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Priorities for Watershed Assessment and Science in the Conservation Effects Assessment Project (CEAP)

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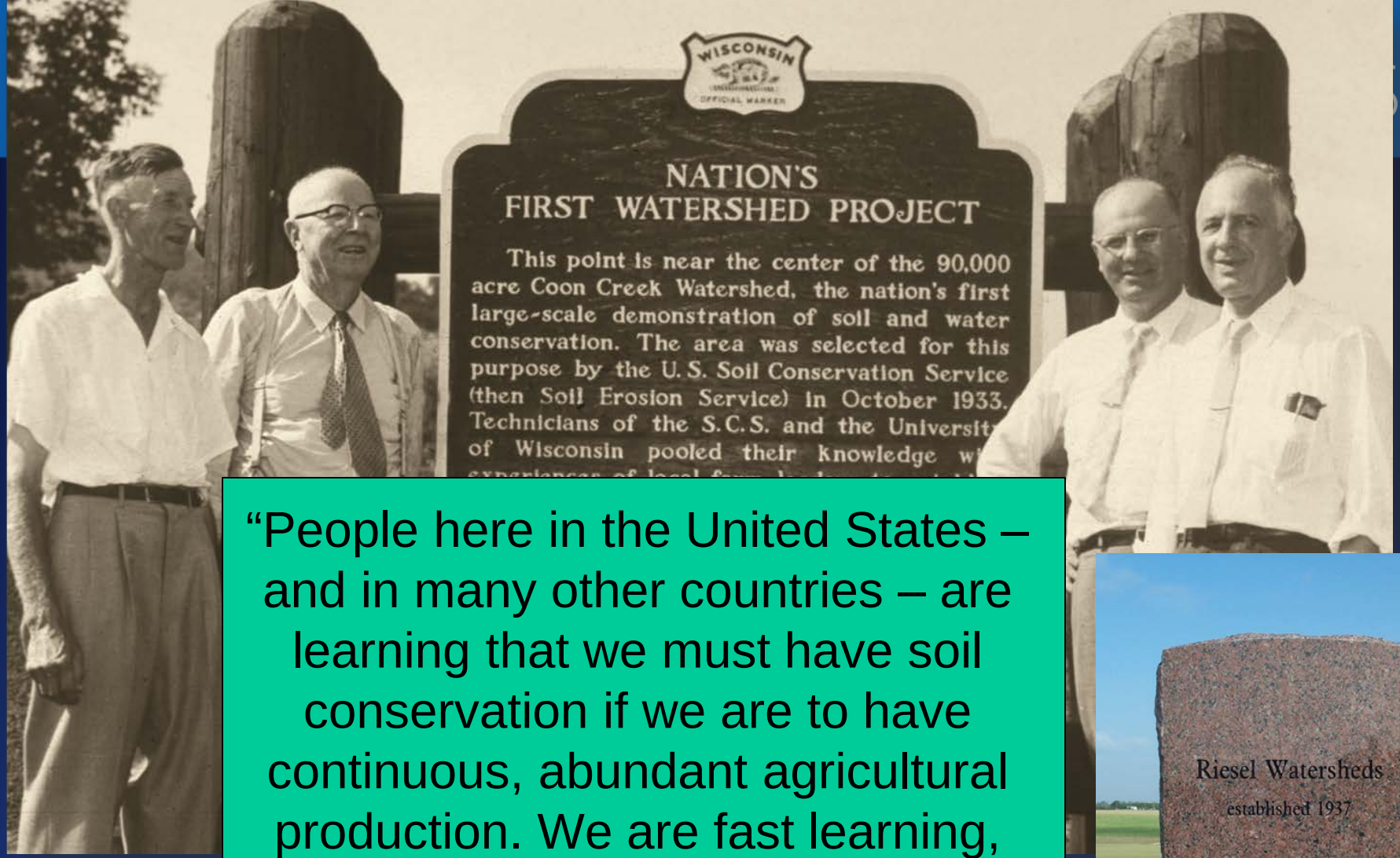
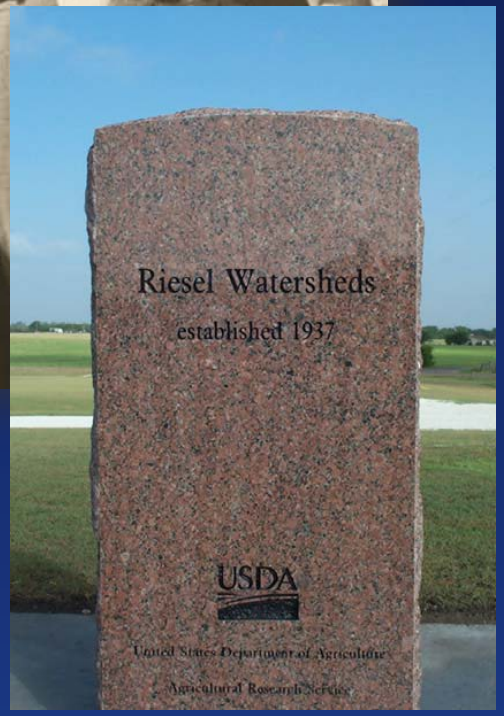
USDA ARS NP211 Stakeholder Workshop
May 20, 2015



"People here in the United States – and in many other countries – are learning that we must have soil conservation if we are to have continuous, abundant agricultural production. We are fast learning, too, that it must be effective conservation…"

Dr. Hugh H. Bennett, 1946, JSWC 1 (1): 21-24.



Carrying on the Vision:

- **Vision:** enhanced natural resources and ecosystems through
  - more effective conservation
  - better management of agricultural landscapes

- **Goal:** Improve efficacy of conservation practices and programs
  - Conservation Planning and Implementation
  - Management Decisions and
  - Policy

Maresch, et al., 2008, JSWC Vol. 63, No. 6, pp. 198A-203A.

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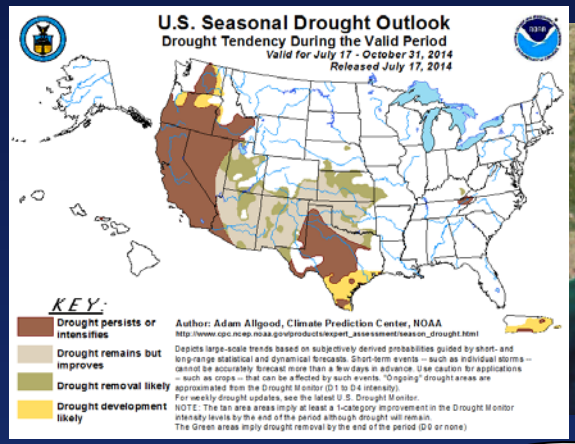
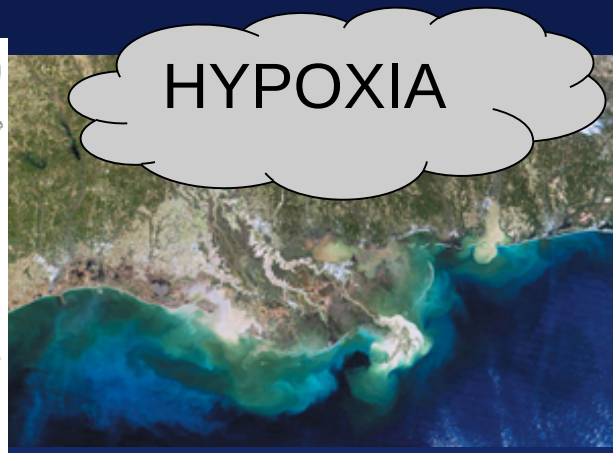
Challenges of Yesterday (2008)… and of Tomorrow

- Drought & Water Availability
- Climate Change, Extreme Events
- Land Use Change
- Translating Science Into Practice
  - Targeting
  - Planning





Maresch, et al., 2008, JSWC Vol. 63, No. 6, pp. 198A-203A.

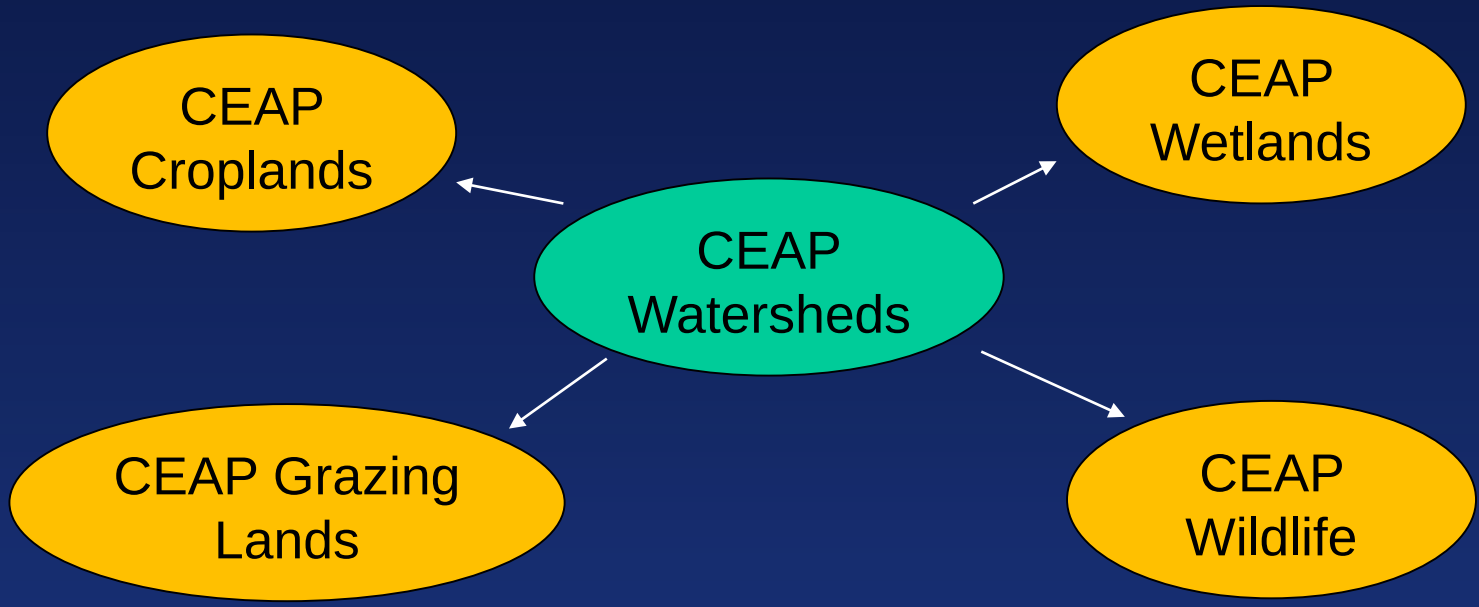
Carrying on the Vision:
CEAP Goals Over Last 10 Years

- Estimate conservation effects and benefits at regional and national scales
- Develop scientific understanding of conservation practice effects at watershed scales

Duriancik, et al., 2008, JSWC Vol. 63, No. 6, pp.185A-197A.

Collaboration and Integration

- Science Support for Water and Soils –



- Linking Scales and Bridging Gaps

Groffman, P., A.Gold, L.F. Duriancik, R.Lowrance al. 2010. From Connecting the Dots to Threading the Needle: The Challenges Ahead for Managing Ag Landscapes for Env'l Quality. *in* MAL II. SWCS. pp 1-12.

Goals of the Watershed Studies:

- quantify the measurable effects of conservation practices at the watershed scale
- enhance understanding of conservation effects in the biophysical setting of a watershed

Duriancik, et al., 2008, JSWC Vol. 63, No. 6, pp.185A-197A.

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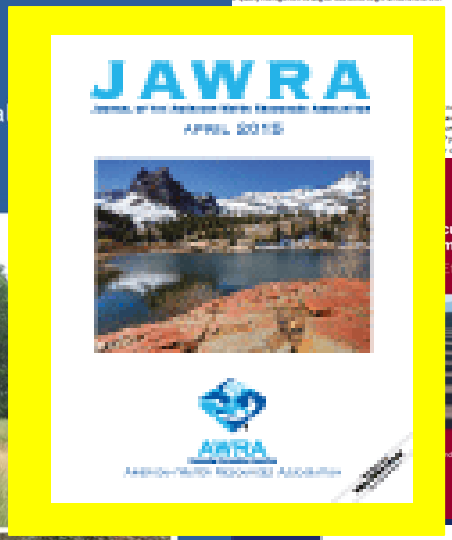
intercept or

How to Build Better Agricultural Conservation Programs to Protect Water Quality:

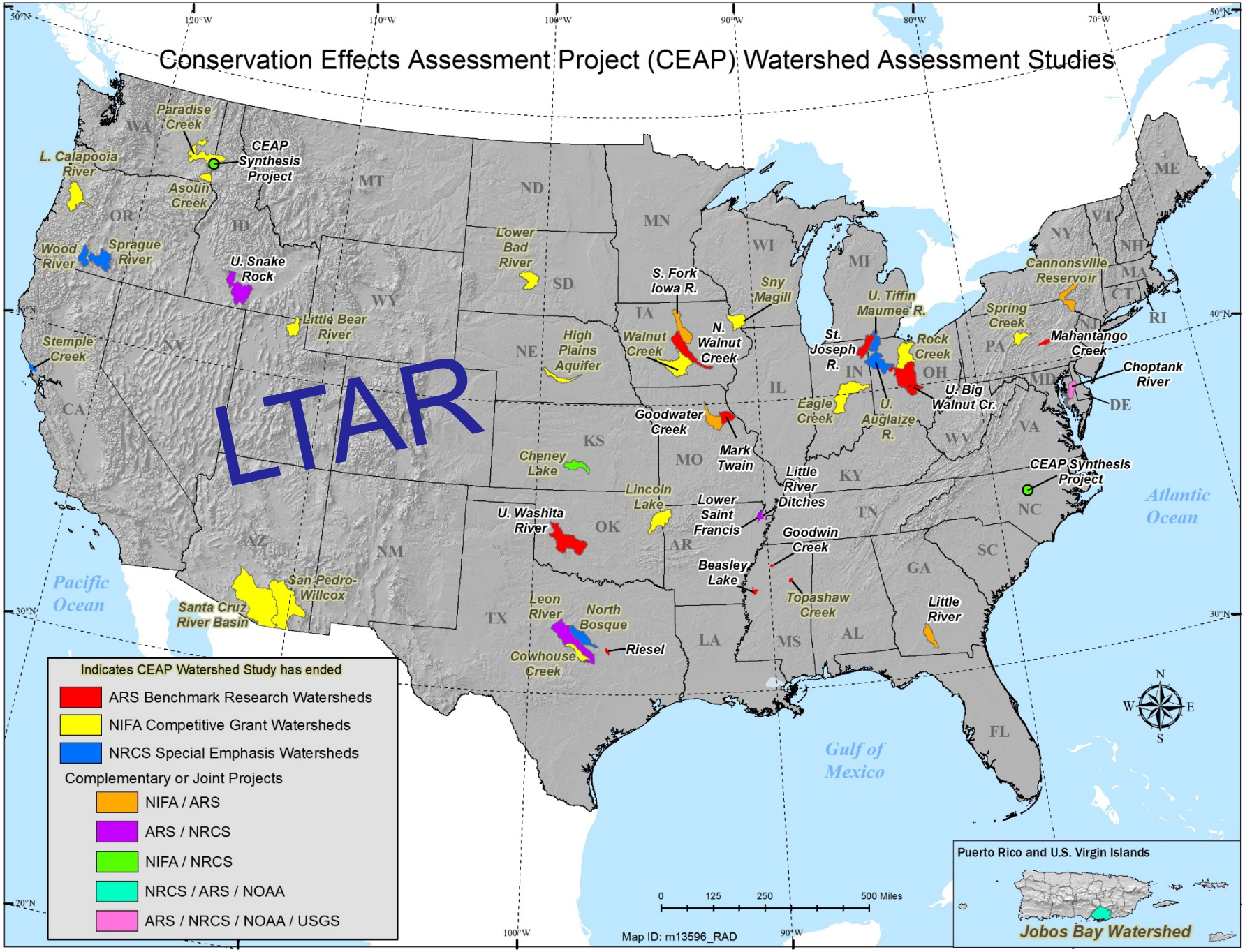
The National Institute of Food and Agriculture–Conservation Effects Assessment Project Experience

Edited by Deanna L. Osmond, Donald W. Mea
Dana LK. Hoag, and Mazdak Arabi

Soil and Water Conservation Society



Osmond et al., 2012 SWCS. 387 pp. "How to Build Better Ag Conservation Programs to Protect Water Quality"
Tomer and Locke, 2011. WS&T, 64(1) 300-310. Tomer et al. 2014, JSWC, 69(5) 365-373


Conservation Effects Assessment Project (CEAP) Watershed Assessment Studies
LTAR
Paradise Creek
CEAP Synthesis Project
L. Calapooia River
Asotin Creek
Wood River
Sprague River
U. Snake Rock
Little Bear River
Stemple Creek
Lower Bad River
S. Fork Iowa R.
Sny Magill
N. Walnut Creek
Walnut Creek
High Plains Aquifer
Goodwater Creek
Mark Twain
Cheney Lake
Lincoln Lake
U. Washita River
Lower Saint Francis
Little River Ditches
Goodwin Creek
Beasley Lake
Topashaw Creek
Leon River
North Bosque
Riesel
Cowhouse Creek
San Pedro-Willcox
Santa Cruz River Basin
U. Tiffin
Maumee R.
St. Joseph R.
Eagle Creek
U. Auglaize R.
Rock Creek
U. Big Walnut Cr.
Cannonsville Reservoir
Spring Creek
Mahantango Creek
Choptank River
CEAP Synthesis Project
Little River
Atlantic Ocean
Pacific Ocean
Gulf of Mexico
Indicates CEAP Watershed Study has ended
ARS Benchmark Research Watersheds
NIFA Competitive Grant Watersheds
NRCS Special Emphasis Watersheds
Complementary or Joint Projects
NIFA / ARS
ARS / NRCS
NIFA / NRCS
NRCS / ARS / NOAA
ARS / NRCS / NOAA / USGS
0 125 250 500 Miles
Map ID: m13596_RAD
Puerto Rico and U.S. Virgin Islands
Jobos Bay Watershed

Key Questions for CEAP Watershed Studies

- Effects of timing and location of practices
- Interaction among practices (additive, independent, or contradictory)
- Targeting - Optimal suite and placement of conservation practices (modeling)
- Socio-economic factors that facilitate or impede implementation and maintenance

Land Use and Changes in Hydrology:

Discharge, DRP and Total P in Tile and Watershed

Nearly 50% on average of both dissolved (soluble) P (49%) and total P (48%) left fields via the tile - a much higher percentage than previously thought.

- soluble phosphorus losses from tile drains decreased by 50 %
- total phosphorus losses by 50 %
- sediment losses by up to 72 %

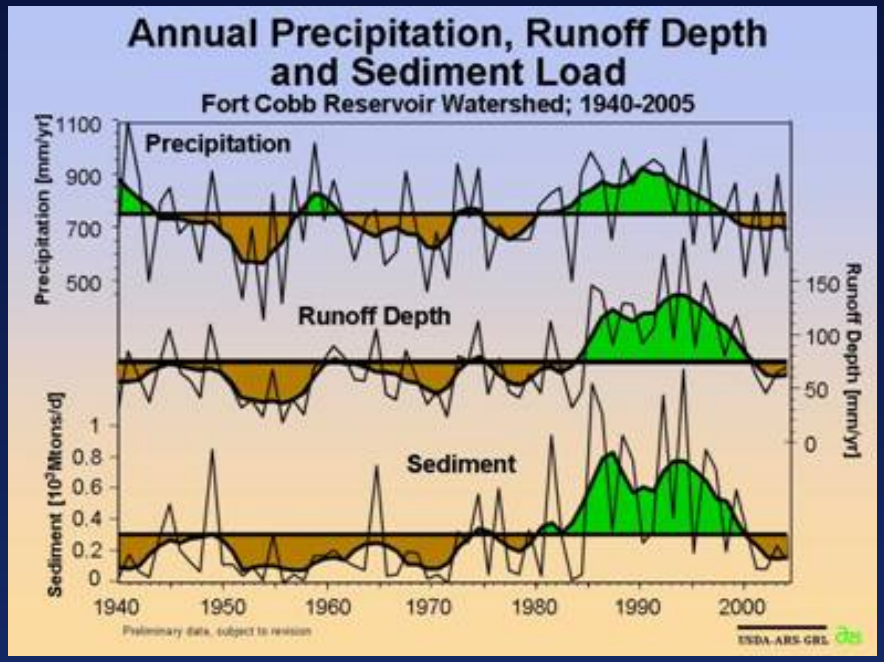
CEAP Conservation Insights:

- Practices work for P loading to surface runoff, but…
- Identify practices to decrease P loading to tile to address unintended consequences
  - Vary suites of practices and management strategies
  - Focus timing of interventions
- Expands contributing source area for P in some drained watersheds for conservation planning purposes

Kevin W. King et al.,2014 JEQ and D. R. Smith et al., JEQ, 2014

What Have We Learned: Climate Impacts

- Climate change scenarios of increased precipitation intensity
  - exponential increase in soil erosion, runoff, and watershed sediment yield
- Stresses current conservation practices or future with present day standards



J.D. Garbrecht et al, 2014, JSWC 69(5): 374-392

Conservation Insights:

- Diminished conservation practice effectiveness
- Increases sediment supply to the stream network

Drought and Water Availability

- Threat to viability of U.S. agriculture
- Billions $ in crop losses
- Difficult decisions for producers

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Governor Inslee Declares Statewide Drought Emergency

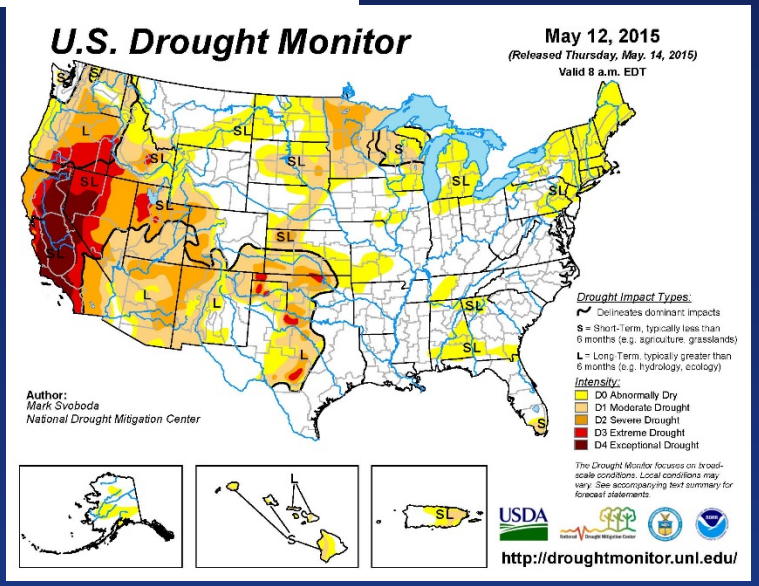
By Dan Thesman. Published Friday, May 15th, 2015

OLYMPIA – With snowpack at historic lows, rivers dwindling and irrigation districts cutting off water to farmers, Gov. Jay Inslee today declared a statewide drought for Washington.

"We're really starting to feel the pain from this snowpack drought," Inslee said. "Impacts are already severe in several areas of the state. Difficult decisions are being made about what crops get priority water and how best to save fish."

The Washington Department of Agriculture is projecting a $1.2 billion crop loss this year as a result of the drought.

To protect crops in the state's most productive agricultural region — the Yakima Basin — irrigation districts are turning off water for weeks at a time to try to extend water supplies longer into the summer.



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Planning and Targeting: More Effective Conservation for Water Quality

- Select the correct conservation practices for the specific water quality concern
- Target practices on lands where they'll do the most good
  - Identify critical source areas
- Ensure that conservation practices are used and maintained

Osmond et al., 2012 SWCS. 387 pp. "How to Build Better Ag Conservation Programs to Protect Water Quality"

Farmland in Coon Valley, WI - 1955

“These tools [of soil conservation] are sometimes used singly where the land is easy to stabilize, but they are more often used in combination, one supplementing another, where the conservation needs are more difficult or complex.”

--Dr. Hugh H. Bennett, 1946, JSWC 1 (1): 21-24.

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