



The Internet of Water Coalition

Peter Colohan & Martin Doyle • March 2022

THE WATER DATA CHALLENGE

Water challenges are mounting across the nation, impacting communities, states, and entire regions. Climate change is increasing the variability of water supplies, while population growth, urbanization, and industry are increasing water demand and degrading water quality. To adapt to these profound changes, decision-makers need easy access to information about the water resources they manage or rely on. In most cases, there is a wealth of public water data available, however, these data are often difficult to find, access, and use.

Public water data are collected for different purposes, at different scales, and are scattered across multiple platforms with different data standards. The time that users must invest to find, clean, and standardize this data leaves little time and resources to put the data to work to generate insights. As a result, decision-makers are often forced to make judgments without the benefit of a complete picture of their water resources. We cannot rise to the water challenges facing our nation without comprehensive, accurate, and up-to-date data and information about our water resources. We aim to address this challenge by developing an Internet of Water, a modern water data infrastructure for the US.

The idea of an Internet of Water was first conceived at the Aspen Institute Dialog Series on Water Data, and formalized in the 2017 report "[The Internet of Water: Sharing and Integrating Water Data for Sustainability](#)." This concept built on earlier academic work in water science, as well the federal government's Open

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Water Data Initiative (OWDI), which substantially improved access to federal water data sets. Subsequently, the United States Geological Survey (USGS) and the Environmental Protection Agency (EPA) have created “internet of water” teams to continue the work of improving water data management at the federal level. These federal and academic efforts, however, have not attempted to improve data infrastructure at state agencies or local utilities. The Western States Water Council recognized this problem as early as 2012 when it created the [Water Data Exchange \(WaDE\)](#) project. Subsequently, [the states of California, New Mexico, Texas, and Oregon have each created initiatives designed to tackle the water data management challenge](#).

In 2018, the Duke University [Nicholas Institute for Environmental Policy Solutions](#) (Nicholas Institute) launched the Internet of Water (IoW) Project as part of their [Water Policy Program](#). Over the past 3 years, the IoW Project has focused on tying these state and federal efforts together, [building state and local capacity](#), developing [essential technologies](#) and [resources](#), and creating a [network of water data users, producers, and decision-makers](#) across the US. As of 2022, agencies in four states are implementing Internet of Water [collaborative projects](#); California, New Mexico, North Carolina, and Texas.

Through this start-up period, we learned that the strength of the Internet of Water is its capacity to unite independent organizations and agencies around the common goal of modernizing water data infrastructure in the US. Only through the collaborative work of these many organizations and agencies can we realize the vision of the Internet of Water: a nation engaged in equitable, sustainable, and resilient water planning, management, and stewardship enabled by shared and integrated water data and information.

Now, as the IoW enters its growth phase, we are scaling up from a project of the Nicholas Institute at Duke to a coalition of organizations working together with federal, state, and local government partners to enact the vision of the Internet of Water. As part of our growth phase, we are launching a new [IoW Initiative](#) at the [Lincoln Institute of Land Policy's Center for Geospatial Solutions](#) (CGS) to operationalize the innovations developed by the team at the Nicholas Institute. CGS is collaborating with the Nicholas Institute and other key IoW partners to form the new [Internet of Water Coalition](#), a diverse organization with the resilience and adaptability to transform water data infrastructure across the US.

IOW COALITION PURPOSE, MISSION, AND VISION

The Internet of Water Coalition is dedicated to advancing the principles and programmatic development of an Internet of Water (IoW). The IoW Coalition will serve as the primary forum for IoW stakeholder representation and dialogue. The mission of the IoW Coalition is to advance the modernization of public water data infrastructure to improve the sharing, accessibility, and integration of water data and information. [Our vision](#) is to enable sustainable, equitable, and resilient water planning, management, and stewardship now and in the future.

IOW COALITION LEADERSHIP AND GOVERNANCE

The Internet of Water Coalition is a multi-sector collaboration co-led by five non-profit organizations: [the Lincoln Institute of Land Policy's Center for Geospatial Solutions \(CGS\)](#), [Duke University's Nicholas Institute for Environmental Policy Solutions](#), [the Consortium of Universities for the Advancement of Hydrologic Sciences, Inc. \(CUAHSI\)](#), [the Water Data Collaborative \(WDC\)](#), and [the Western States Water Council's Water Data Exchange \(WaDE\)](#). One representative from each of these organizations will serve on the [IoW Coalition's steering committee](#), along with two representatives from other organizations in the water sector. The broader IoW Coalition membership will initially consist of 15 to 25 members, including public agency liaisons.

LINCOLN INSTITUTE OF LAND POLICY, CENTER FOR GEOSPATIAL SOLUTIONS

The Lincoln Institute Center for Geospatial Solutions' ([CGS](#)) goals are to empower decision-making with insight from data and facilitate collaboration between organizations to scale collective impact. CGS offers inclusive access to powerful geospatial tools and technologies and partners with organizations that seek equitable solutions to climate change, habitat loss, water scarcity, and other challenges that threaten the quality of life for all people. CGS is uniquely suited to sustain and foster the Internet of Water's technology development, technology adoption, and community partnerships over time. [Peter Colohan](#) will lead the Internet of Water Initiative at CGS as Director, and [Kyle Onda](#) will serve as the Initiative's Associate Director.

[LEARN MORE ABOUT THE CGS IOW INITIATIVE](#)

DUKE UNIVERSITY, NICHOLAS INSTITUTE FOR ENVIRONMENTAL POLICY SOLUTIONS

The Duke University Nicholas Institute's [Water Policy Program](#) was the initial home of the Internet of Water and will remain a key contributor as the project enters its growth phase. The Nicholas Institute's Water Policy Program will continue to be a driver of innovation, developing new data-driven solutions to water challenges throughout the US. It will also continue to support ongoing IoW collaborative projects, as well as the network building, technology adoption, and policy work of the Internet of Water Coalition. Over the next five years, many initiatives and programs currently hosted by the Nicholas Institute will transition to the Lincoln Institute's Center for Geospatial Solutions.

THE CONSORTIUM OF UNIVERSITIES FOR THE ADVANCEMENT OF HYDROLOGIC SCIENCES, INC.

The Consortium of Universities for the Advancement of Hydrologic Sciences, Inc. ([CUAHSI](#)) fosters a diverse and dynamic water science community, enabled by shared scientific infrastructure. CUAHSI's mission is to advance water science by strengthening interdisciplinary collaboration, providing critical infrastructure, and promoting education in water science at all levels. Their work supports the development and communication of an integrated understanding of the interactions between water, earth, ecosystems, and society. CUAHSI provides free, open-source data services and software, such as [Hydroshare](#) and [Hydroclient](#), to the water science community to support all aspects of the data management lifecycle. CUAHSI is a major [data hub](#) of the Internet of Water, sharing a broad set of hydrologic data types including time series, GIS, and models.

THE WATER DATA COLLABORATIVE

The Water Data Collaborative ([WDC](#)) is a network of non-profit, academic, and governmental institutions dedicated to harnessing the power of community-based water quality monitoring data. The WDC's mission is to grow and maintain an inclusive community of trained and qualified community water scientists who employ the best available practices and technologies to provide data that enable the protection and restoration of our nation's waterways. A major focus of the Water Data Collaborative is to create systems that streamline the processes of collecting, uploading, and sharing data, such as the WDC Mainstem Network and Water Reporter. The Mainstem Network is a WDC run collective, bringing together all sectors of the community water science space in one location where they can collaborate, share resources, and find the tools to enhance their

monitoring programs. [Water Reporter](#) is a social network created and managed by [The Commons](#), that is optimized to support watershed initiatives. It allows users to create observations with geo-referenced photos and comments, share data from the field, and work collaboratively to turn reports into action. The WDC is a major [data hub](#) of the Internet of Water, sharing water data collected by community science organizations across the country.

THE WESTERN STATES WATER COUNCIL, WATER DATA EXCHANGE

The Western States Water Council (WSWC) is a government entity comprised of representatives appointed by the governors of 18 western states (Alaska, Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming). In 2011, WSWC launched the Water Data Exchange ([WaDE](#)) Program. WaDE's mission is to assist WSWC member states in publicly sharing water rights, allocation, supply, and use data through a common streamlined and standardized service that enables both state and regional analyses to inform water resources planning and policies. WaDE is transforming disparate state water data systems into a functional regional cloud-based data system with standards and metadata. WaDE is a major [data hub](#) of the Internet of Water, that is also working to include regulatory overlay, site-specific water observations, time series, and aggregated water budget data.

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