



The Long-Term Agro-Ecosystem Research (LTAR) Network: Current Status & Future Trends

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Mark R. Walbridge

National Program Leader

Water Availability & Watershed Management Program

LTAR Coordinator

Philip Heilman

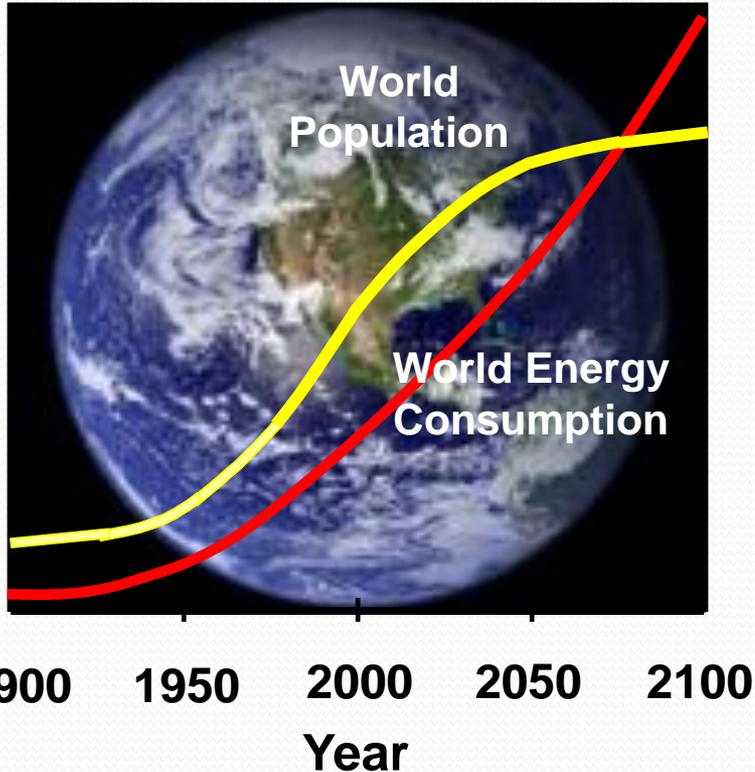
Research Leader

SWRC

LTAR Core Team



Grand Challenges Facing Agriculture in the 21st Century



By 2050, agriculture will need to:

- Supply enough agricultural products to support a global population of 9.7 billion people;
- Without depleting our natural resources or degrading our environment;
- Against a background of changes in climate that are expected to alter patterns of temperature and precipitation on which the world's food production systems depend.

These challenges threaten our food security & the availability of fresh water for a variety of needs.

Calls for the Creation of a Long-Term Research Network for Agro-ecosystems (Walbridge & Shafer 2011)

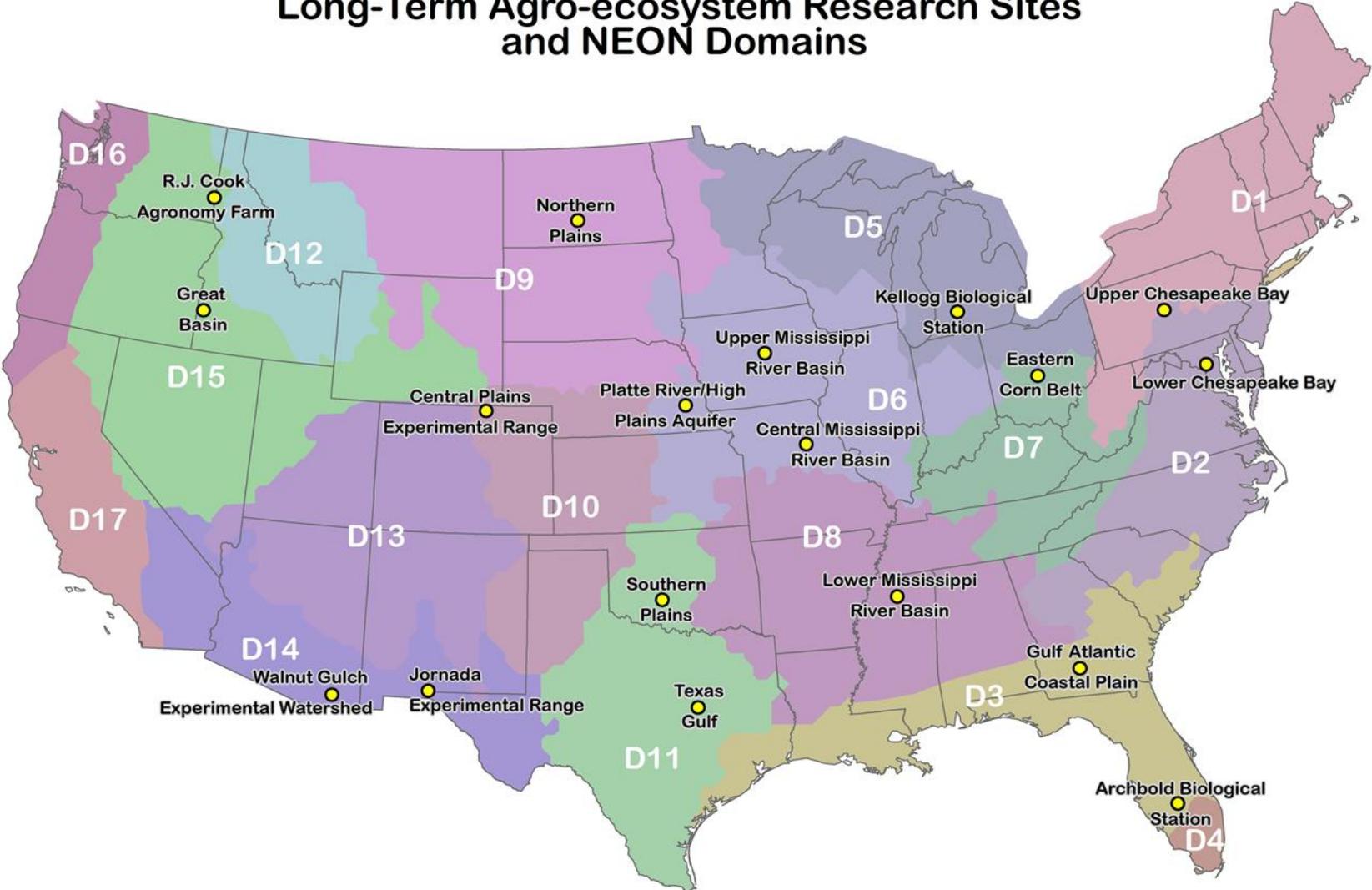
(Similar to NSF's LTER network for Non-Managed Ecosystems)

- ***Infrastructure to:***
 - *enable research on agricultural processes from field to landscape scales;*
 - *support long-term investigations into key components of the sustainable intensification of agricultural production;*
- ***Historical data records would provide a baseline against which to evaluate future changes;***
- ***Collect common datasets using shared research protocols over the next 30-50 years—likely representing the most important datasets collected by such a network.***

In Feb. 2012 Announced First 10 Sites, and in Feb. 2014, Added 8 New Sites to the LTAR Network

- **Fill critical gaps in the existing network**
- **Extend the LTAR network to partner sites outside ARS and USDA**
- **Expand LTAR site coverage to the**
 - **Critical Zone Observatory (CZO) Network**
 - **The National Network of Biological Field Stations**

Long-Term Agro-ecosystem Research Sites and NEON Domains



Long Term Agro-Ecosystem Research Network

Shared Research Strategy (www.ars.usda.gov/ltar)

Four Priority Areas of Concern

- 1) Agro-ecosystem Productivity and Sustainability;
- 2) Climate Variability and Change;
- 3) Conservation and Environmental Quality;
- 4) Socio-economic Viability and Opportunities.

Recent Events/Next Steps

- ARS FY14 Budget added \$10 M/year for LTAR network
- Develop Observatories and Data Access
- Network Wide Experiments: GRACEnet (greenhouse gas reduction), denitrification, wind erosion
- Develop “Common Experiments”



Long-Term Agroecosystem Research Common Meteorology Data (Alpha Pilot)

[CORe Home](#)

[Meteorology Home](#)

[Real-Time Cameras](#)

From

To

Walnut Gulch Experimental Water

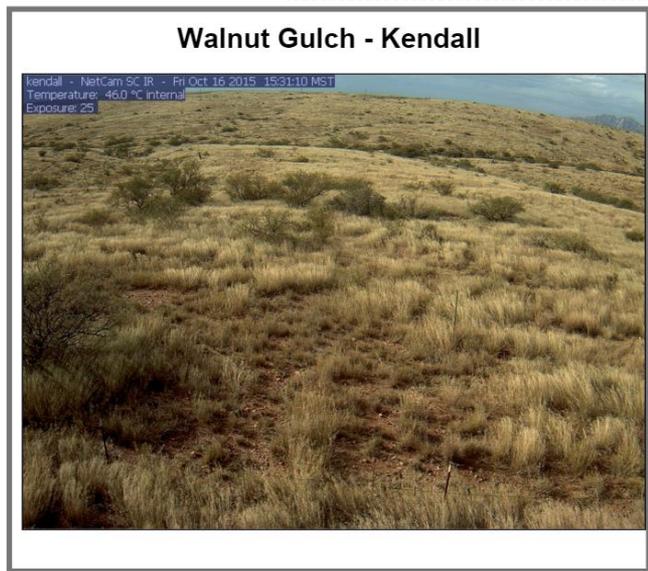
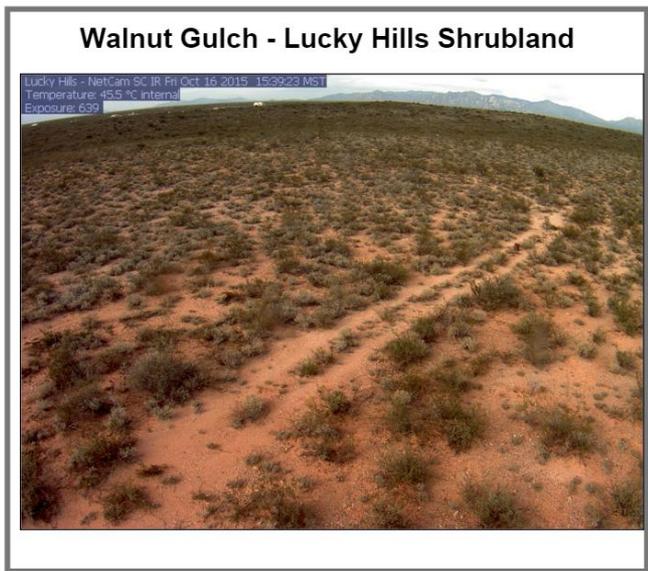
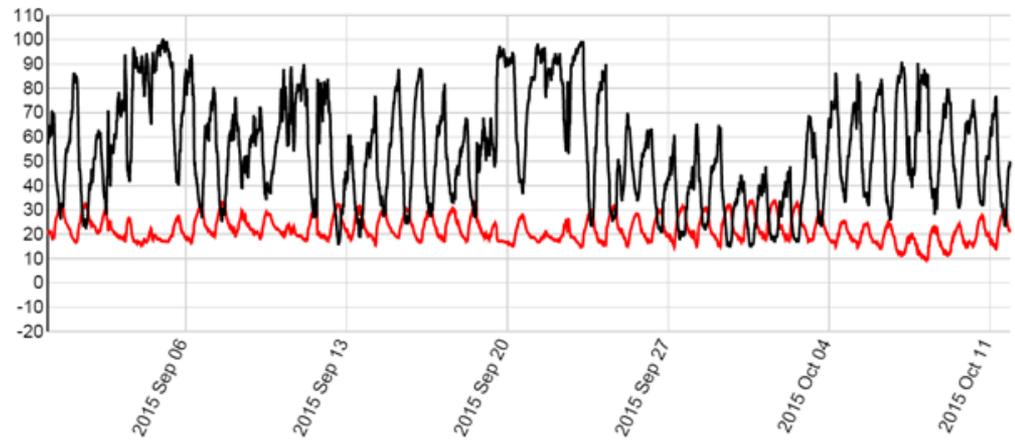
Display meteorology data

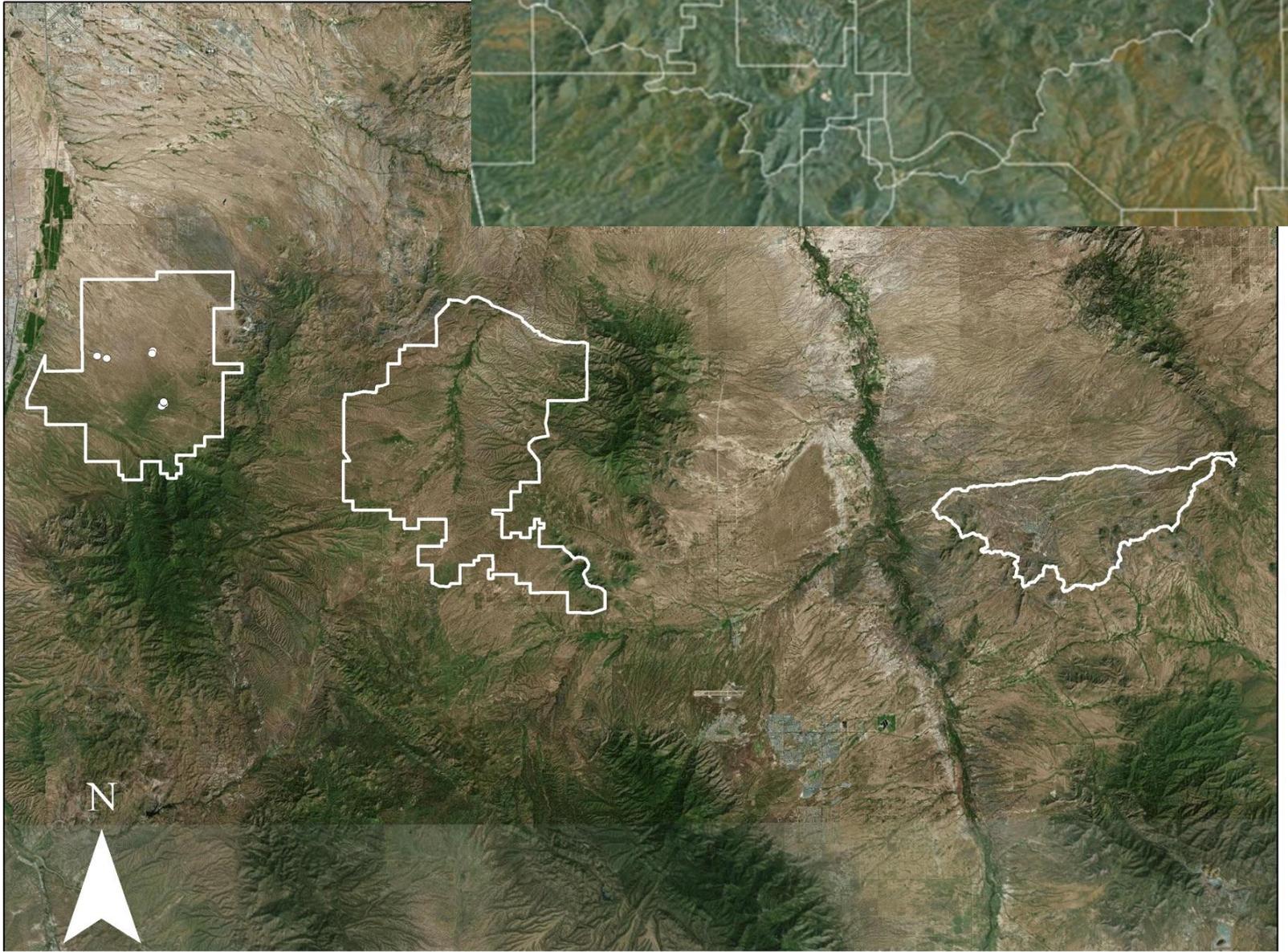
Reset

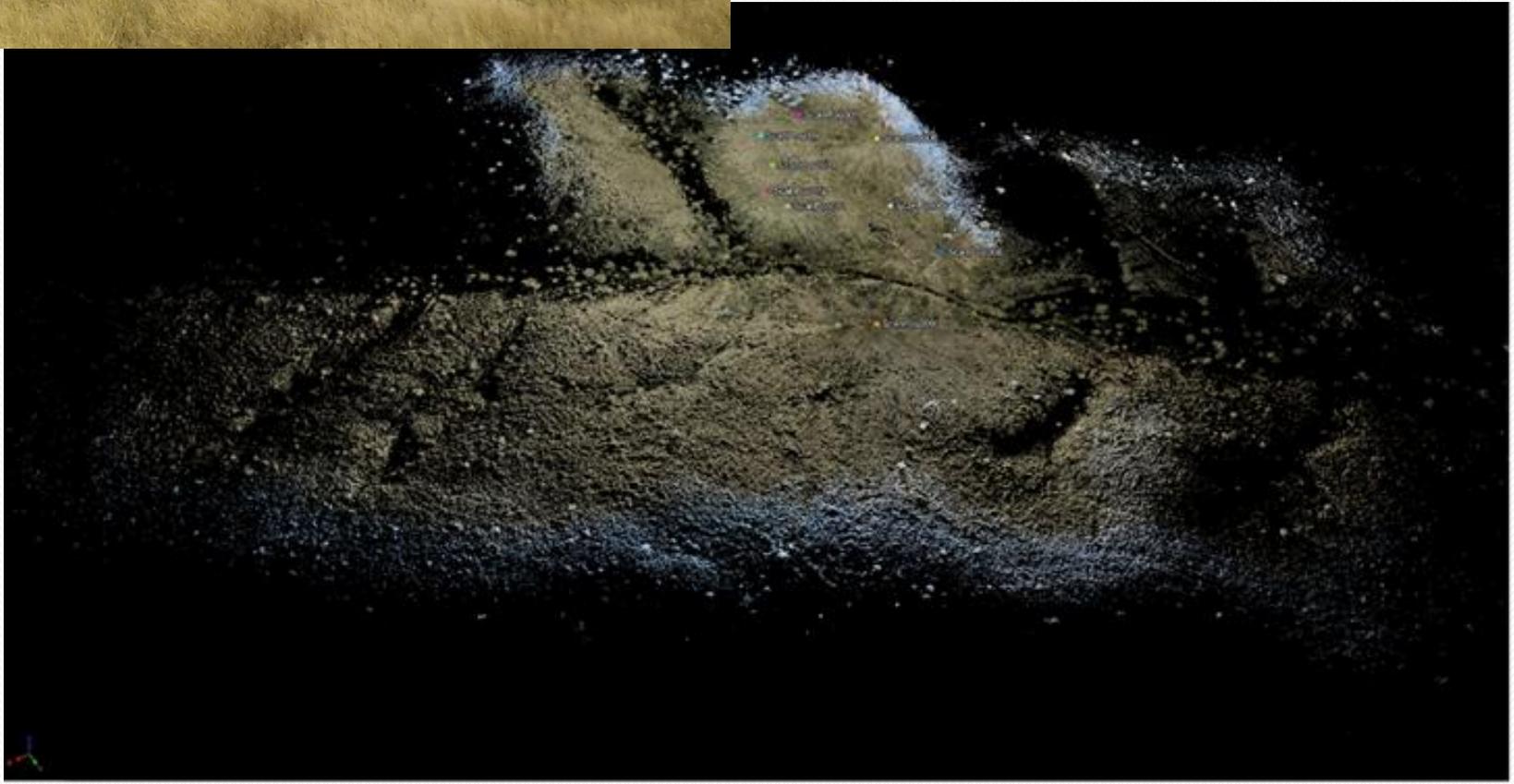


Data management services provided by National Agricultural Library

Air Temperature Air Pressure Precipitation Wind Speed Relative Humidity





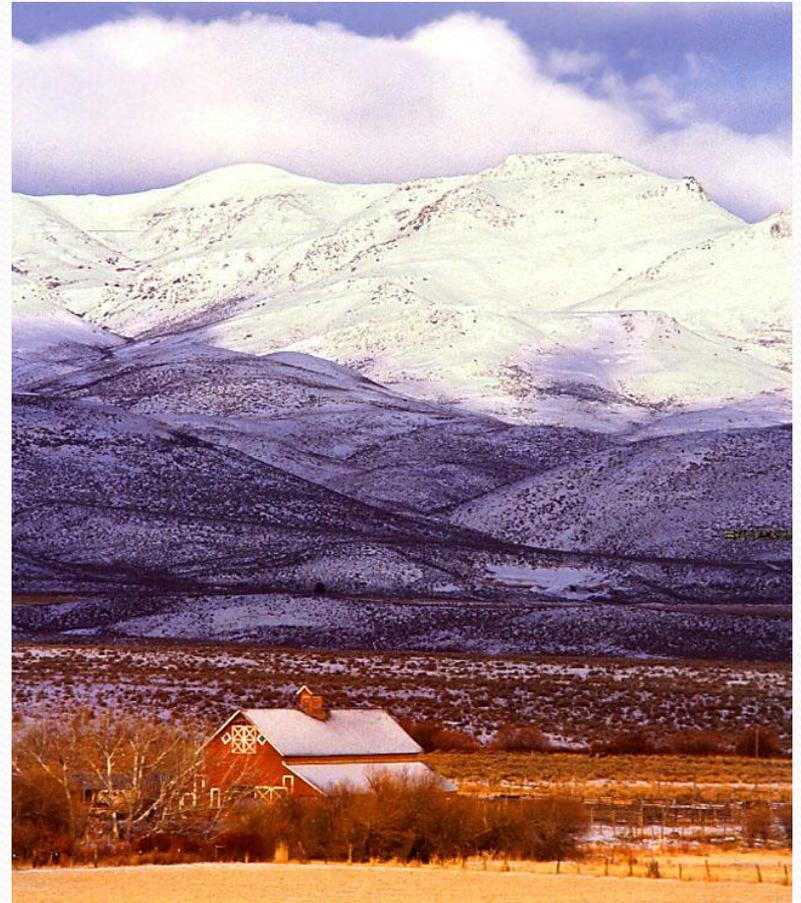


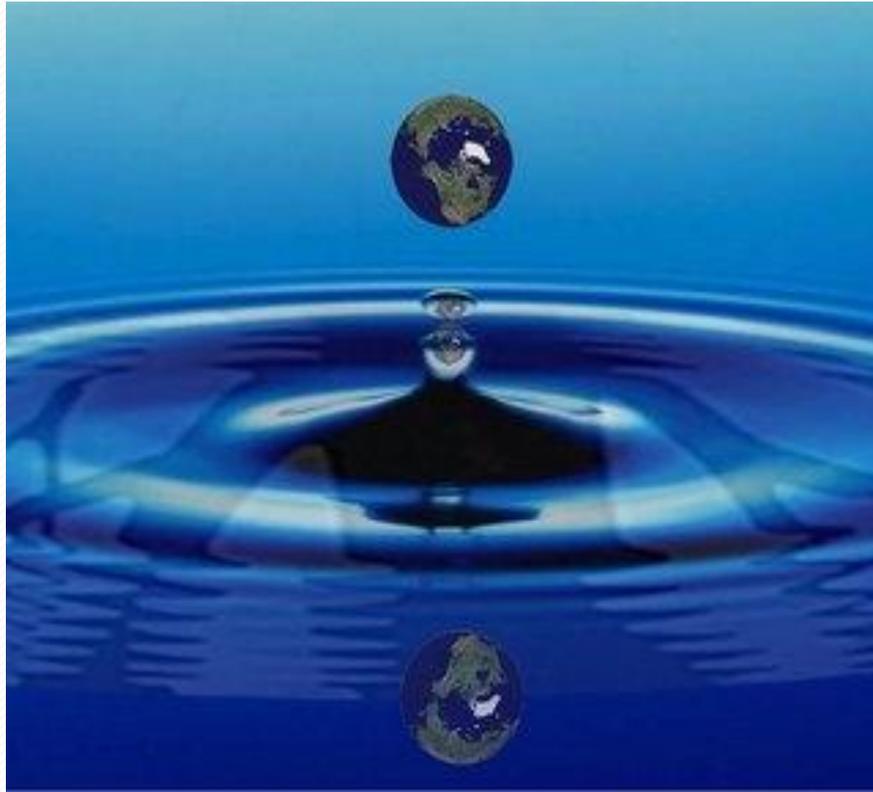


Watersheds 7 and 8 on the Santa Rita Experimental Range

Summary

- As the 21st Century unfolds, agriculture is facing tremendous (grand?) challenges. Addressing these challenges will require transformative changes to agriculture.
- Establishing a long-term agro-ecosystem research network is an important component of understanding how to make these changes.
- The Walnut Gulch Experimental Watershed LTAR site is working with the SRER to better understand management impacts on production and brush management impacts on ecosystem service flows.





Dr. Mark R. Walbridge
National Program Leader
Water Availability &
Watershed Management
LTAR Coordinator



Contact Information
(301) 504-4731 (phone)
(443)-995-7055 (mobile)
mark.walbridge@ars.usda.gov
www.ars.usda/ltar