El Dorado Irrigation District

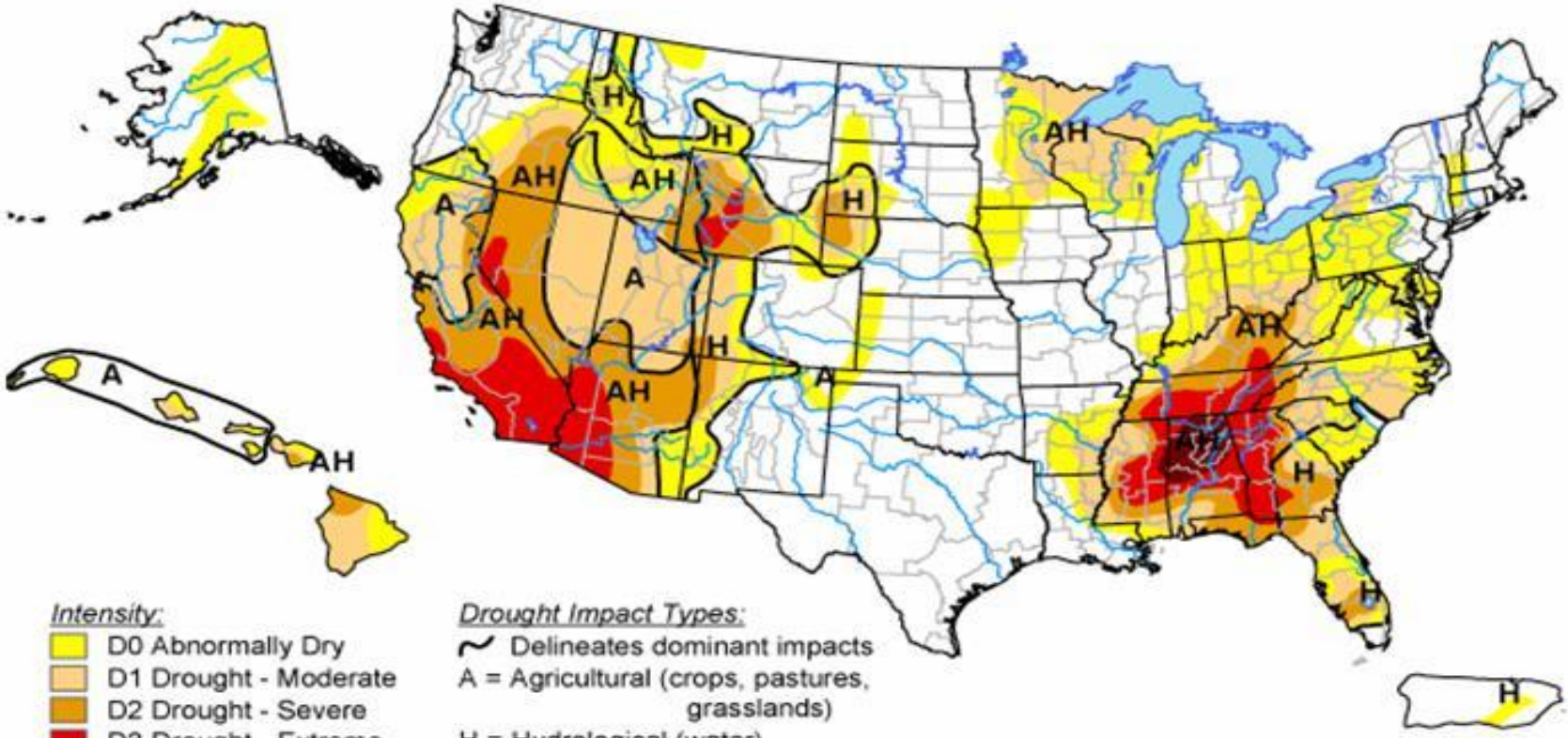
Drought Preparedness
Planning Ahead for Uncertainty

David Witter

July 18, 2007

U.S. Drought Monitor

July 3, 2007
Valid 8 a.m. EDT



Intensity:
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:
- ~ Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://drought.unl.edu/dm

USDA National Drought Mitigation Center

Released Thursday, July 5, 2007
Author: Douglas Le Comte, CPC/NOAA

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Drought Preparedness

- Customer input
- Board of Directors support
- Staff involvement
  - National Drought Policy Commission
- Regional leadership
- Countywide plans

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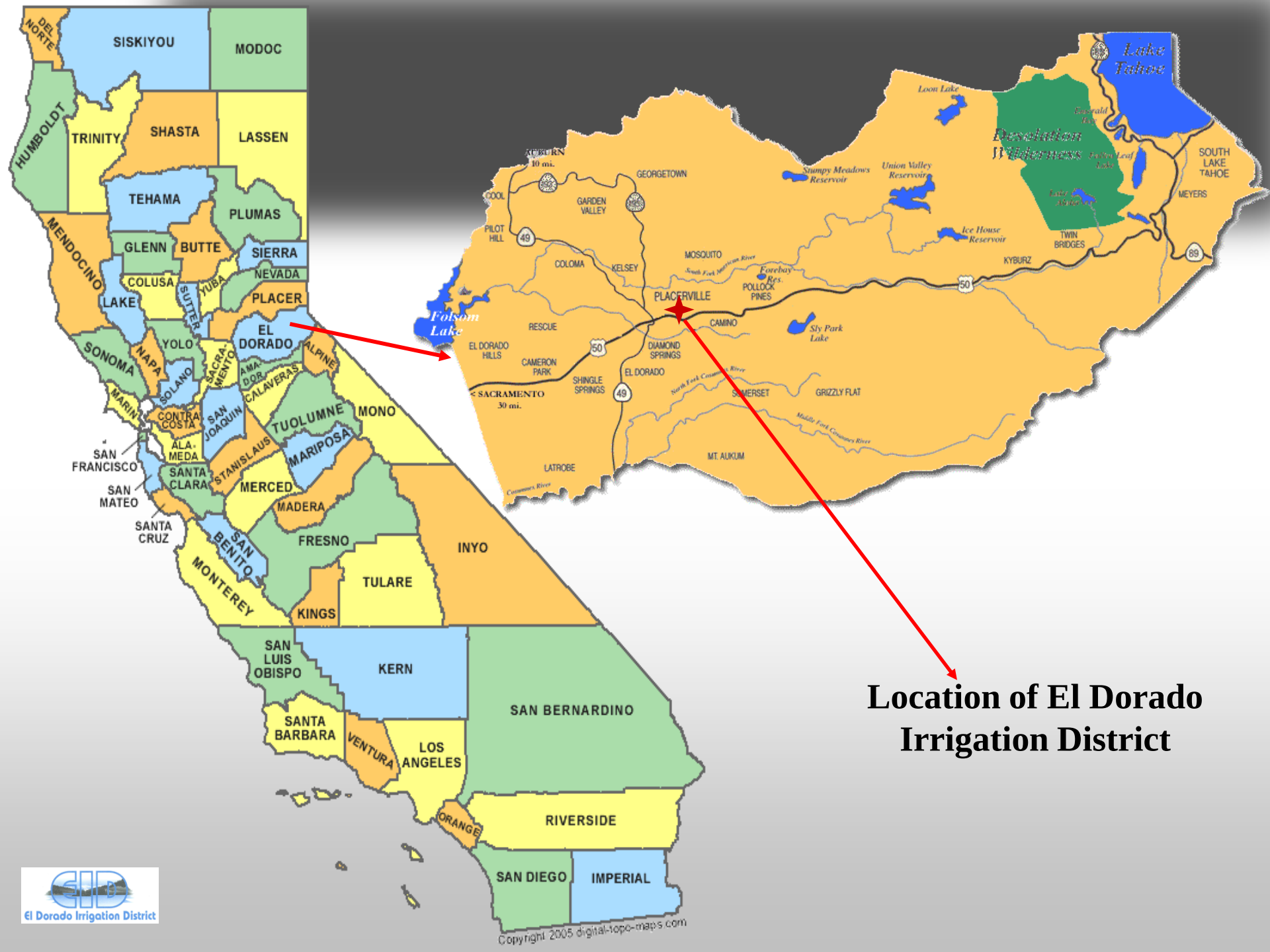

Location of El Dorado Irrigation District

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Water Supply

- Sierra Nevada's snow pack and rainfall
  - Main reservoirs
  - Spring runoff
- Vulnerable to variations
- Seasonally
  - Rainfall
    - Nov - April

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El Dorado Irrigation District Water Demand

- 37,000 connections
  - 100% metered
- 100,000 customers
  - Growing population
  - Increasing water demand
- Surface water supply 56,000 af
- Water usage
  - 81% Urban
  - 19% Agriculture

Gold Rush Era Ditch

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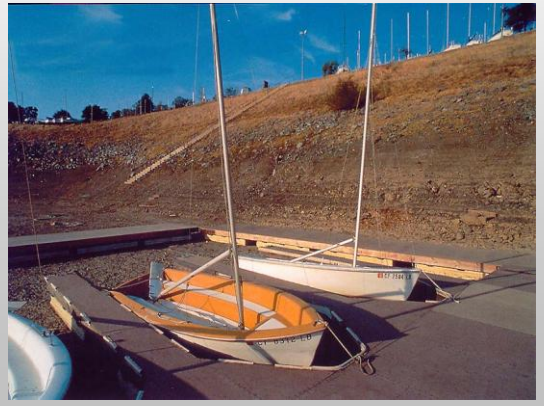
Recent Major Droughts

- 1976-1977
- 1987-1988
- Early 1990's
- Historically – emergency response to drought



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Shortage Responses

- 1976 - 1977 Drought
  - First major drought
    - Water conservation plan- first in California
    - Irrigation Management Service- first in California
    - Recycled water planning started
    - First demand side conservation
    - Achieved 57% conservation

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Water Shortage Planning

- EID's Water Supply and Demand Report
  - Availability of new meter sales
- State of California
  - Urban Water Management Plans
    - Water shortage contingency analysis
- Reclamation
  - Water Conservation Plans

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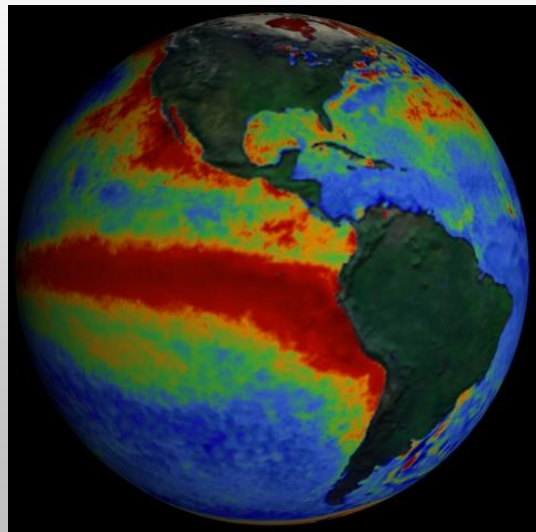
Climate Change Research

- El Nino/ Southern oscillation
  - La Nina
  - 3 - 7 year cycles
- Pacific Decadal Oscillation (PDO)
  - Amplifies or dampens
    - El Nino/ La Nina
    - 20 – 30 Year cycles
- Paleoclimatic data



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California Rainfall – 1600 to 1961 Based on Tree-ring Studies

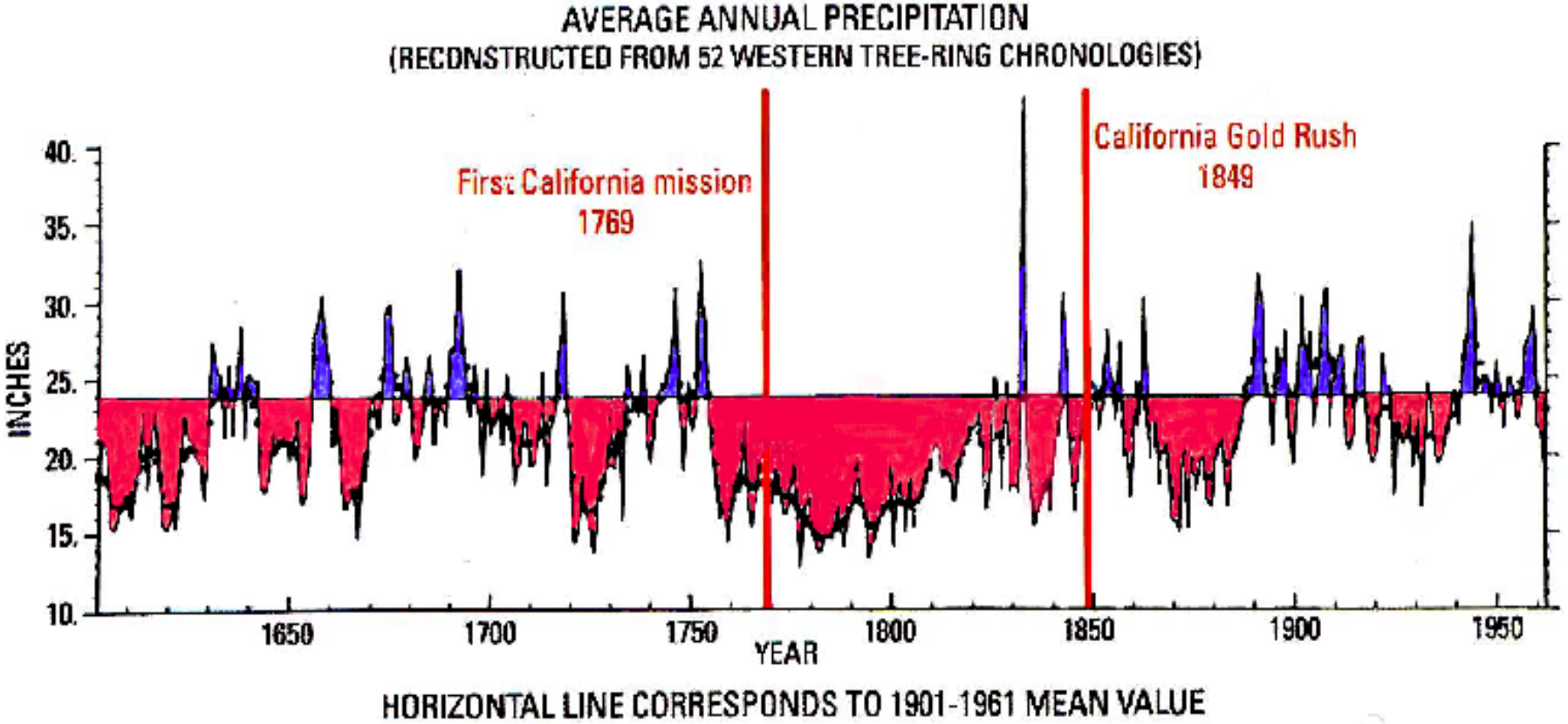
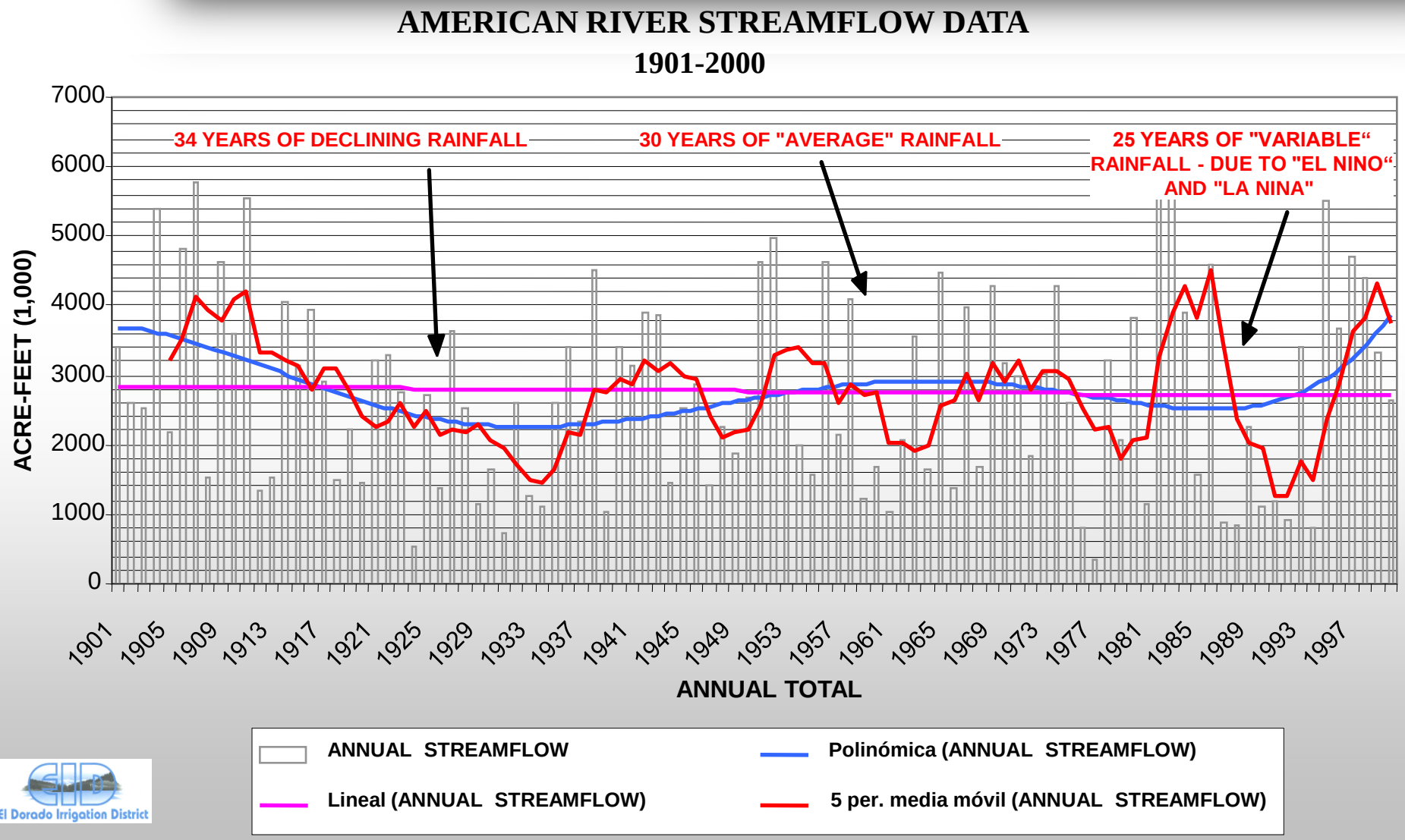


Figure 1. Average annual precipitation in California for 1600–1950 as determined using tree-ring chronology from 52 trees as a proxy for precipitation (Fritts, 1984). Horizontal line represents 1901–1961 average precipitation value from instrumental records.

Evidence in Runoff Hydrology



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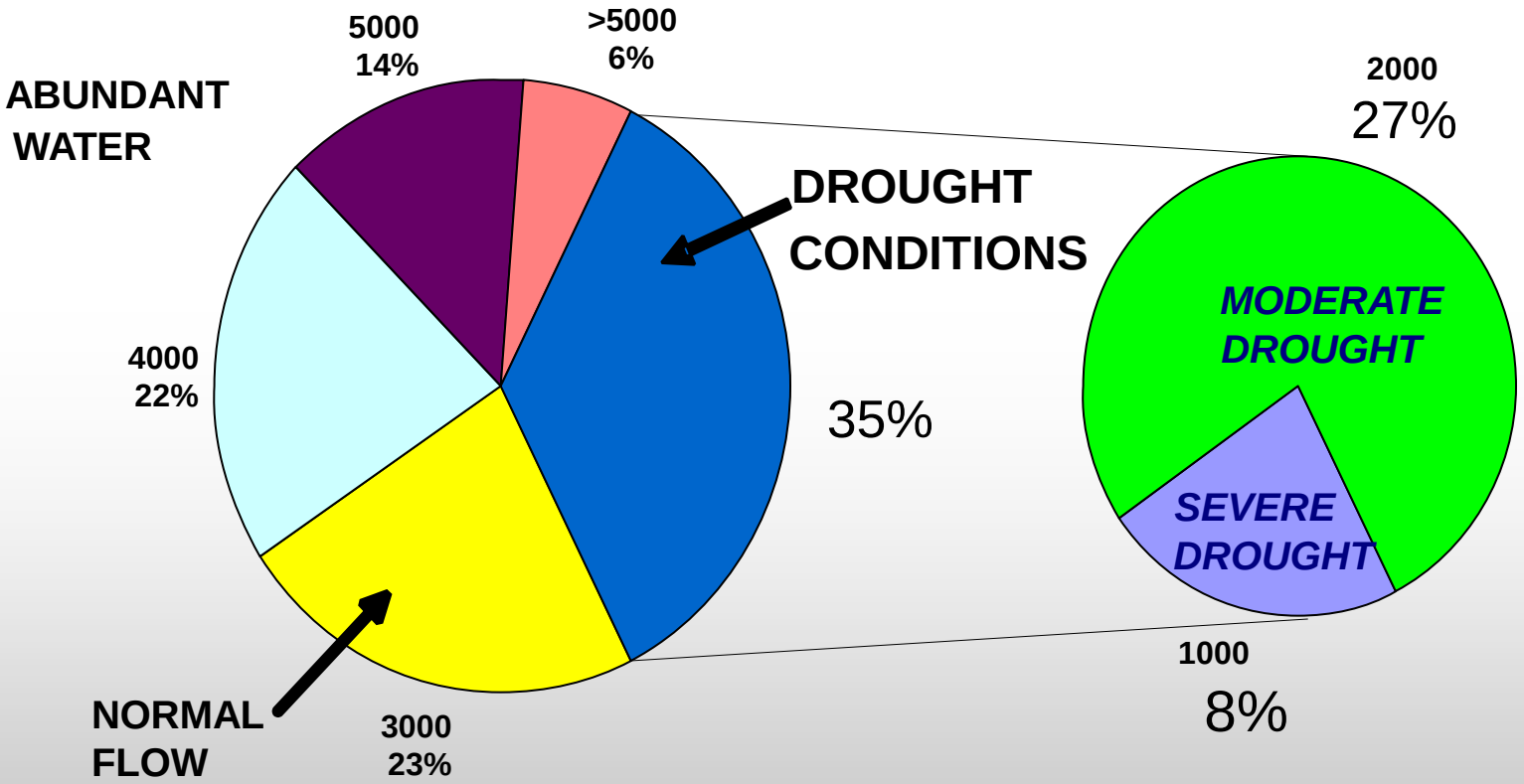
Frequency of Flow Volumes into Folsom Reservoir, 1901-2000



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Climate Change

- Temperature increases
  - Decreasing snowpack
  - Earlier runoff
    - Flood control releases
    - Reduced reservoir storage
  - More extreme events

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How can water suppliers best respond?

- Future water supply planning
  - Drought preparedness is necessary
  - Planning tools and tracking indicators
    - Drought and climate change modeling
  - Assessing climate change impacts
    - Hydrology shifts
  - Other factors:
    - Future demands
    - Conservation programs
    - Mitigation projects

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Drought Preparedness Planning

- Drought Preparedness Plans
  - Takes crisis out of response
  - Reduces likelihood
    - Over reacting
    - Under reacting

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El Dorado County Western Slope Drought Analysis

Goal: have the most comprehensive and practical drought plan ready for implementation

- Forum for stakeholder input
- Modeling tools
  - testing the vulnerabilities of each water provider's system
  - "virtual" drought simulations
- Analysis of drought indicators
- Drought mitigation
  - drought demand reduction
  - supply augmentation
- Preparation of drought plans

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Shared Vision Model

- Test historic hydrology against:
  - current water supply storage,
  - conveyance infrastructure
  - projected future demands
- Climate change scenarios
  - Warming trend
  - Less snow pack
  - Earlier runoff
  - Lower summer stream flows
- Shortfall in supplies

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El Dorado County West Slope Shared Vision Drought Model

Updated August 31, 2006

Please see "Model He folder on CD for help PowerPoint tutorials this system.

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El Dorado County Water Agency
3932 Ponderosa Road, Suite 200
Single Springs, CA 95682
(530) 621-5392

http://www.co.el-dorado.ca.us/water/

Grizzly Flats Community Services District
P.O. Box 250
Grizzly Flats, CA 95636
(530) 622-9626

Georgetown Divide Public Utility District
6425 Main Street
Georgetown, CA 95634
(530) 333-4356

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El Dorado Irrigation District
2890 Mosquito Road
Placerville, CA 95667
(530) 622-4513

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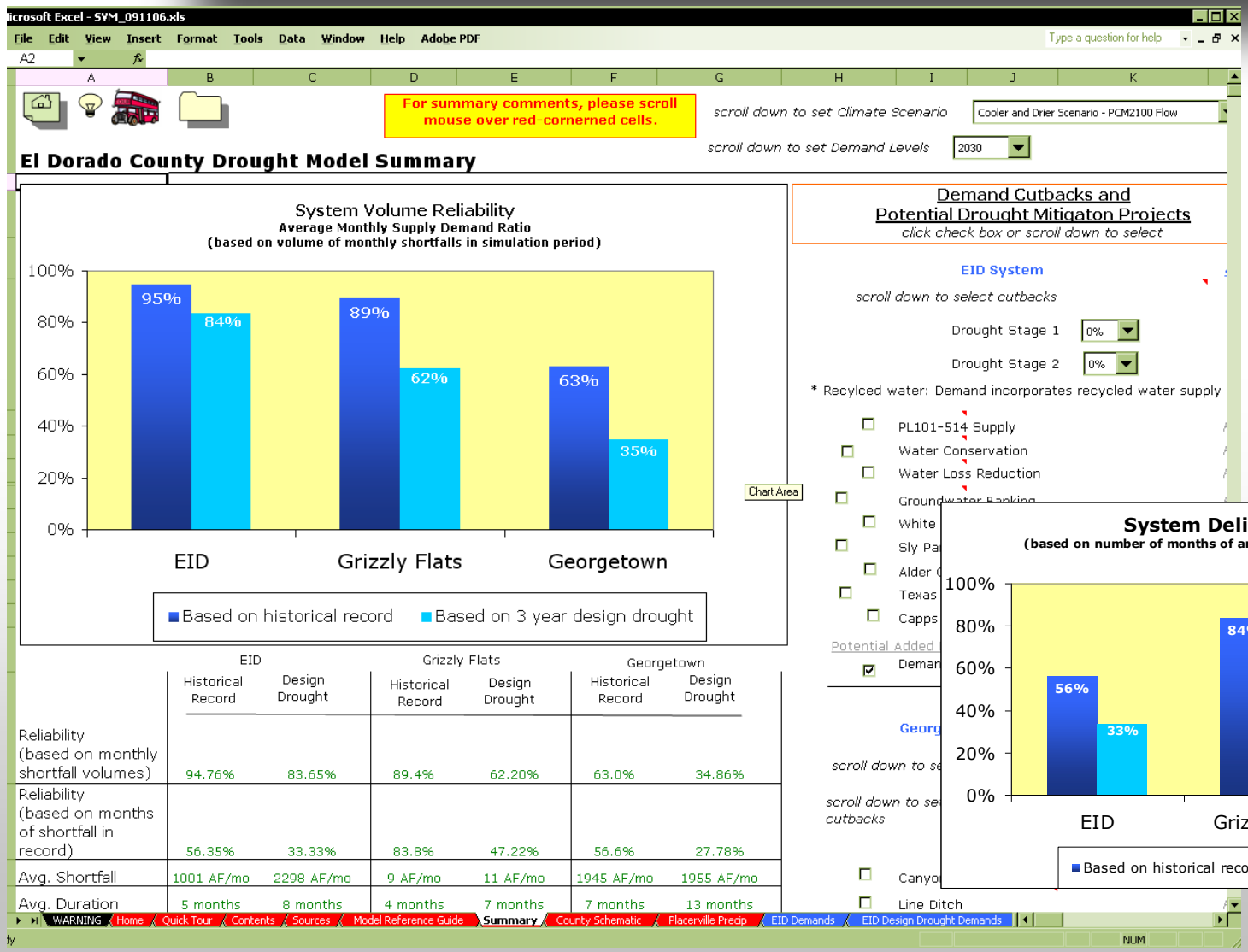
Click to link to Table of Contents

Click to link to Model Reference Guide

BROWN CALDW

Shared Vision Planning Model Benefit: Test Design Droughts



	EID		Grizzly Flats		Georgetown	
	Historical Record	Design Drought	Historical Record	Design Drought	Historical Record	Design Drought
Reliability (based on monthly shortfall volumes)	94.76%	83.65%	89.4%	62.20%	63.0%	34.86%
Reliability (based on months of shortfall in record)	56.35%	33.33%	83.8%	47.22%	56.6%	27.78%
Avg. Shortfall	1001 AF/mo	2298 AF/mo	9 AF/mo	11 AF/mo	1945 AF/mo	1955 AF/mo
Avg. Duration	5 months	8 months	4 months	7 months	7 months	13 months

WEAP Modeling to Address Climate Change

- Water Evaluation and Planning Model (WEAP)
- Uses worldwide climate change models
  - Simulated impacts on:
    - Hydrology
    - Vegetation
    - Water Quality/ temperature
- EPA and NOAA grants
  - NCAR
  - Stockholm Institute

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Summary

- EID story
  - Severe droughts in the past
  - Expecting more frequent and intense droughts
- Long-term water supply planning needs to include climate change
- Modeling to test vulnerabilities using “design drought” simulations
- Drought indicators that incorporate climate change forecasts and real-time data
- Drought preparedness is key to both near and long-term response

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Drought - A National Response

- Drought
  - Economic disasters
    - Larger than earthquakes, floods, etc.
- National Drought Policy
  - National leadership
  - Funding
    - Drought preparedness planning

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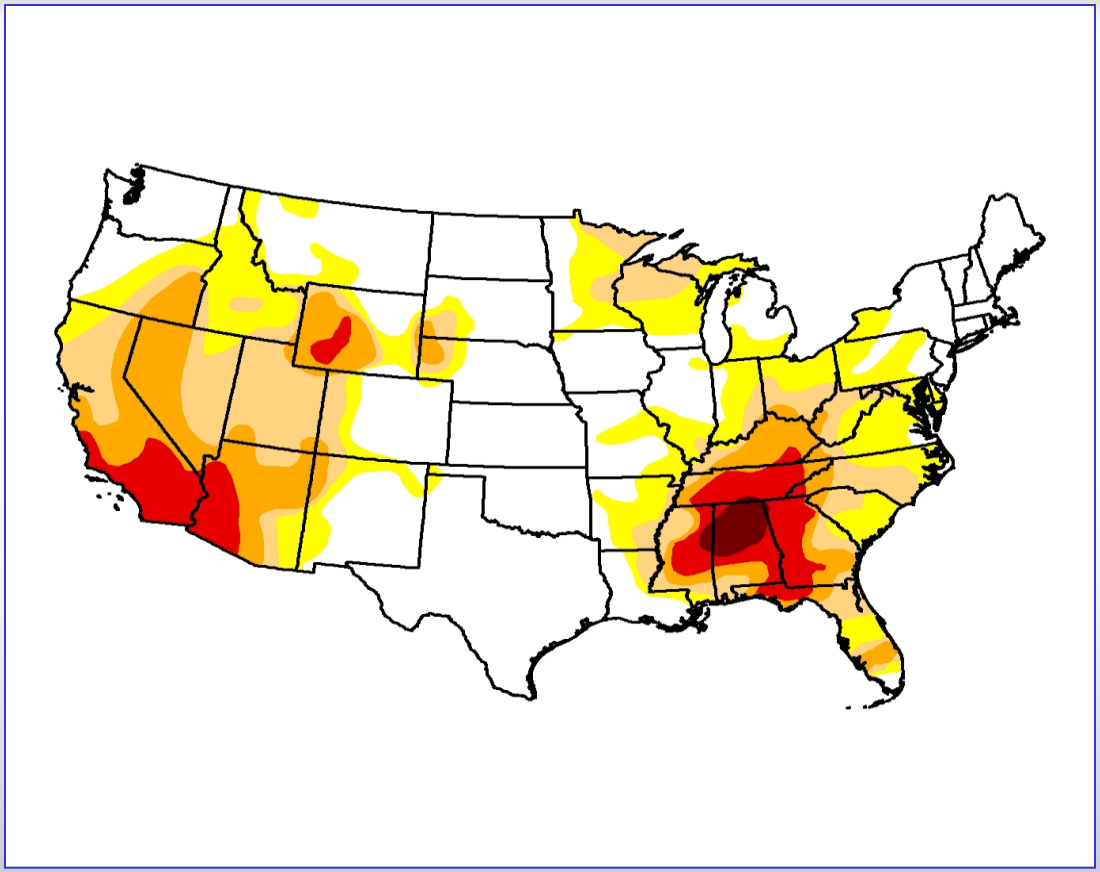
Questions?



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