

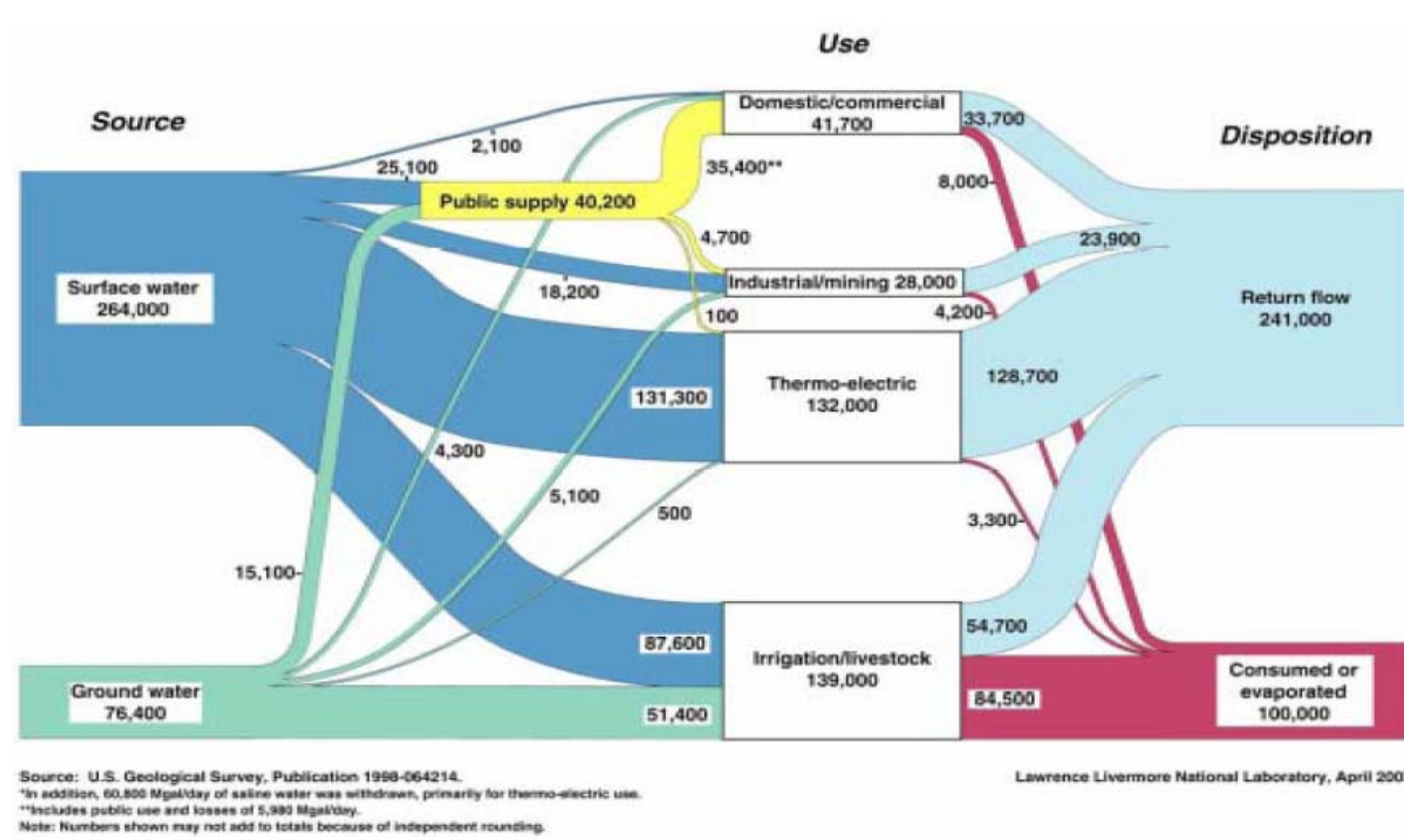


# The Wind/Water Nexus

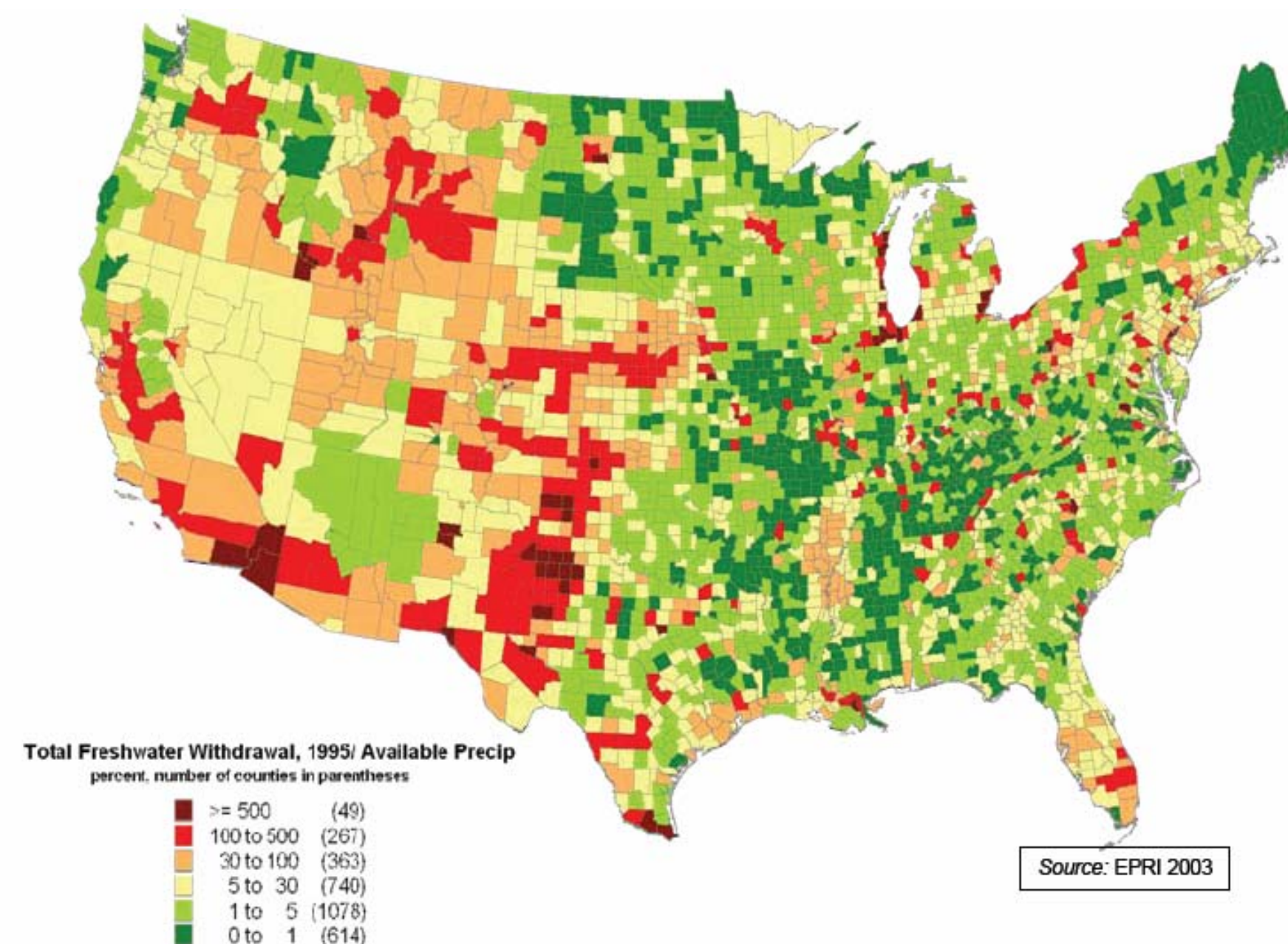
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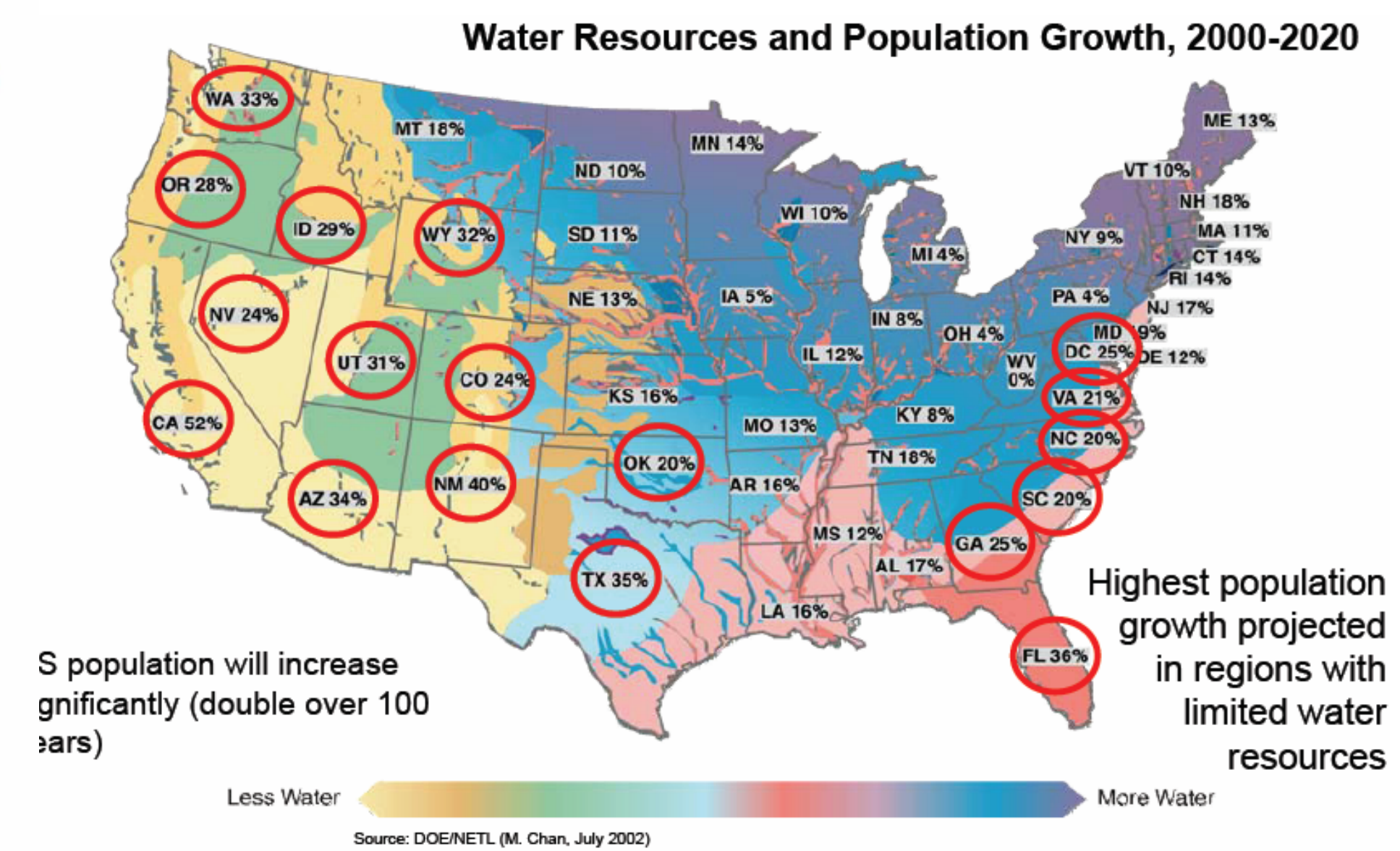
## Water Use



## Water Withdrawals



## Water & Population



## Characterization

## Solutions



### Irrigation

Second largest water user in the United States; irrigation accounts for 137 billion gallons per day, about 34% of water withdrawn

About 14% of U.S. farms are irrigated, representing 55 million acres of irrigated land

Irrigation systems use diesel, gasoline, electricity, propane, or natural gas, depending on local economics, availability, and pump size.

Nine of the top 10 irrigation states (California, Texas, Idaho, Arkansas, Colorado, Nebraska, Arizona, Kansas, Washington, and Oregon) have good to excellent wind resources

The rising and uncertain future costs of diesel, natural gas, and even electricity increase the opportunity for wind energy and its predictable and competitive cost

Hybrid wind-gas or wind-diesel systems provide another option.

### Public Supply



In 2000, total freshwater withdrawals for public supply were 43.3 billion gallons per day

Population/urban growth stress water supplies, and the highest population growth is projected in regions with limited water resources

The states with the largest public supply withdrawals are (in descending order) California, Texas, New York, Florida, Illinois, Ohio, Pennsylvania, Georgia, Michigan, and Arizona.

Twelve of the 15 fastest-growing states (1995–2025), eight of the 10 states with the largest public water supply withdrawals, and nine of the 10 states with the highest per capita water consumption have good to excellent wind resources

Offshore (including the Great Lakes) wind resources are particularly robust and close to large and growing metropolitan areas

Wind energy is relatively economically competitive, predictable, and renewable—all benefits to municipal electricity/water providers.

### Desalination



One strategy to address impending water shortages is the development of new water sources, such as brackish aquifers and sea water. Desalination is utilized by coastal cities as well as inland municipalities with access to brackish water sources. The United States is home to 20% of the world's desalination facilities

Desalination requires a constant power supply, and electricity is the major cost for these plants: for brackish water, electricity use is 11% of total cost, and for seawater, it is 44% of operating costs for the plant.

Many growing coastal cities with high energy costs are located in good wind resource areas

Desalination systems can be installed off-grid, powered by wind or hybrid systems (such as wind-diesel).