

Background

- The defined Chalk Creek watershed drains 2,963 acres (4.6 square miles) in northwest Reno, and discharges to the Truckee River.
- Chalk Creek is a source of elevated total dissolved solids (TDS), total nitrogen (TN), and total phosphorus (TP) to the Truckee River, a river with established total maximum daily loads (TMDLs) for these same constituents. Chalk Creek has:
 - TDS 2,663 mg/L (Truckee 67 mg/L)
 - TN 3.4 mg/L (Truckee 0.32 mg/L)
 - TP 0.35 mg/L (Truckee 0.03 mg/L)
- Chalk Creek is listed on NDEP's 303d list of impaired water bodies for sulfate, ortho-phosphorus, TDS, and selenium.
- Any improvement of Chalk Creek water quality will benefit Truckee River water quality and Truckee Meadows Water Authority (TMWA).

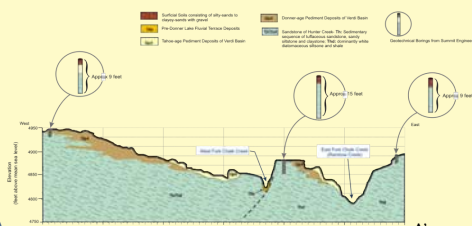
Chalk Creek Watershed Characterization

Christine Johnson and Michael Derby - GIS Specialists

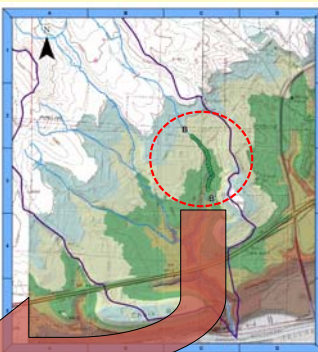
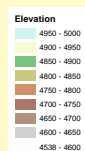
Molly Reeves and Matthew Setty - Project Scientists

Software: ArcGIS 9.3, Spatial/3D Analyst; AutoCAD MAP/Civil 3D

Chalk Creek Schematic Cross Section

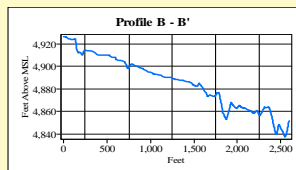


Geology



Geomorphology

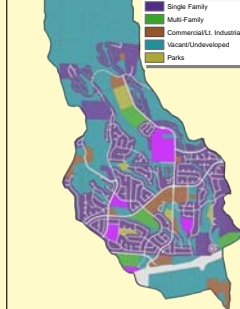
Channel Section for Longitudinal Profile



Watershed Delineation

The watershed is delineated utilizing topographic contours in conjunction with a shapefile of the stormwater drain system provided by the City of Reno. JBR clipped the data to the vicinity of the watershed and delineated the outline of the watershed boundary based upon the stormwater drain collection system, to either include or exclude developed areas that discharge storm runoff into or out of the watershed.

Land Use	Total Acres	Impervious Acres	Previous Acres	Irrigated Previous Ac.
Single Family Residence	659	198	461	461
Multi-Unit Residence	81	58	23	23
Commercial/LEI	107	96	11	11
Industrial	79	45	34	34
Schools	43	4	39	0
Parks	1711	0	1711	0
Vacant/Undeveloped	283	283	0	0
Roads	293	283	0	0
Total	2963	684	2279	568



The Chalk Creek Watershed is delineated to be 2,967 acres. As seen in the figure, 42 percent of the watershed area is developed, the majority of which will remain undeveloped. Development has left the watershed 23 percent impervious (684 acres) and 77 percent pervious (2,279 acres). Spatial analysis methods calculate that approximately 568 acres (19 percent) within the watershed is irrigated lawn and ornamental vegetation. The impervious surface estimates for each land use category were determined empirically by utilizing aerial photograph interpretation in conjunction with the parcel database; which includes lot size, dwelling footprint, and number of dwellings. Additional constructed land coverages (driveways, patios, sidewalks, pools and spas) are averaged by random sampling. The shapefile obtained from Washoe County representing the street centerlines is clipped to the watershed boundary and a calculated average street width of 52 feet is assigned. The limited number of schools and churches within the watershed allowed the percentage of impervious surface vs. lot size to be digitized for area calculations.

Land Use

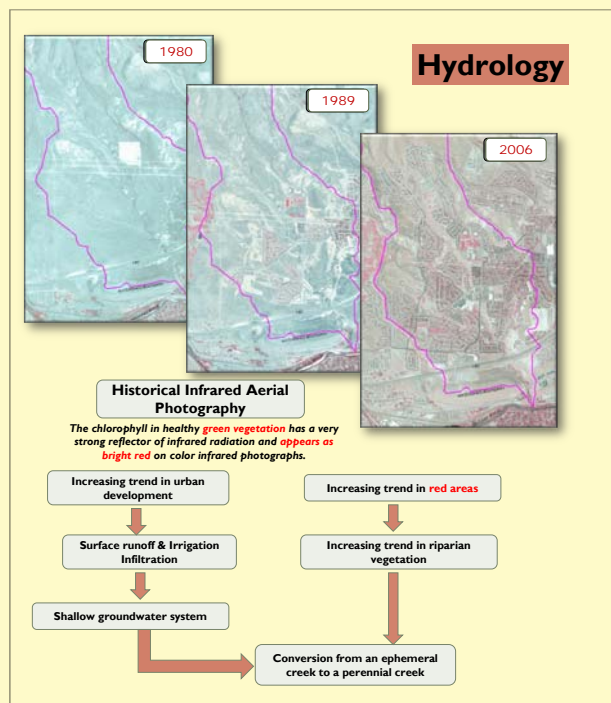
Water Usage

Drinking water in Chalk Creek Watershed is supplied by the Truckee Meadows Water Authority (TMWA), a non-profit, community owned utility. By overlaying the watershed boundary onto a TMWA water use model with water meter data, TMWA estimates an annual water demand of 887 million gallons for the watershed. Year-round base load for the watershed is approximately 296 million gallons, which is indoor use. Approximately 591 million gallons of this are outdoor use between April and October, with a peak use during the hottest summer months. Residential customers account for 85 percent of the outdoor use, with the balance being commercial, multi-family, school, and park irrigation.

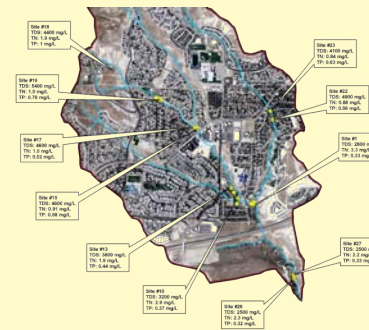
Chalk Creek Objectives

- Identify flow inputs to Chalk Creek
- Identify sources of TDS
- Identify sources of nutrients
- Evaluate mitigation measures to reduce TDS and nutrient loading
- Improve geomorphology and habitat
- Reduce TDS and nutrient loading to the Truckee for the benefit of the non-point source reduction of the Truckee River TMDL.

Hydrology



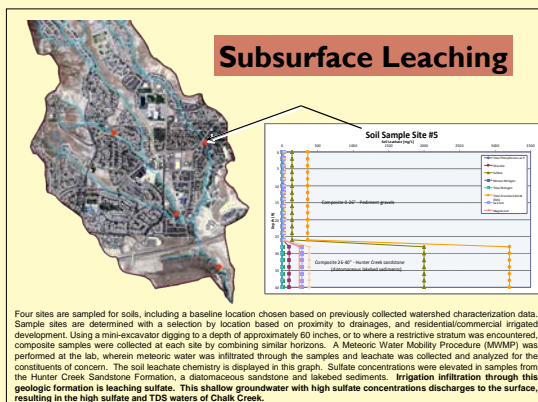
Water Quality



WHAT'S NEXT?

- Watershed modeling
- Design and Recommend mitigation for water quality and geomorphic treatments
- Phase I construction/plantings

Subsurface Leaching



Four sites are sampled for soils, including a baseline location chosen based on previously collected watershed characterization data. Sample sites are determined with a selection by location based on proximity to drainages, and residential/commercial irrigated development. Using a mini-excavator digging to a depth of approximately 60 inches, or to where a restrictive stratum was encountered, composite samples were collected at each site by combining similar horizons. A Meteoric Water Mobility Procedure (MWMP) was performed at the lab, wherein meteoric water was infiltrated through the samples and leachate was collected and analyzed for the constituents of concern. The soil leachate chemistry is displayed in this graph. Sulfate concentrations were elevated in samples from the Hunter Creek Sandstone Formation, a diatomaceous sandstone and lakebed sediments. Irrigation infiltration through this geologic formation is leaching sulfate. This shallow groundwater with high sulfate concentrations discharges to the surface, resulting in the high sulfate and TDS waters of Chalk Creek.