Water Quality Monitors Have Improved!

Evaluation of Real-Time Water-Quality Monitoring in the Little Arkansas River Basin 1998-2009

Trudy Bennett
US Geological Survey
Kansas Water Science Center

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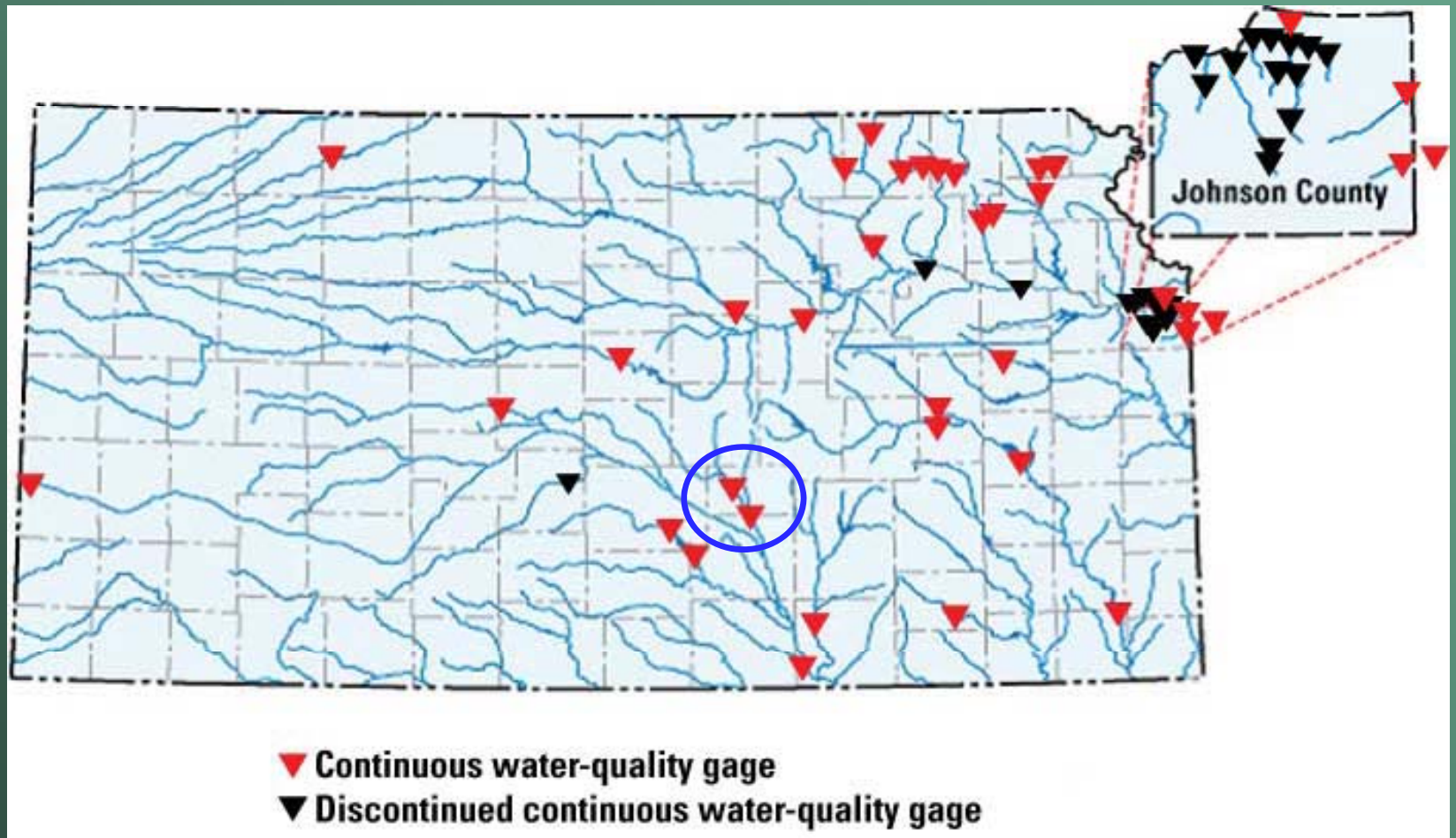
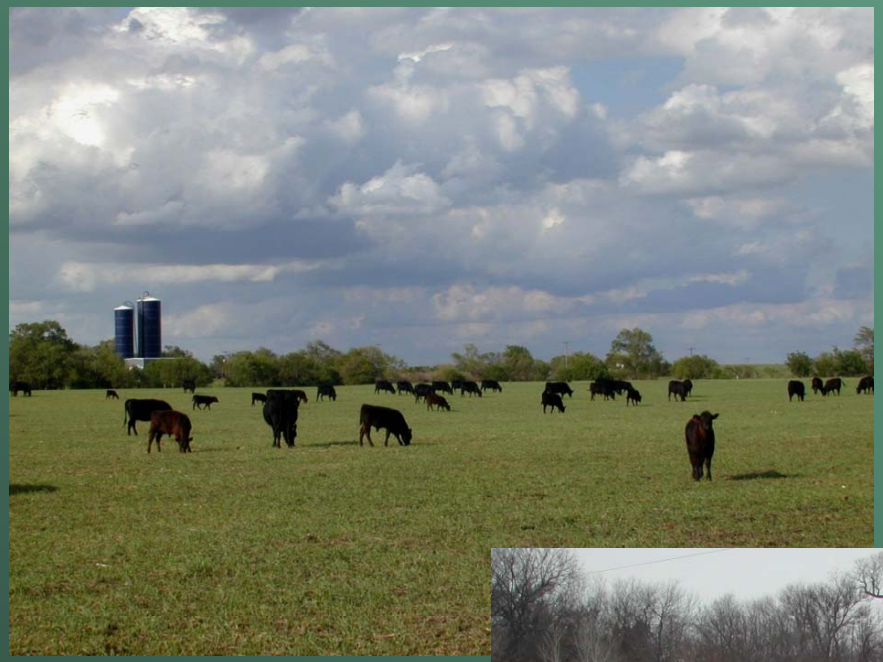
Little Arkansas River near Sedgwick, KS and at Hwy50 near Halstead, KS



http://nrtwq.usgs.gov/ks/

Little Arkansas River Basin



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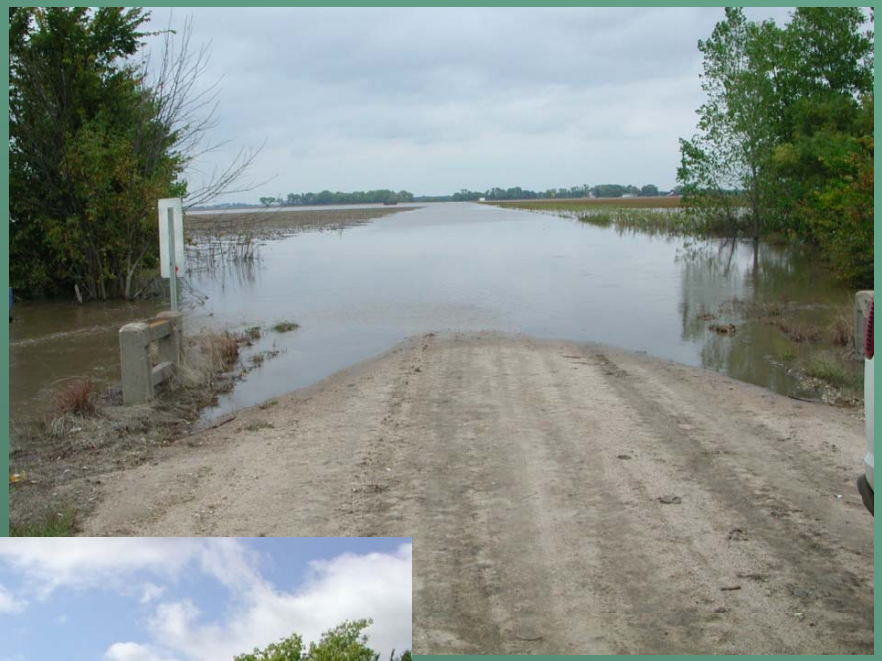
Little Arkansas River Basin



Real-time water-quality monitoring in the Little Arkansas River Basin

✓Little Arkansas River near Sedgwick, KS
✓Little Arkansas River at Hwy50 near Halstead, KS

- Began April and May 1998, respectively
- Water temperature, specific conductance, pH, dissolved oxygen with Clark cell sensor
- Turbidity added Oct. 15, 1998

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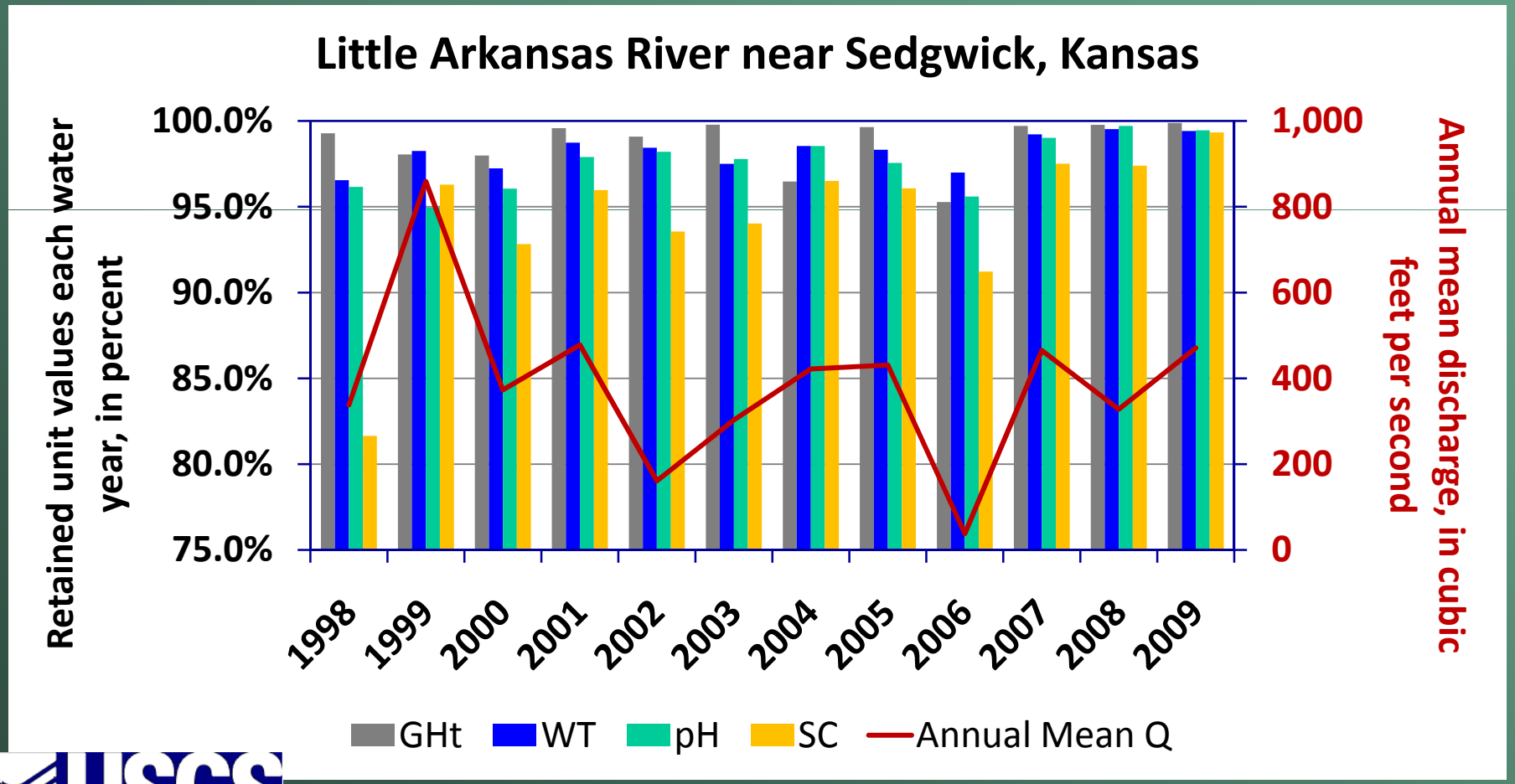
Real-time water-quality monitoring began with bank installations when stream banks had sufficient water depth and flow

Bank installations changed to bridge suspension because sensors got buried in mud or insufficient depth and flow near stream banks

Bridge suspension dramatically increased retained data ('98-'99) for conductivity sensor at Sedgwick site



Downside of bridge suspension, monitors getting caught in debris flow

Historical site visits

- ✓Routine cleaning visits, 2-4 week intervals
- ✓Routine calibration checks, 4-6 week intervals
- ✓Non-routine visits - problems viewed on NWIS web
  - In sand or out of water
  - Excessive fouling (DO, SC, and turbidity)
  - Calibration failure (DO)
  - Sensor problems (DO and turbidity)
  - Monitor problems
  - DCP problems

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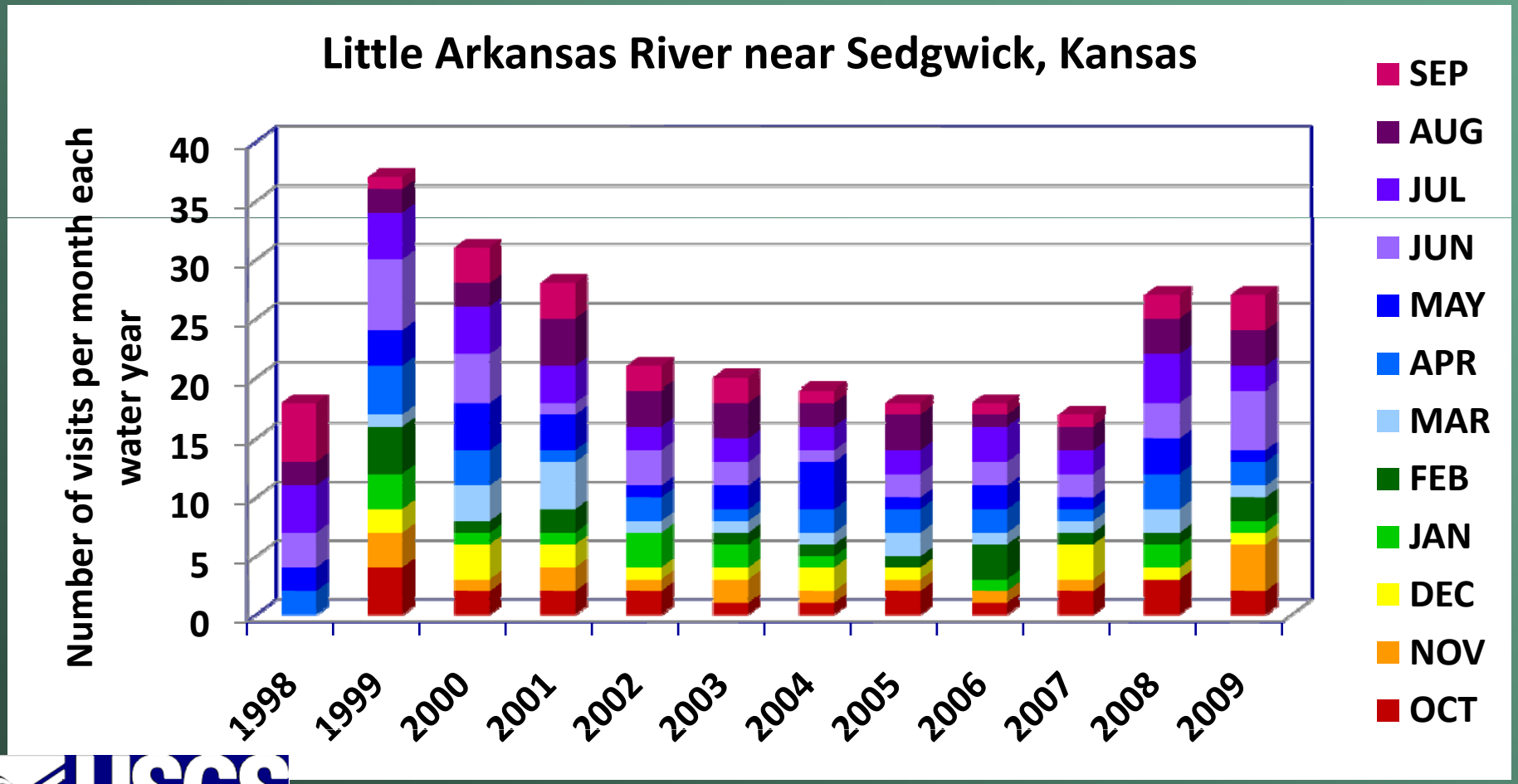
Site visits more frequent during spring and summer months due to increased bio-fouling, storm runoff, and low flow



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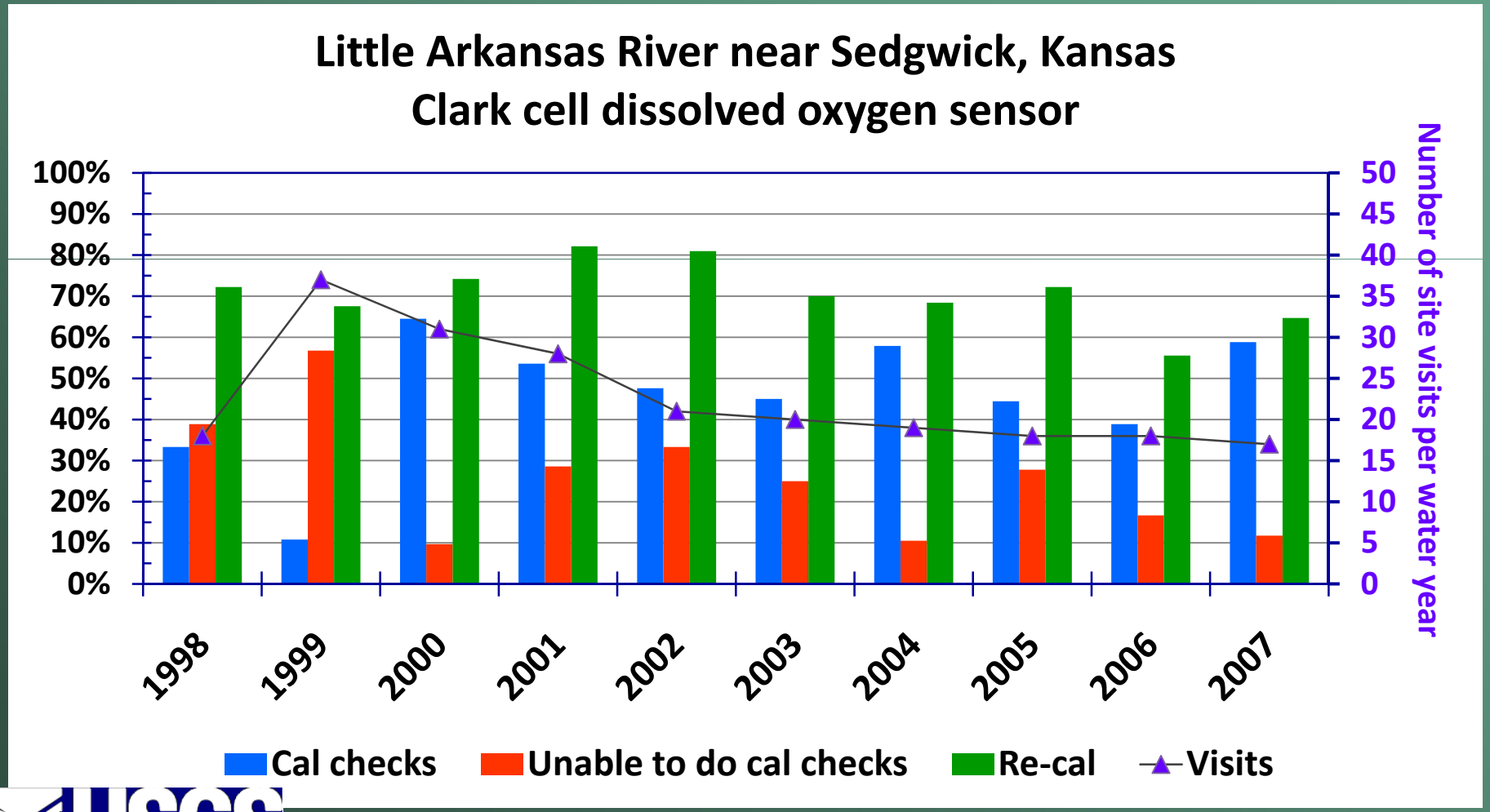
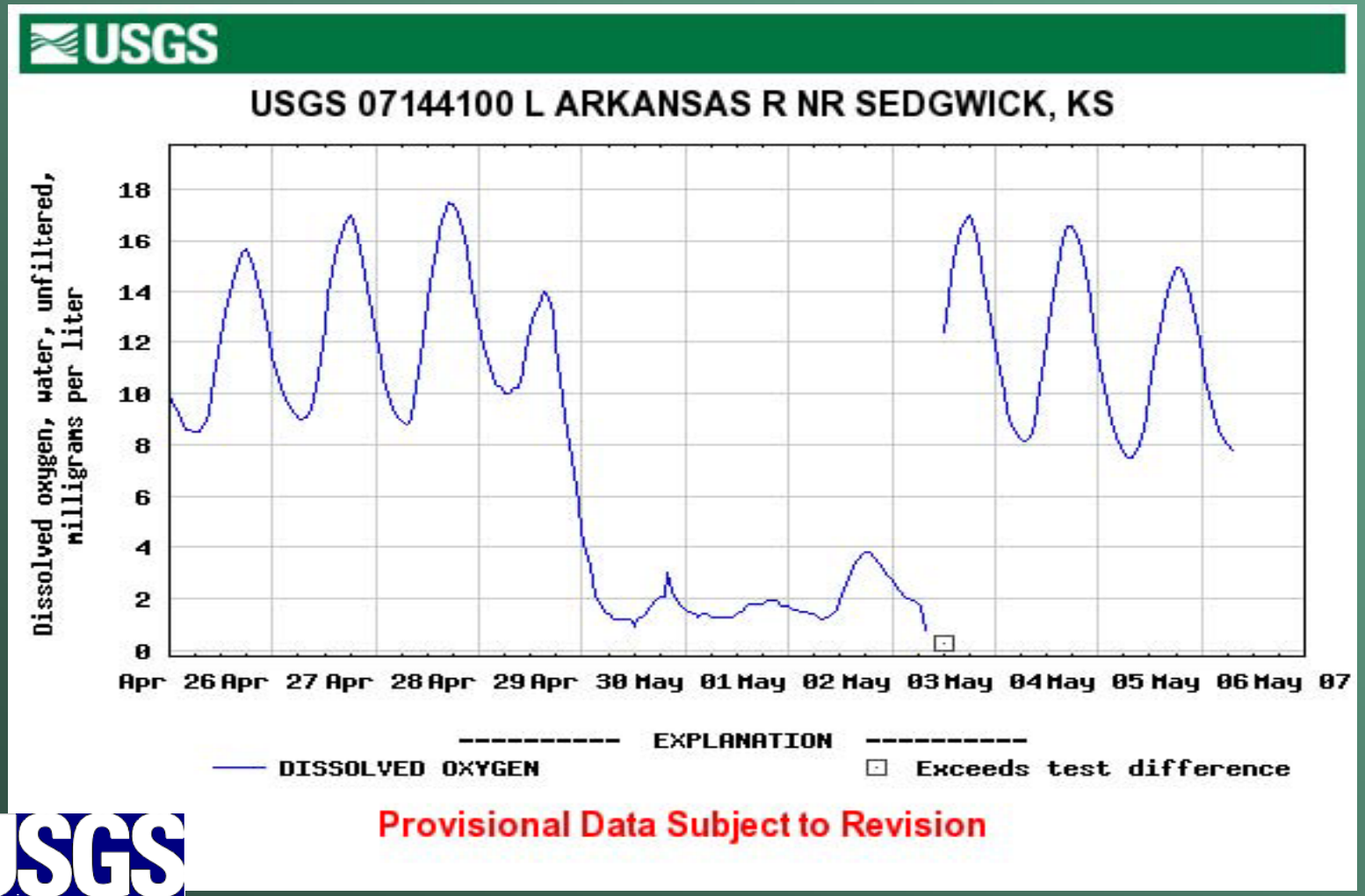
Problems with Clark cell dissolved oxygen sensor contributed to many site visits ('98-'07)



Many problems associated with Clark cell dissolved oxygen sensor involved sensor losing calibration



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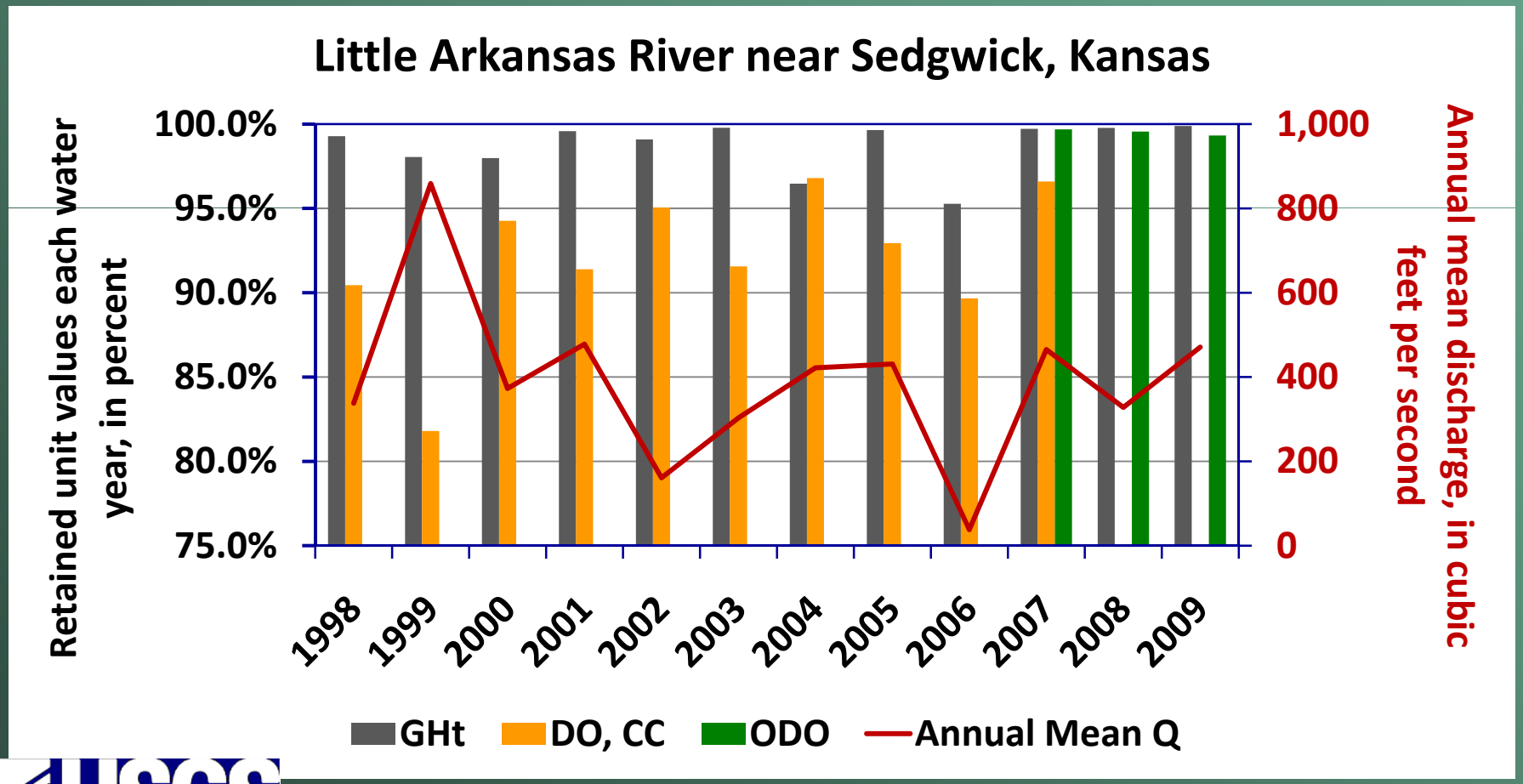
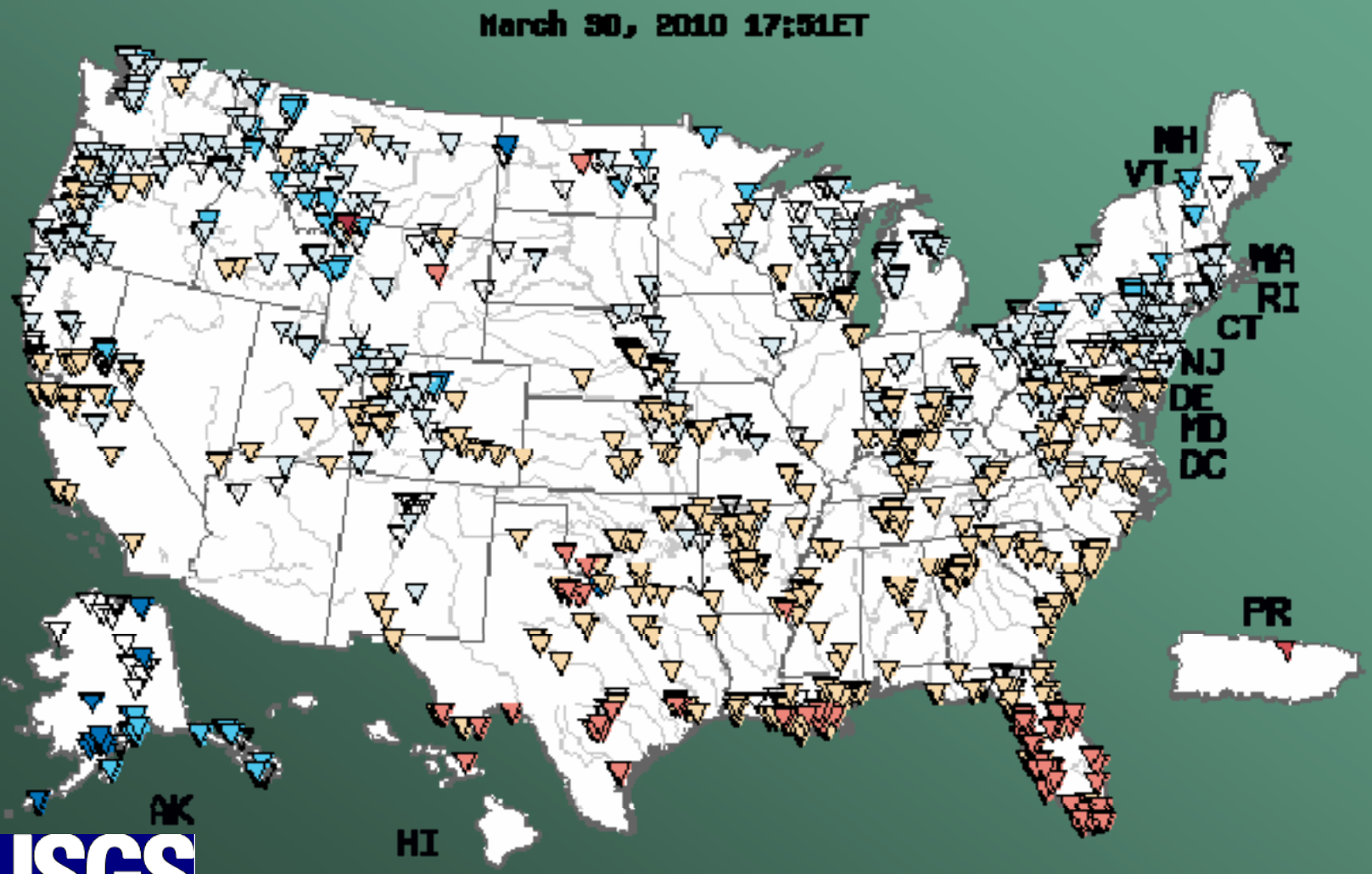
Retained data for dissolved oxygen at Sedgwick site - with less field effort, optical DO sensor is a HUGE improvement

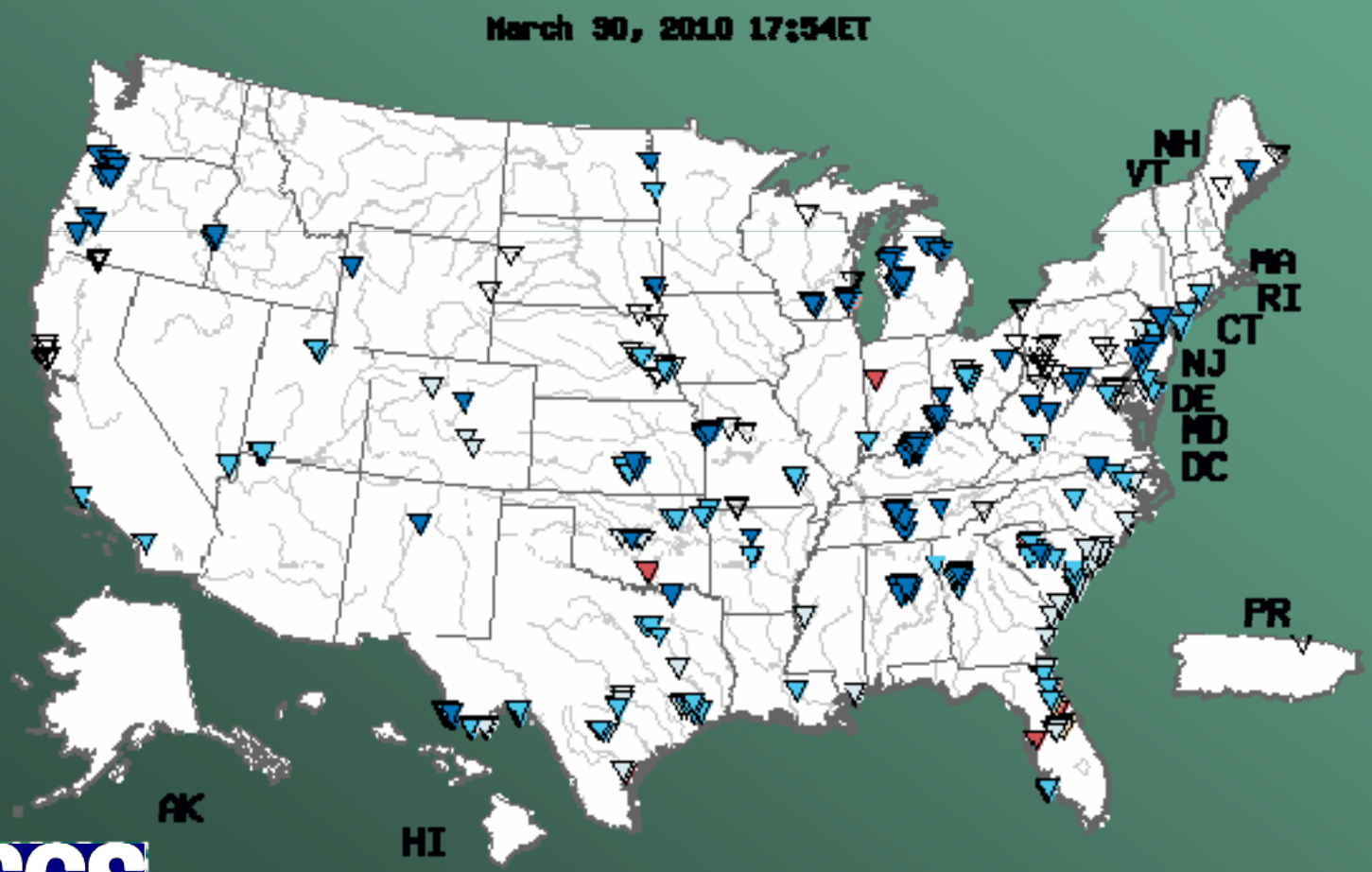


Water temperature monitored at lots of sites (although we need more) (1724 sites)



http://waterwatch.usgs.gov/wqwatc

Historically and today dissolved oxygen not monitored very much (394 sites)



http://waterwatch.usgs.gov/wqwatc

Current site visits

- ✓Less routine cleaning visits
  - Before storm (if able)
  - After event runoff
  - In the area
- ✓Routine calibration checks, 2-3 months intervals
- ✓Non-routine visits - problems viewed on NWIS web
  - In sand or out of water (SC and turbidity)
  - Excessive fouling (SC and turbidity)
  - Calibration failure
  - Sensor problems
  - Monitor problems
  - DCP problems

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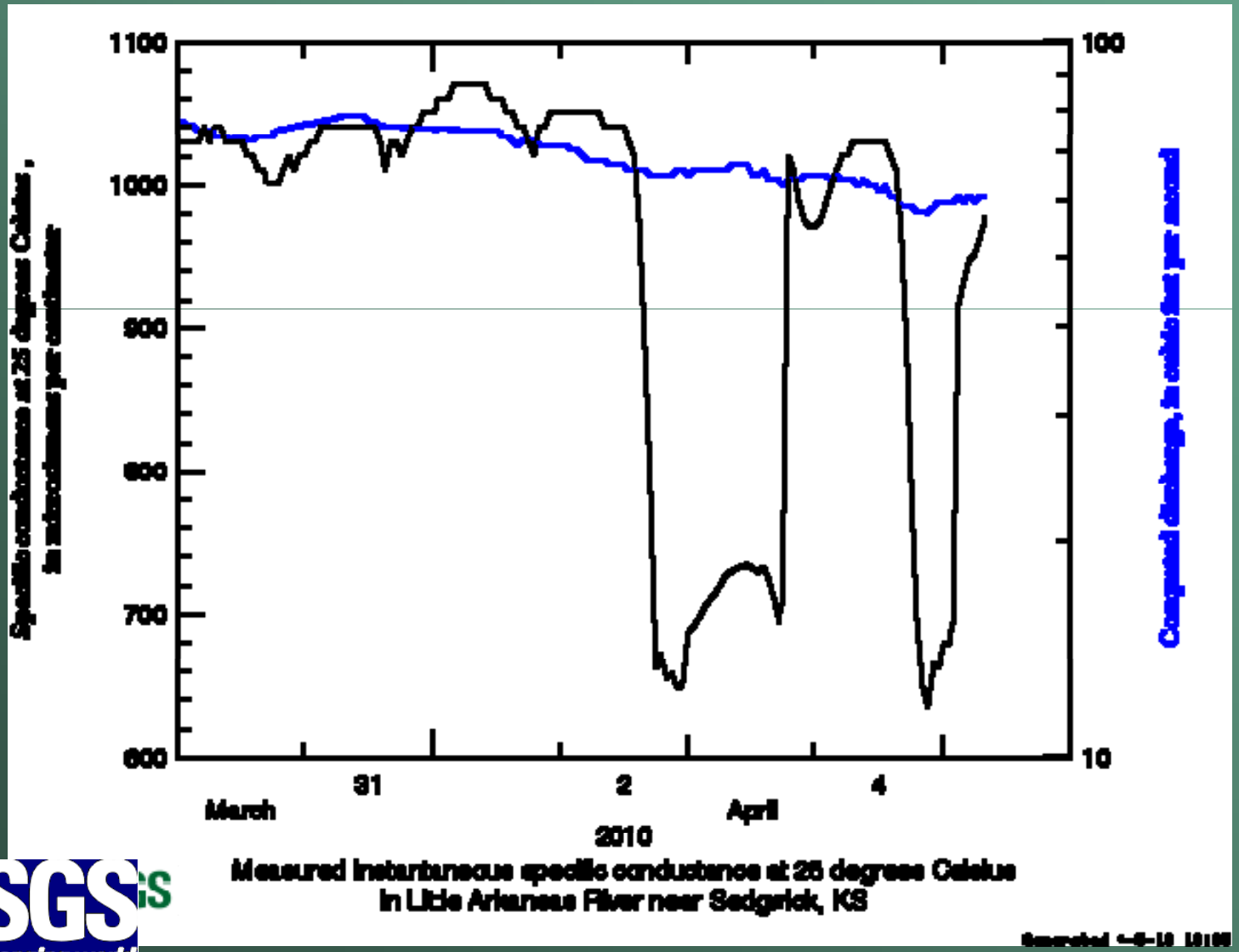
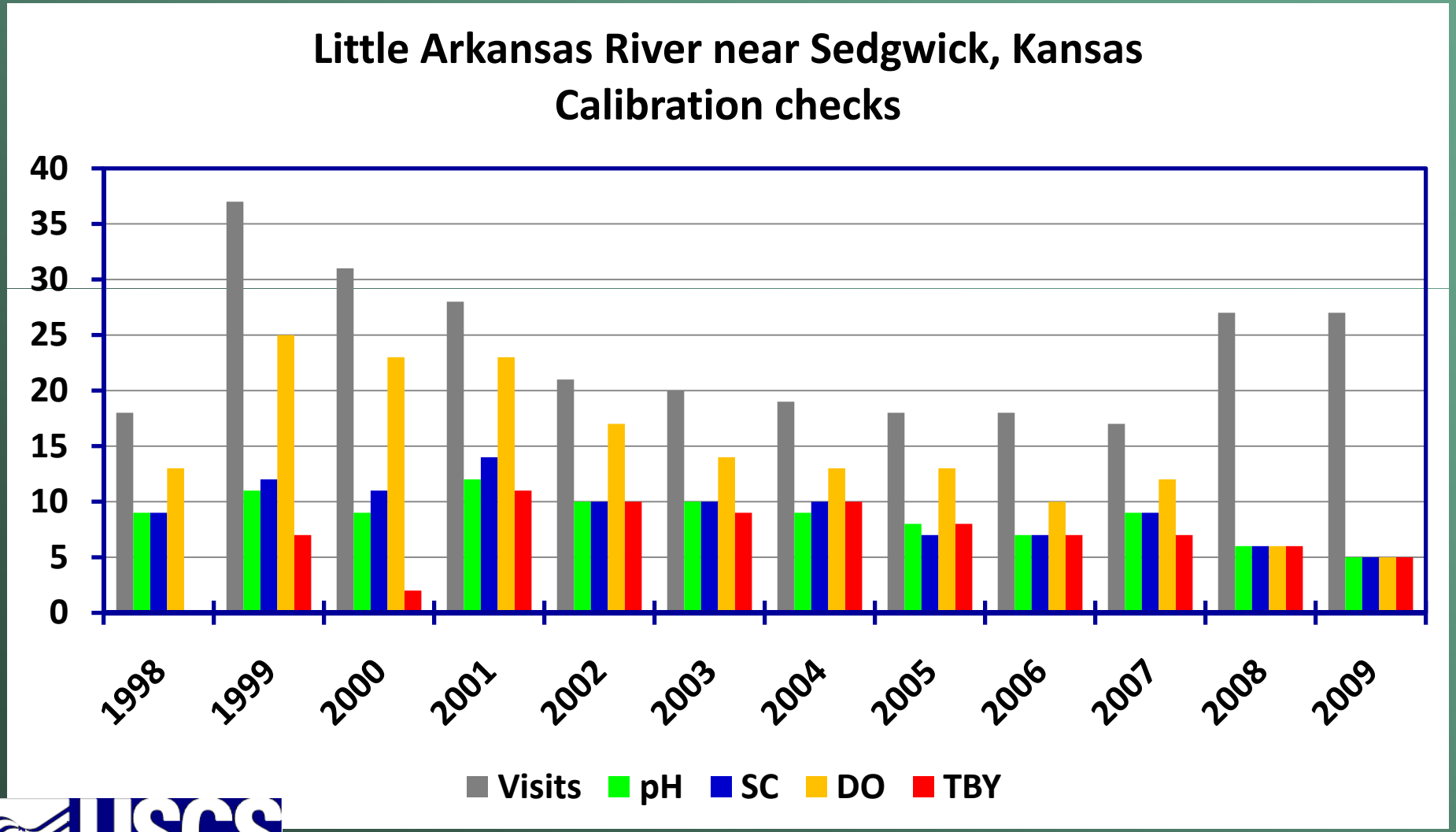
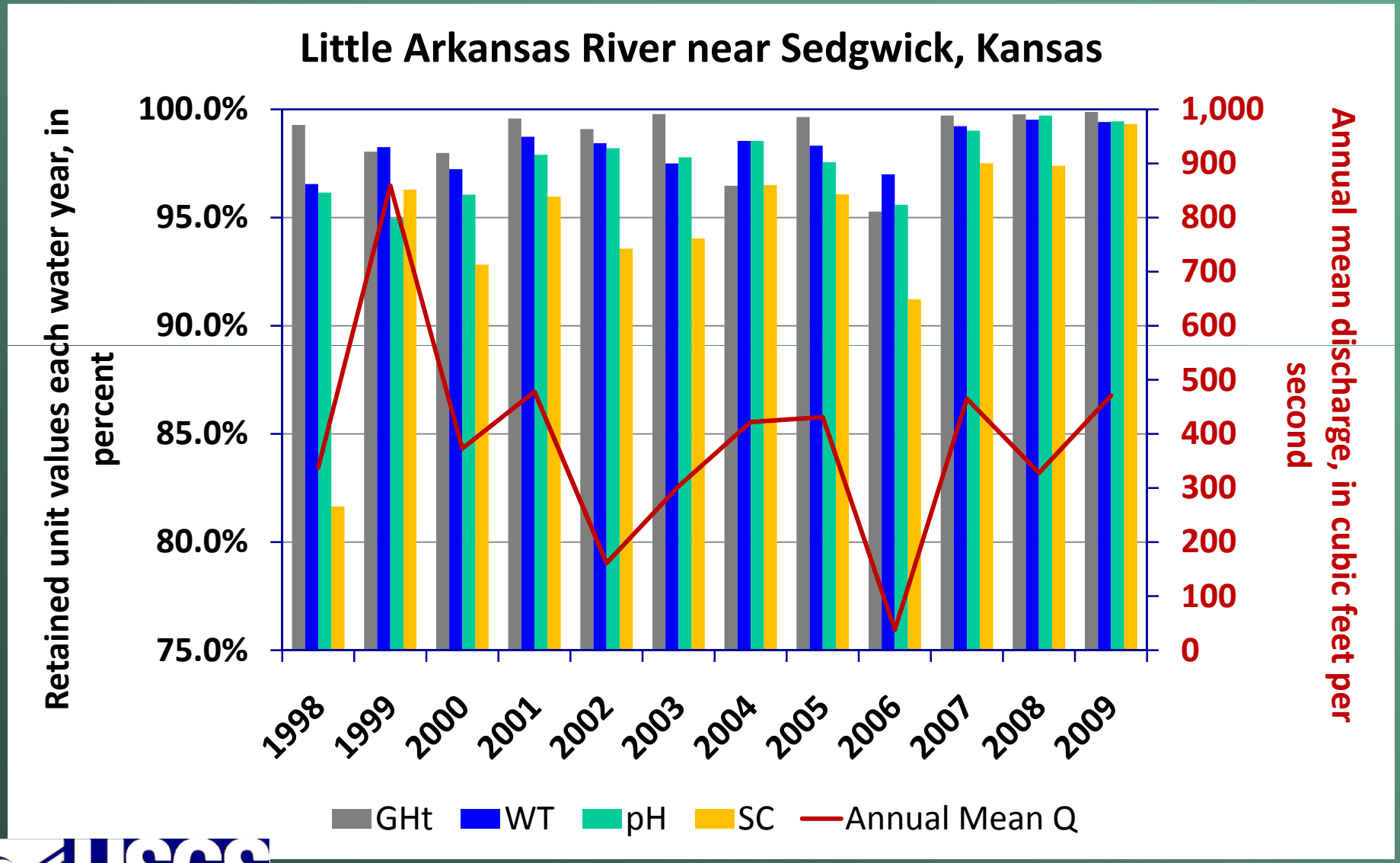
Many times sensor problems are obvious on NWIS web



Number of site visits for calibration checks have been reduced



Data retention varies each water year



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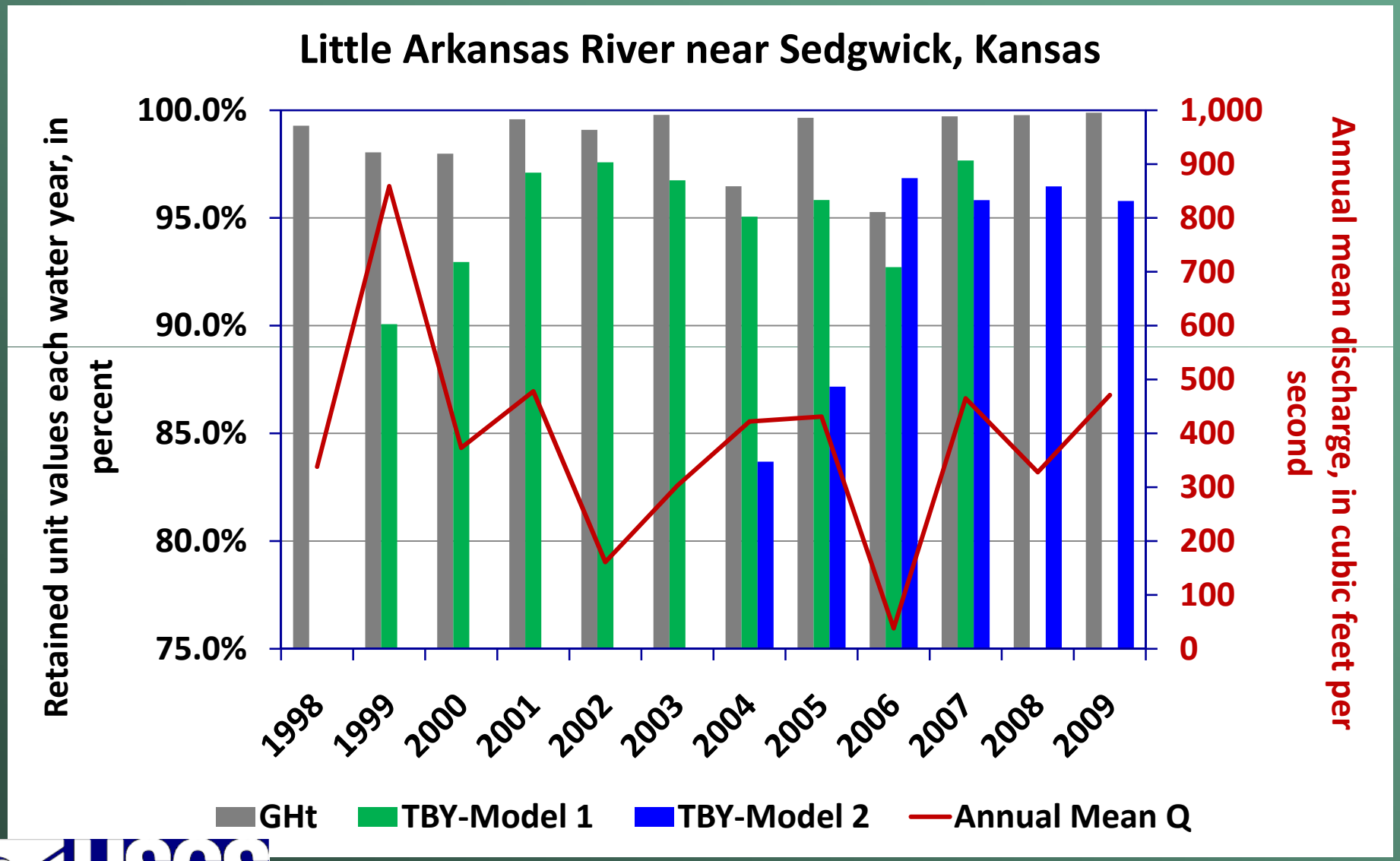

Water-Quality Monitoring Has Improved!

- ✓ **Quality Data**
  - Real-time data review
  - High data retention
- ✓ **Changes in sensor technology**
  - Optical sensors
  - Wiper technology
- ✓ **Improvements in field techniques**
- ✓ **More accurate representation of water quality**

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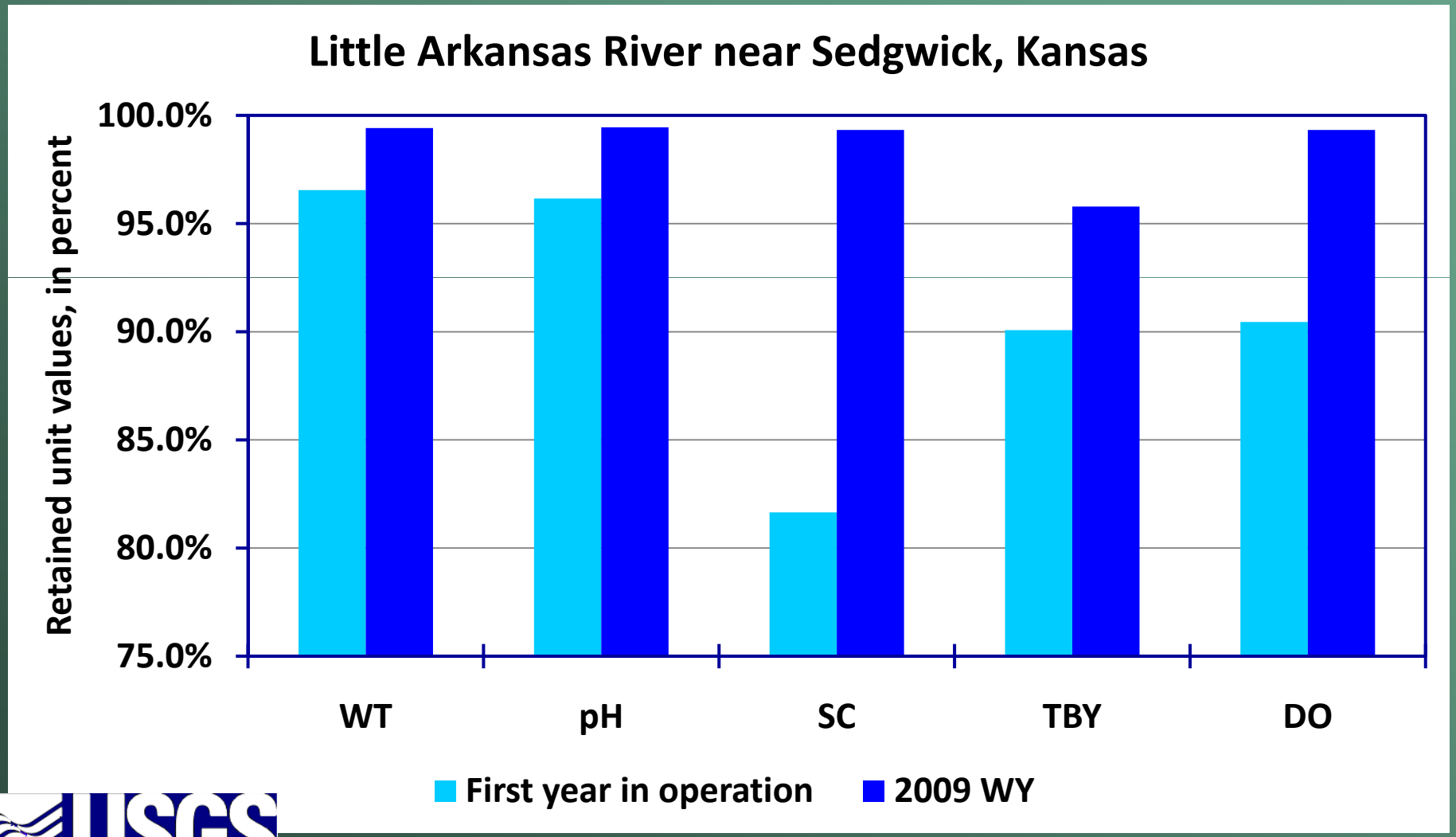
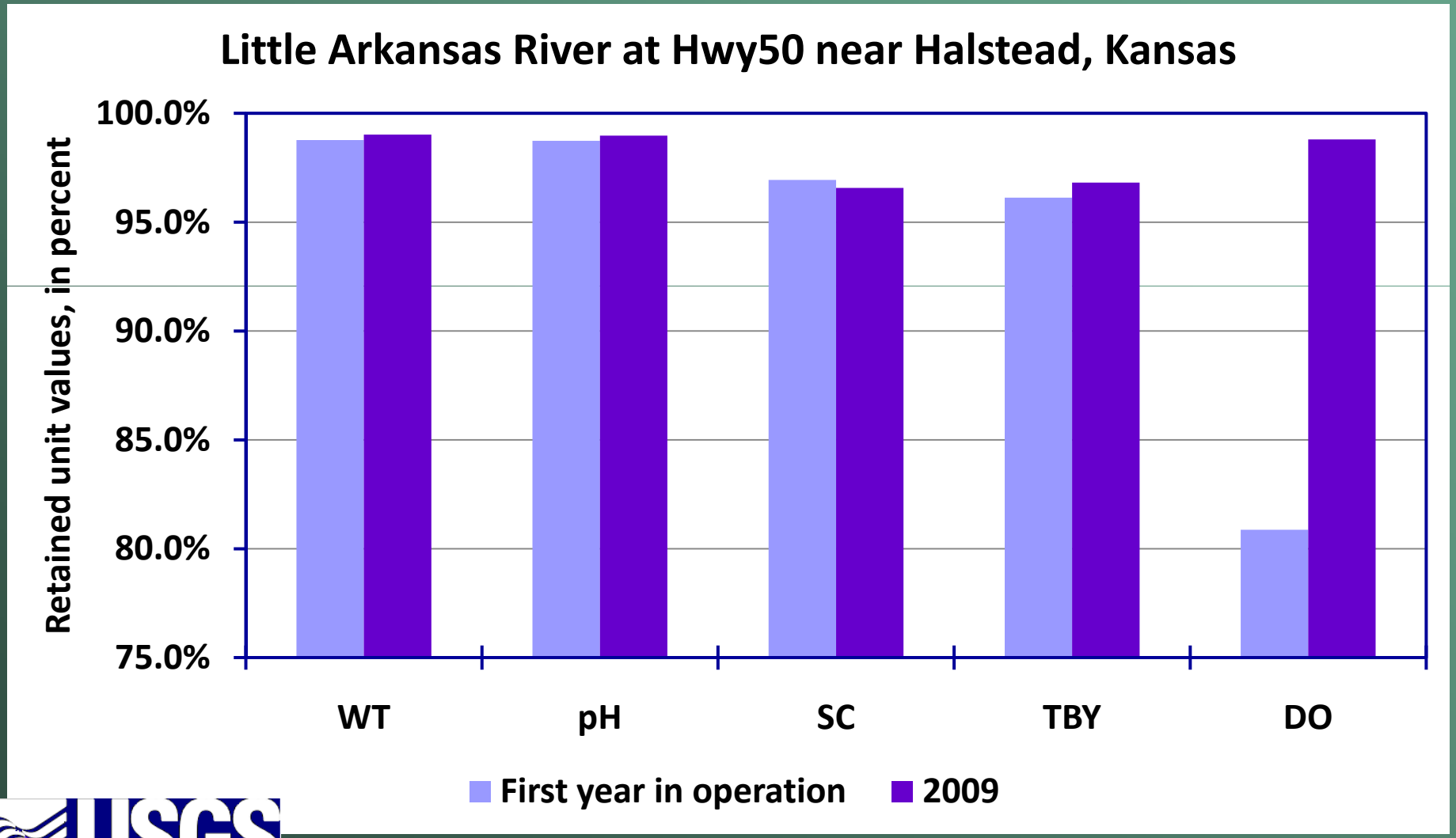
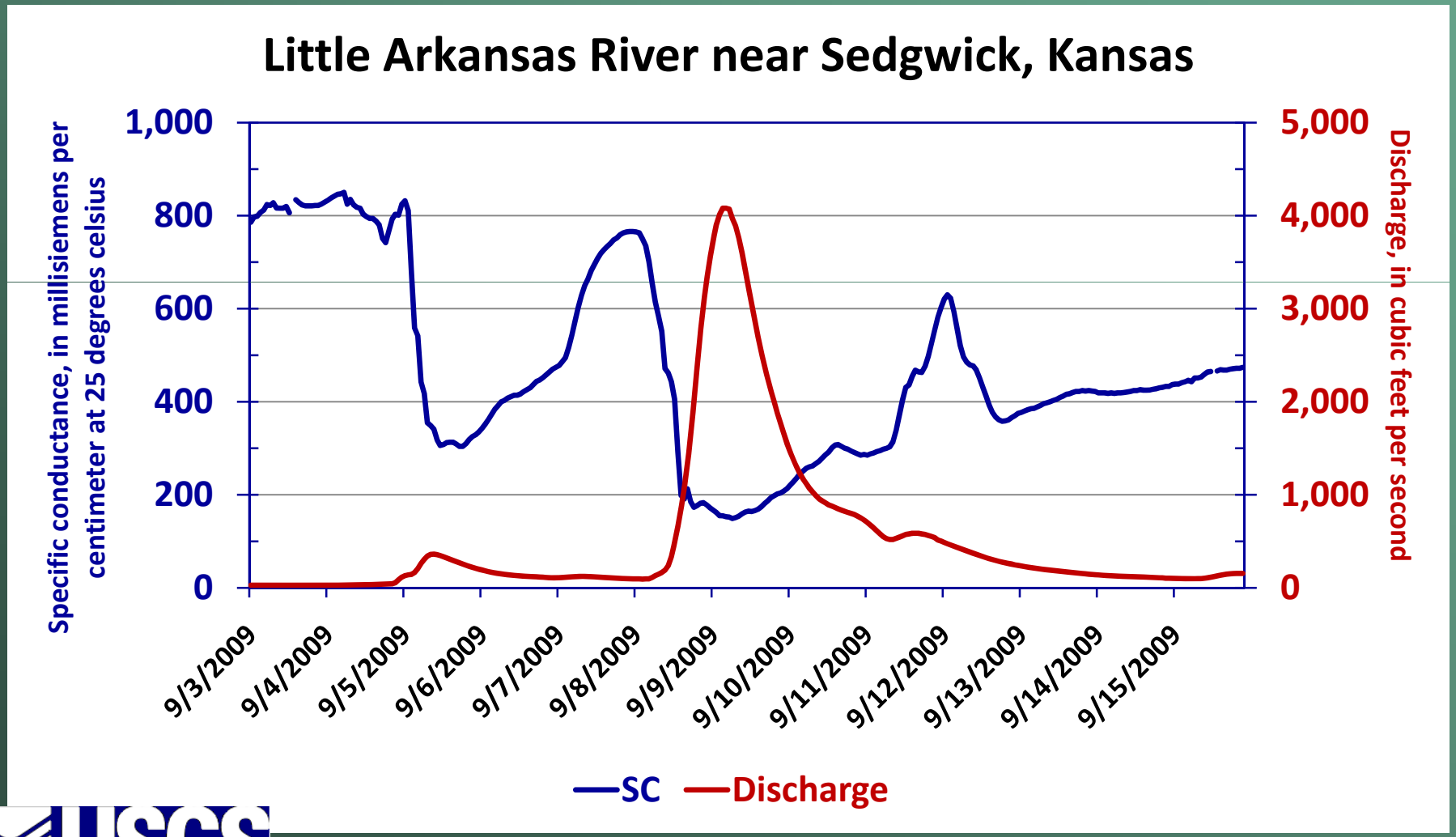
Improvements increased data retention for all parameters at Sedgwick site



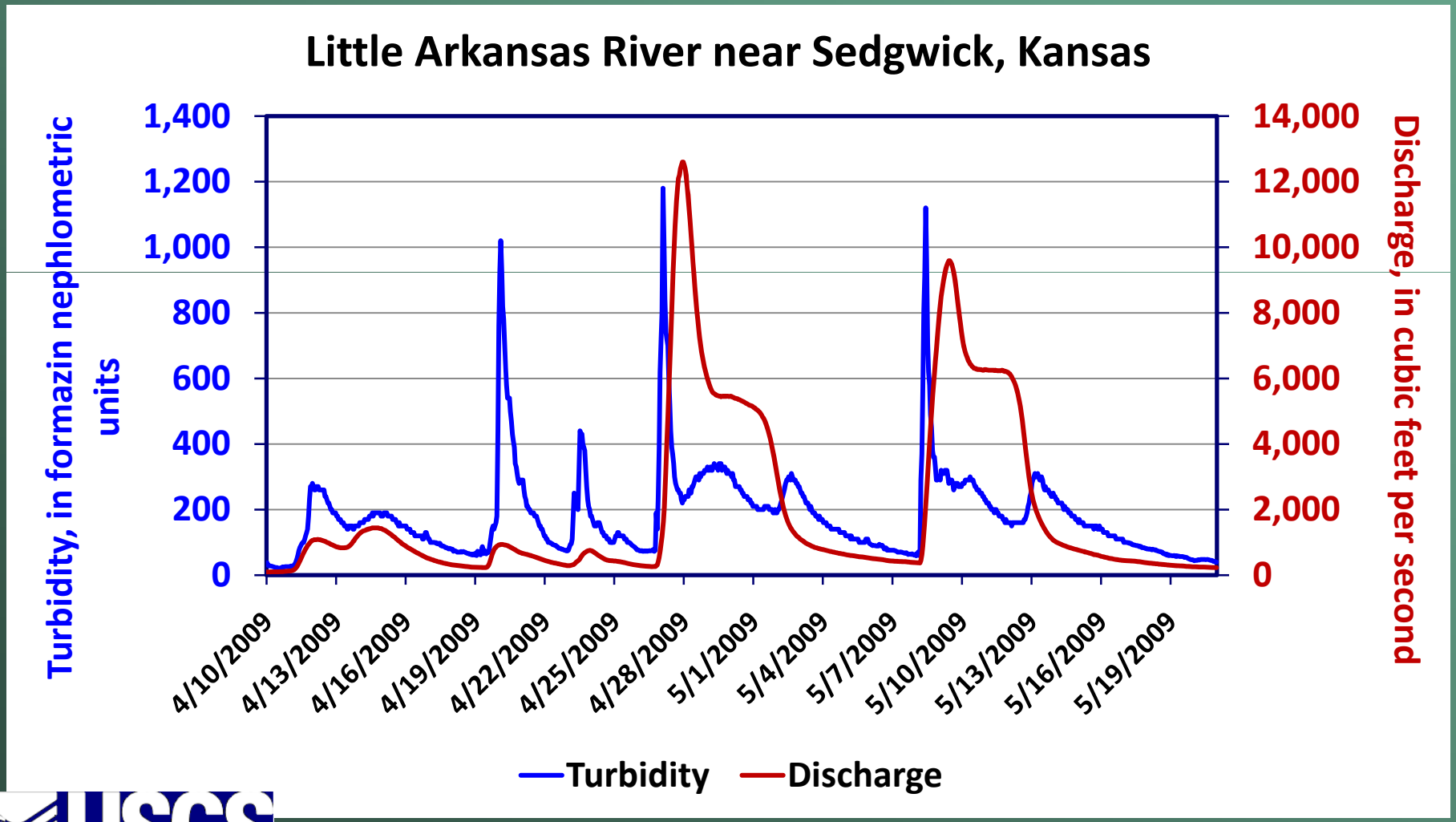
Improvements increased data retention mostly with dissolved oxygen at Hwy50 site



Higher quality of retained data gives us a more complete picture of what we need to see,



but continues to shows us the unexpected and teach us what we don't know



For Additional Information

Contact: Trudy Bennett, trudyben@usgs.gov
phone 316-773-3225

USGS KWSC public homepage
http://ks.water.usgs.gov/

KS Real-Time Water Quality
http://nrtwq.usgs.gov/ks/

Water Quality Watch
http://waterwatch.usgs.gov/wqwatch/

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