



Report on the Open Water Data Initiative (OWDI)

ACWI
October 28, 2015

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Subcommittee on Spatial Water Data



OWDI as a Challenge

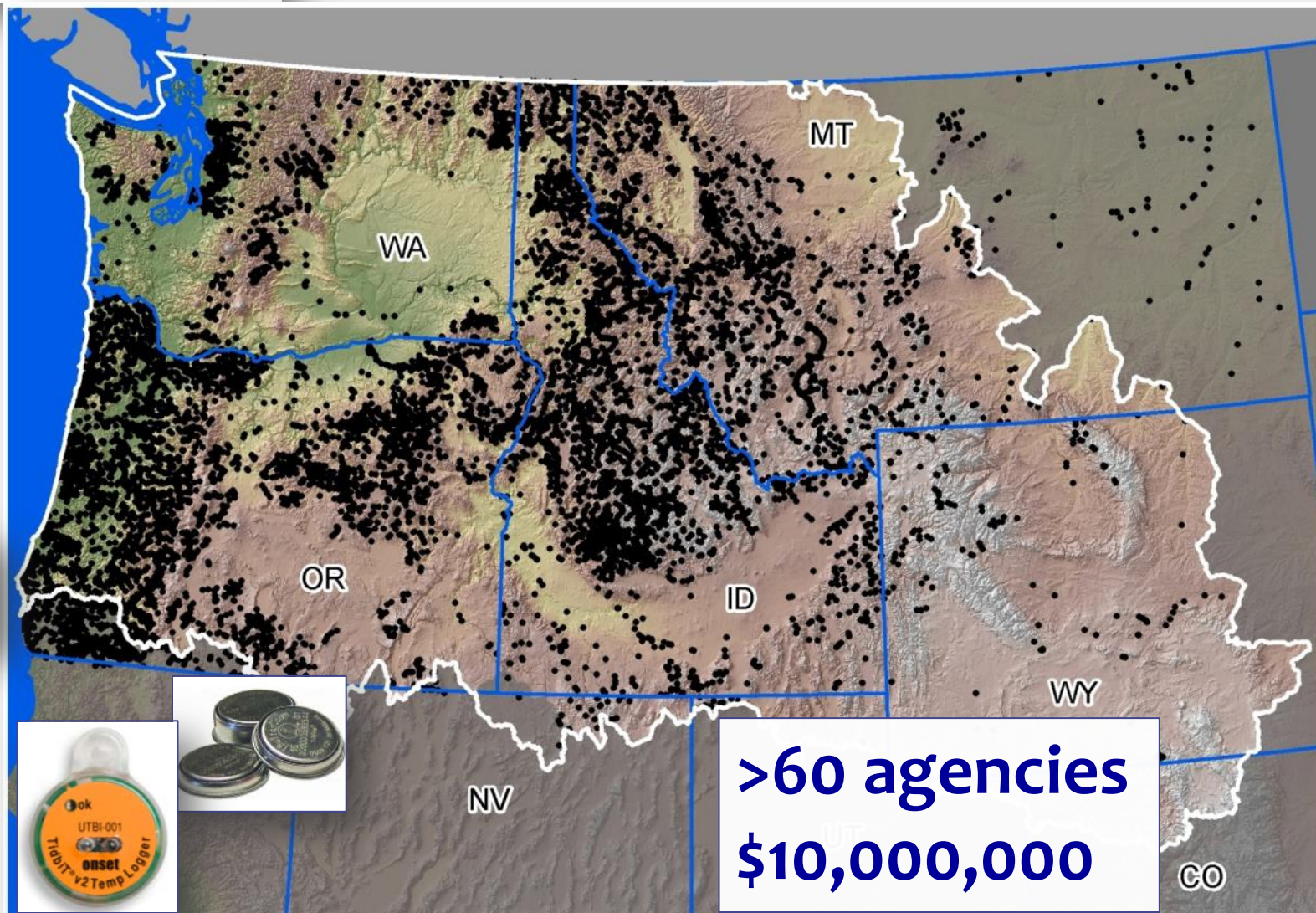
- ◆ Access to water data is difficult
 - Collected by hundreds of organizations
 - No common infrastructure
 - WaterML2 new exchange standard (O&M)
- ◆ Understanding connections requires a geospatial framework
 - Landscape to stream
 - Stream to stream



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>45,000,000 hourly records
>15,000 unique stream sites



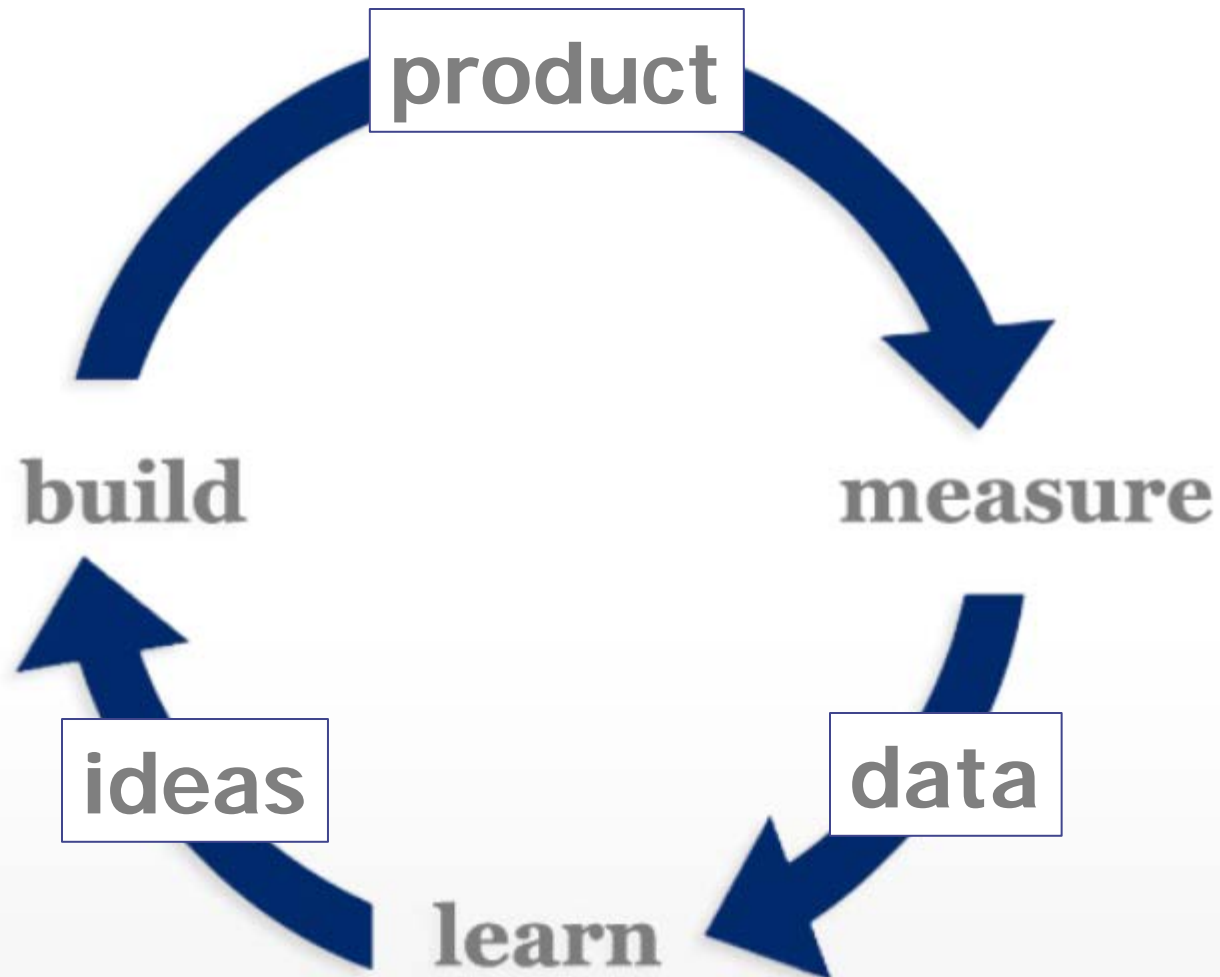
>60 agencies
\$10,000,000

Open Water Web

Water Data Catalog	Water Data as a Service	Enriching Water Data	Community for Water Data, Tools
Find Source Data	Consensus Standards	Network Routing	Marketplace for Knowledge
Create Themes	Visualization and Delivery	Coupling Models	Usage Tracking
Recruit / Engage Partners	Catalog and Serve	Geospatial Framework	Best Practices



Lean Startup Methodology



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



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OWDI Use Cases



Use Case 1:

National Flood Interoperability Experiment

- ◆ Identify flood data including stream-flow observations, forecasts and impacts
- ◆ Developing *geospatial framework* and exploring data conflation



Use Case 2:

Drought Decision Support System

- ◆ Identify water resources data including natural flow, reservoir storage and drought impacts
- ◆ Explore visualization of drought in Lower Colorado



Use Case 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



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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



Status: Water Data as a Service

- ◆ NWS forecasts and NWIS data as WML2
- ◆ Robust serving capacity is necessary
- ◆ Slow services aren't used
- ◆ Repackaged seamless NHDPlus data for download—useful variation
- Metrics of service usage needed
- Many more datasets



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Status: Enriching Water Data

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



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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/>



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Details

Add ▾

Basemap

Analysis

Save ▾

Share

Print

Directions

Measure

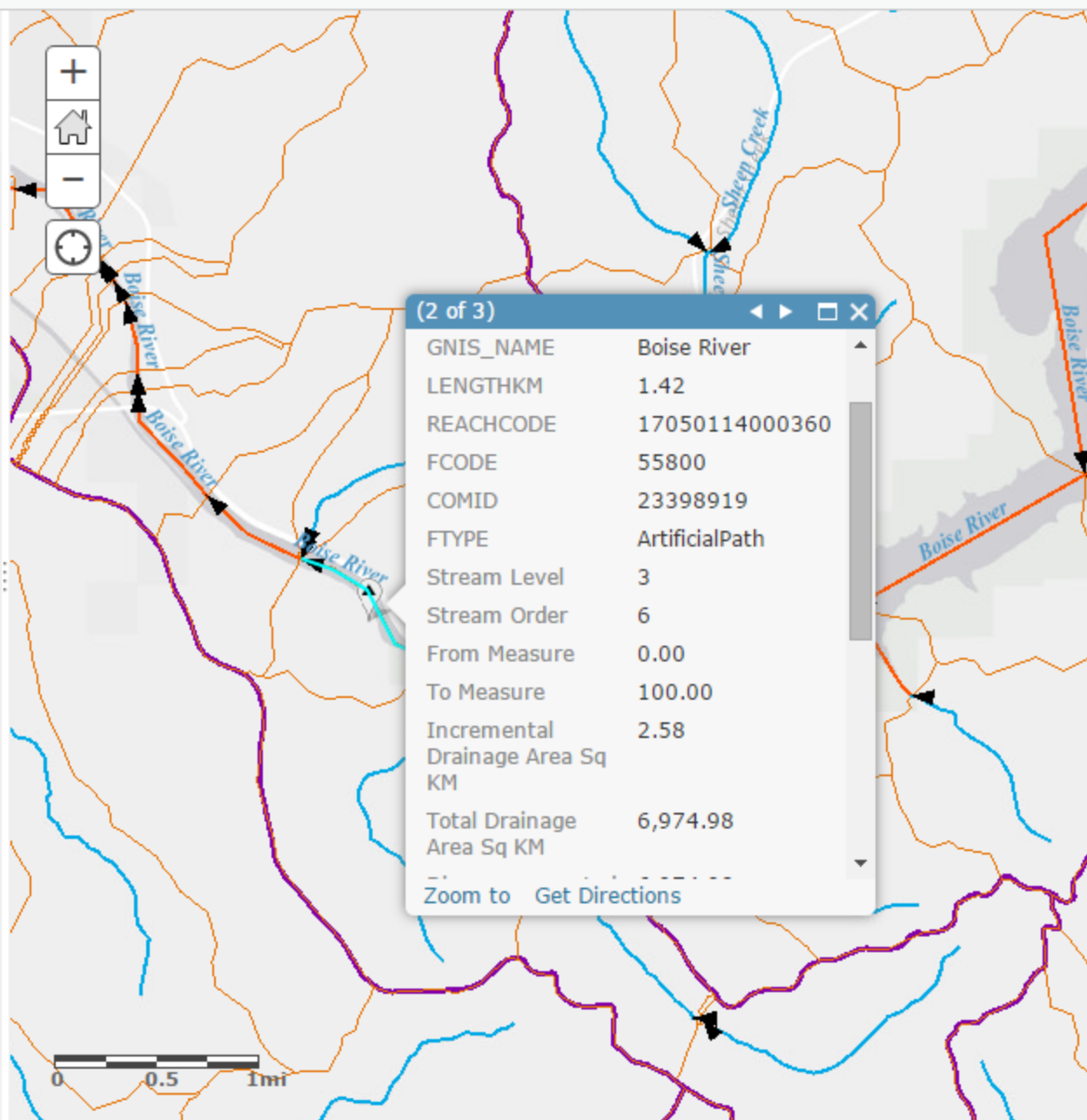
About

Content

Legend

Contents

- ▶ ☐ FEMA National Flood Hazard Layer
- ▶ ☒ Streamgages Linked to NHDPlus V2.1
- ▶ ☒ NHDPlus V2.1
 - ☒ Flow Direction
 - ☒ Network Flowline
 - ☐ Non-Network Flowline
 - ☐ Waterbody
 - ☒ NHD Point
 - ☒ NHD Line
 - ☐ NHD Area
 - ☒ Catchment
 - ☒ Subwatershed (HUC12)

 Light Gray Canvas

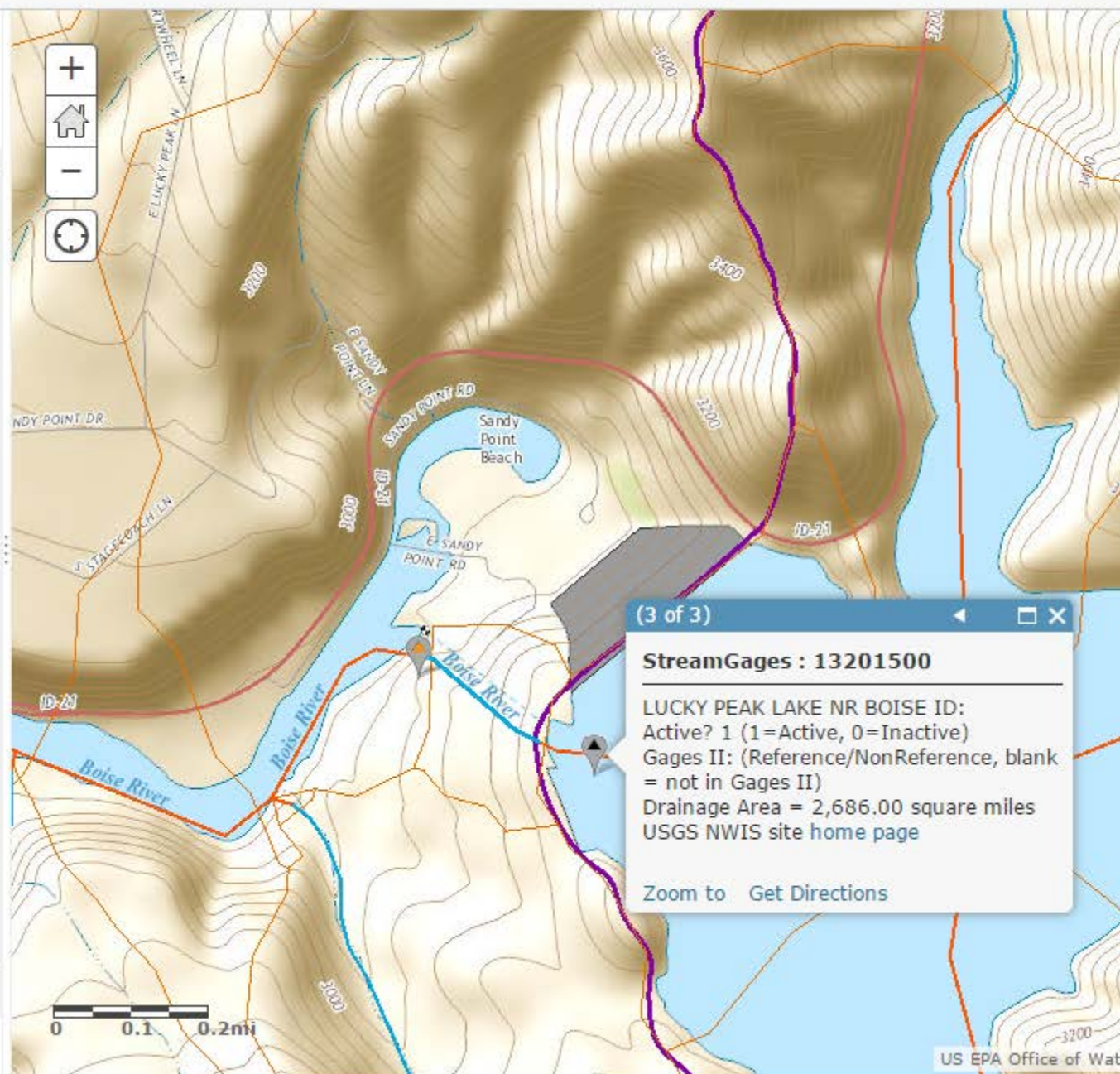
FEMA National Flood Hazard Layer

Streamgages Linked to NHDPlus V2.1

NHDPlus V2.1

☐ Flow Direction☒ Network Flowline☐ Non-Network Flowline☐ Waterbody☒ NHD Point☒ NHD Line☐ NHD Area☒ Catchment☒ Subwatershed (HUC12)

USGS National Map



- Home
- Gallery
- Scene
- Groups
- My Content
- My Organization

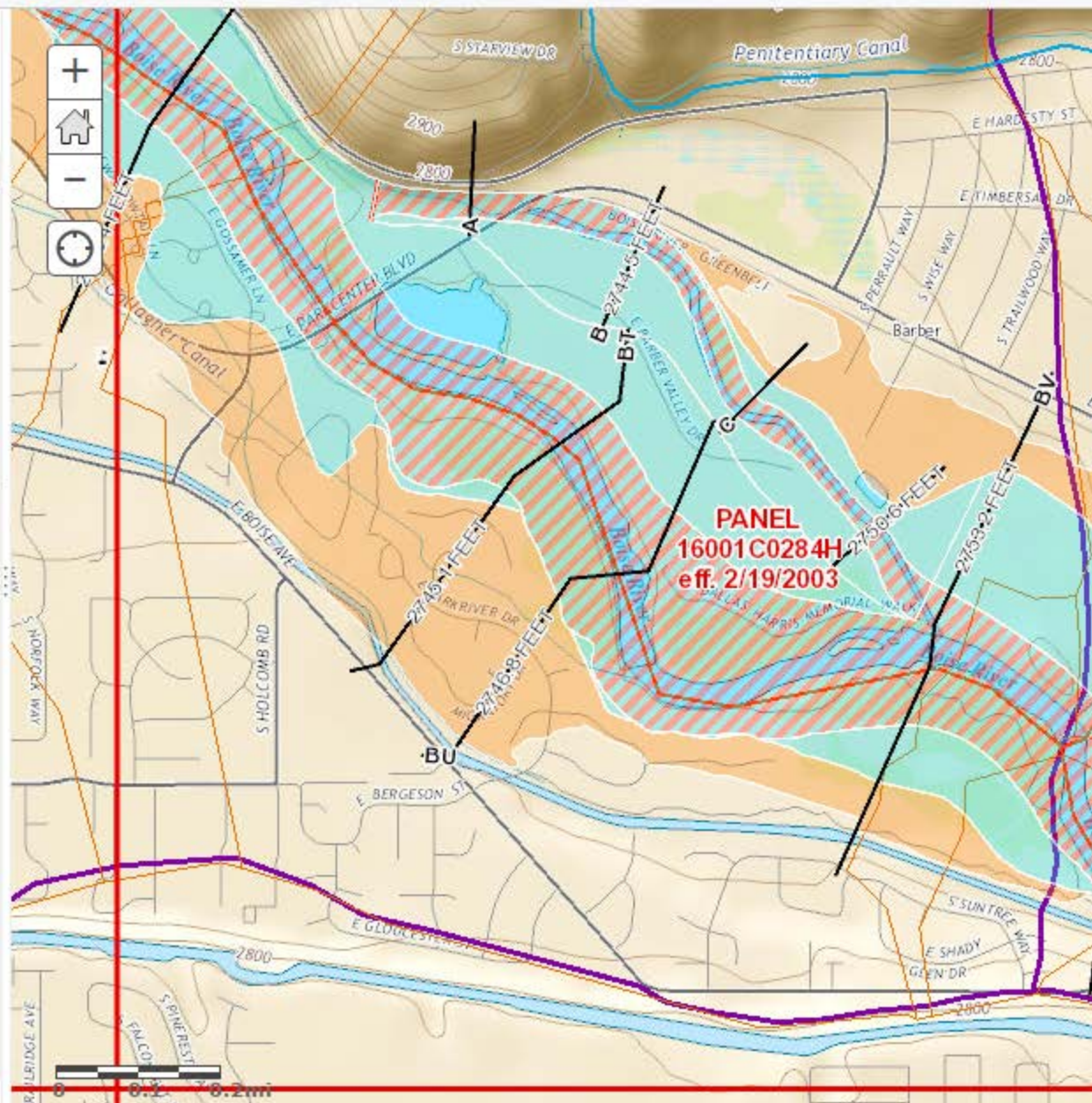
Basemap | Analysis

Save | Share | Print | Directions | Measure

Legend

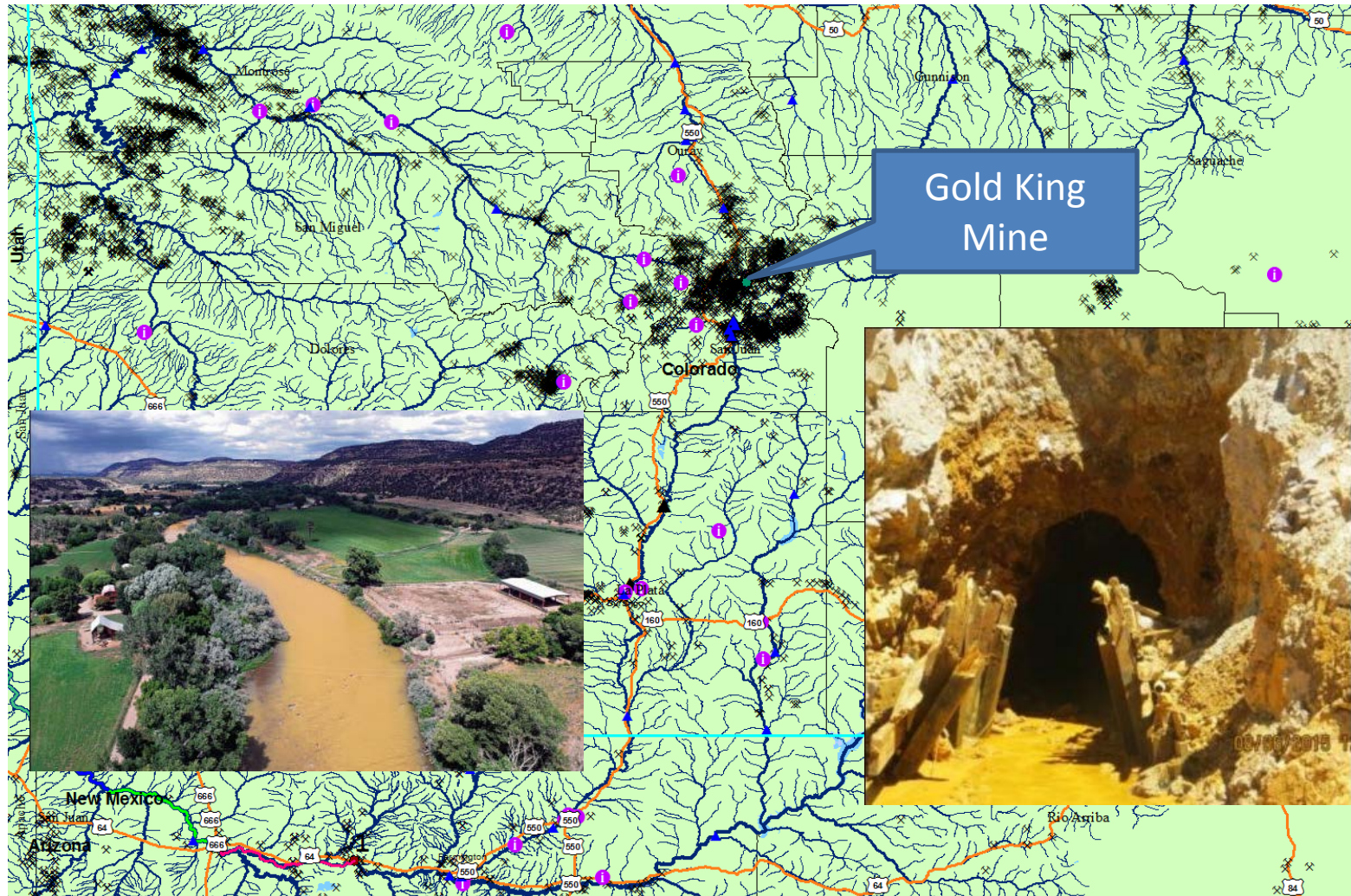
Layer

- ☐ LOMRs
- ☐ LOMAs
- ☒ FIRM Panels
 -
 -
 -
 -
 -
- ☐ Base Index
- ☐ PLSS
- ☐ Topological Low Confidence Areas
- ☐ River Mile Markers
- ☐ Datum Conversion Points
- ☐ Coastal Gages
- ☐ Gages
- ☐ Nodes



Gold King Mine Spill

ICWater Preliminary Results

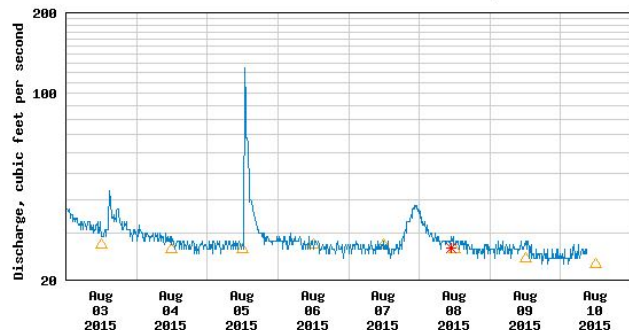


ICWater Quick Trace – 48 hours, based on flow at Cement Creek at Silverton, CO

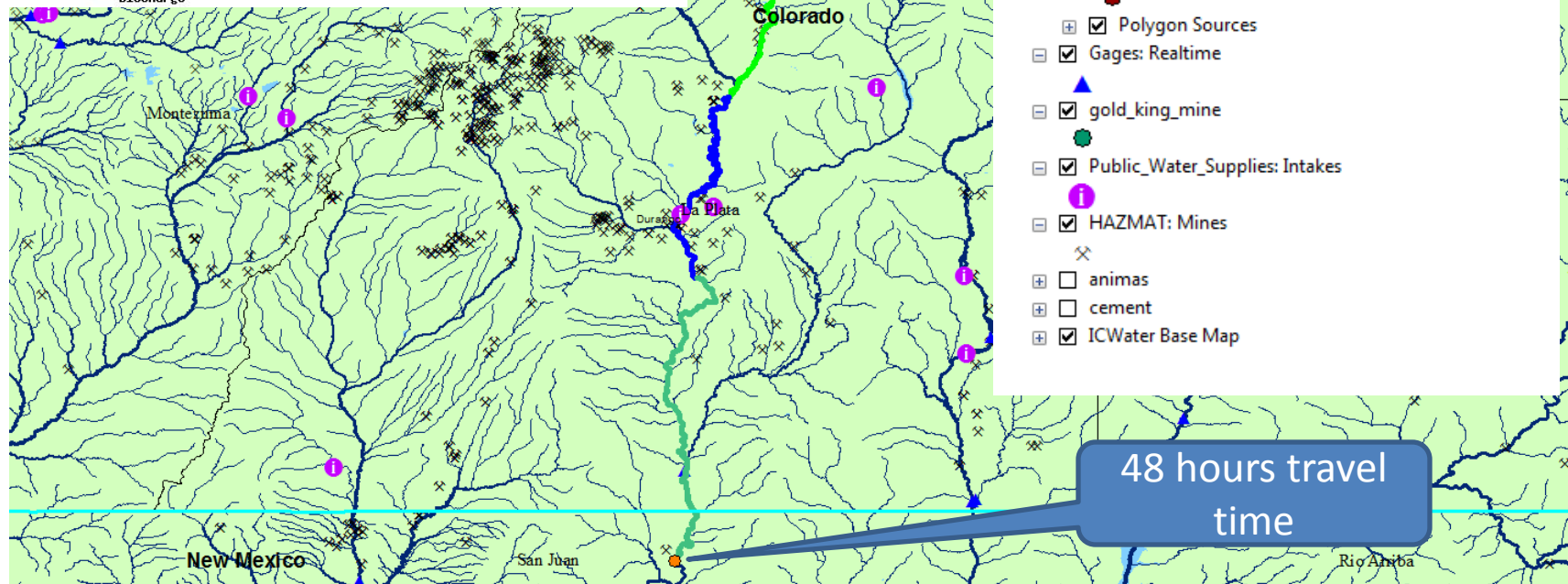
Discharge, cubic feet per second

Most recent instantaneous value: 26 08-10-2015 09:00 MDT

USGS 09350550 CEMENT CREEK AT SILVERTON, CO



△ Median daily statistic (22 years) * Measured discharge
— Discharge



ICWater Preliminary Results

Downstream Quick Trace

- 8/5/2015 at 10:30 AM to 8/5/2015 at 10:30 PM
- 8/5/2015 at 10:30 PM to 8/6/2015 at 10:30 AM
- 8/6/2015 at 10:30 AM to 8/6/2015 at 10:30 PM
- 8/6/2015 at 10:30 PM to 8/7/2015 at 10:30 AM

Preliminary Results
ICWater
QuickTrace

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 12:45 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.



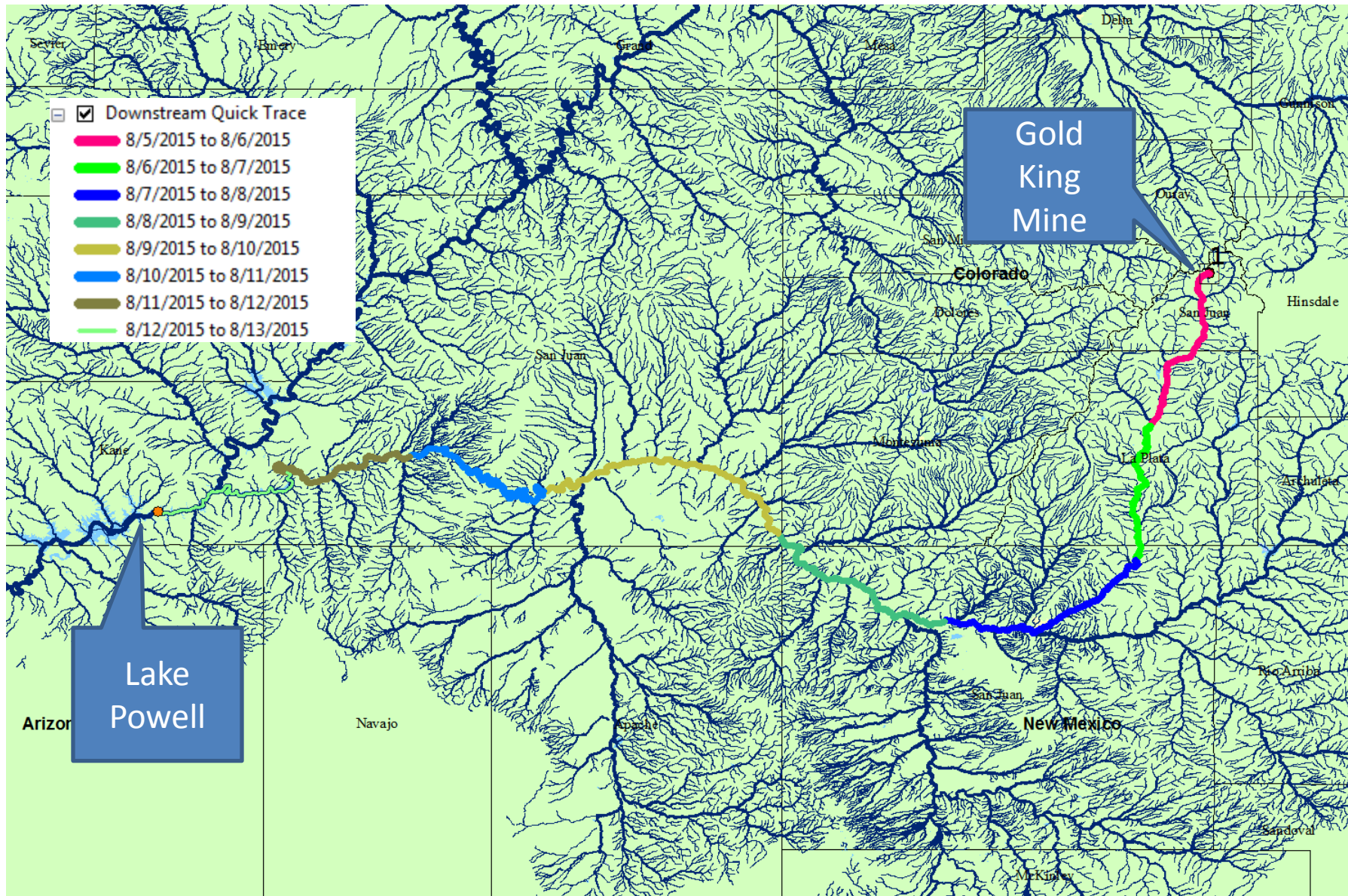
Severiano Galván, The Denver Post

(The Denver Post)

	Location	Date	Day	Time	Observed Hours	Modeled Hours (flow on 8/5, Cement Creek@Silverton)
A	Gold King Mine	8/5/2015	Wednesday	1030	0	0
B	Cement Cr/Animas River	8/5/2015	Wednesday	1245	2.25	5.7
C	Tall Timbers Depot	8/5/2015	Wednesday	2400	13.5	16.1
D	Bakers Bridge	8/6/2015	Thursday	530	19	21.1
E	Glider Park	8/6/2015	Thursday	1330	27	26.7
F	Durango	8/6/2015	Thursday	2000	33.5	33.4
G	Estimated Time to NM Border	8/7/2015	Friday	500	42.5	45.8

ICWater Preliminary Results

ICWater QuickTrace – 8 day travel time



ICWater Preliminary Results

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