

The background is a light gray gradient. It is decorated with numerous realistic water droplets of various sizes, some clustered and others isolated. In the upper center, there is a faint, circular logo that appears to be the United Nations emblem, featuring a world map and olive branches.

DEALING WITH DROUGHT

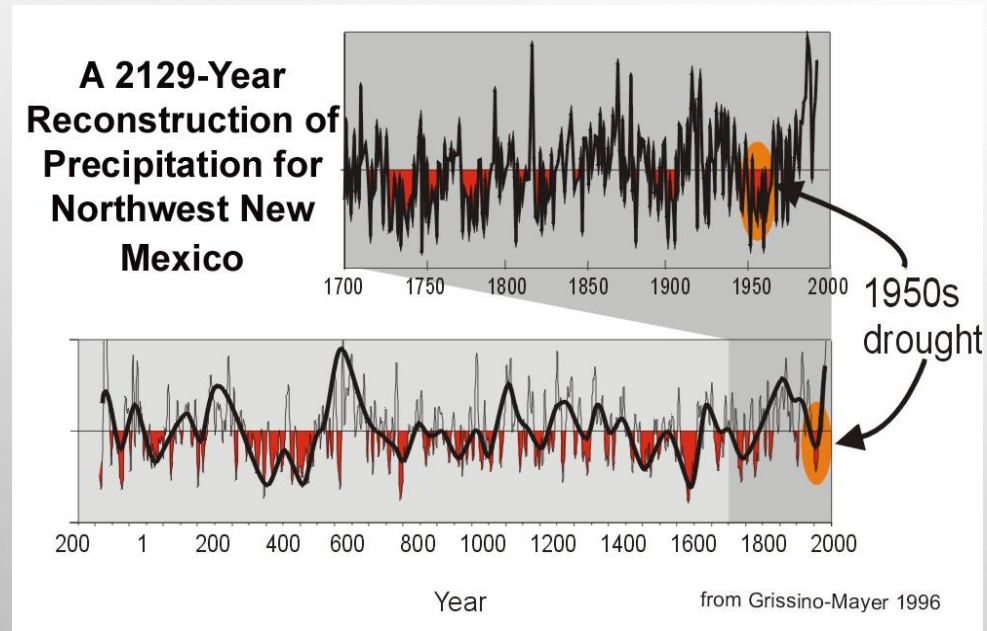
A SURFACE WATER PERSPECTIVE

Steven T. Howser,

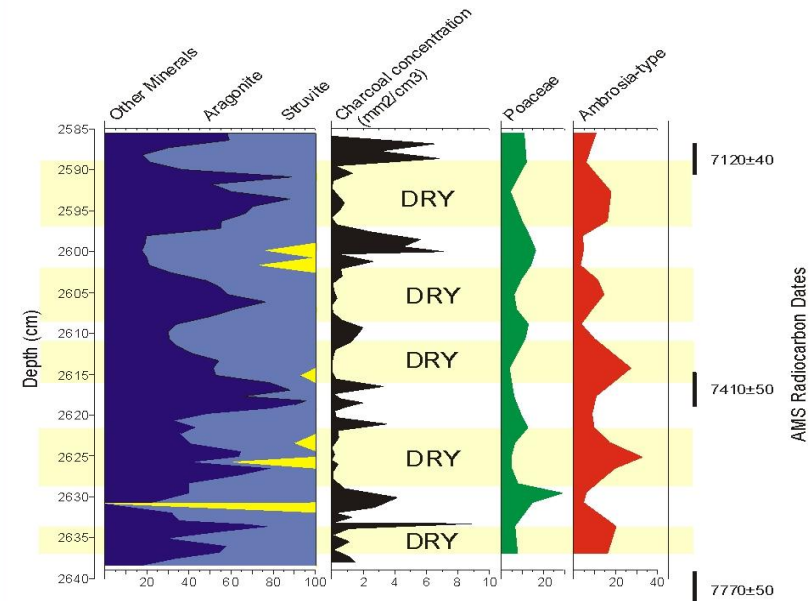
General Manager, Aberdeen-Springfield Canal Company

DROUGHT IS NOT NEW

- Long-term data



EVIDENCE of DROUGHT from MID-HOLOCENE LAKE SEDIMENTS Kettle Lake, Williams County, North Dakota



PRAIRIE (Paleoenvironmental Reconstructions of Aridity:
Interdisciplinary Research Initiative) E. Grimm, J. Clark, J. Donovan (unpublished)

IRRIGATED AGRICULTURE IS NOT NEW

- Earliest archaeological evidence of irrigated agriculture dates to about 6,000 BCE in the Jordan Valley
- The earliest pictorial representation of irrigated agriculture is from Egypt and dates to around 3,100 BCE
- From about 3,000 BCE to 2,000 BCE irrigated agriculture spread throughout Persia, the Middle-East and westward. It also appeared around this time across the Asian continent.
- In the western hemisphere irrigation was practiced by the Aztecs and Mayans. The Hohokam, in central Arizona, built at least 700 miles of canals in the 14th century.



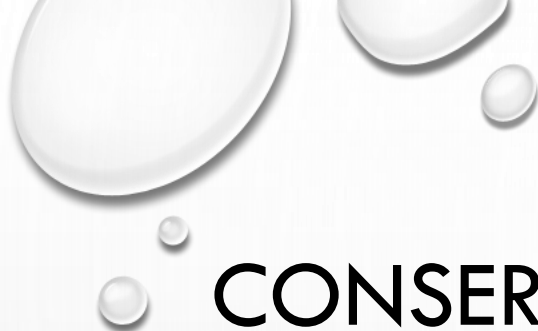
IRRIGATION TODAY

- Starting in the mid-1800's people started diverting water from the Snake River for irrigation
 - The Carey Act and Reclamation Act started a new era in irrigated agriculture, bringing millions of acres under production in the 17 western states, with about 1 million acres developed in Idaho.
 - By the early 1900's it became apparent that the 'natural flow' of the river was too inconsistent to provide a sufficient supply of water every year. The first dam on Jackson Lake was constructed in 1906, and later rebuilt by the USBR.
 - Today, the upper Snake River reservoir system has a capacity of approximately 4 MAF
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RESERVOIRS AND DROUGHT

- Several times since the completion of the upper Snake reservoir system we've experienced short-term drought (2-3 years)
 - Storage water allowed irrigators to make it through these periods with relatively little damage
 - However, the '100 year drought' we experienced at the beginning of this century drained the reservoirs
 - It is very unlikely that we will construct any more storage reservoirs on the upper Snake
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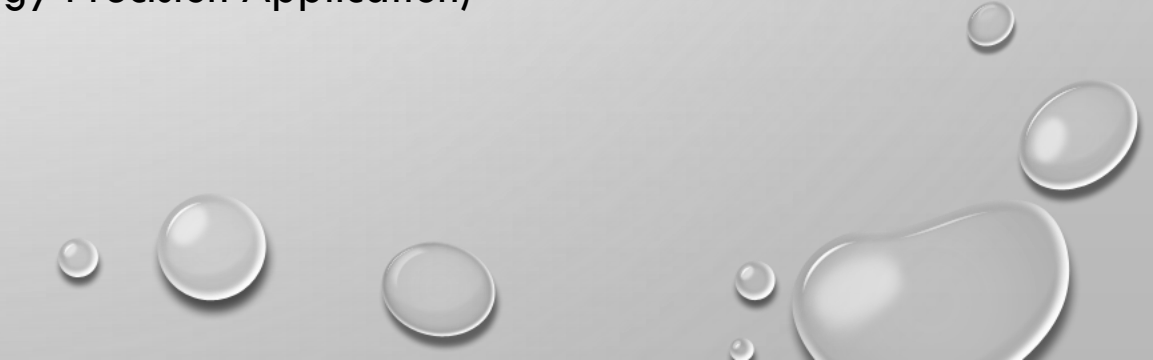


CONSERVATION AND EFFICIENCY

- Without additional storage capacity, conservation and irrigation efficiency must be maximized
 - Canal system
 - On farm
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ON FARM

- Well maintained systems
 - Proper nozzle size
 - No leaking gaskets
 - End gun management
 - Technology
 - Soil moisture sensors/monitoring
 - LESA/LEPA (Low Energy Sprinkler Application/Low Energy Precision Application)
 - Measuring devices
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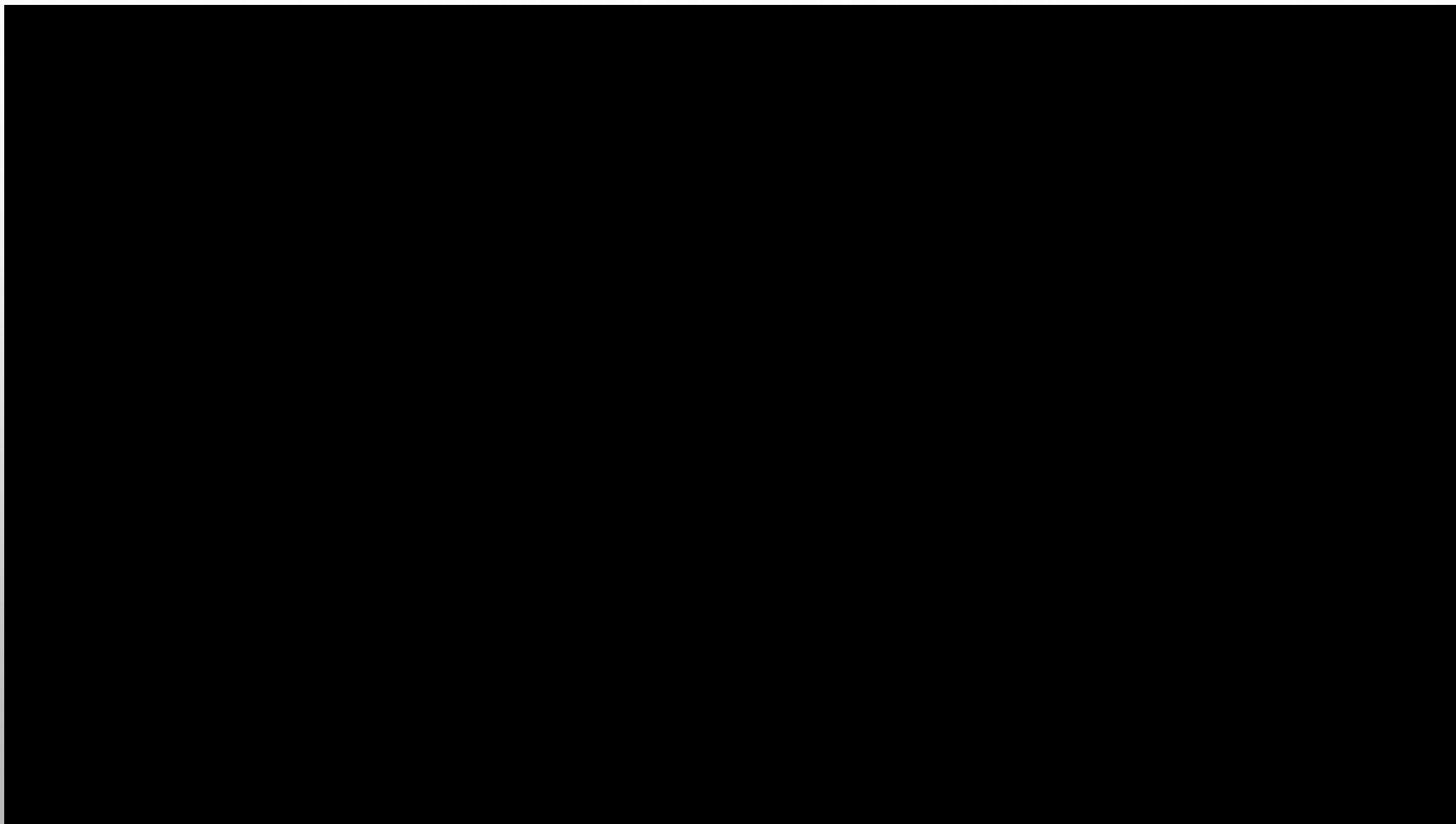
CANAL SYSTEMS

- Accurate measurement (you can't manage what you don't measure)
- Automation
 - Monitoring (part of measurement)
 - Control (automated control can save significant amounts of water)
- Limit spill (a happy by-product of accurate measurement)
- Reduce loss
 - Proper maintenance of the canal prism to facilitate flow
 - Lining to minimize transmission loss ($\sim 62\%$ for ASCC = 200 KAF/year)

MAINTENANCE



LINING



Questions

