Fish Springs -Bently Basins
County	

# Project Prioritization Criteria

- Frequency of Issue
- Level of impact (roads, infrastructure, private property, structures)
- Number of Parcels impacted
- Maintenance Intensity
- Floodplain
- Easements
- Feasibility
- Cost
- Public Agency Coordination/Permitting

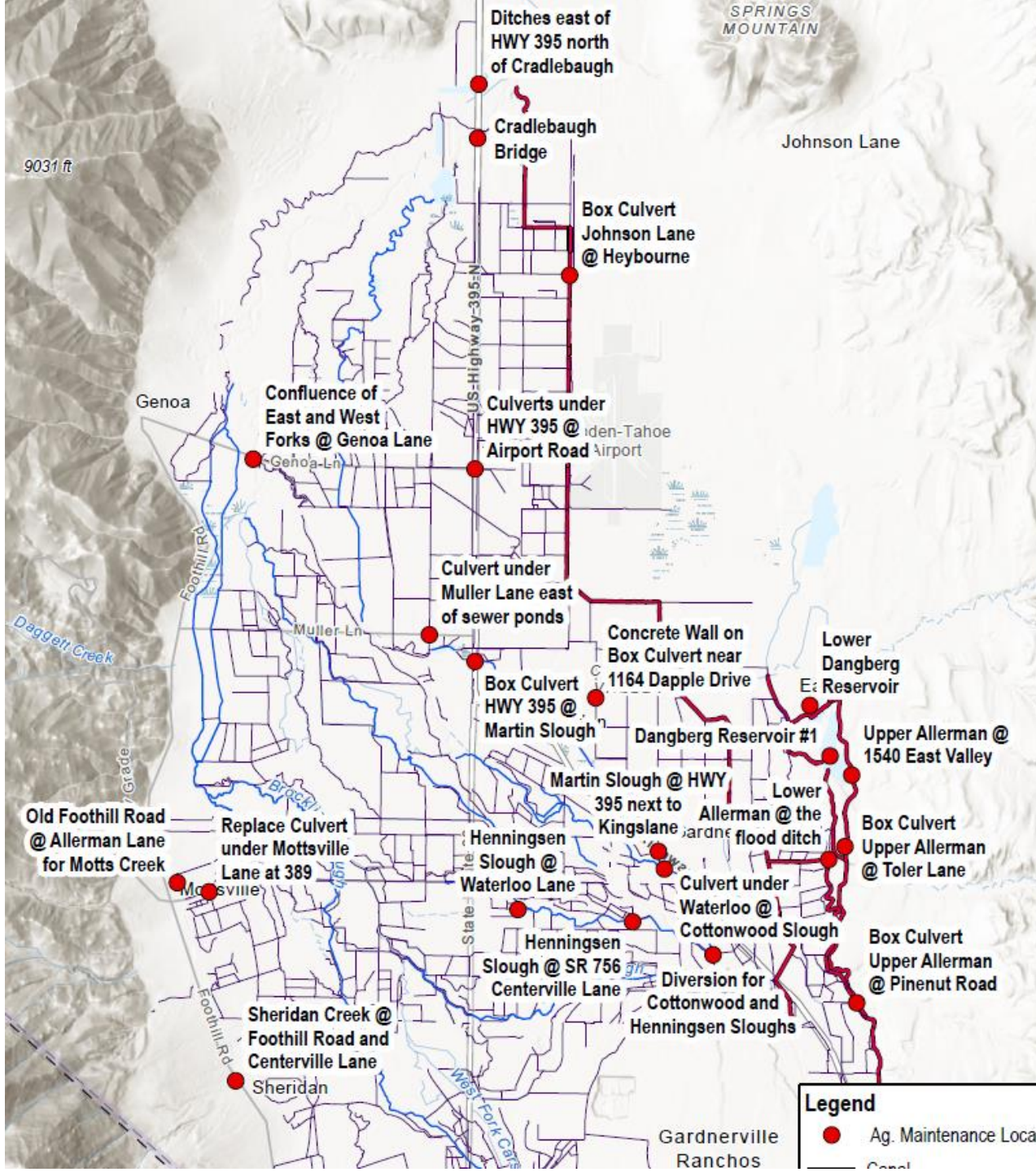


## 4.2.1 East Fork Carson River Levee Issue

Significant riverine flooding in 1997 and again in 2023 raised awareness of the potential failure of a levee structure of unknown origin or ownership. Conflicting opinions of ownership (residents, the Carson Valley Golf Course) resulted in numerous entities contributing to repairing the breached levee in 1997, and again in 2023 to prevent another compromise of this structure that would have flooding of many homes, businesses and roads. The levee is located along the East Fork Carson River adjacent to the Carson Valley Golf Course in the Gardnerville Ranchos. Initial research concluded that the levee was constructed by a rancher in the late 1800's to avoid their fields from being flooded by the river.

Currently there exists a neighborhood that has a subdivision map that dates back to 1965. After the January 1, 1997 flood event, the levee failed, resulting in the severe flooding of several homes in that subdivision. Douglas County, in conjunction with the Carson Water Subconservancy District (CWSD), Nevada Division of State Lands (NDSL), Gardnerville Ranchos GID, and Nevada Division of Environmental Protection worked together to secure funds to perform emergency repairs on the levee prior to the spring melt off that year. In addition, some homeowners were able to structurally raise their homes out of the floodplain. Research shows that repairs were made once again in 2005-06 to repair the compromised levee once again due to damage caused by the high sustained flows on the Carson River. The levee was once again repaired in January 2024 due to sustained high flows during the 2022-23 winter runoff.





Name	Description
Box Culvert HWY 395 @ Martin Slough	Keep culvert clear, NDOT maintained.
Box Culvert Johnson Lane @ Heybourne	Maintenance of box culvert for Heybourne ditch irrigation channel.
Box Culvert Upper Allerman @ Pinenut Road	Maintenance of box culvert on Pinenut Road @ Upper Allerman canal.
Box Culvert Upper Allerman @ Toler Lane	Maintenance of box culvert for Pinenut Creek flows on Toler Lane @ Upper Allerman canal.
Concrete Wall on Box Culvert near 1164 Dapple Drive	Install concrete wall on box culvert to ensure irrigation waters continue north under Buckeye, anything higher than irrigation flows (flood waters) can flow to the north and the west.
Confluence of East and West Forks @ Genoa Lane	Maintenance by NDOT.
Cradlebaugh Bridge	Upsize bridge, NDOT maintained.
Culvert under Muller Lane east of sewer ponds	Keep culvert clear.
Culvert under Waterloo @ Cottonwood Slough	Keep culvert clear and upsize crossing.
Culverts under HWY 395 @ Airport Road	Upsize and keep clear. NDOT maintained.
Dangberg Reservoir #1	Perform maintenance to increase capacity of Dangberg Reservoir #1.
Ditches east of HWY 395 north of Cradlebaugh	Clean ditches on private property.
Diversion for Cottonwood and Henningsen Sloughs	Keep diversion structure clear of debris.
Henningsen Slough @ SR 756 Centerville Lane	Clean culvert under SR 756 (maintained by NDOT).
Henningsen Slough @ Waterloo Lane	Keep culvert clear. County maintained.
Lower Allerman @ the flood ditch	Rock and dirt work to stabilize the diversion structure.
Lower Dangberg Reservoir	Restore the lower Dangberg Reservoir so that it can be used for flood water storage.
Martin Slough @ HWY 395 next to Kingslane	Keep box clear of debris.
Old Foothill Road @ Allerman Lane for Motts Creek	Keep culvert clear.
Replace Culvert under Mottsville Lane at 389	Culvert replacement under Mottsville at 389
Sheridan Creek @ Foothill Road and Centerville Lane	Culvert maintenance. NDOT maintained.
Upper Allerman @ 1540 East Valley	Upper Allerman canal needs to be restored so that it can flow to the north around the Dangberg Reservoir instead

## 5.2 Irrigation Network and Facilities

Somewhat unique to the Carson Valley is an irrigation ditch network developed over 150 years ago to provide access to the river water in the newly settled lands in the County. These ditches divert water from the Carson River through an integrated network of canals, sloughs, and ditches that spider-web across the Carson Valley. These ditches were designed to convey a certain amount of flow based on Alpine<sup>2</sup> decreed water rights from the Carson River. However, as the towns of Minden and Gardnerville grew around the ditches and farmlands, stormwater runoff was captured and conveyed into this drainage network. When the ditches and culverts are already at conveyance capacity either during the irrigation season or after storms, additional stormwater runoff can overwhelm them, causing localized flooding and road closures due to the systems backing up. Sediment and debris entrained in the runoff fills in the drainage capacity of the ditches and impairs the control structures and causes culverts and pipes to clog and flood roads and other drainage facilities. The impact of this encroachment



## 6.4 Additional Stakeholder Coordination

Douglas County was established as a farming and ranching community over 150 years ago. While in many communities in the western United States the use of the irrigation ditches has become a way of the past, their importance in the Carson Valley is still just as strong today. However, there are now competing interests for water, unintended uses of the ditches to convey stormwater, and access and maintenance issues due to encroachment by new development and growth in the County. Regional growth has also brought state highways, resulting in criss-crossing of roads, and public or private drainage infrastructure. Effective communication and coordination must be maintained before, during and after flood events to ensure safe passage through the community and flooding is not exacerbated. The following are steps that can be taken to improve or solidify these relationships.

- NDOT MOUs – County agrees to perform maintenance and bills NDOT for work done
- Irrigation Ditch Companies - Formalize an agreement where the County works with the ditch company and water rights landowners to maintain infrastructure
- Levee Stakeholders – CVCD, Gardnerville Ranchos, Golf Course, NDOT. Establish a working relationship for involved stakeholders to take ownership and responsibility for the levee. Decide on a formal agreement for long-term maintenance.

A scenic view of a river with large boulders and people swimming in the water under a clear blue sky. The river is surrounded by lush green trees and bushes. Several people are visible in the water, some standing on the rocks and others swimming. The water is clear and reflects the surrounding greenery.

# Questions?

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