



**MISSOURI STREAM TEAM
VOLUNTEER WATER QUALITY MONITORING PROGRAM
Standard Operating Procedure**

ORIGINAL EFFECTIVE DATE: November 28, 2017
RECERTIFICATION DATE:
SOP TITLE: MoST-VWQM-SOP: Temperature Measurement of Streams
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APPLICABILITY:	Applies to all Introductory, Level 1, Level 2, Level 3 and CSI trained Missouri Stream Team, Volunteer Water Quality Monitoring Program Participants
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1.0 SCOPE AND APPLICABILITY

Water temperature is important because most of the physical, chemical and biological characteristics of a river are directly affected by temperature. All aquatic organisms have preferred temperature ranges in which they can survive and reproduce optimally.

Temperature also has an important influence on water chemistry. Rates of chemical reactions generally increase with increasing temperature. Temperature is a regulator of the solubility of gases and minerals (solids) – or how much of these materials can be dissolved in water. The solubility of important gases, such as oxygen and carbon dioxide, increases as temperature decreases. In addition, certain pollutants become more toxic at increased temperatures. Temperature data is necessary to assist in interpretation of pH, dissolved oxygen, conductivity and ammonia; since these parameters are all influenced by water temperature (see applicable SOPs).

2.0 DEFINITIONS AND ABBREVIATIONS

°C – Degrees Celsius

CSI – Cooperative Stream Investigation

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

3.0 SUMMARY OF METHOD

The temperature method described in this SOP is used by the MoST, VWQM Program participants that have received Introductory, Level 1, Level 2, Level 3 or CSI Program training.

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 VWQM workshop.

6.0 SUPPLIES AND EQUIPMENT

The following equipment may be used to measure water temperature:

- Program provided alcohol filled thermometer
- Brightly colored string attached to thermometer (allows better visibility of thermometers left in place while completing other tasks)

7.0 PROCEDURE

1. Select a shady, shallow location in the waterbody to be measured.
2. Fully immerse the thermometer directly in the selected location of the waterbody.
3. Allow ample time for the thermometer reading to stabilize (at least 5 minutes).
4. Read the temperature without removing the thermometer from the water to avoid interference from ambient air and wind.
5. Record the temperature in °C on a VWQM field data sheet or field notebook.

8.0 SPECIAL CONSIDERATIONS

Replace the thermometer if the liquid inside contains bubbles.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Thermometers should be checked during each sampling event against the temperature reading of the Hach PocketPro temperature compensated pH meter. Discrepancies of ± 2 °C should be reported to the Stream Team program.

As part of attending a Level 2 QA/QC workshop, thermometers will be checked against a reference temperature probe. Thermometers not meeting ± 2 °C will be replaced.

Level 2 and Level 3 workshop QA/QC is covered under a MoDNR QAPP.

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

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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%20%20-%20Water%20Chemistry.pdf