

**Uncertain Waters: A Plains Perspective on River Restoration**  
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Clear Creek, Ucross Ranch. WY

# **Past and Current Drivers of Stream Works in the Great Plains:**





Black Vermillion River, Kansas



Black Vermillion River, Kansas. Photo by M. McNair

# Streambank Stabilization





Tuttle Creek Reservoir, Big Blue River, Kansas



Endangered Species of the Platte and Missouri



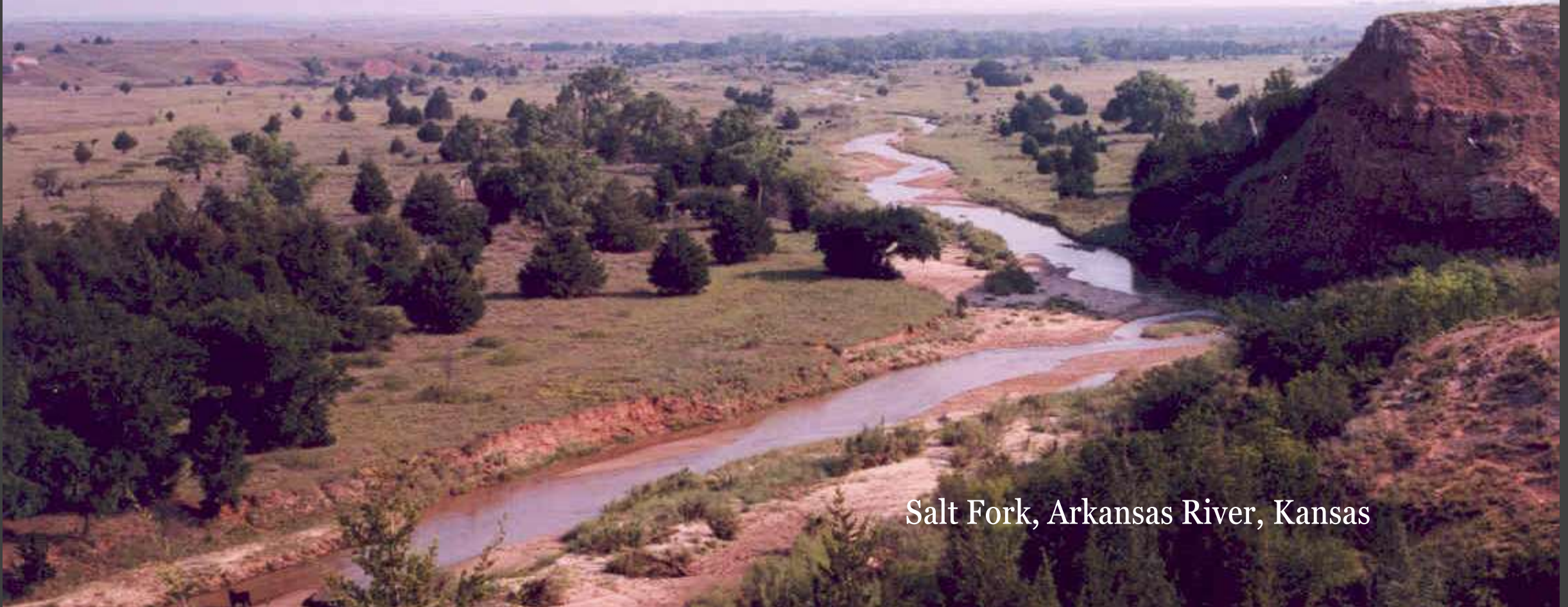
A wide landscape of rolling hills and a large body of water under a blue sky with light clouds. The foreground is dominated by a vast field of tall, golden-brown grasses. In the middle ground, there are several small, dark green trees and shrubs scattered across the landscape. A large, calm body of water, possibly a reservoir or a wide river, stretches across the background. The sky is a clear, pale blue with some light, wispy clouds. The overall scene is a typical representation of the Great Plains region.

# Future Drivers of Stream Works in the Great Plains

Sand Hills, Cherry County, Nebraska



**While predictions vary in their magnitude, the consensus is that the Great Plains will experience flood and drought superimposed upon a prolonged drying period (aridification) throughout the remaining decades of this century.**



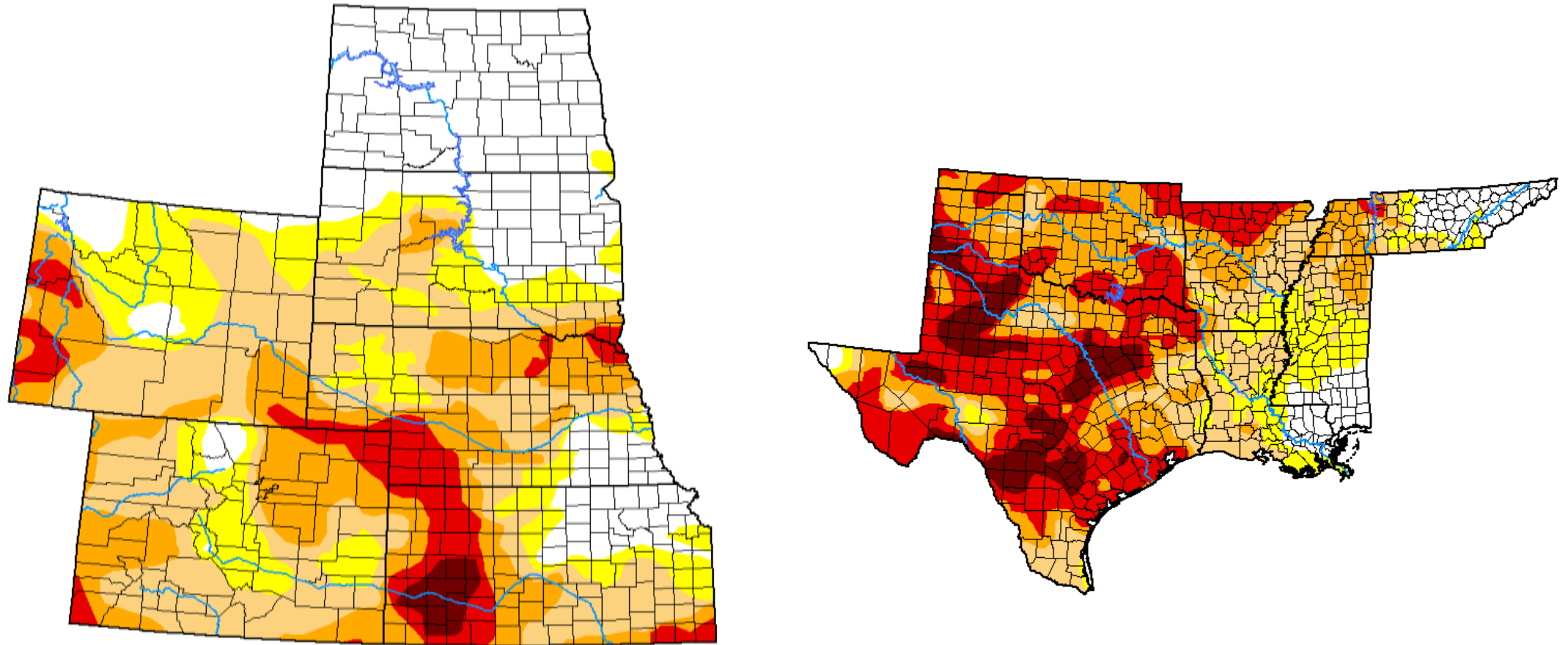
Salt Fork, Arkansas River, Kansas

# Megadroughts

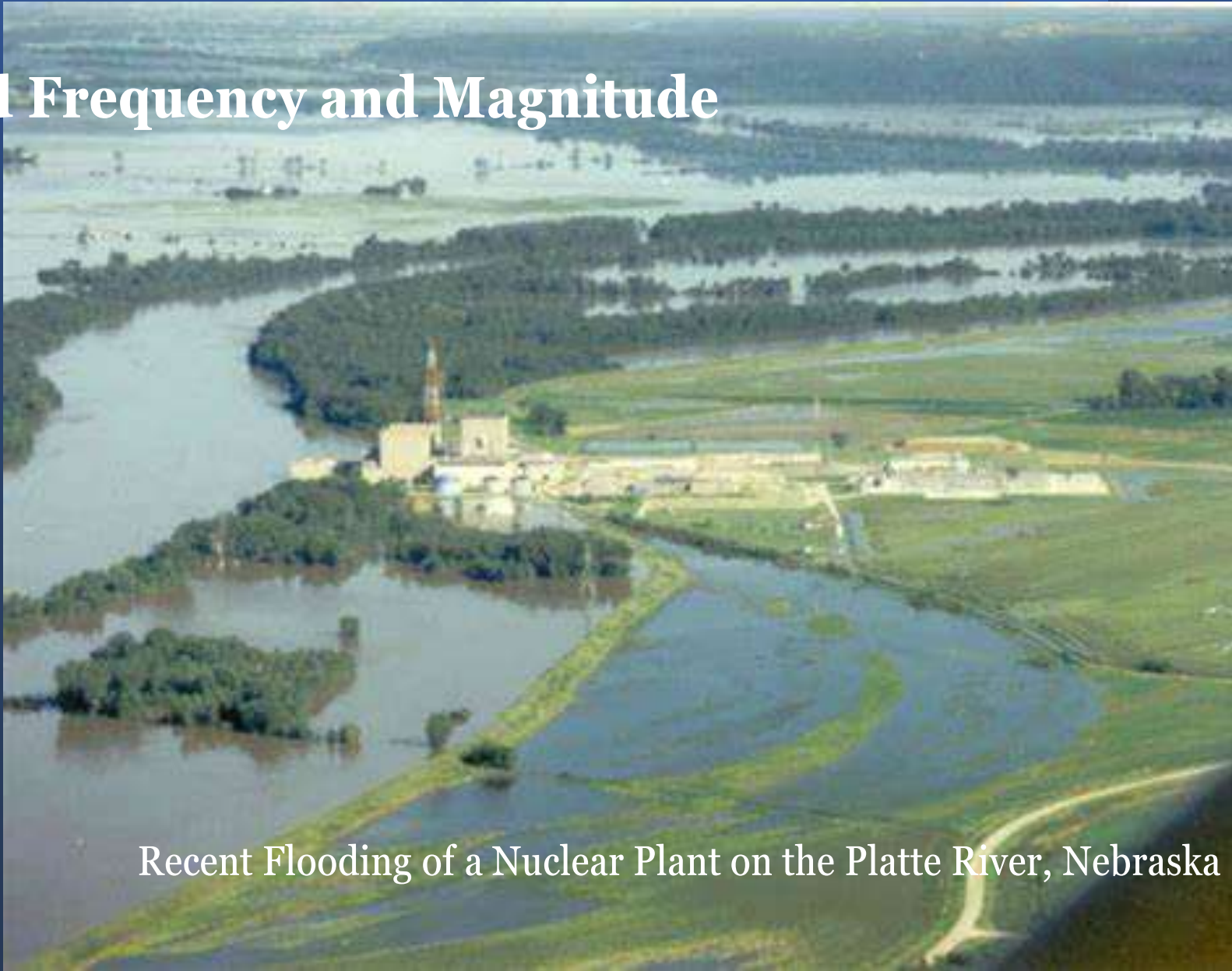
Southern Great Plains, Dust Bowl Era: 1930s



# Great Plains Drought Conditions for July 28, 2022



# Flood Frequency and Magnitude



Recent Flooding of a Nuclear Plant on the Platte River, Nebraska

## Increased Flooding and Associated Damages



An aerial photograph of a river system. A large dam is visible in the upper middle section, with a long, straight canal extending from it towards the top right. The river flows through a landscape of green fields and some wooded areas. The river has several bends and a wide, shallow section in the middle. The sky is overcast.

**Three Integrated Approaches:**

**Strategic Floodplain Restoration/Reconnection**

**Riparian Ecosystem Restoration**

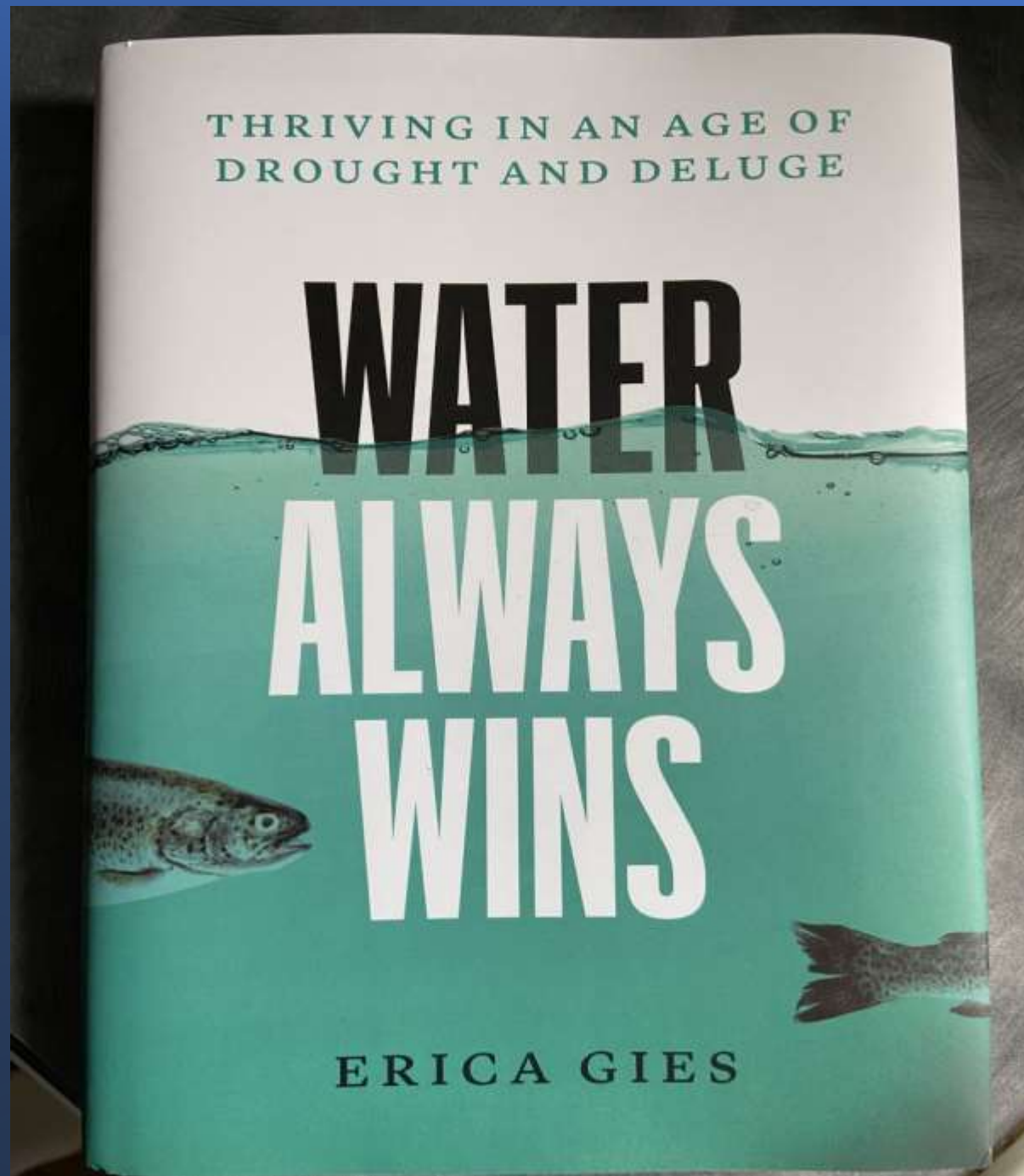
**Watershed Hydrology Restoration/Recovery**

# Strategic Floodplain Restoration/Reconnection



The Nature Conservancy

“Slow Water”

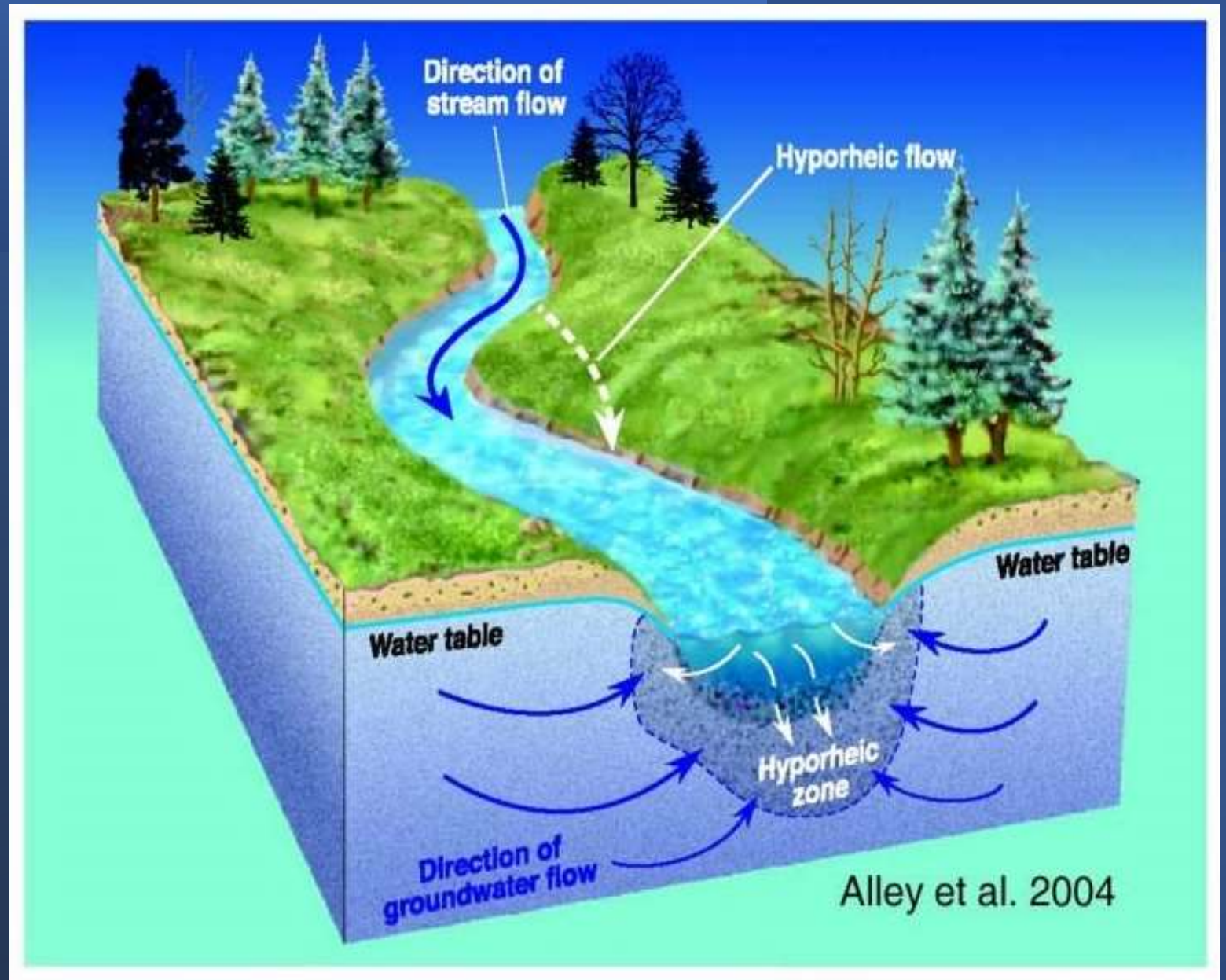




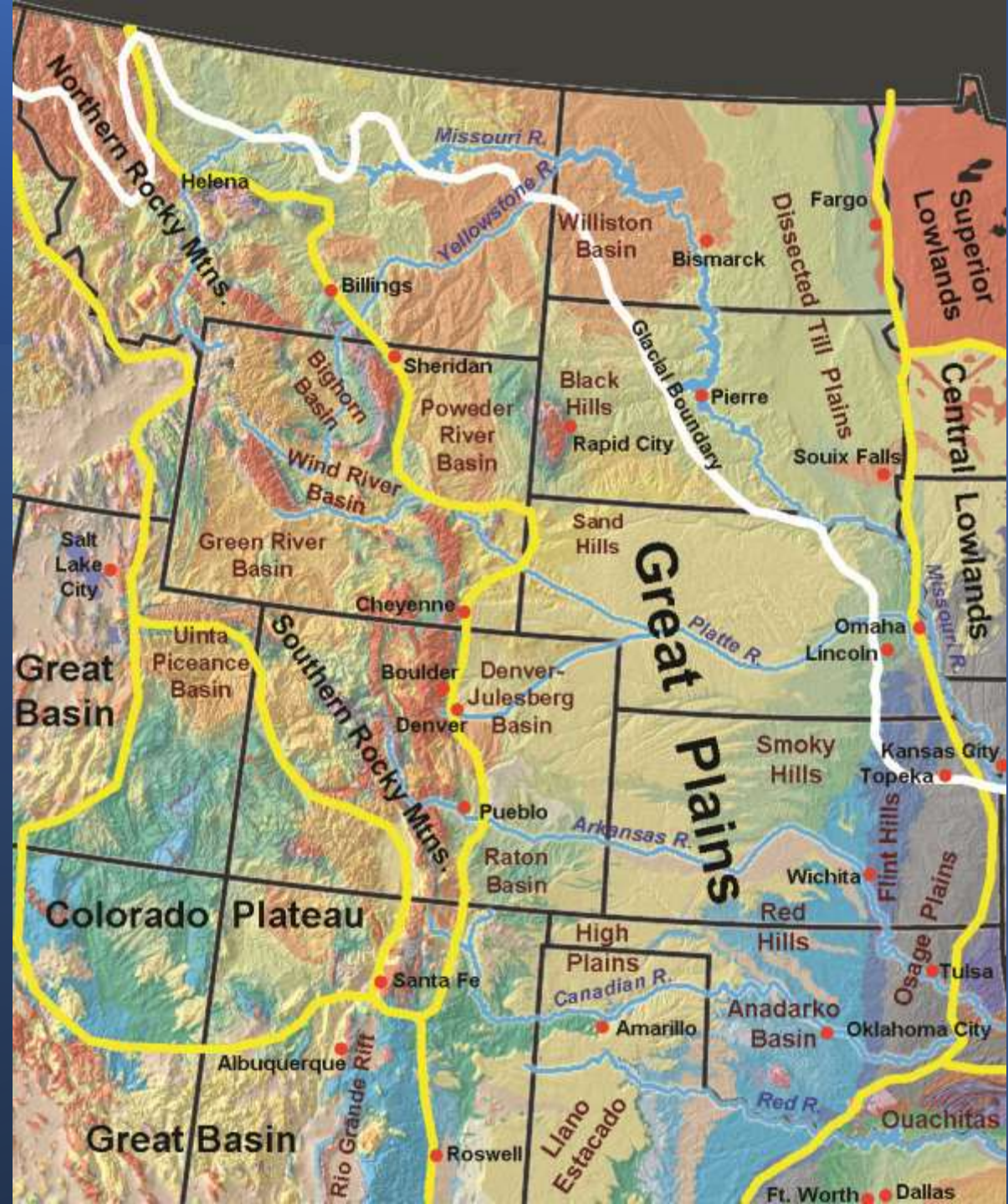


# Riparian Ecosystem Restoration

We must address all of  
The riparian ecosystem:  
the channel, the floodplain,  
the water table, the hyporheic  
zone, the riparian flora and  
fauna, and the human land  
use(s)



“From the Pecos to the Musselshell”



# Rain Garden in a neighborhood setting

## Watershed Hydrology Restoration



**Plant Choice**  
Choose native plants based on need for light, moisture, soil type. They plant should have height, and flower color to maximize appeal and butterfly habitat.

**Depth**  
A typical rain garden is between four and eight inches deep. This depth, proportionate to surface area, helps ensure water will infiltrate quickly and not pond.

**Size**  
A rain garden is typically 1/3 to 1/2 percent the size of the impervious surface that generates runoff.

**Soil Amendments**  
A good soil mix for rain gardens is 25 percent sand, 75 percent topsoil, and 25 percent compost.

**Location**  
Rain gardens are often located at the end of a roof gutter or downspout, as a buffer between the house and the street.

**If we are to survive, to coexist, to sustain the riverine ecosystems of the Great Plains we must go beyond knowing the names of all the plants and animals; we must also know their stories and how they have formed and maintained community.**

Clear Creek, Ucross Ranch, WY