

Continuous Water Quality

DEMO of QW

- Retrieve of In-Situ Sonde
- Cleaning the Sonde
- Checking Calibration
- Calibration
- Insertion of Sonde

Retrieve of In-Situ Sonde



Cleaning the Sonde



The sonde from inspection to inspection gets aquatic growth and dirt.

Checking Calibration and Calibration

A sonde may need calibrated, but may not!

A check needs to be done to determine.



Checking Calibration and Calibration

Demo on QW calibration

Water Quality Equipment

USGS Water Quality Collection Techniques

Multi-parameter Sonde

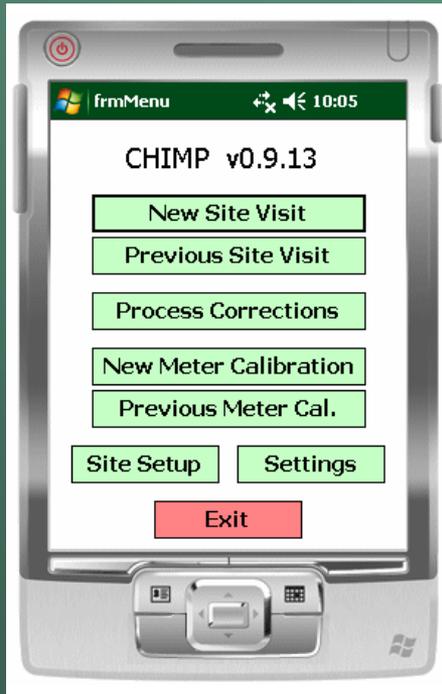
Mobile Lab

Standards for calibration

Water Quality Equipment



New Technology for Better Data Collection



CHIMP (Continuous Hydrologic Instrumentation Monitoring Program) is used to collect data about Monitor Fouling Checks and Calibration Drift Checks during site visits to active continuous water-quality monitors.

Extreme Conditions



Ice Conditions



Drought Conditions

Where's The In-situ Sonde?



I think it would work better in the water



Extension of pipe Problem Solved



Example of field sonde and in-situ sonde



Retrieve of In-Situ Sonde

The Process



Cleaning the Sonde



Calibration



Insertion of Sonde



Collecting Field Data

KY / USGS CONTINUOUS WATER QUALITY MONITOR FIELD FORM	
Station _____ serial number _____	
Date _____ Tech _____ Air Temp _____ °F	Arrival Site Instrument _____
P.C. Sunny Cloudy Overcast Windy Rain Snow	Field Instrument _____
Departure Site Instrument _____	
Stream Quality Assurance Readings	
1. Before Cleaning Site _____ Field _____ Time (240) _____ Temp (°C) _____ Sp. Cond (µs/cm) _____ pH (units) _____ DO (mg/L) _____ Turbidity (FNU) _____ Comments: _____	
2. After Cleaning Site _____ Field _____ Time (240) _____ Temp (°C) _____ Sp. Cond (µs/cm) _____ pH (units) _____ DO (mg/L) _____ Turbidity (FNU) _____ Comments: _____	
4. Final Site _____ Field _____ Time (240) _____ Temp (°C) _____ Sp. Cond (µs/cm) _____ pH (units) _____ DO (mg/L) _____ Turbidity (FNU) _____ Comments: _____	
3. Site Instrument Drift Check/ Calibration Drift _____ miscellaneous notes: _____ Dissolved Oxygen (mg/L): Calibration Criteria = 0.1 mg/L See instrumenter check calibration 01/01/2002 Temp Station BP Chart Reads Adjusted Time _____ (date prepared) Zero DFW: _____ Comments: _____ Turbidity (FNU): criteria = 0.1 FNU or ± 2% of measured value, whichever is greater Standard Reads Adjusted Lot# Exp. Time 1000 _____ Comments: _____ Specific Conductance (µs/cm): ± 2 µs/cm or ± 2% of measured value, whichever is greater Standard Temp Reads Adjusted Lot# Exp. Time 500 _____ 1000 _____ check only _____ Comments: _____ pH: Calibration Criteria = 0.1 pH Standard Temp Chart Reads Adjusted Lot# Exp. Time 10.0 _____ 7.0 _____ Comments: _____	

Note the numbers from both sondes

This will be the before cleaning numbers

KY / USGS CONTINUOUS WATER QUALITY MONITOR FIELD FORM																											
Station _____		serial number _____																									
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1. Before Cleaning Site _____ Field _____ Time (24h) _____ Temp (°C) _____ Sp. Cond (µS/cm) _____ pH (units) _____ DO (mg/L) _____ Turbidity (FNU) _____ Comments: _____		Date _____ serial number _____ miscellaneous notes: _____ Dissolved Oxygen (mg/L): Calibration Criteria = 0.3 mg/L last barometer check / calibration 05/27/2022 Temp Station BP Chart Reads Adjusted Time _____ (date prepared: _____) Zero DW: _____ Comments: _____																									
2. After Cleaning Site _____ Field _____ Time (24h) _____ Temp (°C) _____ Sp. Cond (µS/cm) _____ pH (units) _____ DO (mg/L) _____ Turbidity (FNU) _____ Comments: _____		Turbidity (FNU): criteria = 0.5 FNU or ± 2% of measured value, whichever is greater: <table border="1"> <thead> <tr> <th>Standard</th> <th>Temp</th> <th>Reads</th> <th>Adjusted</th> <th>Lot #</th> <th>Exp.</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1000</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> Comments: _____		Standard	Temp	Reads	Adjusted	Lot #	Exp.	Time	1000																
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500																											
1000																											
4. Final Site _____ Field _____ Time (24h) _____ Temp (°C) _____ Sp. Cond (µS/cm) _____ pH (units) _____ DO (mg/L) _____ Turbidity (FNU) _____ Comments: _____		pH: Calibration Criteria = 0.2 pH <table border="1"> <thead> <tr> <th>Standard</th> <th>Temp</th> <th>Chart</th> <th>Reads</th> <th>Adjusted</th> <th>Lot #</th> <th>Exp.</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>7.0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>7.6</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> Comments: _____		Standard	Temp	Chart	Reads	Adjusted	Lot #	Exp.	Time	7.0								7.6							
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7.6																											

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Calibration is determined by if the standard reading is +/- a certain threshold.

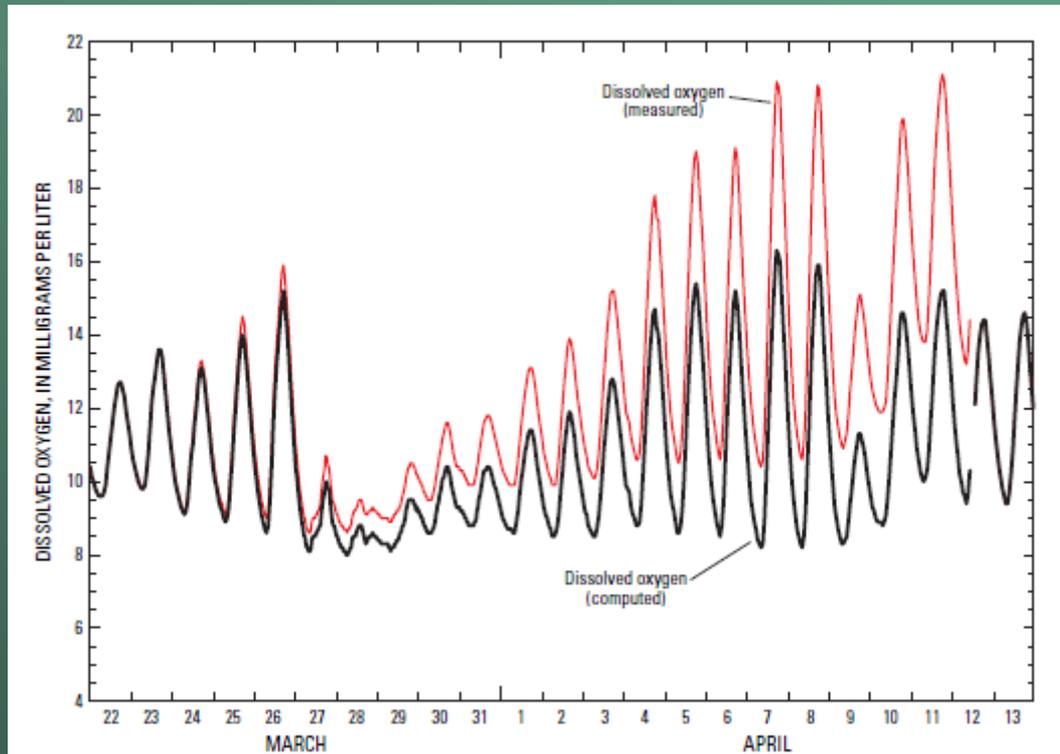
The sonde is only as good as it's accuracy.

Temperature	> \pm 0.2 ° C
Specific conductance	Greater of \pm 5 uS/cm or \pm 3 % of measured value
Dissolved oxygen	> \pm 0.3 mg/L
pH	> \pm 0.2 pH unit
Turbidity	\pm 0.5 turbidity units or \pm 5 % of measured value

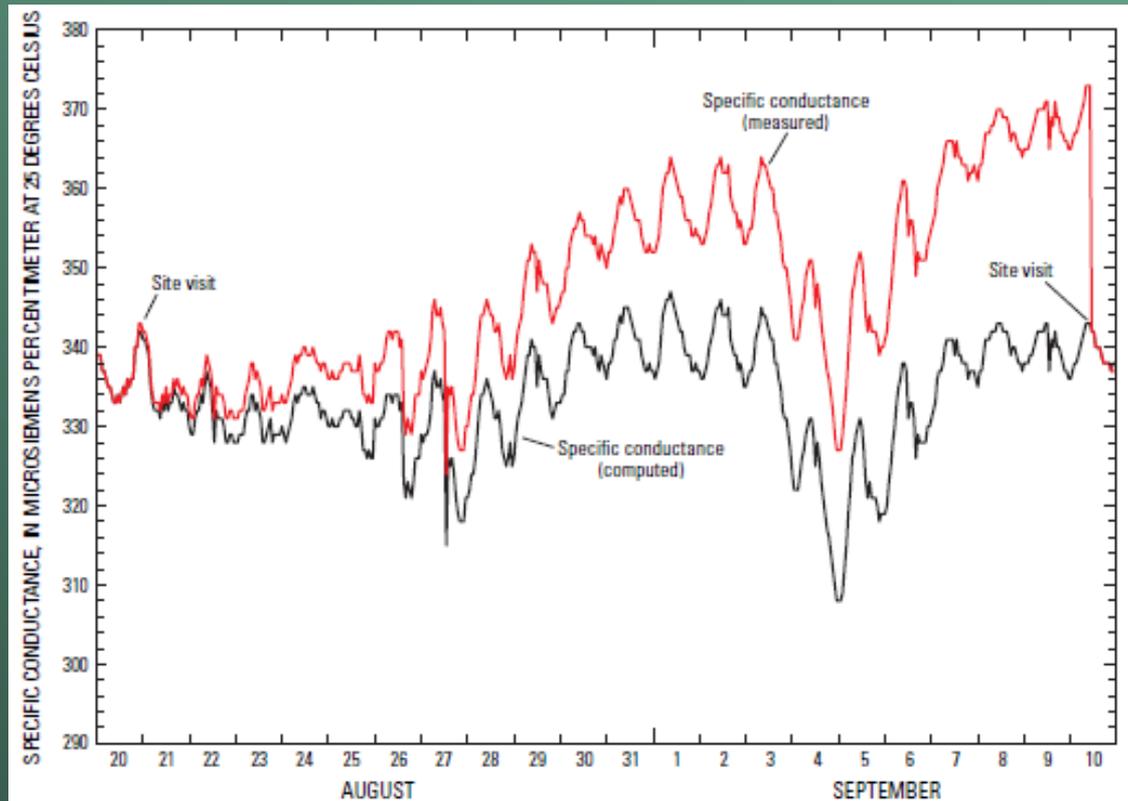
Criteria for WQ data corrections

Measured property	Shift criteria
Temperature	$> \pm 0.2 \text{ } ^\circ \text{C}$
Specific conductance	Greater of $\pm 5 \text{ uS/cm}$ or $\pm 3 \%$ of measured value
Dissolved oxygen	$> \pm 0.3 \text{ mg/L}$
pH	$> \pm 0.2 \text{ pH unit}$
Turbidity	$\pm 0.5 \text{ turbidity units}$ or $\pm 5 \%$ of measured value

DO Measured Data VS Computed Data



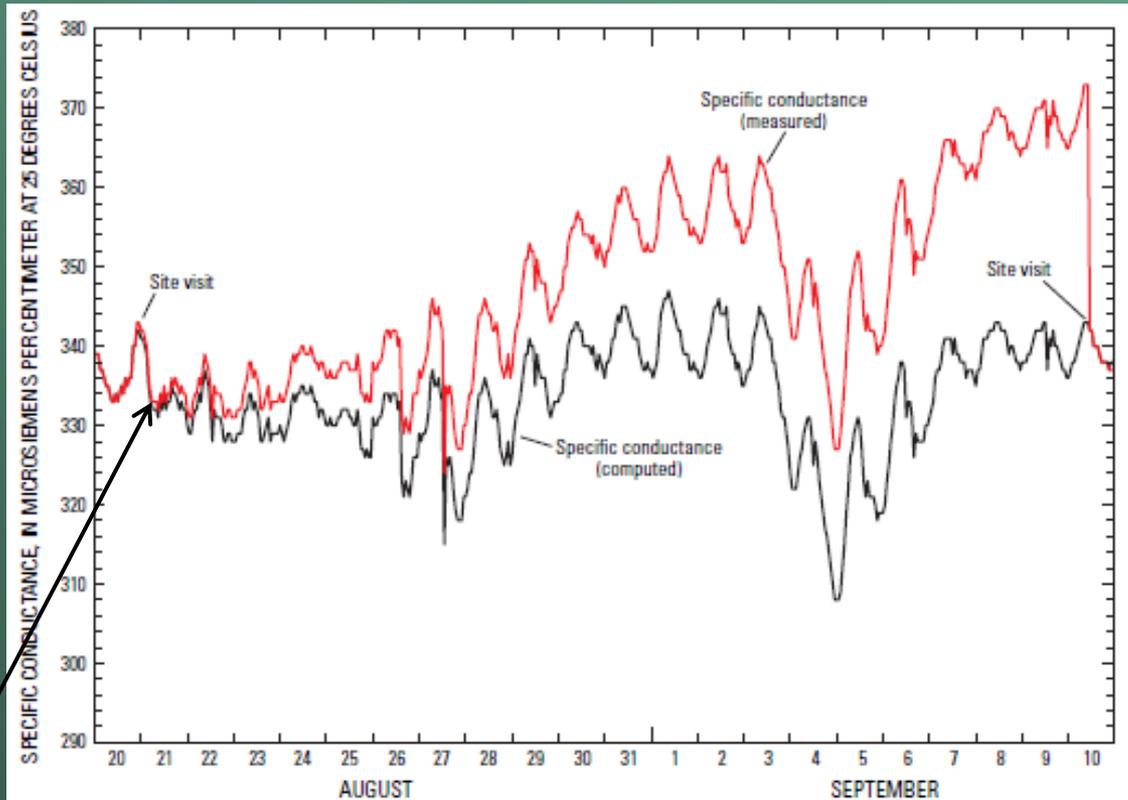
SC Measured Data VS Computed Data



Rating the Quality of Continuous WQ Records

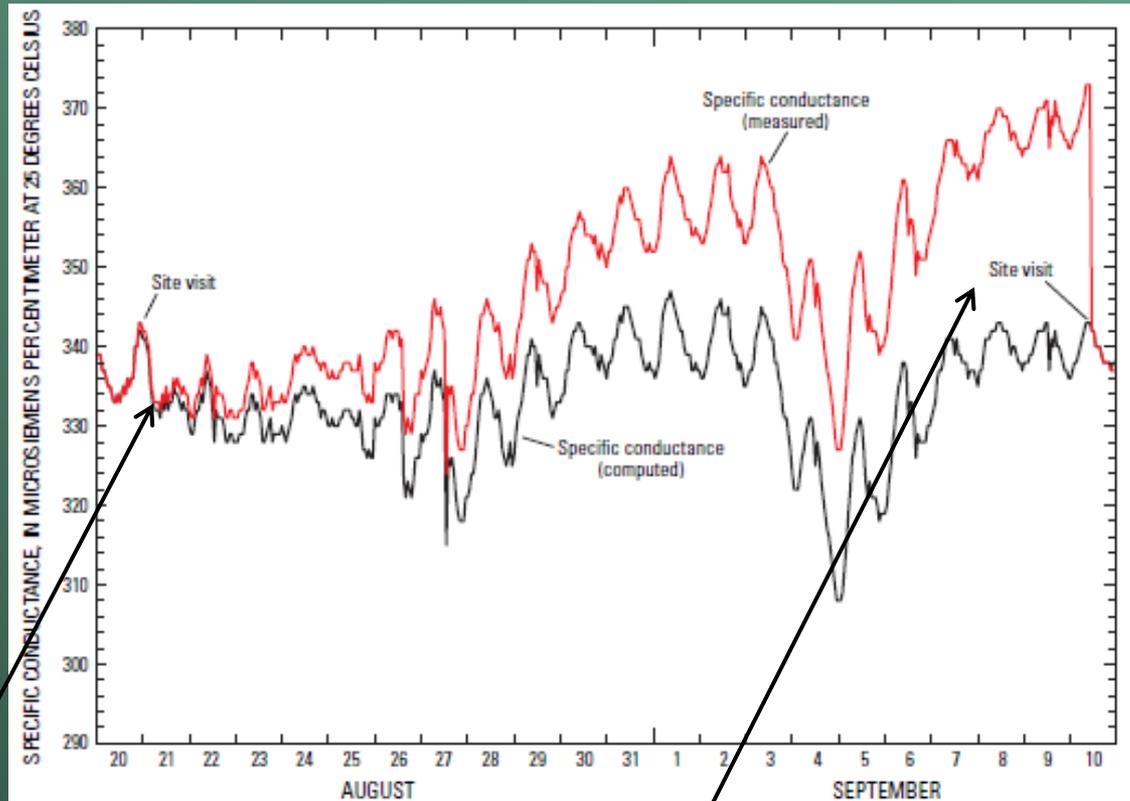
Physical property	Ratings			
	Excellent	Good	Fair	Poor
Temperature	$\leq \pm 0.2$	$> \pm 0.2$	$> \pm 0.5$	$> \pm 0.8$
Specific conductance	$\leq \pm 3 \%$	$> \pm 3$	$> \pm 10$	$> \pm 15$
pH	$\leq \pm 0.2$	$> \pm 0.2$	$> \pm 0.5$	$> \pm 0.8$

SC Measured Data VS Computed Data



Excellent

SC Measured Data VS Computed Data

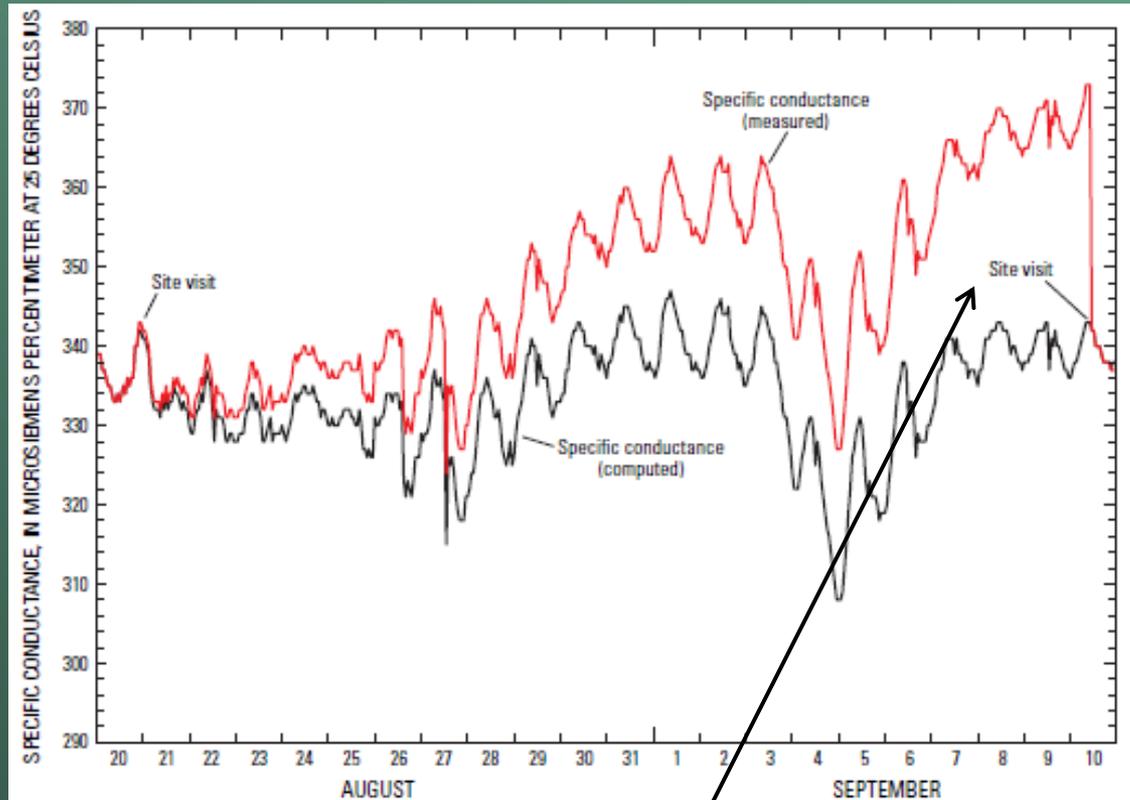


Excellent

Poor

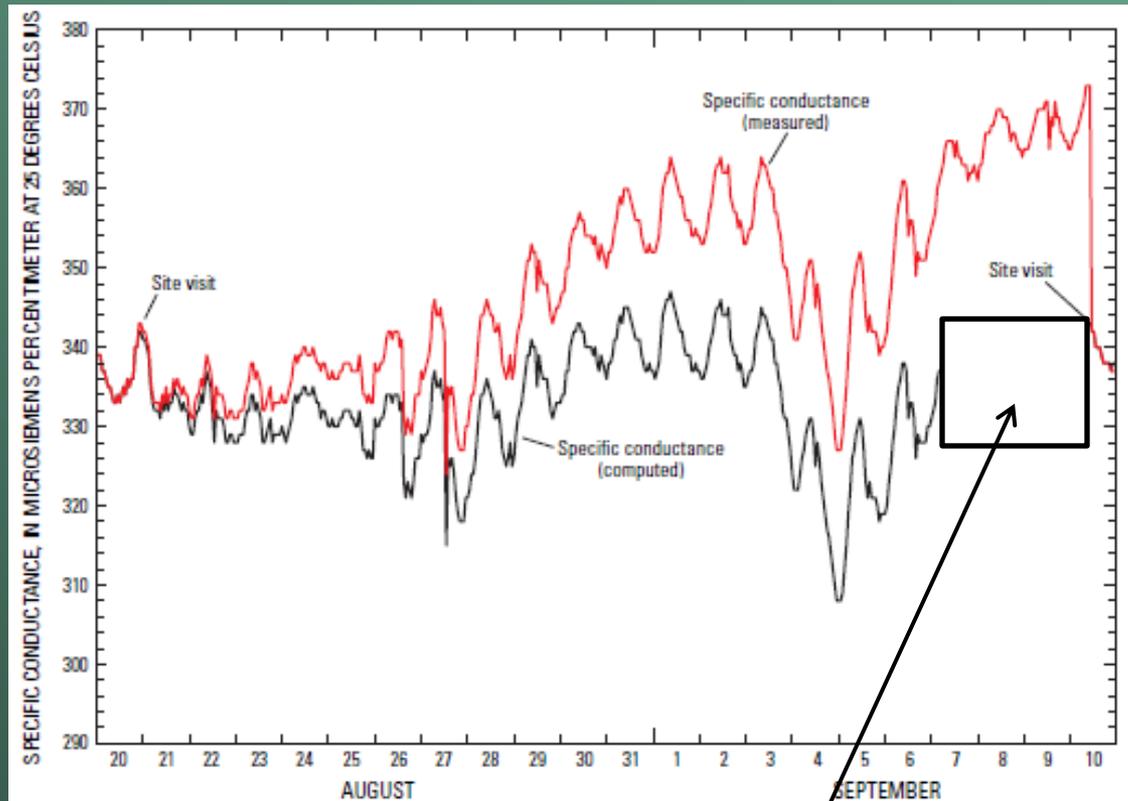
Measured physical property	Maximum allowable limits
Temperature	± 2.0 C
Specific conductance	± 30 percent
Dissolved oxygen	The greater of ± 2.0 mg/L or 20 percent
pH	± 2 pH units
Turbidity	The greater of 3.0 TU or ± 30 percent

SC Measured Data VS Computed Data



Although rated poor it may also need deleted

SC Measured Data VS Computed Data

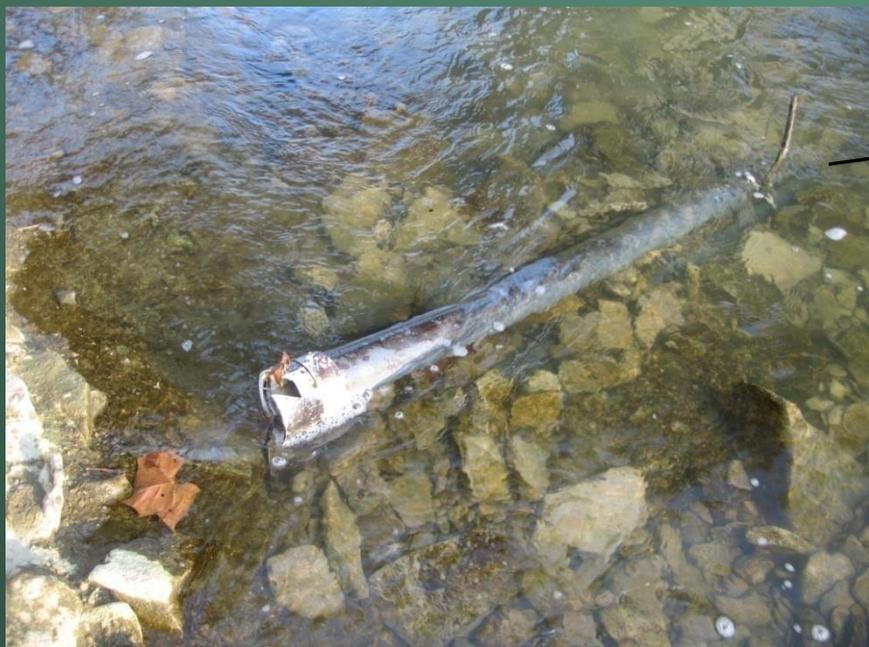


Deleted, because outside allowable limits

Sometimes Nature tests the Installations



Before



After



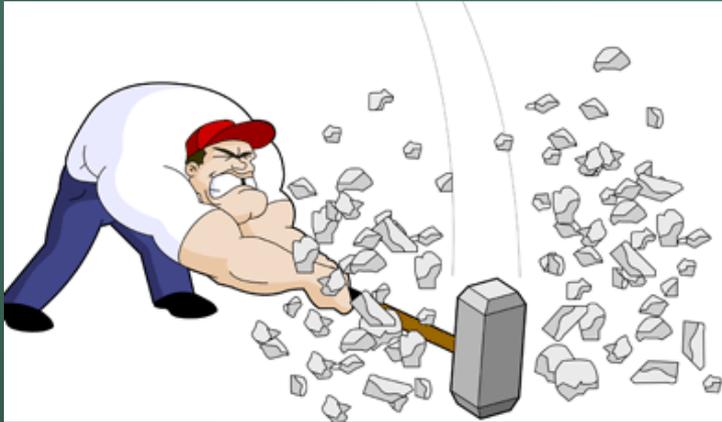
Before



After



And sometimes It's Not Nature, but People



Before



After



Before



After



Now let's see if the calibration is done?

