Chloride Monitoring Volunteer Manual 2017

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1 Last updated February 3, 2017
I. Project Goal
The goal of the project is to determine if wadable streams of Wisconsin are experiencing acute or chronic chloride impairments by assessing specific conductance and chloride levels over time.

II. Volunteer Time Commitment
Volunteers must commit to attending a three-hour training in its entirety prior to beginning participation in this monitoring project. Once trained, volunteers should expect to monitor specific conductance monthly April to November, and at least twice a month, generally every other week, between December and March. In addition, if a target specific conductance is observed, volunteers are asked to monitor for chloride at that time and again daily for four consecutive days following that observation.

It takes approximately 10 minutes to calibrate the specific conductance meter at home. Once at the monitoring site, it takes about five minutes to conduct the monitoring. Volunteers must enter their data as soon as possible after collection to an online-accessible Department of Natural Resources’ database. It takes approximately five minutes to enter data once logged in to the site. Finally, volunteers must commit to mailing up to five water samples to the lab to be analyzed for chloride as soon as possible after completing the five consecutive days of sampling if the target specific conductance level is observed. All postage will be paid by the project sponsors, however, the volunteer will need to package the sample, print a mailing label and arrange for the package to be picked up by FedEx and/or delivered to a local drop off point for delivery.

We estimate the time commitment per volunteer to be about 20-30 hours per year if one site is monitored.

III. What is Monitored
The main parameters to be monitored are specific conductance and chloride. Specific conductance, a measure of how well water can conduct an electric current, is monitored in the field. Chloride is a key element used in traditional road deicing methods across the northern U.S. When it enters waterways in runoff, it can be toxic to aquatic organisms. Chloride concentrations are determined in a lab from water samples that are collected by volunteers and shipped to the lab. EPA and states have water quality standards based on chloride concentrations. Wisconsin’s acute chloride standard is 757 mg/L while the chronic standard is a four-day average of 395 mg/L.
mg/L. Neither value should be exceeded more than once every three years. Further, at least two observations of such chloride levels must be made within a three-year time period for the standard to be exceeded. Federal EPA standards are similarly defined. The acute standard of 860 mg/L should not be exceeded more than once every three years, and the four-day average concentration of chloride should not exceed 230 mg/L more than once every three years.

Specific conductance has been demonstrated to be a good surrogate for chloride in many situations. In fact, regional relationships between the two parameters have been developed based on volunteer monitoring at more than 100 sites across Wisconsin and Iowa. This allows for prediction of chloride levels when only specific conductance is monitored at any stream site in the state. Since specific conductance monitoring is more inexpensive than chloride monitoring, volunteers can keep an eye out for potentially troublesome levels of chloride by monitoring for specific conductance. If a target level of specific conductance is observed, a water sample can be collected and analyzed at the lab for chloride. Department of Natural Resource employees can then use the information to inform management decisions, such as whether waterbodies should be listed as impaired for chloride.

Specific conductance is measured in \( \mu \text{S/cm} \) (microSiemens per centimeter). This can also be written as mS/cm (milliSiemens per centimeter) when higher salt concentrations are present. When monitoring, volunteer monitors should use extreme caution to read the units displayed on the meter. The units on the meters used in this project switch automatically depending on the specific conductance level in the stream.

Specific conductance is expected to be higher in chloride-enriched waters as might occur during winter storms when roads are being salted and runoff enters nearby streams. Other ions – or salts – can also affect specific conductance levels, including phosphate, nitrate, magnesium, calcium, sodium, or potassium which may be present in urban, industrial or agricultural runoff. At lower specific conductance levels (less than 1540 \( \mu \text{S/cm} \)), these other ions tend to play a bigger role in affecting specific conductance. At higher specific conductance levels, chloride tends to be the dominant salt playing a role in affecting specific conductance levels in Wisconsin streams.
IV. Volunteer Duties and Monitoring Schedule

Sites to be monitored fall into two categories: new and follow-up. Each of these has slightly different monitoring schedules which are described below and in the tables on the following pages. **New sites** have not been monitored as part of this project in the past. The goal of monitoring these sites is to assess if specific conductance levels near or above target levels of concern are observed. **Follow-up sites** are those which have data suggesting possible water body impairments due to chloride (Table 2).

**Specific Conductance Monitoring**

Specific conductance monitoring will be carried out using a handheld meter (i.e., *Oakton ECTestr 11*). Prior to monitoring on each sampling date, volunteers should calibrate their ECTestr following procedures recommended by USGS and the manufacturer. These methods are described in detail in this volunteer manual. A calibration log should be kept for each meter and turned in to project staff annually. Note to volunteers who monitor at more than one location: calibration is not required between sites; it is only required between sampling dates.

**At new sites,** between April and November, volunteers should collect monthly specific conductance samples (Table 3). Between December and March, volunteers should assess specific conductance twice per month, about every other week (Table 3). During these winter months, occasional additional specific conductance monitoring may be triggered by real-time specific conductance measurements at nearby USGS-maintained continuous monitoring stations or by project coordinator observations of current weather conditions. For these triggered monitoring events, volunteer monitors will be notified by text message and/or email. Whenever possible, volunteers should monitor within 48 hours of receiving the notification.

**At follow up sites,** volunteers may opt to follow the same monitoring schedule as new sites, or they can use past results to inform when they monitor. For instance, if chloride levels have not been observed or predicted to be approaching acute or chronic chloride levels except during winter storm events or during a warm up period following a winter storm, volunteers might select to only monitor at such times. Volunteers can use Table 1 and/or previous years’ site reports as a guide for when chloride levels have been predicted or measured to be nearing chronic or acute levels. Reports are available at:

http://watermonitoring.uwex.edu/level3/UrbanRoadSaltReports.html
At both types of sites, if the volunteer observes that the target level of specific conductance has been met or exceeded, they should collect a water sample that may be analyzed at the lab for chloride. In addition, for follow-up sites being monitored for chronic exceedences (Table 1) the volunteer is requested to return to the site to monitor specific conductance on four consecutive days following that sampling date. On each occasion, they are asked to again assess specific conductance and collect a water sample for chloride analysis if specific conductance remains at or above the target level.

**Chloride Monitoring**
Water samples to be analyzed for chloride will be delivered to the Wisconsin State Lab of Hygiene in Madison.

At new sites, a water sample to be analyzed for chloride should only be collected when specific conductance at the site is at or above 3200 µS/cm. The goal for first year sampling is to identify the range of specific conductance levels observed and to assess for acute chloride exceedences. Please contact Kris Stepenuck or Jeanne Scherer to set up new stations in the SWIMS database.

At follow-up sites, if an acute chloride exceedence has not been previously documented with a lab-analyzed chloride sample, this will be indicated in Table 1. For these sites, the target specific conductance at which to grab a water sample for chloride analysis is 3200 µS/cm.

In addition, Table 1 lists stations (grouped by assessment unit) at which chronic exceedences have been observed. These are highest priority to monitor in 2015, but any site can be monitored. Table 2 indicates the target specific conductance levels at which to collect water samples for chloride analysis. These vary based on geographic location. If, on any site visit, specific conductance meets or exceeds the target level for your area, please collect a water sample to be analyzed for chloride and return to the monitoring location 24 hours later. At that time, again monitor specific conductance; if it still meets or exceeds the target level, collect another water sample to be analyzed for chloride. Repeat this process for a total of five consecutive days. If on any of the days the specific conductance drops below the target level, you need not return the following day(s) unless triggered due to weather or if it is your regular monitoring day. A water sample collected at the acute target level can serve as the first of five days of consecutive samples to support presence of a chronic chloride exceedence.
Since chronic levels of chloride must be maintained for four consecutive days to exceed the standard, if specific conductance falls below the target level on any of the days, our assumption is that chloride has also fallen below the standard. However, please submit any water samples you did collect to the lab for analysis. Any sample in exceedence of the water quality standards is sufficient to demonstrate chloride impairment.

Table 1. Follow-up sites at which Wisconsin acute (797 mg/L) and chronic chloride levels (395 mg/L) have been previously observed or predicted on at least one occasion. Stations within the same table cell are in the same assessment unit. Data to confirm acute and/or chronic chloride exceedences are only needed from one station within an assessment unit.

<table>
<thead>
<tr>
<th>Urban Area</th>
<th>Station Name (Station ID)</th>
<th>Previous Chronic Exceedence(s)</th>
<th>Acute Exceedence Sample Needed?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black River Falls</td>
<td>Robinson Creek DS HWY 27 (10039117)</td>
<td>Winter*</td>
<td>No</td>
</tr>
<tr>
<td>Eau Claire</td>
<td>Little Niagara Creek at UWEC Campus (183137)</td>
<td>Winter</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Sherman Creek at Race St (10034891)</td>
<td>Winter</td>
<td>Yes</td>
</tr>
<tr>
<td>Fox Valley</td>
<td>Campbell Creek at Witzel Ave (10034848)</td>
<td>Winter &amp; Spring**</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>• Mud Creek at CTH BB (453258) OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Mud Creek at Spencer St (10011423)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neenah Slough at Cameron (10031789)</td>
<td>Winter</td>
<td>Yes</td>
</tr>
<tr>
<td>Madison</td>
<td>Badger Mill Creek at Bruce St (10011965)</td>
<td>Winter</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Cadwallader Washburn Spring (10036931)</td>
<td>Winter</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>• Pheasant Branch at USH 12 (133315) OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Pheasant Branch DS of Century Ave at foot bridge (10033405) OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• N. Br. Pheasant Branch DS of pond at Deming Way (10032762)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• E. Br. Starkweather Creek at Commercial (10032759) OR</td>
<td>Winter</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• E. Br. Starkweather Creek at Milwaukee (133076) OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Starkweather Creek at Atwood Ave (USGS station) (10034910)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>W. Br. Starkweather Creek at Daley Dr (10034911)</td>
<td>Winter</td>
<td>No</td>
</tr>
<tr>
<td>Menomonie</td>
<td>• Galloway Creek at 3rd St (10037540) OR</td>
<td>Winter</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Galloway Creek at 9th St (10039077) OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Galloway Creek at Red Cedar River (10037920)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Jarrett Creek 10m US Middle Branch (10041498) OR</td>
<td>Winter (except Spring too at site above Lake Menomin)</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Jarrett Creek 100m US Lake Menomin (10038741) OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Jarrett Creek at Schneider Ave (10039038) OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Jarrett Creek E. Br., 10m US main branch (10041500) OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Jarrett Creek Middle Br., 10m US main branch (10041499)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban Area</td>
<td>Station Name (Station ID)</td>
<td>Previous Chronic Exceedence(s)</td>
<td>Acute Exceedence Sample Needed?</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
<td>-----------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>Milwaukee</td>
<td>Hoods Creek at Brooks Rd (523106)</td>
<td>Winter</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Kinnickinnic River at 11th St (413817)</td>
<td>Winter and Spring</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Lily Creek at Good Hope Rd near Menomonee Falls (10032538)</td>
<td>Winter</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Lincoln Creek at Sediment Trap /46th St (413806)</td>
<td>Winter</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Little Menomonee River 100ft DS HWY 45 (10032751) OR</td>
<td>Winter</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Little Menomonee River at W Leon Terr (10031614)</td>
<td>Winter</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Oak Creek US of 15th Ave, N of Beech St (413913)</td>
<td>Winter</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Root River at Grange Ave (CTH HH) (413716) OR</td>
<td>Winter and Spring</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Root River at Layton Ave (10031473) OR</td>
<td>Winter and Spring</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Root River at Puetz Rd (10032787)</td>
<td>Winter and Spring</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Ulao Creek at Hwy 60 East of Hwy 43 (10028775)</td>
<td>Winter, Spring, &amp; Fall***</td>
<td>No</td>
</tr>
<tr>
<td>Racine-Kenosha</td>
<td>Pike Creek – 41 (10010491)</td>
<td>Winter</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Pike River along Pike River Pathway at intsn of Lannon Terr and Oakes Rd (10034958)</td>
<td>Winter and Spring</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Pike River Along the Pike River Pathway S side of 1st walking bridge crossing river (10034959)</td>
<td>Winter</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Pike River N of mouth to Lake Michigan (10034962)</td>
<td>Winter and Spring</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Pike River West side of walking bridge at middle entrance to Carthage College (10034957)</td>
<td>Winter and Spring</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>• Pike River at CTH A (10010400) OR</td>
<td>Winter and Spring</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Pike River South side of first bridge at northern entrance to Carthage College (10034956) OR</td>
<td>Winter and Spring</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Pike River south side of walking bridge (10034960) OR</td>
<td>Winter and Spring</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Pike River W side of CTH E btwn CTH Y &amp; Sheridan Rd (10034955) OR</td>
<td>Winter and Spring</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Pike River W of first bridge on CTH Y north of CTH E (10034954)</td>
<td>Winter and Spring</td>
<td>No</td>
</tr>
<tr>
<td>Waukesha</td>
<td>Meadow Brook at CTH SS (10030297)</td>
<td>Winter</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>• Pewaukee River at Capitol Dr crossing near Village Park (10029788) OR</td>
<td>Winter</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Pewaukee River at STH 164 (683228)</td>
<td>Winter</td>
<td>No</td>
</tr>
</tbody>
</table>

*Winter sampling was conducted between December and March.
**Spring sampling during which exceedences were observed was conducted in April and May.
***Fall sampling during which exceedences were observed was conducted in September and October.
Table 2. Follow-up sites target chronic and acute specific conductance levels. These are the levels at which to collect water samples if they are needed.

<table>
<thead>
<tr>
<th>Urban Area</th>
<th>Target Chronic Specific Conductance (µS/cm)</th>
<th>Target Acute Specific Conductance (µS/cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black River Falls</td>
<td>≥1550</td>
<td>≥3200</td>
</tr>
<tr>
<td>Eau Claire</td>
<td>≥1800</td>
<td></td>
</tr>
<tr>
<td>Fox Valley</td>
<td>≥2100</td>
<td></td>
</tr>
<tr>
<td>Madison</td>
<td>≥2100</td>
<td></td>
</tr>
<tr>
<td>Menomonie</td>
<td>≥1800</td>
<td></td>
</tr>
<tr>
<td>Milwaukee</td>
<td>≥2100</td>
<td></td>
</tr>
<tr>
<td>Poynette</td>
<td>≥1800</td>
<td></td>
</tr>
<tr>
<td>Racine / Kenosha</td>
<td>≥1800</td>
<td></td>
</tr>
<tr>
<td>Waukesha</td>
<td>≥2100</td>
<td></td>
</tr>
<tr>
<td>Other areas of the state</td>
<td></td>
<td>≥2100</td>
</tr>
</tbody>
</table>

Table 3. Monitoring Schedule

<table>
<thead>
<tr>
<th>Chloride Grab Samples</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New sites</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Acute:</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Up to one sample</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Follow-up sites</strong></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td><strong>Acute:</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>If an acute exceedences has not been previously confirmed (see Table 1), up to one sample collected if specific conductance is recorded to be 3200 µS/cm or higher.</td>
<td></td>
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<tr>
<td><strong>Chronic:</strong></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to five samples</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>collected and submitted to the lab if specific conductance initially meets and remains at or above a target specific conductance level (see Table 2) for five consecutive days. (Note: Additional samples may be collected but then not be submitted to the lab if specific conductance falls below the target level during the five-day period.)</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specific Conductance Monitoring</th>
<th>New sites</th>
<th>New sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twice per month (about every other week) plus triggered monitoring</td>
<td>Monthly monitoring</td>
<td></td>
</tr>
<tr>
<td><strong>Follow-up sites</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Follow new site monitoring schedule or use past monitoring results as a guide for when to monitor (see Table 1). Carry out 5-day consecutive monitoring if 3200 µS/cm or chronic target conductance level (see Table 2) observed.*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Note: Once lab results confirm acute and chronic chloride exceedences, sampling at the site can cease as sufficient data have been collected to address Department needs.
V. Oakton ECTestr 2-point Calibration Set-up

Your meter should come to you set up to conduct 2-point calibration. However, we provide these instructions in the event that for some reason it is not set up for you. After you follow steps 1-4 below, your meter will be set up for 2-point calibration unless you change it. You will not have to repeat steps 1-4 each time you calibrate.

1. Turn meter off, press and hold ‘INC’ (see figure below) while turning meter back on.

![INC button](image)

2. Meter should say ‘ACAL’ on bottom of screen while flashing ‘no’. Press ‘HOLD/ENT’ to accept.
   
   **Note:** If ‘ACAL’ flashes ‘yes’, press ‘INC’ to change to ‘no’, then press ‘HOLD/ENT’ to accept.


4. Your meter should now be ready for 2-point calibration.
VI. Oakton ECTestr 2-point Calibration Procedure

1. **Record date, time and calibration analyst’s name on the 2-point calibration log.**
2. Unscrew and remove cap from top of the meter as well as the protective cap on the probe.
3. Turn the meter on.
4. Make sure tester is in measuring mode (MEAS will appear in the upper left corner of the screen).
5. Rinse electrode with high standard (10,000 µS/cm which can also be written as 10 mS/cm) THREE times in 30 ml Nalgene jar, pouring out standard into waste tray between each rinse.
6. Fill 30 ml Nalgene jar with high standard a fourth time.
7. Fully submerge probe in 30 ml Nalgene jar with standard and swirl gently to create a homogenous sample and allow reading to stabilize.
   **Note:** Upper reading displays measured conductivity reading, lower reading displays temperature.
8. **Record measured specific conductance reading (make sure to record units) under ‘initial reading’ on calibration log under appropriate standard.**
9. **Record temperature.**
10. Keeping the probe submerged in solution, press the ‘INC’ button to enter calibration mode (see figure below). ‘CAL’ should appear on the screen and briefly show the number of points the tester will calibrate. (Notice the meter now says ‘2.PNT’ instead of ‘1.PNT’. If it does not say ‘2.PNT’, repeat steps 1-4 in calibration set-up section above.)
   **Note:** Upper reading displays measured conductivity reading, lower reading displays default uncalibrated conductivity reading.

![INC and DEC buttons]
11. If value on meter does not match standard, use the ‘INC’ or ‘DEC’ to correct the conductivity value to the calibration solution. Once the meter has been corrected, the screen displays confirmation, ‘CO’ and returns to measuring mode. **Note:** If you do not press INC or DEC within 5 seconds, the tester shows confirmation, ‘CO’ and returns to measuring mode. The tester is not calibrated to new values if this has happened. Repeat steps 10-11 to calibrate.

12. **Record measured specific conductance reading (make sure to record units) under ‘adjusted reading’ on calibration log.**

13. If the calibrated specific conductance value for the 10,000 µS/cm (10 ms/cm) standard is outside the range of 9667-10333 µS/cm (9.7 – 10.3 mS/cm) recalibrate the meter by repeating steps 10 and 11. Note this occurred and record results on the next row in your calibration log.

14. Rinse probe with distilled or deionized water THREE times.

15. Repeat steps 5-14 with low standard (1413 µS/cm). Note: Set meter to 1410 µS/cm when calibrating using this standard.

16. If the calibrated specific conductance value for the 1413 µS/cm standard is outside the range of 1366-1460 µS/cm, recalibrate the meter with this standard. Note this occurred and record results on the next row in your calibration log.

**Check Measurement with Deionized or Distilled Water:**

17. Rinse probe with distilled or deionized water THREE times.

18. Fill 30 ml Nalgene jar with distilled or deionized water. Fully submerge probe in 30 ml Nalgene jar with water and swirl gently to create a homogenous sample and allow reading to stabilize.

19. **Record measured specific conductance reading (make sure to record units) under ‘distilled or deionized water’ on calibration log. (This measured specific conductance should be zero.)**

20. **Record temperature.**
VII. Field Sampling Methods

Prior to monitoring, calibrate ECTestr following procedures listed above. At the monitoring site:

1. Ensure your site is safe to access. If snow, ice, traffic or other conditions threaten your safety in any manner DO NOT MONITOR. Your safety is of utmost importance in this study.

2. Record collector name(s), date, and start time on data sheet.

3. Record if the sampling event is “primary” (scheduled), “triggered” (when you have been alerted to possible high chloride or specific conductance levels in your area), or “other” on data sheet.

4. Record if the stream is ice covered (Yes or No). Choose “Yes” if the stream is open in areas, but you are unable to sample due to safety concerns. If you indicate that the site is ice covered, this is all you need to do at the site on this date. Your safety is most important.

5. Put on appropriate disposable, powderless gloves.

6. Attach the “ISCO” sample collection bottle to the pole sampler using the large rubber band.

7. Insert rubber stopper with vent tube into sample bottle opening.

8. Partially fill and rinse the sample bottle with the stream water to be sampled (rinse water).
   Avoid getting bottom sediment/sand in the rinse water.

9. Shake or swirl and then drain the rinse water from the sample bottle.

10. Repeat this rinsing process three times.

11. If a water sample is being collected for delivery to the lab for chloride analysis, rinse the lab bottle three times with stream water at this time as well.

12. To collect the sample to be measured, lower the field-rinsed sample bottle slowly down through the water column, being careful to avoid making contact with the streambed. Raise the sampler at the same rate up through the water column, and lower again as needed until sampler is filled.

   This method is used to minimize collection of water at the surface of the stream and to avoid stirring up sediments at the bottom of the stream, both of which could affect specific conductivity, chloride, and/or BOD/COD measurements.

13. Inspect the sample after it is collected, looking for the presence of anomalously large amounts of particulates that might have been captured because of excessive streambed

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2 These methods were adapted from the following USGS guidance documents: http://water.usgs.gov/owq/FieldManual/chapter4/pdf/Chap4_v2.pdf and http://water.usgs.gov/owq/FieldManual/chapter3/final508Chap3book.pdf
disturbance during sample collection. If you note any large particles, discard the sample, making sure there are no residual particulates left in the container, and resample.

14. Turn on the ECTestr and dip its electrode into the remaining sample in the ISCO sample collection bottle, making sure the sensor is fully immersed and stirring slowly. Once the reading stabilizes, read and record specific conductance and temperature on the data sheet. The **HOLD button can be pressed** to freeze the display to ensure you have read displayed units and results correctly. It is **highly recommended** that you use this function of the meters to assist you. Note: If meter goes to error message due to cold temperatures, record the last temperature and specific conductance value displayed, if known.

15. Once you know the specific conductance in your sample, you can decide if you will collect a water sample to be shipped to the lab for chloride analysis. Remember if you are monitoring a new site to this project, you want to collect samples to be analyzed for chloride only if specific conductance meets or exceeds 3200 µS/cm. If you are monitoring a follow-up site, you have defined levels of specific conductance at which to collect water samples to be analyzed for chloride (Table 2).

16. **If collecting a water sample to be analyzed for chloride at the lab:**
   a. **On the data sheet,** indicate “yes” that a chloride grab sample will be collected. Also record the “Point/Outfall number (SWIMS Fieldwork Seq No).” This is located about halfway down the “Test Request – Inorganic Surface Water & Microbiology” form, or the “lab slip” (see sample lab slip on the next page).
   b. **Label the bottle** with site name, date, and “Field Number (Bottle Label ID)” from the lab slip.
c. **On the lab slip**, fill in the “Date and Time of Sample Collection” and the “Who collected the sample” fields. **Do not fill in any other fields on the lab slip.** Note: Each sample collected should have a separate lab slip. Lab slips will be provided via USPS mail or during training. *Never reuse or alter lab slips.* Each sample that is sent to the lab must have a unique lab slip number, and each lab slip contains site-specific information, thus you should *never* modify them.

17. Once you have labeled the bottle and the lab slip, fill the lab-provided bottle by pouring some of the sample from the ISCO sample collection bottle into it. Cap the sample and set it aside.

18. Record air temperature (° C) on your data sheet.

19. Rinse the pole sampler, sample bottle and stopper with deionized water (DIW).

20. Use detergent to clean the sampler between DIW rinses if excessively contaminated.
VIII. QA/QC—Duplicate samples

To ensure the accuracy and precision of the field data collected by volunteers 10% of the grab samples to be collected and analyzed for chloride will be chosen each year to participate in collection of quality assurance/quality control (QA/QC) samples. The samples are randomly selected from the list of stations that are monitored.

Two types of QA/QC samples will be collected: field blank and field replicate (duplicate) samples. Project coordinators will let you know if your site(s) have been selected at random for QA/QC sampling.

The result of this additional sampling is that you will be mailing a total of three water samples to the lab following one of your site visits: one regular sample, one duplicate, and one blank. Each sample should be placed in a separate Ziploc bag inside the box in which you ship them.

Please prepare this sample at the same time as your regular samples, as follows: Collect a second sample from the same location following the directions in Section VI of this manual. Label the bottle with site name, date, and Point or Outfall number associated with lab slip for the duplicate sample. Also write “DUPLICATE” on the bottle after the lab slip number. Find the lab slip you were provided that is pre-marked with the word “DUPLICATE” near the upper right corner, fill the required fields, and place in the Ziploc bag containing lab slips before shipping.

IX. QA/QC—Blank samples

Please prepare this sample after the collection of your regular samples, as follows: Rinse a lab-provided sample bottle three times with distilled water and then fill it with distilled water and cap. Label the bottle with site name, date, and Point or Outfall number associated with lab slip for the blank sample. Also write “BLANK” on the bottle after the lab slip number. Find the lab slip you were provided that is pre-marked with the word “BLANK” near the upper right corner, fill the required fields, and place in the Ziploc bag containing lab slips before shipping.
X. **Delivery of Samples to the Lab**

Madison area volunteers should deliver their samples to Kris Stepenuck or to the Wisconsin State Laboratory of Hygiene (2601 Agriculture Drive Madison, WI 53718).

Volunteers in other areas of Wisconsin should contact Kris Stepenuck or Jeanne Scherer to obtain a prepaid shipping label via e-mail or to obtain a prepaid USPS flat rate shipping box.

All samples must be *analyzed* within 28 days after sampling. The lab is not open on weekends, and these samples have lesser priority than any drinking water health-related samples the lab receives. Thus, **please plan to ship your samples as soon as possible after collecting them** to ensure this time requirement is met.

XI. **Submitting Data**

After each stream-monitoring event, someone (only one person, please) must enter your team’s data into SWIMS. SWIMS is the acronym for the Wisconsin Department of Natural Resources (WDNR) Surface Water Integrated Monitoring System database. This database is available to biologists across the state of Wisconsin and is an integral part of how the Water Action Volunteers (WAV) Stream Monitoring data are communicated to those individuals working on various water quality issues on rivers and streams in Wisconsin.

All volunteers are encouraged to view and explore the data available in SWIMS. Occasional online trainings are held to introduce citizens to searching the database. If this is of interest to you, contact the WAV program staff.

Any volunteer who wishes to enter, edit, or view data must follow steps described in detail on the following pages to initially obtain a username and password for access, and then to learn how to enter, edit or view data in the database.

A. **How to Get a WAMS User ID and Password**

Volunteers need a User ID and Password to enter and edit data using the SWIMS database on an internet-connected computer. The State of Wisconsin established the Wisconsin Web Access Management Systems (WAMS) to allow access by authorized individuals to State forms and databases available through the Internet. The simple self-registration procedure creates a
personal Wisconsin Login Account ID that allows you access to SWIMS. If you already have a
WAMS ID, you can use this ID to access the SWIMS database. If you do not already have a
WAMS ID, follow the directions below.

NOTE: Your web browser should be Microsoft Internet Explorer version 5.5 or higher.
For more information on the purpose of WAMS, their web site and account management
tips see Appendix A.

1. Access on.wisconsin.gov

   Click open your Microsoft Internet Explorer browser and type in the URL:

   https://on.wisconsin.gov/WAMS/home
2. **Access WAMS**

Use the vertical scroll bar on the right-hand of the screen to move down the page if necessary. Click on the **Self-Registration** (Request a Wisconsin User ID and Password) link as shown below.

3. **Accept User Acceptance Agreement**

The next screen is the WAMS **Self-Registration** screen. The screen explains the WAMS registration process. Scroll down and read the State of Wisconsin Web Access Management System User Acceptance Agreement. Click on the **Accept** button at the bottom of the page to move to the next screen.
4. **Complete the Profile Information**
   Fill in your name and email in the Profile Information section.
   
   NOTE: Only fields with a Red * next to them are required. There is a bug with entering postal addresses. We suggest **leaving the address blank**. Addresses for volunteers are kept separately in the SWIMS database system. We will have your address in the SWIMS database if you have already given it to us (during your training, for instance).

5. **Create your User ID and Password**
   Enter the requested information in the Account Information section including a User ID and Password (both of which you pick), and your personal e-mail address. See Appendix A for tips on Passwords.
   
   NOTE: You can click on the printer icon on your tool bar to print out a copy of this screen if you wish to retain a record of your User ID and Password for future reference. Be sure to record your User ID and Password, and keep this information in a handy but secure location.

   Click on the Submit button.
6. Open Your Personal E-mail Account and Log In

Open your personal e-mail account. Check your mailbox for a message from “Wisconsin.gov” thanking you for registering with the State of Wisconsin Web Access Management System (WAMS).

Open the email and click on the link in the e-mail. **You must complete this final step within four days of receiving the message**, or you will need to repeat the registration process.

7. Log-in to WAMS with Your New User ID and Password

When you click on the Web link in the e-mail message from “Wisconsin.gov”, it will take you back to the WAMS web site. You will see the WAMS Account Activation - Final Step screen. Log in your User ID and Password again in the Account Activation Screen, and click on the **Login** button. You will receive your final e-mail message that your self-registration is complete. Now you have completed the WAMS registration process and you can exit the WAMS web site.
8. **Use your WAMS ID to register for SWIMS access**

Now that you have your WAMS ID, it’s time to visit the SWIMS page to complete your monitoring registration for SWIMS access.

Go to: [https://dnrx.wisconsin.gov/swims](https://dnrx.wisconsin.gov/swims)

Enter your WAMS User ID and Password and click the "Sign In" button.

This form will appear:

![Surface Water Integrated Monitoring System (SWIMS) Form](image)

Complete the boxes at the top with your name and email address. Next, check any and all boxes that apply to the type of monitoring projects you are currently involved in (e.g., Citizen Lake Monitoring, Project Riverine Early Detectors, etc.).

In the first box at the bottom of the form please enter the following:

- The **name(s) of your monitoring site(s)**
- Each site’s **Station ID**, if known

In the **Other Comments** box at the bottom, enter your responses to these two questions:

1. Are you a WAV volunteer monitor or a WAV local coordinator?
2. Are you doing WAV Level 1, 2 AND/OR 3?

**Troubleshooting**

If the form does not pop up automatically on your first log in, even though your log in appears successful, there may be a problem. Please email Jeanne Scherer at [Jeanne.scherer@wisconsin.gov](mailto:Jeanne.scherer@wisconsin.gov) for assistance.
B. How to Enter Your Data into SWIMS

1. Login to SWIMS
   a. Using Internet Explorer navigate to: https://dnrx.wisconsin.gov/swims
   b. Type your WAMS User ID and Password and click Sign In

2. Click the Submit Data tab.

3. Click the Add New link.
   Note: Use the View List link if you wish to view or edit previously entered data.
4. Select the project and then the station.

   a. The project you should select from the Project dropdown list will be called “Urban Road Salt Study” followed by the name of your urban area.

   b. Select the station for which you wish to enter data from the Station dropdown list. If your monitoring location is not listed in the drop down Station list, please do not enter your data at this time and instead contact your project leader or the WAV data manager to get your SWIMS account assigned to the correct station(s).

5. Select or create your group of Data Collectors.

   If the correct list of data collectors is not in the list, contact your project leader or the WAV data manager to get the correct collectors added to the dropdown menu.

6. Click the Select Date button to enter the Start Date (mm/dd/yyyy).

7. Enter the Time that you started your data collection work.

   SWIMS requires the start time information for all monitoring data. Be sure to enter AM or PM, also. Note: 12 NOON is 12:00 PM.
8. Select the Urban Road Salt form.
The Urban Road Salt form should already be selected. If it is not, select it from the drop down list. If it is not available, you will need to contact the WAV Data Manager to correct this before you will be able to enter your monitoring data.

[SKIP] Do not enter the Latitude and Longitude.

The location of your monitoring site is already established in SWIMS.

If you do check this box, you will get the following form which allows you to enter additional comments about the location of this monitoring event.
9. **Enter the End Date and Time.**
   This is the date and time that you completed your monitoring work.

10. Add any **Comments** you recorded from your field data sheet.

11. Click **Next** to go to the field work data entry screen.

12. Enter your monitoring data in the **Result** column.
   Enter the values recorded for each measured parameter from your data sheet. Conductivity results should be reported in μS/cm. **Important:** If your meter auto-switched to mS/cm, convert to μS/cm before entering in SWIMS.

    1mS/cm=1000μS/cm. If your meter displayed a value of 2.4mS/cm, move the decimal to the right 3 spaces and record 2400μS/cm on the SWIMS form.

    If your site is ice covered and you cannot sample, fill out form through “Ice Covered Water”.

13. Save your monitoring data.

You have three options to save your data, depending if you have results from only one site and date to report or if you have multiple sites and/or dates from which to report data.

a. Click **Save and Return to List** to enter data for other sites.

   If you choose this option, you will see a list of all data you have entered for your sites.

b. Click **Next Date** to enter other data for same site.

   If you have data for several dates at the same site, choose this option.

c. Choose **Next Station** to enter data for a different site on the same date.

A. How to Edit Your Monitoring Data

1. Login to SWIMS at: [https://dnrx.wisconsin.gov/swims](https://dnrx.wisconsin.gov/swims)
2. Click the **Submit Data** tab.
3. Click **View List**.
4. Click the pencil **✏️** for the date you want to edit.
5. You can edit comments, etc. on the first page, then click **Next**.
6. You can edit results on this screen.
7. Click **Save and Return to List** to save your changes.

B. How to View Monitoring Data

1. Login to SWIMS at: [https://dnrx.wisconsin.gov/swims](https://dnrx.wisconsin.gov/swims)
2. Click the **Submit Data** tab.
3. Click **View List**.
4. Click the magnifying glass **🔍** to View previously entered data.