MISSOURI STREAM TEAM
VOLUNTEER WATER QUALITY MONITORING PROGRAM
Standard Operating Procedure

EFFECTIVE DATE: December 22, 2017
RECERTIFICATION DATE:
SOP TITLE: MoST-VWQM-SOP: Specific Conductivity Measurement of Streams
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APPLICABILITY:	Applies to all Level 1, Level 2, Level 3 and CSI trained Missouri Stream Team, Volunteer Water Quality Monitoring Program Participants

1.0 SCOPE AND APPLICABILITY

This Standard Operating Procedure (SOP) provides MoST, VWQM Program participants with guidance on the operation and maintenance of the Hach PocketPro low-range conductivity meter and how to conduct field analysis of specific conductivity in streams. Specific conductivity is the measurement of the ability of water to conduct an electrical current at a specific temperature. The specific conductivity of water depends upon the presence and concentration of ions and the temperature of the solution. All stream water will conduct electricity to some degree. Adding ionic compounds such as minerals, salts, acids or bases to water increases the conductivity of the resulting solution. Please refer to Table 1 for the ranges of conductivity in Missouri streams and rivers.

2.0 DEFINITIONS AND ABBREVIATIONS

°C – Degrees Celsius
CSI – Cooperative Stream Investigation
DI – de-ionized
MDC – Missouri Department of Conservation
MoDNR – Missouri Department of Natural Resources
MoST – Missouri Stream Team
SOP – Standard Operating Procedure
VWQM – Volunteer Water Quality Monitoring
QAPP – Quality Assurance Project Plan
QA/QC – Quality Assurance/Quality Control
µS/cm – micro-Siemens per centimeter

3.0 SUMMARY OF METHOD

The specific conductivity method described in this SOP is used by the MoST, VWQM Program participants that have received Level 1, Level 2, Level 3 or CSI Program training. Further background information can be found in the MoST, VWQM Level 1 Notebook and PowerPoint Presentation on water chemistry (see Section 10.0).

4.0 HEALTH AND SAFETY REQUIREMENTS

Appropriate protective gear, such as gloves and water proof boots, should be worn to protect against encountering potential water-borne illnesses during sampling. It is also advisable to frequently wash hands with soap and water, especially before eating or drinking.

Those participants that monitor near wastewater outfalls should be vaccinated for Hepatitis A. Please contact your county health department or your personal physician for this vaccination.

5.0 PERSONNEL QUALIFICATIONS

Participants will be knowledgeable of this SOP and will have, at a minimum, attended an Introductory and Level 1 VWQM workshop.

6.0 SUPPLIES AND EQUIPMENT

The following equipment is needed to measure conductivity:

- Program provided Hach PocketPro low-range conductivity meter
- 1413 µS/cm calibration solution
- DI water

7.0 PROCEDURE

7.1 CALIBRATION

1. Set the power to on and remove the cap from the sensor.

2. Push to go to calibration mode. The auto-recognition standard (1413 µS/cm) the tester expects to measure shows on the bottom line.

3. Pour the 1413 µS/cm calibration standard shown into the cap to the fill line.

4. Put the sensor fully into the cap.

5. When the measurement is stable, push to save the calibration and exit to continuous measurement mode. The measured value will flash 3 times and then stop. Then, "END" shows on the display.

6. Rinse the sensor and cap with DI water and blot dry.

7.2 MEASUREMENT

1. Set the power to on.

2. Remove the cap from the sensor.

3. If the lock icon shows on the display, push to go to continuous measurement mode.

4. If possible, it is preferable to place the meter's electrode directly into the water. Immerse the electrode end of the meter approximately 1 inch deep in slightly moving water.

5. If the meter cannot be held in the water; fill the cap with stream water to the fill line.

6. Put the sensor fully into the cap.

7. The measured value shows on the top line of the display.

8. Allow the measured value to stabilize.

9. Record the specific conductance in µS/cm on a VWQM field data sheet or field notebook

8.0 SPECIAL CONSIDERATIONS

Rinse the sensor and cap with DI water and blot dry before storage.

While calibrating the meter and determining the specific conductance of stream water, be sure to hold the meter while keeping your hand off the cap. If you set the meter on a table or wrap your hand around the cap, the conductance of the calibration fluid or stream water may be influenced, resulting in an erroneous reading.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

As part of attending a Level 2 QA/QC workshop, specific conductance meters will be checked against a reference standard. Meters that cannot measure ± 10% of the reference standard will be replaced.

Level 2 and Level 3 workshop QA/QC is covered under a MoDNR QAPP (see Section 10.0).

10.0 REFERENCES

Missouri Department of Natural Resources, Quality Assurance Project Plan for Level 2 and Level 3 Volunteer Water Quality Monitoring.

Missouri Stream Team – Volunteer Water Quality Monitoring Program; Level 1 Volunteer Water Quality Monitoring Training Notebook, Chapter 2, Water Chemistry http://www.mostreamteam.org/Documents/VWQM/Level1_Notebook/04_Chapter2_Chemistry.pdf

Missouri Stream Team – Volunteer Water Quality Monitoring Program; Level 1 Volunteer Water Quality Monitoring Workshop PowerPoint Presentation, Water Chemistry http://www.mostreamteam.org/Documents/VWQM/Level1_PPT/Chapter%202%20–%20Water%20Chemistry.pdf

Table 1
Ranges of Conductivity in Missouri Streams and Rivers

Missouri River at St. Joseph	400-750 µS/cm
Grand River near Sumner (Plains)	350-550 µS/cm
Pomme de Terre near Polk (Ozarks)	250-450 µS/cm
Big Piney at Devil's Elbow (Ozarks)	200-350 µS/cm
Little Ditches near Rives (Bootheel)	85-580 µS/cm
Municipal wastewater treatment plant effluent	800-2000 µS/cm