National Park Service
U.S. Department of the Interior

Yellowstone Center for Resources

Surface Water Supply:
Upper Yellowstone Headwaters

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Park Hydrologist

EXPERIENCE YOUR AMERICA

NPS Mission

"... to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations." – NPS Organic Act of 1916

Grand Prismatic Spring
Photo credit: Jim Peaco, NPS

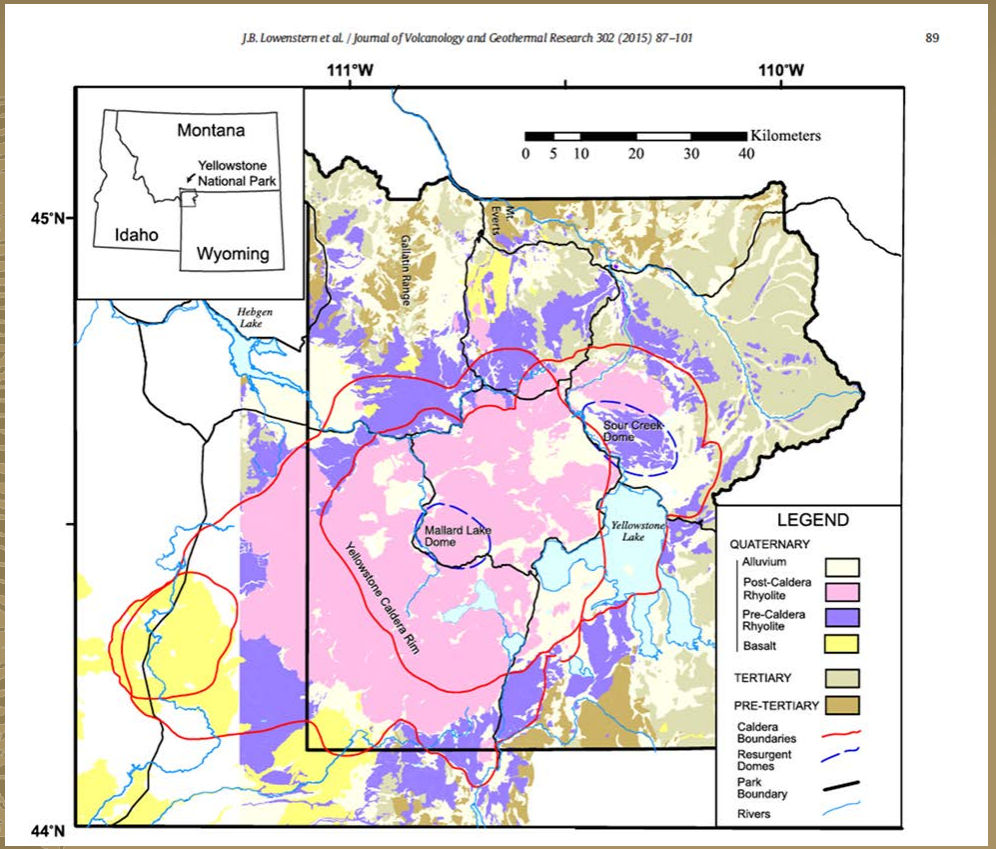
Key Questions

- How do water conditions inside Yellowstone National Park impact the Yellowstone River at Gardiner and below?
- How does NPS monitor water quality?
- What are resource management challenges?

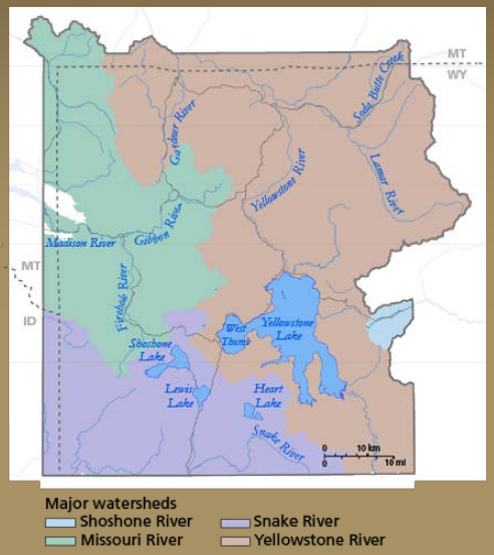
Lower Falls from Lookout Point
Photo credit: Neal Herbert, NPS

Yellowstone National Park

- First National Park ever (1872!)
- ~9000 km^2 (>2.2 million acres)
- One of the most geologically dynamic areas on Earth
- Volcano with one of the largest known calderas (75 x 45 km)
- Over half of the world's active hydrothermal features (>10,000)



GYE Headwaters of the Nation!



- Elevations between 5,282-11,358 feet (1,610-3,462 m)
- Water quality surpasses most national and state water quality standards
- Reaches Pacific Ocean, the Gulf of California, and the Gulf of Mexico

Monitoring Water Quality

- **U.S. Geological Survey (USGS) – NPS**
  - Collecting stream discharge measurements since 1889 on Yellowstone River
  - 8 active monitoring stations in YNP
- **NPS Greater Yellowstone Inventory and Monitoring Network**
  - One of 32 NPS monitoring sites nationwide
  - Baseline data published in 1994; last report 2015
- **Montana Bureau of Mines and Geology**
  - 33 sites, 19 wells, 1 piezometer, and 13 springs
- **Researchers**
  - Government agencies, universities, and NGOs
  - NEON – National Ecological Observatory Network

Rainstorm over Yellowstone Lake
Photo credit: Diane Renkin, NPS

Fecal Coliform and *E. Coli*

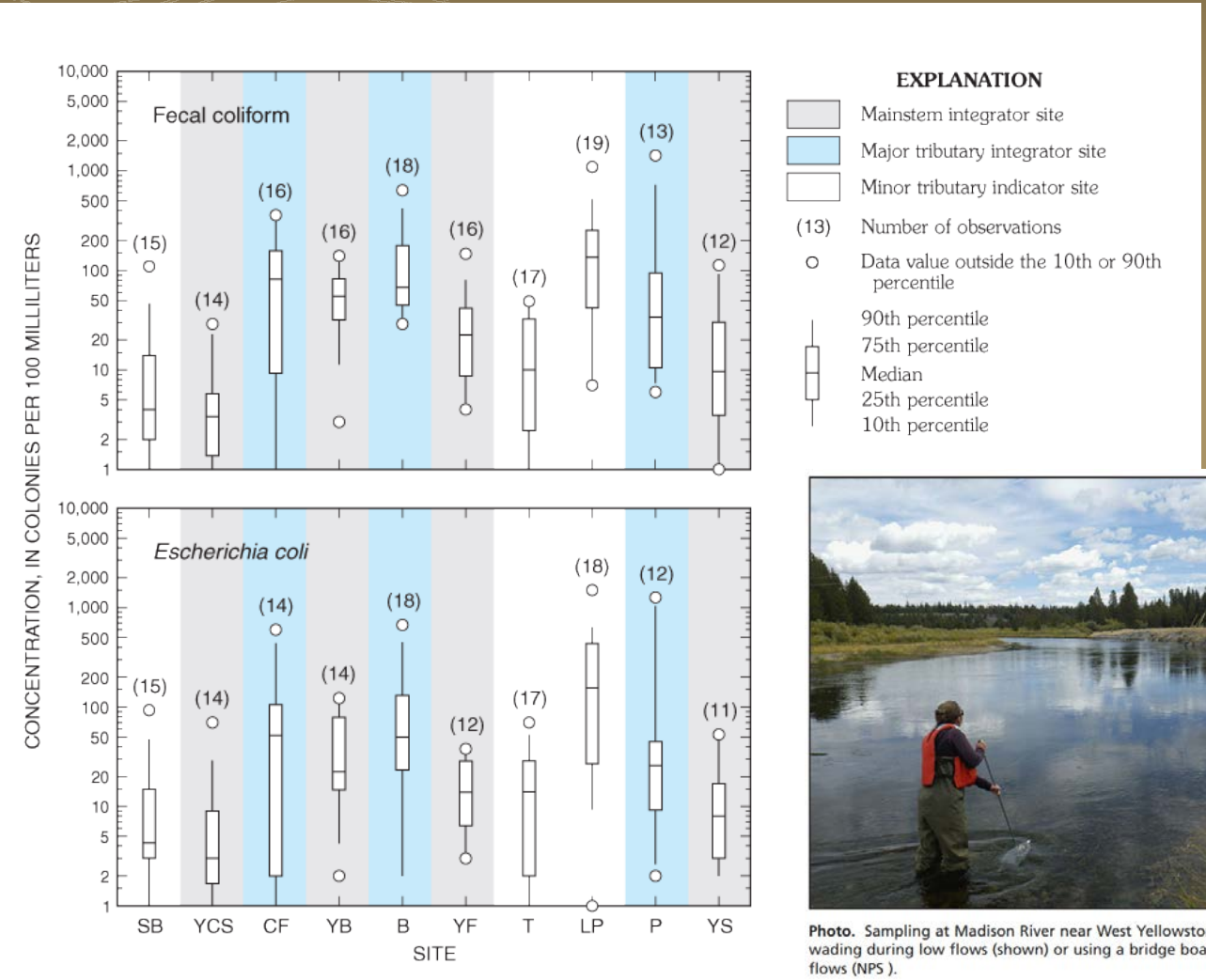
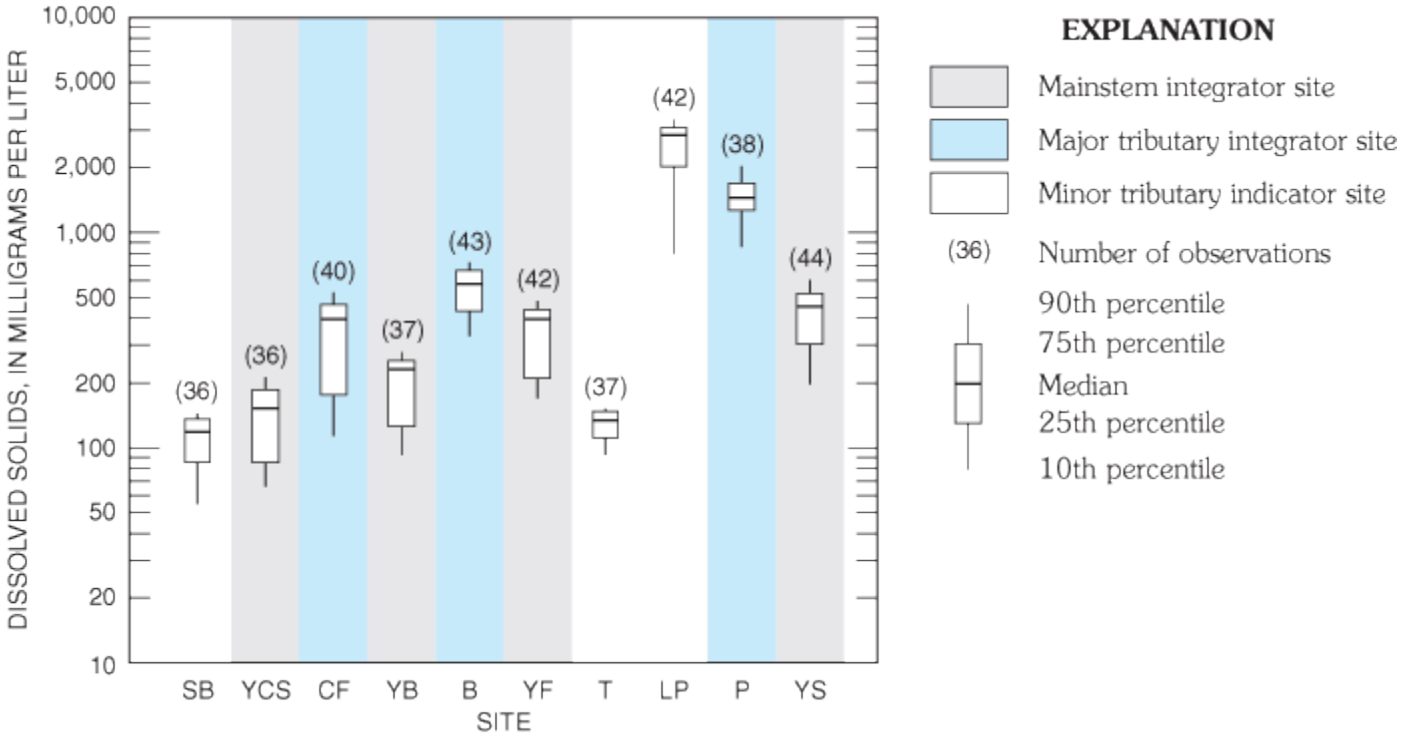


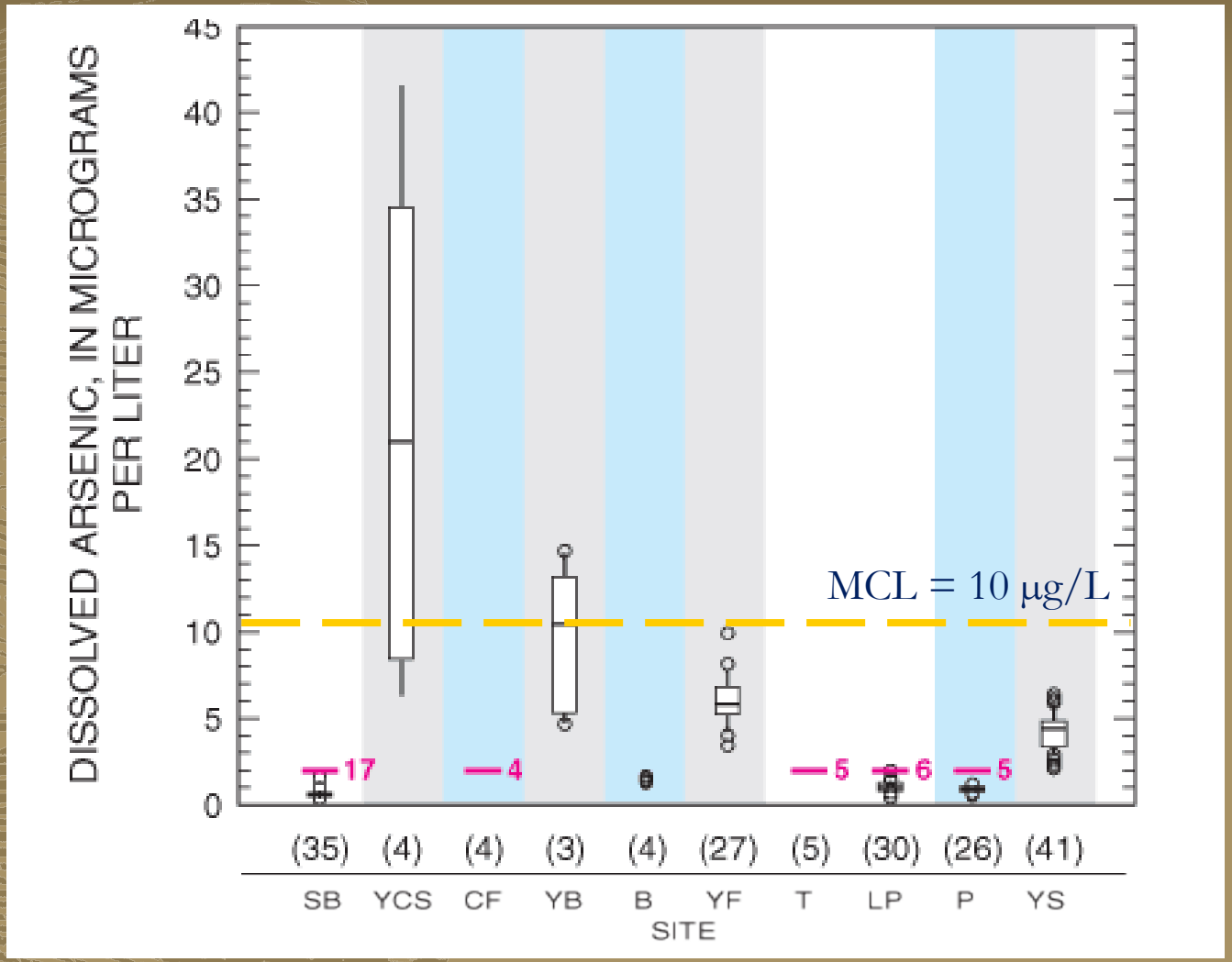
Photo. Sampling at Madison River near West Yellowstone, MT is accomplished by wading during low flows (shown) or using a bridge board and reel during high flows (NPS).

USGS Scientific Investigations Report 2004-5113

Dissolved Solids



Dissolved Arsenic (As)



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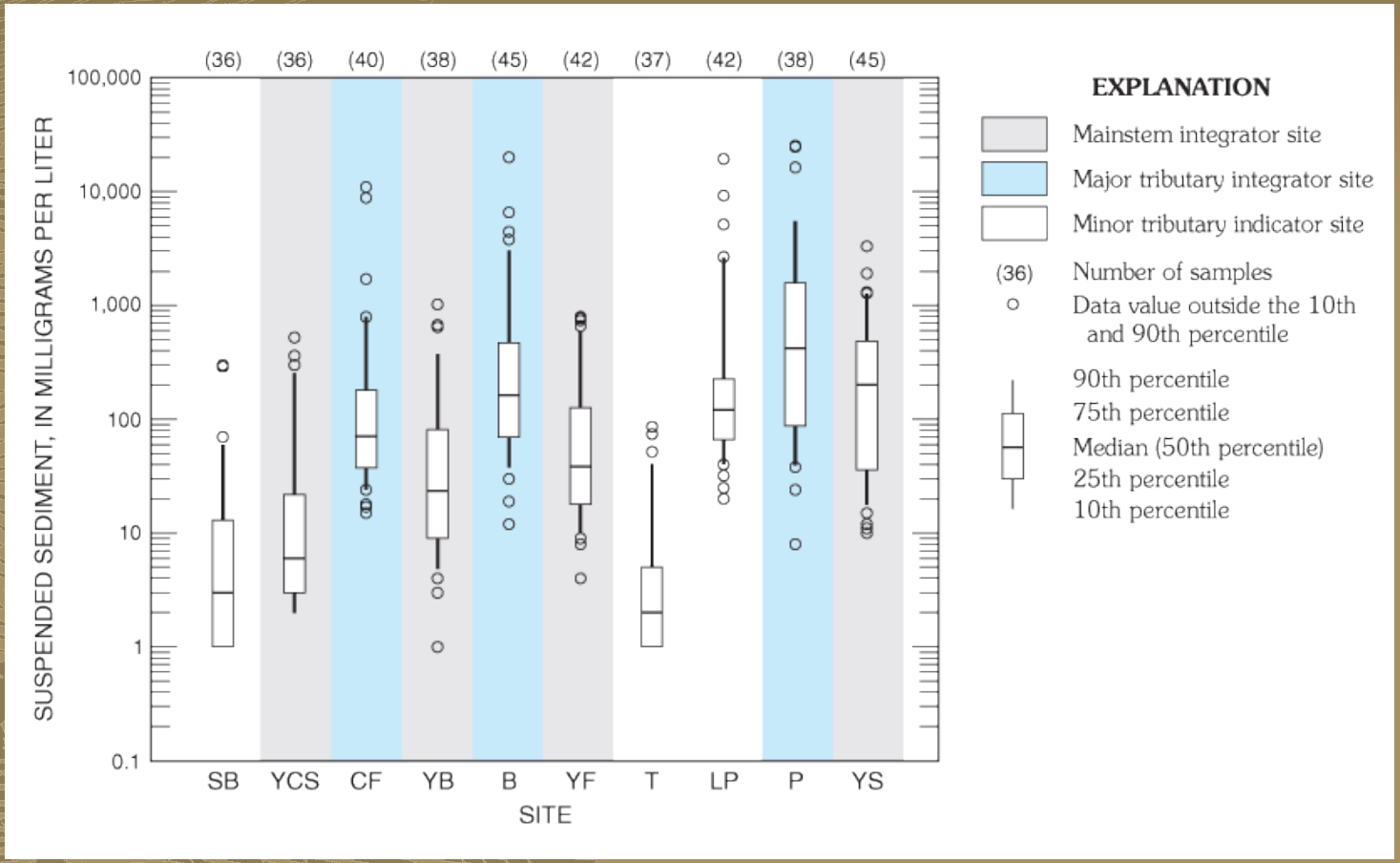
Suspended Sediment



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Other water quality factors

- Geothermal sources
- Seasonal effects that influence discharge patterns

Snowy Bison on Swan Lake Flat
Photo credit: Neal Herbert, NPS

Resource Management Challenges

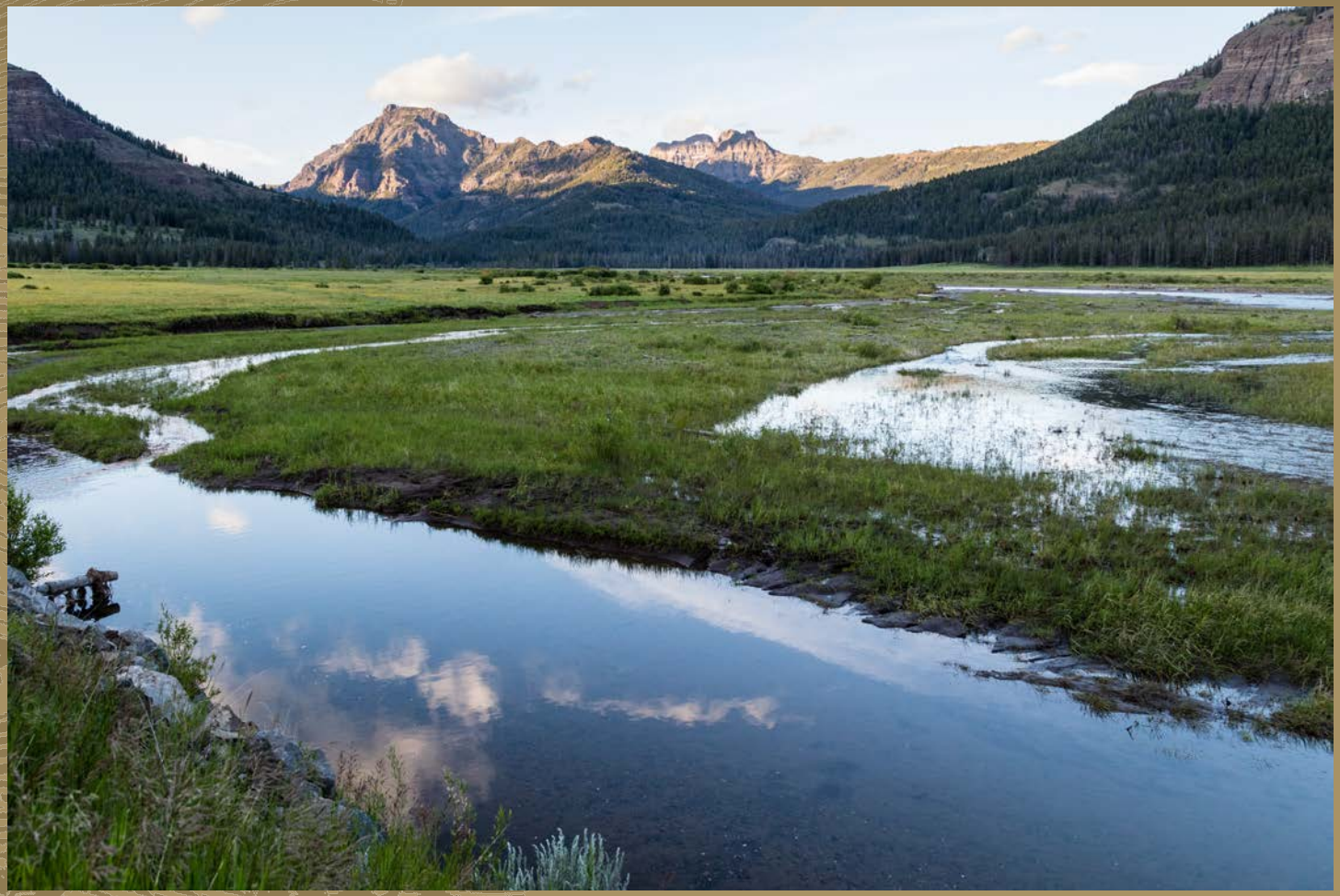
- Water availability: Water rights
- Water quality: 303(d) Impaired waters
- Data needs: Climate, flows

Reese Creek – Upper Diversion

Issue: Water Availability

Soda Butte Creek

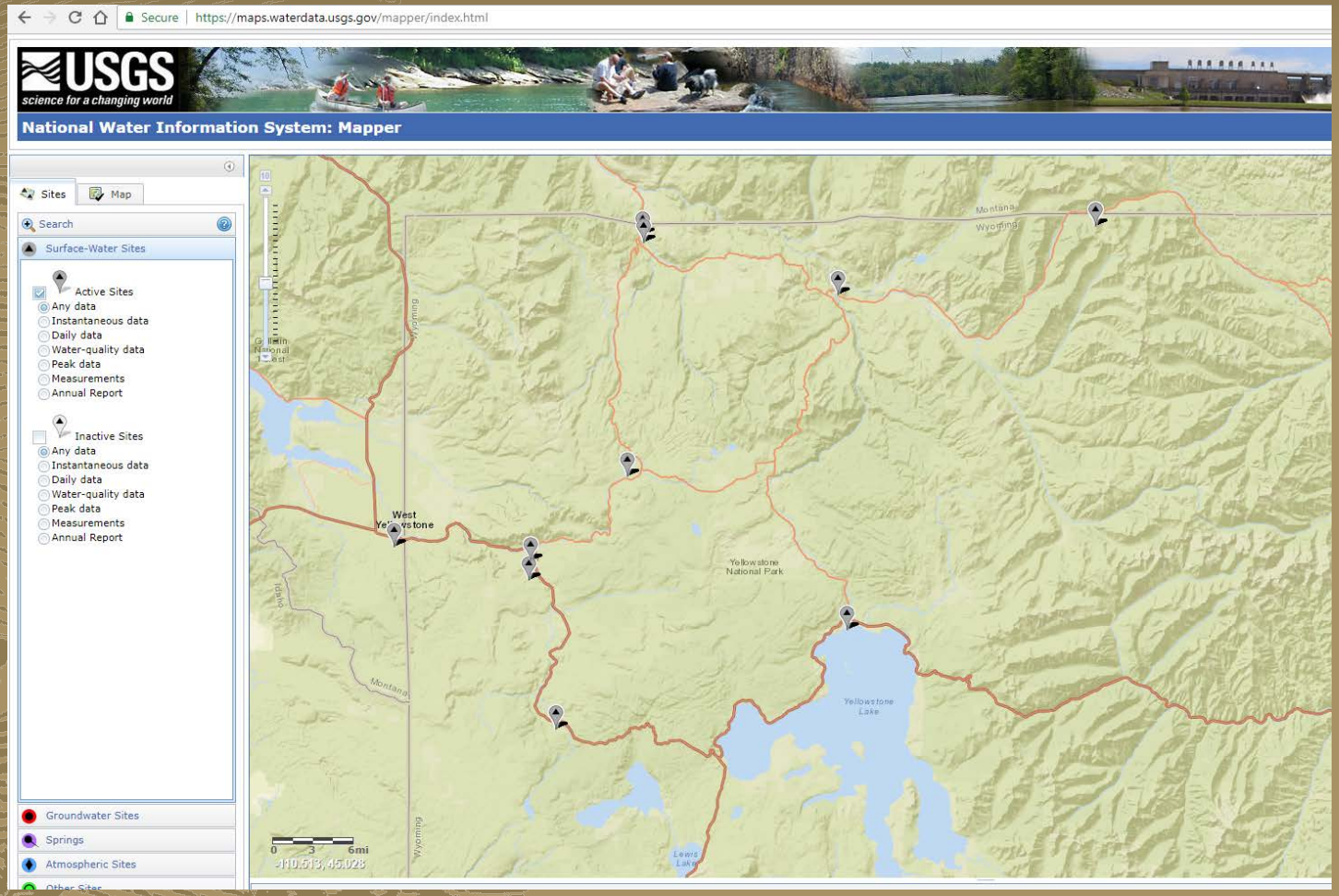
Issue: Water Quality



Below Confluence of Pebble and Soda Butte Creeks
Photo credit: Jacob W. Frank, NPS

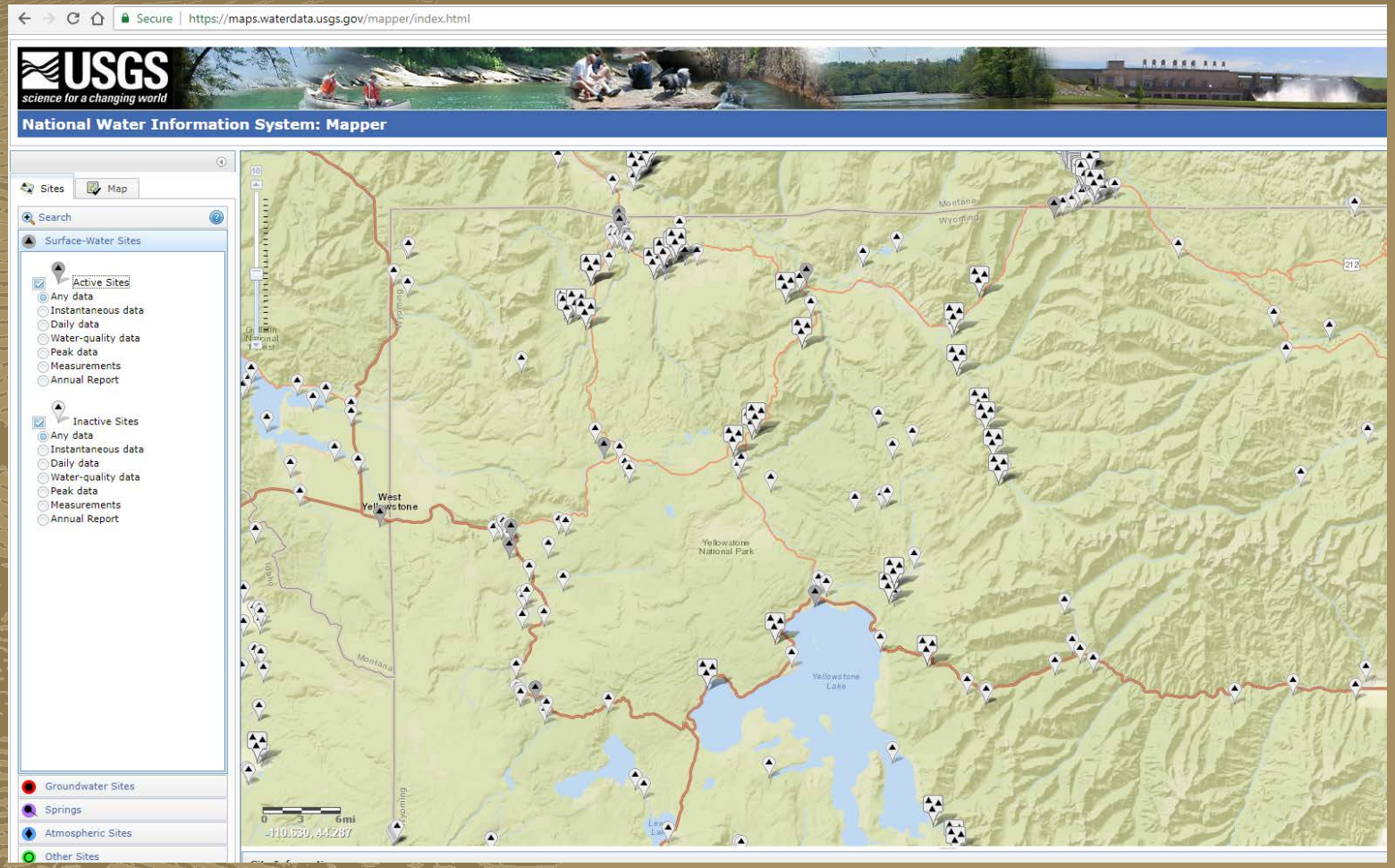
USGS-NWIS Active Surface Water Monitoring Sites

Issue: Data Availability



USGS-NWIS Inactive Surface Water Monitoring Sites

Issue: Data Availability



Data and Additional Resources

- https://www.nps.gov/im/gryn
- https://waterdata.usgs.gov/nwis
- https://volcanoes.usgs.gov/volcanoes/yellowstone
- https://www.nps.gov/yell/learn/nature/water.htm

SE Arm of Yellowstone Lake
Photo credit: Neal Herbert, NPS

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