

Preface

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Why are we here?

- Populations are increasing...
- Hydrological cycles are dynamic...
- Demands for water are increasing...

We know that agriculture water is under siege...

- Review basic policy concepts...
- Water practices by producers...
- Overall profitable agriculture...

What can the producer do?

- Reduce the amounts of water applied...
 - Change the way water is delivered
 - Switch to an alternative crop that uses less water

WSARE Professional Development Curriculum

- Addresses needs of producers involving:
 - Economic, political and environmental benefits of reducing water use in agriculture
 - Basic agronomics of alternative crops available to producers in the Great Basin
 - Evaluates the economic feasibility of low water use crops

WSARE Professional Development Curriculum

- Five separate modules:
 - Module 1 - Introduction and Water Issues
 - Module 2 - Agronomics of Alternative Crops
 - Module 3 - Market Opportunities for Alternative Crops
 - Module 4 - Selecting Alternative Crops
 - Module 5 - Assistance in Implementing Alternative Crops

Module 1

Introduction & Water Issues

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Objectives

- Understand the need to reduce water use and the potential benefits of alternative crops
- Compare their perceptions with the response of some Great Basin water rights owners
- Increase awareness of issues surrounding water law across Great Basin States
- Estimate the amount of surface water available for the following year on a given parcel

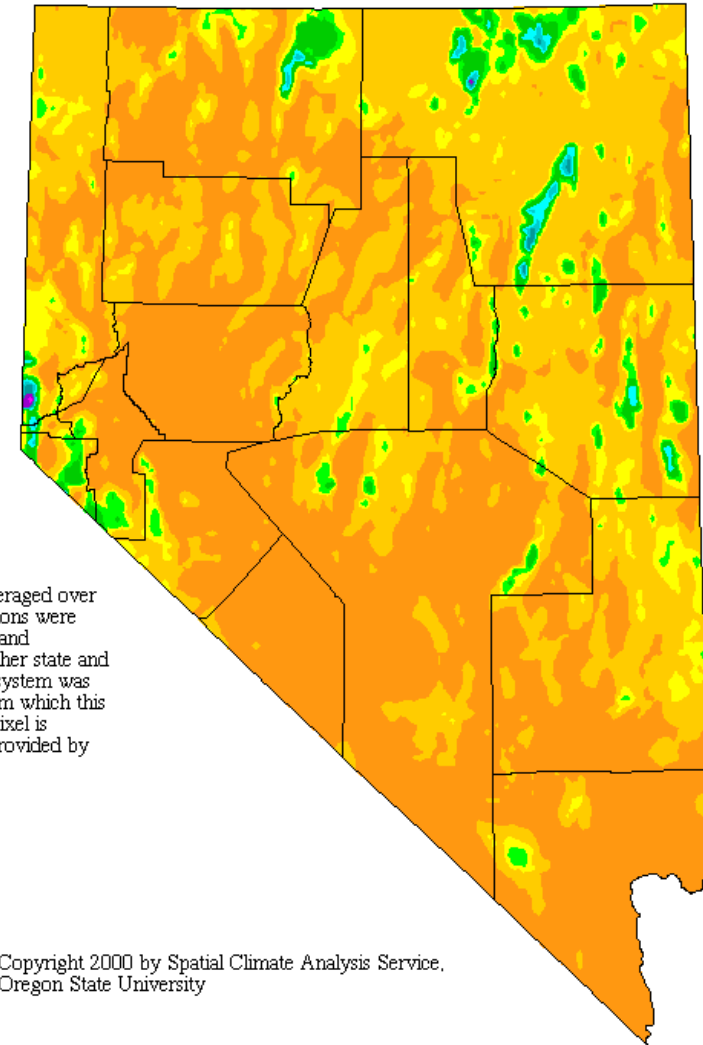
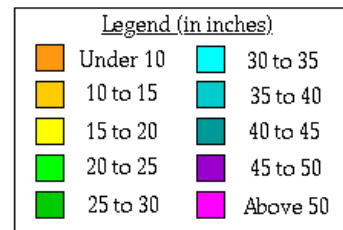
Why reduce water?

Nevada Water

- One of the driest states in the nation.
- Most of the state is under 10 inches of rainfall a year.
- Spring and summer snow melts provide the majority of stream flow.

Average Annual Precipitation

Nevada



This is a map of annual precipitation averaged over the period 1961-1990. Station observations were collected from the NOAA Cooperative and USDA-NRCS SnoTel networks, plus other state and local networks. The PRISM modeling system was used to create the gridded estimates from which this map was made. The size of each grid pixel is approximately 4x4 km. Support was provided by the NRCS Water and Climate Center.

For information on the PRISM modeling system, visit the SCAS web site at <http://www.ocs.orst.edu/prism>

The latest PRISM digital data sets created by the SCAS can be obtained from the Climate Source at <http://www.climatesource.com>

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Oregon State University

Hydrological Cycles

- Man made changes...
 - Populations increase
 - Recreation
 - Hydropower generation
 - Other in-stream uses

As more water is diverted from agriculture use, more and more challenges present themselves such as dealing with delivery systems.

Perceptions and Attitudes?

How can I retain my agricultural lifestyle and still make money?

- Plant alternative crops???
- Agriculture producers in a Walker River Basin research study showed in 2007 that they are willing to implement water-conserving crops
 - 45% indicated that they would change to an alternative crop using less water
 - 33% were unsure
 - 22% were not willing to change at all

- Producers involved in agriculture for less than 35 years were less likely and more unsure, by a 6 % margin, about implementing an alternative crop
- Producers involved in agriculture more than 35 years were more likely and less unsure about implementing an alternative crop

Common Concepts of Water Law?

Laws of the land

- Theory or Reality with water rights...
 - Common law. Like court cases are decided alike....Precedent is set by previous court cases.
 - Legislative Law. Changes with the public's perceptions and attitudes...driven by political forces.

Prior Appropriation

- Developed due to water scarcity in the mining camps.
- Based on the foundation of seniority.
- “First in Time, First in Right”
 - Areas of water are designated under law. (i.e. Mining, farming, ranching, municipal, industrial.)

Nevada Water

- Nevada Revised Statutes. Chapters 532-538.
- State Engineer and Nevada Water Resources Division has responsibility for the administration and enforcement of Nevada water.
 - But it is more complicated than the simple statement.

Water Right

- A right given to someone or something to use water.
- Beneficial Use
 - A water right encompasses who has the right to use the water, what it is used for and where it is used.

Beneficial Use

- A right to utilize water and the benefits that the water provides without having the legal title of ownership.
- The Nevada public holds the title for water, however, the appropriation of water under beneficial use creates a water right for the user.
- Beneficial use is the basis and measure for water. It also limits the right of use to water.

Nevada Water

- Ground Water
 - The 1939 Nevada Underground Water Act gave the state division of water resources under the state engineer authority and jurisdiction over groundwater in the state.
- Surface Water
 - Authority and jurisdiction of surface water is a multifaceted web of local, state and federal laws and court decrees.

Therefore a Water Right...

- Important: A water right becomes both real and personal property once it is granted.
 - This results in the ability of a water right to be conveyed or transferred.
 - However, water rights are appurtenant to the land and are usually conveyed by deed with the land.
 - One exception is if the seller specifically reserves the water right in the deed and has submitted a “Report of Conveyance” with the State Engineer abiding by the law set forth.

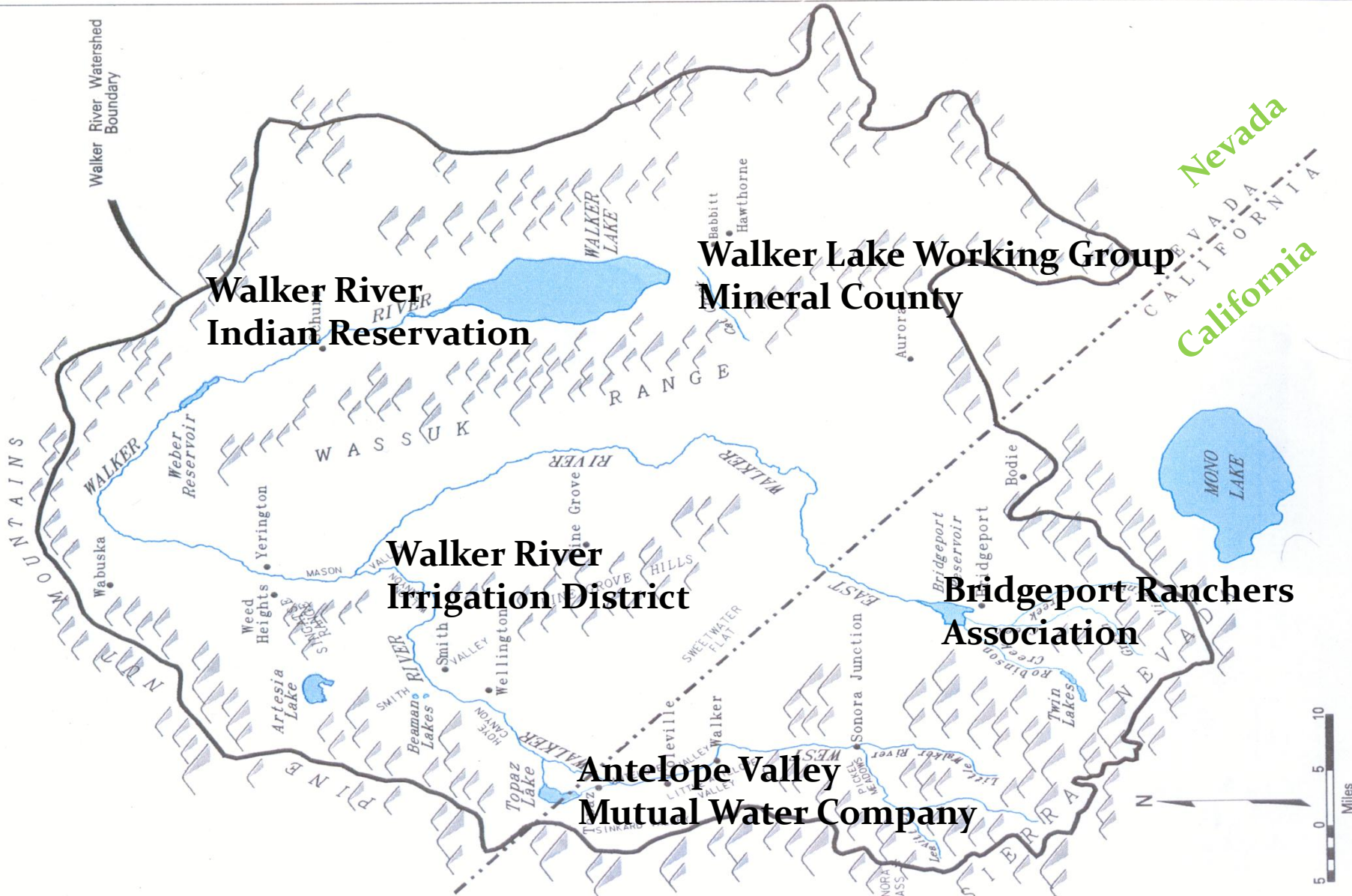
American Environmentalism

- 1969 National Environmental Policy Act (NEPA)
 - “Purpose was to provide a clear mandate for all federal agencies, regardless of their mission or position within the government, to create and maintain conditions under which man and nature can exist in productive harmony.”

-Buck, 1997

Surface water available on a given parcel

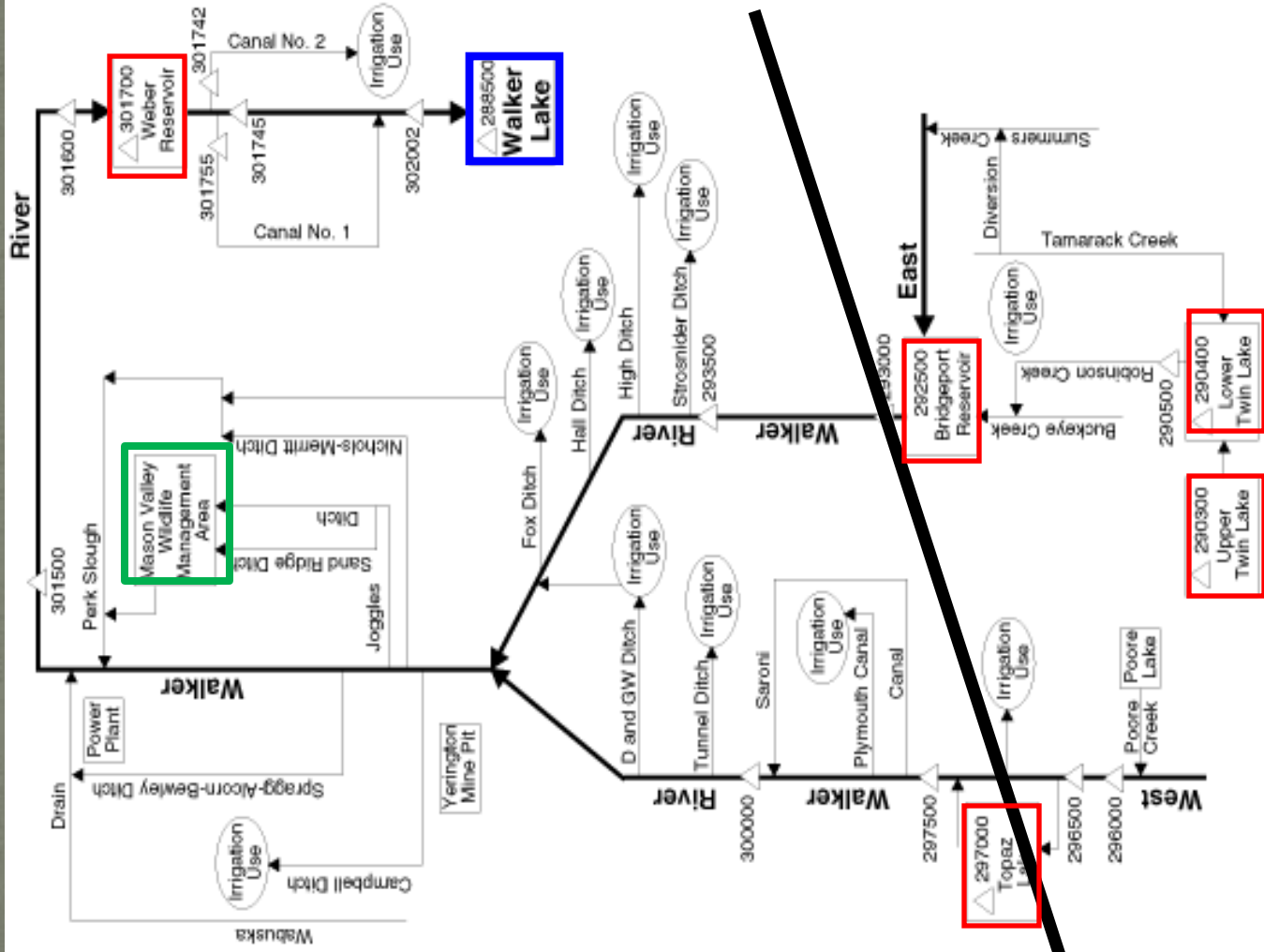
Walker River Basin



Walker River Basin Water Rights

- Surface water regulated by Federal Court Decree C-125.
 - Implemented by a Federal Water Master who reports to a board of water commissioners.
- Ground water regulated by the State of Nevada. (State Engineer)

Nevada



California
Headwaters

EXPLANATION
 Active gaging station with abbreviated number-
 Complete designation includes Part number 10
 (Great Basin) as first two digits.

Walker River Flow Schematic
 Walker River Basin Listing of USGS Gaging Stations

Schematic diagram provided courtesy of
 U.S. Geological Survey, Water Resources
 Division, Carson City, Nevada, 1996

The Walker River Basin

- Agriculture Economics
 - Onions, garlic, alfalfa hay, grass hay are the main crops of the Walker River Basin. They contribute substantially to the economics of the communities of Yerington, Smith Valley, Coleville, Bridgeport and Schurz.
 - These crops all need water!!!!



Walker River Basin Agriculture

- First reported irrigation was in 1860.
- Federal Decree 731 issued in 1919.
- Federal Decree C-125 issued in 1939
 - Amended in 1940

Part I: Producer knows...

- 30-acre parcel
- This parcel has 4 acre feet of water, per acre, per year
- It is surface water under federal decree C-125 with a 1900 prior appropriation right.
- There is also a state permit for a supplemental well
- Basin is 120% over allocated
- Restrictions are related to C-125 decree, which is monitored by the Walker River Federal Water Master.

Part II: Pick a Parcel

- Find the gauging station for your parcel. find the flow rate
 - <http://waterdata.usgs.gov/usa/nwis/rt>
- Find your snow pack. What is the percent of average of the snowpack for the basin that your parcel is located in.
 - ftp://ftp.wcc.nrcs.usda.gov/data/snow/basin_reports/

Drought Outlook

- National Weather Service predicts the drought outlook for three months in advance
 - http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html

Are there potential issues with reducing water use?

What are the issues?

- No incentives?
- Water law?
- Beneficial use?
- What else?

“Managers are increasingly coming to agree that ‘watershed management,’ although dependent of science and engineering, is fundamentally social in nature.”

Korfmacher, 2002

Your World View/Finding a Balance

- A basic understanding...
 - **Individuals, while they need to be presented with new information and ideas, need the autonomy to adopt “change” as they choose.**
 - **Many of the attitudes individuals have are an integral part of their culture and belief system.**