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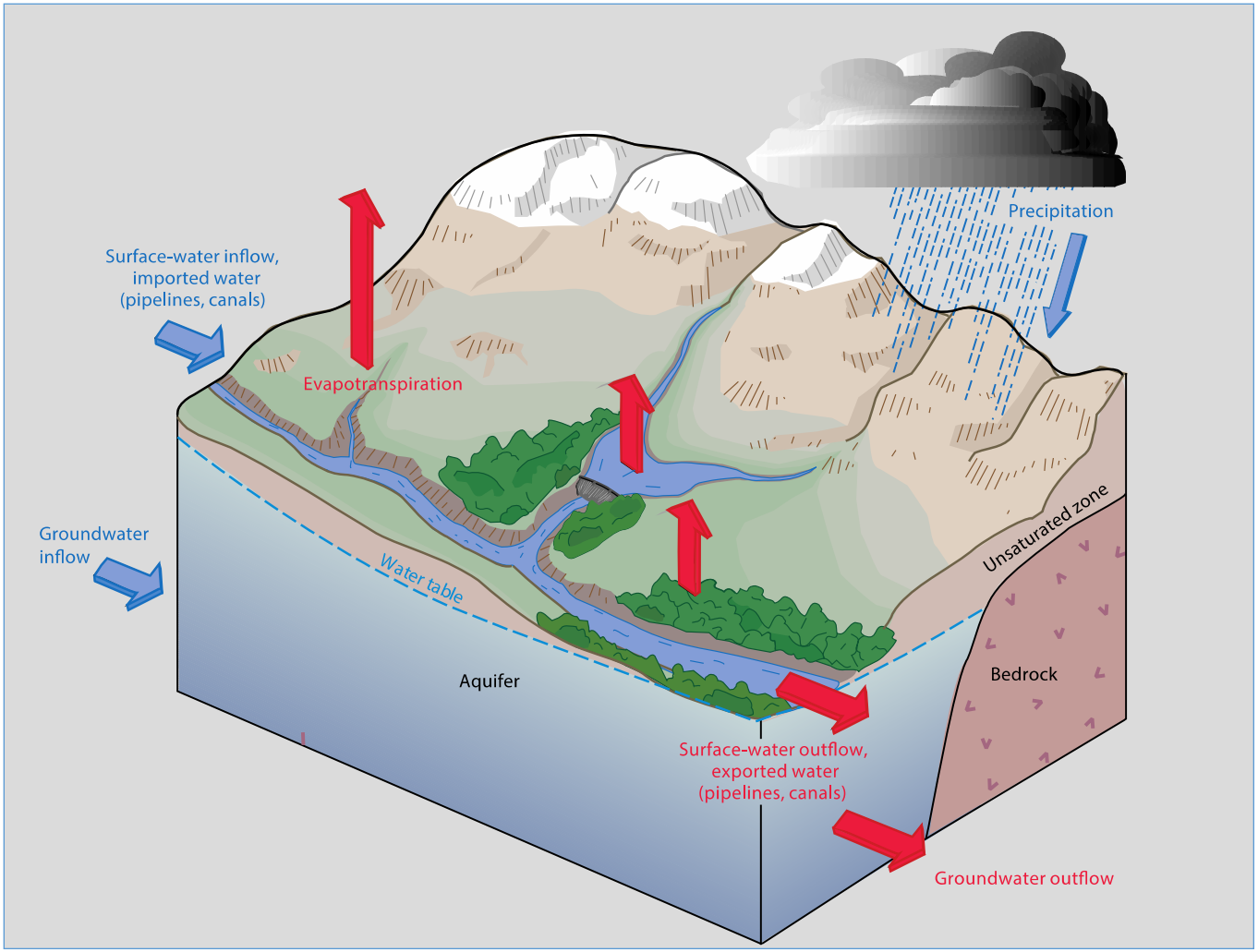
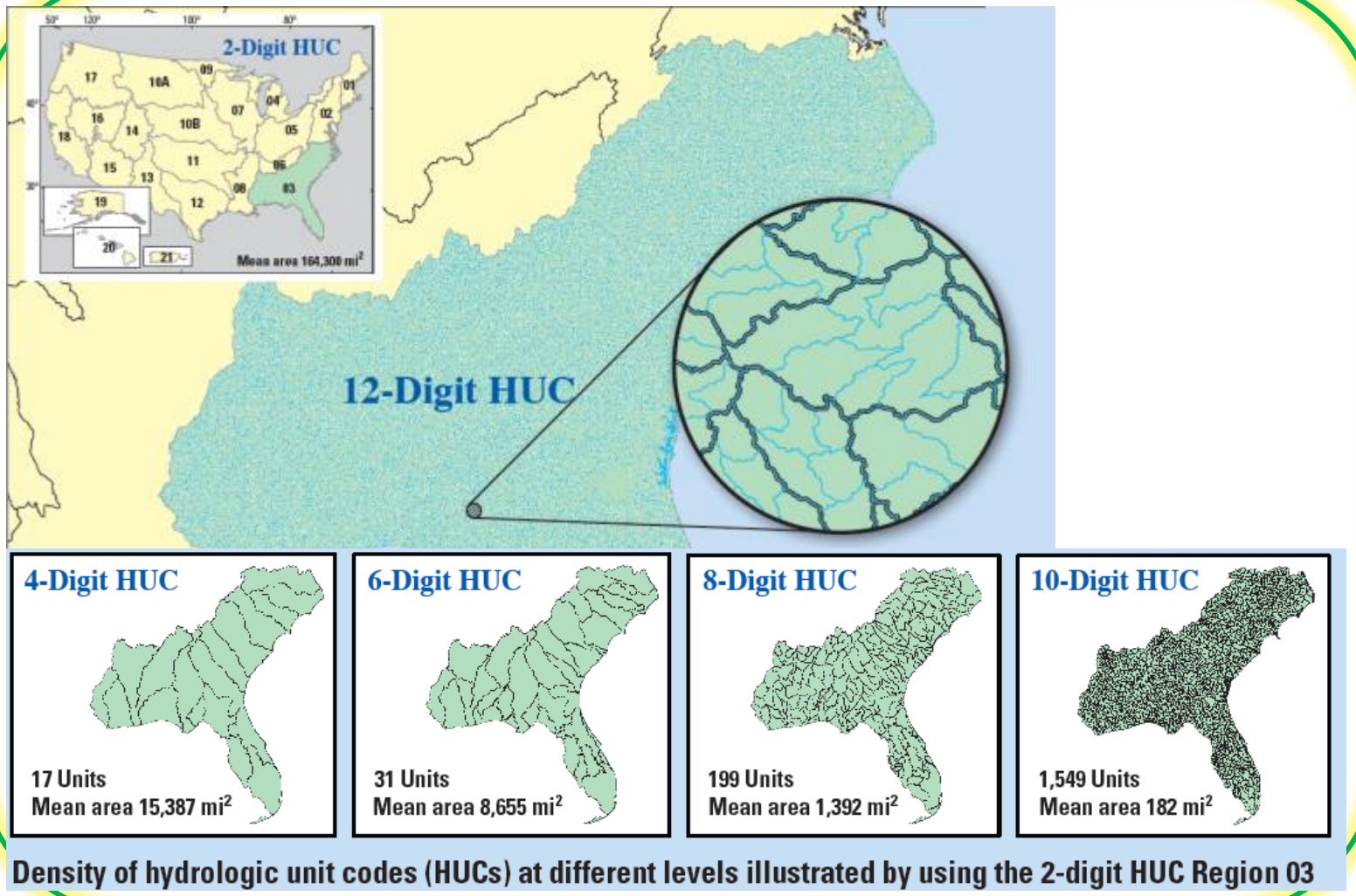
science for a changing world

Water Availability and Use Science Program and WUDR Updates

Water Budgets provide a unifying theme



Scale Matters

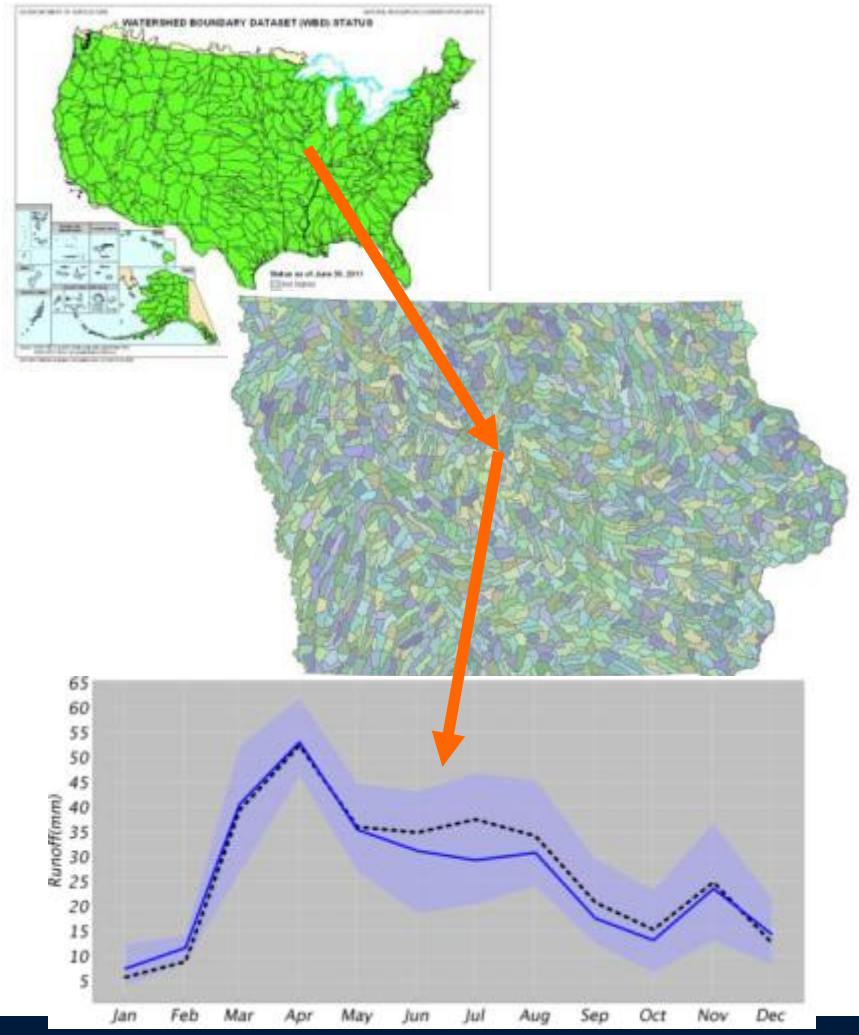


Density of hydrologic unit codes (HUCs) at different levels illustrated by using the 2-digit HUC Region 03

USGS

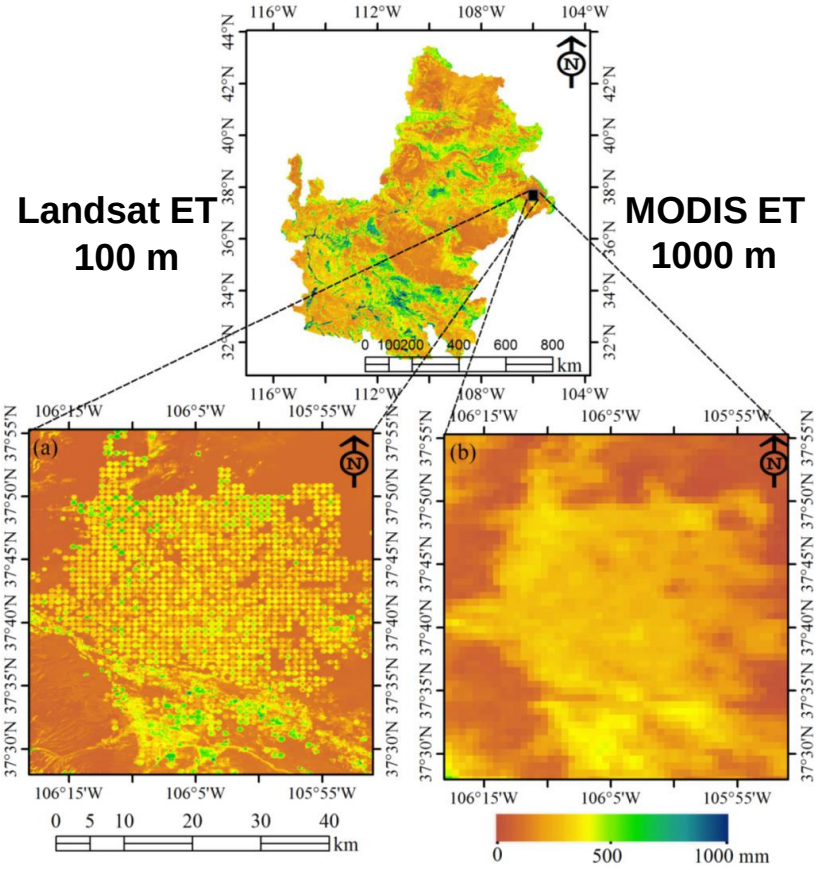
Estimating Flows in Ungaged Basins

- Estimates of daily ungaged streamflow at a HUC-12 scale, leveraging the advantages of both statistical and process-based models
- Uncertainty in ungaged flows and improved calibration (statistical informing deterministic)

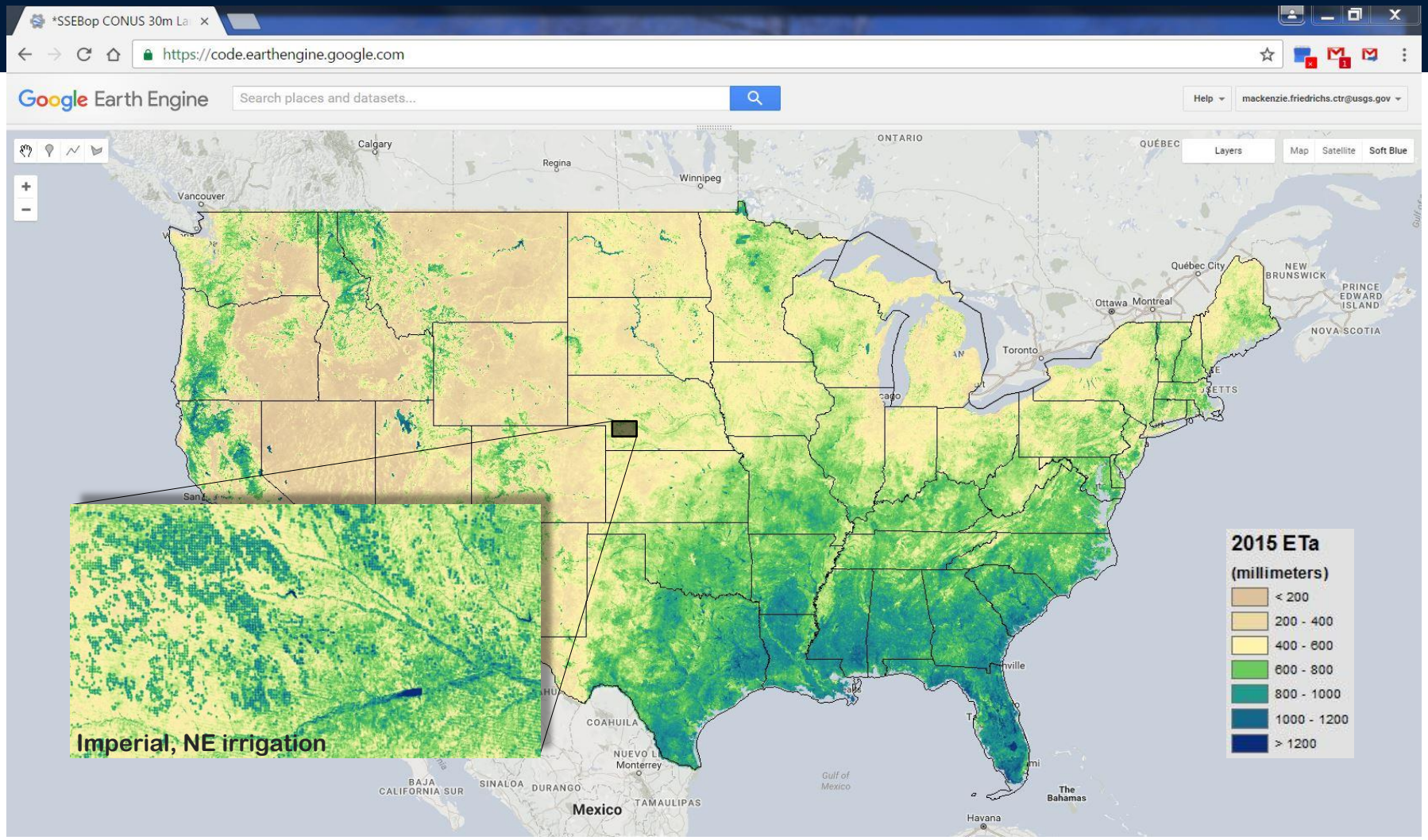


Evapotranspiration

- Monthly and Annual ET estimates at MODIS and Landsat scales – spatial and temporal trends – for the entire nation
- Improve remote sensing methods to estimate Irrigation Consumptive Use for 2015
- Field testing and refinement as part of NWC Focus Area Studies
- Collaborative efforts with Federal and State agencies to improve crop data layer and land use maps



Landsat SSEBop ET (CONUS)



2015 Total Actual ET from Landsat (Preliminary)

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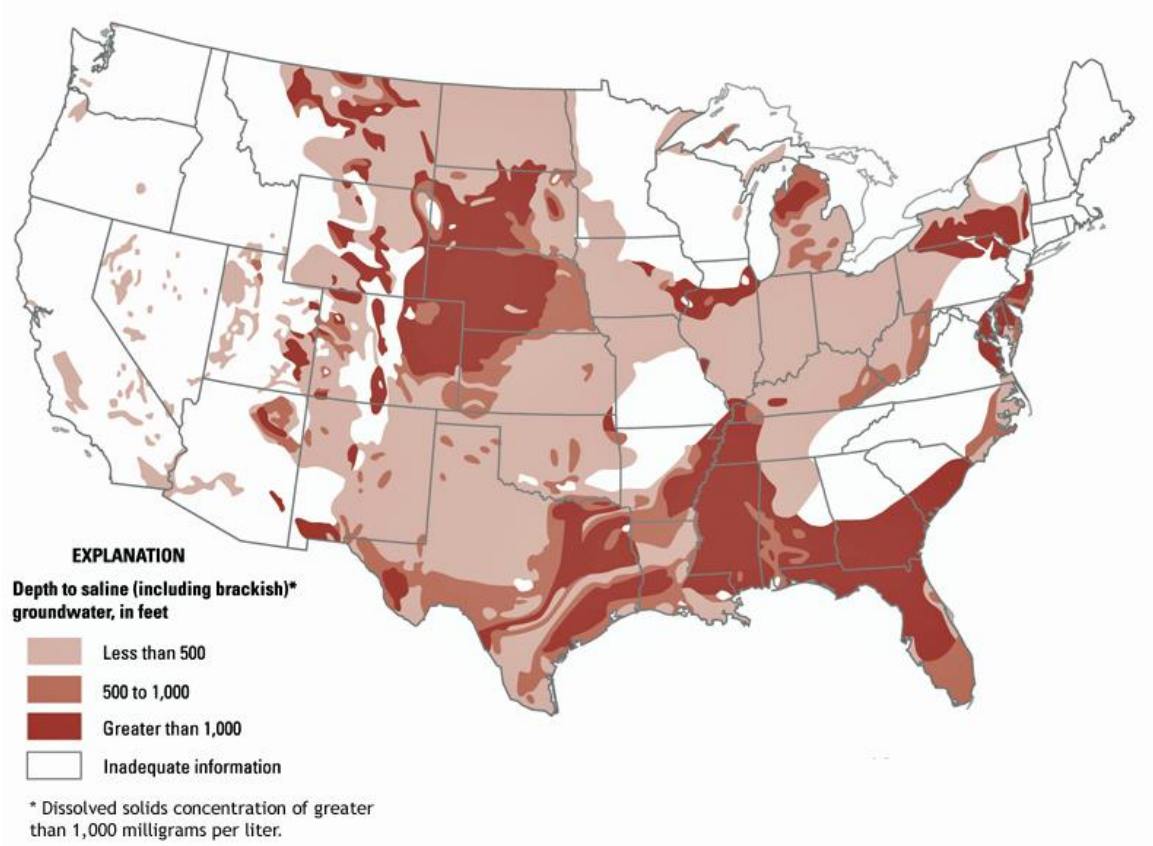
Groundwater's role in Water Availability

- Recharge
- GW yields
- Changes in storage
- Trends in groundwater indices
- Groundwater/Surface water Interactions

National Brackish Groundwater Assessment

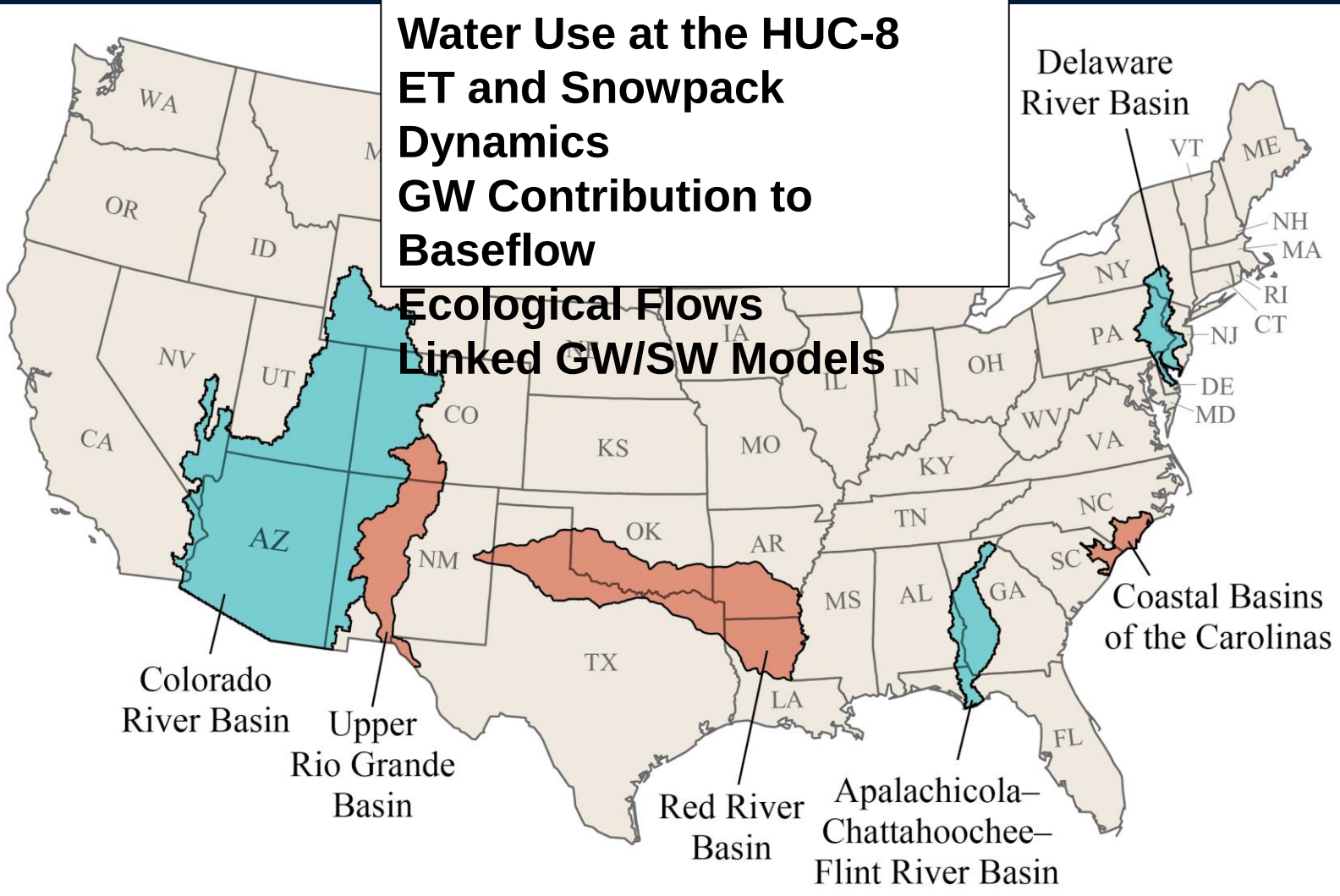
- Developed digital databases that include chemical, hydrogeology, water use, and permit data
- Improved spatial resolution and consistent methods nationally
- National maps of dissolved-solids concentrations
- Identifying data gaps that limit full characterization of brackish aquifers



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

Focus Area Studies

Water Use at the HUC-8
ET and Snowpack Dynamics
GW Contribution to Baseflow
Ecological Flows
Linked GW/SW Models



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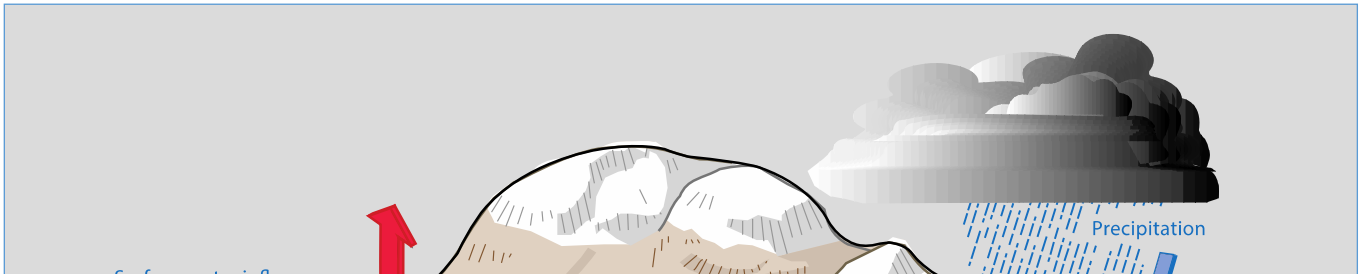
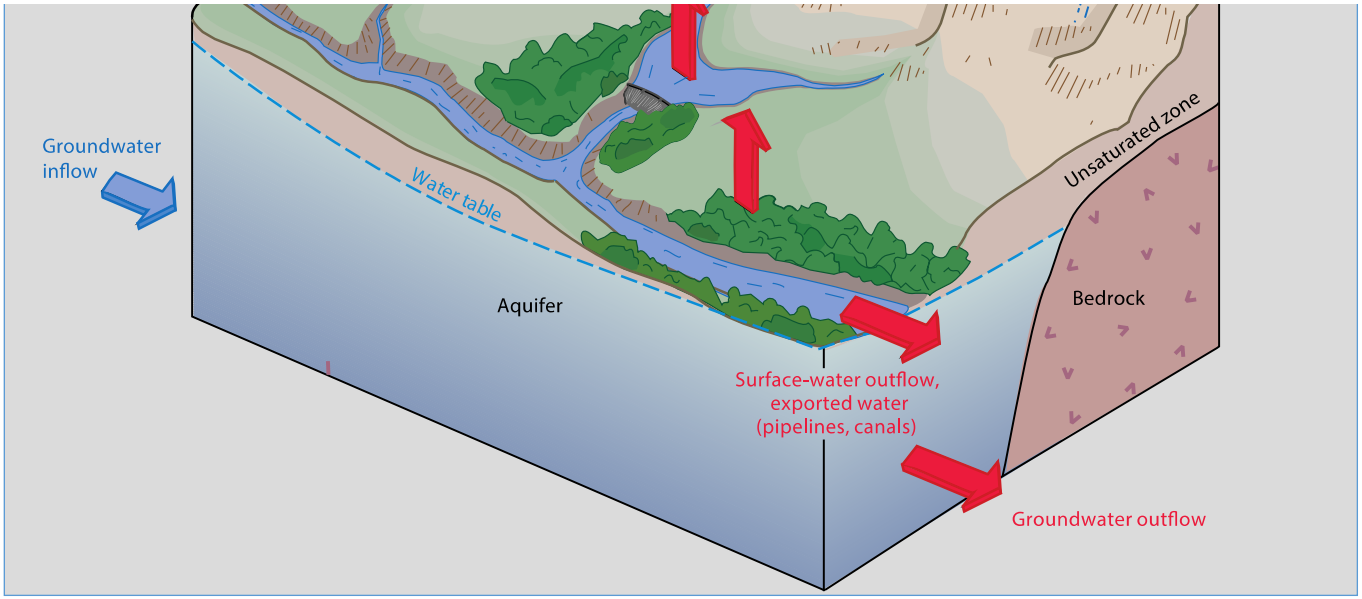
Water Budgets provide a unifying theme



What about human water use?



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Water strategies for the next administration

Peter H. Gleick

+ Author Affiliations

Email: pgleick@pipeline.com

Science 04 Nov 2016:
Vol. 354, Issue 6312, pp. 555-556
DOI: 10.1126/science.aaj2221

Basic water science and data collection remain undone. Vital water data are not collected or analyzed, and fundamental hydrologic science remains incomplete (6). There is massive groundwater overdraft in California and the Great Plains–Ogallala aquifer but little accurate information about withdrawals or recharge rates. The U.S. Geological Survey collects and publishes water-use data only every 5 years (7), and data are not collected in a comprehensive or consistent manner. Links between clean and adequate water and healthy aquatic ecosystems are strong, but little information is available on sustainable watersheds and freshwater management.

By CHARLES FISHMAN MARCH 17, 2010

incomplete water usage data

USGS

Water Use

USGS Efforts

- 2015 Compilation planned release in early summer
- Public Supply SWUDS Database (in collaboration with EPA SDWIS)
- Irrigation Consumptive Use
- Thermoelectric Water Use
- Unconventional Oil and Gas Topical Study
- Water Use by Aquifer
- Developed QA/QC tools using R
- Topical Research Team to improve statistical applications of water use science
- Database improvements and redesign

Water Use

External Collaboration

- Comparison of water use reporting and collecting activities with Bureau of Reclamation
- Improving estimates of Thermoelectric Water Use and Consumptive Use with Energy Information Agency
- Water Use Conservation policy with Vanderbilt University
- Reinstating industrial/mining water use with US Census Bureau
- Working with WSWC and WaDE to map water use data from AWUDS (WUDS)

Water Use Data and Research Program (WUDR)

The USGS Water Use Data and Research Program (WUDR) is authorized under the SECURE Water Act Section 9508.

- $12,500,000 authorized for Grants Program in 2009.
- Each State can receive a maximum of $250,000, cumulatively, in grant funding.
- The USGS received the first appropriation of $1,500,000 in federal FY15.

WUDR Overview

Goals:

- Improve the availability, quality, compatibility, and delivery of water use data that is collected and/or estimated by States.

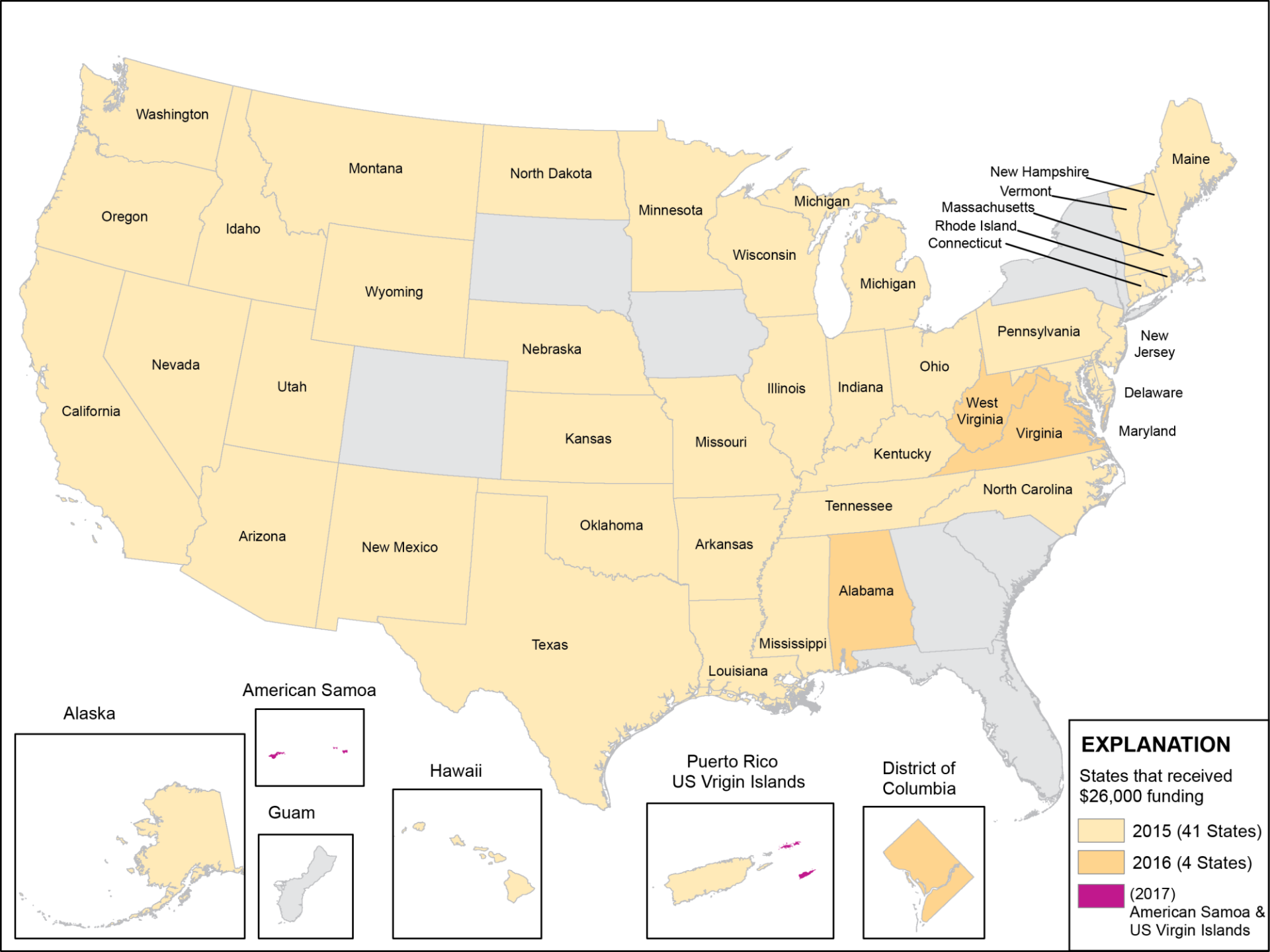
- Integrate State water resource agency water-use or water-availability datasets into USGS databases.

Workplan Funding

- Cooperative agreements for writing “Workplan” document were awarded to 42 states in FY15.
- Three additional states (45 total) were awarded $26K funding in FY16.
- Awarded funding to American Samoa and US Virgin Islands in FY17 – 47 “states” total.
- In the process of awarding funds to Guam.

State Workplans

- Describe the current State water use program
  - Outline State priorities for improving water use data
  - List steps proposed to address priorities
  - Describe collaboration that was part of the Workplan development, or WUDR funding
  - Describe additional tasks and products to be proposed as part of cooperative agreements
- Reviewed by USGS WUDR, NWULT, and WSC staff, will be available on WUDR website
- Most States (32 of 44) have finalized their workplans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Connecticut
Maine
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American Samoa
Guam
Hawaii
Puerto Rico
US Vrigin Islands
District of Columbia
EXPLANATION
States that received $26,000 funding
2015 (41 States)
2016 (4 States)
(2017) American Samoa & US Virgin Islands

Competitive Awards Process

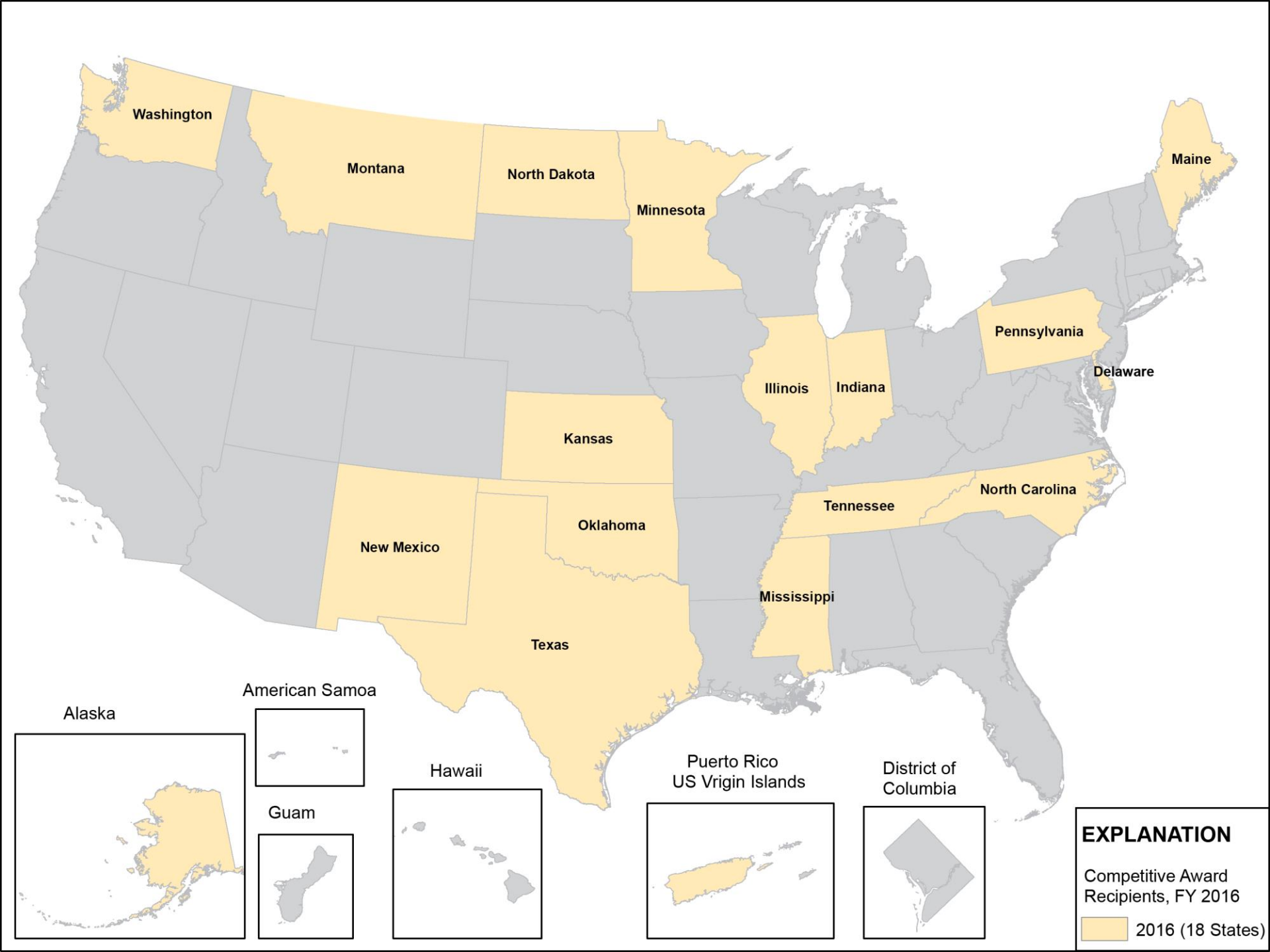
FY16

- 26 proposals were received
- 18 proposals were awarded funding (~1.4M)

FY17

- 17 proposals were received
- 15 proposals were awarded funding (~$1.32M)

A database to track the performance metrics for the WUDR Program was designed at the end of FY17.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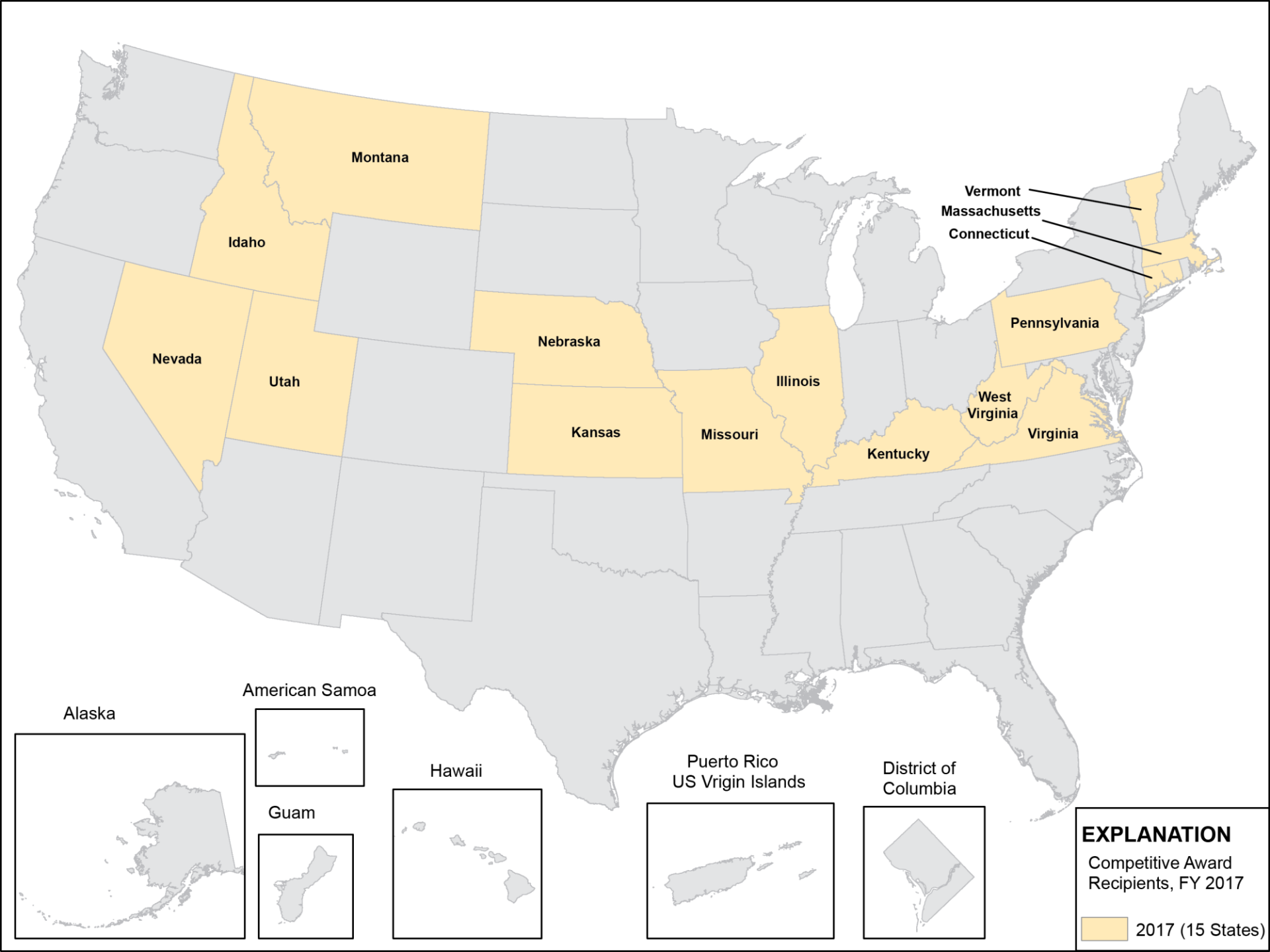
Competitive Award
Recipients, FY 2016
2016 (18 States)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Alaska
American Samoa
Guam
Hawaii
Puerto Rico
US Vrigin Islands
District of Columbia
EXPLANATION
Competitive Award Recipients, FY 2017
2017 (15 States)

Abstract

Actual ET (ETa) is produced using the operational Simplified Surface Energy Balance (SSEBop) model (Senay and others, 2013) for the period 2000 to present. The SSEBop setup is based on the Simplified Surface Energy Balance (SSEB) approach (Senay and others, 2007, 2011) with unique parameterization for operational applications. It combines ET fractions generated from remotely sensed MODIS thermal imagery, acquired every 8 days, with reference ET using a thermal index approach. The unique feature of the SSEBop parameterization is that it uses pre-defined, seasonally dynamic, boundary conditions that are unique to each pixel for the hot/dry and cold/wet reference points. Reference: Senay, G. B., Bohms, S., Singh, R. K., Gowda, P. H., Velpuri, N. M., Alemu, H., et al. (2013). Operational evapotranspirationmapping using remote sensing andweather datasets: A new parameterization for the SSEB approach. Journal of the American Water Resources Association, 1-2013;15, **http://dx.doi.org/10.1111/jawr.12057**. Reference: Velpuri, N. M., Senay, G. B., Singh, R. K., Bohms, S., and Verdin, J. P.: A comprehensive evaluation of two MODIS evapotranspiration products over the conterminous United States: Using point and gridded FLUXNET and water balance ET, Remote Sensing of Environment, 139, 35-49, **http://dx.doi.org/10.1016/j.rse.2013.07....**, 2013.

Point of Contacts

Stefanie Bohms
U.S. Geological Survey

Time Range

2000-01-01 - 2015-12-01

Distribution Info

Web Service and Data Access - **https://cida.usgs.gov/thredds/**

Data Sources available for GDP processing

- Monthly Conterminous U.S. actual evapotranspiration data
- Yearly Conterminous U.S. actual evapotranspiration data

Available algorithms for data sources

- Area Grid Statistics (weighted)
- Area Grid Statistics (unweighted)
- OPeNDAP Subset

Cancel | Process Data Source

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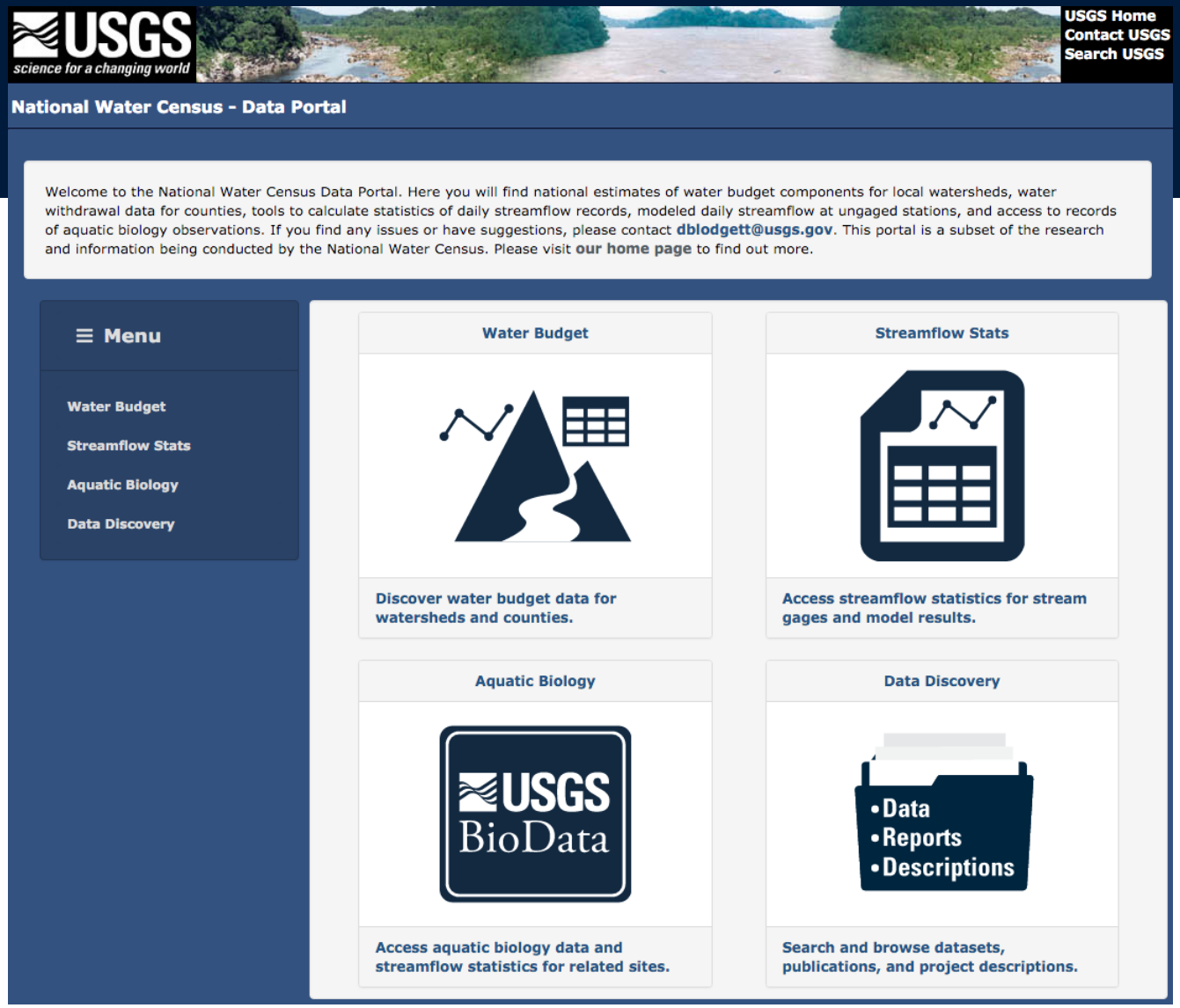

http://cida.usgs.gov/nwc/

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LANDSAT Data Products

- **EarthExplorer** – ***https://earthexplorer.usgs.gov/***

  Provides a graphical user interface to define areas of interest (AOI) by place name, address, zip code or creating an AOI on the interactive map. Queries can be applied to multiple collections simultaneously. (Landsat Collection datasets are listed under the Landsat section on the Data Set tab. User login required to download data and/or metadata.)

- **GloVis** –***https://glovis.usgs.gov/***

  A next-generation global visualization viewer provides access to select datasets within the USGS remote sensing archive.

- **LandsatLook Viewer** – ***https://landsatlook.usgs.gov/***

  Allows rapid online viewing and access to the USGS Landsat Pre-Collection image archives.

Questions

Mindi Dalton

Acting Program Coordinator

USGS Water Availability and Use Science Program

January 17, 2018

USGS