The West Fork Carson River
"Vision" Watershed Water Quality Problem Statement

The Lahontan Regional Water Quality Control Board (Water Board) has identified that over 75% of the West Fork Carson River has pollutants at levels that exceed protective water quality standards. This requires the development of a Total Maximum Daily Load (TMDL) or recognition that some other regulatory program(s) will address the impairment instead of a TMDL. In 2013, the U.S. Environmental Protection Agency (USEPA) announced a new collaborative framework for implementing the Clean Water Act (CWA) Section 303(d) program called the *Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program* (The Vision). The Vision provides flexibility in using available tools beyond TMDLs to attain water quality restoration and protection. In 2015, the Water Board staff identified the West Fork Carson River as one of two "Vision Watersheds" to be addressed by 2022 and is developing a Vision Project Plan (Vision Plan) to guide restoration and protection efforts in the watershed. Collaboration and partnerships with stakeholders in the watershed will be integral to the Vision Plan.

Watershed Description

The West Fork Carson River originates in the Toiyabe National Forest at approximately 9,000 feet. It is fed from Lost Lakes in the Sierra Nevada Mountain Range, flows through Alpine County, and then crosses the Nevada Stateline. In Nevada, it joins the East Fork Carson River to form the main stem Carson River and terminates in the Carson Sink, near Fallon. In California, the West Fork Carson River watershed includes 67,760 acres of land and over 25 miles of river. Land use consists of 86.5% evergreen forest land, 7.6% shrub and brush Rangeland, and less than 1% of the following: bare exposed rock, cropland and pasture, deciduous forest land, lakes, mixed forest land, mixed rangeland, other agricultural land, reservoirs and residential.

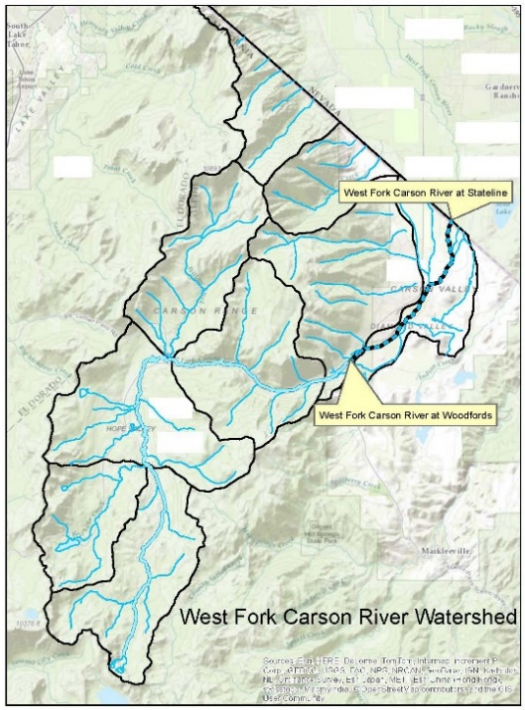

Figure 1: West Fork Carson River and surrounding watershed, Alpine County, CA

Water Quality Standards

The Water Quality Control Plan for the Lahontan Regional (Basin Plan) established water quality standards (beneficial uses and water quality objectives) for the West Fork Carson River as two separate reaches: West Fork Carson River at Woodfords (upper reach) and West Fork Carson at Stateline (lower reach).

The upper reach is designated for the following beneficial uses: Municipal (MUN), Agricultural Supply (AGR), Industrial Service Supply (IND), Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Recreation (REC-2), Commercial and Sportfishing (COMM), Cold Freshwater Habitat (COLD), Wildlife Habitat, Rare, Threatened, or Endangered Species (RARE) and Spawning, Reproduction, and development (SPWN). In addition to MUN, AGR, IND, GWR, REC-1, REC-2, COMM, RARE and SPWN, the lower segment is also designated for the following beneficial uses: Freshwater Replenishment (FRSH), Navigation (NAV) and Hydropower Generation (POW). In addition to the water quality objectives which apply to all surface waters within the Lahontan Region, the Basin Plan includes site-specific objectives for the West Fork Carson River (see page 3-3 of the Basin Plan). Site specific objectives for the West Fork Carson River are listed below:

Table 1 - Site Specific Objectives (mg/L)*

Surface Waters	TDS	Cl	SO4	Total P	B	Total N	TKN	NO3-N
West Fork Carson River at Woodfords (upper reach)	55	1.0	2.0	0.02	0.02	0.15	0.13	0.02
West Fork Carson River at Stateline (lower reach)	70	2.5	2.0	0.03	0.02	0.25	0.22	0.03

*Mean of monthly mean for the period of record

Water Quality Impairments

The Water Board is required to routinely assess water quality monitoring data for the Region's surface waters to determine if they contain pollutants at levels that exceed protective water quality standards. Waters with pollutants that exceed protective water quality standards are placed on the State's Clean Water Act 303(d) List. The 2012 CWA 303(d) List included the West Fork Carson River for exceedances of several analytes. For listing purposes, exceedances in the 25 miles of the West Fork Carson River were divided into three segments. The following table includes those segments, listings, and impairments:

Table 2 - Water Quality Segments, Listings and Impairments

Segment	**Assessed Area**	**Listings**	**Beneficial Uses Impaired***
Carson River, West Fork (Headwaters to Woodfords)	19 miles	Chloride, Nitrate, Nitrogen, Phosphorus, Sulfates, Total Dissolved Solids, Turbidity	Cold Freshwater Habitat (COLD)
Carson River, West Fork (Woodfords to Paynesville)	3.7 miles	Chloride, Fecal Coliform, Nitrate, Nitrogen, Sulfates, Total Dissolved Solids, Turbidity	Cold Freshwater Habitat and Water Contact Recreation (COLD and REC-1)

Carson River, West Fork (Paynesville to State Line)	2.4 miles	Fecal Coliform	Water Contact Recreation (REC-1)

*These are the current beneficial use impairments listed in the integrated report. Additional beneficial use impairments may be determined after a more complete data assessment to be done as part of the Vision Project.

Defining Reaches for Assessment Purposes

Since the 2012 CWA 303 (d) List, in consideration of new data, and to ensure accurate and efficient assessment of the health of the waters in the West Fork Carson River, Water Board staff has further divided the river segments. Moving forward, the new segmentation of the river will allow for a scientific assessment of water quality as it relates to land-use and available data. It will allow staff to develop the Vision Plan in a watershed-wide, holistic approach. The new segments are listed in the table below:

Table 3 - Newly Defined Segments

New Waterbody Segment for CWA 303(d) 2018 Listing Cycle	Old Segment from 303(d) 2012 Listing Cycle	Begin/End of New Segment
Carson River, West Fork (Headwaters to Hope Valley)	Carson River, West Fork (Headwaters to Woodfords)	Headwaters to end of Hope Valley
Carson River, West Fork (Hope Valley to Woodfords)	Carson River, West Fork (Woodfords to Paynesville)	End of Hope Valley to Woodfords
Carson River, West Fork (Woodfords to Stateline)	Carson River, West Fork (Paynesville to Stateline)	Woodfords to CA/NV Stateline

Once a waterbody is placed on the CWA 303(d) List, the development of a TMDL or some other regulatory program(s) to address the impairment is required.

Historic (Legacy) and Current Land Use Impacts on Water Quality

The upper reach of the West Fork Carson River begins at the Faith Valley Meadow complex, then flows along and crosses Blue Lakes Road and Highway 89 before eventually reaching the Town of Woodfords. Several meadow sections throughout this reach have high, unstable banks and incised channels leading to over-banking only during very high flows. Some factors that could have led to these conditions are channel straightening, constrictions by bridges or rangeland livestock grazing. Many of these meadows could be impacted by legacy grazing that took place between 1850 and 1980. Parts of the river close to the road, including bridges could also have water quality impacts from abrasives used for winter road maintenance that are delivered to the river. Heavy erosion also occurred during the 1997 flood. Today, the most dominant land uses include recreation, camping, fishing and winter activities.

The lower reach of the West Fork Carson River from Woodfords to the Nevada state line is primarily dominated by pastureland and rural residences. There are several water diversions that deliver irrigation water to pasture lands. Some pastures are irrigated with treated wastewater effluent supplied by South Tahoe Public Utility District. Irrigation and irrigation return flow using diverted surface water or treated wastewater have potential water quality impacts.

Sources of phosphorus loading in the West Fork Carson River may include eroded sediment from streambanks, road and highway maintenance, construction sites, forest fires, storm water runoff and atmospheric deposition. Possible sources of nitrogen are septic systems, erosion, storm water, agricultural storm water, historic livestock grazing, treated effluent supplied for irrigation and natural nitrogen fixing by plants and soil bacteria. One likely source of fecal coliform is livestock waste. Other possible sources include wildlife, septic systems and recreational users of the watershed. Chloride, sulfate, total dissolved solids (TDS), and turbidity are likely caused by sources similar to the erosion factors mentioned above.

Information Sources

Alpine Watershed Group and the Sierra Nevada Alliance, 2004. Upper Carson River Watershed Stream Corridor Condition Assessment.

2012 California Integrated Report (Clean Water Act Section 303 (d) List/ 305 (b) Report). Available on the Internet: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2012.shtml

Water Quality Control Plan for the Lahontan Region (Basin Plan). Available on the internet: http://www.waterboards.ca.gov/rwqcb6/water_issues/programs/basin_plan/references.shtml

Unsicker, J., 2001. Water Body Fact Sheets for 2002 Section 303 (d) List Update Lahontan Region: West Fork and East Fork Carson River Hydrologic Units.

Electronic Water Rights Information Management System, 2016. EWRIMS.LandUseState GIS Layer provided by State Water Resources Control Board. This data set depicts land use and land cover from the 1970s and 1980s and has been previously published by the U.S. Geological Survey (USGS) in other file formats.