United States Department of Agriculture
Natural Resources Conservation Service

Conservation Effects Assessment Project:

Use of Modeling for Grazing Land Resource Assessments at a National Scale

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CEAP Vision

Enhanced natural resources + Healthier ecosystems …

via improved *conservation effectiveness* and
better management of agricultural landscapes.

CEAP Goal

Improve efficacy of conservation practices and programs

by *quantifying conservation effects* and
providing the science and education base needed to enrich

conservation planning, implementation, management decisions, and policy.

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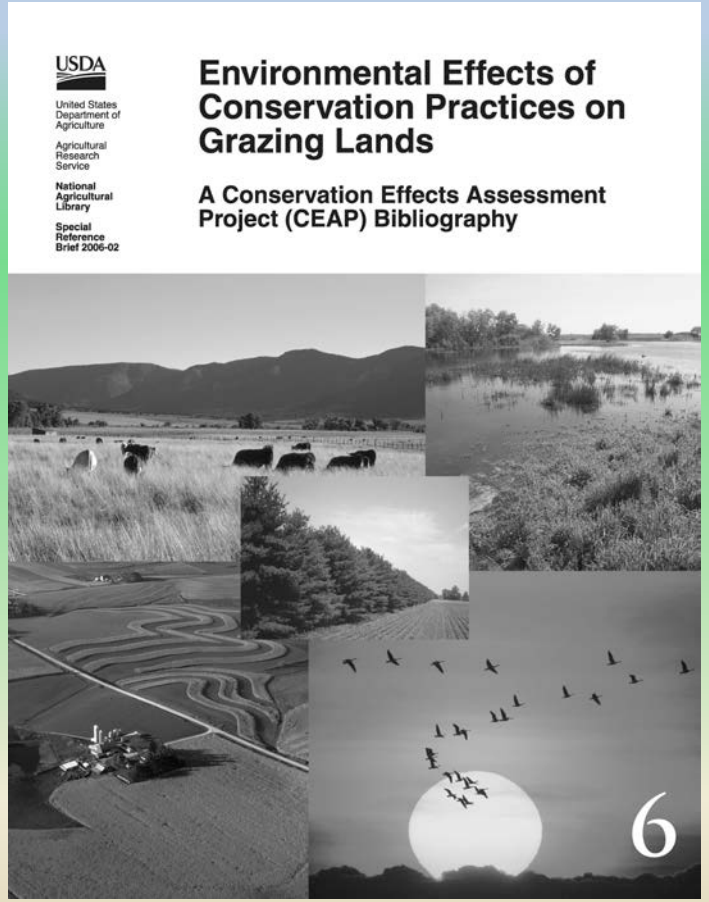
CEAP Grazing Land Strategy

1. **National Assessment.**
   - National summary estimates of existing conservation practice benefits.
   - Assessment of the potential for USDA conservation programs and technical assistance to meet the nation's environmental and conservation goals.

2. **Watershed Assessment Studies.**
   - Basic research on conservation practices in selected watersheds throughout the nation.
   - Provide a framework for evaluating and improving performance of national assessment models.
   - Bosque watershed in central Texas.
   - La Cienega / Cienega Creek Watershed in southeastern Arizona.

CEAP Grazing Land Strategy

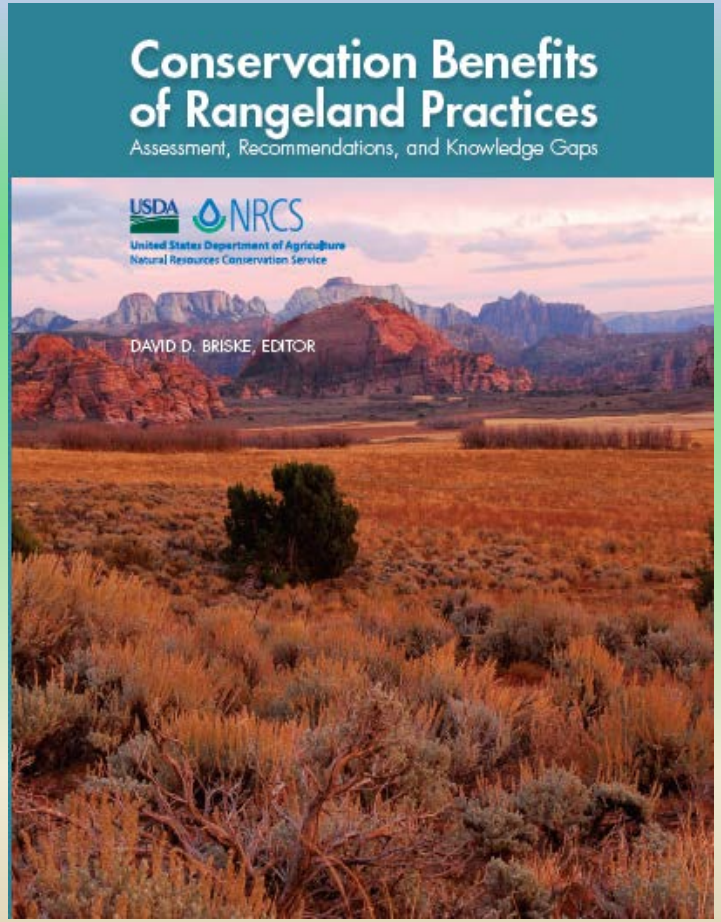


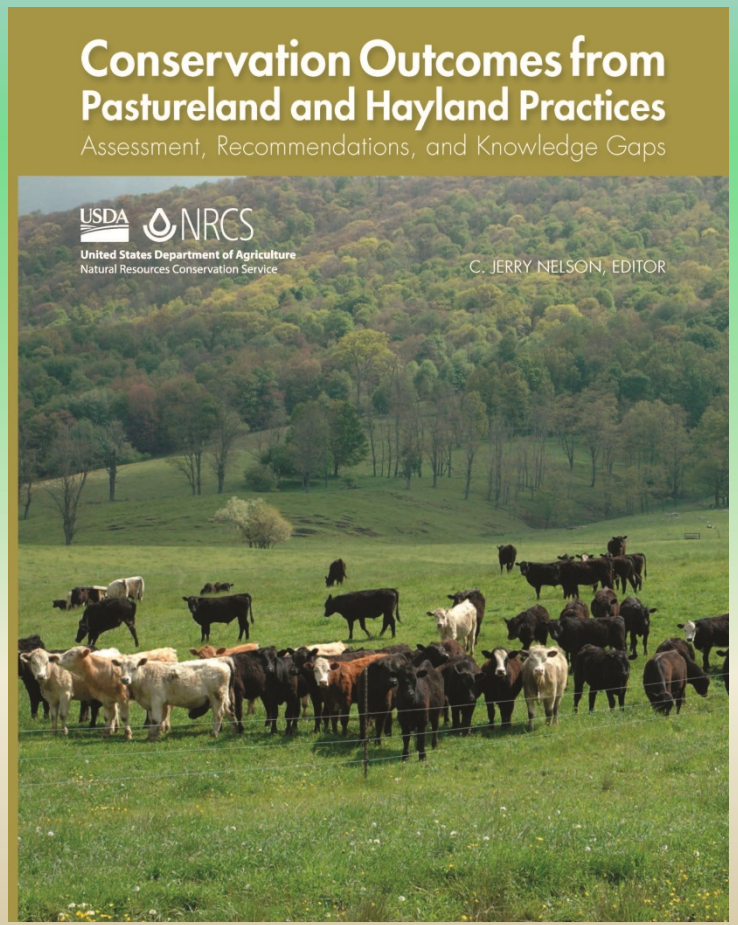
3. Bibliographies.

- Current literature … What's known and what's not known about the environmental benefits of conservation practices and programs?
- Leonard Jolley provided direction to the National Agricultural Library (NAL) on the development of a printed bibliography published in 2006, and search criteria for a dynamic bibliography at the NAL's Water Quality Information Center's website.
- Organized by land use: rangeland; pastureland/hayland.

CEAP Grazing Land Strategy

4. Literature Review / Synthesis.





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CEAP Grazing Land Strategy

5. Technology Transfer and Outreach.

- Designed to gather technical material and results from recent research or other activities that can be used to:

  Improve the scientific knowledge base for making decisions on which conservation practices are most efficient at achieving specific environmental benefits.

- In coordination with professional societies, research institutions, Agricultural Research Service (ARS), others.

CEAP Partners

- NRCS – Natural Resources Conservation Service
- ARS – Agricultural Research Service
- NIFA – National Institute of Food and Agriculture
- Colleges and Universities, including Emeritus professors
- FSA – Farm Service Agency
- NASS – National Agricultural Statistics Service
- Other Federal and State agencies
- Non-Profit organizations
- Retired NRCS grazing land ecologists and specialists

There are currently over 60 partners with CEAP!

Use of Modeling for Grazing Land Resource Assessments at a National Scale

- **Key Steps and Principles in the Modeling Process**

  1. Establish a clear set of rules regarding:
     - What do we want to know?
     - What is the area of interest?
     - Where will data come from?
     - What protocols were used to collect the data?
     - At what scale were data collected?

Use of Modeling for Grazing Land Resource Assessments at a National Scale

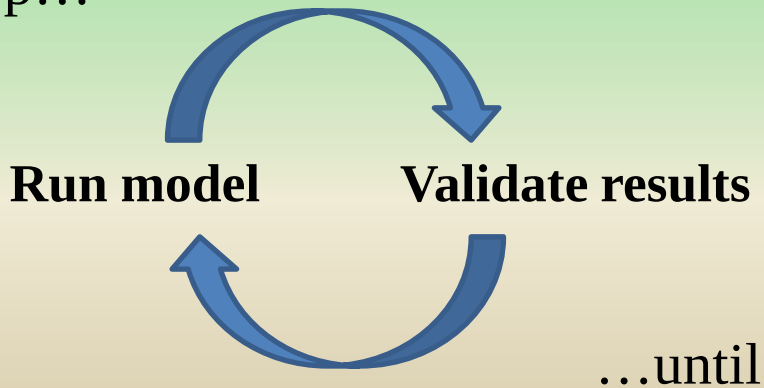
- **Key Steps and Principles in the Modeling Process**

  1. Establish a clear set of rules regarding:
     - What vintage is the data?
     - Be moderate: Do not overestimate benefits.
     - Be consistent: Treat each point the same.
     - Be simple: Complex rules lead to complex explanations and fosters doubt.
     - The No Practice Scenario is a *Technological* step back, **not** a *Chronological* step back.

Use of Modeling for Grazing Land Resource Assessments at a National Scale

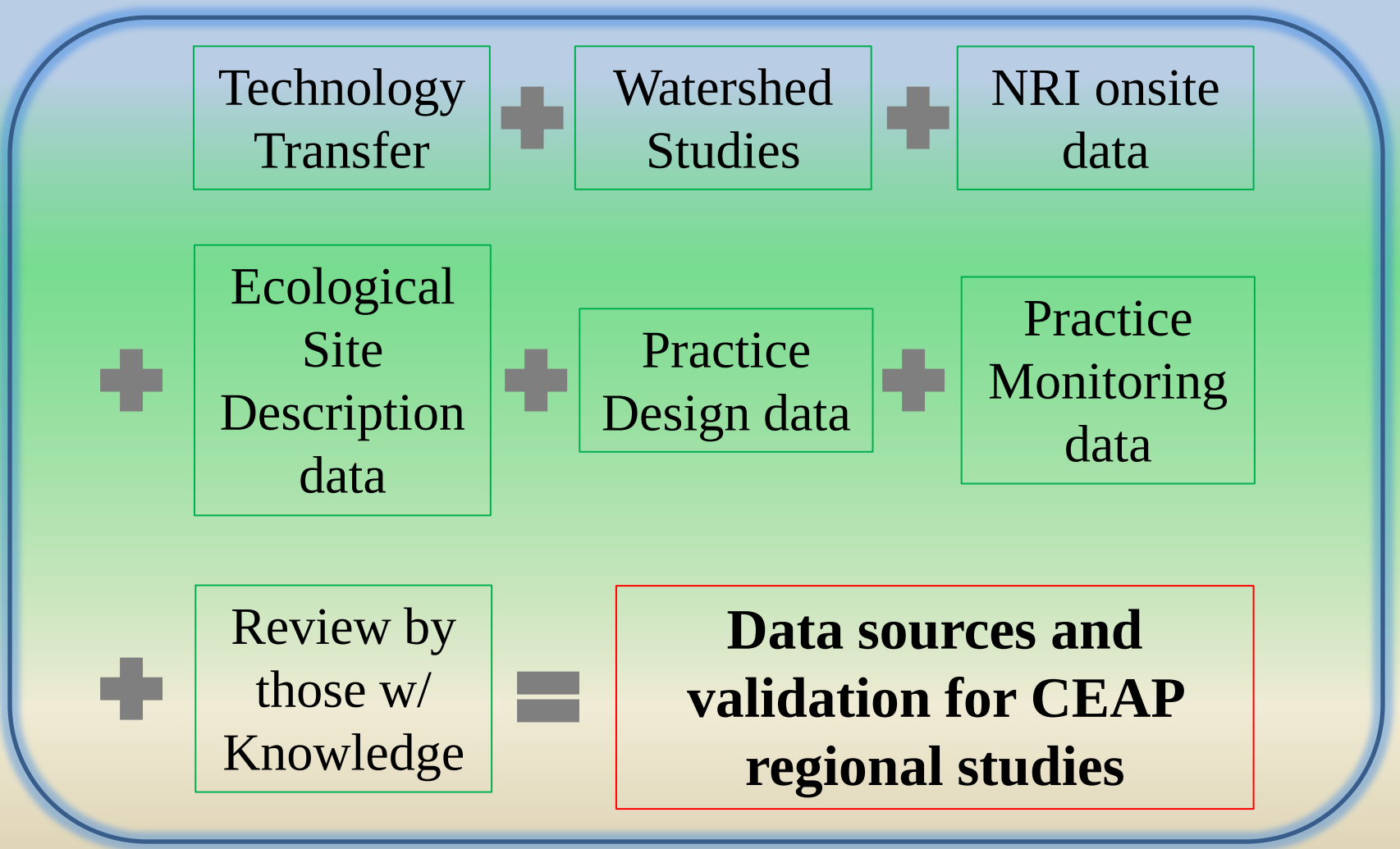
- **Modeling Guidelines:**

  1. Determine which model(s) to use.
  2. Identify the kinds of expertise needed (eg, soil, economic, grazing, plant growth, etc knowledge).
  3. Assemble the data needed to run the model …
     Trust but verify the data and its appropriate use!
  4. Feedback loop…



…until results are consistent and reasonable.

Linkages Needed for Successful Modeling of Conservation Practice Effects:



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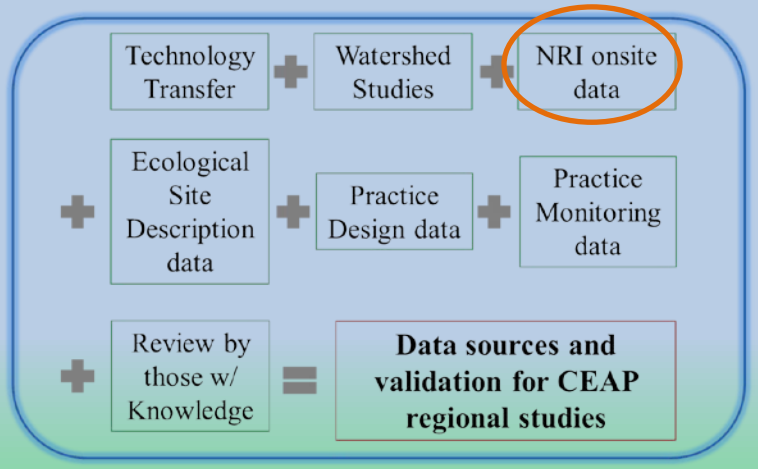
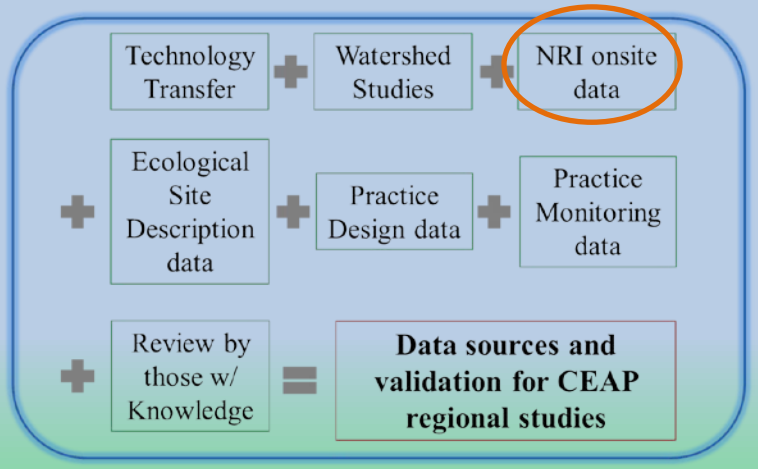


NRI – National Resources Inventory

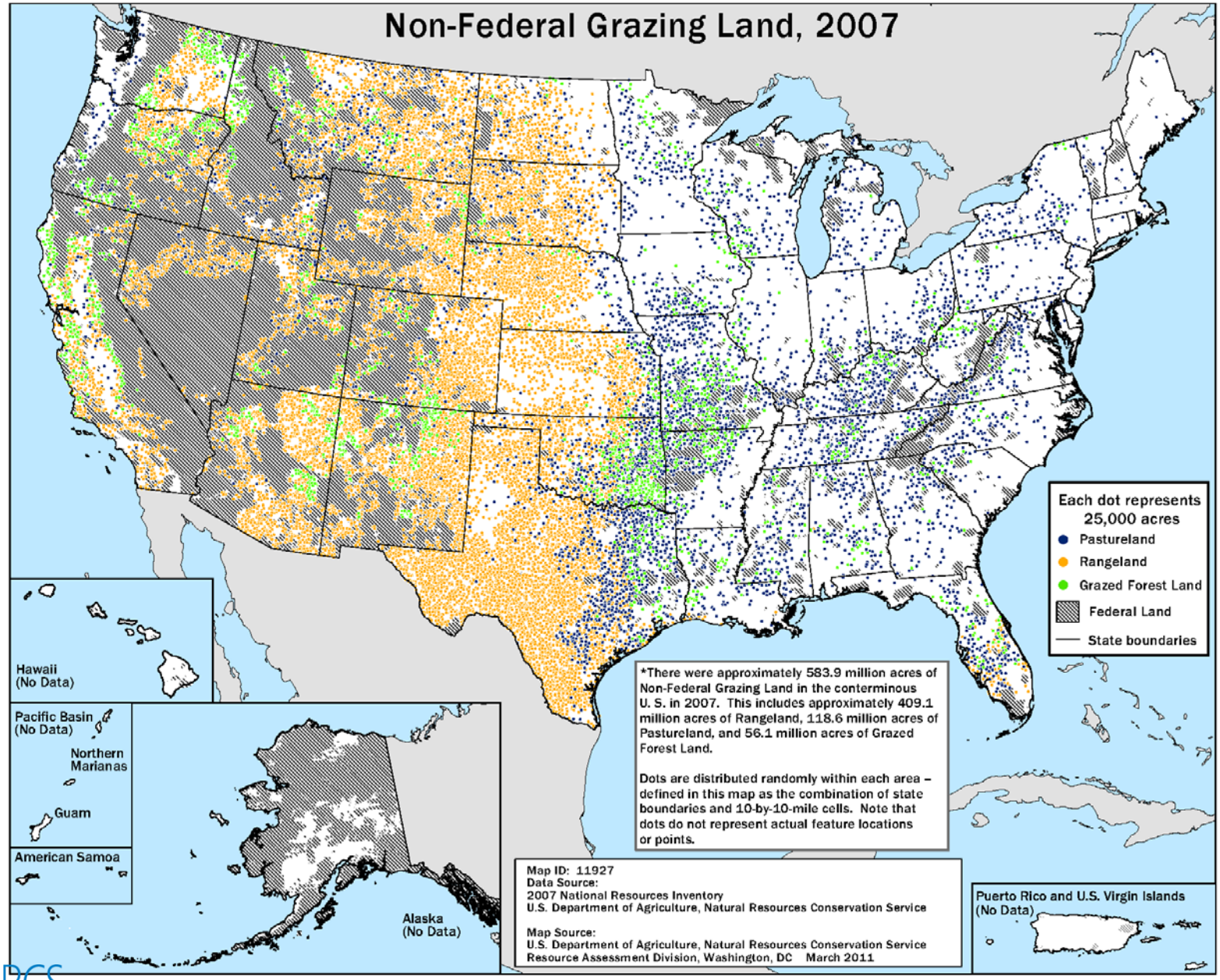
- Led and conducted by NRCS.
- Statistical survey designed to gauge natural resource status, conditions and trends on the Nation's non-federal land.
- Used to inform decision makers about resource conditions at different scales.



NRI – National Resources Inventory

- Focuses on key issues in rangeland science:

Rangeland Health	Non-native Plants
Invasive Plants	Inter-canopy Gaps
Ground Cover	Foliar Cover
Annual Production	Soil Surface Aggregate Stability
Disturbances	Conservation Practices Applied + Needed



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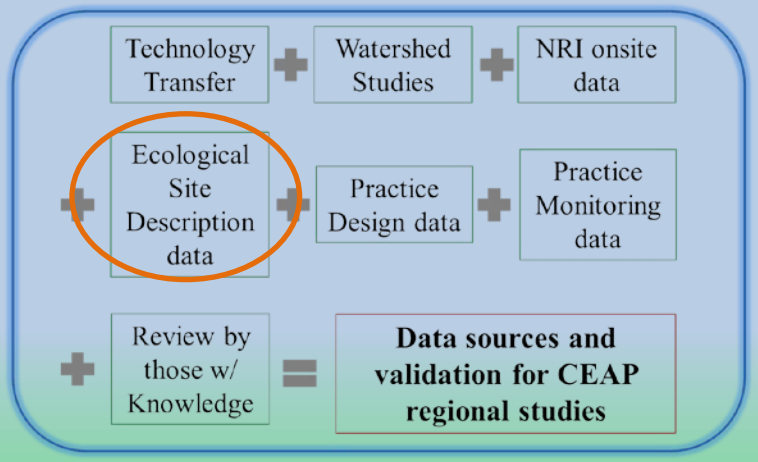
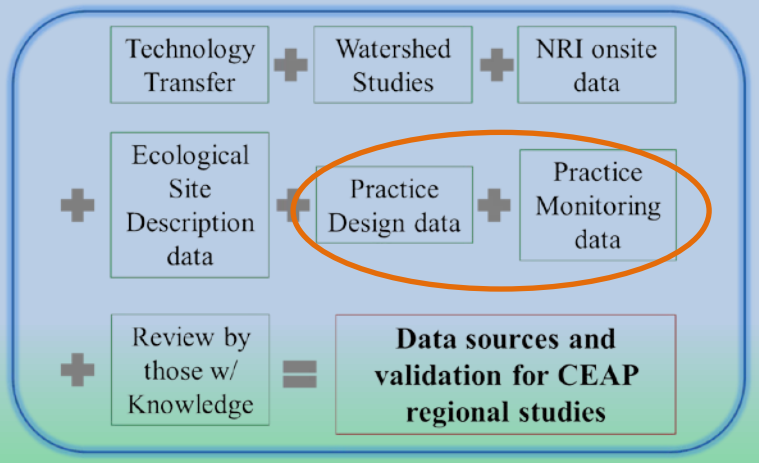


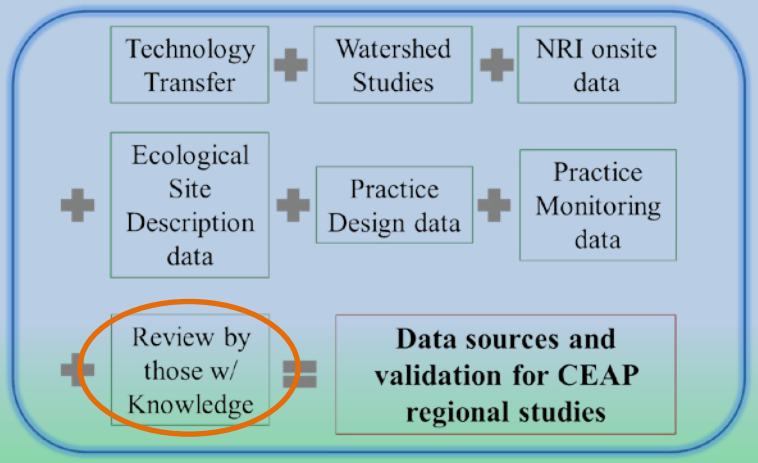
ESD – Ecological Site Descriptions

- Physiographic features, climate, soils, STMs, ecological dynamics, vegetation, production, ground cover, palatability, hydrology, wildlife.
- Perfect scale for conservation planning; too fine a scale for CEAP modeling work.
- Group ESDs by response units (mgmt/disturbance) for CEAP.
- Key in on the salient data from those groupings and utilize in CEAP analysis.
- Continue developing ESDs; consider adding a level of response groupings for larger scale application.

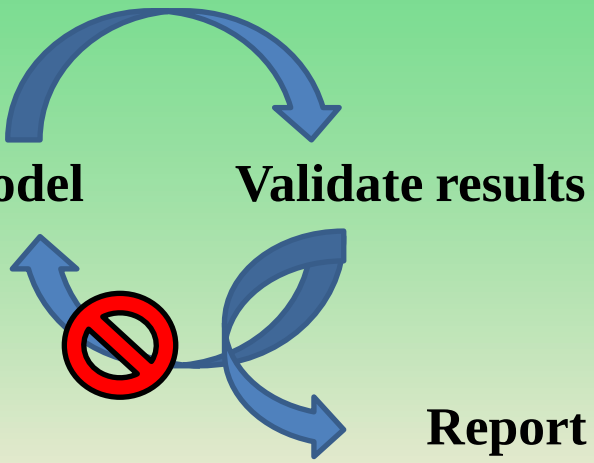


Conservation Practices by region

- Typical conservation practices applied to grazing lands.
- Typical conservation practice application scenarios.
- Conservation effects of varying application methods, frequencies of reapplication, degree of effect under variable environmental conditions.
- The “no practice scenario” is a *technological* step back, not a *chronological* step back.
- Utilize existing monitoring, research and NRI data to validate the model outputs for conservation practice scenarios.



Expert Review of Model Results



Report results only when ready!

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Regional CEAP Modeling Reports

- Project findings will be used to:
  - Guide USDA conservation policy
  - Guide USDA program development
  - Help conservationists, farmers and ranchers make more informed conservation decisions

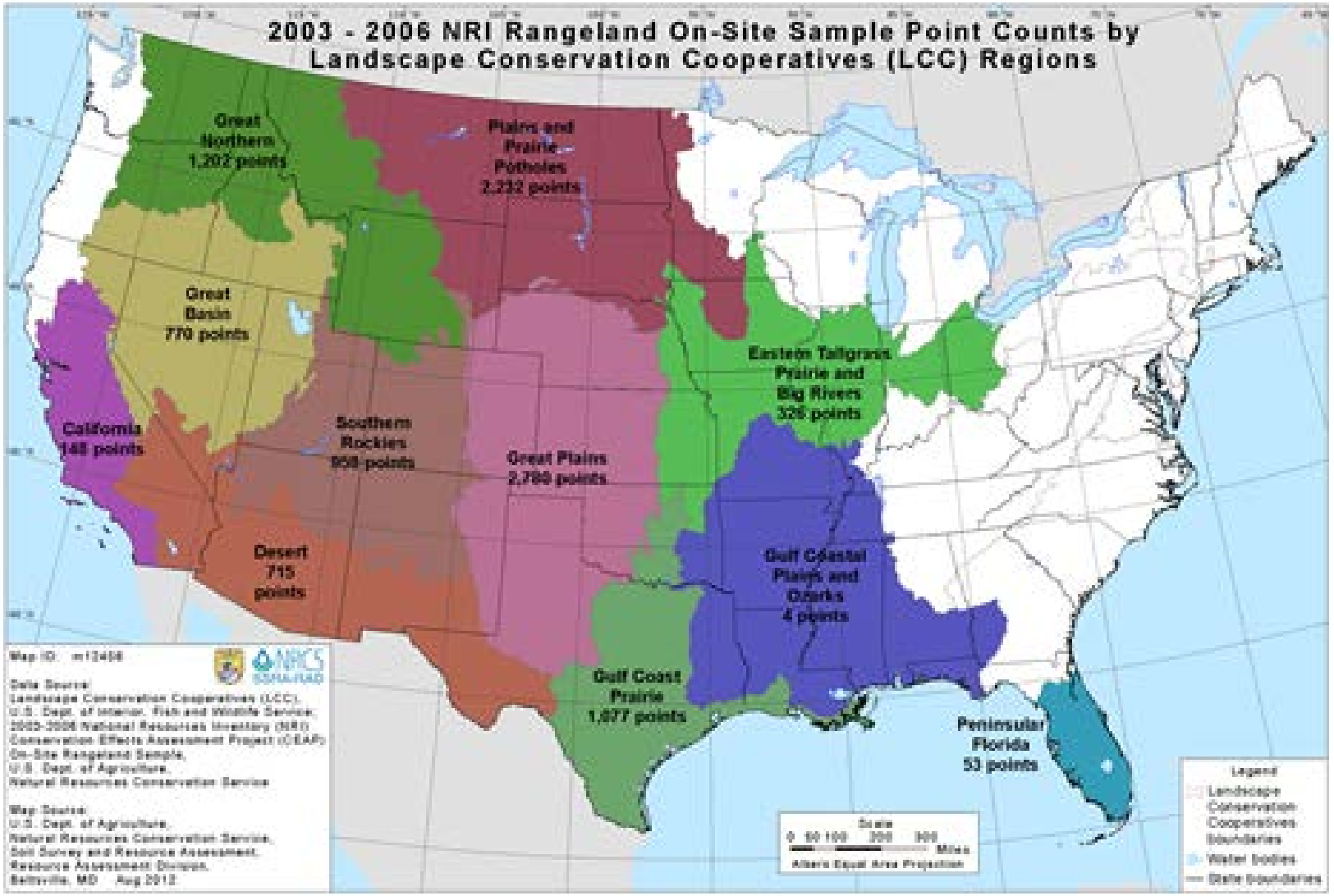
- CEAP Goal:

  Improve efficacy of conservation practices and programs by quantifying conservation effects and providing the science and education base needed to enrich conservation planning, implementation, management decisions, **performance reporting and policy**.

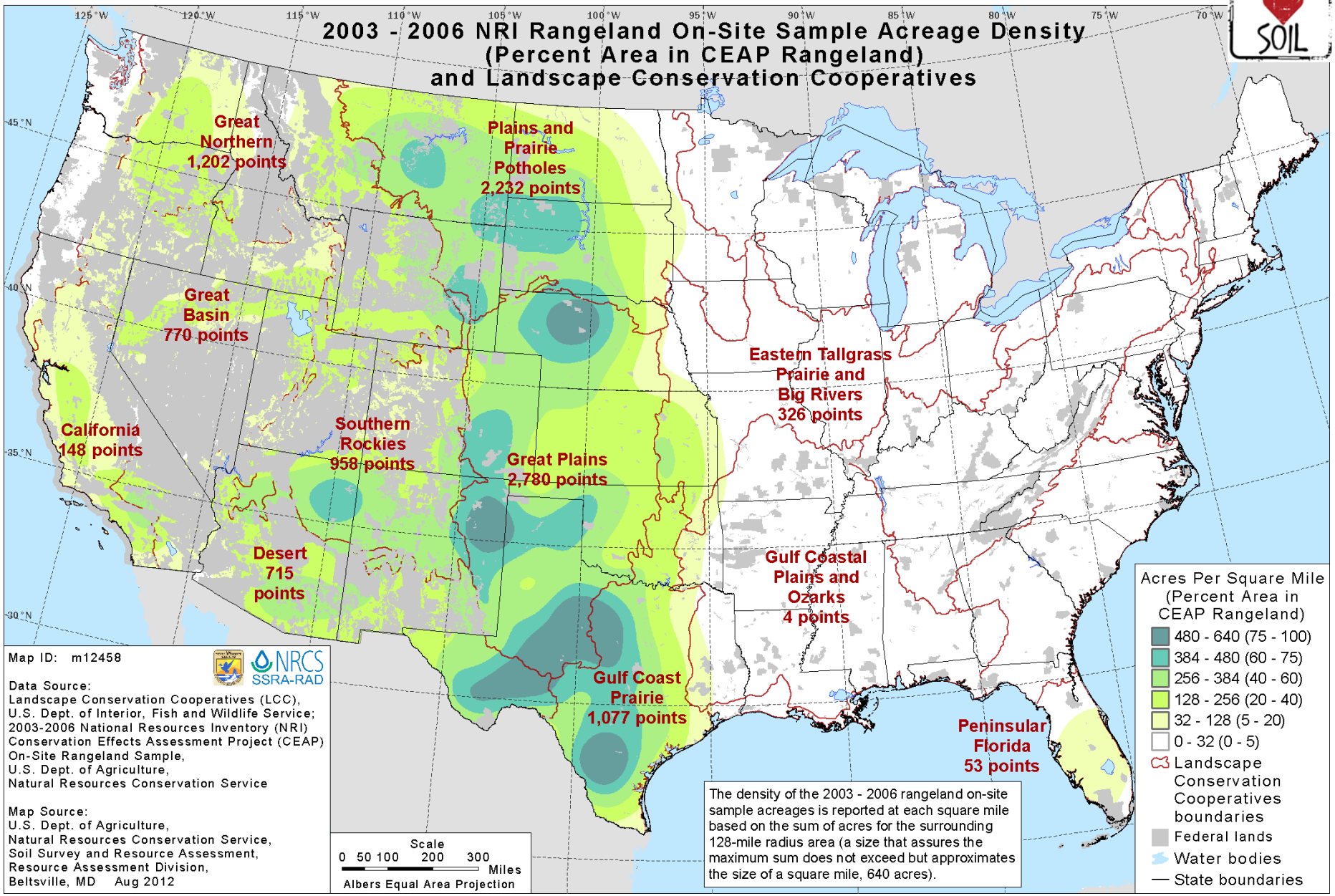
Regional CEAP Modeling Reports

- Chapters to discuss these topics:
  - Land Use and Grazing Lands
  - Overview of Sampling and Modeling Approach
  - Evaluation of Conservation Practice Use – the Baseline Conservation Condition
  - Onsite (Field Level) Effects of Conservation Practices
  - Assessment of Conservation Treatment Needs
  - Assessment of Potential Field Level Gains from Additional Conservation Treatment
  - Rangeland Impacts on Wildlife
  - Offsite Air Quality Effects of Conservation Practices
  - Summary of Findings; References; Appendices

Regional CEAP Modeling Reports



2003 - 2006 NRI Rangeland On-Site Sample Acreage Density (Percent Area in CEAP Rangeland) and Landscape Conservation Cooperatives



Map ID: m12458

NRCS SSRA-RAD

Data Source:
Landscape Conservation Cooperatives (LCC),
U.S. Dept. of Interior, Fish and Wildlife Service;
2003-2006 National Resources Inventory (NRI)
Conservation Effects Assessment Project (CEAP)
On-Site Rangeland Sample,
U.S. Dept. of Agriculture,
Natural Resources Conservation Service

Map Source:
U.S. Dept. of Agriculture,
Natural Resources Conservation Service,
Soil Survey and Resource Assessment,
Resource Assessment Division,
Beltsville, MD Aug 2012

Scale
0 50 100 200 300
Miles
Albers Equal Area Projection

The density of the 2003 - 2006 rangeland on-site sample acreages is reported at each square mile based on the sum of acres for the surrounding 128-mile radius area (a size that assures the maximum sum does not exceed but approximates the size of a square mile, 640 acres).

Acres Per Square Mile (Percent Area in CEAP Rangeland)
- 480 - 640 (75 - 100)
- 384 - 480 (60 - 75)
- 256 - 384 (40 - 60)
- 128 - 256 (20 - 40)
- 32 - 128 (5 - 20)
- 0 - 32 (0 - 5)
- Landscape Conservation Cooperatives boundaries
- Federal lands
- Water bodies
- State boundaries

Thank you!

- For updates on CEAP Grazing Lands activities:

  Google “NRCS CEAP Grazing Lands”

- Extra appreciation to our partners with ARS, Universities, NASS, NRCS offices at all levels, and countless others for thoughtful input, products and review of CEAP outputs.

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