

## Appendix D: KTWQP Nutrient, Phytoplankton, Periphyton and Algal Toxin SAP

### YSI Calibration SOP

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Upon arrival at each monitoring site, numerous tasks must be performed to successfully meet the QA/QC protocol and service the Sonde. Properly filling out the calibration sheet is critical to collecting all the data that is needed for the evaluation of the sonde file. Here is an overview of a typical field tour consisting of extracting the sonde, performing scheduled maintenance and redeploying.

- Arrive on site and acclimate pH and conductivity standards and a liter of DI water to ambient stream temperature in order to accurately calibrate the Sonde. Place ice packs and calibration standard bottles in small cooler. Monitor the temperature of the standards to ensure they do not get too cold.
- Record current barometric pressure at the site along with other environmental conditions, such as; weather, changing water levels, color of water, etc on the datasheet. Reference Sonde (Quanta) should be calibrated weekly to insure accuracy. Once on site inspect Quanta DO membrane and re-calibrate the dissolved oxygen (percent saturation) to current site barometric pressure and deploy next to the sonde at least ten minutes before the half hour.

#### **Download site sonde data**

- Sonde menu
- Press enter
- Highlight File and press enter
- Select upload and press enter
- PC6000 Format press enter
- **Audit the site sonde** (datasonde that is dedicated to the site) by placing the reference sonde as close as possible to the lock box that contains the site sonde. As close to the half hour or top of the hour as possible, record the reference sonde water quality parameters on the datasheet. Remove the lock box containing the site sonde from the water approximately 5 minutes after the 30 minute or top of the hour reading. Carefully remove the site sonde from the housing trying not to disturb any fouling on the probes.
- Fill bucket with river water or tap water depending on time of season.
- Connect site sonde to hand held and put in run mode by going to the sonde menu, highlight run and press enter, unattended, and look at file to ensure that it has been logging. At the bottom of the unattended setup screen highlight stop logging.

- Press escape and highlight Discrete Sample and press enter, highlight start sampling and press enter. Sonde will stabilize for 120 seconds and then begin to show WQ parameters.
- Place both the site sonde and reference sonde in the bucket and record pre-cleaning readings after WQ parameters have stabilized (Temp, SpCond, DO, pH) of site sonde in addition to readings of reference sonde (quanta) in bucket.
- Turn off reference sonde. Remove site sonde and thoroughly clean. Use an Alan head wrench to remove the wiper brush. Install wiper pad with no brush.
- Take the big brush and thoroughly clean the inside and outside of the sonde lock box and clean the site sonde sensor guard with a toothbrush and Q-tips.
- Take a Q-tip and clean out the data line connection on the datasonde and on the data line ensuring it is free of water and sand. Spread a thin coat of silicone on the o-ring on the connector.
- Cleaning site sonde: **Note: only site sonde is cleaned during cleaning process**
- YSI Sonde cleaning
  - Wash the outside and probe guard with towel and toothbrush
  - **To clean the Optical DO and BGA probes carefully wipe the surface of the probes with a moist kim wipe or Q-tip-DO NOT use any alcohol or Hydrogen peroxide**
  - Clean DO membrane softly with Q-tip and check membrane for bubbles, holes and wrinkles.
  - Clean pH probe with spray bottle. Wipe *carefully* with Q-tip only if necessary
  - Clean Conductance probe with pipe cleaner. Rinse with spray bottle.
  - Clean Temperature probe with Q-tip. Rinse with spray bottle
  - Use Q-tip, toothbrush and spray bottle
- Replace site sonde and reference sonde in bucket and record post-clean readings of YSI site sonde and reference sonde in bucket after WQ parameters have stabilized.

### **Calibrate Conductivity**

- Rinse probes two times with DI water.
- Rinse probes two times with specific conductivity standard.
- Fill calibration cup with fresh specific conductivity standard.
- Under the main menu highlight calibrate and hit enter
- Highlight Conductivity and hit enter
- Highlight SpCond and hit enter
- Enter the value of calibration standard (for 1,000  $\mu\text{S}/\text{cm}$ , enter 1.0) and press enter.

- Wait at least 30 seconds until specific conductivity stabilizes and record the temperature and initial specific conductivity value onto data sheet.
- Press enter to calibrate the sonde
- Never accept an “Out of Range” message – if this occurs ensure there are no bubbles in the hole where the Sp Cond probe is located and that the standard covers the hole completely
- Record the final value of specific conductivity onto data sheet.
- Press Escape several times to go to the Main Menu and highlight Advanced and hit enter
- Highlight Cal constants and hit enter
- Record conductivity cell constant onto data sheet and verify the number ranges between 4.5 to 5.5
- Dump conductivity standard into rinse jar.

### **Calibrate pH**

- Rinse two times with DI water
- Rinse two times with pH 7.0\_ standard.
- Fill calibration cup with fresh pH 7.0\_ standard ensuring that the temp probe is covered with calibration standard
- Press Escape twice to the main menu and highlight run and hit enter
- Highlight discrete sample and hit enter
- Highlight start sampling and hit enter
- Wait until temp stabilizes and record the temperature of the pH 7.0\_ standard and the temperature compensated value for the pH standard, this is done to determine the temperature compensation for the pH standard, for example if the temp is 18 degrees C then determine the value of the pH 7 standard at 20 degrees C on the look up table on the datasheet and fill it out in the pH standard line on the datasheet
- Press escape 3 times to go to the Main Menu
- Highlight calibrate and hit enter
- Highlight ISE1 pH and press enter
- Highlight 2 point and press enter
- Enter the temperature compensated value for the pH 7.\_ calibration standard for the first calibration point and hit enter.
- Wait at least 30 seconds until pH stabilizes and record the initial pH 7.\_ value onto the data sheet.
- Press enter to calibrate the sonde
- **DO NOT press enter or escape!**
- Record the final value of pH onto data sheet.
- Record pH mv onto data sheet and verify that the value ranges between -50 and +50
- Dump pH standard into rinse jar.
- Rinse two times with DI water.
- Rinse two times with pH 10.\_ standard.

- Fill calibration cup with fresh pH 10.0\_ standard., ensuring that the pH probe is completely submerged
- Record the temperature of the pH 10.0\_ standard and the temperature compensated value for the pH standard onto the datasheet
- Press Enter once and enter the temperature compensated pH 10.0\_ value as the second point and hit ENTER.
- Wait until pH stabilizes and record the initial pH 10 value onto data sheet
- Press enter to calibrate the sonde
- Record the final value of pH onto data sheet
- Record pH mv onto data sheet and verify that the value ranges between -130 and -230
- Calculate the pH slope onto data sheet by subtracting the difference between the two numbers and enter the value onto the datasheet, ensure the value ranges between 165 and 180. A value of 165 or less indicates a failing probe.
- Dump pH 10.0\_ standard into rinse jar
- Rinse two times with DI water

### **Calibrate BGA Probe (SV)**

- Fill calibration cup  $\frac{3}{4}$  of the way with DI water so that the BGA and temp probe are fully immersed.
- If using a short calibration cup, be sure to engage only one thread on the calibration cup during this procedure to avoid a small interference from the cup bottom
- Highlight Run in the main menu and press enter, highlight discrete sample and press enter, highlight interval and change it from 0.5 to 4 and highlight start sampling and press enter.
- On the 650 activate the wiper to clean the optics to remove any bubbles that may be present. Wiper should stop 180<sup>0</sup> to probe lens.
- **After BGA has stabilized.** Record initial temperature and BGA on data sheet. Press enter.

### **Calibrate Optical DO Probe**

Wrap the wet towel over the sensor guard to provide insulation. Place the entire sonde with wet towel into the DO calibration chamber (insulated cooler with ice packs) and make sure the sonde will not fall over.

- Go to the sonde main menu, highlight run and press enter, highlight discrete run, highlight interval and change it from 0.5 to 4 and highlight start sampling and press enter. **The ODO should be stable because it has been in the stable environment of the cooler.** Record initial temperature and ODO in mg/L on data sheet.
- Highlight calibrate and press enter. Highlight Optic T- Dissolved Oxy and press enter, highlight DO% and press enter. Enter the current BP, round off to the nearest whole number and press enter.

- The sonde will stabilize for 120 seconds and automatically calibrate ODO. Record the final ODO value onto datasheet in mg/L after calibration.
- Escape to the Advanced menu highlight cal constants and press enter and record the DO gain and verify range of DO gain is within 0.5 to 1.7
- Disconnect the sonde and 650.
- Take off the wiper pad and install the clean wiper brush. Ensure that you can place a piece of paper between the bottom of the plastic wiper arm and the probe face.
- Gently press the wiper against the face of the probe until the foam pad is compressed to roughly one half of the original thickness and then tighten the setscrew.
- Install sensor guard and deploy sonde at least 5 minutes before it is set to take a measurement. Record the time of deployment

To create a new file:

On 650 handheld highlight sonde menu (it will now connect to sonde and beep. Notice small sonde icon on bottom right of 650 screen.)

Highlight run → unattended sample

Set interval to 00:30:00 and ensure that duration is 30 days.

Type filename: two letter site name then date ie IG062507

Type site name: Ie: Iron Gate

Write down battery voltage on audit sheet.

Start logging → are you sure? → yes

That will take you to logging screen where you will record start date/time and end date/time.

To double check that it is logging → on sonde main screen → status. Look to see if logging is active.

- Place the reference sonde (Quanta) next to the datasonde at least 5 minutes before it is set to take a measurement and record WQ parameters as close as possible to the half hour or top of the hour.

### **H350 XL Datalogger Instructions at USGS sites**

Klamath River at Orleans (OR) and Klamath River at Seiad Valley (SV)

#### **Equipment needed:**

- Compact Data Card
- Key to enter lock box

- This SOP

**To Download Data**

- Insert 256 MB Compact Flash Card with PC Card Adapter into Datalogger
- Scroll Down to 'Data Options'
- Press Arrow →
- Scroll Down to 'Copy Data to Card?'
- Press Enter
- Wait Until Datalogger reads 'Done, Press Cancel'
- Press Esc/Cancel to Main Menu
- Remove Data Card by pushing eject button next to card slot