

Science to Sustain At-Risk Terminal Lakes

The Walker Project



Progress Report To Walker River Paiute Tribe

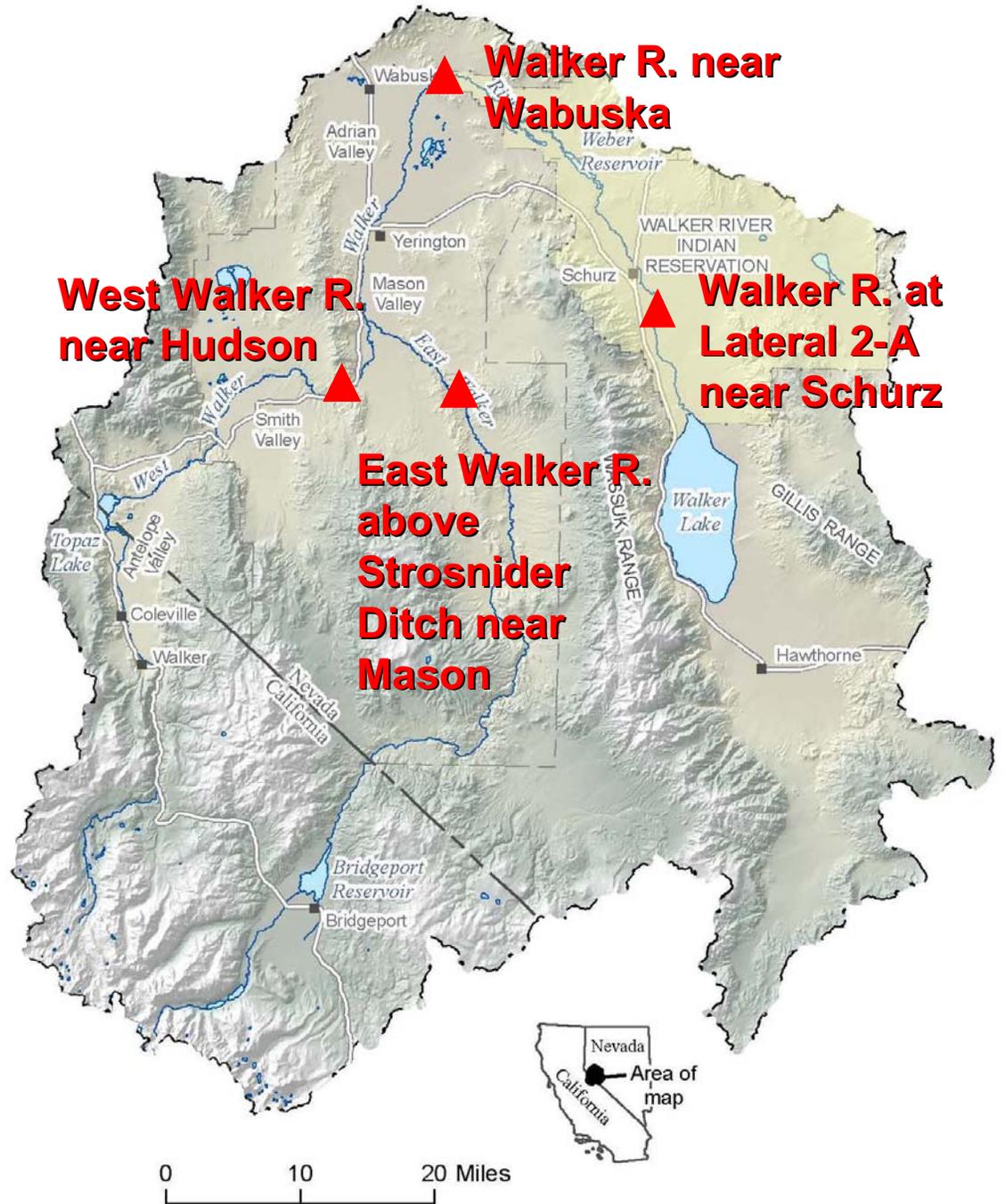
August 25, 2005

By

Project Hydrologist: Kip K. Allander

Project Chief: Thomas J. Lopes

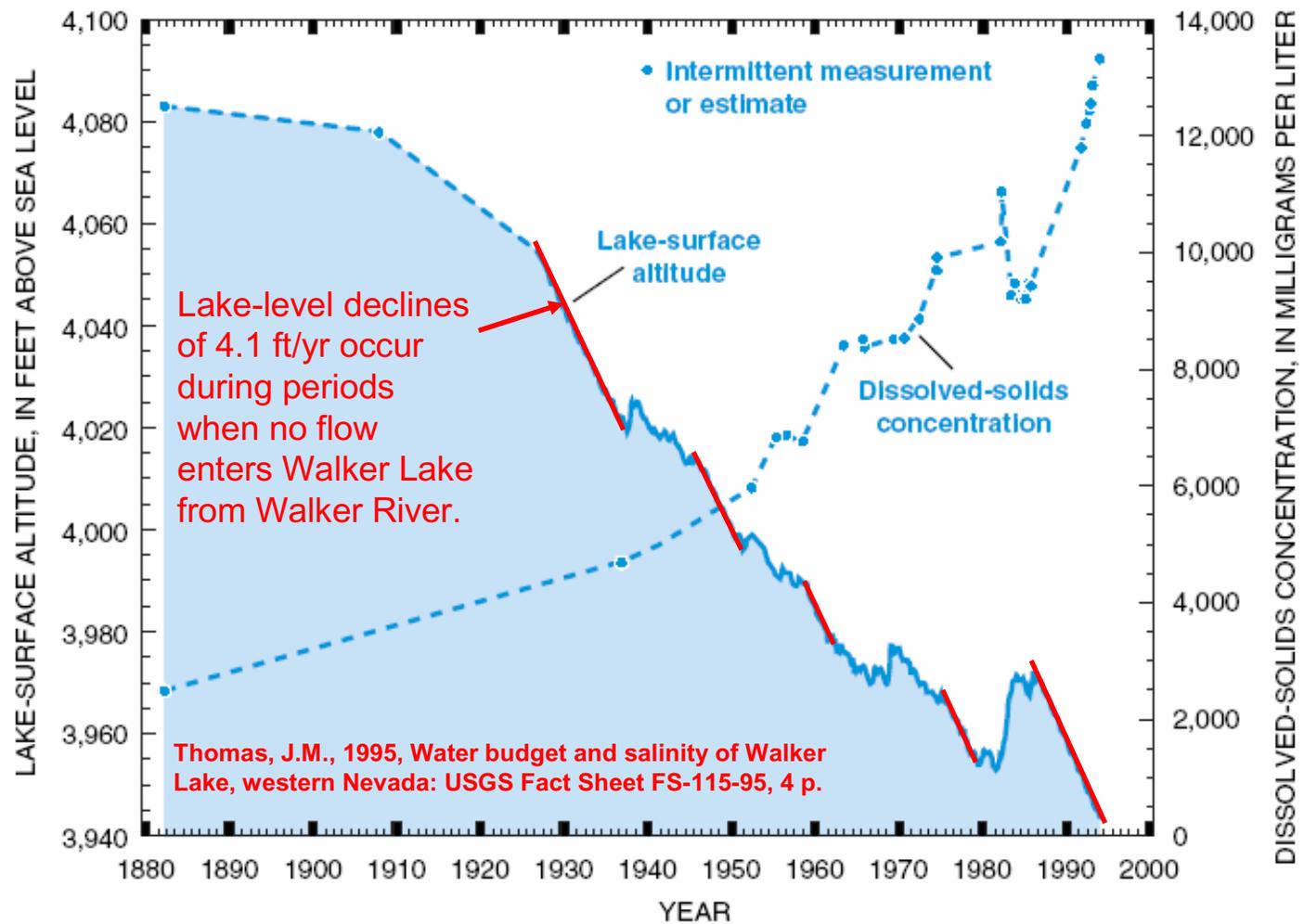
Location of Walker River Basin



Overview

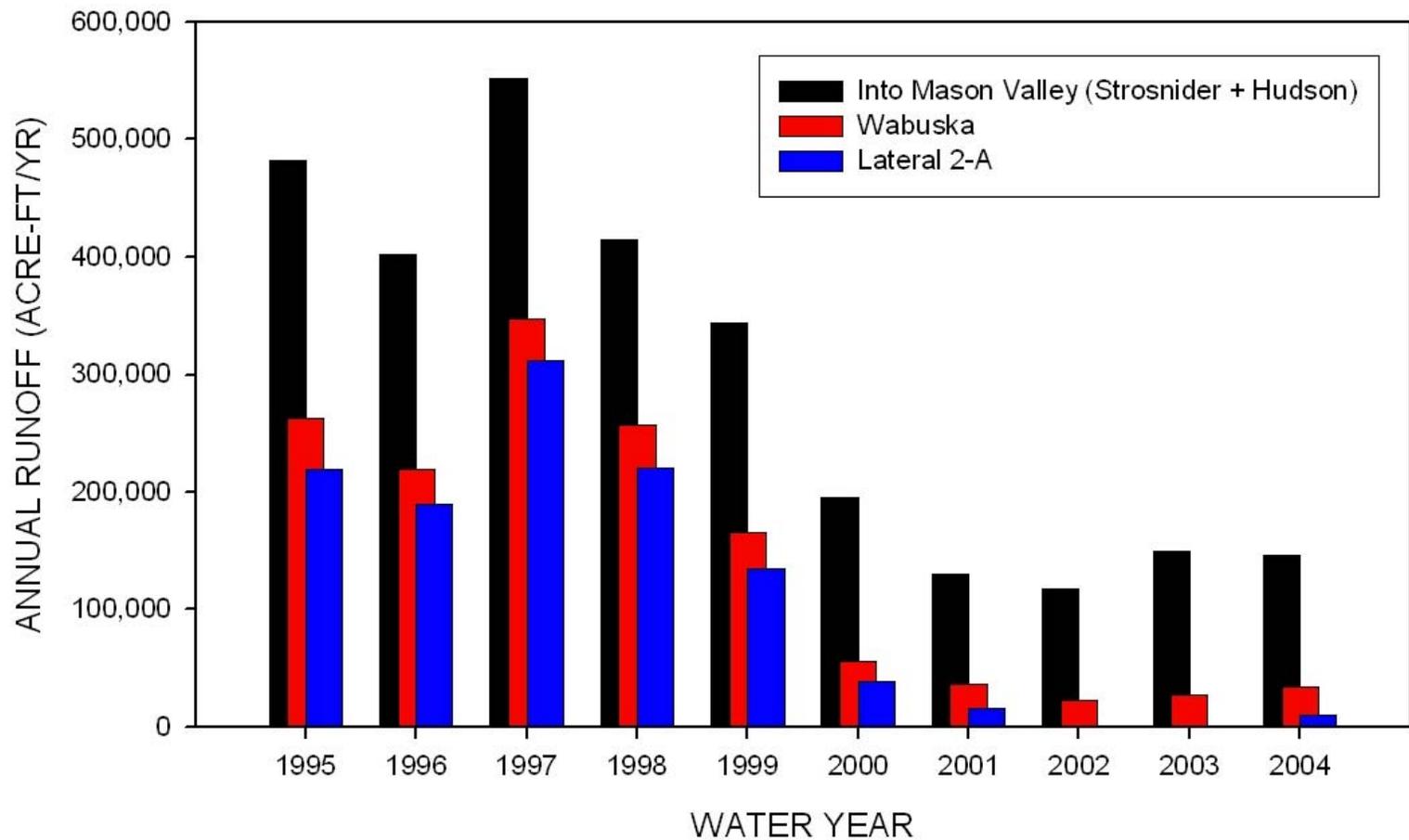
- Problem
- Purpose and objectives of project
- Status of activities and accomplishments
- Plans for upcoming year

Walker Lake Salinity



Walker River Streamflow

Annual runoff for select locations along Walker River.



Objectives

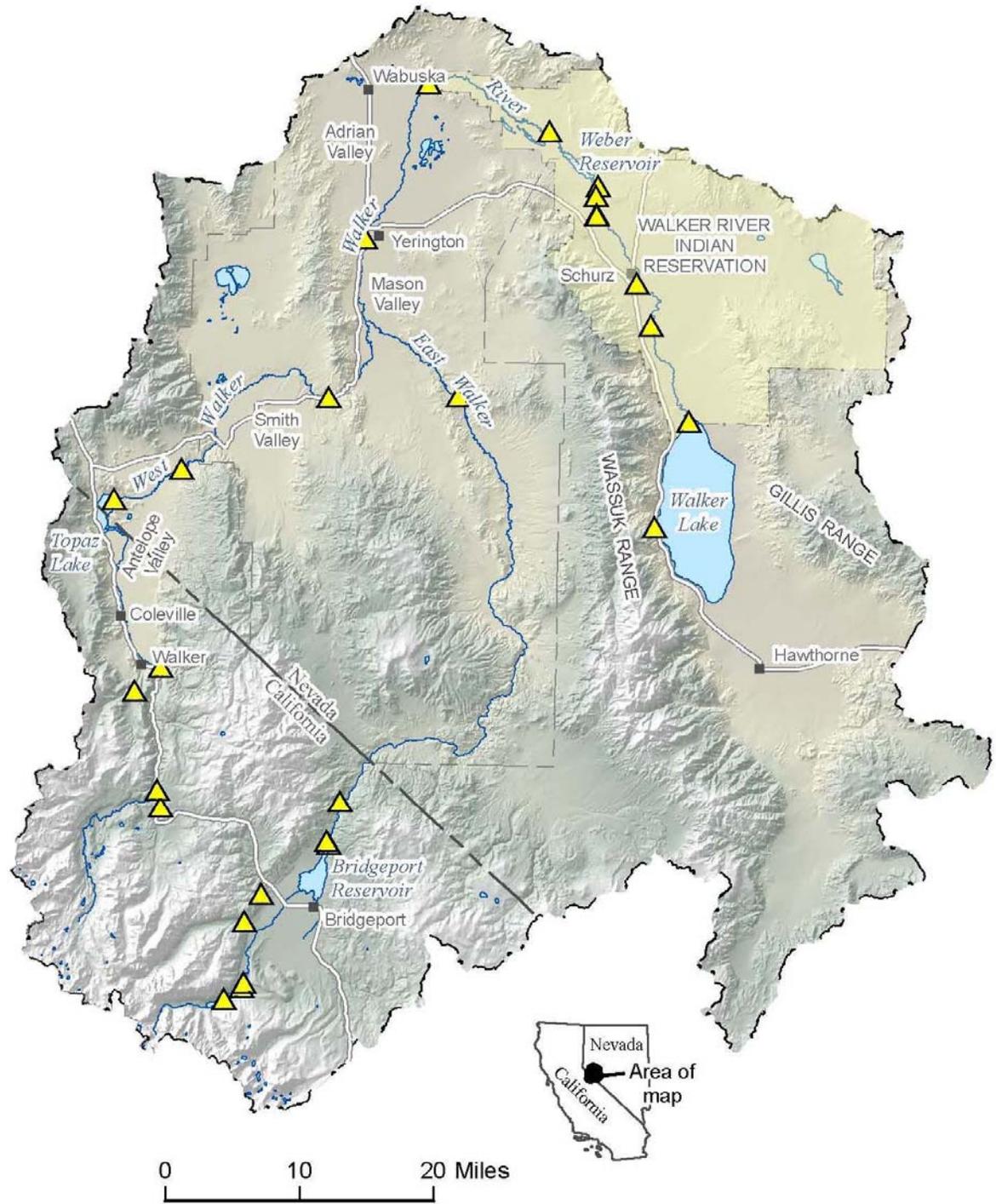
- Better quantify streamflow in the Walker Basin
- Estimate evapotranspiration losses from the lake and natural and agricultural vegetation
- Develop an improved water budget for Walker Lake
- Develop a model to predict how changes in upstream irrigation practices would affect flows into Walker Lake

Accomplishments

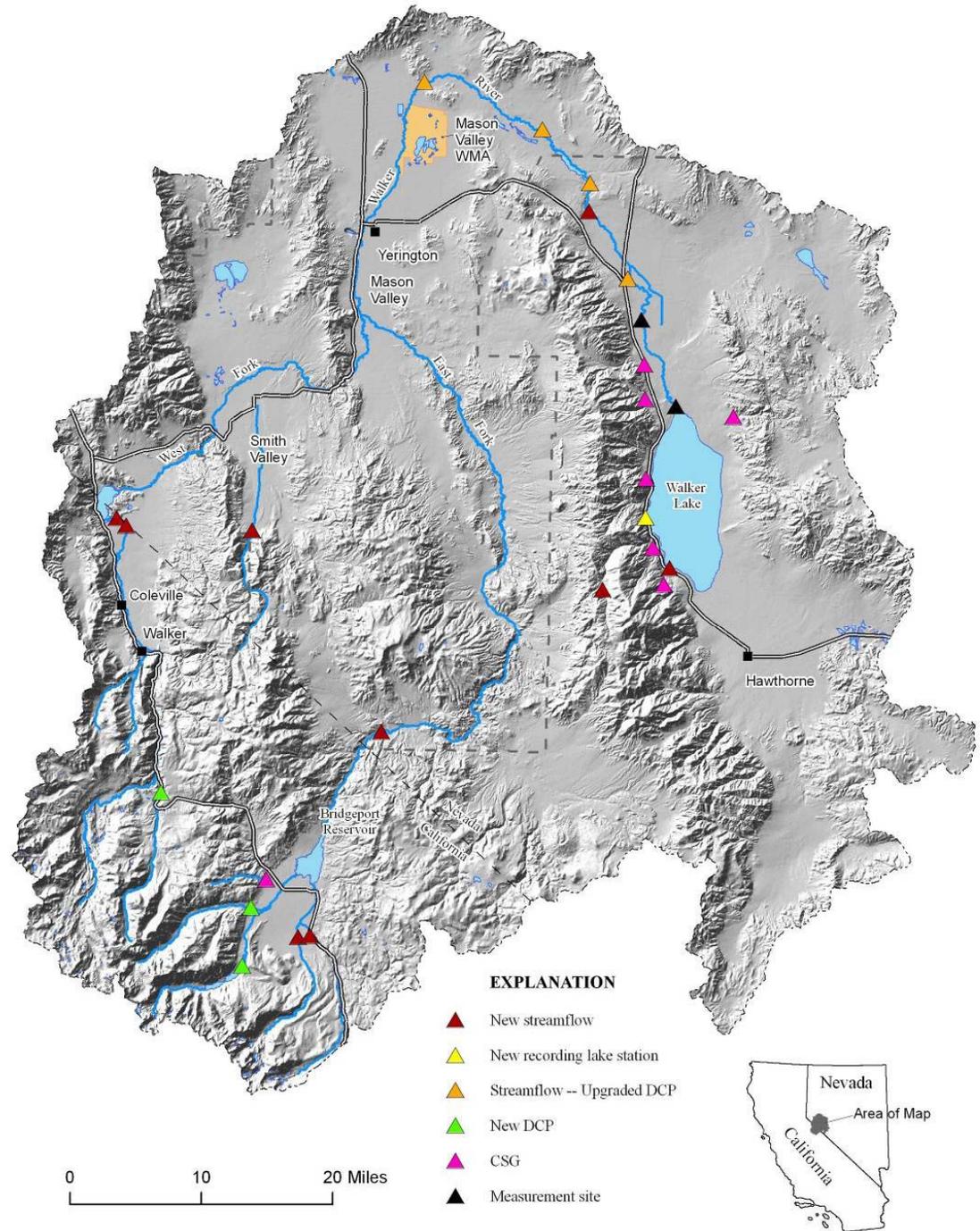
- Surface-Water (SW) network
- Ground-Water (GW) network
- Evapotranspiration (ET) network
- Mapping
- Web Site

SW Network

▲ SW Sites



SW Network -upgrades



New Stream Gages

Green Ck near Bridgeport



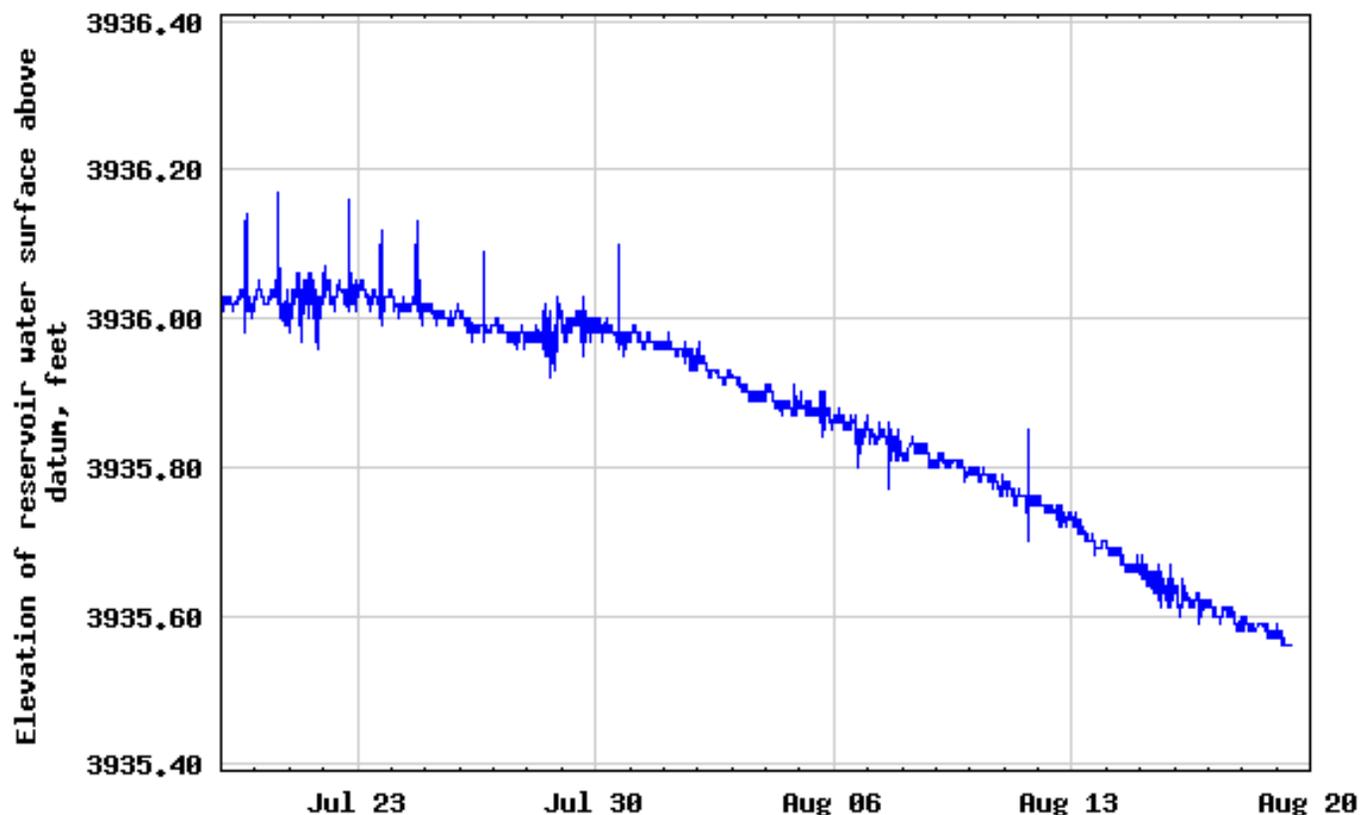
Virginia Ck near Bridgeport



Real-Time Data on Walker Lake Gage



USGS 10288500 WALKER LAKE NEAR HAWTHORNE, NV



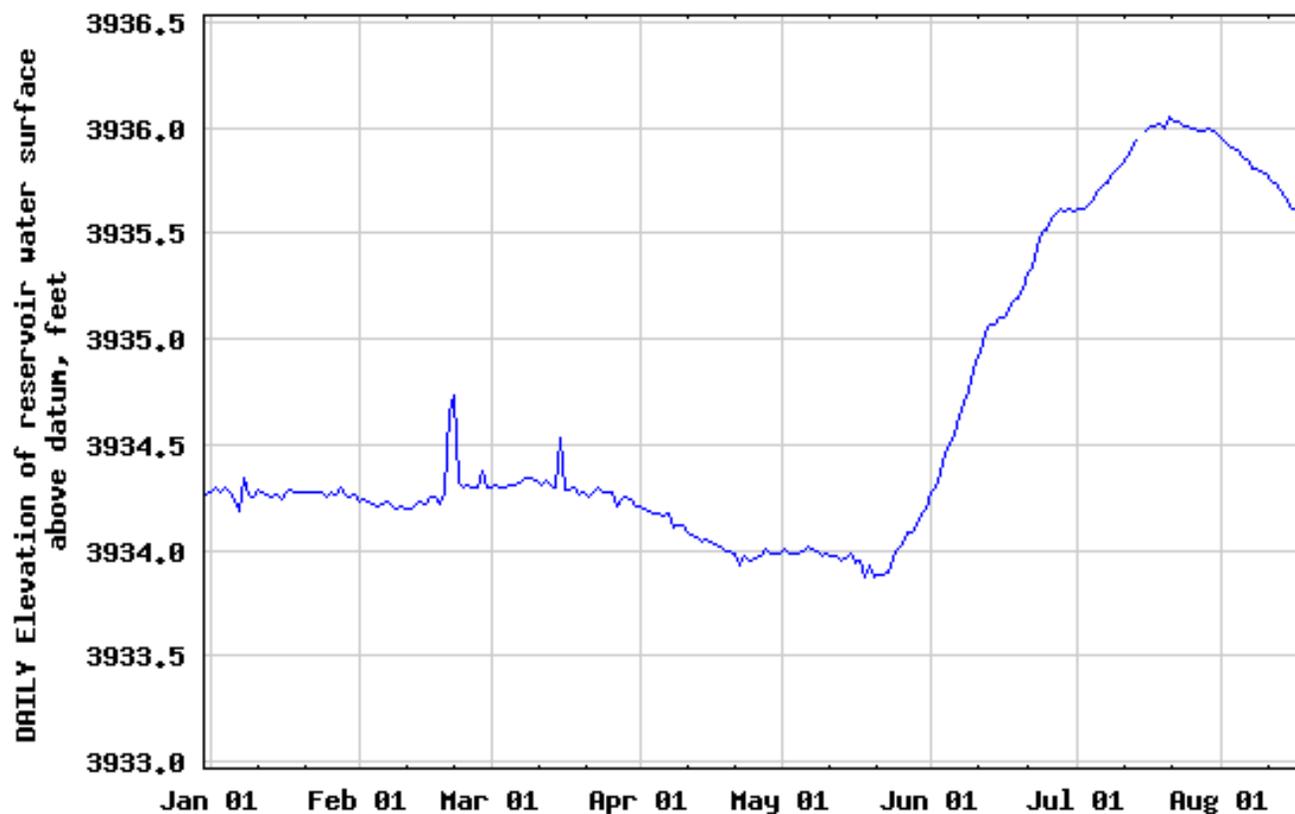
Provisional Data Subject to Revision



Recent Daily Data on Walker Lake Gage



USGS 10288500 WALKER LAKE NEAR HAWTHORNE, NV

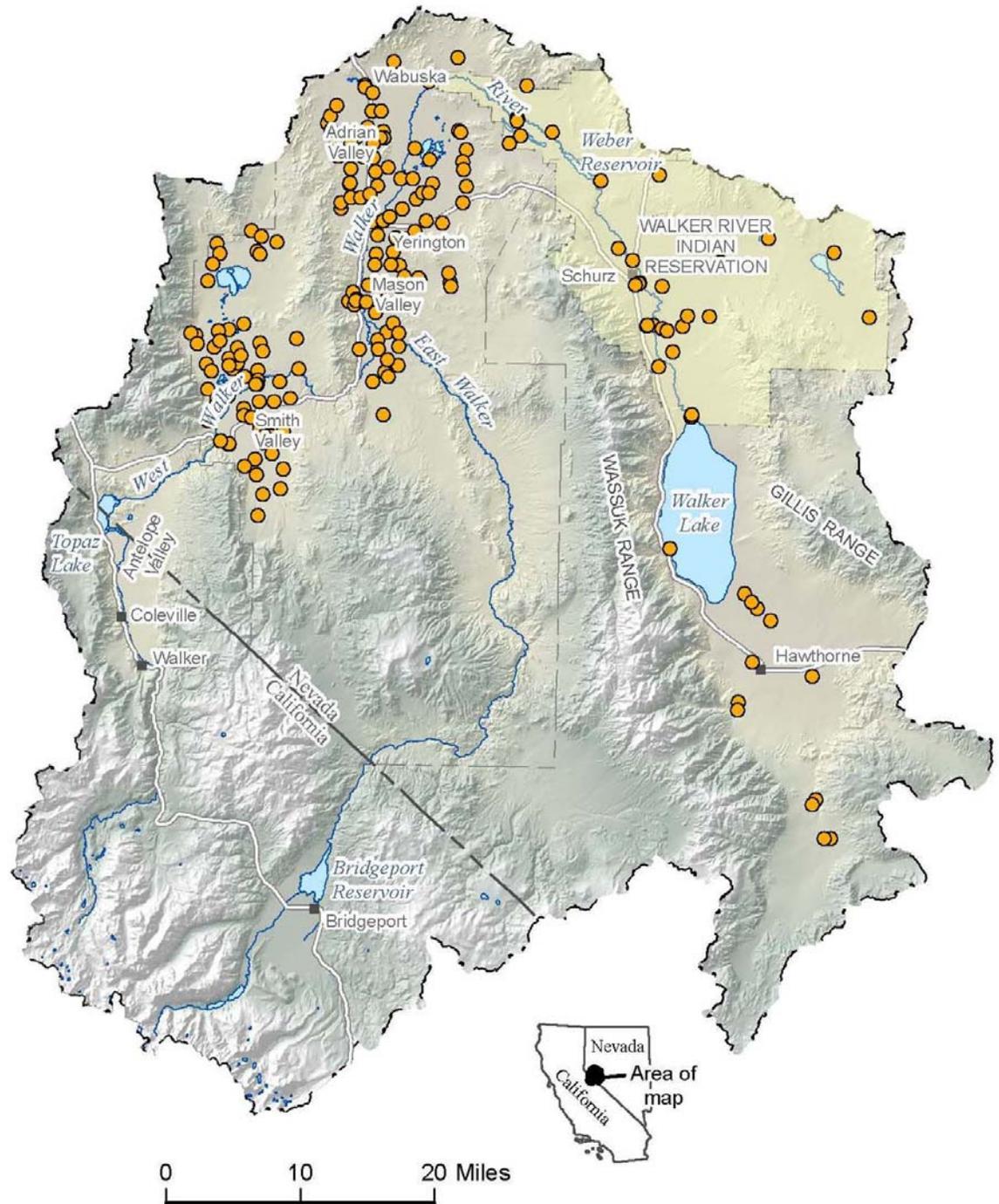


Provisional Data Subject to Revision



GW Network

- GW sites

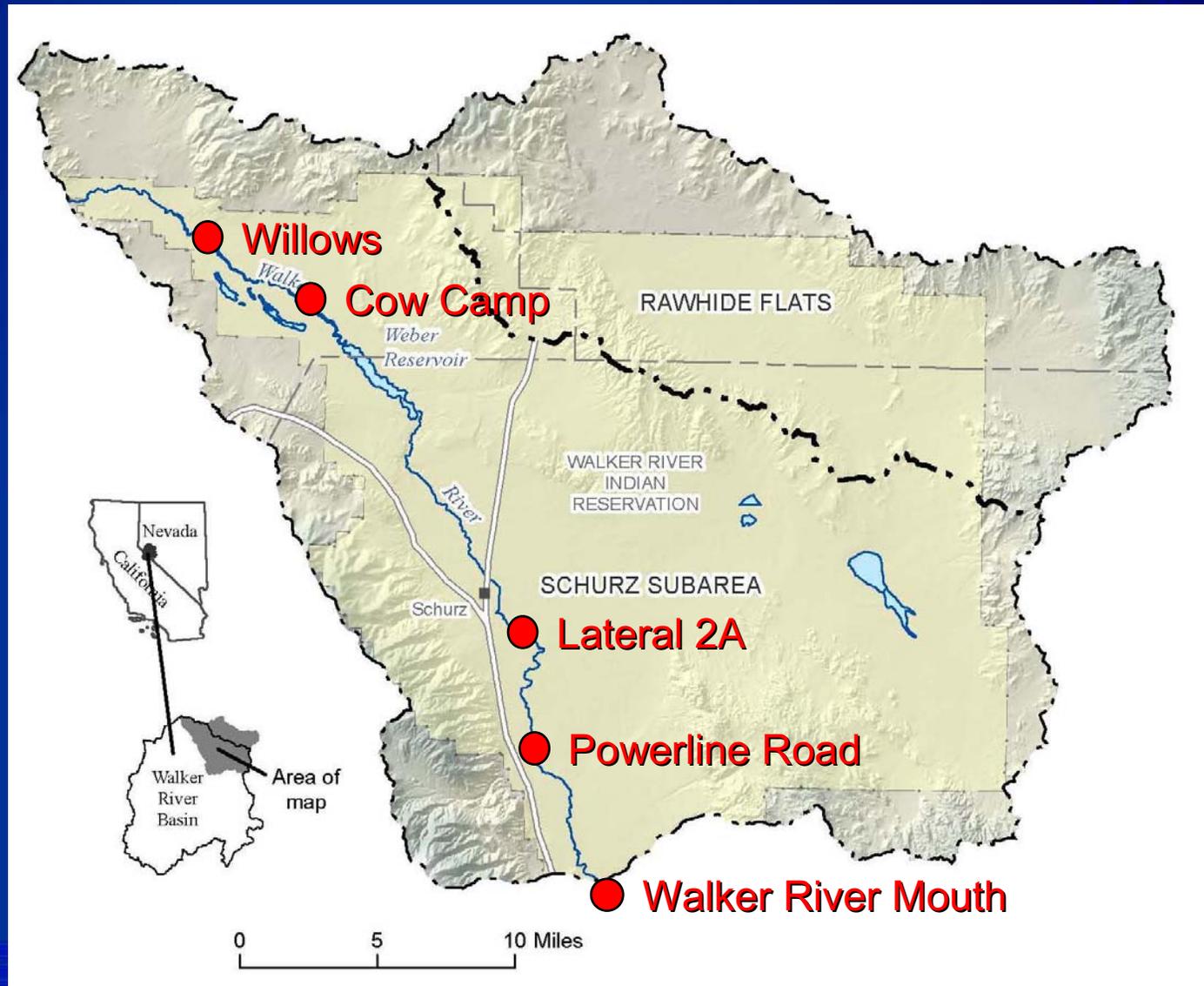


Ground-Water/Surface-Water Sites

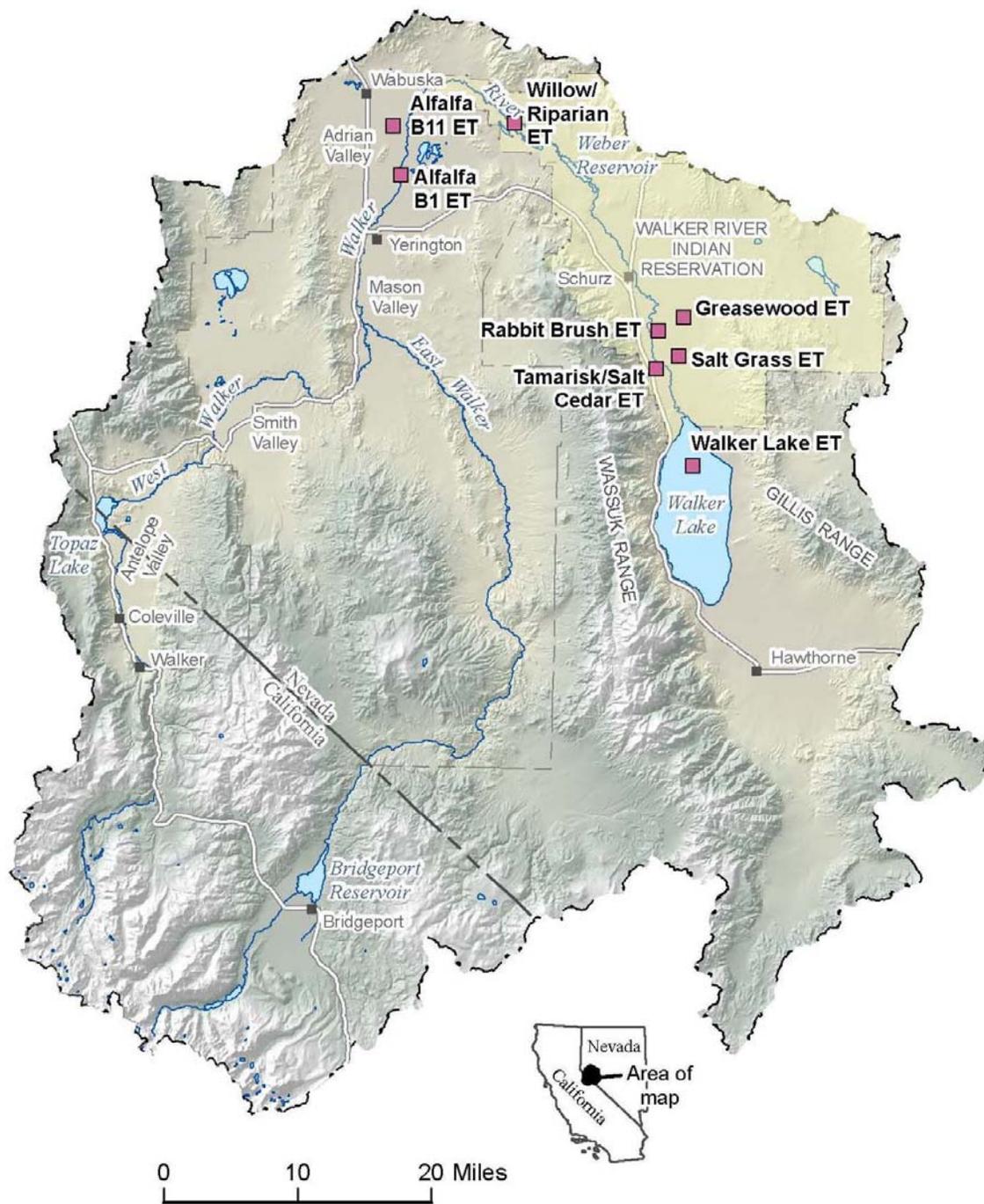
- Willows ET (above Weber)
- Cow Camp Gage
- Lateral 2-A Gage
- Powerline Road
- Walker River at Mouth



GW/SW Site Locations



ET Network



Evapotranspiration (ET) Stations

- Alfalfa (2) – Mason Valley WMA
- Willow – Above Weber Reservoir
- Greasewood – Southeast of Schurz
- Rabbit Brush – Near Feedlot
- Salt Grass – South of Feedlot
- Tamarisk – South of Powerline Road
- Open Water – Walker Lake

Alfalfa – Mason Valley WMA



Willows – Above Weber



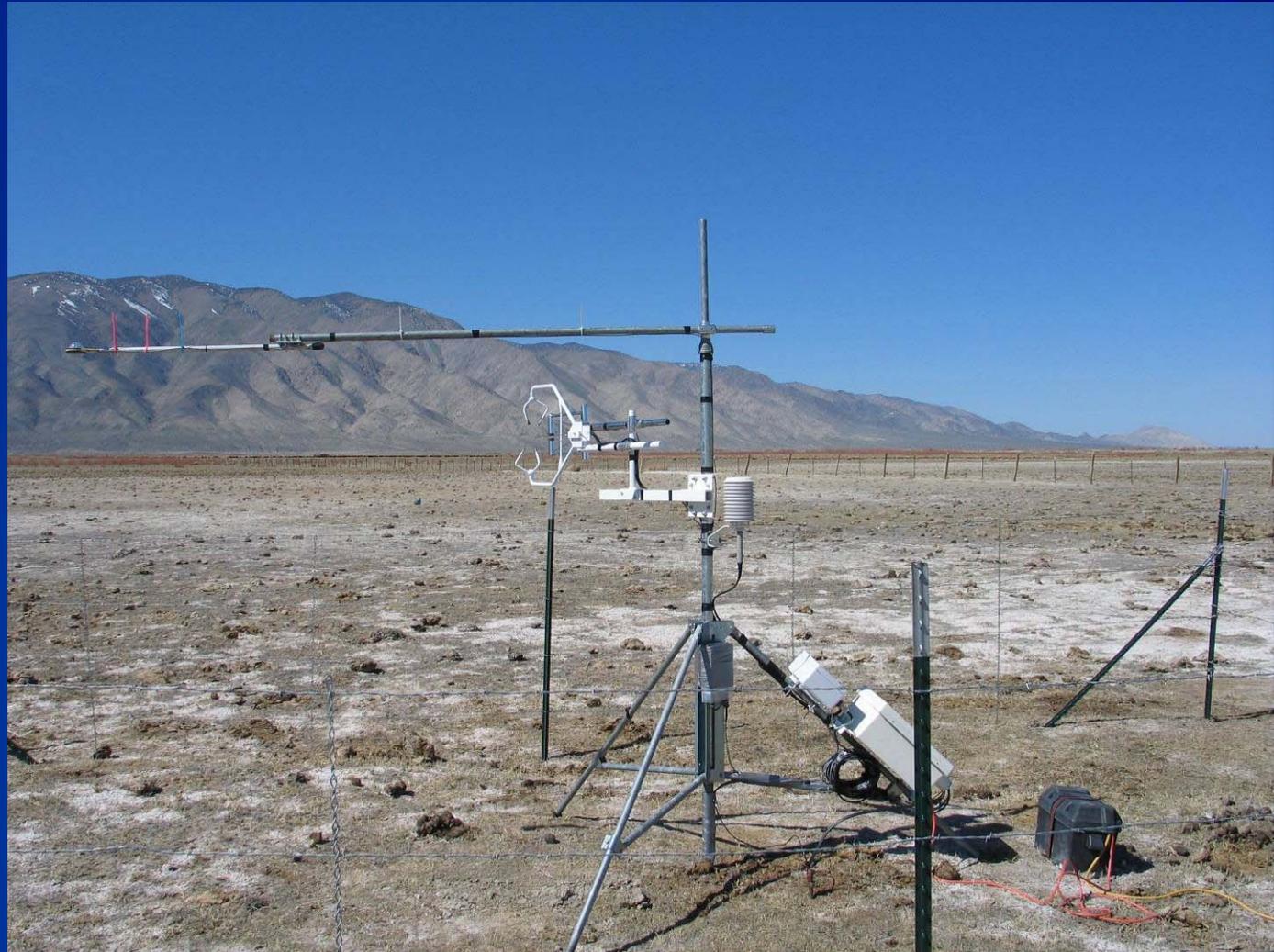
Rabbit Brush – Near Feedlot



Greasewood – Southeast of Schurz



Salt Grass – South of Feedlot



Salt Cedar – South of Powerline Road

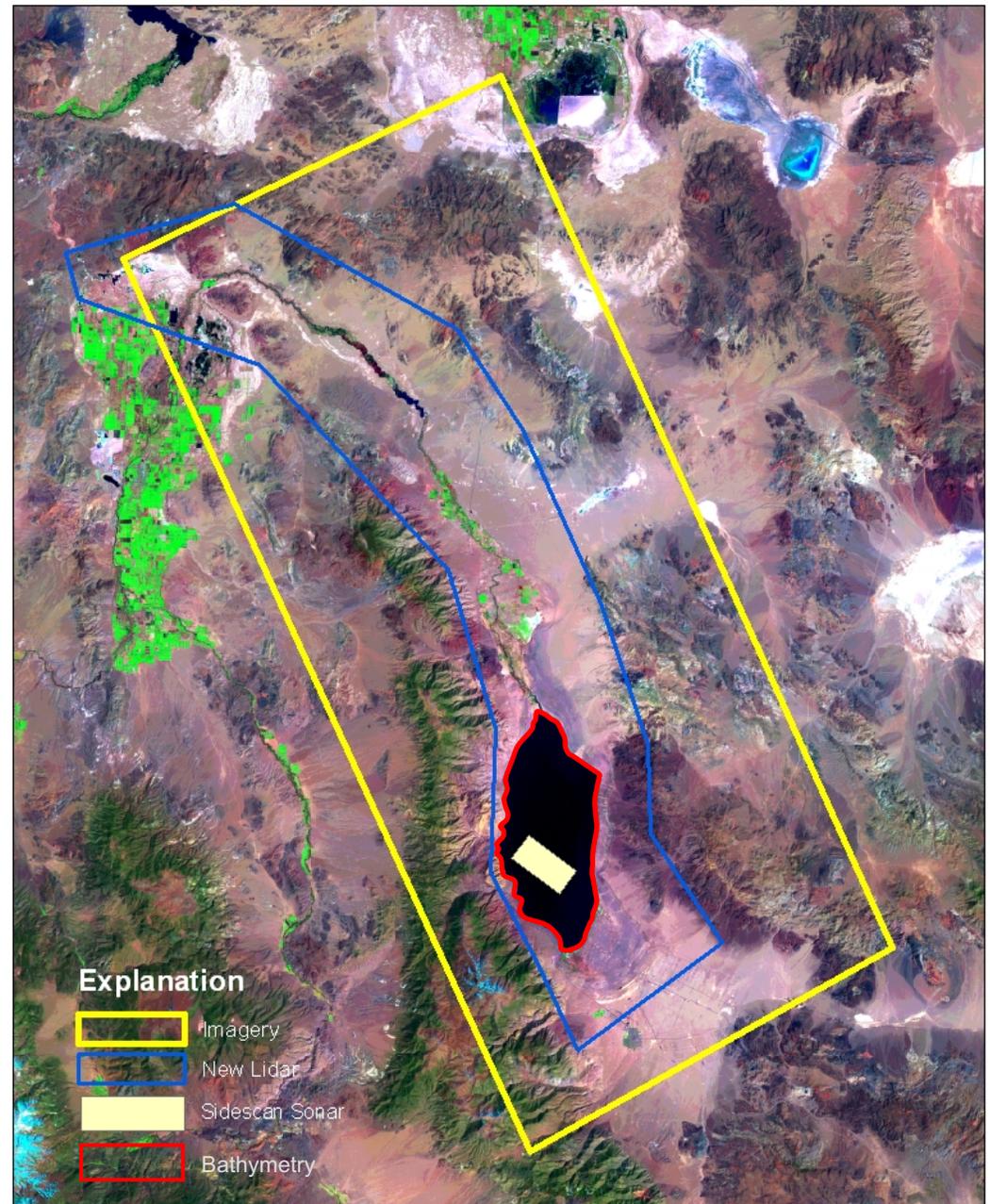


Open Water – Walker Lake



Mapping:

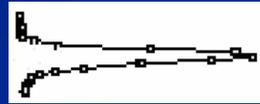
- Satellite imagery
- Lidar
- Bathymetry
- Side-scan sonar



0 3 6 12 Kilometers


Walker Lake Project Area

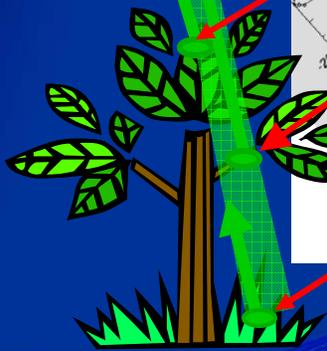
Lidar Principle



Transmit
Pulse

Range

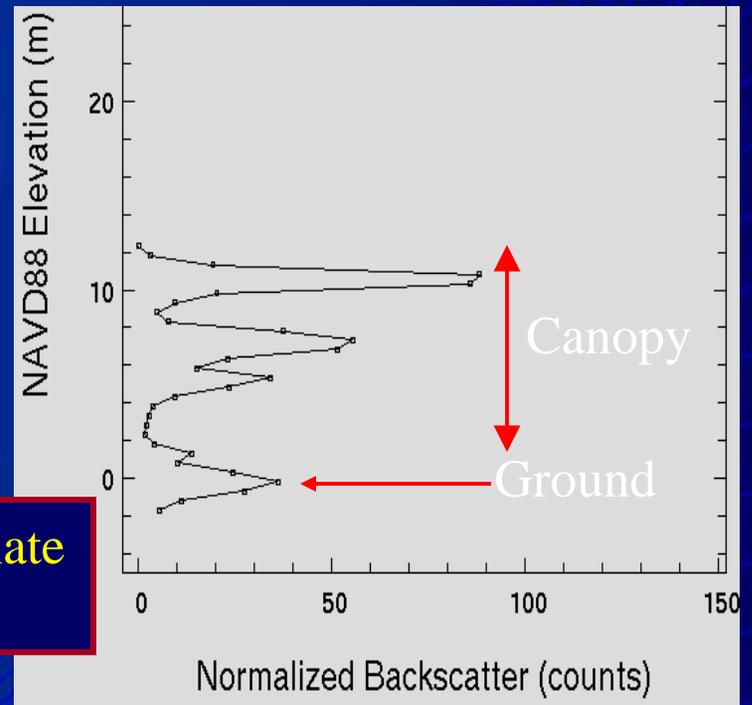
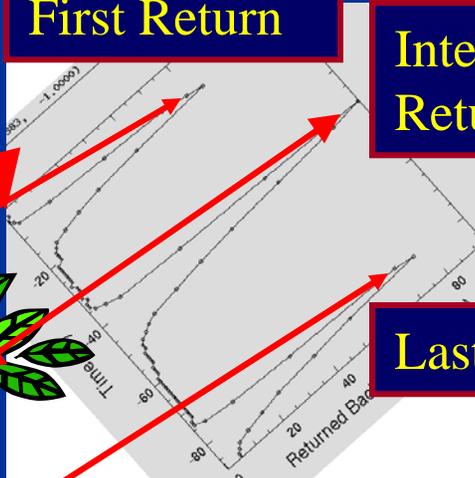
Returned
Backscatter



First Return

Intermediate
Return

Last Return

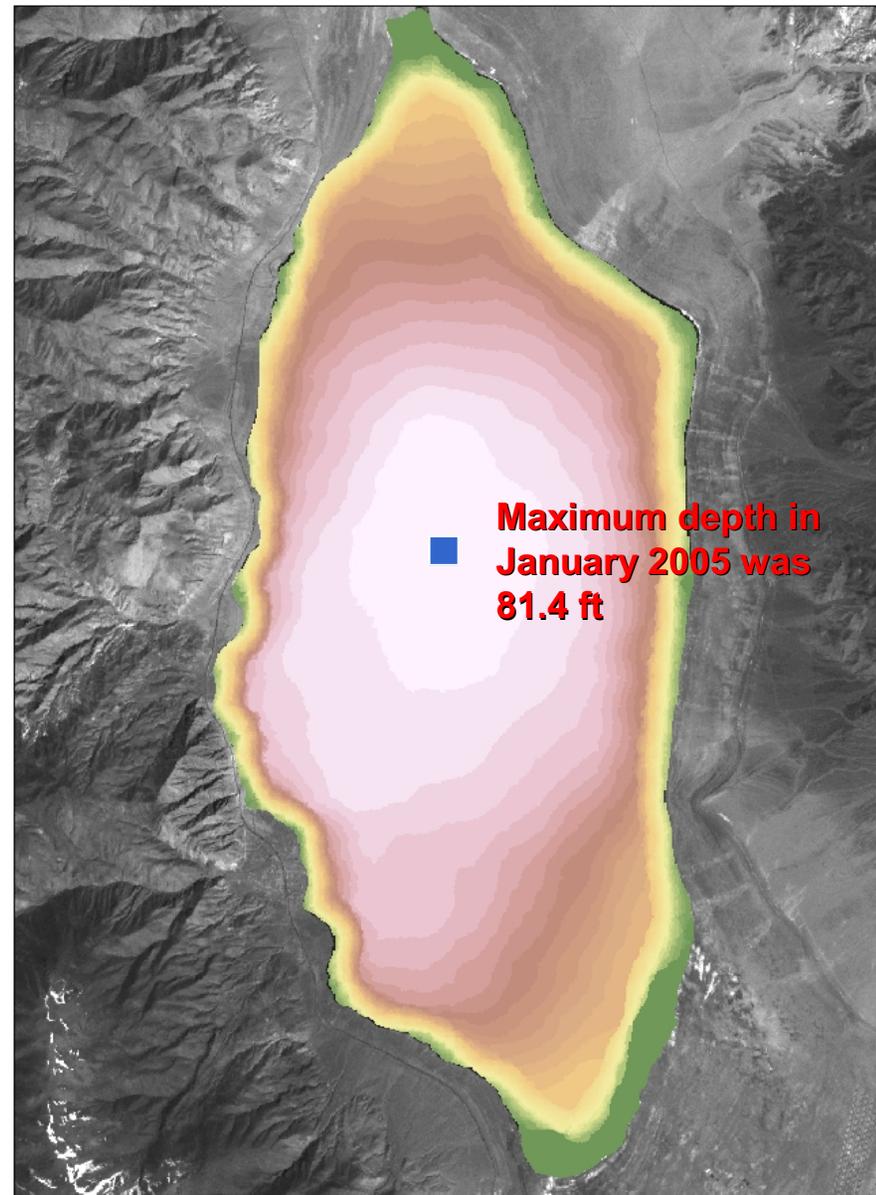


Walker Lake bathymetry

Refined elevation/volume relations



Bathymetry



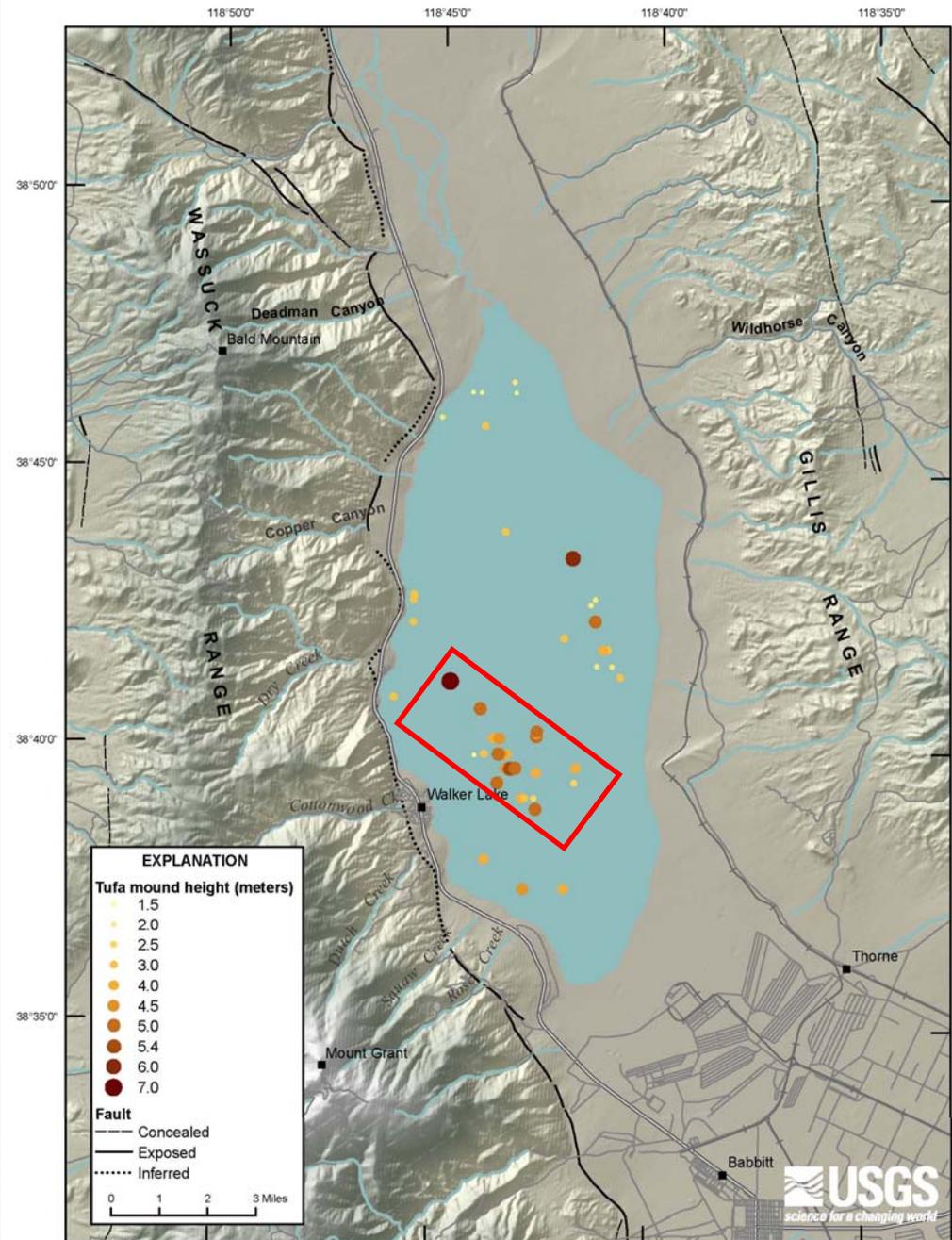
**Maximum depth in
January 2005 was
81.4 ft**

0 0.5 1 2 Miles
1:100,000 scale

Walker Lake Bathymetry
Provisional Data, Subject to revision

Walker Lake Spring Deposits

- Side-scan sonar



Side-Scan Sonar

- High Resolution Sonar technique
- Used for detailed mapping

Shipwreck (located in Gulf of Mexico) is an example of resolution of detail of side-scan sonar technique.



SS AICOA PURITAN

Web Site

Click on data link for
interactive map page



- Objectives
- Approach
- Maps
- Imagery
- Schedule
- Project Team
- Data
- Publications
- Photo Gallery
- Mercury Studies
- Related Links

Hydrology of the Walker River Basin

Walker Lake is one of the few perennial, natural terminal lakes in the Great Basin. Terminal lakes are sinks for surface-water drainage in topographically closed basins. Under natural conditions, evaporation from the lake surface typically is the primary component of basin outflow. Due to high evaporation rates in the Great Basin, the water-levels and salinity of terminal lakes are extremely sensitive to changes in streamflow. Most streamflow in the Walker River Basin originates as snowmelt from the Sierra Nevada. Prior to the late 1800s, most of the water flowed into Walker Lake. Since then, agricultural diversions have increased to the point that, except during flood flows, most streamflow is consumed by agriculture. Between 1882 and 1994, upstream diversions caused Walker Lake to decline about 140 feet and the total dissolved solids (TDS) concentrations to increase from 2,500 mg/L to 13,300 mg/L. Currently (2004), the TDS is about 15,000 mg/L. Compared to the Great Salt Lake, Walker Lake is relatively fresh and supports a diverse ecosystem including the threatened Lahontan cutthroat trout (LCT). The LCT has adapted to the high TDS of terminal basins. However, diversions have lowered lake levels and increased TDS to concentrations that threaten its survival.

The ecosystems and recreational uses of Walker Lake and other terminal lakes in the Great Basin have become at-risk due to consumptive water use. The goal of section 2057 of Public Law 107-171 is to provide water to selected at-risk terminal lakes in Nevada in order to sustain their ecosystems. This study will provide scientifically sound data and tools to parties involved in the Walker River Mediation so they can evaluate alternatives for supplementing flow to Walker Lake.

For further information about this study, contact:

Tom Lopes
333 W. Nye Lane
Carson City, NV 89706
(775) 887-7688
Email: tlopes@usgs.gov



<http://nevada.usgs.gov/walker/>

Plans for Upcoming Year

- Continue to collect data – Data network is essentially in full operation
- Develop elevation/volume relations for Walker Lake
- Classify and map vegetation
- Geophysics near Double Springs and river mouth
- Obtain water level at Double Springs Well
- Install additional observation wells to refine hydrologic understanding of GW system

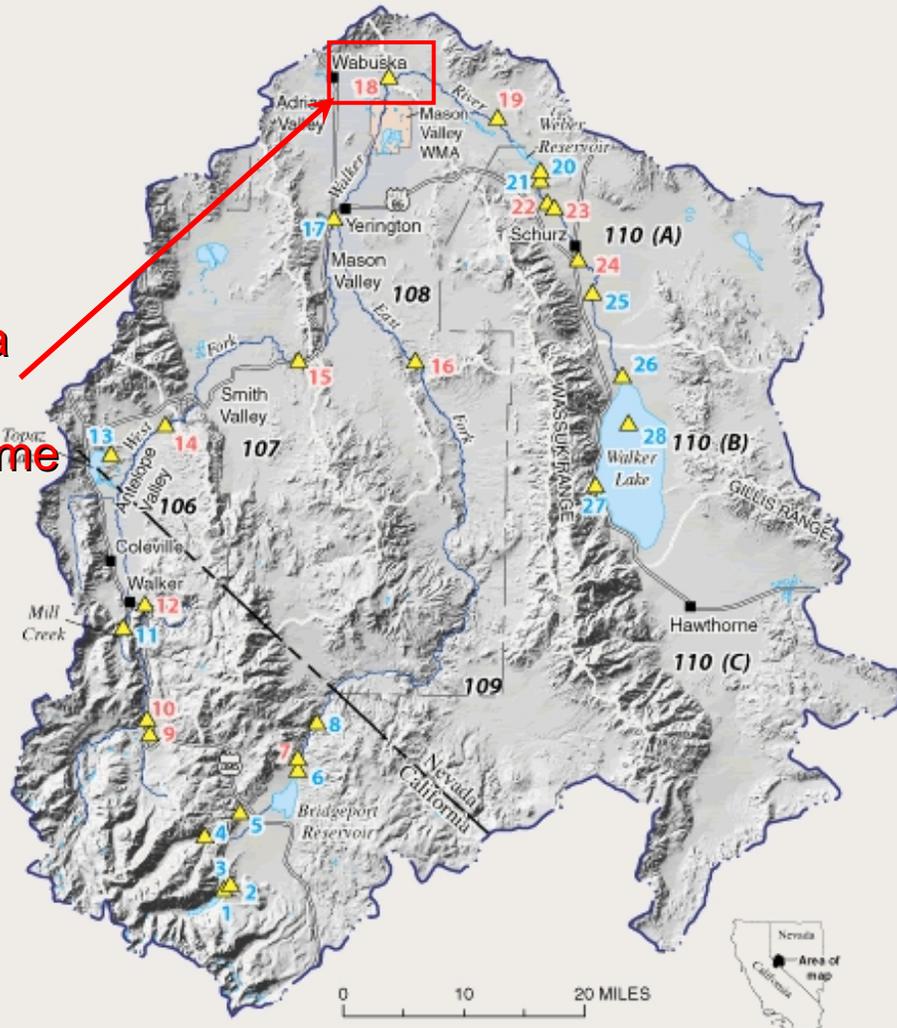


- Objectives
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- Photo Gallery
- Mercury
- Related Links
- Home Page

Data

Data for the Walker River Basin is available by clicking on a number on the map below or on the site name in the table below. Sites in **orange** have real-time data available.

Click on Wabuska Streamgauge for example of real-time data retrieval



USGS 10301500 WALKER R NR WABUSKA, NV

PROVISIONAL DATA SUBJECT TO REVISION

Available data for this site

[Nevada Water Science Center Annual Data Report](#) This website is an online version of the latest in a series of annual reports that document hydrologic data gathered from the U.S. Geological Survey's surface-water and ground-water data-collection networks in Nevada.

[Station Data Availability Page](#) This page provides links to pages from the Annual Data Report which are specific to this site. These pages may include daily value tables, graphic summary pages and water quality data.

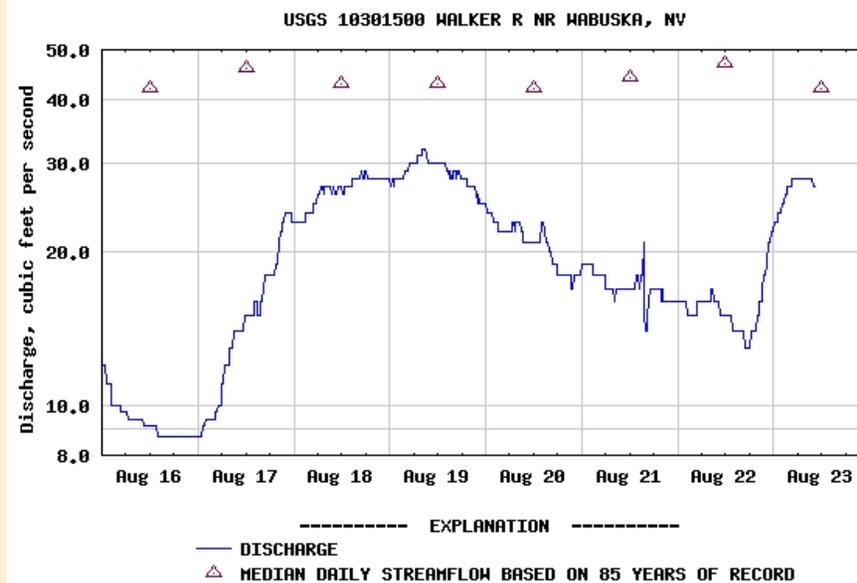
During winter months, stage and discharge may be affected by ice in the channel.

This station managed by the Carson City Field Unit.

Available Parameters	Output format	Days	<input type="button" value="get data"/>
All 4 parameters available at this site 00060 Discharge (DD 01) 00065 Gage height (DD 02) 00010 Temperature, water (DD 04)	Graph	7 (1-31)	

Discharge, cubic feet per second

Most recent value: 27 08-23-2005 10:30



Click here to return to slide show

