

USGS Protocols for the Operation of Continuous Water-Quality Monitors

National Water Quality
Monitoring Council
Portland, Oregon

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May 2, 2012

Key Issues

- Potential data errors
- Protocols and Guidelines
- Data comparability
- Data release and quality assurance

Potential Data Errors

- Fouling
- Calibration drift

Standard Protocol

1. Initial reading: “dirty” **
2. After-cleaning reading: “clean” **
3. Calibration check
4. Recalibration (if necessary)
5. Final reading **

**with side-by-side field meter readings

Fouling on sonde





SPRAY
Chemically
5 YEAR

Fouling on PVC



Clean sonde



Variations of the Standard Protocol

- Steady-state protocol
- Protocol for rapidly-changing conditions
- Hybrid protocol(s)



DANGER
PROPERTY OF USGS
NO CLIMBING
NO SWIMMING

WATER QUALITY AND
WEATHER MONITORING STATION
THIS STATION IS A PROPERTY OF THE U.S. GOVERNMENT
AND IS NOT TO BE USED FOR ANY OTHER PURPOSE
WITHOUT THE WRITTEN PERMISSION OF THE U.S. GEOLOGICAL SURVEY
WARNING
U.S. GOVERNMENT PROPERTY
NO TRESPASSING

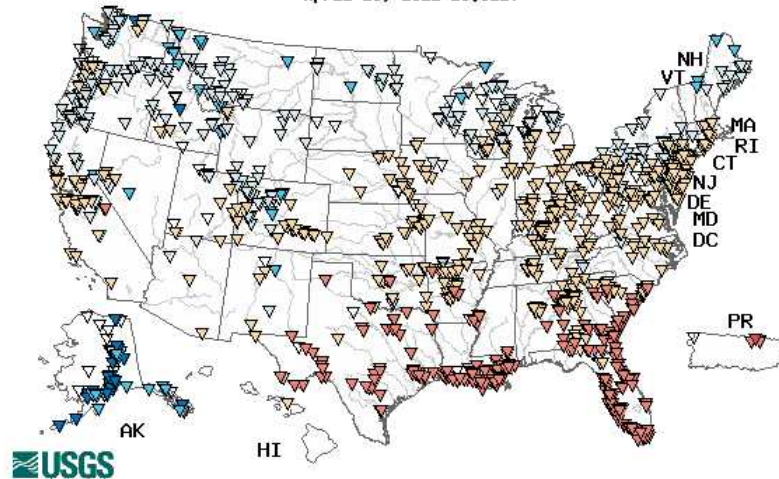
Data Comparability



WaterQualityWatch -- Continuous Real-Time Water Quality of Surface Water in the United States

Real-Time Water Temperature, in °C

April 10, 2012 13:32ET



Explanation							
<1	1-4.9	5-9.9	10-19.9	20-29.9	30-35	>35	No Data

- Temp
- Cond
- pH
- D.O.
- Turb
- Nitrate
- Disch

* Site operated on a seasonal basis or currently is not operating.
No values are available for the last 6 hours.

The "Real-time" map tracks short-term changes (over several hours) of water quality. Although the general appearance of the map changes very little from one hour to the next, individual sites may change rapidly in response to major rain events or to reservoir releases. The data used to produce this map are [provisional](#).

Animate national map by current [Month](#), or [last 12 months](#)

[About USGS WaterQualityWatch](#)

Current RTWQ Maps

State:

Measurement:

[Google Map of all USGS Real-Time Water Data](#)

RTWQ FAQ

- [What is the USGS?](#)
- [What is continuous RTWQ?](#)
- [How are sites selected?](#)
- [Why continuous and real time?](#)
- [How are these data used?](#)
- [What are these measurements?](#)
- [How are monitors maintained?](#)
- [What is a surrogate?](#)

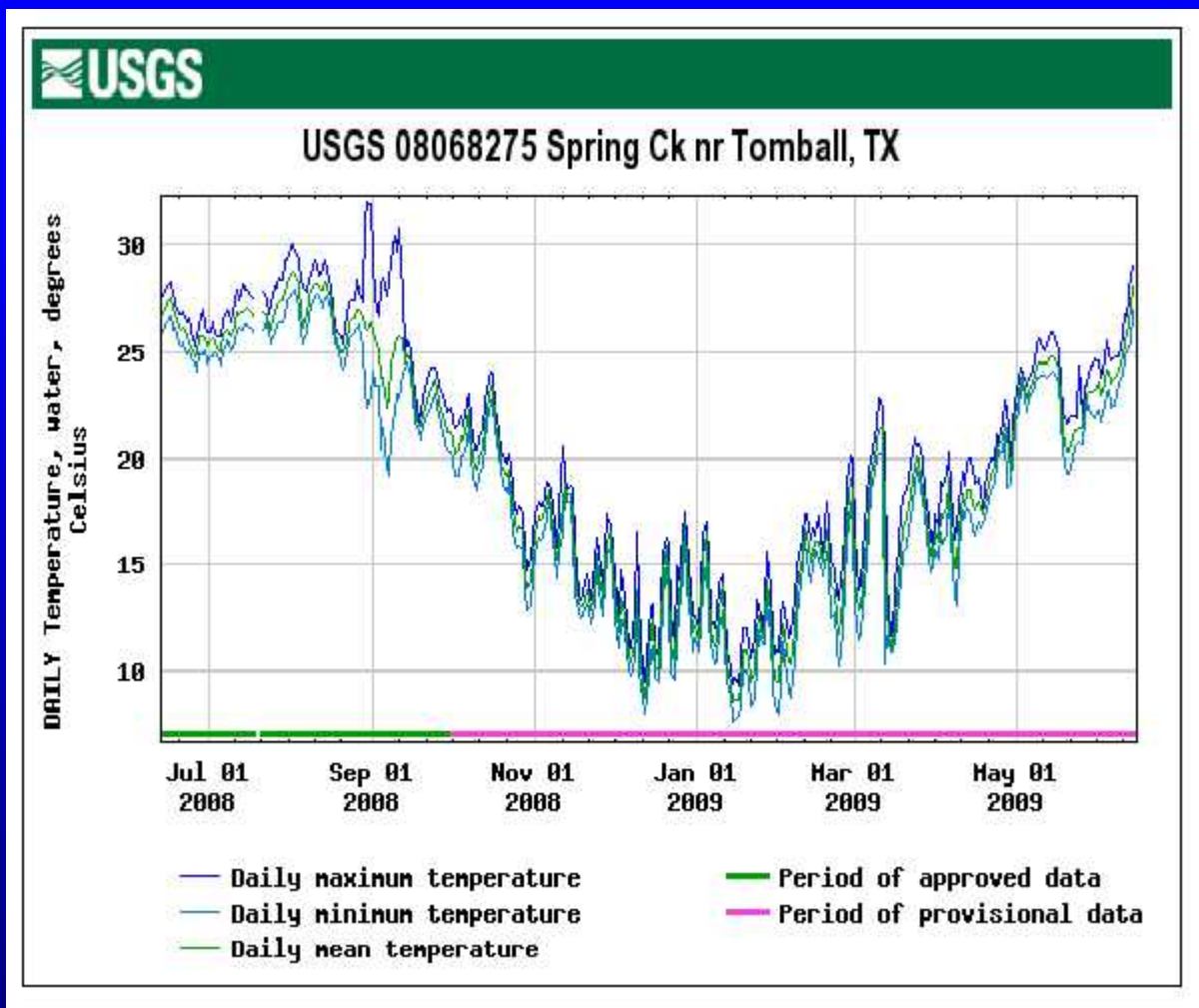
Example of Sites Displaying Surrogates

- [California](#)
- [Colorado](#)
- [Georgia](#)
- [Kansas](#)
- [Maryland](#)
- [Montana](#)
- [North Dakota](#)
- [Ohio](#)
- [South Dakota](#)
- [Wyoming](#)

Examples of Surrogates Methods and Reports

- [National](#)
- [California](#)
- [Colorado](#)
- [Florida](#)
- [Georgia](#)
- [Kansas](#)
- [Louisiana](#)

Daily Values



Rating Continuous Water-Quality Data

- ❑ Assessment of accuracy
- ❑ Amount of data recorded and assessment of instrument performance
 - ✓ Excellent
 - ✓ Good
 - ✓ Fair
 - ✓ Poor

USGS Techniques and Methods

- **Book 1, Section D3**
- **<http://pubs.usgs.gov/tm/2006/tm1D3/>**

USGS National Field Manual

<http://water.usgs.gov/owq/FieldManual/>