Report on the Open Water Data Initiative (OWDI)

National Geospatial Advisory Committee
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Subcommittee on Spatial Water Data
OWDI as a Challenge

Access to water data is difficult
- Collected by hundreds of organizations
- No common infrastructure
- WaterML2 new exchange standard (O&M)

Understanding connections requires a geospatial framework
- Landscape to stream
- Stream to stream
>45,000,000 hourly records
>15,000 unique stream sites

>60 agencies
$10,000,000
Open Water Web

Water Data Catalog
- Find Source Data
- Create Themes
- Recruit / Engage Partners

Water Data as a Service
- Consensus Standards
- Visualization and Delivery
- Catalog and Serve

Enriching Water Data
- Network Routing
- Coupling Models
- Geospatial Framework

Community for Water Data, Tools
- Marketplace for Knowledge
- Usage Tracking
- Best Practices
Lean Startup Methodology

1. Ideas
2. Build
3. Measure
4. Learn
5. Data
6. Product
7. Ideas

WhiteHouse.Gov
Use Case Concepts

- Define use cases that respond to societal needs and cover broad range of water resources issues
- Identify critical data inputs — focus on these first
- Our emphasis is on the data, not the full solution
OWDI Working Groups

**Work Group 1:**
National Flood Interoperability Experiment
- Identify flood data including stream-flow observations, forecasts and impacts
- Developing *geospatial framework* and exploring data conflation

**Work Group 2:**
Drought Decision Support System
- Identify water resources data including natural flow, reservoir storage and drought impacts
- Explore visualization of drought in Lower Colorado

**Work Group 3:**
Spill Response Tool
- Review existing modeling applications and data requirements
- Exploring requirements for new/additional data (e.g. velocity forecasts and reservoir residence times)
Common Data Needs

- **NHDPlus V2.1**
  - National in single file geodatabase
  - Denormalized (flattened) data model
  - Available for download and as services

- **Sites indexed to NHDPlus V2.1 network**
  - Streamgages
  - NWS river forecast points
  - Dams
  - Large diversions and return flows
  - ...and many others
Status: Water Data Catalog

- Climate Data Initiative—Water Theme
  - Use same catalog
    - Develop separate landing page
- Linked data catalog
  - Federated data model
  - Data discovery using upstream/downstream navigation
- Data quality info
- Machine readable ontologies

Subcommittee on Spatial Water Data
Status: Water Data as a Service

- NWS forecasts and NWIS data as WML2
- Robust serving capacity is necessary
- Slow services aren’t used
- Measurement of service usage is key
- Repackaged seamless NHDPlus data for download—useful variation

- Many more datasets
Status: Enriching Water Data

Linking data to a standardized geospatial framework (e.g. NHDPlus)
- Sites with observations and measurements
- Better integration of geospatial layers (e.g. WBD linked to NHDPlus network)
- Modeling parameters for catchments

Network trace (upstream/downstream) capability is key
Status: Water Data and Tools Marketplace (Community)

- Community dialogue (SSWD, AWRA, etc.)
  - Web-based forum needed (wiki or similar)
  - Code/tool/procedure open source repositories (e.g. GitHub)
OWDI Examples:

- ArcGIS Online web map showcasing some OWDI data services:
  
  http://arcg.is/1EIL4bP

- National denormalized NHDPlus V2.1 download:
  
  ftp://ec2-54-227-241-43.compute-1.amazonaws.com/NHDplus/OWDI/
StreamGages: 13201500

LUCKY PEAK LAKE NR BOISE ID:
Active? 1 (1=Active, 0=Inactive)
Gages II: (Reference/NonReference, blank = not in Gages II)
Drainage Area = 2,686.00 square miles
USGS NWIS site [home page](https://waterdata.usgs.gov/nwis/gw)
Gold King Mine Spill
ICWater Preliminary Results

Gold King Mine
ICWater Quick Trace – 48 hours, based on flow at Cement Creek at Silverton, CO

ICWater Preliminary Results

Gold King Mine

48 hours travel time
Contaminated river
The Environmental Protection Agency triggered the wastewater release Wednesday morning while using heavy machinery to investigate pollutants at the Gold King Mine north of Silverton.

A 10:30 a.m. Wednesday
Spill begins that sent 1 million gallons of wastewater into the Cement Creek then Animas River.

B 12:15 p.m.
Approaches town of Silverton, where Cement Creek flows into the Animas River.

C Midnight Wednesday
Approaches Tall Timbers Depot on the Durango & Silverton Narrow Gauge Railroad.

D 5:30 a.m. Thursday
Travels toward Bakers Bridge.

E 1:30 p.m.
Water discoloration begins near Glider Park.

F 8 p.m.
Contaminated water reaches Durango as hundreds line the river to watch.

G 5 a.m. Friday
Estimated time to reach New Mexico state line.

(Time of Travel Comparisons)

<table>
<thead>
<tr>
<th>Location</th>
<th>Date</th>
<th>Day</th>
<th>Time</th>
<th>Observed Hours</th>
<th>Modeled Hours (flow on 8/5, Cement Creek@Silverton)</th>
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<tr>
<td>Gold King Mine</td>
<td>8/5/2015</td>
<td>Wednesday</td>
<td>1030</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Cement Creek/Animas River</td>
<td>8/5/2015</td>
<td>Wednesday</td>
<td>1245</td>
<td>2.25</td>
<td>5.7</td>
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<td>Tall Timbers Depot</td>
<td>8/5/2015</td>
<td>Wednesday</td>
<td>2400</td>
<td>13.5</td>
<td>16.1</td>
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<td>Bakers Bridge</td>
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<td>Thursday</td>
<td>1330</td>
<td>27</td>
<td>21.1</td>
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<td>Glider Park</td>
<td>8/6/2015</td>
<td>Thursday</td>
<td>2000</td>
<td>33.5</td>
<td>33.4</td>
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<td>Durango</td>
<td>8/6/2015</td>
<td>Thursday</td>
<td>300</td>
<td>42.5</td>
<td>45.8</td>
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<td>Estimated Time to NM Border</td>
<td>8/7/2015</td>
<td>Friday</td>
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</table>
ICWater QuickTrace – 8 day travel time

Downstream Quick Trace
- 8/5/2015 to 8/6/2015
- 8/6/2015 to 8/7/2015
- 8/7/2015 to 8/8/2015
- 8/8/2015 to 8/9/2015
- 8/9/2015 to 8/10/2015
- 8/10/2015 to 8/11/2015
- 8/11/2015 to 8/12/2015
- 8/12/2015 to 8/13/2015

Lake Powell
Gold King Mine

ICWater Preliminary Results
For more information:

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