

USGS Monitoring and Science to Meet Fresh Water Needs, Now and into the Future



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Associate Director for Water
October 10th, 2014

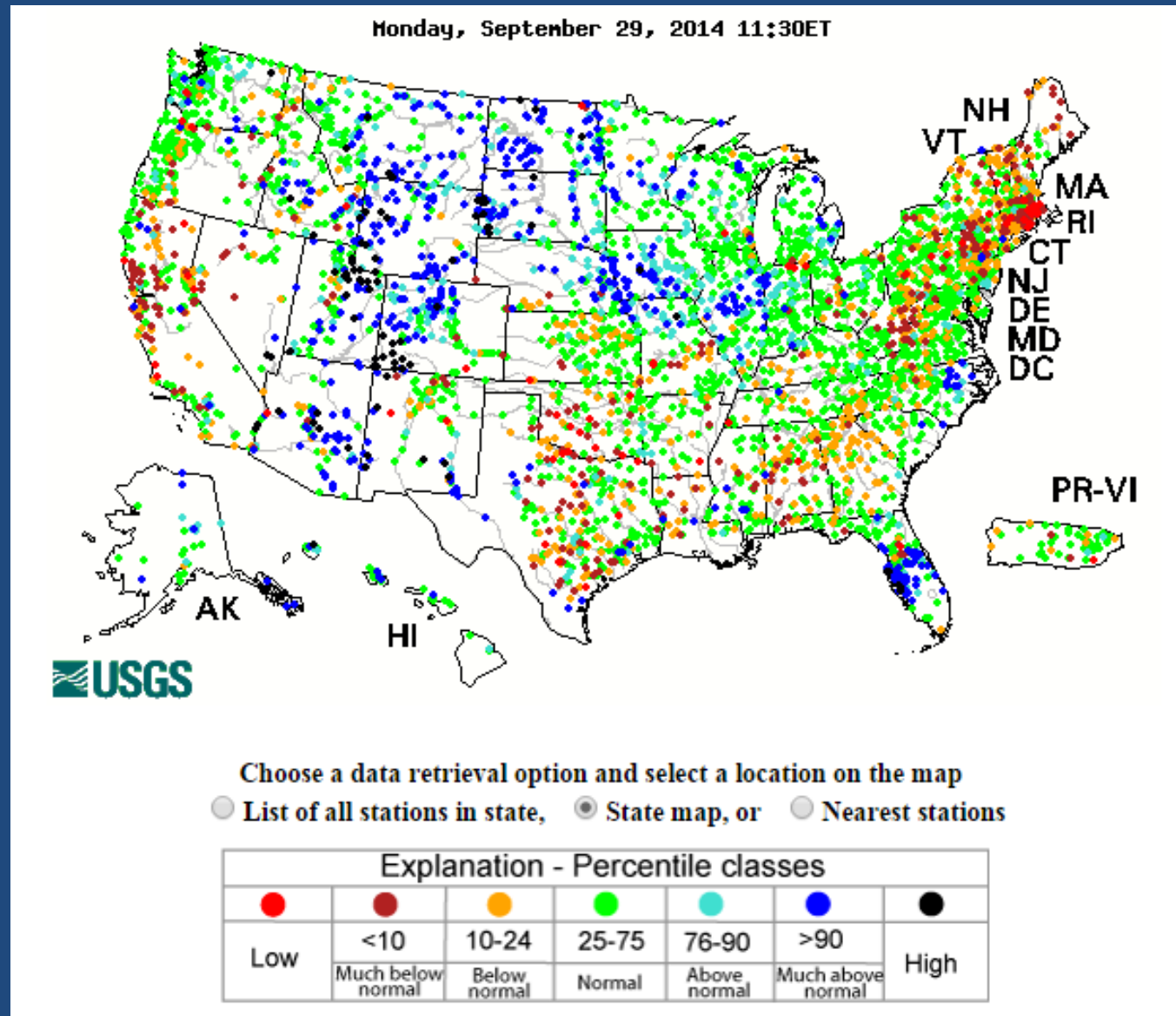
Success in USGS Monitoring, Hazard Mitigation, Understanding and Forecasting Water Resources, and Information Delivery

- **Rigorous and consistent methods**
- **Total resource for hydrologic context**
- **Interdisciplinary**
- **Long-term commitment**
- **Real-time response**
- **Innovative tools, models, and technology**
- **Efficient and cost effective field monitoring technologies**
- **New laboratory methods for tracers and emerging contaminants at low levels of detection**

Priorities for the Future

- **National networks that are stable, interdisciplinary and responsive**
- **Continued enhancement of “real time” monitoring/modeling**
- **Continued development of applications for information management and delivery**
- **Monitoring to modeling for prediction and forecasting of water availability—quantity and quality**
- **Innovative techniques for monitoring and analysis**

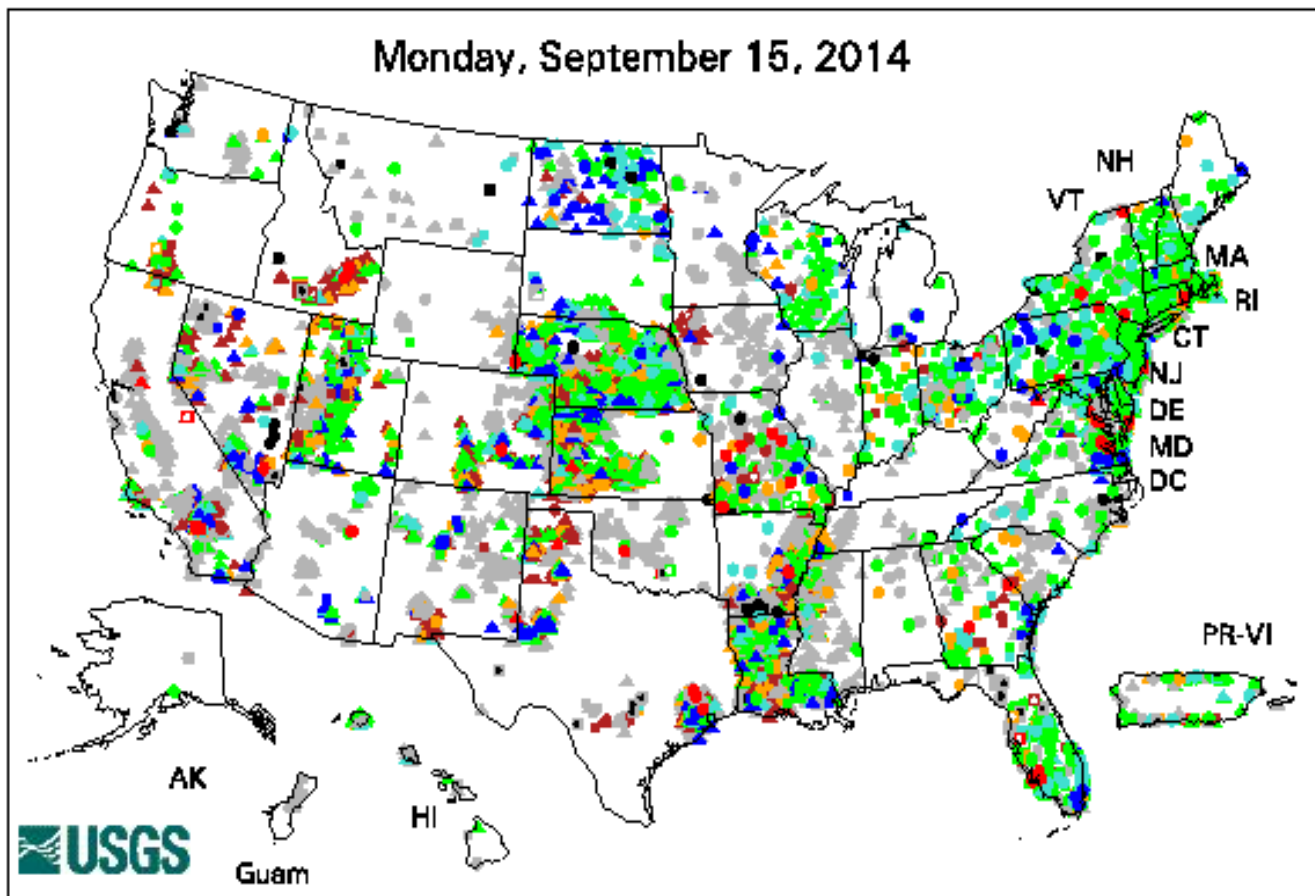
Stabilizing our Streamflow Information National Network



National Networks - Groundwater

Active Groundwater Level Network

Monday, September 15, 2014



Explanation - Percentile classes (symbol color based on most recent measurement)							Wells	Springs	
								 Real-Time	
Low	<10	10-24	25-75	76-90	>90	High	Not Ranked	 Continuous	
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal			 Periodic Measurements	

Active
(about
20,000 wells)

Real-time
(1,500 wells)

Long term
(18,000
wells)

Below Level
(currently
5,800 wells)

Climate
Response
(590 wells)

Principal
Aquifers

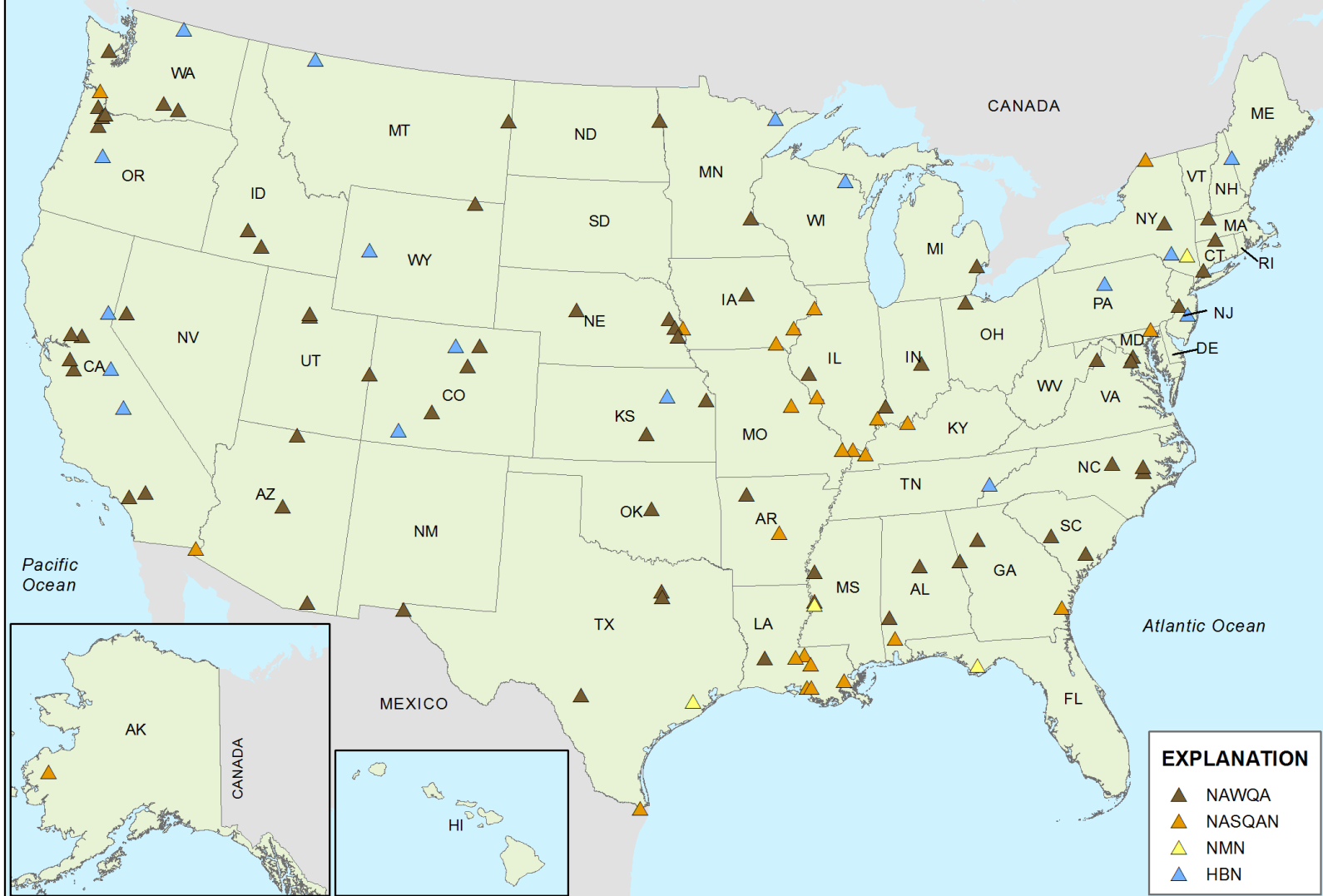
CURRENT NETWORK:

2806 water-level wells
x water-quality wells

10 subnetworks

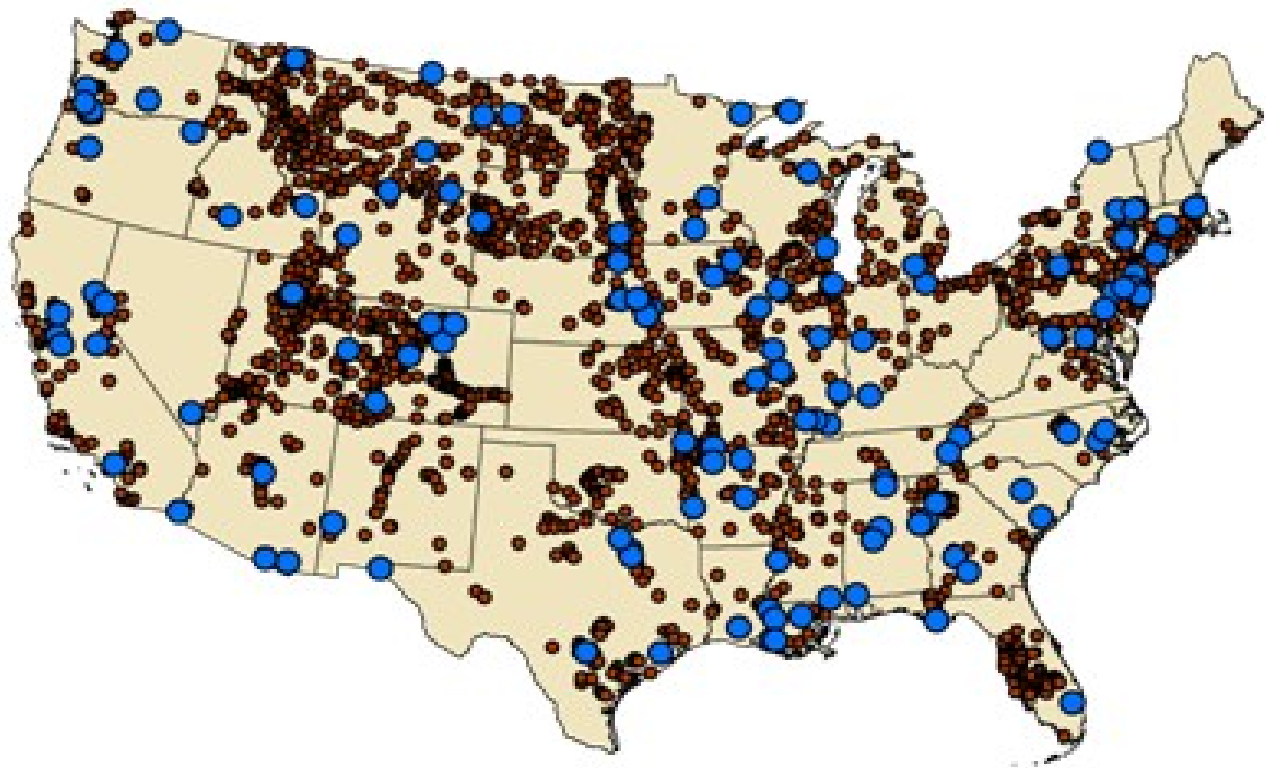
7 contributing agencies
29 states
48 principal aquifers

Water Quality National Network



Water Quality Monitoring Sites

(sites where water-quality samples have been collected at least once from 2010 to present)



Blue Symbols = National Networks (NAWQA, NASQAN, NMN, HBN)

Red Symbols = Other NWIS sites (majority are likely CWP sites)

Innovation - Real Time Sensors



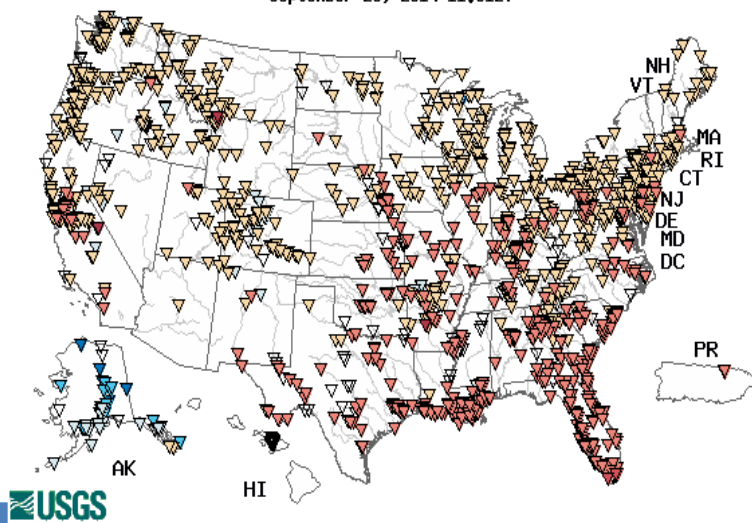
WaterQualityWatch

<http://waterwatch.usgs.gov/wqwatch/>

Measurement	2001	2014
Discharge	7,245	7,994
Water Temperature	850	1,699
Specific Conductance	531	871
Dissolved Oxygen	251	470
Turbidity	90	372
Nitrate	2	95

Real-Time Water Temperature, in °C

September 26, 2014 11:31ET



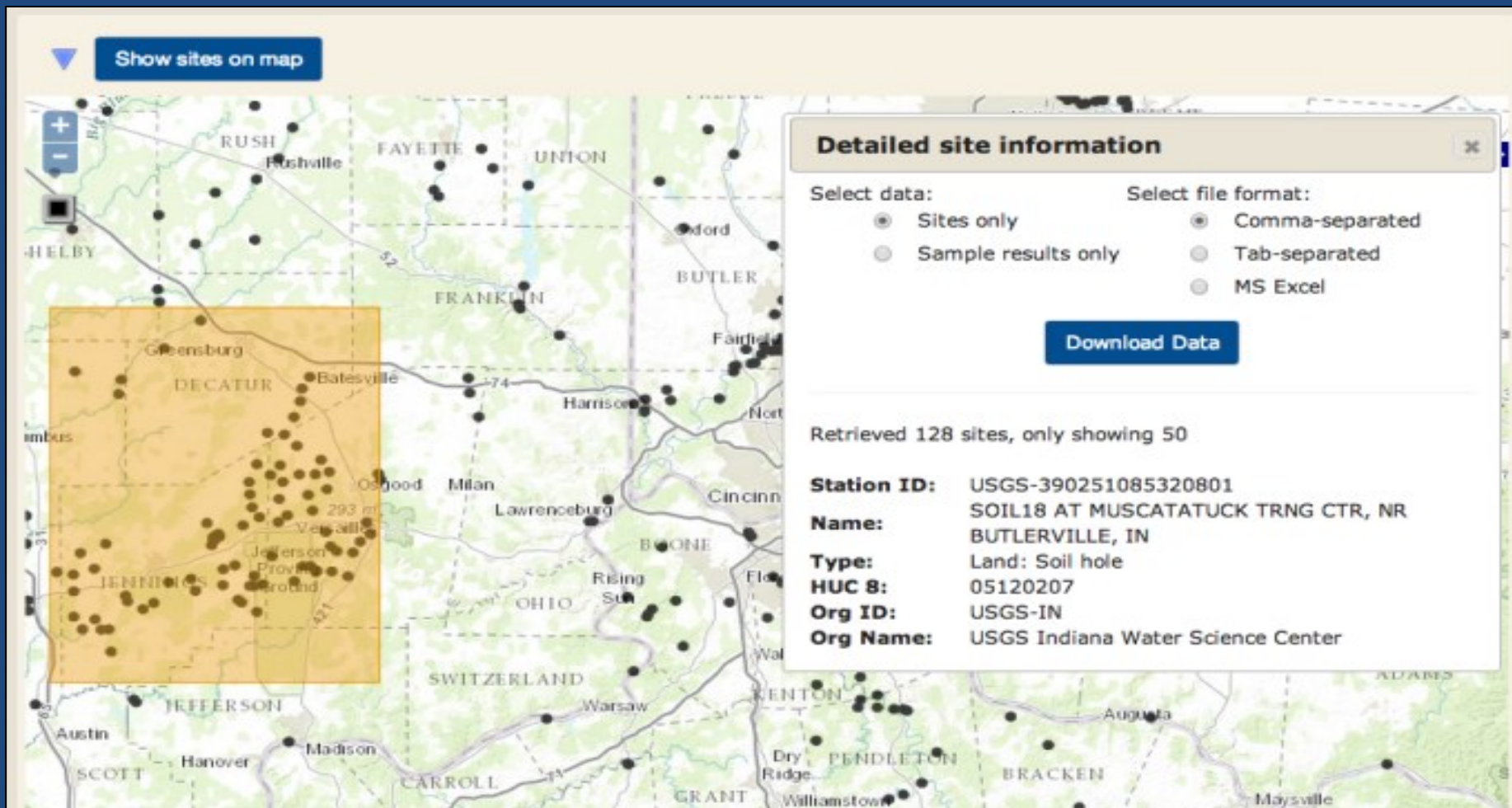
Explanation							
<1	1-4.9	5-9.9	10-19.9	20-29.9	30-35	>35	No Data

NWISWeb and NWIS Water Services in Millions of Successful Page Requests



Water Quality Portal – NWIS/STORET

<http://www.waterqualitydata.us>

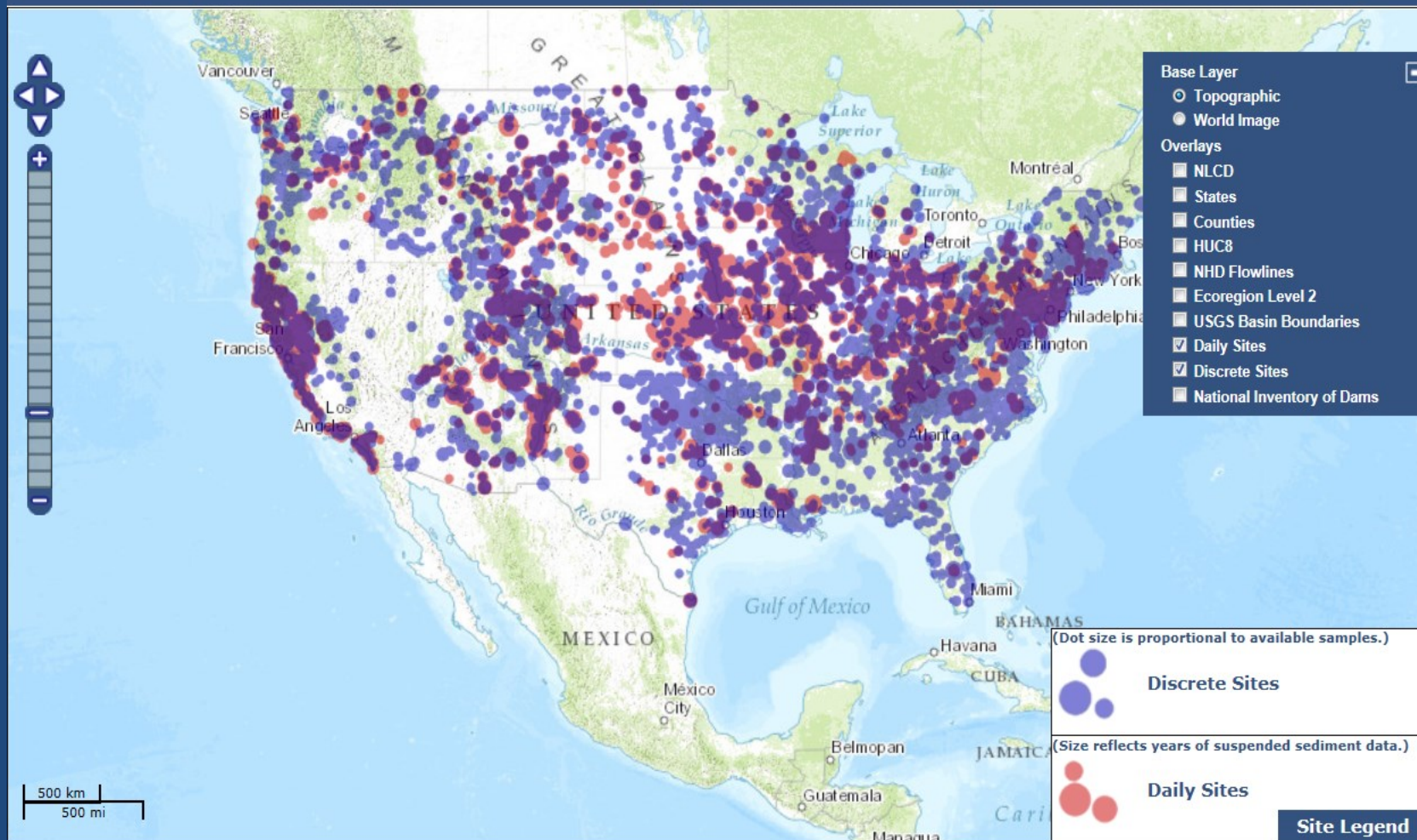


Water quality portal stats: 250 million sample results at 2 million sites;
1.4 billion automated web retrieval downloads; 4,155 visits from 2,600

New USGS Data Portal Provides Access to More than a Century of Sediment Data

USGS Sediment Data Portal

Apply Filter



USGS WaterNow

**On-demand, current conditions for water data
directly to your mobile phone or email**

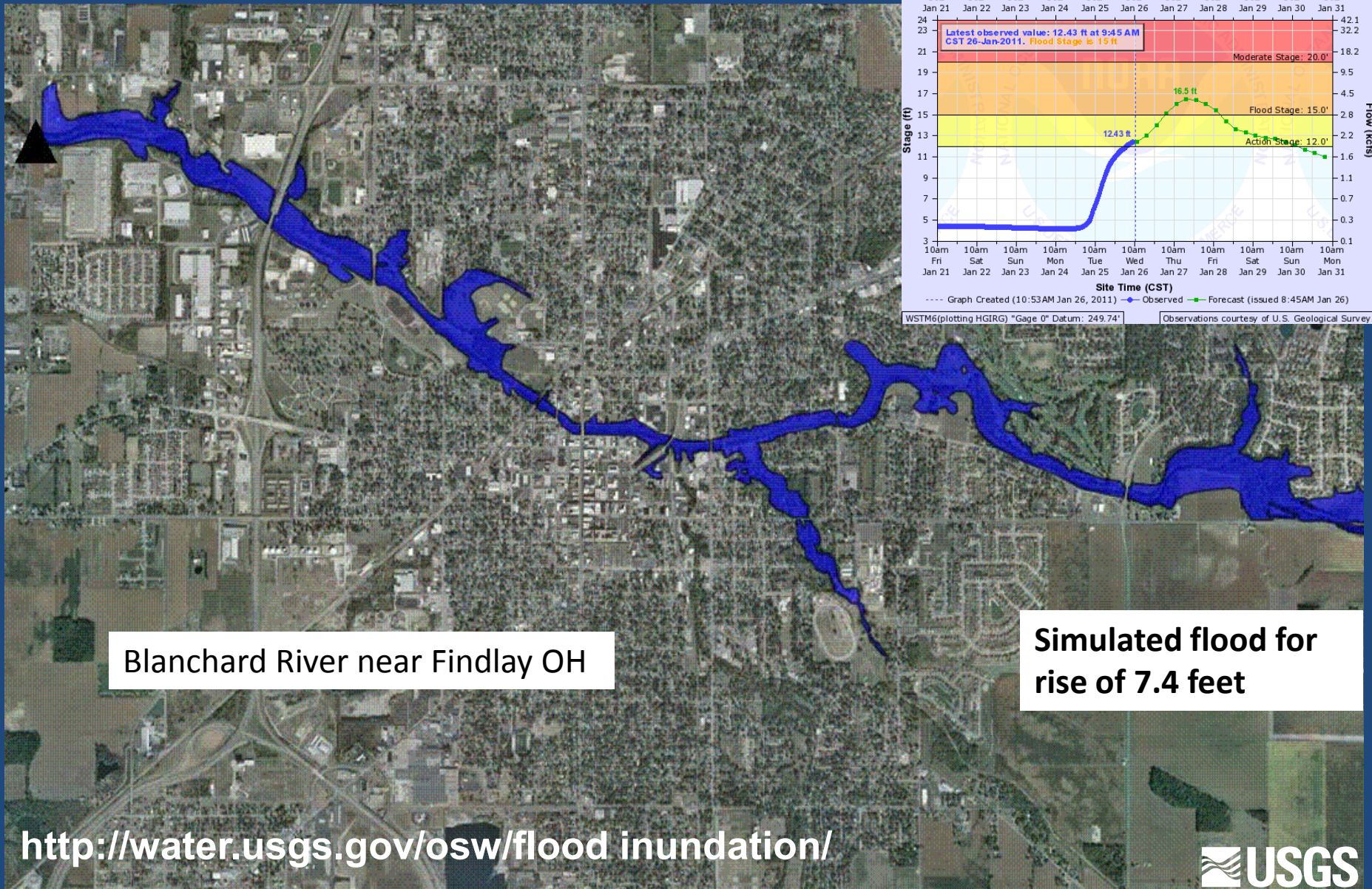


**02035000 13:00EDT
JAMES RIVER AT
CARTERSVILLE, VA**

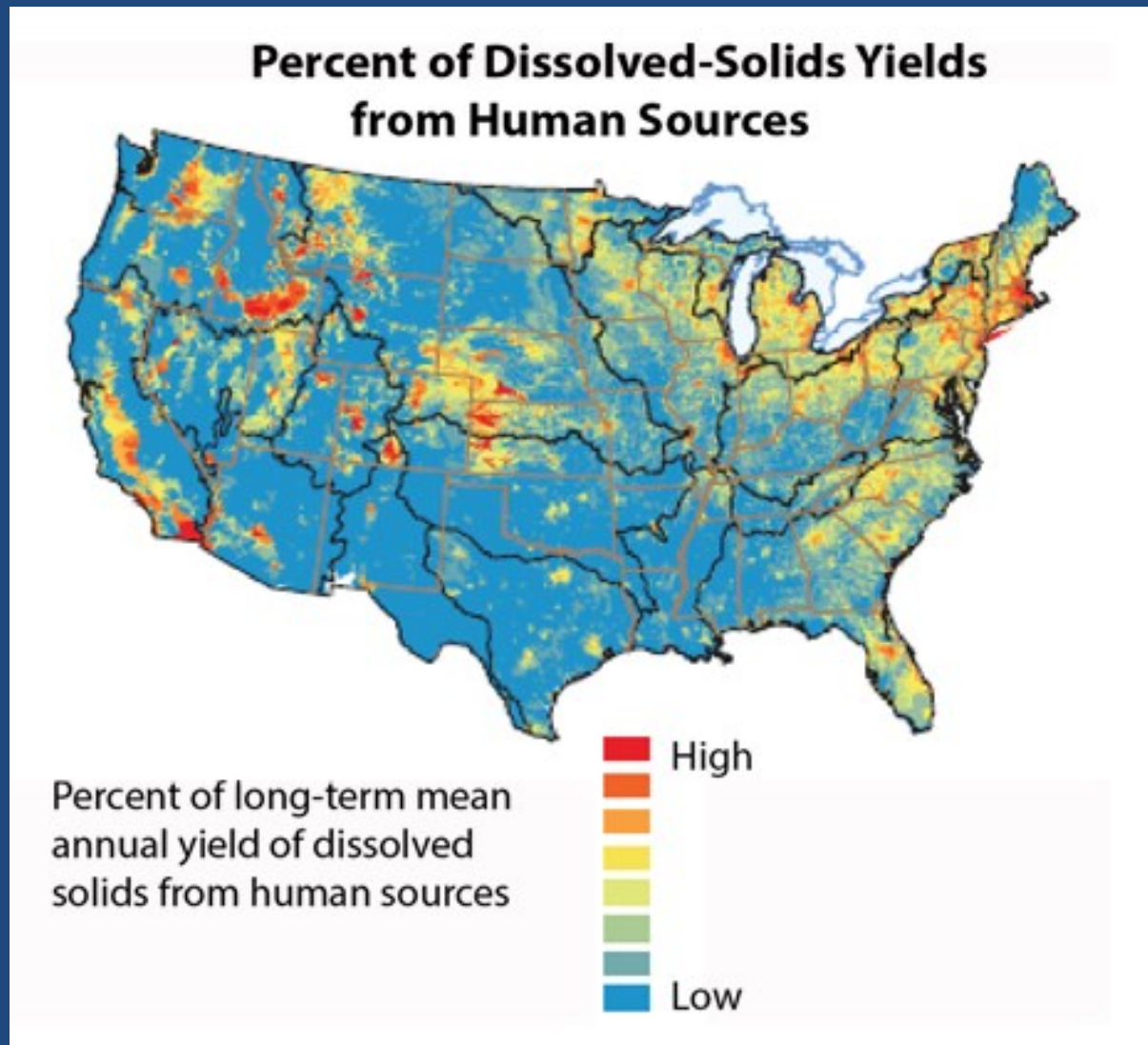
99137 Nitrate, water, in situ,
milligrams per liter as
nitrogen = 0.11

00010 Temperature, water,
degrees Celsius = 21.1

Hazards - Flood Inundation Mapping and Analysis



Dissolved-Solids Sources, Loads, Yields, and Concentrations in Streams



Investments in USGS water-quality monitoring *and* modeling foster capabilities to predict and forecast contaminant occurrence and trends under multiple scenarios at nationally significant scales.

National Drought Synthesis - Estimating drought streamflow frequency, duration, magnitude, and probability



Water Census

- **Monitoring Innovation/Techniques:** Improved satellite-based mapping and estimates of soil moisture, ET, vegetation drought response, consumptive use (agriculture and thermoelectric)
- **Models:**
 - Ecosystem/hydrologic alteration models; characterization of ecological flows
 - Modeled estimates for streamflow in ungaged basins
 - Development of a national hydrologic model that accounts for all aspects of the water budget (precipitation, storage, recharge, streamflow, ET, irrigation)
- **Data delivery** – Web-based portal with water accounting information at HUC12 scale
- **Characterizations** – Focused water availability characterizations, such as in the Colorado River Basin, Delaware River Basin, and ACF basins.

Water Use Activities

- **Reports** – (1) Periodic Water Use Report for U.S. (every five years) (2010 water use report expected November 2014); and (2) Special national reports – such as “Methods for estimating water consumption by thermoelectric power plants” (expected September 2014); and “Estimating irrigated water use in humid U.S”
- **Expand collection/synthesis of information for uses** – (1) Update public-supply database – by county and population served; (2) Update irrigated acreage (in collaboration with USDA-NASS); (3) Reinstate use sectors of self-supplied commercial and hydroelectric, along with adding navigation and recreation uses.
- **Refine reporting scale (space and time)** – Increase resolution by reinstating watershed-based (HUC-based) reporting of water use (versus county); enhance site-specific data as possible about withdrawals, transfers, uses, consumption and return flows; present information on an annual (versus 5-year) basis
- **Technical** - Quantify uncertainty associated with water use data



serving water needs

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