Strategy to Assess the Nation's Ground-Water Availability

Released July 2008

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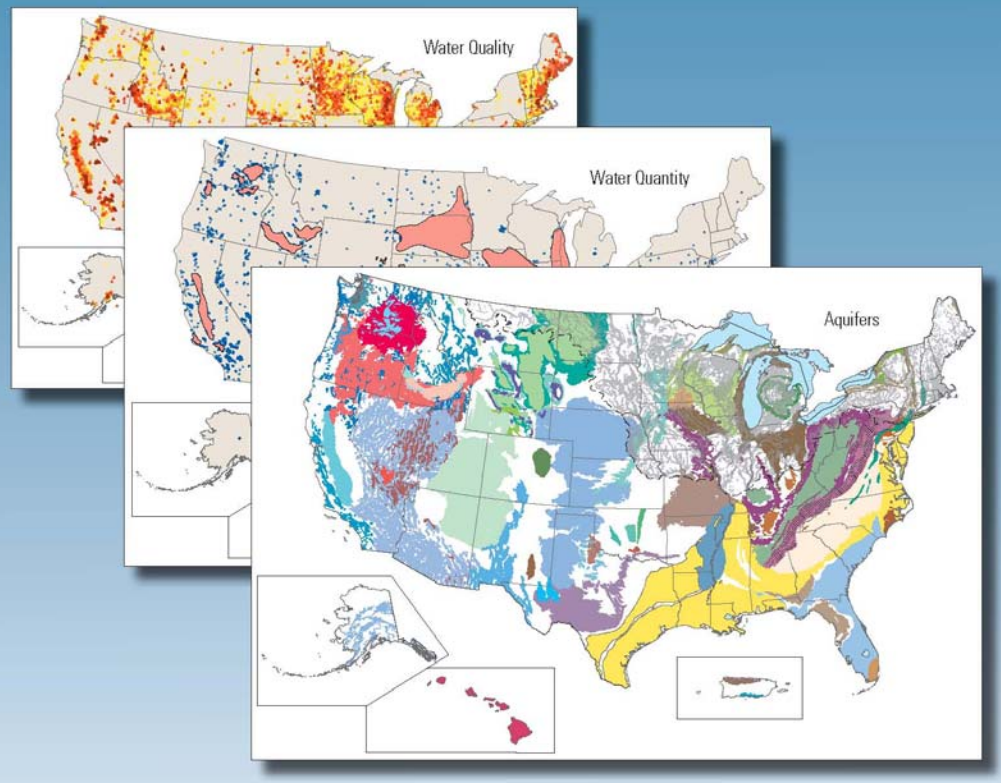
Ground-Water Resources Program

Ground-Water Availability in the United States



Circular 1323

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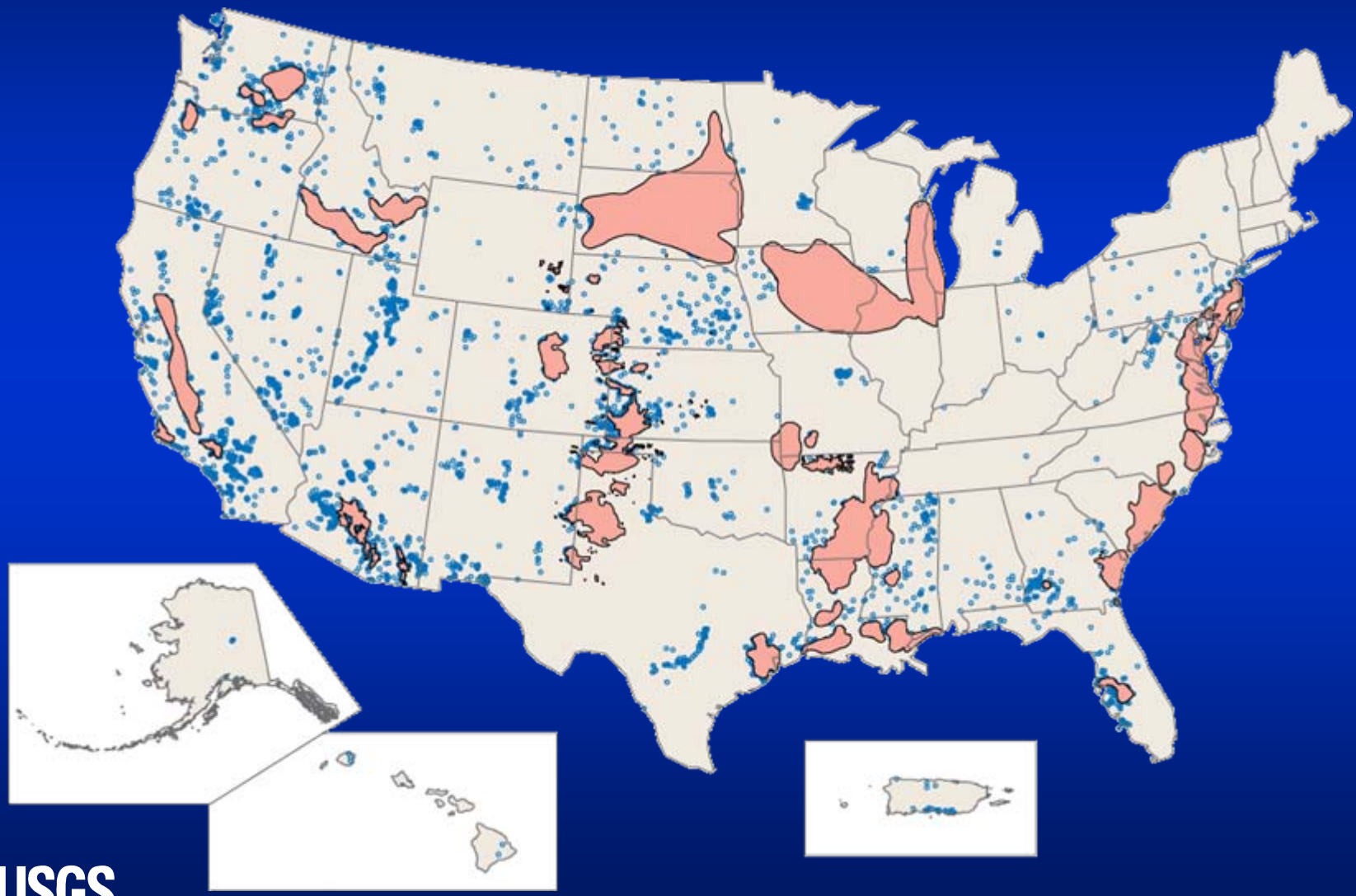
Water-Level Declines



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Source: Reilly and others, 2008

Challenges Facing the Nation with Respect to Ground-Water Resources

- Demands from increasing populations
- Competition between surface water (instream) and ground water (pumping) uses
- Water quality requirements
- Ecological needs
- Economic changes—agriculture, urbanization, and energy

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Awareness Leads to Basic Questions

- How much ground water do we have?
- Are we running out?
- Where are ground-water resources most stressed by human development?
- Where are resources most available for future supplies?

Questions seems simple—Providing answers complex

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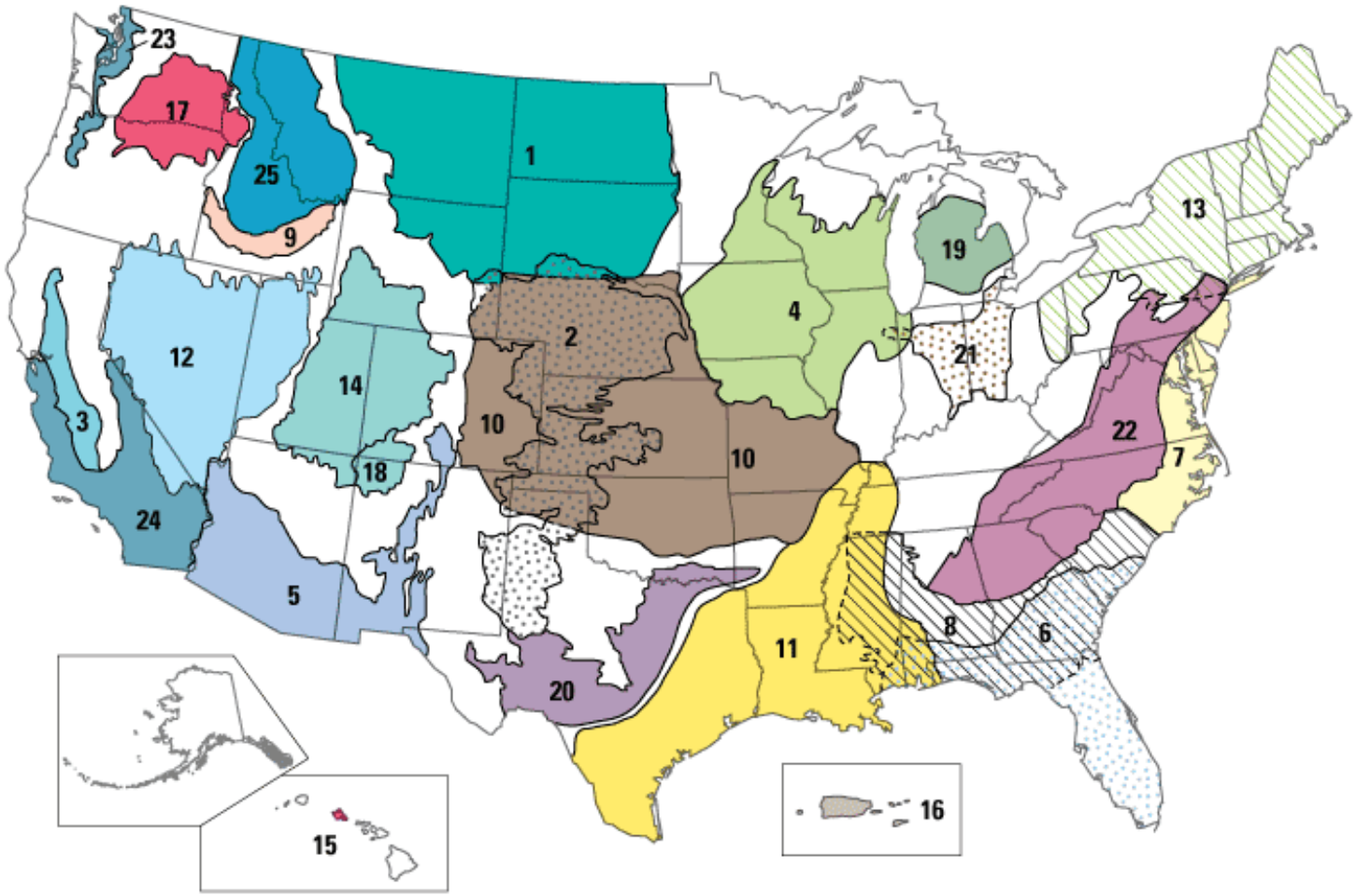
Regional Aquifer-System Analysis (RASA) Program



EXPLANATION

RASA study areas

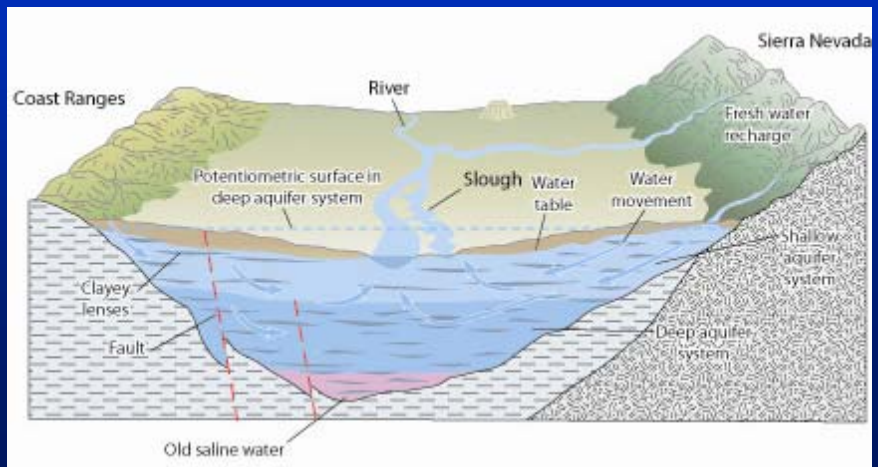
1 Northern Great Plains
2 High Plains
3 Central Valley, California
4 Northern Midwest
5 Southwest alluvial basins
6 Floridan
7 Northern Atlantic Coastal Plain
8 Southeastern Coastal Plain
9 Snake River Plain
10 Central Midwest
11 Gulf Coastal Plain
12 Great Basin
13 Northeast glacial aquifers
14 Upper Colorado River Basin
15 Oahu, Hawaii
16 Caribbean Islands
17 Columbia Plateau
18 San Juan Basin
19 Michigan Basin
20 Edwards–Trinity
21 Midwestern basins and arches
22 Appalachian valleys and Piedmont
23 Puget–Willamette Lowland
24 Southern California alluvial basins
25 Northern Rocky Mountain Intermontane Basins

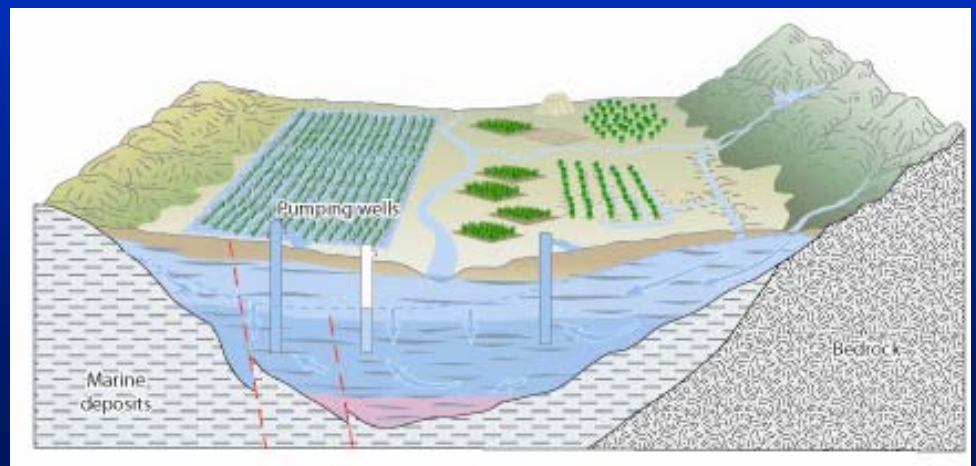
What do we need to know to assess the Nation's ground-water availability?

- Quantify resource (supply)

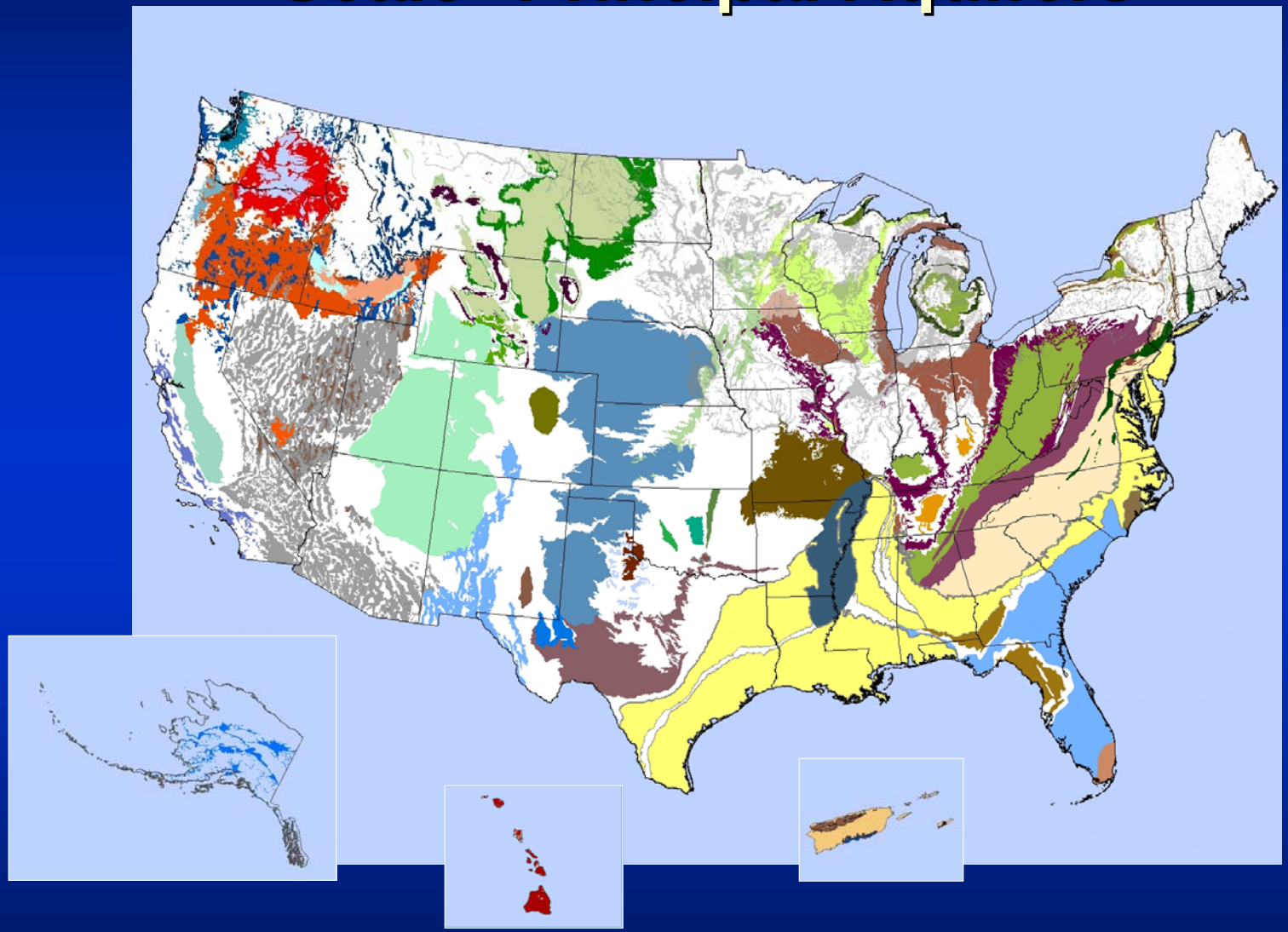
  and

- Information about its use (demand).





Framework for GW Availability at a Regional Scale--Principal Aquifers



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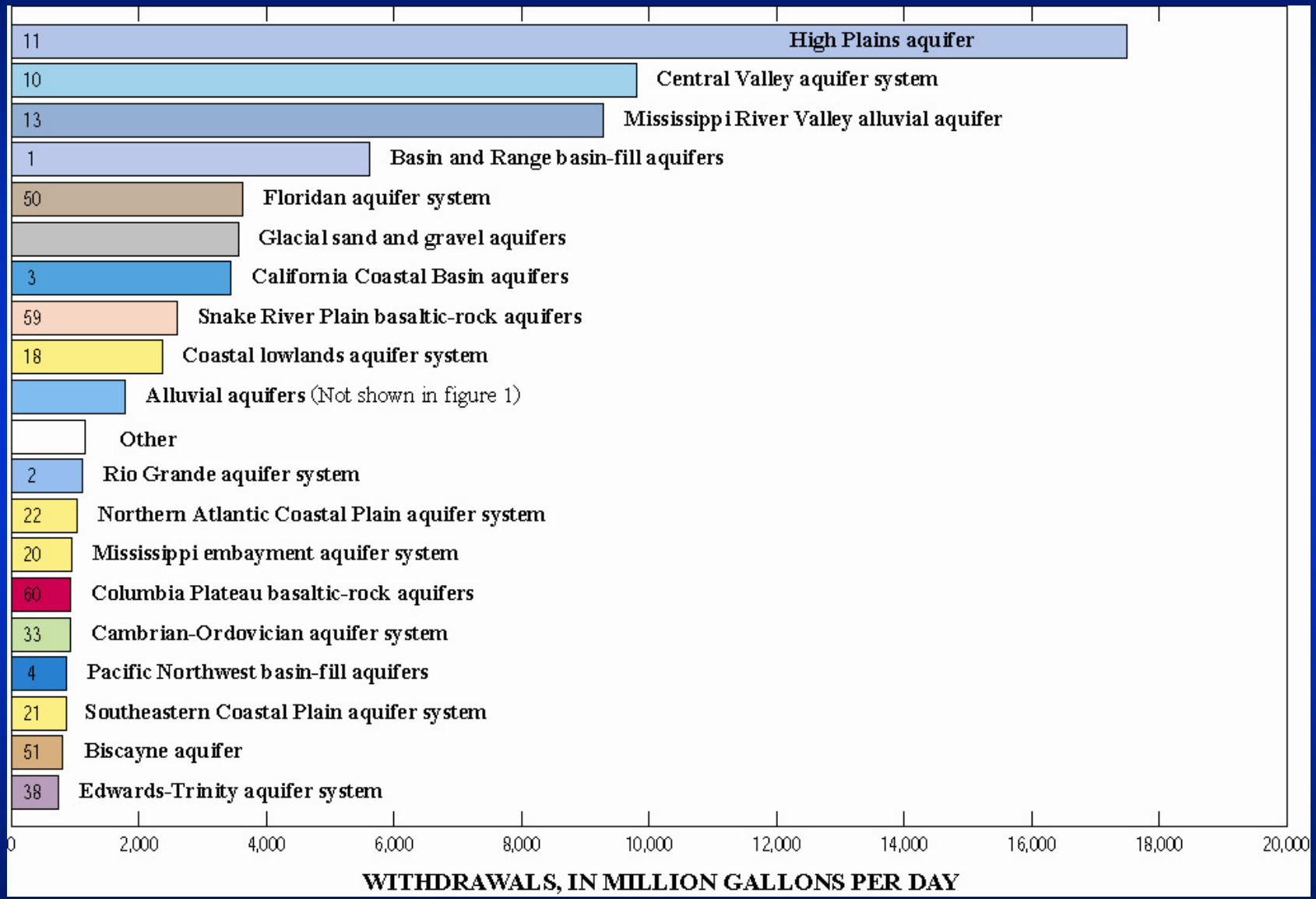
Source: U.S. Geological Survey National Atlas of the United States; http://nationalatlas.gov/atlasftp.html

Total Withdrawals by Aquifer in US--2000



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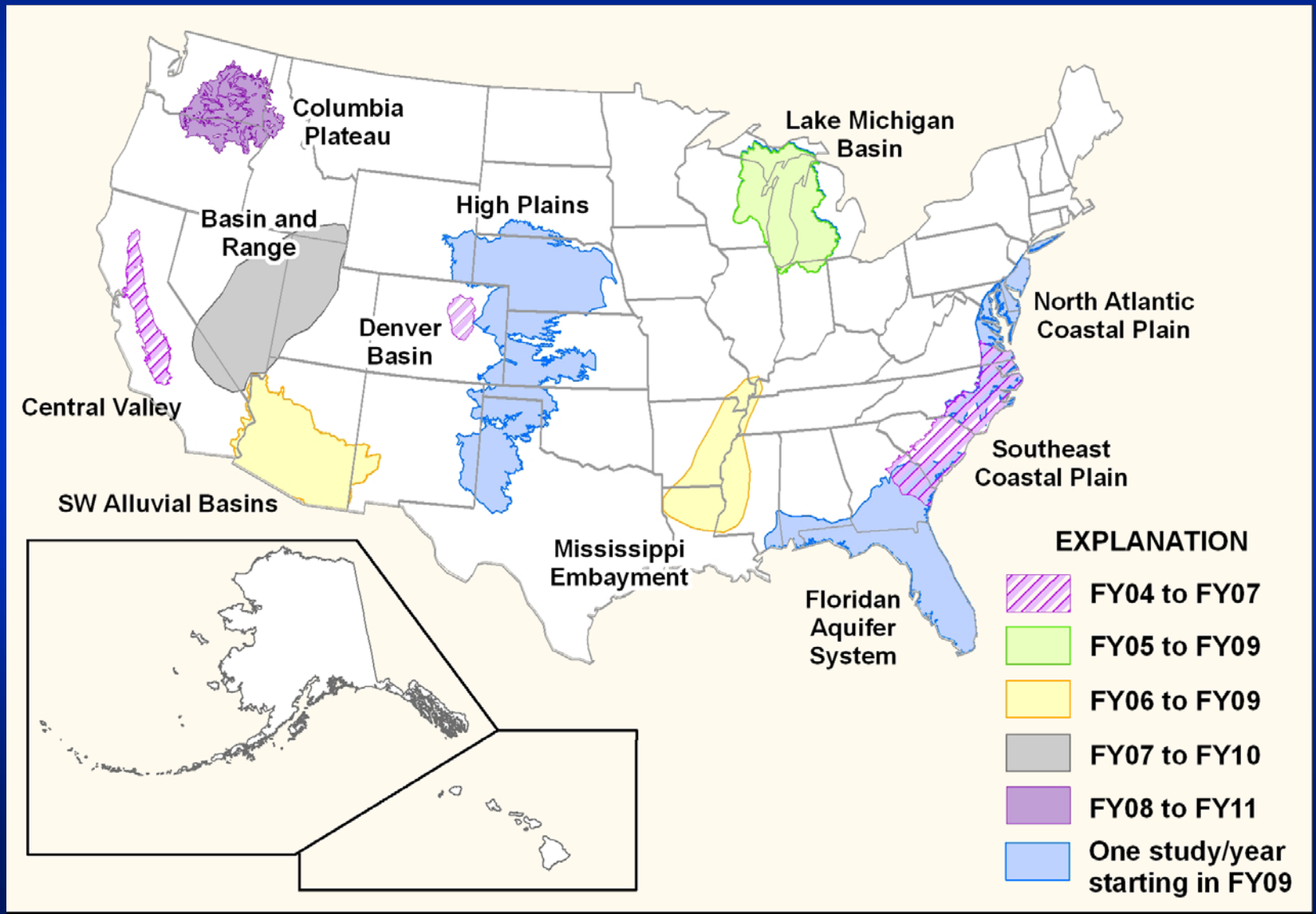
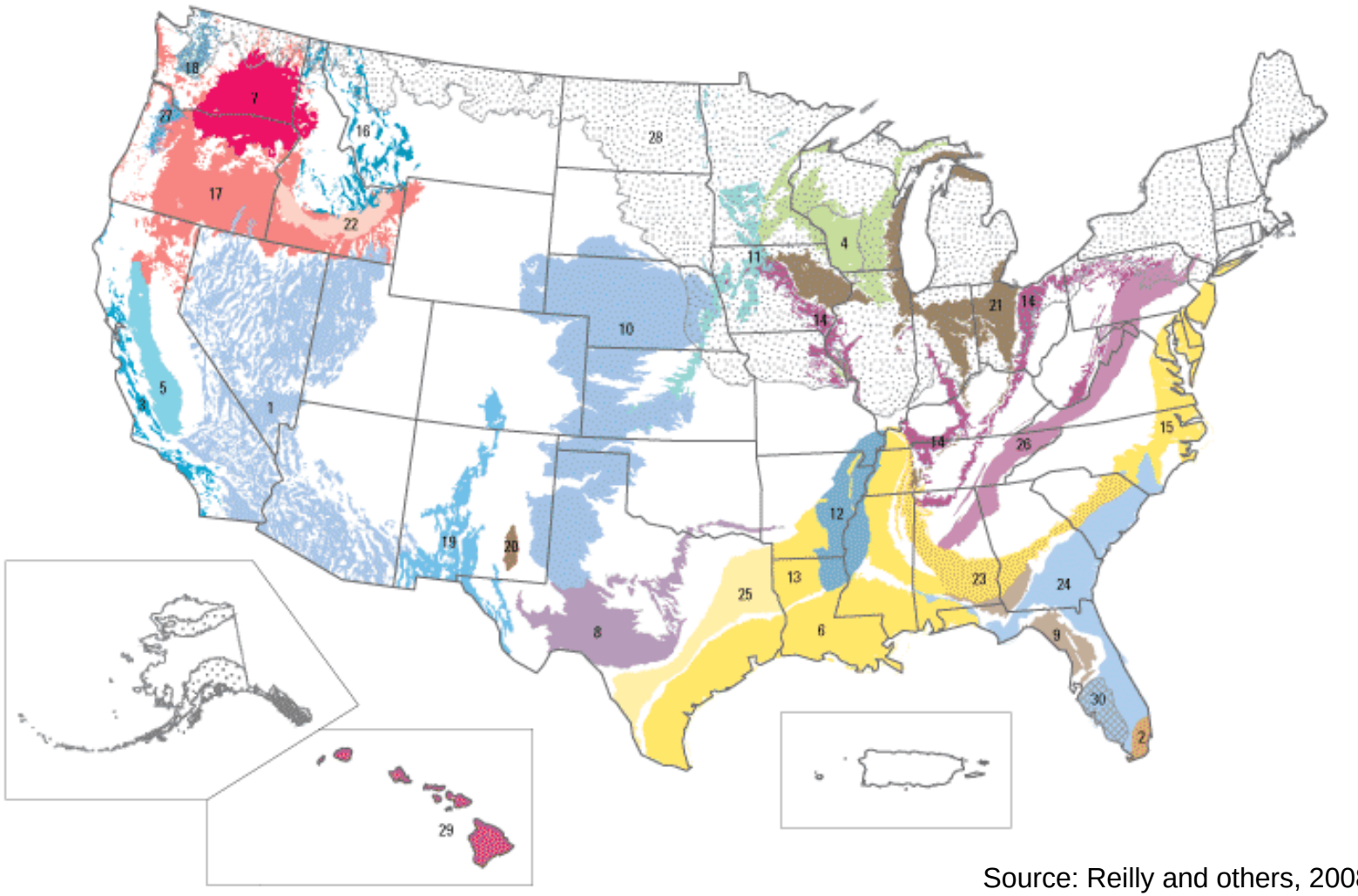
Source: Maupin and Barber, 2005

Regional-Scale Approach to a National Assessment



Priority Aquifers for a National Assessment of Ground-Water Availability



Source: Reilly and others, 2008

Regional GW Availability Studies

Objectives

- Quantify current ground-water resources

- Evaluate how these resources have changed over time

- Provide tools to forecast system responses to stresses from future human and environmental uses.

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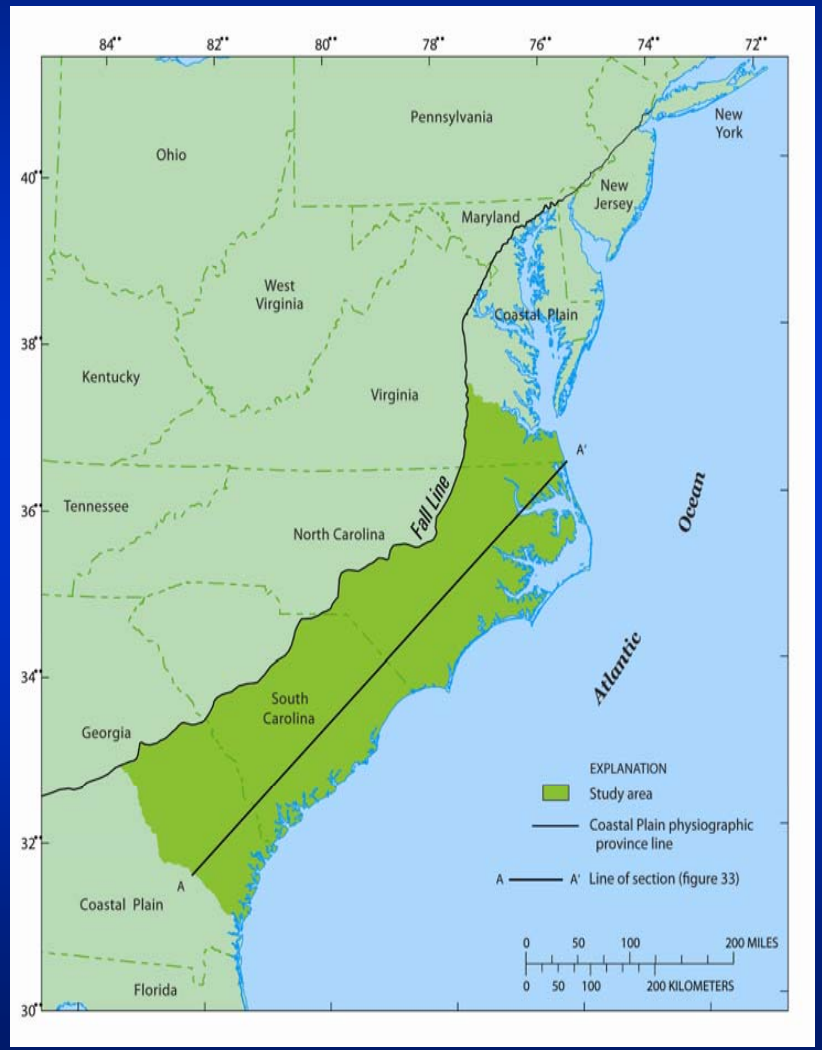
Study Design

- Build on foundation of previous studies
- Regional scale and multidisciplinary
- Share common national objectives
- Studies are NATIONALLY directed but need to be REGIONALLY executed.



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Study Design-Regional/Local Flexibility

- GW/SW interactions
- Salt-water intrusion
- Impacts of GW depletion
- Subsidence
- Ecological flows
- Geologic consistency
- Water legislation
- Conjunctive use

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Outcomes

- Water budgets of major aquifers systems
- Trends in ground-water use, storage, recharge, and discharge
- Ground-water models that provide
  - Regional context for more local studies
  - Tools to make future projections of ground-water availability
- Region-wide estimates of key hydrologic variables
- Evaluation of existing networks for monitoring ground-water availability

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Central Valley Ground-Water Budget

Budgets not yet approved for release

Pre-development

Post-development

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In Conclusion…

- Will take 3 decades to complete
- Regional studies build on previous and ongoing studies
- Ground-water availability studies will compliment the national assessment of water availability proposed by the Water for America Initiative

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For More Information

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New in GWRP

Regional Ground-Water Studies
- Ground-Water Availability in the United States

Water Availability Pilot
- Consumptive water use coefficients for Great Lakes Basin

Ground Water & the Environment
- Ground-Water Recharge in Southwestern US

Methods & Modeling
- SEAWAT v4--Simulation of 3D variable-density ground--water flow and transport

Data & Information
- Water-Level changes in aquifers of the Atlantic Coastal Plain, predevelopment to 2000

USGS in Your State

USGS Water Science Centers are located in each state.

USGS Ground-Water Resources Program

The Ground-Water Resources Program provides the objective scientific information and develops the interdisciplinary understanding necessary to assess and quantify the availability of the Nation's ground-water resources.

Regional Ground-Water Studies
- Overview of USGS Regional Ground-Water Studies
- Ground-Water Availability
- Water Availability & Use

Ground Water & the Environment
- Recharge
  - Climate Variability Effects
  - Ground Water Age Dating & Recharge
  - Chloride Mass Balance in Streams to Estimate Recharge
- Karst & Fractured Rock

Methods and Modeling
- Geophysical Methods
  - Fiber-Optic Distributed Temperature Sensing
- Estimating Ground-Water Recharge in Humid Areas
- Ground-Water Model Development

Publications
- GWRP Bibliography
- Selected USGS Ground-water Publications
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Data & Information
- Principal Aquifers in US
- High Plains Water-Level Monitoring Project
- Ground-Water Level Data
  - Active Ground-Water Level Network
  - Climate Response Network
  - Real-Time Ground-Water Level Network

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- Contact the USGS Ground-Water Resources Program online
- Call the USGS Ground-Water Resources Program at 703-648-5001.
- For general USGS questions, contact Ask USGS online or call 1-888-ASK-USGS (1-888-275-8747)

http://water.usgs.gov/ogw/gwrp/

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