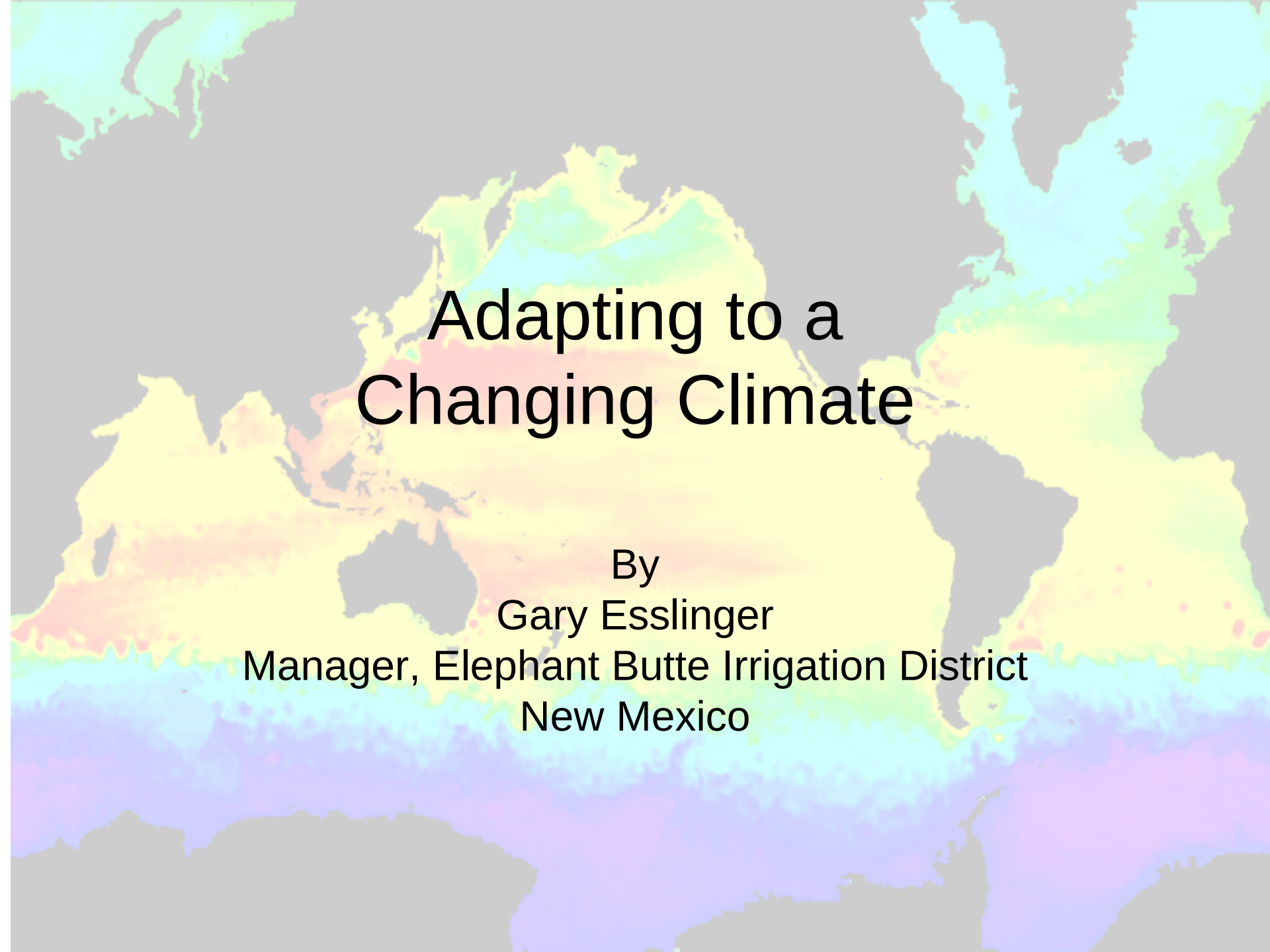
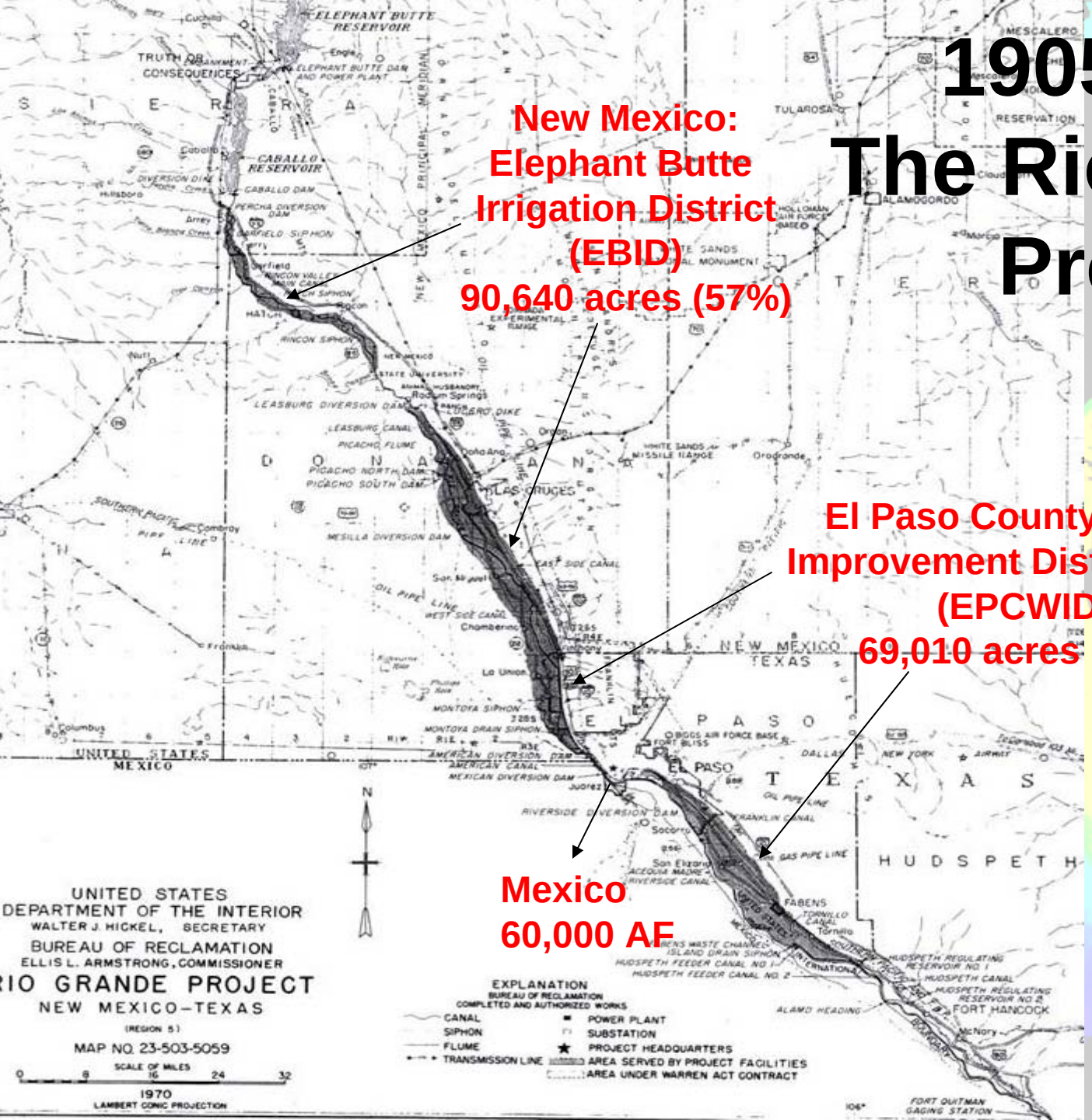


Adapting to a Changing Climate

By
Gary Esslinger
Manager, Elephant Butte Irrigation District
New Mexico

1905-1916 The Rio Grande Project



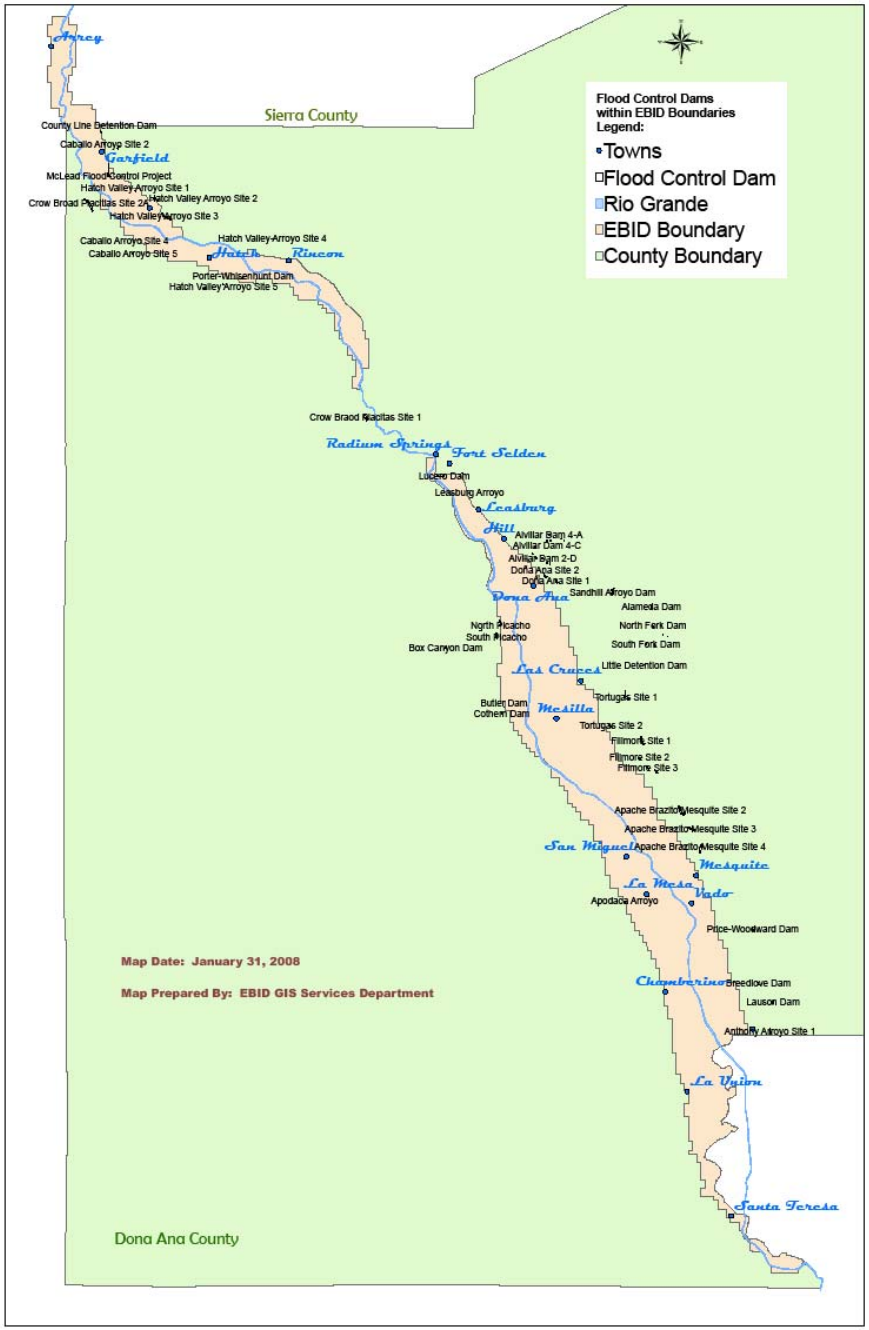
EBID's Planning Scenario

- Long-term decline in average snowpack
  - Historically about 80 percent of Project water supply
- Long-term decline in average local precipitation (primarily monsoonal rainfall)
- Long-term increase in frequency of extreme events (drought, high intensity rainfall/runoff)

EBID Strategies

- Conjunctively manage surface water and groundwater supplies:
  - Surface water as first option – direct use and groundwater recharge
  - Groundwater primarily for drought reserve
- Upgrade flood management infrastructure to provide adequate flood protection
- Further upgrade flood management infrastructure to allow beneficial use of flood water

Flood Control Dams within EBID Boundaries



EBID Initiatives

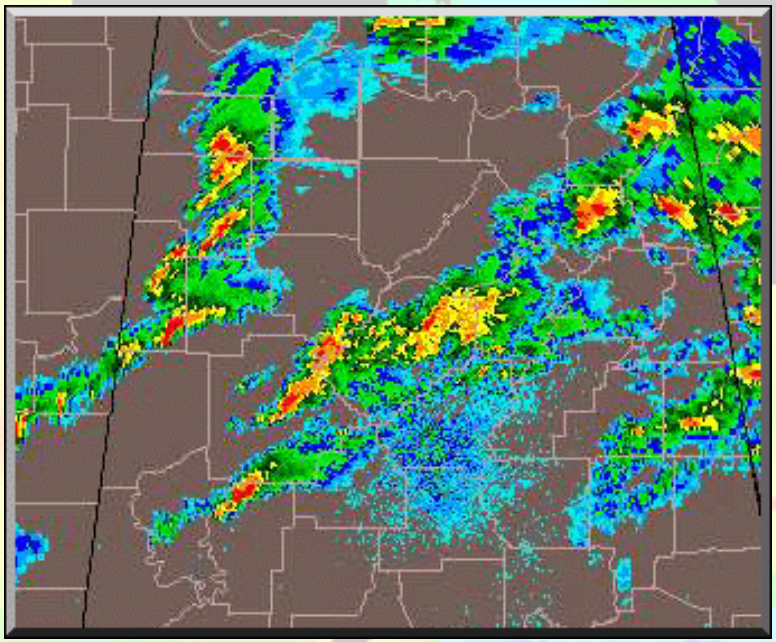
- Advance Warning System
  - NEXRAD Forecasting – NMSU
  - Watershed Weather Instrumentation – ACE
  - Arroyo Flow Measurement - ACE
  - River Flow Monitoring – EBID
- Multifunction Drain Use - NMED
  - Capture, storage, and conveyance of flood flows
  - E. Coli mitigation
  - Habitat establishment

EBID Initiatives

- Regulating Reservoirs
  - Burn Lake – City of Las Cruces
  - Below Mesilla Dam –Proposal to BOR 2025
- NMSU/EBID Dam Safety Center – Legislative funding
  - Technical services
  - Research
  - Planning
- Hydropower - NM Energy Commission
  - Low-head hydropower using existing conveyance facilities
  - Power for drip, sprinkler irrigation, surface water treatment plant
- Remote Sensing – BOR 2025
  - Map current and changing ET for water budgeting

Advance Warning - NEXRAD

- Identify preferential storm paths for optimal instrumentation location
- Monitor trajectory and intensity of storms real-time for flood response
- Develop image processing algorithms for short-term forecasting (NMSU)
- Retain or release floodwater based on incoming weather



Watershed Instrumentation Arroyo Metering (ACE)

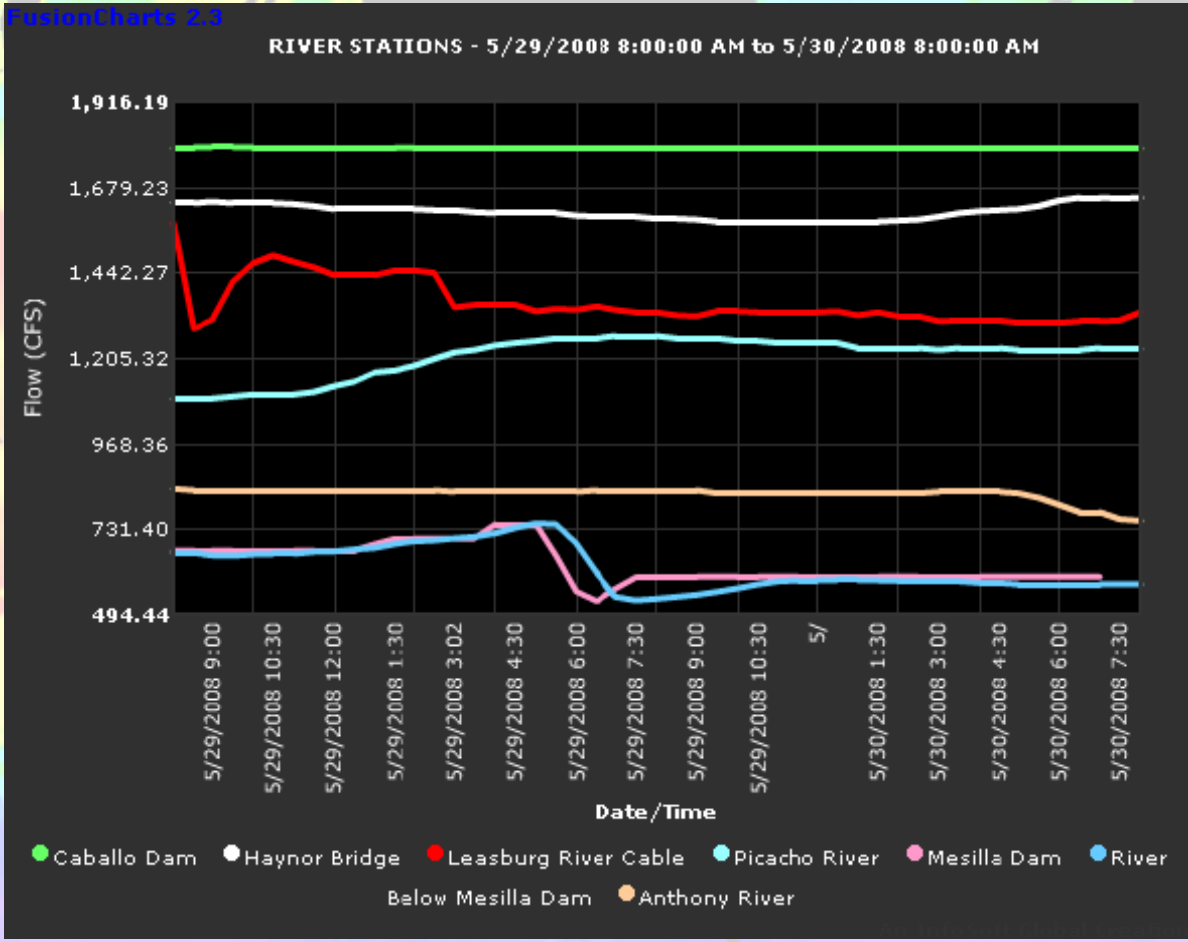
- Early Warning from rain gauges in upper watersheds
  - Flood warning
- Flumes for metering flow into Rio Grande
  - Flood warning
  - Diversion management
- Calibrate hydrologic models of watersheds
  - Improve forecasting
  - Improve statistical characterization of flood flows
  - Identify and prioritize areas for stormwater capture

Reservoir Instrumentation

- Track outlet flow and potential for emergency spillway flow
- Track remaining retention space
- Much safer and more timely than visual confirmation

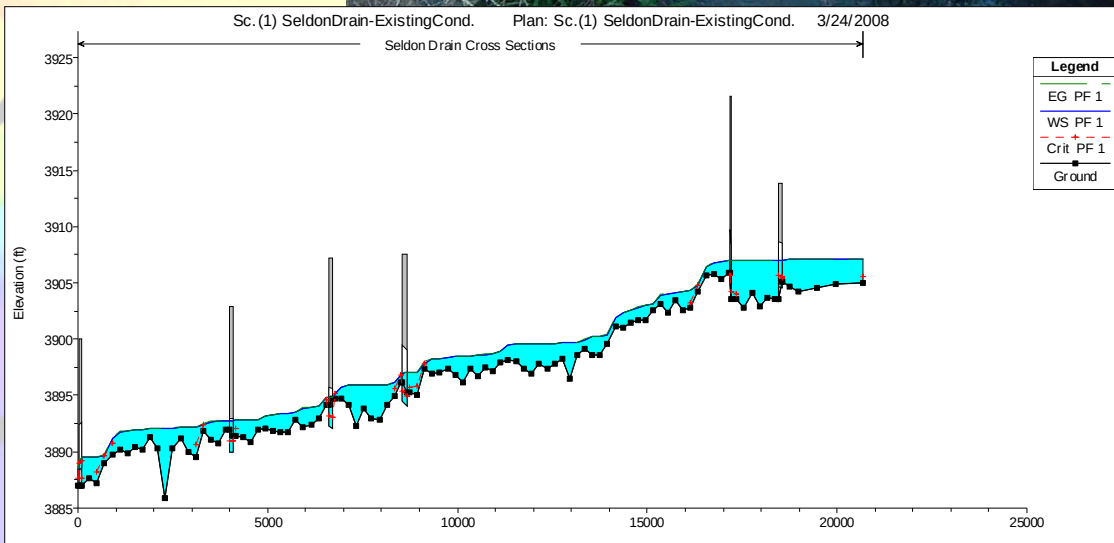
River Metering Stations

- 7 operational stations from Caballo Dam to the Texas State Line
- 20 minute real-time data, radio telemetry
- Operations management
- Flood tracking and warning
- Available on web, used by many local agencies



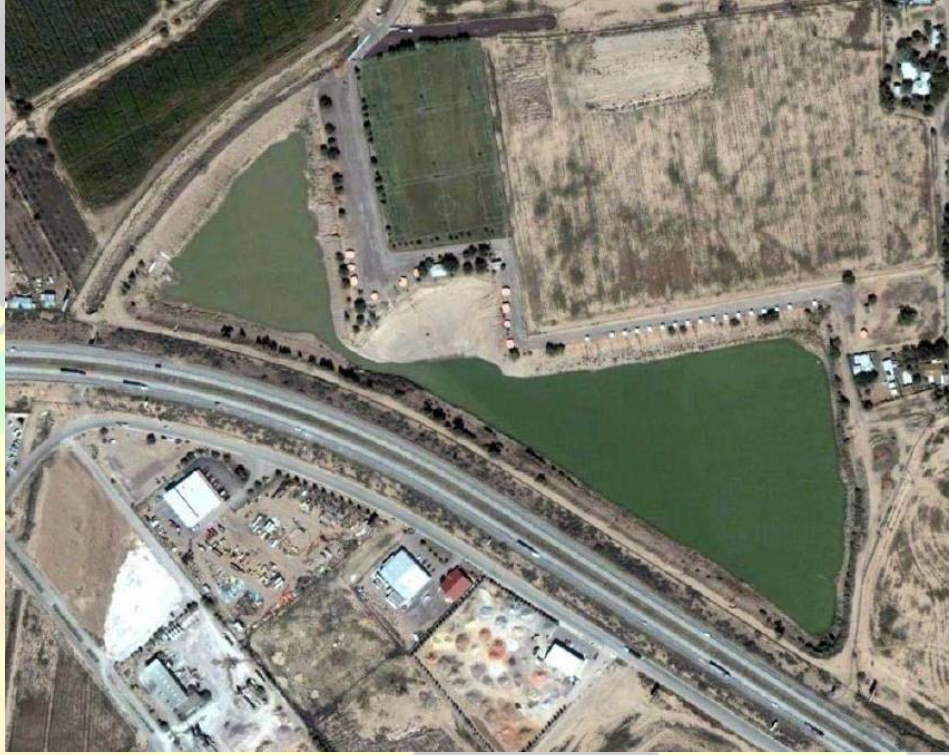
Multi-function Drain Use (NMED)

- Agricultural Drainage
  - Water table control
  - Salt removal
- Habitat Establishment
- Storm water storage and regulation
- E. Coli mitigation from runoff



Regulating Reservoirs

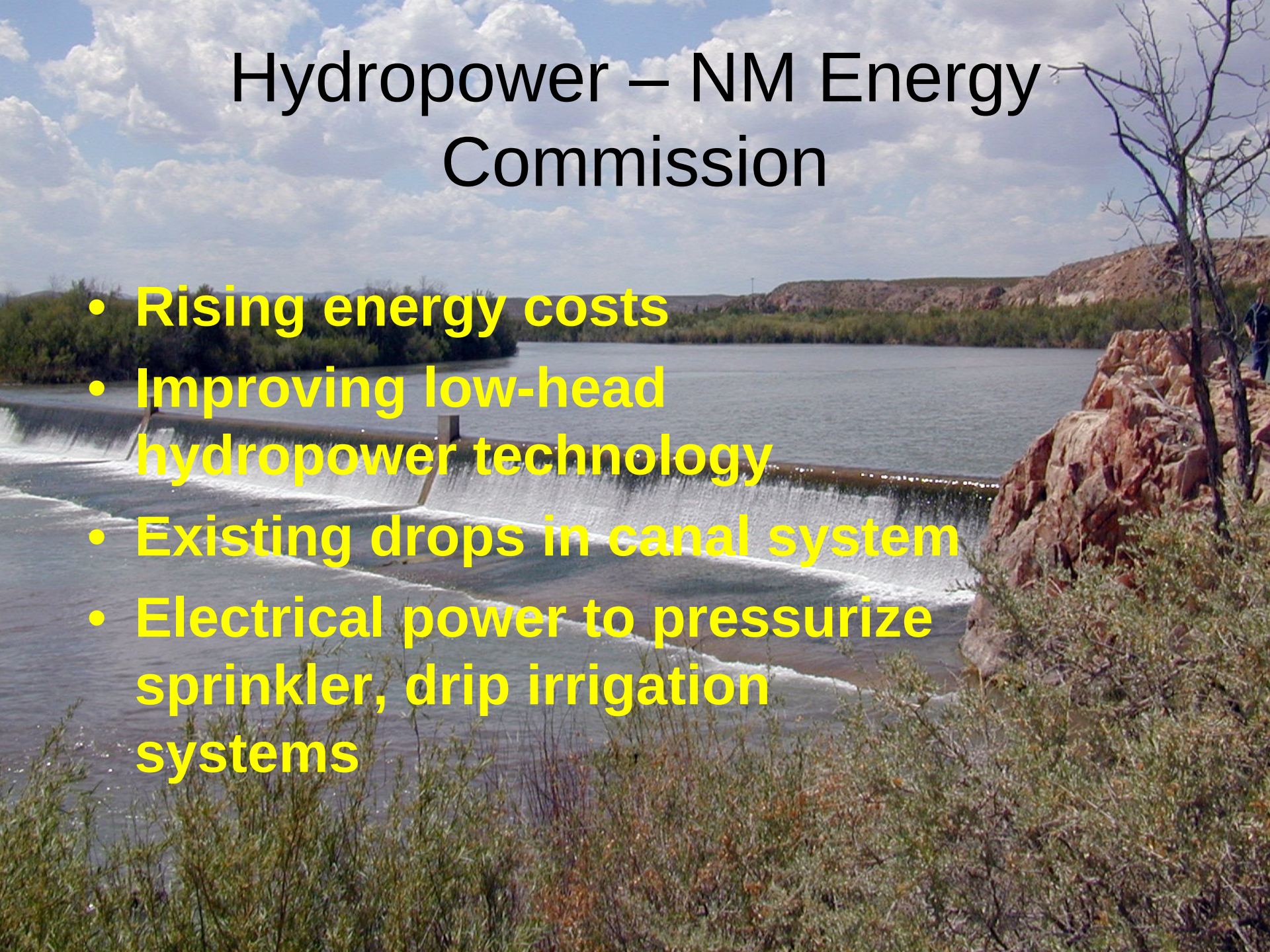
- Burn Lake – Water 2025 grant in partnership with City of Las Cruces
- Westside Canal, Mesilla Dam – 2025 proposal



NMSU Dam Safety Center

- NM Legislative funding FY 2009
- Technical services:
  - Hydrology studies
  - Breach analyses
  - Inundation mapping
  - Emergency action planning
- Research
  - “Smart” dams – instrumentation, non-destructive testing
  - Management for flood water use
  - Financial analysis
- Training
  - Dam inspectors

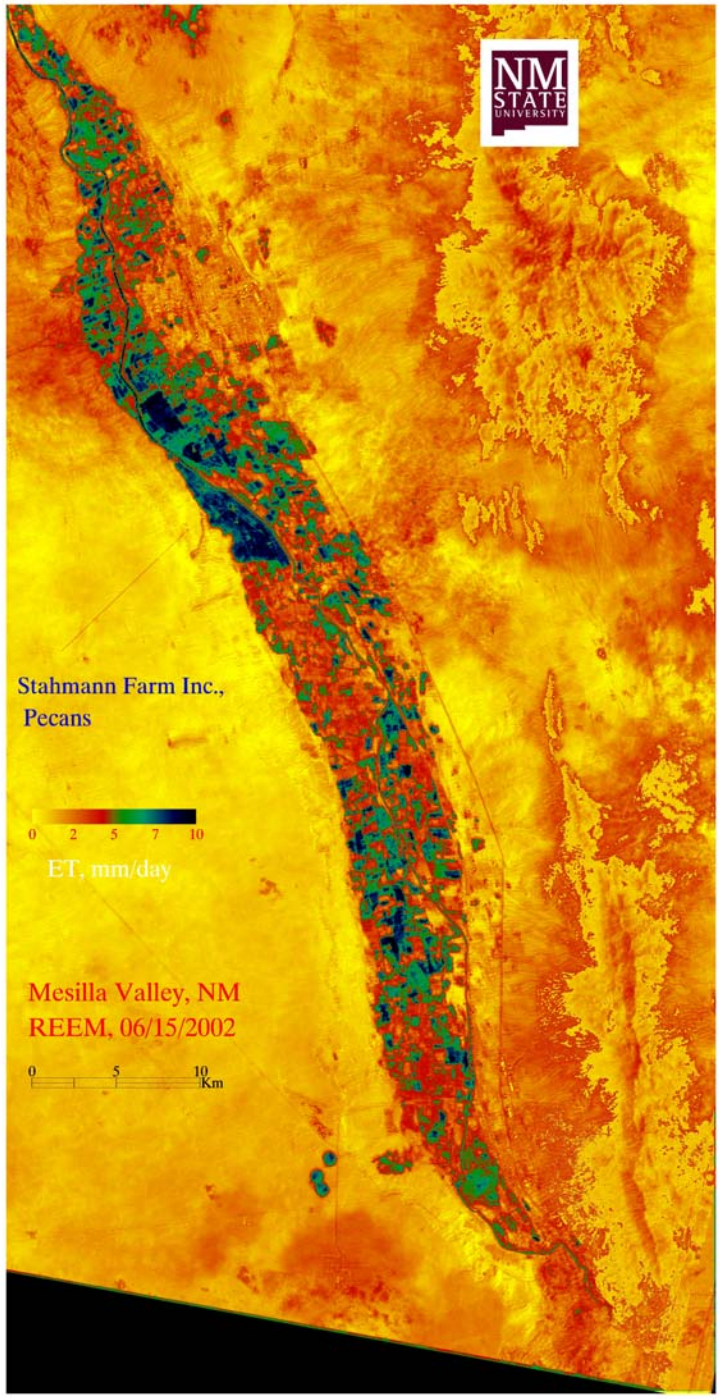
Hydropower – NM Energy Commission



- **Rising energy costs**
- **Improving low-head hydropower technology**
- **Existing drops in canal system**
- **Electrical power to pressurize sprinkler, drip irrigation systems**

Remote Sensing

- Evapotranspiration mapping
- Depletion changes with:
  - Changing crops
  - Drought cycles
  - Climate change
- Key to interstate, international water management



Management Strategies

- Reduce upstream release, use storm water in river to make diversions and downstream delivery
- Infiltrate captured water in reservoirs
- Release from reservoirs into canal system
  - Irrigation, surface water treatment plants
  - Infiltration
- Store in drains
- Regulating reservoirs
- Infiltrate by delivering to land that does not require irrigation

Needs

- Adaptive Research – Dam Safety Center, New Mexico State University
- Local, state, and federal investment in infrastructure
  - Rehabilitate existing dams
  - Additional storage/retention capacity
  - Data collection infrastructure
- Financial mechanisms that provide for adequate O&M, upgrades
- Cooperation among water users and water use sectors

Thank You!

Questions?