



Quantifying the Environmental Effects of CRP on Prairie Wetlands: Separating Acts of Nature from Acts of Congress

U.S. Department of the Interior
U.S. Geological Survey

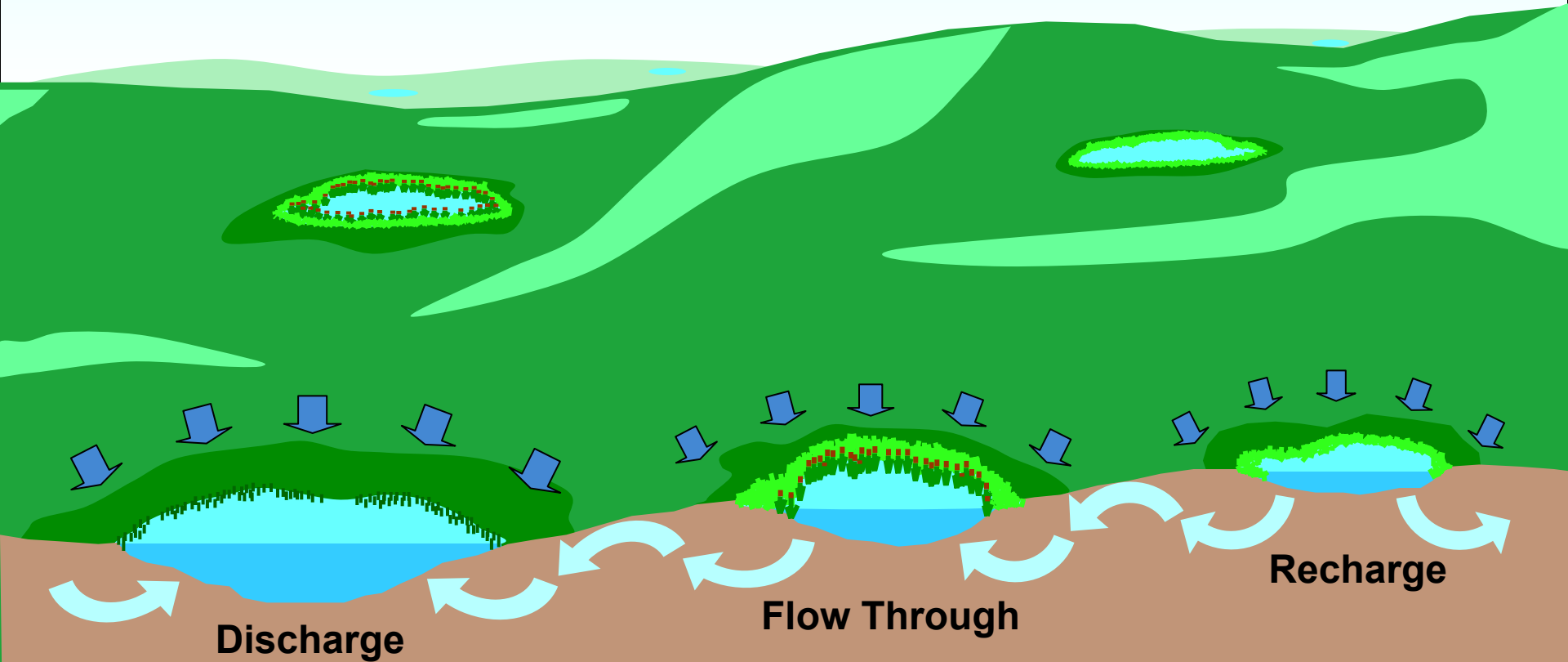
Acts of Nature

- Landscape Formation
 - Structural (e.g., volcanoes)
 - Intermountain Basins
 - Weathering (physical/chemical weathering)
 - Karst Topography (sinks, caverns)
 - Erosion/Deposition (glaciers, water, wind)
 - Prairie Potholes

Acts of Nature

- Landscape Position
 - Elevation, Slope, Aspect
- Geomorphic Processes
 - Soils (texture, chemical composition)
 - Hydrologic Connectivity
 - Water Quality
- Climate
 - Precipitation, Evaporation, Temperature

Wetland Hydrological Functions

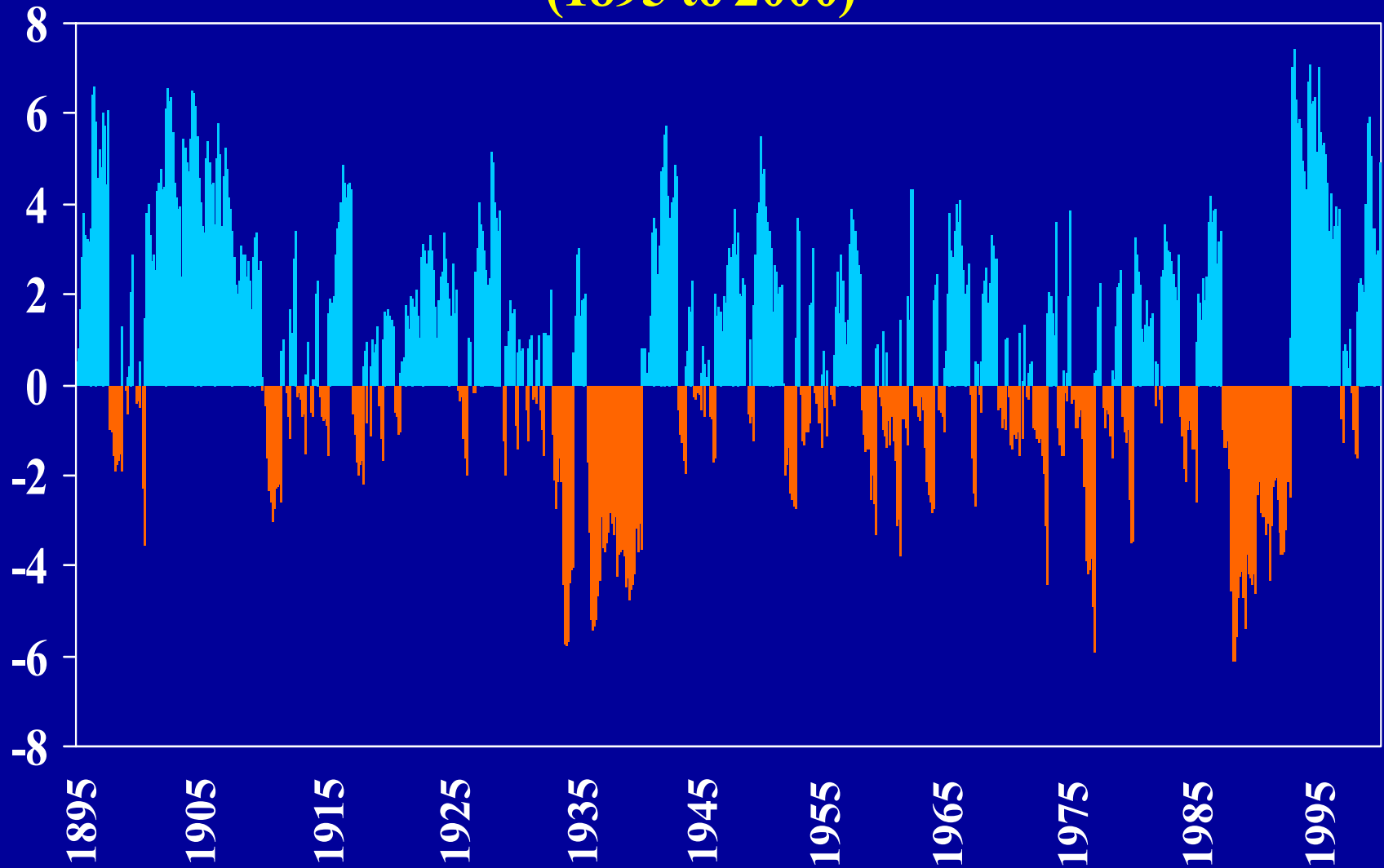








Palmer Drought Severity Index, Division 5, ND (1895 to 2000)



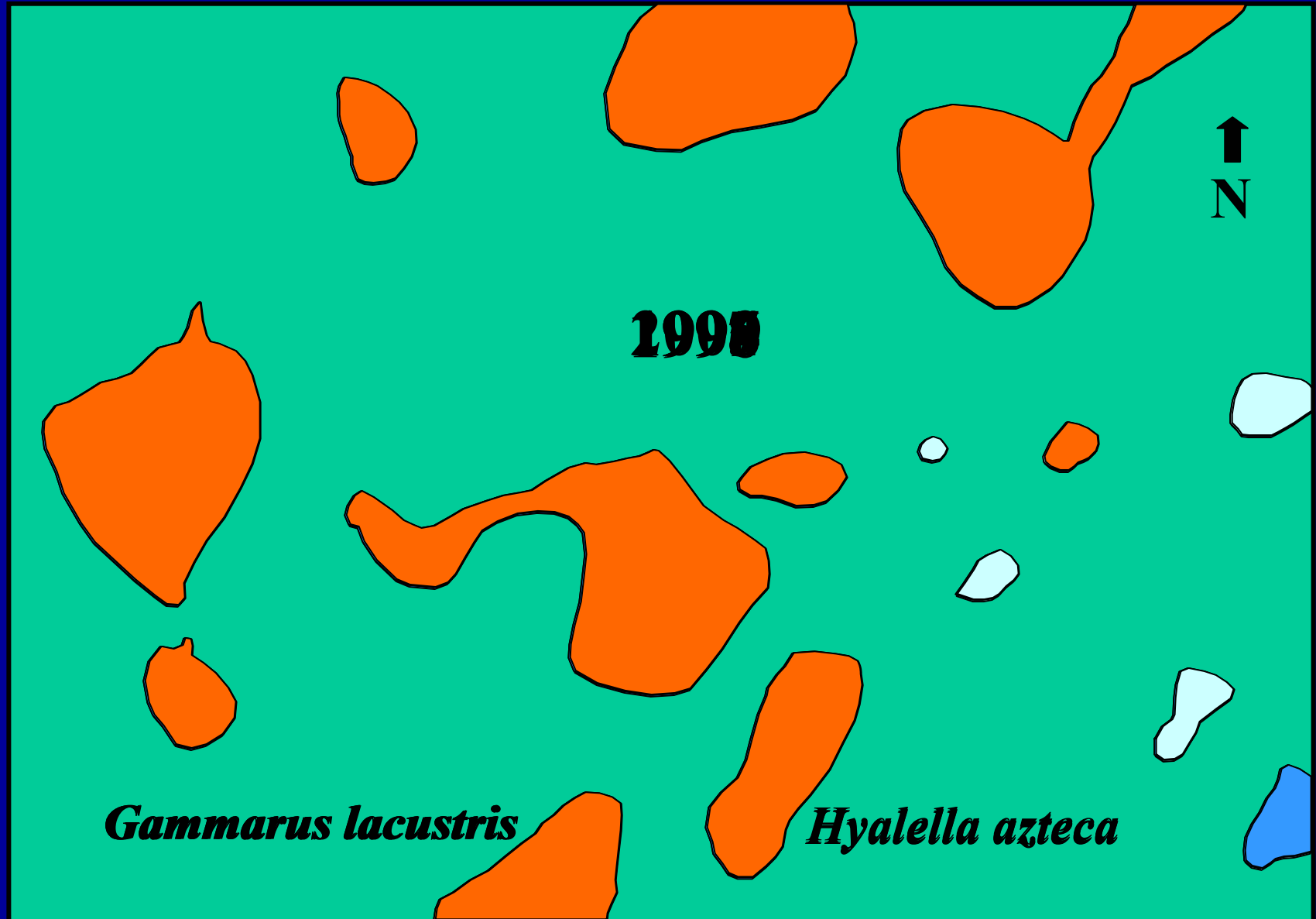
Drought



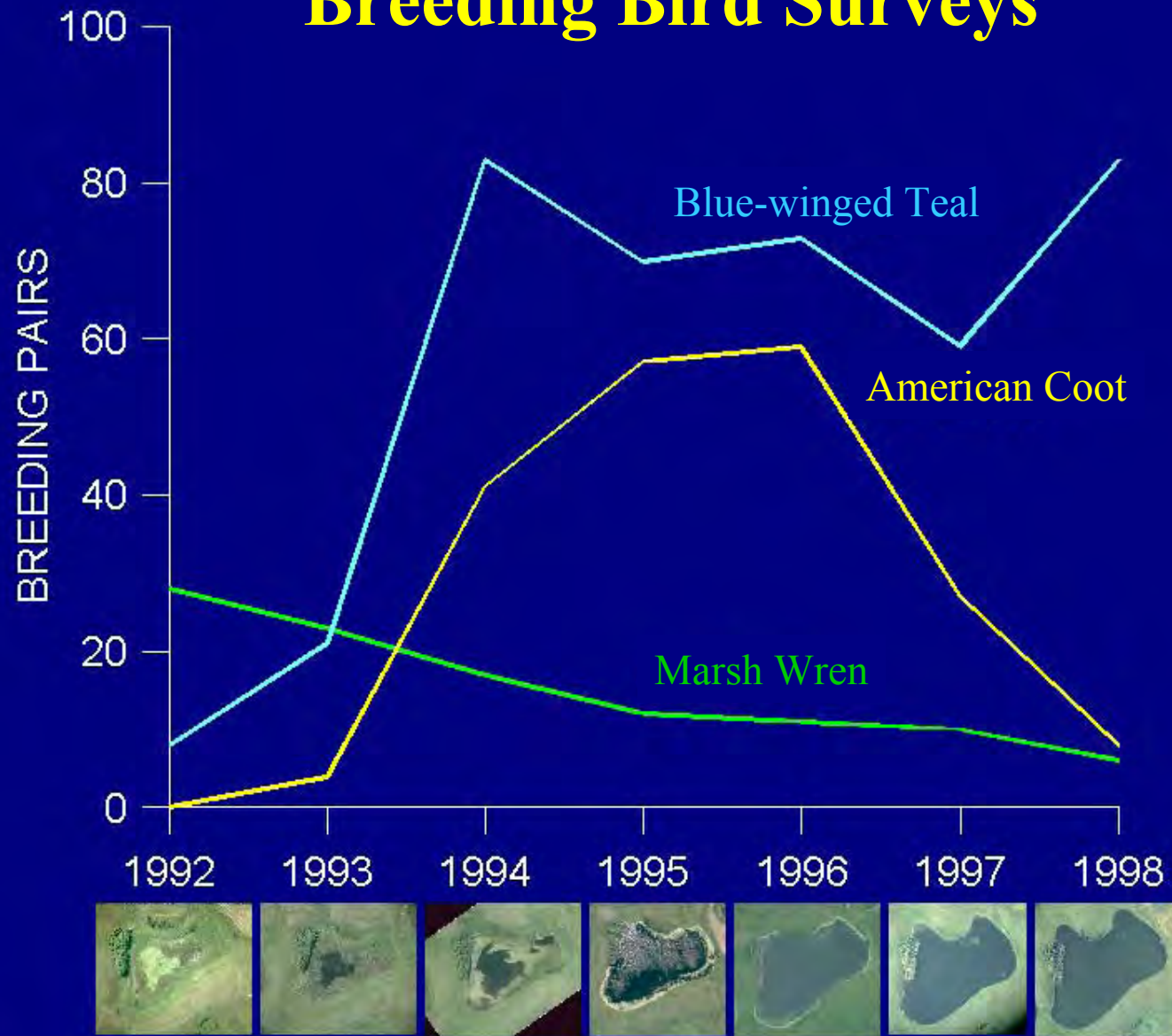
Deluge



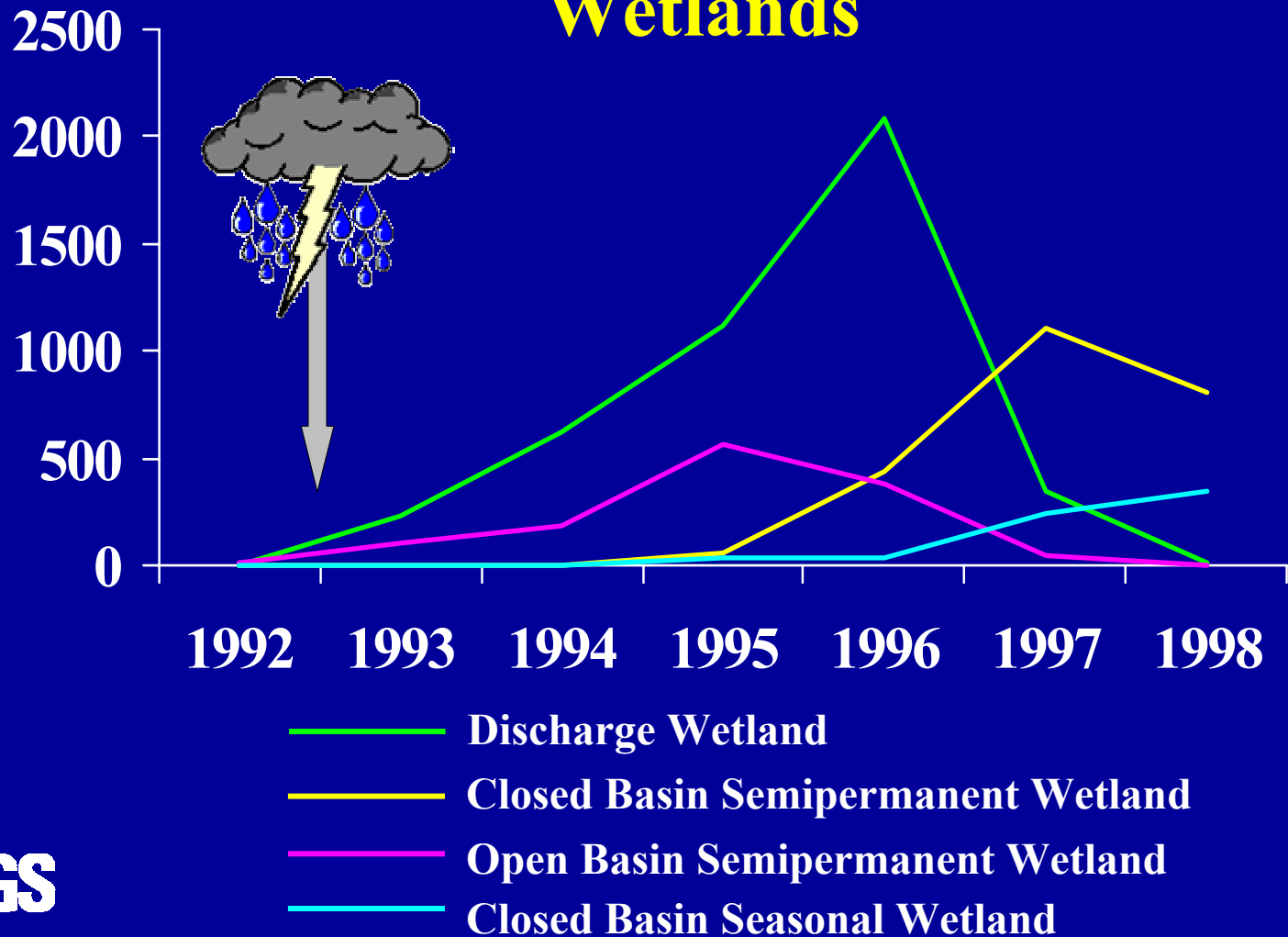
Amphipods in Cottonwood Lake Study Area Wetlands



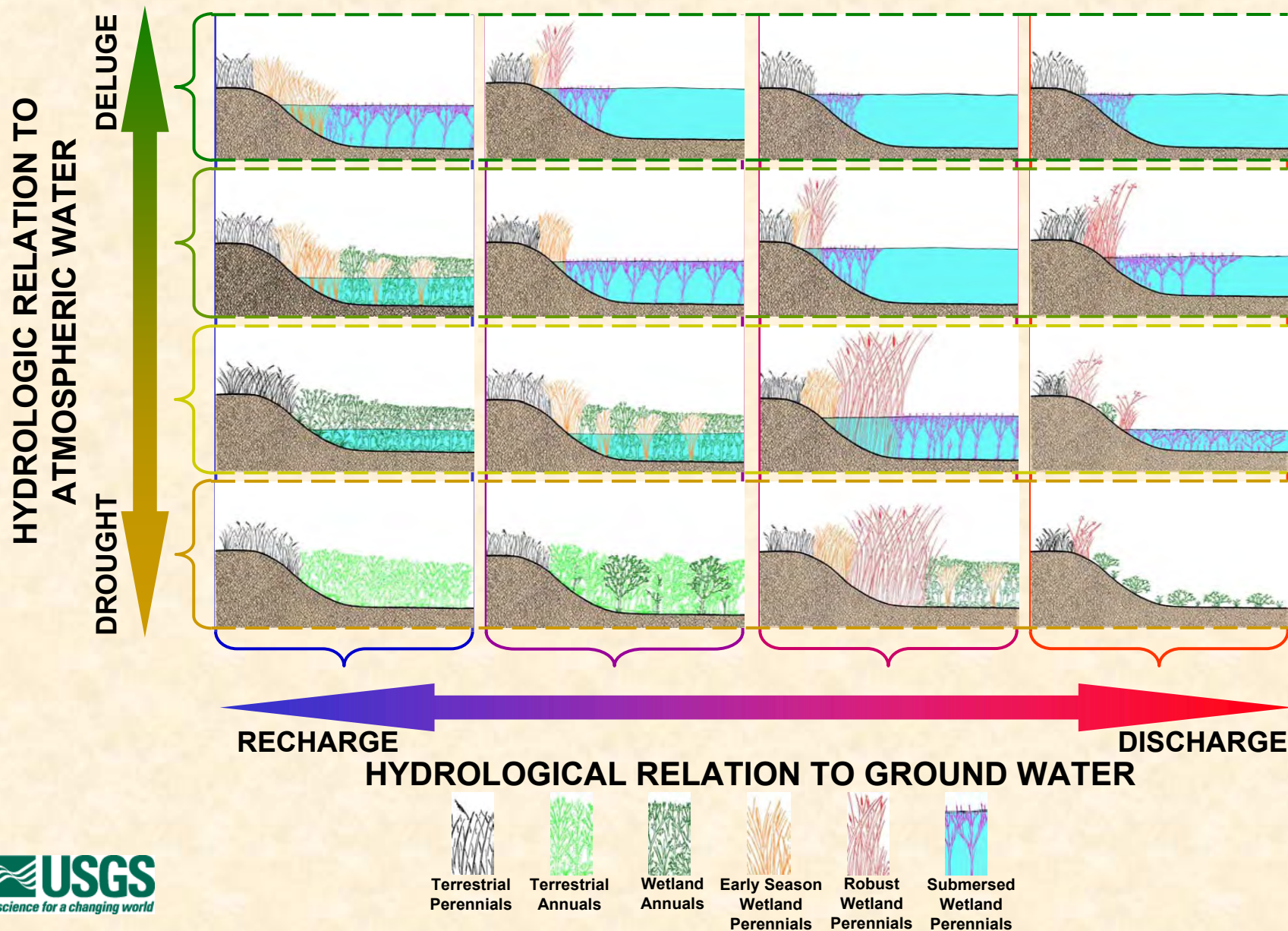
Breeding Bird Surveys



Tiger Salamander Captures in Cottonwood Lake Study Area Wetlands



THE WETLAND CONTINUUM



Acts of Congress

1849 - Swamp Lands Act

1934 - Migratory Bird Hunting Stamp Act

1954 - Water Protection and Flood Prevention Act

1972 - Federal Water Pollution Control Act (Sec 404)

1985 – Food Security Act

1986 – Emergency Wetland Resources Act

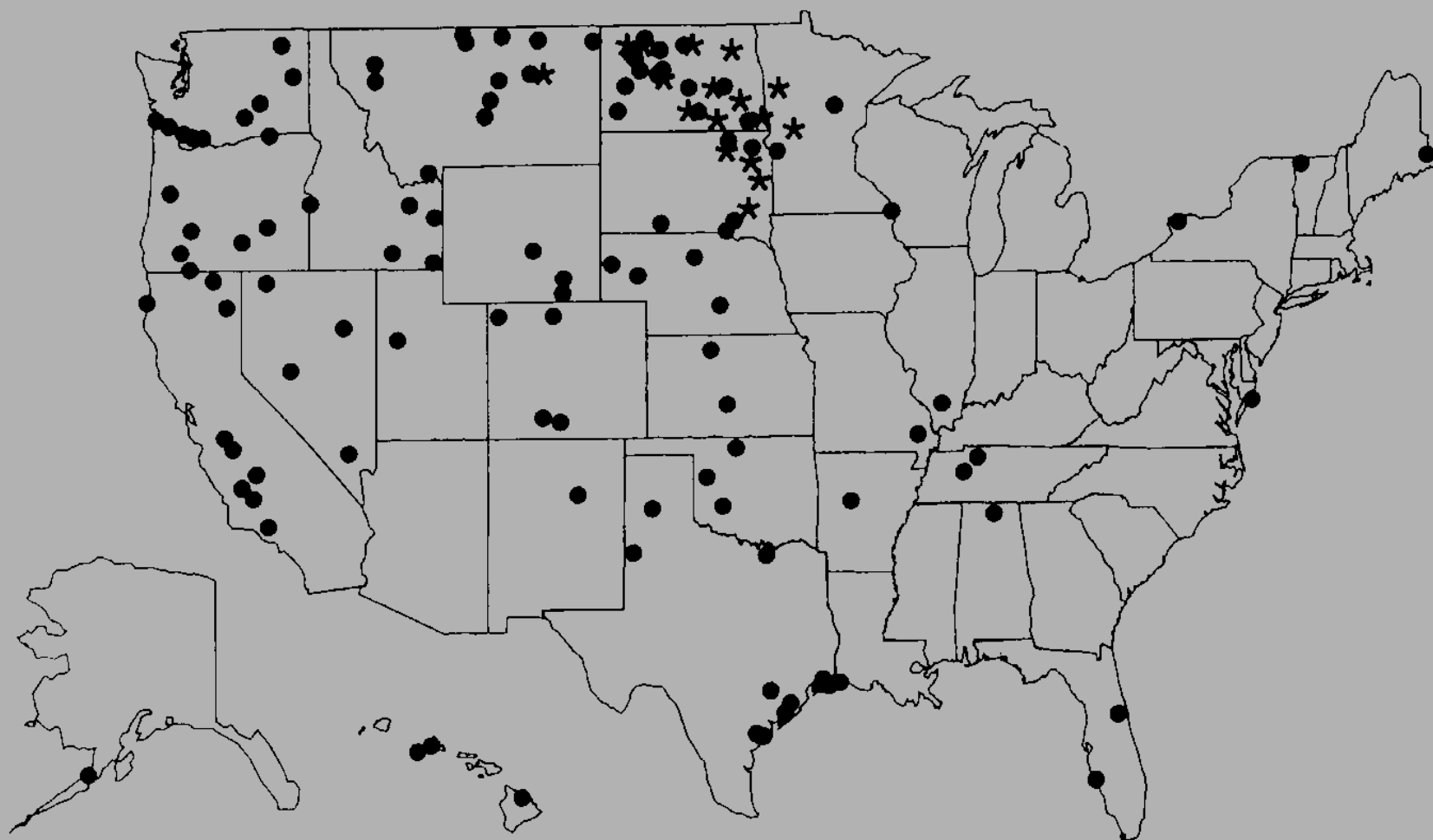
2001 – SWANCC vs USACOE

Influence of Agricultural Practices on Wetland Functions





Grazing on Public Lands



Kirby, R. E., J. K. Ringelman, D. R. Anderson, and R. S. Sojda.
1992. Transactions of the North American Wildlife and Natural
Resources Conference

PHYSICAL FACTORS

Hydroperiod Fire Climate Topography

Dams/Levees

Agriculture

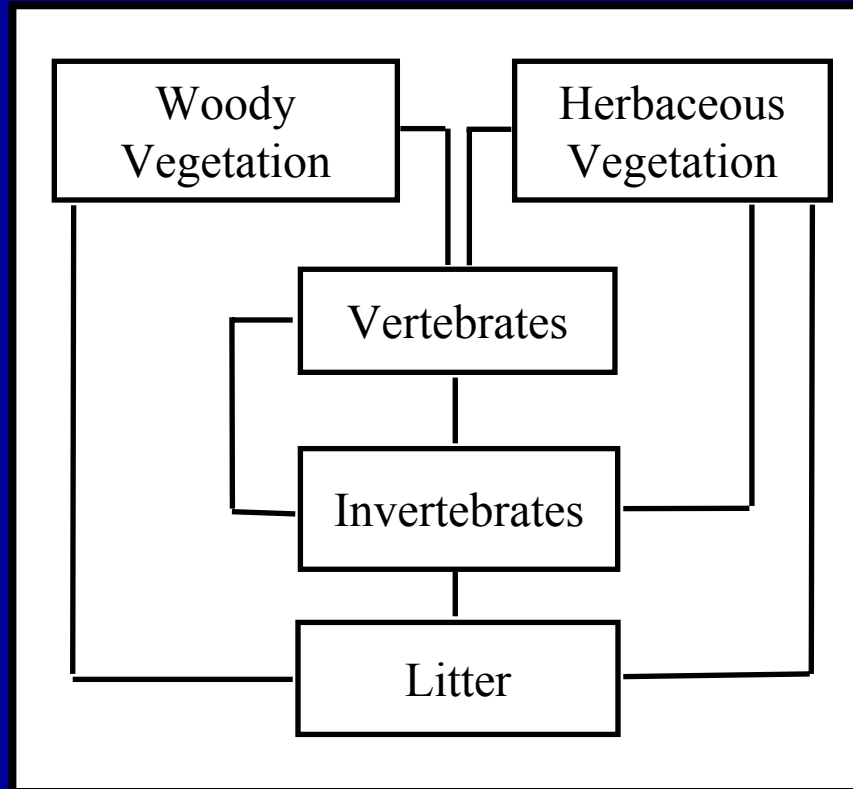
Climate Change

HUMAN
IMPACTS

Pesticides

Roads

Sedimentation



Pathogens

Herbivory

BIOLOGICAL
FACTORS

Parasites

Predators

Soil nutrients

Water quality

CHEMICAL FACTORS

Critical Information

- Ecosystem function in the prairie depend on synergistic processes involving both uplands and wetlands
- A single wetland can undergo dramatic changes in structure and function in relation to short- and long-term “acts of nature”
- Wetland processes can be influenced but not completely altered
- Processes influencing wetlands are interrelated; thus, any action intended to alter a specific wetland function may have unintended results

Concept of Ecological Fit

The idea that the health and sustainability of ecosystems depends on how well
“Acts of Congress” are coordinated with
“Acts of Nature”















Goal

- Long-term sustainable productivity and “health” of our Nation’s ecosystems
- Improved criteria for selection and management to improve “Ecological fit”



Impact of U.S. Department of Agriculture and U.S. Department of Interior Programs on Functions Performed by Restored Wetlands in the Prairie Pothole Region

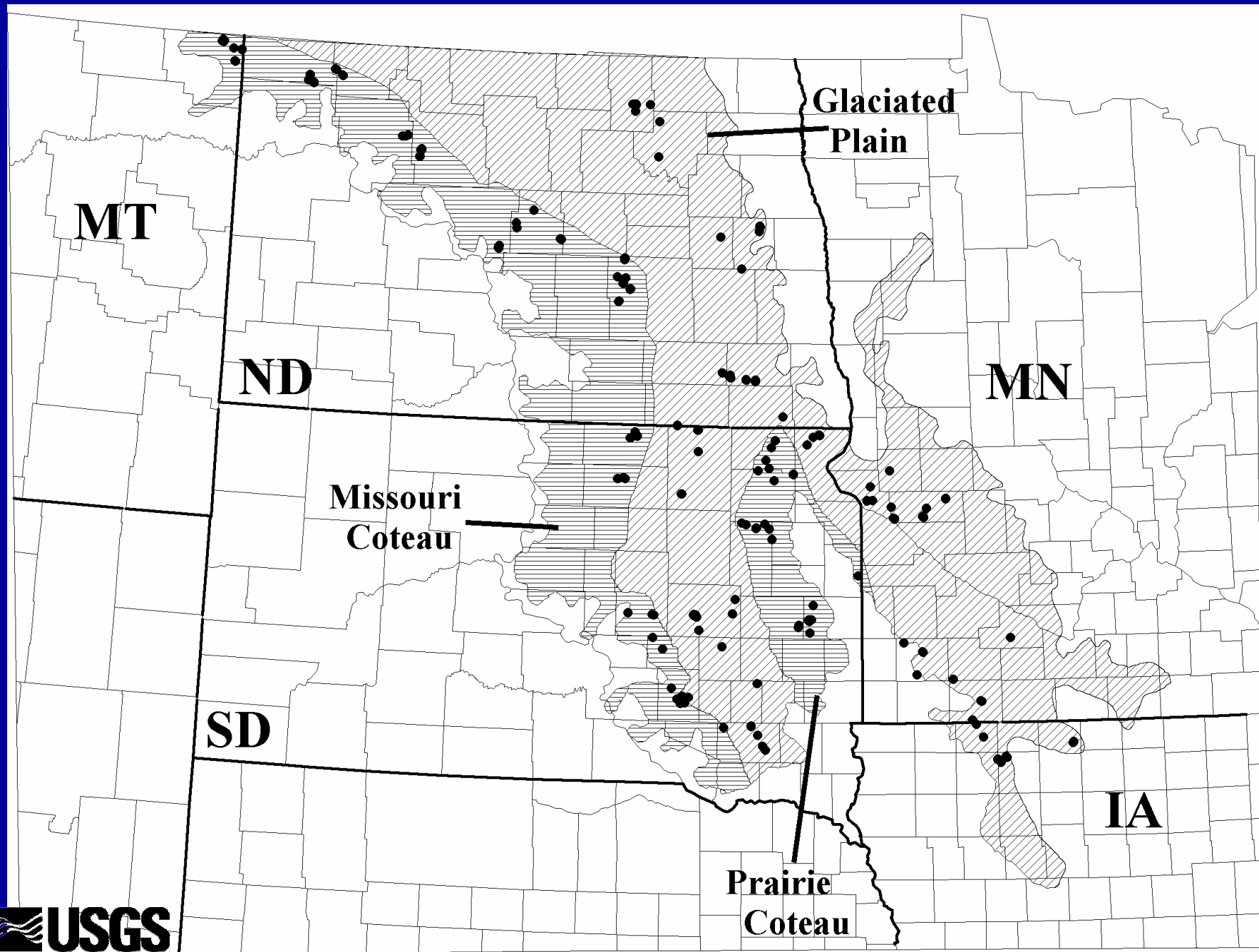
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Ecosystem Services

