United States Department of Agriculture
Natural Resources Conservation Service

Impact of Resistant Weeds On Conservation

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USDA – NRCS

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Impact of Herbicide Resistance on Natural Resources

Judicious use of herbicides support natural resource conservation

- Soil
- Water
- Air
- Plant
- Animals
- Energy Conservation

Herbicide Resistance Impact on Crop Production

- Reduced income
- Fewer herbicide options
- Fewer crop options ????
- More expensive herbicide options

Potential **Behavior** Changes with Herbicide Resistance

- More Intensive Tillage
- Use Alternative Pesticides
- Reduce or Abandon Economic Crops
- Opportunity to Improve***

Herbicide Resistance Impacts

The negative impact to crop production and economics

The negative impact to conservation efforts

If we use more intensive tillage to address herbicide resistant weeds…

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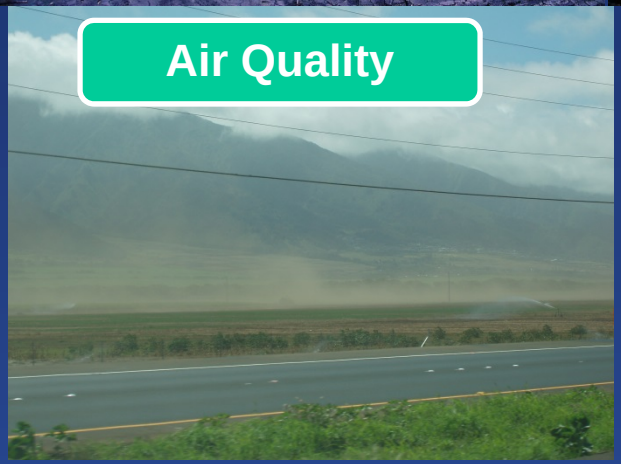
Weed Resistance - Negative Impacts to Conservation Efforts

Wind Erosion

Water Erosion

Water Quality

Air Quality



Wildlife

Plant Communities

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Herbicide Resistance Impact on Conservation

Herbicides facilitate conservation tillage

Conservation tillage is dependent upon herbicides for weed control

Photos courtesy of: University of Minnesota (2) and USDA (2)

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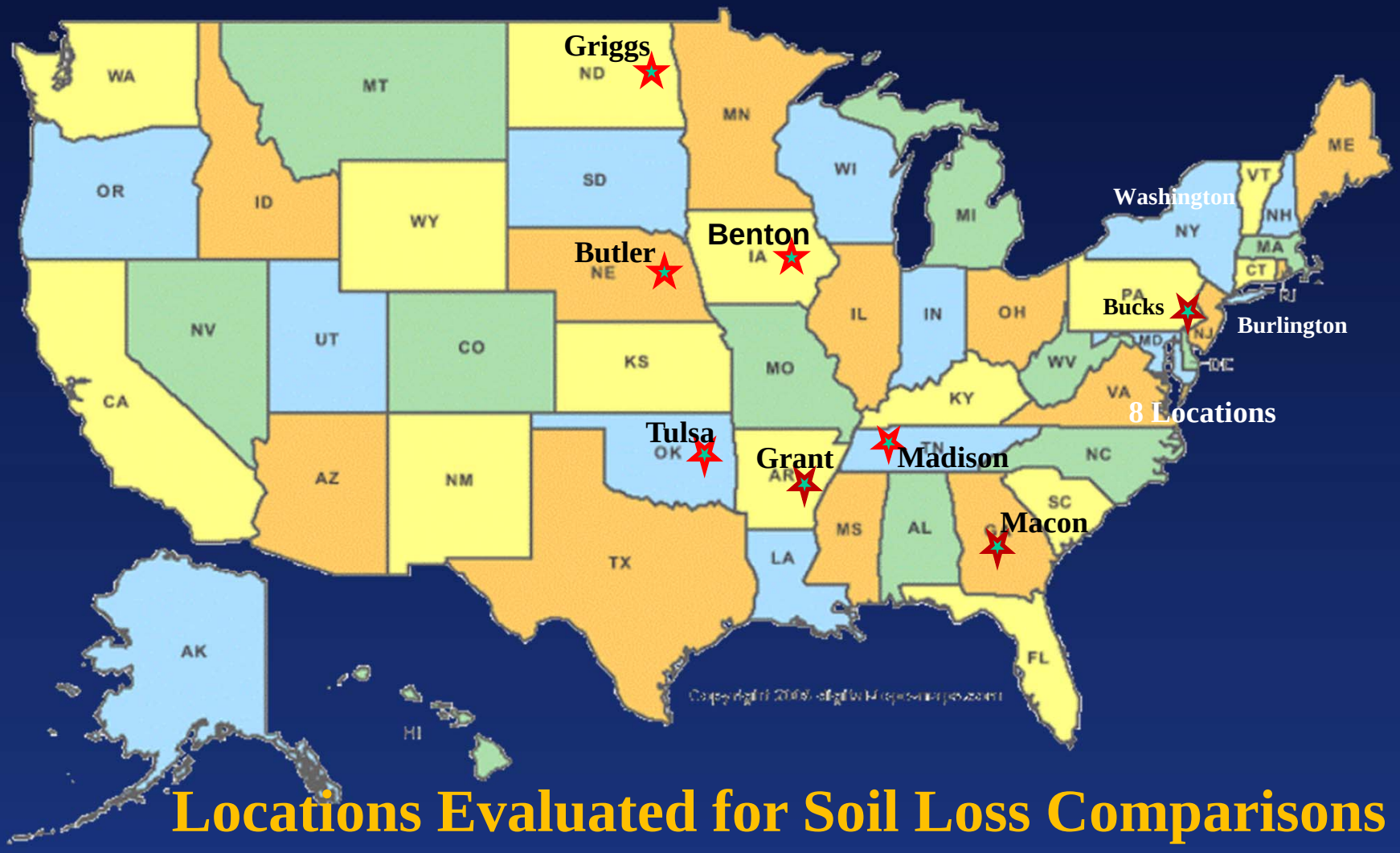

Locations Evaluated for Soil Loss Comparisons

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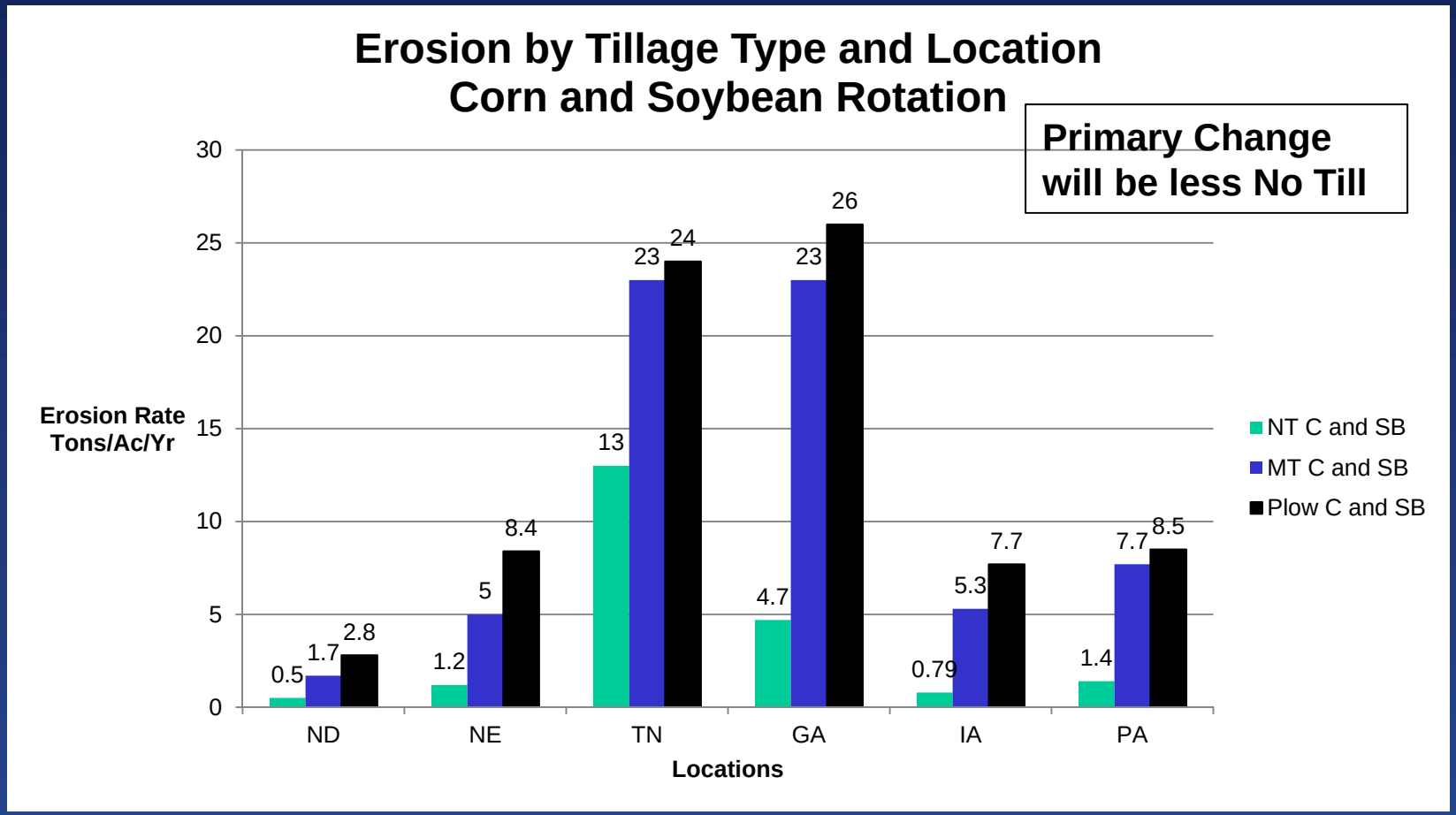
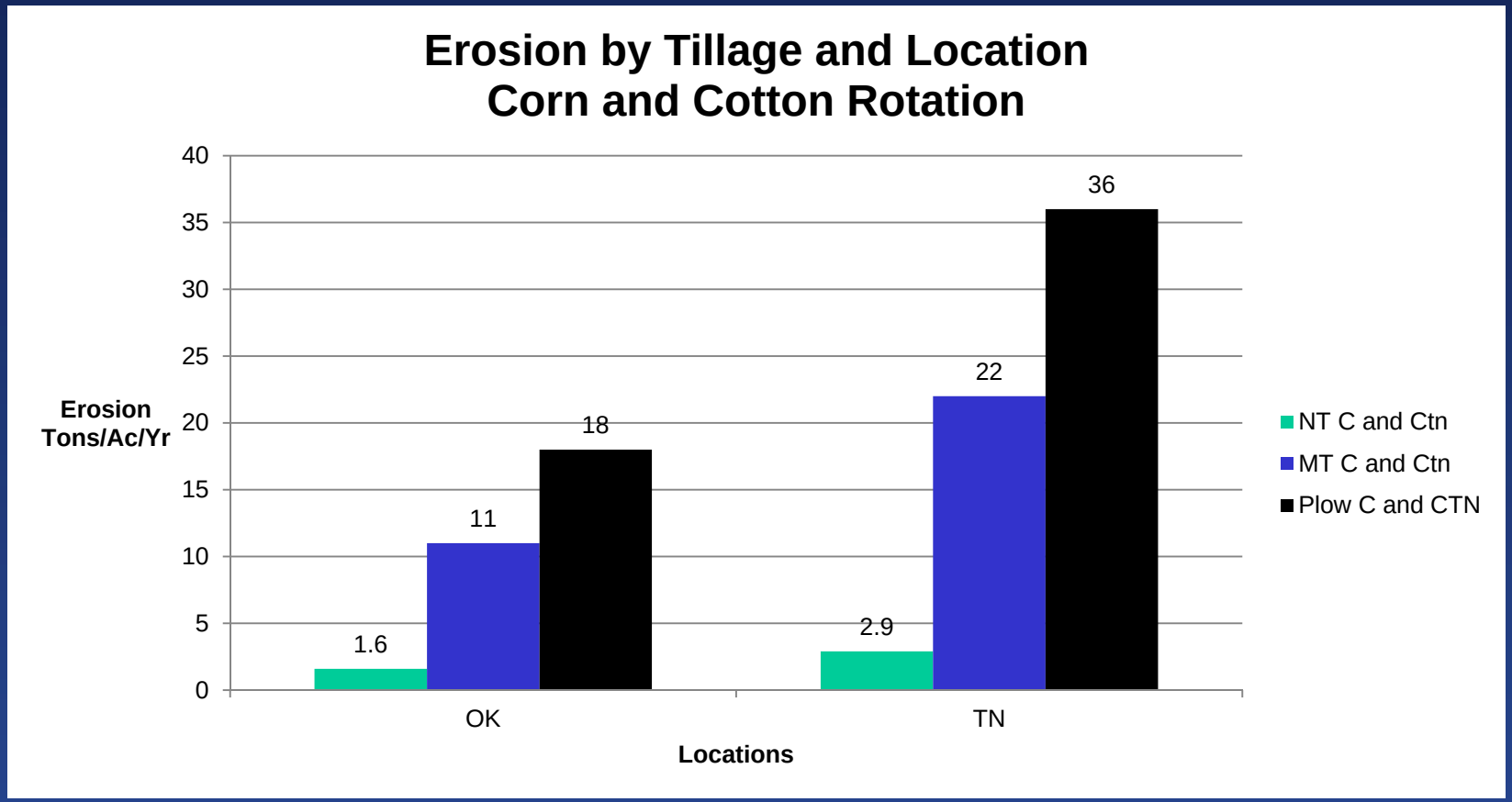
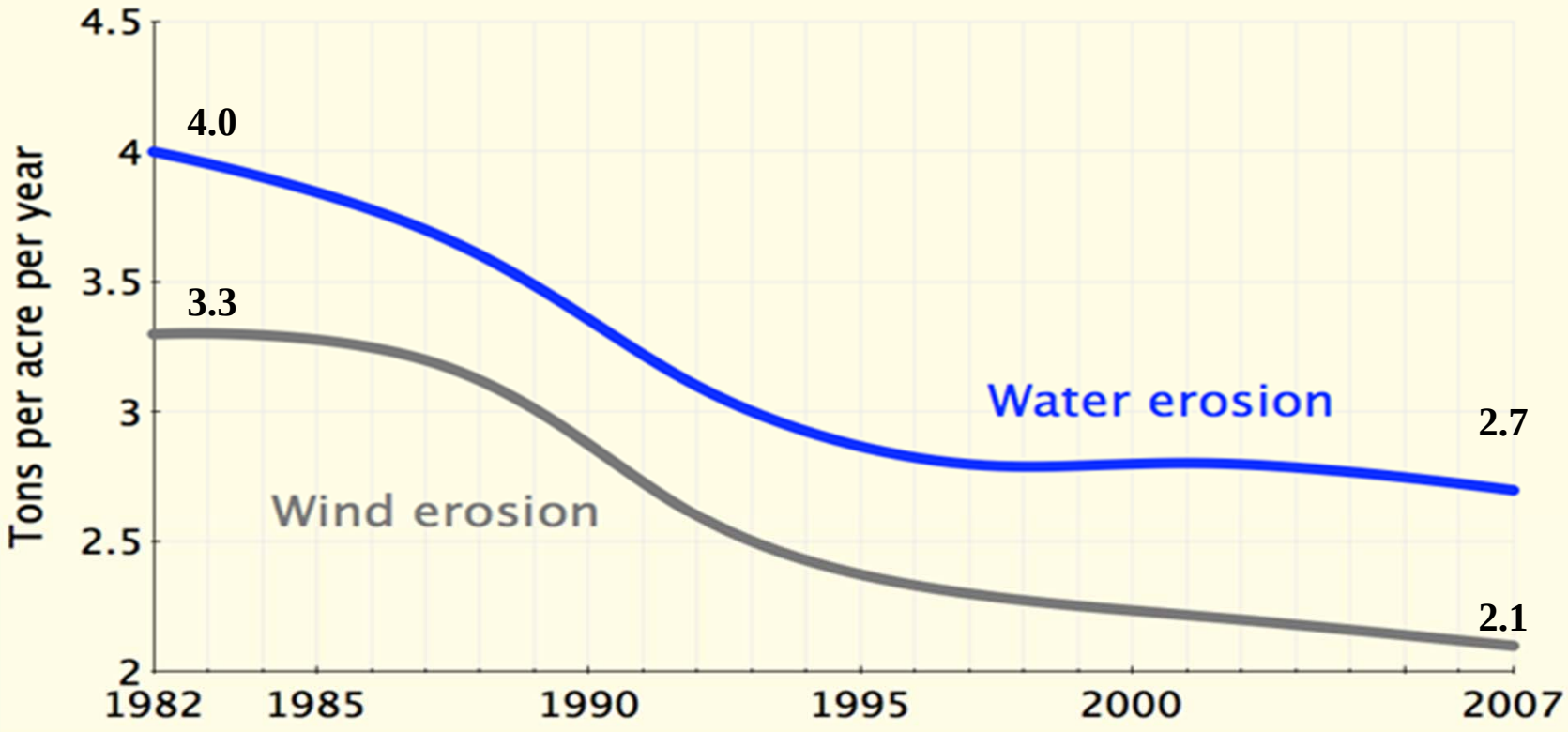
Effect of Tillage on Water Erosion



Effect of Tillage on Water Erosion



Soil erosion



Source: NRI, NRCS

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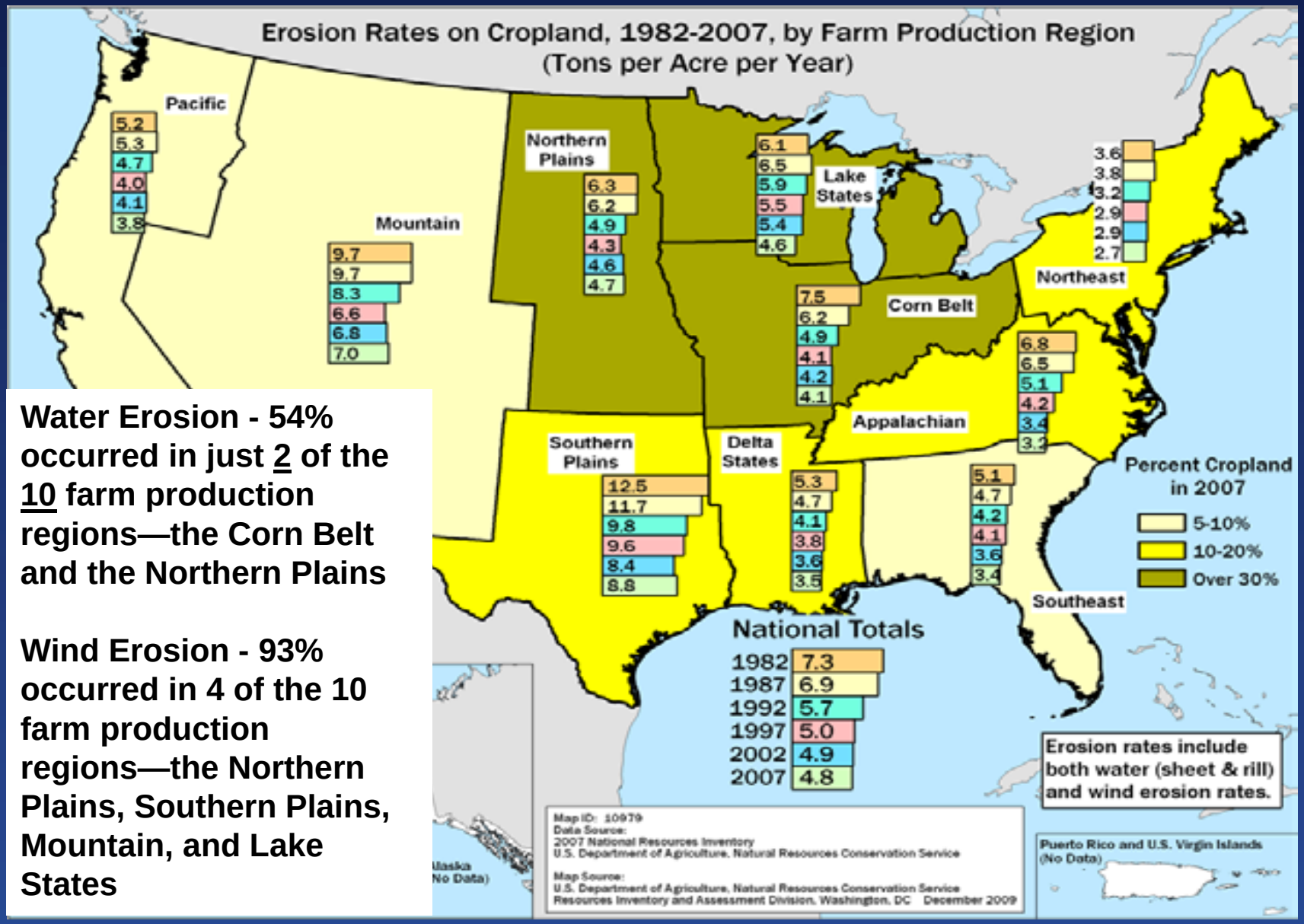

Water Erosion - 54% occurred in just 2 of the 10 farm production regions—the Corn Belt and the Northern Plains

Wind Erosion - 93% occurred in 4 of the 10 farm production regions—the Northern Plains, Southern Plains, Mountain, and Lake States

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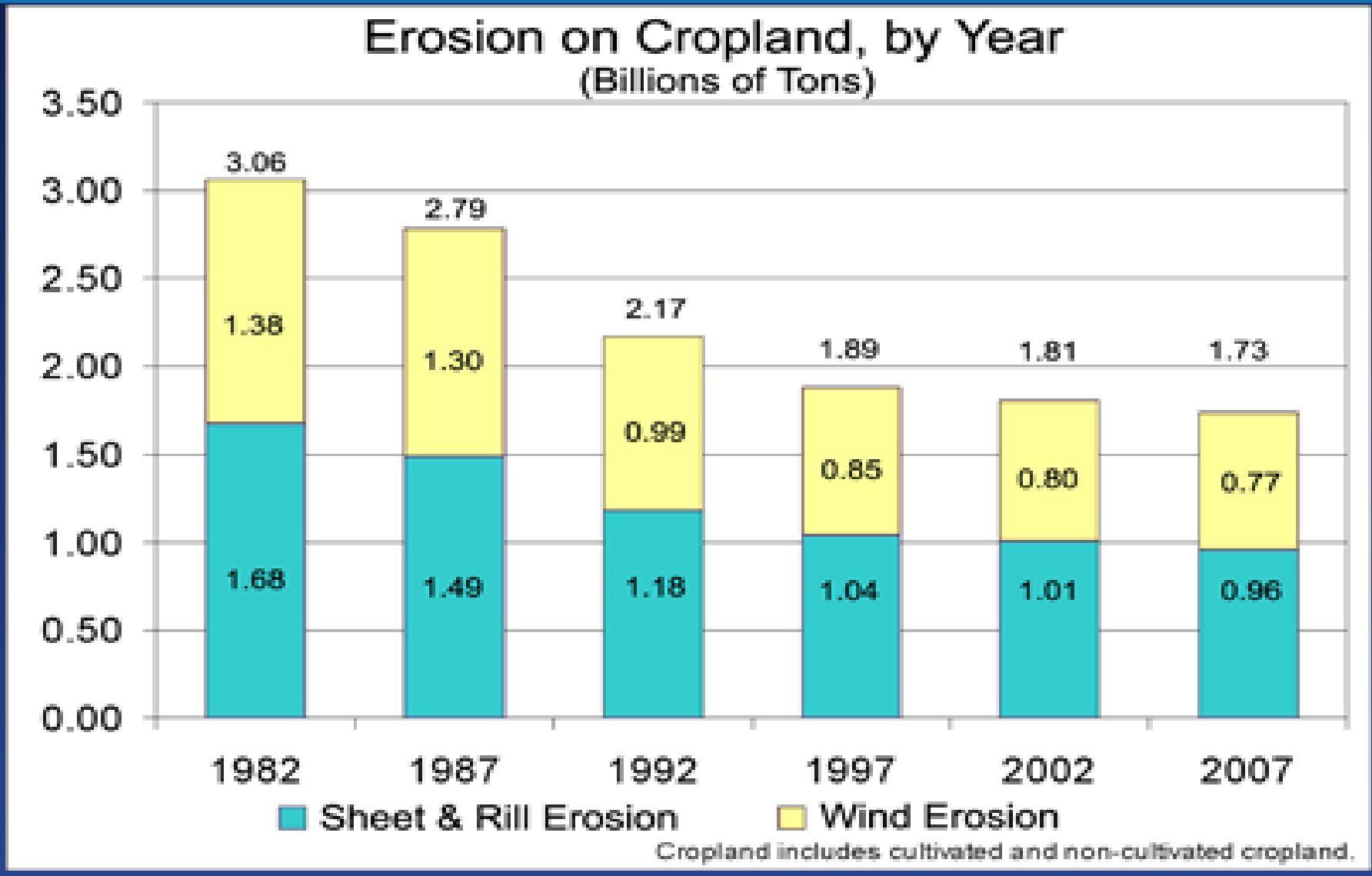

Conservation Effect of Water Erosion

Per 2007 NRI we have 304.9 M acres of cultivated cropland in the US.

For each 1 ton/ac/yr. increase in water erosion this equals:

- 1.4 B Tons N/Yr.
- 228 M Tons P/Yr.
- 365 B Ton Sediment/Yr.
- 24 B Tons Carbon/Yr.

We Cannot Go Backwards on Conservation

Water Erosion/Water Quality/Productivity

Wind Erosion/Air and Water Quality/Productivity

Opportunity to Improve

- What got us into this problem?
  - Tillage choices – can change
  - Crop choices – can change
  - Rotation choices – can change
  - Herbicide choices – can change
  - Weed adaptability – we can influence

If we keep doing things the same way – things will not get better

Future Technical Solutions to Address Herbicide Resistance must be:

- Environmentally sound
- Economically sound
- Socially **acceptable**

This must be reflected at the farm level, local, state, and national levels.

Changes involve more than just…

- Changing herbicide mode of action
- Rotation
- Tillage

Change will require…

- Understanding the science/biology of the problem
- Behavior change by producers, industry, and government
- Farmers, industry, and government working together at all levels
- Environmentally sound, Economically sound, Socially **acceptable**

Understanding the science/biology of the problem

Needed to develop…

- Cultural/Biological methods (rotations, types of crops, timings, tillage or lack of tillage)
- Chemical methods (pesticides, modes of action, timing, etc.)
- **Behavior Change**

Behavior change by producers, industry, and government

Willingness to change…

- Production practices
- Marketing strategies
- Government Policy to facilitate change

Farmers, industry, and government working together at all levels

Information and Education at the…

- Local level
- State/Regional Level
- National Level

Everyone must be on the same page

Some Examples of Good Things Happening

- NRCS and other Conservation Org's – Technical and Financial Assistance
- Land Grant Universities – Research and Education
- ARS and ERS – Research
- Industry – Commodity Org's and Farmers

NRCS Technical Assistance to Facilitate Information and Education

Partner with industry, commodity groups, extension, crop consultants, etc.

- National Level
- State Level
- Local Level

We need more….

Need more information and education for producers

- New technology
- Better Understanding the biology and science of the problem
- More long and short-term economic scenarios to change behavior.

Need a “consistent message” from industry and government

Summary

There are negative conservation implications of using more tillage to address herbicide/pesticide resistance.

Environmental, Economic, and Social solutions are possible and will present an opportunity to improve.

A coordinated effort at levels by producers, industry, and government is needed.