



# Water Resources Availability Portfolio Update

ICWP AND WSWC SPRING ROUNDTABLE

APRIL 15, 2021



# Strategic Priorities

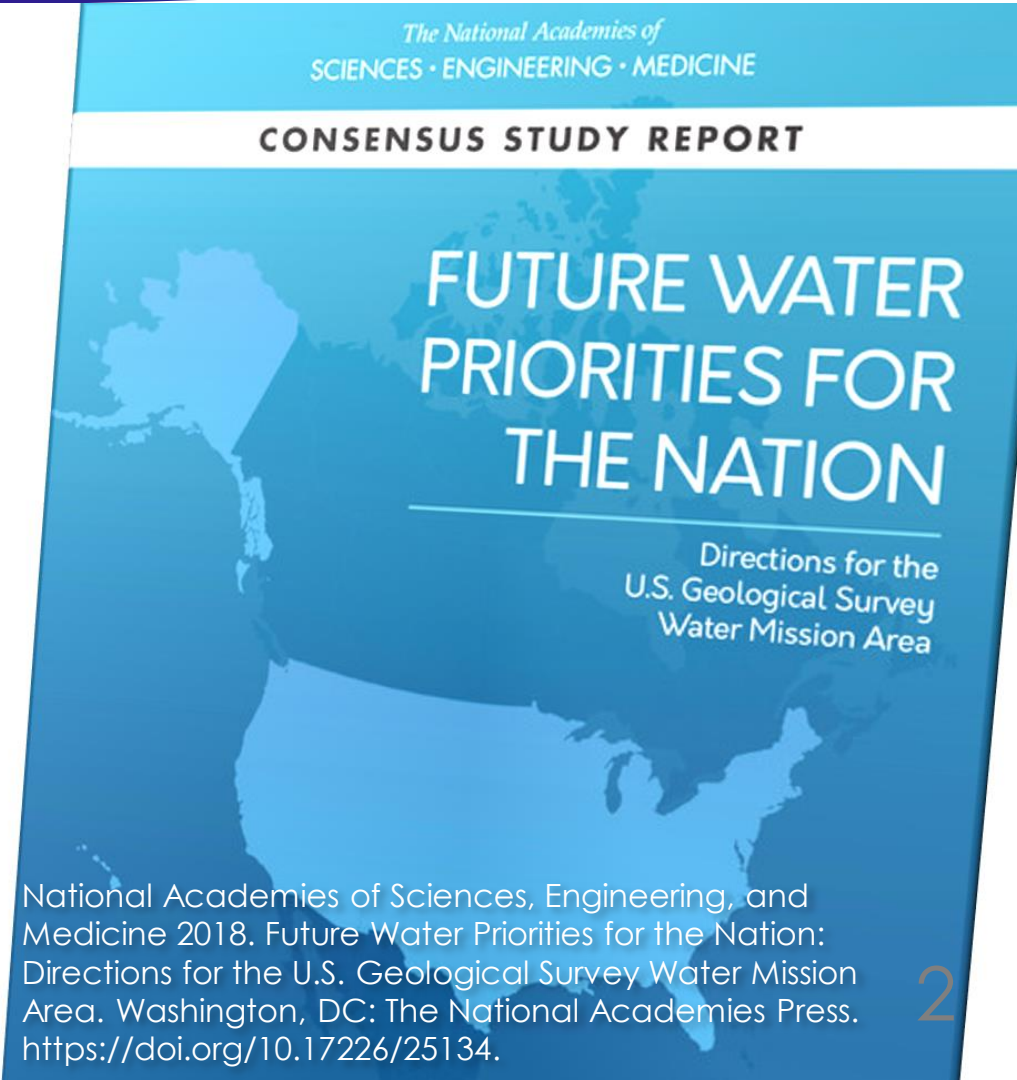
*In 2018 the National Academies of Science, Engineering and Medicine recommended that to prepare for the next generation of water resources challenges the Nation will face, we should focus now on the following science priorities:*

## **Six Cross-Cutting Water Challenges**

1. Understanding the role of water in the Earth system
2. Quantifying the water cycle
3. Developing integrated modeling and prediction
4. Quantifying change in the socio-hydrological system
5. Securing reliable and sustainable water supplies
6. Understanding and predicting water-related hazards

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7. Leverage emerging technologies



# Water Availability Forecasting

## Improve Water Availability Information Delivery

Working with regional and National stakeholders, deliver the data, tools, and information they need to make management decisions. Improve capacity to understand daily availability and provide forecasts at weekly, monthly, seasonal, and decadal time steps. What is the most effective and impactful way to deliver this information so it becomes critical data.

## Hydrologic Drought and Human Behavior

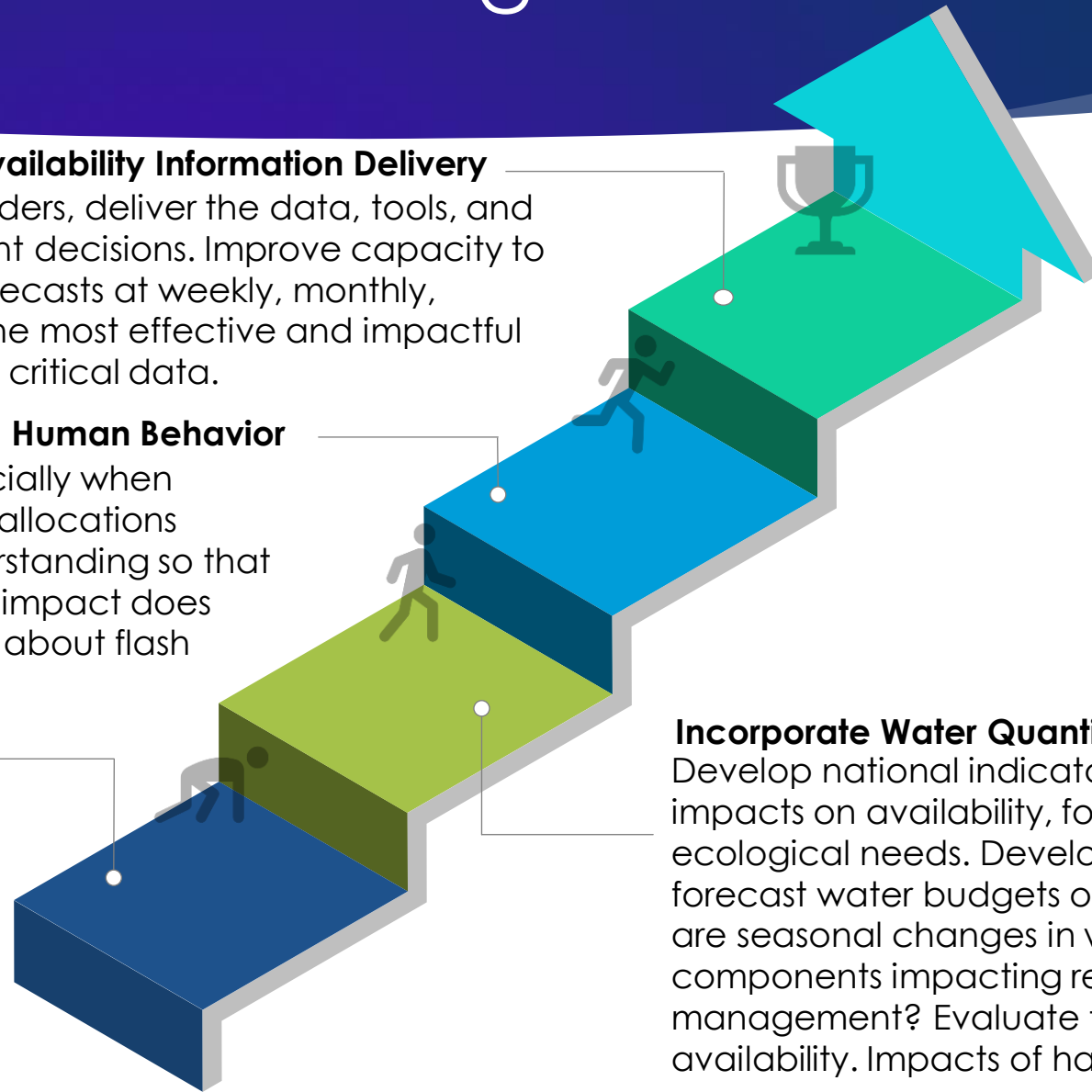
How do socioeconomics impact availability, especially when supplies do not meet demand? How are resource allocations made? Can we improve hydrologic drought understanding so that we can forecast onset and predict severity? What impact does drought have on water quality and habitat? What about flash droughts and economic impacts?

## Improve Water Use Reporting

By 2022, USGS will report daily water use estimates for 90% of the total water use in the Nation, goal is to report 100% through models. Five-year reporting will focus on water availability and trends in factors that impact availability, such as water use.

## Incorporate Water Quantity and Quality

Develop national indicators of water quality impacts on availability, for both human and ecological needs. Develop models that forecast water budgets on daily basis. How are seasonal changes in water budget components impacting reservoir management? Evaluate trends in water availability. Impacts of hazards?



# USGS Integrated Water Resources Initiatives



## **Next Generation Water Observing System (NGWOS)**

NGWOS collects real-time data on water quantity and quality in more affordable, rapid, and intensive ways than has previously been possible. The flexible monitoring approach enables USGS networks to evolve with new technology and emerging threats.



## **Integrated Water Availability Assessments (IWAA)**

IWAAs examine the supply, use, and availability of the nation's water. These regional and national assessments evaluate water quantity and quality in both surface and groundwater, as related to human and ecosystem needs and as affected by human and natural influences.



## **Integrated Water Prediction (IWP)**

IWP builds a powerful set of modeling tools to predict the amount and quality of surface and groundwater, now and into the future. These models use the best available science to provide information for more rivers and aquifers than can be directly monitored.

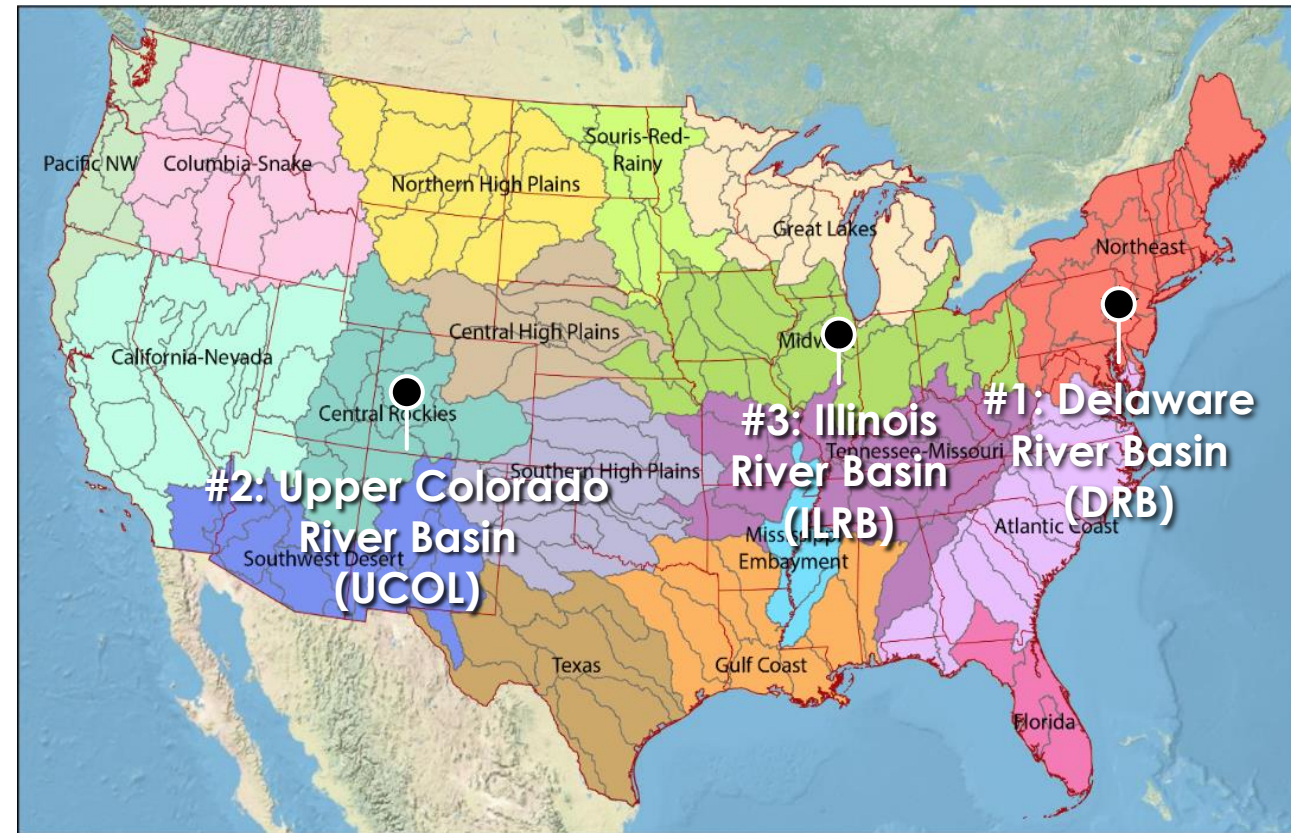


## **National Water Information System (NWIS) Modernization**

NWIS data systems that house USGS water information are being modernized to maximize data integrity, simplify data delivery to the general public, automate early warning to enable faster response times during water emergencies, and support the new **National Water Dashboard**.

# Integrated Water Resources Basins

- ▶ Goal: 10 river basins (10,000-20,000 mi<sup>2</sup>) in 10 years, representative of larger water-resource regions to drive the future of integrated water resources science
  - ▶ Regional focus areas for intensive observation, assessments, modeling, prediction, and validation
  - ▶ Develop a deep, integrated understanding that can be extended to the broader region
- ▶ Basin selection process includes quantitative metrics and extensive stakeholder engagement
- ▶ Basin #4 selection by end of FY21



# WRAP Planned Accomplishments

## FY2021-FY2024

- ▶ Finalize infrastructure and engineering strategy and begin testing, evaluation, and development of **community-based integrated water prediction platform**
- ▶ Develop **water use withdrawal models**, including consumptive use, that account for 90% of water use nationally
- ▶ Develop tools to evaluate **groundwater vulnerability** and plan for developing capability to assess groundwater vulnerability nationally
- ▶ Deliver a web-based, integrated **National Water Census** representing water availability in over 100,000 small watersheds
- ▶ Pilot predictive modeling capabilities for ecological flow needs in UCOL IWS
- ▶ Develop eDNA sampling network to inform analytical system of ecological health
- ▶ Develop machine learning techniques to guide **drought prediction**, including onset and duration and deliver prototype prediction capability in IWS Basin
- ▶ Develop science-based decision tools and models that assist with delivery of **HABs early event warning system**

# Contact Information

Mindi Dalton

**Program Coordinator**

Water Resources Mission Area

Email: [msdalton@usgs.gov](mailto:msdalton@usgs.gov)

Phone: 770-283-9728