

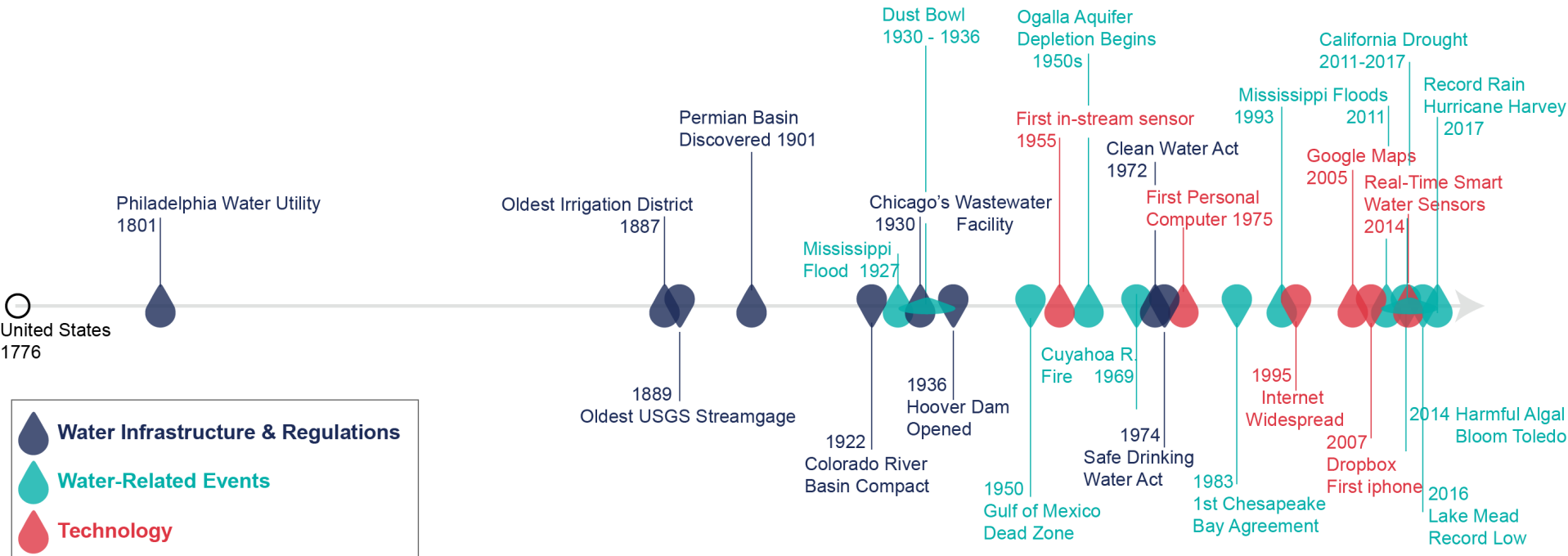


# The Internet of Water

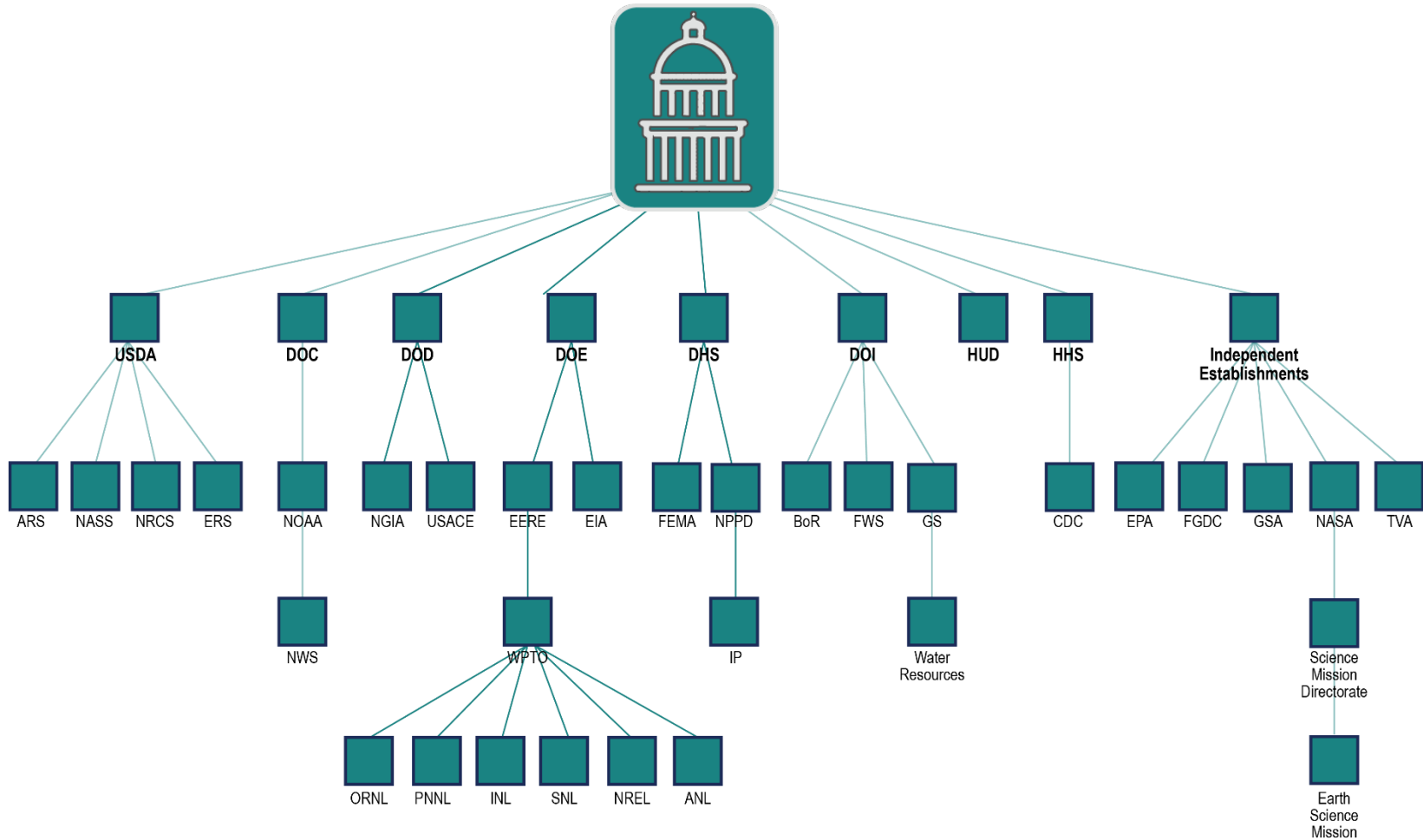
**Sharing and Integrating Water Data for Sustainability**

November 6, 2019  
AWRA Conference

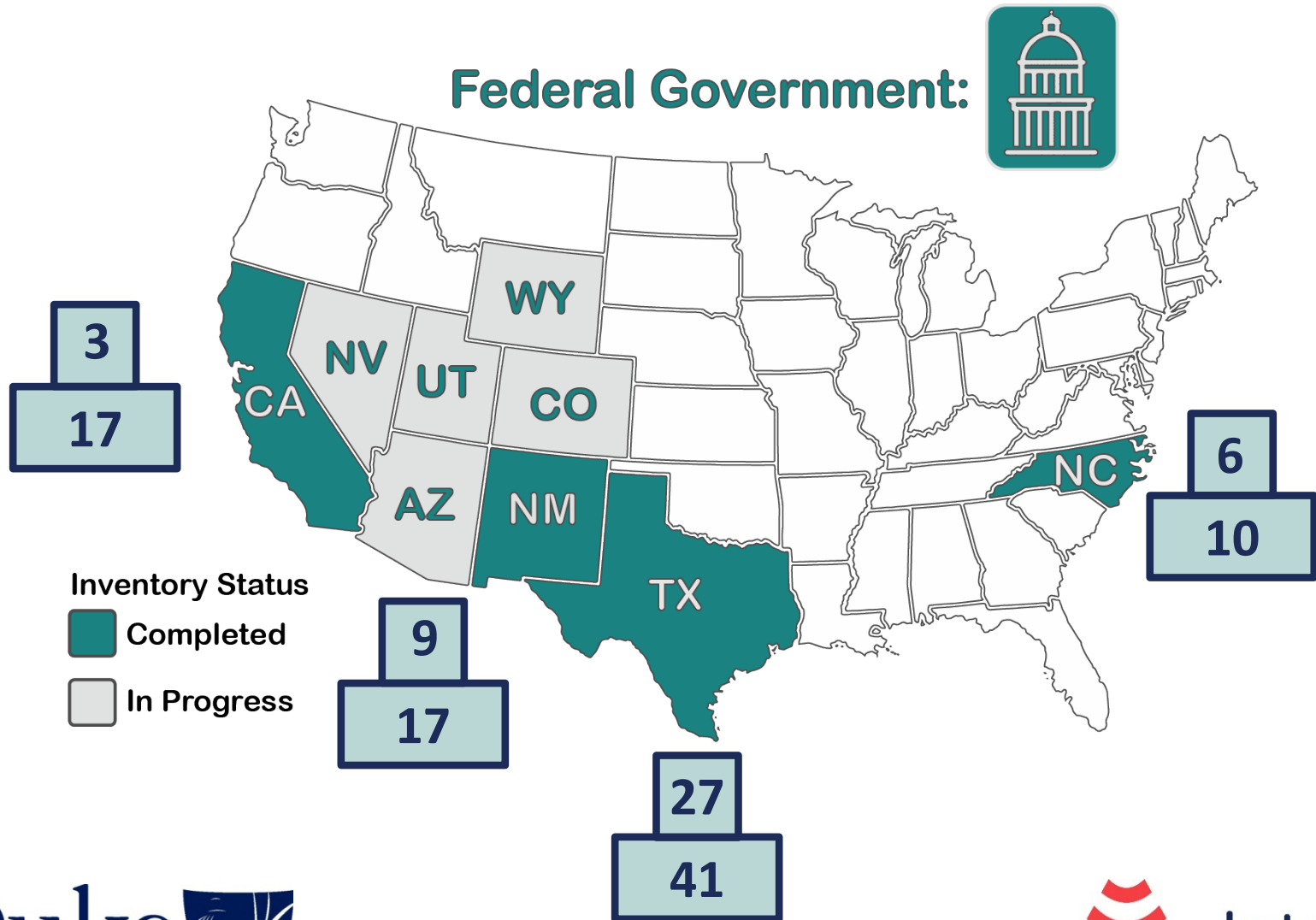
# Why do we need an Internet of Water?



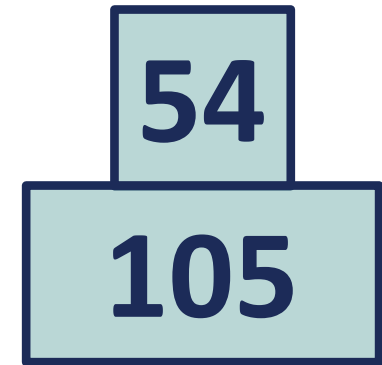
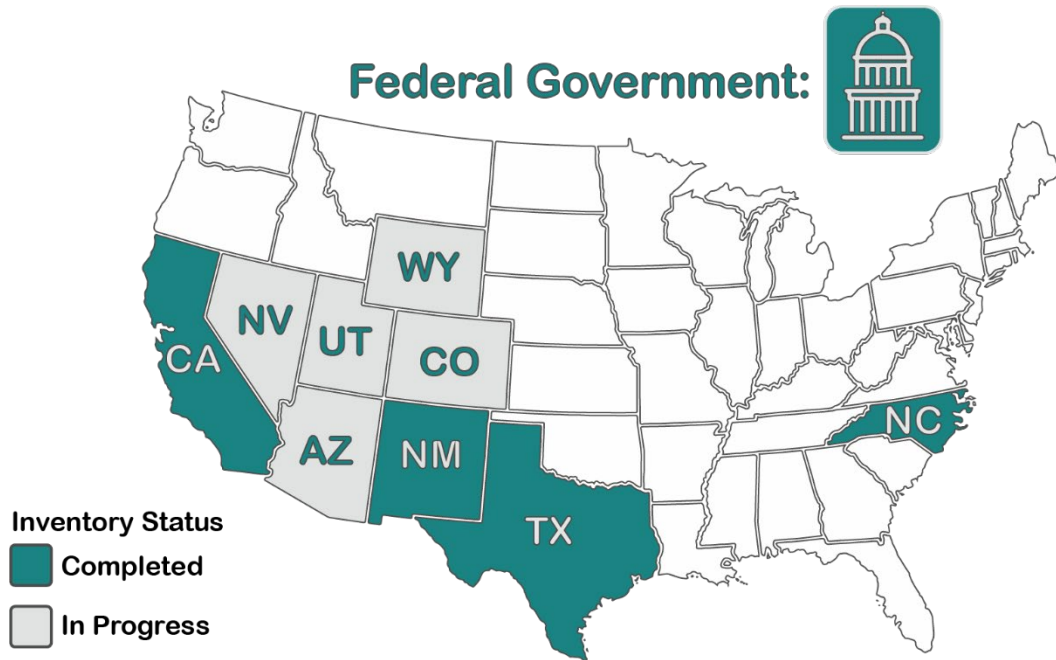
# Integrated Management Needs Integrated Data



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# Integrated Management Needs Integrated Data

CORPS OF ENGINEERS

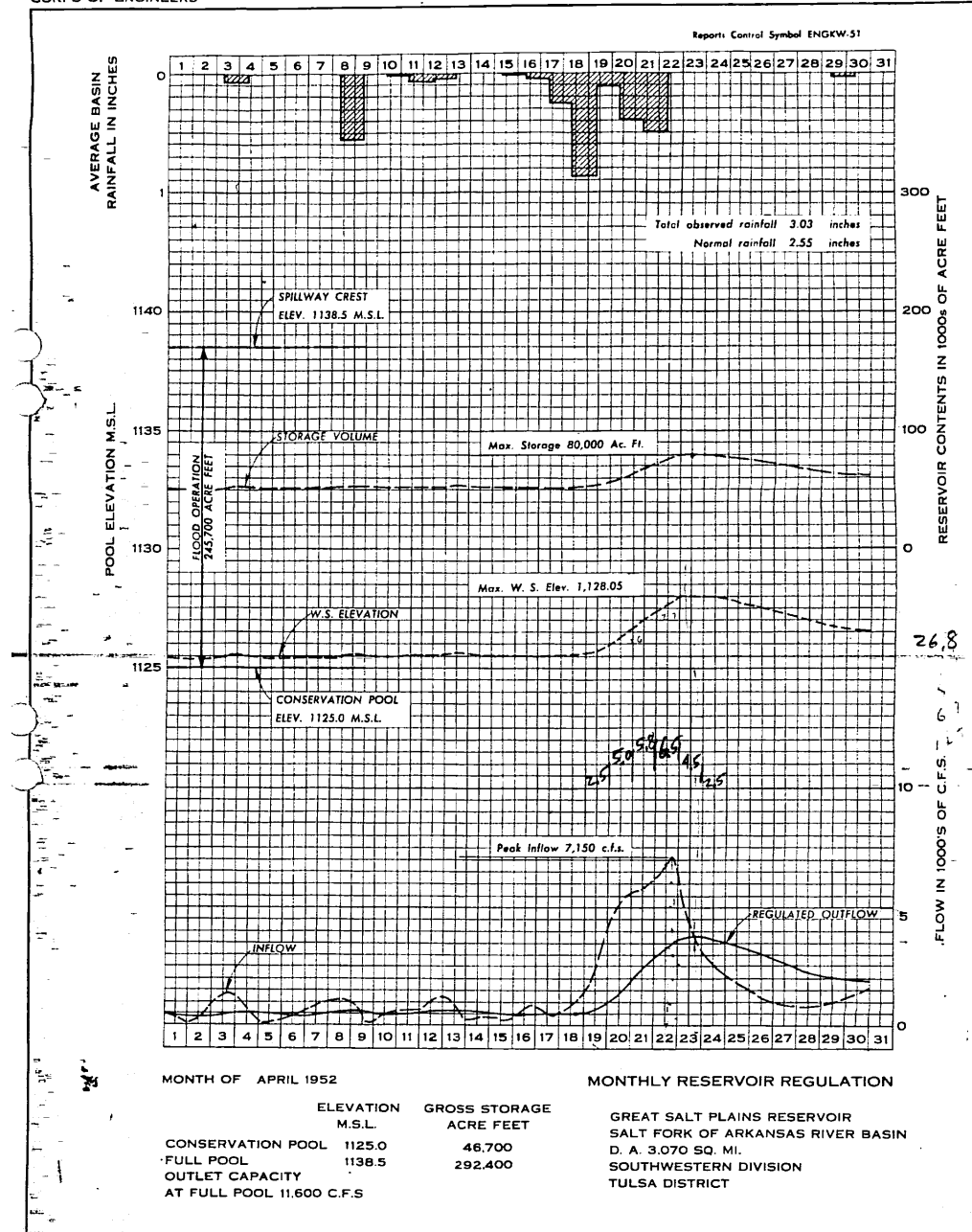
U.S. ARMY

1884 – 1<sup>st</sup> Corps dam

1946 – 1<sup>st</sup> computer



———— Data recorded on paper or graphed



# Integrated Management Needs Integrated Data

Late 1970s –  
Personal Computers

1884 – 1<sup>st</sup> Corps dam

1946 – 1<sup>st</sup> computer

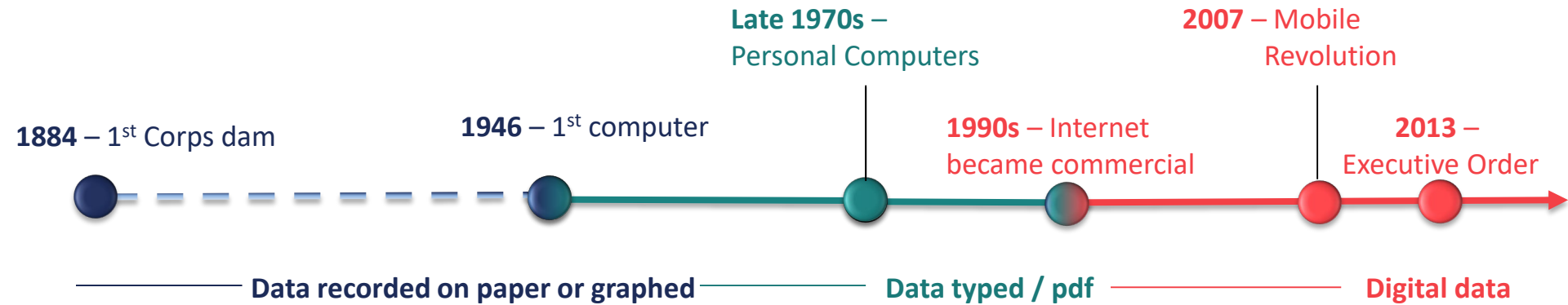


Data recorded on paper or graphed

GREAT SALT PLAINS LAKE MONTHLY LAKE REPORT APR.81												
DAY	POOL ELEVATIONS		STORAGE 2400HR AC-FT	RELEASES		EVAP INCHES 8A TO 8A	INFLOW ADJ DSF	RAINFALL				
	FT-NGVD 0800	2400		POWER	DSF TOTAL			7A TO 7A DAM	7A TO 7A BSN			
PRIOR MONTH	1125.22		33461									
1	1125.20	1125.17	32997	0	80	0.280	80	0.	0.			
2	1125.17	1125.18	33090	0	65	0.370	80	0.	0.			
3	1125.20	1125.47	35781	0	183	0.470	70	0.	0.			
4	1125.35	1125.17	32997	0	183	0.250	70	0.	0.			
5	1125.15	1125.12	32533	0	58	0.250	60	0.	0.			
6	1125.11	1125.14	32719	0	55	0.210	60	0.	0.			
7	1125.10	1125.12	32533	0	52	0.410	60	0.	0.			
8	1125.12	1125.07	32069	0	35	0.450	50	0.	0.			
9	1125.03	1125.02	31605	0	15	0.250	50	0.	0.			
10	1125.04	1125.06	31976	0	15	0.350	50	0.	0.			
11	1125.05	1125.07	32069	0	18	0.280	50	0.	0.			
12	1125.09	1125.05	31884	0	31	0.280	50	0.	0.			
13	1125.05	1125.04	31791	0	17	0.280	60	0.	0.			
14	1125.00	1124.95	31012	0	3	0.370	40	0.17	0.04			
15	1124.95	1124.99	31338	0	0	0.250	50	0.	0.			
16	1125.03	1125.15	32811	0	26	0.120	50	0.12	0.03			
17	1125.12	1125.00	32162	0	43	0.240	70	0.	0.			
18	1125.06	1125.05	31884	0	19	0.200	80	0.	0.			
19	1125.05	1125.08	32162	0	20	0.200	100	0.18	0.10			
20	1125.04	1125.03	31698	0	15	0.200	110	0.22	0.06			
21	1125.05	1125.08	32162	0	18	0.050	120	0.03	0.			
22	1125.09	1125.11	32440	0	38	0.110	125	0.02	0.			
23	1125.11	1125.12	32533	0	44	0.150	110	0.	0.			
24	1125.12	1125.11	32440	0	42	0.260	110	0.	0.			
25	1125.12	1125.12	32533	0	45	0.380	110	0.	0.			
26	1125.11	1125.10	32348	0	41	0.380	100	0.	0.			
27	1125.07	1125.09	32255	0	36	0.380	100	0.	0.			
28	1125.10	1125.03	31698	0	25	0.550	100	0.	0.			
29	1125.03	1125.02	31605	0	9	0.250	100	0.	0.			
30	1125.01	1124.94	30931	0	1	0.360	100	0.	0.			
TOTAL				0	1232	8.580	2365	0.74	0.23			
AVERAGE	1125.09			0	41		78	NORMAL=	2.37			
MAXIMUM	1125.47		35781	DATE= 3	TOP CONSERVATION POOL					1125.00		
MINIMUM	1124.94		30931	DATE=30	TOP FLOOD POOL					1138.50		
WATER SUPPLY: WITHDRAWN 0 AC-FT, RELEASED 0 AC-FT												
INFLOW VOLUME= 4690 AC-FT												

Not-Machine Readable

# Integrated Management Needs Integrated Data





# What is the Internet of Water?

## Aspen Institute Dialogue Series

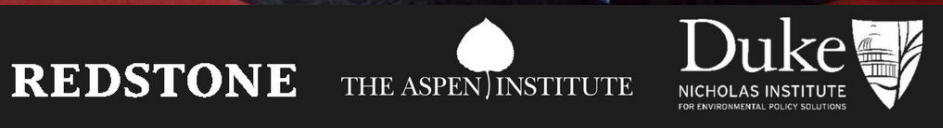


### PURPOSE

How to create a national framework for sharing and integrate already existing publicly collected water data?

### PARTICIPANTS

27 water experts, managers, policy makers, regulators, and representatives from the private and social sectors



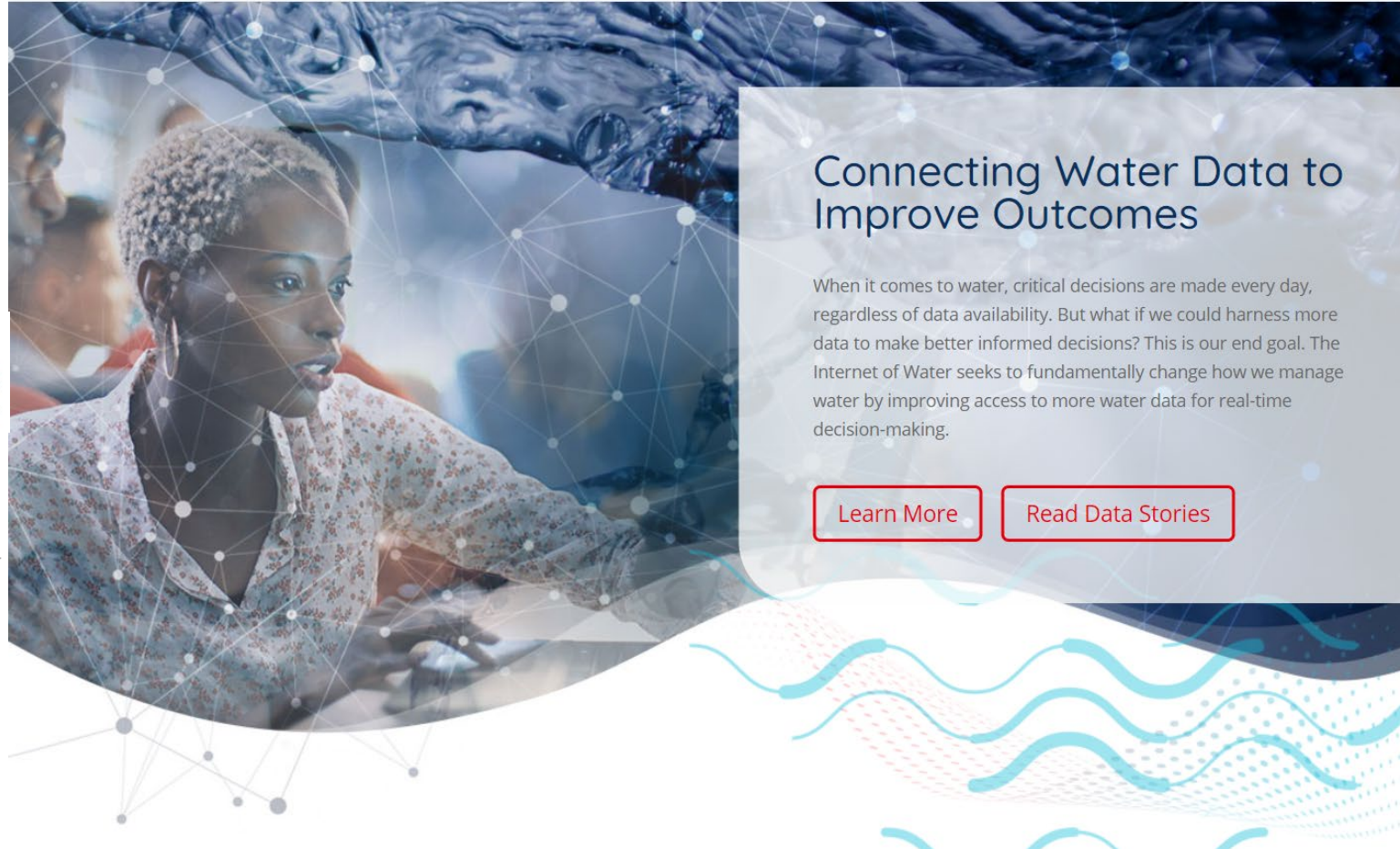
<https://www.aspeninstitute.org/tag/internet-of-water/>



# What is the Internet of Water?



[About](#) [Resources](#) [Data Stories](#) [News](#) [Events](#) [Connect](#) 

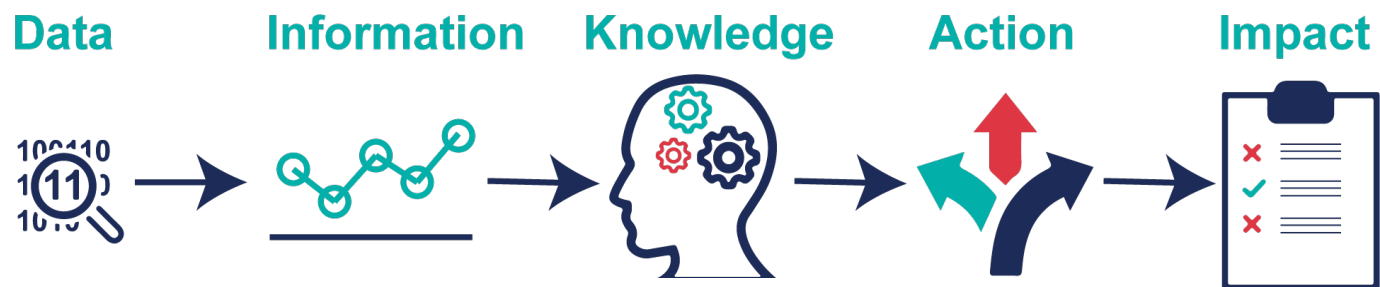


<https://internetofwater.org/>



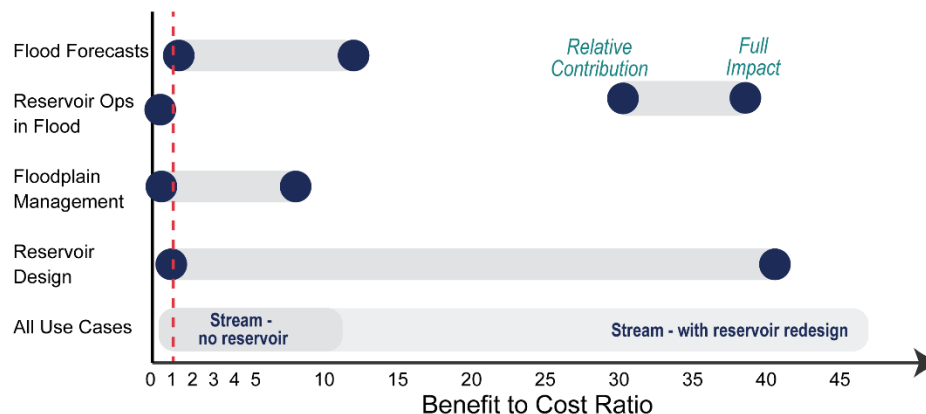
# Valuing Water Data

**Finding 1.** The value of open, shared, and integrated water data has not been widely quantified, documented, or communicated.



# Valuing Water Data

**Finding 1.** The value of open, shared, and integrated water data has not been widely quantified, documented, or communicated.



## Activities:

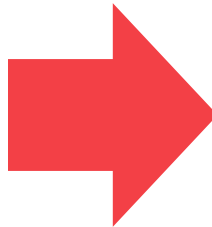
- Created educational materials on why data are hard to value and approaches to economically valuing data.
- Developing data stories that communicate the value of water data to various organizations in economic terms.
- Engaged in pilot projects to demonstrate the value of sharing and integrating data.



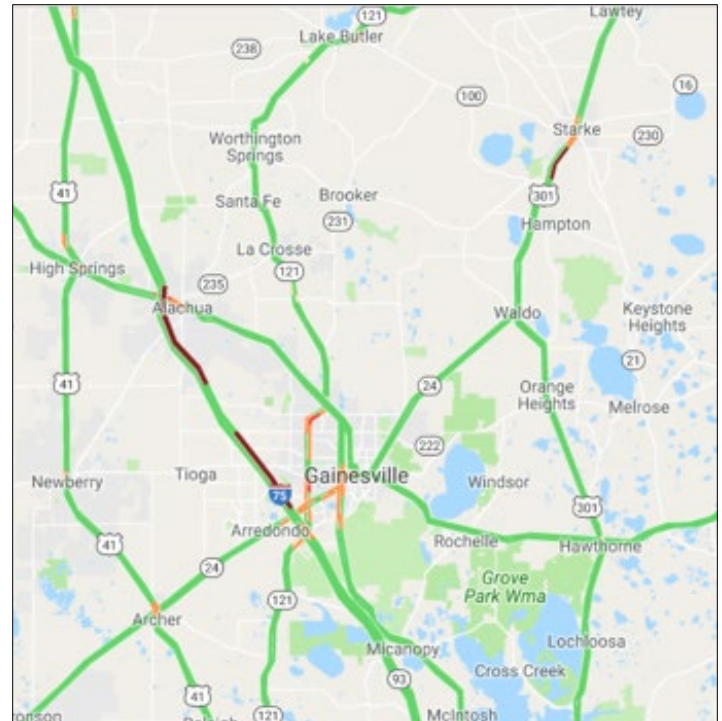
# Open Public Data

## Finding 2. Making Existing Public Water Data Open is a Priority

**We had to have this...**



**In order to do this.**



# Open Public Data

## Finding 2. Making Existing Public Water Data Open is a Priority

### Activities. Helping Your Data to Flow

A key finding from the Aspen Institute dialogue series on water data was that *the most necessary step in using water data for sustainability is making public water data open by default, discoverable, and digitally accessible*. We are developing educational materials, resources, and tools for making water data more open. Click on an icon below to learn more. **These resources are actively being developed so be sure to keep checking back!**



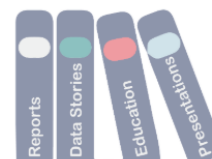
#### Inventory

Explore (1) which public agencies are collecting (2) what types of water data for (3) what purposes, and (4) the openness of those data.



#### Tools to Make Data Open

**Coming Soon:** Explore why open data are important, find out how open your data are, and how you can improve openness.



#### Publications

**Coming Soon:** Find publications and presentations including reports, white papers, data stories, and educational materials.



#### Learning Center

**Coming Soon:** A series of educational materials to explain standards, metadata, cloud services, etc. What they are, why they are important, what tools are available, and how to use them.



#### Glossary

**Coming Soon:** Public agencies may have different definitions for the same type of data. Search here to learn who uses what definitions for different types of water data.



#### Water Budgets

**Coming Soon:** Explore the workflow and resources for creating water budgets currently adopted by federal and state governments.



# Open Public Data

**Finding 2.** Making Existing Public Water Data Open is a Priority

**Activities.** Encourage public data to be shared **FAIRly**.

**F**indable  
**A**ccessible  
**I**nteroperable  
**R**eusable

# Open Public Data

**Finding 2.** Making Existing Public Water Data Open is a Priority

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**F**indable  
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**R**eusable



Nobody  
knows  
I exist



I exist only  
in my  
organization



I'm online  
but you have  
to know my  
address



My address  
is easy to  
find in my  
org's website



I'm in a  
catalog you  
can search

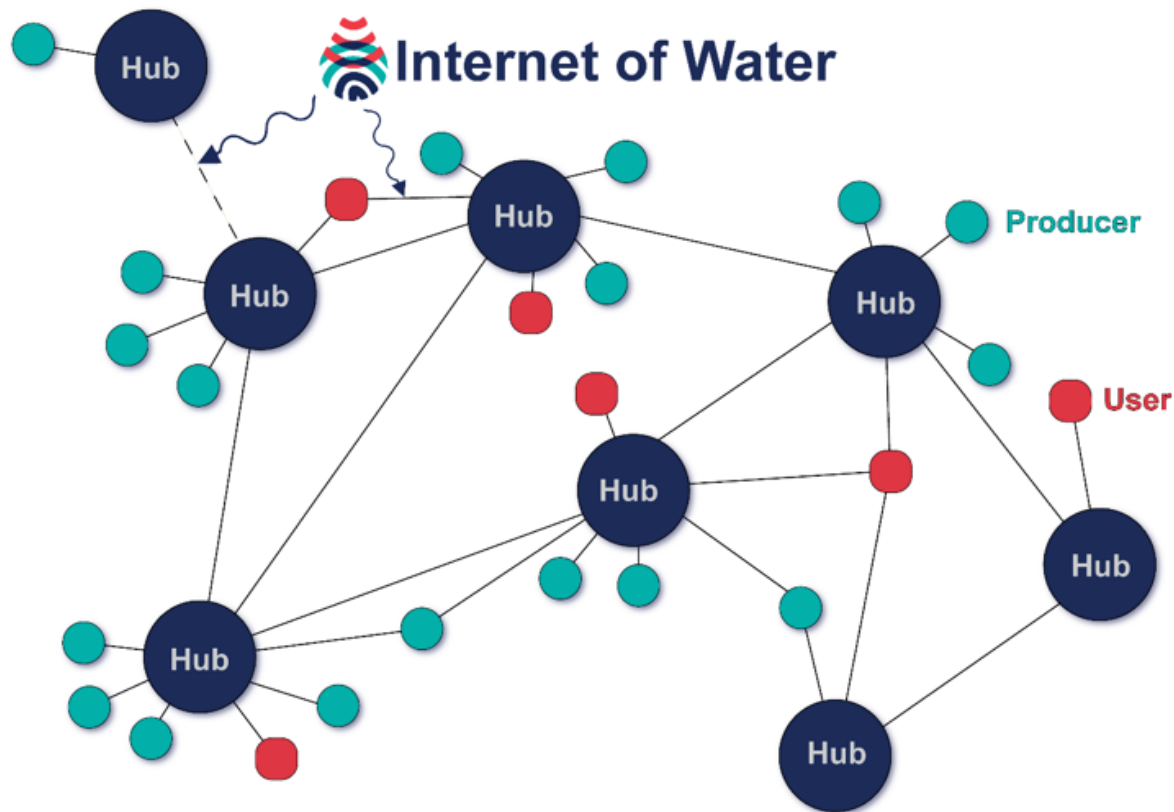


I can be  
googled



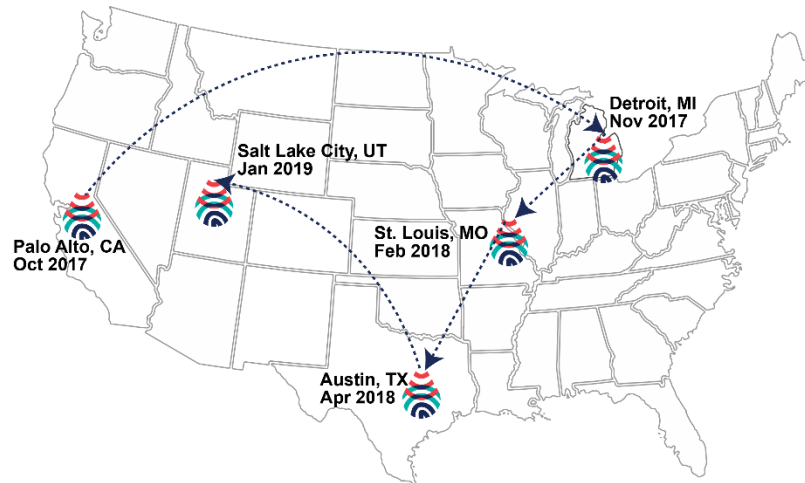
# Create an Internet of Water

**Finding 3.** The appropriate architecture for an “Internet of Water” is a federation of data producers, hubs, and users.



# Create an Internet of Water

**Finding 3.** The appropriate architecture for an “Internet of Water” is a federation of data producers, hubs, and users.



## Activities:

- Hosted a series of roundtables to better understand what different sectors needs are around water data
- Developing peer-to-peer learning networks and list serves
- Match-maker role for those facing particular challenges with those in our network that have found various solutions



# Questions?



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Internet  
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<https://internetofwater.org/>