

Energy-Water Nexus



Larry Flowers, NREL

WINDY TWEET ROCKY MOUNTAIN NEWS NEWS 7

amid dry skies, wells

Eastern plains farmers confronted by uncertain future as drought, cities' relentless thirst threaten agriculture

By Jerd Smith ■ Photos by Davis McGregor ■ Rocky Mountain News

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Border Street: A new spirit despite immigration bill's demise
Dive instructor pulls elderly man from beneath caps
One-tank road trips can be a gas no matter what your car

Rocky Mountain News

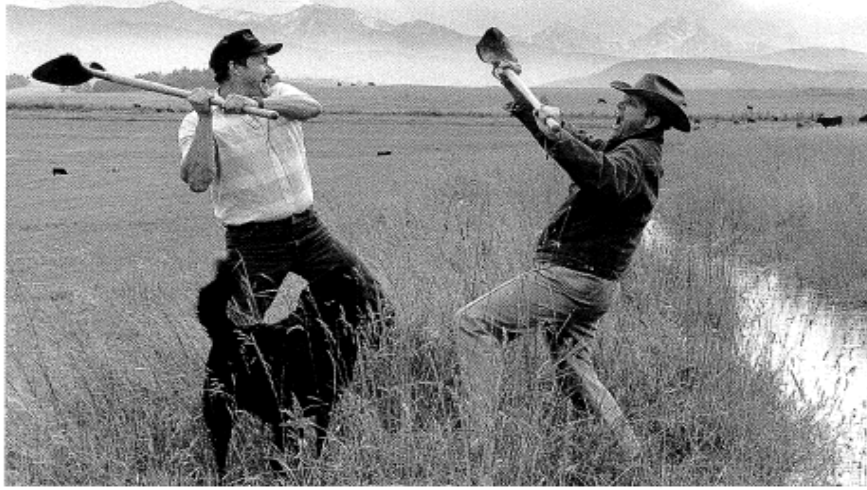
SHADOW OF A DROUGHT

New laws, legal fights and a long dry spell have changed a way of life on the eastern plains. For many, the next steps remain uncertain.



Farms high and dry

■ State shutting 400 wells to preserve South Platte; 200 growers could lose crops. 4A



Discussing Water Rights, A Western Pastime

Western droughts could become norm

Models predict Colorado, drier

If that happens, the state will get drier, with less mountain snow in the winter, lower stream flows in the summer, and an increased threat of wildfires.

"I think the drought that we've been in since 1999, on and off, is a great preview of what's going to happen in the future—and you won't have to wait too long," said Jonathan Overpeck, a University of Arizona paleoclimatologist and an author of the latest Intergovernmental Panel on Climate Change report.

A 21-page summary of the 11-chapter report was released Friday in Paris. The IPCC's periodic updates are considered the world's most authoritative assessments of climate science.

The new report projects a global temperature increase of 7.5 degrees Fahrenheit by end of the century.

The planet warmed slightly more than 1 degree Fahrenheit over the past century. IPCC estimates see a greater than 90 percent likelihood of most warming of the last 50 years occurring because of human-caused emissions of heat-trapping "greenhouse" gases.

"If we don't dial back greenhouse gas emissions, what we've seen so far is nothing compared to what we'll get," Overpeck said Friday from Paris.

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... that requires farmers who use irrigation wells to find extra water to recharge the underground aquifer that supplies the South Platte River.

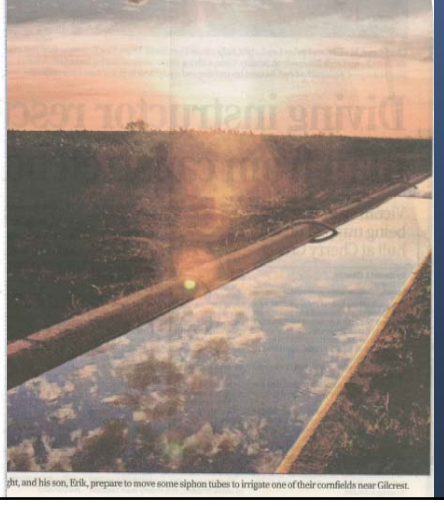
Farmers sweating over lack of water

Growers mop brows after state edict to shut down wells

By Jerd Smith
 ROCKY MOUNTAIN NEWS

The state ordered more than 400 powerful irrigation wells shut down this week to protect the South Platte River, triggering a crisis for about 200 farms from Brighton to Fort Morgan.

"It's the toughest decision I've ever had to make," said State Engineer Hal Sturgeon, Colorado's top



South Platte irrigation wells turned off

More than 400 irrigation wells used by farmers are being shut down because they can't meet the requirements of a new law designed to protect the South Platte River. The irrigation wells rely on the same shallow aquifer that helps supply the river.



... and his son, Erik, prepare to move some siphon tubes to irrigate one of their cornfields near Glenwood.

Humanity's Top Ten Problems for next 50 years

1. Energy
2. Water
3. Food
4. Environment
5. Poverty
6. Terrorism & War
7. Disease
8. Education
9. Democracy
10. Population



2003: 6.3 Billion people

2050: 9-10 Billion people

Total Water Withdrawals, 2000

Public supply, 11 percent



Public supply water intake, Bay County, Florida

Richard L. Merritt, USGS

Irrigation, 34 percent



Gated-pipe flood irrigation, Fremont County, Wyoming

Jeff Vanuga, USDA NRCS

Aquaculture, less than 1 percent



World's largest trout farm, Buhl, Idaho

Courtesy of Clear Springs Foods, Inc.

Mining, less than 1 percent



Spodumene pegmatite mine, Kings Mountain, North Carolina

Nancy L. Barber, USGS

Domestic, less than 1 percent



Domestic well, Early County, Georgia

Alan M. Cressler, USGS

Livestock, less than 1 percent



Livestock watering, Rio Arriba County, New Mexico

Jeff Vanuga, USDA NRCS

Industrial, 5 percent



Paper mill, Savannah, Georgia

Alan M. Cressler, USGS

Thermoelectric power, 48 percent

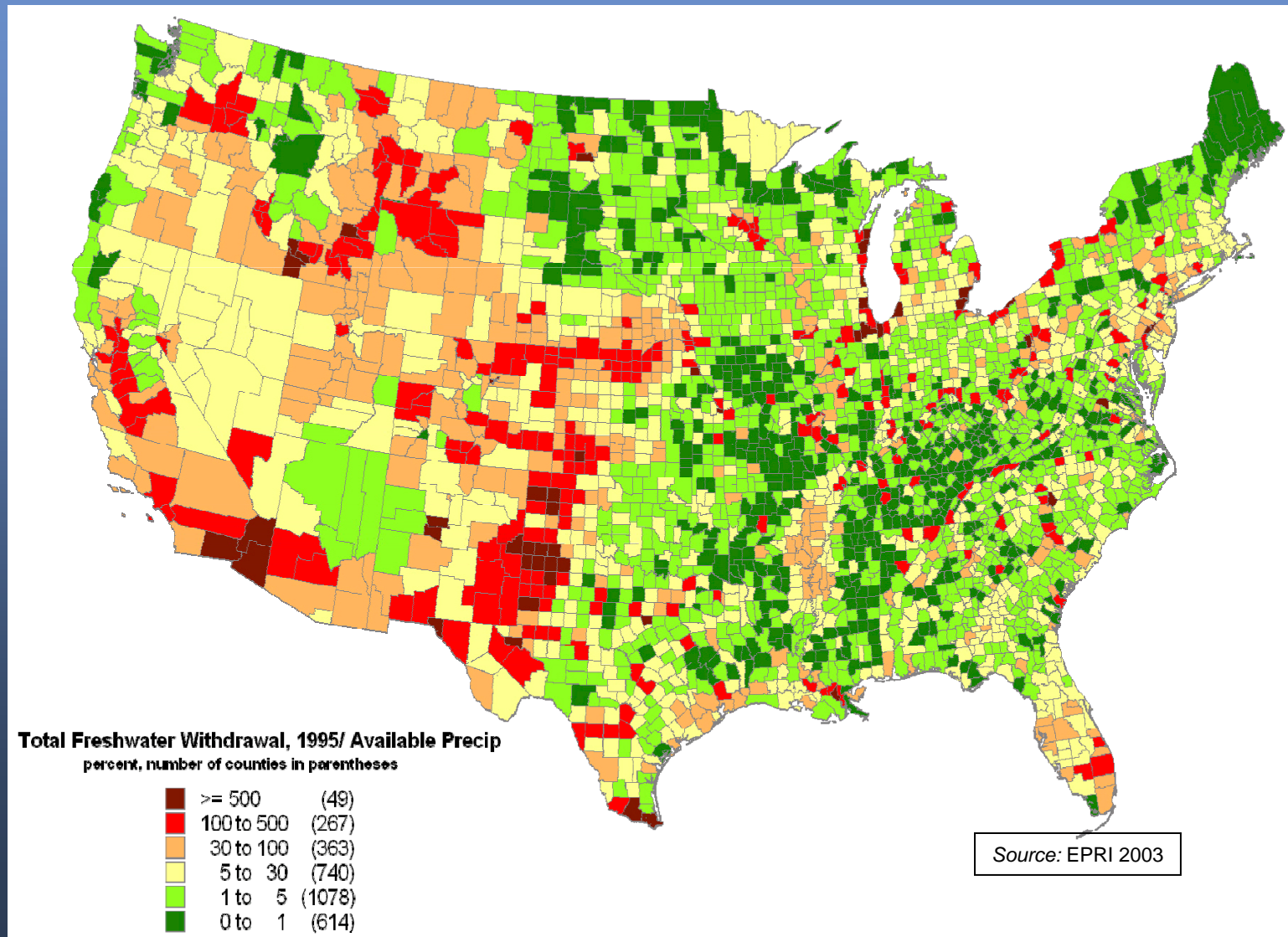


Cooling towers, Burke County, Georgia

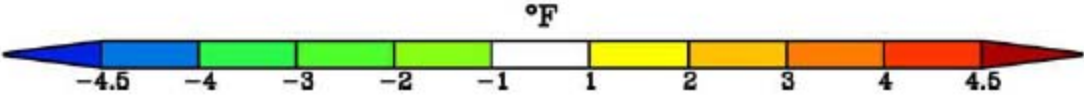
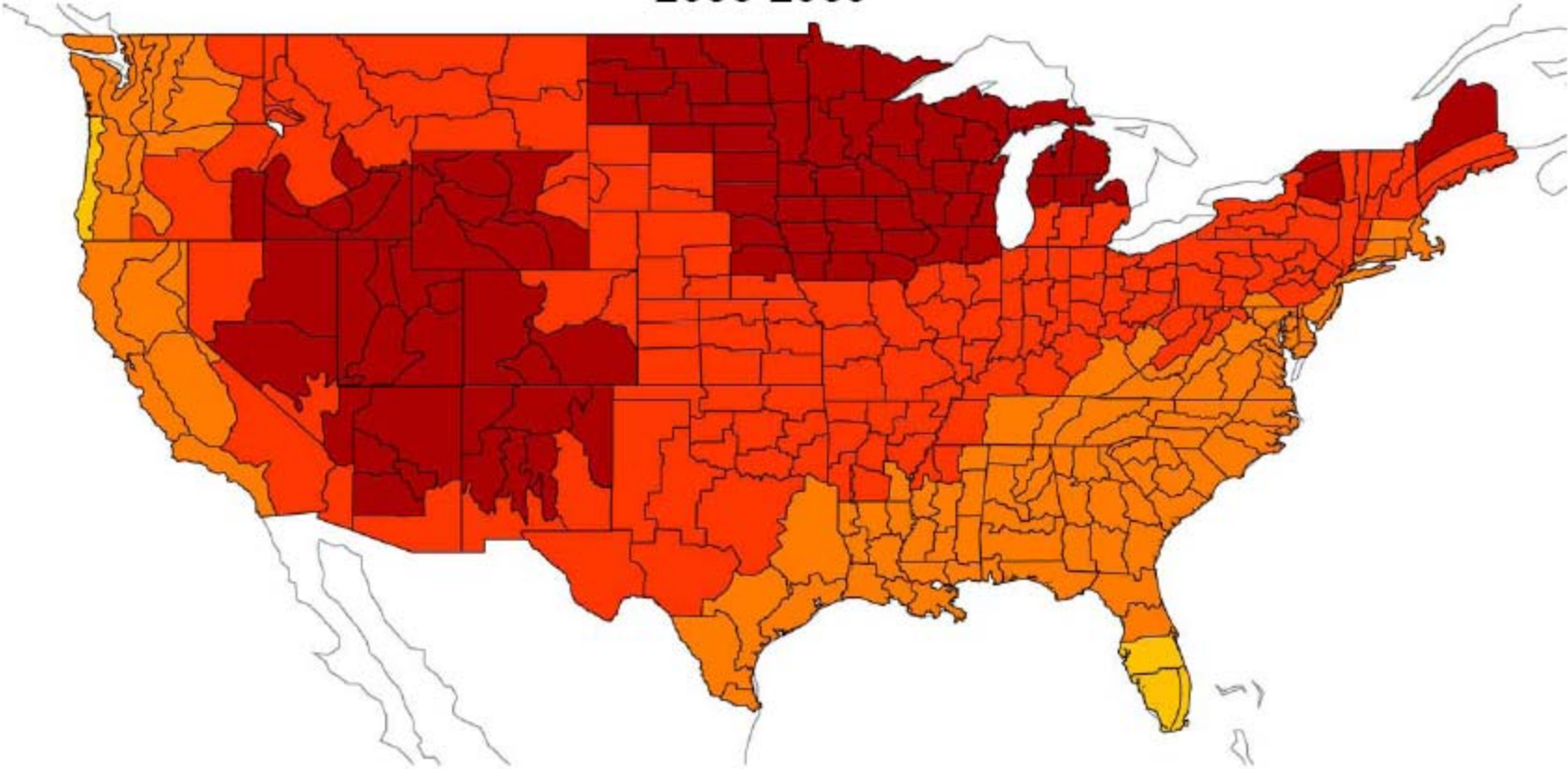
Alan M. Cressler, USGS

Source: USGS Circular 1268, 15 figures, 14 tables (released March 2004 and revised April and May 2004). Available at: <http://water.usgs.gov/pubs/circ/2004/circ1268/index.html>

Sustainable Withdrawal Of Freshwater Is National Issue

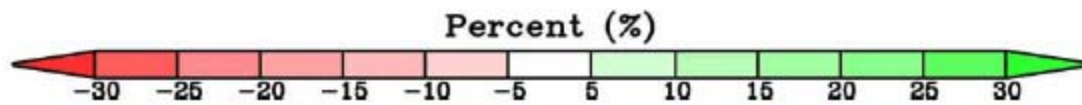
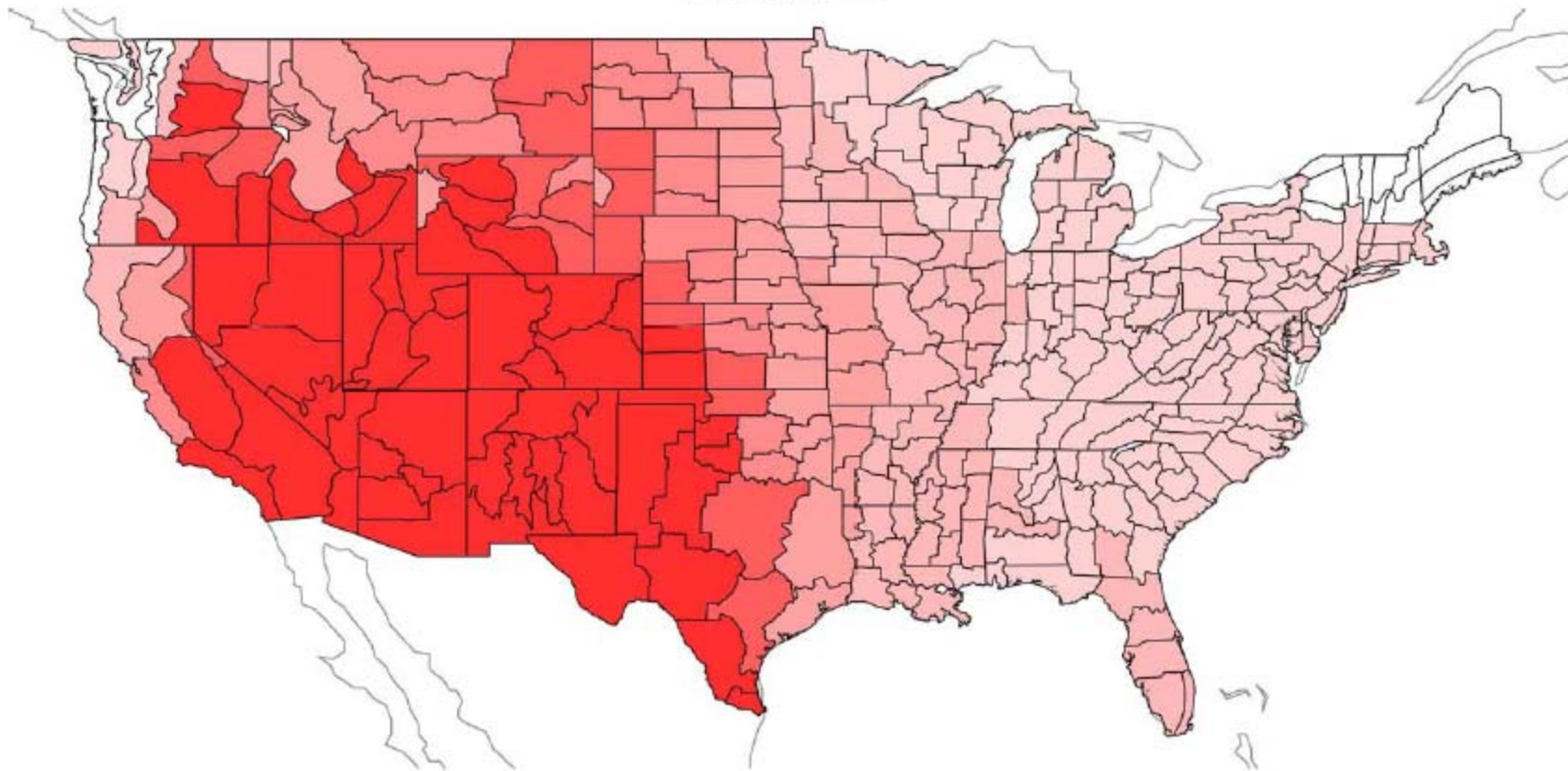


Change in Annual Temperature 2035-2060



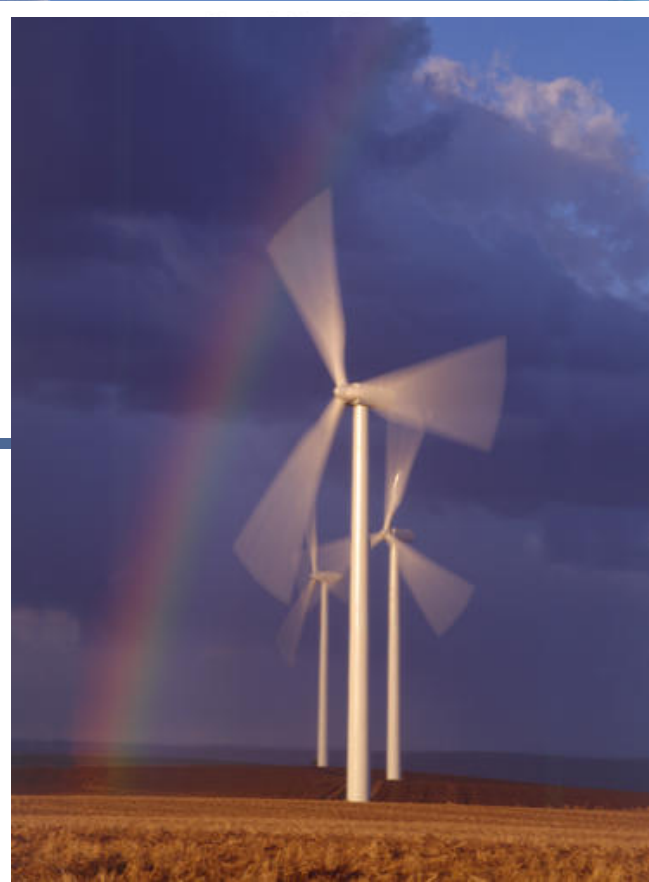
Source: NOAA

Change in Annual (PCPN-Potential Evapotranspiration) 2035-2060

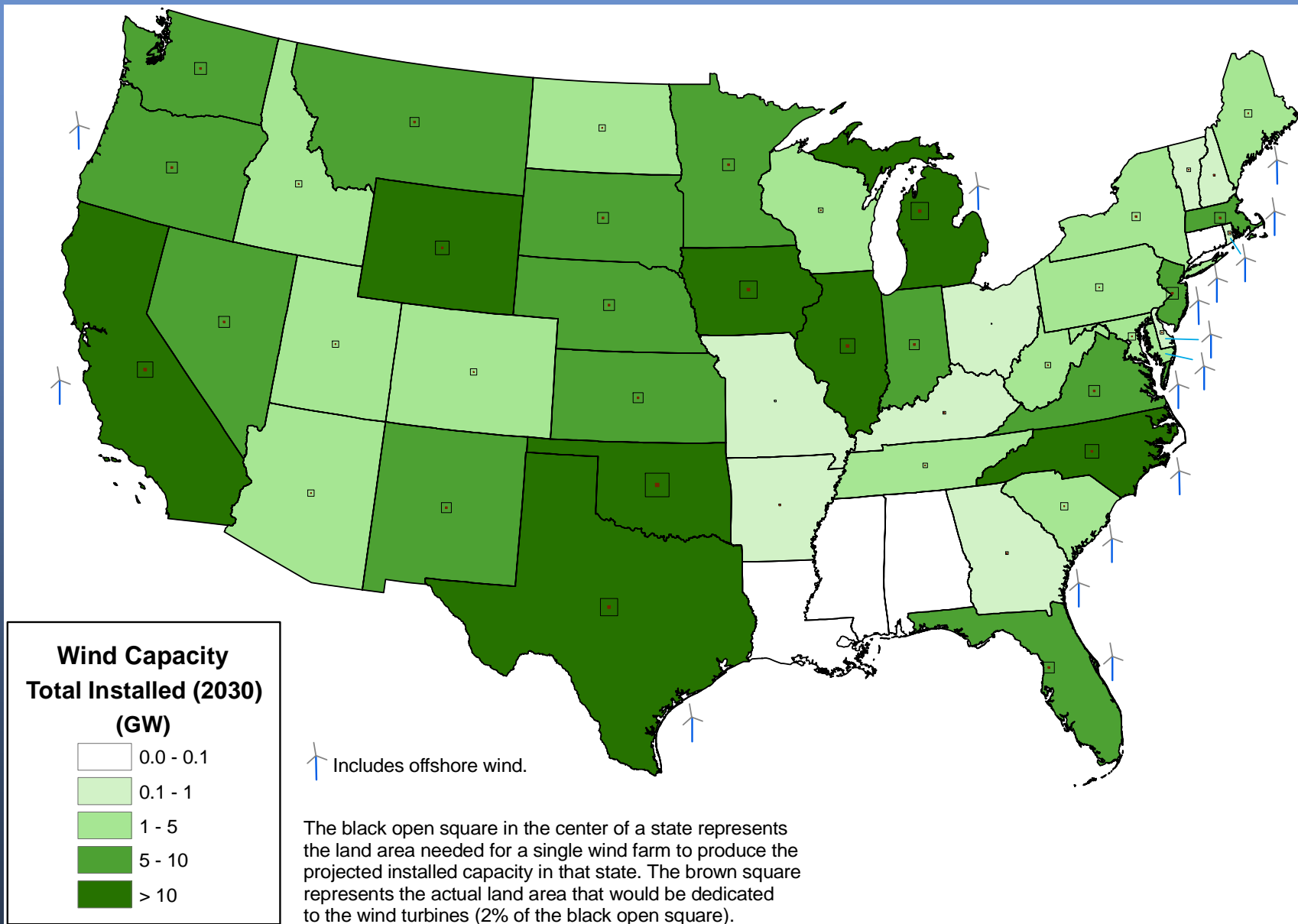


Source: NOAA

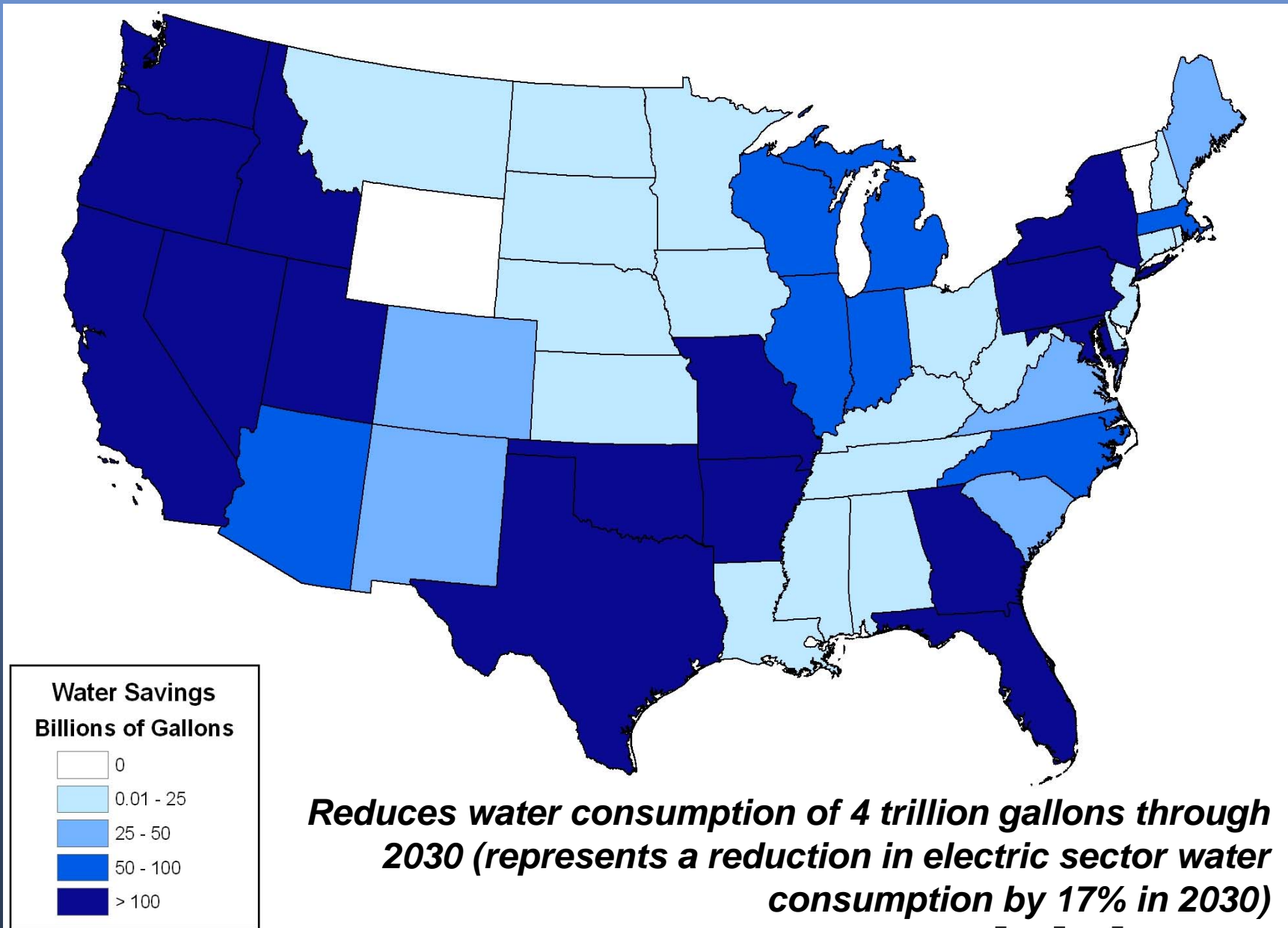
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46 States Would Have Substantial Wind Development by 2030



Cumulative Water Savings from 20% Scenario



“The future ain’t what it used to be.”

- Yogi Berra