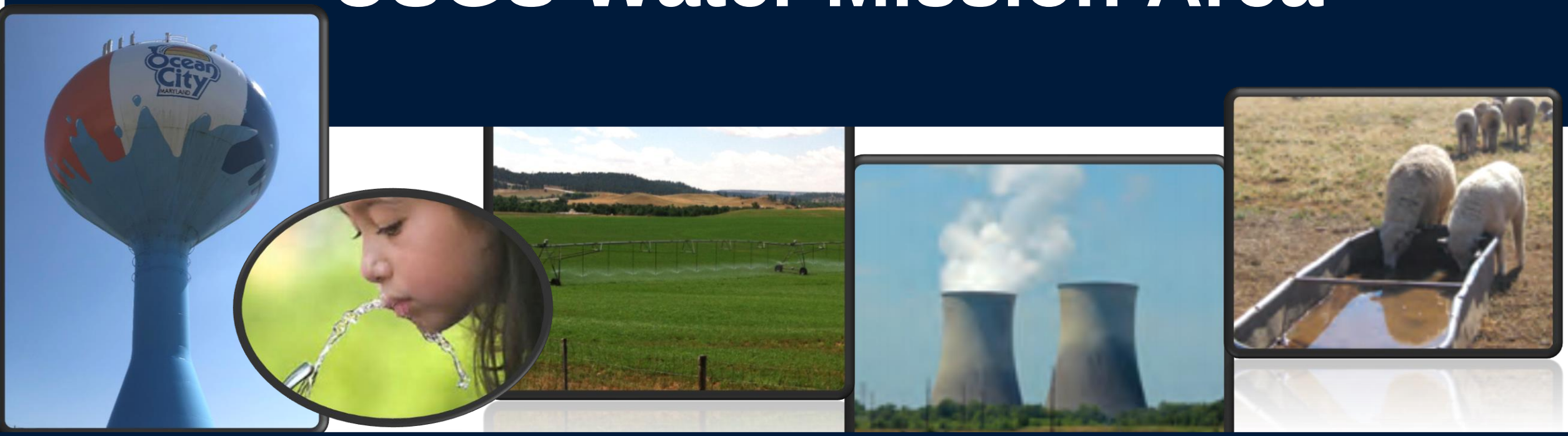
Importance of Water Use Data to USGS Water Mission Area



Molly Maupin

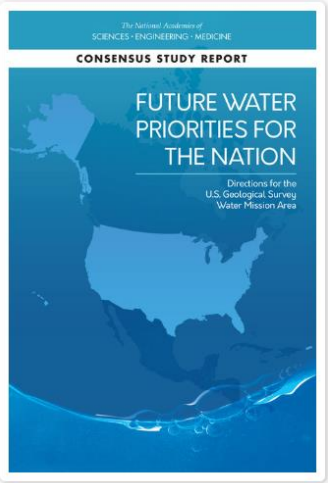
2019 WSWC Water Information Management Systems (WIMS) Workshop
USGS National Water Use Workshop Collaboration
Fort Collins, Colorado

USGS

Welcome

- Thank you– WSWC and USGS Fort Collins Science Center (FORT)
- Network
- USGS Wednesday talks
- Thursday morning groups

Why is water use data important
NAS Research Recommendations (2018)



Priority questions that would benefit USGS Strategic Science:

1. What is the quality and quantity of atmospheric, surface, and subsurface water, and how do these vary spatially and temporally?
2. How do human activities affect water quantity and quality?
3. How can water accounting be done more effectively and comprehensively to provide data on water availability and use?
4. How does changing climate affect water quality, quantity, and reliability, as well as water-related hazards and extreme events?
5. How can long-term water-related risk management be improved?

Recommendations Relevant to Water Use

Recommendation 1.1: Enhance data collection, include citizen science, and develop Web-based analytical tools:

- Strategically enhance the temporal and spatial collection of water quantity, quality, and water-use data using robust, innovative technologies to develop readily accessible 'fit-for-purpose' information.

Recommendation 3.1: Develop a robust water accounting system.

- Conduct studies to efficiently execute water accounting, and present uncertainty in the reported data.
- Go beyond measurement of the resource and consider the biophysical and societal constraints on water use.
- Include estimates of consumptive vs non-consumptive use

Recommendation 3.2: Collaborate with agencies and organizations on water-use data standards and categories of use.

- Co-develop standards, protocols, and clear definitions for categories of water use, and should adhere to common format standards across states, counties, and watersheds.

SECURE Water Act
Section 9508

Establish a national assessment program to be known as the “national water availability and use assessment program”

Program Elements – National Water Census (NWC)

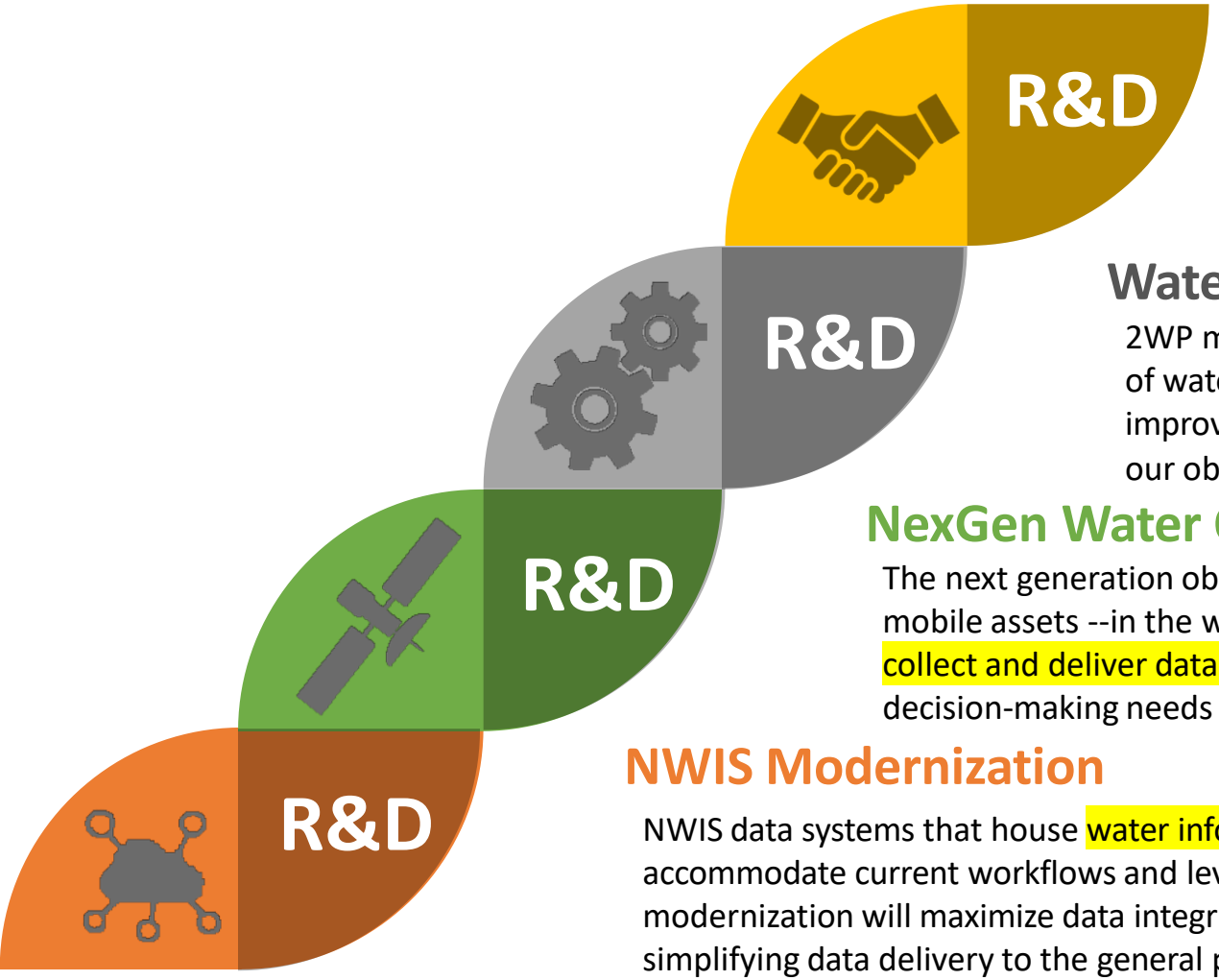
Water Use (HUC and Aquifer)

- **Comprehensive national inventory**
- Incorporate **water use** science with emphasis on **applied research** and **statistical estimation**
- **Integrate State datasets**
- Integrate **water use**, flow, and quality to evaluate the impact of **human activity** on water and **ecological resource**

Water Availability

- Develop nationally consistent indicators of availability for both surface and groundwater resources
- Maintain national database of availability (electronically available maps, reports, and data)
- Develop and apply predictive modeling tools that integrate groundwater, surface water, and ecological systems

Water Mission Area Priorities



Integrated Water Availability Assessments (IWAAS)

IWAAs evaluate water availability in terms of the spatial and temporal distribution of water quantity and quality in both surface and groundwater, as related to human and ecosystem needs and as affected by human and natural influences.

Water Prediction Work Program (2WP)

2WP model predictions will support daily to decadal forecast-based management of water supplies and infrastructure at a regional and National extent through improvement of existing tools and development of new capacity supported by our observational data and data collected by other monitoring organizations.

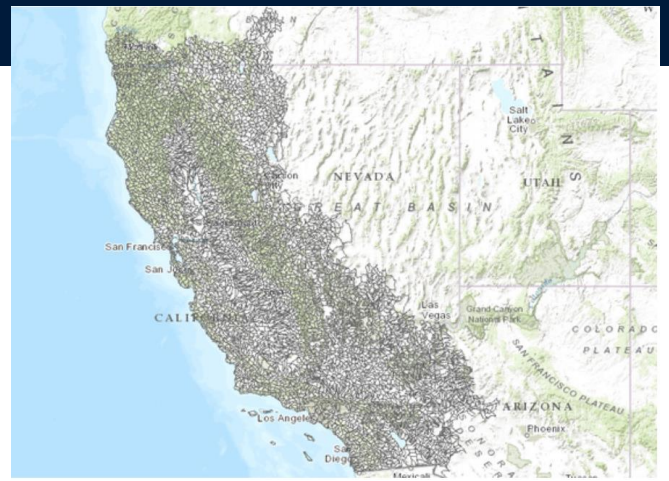
NexGen Water Observing System (NGWOS)

The next generation observing systems (NGWOS) is an integrated set of fixed and mobile assets --in the water, on the ground and in the air-- that will measure, collect and deliver data that can help address water resource challenges and decision-making needs of the future.

NWIS Modernization

NWIS data systems that house water information will be modernized to accommodate current workflows and leverage latest technology. NWIS modernization will maximize data integrity, reliability, and accessibility while simplifying data delivery to the general public.

Incorporating Water Use Science



- **Priority on Water Budget Estimation and Evaluation Project**
  - Thermoelectric
  - Irrigation
  - Public Supply

  } 90% of Total Water Use

- **Water Budget Estimation and Evaluation Project (WBEEP)**
  - Water Budget with 9 components; 3 are water use (TE/IR/PS)
  - HUC 12, daily. Annual - but potentially sem-annual/seasonal, or on demand
  - Developed model strategies for daily estimates of withdrawal by end of 2019
  - Full integration into NHM in FY2022
  - Collaboration with EROS (SSEBop; ETa) and UW (Irrig. Lands)

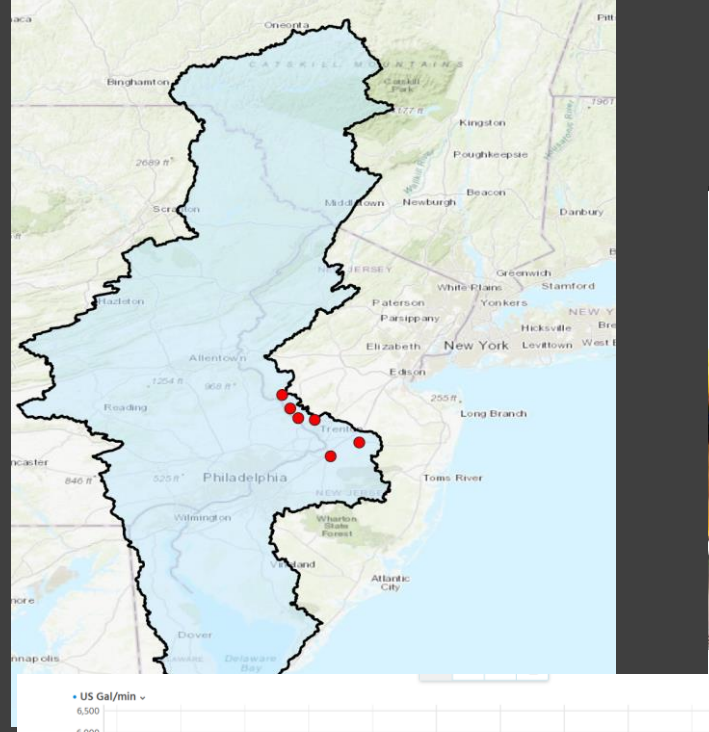
- **Take advantage of other Program resources to support improvements**
  - Water -Use Data and Research (WUDR) Program
  - Coop Matching Funds for Water Use Research (CMF-WUR)
  - WRRI (InterbasinTransfers)

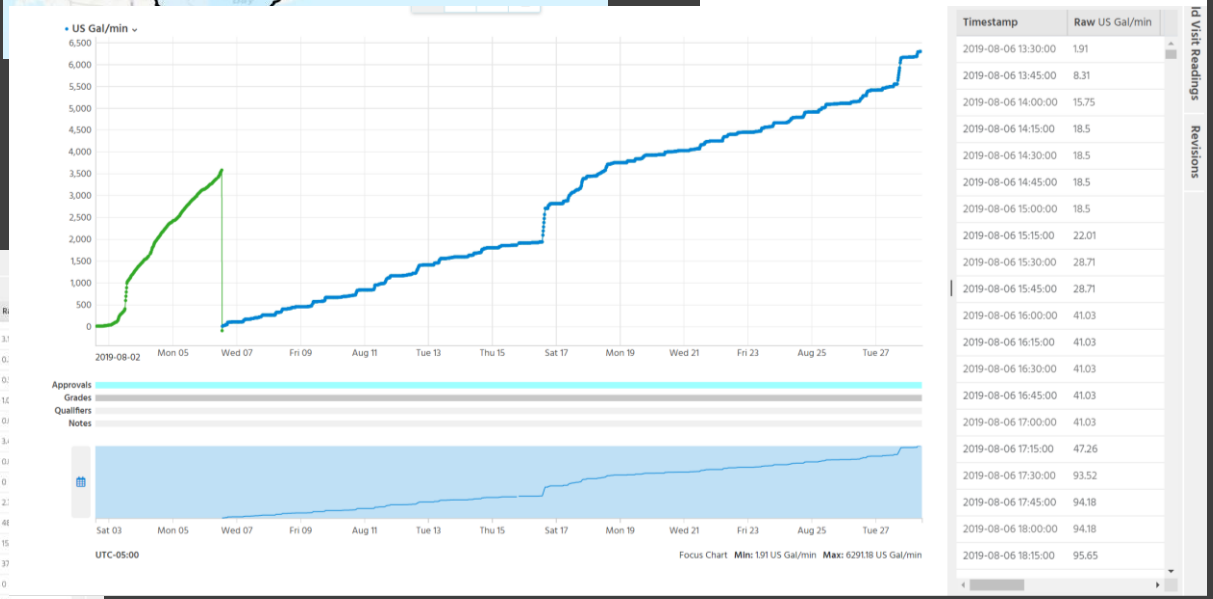
Water Use Research Cooperative Matching Funds (CMF-WUR)

- $2M annually, separate allocation from other CMF
- Congressional Intent for Use
  - Data collection to support national models (ie. H12,daily, PS,IR,TE)
  - Use remote sensing or spatial datasets for new methods
  - CU (any cat)
  - Site specific data (any cat)
  - Database develop, data delivery, visualization
- All data from projects go into USGS water use database or repository

NGWOS for Water Use

- Metered real-time self-supply domestic use
- 6 domestic wells
- Hourly transmission of 15-min readings
- Aquarius
- NWISWeb





Collaboratively Improve Water Use Reporting via WUDR

Improve Water Use Data Delivery Nationally

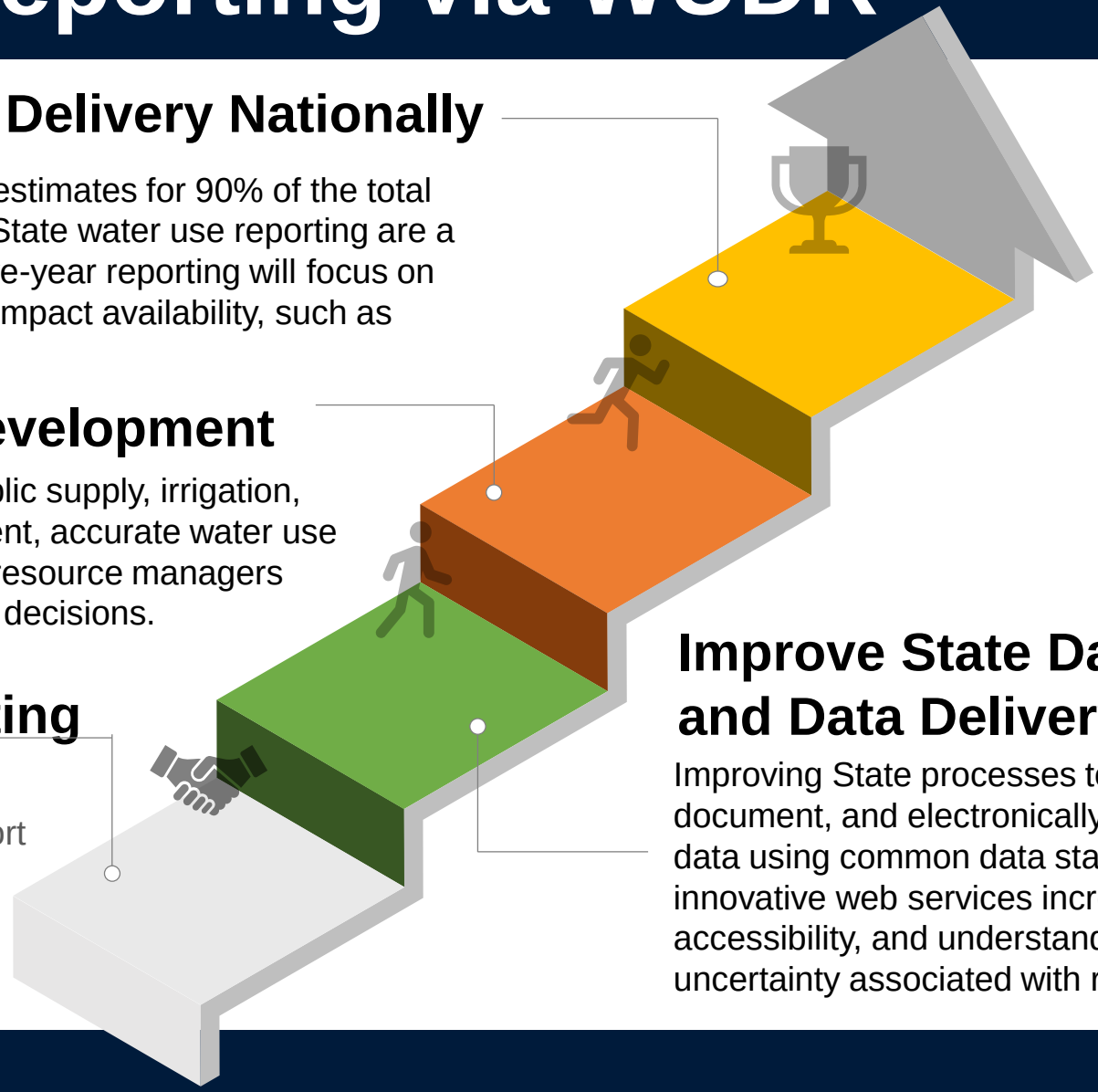
By 2022, USGS will report daily water use estimates for 90% of the total water use in the Nation. Improvements to State water use reporting are a critical component of this strategic goal. Five-year reporting will focus on water availability and trends in factors that impact availability, such as water use.

USGS Water Use Model Development

USGS is developing daily water use models for public supply, irrigation, and thermoelectric uses. These models need current, accurate water use data from State agencies. The models will provide resource managers valuable information needed to make management decisions.

Improve State Water Use Reporting

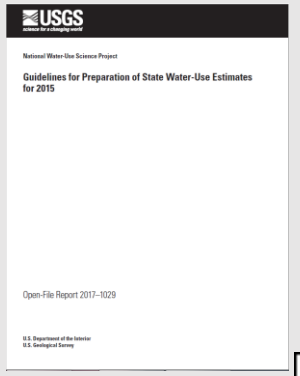
State agencies are looking for ways to improve water use data and tools to more accurately report and understand water use needs for multiple sectors. This information is critical to effective water resources availability management.

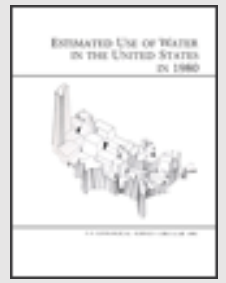


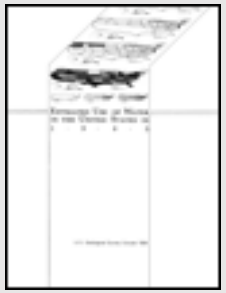
Improve State Databases and Data Delivery

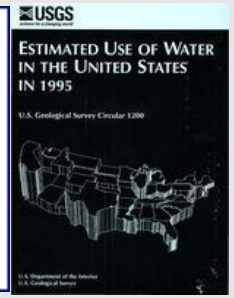
Improving State processes to acquire, maintain, document, and electronically deliver water use data using common data standards and innovative web services increase the accessibility, and understanding of the uncertainty associated with reported data.

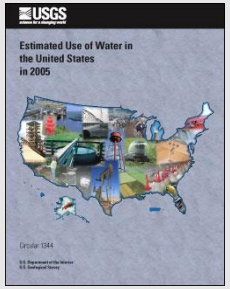
Comprehensive National Inventory
Estimated Use of Water in the United States

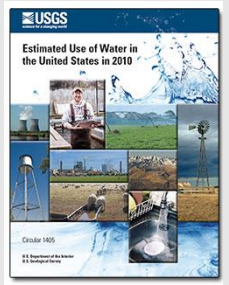


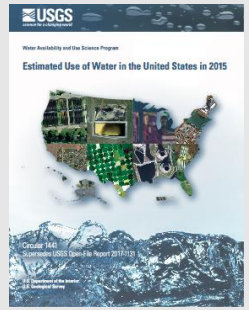


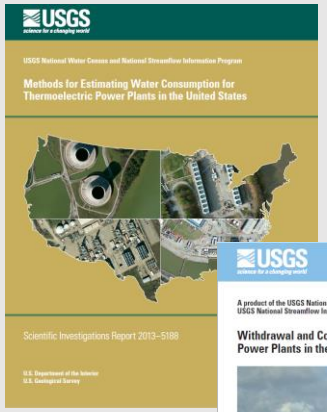


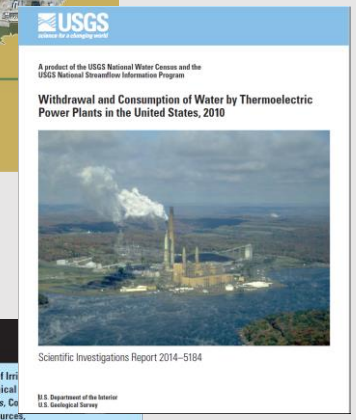


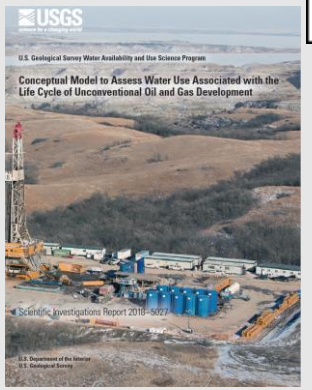


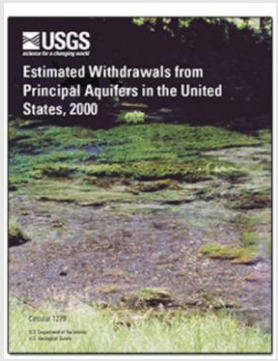


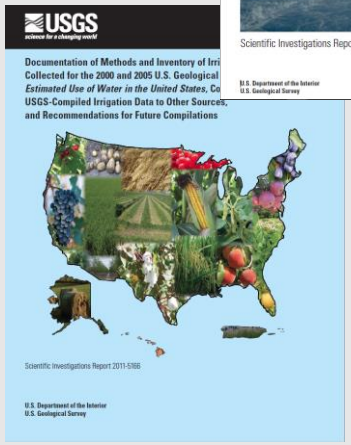












http://water.usgs.gov/watuse/

Water Use in the Future

Q: What will future compilations look like?

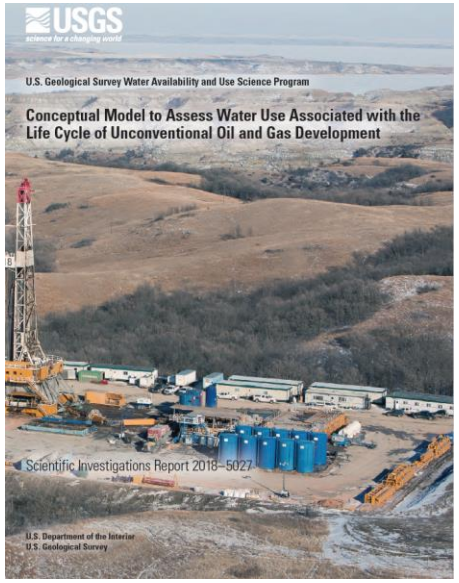
- National trends reports
- Annual (or sub-annual) assessments using models
- New model opportunities
- Use State data for calibration, verification and model improvements
- Webservices delivery of data on demand

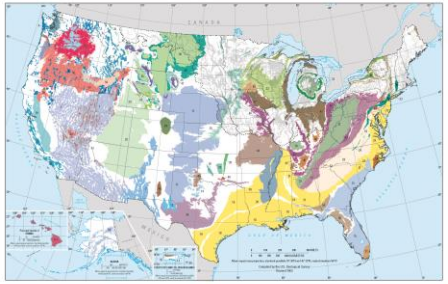
Q: How will Work Programs drive water use?

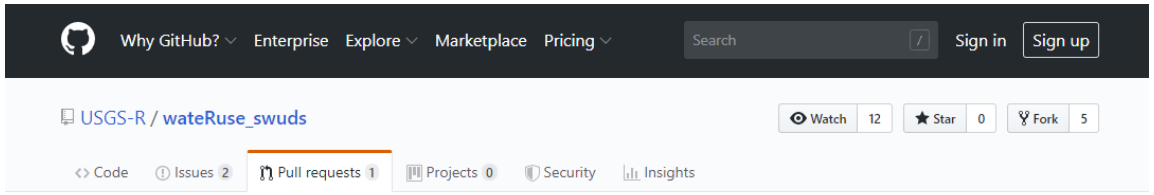
- Set priorities, objectives and goals
- Facilitate new water-use analysis capabilities (socio-economic, predictions)
- Integration water use into national models and other assessments

Ongoing Water Use Work

- Principal aquifer by county, 8 categories
- UOG Water Use
- wateRuseSWUDS







Uncertainty (FY19-20)

Uncertainty:

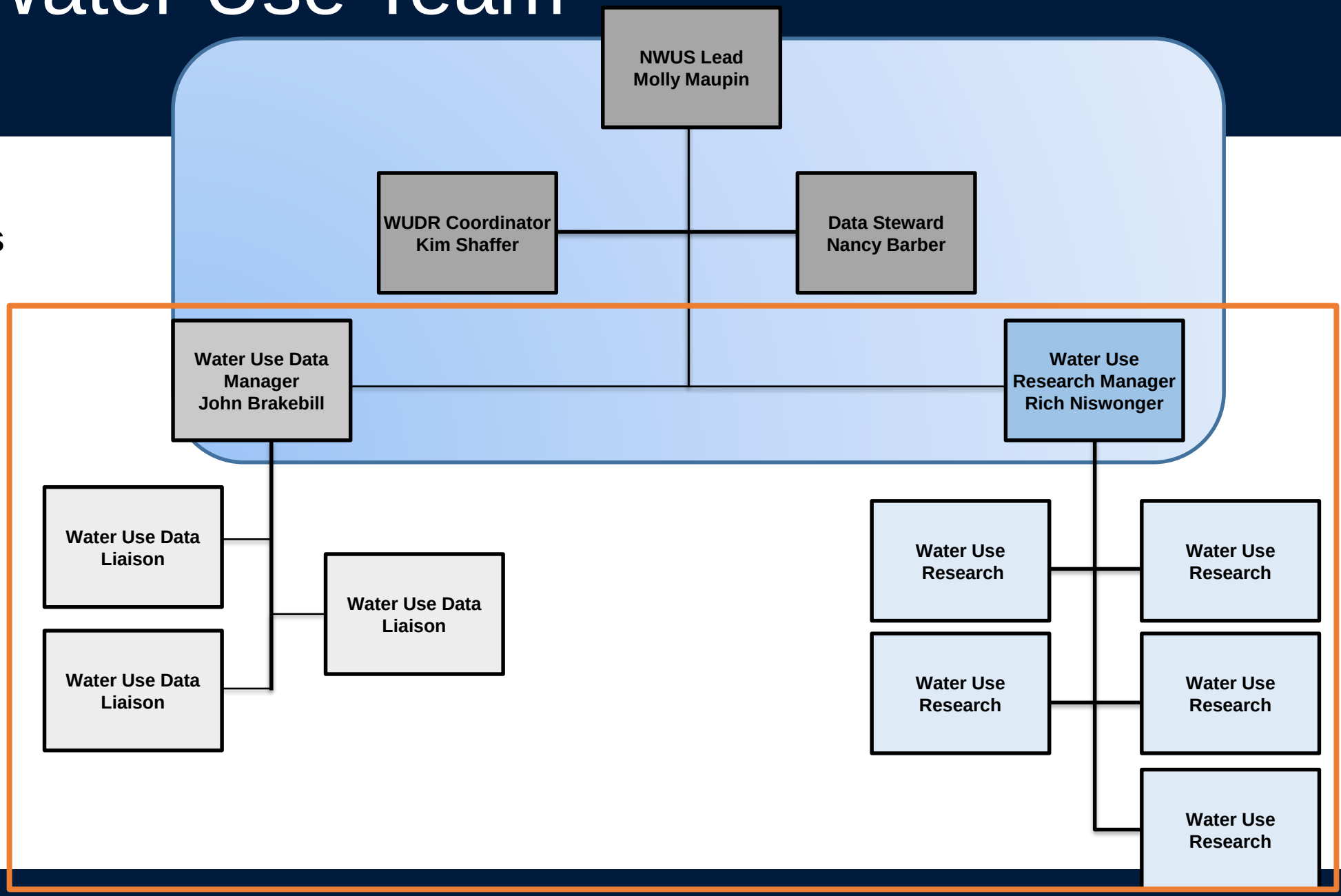
- Evaluating uncertainty in (1985-2015 County)
- Quantitative and Qualitative (method codes/data)
- Recommendations for protocols

Outcomes:

- Assessment of data value ranges and variances
- Protocols for water use data management and method descriptions

National Water Use Team

- Up to 10 new FTEs
- Optimize data collection to assist large-scale estimation and modeling



Questions

Molly Maupin
mamaupin@usgs.gov