Development of web based hydrologic visualization tool for the Carson Basin



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USGS Studies in the Carson River Basin

- Evaluating the effects of groundwater management options on water resources in the Carson Valley.
- Evaluation of water use in the Middle Carson River streamflow, effects of climate change and future growth on inflows to Lahontan Reservoir
- Stream capture analysis and development of capture tool
- Integrated water availability and migratory bird assessment for terminal lakes (Carson Lake, Sink, and Stillwater National Wildlife Refuge)
- Water levels, arsenic, nitrate trends and development of Carson Basin Hydromapper





Study Objectives and Tasks

This study involves 1) document trends in water levels, arsenic and water levels (USGS/ NDWR) in Carson Valley, 2) **develop an online data visualization tool for real-time and discrete data**

- Task 1: Assemble Water Levels, Arsenic and Nitrate Data
- Task 2: Monitoring Well Network Assessment
- Task 3: Carson Basin Hydro Mapper
- Task 4: Documentation



Background

Wells with elevated nitrate are in areas with highest septic system density

Low nitrates in agricultural areas except for areas near residential development







Water quality and Water Levels





Deepened

Deepened and replaced well

Source: Nevada State Engineers Database



feel

Tracking Water Quality and Water Levels

Real-time basin specific hydrologic data visualization tool

Walker Basin



https://webapps.usgs.gov/walkerbasinhydromapper/#home

Streamflow Diversions Lake and Reservoir Stage Water Accounting



Lake Tahoe



https://webapps.usgs.gov/tahoe/

Streamflow Nutrient Loads Sediment Loads Lake Stage Water Year Comparison Tool

Carson Basin



Streamflow Groundwater Levels Nitrate Arsenic Reservoir Stage

Why it's Needed



Visualization of hydrologic data, past and present will give agencies and the public improved understanding of processes and knowledge of conditions



Carson Basin Hydromapper





Additional content





Base map options



Hydrology option- "Rivers"





Access to Water Quality Data



Legend

Facility





USGS Real-time streamflow and reservoir Levels





Groundwater Monitoring

USGS wells



NDWR wells





Groundwater Hydrographs

USGS Data



🔿 1 year 🔘 10 years 🔿 Period of record



NDWR Data







Display Historic vs Recent Data

Arsenic data 1954 to 2021



Arsenic data since 2020



Less than 5

Atmospheric
Facility

5 to 9.9
10 to 50
Greater than 50
SHAPE - SITE TYPE
Surface-Water

Groundwater
Spring

Use slider to display given years



Compare well with basin-wide observations

Arsenic from 1954 to 2021



Nitrate from 1954 to 2021



High values of Arsenic – Surface Water

SUSGS Carson River Hydro Mapper

Overview SLayers II ELegend 2 Tools

Layers 📚



- 10 to 50
- Greater than 50

Atmospheric

Facility

SHAPE - SITE TYPE



- Groundwater
- Spring



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NIDIS

Data Sources SUSGS

Snow depth observations



12/05/2022







4/17/2023





Snow depth and surface water observations

1

19.7156



Data Source: National Weather Service - Nationa

Streamflow



Streamflow below Lahontan





Current Drought Conditions





Wildland Fire coverage





Next Steps

- Development of additional features to plot USGS and NV DWR water level data - Lasso Tool
- Graphs displaying time-series of nitrate data in active wells for Carson Valley
 - Separate visualization
- USGS Peer Review completed
 - Under revision
- Development of website with background information on the scope of the hydromapper
- Will be made publicly available in 2023

