

Northeast Great Basin RAC

Nevada GW Development Panel Discussion

January 28, 2005

Ground Water Sustainability Concepts

BARCASS – USGS/DRI Water Study



Sustainability of Ground-Water Resources in the Basin and Range Carbonate- Rock Province

Understanding the Implications of
Large-Scale Ground-Water
Development in southeastern Nevada



Sustainability and its Implications

- Term: Safe Yield
- Term: Sustainability
- Use of Sustainability Concepts in Hydrologic Analysis



Safe Yield

Discharge = Recharge +/- Change in Storage

Natural Systems at equilibrium: Change in Storage is zero

Discharge = Recharge

Safe Yield: “quantity pumped regularly and permanently without dangerous depletion of storage reserve”...Lee 1915

Safe Yield CW: An average annual rate of withdrawal that does not exceed the average annual rate of recharge



Sustainability

Water resources can not be developed without altering the natural environment.

Safe Yield “disregards” natural discharge.

Sustainability: “Use of ground-water resources in a manner that can be maintained for an indefinite period of time without causing **unacceptable** environmental, economic or social consequences”



Sustainability

- Sustainability fosters a long-term view, similar to the physical processes that govern ground-water systems.
- Partitions contributions to withdrawals into removal from storage and capture from ET and surface water.
- Provides relative contributions at various time steps until new equilibrium is reached
- Makes no assumptions on the acceptability of the effects of ground-water withdrawals.



Water Resources of the **B**asin
and **R**ange **C**arbonate **A**quifer
System in White Pine County
Nevada, and adjacent areas in
Nevada and Utah

BARCAS Study

or

BARCASS



BARCASS

- Present study mandated by Lincoln County Conservation, Recreation, and Development Act of 2004 (short title)
- Funding of \$6 million provided by amendments to SNPLMA
- Draft Report – June 1, 2007
- Final Report – December 1, 2007

Lincoln County Land Act

- “(1) IN GENERAL – The Secretary, acting through the United States Geological Survey, the Desert Research Institute, and a designee from the State of Utah shall conduct a study to investigate ground water quantity, quality, and flow characteristics in the deep carbonate and alluvial aquifers of White Pine County, Nevada, and any groundwater basins that are located in White Pine County, Nevada, or Lincoln County, Nevada, and adjacent areas in Utah”.



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Study Team Participants

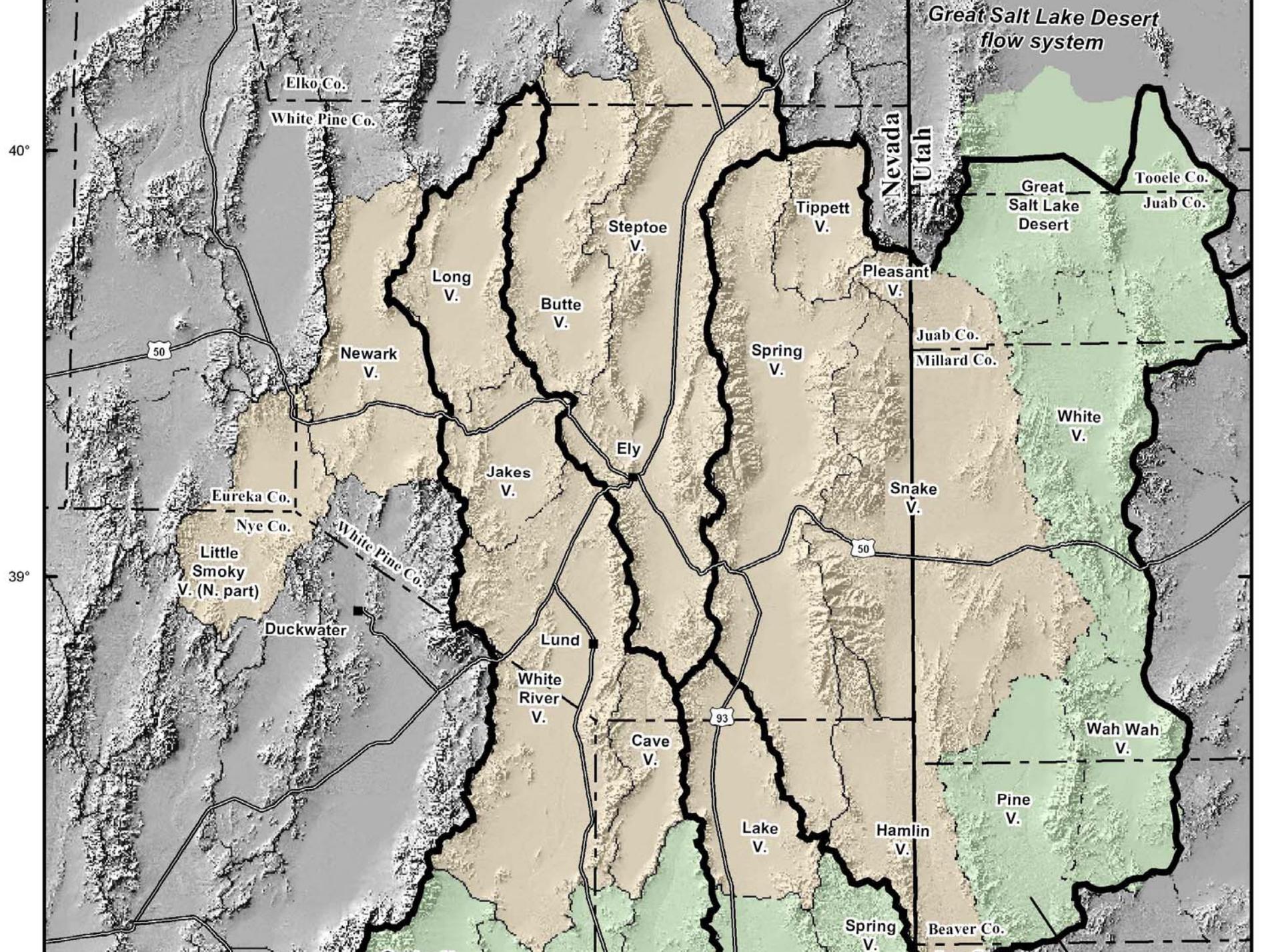
- United States Geological Survey
 - Water Resources Nevada District
 - Water Resources Utah District
 - Geology Denver
 - Geology Menlo Park
- Desert Research Institute
- Designee from Utah – Utah State Engineers Office



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Lincoln County Land Act

- “The study shall—
 - (A) focus on a review of existing data and may include new data;
 - (B) determine the approximate volume of water stored in the aquifers in those areas;
 - (C) determine the hydrogeologic and other controls that govern the discharge and recharge of each aquifer system; and
 - (E) develop maps at consistent scale depicting aquifer systems and the recharge and discharge areas of such systems.”



BARCASS Tasks

- (1) Consolidation of information and operation of a unified data collection network
- (2) Determination of the extent, thickness and hydrologic properties of the various aquifer units and estimation of the volume of ground water in storage.
- (3) Delineation of ground-water recharge areas and rates.
- (4) Delineation of ground-water discharge areas and rates.
- (5) Correlation and quantification of water budget components into conceptual regional flow systems.
- (6) Reporting of Results



Scope of Tasks

- (1) Data 660,000
- (2) Geohydrology 1,100,000
- (3) Recharge 250,000
- (4) Discharge 1,670,000
- (5) Conceptual Model 1,290,000
- (6) Reporting 1,030,000



BARCASS Products

- Report to Congress
- Initiate construction of 3-D hydrogeologic framework
- Constrain water-budget estimates for all valleys in study area
- Establish long-term data networks and information delivery systems
- Institutionalize agency relations and public expectations



BARCASS is/will Not

- An Environmental Impact Study
- Produce a calibrated ground-water flow model
- Answer all questions or alleviate all concerns
- Fully address sustainability concepts.

